# BEARING CATALOGUE



RKB
BEARING INDUSTRIES
SWITZERLAND

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RKB BEARING INDUSTRIES SWITZERLAND

# Introduction



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RKB
BEARING INDUSTRIES

# Introduction

## RKB: the Swiss premium class bearing manufacturer

The RKB Bearing Industries Group, a Swiss-based manufacturing organization, has been a key player in the bearing industry since 1936.

Leveraging decades of experience, RKB possesses the specialized knowledge and skills required to design and produce industrial bearings from 1 mm bore diameter to over 2.000 mm outer diameter.

With a global distribution footprint reaching over 70 countries, RKB provides value-driven solutions characterized by impressive operational adaptability, top-tier services, huge stock reserves, quick shipping times, and the hallmark quality expected of a premium bearing provider.



RKB Rolling bearings

## RKB Group milestones

- *1936*

RKB traces its roots back to the passion and commitment of the Colleoni family to building a reliable source for high quality rolling bearings and bushings for industry

- *1960*

The economic boom of 1960's led Mr. Gianni Colleoni to establish a new and modern facility of 9.000 sqm to expand operations

- *1978*

RKB starts a close cooperation with technological partners to exchange manufacturing expertise in overseas projects

- *1996*

RKB embraces the new challenges of the global economy by establishing the RKB Group along with a bunch of branch offices in the world

- *2001*

RKB management establishes two new production facilities: RKB LN Plant and RKB MS Plant

- *2007*

RKB T3 Plant celebrates official opening, encompassing an area of 56.000 sqm

- *2014*

RKB acquires 40.000 sqm of new property for the new T4 Plant. RKB MS Plant relocates to a new site of 8.000 sqm

- *2016*

RKB opens two new branch offices: RKB SSC in Romania and RKB Latam in Mexico

- *2018*

RKB opens a new branch office in Canada with adjoining warehouse

- *2020*

RKB starts RKB MENA with bearing stock to serve UAE and adjacent countries

- *2022*

RKB establishes RKB Wälzlager, a new local branch located in Oer-Erkenschwick, Germany

- *2024*

RKB launches two new branch offices: RKB Indonesia and RKB Balkans in North Macedonia. In addition, RKB Sudamericana, a new enterprise with a large, modern bearing storage facility designed to swiftly serve all American countries, opens in Panama

## Deep knowledge of all major industries

Born as a niche supplier of rolling bearings and bushings, at present the RKB Group serves a ***full range of industries all around the world***, having developed specific knowledge and expertise in each of them. Understanding the unique attributes and requirements of every industry is at the base of RKB's manufacturing and marketing philosophies. After thousands of ***successful*** cases of collaboration with ***leading OEM and MRO*** customers in different fields, RKB has gained an unparalleled ***bearing knowledge***. From shipbuilding to offshore oil platforms, from steelmaking to metalworking, from excavators to tunnel boring machines, from lifting bridges to power transmission applications, from home appliances to giant gearboxes for wind turbines, from heavy automotive to off-highway applications, RKB can point to a history of ***real gains*** in all major industries. Thorough understanding and ***first-hand experience*** in designing, R&D, and manufacturing technology are at the base of RKB's success in every industrial sector.

## A unique source for industrial bearings

The challenge of RKB is to offer, as a unique and ***reliable source, a complete portfolio*** of innovative high quality rolling bearings, ranging from miniature to extra-large sizes. RKB rolling bearings are manufactured in ***conformity with ISO, ANSI/ABMA or GOST*** standards or according to customer's special requirements. Naturally, customers are supported by RKB's Technical Department in the selection process of the most adequate bearing for their specific applications.

## Special solutions for special applications

RKB is actively engaged in the development, management and oversight of hundreds of special projects worldwide to support clients in the implementation of ***original and customized bearing solutions*** for their applications.

Collaborating with OEM and MRO companies, RKB can develop the best technical proposals in order to ***meet customer requirements*** in terms of specifications and rolling bearing performance.

## Organizational efficiency and flawless production

Since its foundation, the RKB Group has been following a ***Total Quality Approach*** devoted to increasing organization efficiency and safeguarding product quality. RKB Executive Headquarters and manufacturing facilities have ***ISO certifications*** in quality, environment, and occupational health and safety, which are a mark of distinction and well emphasize the commitment of the Group to sustaining rigorous standards of quality throughout the value chain.



Quality control with CMM

## Advanced technology with a focus on flexibility

RKB's business model is based on the concept of a ***vertically integrated system***, according to which all main phases of the production chain are managed within company perimeter. Through the ***effective control*** of every manufacturing step, RKB ensures the quality of its products. RKB is continuously updating its production processes to optimize investments in equipment and to exploit the latest technical and engineering developments. RKB's manufacturing strategy is supported by the R&D Department, which constantly develops ***new technologies and techniques*** to increase product reliability, production flexibility and environmental sustainability. RKB's innovative business model can respond quickly to all supply requests, even in small or medium batches.

Finally, the wide use of smart in-line systems for ***tighter control of manufacturing processes*** efficiently reduces waste and production allowances and variations, resulting in enhanced overall quality and precision.




Multi-axis CNC machine

## Technical assistance at customer's site

*Application engineering*

RKB's Technical Team Unit (TTU) is the division of the Technical Department that offers ***technical assistance*** directly at customer's site. The Unit is made up of skilled application engineers and experienced mechanic assistants that feature:

- ***bearing mounting supervision***
- ***condition monitoring*** services, including visual, shock and vibration analysis
- ***training*** with maintenance and technical staff, focusing on lubrication and correct mounting and dismounting procedures

*Reverse engineering*

Through the process of reverse engineering, RKB's Technical Team Unit can ***deduce decisions from end products*** in applications which have incomplete or obsolete documentation. The experience of RKB TTU is instrumental in solving ***machine and bearing design problems*** starting from little or no knowledge about the original components installed in the application. The analysis of the current mechanical design and operating conditions can also led to recommended ***structural improvements***, optimizing the overall performance.

*Asset lifecycle solutions*

In today's business scenario, the effective management of assets throughout their lifecycle is crucial to deliver ***value-added solutions***, improve productivity and reduce total costs. ***BSS (Bearing Service and Solutions)*** is the 360° proposal worked out by RKB to support customers over the entire lifecycle of the asset, from early consultancy services to after-sales maintenance. BSS aims to maximize the mechanical performance of the customer's application, creating ***synergies*** between RKB and the customer's knowledge and experience.

## Training and seminars

Training is a cost-effective investment that yields ***higher productivity and increased efficiency***. For this reason, RKB's Technical Department can offer a comprehensive and ***customizable portfolio of seminars***, featuring highly skilled experts in the bearing industry.

The attendees of the training courses, which may take place both in RKB Headquarters and at the customer's plant, will increase their ***knowledge*** on the most significant bearing-related topics, thus improving their working efficacy.

## Huge stock of standard and special bearings

RKB believes that stock availability is a crucial function for a world class bearing manufacturer's consistency, market presence and brand awareness.

The RKB Group has one of the ***largest stocks*** of rolling bearings worldwide. With over ***6.000 part numbers*** ranging from small to extra-large sizes, the current stock reflects the long standing experience and international vocation of RKB to support customers in a variety of industries worldwide.

Naturally, besides a well-stocked warehouse in terms of bearing ***variety and availability***, a strong logistics organization is strictly necessary to efficiently serve the international market.

For this reason, all RKB stocks around the world are run by a proprietary software system (***ASSM - Active Stock System Management***) that optimizes lead time and drastically decreases machine downtime for the customer.

## Global logistics network

The RKB Group can rely on a series of modern ***logistics hubs*** in the world's most ***strategic areas***:

- ***Switzerland*** central hub: ***15.000 sqm*** to deliver bearings to overseas countries
- ***Italy*** hub: ***14.000 sqm*** to deliver bearings to European Union countries and Turkey
- ***Romania*** hub: ***2.500 sqm*** to deliver bearings to East Europe countries
- ***India*** hub: ***2.000*** sqm to deliver bearings to Indian market

## Strong brand identity

RKB has an ever growing ***network of local warehouses*** directly run in cooperation with its regional partners to ensure proximity and fast delivery. Naturally, all storage areas are under controlled environmental conditions to guarantee ***perfect conservation of the bearings***. Besides, RKB's highly specialized packaging, specifically created to protect the bearings in unfavorable conditions, is easily recognized and ensures ***brand identity all over the world***.



Central logistics hub in Switzerland

# Standards

| Standard | Description |
|---|---|
| ISO 286-1, -2 | Geometrical product specifications (GPS) -- ISO code system for tolerances on linear sizes |
| | Part 1: Basis of tolerances, deviations and fits |
| | Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts |
| ISO 1101 | Geometrical product specifications (GPS) -- Geometrical tolerancing -- Tolerances of form, orientation, location and run-out |
| ISO 1132-1, -2 | Rolling bearings -- Tolerances |
| | Part 1: Terms and definition |
| | Part 2: Measuring and gauging principles and methods |
| ISO 2768-1, -2 | General tolerances |
| | Part 1: Tolerances for linear and angular dimensions without individual tolerance indications |
| | Part 2: Geometrical tolerances for features without individual tolerance indications |
| ISO 8826-1, -2 | Technical drawings -- Rolling bearings |
| | Part 1: General simplified representation |
| | Part 2: Detailed simplified representation |
| ISO 5593 | Rolling bearings -- Vocabulary |
| ISO 9493 | Geometrical product specifications (GPS) -- Dimensional measuring equipment: Dial test indicators (lever type) -- Design and metrological characteristics |
| ISO 14405-1, -2, -3 | Geometrical product specifications (GPS) -- Dimensional tolerancing |
| | Part 1: Linear sizes |
| | Part 2: Dimensions other than linear or angular sizes |
| | Part 3: Angular sizes |
| ISO 10317 | Rolling bearings -- Tapered roller bearings -- Designation system |
| ISO 21920-1, -2, -3 | Geometrical product specifications (GPS) -- Surface texture: Profile |
| | Part 1: Indication of surface texture |
| | Part 2: Terms, definitions and surface texture parameters |
| | Part 3: Specification operators |
| ISO/TS 23768-1 | TECHNICAL SPECIFICATION -- Rolling bearings -- Parts library -- Part 1: Reference dictionary for rolling bearings |
| ISO 8015 | Geometrical product specifications (GPS) -- Fundamentals -- Concepts, principles and rules |
| ISO 14253-1, -2 | Geometrical product specifications (GPS) -- Inspection by measurement of workpieces and measuring equipment |
| | Part 1: Decision rules for proving conformity or nonconformity with specifications |
| | Part 2: Guidance for the estimation of uncertainty in GPS measurement, in calibration of measuring equipment and in product verification |

Tab. 1 - General

| Standard | Description |
|---|---|
| ISO 15 | Rolling bearings -- Radial bearings -- Boundary dimensions, general plan |
| ISO 104 | Rolling bearings -- Thrust bearings -- Boundary dimensions, general plan |
| ISO 199 | Rolling bearings -- Thrust bearings -- Geometrical product specifications (GPS) and tolerance values |
| ISO 246 | Rolling bearings -- Cylindrical roller bearings, separate thrust collars -- Boundary dimensions |
| ISO 355 | Rolling bearings -- Tapered roller bearings -- Boundary dimensions and series designations |
| ISO 464 | Rolling bearings -- Radial bearings with locating snap ring -- Dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 492 | Rolling bearings -- Radial bearings -- Geometrical product specifications (GPS) and tolerance values |
| ISO 582 | Rolling bearings -- Chamfer dimensions -- Maximum values |
| ISO 582 | Rolling bearings -- Chamfer dimensions -- Maximum values |
| ISO 1132-1 | Rolling bearings -- Tolerances -- Part 1: Terms and definition |
| ISO 1206 | Rolling bearings -- Needle roller bearings with machined rings -- Boundary dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 2982-1, -2 | Rolling bearings -- Accessories<br>Part 1: Dimensions for adapter sleeve assemblies and withdrawal sleeves<br>Part 2: Dimensions for locknuts and locking devices |
| ISO 3031 | Rolling bearings -- Thrust needle roller and cage assemblies, thrust washers -- Boundary dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 3096 | Rolling bearings -- Needle rollers -- Boundary dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 3245 | Rolling bearings -- Needle roller bearings with drawn cup and without inner ring -- Boundary dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 3290-1, -2 | Rolling bearings -- Balls<br>Part 1: Steel balls<br>Part 2: Ceramic balls |
| ISO 7063 | Rolling bearings -- Needle roller bearing track rollers -- Boundary dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 8443 | Rolling bearings -- Radial ball bearings with flanged outer ring -- Flange dimensions |
| ISO 9628 | Rolling bearings -- Insert bearings and eccentric locking collars -- Geometrical product specifications (GPS) and tolerance values |
| ISO 12043 | Rolling bearings -- Single-row cylindrical roller bearings -- Chamfer dimensions for loose rib and non-rib sides |
| ISO 12043 | Rolling bearings -- Single-row cylindrical roller bearings -- Chamfer dimensions for loose rib and non-rib sides |
| ISO 12297 | Rolling bearings -- Steel cylindrical rollers -- Dimensions and tolerances |
| ISO 12240-1, -2, -3, -4 | Spherical plain bearings<br>Part 1: Radial spherical plain bearings<br>Part 2: Angular contact radial spherical plain bearings<br>Part 3: Thrust spherical plain bearings<br>Part 4: Spherical plain bearing rod ends |

Tab. 2 (1 of 2) - Dimensions and tolerances

| Standard | Description |
|---|---|
| ISO 20515 | Rolling bearings -- Radial bearings, retaining slots -- Dimensions, geometrical product specifications (GPS) and tolerance values |
| ISO 12044 | Rolling bearings -- Single-row angular contact ball bearings -- Chamfer dimensions for outer ring non-thrust side |
| DIN 620-6 | Rolling bearings -- Rolling bearing tolerances -- Part 6: Chamfer dimension limits |
| DIN 620-3 | Rolling bearings -- Rolling bearing tolerances -- Part 3: Tolerances for thrust bearings |
| DIN 620-1 | Rolling bearings -- Rolling bearing tolerances -- Part 1: Gauging methods for dimensional and running tolerances |
| DIN 623-1 | Rolling bearings -- Fundamental principles -- Part 1: Designation system for rolling bearings |
| DIN 625-1 | Rolling bearings -- Radial deep groove ball bearings -- Part 1: Single row |
| DIN 625-1 | Rolling bearings -- Radial deep groove ball bearings -- Part 1: Single row |
| DIN 711 | Rolling bearings -- Single direction thrust ball bearings |
| DIN 711 | Rolling bearings -- Single direction thrust ball bearings |
| DIN 722 | Rolling bearings -- Thrust cylindrical roller bearings. Single direction |
| DIN 722 | Rolling bearings -- Thrust cylindrical roller bearings. Single direction |
| DIN 5401 | Balls for rolling bearings and general industrial use |
| DIN 5402-1 | Rolling bearings -- Parts of rolling bearings -- Part 1: Cylindrical rollers |
| DIN 5412-1, -4, -9 | Rolling bearings -- Cylindrical roller bearings<br>Part 1: Single row with cage, separate thrust collars<br>Part 4: Double row, with cage, increased accuracy<br>Rolling bearings; cylindrical roller bearings, double row, full type roller bearings, non separable; dimension series 48 and 49 |
| DIN 12240-1 | Spherical plain bearings -- Part 1: Radial spherical plain bearings |
| ANSI/ABMA 19.1 | Tapered Roller Bearings -- Radial Metric Design |
| ANSI/ABMA 19.2 | Tapered Roller Bearings -- Radial Inch Design |
| ANSI/ABMA 20 | Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types -- Metric Design |
| ANSI/ABMA 23.2 | Thrust Bearings of Tapered Roller Type -- Inch Design |
| ANSI/ABMA 24.2 | Thrust Bearings Of Ball And Cylindrical Roller Types |
| ANSI/ABMA 26.2 | Thin Section Ball Bearings -- Inch Design |
| ANSI/AFBMA 10 | Metal balls |

Tab. 3 (2 of 2) - Dimensions and tolerances

| Standard | Description |
|---|---|
| ISO 5753-1, -2 | Rolling bearings -- Internal clearance<br>Part 1: Radial internal clearance for radial bearings<br>Part 2: Axial internal clearance for four-point-contact ball bearings |
| DIN 620-4 | Rolling bearings -- Rolling bearing tolerances -- Part 4: Radial internal clearance |

Tab. 4 - Internal clearance

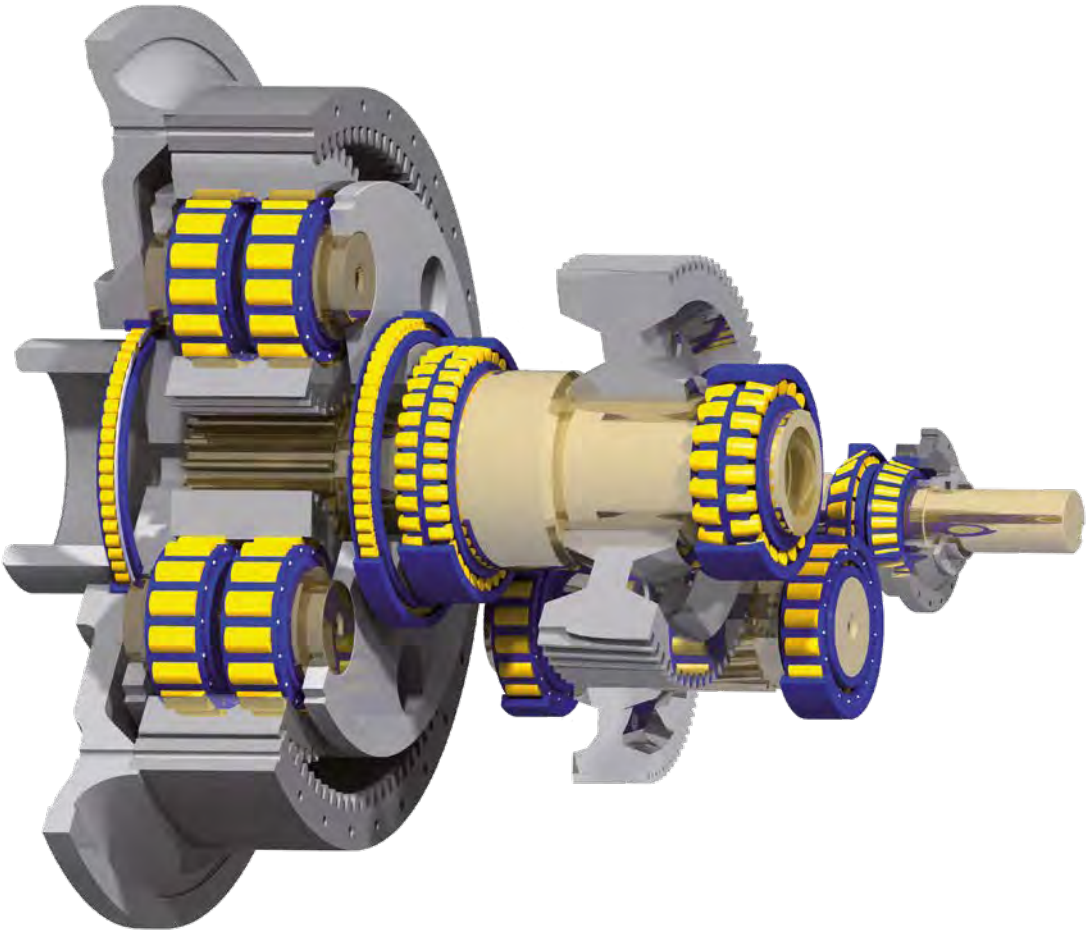
| Standard | Description |
|---|---|
| ISO 377 | Steel and steel products -- Location and preparation of samples and test pieces for mechanical testing |
| ISO 377 | Steel and steel products -- Location and preparation of samples and test pieces for mechanical testing |
| ISO 642 | Steel -- Hardenability test by end quenching (Jominy test) |
| ISO 643 | Steels -- Micrographic determination of the apparent grain size |
| ISO 683-17 | Heat-treated steels, alloy steels and free-cutting steels -- Part 17: Ball and roller bearing steels |
| ISO 1132-2 | Rolling bearings -- Tolerances -- Part 2: Measuring and gauging principles and methods |
| ISO 2639 | Steels -- Determination and verification of the depth of carburized and hardened cases |
| ISO 2639 | Steels -- Determination and verification of the depth of carburized and hardened cases |
| ISO 3887 | Steels -- Determination of depth of decarburization |
| ISO 4934 | Steel and iron -- Determination of sulfur content -- Gravimetric method |
| ISO 4948-1, -2 | Steels -- Classification<br>Part 1: Classification of steels into unalloyed and alloy steels based on chemical composition<br>Part 2: Classification of unalloyed and alloy steels according to main quality classes and main property or application characteristics |
| ISO 4967 | Steel -- Determination of content of non-metallic inclusions -- Micrographic method using standard diagrams |
| ISO 6506-1 | Metallic materials -- Brinell hardness test -- Part 1: Test method |
| ISO 6508-1 | Metallic materials -- Rockwell hardness test -- Part 1: Test method |
| ISO 11971 | Steel and iron castings -- Visual examination of surface quality |
| ISO 14577-4 | "Metallic materials -- Instrumented indentation test for hardness and materials parameters -- Part 4: Test method for metallic and non-metallic coatings" |
| ISO 15243 | Rolling bearings -- Damage and failures -- Terms, characteristics and causes |
| ISO 18203 | Steel -- Determination of the thickness of surface-hardened layers |
| ISO 18265 | Metallic materials -- Conversion of hardness values |
| DIN 1605 | Testing of materials; mechanical testing of metals; general and acceptance |
| DIN 50145 | Testing of metallic materials; tensile test |
| DIN 50351 | Testing of metallic materials; Brinell hardness testing |
| DIN 50938 | Black oxide treatment of ferrous products -- Requirements and testing |
| ASTM A295 | High carbon anti-friction bearing steel |
| ASTM A485 | High hardenability anti-friction bearing steel |
| ASTM A534 | Carburized anti-friction bearing steel |
| ASTM A756 | Stainless anti-friction bearing steel |
| ASTM A866 | Medium carbon anti-friction bearing steel |
| ASTM E10 | Standard Test Method for Brinell Hardness of Metallic Materials |
| ASTM E18 | Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials |

Tab. 5 - Materials and testing

| Standard | Description |
|---|---|
| ISO 76 | Rolling bearings -- Static load rating |
| ISO 281 | Rolling bearings -- Dynamic load ratings and rating life |
| ISO/TR 1281-1, -2 | TECHNICAL REPORT -- Rolling bearings -- Explanatory notes on ISO 281 |
| | Part 1: Basic dynamic load rating and basic rating life |
| | Part 2: Modified rating life calculation, based on a systems approach to fatigue stresses |
| ISO/TR 10657 | TECHNICAL REPORT -- Explanatory notes on ISO 76 |
| ISO 15312 | Rolling bearings -- Thermal speed rating -- Calculation |
| ISO/TS 16281 | TECHNICAL SPECIFICATION -- Rolling bearings -- Methods for calculating the modified reference rating life for universally loaded bearings |
| ISO 20015 | Spherical plain bearings -- Method for the calculation of static and dynamic load ratings |
| DIN 732 | Rolling bearings -- Thermally safe operating speed -- Calculation and correction values |

Tab. 6 - Calculations

# Bearing arrangements



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# Bearing arrangements

From the onset, we have to fight the common perception that the bearing arrangements assure only the sustaining of the shafts in rotating or oscillating motion and the machine elements mounted on them. A bearing arrangement does not only consist of rolling bearings but includes the components associated with the bearings, such as the shaft and housing, covers, seals, holding and locking devices, etc. In all applications the bearings have to assure a certain radial and/or axial position of the shaft in relation with the stationary housing within the machine assembly, as well as the possibility to accommodate the thermal expansion/contraction of the shaft as a result of the working temperature.

Bearings must often tolerate a certain amount of angular misalignment resulting from shaft bending, improper mounting, or fitting errors. In many cases, when gears are mounted on the shafts, the bearings must allow the adjustment of gear meshing (e.g. bevel gearing, worm drive, etc.).

Besides this, it is worth mentioning that lubrication is crucial, and becomes a very important component of the bearing arrangement. Since lubricant cleanliness has a decisive effect on the life of the bearing, seals are also a crucial component of bearing arrangements. It should be noted that seals also help maintain a clean environment and decrease lubricant consumption. All these aspects reveal the complexity of the bearings themselves and bearing arrangements also.

The support of loads as well as the radial and axial location of the shaft is generally required in industrial applications. In addition to the correct bearing type and size selection, the following aspects must be taken into account when considering the bearing mounting arrangement:

- appropriate design of the bearing surrounding parts (housing, shaft, spacers, etc.). The most important issue here is to ensure the achievement of the intended bearing location (locating/non-locating bearing), but also the possibility of other parts adjustment (e.g. bevel gears, worm gears, etc.);
- right choice of the fits between the shaft and the inner ring (shaft washer), and between the outer ring (housing washer) and the housing bore;
- accurate assessment of the bearing internal clearance/preload value should take into consideration the required precision of the shaft during rotation, the expansion/contraction of the bearing rings as a result of the mounting fits, as well as that caused by thermal variation, and finally the misalignment of the bearing rings caused by conjugate part deflection and/or mounting errors;
- adequate sealing system;
- suitable selection of the type and quantity of lubricant in order to ensure the lubrication, sealing and/or cooling of the bearings and of the other parts of the mechanical assembly during operation.

In relation to the aspects mentioned above, it is worth noting that any wrong decision made during the design phase, has an adverse effect on the efficiency and reliability of the bearing arrangement, or often of the entire application. Previous experiences regarding similar bearing arrangements will contribute decisively to making the right decisions.

This chapter encompasses only the necessary information required by the designer or user to understand and approach the bearing arrangements. Obviously, when more sophisticated or specific applications have to be considered, much more work is needed, including accurate calculations and/or suitable experiments and tests.

Customers are invited to consult RKB Technical Department for support on bearing selection and full calculations of bearing arrangements.

# First and second type bearing arrangement functions

Correctly designed, mounted and used, bearing arrangements have to meet some special functions. We can divide them in first type and second type functions.

First type functions include:
- radial locating and centering of the shaft;
- axial locating of the shaft;
- free thermal expansion/contraction of the shaft at the working temperature.

Second type functions include:
- bearing lubrication;
- bearing sealing and cooling.

First type bearing arrangement functions are presented and detailed within the analysis of the typical bearing arrangements, whereas second type functions are investigated in the specific chapters of this catalogue.

Radial location of the shaft (i.e. prevention of the radial movement of the shaft in relation to the stationary housing) is based on the fitting of the bearing rings in the conjugate parts (shaft and housing).

Shaft centering means to provide a unique radial position of the shaft in the sub-assembly. The quality of the shaft centering depends on the selected fits (between the bearing rings and mating parts) and on the radial internal clearance of the mounted bearing.

Axial location of the shaft (i.e. prevention of the axial movement of the shaft in both directions) is realized by several means, the most widely used is the so-called locating bearing.

Free thermal expansion/contraction of the shaft at the working temperature is created through several design solutions. Among these, the most popular is the so-called non-locating bearing that supports the shaft in conjunction with a locating bearing.

# Typical bearing arrangements

The most frequent design situation is when a rotating shaft is supported and located both radially and axially by at least two radial bearings. Depending on the application, load conditions, running accuracy and cost, a decision should be made between the following typical bearing arrangements:

- locating and non-locating bearing arrangements;
- adjusted bearing arrangements;
- floating bearing arrangements.

## Locating and non-locating bearing arrangements

These arrangements generally consist in a locating bearing situated on one side of the shaft and a non-locating bearing on the other side.

The locating bearing (fixed bearing) must provide the shaft with both radial and axial support (i.e. the bearing must be able to take radial and axial loads); at the same time, it has to locate the shaft axially. A well-designed locating bearing fulfills its purpose if the shaft cannot move in both axial directions, as in Fig. 1b page 20 or Fig. 1c page 20. Consequently, the locating bearing must be clamped both on the shaft and in the housing.

The type of bearings selected as locating bearing depends on the magnitude of the axial load and the requisite axial accuracy of the shafts. According to this, suitable products for the locating bearing are the following:

- non-separable bearings that can accommodate combined loads (deep groove ball bearings, double row angular contact ball bearings, self-aligning ball bearings, spherical roller bearings, etc.);
- two or more separable bearings (single row angular contact ball bearings mounted in pairs, paired tapered roller bearings, etc.);
- combinations of a radial bearing that can

take only radial load (e.g. a cylindrical roller bearing - types NU, N, NNU, or NN) with a bearing that can accommodate axial loads (e.g. double direction thrust bearing, four-point contact ball bearing or even a deep groove ball bearing). In this combination, the axial bearing must be mounted with clearance fit in the housing, in order to avoid supporting radial loads.

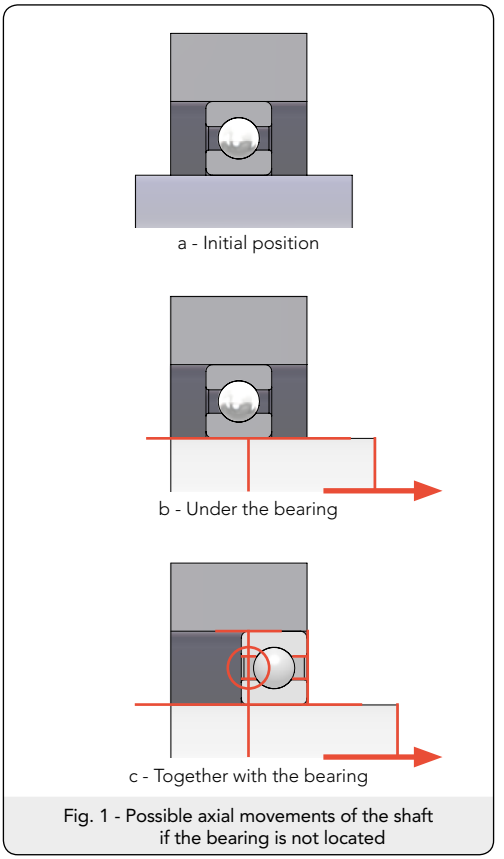



Fig. 1 - Possible axial movements of the shaft if the bearing is not located

The non-locating bearing (free bearing) must provide radial support (e.g. it must accommodate radial loads only) and must also enable the axial displacement of the shaft. This is mandatory to prevent hyper static assembly, where the bearing reactions cannot be evaluated properly. In fact the distance between the bearing seats on the shaft and the housing are usually unequal for two reasons:

- manufacturing errors (even if they are within the manufacturing tolerances);
- temperature gradient during operation.

The bearing type selected as non-locating bearing depends on the magnitude of the radial load and axial displacement. Axial displacement can take place:

- for non-separable bearings, between one of the bearing rings and its seat, preferably between the outer ring and its seat in the housing bore - e.g. deep groove ball bearings (**Fig. 2a page 21**), self-aligning ball bearings (**Fig. 2b page 21**), spherical roller bearings (**Fig. 2c page 21**);
- for separable bearings, inside the bearing - e.g. cylindrical roller bearings, type NU or N (**Fig. 2d page 21**), needle roller bearings (**Fig. 2e page 21**, **Fig. 2f page 21**).

Obviously, there is a considerably vast number of arrangements with locating and non-locating bearings, but only some of the most popular combinations are presented below. In each case, special attention was given to the explanation of the first type bearing arrangement functions.

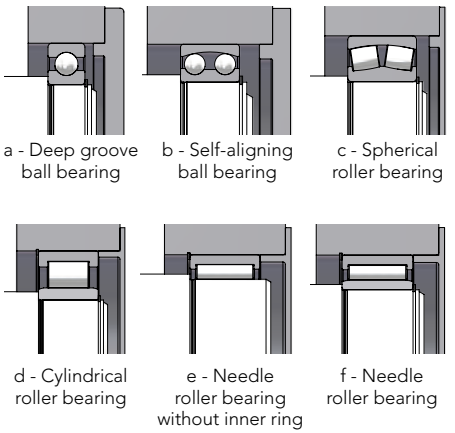



Fig. 2 - Examples of non-locating bearings

## Shaft mounted on two deep groove ball bearings (locating bearing and non-locating bearing)

This typical and popular arrangement is presented in **Fig. 3**. In this and following figures, symbols were used to better understand the first type bearing arrangements:

- L shaft axial displacement to the left;
- $L_u$ part or part feature that blocks the shaft axial displacement, under the bearing(s), to the left;
- $L_t$ part or part feature that blocks the shaft axial displacement, together with the bearing(s), to the left;
- R shaft axial displacement to the right;
- $R_u$ part or part feature that blocks the shaft axial displacement, under the bearing(s), to the right;
- $R_t$ part or part feature that blocks the shaft axial displacement, together with the bearing(s), to the right;
- SAD shaft axial displacement caused by thermal expansion/contraction.

Radial location and centering of the shaft are based on the fitting of the bearing rings in the conjugate parts (shaft and housing). The quality of the shaft centering depends on the chosen fits (between the bearing rings and mating parts) and radial internal clearance of the bearing.

Please note that in virtue of the mounting (inner ring expands and outer ring contracts if they are mounted with interference fit on the shaft and into the housing, respectively) and of the increased temperature during operation, the initial radial internal clearance inside the bearing could be significantly reduced, vanish, or even generate a preload.

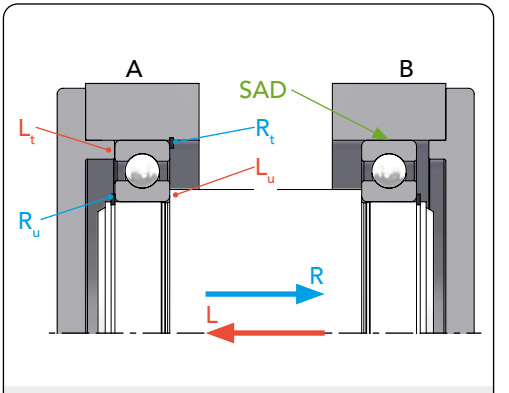



Fig. 3 - Shaft mounted on two deep groove ball bearings (locating bearing and non-locating bearing)

The axial location of the shaft is achieved by locating bearing A. Bearing A is a non-separable bearing and, because of its construction and mounting, it prevents the axial movement of the shaft in both directions. Bearing inner ring and outer ring are clamped on the shaft and in the housing, making the axial displacement of the shaft impossible. If the shaft has the tendency to move to the left (L), as a result of external axial loads, this displacement under the fixed bearing A is prevented by the shaft abutment shoulder ($L_u$), and together with bearing A by the case cover ($L_t$). In this case, the axial loads are taken by the cover screws that must be well dimensioned.

The calibrated metallic shims under the cover ensure firm contact between the cover and bearing inner ring. Since these shims do not ensure good sealing, an O-ring could

be useful (**Fig. 4**). The axial displacement of the shaft to the right (R) under the bearing A (considered fixed) is blocked by the shaft snap ring ($R_u$), and together with the bearing by housing snap ring ($R_t$), which has to withstand the axial loads.

The axial positioning of the shaft is not very precise in virtue of the axial clearance (even reduced during operation) existing inside the deep groove ball bearing A.

The same can also be found on a spherical roller bearing used as locating bearing, but a double row angular contact ball bearing gives closer axial guidance, and paired angular contact ball bearings or tapered roller bearings provide significantly precise axial positioning.

Free thermal expansion/contraction of the shaft at the working temperature is allowed by the non-locating bearing B. This deep groove ball bearing is non-separable and, consequently, when the shaft expands/contracts, the bearing moves together with the shaft and slides along the housing bore (SAD, **Fig. 3 page 21**).

The snap ring mounted on the shaft ensures the axial movement of the bearing B together with the shaft in both directions during shaft expansion and contraction. Obviously, the housing bore tolerance must be selected appropriately to result in a clearance fit.

Metallic shims are not found between the cover of the bearing B and housing. They are not required since the cover should not touch the outer ring, and sealing gaskets are provided in their place.

The above bearing arrangement with locating and non-locating bearing has the advantage that it does not require any dimensional chain calculation (on axial direction) to properly adjust the clearance inside the bearings or to ensure the free thermal expansion/contraction of the shaft.

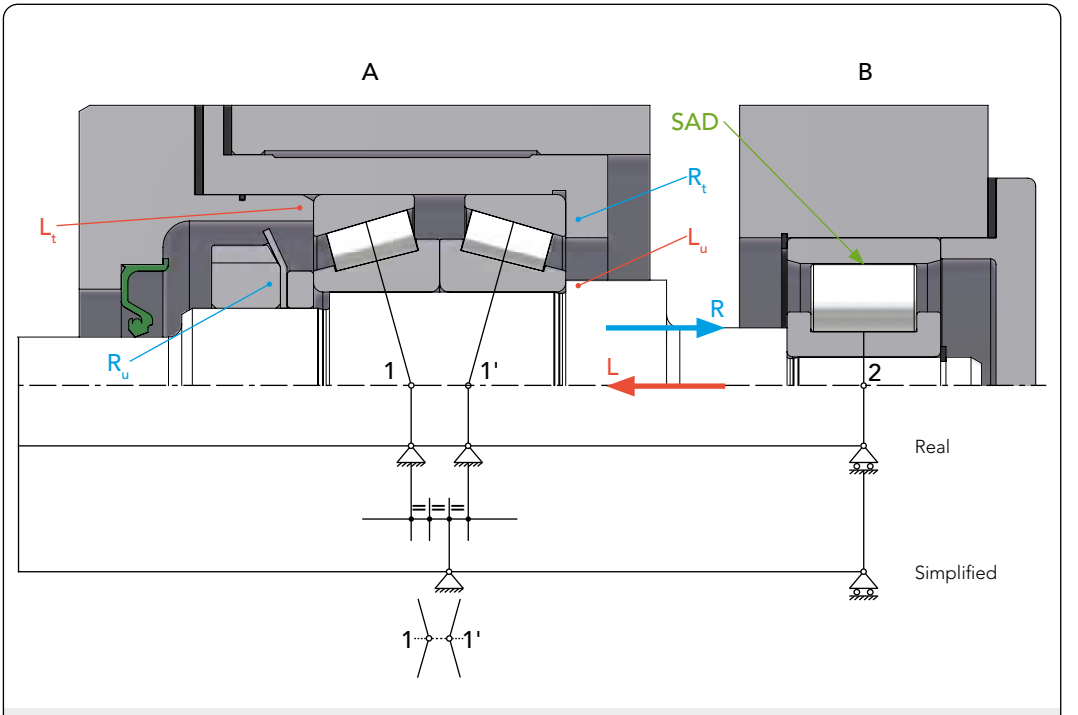



Fig. 4 - Shaft mounted on two tapered roller bearings in face-to-face configuration as locating bearing and a cylindrical roller bearing as non-locating bearing

## Shaft mounted on two tapered roller bearings in face-to-face configuration as locating bearing and a cylindrical roller bearing as non-locating bearing

In **Fig. 4 page 22** a shaft is mounted on two tapered roller bearings paired in face-to-face configuration (also known as X configuration, due to the position of pressure lines) as locating bearing and a cylindrical roller bearing as non-locating bearing. The particularity of this bearing arrangement consists in the presence of an own housing (cassette, chock) for the paired tapered roller bearings. Assuming that a gear is mounted on the shaft between the two bearings (not represented in **Fig. 4 page 22**), after the complete bearing adjustment, the position of the gear relative to the conjugate gear is easily set by means of the metallic shims placed between the cassette collar and machine case.

As can be observed, the supports of the shaft are considered in the bearings centers of pressure (1, 1' and 2). The shaft is actually sustained by three supports, which means that the shaft is a statically indeterminate beam and the calculation of the real reactions in supports (i.e. the real forces that load the bearings) is difficult. However, it is generally acceptable to simplify the problem and transform the real statically indeterminate beam into a statically determinate beam: the pair of supports 1 and 1' are substituted artificially by a single support situated at one third of the distance between the supports 1 and 1' and closer to the gear load. Please note that with this simplification the calculation of the bearing loads is very easy but the results could be far from their actual values. For critical applications we advise to contact RKB Technical Department for technical support regarding the correct calculation of the bearing loads.

Radial location and centering of the shaft are based on the correct choice of mounting fits of the bearing rings in the conjugate parts (shaft and housing bore), and on the adjustment of the axial clearance in the paired tapered roller bearings. In the variant of **Fig. 4 page 22**, the clearance is set by means of the metallic shims mounted between the bearing cover and housing collar. A precise clearance and easy installation can be provided by using a set of tapered roller bearings with a preset spacer that will be mounted between the bearing outer rings.

The axial location of the shaft is achieved by the locating bearing A, which makes the axial displacement of the shaft impossible. If the shaft tends to move to the left (L), due to external axial loads, this displacement under the inner rings of the tapered roller bearings (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and with the bearings by the cassette cover ($L_t$). The axial displacement of the shaft to the right (R) under the bearings A (considered fixed) is blocked by the spacer and locknut ($R_u$), and together with the bearings by cassette rib ($R_t$), which has to withstand the axial loads.

With regards to the free thermal expansion/contraction of the shaft at the working temperature, this is provided by the non-locating bearing B. The cylindrical roller bearing is separable and consequently when the shaft expands/contracts the bearing inner ring, cage, and rollers move together with the shaft and the rollers slide along the outer ring raceway (SAD, **Fig. 4 page 22**). Therefore, the outer ring has to be clamped inside the housing and this is achieved by using a housing snap ring, on the left side, and, on the other side, the ring is supported by the bearing cover. In order to obtain a clear contact between the cover and the bearing outer ring a set of calibrated metallic shims is used.

The advantages of this bearing arrangement are the precise axial positioning and relative stiffness of the shaft and the compactness of the locating bearing A, while the main disadvantage consists in the difficulty of the clearance adjustment for tapered bearings.

## Shaft mounted on two tapered roller bearings in back-to-back configuration as locating bearing and a deep groove ball bearing as non-locating bearing

In **Fig. 5** a shaft is mounted on a pair of tapered roller bearings in back-to-back configuration (also known as O configuration) as locating bearing and a deep groove ball bearing as non-locating bearing.

Most of the considerations reported in the previous paragraph remain valid for this bearing arrangement. A particularity of the locating bearing A is the presence of a spacer between the outer rings of the tapered roller bearings. The role of this spacer is to prevent the bearing cages from touching each other. It is worth noting here that the greater distance between the pressure centers of the tapered roller bearings results in likely larger errors in the calculation of the bearing loads when the simplification presented in the previous paragraph is used.

Radial location and centering of the shaft are based on the correct choice of mounting fits of the bearing rings in the shaft and cassette bore, respectively, and on the adjustment of the clearance in the paired tapered roller bearings. In the variant presented in **Fig. 5** the clearance is adjusted by means of the provided locknut. A precise clearance and easy installation can be provided by using a set of tapered roller bearings with preset axial internal clearance (BEP).

As previously mentioned, the axial location of the shaft is given by the locating bearing A. If the shaft tends to move to the left (L), because of the external axial loads, this movement, under the inner rings of the tapered roller bearings (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and together with the bearings by the spacer and/or cassette cover ($L_t$). The shaft axial displacement to the right (R) under the bearings A is blocked by the spacer and locknut ($R_u$), and together with the bearings by cassette rib ($R_t$), which has to take the axial loads.

The free thermal expansion/contraction of the shaft at working temperature is

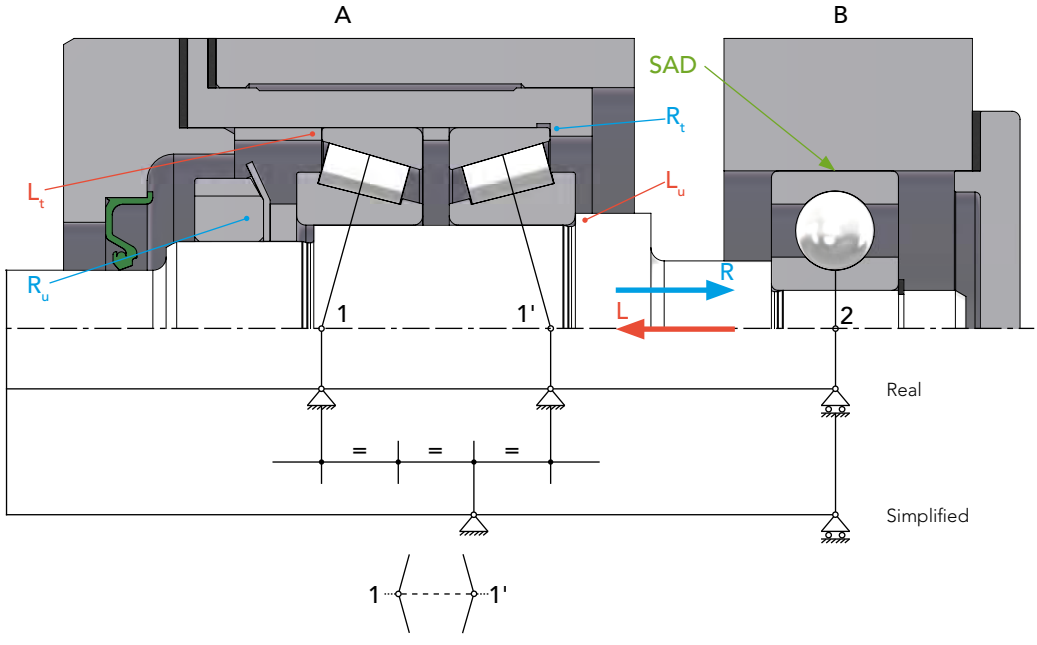



Fig. 5 - Shaft mounted on two tapered roller bearings in back-to-back configuration as locating bearing and a deep groove ball bearing as non-locating bearing

ensured by the non-locating bearing B. This deep groove ball bearing is non-separable and consequently, when the shaft expands/contracts, the bearing moves together with the shaft and slides along the housing bore (SAD, **Fig. 5**). With regards to the clearance inside the paired tapered roller bearings of the locating bearing A, it should be emphasized that, due to the small distance between the bearings, the clearance decreases with the increase of the shaft length caused by thermal expansion. A close study about the variation of the clearance inside a paired tapered roller bearing in back-to-back arrangement with the increase of the shaft length caused by thermal expansion is given in the appropriate part of the paragraph **"Adjusted bearing arrangements" page 26**.

The advantages of this bearing arrangement are the precise axial positioning of the shaft, higher stiffness of the locating bearing A, easy installation and adjustment of the bearing clearance; the main disadvantage consists in the larger axial size of the locating bearing A.

## Shaft mounted on two single direction thrust ball bearings and a deep groove ball bearing as locating bearing and a deep groove ball bearing as non-locating bearing

**Fig. 6** shows a shaft mounted on a locating bearing A, which encompasses two single direction thrust ball bearings and a deep groove ball bearing, and, on the other side, on a deep groove ball bearing as non-locating bearing B.

Within the locating bearing A the tasks are shared between the embedded bearings: the axial bearings are responsible for taking only the external axial loads, and the deep groove ball bearing accommodates only the radial load. If the external radial load acts from right to left then this load is supported by the left single direction thrust ball bearing and if, on the contrary, the external radial load is headed from the left to the right, then it is supported by the right single direction thrust ball bearing. It is worth noting that the parts that support the bearing washers of the thrust bearings must be carefully and appropriately designed in order to avoid the washer bending.

Radial location and centering of the shaft are ensured by both deep groove ball bearings and are based on the correct choice of mounting fits of the bearing rings in the conjugate parts (shaft and housing, respectively). In order to avoid the double centering, the housing washers of both single direction thrust ball bearings must be mounted in the cassette with proper radial clearance.

The axial location of the shaft is given by

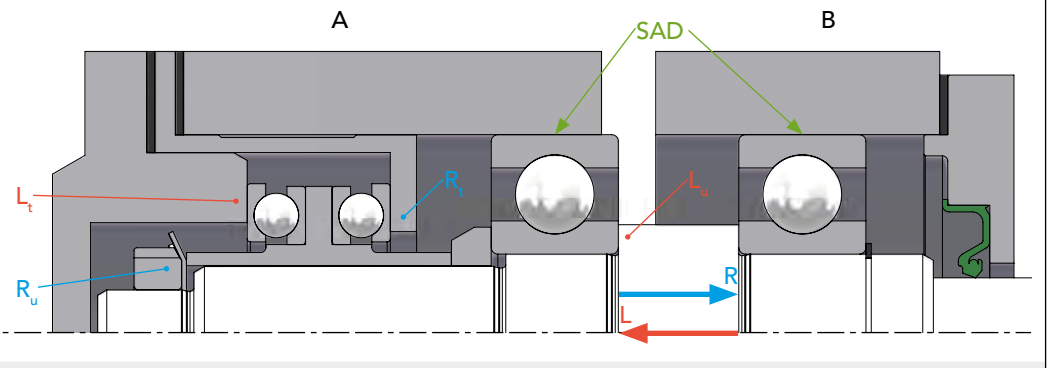



Fig. 6 - Shaft mounted on two single direction thrust ball bearings and a deep groove ball bearing as locating bearing and a deep groove ball bearing as non-locating bearing

the pair of single direction thrust ball bearings mounted in the cassette of the locating bearing A, which prevent the axial movement of the shaft. If, due to external axial loads, the shaft tends to move to the left (L), this movement, under the spacer between the shaft washers of the single direction thrust ball bearings (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and together with the bearings by the cassette cover ($L_t$). The axial displacement of the shaft to the right (R) under the spacer between the shaft washers (considered fixed) is blocked by the locknut ($R_u$), and together with the bearings by cassette rib ($R_t$).

The free thermal expansion/contraction of the shaft at the working temperature is allowed by both deep groove ball bearings. The deep groove ball bearings are non-separable and consequently when the shaft expands/contracts the bearings move together with the shaft and slither along the housing bore (SAD, Fig. 6 page 25).

This bearing arrangement is suitable for applications in which large axial loads act on the shaft. Instead of two single direction thrust ball bearings one can also successfully use a double direction thrust ball bearing.

## Adjusted bearing arrangements

The adjusted bearing arrangements (also referred to as cross located bearing arrangements) generally encompass two mirrored arranged deep groove ball bearings, tapered roller bearings, or angular contact ball bearings (in general all types of radial bearings that can accommodate axial loads in at least one direction). The main design idea of these arrangements is that the shaft is axially alternatively located by the bearings (i.e. in one direction the shaft is located by one bearing and in the opposite direction by the other bearing).

During mounting, one bearing ring (the outer ring in face-to-face configuration and the inner ring in back-to-back configuration) is axially displaced along the housing bore (face-to-face configuration) or shaft (back-to-back configuration) until the prerequisite clearance/preload is achieved inside the bearing arrangement. This bearing arrangement type is usual for short shafts that work at moderate temperatures.

Due to the easy clearance/preload adjustment, this arrangement is suitable where precise axial positioning of the shaft is imperative (e.g. machine tool spindle bearing arrangements, pinion bearing arrangements, etc.).

### Shaft mounted on two adjusted deep groove ball bearings

Fig. 7 page 27 shows a shaft mounted on two adjusted deep groove ball bearings (cross located bearings). This arrangement is suitable for short shafts that experience low axial loads, and shaft axial guidance does not have to be highly accurate.

Radial location and centering of the shaft are based on the fitting of the bearing rings in the conjugate parts (shaft and housing). The quality of the shaft centering depends on the chosen fits (between the bearing rings and mating parts) and radial internal clearance of the mounted bearing. Due to the ring fitting (inner ring expands and outer ring contracts if they are mounted with interference fit on the shaft and in the housing, respectively) and to the increased temperature during operation, the initial radial internal clearance inside the bearing could significantly be reduced. Clearances in bearings can be modified using calibrated metallic shims mounted under both bearing covers and therefore the running precision of the shaft can be influenced.

The axial location of the shaft is achieved only when the two bearing covers are in contact with the outer rings of the deep groove ball bearings. To accomplish this, the thickness of the two sets of metallic shims are modified to satisfy the following geometric relationship:

$$L_c + l_{s1} + l_{s2} - l_{c1} - l_{c2} = L_{sh} + B_1 + B_2$$

This is a major disadvantage of this bearing

arrangement type in comparison with the arrangements with locating and non-locating bearings. After the complete adjustment of the bearing clearances, by moving some calibrated shims from one side to the other, bearing clearances do not change, but this movement changes the axial position of the gear mounted on the shaft to ensure its correct mashing with the conjugate gear. Since these shims do not ensure a good sealing, O-rings could be useful.

If, due to external axial loads, the shaft has the tendency to move to the left (L), this displacement under the bearing A (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and together with the bearing A by the bearing cover ($L_t$).

Very similarly, the axial displacement of the shaft to the right (R) under the bearing B is blocked by the shaft abutment ($R_u$), and together with the bearing B by the bearing cover ($R_t$). In both cases the cover screws that must be matched to the actual axial forces take the axial loads. The possibility of the free thermal expansion/contraction of the shaft at the working temperature is a very important issue of this bearing arrangement. At working temperature, besides the radial thermal expansions of the bearing parts (that contribute to the reduction of the radial internal clearance inside the bearings), the shaft expands also axially. In this movement, the inner rings together with the cages and balls are driven, whereas the bearing covers block the outer rings. As a result, the balls approach the outer ring raceways decreasing the initial axial clearance of the bearings.

Since there is a geometric relationship between the internal axial and radial clearance, the latter will decrease too. In conclusion, axial shaft expansion is possible only within the available residual clearance inside the bearing (SAD, **Fig. 7**). If this clearance is exceeded, then the bearing may be heavily loaded, with adverse consequences on its life.

The issues regarding the initial and mounting radial/axial clearance and their modification due to the thermal expansion of the shaft and bearing parts should be treated very carefully because the consequences of miscalculation can be disastrous.

RKB Technical Department is at customer disposal and can offer prompt and competent services in this important area (calculations, co-engineering in design, mounting procedures, mounting assistance, etc.).

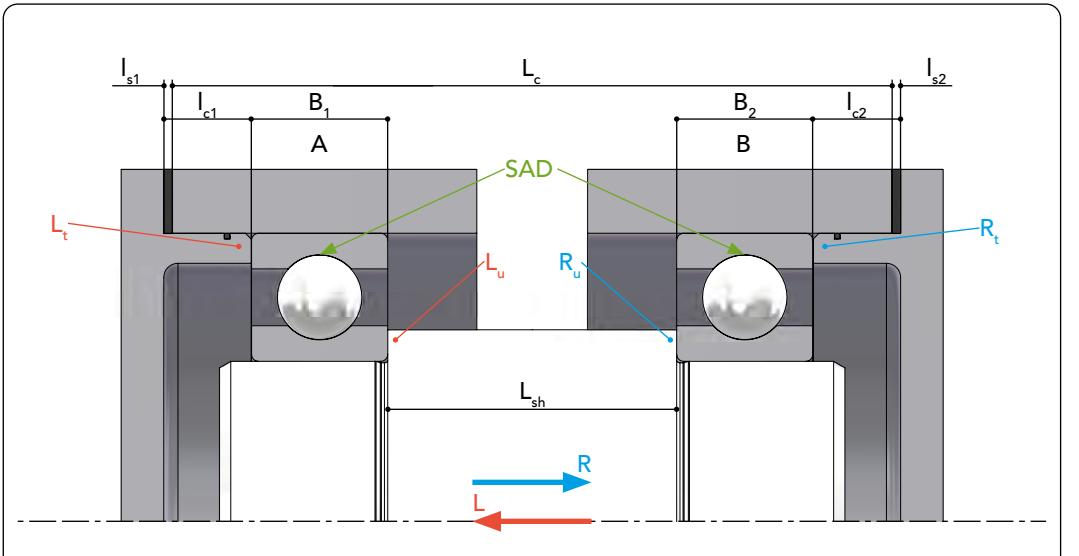



Fig. 7 - Shaft mounted on two adjusted deep groove ball bearings

The problem of the thermal expansion of the shaft may be better solved by preloading by means of elastic elements (e.g. Bellville springs) mounted between the outer ring and bearing cover (**Fig. 8**). Note that these springs must be stiff enough to make their deformation due to axial load negligible but able to compensate the shaft thermal expansion. The elastic adjustment method can also be used where bearing arrangements are subjected to vibration while stationary.

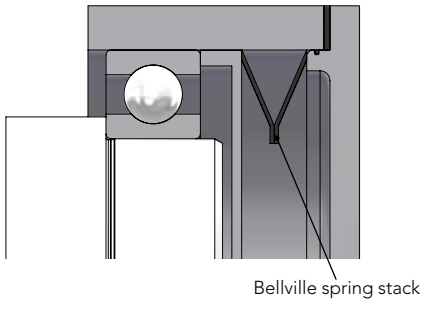



Fig. 8 - Deep groove ball bearing preloaded by Bellville spring stack

## Shaft mounted on two adjusted tapered roller bearings in face-to-face configuration

**Fig. 9** shows a shaft mounted on two adjusted (cross located) tapered roller bearings in face-to-face configuration. Tapered roller bearings are separable bearings and therefore, during the bearing mounting, a certain axial clearance can be set. Since there is a simple geometric relationship between the axial and radial clearance, one may say that when adjusting an internal axial clearance, a certain internal radial clearance is automatically set inside the bearing arrangement. To ensure the running accuracy of the shaft, the clearance must be set during the bearing fitting. As for the previous bearing arrangement presented here, the internal clearance of the tapered roller bearing is adjusted by means of the calibrated metallic shims mounted under both bearing covers. In fact, almost all the remarks already made for the shaft mounted on two adjusted deep groove ball bearings are valid here.

Radial location and centering of the shaft are ensured by the correct choice of mounting fits and by setting the bearing clearances. In

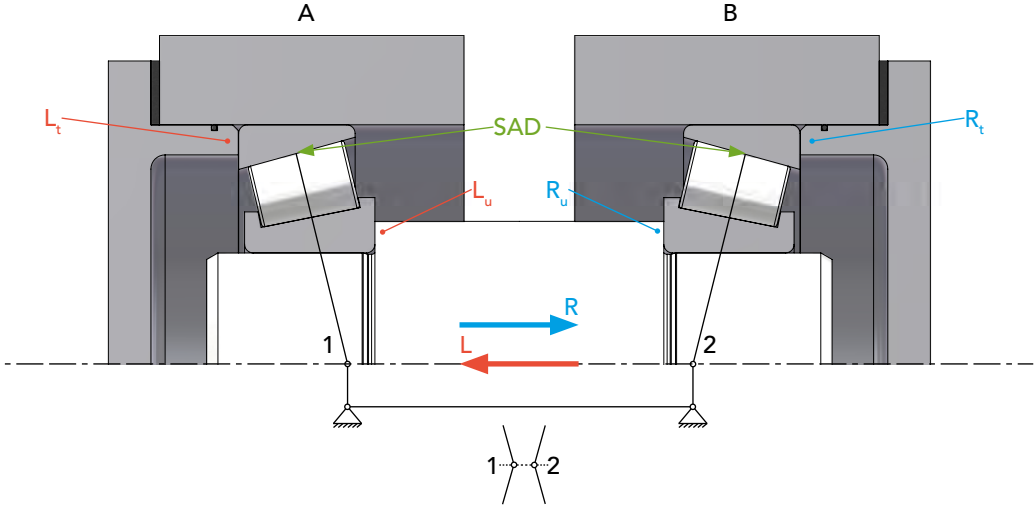



Fig. 9 - Shaft mounted on two adjusted tapered roller bearings in face-to-face configuration

addition, the desired runaway accuracy of the shaft is also achieved.

The axial location of the shaft is ensured as shown in **Fig. 9 page 28**. If, due to external axial loads, the shaft has the tendency to move to the left (L), this displacement, under the bearing A (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and together with the bearing A by the bearing cover ($L_t$). The axial displacement of the shaft to the right (R) under the bearing B (considered fixed) is prevented by the shaft abutment ($R_u$), and together with the bearing B by the bearing cover ($R_t$). In both cases, the axial loads are taken by the cover screws that must be matched to the actual axial forces.

The free thermal expansion/contraction of the shaft is possible only within the available axial clearance (SAD, **Fig. 9 page 28**). It is important to take into account the shaft thermal expansion when setting the axial internal clearance. It is easy to understand that, for two adjusted tapered roller bearings in face-to-face configuration, the bearing clearances decrease due to the temperature difference between the shaft and housing. This statement is valid in the following conditions:

- shaft and housing are made of the same material;
- inner ring and shaft are at the same temperature;
- outer ring and the entire housing are at identical temperatures.

Therefore, the problem of thermal expansion of a shaft mounted on two adjusted tapered roller bearings in face-to-face configuration is the same as the one presented in the previous paragraph.

## Shaft mounted on two adjusted tapered roller bearings in back-to-back arrangement

In **Fig. 10** a pinion-shaft is mounted on two adjusted (cross located) tapered roller bearings in back-to-back configuration. The particularity of this bearing arrangement consists in the presence of an own housing (cassette, chock) for the tapered roller bearings. This is very important because, after the complete bearing adjustment by means of the metallic shims placed between the cassette collar and machine case, the position of the bevel pinion relative to the conjugate gear is easily set.

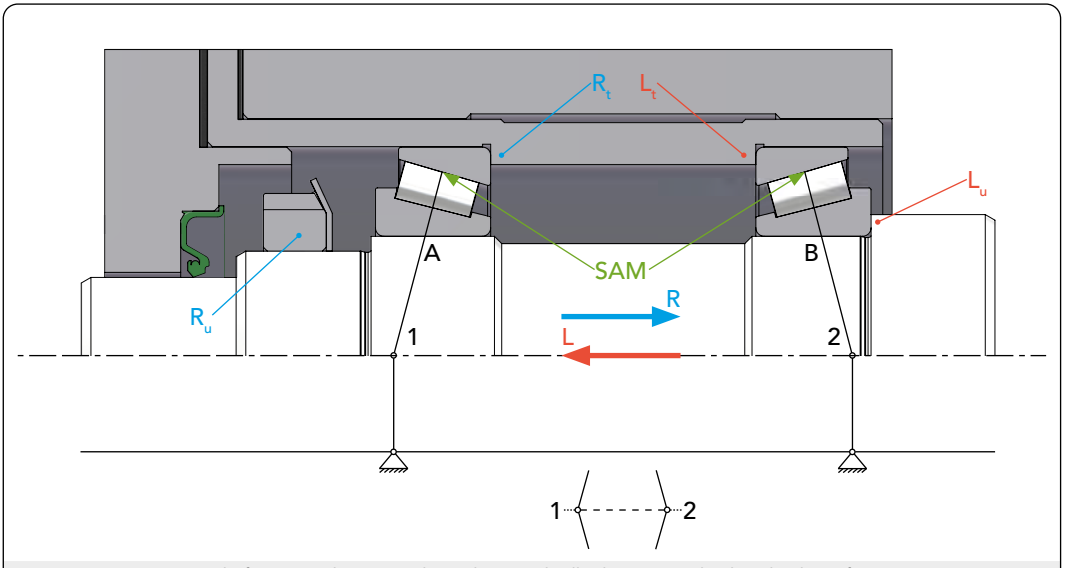



Fig. 10 - Shaft mounted on two adjusted tapered roller bearings in back-to-back configuration

Under the bearing cover (inside which a rotary lip seal is mounted) there is a sealing gasket.

In order to ensure the running accuracy of the shaft, the clearance must be set during the bearing installation. Unlike the previous bearing arrangement, a shaft locknut adjusts the internal clearance of the tapered roller bearing.

Radial location and centering of the shaft are ensured by the correct choice of mounting fits (of the bearing rings in the conjugate parts - shaft and housing) and by setting the bearing clearances. In fact, the residual internal clearance influences the running accuracy of the shaft.

The axial location of the shaft is ensured as depicted in **Fig. 10 page 29**. If the shaft has the tendency to move to the left (L) because of external axial loads, this displacement under the bearings (considered fixed) is prevented by the shaft abutment shoulder ($L_u$), and together with the bearings by the cassette large rib ($L_t$).

The axial displacement of the shaft to the right (R), under the bearings (considered fixed) is prevented by the shaft locknut ($R_u$), and together with the bearing B by the bearing cover ($R_t$). In the first case (L) the axial load is taken by the cassette rib and in the second case (R) by the locknut/shaft thread, and both must be matched to the actual axial forces.

The free thermal expansion/contraction of the shaft at the working temperature is possible only within the available axial clearance (SAD, **Fig. 10 page 29**). When the axial internal clearance is set during installation, it is very important to consider the thermal expansion of the shaft, housing, and bearing parts. In the case of this bearing arrangement (two adjusted tapered roller bearings in back-to-back configuration), unlike the previous arrangement (two adjusted tapered roller bearings in face-to-face configuration), one cannot assert that the clearance inside the bearings will increase. Things are a little bit more complicated in this bearing arrangement.

Due to the temperature difference between the shaft and housing, for two adjusted tapered roller bearings in back-to-back configuration, the bearing clearance:

- increases with the increase of the bearing operating temperature, if the bearing roller cones do not meet **(Fig. 11a)**;
- remains the same with the increase of the bearing operating temperature, if the bearing roller cones apexes coincide **(Fig. 11b)**;
- decreases with the increase of the bearing operating temperature, if the bearing roller cones overlap **(Fig. 11c)**.

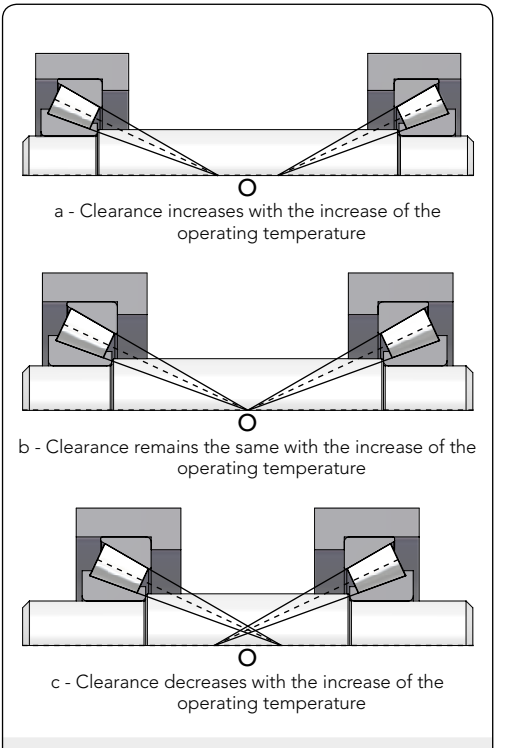



Fig. 11 - Clearance variation for TRBs in back-to-back configuration.
Roller cones: a) do not meet b) apexes coincide c) overlap

This rule of thumb is valid in the following conditions:

- shaft and housing of same isotropic material (same coefficient of thermal expansion, $\alpha_t$, in both radial and axial direction);
- inner ring and shaft operate at same temperature ($t_i$);

- outer ring and entire housing at identical working temperature ($t_e$).

The rule remains the same even if the above mentioned thermal expansion coefficients are slightly different.

**Fig. 12** shows a tapered roller bearing with zero mounting clearance. The distance between the roller cone apex and the midpoint O of the distance between the bearings seats (same as in **Fig. 11**) is denoted by $x_0$ which is positive, zero, or negative as the actual arrangement is in one of the cases presented in **Fig. 11a**, **b**, and **c page 30**. The bearing mounting temperature is $t_0$.

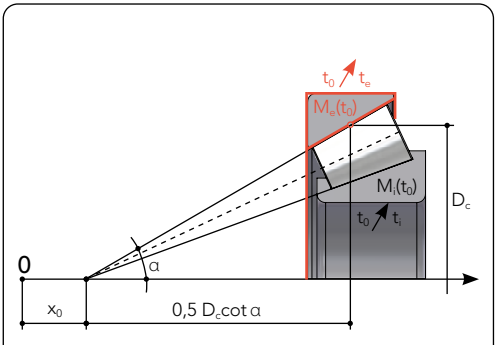



Fig. 12 - Tapered roller bearing with zero mounting clearance before heating

Consider a contact point situated at the middle of the roller generatrix. At the mounting temperature, this point is denoted by $M_i(t_0)$, if it is considered belonging to the roller, and by $M_e(t_0)$, if it is considered on the outer ring raceway.

During operation, roller temperature increases from $t_0$ to $t_i$ (bearing cage, inner ring, and shaft temperatures also), and the outer ring temperature increases from $t_0$ to $t_e$. The thermal expansion of the parts causes points $M_i(t_0)$ and $M_e(t_0)$ to reach the positions $M_i(t_i)$ and $M_e(t_e)$. It is easy to prove that after the thermal expansion the points $M_i(t_0) = M_e(t_0)$, $M_i(t_i)$ and $M_e(t_e)$ lie on a single straight line (i.e. they are collinear). This line is inclined to the bearing axis by the angle $\beta_t$ **(Fig. 13)**.

Depending on the value of this angle and its relationship with the nominal contact angle α, the relative position of roller and outer ring raceway results in:

- clearance, if $\alpha > \beta_t$ **(Fig. 13a)**;
- zero clearance, if $\alpha = \beta_t$;
- interference, if $\alpha < \beta_t$ **(Fig. 13b)**.

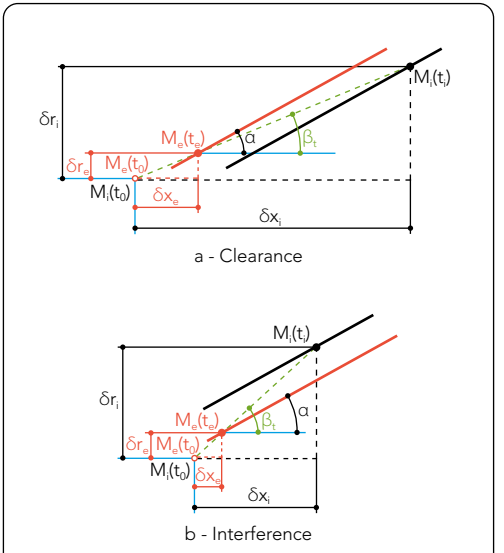



Fig. 13 - Relative position of roller and outer ring raceway

On the other hand, between the two angles $\beta_t$ and α (whatever the relationship) there is a simple geometric relationship given by the equation:

$$\tan\alpha - \tan\beta_t = \frac{x_0 \tan\alpha}{x_0 + 0{,}5\, D_c \cot\alpha} \qquad \textbf{Eq. 1}$$

where:

- $D_c$ diameter of the circle on which the contact point between roller and outer ring raceway (at the middle of the roller) is situated, mm;
- $x_0$ distance between the roller cone apex and the midpoint O of the distance between the bearings seats (same as in **Fig. 11 page 30**), mm;
- α nominal contact angle, rad or deg;

- $\beta_t$ inclination angle (from the bearing axis), of the straight line connecting the points $M_i(t_0) = M_e(t_0)$, $M_i(t_i)$ and $M_e(t_e)$, rad or deg.

Note that this equation is independent of the temperatures $t_0$, $t_i$ and $t_e$ and the denominator of the fraction is always positive, even at the limit when $x_0$ is negative and bearings touch each other. The following results from the equation above:

- $\alpha > \beta_t$ if and only if $x_0 > 0$;
- $\alpha = \beta_t$ if and only if $x_0 = 0$;
- $\alpha < \beta_t$ if $x_0 < 0$ and it does not exceed the limit when the bearings touch each other.

With all these, the proof of the rule of thumb regarding the bearing clearance variation in a bearing arrangement consisting of two tapered roller bearings in back-to-back configuration is complete.

Since the consequences of a miscalculation can be extremely serious, problems regarding the mounting clearance and its modification caused by the thermal expansion of the shaft, housing, and bearing parts should always be carefully taken into consideration. For specific, complex, sensitive and, last but not least, expensive applications, or when previous experience in similar bearing arrangements is not available, RKB Technical Department can offer prompt and competent services in this important area. Our engineers may provide fits and clearance/preload calculations, predicted basic and modified bearing life calculation, co-engineering in application design, bearing mounting procedures, on-site mounting assistance, etc.

## Floating bearing arrangements

A typical floating bearing arrangement encompassing two deep groove ball bearings is presented in **Fig. 14**. The design is very similar to that of the adjusted bearing arrangement, since it is also cross located. It is an economical solution where tight requirements for shaft axial location are not necessary or where other parts mounted on the shaft (e.g. double helical gears, Herringbone gears, etc.) are used to locate it axially.

Radial location and centering of the shaft are based on the fitting of the bearing rings in the conjugate parts (shaft and housing). As already mentioned, the quality of the shaft centering depends on the chosen fits and radial internal clearance of the mounted bearing. In fact, due to the ring fitting (inner ring expands and outer ring contracts, if they are mounted with interference fit on the shaft and in the housing, respectively) and to the increased temperature during operation, the initial radial internal clearance inside the bearing could significantly be reduced. These final clearances in bearings have a huge impact both on stiffness and running precision of the shaft.

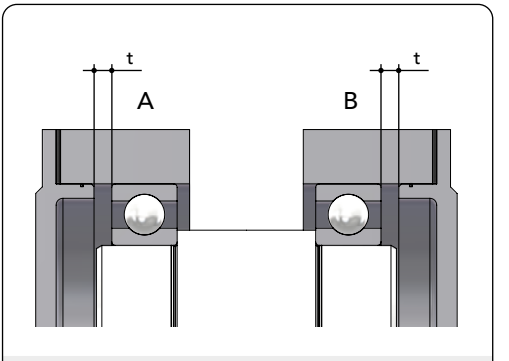



Fig. 14 - Shaft mounted on two deep groove ball bearings (floating bearings)

Regarding the axial location of the shaft and its free thermal expansion/contraction at the working temperature, if other parts do not axially position it, the shaft can be displaced relative to the housing as the axial clearance t permits. For this arrangement type two cases, having own specificities, are common:

- if the bearings used are non-separable (e.g. deep groove bearing, self-aligning ball bearing and spherical roller bearing), they have to slither axially in the housing and their outer rings are mounted with

clearance fit in the housing bore;
- if the bearings used are separable (e.g. NJ design cylindrical roller bearing), the axial movement takes place within the bearings and their rings can have interference fits with the conjugate parts.

Since the clearance in angular contact ball bearings and tapered roller bearings must be adjusted in order to run correctly, these bearings are not suitable for floating bearing arrangements.

# Bearing stiffness

Stiff (rigid) is the antonym of elastic. Therefore, the stiffness of a certain body subjected to a certain load is characterized by the magnitude of its elastic deformations under the respective load. The smaller the elastic deformations (under the same load), the stiffer (the less elastic) is the body. For linear characteristics the stiffness is expressed as the ratio of load to deflection. These are also valid for rolling bearings. Most often, the bearing rings (washers) may be considered perfectly stiff bodies, and the elastic elements are the rolling bodies. Besides the rolling element material, the most important parameters that influence the stiffness of a rolling bearing or a rolling bearing set are:

- type, number, and size of rolling elements (due to the line contact, roller bearings are stiffer than ball bearings which exhibit point contacts between balls and raceways);
- bearing contact angle(s);
- bearing internal clearance or preload (bearing set stiffness can be further increased by creating a preload in the arrangement, very common practice with high precision machines such as machine tools);
- type of fits on conjugate elements.

## Clearance or preload?

Since generally applicable and definitive recipes cannot be issued, the following comments on bearing clearance or preload option take into consideration only the usual and commonly valid circumstances. Special technical situations, which require new solutions with different and nuanced approaches to bearing clearance or preload problem, continuously appear.

In most situations, during operation the bearings must have a certain internal clearance. The higher the needs of the shaft guidance precision and running accuracy, the smaller the internal clearance. Basically, the residual internal clearance (both axial and radial) in the bearing influences the following aspects:

- load distribution on rolling elements around the clock;
- bearing expected life;
- noise of the bearing during rolling;
- vibration level during operation;
- running accuracy.

Note once again the difference between bench end play (internal clearance of the unmounted bearing, at reference temperature), mounted end play (internal clearance of the mounted bearing, at mounting temperature), and working clearance (internal clearance of the mounted and operating bearing, at working temperature). In most of the cases, the mounting and the operating conditions will also result in the decrease of the bearing internal clearance. Therefore, a certain bearing bench clearance might easily turn into a certain preload and sometimes this could have disastrous consequences. In virtue of these reasons, the selection of the bearing bench internal clearance is of utmost importance. Bearing clearance classes give the designer the ability to adapt to a specific situation. Some very general recommendations for choosing bench internal clearance class of bearings are given in Tab. 1 page 34. As will be seen, setting or adjusting of bearing internal clearance is done in the same way as the setting or adjusting of bearing preload.

Preload can be thought of as negative internal clearance. Bearing preloading

is mandatory in certain circumstances, whereas it is an available option or only a recommendation in other situations. The preload represents a certain level of interference (axial or radial) between the rolling elements and bearing raceways by displacing, axially or radially, one ring (or washer) toward the other. The preload magnitude is adjusted by controlling the value of the applied displacement, and therefore one can refer to a certain preload by mentioning the preload load or the displacement.

There are at least two main reasons to use the preloaded bearing arrangements:

- to enhance the stiffness of the bearing arrangement and increase the running precision (e.g. machine tool spindles). In this case, bearing preloading is useful also in reducing the vibrations of the bearing (especially when the assembly works near its resonance frequencies, with a possible risk of increasing the emitted noise);
- to provide the minimum load to bearings, either to avoid skidding of the rolling bodies (e.g. high-speed shafts subjected to high accelerations and decelerations during starts and stops and under very light or zero loads), or to assure the appropriate position of the bearing parts (e.g. spherical roller thrust bearing mounted on a horizontal shaft).

## Bearing preloading methods

Bearing(s) preloading is obtained by the displacement of a ring toward the other, and it can be either axial or radial depending on the type and geometry of the bearing(s). In virtue of their geometry, all thrust bearings can only be preloaded axially.

Cylindrical and spherical roller bearings with tapered bore can be preloaded radially by adjusting the position of the inner ring on the sleeve or tapered journal (by tightening or loosening the locknut). The required preload is obtained when the bearing inner ring is driven up onto its tapered seat, and expands. Tapered roller bearings and angular contact ball bearings are preloaded axially. Depending on the bearing arrangement types, the preload is obtained by applying an axial force either on the cone or on the cup of one bearing (for tapered roller bearing arrangements), or either on the outer ring or on the inner ring of the bearing (for angular contact ball bearing arrangements).

When bearings are mounted in back-to-back arrangement the axial preload load should be applied on the inner ring (Fig. 15a page 35 and Fig. 17a page 36) or cone (Fig. 16a page 35), and when bearings are mounted in face-to-face arrangement it is necessary to load the outer ring (Fig. 15b page 35) or cup (Fig. 16b page 35).

There are several methods to preload angular ball bearing and tapered roller bearing

| Internal clearance class | Recommendations |
|---|---|
| C1 | Very precise positioning of the shaft<br>High stiffness of the mounted assembly |
| C2 | Variable loads<br>Silent running without vibrations |
| CN | Normal operating conditions |
| C3 | One or both bearing rings mounted with interference fits<br>High operating temperature<br>Important vibrations |
| C4 | One or both bearing rings mounted with heavy interference fits<br>High and very high operating temperature<br>Significant vibrations |
| C5 | Large variations of temperature |

Tab. 1 - General recommendations for choosing bearing (bench) internal clearance class

arrangements.

First case is that of matched paired bearings, for which the value of the preload is set when the bearings are manufactured and cannot be changed. In most of the cases when angular contact ball bearings are used, auxiliary spacers are not necessary **(Fig. 15)** and, during mounting, the only thing to do is tighten the bearing set (for example using a locknut) until the provided gap between the appropriate bearing rings is eliminated.

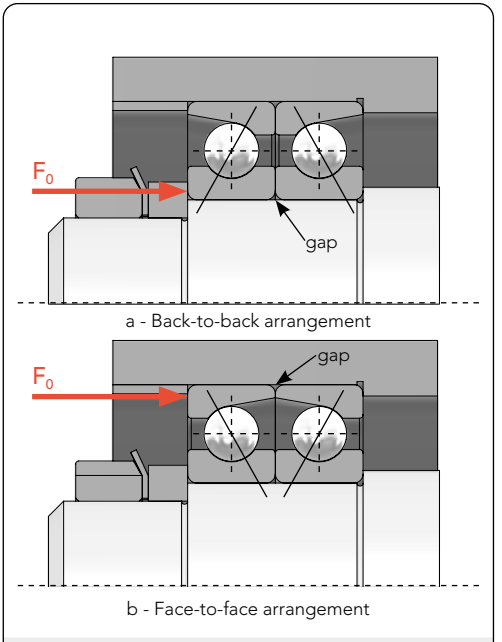



Fig. 15 - Matched single row angular contact ball bearing

When matched pairs of tapered roller bearings are used, the use of spacers is mandatory **(Fig. 16)** as a result of the special geometry of the bearing.

During mounting, the bearing set should be tightened until the provided gap between the spacer and appropriate bearing rings is eliminated. Note that the preload in the bearing set can be adjusted by grinding the side face of the inner or outer spacer. In operation, a matched bearing set can experience a different (more likely increased) preload than that predetermined during manufacturing.

After mounting, the preload depends on the shaft/inner ring and outer ring/housing bore actual fits, and on the deviations from the geometrical form of bearing mating parts (e.g. cylindricity, perpendicularity or concentricity of the bearing seats).

During operation, preload may further change due to the temperature difference between the bearing parts, different coefficient of thermal expansion for the shaft, housing, and bearing materials, centrifugal force, etc.

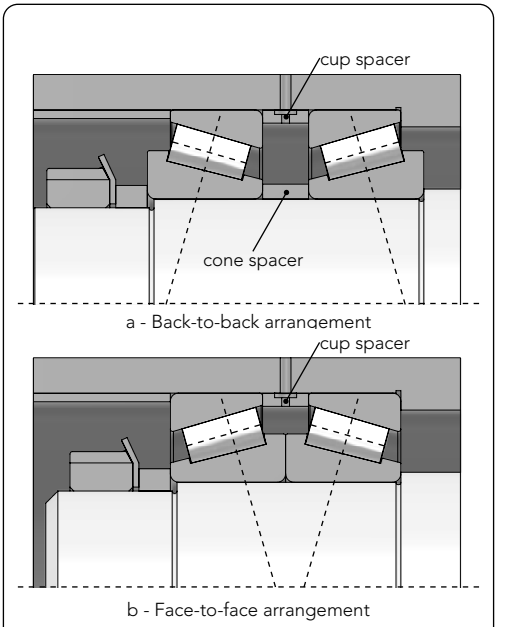



Fig. 16 - Matched single row tapered roller bearing

The second bearing preloading method refers to the bearing arrangements for which the preload can be adjusted at bearing mounting **(Fig. 17a page 36)**. In this case, the spacer rings are not supplied by the bearing company and have to be carefully designed and manufactured. Spacer rings should be made of high-grade steel, hardened to 45-60 HRC, and must be stiff enough to withstand deformation under loads. The face

surfaces of the spacers should be carefully ground because their plane parallelism is very important.

Usage of spacers is an important option when:

- preload in the bearing set needs to be adjusted;
- tilting moment load capacity of the bearing set should be increased;
- nozzles for oil lubrication must be as close as possible to the bearing raceways;
- large space is required for extra grease (needed to reduce frictional heat in the bearings).

Note that all the preloading methods (used for angular contact ball bearing and tapered roller bearing arrangements) presented so far are similar to the methods for clearance setting/adjusting (with a special mention to paired bearing sets where the gap is between the rings opposite to those in the preloading case). The third preloading method uses cylindrical helical compression springs (**Fig. 17a**) or Belleville springs, which assure a practically constant preload load (even when a bearing axial displacement occurs due to the thermal expansion of shaft).

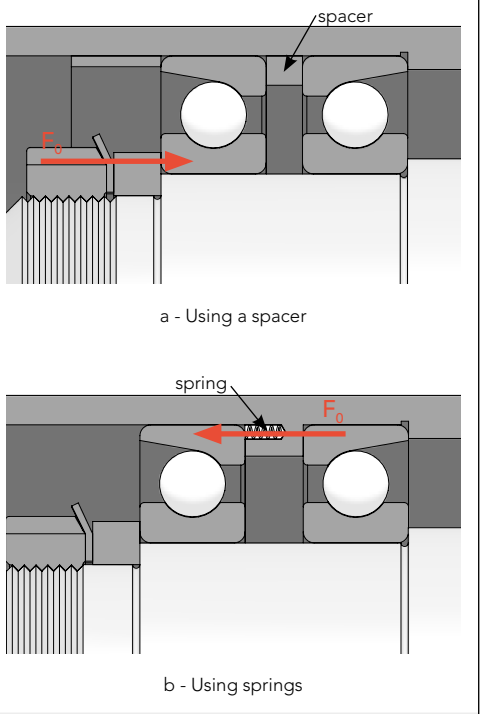



Fig. 17 - Preloaded single row angular contact ball bearings

Obviously, the bearing ring on which the spring acts may move axially. Preloading with springs is not very stiff and is absolutely unsuitable for applications where the direction of axial loads changes or where shock loads occur (the more so as their direction is undetermined).

## Determining the preloading force

**Fig. 18 page 37** presents a shaft resting on two matched single row angular contact ball bearings (as locating bearing) and, at the other end, on a deep groove ball bearing (as non-locating bearing). It is assumed that the angular contact ball bearing set was already preloaded at installation. For an easier development of the mathematical model, the

bearing preload under the action of only axial forces will be considered. When an external axial load is introduced into the system, bearing B becomes more loaded, while bearing A is discharged.

Please note that in the following examples, bearing A is the bearing that, after preloading, will relax axially when axial load $K_a$ is introduced, and bearing B is the bearing that, after preloading, will be more loaded axially (when axial load $K_a$ begins to act).

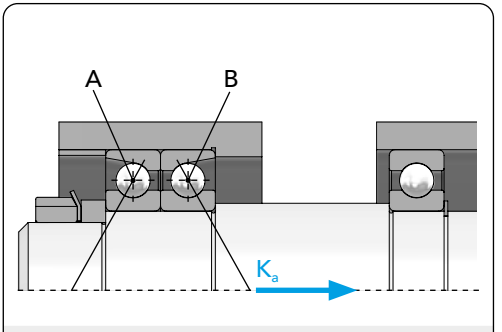



Fig. 18 - Preloaded matched angular contact ball bearing pair in back-to-back arrangement

## Linear model

This model is used here only to explain the behavior of preloaded paired ball or roller bearings and supposes a linear dependence described by the following equation between the axial load and axial deformation of the bearing under the load (i.e. relative axial displacement of one bearing ring relative to the other):

$$F_a = C_b \cdot \delta \, [N] \qquad \text{Eq. 2}$$

where

- $F_a$ axial load on bearing, N;
- $C_b$ spring constant of the bearing, N/mm;
- $\delta$ axial deformation of the bearing, mm.

Considering the bearings A and B **(Fig. 18)** of different axial stiffness and their spring constants $C_A$ and $C_B$ ($C_A < C_B$), the spring characteristics of the two bearings are presented in **Fig. 19a**. As one can see, bearing B is stiffer than bearing A, because under the same axial load, the axial deformation of bearing B is smaller than that of the bearing A.

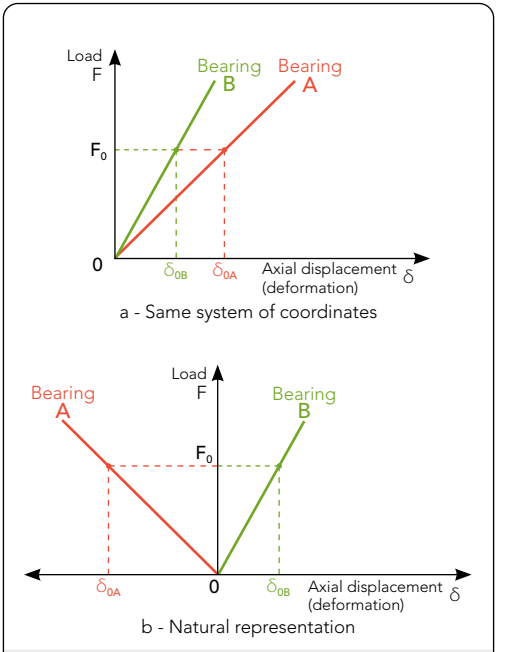
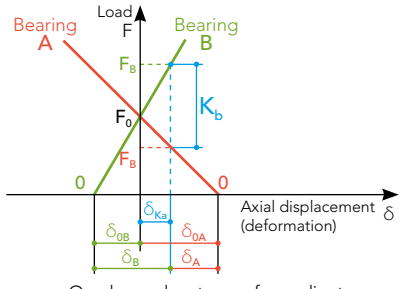


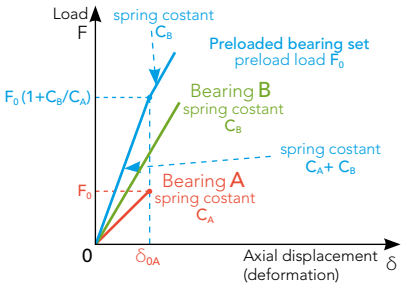

Fig. 19 - Bearing A and B spring linear characteristics

**Fig. 19a** shows the preloading axial deformations $\delta_{0A}$ and $\delta_{0B}$ of the bearings A and B, respectively, obtained after an axial displacement $\delta_{0AB} = \delta_{0A} + \delta_{0B}$ of one bearing relative to the other (here equal to the drive up of the locknut), resulting in a preload force $F_0$ acting on both bearings. Since under an external axial load, for a given axial displacement of the bearing set, the individual bearing axial displacements have different senses, it is convenient to represent the two bearing spring characteristics as in **Fig. 19b**, where the natural senses of the axial bearing deformations **(Fig. 18)** were preserved. Moreover, since only the absolute values of the axial displacements must be considered, and in order to better understand what happens when the operating axial load $K_a$ is introduced

into the system, the two characteristics are displaced axially toward each other until they cross the load axis (vertical axis) at the same point corresponding to the axial preload load $F_0$ (**Fig. 20a**).




a - Overlapped systems of coordinates




b - Same system of coordinates

Fig. 20 - Bearing set axial displacement under the action of external axial load

When an external axial load $K_a$ is applied on the shaft, a bearing set displacement $\delta_{Ka}$ occurs and the load on bearing B increases from $F_0$ to $F_B$, while the load on bearing A decreases from $F_0$ to $F_A$ (**Fig. 20a**). Axial displacements of rings of both bearings follow the spring characteristics and thus $\delta_B$ is the increased axial deformation of bearing B, while $\delta_A$ is the remaining preload on bearing A. The following equations can be written immediately:

$$F_0 = C_A \cdot \delta_{0A} = C_B \cdot \delta_{0B} \ [N] \qquad \textbf{Eq. 3}$$

$$F_A = C_A \cdot \delta_A = C_A \cdot (\delta_{0A} - \delta_{Ka}) \ [N] \qquad \textbf{Eq. 4}$$

$$F_B = C_B \cdot \delta_B = C_B \cdot (\delta_{0B} + \delta_{Ka}) \ [N] \qquad \textbf{Eq. 5}$$

$$\delta_{Ka} = \delta_{0A} - \delta_A = \delta_B - \delta_{0B} \qquad \textbf{Eq. 6}$$

$$K_a = F_B - F_A \qquad \textbf{Eq. 7}$$

If the axial force $K_a$ further increases, the remaining preload on bearing A decreases accordingly and vanishes eventually when the axial load reaches the limit value:

$$K_{a_lim} = \left(1 + \frac{C_B}{C_A}\right) \cdot F_0 \ [N] \qquad \textbf{Eq. 8}$$

At this point, bearing A is completely unloaded and when this happens the unloaded rolling elements could stop rolling and start skidding and the risk of a premature bearing failure increases significantly.

To avoid this situation, the appropriate value of the preload load should be set to the following value:

$$F_0 = F_{A_min} + \frac{K_a}{1 + \frac{C_B}{C_A}} [N] \qquad \textbf{Eq. 9}$$

The value of the minimum axial force that must remain on bearing A is connected to the minimum number of bearing rolling elements that will be loaded under the combined action of this axial load and the actual radial load. For given $F_{A_min}$ and $K_a$, in order to use a preload as low as possible, the ratio $C_B/C_A$ should be as high as possible. This means that either bearing B must have a higher stiffness than bearing A (e.g. higher contact angle), or, if sets of identical bearings are used, the number of bearings B in the set should be larger than the number of bearings A.

It is worth to highlight that up to a certain point, the stiffness of the bearing set is higher than any individual bearing A or B of the set (**Fig. 20**). The characteristic of the bearing set represents the dependence between the load $K_a$ and the axial displacement $\delta_{Ka}$ of the bearing set. The constant spring of the bearing set is $C_A + C_B$ until the axial load reaches the limit value $K_{a_lim}$, when bearing B becomes completely unloaded (knee point of the characteristic). If the axial load increases over this limit, since only bearing B is loaded and subjected to the entire axial load, the spring constant of the set has the

value $C_B$. The characteristic of the bearing set is given by the equation:

$$K_a = \begin{cases} (C_A + C_B) \cdot \delta_{Ka} & \text{if } \delta_{Ka} \le \delta_{0A} \\ C_B \cdot (\delta_{0B} + \delta_{Ka}) & \text{if } \delta_{Ka} > \delta_{0A} \end{cases} [N] \qquad \textbf{Eq. 10}$$

## Non-linear model

This model, closer to reality, assumes that the dependency between the axial load and bearing axial deformation is not linear but exponential (**Fig. 21**) and is given by the equation:

$$F_a = C_b \cdot \delta^n [N] \qquad \textbf{Eq. 11}$$

where:

- n exponent equals to 3/2, for ball bearings, or 10/9 for roller bearings.

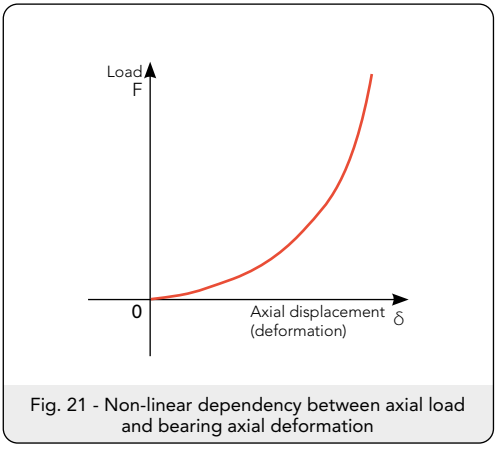



Fig. 21 - Non-linear dependency between axial load and bearing axial deformation

Whilst **Eq. 5 page 38** and **Eq. 6 page 38** still remain valid, **Eq. 2 page 37**, **Eq. 3 page 38**, and **Eq. 4 page 38** become:

$$F_0 = C_A \cdot \delta_{0A}^n = C_B \cdot \delta_{0B}^n \ [N] \qquad \textbf{Eq. 12}$$

$$F_A = C_A \cdot \delta_A^n = C_A \cdot (\delta_{0A} - \delta_{Ka})^n [N] \qquad \textbf{Eq. 13}$$

$$F_B = C_B \cdot \delta_B^n = C_B \cdot (\delta_{0B} + \delta_{Ka})^n [N] \qquad \textbf{Eq. 14}$$

The axial load remaining in bearing **A** vanishes when the following condition is fulfilled:

$$K_{a_lim} = \left[1 + \left(\frac{C_B}{C_A}\right)^{1/n}\right]^n \cdot F_0 [N] \qquad \textbf{Eq. 15}$$

At this point bearing A is completely unloaded and the unloaded rolling elements could stop rolling and start skidding. Consequently, as mentioned previously, the value of the minimum residual axial load on bearing A should be established. Then, knowing the value of operating axial load $K_a$, the value of the preload load is given by the equation:

$$F_0 = \left\{ F_{A_min}^{1/n} + \frac{K_a^{1/n}}{\left[1 + \left(\frac{C_B}{C_A}\right)^{1/n}\right]} \right\}^n [N] \qquad \textbf{Eq. 16}$$

The characteristic of the bearing set (dependency between the axial external load $K_a$ and the bearing set deformation $\delta_{Ka}$) is now given by the equation:

$$K_a = \begin{cases} C_B \cdot (\delta_{0B} + \delta_{Ka})^n - C_A \cdot (\delta_{0A} - \delta_{Ka})^n & \text{if } \delta_{Ka} \le \delta_{0A} \\ C_B \cdot [(\delta_{0B} + \delta_{0A})^n + (\delta_{Ka} - \delta_{0A})^n] & \text{if } \delta_{Ka} > \delta_{0A} \end{cases} [N] \qquad \textbf{Eq. 17}$$

If bearings A and B are identical then $C_A = C_B = C_b$, $\delta_{0A} = \delta_{0A} = \delta_0$ and therefore:

$$K_{a_lim} = 2^n \cdot F_0 [N] \qquad \textbf{Eq. 18}$$

$$F_0 = (F_{A_min}^{1/n} + K_a^{1/n}/2)^n [N] \qquad \textbf{Eq. 19}$$

$$K_a = \begin{cases} C_b \cdot [(\delta_0 + \delta_{Ka})^n - (\delta_0 - \delta_{Ka})^n] & \text{if } \delta_{Ka} \le \delta_0 \\ C_b \cdot [2^n \cdot \delta_0^n + (\delta_{Ka} - \delta_0)^n] & \text{if } \delta_{Ka} > \delta_0 \end{cases} [N] \qquad \textbf{Eq. 20}$$

For roller bearings n = 10/9 and **Eq. 18**, **Eq. 19**, and **Eq. 20** particularize as:

$$F_{0_min} = 0{,}35 \cdot K_a [N] \qquad \textbf{Eq. 21}$$

$$F_0 = [F_{A_min}^{0,9} + K_a^{0,9}/2]^{1,11} [N] \qquad \textbf{Eq. 22}$$

$$K_{a_lim} = 2,16 \cdot F_0 \, [N]$$ **Eq. 23**

For ball bearings n = 3/2 and the same equations as above become:

$$F_{0_min} = 0,46 \cdot K_a \, [N]$$ **Eq. 24**

$$F_0 = \left[F_{A_min}^{0,67} + K_a^{0,67}/2\right]^{1,5} [N]$$ **Eq. 25**

$$K_{a_lim} = 2,83 \cdot F_0 \, [N]$$ **Eq. 26**

Keeping in mind that radial bearings of the same type, mounted in tandem, act under axial load as springs mounted in parallel, for sets of tandem single row tapered roller bearings or single row angular contact ball bearings mounted in back-to-back arrangement **(Fig. 22)** the value of the axial load under which the bearing set A becomes completely unloaded is:

$$K_{a_lim} = \left(1 + q^{1/n}\right)^n \cdot F_0 \, [N]$$ **Eq. 27**

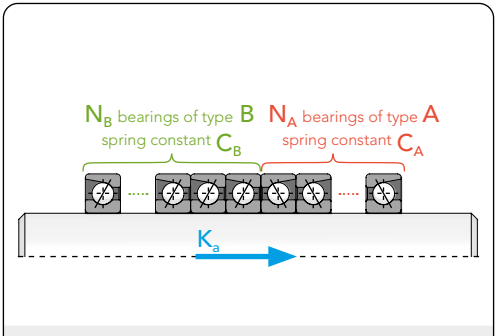



Fig. 22 - Sets of tandem single row angular contact ball bearings mounted in back-to-back arrangement

$$q = \frac{N_B}{N_A} \cdot \frac{C_B}{C_A}$$ **Eq. 28**

- $N_B$ number of bearings B (those that become more loaded under the action of external axial force $K_a$);
- $N_A$ number of bearings A (those that become unloaded under the action of external axial force $K_a$).

For single row angular contact ball bearings, if bearings A and B have the same boundary dimensions and number of balls, but different contact angles, ratio q is given by the equation:

$$q = \frac{N_B}{N_A} \cdot \left(\frac{\sin\alpha_B}{\sin\alpha_A}\right)^{5/2}$$ **Eq. 29**

where:

- $\alpha_B$ nominal contact angle of bearings B (those that become more loaded under the action of external axial force $K_a$);
- $\alpha_A$ nominal contact angle of bearings A (those that become unloaded under the action of external axial force $K_a$).

In the very likely case in which the single row angular contact bearings A and B are identical, ratio q is given by the equation:

$$q = \frac{N_B}{N_A}$$ **Eq. 30**

For example, if $N_B$ = 3 and $N_A$ = 1, and taking into account that for ball bearings n = 3/2, from **Eq. 27** and **Eq. 30**:

$$K_{a_lim} = \left(1 + 3^{2/3}\right)^{3/2} \cdot F_0 = 5,41 \cdot F_0$$ **Eq. 31**

The values of the maximum limit of the external axial load in identical angular contact bearings mounted in sets **(Fig. 22 page 40)** and preloaded by the axial load $F_0$ are given in **Tab. 2 page 41**.

| Number of bearings of type Bb $N_B$ | Number of bearings of type Ac $N_A$ | Maximum limit of axial load $K_{a_lim}$ |
|---|---|---|
| 1 | 1 | 2,83 · $F_0$ |
| 1 | 2 | 2,08 · $F_0$ |
| 1 | 3 | 1,80 · $F_0$ |
| 1 | 4 | 1,65 · $F_0$ |
| 2 | 1 | 4,16 · $F_0$ |
| 2 | 2 | 2,83 · $F_0$ |
| 2 | 3 | 2,34 · $F_0$ |
| 2 | 4 | 2,08 · $F_0$ |
| 3 | 1 | 5,41 · $F_0$ |
| 3 | 2 | 3,51 · $F_0$ |
| 3 | 3 | 2,83 · $F_0$ |
| 3 | 4 | 2,47 · $F_0$ |
| 4 | 1 | 6,60 · $F_0$ |
| 4 | 2 | 4,16 · $F_0$ |
| 4 | 3 | 3,29 · $F_0$ |
| 4 | 4 | 2,83 · $F_0$ |

Tab. 2 - Maximum limit of axial load in identical angular contact bearings mounted in sets and preloaded by the axial load $F_0$[a]

a - $F_0$ is the preload load, N
b - Bearing(s) that, after preloading, will be more loaded axially when axial load $K_a$ is applied
c - Bearing(s) that, after preloading, will relax axially when axial load $K_a$ is applied

# Noise and vibrations

Rolling bearings are dynamic systems; vibrations and sounds will always appear, no matter how "perfect" they are manufactured, mounted, lubricated, sealed and operated. Since, nowadays, quiet running is always associated with excellent form and finish of the rolling contact surfaces, bearing vibration or sound has become synonymous with bearing quality. It is well-known that as the rolling contact surfaces degrade, the vibration signature of the rolling bearing changes. Consequently, vibration monitoring is an essential and reliable component of many maintenance programs.

A certain vibration or sound can be described by its essential numerical descriptors, amplitude and frequency, respectively. Amplitude shows how severe vibration is, whereas frequency indicates the oscillation rate of vibration. Together, amplitude and frequency of vibration can provide a reliable basis for identifying the root cause of vibration.

Vibrations and sounds almost always accompany each other, but only certain sounds or vibrations, depending on their frequency, are heard or perceived by humans. For this reason, problems occurring at low frequency are called vibration problems, and those occurring at high frequency are named noise problems. The conventionally chosen threshold that helps distinguish vibration problems from noise problems is 1000 Hz (1 kHz). Vibration is considered to be below 1000 Hz and sound or noise above 1000 Hz.

Machine vibration or noise levels, either excessive or not, are influenced by bearings in three ways:

- as a structural element characterizing a machine stiffness;
- as a generator of vibrations due to the way load distribution varies cyclically within the bearing;
- as a vibration generator because of geometrical flaws from manufacturing, mounting, wear, and damage after extended use.

## Bearing fundamental frequencies

For rotating inner ring and stationary outer ring, the bearing fundamental equations are:

$$FTFO = 0,5 \cdot f_r \cdot (1 - \gamma) \, [Hz] \quad \textbf{Eq. 32}$$

$$FTFI = 0,5 \cdot f_r \cdot (1 + \gamma) \, [Hz] \quad \textbf{Eq. 33}$$

$$BPFO = Z \cdot FTFO \, [Hz] \quad \textbf{Eq. 34}$$

$$BPFI = Z \cdot FTFI \, [Hz] \quad \textbf{Eq. 35}$$

$$BSF = FTFO \cdot \left(1 + \frac{1}{\gamma}\right) \cdot \cos\alpha \, [Hz] \quad \textbf{Eq. 36}$$

where:

- FTFO fundamental train (cage) frequency (relative to the outer ring); many times it is referred to as FTF;
- FTFI fundamental train (cage) frequency (relative to the inner ring);
- BPFO ball (roller) pass frequency of outer ring, Hz;
- BPFI ball (roller) pass frequency of inner ring, Hz;
- BSF ball (roller) spin frequency, Hz;
- $f_r$ rotational frequency of the inner ring:

$$f_r = \frac{n}{60} \, [Hz] \quad \textbf{Eq. 37}$$

- n inner ring speed, rpm;
- γ bearing geometric factor:

$$\gamma = \frac{D_{w(e)} \cdot \cos\alpha}{D_{pw}} \quad \textbf{Eq. 38}$$

- $D_w$ ball diameter, mm;
- $D_{we}$ roller diameter, mm;
- $D_{pw}$ pitch diameter, mm;
- α contact angle, rad.

Equations of bearing fundamental frequencies represent some ideal formulas, derived from bearing geometry and assuming that the rolling elements roll without sliding over the raceway surfaces. However, in everyday practice, this is a very rare case since bearing vibration signals are modified by the interaction of the component parts, and this fact can be used to detect, for example, a flaw of the rolling surfaces or identify the bearing working performance.

In this context, for a bearing with rotating inner ring and stationary outer ring, an important parameter is the bearing speed ratio (relative to the outer ring) defined as the ratio between the ball pass frequency (relative to the outer ring) and inner ring rotational frequency:

$$BSRO = \frac{BPFO}{f_r} = 0,5 \cdot Z \cdot (1 - \gamma) \quad \textbf{Eq. 39}$$

The value of the actual bearing speed ratio, based on ball (roller) pass frequency measurement, is influenced by the bearing internal clearance and supported loads, and can, therefore, give some indication of the bearing operating conditions. If the actual bearing speed ratio is below (over) the value predicted by **Eq. 39**, it may indicate insufficient (excessive) loading, insufficient (excessive) radial internal clearance, or excessive (insufficient) lubrication.

## Vibration and sound generation in bearings and their sources

Ball and roller bearing noise generation raises significant problems in the present technology level. In technical applications, noise occurs for various reasons, but almost always from operating machine and equipment problems. Therefore, it is necessary to identify and understand the producing mechanism.

Compared to some specific installations, bearings produce less noise intensity, although vibration and noise are present and do not degrade their performance, if maintained within reasonable limits, being accepted as standard bearing characteristics. Obviously

the presence of vibrations and noises in rolling bearings, even if it is natural, is strictly connected to the internal micro-geometry, the manufacturing tolerances, raceway roughness, bearing precision class, fitting arrangements, lubrication, etc.

Geometrical imperfections during manufacturing, geometrical errors in associated components, inappropriate fits, defects on the rolling surfaces due to handling, mounting or wear, lubricant contamination, etc. will significantly modify the rolling bearing vibration/noise signature.

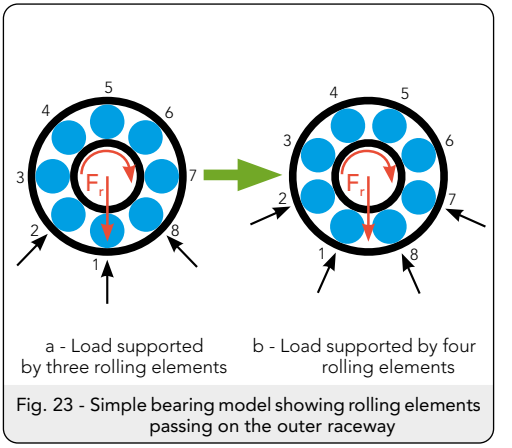



Fig. 23 - Simple bearing model showing rolling elements passing on the outer raceway

## Implicit sources

The main cause of vibration in rolling bearings is a consequence of their operation under radial or misaligned loads and occurs even if the rolling surfaces are geometrically perfect. The radial load is supported by only a few rolling elements (confined to a narrow load zone), the position of which, with respect to the load direction, changes continuously with time during bearing operation.

In **Fig. 23** the radial load is supported either by three rolling bodies (1 - the most loaded rolling element, 2 and 8), or by four (1 and 8 - the most loaded rolling elements, 2 and 7). During the shaft rotation, the number of loaded rolling elements turns from 3 to 4, back to 3, and the cycle repeats. When the number of loaded rolling elements turns from 3 to 4 the shaft bends downward and the two bearing rings approach. On the contrary, when the number of loaded rolling elements returns from 4 to 3 the shaft bends upward and the two bearing rings move away from each other.

In **Fig. 23** the radial load is supported either by three rolling bodies (1 - the most loaded rolling element, 2 and 8), or by four (1 and 8 - the most loaded rolling elements, 2 and 7). During the shaft rotation, the number of loaded rolling elements turns from 3 to 4, back to 3, and the cycle repeats. When the number of loaded rolling elements turns from 3 to 4 the shaft bends downward and the two bearing rings approach. On the contrary, when the number of loaded rolling elements returns from 4 to 3 the shaft bends upward and the two bearing rings move away from each other.

The amplitude of this vibration (rolling element passage vibration) is influenced by the number of rolling elements supporting the applied load (i.e. size of loaded zone), decreasing with this number. For bearings that are radially loaded or misaligned, the higher the running radial clearance, the smaller the size of the load zone. Thus the vibrations amplitude can be decreased by reducing the bearing internal radial clearance or by applying an axial preloading. During these vertical movements, the shaft also has slight horizontal vibration, but this is almost always negligible.

Another implicit source of noise in any type of bearings is that emitted when the rotating cage collides with rolling elements or bearing rings. The magnitude of this noise is usually not very high. Since there will always be a certain clearance between cage and rolling elements

or rings, it is almost impossible to completely eliminate this noise. Reducing the mounting error can only diminish its level.

A specific type of noise is produced when large bearings work under radial loads at low speed. In the unloaded zone, the gravity force is higher than the centrifugal one and the rolling elements fall and impact the cage and/or inner ring. When light rolling elements (e.g. made of ceramic) are not used for certain reasons (e.g. shock loads), since the reduction of the bearing clearance is not an effective countermeasure, the single possible solution in reducing this type of sound seems to be the bearing axial preloading.

## Sources due to bearing manufacturing

Geometrical imperfections caused during the manufacturing of bearing components will appear at different degrees, depending on the accuracy class of the bearing. Dimensional errors can only be reduced, but not completely eliminated. Vibrations resulting from inaccuracy in dimensions generate most of the noise (the level of which increases with dimensional inaccuracy).

Deviation from roundness and waviness of the raceways or rolling elements develops into vibrations and audible noise. Moreover, roughness of the same surfaces can also be an important source of vibration.

### Surface roughness

Vibration sometimes originates in the surface roughness, when its level is higher than the lubricant film thickness between the raceway and rolling elements. In this case, some asperities of one surface can easily penetrate the lubricant film and come into contact with the asperities of the opposite surface, generating metal-to-metal contacts. The contacting spot surfaces weld together and immediately, due to the traction force, welding points are sheared apart producing friction and striking with irregular motion or vibration. The resulting vibration, consisting of a random sequence of small impulses, usually has a frequency above 60 times the bearing rotational speed.

### Surfaces waviness

The most important vibrations due to bearing manufacturing are those caused by the waviness of raceways or rolling element surfaces. Even if precision machining technology is used, waviness exists and will produce noise and vibrations. Waviness consists of imperfections with a sinusoidal shape located on the outer surface of the bearing components.

As shown in **Fig. 24**, vibration appears in radial direction when the number of peaks of waviness on the inner ring raceways exceeds by 1 a certain multiple of the number of rolling elements. The generated vibration may have frequencies up to approximately 300 times the rotational speed of the bearing, but is commonly encountered at frequencies under 60 times bearing rotational speed.

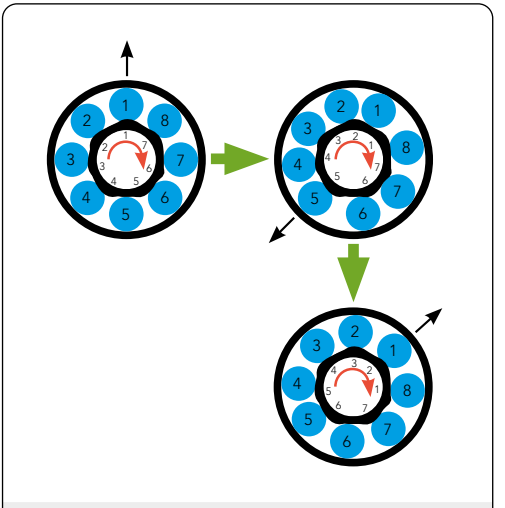


Fig. 24 - Vibration generation due to waviness of inner ring raceway surface

Contrarily to the other noise generated by

a rolling bearing, the frequency of noise due to waviness depends on the operating speed of the bearing. At a uniform rotational speed, the noise caused by waviness is strident and constant in frequency. It becomes more severe when a bearing accelerates or decelerates and its frequency increases or decreases with speed. When the vibration due to the waviness of the raceways and/or rolling elements is excessive, the resulting noise can be a real problem. Noise caused by waviness can be reduced only by decreasing the amplitude of waviness on the finished surfaces of the bearing components.

## Sources due to bearing component defects

Although bearing main components have very hard surfaces, continued repetitive loading of a bearing will result in surface fatigue: pitting, spalling, or flaking of bearing raceways and rolling elements. Impacts or shocks could lead also to dents on the raceways or rolling element surfaces. Even minor shape defects can generate noise and vibration. If considerable acoustic emissions occur, there is a clear indication of sub-surface fatigue crack expansion that will likely end with surface failure in the form of pitting or spalling.

### Raceway defect

If a flaw (pit, spall, flake, dent, rust, etc.) is developed on the ring raceways, the rolling elements hit that particular flaw during rotation and, therefore, a pulsating noise appears. The frequency of this noise has specific generation cycles, as indicated in **Fig. 25**. If the lubricant is a high-viscosity grease, the noise level tends to be reduced, due to the dampener properties of the grease thickener.

A minor defect on inner raceway will produce a sequence of high-energy impulses with a frequency equal to that of rolling elements pass frequency relative to the inner raceway. As the inner ring rotates, this defect will enter, pass through, and then leave the bearing loaded zone, inducing a variation in the deflections of the rolling elements existing in the loaded zone.

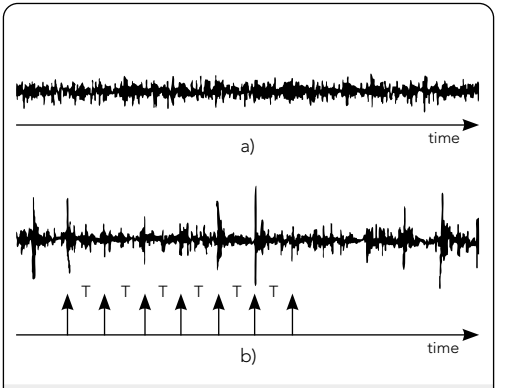



Fig. 25 - Bearing noise: a) without flaws on bearing components b) with flaws on bearing components

The highest amplitude of the impulses will appear when the defect passes through the load zone, but as the flaw leaves this zone, the amplitude will decrease. The noise generation cycle is extended with speed decrease, while at constant speed, it remains constant. A minor defect on the outer raceway will produce also a sequence of high-energy impulses, but with a frequency equal to that of rolling elements pass frequency relative to the outer raceway. Since the outer ring is stationary, amplitude of the impulses will not change, and thus in the frequency area only a single minor peak will appear. The outer ring natural frequency will be more likely detected due to the small interference or clearance fit in the housing.

### Rolling element defect

Defects on the rolling elements can produce a frequency at twice their spin frequency when the rolling element with the defect is in the loaded zone, and a lower frequency when the defect hits the raceways in the unloaded zone. When more than one rolling element encounters defects, sum of their spin frequencies can be produced, and if these defects are too large, vibration at

fundamental cage frequency appears.

## Cage defect

Bearing cage usually has low mass and rotates at 0,4 times inner ring speed and thus the cage vibration becomes perceptible only if there is a manufacturing defect. As a cage deteriorates, possibly as a result of inadequate lubrication, wear may occur in its pockets or on its guiding surfaces. An increased clearance can lead to vibration at the fundamental cage frequency, as the rolling elements accelerate and decelerate when passing through the bearing loaded zone. For this reason large impact forces between the rolling elements and cage pockets are developed.

## Sources due to improper handling, mounting, and operation

Damages to the bearing such as dents, scratches and even cracks can be generated during improper handling and mounting, and appear on the surfaces of raceways or rolling elements. As mentioned before, these flaws will lead to severe vibration and noise of the bearing in operation.

When an inappropriate bearing seal system is used or during operation in severe conditions, the infiltration of contaminants into the bearing is very likely to occur. Negligent handling can also determine bearing contamination. Contaminants are then over rolled by the rolling elements, causing wear and damage (including dents) to the rolling contact surfaces. The magnitude of the generated vibration is conditioned by the type, size and structure of the contaminants.

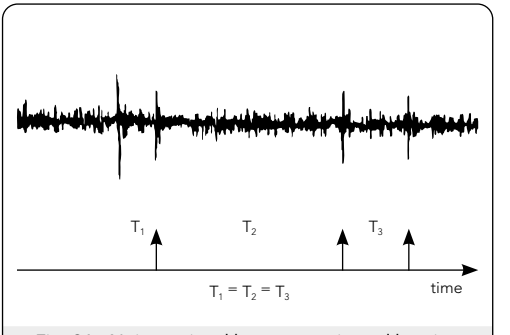


Fig. 26 - Noise emitted by a contaminated bearing

Contamination produces vibration and irregular noise as shown in **Fig. 26**. The influence of foreign particles varies according to bearing size and the noise usually becomes a problem for small-sized bearings.

Remember that insufficient or inadequate lubrication can produce friction and striking with irregular motion or vibration. The contacting surfaces will weld together and will be broken or sheared apart, if a separating lubricant layer is missing.

During bearing operation, the axis of the inner raceway permanently oscillates with respect to the outer raceway. Radial internal clearance, thermal expansion and deformations appearing during installation and resulting from external load represent the main reasons for these oscillations. Variation of the external load can also significantly affect the vibrational regime of the bearing. Regarding bearing internal clearance, a large clearance produces a distinctive hollow noise, whilst an excessive negative clearance (preload) produces a different particular high-pitch noise.

## Other sources of vibration

Manufacturing errors in the form of deviations from roundness can be transferred by elastic deformation of the rings from the housing and shaft seats to the raceways. In such situations when there is a tight fit between the bearing ring and the housing or the shaft, the result is that the bearing ring is likely to take the

shape of the adjacent components and exhibits waviness that generates vibration and noise.

Rolling bearing seals or closures represent another source of vibrations and noise. Seal noise is present when contact seals are used for grease lubricated bearings and is assigned to self-induced vibration, generated by the friction between the seal and mating part. This type of vibration is not regarded as a serious problem for the majority of applications until its magnitude is low.

External vibrations can be generated elsewhere in the machine and can create difficulties during bearing vibration measurements. It is sometimes hard to detect the external sources from inherent bearing vibration, basically because bearings develop the transmission path between vibrations having their origin in the rotating assembly and the bearing housing or machine chassis, which are stationary.

## Reducing the levels of noise and vibration

Excessive noise and vibration levels occurring in large equipment represent an increasing issue for industry. Excessive vibration may produce premature failure and high cost maintenance, possibly leading to production loss. In such applications where vibration plays a crucial role, its levels can be reduced to minimum by using ball or roller bearings with a correct degree of axial preload. Low frequency vibration resulting from the load variation can also be reduced by applying an axial preload in order to load all the rolling elements (which is not possible with cylindrical roller bearings) or by reducing the radial clearance. Minimizing dimensional faults and the magnitude of the waviness on the finished surfaces of bearing components is fundamental to have less noise. This can be achieved by improving the overall quality and precision of bearings, but also special care should be taken to the form and precision of all adjacent components. However, it is imperative that all these components are manufactured at a similar level of precision.

Since there is clearance between the cage and rolling elements and raceway rings, it is almost impossible to exclude the generated noise, but it can be reduced to some degree by minimizing the mounting errors. Sliding friction occurs between the guiding face of the cage and the bearing component that guides the cage, generating vibration and hence noise. There is a general rule asserting that vibration is a dynamic response to a dynamic force whose increase becomes harmful to bearing life; excessive vibration = excessive force = a severe bearing life reduction.

As a countermeasure, it is desirable to reduce and even exclude forces originating from looseness, unbalance, and misalignment. Since bearing clearance influences the presence of vibrations, number of loaded rolling elements and bearing running accuracy, it is preferable to have a minimum residual internal clearance in the bearing in order to reach a minimized noise level. In practice, however, this is difficult to achieve because of variable working conditions. Therefore, the reduction of clearance after installation, due to the interference fits at the bearing seats and to the thermal expansion during operation, has to be taken into consideration. As rolling bearing seals contribute to generate vibration, an important countermeasure is the use of a different type of seal or the selection of a different type of grease. In various technical fields and noise critical applications, ultra-pure and low-noise greases are necessary for rolling bearings. Special lubricating greases comply with the requisite noise limits and tight operating tolerances in precision rolling bearings, providing an economic and energy efficient functioning.

## Vibration monitoring and measurement

In industry, vibration monitoring is currently part of many planned maintenance programs. Rolling bearings transmit load through rotating elements, and their dynamic behavior is one of the most important and relevant indicator of the general mechanical system operation state. In most cases these

vibrations cannot be measured directly on the bearing and, therefore, the machine structure influences and modifies the signature of bearing vibration. For these particular reasons, trained personnel should measure vibrations in the proximity of the bearings with sensors located on their housing or machine chassis. Otherwise, misdiagnosis becomes very probable, resulting in unnecessary machine downtime and high costs.

Wideband vibration measurement represents the first step in detecting defects. It is fast and low-cost, but, on the other hand, it has the disadvantage of being less sensitive to the early phases of the developed defects. When the source of the flaw (along with its earlier development) needs to be known, the use of frequency analysis represents an improvement in diagnostic capability. This technique helps identify independent factors that contribute to the overall machine vibration (unbalance, misalignment, etc.) in the frequency area and it is easy to associate them with the independent vibration sources. In an earlier phase, the developing defect appears in the form of a raised vibration with a typical frequency.

The general noise produced by the machine can cover the vibration signal generated in the initial phase of the bearing deterioration. This will make difficult the detection using only the spectrum analysis.

The Envelope Spectrum or High Frequency Resonance Technique (HFRT) has the major advantage of extracting the periodic impacts from the modulated random noise and that is why this technique is often used to detect early damage in rolling element bearings of a deteriorating rolling bearing.

# Bearing radial location

Bearing radial location (i.e. prevention of the radial movement of the bearing rings relative to the shaft or housing) is achieved by form and is based on the fitting of the bearing rings in the conjugate parts (shaft and housing). It is easy to understand that if the bearing rings (washers) are not entirely and firmly supported around their circumference and along their width (height), the correct functioning of the bearing could be compromised.

Consequently, the bearing seats both on shaft and in housing have to be machined with adequate dimensional, form, orientation, and runout accuracy and their surfaces will not be interrupted by grooves, holes or other features that can influence the supporting of the bearing mating surfaces. Moreover, appropriate and reliable measures must be taken in order to prevent the bearing rings (washers) from turning on or in their seats (especially under circumferential loads), since this leads to a quick wear in the abutting components and to the bearing failure.

Regarding the quality of the bearing radial location, it is worth noting here that only the mounting with appropriately selected interference fits of the bearing rings in the mating parts can assure appropriate radial location and firm support. However there are situations in which the use of interference fit is inappropriate (desirable easy mounting and dismounting, required axial displacement of an individual ring or of the entire bearing, etc.) and clearance or transitive fit should be used. In these cases, special measures to limit the inevitable wear from creep should be taken: very careful selection of clearance fit, surface hardening of the bearing mating surfaces (shaft and housing seats and abutments), lubrication of creeping surfaces, evacuation of wear particles, etc.

This suggests how important the selection of correct fits and form, orientation, runout accuracy is, and how decisive is also the machining of the bearing conjugate parts.

## Bearing mounting fits

Dimensions of all machine parts (the bearings as well) have specified tolerances when they are manufactured. Where a specific fit condition is required between mating surfaces of two different parts, it is necessary to ascribe an allowance, either positive or negative, to the nominal size to achieve

the required clearance or interference. ISO 286:2010 gives the internationally accepted code system for tolerances on linear sizes (useful for shafts and housings) and other specific standards establish the tolerances for bearings. The goal of combining these two tolerance types is the fulfillment of the appropriate operational fits of the bearing with its mating parts.

## ISO code system for tolerances on linear sizes

ISO 286:2010 establishes the tolerances to be used for linear sizes of features of cylinders and of two parallel opposite surfaces. The basic concepts of this code system provide a standardized selection of tolerance classes for general purposes. Terminology, definitions, and denotations referring to ISO code system for tolerances are given in **Tab. 3 page 50** and illustrated in **Fig. 27**.

The concept of ISO code system for tolerances is the so-called tolerance class that contains two standardized pieces of information that completely defines the tolerance magnitude and its placement: tolerance interval and fundamental deviation **(Fig. 28)**. The standard tolerance grade (ITx) is obtained from the standard tolerance grade number (x), and the standard tolerance value is obtained from the nominal size and the standard tolerance grade (i.e. the magnitude of the tolerance) by the use of **Tab. 4 page 51** and **Tab. 5 page 52**.

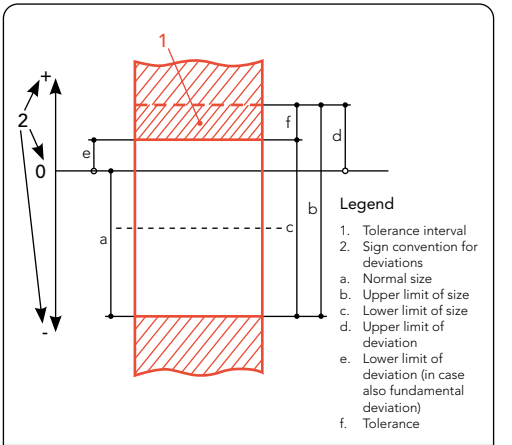



Fig. 27 - Illustration of definitions (a hole is used in the example)

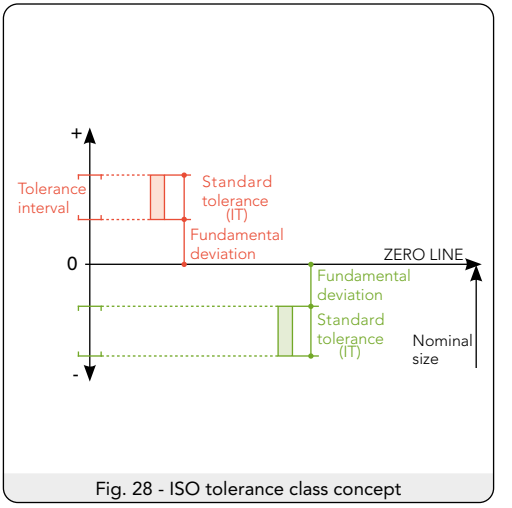



Fig. 28 - ISO tolerance class concept

| Nominal size [mm] | | Standard tolerance grades | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT01 | IT0 | IT1 | IT2 | IT3 | IT4 | IT5 | IT 6 | IT 7 | IT 8 | IT 9 | IT10 | IT11 |
| | | Standard tolerance values [µm] | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | |
| - | 3 | 0,3 | 0,5 | 0,8 | 1,2 | 2 | 3 | 4 | 6 | 10 | 14 | 25 | 40 | 60 |
| 3 | 6 | 0,4 | 0,6 | 1 | 1,5 | 2,5 | 4 | 5 | 8 | 12 | 18 | 30 | 48 | 75 |
| 6 | 10 | 0,4 | 0,6 | 1 | 1,5 | 2,5 | 4 | 6 | 9 | 15 | 22 | 36 | 58 | 90 |
| 10 | 18 | 0,5 | 0,8 | 1,2 | 2 | 3 | 5 | 8 | 11 | 18 | 27 | 43 | 70 | 110 |
| 18 | 30 | 0,6 | 1 | 1,5 | 2,5 | 4 | 6 | 9 | 13 | 21 | 33 | 52 | 84 | 130 |
| 30 | 50 | 0,6 | 1 | 1,5 | 2,5 | 4 | 7 | 11 | 16 | 25 | 39 | 62 | 100 | 160 |
| 50 | 80 | 0,8 | 1,2 | 2 | 3 | 5 | 8 | 13 | 19 | 30 | 46 | 74 | 120 | 190 |
| 80 | 120 | 1 | 1,5 | 2,5 | 4 | 6 | 10 | 15 | 22 | 35 | 54 | 87 | 140 | 220 |
| 120 | 180 | 1,2 | 2 | 3,5 | 5 | 8 | 12 | 18 | 25 | 40 | 63 | 100 | 160 | 250 |
| 180 | 250 | 2 | 3 | 4,5 | 7 | 10 | 14 | 20 | 29 | 46 | 72 | 115 | 185 | 290 |
| 250 | 315 | 2,5 | 4 | 6 | 8 | 12 | 16 | 23 | 32 | 52 | 81 | 130 | 210 | 320 |
| 315 | 400 | 3 | 5 | 7 | 9 | 13 | 18 | 25 | 36 | 57 | 89 | 140 | 230 | 360 |
| 400 | 500 | 4 | 6 | 8 | 10 | 15 | 20 | 27 | 40 | 63 | 98 | 155 | 250 | 400 |
| 500 | 630 | - | - | 9 | 11 | 16 | 22 | 32 | 44 | 70 | 110 | 175 | 280 | 440 |
| 630 | 800 | - | - | 10 | 13 | 18 | 25 | 36 | 50 | 80 | 125 | 200 | 320 | 500 |
| 800 | 1000 | - | - | 11 | 15 | 21 | 28 | 40 | 56 | 90 | 1400 | 230 | 360 | 560 |
| 1000 | 1250 | - | - | 13 | 18 | 24 | 33 | 47 | 66 | 105 | 165 | 260 | 420 | 660 |
| 1250 | 1600 | - | - | 15 | 21 | 29 | 39 | 55 | 78 | 125 | 195 | 310 | 500 | 780 |
| 1600 | 2000 | - | - | 18 | 25 | 35 | 46 | 65 | 92 | 150 | 230 | 370 | 600 | 920 |
| 2000 | 2500 | - | - | 22 | 30 | 41 | 55 | 78 | 110 | 175 | 280 | 440 | 700 | 1100 |
| 2500 | 3150 | - | - | 26 | 36 | 50 | 68 | 96 | 135 | 210 | 330 | 540 | 860 | 1350 |

Tab. 3 - Values of standard tolerance grades for nominal sizes up to 3150 mm: IT01-IT11

| Nominal size [mm] | | Standard tolerance grades | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | IT12 | IT13 | IT14 | IT15 | IT16 | IT17 | IT18 |
| | | Standard tolerance values [mm] | | | | | | |
| over | incl. | | | | | | | |
| - | 3 | 0,1 | 0,14 | 0,25 | 0,4 | 0,6 | 1 | 1,4 |
| 3 | 6 | 0,12 | 0,18 | 0,3 | 0,48 | 0,75 | 1,2 | 1,8 |
| 6 | 10 | 0,15 | 0,22 | 0,36 | 0,58 | 0,9 | 1,5 | 2,2 |
| 10 | 18 | 0,18 | 0,27 | 0,43 | 0,7 | 1,1 | 1,8 | 2,7 |
| 18 | 30 | 0,21 | 0,33 | 0,52 | 0,84 | 1,3 | 2,1 | 3,3 |
| 30 | 50 | 0,25 | 0,39 | 0,62 | 1 | 1,6 | 2,5 | 3,9 |
| 50 | 80 | 0,3 | 0,46 | 0,74 | 1,2 | 1,9 | 3 | 4,6 |
| 80 | 120 | 0,35 | 0,54 | 0,87 | 1,4 | 2,2 | 3,5 | 5,4 |
| 120 | 180 | 0,4 | 0,63 | 1 | 1,6 | 2,5 | 4 | 6,3 |
| 180 | 250 | 0,46 | 0,72 | 1,15 | 1,85 | 2,9 | 4,6 | 7,2 |
| 250 | 315 | 0,52 | 0,81 | 1,3 | 2,1 | 3,2 | 5,2 | 8,1 |
| 315 | 400 | 0,57 | 0,89 | 1,4 | 2,3 | 3,6 | 5,7 | 8,9 |
| 400 | 500 | 0,63 | 0,97 | 1,55 | 2,5 | 4 | 6,3 | 9,7 |
| 500 | 630 | 0,7 | 1,1 | 1,75 | 2,8 | 4,4 | 7 | 11 |
| 630 | 800 | 0,8 | 1,25 | 2 | 3,2 | 5 | 8 | 12,5 |
| 800 | 1000 | 0,9 | 1,4 | 2,3 | 3,6 | 5,6 | 9 | 14 |
| 1000 | 1250 | 1,05 | 1,65 | 2,6 | 4,2 | 6,6 | 10,5 | 16,5 |
| 1250 | 1600 | 1,25 | 1,95 | 3,1 | 5 | 7,8 | 12,5 | 19,5 |
| 1600 | 2000 | 1,5 | 2,3 | 3,7 | 6 | 9,2 | 15 | 23 |
| 2000 | 2500 | 1,75 | 2,8 | 4,4 | 7 | 11 | 17,5 | 28 |
| 2500 | 3150 | 2,1 | 3,3 | 5,4 | 8,6 | 13,5 | 21 | 33 |

Tab. 4 - Values of standard tolerance grades for nominal sizes up to 3150 mm: IT12-IT18

| Nominal size [mm] | | Standard tolerance grades | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | IT12 | IT13 | IT14 | IT15 | IT16 | IT17 | IT18 |
| | | Standard tolerance values [mm] | | | | | | |
| over | incl. | | | | | | | |
| - | 3 | 0,1 | 0,14 | 0,25 | 0,4 | 0,6 | 1 | 1,4 |
| 3 | 6 | 0,12 | 0,18 | 0,3 | 0,48 | 0,75 | 1,2 | 1,8 |
| 6 | 10 | 0,15 | 0,22 | 0,36 | 0,58 | 0,9 | 1,5 | 2,2 |
| 10 | 18 | 0,18 | 0,27 | 0,43 | 0,7 | 1,1 | 1,8 | 2,7 |
| 18 | 30 | 0,21 | 0,33 | 0,52 | 0,84 | 1,3 | 2,1 | 3,3 |
| 30 | 50 | 0,25 | 0,39 | 0,62 | 1 | 1,6 | 2,5 | 3,9 |
| 50 | 80 | 0,3 | 0,46 | 0,74 | 1,2 | 1,9 | 3 | 4,6 |
| 80 | 120 | 0,35 | 0,54 | 0,87 | 1,4 | 2,2 | 3,5 | 5,4 |
| 120 | 180 | 0,4 | 0,63 | 1 | 1,6 | 2,5 | 4 | 6,3 |
| 180 | 250 | 0,46 | 0,72 | 1,15 | 1,85 | 2,9 | 4,6 | 7,2 |
| 250 | 315 | 0,52 | 0,81 | 1,3 | 2,1 | 3,2 | 5,2 | 8,1 |
| 315 | 400 | 0,57 | 0,89 | 1,4 | 2,3 | 3,6 | 5,7 | 8,9 |
| 400 | 500 | 0,63 | 0,97 | 1,55 | 2,5 | 4 | 6,3 | 9,7 |
| 500 | 630 | 0,7 | 1,1 | 1,75 | 2,8 | 4,4 | 7 | 11 |
| 630 | 800 | 0,8 | 1,25 | 2 | 3,2 | 5 | 8 | 12,5 |
| 800 | 1000 | 0,9 | 1,4 | 2,3 | 3,6 | 5,6 | 9 | 14 |
| 1000 | 1250 | 1,05 | 1,65 | 2,6 | 4,2 | 6,6 | 10,5 | 16,5 |
| 1250 | 1600 | 1,25 | 1,95 | 3,1 | 5 | 7,8 | 12,5 | 19,5 |
| 1600 | 2000 | 1,5 | 2,3 | 3,7 | 6 | 9,2 | 15 | 23 |
| 2000 | 2500 | 1,75 | 2,8 | 4,4 | 7 | 11 | 17,5 | 28 |
| 2500 | 3150 | 2,1 | 3,3 | 5,4 | 8,6 | 13,5 | 21 | 33 |

Tab. 5 - Values of standard tolerance grades for nominal sizes up to 3150 mm: IT12-IT18

The fundamental deviation is that limit deviation that is the nearest to the nominal size (**Fig. 28 page 49**). The fundamental deviations are identified and controlled by:

- upper case letter(s) for holes (A…ZC, **Fig. 29a**);
- lower case letter(s) for shafts (a…zc, **Fig. 29b**).

The fundamental deviation is a function of the identifier (letter) and the nominal size of the toleranced feature. They are not defined individually for each specific nominal size, but for ranges of nominal sizes. Tolerance limits may be one-sided (both values on one side of the nominal size line) or two-sided (values on both sides of the nominal size line). The case where one tolerance limit is on one side, the other limit value being zero (fundamental deviation equals zero), is a special case of a one-sided indication, and H (for holes) and h (for shafts) are the most representative situations.

Note that the concept of fundamental deviation does not apply to JS and js. Their tolerance limits are distributed symmetrically relative to the nominal size line (zero line).

With all these, the tolerance class shall be designated by the combination of an upper case letter (for holes) or lower case letter (for shafts) identifying the fundamental deviation and the number representing the standard tolerance grade (e.g. H7, h7).

Knowing the nominal size and the tolerance class, the value of the lower limit deviation (EI for holes or ei for shafts) and upper limit deviation (ES for holes or es for shafts) can be easily calculated. This catalogue only gives the tolerance classes (accompanied by the values of the upper and lower limit deviations), and the most relevant nominal sizes for bearing mounting are given from **Tab. 6 page 54** to **Tab. 8 page 56** for shaft diameters, and from **Tab. 9 page 57** to **Tab. 11 page 59** for housing bore diameters.

Note that since the values of standard tolerance grades are useful not only for the bearing fits but in many other situations, they are also presented in this catalogue (**Tab. 4 page 51** and **Tab. 5 page 52**).

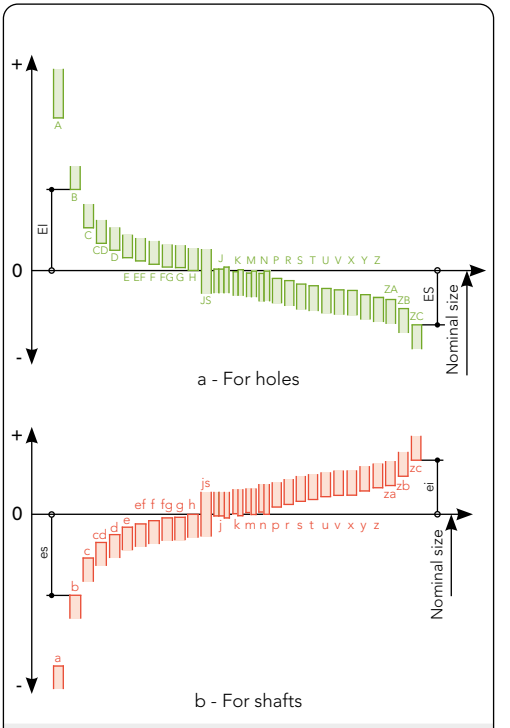



Fig. 29 - ISO tolerance interval placement (fundamental deviation) relative to the nominal size

| Nominal shaft diameter d [mm] | | Tolerance class | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | e7 | | f5 | | f6 | | g5 | | g6 | | h5 | | h6 | | h8 | | h9 | | j5 | |
| | | Upper and lower limit deviations, es and ei [µm] | | | | | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | | | | | |
| 1 | 3 | -14 | -24 | -6 | -10 | -6 | -12 | -2 | -6 | -2 | -8 | 0 | -4 | 0 | -6 | 0 | -14 | 0 | -25 | 2 | -2 |
| 3 | 6 | -20 | -32 | -10 | -15 | -10 | -18 | -4 | -9 | -4 | -12 | 0 | -5 | 0 | -8 | 0 | -18 | 0 | -30 | 3 | -2 |
| 6 | 10 | -25 | -40 | -13 | -19 | -13 | -22 | -5 | -11 | -5 | -14 | 0 | -6 | 0 | -9 | 0 | -22 | 0 | -36 | 4 | -2 |
| 10 | 18 | -32 | -50 | -16 | -24 | -16 | -27 | -6 | -14 | -6 | -17 | 0 | -8 | 0 | -11 | 0 | -27 | 0 | -43 | 5 | -3 |
| 18 | 30 | -40 | -61 | -20 | -29 | -20 | -33 | -7 | -16 | -7 | -20 | 0 | -9 | 0 | -13 | 0 | -33 | 0 | -52 | 5 | -4 |
| 30 | 50 | -50 | -75 | -25 | -36 | -25 | -41 | -9 | -20 | -9 | -25 | 0 | -11 | 0 | -16 | 0 | -39 | 0 | -62 | 6 | -5 |
| 50 | 80 | -60 | -90 | -30 | -43 | -30 | -49 | -10 | -23 | -10 | -29 | 0 | -13 | 0 | -19 | 0 | -46 | 0 | -74 | 6 | -7 |
| 80 | 120 | -72 | -107 | -36 | -51 | -36 | -58 | -12 | -27 | -12 | -34 | 0 | -15 | 0 | -22 | 0 | -54 | 0 | -87 | 6 | -9 |
| 120 | 180 | -85 | -125 | -43 | -61 | -43 | -68 | -14 | -32 | -14 | -39 | 0 | -18 | 0 | -25 | 0 | -63 | 0 | -100 | 7 | -11 |
| 180 | 250 | -100 | -146 | -50 | -70 | -50 | -79 | -15 | -35 | -15 | -44 | 0 | -20 | 0 | -29 | 0 | -72 | 0 | -115 | 7 | -13 |
| 250 | 315 | -110 | -162 | -56 | -79 | -56 | -88 | -17 | -40 | -17 | -49 | 0 | -23 | 0 | -32 | 0 | -81 | 0 | -130 | 7 | -16 |
| 315 | 400 | -125 | -182 | -62 | -87 | -62 | -98 | -18 | -43 | -18 | -54 | 0 | -25 | 0 | -36 | 0 | -89 | 0 | -140 | 7 | -18 |
| 400 | 500 | -135 | -198 | -68 | -95 | -68 | -108 | -20 | -47 | -20 | -60 | 0 | -27 | 0 | -40 | 0 | -97 | 0 | -155 | 7 | -20 |
| 500 | 630 | -145 | -215 | -76 | -104 | -76 | -120 | -22 | -50 | -22 | -66 | 0 | -28 | 0 | -44 | 0 | -110 | 0 | -175 | - | - |
| 630 | 800 | -160 | -240 | -80 | -112 | -80 | -130 | -24 | -56 | -24 | -74 | 0 | -32 | 0 | -50 | 0 | -125 | 0 | -200 | - | - |
| 800 | 1000 | -170 | -260 | -86 | -122 | -86 | -142 | -26 | -62 | -26 | -82 | 0 | -36 | 0 | -56 | 0 | -140 | 0 | -230 | - | - |
| 1000 | 1250 | -195 | -300 | -98 | -140 | -98 | -164 | -28 | -70 | -28 | -94 | 0 | -42 | 0 | -66 | 0 | -165 | 0 | -260 | - | - |
| 1250 | 1600 | -220 | -345 | -110 | -160 | -110 | -188 | -30 | -80 | -30 | -108 | 0 | -50 | 0 | -78 | 0 | -195 | 0 | -310 | - | - |
| 1600 | 2000 | -240 | -390 | -120 | -180 | -120 | -212 | -32 | -92 | -32 | -124 | 0 | -60 | 0 | -92 | 0 | -230 | 0 | -370 | - | - |

Tab. 6 - Upper and lower limit deviations of shaft diameter tolerance intervals: e7-j5

| Nominal shaft diameter d [mm] | | Tolerance class | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | j6 | | js5 | | js6 | | js7 | | k4 | | k5 | | k6 | | m5 | | m6 | | n5 | |
| | | Upper and lower limit deviations, es and ei [µm] | | | | | | | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | | | | | | | |
| **1** | **3** | 4 | -2 | 2 | -2 | 3 | -3 | 5 | -5 | 3 | 0 | 4 | 0 | 6 | 0 | 6 | 2 | 8 | 2 | 8 | 4 |
| **3** | **6** | 6 | -2 | 2,5 | 2,5 | 4 | -4 | 6 | -6 | 5 | 1 | 6 | 1 | 9 | 1 | 9 | 4 | 12 | 4 | 13 | 8 |
| **6** | **10** | 7 | -2 | 3 | -3 | 4,5 | -4,5 | 7,5 | -7,5 | 5 | 1 | 7 | 1 | 10 | 1 | 12 | 6 | 15 | 6 | 16 | 10 |
| **10** | **18** | 8 | -3 | 4 | -4 | 5,5 | -5,5 | 9 | -9 | 6 | 1 | 9 | 1 | 12 | 1 | 15 | 7 | 18 | 7 | 20 | 12 |
| **18** | **30** | 9 | -4 | 4,5 | -4,5 | 6,5 | -6,5 | 11 | -11 | 8 | 2 | 11 | 2 | 15 | 2 | 17 | 8 | 21 | 8 | 24 | 15 |
| **30** | **50** | 11 | -5 | 5,5 | -5,5 | 8 | -8 | 13 | -13 | 9 | 2 | 13 | 2 | 18 | 2 | 20 | 9 | 25 | 9 | 28 | 17 |
| **50** | **80** | 12 | -7 | 6,5 | -6,5 | 9,5 | -9,5 | 15 | -15 | 10 | 2 | 15 | 2 | 21 | 2 | 24 | 11 | 30 | 11 | 33 | 20 |
| **80** | **120** | 13 | -9 | 7,5 | -7,5 | 11 | -11 | 18 | -18 | 13 | 3 | 18 | 3 | 25 | 3 | 28 | 13 | 35 | 13 | 38 | 23 |
| **120** | **180** | 14 | -11 | 9 | -9 | 13 | -13 | 20 | -20 | 15 | 3 | 21 | 3 | 28 | 3 | 33 | 15 | 40 | 15 | 45 | 27 |
| **180** | **250** | 16 | -13 | 10 | -10 | 15 | -15 | 23 | -23 | 18 | 4 | 24 | 4 | 33 | 4 | 37 | 17 | 46 | 17 | 51 | 31 |
| **250** | **315** | 16 | -16 | 12 | -12 | 16 | -16 | 26 | -26 | 20 | 4 | 27 | 4 | 36 | 4 | 43 | 20 | 52 | 20 | 57 | 34 |
| **315** | **400** | 18 | -18 | 13 | -13 | 18 | -18 | 29 | -29 | 22 | 4 | 29 | 4 | 40 | 4 | 46 | 21 | 57 | 21 | 62 | 37 |
| **400** | **500** | 20 | -20 | 14 | -14 | 20 | -20 | 32 | -32 | 25 | 5 | 32 | 5 | 45 | 5 | 50 | 23 | 63 | 23 | 67 | 40 |
| **500** | **630** | 22 | -22 | 14 | -14 | 22 | -22 | 35 | -35 | - | - | 29 | 0 | 44 | 0 | 55 | 26 | 70 | 26 | 73 | 44 |
| **630** | **800** | 25 | -25 | 16 | -16 | 25 | -25 | 40 | -40 | - | - | 32 | 0 | 50 | 0 | 62 | 30 | 80 | 30 | 82 | 50 |
| **800** | **1000** | 28 | -28 | 18 | -18 | 28 | -28 | 45 | -45 | - | - | 36 | 0 | 56 | 0 | 70 | 34 | 90 | 34 | 92 | 56 |
| **1000** | **1250** | 33 | -33 | 21 | -21 | 33 | -33 | 52 | -52 | - | - | 42 | 0 | 66 | 0 | 82 | 40 | 106 | 40 | 108 | 66 |
| **1250** | **1600** | 39 | -39 | 25 | -25 | 39 | -39 | 62 | -62 | - | - | 50 | 0 | 78 | 0 | 98 | 48 | 126 | 48 | 128 | 78 |
| **1600** | **2000** | 46 | -46 | 30 | -30 | 46 | -46 | 75 | -75 | - | - | 60 | 0 | 92 | 0 | 118 | 58 | 150 | 58 | 152 | 92 |

Tab. 7 - Upper and lower limit deviations of shaft diameter tolerance intervals: j6-n5

| Nominal shaft diameter d [mm] | | Tolerance class | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n6 | | p6 | | p7 | | r6 | | r7 | | s6 | | s7 | |
| | | Upper and lower limit deviations, es and ei [µm] | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | |
| 1 | 3 | 10 | 4 | 12 | 6 | 16 | 6 | 16 | 10 | 20 | 10 | 20 | 14 | 24 | 14 |
| 3 | 6 | 16 | 8 | 20 | 12 | 24 | 12 | 23 | 15 | 27 | 15 | 27 | 19 | 31 | 19 |
| 6 | 10 | 19 | 10 | 24 | 15 | 30 | 15 | 28 | 19 | 34 | 19 | 32 | 23 | 38 | 23 |
| 10 | 18 | 23 | 12 | 29 | 18 | 36 | 18 | 34 | 23 | 41 | 23 | 39 | 28 | 46 | 28 |
| 18 | 30 | 28 | 15 | 35 | 22 | 43 | 22 | 41 | 28 | 49 | 28 | 48 | 35 | 56 | 35 |
| 30 | 50 | 33 | 17 | 42 | 26 | 51 | 26 | 50 | 34 | 59 | 34 | 59 | 43 | 68 | 43 |
| 50 | 65 | 39 | 20 | 51 | 32 | 62 | 32 | 60 | 41 | 71 | 41 | 72 | 53 | 83 | 53 |
| 65 | 80 | 39 | 20 | 51 | 32 | 62 | 32 | 62 | 43 | 73 | 43 | 78 | 59 | 89 | 59 |
| 80 | 100 | 45 | 23 | 59 | 37 | 72 | 37 | 73 | 51 | 86 | 51 | 93 | 71 | 106 | 71 |
| 100 | 120 | 45 | 23 | 59 | 37 | 72 | 37 | 76 | 54 | 89 | 54 | 101 | 79 | 114 | 79 |
| 120 | 140 | 52 | 27 | 68 | 43 | 83 | 43 | 88 | 63 | 103 | 63 | 117 | 92 | 132 | 92 |
| 140 | 160 | 52 | 27 | 68 | 43 | 83 | 43 | 90 | 65 | 105 | 65 | 125 | 100 | 140 | 100 |
| 160 | 180 | 52 | 27 | 68 | 43 | 83 | 43 | 93 | 68 | 108 | 68 | 133 | 108 | 148 | 108 |
| 180 | 200 | 60 | 31 | 79 | 50 | 96 | 50 | 106 | 77 | 123 | 77 | 151 | 122 | 168 | 122 |
| 200 | 225 | 60 | 31 | 79 | 50 | 96 | 50 | 109 | 80 | 126 | 80 | 159 | 130 | 176 | 130 |
| 225 | 250 | 60 | 31 | 79 | 50 | 96 | 50 | 113 | 84 | 130 | 84 | 169 | 140 | 186 | 140 |
| 250 | 280 | 66 | 34 | 88 | 56 | 108 | 56 | 126 | 94 | 146 | 94 | 190 | 158 | 210 | 158 |
| 280 | 315 | 66 | 34 | 88 | 56 | 108 | 56 | 130 | 98 | 150 | 98 | 202 | 170 | 222 | 170 |
| 315 | 355 | 73 | 37 | 98 | 62 | 119 | 62 | 144 | 108 | 165 | 108 | 226 | 190 | 247 | 190 |
| 355 | 400 | 73 | 37 | 98 | 62 | 119 | 62 | 150 | 114 | 171 | 114 | 244 | 208 | 265 | 208 |
| 400 | 450 | 80 | 40 | 108 | 68 | 131 | 68 | 166 | 126 | 189 | 126 | 272 | 232 | 295 | 232 |
| 450 | 500 | 80 | 40 | 108 | 68 | 131 | 68 | 172 | 132 | 195 | 132 | 292 | 252 | 315 | 252 |
| 500 | 560 | 88 | 44 | 122 | 78 | 148 | 78 | 194 | 150 | 220 | 150 | 324 | 280 | 350 | 280 |
| 560 | 630 | 88 | 44 | 122 | 78 | 148 | 78 | 199 | 155 | 225 | 155 | 354 | 310 | 380 | 310 |
| 630 | 710 | 100 | 50 | 138 | 88 | 168 | 88 | 225 | 175 | 255 | 175 | 390 | 340 | 420 | 340 |
| 710 | 800 | 100 | 50 | 138 | 88 | 168 | 88 | 235 | 185 | 265 | 185 | 430 | 380 | 460 | 380 |
| 800 | 900 | 112 | 56 | 156 | 100 | 190 | 100 | 266 | 210 | 300 | 210 | 486 | 430 | 520 | 430 |
| 900 | 1000 | 112 | 56 | 156 | 100 | 190 | 100 | 276 | 220 | 310 | 220 | 526 | 470 | 560 | 470 |
| 1000 | 1120 | 132 | 66 | 186 | 120 | 225 | 120 | 316 | 250 | 355 | 250 | 586 | 520 | 625 | 520 |
| 1120 | 1250 | 132 | 66 | 186 | 120 | 225 | 120 | 326 | 260 | 365 | 260 | 646 | 580 | 685 | 580 |
| 1250 | 1400 | 156 | 78 | 218 | 140 | 265 | 140 | 378 | 300 | 425 | 300 | 718 | 640 | 765 | 640 |
| 1400 | 1600 | 156 | 78 | 218 | 140 | 265 | 140 | 408 | 330 | 455 | 330 | 798 | 720 | 845 | 720 |
| 1600 | 1800 | 184 | 92 | 262 | 170 | 320 | 170 | 462 | 370 | 520 | 370 | 912 | 820 | 970 | 820 |
| 1800 | 2000 | 184 | 92 | 262 | 170 | 320 | 170 | 492 | 400 | 550 | 400 | 1012 | 920 | 1070 | 920 |

Tab. 8 - Upper and lower limit deviations of shaft diameter tolerance intervals: n6-s7

| Nominal housing bore diameter D [mm] | | Tolerance class | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F7 | | G6 | | G7 | | H5 | | H6 | | H7 | | H8 | | H9 | |
| | | Lower and upper limit deviations, EI and ES [µm] | | | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | | | |
| **6** | **10** | 13 | 28 | 5 | 14 | 5 | 20 | 0 | 6 | 0 | 9 | 0 | 15 | 0 | 22 | 0 | 36 |
| **10** | **18** | 16 | 34 | 6 | 17 | 6 | 24 | 0 | 8 | 0 | 11 | 0 | 18 | 0 | 27 | 0 | 43 |
| **18** | **30** | 20 | 41 | 7 | 20 | 7 | 28 | 0 | 9 | 0 | 13 | 0 | 21 | 0 | 33 | 0 | 52 |
| **30** | **50** | 25 | 50 | 9 | 25 | 9 | 34 | 0 | 11 | 0 | 16 | 0 | 25 | 0 | 39 | 0 | 62 |
| **50** | **80** | 30 | 60 | 10 | 29 | 10 | 40 | 0 | 13 | 0 | 19 | 0 | 30 | 0 | 46 | 0 | 74 |
| **80** | **120** | 36 | 71 | 12 | 34 | 12 | 47 | 0 | 15 | 0 | 22 | 0 | 35 | 0 | 54 | 0 | 87 |
| **120** | **150** | 43 | 83 | 14 | 39 | 14 | 54 | 0 | 18 | 0 | 25 | 0 | 40 | 0 | 63 | 0 | 100 |
| **150** | **180** | 43 | 83 | 14 | 39 | 14 | 54 | 0 | 18 | 0 | 25 | 0 | 40 | 0 | 63 | 0 | 100 |
| **180** | **250** | 50 | 96 | 15 | 44 | 15 | 61 | 0 | 20 | 0 | 29 | 0 | 46 | 0 | 72 | 0 | 115 |
| **250** | **315** | 56 | 108 | 17 | 49 | 17 | 69 | 0 | 23 | 0 | 32 | 0 | 52 | 0 | 81 | 0 | 130 |
| **315** | **400** | 62 | 119 | 18 | 54 | 18 | 75 | 0 | 25 | 0 | 36 | 0 | 57 | 0 | 89 | 0 | 140 |
| **400** | **500** | 68 | 131 | 20 | 60 | 20 | 83 | 0 | 27 | 0 | 40 | 0 | 63 | 0 | 87 | 0 | 155 |
| **500** | **630** | 76 | 146 | 22 | 66 | 22 | 92 | 0 | 28 | 0 | 44 | 0 | 70 | 0 | 110 | 0 | 175 |
| **630** | **800** | 80 | 160 | 24 | 74 | 24 | 104 | 0 | 32 | 0 | 50 | 0 | 80 | 0 | 125 | 0 | 200 |
| **800** | **1000** | 86 | 176 | 26 | 82 | 26 | 116 | 0 | 36 | 0 | 56 | 0 | 90 | 0 | 140 | 0 | 230 |
| **1000** | **1250** | 98 | 203 | 28 | 94 | 28 | 133 | 0 | 42 | 0 | 66 | 0 | 105 | 0 | 165 | 0 | 260 |
| **1250** | **1600** | 110 | 235 | 30 | 108 | 30 | 155 | 0 | 50 | 0 | 78 | 0 | 125 | 0 | 195 | 0 | 310 |
| **1600** | **2000** | 120 | 270 | 32 | 124 | 32 | 182 | 0 | 60 | 0 | 92 | 0 | 150 | 0 | 230 | 0 | 370 |
| **2000** | **2500** | 130 | 305 | 34 | 144 | 34 | 209 | 0 | 70 | 0 | 110 | 0 | 175 | 0 | 280 | 0 | 440 |

Tab. 9 - Lower and upper limit deviations of housing bore diameter tolerance intervals: F7-H9

| Nominal housing bore diameter D [mm] | | Tolerance class | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | H10 | | J6 | | J7 | | JS5 | | JS6 | | JS7 | | K5 | | K6 | |
| | | Lower and upper limit deviations, EI and ES [µm] | | | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | | | |
| **6** | **10** | 0 | 58 | -4 | 5 | -7 | 8 | -3 | 3 | -4,5 | 4,5 | -7,5 | 7,5 | -5 | 1 | -7 | 2 |
| **10** | **18** | 0 | 70 | -5 | 6 | -8 | 10 | -4 | 4 | -5,5 | 5,5 | -9 | 9 | -6 | 2 | -9 | 2 |
| **18** | **30** | 0 | 84 | -5 | 8 | -9 | 12 | -4,5 | 4,5 | -6,5 | 6,5 | -10,5 | 10,5 | -8 | 1 | -11 | 2 |
| **30** | **50** | 0 | 100 | -6 | 10 | -11 | 14 | -5,5 | 5,5 | -8 | 8 | -12,5 | 12,5 | -9 | 2 | -13 | 3 |
| **50** | **80** | 0 | 120 | -6 | 13 | -12 | 18 | -6,5 | 6,5 | -9,5 | 9,5 | -15 | 15 | -10 | 3 | -15 | 4 |
| **80** | **120** | 0 | 140 | -6 | 16 | -13 | 22 | -7,5 | 7,5 | -11 | 11 | -17,5 | 17,5 | -13 | 2 | -18 | 4 |
| **120** | **150** | 0 | 160 | -7 | 18 | -14 | 26 | -9 | 9 | -12,5 | 12,5 | -20 | 20 | -15 | 3 | -21 | 4 |
| **150** | **180** | 0 | 160 | -7 | 18 | -14 | 26 | -9 | 9 | -12,5 | 12,5 | -20 | 20 | -15 | 3 | -21 | 4 |
| **180** | **250** | 0 | 185 | -7 | 22 | -16 | 30 | -10 | 10 | -14,5 | 14,5 | -23 | 23 | -18 | 2 | -24 | 5 |
| **250** | **315** | 0 | 210 | -7 | 25 | -16 | 36 | -11,5 | 11,5 | -16 | 16 | -26 | 26 | -20 | 3 | -27 | 5 |
| **315** | **400** | 0 | 230 | -7 | 29 | -18 | 39 | -12,5 | 12,5 | -18 | 18 | -28,5 | 28,5 | -22 | 3 | -29 | -7 |
| **400** | **500** | 0 | 250 | -7 | 33 | -20 | 43 | -13,5 | 13,5 | -20 | 20 | -31,5 | 31,5 | -25 | 2 | -32 | 8 |
| **500** | **630** | 0 | 280 | - | - | - | - | -14 | 14 | -22 | 22 | -35 | 35 | - | - | -44 | 0 |
| **630** | **800** | 0 | 320 | - | - | - | - | -16 | 16 | -25 | 25 | -40 | 40 | - | - | -50 | 0 |
| **800** | **1000** | 0 | 360 | - | - | - | - | -18 | 18 | -28 | 28 | -45 | 45 | - | - | -56 | 0 |
| **1000** | **1250** | 0 | 420 | - | - | - | - | -21 | 21 | -33 | 33 | -52 | 52 | - | - | -66 | 0 |
| **1250** | **1600** | 0 | 500 | - | - | - | - | -25 | 25 | -39 | 39 | -62 | 62 | - | - | -78 | 0 |
| **1600** | **2000** | 0 | 600 | - | - | - | - | -30 | 30 | -46 | 46 | -75 | 75 | - | - | -92 | 0 |
| **2000** | **2500** | 0 | 700 | - | - | - | - | -35 | 35 | -55 | 55 | -87 | 87 | - | - | -110 | 0 |

Tab. 10 - Lower and upper limit deviations of housing bore diameter tolerance tervals: H10-K6

| Nominal housing bore diameter D [mm] | | Tolerance class | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | K7 | | M5 | | M6 | | M7 | | N6 | | N7 | | P6 | | P7 | |
| | | Lower and upper limit deviations, EI and ES [µm] | | | | | | | | | | | | | | | |
| over | incl. | | | | | | | | | | | | | | | | |
| 6 | 10 | -10 | 5 | -10 | -4 | -12 | -3 | -15 | 0 | -16 | -7 | -19 | -4 | -21 | -12 | -24 | -9 |
| 10 | 18 | -12 | 6 | -12 | -4 | -15 | -4 | -18 | 0 | -20 | -9 | -23 | -5 | -26 | -15 | -29 | -11 |
| 18 | 30 | -15 | 6 | -14 | -4 | -17 | -4 | -21 | 0 | -24 | -11 | -28 | -7 | -31 | -18 | -35 | -14 |
| 30 | 50 | -18 | 7 | -16 | -5 | -20 | -4 | -25 | 0 | -28 | -12 | -33 | -8 | -37 | -21 | -42 | -17 |
| 50 | 80 | -21 | 9 | -19 | -6 | -24 | -5 | -30 | 0 | -33 | -14 | -39 | -9 | -45 | -26 | -51 | -21 |
| 80 | 120 | -25 | 10 | -23 | -8 | -28 | -6 | -35 | 0 | -38 | -16 | -45 | -10 | -52 | -30 | -59 | -24 |
| 120 | 150 | -28 | 12 | -27 | -9 | -33 | -8 | -40 | 0 | -45 | -20 | -52 | -12 | -61 | -36 | -68 | -28 |
| 150 | 180 | -28 | 12 | -27 | -9 | -33 | -8 | -40 | 0 | 45 | -20 | -52 | -12 | -61 | -36 | -68 | -28 |
| 180 | 250 | -33 | 13 | -31 | -11 | -37 | -8 | -46 | 0 | -51 | -22 | -60 | -14 | -70 | -41 | -79 | -33 |
| 250 | 315 | -36 | 16 | -36 | -13 | -41 | -9 | -52 | 0 | -57 | -25 | -66 | -14 | -79 | -47 | -88 | -36 |
| 315 | 400 | -40 | 17 | -39 | -14 | -46 | -10 | -57 | 0 | -62 | -26 | -73 | -16 | -87 | -51 | -98 | -41 |
| 400 | 500 | -45 | 18 | -43 | -16 | -50 | -10 | -63 | 0 | -67 | -27 | -80 | -17 | -95 | -55 | -108 | -45 |
| 500 | 630 | -70 | 0 | - | - | -70 | -26 | -96 | -26 | -88 | -44 | -114 | -44 | -122 | -78 | -148 | -78 |
| 630 | 800 | -80 | 0 | - | - | -80 | -30 | -110 | -30 | -100 | -50 | -130 | -50 | -138 | -88 | -168 | -88 |
| 800 | 1000 | -90 | 0 | - | - | -90 | -34 | -124 | -34 | -112 | -56 | -146 | -56 | -156 | -100 | -190 | -100 |
| 1000 | 1250 | -105 | 0 | - | - | -106 | -40 | -145 | -40 | -132 | -66 | -171 | -66 | -186 | -120 | -225 | -120 |
| 1250 | 1600 | -125 | 0 | - | - | -126 | -48 | -173 | -48 | -156 | -78 | -203 | -78 | -218 | -140 | -265 | -140 |
| 1600 | 2000 | -150 | 0 | - | - | -158 | -58 | -208 | -58 | -184 | -92 | -242 | -92 | -262 | -170 | -320 | -170 |
| 2000 | 2500 | -175 | 0 | - | - | -178 | -68 | -243 | -68 | -220 | -110 | -285 | -110 | -305 | -195 | -370 | -195 |

Tab. 11 - Lower and upper limit deviations of housing bore diameter tolerance intervals: K7-P7

# Bearing fits

When two mating parts are assembled together, the mounting resulting from the assembly arrangement depends on the tolerances prescribed for the common dimensions (i.e. a diameter) of both mating parts (**Fig. 30**). According to this, fit can be defined as the relationship between an external and an internal feature of size, with the same nominal dimensions, which are to be assembled.

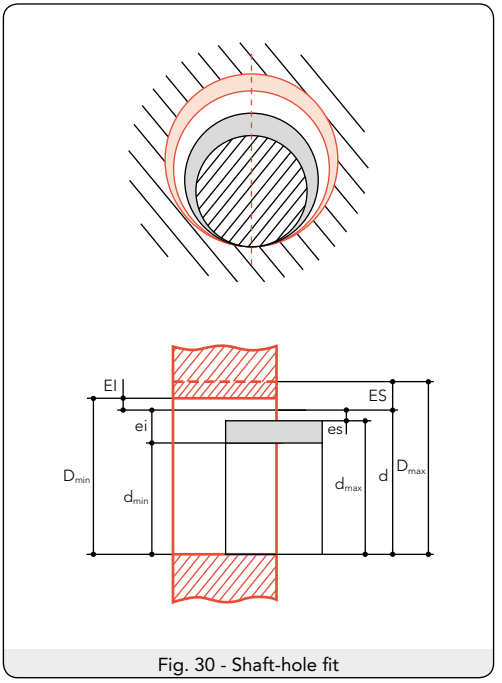



Fig. 30 - Shaft-hole fit

The fit system used is commonly divided into three types of fits according to their allowance: clearance fit, transition fit and interference fit (**Fig. 31**).

Clearance fit (loose fit) represents the assembled part in a matching hole with a slightly larger diameter which provides a different clearance degree range (**Fig. 31a**).

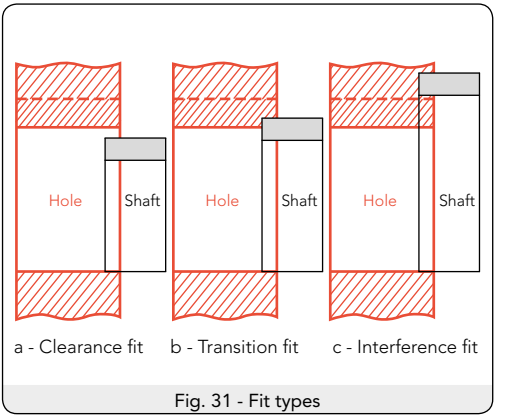



Fig. 31 - Fit types

Referring both to the nominal size:

| | | | | |
|---|---|---|---|---|
| Minimum clearance | = | hole size lower limit deviation | - | shaft size upper limit deviation |
| Maximum clearance | = | hole size upper limit deviation | - | shaft size lower limit deviation |

Transition fit (intermediary fit) is the fit that may provide either clearance or interference between the hole and the shaft when assembled. In a transition fit, the tolerance intervals of the hole and the shaft partially overlap (**Fig. 31b**). Therefore, it depends on the actual sizes of hole and shaft if there is a clearance or interference.

Interference fit (tight fit, press fit) is the fit that always provides interference between the hole and the shaft when assembled (**Fig. 31c**). Significant pressure is necessary for assembling parts and this assembly becomes more or less permanent.

Similarly to the clearance fits, one can define:

| | | | | |
|---|---|---|---|---|
| Minimum interference | = | shaft size lower limit deviation | - | hole size upper limit deviation |
| Maximum interference | = | shaft size upper limit deviation | - | hole size lower limit deviation |

ISO fit system comprises shafts and holes toleranced by the ISO code system for tolerances on linear sizes (ISO 286:2010). The precondition for the application of the ISO code system for tolerances on linear sizes for the features forming a fit is that the nominal sizes of the hole and the shaft are identical. According to ISO 286:2010 there are two usual fit subsystems embedded in the ISO fit system: hole-basis fit system (fits where the fundamental deviation of the hole is zero, i.e. the lower limit deviation is zero) and shaft-basis fit system (fits where the fundamental deviation of the shaft is zero, i.e. the upper limit deviation is zero).

Note that in the case of the bearing mounting fits neither the shaft-bearing bore fit, nor the bearing-housing bore fit can be included in the two fit systems mentioned above, but the tolerances of the shaft and housing bore diameters comply with ISO 286:2010 prescriptions. For bearing tolerances, refer to the deviation of the mean bearing bore diameter from the nominal value $\Delta_{dmp}$ **(Fig. 32)** and to the deviation of the mean bearing outer diameter from the nominal value $\Delta_{Dmp}$ **(Fig. 33)**.

## Calculation example

### Task

Find minimum and maximum clearance/ interference of the shaft-bearing bore fit and bearing-housing bore fit for the spherical roller bearing 21310 CCC3W33.

### Input data

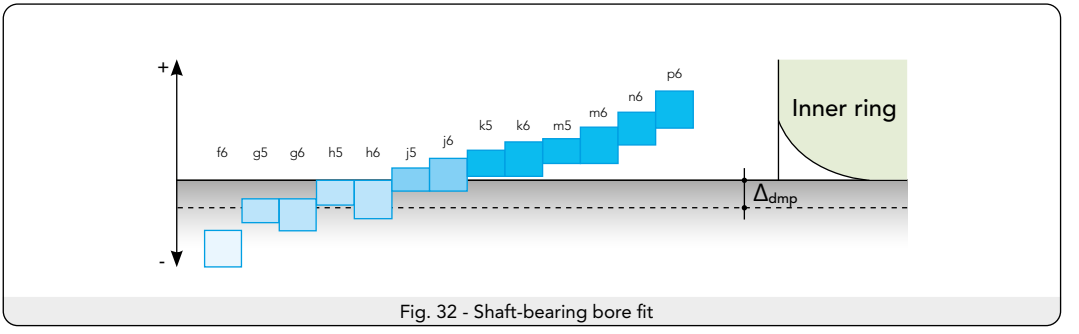



Fig. 32 - Shaft-bearing bore fit

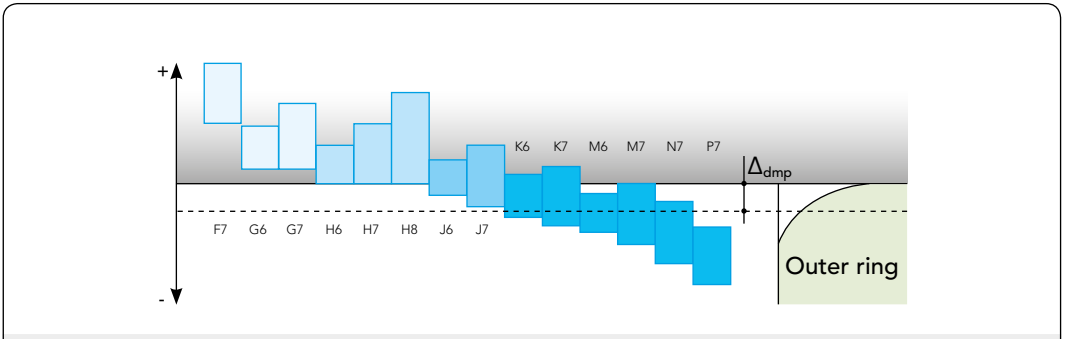



Fig. 33 - Bearing-housing bore fit

| Bearing type: | Spherical roller bearing |
|---|---|
| Bearing bore diameter: | d = 50 mm |
| Bearing outer diameter: | D = 110 mm |
| Bearing width: | B = 27 mm |
| Precision class: | P0 (normal class) |
| Shaft diameter tolerance class: | n6 |
| Housing bore diameter tolerance class: | P7 |

**Solution**

From **Tab. 22 page 70**, the lowest and highest values of the deviation of the mean bearing bore diameter from the nominal value are:

$$\Delta_{dmp_low} = -12\,\mu m = -0{,}012\ mm \qquad \textbf{Eq. 40}$$

$$\Delta_{dmp_high} = 0 \qquad \textbf{Eq. 41}$$

Tolerance of mean bearing bore diameter is:

$$T_{dh} = \Delta_{dmp_high} - \Delta_{dmp_low} = \qquad \textbf{Eq. 42}$$
$$= 0 - (-0{,}012) = 0{,}012\,mm$$

From **Tab. 8 page 56**, the values of lower and upper limit deviations for shaft diameter tolerance class (n6) are:

$$ei = 17\,\mu m = 0{,}017\,mm \qquad \textbf{Eq. 43}$$

$$es = 33\,\mu m = 0{,}033\,mm \qquad \textbf{Eq. 44}$$

Tolerance of the shaft diameter is:

$$T_{ds} = es - ei = 0{,}033 - 0{,}017 = \qquad \textbf{Eq. 45}$$
$$= 0{,}016\,mm$$

The calculation will be made in terms of clearance (i.e. if the result is positive, it is a clearance, and if the result is negative, an interference results).

Shaft-bearing bore fit:

$$\Delta_{dmp_low} - es = -0{,}012 - 0{,}033 = \qquad \textbf{Eq. 46}$$
$$= -0{,}045\,mm$$

Hole size upper limit deviation minus shaft size lower limit deviation:

$$\Delta_{dmp_high} - ei = 0 - 0{,}017 = -0{,}017\,mm \qquad \textbf{Eq. 47}$$

So the interference fit between the shaft and the bearing inner ring is:

$$I_{d_min} = -0{,}017\,mm \qquad \textbf{Eq. 48}$$

$$I_{d_max} = -0{,}045\,mm \qquad \textbf{Eq. 49}$$

The mean value of the theoretical interference interval is:

$$I_{d_m} = \frac{I_{d_min} + I_{d_max}}{2} = \qquad \textbf{Eq. 50}$$
$$= \frac{-0{,}017 + (-0{,}045)}{2} = -0{,}031 mm$$

The probable range in which the actual value of the interference will be is $I_{d_m} \pm T_{dIC}/2$, where $T_{dIC}$ is the tolerance of the shaft-bearing bore clearance/interference and is given by the following equation:

$$T_{dIC} = \sqrt{T_{dh}^2 + T_{ds}^2} = \sqrt{0{,}012^2 + 0{,}016^2} = \qquad \textbf{Eq. 51}$$
$$= 0{,}020\,mm$$

The limits of the interference probable range are:

$$I_{d_prob_min} = I_{d_m} + \frac{T_{dIC}}{2} = -0{,}031 + \frac{0{,}020}{2} = \qquad \textbf{Eq. 52}$$
$$= -0{,}021 mm$$

$$I_{d_prob_max} = I_{d_m} - \frac{T_{dIC}}{2} = -0{,}031 - \frac{0{,}020}{2} = \qquad \textbf{Eq. 53}$$
$$= -0{,}041 mm$$

From **Tab. 21 page 70**, the lowest and highest values of the deviation of the mean bearing outer diameter from the nominal value are:

$$\Delta_{Dmp_low} = -15\,\mu m = -0{,}015\,mm \qquad \textbf{Eq. 54}$$

$$\Delta_{Dmp_high} = 0 \qquad \textbf{Eq. 55}$$

Tolerance of mean bearing outer diameter is:

$T_{Ds} = \Delta_{dmp_high} - \Delta_{dmp_low} = 0 - (-0{,}015) =$ **Eq. 56**
$= 0{,}015\,mm$

From **Tab. 8 page 56**, the values of lower and upper limits deviations for housing bore diameter tolerance class (P7) are:

$EI = -59\,\mu m = -0{,}059\,mm$ **Eq. 57**

$ES = -24\,\mu m = -0{,}024\,mm$ **Eq. 58**

Tolerance of the housing bore diameter is:

$T_{Dh} = ES - EI = -0{,}024 - (-0{,}059) =$ **Eq. 59**
$= 0{,}035\,mm$

Bearing-housing bore fit is given by hole size lower limit deviation minus shaft size upper limit deviation:

$EI - \Delta_{Dmp_high} = -0{,}059 - 0 =$ **Eq. 60**
$= -0{,}059\,mm$

and hole size upper limit deviation minus shaft size lower limit deviation:

$ES - \Delta D_{mplow} = -0{,}024 - (-0{,}015) =$ **Eq. 61**
$= -0{,}009\,mm$

This yields an interference fit also between the bearing outer ring and the housing bore:

$I_{D_min} = -0{,}009\,mm$ **Eq. 62**

$I_{D_max} = -0{,}059\,mm$ **Eq. 63**

The mean value of the theoretical interference interval is:

$$I_{D_m} = \frac{I_{D_min} + I_{D_max}}{2} = \frac{-0{,}009 + (-0{,}059)}{2} = -0{,}034\,mm \quad \textbf{Eq. 64}$$

The probable range in which the actual value of the interference will be is $I_{D_m} \pm T_{DIC}/2$, where

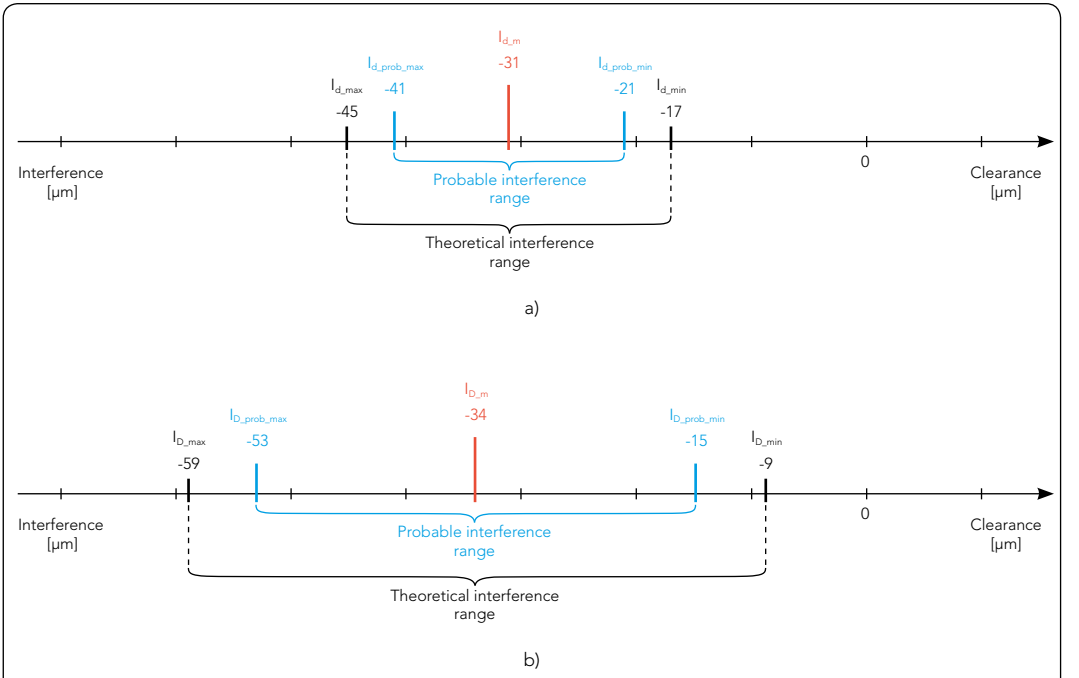



Fig. 34 - Bearing fits: a) shaft-bearing bore b) bearing-housing bore

$T_{DIC}$ is the tolerance of the bearing bore-outer ring clearance/interference and is given by the following equation:

$$T_{DIC} = \sqrt{T_{Dh}^2 + T_{Ds}^2} = \quad \text{Eq. 65}$$
$$= \sqrt{0,035^2 + 0,015^2} = 0,038\,\text{mm}$$

The limits of the interference probable range are:

$$I_{D_prob_min} = I_{D_m} + \frac{T_{DIC}}{2} = \quad \text{Eq. 66}$$
$$= -0,034 + \frac{0,038}{2} = -0,015\,\text{mm}$$

$$I_{d_prob_max} = I_{D_m} - \frac{T_{DIC}}{2} = \quad \text{Eq. 67}$$
$$= -0,034 - \frac{0,038}{2} = -0,053\,\text{mm}$$

The above results are schematically represented in **Fig. 34 page 63**.

## Selection of appropriate bearing mounting fits

A damaging phenomenon known as fretting corrosion may appear between the mating parts of the shaft-bearing-housing assembly. The relative movement of the conjugate part surfaces causes this phenomenon. To prevent fretting corrosion, correct fits between the mating parts of the shaft-bearing-housing assembly must be provided.

A rule can be mentioned: the rotating ring of a shaft-bearing-housing assembly should be the one mounted with a precise fit in the conjugate part, and often an interference fit is desirable. Interference fit is the most effective way to assemble bearings on the shaft and, sometimes, in the housing, providing uniform load support on each of the contact surfaces, and reducing any loss of load carrying capacity. Interference fit is an important condition to avoid the sliding between the ring and its seat; this movement may occur during the start-up and stopping of the machine. However, interference fit is not suitable for applications where easy mounting and dismounting are required, or for fitting non-separable bearings. In the case of an application with unusual operating conditions, it is advisable to request technical assistance and support services from RKB Technical Department. An appropriate fit selection depends on the following parameters.

### Magnitude and direction of the acting load

According to their magnitude, the bearing loads can be classified roughly in four categories as presented in **Tab. 12**.

| **Load magnitude** | |
|---|---|
| Light | $P/C \leq 0,05$ |
| Normal | $0,05 < P/C \leq 0,1$ |
| Heavy | $0,1 < P/C \leq 0,15$ |
| Very heavy (or shocks) | $P/C > 0,15$ |

Tab. 12 - Magnitude of the bearing load

where:

- P dynamic equivalent load, N;
- C basic radial/axial dynamic load rating of the bearing, N.

Note that an increased load applied on the inner ring can deform it and, therefore, this will contribute to the fit loosening between the shaft seat and inner ring bore. The loss of interference due to radial load must be taken into consideration since it may affect the pressure distribution among the rolling elements inside the bearing. Direction of the acting load refers to the relative movement of the load direction in relation to the movement of one bearing ring. The possible situations are expressed as rotating load, stationary load or load of undetermined direction (all referring to a certain bearing ring).

Stationary load is directed to the same position on the raceway whether the ring is stationary or rotating. Generally, the bearing ring does not rotate in its seat and consequently there is no risk for seating surface damage,

and clearance fit is usually used (unless the application necessarily requests, for other reasons, an interference fit).

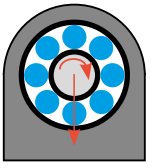
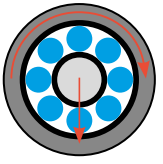
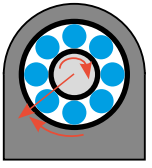
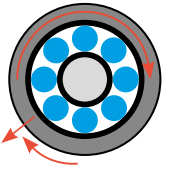
Rotating load acts on every point of the raceway and can turn the ring relative to its seating surface if clearance fit is used. In this case the contact surfaces will be worn out (fretting corrosion) and to prevent this phenomenon interference fits have to be used. Note that the level of the interference should be in close correlation with the operating conditions.

Loads of undetermined direction could be variable external loads, shock loads, vibrations and unbalanced loads in high-speed machines that lead to the variation of load directions. Under these loads, in many situations, interference fit for both rings in their corresponding seats is recommended. Regarding the direction of the load, Tab. 13 presents some examples of loads acting on bearing rings and recommended fit types.

## Bearing operating internal clearance

In many applications, during operation, a minimum value of the bearing internal clearance is desired and the bearing preload has to be avoided. Many bearings are manufactured with an initial internal clearance (standardized values), which could be significantly reduced due to the elastic deformations of the rings after mounting with interference fit and due to the thermal expansions of rings and rolling elements during operation.

When the inner ring is mounted with interference fit on the shaft, it elastically expands and when the outer ring is mounted with interference fit in the housing it elastically

| Operating conditions[a] | | Application example | Load on | | Recommended fits | |
|---|---|---|---|---|---|---|
| | | | inner ring | outer ring | inner ring | outer ring |
| Inner ring | Rotating |  | Rotating | Stationary | Interference | Clearance |
| Outer ring | Stationary | | | | | |
| Load direction | Constant | | | | | |
| Inner ring | Stationary |  | Stationary | Rotating | Clearance | Interference |
| Outer ring | Rotating | | | | | |
| Load direction | Constant | | | | | |
| Inner ring | Rotating |  | Stationary | Rotating | Interference | Clearance |
| Outer ring | Stationary | | | | | |
| Load direction | Rotates with inner ring | | | | | |
| Inner ring | Stationary |  | Rotating | Stationary | Interference | Clearance |
| Outer ring | Rotating | | | | | |
| Load direction | Rotates with outer ring | | | | | |

Tab. 13 - Recommended fits according to bearing loading and rotation conditions

[a] - As they are perceived by an external observer

contracts. Both actions contribute solely or simultaneously to the reduction of the initial internal clearance of the bearing.

In operation, all bearing components, the shaft and the housing change their initial temperature. Therefore, two aspects should be taken into account when calculating the residual (working, operating) internal clearance of the bearing. On the one hand, due to the temperature difference between the mating parts, the clearance or interference between the inner ring and shaft and between the outer ring and housing, respectively, change their values and consequently the elastic deformation changes also. Note that a decrease of the interference can lead to the possibility of the relative turning of the ring in relation to the mating seat and, therefore, to fretting corrosion. On the other hand, when the temperatures of the bearing parts increase, the rings and rolling elements expand and the bearing internal clearance is further reduced.

In conclusion, the appropriate selection of the bearing fit and initial radial internal clearance, and the correct estimate of the heat flow in the bearing arrangement as well as of the temperature differences are crucial in the subsequent well-functioning bearing.

## Design and material of shaft and housing

The fit between each of the bearing rings and their corresponding seat must be carefully selected to avoid the bearing out of roundness, which may occur in the case of seat discontinuity.

For this reason, in applications that require high interference fit between outer ring and housing, it is advisable to use non-split housing. If split housing has to be used, the fundamental deviation of the bore diameter should not exceed H or at the most K.

**Tab. 14 page 68** to **Tab. 22 page 70** give recommended fits for solid shafts made of steel and for split or non-split housings made of cast iron or steel. However, the recommended fits are different for other designs and/or materials.

For example, the recommended interference fits for hollow shafts should be increased, compared to the recommended fits for similar solid shafts. Also, to ensure suitable support for the bearings mounted in housings with thin walls or made from light alloy, the recommended interference fits should be heavier compared to those recommended for thick-walled housings or made of cast iron or steel.

## Axial displacement of non-locating bearing

When axial displacement takes place within the bearing (e.g. cylindrical roller bearings, needle roller bearings, etc.) both rings can be mounted on shaft and in housing with interference fits. However, when the entire bearing must accommodate axial displacements, only one ring (typically the ring on which the load is stationary) must be free to move axially on or in its seat and, therefore, a clearance fit has to be selected.

## Running accuracy

As a general rule, to keep the vibration level under control, and allow the correct pressure distribution on the rolling elements, bearings should be mounted with proper fittings. Moreover, tight dimensional, form, orientation and runout tolerances should be applied to the mating part surfaces.

## Mounting and dismounting

When bearings require interference fits due to operating conditions as well as easy mounting and dismounting, bearings with tapered bore (mounted directly on the tapered shafts or on sleeves mounted on cylindrical shafts) or separable bearings should be used.

Obviously, clearance fits may be used, when possible, to ease the mounting and dismounting of bearings.

**Tab. 14 page 68** to **Tab. 19 page 69**

give recommended fits for solid shafts made of steel, and **Tab. 20 page 70** to **Tab. 22 page 70** show recommended fits for housings made of cast iron or steel.

| Bearing type | Bore diameter d | | Light and variable load | Normal to heavy load | | Heavy loads, shocks |
|---|---|---|---|---|---|---|
| | | | P/C ≤ 0,05 | 0,05 < P/C ≤ 0,1 | | P/C > 0,1 |
| | [mm] | | | Radial internal clearance | | |
| | over | incl. | | CN | larger than CN | |
| Radial ball bearings | - | 10 | js5, h5[a] | js5 | k4 | - |
| | 10 | 17 | | j5, js5[a] | | - |
| | 17 | 25 | j6, j5[a] | k5, j5[a] | k5 | |
| | 25 | 30 | | | | |
| | 30 | 100 | | k5 | m5 | - |
| | 100 | 140 | k6 | m5 | | - |
| | 140 | 200 | - | m6 | n6 | - |
| | 200 | 300 | - | n6[b] | | - |
| | 300 | 500 | - | | p6 | - |
| | 500 | - | - | p7[b] | - | - |
| Cylindrical roller bearings | - | 25 | j6, j5[a] | | k6 | - |
| | 25 | 30 | | | | - |
| | 30 | 50 | k6 | | m5 | - |
| | 50 | 60 | m6 | | n5b | n5[b] |
| | 60 | 65 | | | | |
| | 65 | 85 | | | n6[b] | n6[b] |
| | 85 | 100 | | | | |
| | 100 | 140 | | | p6[c] | p6[c] |
| | 140 | 280 | - | | p6[b] | r6[c] |
| | 280 | 300 | - | | r6[b] | |
| | 300 | 500 | - | | | $s6_{min}$ ± IT6/2[c] |
| | 500 | - | - | | r7[b] | $s7_{min}$ ± IT7/2[c] |
| Tapered roller bearings | - | 25 | j6, j5[a] | | k6 | - |
| | 25 | 40 | | | | - |
| | 40 | 50 | k6 | | m6 | - |
| | 50 | 60 | | | | |
| | 60 | 65 | m6 | | | n6[b] |
| | 65 | 110 | | | n6[b] | |
| | 110 | 140 | | | | p6[c] |
| | 140 | 200 | - | | | |
| | 200 | 360 | - | | p6[b] | r6[b] |
| | 360 | 500 | - | | r6[b] | |
| | 500 | - | - | | r7[b] | $s7_{min}$ ± IT7/2[c] |
| Spherical roller bearings | 25 | 40 | - | | m5 | - |
| | 40 | 50 | - | | n5[b] | - |
| | 50 | 60 | - | | | n5[b] |
| | 60 | 70 | - | | n6[b] | |
| | 70 | 100 | - | | | p6[c] |
| | 100 | 140 | - | | p6[c] | |
| | 140 | 200 | - | | p6[b] | r6[b] |
| | 200 | 280 | - | | r6[b] | |
| | 280 | 400 | - | | r6[b] | $s6_{min}$ ± IT6/2[c] |
| | 400 | 500 | - | | | $s7_{min}$ ± IT7/2[c] |
| | 500 | - | - | | r7[b] | |

Tab. 14 - Tolerance classes for steel solid shafts for radial bearings with cylindrical bore (rotating load on inner ring or load of indeterminate direction)

[a] - Recommended for stainless steel bearings [b] - Radial internal clearance greater than CN may be necessary
[c] - Radial internal clearance greater than CN is recommended

| Bearing type | Bore diameter d [mm] | | Tolerance class |
|---|---|---|---|
| | over | incl. | |
| **Radial ball bearings** | **10** | **240** | js4 |
| **Cylindrical roller bearings** | **25** | **40** | js4 |
| | **40** | **140** | k4 |
| | **140** | **200** | m5 |
| | **200** | **500** | m6 |
| **Tapered roller bearings**[a] | **25** | **40** | j5 |
| | **40** | **140** | k5 |
| | **140** | **200** | m5 |
| | **200** | **500** | m6 |

Tab. 15 - Tolerance classes for steel solid shafts for radial bearings with cylindrical bore running quietly and accurately (light loads only: P/C ≤ 0,05)

[a] - For lightly loaded tapered roller bearings adjusted via the inner ring use tolerance class js5 or js6

| Bore diameter d [mm] | Easy axial displacement of inner ring on shaft | Tolerance class |
|---|---|---|
| **All diameters** | Desirable | g6[a] |
| | Unnecessary | h6 |

Tab. 16 - Tolerance classes for steel solid shafts for radial bearings with cylindrical bore (stationary load on inner ring)

[a] - For large bearings use tolerance class f6

| Bore diameter d [mm] | Tolerance class |
|---|---|
| **≤ 250** | j6 |
| **> 250** | js6 |

Tab. 17 - Tolerance classes for steel solid shafts for radial bearings with cylindrical bore (axial loads only)

| Bore diameter d [mm] | Application | Tolerance class | Cylindricity tolerance zone $t_1$ |
|---|---|---|---|
| **All diameters** | General arrangement | h9 | IT5/2 |
| | Railway vehicles | h10 | IT7/2 |

Tab. 18 - Tolerance classes and cylindricity tolerance zone for steel solid shafts for radial bearings with tapered bore mounted on sleeves (all types of loads)

| Bearing type | Load type | Bore diameter d [mm] | Tolerance class |
|---|---|---|---|
| **Thrust ball bearings** | Axial load | All diameters | h6 |
| **Cylindrical roller thrust bearings** | | | h6, h8 |
| **Spherical roller thrust bearings** | Stationary load on shaft washer | d ≤ 250 | j6 |
| | | d > 250 | js6 |
| | Rotating load on shaft washer or load of indeterminate direction | d ≤ 200 | k6 |
| | | 200 < d ≤ 400 | m6 |
| | | d > 400 | n6 |

Tab. 19 - Tolerance classes for steel solid shafts for thrust bearings

| Housing construction | Load condition | Load magnitude | Tolerances class | Outer ring axial displacement |
|---|---|---|---|---|
| Solid (non-split) housing | Rotating load on outer ring | Light or variable loads (P/C ≤ 0,05) | M7 | Non-displaceable |
| | | Normal to heavy loads (0,05 < P/C ≤ 0,1) | N7 | |
| | | Heavy loads or shocks on bearing in thin-wall housings (P/C > 0,1) | P7 | |
| | Load of indeterminate direction | Normal to heavy loads (0,05 < P/C ≤ 0,1) | K7 | |
| | | Heavy shock loads (P/C > 0,1) | M7 | |
| Solid (non-split) or split housing | Load of indeterminate direction | Light or normal loads (P/C ≤ 0,1) | J7, JS7[a] | Displaceable |
| | Stationary load on outer ring[c] | Loads of all kinds | H7, G7[b] | |
| | | Light to normal loads (P/C ≤ 0,1) | H8 | |

Tab. 20 - Tolerance classes for steel or cast iron housings for all types of radial bearings working in normal conditions

[a] - When easy displacement of outer ring is required use JS7 instead of J7
[b] - If outer diameter is larger than 250 mm and the temperature difference between outer ring and housing exceeds 10 °C G7 should be used instead of H7
[c] - When the heat has to be evacuated through the shaft G7 is generally used. If the outer diameter is larger than 250 mm and the temperature difference between outer ring and housing exceeds 10 °C F7 should be used instead of G7

| Bearing type | Load magnitude and other conditions | Tolerance class |
|---|---|---|
| **Radial ball bearings** | Small bearings | J6, H6[a] |
| | Bearing is adjusted by means of the outer ring | JS5 |
| **Tapered roller bearings** | Bearing is adjusted by means of the inner ring | K5 |
| | Rotating load on outer ring | M5 |

Tab. 21 - Tolerance classes for all types of steel or cast iron housings for axially displaceable radial bearings running quietly and accurately

[a] - When easy displacement of outer ring is required use H6 instead of J6

| Bearing type | Load magnitude and other conditions | Tolerance class |
|---|---|---|
| **Thrust ball bearings** | Axial load only | H8 |
| **Cylindrical roller thrust bearings** | | H7, H9 |
| **Cylindrical roller and cage thrust assemblies** | | H10 |
| **Spherical roller thrust bearings** | Stationary load on housing washer | H7 |
| | Rotating load on housing washer | M7 |

Tab. 22 - Tolerance classes for all types of steel or cast iron housings for thrust bearings

# Dimensional and geometrical accuracy of bearing seats and abutments

Dimensional tolerances of cylindrical bearing seats on shaft and in housing bore should comply with the bearing precision class. For instance, for bearings manufactured in Normal precision class, the dimensional accuracy (tolerance grade) should be at least IT6 for cylindrical shafts and IT7 for cylindrical housings. Tight tolerances for bearing seats should be used for bearings with high accuracy **(Tab. 15 page 69**, **Tab. 21 page 70)** and for bearings mounted in thin housings or on hollow shafts. Wide tolerances may be selected when tapered bore bearings mounted via adapter or withdrawal sleeve on cylindrical shafts **(Tab. 18 page 69)**. For bearings with tapered bore mounted directly on tapered shaft seats, the tolerance of the diameter of the taper shorter side can be wider than in the case of cylindrical seats **(Fig. 36)**.

Regarding the geometrical accuracy, the used geometric characteristics, tolerances and symbols **(Fig. 35)** comply with ISO 1101:2012(E). As in the case of the dimensional tolerances, the geometric tolerances of cylindrical bearing seats on shafts and in housing bores, of thrust bearing washer seats, and of the bearing abutments must be in concordance with the accuracy of the bearings used.

The tolerances (permissible deviations) of form, orientation, and runout for cylindrical bearing seats and flat abutments on shafts and in housings that should be followed when these are machined are given in **Tab. 23 page 72** for different precision classes.

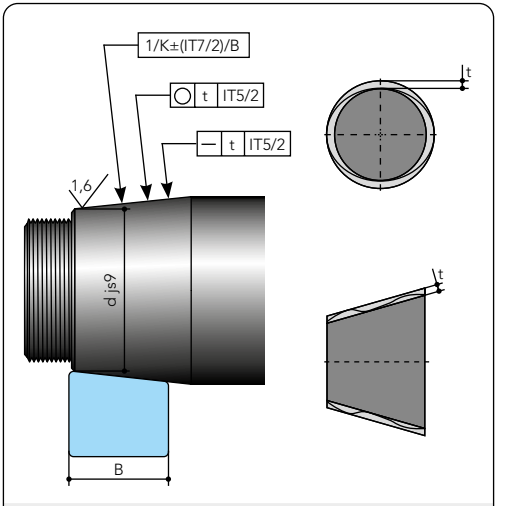
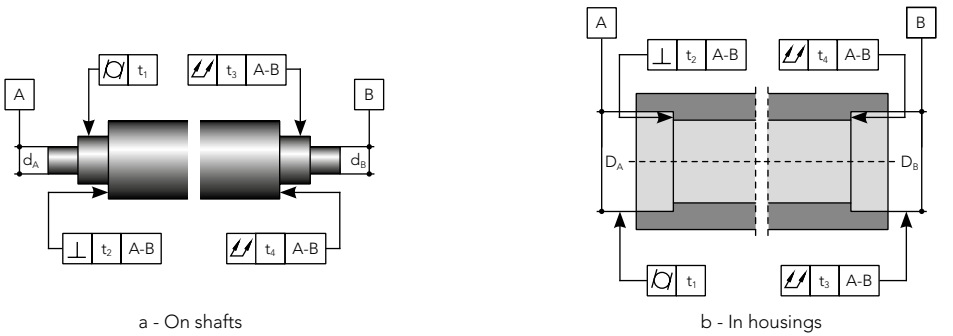



Fig. 36 - Dimensional and form tolerances for tapered bearing shaft seats

As a rule of thumb, the cylindricity tolerances should be up to 2 IT grades tighter than the IT grade prescribed for the dimensional tolerance (e.g. if p6 was prescribed for the shaft diameter, then the accuracy of form should be to IT5 or IT4).




a - On shafts

b - In housings

Fig. 35 - Accuracy of form, orientation and runout for cylindrical bearing seats and flat abutments

| Surface | Basic geometric characteristic | Symbol | Bearing precision class | | |
|---|---|---|---|---|---|
| | | | Normal, CLN | P6 | P5 |
| Cylindrical seat (shaft or bore) | Cylindricity | $t_1$ | IT5/2 | IT4/2 | IT3/2 |
| | Total radial runout | $t_3$ | IT5/2 | IT4/2 | IT3/2 |
| Flat abutment | Rectangularity | $t_2$ | IT5 | IT4 | IT3 |
| | Total axial runout | $t_4$ | IT5 | IT4 | IT3 |

Tab. 23 - Tolerances (permissible deviations) of form, orientation and runout for cylindrical bearing seats and flat abutments on shafts and in housings

When tapered bore bearings are mounted via adapter or withdrawal sleeves on cylindrical shafts, wider tolerances for the cylindricity may be selected for the sleeve seat (Tab. 16 page 69).

Regarding the tolerances for the perpendicularity of the abutments for bearing rings (related to the cylindrical seat surfaces on shafts or housing bores) they should be better by at least 1 IT grade than the diameter tolerance of the respective cylindrical seat. For the seats of thrust bearing washers, the perpendicularity tolerance should not exceed IT5.When a bearing is mounted directly onto a tapered shaft seat, tolerance interval of the taper incline is given by the following equations:

$$V_K = \frac{1}{12} \pm \frac{IT7}{2 \cdot B} \quad \text{if taper 1:12} \qquad \textbf{Eq. 68}$$

$$V_K = \frac{1}{30} \pm \frac{IT7}{2 \cdot B} \quad \text{if taper 1:30} \qquad \textbf{Eq. 69}$$

where:

- $V_K$ tolerance interval of the taper incline;
- B bearing width, mm;
- IT7 tolerance grade based on the bearing width, mm.

Note that the straightness tolerance and the radial deviation from circularity (both denoted by t in Fig. 36 page 71) are both based on the diameter d of the taper shorter side.:

## Recommended surface roughness of bearing seats and abutments

Whereas dimensional and geometrical accuracies have a great impact on the bearing performance, not the same thing can be said about the roughness of bearing seat surfaces. However, the presence of the asperities on the mating surfaces lead to an interference less than the theoretical one and hence the smoother the surfaces, the closer to the theoretical value the actual interference. When high accuracy is demanded, for ground bearing seats on shafts or in housings, values of the recommended surface roughness $R_a$ are given in Tab. 24 for different tolerance grades based on the seat diameter.

| Diameter of seat d **or** D [mm] | | Tolerance grade (based on seat diameter) | | |
|---|---|---|---|---|
| | | IT7 | IT6 | IT5 |
| over | incl. | $R_a$ [µm] | | |
| - | 80 | 1,6 | 0,8 | 0,4 |
| 80 | 500 | 1,6 | 1,6 | 0,8 |
| 500 | - | 3,2 | 1,6 | 1,6 |

Tab. 24 - Recommended surface roughness $R_a$

# Bearing axial location

As previously presented, one or both bearing rings have to be axially located on the shaft or in the housing, which means they are not allowed to move axially when loaded. Due to the possible ring axial displacement generated by the shaft bending, even bearings that do not take axial loads (e.g. cylindrical roller bearings) have to be clamped axially. Since almost always the interference fit alone is not enough to axially locate the bearing, many methods are used to achieve this result. Some of them are presented below. Other important information regarding bearing seat dimensions for an appropriate mounting/ dismounting is also provided.

## Location methods

Inner rings can be located axially on one side by the shaft shoulder or intermediate spacer (if the shaft seat is longer or when the shaft fillet radius must be large in order to decrease the effect of stress concentrator), and on the other side by a locknut (many times locked in the desired position by means of a locking washer, **Fig. 37a**), by an end plate (attached to the shaft end by screws, **Fig. 37b**), or by a snap ring **(Fig. 37c)**.

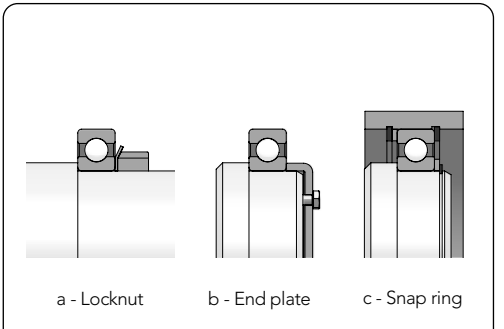



Fig. 37 - Methods for axial location of inner rings

The axial location of outer rings is usually achieved on one side by housing shoulder, and on the other side by means of housing end covers, fastened to the housing with screws **(Fig. 38a)**, or even by threated ring **(Fig. 38b)**.

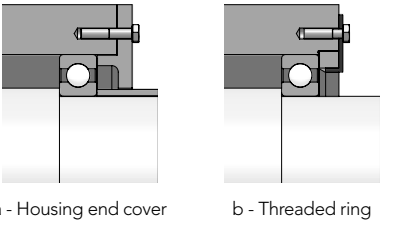



Fig. 38 - Methods for axial location of outer rings

Snap rings may also be used to support the bearing axially on both parts **(Fig. 39a)**, or using only one snap ring mounted in the groove of the bearing outer ring **(Fig. 39b)**.

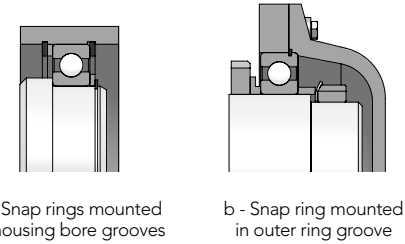


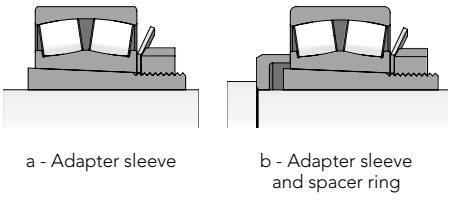

Fig. 39 - Other methods for axial location of outer rings

The axial location of bearing rings by means of snap rings makes construction very simple, saves space, simplifies the shaft and housing design and manufacture, and allows easy and rapid bearing mounting and dismounting. In order to reduce the bending moment acting on a snap ring, a spacer should

be placed between the bearing ring and the snap ring (this decreases the distance between the direction of the axial force and the fixing surface of the snap ring) **(Fig. 39b page 73)**. Note that snap rings are not suitable for applications with large axial loads or when high accuracy is required.

Bearings with tapered bore are installed and fixed axially on cylindrical shafts by means of adapter sleeves or withdrawal sleeves. When an adapter sleeve is used on a smooth shaft (without shoulder), the friction between sleeve and shaft is responsible for the axial constraint of the bearing and the upward axial drive of the bearing on the sleeve is given by the position of the locknut, influencing also the residual internal clearance after mounting **(Fig. 40a)**.

This fault is avoided by using a stepped shaft and a spacer ring inserted between the shaft shoulder and inner ring on the other side **(Fig. 40b)**. The presence of a shoulder (with or without a spacer ring) is mandatory when a withdrawal sleeve is used **(Fig. 41a)**.

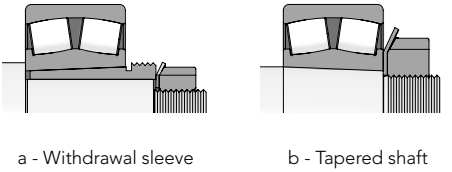


a - Adapter sleeve

b - Adapter sleeve and spacer ring

Fig. 40 - Methods for axial location of inner ring of tapered bore bearings

n this case, the withdrawal sleeve is axially clamped by a locknut or an end plate. When bearings with tapered bore are mounted directly on tapered shafts the bearing is axially located also by a locknut or by a split ring inserted into a shaft groove and secured, for example, by a split ring nut **(Fig. 41b)**.



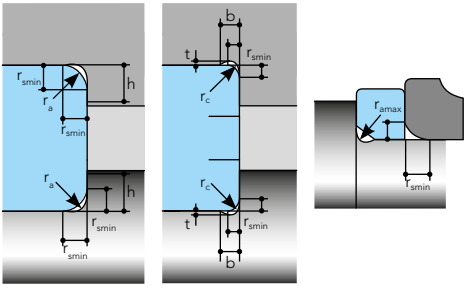
a - Withdrawal sleeve

b - Tapered shaft

Fig. 41 - Other methods for axial location of inner ring of tapered bore bearings

## Abutment and fillet dimension

Inevitably, between the shaft or housing shoulder and bearing seat there is a simple fillet or an undercut **(Fig. 42)**. Both features are stress concentrators (risers) and the greater the fillet radius, the more favorable the stress distribution in the transition area. Considering that the effect of multiple stress concentrators in the same section is multiplicative (not additive), the use of undercut should be made with caution.




a - Fillet

b - Undercut

c - Spacer

Fig. 42 - Fillet radius and shoulder height of shaft and housing

The shaft or housing fillets must not interact

with the bearing chamfer, which means that the fillet radius $r_a$ of the shaft or housing shoulder must be smaller than the bearing minimum chamfer radius $r_{s_min}$ (**Fig. 42 page 74**) and, due to the fact that the components adjacent to the bearing must provide sufficient support to the bearing rings, the minimum height $h_{min}$ of the shaft, housing, or spacer ring abutment must exceed the maximum allowable chamfer dimension (**Tab. 11 page 59, Tab. 12 page 64** and **Tab. 12 page 64**).

Note that the maximum value of the maximum height of these features has to be properly selected taking into account, besides the necessary support dimensions, the bearing dismounting possibility, the cage dimensions, etc. The fillet, undercut, and abutment dimension limits for radial bearings are given in **Tab. 25**.

The use of spacers is necessary in certain cases: when due to the heavy axial load on the shaft the fillet radius must have a large dimension, when due to some reasons the bearing seat is longer than the bearing width, or where there is not a proper contact surface between the bearing and the shaft or housing caused by an insufficient shoulder height.

Related to the axial load level and necessary rigidity, the supports of the raceway washer back face of thrust bearings should be broad and thick enough to take the loads properly (without bearing damage). Subsequently, the heights of shaft and housing abutments will be larger than in the case of radial bearings. As a rule, consider that the bearing pitch circle must be always within both the shaft and housing shoulders.

| **Minimum bearing chamfer dimension** | **Maximum allowable fillet radius** | **Undercut dimensions** | | | **Minimum shoulder height** |
|---|---|---|---|---|---|
| $r_s$ (min)[a] [mm] | $r_a$ (max) [mm] | t [mm] | $r_c$ [mm] | b [mm] | h (min)[b] [mm] |
| 0,05 | 0,05 | - | - | - | 0,3 |
| 0,08 | 0,08 | - | - | - | 0,3 |
| 0,1 | 0,1 | - | - | - | 0,4 |
| 0,15 | 0,15 | - | - | - | 0,6 |
| 0,2 | 0,2 | - | - | - | 0,8 |
| 0,3 | 0,3 | - | - | - | 1,25 |
| 0,6 | 0,6 | - | - | - | 2,25 |
| 1 | 1 | 0,2 | 1,3 | 2 | 2,75 |
| 1,1 | 1 | 0,3 | 1,5 | 2,4 | 3,5 |
| 1,5 | 1,5 | 0,4 | 2 | 3,2 | 4,25 |
| 2 | 2 | 0,5 | 2,5 | 4 | 5 |
| 2,1 | 2 | 0,5 | 2,5 | 4 | 6 |
| 2,5 | 2 | 0,5 | 2,5 | 4 | 6 |
| 3 | 2,5 | 0,5 | 3 | 4,7 | 7 |
| 4 | 3 | 0,5 | 4 | 5,9 | 9 |
| 5 | 4 | 0,6 | 5 | 7,4 | 11 |
| 6 | 5 | 0,6 | 6 | 8,6 | 14 |
| 7,5 | 6 | 0,6 | 7 | 10 | 18 |
| 9,5 | 8 | - | - | - | 22 |
| 12 | 10 | - | - | - | 27 |
| 15 | 12 | - | - | - | 32 |
| 19 | 15 | - | - | - | 42 |

Tab. 25 - Fillet, undercut and abutment dimension limits for radial bearings

[a] - Could be any of $r_1$, $r_2$, $r_3$, and $r_4$ (see **Tab. 11 page 59** and **Tab. 12 page 64**)

[b] - For large axial loads the values given here must be exceeded (this has to be carefully done since the possibility of bearing dismounting is necessary to be assured)

# Sealing arrangements

The main purpose of bearing seals or rotating machine sealing is to prevent the entry of contaminants such as dust, water or other foreign particles, and to retain lubricant. Thus, seals separate two different media and according to their design may be suitable for proper operations under pressure.

During operation, even in the worst conditions, it is important that the seals do not run with high friction and wear. Seals can be manufactured in many different designs and from various materials to meet the most demanding applications and operating conditions. Obviously, bearing life is significantly influenced by the effectiveness of the sealing system.

## Seal types

The main bearing seal categories are:

- integral bearing seals **(Diagram 1)** that should prevent the infiltration of contaminants and lubricant escape from the bearings;
- external bearing seals **(Diagram 2 page 78)** that should avoid mixing the two media existing between a rotating and a stationary part (e.g. shaft and housing).

Both these main seal categories are divided into non-contacting seals and contacting seals. In the case of non-contacting seals, a gap still remains between the rotating part (e.g. shaft) and seal lip (for some types of seal this gap is between the parts of the seal, e.g. labyrinth seal). The ventilation effect force stops both lubricant leakage through this gap and prevents the inlet of contaminants.

For the contacting seals, there is a sliding contact between the rotating part and the seal lip. The material of these types of seals should be chosen according to the working conditions of the bearings. They should also be sufficiently strong to enable efficient operation under pressure and be resistant over a wide range of temperatures as well.

## Integral bearing seals

When required by the application, several types of bearings can be produced with shields (non-contacting seals) or seals **(Diagram 1)**. Bearing shields or seals at both sides are generally provided filled with grease. Integral bearing seals offer space saving solution, so they are recommended for applications where space is crucial.

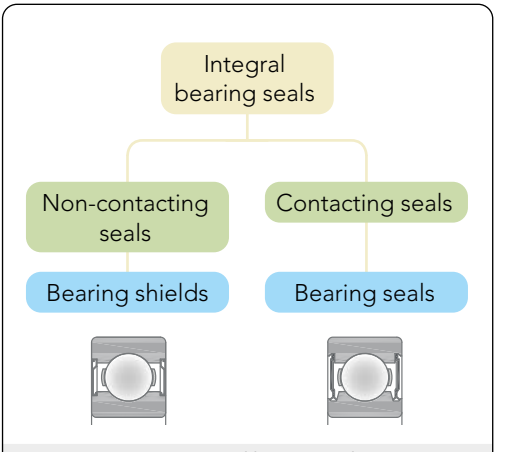


Diagram 1 - Integral bearing seals types

## Shielded bearings

Shielded bearings are suitable for applications where the operating speed and temperature are high, the level of contamination is low and there is no water or moisture. The shield is fixed to the outer ring and between the shield and the inner ring a narrow gap is formed. In virtue of this gap, the efficiency of this type of sealing system is lower than that of the contacting seal. Moreover, since there is no contact between the shield and the rotating part, the frictional moment of the bearing is lower than the one of a sealed bearing. A disadvantage of the gap is that the grease is not retained inside the bearing.

Sealed bearings are used in applications

where an extended life of the bearing is desired, or when the contamination level is moderate and there is no certainty regarding the presence of water and moisture. This type of seal is fixed to the outer ring and makes contact directly with the inner ring shoulder or with a recess in the inner ring shoulder. Since the seal lip is in sliding contact with the rotating part, the frictional moment is increased and bearing speed is reduced.

Since the seal is fixed to the outer ring and develops pressure contact with the inner ring, grease is properly retained inside the bearing and infiltration of contaminants between the moving parts of the bearings is prevented.

## External bearing seals

There are various sealing solutions for applications where the space is not a problem (**Diagram 2 page 78**). As mentioned above, external bearing seals are divided in non-contacting and contacting seals.

### Non-contacting seals

The working principle of these seals is based on creating special slots between the rotating part (i.e. shaft) and the stationary part (i.e. housing). These special slots can be of different shapes and dimensions: a simple gap for grease lubrication or a labyrinth seal for oil lubrication. So, they can vary from a simple to a very complex shape according to the application (the most complex are those for very high speed shafts of turbo machinery).

Different types of non-contacting seals are presented in **Diagram 2 page 78**. They can be used for high speeds and also for a very long time but obviously, because of the clearance between the rotating part of the seal and the stationary one, they cannot ensure a barrier against leakage. Some of the advantages of these seals are:

- no frictional power loss: because of the non-contacting parts of the seal, no wear is produced and obviously no heat is generated by the seal;
- extended life: due to the wear absence they are used for a very long time;
- they can be used for high speeds.

### Gap type seals

The simplest non-contacting seal, that is a small gap between the shaft and housing or cover (**Fig. 43**), is used when the application is grease lubricated, the operating speed is low, and there is no dust in the environment. The thinner the gap, the greater the sealing, but pay attention because the shaft and housing (cover) should not touch during operation.

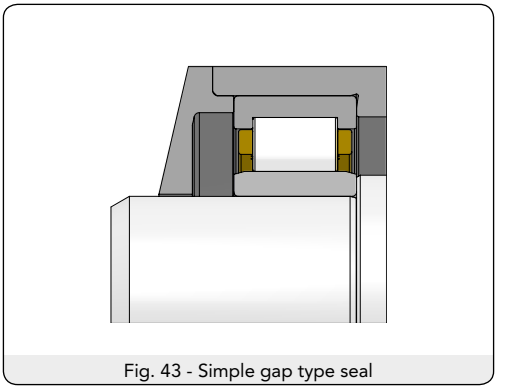


Fig. 43 - Simple gap type seal

Several concentric annular grooves can be machined on the housing (cover) bore or shaft surface or on both, depending on the design, to improve this simple type of seal (**Fig. 44 page 79**). In operation, the annular grooves are filled with grease, which helps prevent the inlet of the contamination particles. In order to create a labyrinth effect, the minimum number of grooves must be 3.

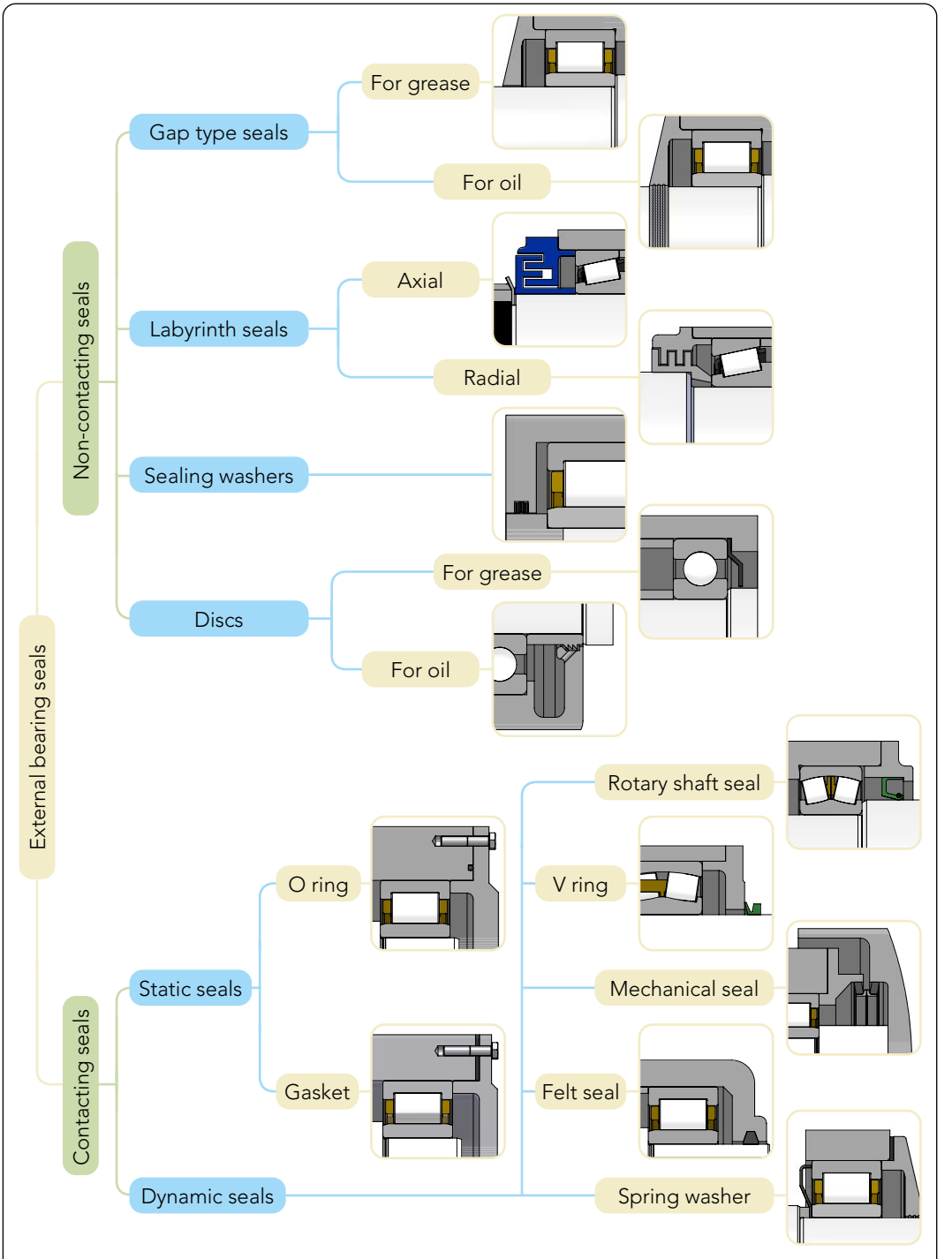



Diagram 2 - External bearing seals types

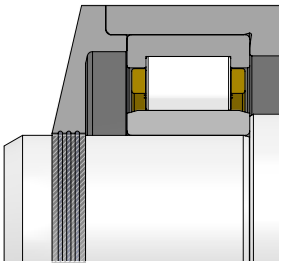


Fig. 44 - Gap type seal with annular grooves

In case of oil lubricated applications, helical grooves that interrupt the oil capillarity action are machined (**Fig. 45**). An essential point is that the shaft rotation direction should not change. It is interesting to note that in order to prevent oil leakage in applications where the contamination due to bearing lubricant might be a problem, this type of seal has to be combined with another type, so that labyrinth seal is effective.

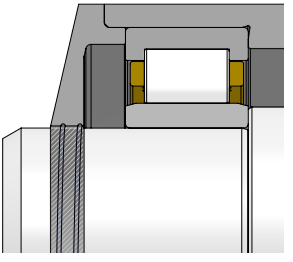
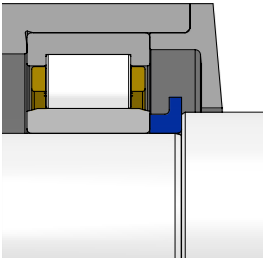
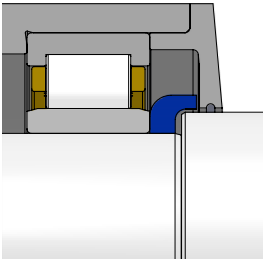


Fig. 45 - Gap type seal with helical grooves

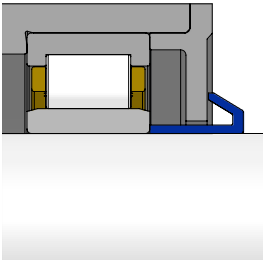
In addition to the grooves, a flinger type seal can be used to better protect the bearing against contamination or oil leakage. When the flinger is mounted inside the housing, due to centrifugal forces and the flinger shape, the oil is prevented from escaping (**Fig. 46a** and **Fig. 46b**), whereas when the flinger is mounted outside the housing the contaminants cannot enter for the same reasons (**Fig. 46c** and **Fig. 46d**).



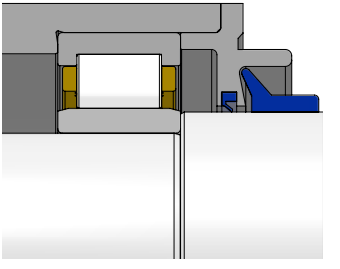
a - Flinger is mounted inside the housing



b - Flinger is mounted inside the housing



c - Flinger is mounted outside the housing



d - Flinger is mounted outside the housing

Fig. 46 - Flinger seal configurations

## Labyrinth seals

As its name suggests, this type of seal creates a twisted path between the bearing and the environment. If bearings are oil lubricated, this twisted path acts like a barrier against oil leakage **(Fig. 47),** but at the same time if the foreign particles from outside enter the labyrinth, they impact the walls and are slowed, so crossing the labyrinth from outside is almost impossible.

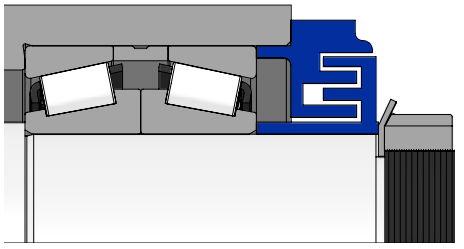


Fig. 47 - Labyrinth seal

In case of grease lubrication, the labyrinth seal path can be filled with water insoluble grease, thus improving seal efficiency because dust or water from the environment cannot enter. The labyrinth seals consist of a rotating and a stationary part with a gap between them. The gap thickness in radial direction must be larger than the radial internal clearance of the bearing. In axial direction, it has to take into account the axial clearance of the bearing and the shaft expansion. Parameters such as operating temperature, operating speed, alignment of the shaft and housing should also be considered when this gap is established. The recommended gaps are given in **Tab. 26**.

| **Shaft diameter** [mm] | **Radial gap** [mm] | **Axial gap** [mm] |
|---|---|---|
| **Under 50** | 0,25 to 0,4 | 1 to 2 |
| **50 to 200** | 0,5 to 1,5 | 2 to 5 |

Tab. 26 - Gap dimensions for labyrinth seals

The labyrinth path can be arranged axially **(Fig. 48)** if the housing is one-piece or radially **(Fig. 49)** for a split housing.

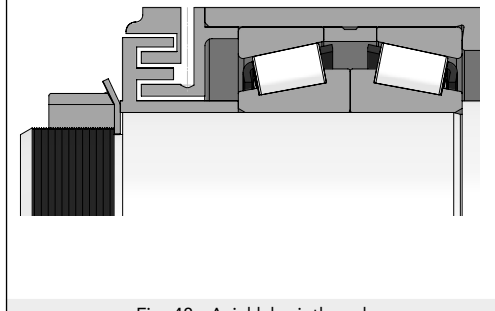


Fig. 48 - Axial labyrinth seal

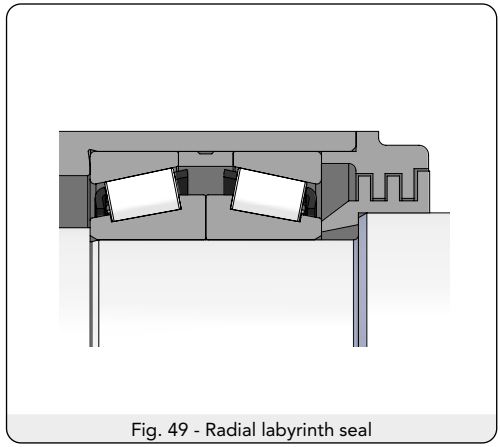


Fig. 49 - Radial labyrinth seal

This type of seal is mainly used for applications where liquid contamination is a serious problem. Since the larger diameter of the labyrinth is oriented to the contamination

source and due to the labyrinth rotating radial surfaces, a centrifugal force that separates the liquids is formed. In addition, some escaping passages can be created, so that the separated lubricating oil can be drained back to the oil sump, and the separated contaminants can be removed (**Fig. 50**).
The labyrinth gap that comes into contact with the contaminated environment can be shielded and thus an axial overlap on the outer diameter of the labyrinth rotating part appears (**Fig. 50**). The external contaminated liquid is expelled thanks to the centrifugal force of the rotor.

In applications where the shaft and the housing are not aligned, a labyrinth seal with inclined passages has to be used (**Fig. 51**).

A porous filter at a certain place of the labyrinth can be used to improve sealing efficiency (**Fig. 52 page 82**), but, since the filter is positioned between the rotating and stationary parts, it will be affected by progressive wear. Another method to improve seal effectiveness is the introduction of pressurized air inside the labyrinth outward (**Fig. 53 page 82**). These two methods are very efficient even in case of machine cool down, because they prevent contaminant aspiration.

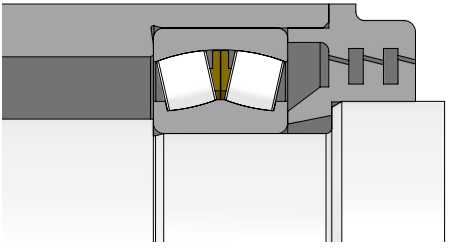
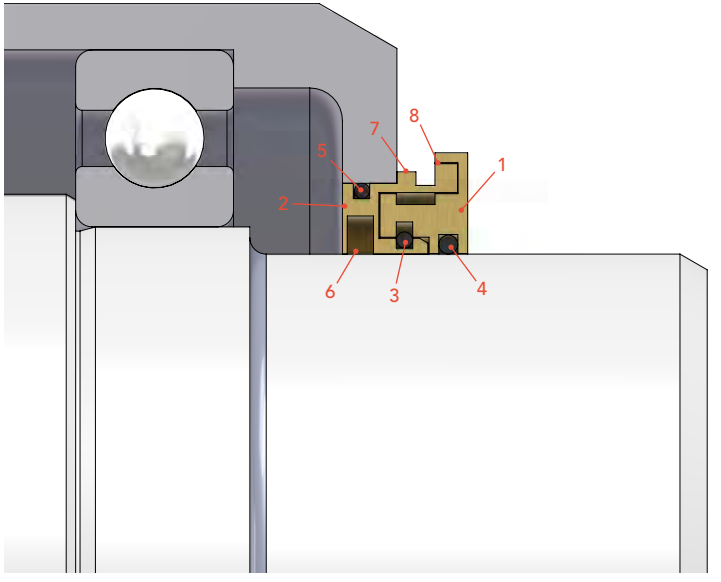


Fig. 51 - Labyrinth seal for self-aligning shaft




Legend

1. Rotor
2. Stator
3. VBXR ring
4. Rotor drive ring
5. Stator gasket
6. Lube retention groove
7. Square shoulder
8. VBXX interface

Fig. 50 - Complex labyrinth seal design

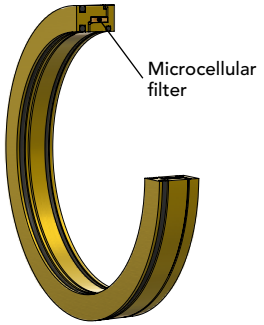



Fig. 52 - Axial labyrinth seal

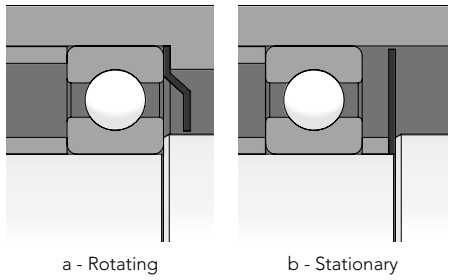



Fig. 54 - Discs for grease lubricated bearings

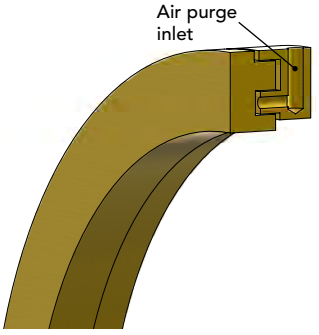



Fig. 53 - Axial labyrinth seal

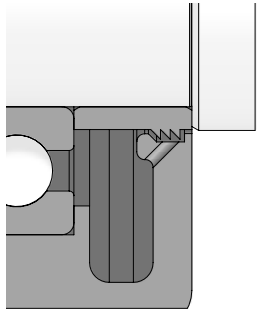


Fig. 55 - Rotating disc for oil lubricated bearings

## Rotating or stationary discs

For grease lubricated bearings, the rotating part is a disc that is often fitted to the shaft and there is a small gap between the rotating disc and housing **(Fig. 54a)**. Thus, the disc retains the grease in the space around the bearing, while the grease passing through the gap between the disc and housing protects the bearing against contamination.

Sometimes a stationary disc, fitted in the housing is used **(Fig. 54b)**. For oil lubricated bearings, splash rings can be used to prevent oil leakage. The oil drain hole in the lower part of the sealing arrangement must be large enough to impede its clogging with contaminants **(Fig. 55)**.

## Contacting seals

This category can be divided into static seals and dynamic seals. Static seals are seals that come into contact with static surfaces and where sealing is achieved due to the radial or axial deformation of the seal after mounting.

Dynamic seals are seals that come into contact with one or more interfaces with sliding surfaces (rotational or translational motion).

## Static seals

### O-ring seals

One of the most common static seals is the elastomer O-ring and a typical arrangement of this kind of seal in a groove is shown in **Fig. 56**. The O-ring groove is designed so that the seal is compressed on one axis (usually this axis perpendicular to the axis of action of the pressure in the sealing area), while there has to be a free volume on the other axis in the groove.

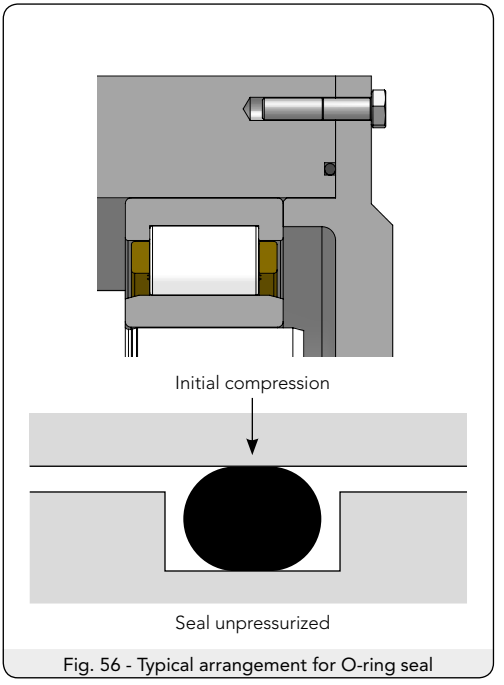



Fig. 56 - Typical arrangement for O-ring seal

The nominal value of seal initial compression in the groove has to be in the range of 15-20% relative to its initial state, but a recent trend wants to increase this value to 20-25%. When an O-ring is mounted in the groove, some forces are developed on the counterfaces, as presented in **Fig. 57a**. During operation, a pressure is developed and acts on the O-ring that is compressed against the wall of the groove **(Fig. 57b)**. In this way the sealing is achieved by means of the elastomer properties.

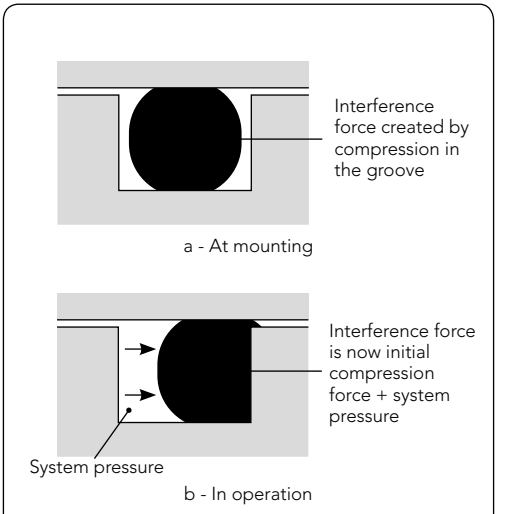



Fig. 57 - Acting loads on an elastomer O-ring

O-ring material is very deformable but maintains its volume since the Poisson's coefficient is close to 0,5. So, for this reason, the mounting stresses act as tensions within the material and then, when a pressure is applied, due to the flexibility and resistance of the material to volume change, the pressure applied is transferred to the axis of compression.

The groove of the O-ring has rectangular and not circular section, for the following reasons:

- since the elastomer becomes almost incompressible when the O-ring is compressed, it is necessary to allow it to expand in other directions;
- the thermal expansion coefficient of the elastomer is higher relative to the other surrounding metal parts from the assembly,

so for elevated working temperatures a space for the thermal expansion of the O-ring is necessary;
- if the O-ring comes in contact with the lubrication oil of the application, the elastomer can absorb a part of the oil. The increase in volume of the material is of about 5-10%.

A common design criterion for O-rings is that it occupies 70% of the groove volume. Even for a correct design arrangement of the seal, there may be some failure reasons:

- if the counterfaces of the design arrangement of the seal can move relative to each other, the initial compression of the O-ring is reduced;
- if the pressure developed in operation, which acts on the O-ring, is too high, the seal will be extruded from the groove **(Fig. 58)**;
- if the working temperature of the O-ring is too low, the elastomer loses its elastic properties and at the same time the initial compression of the seal is reduced;
- ageing of the seal material leads to the loss of the elastomer properties.

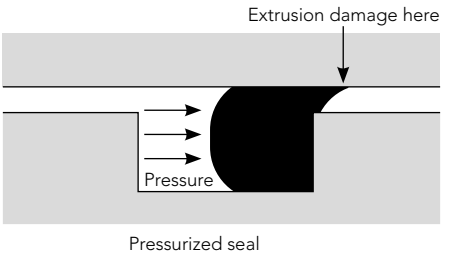



Fig. 58 - O-ring subjected to high pressure

## Gaskets

Gasket is another typical static seal **(Fig. 59)**. A gasket seals two surfaces through the stored energy within the gasket itself. Gaskets are made from different materials so they can be non-metallic (elastomers, cork, compressed fiber, graphite, etc.), semi-metallic and metallic.

The gasket is tightened with the loads generated by the screws or bolts. Due to these loads, an initial stress appears and compresses the gasket. Therefore, if the gasket is non-metallic, all the voids from the fibers will be compacted, but if it is metallic, the gap between the assembly parts will vanish. In operation, some loads or pressures appear, and they tend to increase the tensile load on the bolts and to decrease the stress on the gasket. This remaining stress in the gasket is called operating or residual pressure. It is important to maintain the operating stress within the gasket because in this manner the gasket preserves its ability to seal.

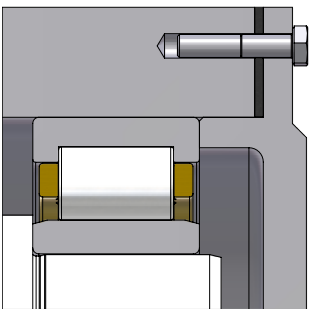


Fig. 59 - Typical gasket assembly

Assembly relaxation can occur between the mating surfaces and also in the gasket material. When the gasket materials contain a high amount of elastomer, the gasket will considerably relax at high temperatures. When the gasket material is compressed fiber, it must be given greater attention because a thicker material will relax more than a thinner one.

For a good performance of the seal, the

surfaces that come into contact with the gasket have to be properly machined. The value of the roughness $R_a$ for a good performance of the seal has to range from 3,2 µm to 12,5 µm. To improve the performance, the roughness of the surfaces $R_a$ should range from 3,2 µm to 6,3 µm when the gasket is semi-metallic and from 6,3 µm to 12,5 µm when the gasket is non-metallic. The finished surfaces prevent the creep of the gasket across the contacting surfaces. Grease or other lubricant must not be used on the surfaces because the sealing performance will be reduced.

The best practice for a gasket installation is:

- the mating parts of the assembly (e.g. the cover and the housing) have to be correctly aligned;
- the screws or bolts have to be calculated to be sure that their elastic limit is less than the required tension. When they are selected for mounting, they must not show signs of corrosion because this would affect their functionality. During mounting, a thin uniform layer of thread or anti-galling lubricant should be applied on screws or bolts threads;
- the gasket should be stored lying down not hanging, in a cool dry place away from heat, moisture, water or chemicals. The gasket should be as thin as possible and during mounting, it should not be hammered against the housing or cover surface because the contact surfaces or gasket material could be damaged. This damage could result in a lower performance of the sealing;
- gaskets and screws/bolts (if possible) should never be reused.

Gaskets have to be tightened uniformly in three or four steps using a crossed pattern, as shown in **Fig. 60**.

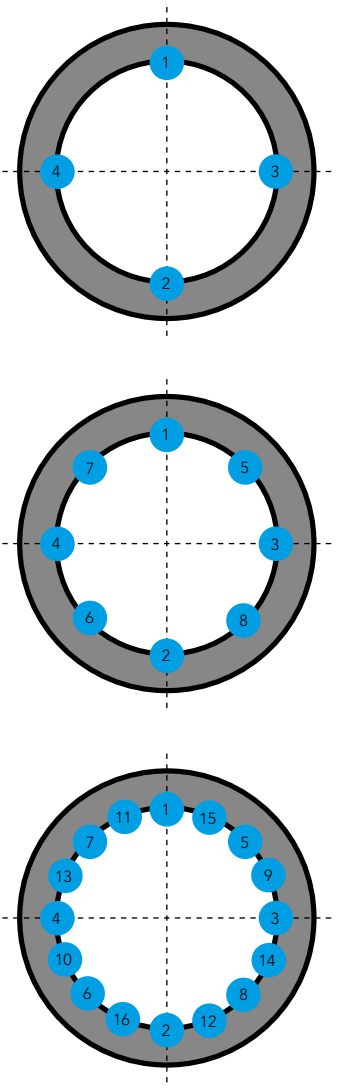



Fig. 60 - Screws or bolts tightening sequence

## Dynamic seals

### Felt seals

Felt seals (**Fig. 61**) are the simplest dynamic seals. This seal is used only with grease lubrication, to prevent the entry of the contaminants inside the housing. In case of oil lubrication, leakage of the oil cannot be avoided. Mounting a secondary seal such as a gap type seal or a labyrinth seal can increase the efficiency of the felt seal. The operating limits of this type of seal are:

- speed up to 4 m/s;
- maximum misalignment error is 0,5 °;
- temperature between -40 °C and +110 °C.

It is important to mention that the felt seal has to be immersed in oil heated at 80 °C before mounting.

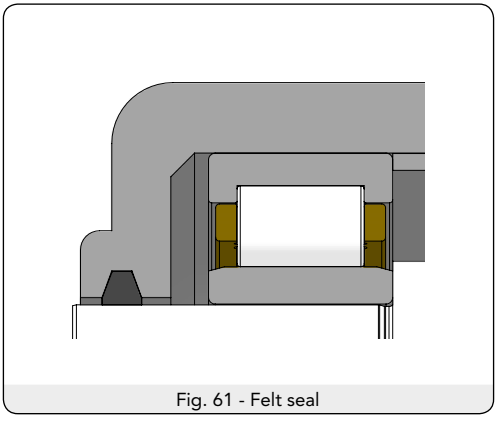


Fig. 61 - Felt seal

### Rotary lip seals

This seal type is the most frequently used because it is mass-produced and, therefore, relatively inexpensive. A sketch of a rotary lip seal is shown in **Fig. 62**. This figure shows the important seal parts: the lip seal, made of elastomer, the inserted toroidal spring, and the case (steel reinforcement) that can be partially or completely covered by elastomer. When the seal is mounted on the shaft, the lip will be deformed due to the interference fit between the seal lip and shaft, thus the lubricant is prevented from escaping when the shaft is stationary. The axial length of the contact region of seal lip with the shaft is initially about 0,1 mm but, after running-in, the length is extended to 0,2 to 0,3 mm. In operation, the sealed fluid lubricates the contact surface. Under normal operating conditions, a full-film lubrication is formed in the sealing region. The film thickness is about 1 μm, and its presence is beneficial because wear and friction of the seal lip are reduced.

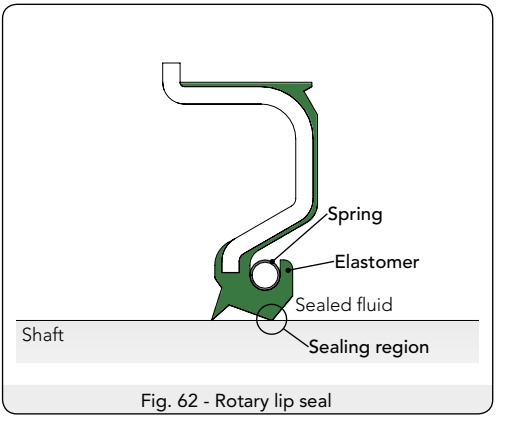



Fig. 62 - Rotary lip seal

Standard lip seals are designed to be used in applications where there is low pressure and, therefore, seal manufacturers recommend a maximum operating pressure between 0,3 bar and 0,5 bar. If pressure increases, the seal lip will be deformed, consequently the contact surface between the lip and the shaft will be increased. This leads to a higher operating temperature and wear of the seal.

The effectiveness of a rotary lip seal depends on the geometry of the lip, the texture and roughness of the lip surface, position of the toroidal spring relative to the sealing region center, and the quality of finished shaft surface.

The most important parameters of lip geometry are the lip angles: the liquid side angle and the air side angle. As shown in **Fig. 63**, the air side angle has to be smaller than the

liquid side angle. The air side angle has to be between 20° and 35° and the liquid side angle between 40° and 70°. Regarding the position of the spring of the sealing surface center, the center of the spring has to be closer to the air side than to the liquid side.

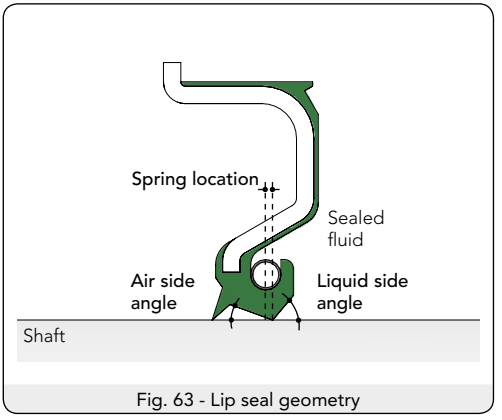



Fig. 63 - Lip seal geometry

The sealing action of lip seals is based on the centrifugal force and the pressure difference between the two seal sides (internal and external). The effectiveness of the radial lip seal is related to the reverse pumping because if the pumping rate is too low the seal will leak. The inward pumping mechanism depends mainly on two seal characteristics:

- asymmetric geometry of the lip (enhanced by the position of the spring);
- lip surface texture in the contact zone (after running-in).

The asperities on the surfaces of a new rotary lip seal are randomly distributed. During the running-in period between the contacting surfaces there is mixed lubrication, so contact between the shaft and lip occurs. Therefore, the wear causes pronounced asperities on the lip as well as the formation of micro-ondulations. When shaft rotates, due to the friction, the seal elastomer body distorts mainly in the lip zone, and the lip surface asperities (whatever their origin is) also deform so that they will be oriented at an angle to the shaft axis. These angled asperities will serve to hydrodynamically lift the lip and to pump the liquid from both sides towards the lip. Since the asperity field on the air side exceeds that on the liquid size, the inward pumping effect will be stronger than the natural outward one. Hence, the reverse pumping phenomenon counteracts the natural leakage of the seal resulting in no leakage at all.

According to the sense of lip mounting, it is possible to use the seal to prevent lubricant contamination and pollution, or the outlet of the lubricant from the bearing.

The sealing contact region is lubricated with a small amount of melted oil from the grease which is pumped out. This oil prevents wear and entering of liquid contaminants.

The shaft surface is also important for a rotary lip seal to work properly. If the surface is too rough, the lip contact surface will be damaged earlier and if it is too smooth, during the running-in period, the asperities on the lip surface cannot be formed. The Rubber Manufacturer Association and the Society of Automotive Engineers established that a good shaft surface roughness $R_a$ value ranges between 0,25 µm to 0,50 µm. In operation, if the rotation direction of the shaft must be reversed and if a relatively new seal is mounted on it, this will work properly, but if the seal had been working for an extended period before changing shaft rotation, the seal will possibly leak because of elastomer ageing. Other types can derive from the basic configuration of the lip seal, such as an added lip when contaminants need to be excluded and oil leakage prevented as shown in Fig. 64 page 88.

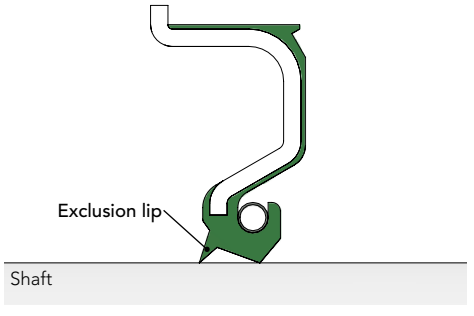



Fig. 64 - Rotary lip seal with contaminants exclusion lip

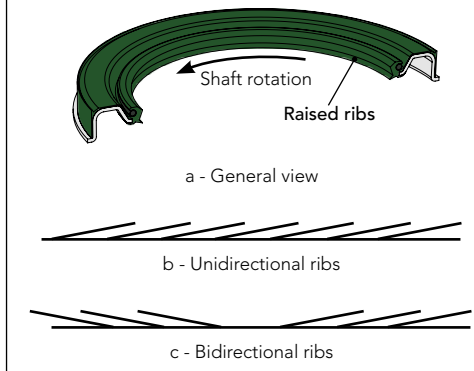



Fig. 65 - Rotary lip seal with sealing aids

Other rotary lip seals are produced with the so-called sealing aids. In fact, there are small ribs on the airside of the seal lip. The ribs collect the oil amount, which passed through to the seal lip and guide it back to the sealing area. These ribs have to be in contact with the shaft to be effective, and to merge into the lip **(Fig. 65a)**. A majority of these seal types have unidirectional ribs **(Fig. 65b)** that are suitable for applications where the shaft is predominantly rotating in one direction. Lip seals with bidirectional ribs **(Fig. 65c)** are also available, but one disadvantage is that the proportion of pumping in one direction is less than for the unidirectional design.

## V-ring seals

A V-ring seal is mounted with interference fit on the shaft while the lip acts axially against a mating radial surface **(Fig. 66)**.

This seal type is commonly used as bearing seal in applications with low or moderate speed, and slight contamination, but it is also used as an excluder seal on the air side (**Fig. 67 page 89**). For oil lubrication applications, where the speed is very high, the V-ring can be mounted statically on a radial surface, because the speed increases the centrifugal forces that reduce the contract stress between the shaft and seal. Therefore, the V-ring will work as a clearance seal.

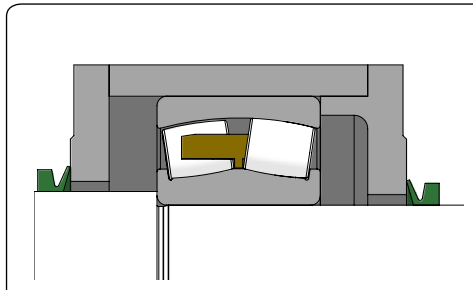


Fig. 66 - V-ring arrangement

For this kind of application and when the seal has a large diameter as 1 m to 2 m, a clamping band **(Fig. 68)** or a suitable housing can be used for radial retention.

The effectiveness of the V-ring depends on the shaft surface finish and also on the flatness of the radial surface which comes in contact with the seal lip. The shaft surface roughness $R_a$ should range between 0,4 µm and 0,8 µm and the flatness has to be 0,4 mm per 100 mm diameter.

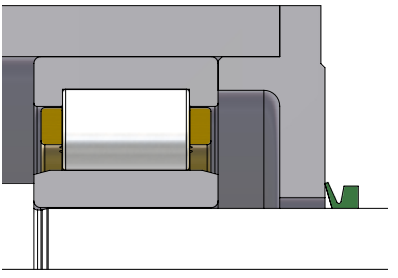


Fig. 67 - V-ring arrangement used as an excluder seal

The V-ring seals have some advantages compared to the rotary lip seal since:

- they can support large axial movements because of the seal geometry, which allows its bending;
- they can operate at higher speeds;
- the roughness value of the shaft surface is not so critical;
- they can work with a considerable runout and misalignment.

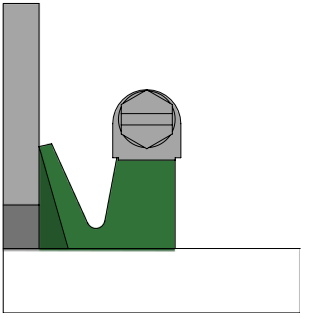
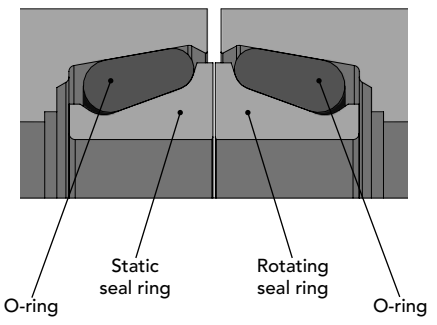


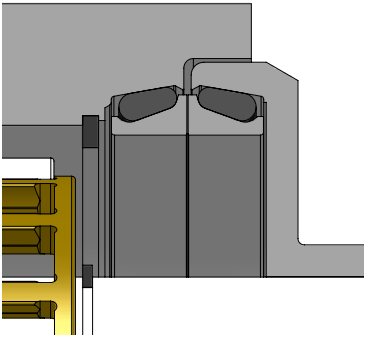
Fig. 68 - V-ring with a clamping band

## Mechanical face seals

This type of seal is used in applications with dirty environments and moderate operating speed. There are two types of mechanical face seals: TO **(Fig. 69)** that uses an O-ring for the




a - Sealing principle



b - Mounted seal

Fig. 69 - TO type mechanical face seal

sealing region and DF that uses a ring made of elastomer with a diamond-shaped cross section instead of an O-ring (Fig. 70 page 90).TO type seal consists of two metallic rings mounted face-to-face in two separate housings and the O-ring centers the sealing in the housing.

The rings seal against each other on a lapped seal face. This narrow contact surface is of a few millimeters and, from that place towards the shaft axis, a tapered gap is formed, as shown in Fig. 69 page 89.

This tapered gap has the following purposes:

- helps the lubricant reach the contact seal surfaces due to the centrifugal forces and capillarity action. The frictional heat generated by the contact surfaces of the seal must be dissipated to achieve a good operation of the seal. A seal works properly when a trace of lubricant can be seen on the outer diameter of the ring seal;
- the wear zone can be extended until it reaches the inside diameter.

Adaptor rings can be used if the housing profile cannot be machined to a specific surface finish to achieve a correct operation of the O-ring (DO type, Fig. 71).



Fig. 70 - DO type mechanical face seal with adapter rings

After mounting the O-rings or shaped elastomers, between the ring seal and housing a uniform axial load is created thanks to their material elasticity.

With regards to lubrication, this type of seal achieves maximum effectiveness with oil lubrication and moreover transmission oil with a high viscosity is recommended.

The operating limits of this type of seal are:

- speed up to 3 m/s with grease lubrication and up to 10 m/s with oil lubrication;
- pressure up to 3 bar. A higher pressure will lead to a misalignment of the seal;
- temperature between -40 °C to + 200 °C.

If the seal is operating on speed upper limit, the axial compression of the O-ring must be reduced so that the load acting on the seal face and the heat generated will be reduced. The only way to reduce the axial compression of the O-ring is to increase the axial gap s (Fig. 71) between the lateral housing faces.

This axial gap is established according with the O-ring cross section diameter. Tab. 27 page 91 shows the possible axial gaps, but testing to find the most appropriate seal settings is recommended.

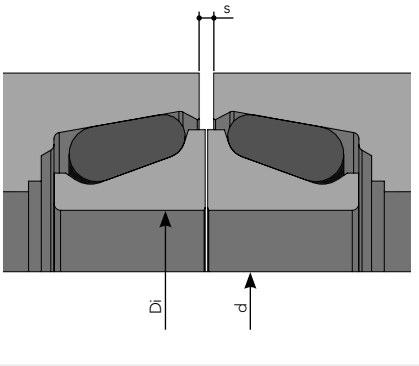



Fig. 71 - Adjusting the axial compression of the O-rings of a mechanical face seal

| **Diameter of O-ring cross section** [mm] | **Axial gap** [mm] |
|---|---|
| ≤ 8 | 4 |
| 8 to 12,7 | 5 |
| > 12,7 | 6 |

Tab. 27 - Axial gap dimensions

The effectiveness of the seal is related to the surface finish of the surfaces which come in contact with the O-ring. It is true that under pressure, an O-ring is deformed even under the action of irregular surfaces, but a minimum requirement of these surfaces is necessary. The recommended machining quality of the surfaces should have the roughness $R_a$ lower than 3,2 µm. Moreover, all the housing edges must be rounded in order not to nick and damage irremediably the O-rings.

This type of seal does not come into contact with the shaft and for this reason the quality of the shaft surface is not so important. In any case, to ensure that the lubricant reaches the contacting surfaces of the seal through the tapered gap, as it is explained above, a minimum radial gap has to be maintained between the seal rings and the shaft.

Furthermore, this radial gap prevents the problem related to the part assembly tolerances and shaft deflection or misalignment.

## Seal selection

The factors that have to be taken into account when selecting the proper seals are:

- lubrication type (oil/grease) and lubrication method;
- operating environment (presence and type of contaminants);
- shaft speed and its direction;
- shaft eccentricity;
- operating temperature;
- internal or external pressure;
- free available space;
- mounting procedure;
- economic considerations.

Since one or more of these factors will predominate, depending on the application, it is very difficult to establish general rules to select the proper seal. According to the main purpose of the seal, some seal types are more often used.

# Main prefixes and suffixes

| Prefixes | |
|---|---|
| GS | Housing washer of cylindrical roller thrust bearings |
| K | Cylindrical roller and cage thrust assembly |
| L | Separable bearing ring, including possible loose lips of separable roller bearings. Also, separable bearing rings which consist of several parts |
| R | Bearing ring with rolling element and cage assembly of separable roller bearings or needle roller bearings |
| WS | Shaft washer of cylindrical roller thrust bearings |

Tab. 1 - Prefixes

| Suffixes | Internal design |
|---|---|
| A…Z<br>1…n | Modification code to the bearing. Typically placed at the end of the part number, the meaning of these characters is not specifically fixed (e.g. modified internal design or configuration, special production protocol, application optimized version, filled with non-standard grease or other special feature). The actual modification to the original design is specific to the individual bearing and is provided on the related drawing. Combinations of letters and digits are also used (e.g. AC, A2). Sometimes, this type of suffix is preceded by an oblique stroke (e.g. /4) |
| E/EC | Optimized internal design with reinforced execution and/or increased load ratings |
| SP | Special or non-standard bearing |
| AOB | Application optimized bearing |

Tab. 2 - Suffixes: internal design

| Suffixes | External design |
|---|---|
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper 1:30 |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

Tab. 3 - Suffixes: external design

| Suffixes | Set |
|---|---|
| DB | Two bearings matched for mounting back-to-back |
| DF | Two bearings matched for mounting face-to-face |
| DT | Two bearings matched for mounting in tandem |
| 2x… | Pair of two bearings |
| 3x… | Group of three bearings |
| SET 2x… | Set of two bearings with possible presence of spacers |
| SET 3x… | Set of three bearings with possible presence of spacers |

Tab. 4 - Suffixes: set

| Suffixes | Materials and heat treatments |
|---|---|
| HB1 | Bainite hardened outer and inner ring |
| HB2 | Bainite hardened outer ring |
| HB3 | Bainite hardened inner ring |
| HB4 | Bainite hardened outer and inner ring and rolling elements |
| HB5 | Bainite hardened rolling elements |
| HB6 | Bainite hardened outer ring and rolling elements |
| HB7 | Bainite hardened inner ring and rolling elements |
| HA1 | Case hardened outer and inner ring |
| HA2 | Case hardened outer ring |
| HA3 | Case hardened inner ring |
| HA4 | Case hardened outer and inner ring and rolling elements |
| HA5 | Case hardened rolling elements |
| HA6 | Case hardened outer ring and rolling elements |
| HA7 | Case hardened inner ring and rolling elements |

Tab. 5 - Suffixes: materials and heat treatments

| Suffixes | Special surface treatments |
|---|---|
| AWT1 | Anti-wear treated outer and inner ring |
| AWT2 | Anti-wear treated outer ring |
| AWT3 | Anti-wear treated inner ring |
| AWT4 | Anti-wear treated outer and inner ring and rolling elements |
| AWT5 | Anti-wear treated rolling elements |
| AWT6 | Anti-wear treated outer ring and rolling elements |
| AWT7 | Anti-wear treated inner ring and rolling elements |
| PT1 | Phosphate treated outer and inner ring |
| PT2 | Phosphate treated outer ring |
| PT3 | Phosphate treated inner ring |
| PT4 | Phosphate treated outer and inner ring and rolling elements |
| PT5 | Phosphate treated rolling elements |
| PT6 | Phosphate treated outer ring and rolling elements |
| PT7 | Phosphate treated inner ring and rolling elements |
| ACT1 | Anti-corrosion treated outer and inner ring |
| ACT2 | Anti-corrosion treated outer ring |
| ACT3 | Anti-corrosion treated inner ring |

Tab. 6 - Suffixes: special surface treatments

| Suffixes | Dimensional stabilizing |
|---|---|
| S0 | Bearing rings heat stabilized for operating temperatures up to 150 °C (300 °F) |
| S1 | Bearing rings heat stabilized for operating temperatures up to 200 °C (390 °F) |
| S2 | Bearing rings heat stabilized for operating temperatures up to 250 °C (480 °F) |
| S3 | Bearing rings heat stabilized for operating temperatures up to 300 °C (570 °F) |

Tab. 7 - Suffixes: dimensional stabilizing

| Suffixes | Dimensional and running accuracy, clearance |
|---|---|
| ABEC1 | Approximated to tolerance class P0 |
| ABEC3 | Approximated to tolerance class P6 |
| ABEC5 | Approximated to tolerance class P5 |
| ST | Special tolerance |
| C1 | Radial internal clearance smaller than C2 |
| C2 | Radial internal clearance smaller than Normal |
| CN | Normal radial internal clearance |
| C3 | Radial internal clearance greater than Normal |
| C4 | Radial internal clearance greater than C3 |
| C5 | Radial internal clearance greater than C4 |
| C…S | Special radial internal clearance in a given range of the stated class |
| C…SL | Special radial internal clearance in the lower part of the stated class (e.g. C4SL = radial internal clearance in the lower part of C4) |
| C…ST | Special radial internal clearance in the upper part of the stated class (e.g. C4ST = radial internal clearance in the upper part of C4) |
| C…R | Radial internal clearance between upper part of previous class and lower part of the stated class (e.g. C4R = radial internal clearance between upper part of C3 and lower part of C4) |
| CS | Special radial internal clearance |
| P0 | Dimensional and running accuracy to ISO tolerance class 0 |
| P5 | Dimensional and running accuracy to ISO tolerance class 5 |
| P6 | Dimensional and running accuracy to ISO tolerance class 6 |
| P6S | Dimensional and running accuracy between P6 and P5 |
| P51 | P5 + C1 |
| P52 | P5 + C2 |
| P53 | P5 + C3 |
| P54 | P5 + C4 |
| P55 | P5 + C5 |
| P61 | P6 + C1 |
| P62 | P6 + C2 |
| P63 | P6 + C3 |
| P64 | P6 + C4 |
| P65 | P6 + C5 |
| P62R | P6 + radial internal clearance between upper part of C1and lower part of C2 |
| P63R | P6 + radial internal clearance between upper part of normal and lower part of C3 |
| P64R | P6 + radial internal clearance between upper part of C3 and lower part of C4 |
| P65R | P6 + radial internal clearance between upper part of C4 and lower part of C5 |
| SP | Special precision class |

Tab. 8 - Suffixes: dimensional and running accuracy, clearance

| Suffixes | Other |
|---|---|
| VL | Victory Line: combination of state-of-the-art bearing features to meet the ever-demanding requirements of modern machinery. It is a combination of factors connected to internal geometry, surface finish, cage design, steel cleanliness, advanced heat treatments, and optimization of rolling element/raceway contact. It is not necessarily stated in the bearing code |

Tab. 9 - Suffixes: other

| Bearing designation | Decoding |
|---|---|
| 6315 MC4S2 | • bearing type 6: deep groove ball bearing<br>• dimension series 03: width series 0 and diameter series 3<br>• bore diameter code 15: bore diameter 15 x 5 = 75 mm<br>• cage type code M: machined brass cage guided on rolling elements<br>• precision class: P0<br>• radial internal clearance: C4<br>• special suffix S2: rings heat stabilized for operating temperatures up to 250 °C |
| N 1964 KMP62ZB | • bearing type N: single row cylindrical roller bearing<br>• dimension series 19: width series 1 and diameter series 9<br>• bore diameter code 64: bore diameter 64 x 5 = 320 mm<br>• ring design K: tapered bore, taper 1:12<br>• cage type code M: machined brass cage guided on rolling elements<br>• precision class: P6<br>• radial internal clearance: C2<br>• special suffix ZB: optimized roller profile |
| 24130 K30CAW33S1 | • bearing type 2: double row spherical roller bearing<br>• dimension series 41: width series 4 and diameter series 1<br>• bore diameter code 30: bore diameter 30 x 5 = 150 mm<br>• ring design K30: tapered bore, taper 1:30<br>• cage type code CA: double pronged machined brass cage. Bearing with symmetrical roller and retaining ribs<br>• special suffix W33: annular groove and lubrication holes in the outer ring<br>• special suffix S1: rings heat stabilized for operating temperatures up to 200 °C |
| 293/600 EM | • bearing type 2: spherical roller bearing (thrust)<br>• dimension series 93: height series 9 and diameter series 3<br>• bore diameter 600 mm<br>• bearing design E: optimized internal design with reinforced execution<br>• cage type code M: machined brass cage guided on shaft washer with or without retaining sleeve |

Tab. 10 - Bearing designation examples



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RKB
BEARING INDUSTRIES
SWITZERLAND

# Ball bearings

The ball bearings (BBs) manufactured by RKB come in many designs, dimensions and series. They are conceived to withstand combined loads and high speeds, covering most requirements in a number of standard and special industrial applications. All RKB BBs are made from high quality materials and special heat treatments for superior performance.

Available in single and double row configuration, in open or sealed version, they are low-maintenance, which makes them an irreplaceable cost-effective solution in many cases.

For large size BBs, RKB can also apply Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) on rings and balls. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Deep groove ball bearings

## Deep groove ball bearings

RKB offers a wide range of deep grove ball bearings (DGBBs) in single row design (open, sealed or shielded), with proven performance in many industrial fields. Having optimized internal geometry, they can operate at high speeds, sustaining radial and axial loads in both directions and generating low friction.

RKB DGBBs are engineered to successfully respond to the most demanding application requirements, in terms of high speeds, heavy loads and low noise. This is mainly due to the use of the best raw materials and manufacturing technology, that permit to deliver only premium deep groove ball bearings.

### Bearings with contact seals

Seals are retained in their correct position by a recess in the outer ring. They are normally made by acrylonitrile-butadiene rubber (NRB) with a metallic reinforcement, so the continuous range working temperature is from -40 to 100 °C. A peak temperature of 120 °C can be supported for a short period of time. If the sealed bearings have to be used in harsh conditions, e.g. high temperature or high rotation speed, a grease leakage from the inner ring side could take place. In these cases a special seals design could be requested, so please consult the RKB application engineering service.

### Internal clearance

Single row deep groove ball bearings are produced as standard with Normal radial clearance CN, but they can be manufactured featuring C2 ,C3, C4 and C5 radial clearance, in accordance with the ISO 5753:2009.

Bearings with special radial clearance in a different range than ISO 5753:2009 can be manufactured on request.

The radial clearance values are provided in the **Tab. 1 page 102** and they are valid only for bearing not yet mounted and loaded.

## Misalignment

For single row deep groove ball bearing is not possible to determine a unique value of the shaft and housing misalignment.

Permissible misalignment depends on several factors such as:

- Radial internal clearance;
- Bearing size;
- Internal design;
- Forces and moments acting on it.

According to the above concept and depending on the influences of all these variables, the corresponding permissible misalignment vary between 2 and 10 minutes of arc, but it has to be considered that the induced additional stress inside the bearing influences negatively its service life.

For additional information, please consult the RKB application engineering service.

## Minimum load

A minimum radial load is requested for single row deep groove ball bearing to allow an adeguate operating condition, especially in presence of difficult working conditions like: high speed, high acceleration and sudden changes of rotating direction. According to these operating conditions, a skidding between balls and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load help to prevent such problem and can be theoretically estimated using the following formula:

$$\frac{F_{rm}}{C_r} > 0{,}015$$

where:

- $F_{rm}$ minimum radial load, [kN];
- $C_r$ basic dynamic load rating, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the single row deep groove ball bearing. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a larger minimum radial load is required.

It is possible to apply the axial preload for single row deep groove ball bearing by adjusting one ring against the other one or by using springs.

## Axial load carrying capacity

If the single row deep groove ball bearings are subjected to the axial load, its value should not exceed:

- 0.25 $C_0$ for small bearing (bore up to 12 mm) and light series bearing (diameter series 8, 9, 0 and 1);
- 0.5 $C_0$ for the other series.

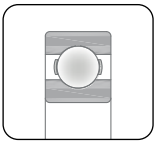
It has to be considered that an excessive axial load will influenced negatively the bearing life.

| d [mm] | | Radial internal clearance [µm] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | | C5 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. |
| 2,5 | 6 | 0 | 7 | 2 | 13 | 8 | 23 | – | – | – | – |
| 6 | 10 | 0 | 7 | 2 | 13 | 8 | 23 | 14 | 29 | 20 | 37 |
| 10 | 18 | 0 | 9 | 3 | 18 | 11 | 25 | 18 | 33 | 25 | 45 |
| 18 | 24 | 0 | 10 | 5 | 20 | 13 | 28 | 20 | 36 | 28 | 48 |
| 24 | 30 | 1 | 11 | 5 | 20 | 13 | 28 | 23 | 41 | 30 | 53 |
| 30 | 40 | 1 | 11 | 6 | 20 | 15 | 33 | 28 | 46 | 40 | 64 |
| 40 | 50 | 1 | 11 | 6 | 23 | 18 | 36 | 30 | 51 | 45 | 73 |
| 50 | 65 | 1 | 15 | 8 | 28 | 23 | 43 | 38 | 61 | 55 | 90 |
| 65 | 80 | 1 | 15 | 10 | 30 | 25 | 51 | 46 | 71 | 65 | 105 |
| 80 | 100 | 1 | 18 | 12 | 36 | 30 | 58 | 53 | 84 | 75 | 120 |
| 100 | 120 | 2 | 20 | 15 | 41 | 36 | 66 | 61 | 97 | 90 | 140 |
| 120 | 140 | 2 | 23 | 18 | 48 | 41 | 81 | 71 | 114 | 105 | 160 |
| 140 | 160 | 2 | 23 | 18 | 53 | 46 | 91 | 81 | 130 | 120 | 180 |
| 160 | 180 | 2 | 25 | 20 | 61 | 53 | 102 | 91 | 147 | 135 | 200 |
| 180 | 200 | 2 | 30 | 25 | 71 | 63 | 117 | 107 | 163 | 150 | 230 |
| 200 | 225 | 2 | 35 | 25 | 85 | 75 | 140 | 125 | 195 | 175 | 265 |
| 225 | 250 | 2 | 40 | 30 | 95 | 85 | 160 | 145 | 225 | 205 | 300 |
| 250 | 280 | 2 | 45 | 35 | 105 | 90 | 170 | 155 | 245 | 225 | 340 |
| 280 | 315 | 2 | 55 | 40 | 115 | 100 | 190 | 175 | 270 | 245 | 370 |
| 315 | 355 | 3 | 60 | 45 | 125 | 110 | 210 | 195 | 300 | 275 | 410 |
| 355 | 400 | 3 | 70 | 55 | 145 | 130 | 240 | 225 | 340 | 315 | 460 |
| 400 | 450 | 3 | 80 | 60 | 170 | 150 | 270 | 250 | 380 | 350 | 520 |
| 450 | 500 | 3 | 90 | 70 | 190 | 170 | 300 | 280 | 420 | 390 | 570 |
| 500 | 560 | 10 | 100 | 80 | 210 | 190 | 330 | 310 | 470 | 440 | 630 |
| 560 | 630 | 10 | 110 | 90 | 230 | 210 | 360 | 340 | 520 | 490 | 700 |
| 630 | 710 | 20 | 130 | 110 | 260 | 240 | 400 | 380 | 570 | 540 | 780 |
| 710 | 800 | 20 | 140 | 120 | 290 | 270 | 450 | 430 | 630 | 600 | 860 |
| 800 | 900 | 20 | 160 | 140 | 320 | 300 | 500 | 480 | 700 | 670 | 960 |
| 900 | 1 000 | 20 | 170 | 150 | 350 | 330 | 550 | 530 | 770 | 740 | 1 040 |
| 1 000 | 1 120 | 20 | 180 | 160 | 380 | 360 | 600 | 580 | 850 | 820 | 1 150 |
| 1 120 | 1 250 | 20 | 190 | 170 | 410 | 390 | 650 | 630 | 920 | 890 | 1 260 |
| 1 250 | 1 400 | 30 | 200 | 190 | 440 | 420 | 700 | 680 | 1 000 | – | – |
| 1 400 | 1 600 | 30 | 210 | 210 | 470 | 450 | 750 | 730 | 1 060 | – | – |

Tab. 1 - Radial internal clearance of deep groove ball bearings

## Designs and variants

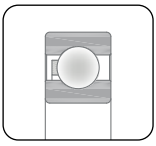
### Type J



HB BAINITE HT | S STABILIZATION

- One-piece inner and outer ring
- High strength two-piece pressed steel cage guided on balls (J)
- Execution suitable for high operating speeds
- Available with snap ring groove in outer ring for axial location (N)

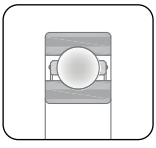
### Type TN



HB BAINITE HT | S STABILIZATION | R+ REINFORCED

- One-piece inner and outer ring
- Moulded glass fiber reinforced polyamide snap-in cage guided on balls (TN)
- Execution suitable for very high accelerations and operating speeds

### Type M

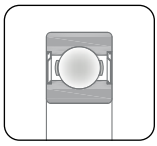


HB BAINITE HT | S STABILIZATION | O+ OPTIMIZED

- One-piece inner and outer ring
- Two-piece machined brass cage guided on balls (M)
- Execution suitable for very high operating speeds
- Available with two-piece machined brass cage guided on inner ring (MB) or outer ring (MA)
- Available with axial lubrication grooves in the guiding surface of the cage (MAS/MBS)
- Available with locating slot for axial location (N)

## Special designs and variants

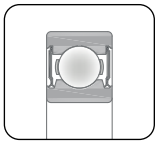
### Seal type ZZ



HB BAINITE HT | S STABILIZATION | O+ OPTIMIZED

- One-piece inner and outer ring
- High strength two-piece pressed steel cage guided on balls (J)
- Two non-contacting steel shields at both sides (ZZ)
- Supplied already filled with grease for maintenance free operations
- Shielded type to keep the grease inside the bearing without compromising the limiting speed

### Seal type 2RS



HB BAINITE HT | S STABILIZATION | O+ OPTIMIZED

- One-piece inner and outer ring
- High strength two-piece pressed steel cage guided on balls (J)
- Two contacting rubber seals at both sides (2RS, or 2RSL for light contact)
- Supplied already filled with grease for maintenance free operations
- Sealed type to keep the grease inside the bearing and enhance contaminant exclusion

## Prefixes

| | |
|---|---|
| F | Flanged outer ring |
| DGBB | Out of standard deep groove ball bearing followed by drawing number |

## Suffixes — Internal design

| | |
|---|---|
| E | Optimized internal design |

## Suffixes — Cage

| | |
|---|---|
| J or without suffix | Pressed steel cage |
| M | Machined brass cage guided on rolling elements |
| MA | Machined brass cage guided on outer ring |
| MAS | Machined brass cage guided on outer ring with lubrication grooves in the guiding surface |
| MB | Machined brass cage guided on inner ring |
| MBS | Machined brass cage guided on inner ring with lubrication grooves in the guiding surface |
| TN or ATN | Molded polyamide cage (PA66) guided on rolling elements |
| TN9 | Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on rolling elements |

## Suffixes — Accuracy, clearance, running

| | |
|---|---|
| ABEC1 | Approximated to tolerance class P0 |
| ABEC3 | Approximated to tolerance class P6 |
| ABEC5 | Approximated to tolerance class P5 |
| ST | Special tolerance |
| CM | Special radial internal clearance for EMQ applications |

MC1…MC6

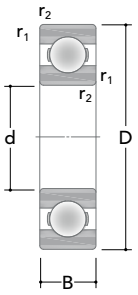
Radial internal clearance of extra small and miniature ball bearings — Units: µm

| Clearance symbol | MC1 | | MC2 | | MC3 | | MC4 | | MC5 | | MC6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. |
| Clearance | 0 | 5 | 3 | 8 | 5 | 10 | 8 | 13 | 13 | 20 | 20 | 28 |

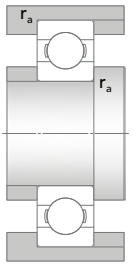
**Remarks** 1. The standard clearance is MC3.
2. To obtain the measured value, add the correction amount in the table below

| | |
|---|---|
| CS | Special radial internal clearance |
| EMQ | Electric motor quality: bearing specifically designed for quiet running in electric motors |
| S12 | Special selection for extremely low noise running |
| P66 | Vibration peaks and noise level lower than normal |

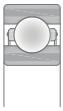
| Suffixes | External design |
|---|---|
| Z | Shield on one side |
| ZZ or 2Z | Shield on both sides |
| RS | Contact seal on one side |
| 2RS | Contact seal on both sides |
| RSL | Light contact seal on one side |
| 2RSL | Light contact seal on both sides |
| G/R3 | Filled with exceptionally good low noise and long life grease usable over a wide range of temperatures |
| G/R4 | Filled with good low noise and high temperature, high speed and long life grease |
| N | Snap ring groove in outer ring |
| NR | Snap ring groove in outer ring with suitable snap ring |
| N1 | One locating slot in outer ring |
| N2 | Two locating slots in outer ring |



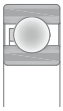

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **3** | 10 | 4 | 0,55 | 0,19 | 0,007 | 124000 | 70400 | **623** |
| **4** | 9 | 2,5 | 0,46 | 0,13 | 0,006 | 134000 | 73100 | **618/4** |
| | 11 | 4 | 0,71 | 0,20 | 0,009 | 127000 | 71200 | **619/4** |
| | 12 | 4 | 0,94 | 0,32 | 0,014 | 116000 | 65300 | **604** |
| | 13 | 5 | 1,04 | 0,31 | 0,013 | 107000 | 59000 | **624** |
| | 16 | 5 | 1,24 | 0,43 | 0,018 | 92600 | 54000 | **634** |
| **5** | 11 | 3 | 0,51 | 0,16 | 0,007 | 115000 | 66000 | **618/5** |
| | 13 | 4 | 1,00 | 0,37 | 0,015 | 107000 | 62300 | **619/5** |
| | 16 | 5 | 1,16 | 0,38 | 0,016 | 92400 | 51000 | **625** |
| | 19 | 6 | 2,32 | 0,95 | 0,040 | 77900 | 43100 | **635** |
| **6** | 13 | 3,5 | 0,77 | 0,25 | 0,011 | 106000 | 59000 | **618/6** |
| | 15 | 5 | 0,98 | 0,31 | 0,013 | 97600 | 56100 | **619/6** |
| | 19 | 6 | 2,29 | 0,94 | 0,040 | 77600 | 44500 | **626** |
| **7** | 14 | 3,5 | 0,88 | 0,30 | 0,013 | 96700 | 56700 | **618/7** |
| | 17 | 5 | 1,16 | 0,41 | 0,017 | 86900 | 47600 | **619/7** |
| | 19 | 6 | 2,29 | 0,95 | 0,040 | 82300 | 45100 | **607** |
| | 22 | 7 | 3,38 | 1,35 | 0,056 | 68000 | 39600 | **627** |
| **8** | 16 | 4 | 0,84 | 0,32 | 0,013 | 88100 | 49300 | **618/8** |
| | 19 | 6 | 1,51 | 0,50 | 0,022 | 82200 | 47700 | **619/8** |
| | 22 | 7 | 3,52 | 1,36 | 0,057 | 72800 | 41300 | **608** |
| | 24 | 8 | 3,98 | 1,65 | 0,071 | 61400 | 34800 | **628** |
| **9** | 17 | 4 | 0,89 | 0,36 | 0,015 | 82800 | 46100 | **618/9** |
| | 20 | 6 | 2,43 | 1,01 | 0,044 | 76900 | 44500 | **619/9** |
| | 24 | 7 | 3,94 | 1,65 | 0,071 | 67300 | 37800 | **609** |
| | 26 | 8 | 4,70 | 1,95 | 0,083 | 57900 | 32700 | **629** |
| **10** | 19 | 5 | 1,75 | 0,86 | 0,037 | 76800 | 41300 | **61800** |

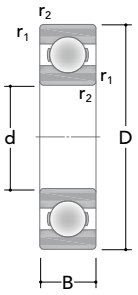


M

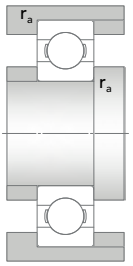


TN

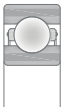
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 3 | 0,15 | 0,1 | 0,002 | 623 |
| 4 | 0,1 | 0,1 | 0,001 | 618/4 |
| | 0,15 | 0,1 | 0,002 | 619/4 |
| | 0,2 | 0,2 | 0,002 | 604 |
| | 0,2 | 0,2 | 0,003 | 624 |
| | 0,3 | 0,3 | 0,005 | 634 |
| 5 | 0,15 | 0,1 | 0,001 | 618/5 |
| | 0,2 | 0,2 | 0,003 | 619/5 |
| | 0,3 | 0,3 | 0,005 | 625 |
| | 0,3 | 0,3 | 0,009 | 635 |
| 6 | 0,15 | 0,1 | 0,002 | 618/6 |
| | 0,2 | 0,2 | 0,004 | 619/6 |
| | 0,3 | 0,3 | 0,008 | 626 |
| 7 | 0,15 | 0,1 | 0,002 | 618/7 |
| | 0,3 | 0,3 | 0,005 | 619/7 |
| | 0,3 | 0,3 | 0,008 | 607 |
| | 0,3 | 0,3 | 0,012 | 627 |
| 8 | 0,2 | 0,2 | 0,003 | 618/8 |
| | 0,3 | 0,3 | 0,007 | 619/8 |
| | 0,3 | 0,3 | 0,012 | 608 |
| | 0,3 | 0,3 | 0,018 | 628 |
| 9 | 0,2 | 0,2 | 0,003 | 618/9 |
| | 0,3 | 0,3 | 0,008 | 619/9 |
| | 0,3 | 0,3 | 0,014 | 609 |
| | 0,3 | 0,3 | 0,02 | 629 |
| 10 | 0,3 | 0,3 | 0,005 | 61800 |



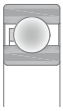

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| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **10** | 22 | 6 | 2,81 | 1,30 | 0,055 | 70400 | 45600 | **61900** |
| (cont.) | 26 | 8 | 4,75 | 1,96 | 0,082 | 67500 | 40400 | **6000** |
| | 28 | 8 | 5,26 | 2,53 | 0,107 | 60200 | 38200 | **16100** |
| | 30 | 9 | 5,45 | 2,36 | 0,100 | 56700 | 36000 | **6200** |
| | 35 | 11 | 8,52 | 3,48 | 0,142 | 50200 | 32500 | **6300** |
| **12** | 21 | 5 | 1,83 | 0,96 | 0,041 | 70100 | 43400 | **61801** |
| | 24 | 6 | 3,07 | 1,56 | 0,066 | 67300 | 40400 | **61901** |
| | 28 | 8 | 5,45 | 2,36 | 0,100 | 60700 | 38700 | **6001** |
| | 30 | 8 | 5,07 | 2,46 | 0,104 | 60200 | 38200 | **16101** |
| | 32 | 10 | 7,28 | 3,14 | 0,129 | 50500 | 32200 | **6201** |
| | 37 | 12 | 10,20 | 4,15 | 0,174 | 45600 | 28400 | **6301** |
| **15** | 24 | 5 | 1,90 | 1,13 | 0,049 | 60900 | 38000 | **61802** |
| | 28 | 7 | 4,46 | 2,30 | 0,098 | 56000 | 34600 | **61902** |
| | 32 | 8 | 5,85 | 2,85 | 0,118 | 50000 | 32000 | **16002** |
| | 32 | 9 | 5,85 | 2,85 | 0,119 | 50000 | 32000 | **6002** |
| | 35 | 11 | 8,09 | 3,75 | 0,158 | 43600 | 28800 | **6202** |
| | 42 | 13 | 11,90 | 5,49 | 0,228 | 38100 | 24100 | **6302** |
| **17** | 26 | 5 | 2,04 | 1,35 | 0,057 | 56000 | 34600 | **61803** |
| | 30 | 7 | 4,81 | 2,68 | 0,114 | 50100 | 32500 | **61903** |
| | 35 | 8 | 6,50 | 3,25 | 0,137 | 45000 | 28400 | **16003** |
| | 35 | 10 | 6,50 | 3,25 | 0,136 | 45000 | 28400 | **6003** |
| | 40 | 12 | 9,95 | 4,75 | 0,199 | 38000 | 24600 | **6203** |
| | 47 | 14 | 14,4 | 6,59 | 0,272 | 34000 | 22000 | **6303** |
| | 62 | 17 | 24,0 | 11,1 | 0,468 | 28100 | 18000 | **6403** |
| **20** | 32 | 7 | 4,10 | 2,36 | 0,106 | 45000 | 28200 | **61804** |
| | 37 | 9 | 6,66 | 3,83 | 0,164 | 43600 | 26000 | **61904** |
| | 42 | 8 | 7,28 | 4,05 | 0,170 | 38000 | 24100 | **16004** |
| | 42 | 12 | 9,95 | 5,06 | 0,210 | 38000 | 24400 | **6004** |
| | 47 | 14 | 13,5 | 6,55 | 0,275 | 32100 | 20000 | **6204** |

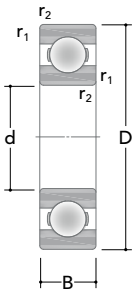


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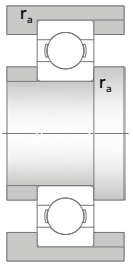


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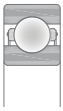
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 10 | 0,3 | 0,3 | 0,01 | 61900 |
| (cont.) | 0,3 | 0,3 | 0,019 | 6000 |
| | 0,3 | 0,3 | 0,024 | 16100 |
| | 0,6 | 0,6 | 0,031 | 6200 |
| | 0,6 | 0,6 | 0,053 | 6300 |
| 12 | 0,3 | 0,3 | 0,006 | 61801 |
| | 0,3 | 0,3 | 0,011 | 61901 |
| | 0,3 | 0,3 | 0,021 | 6001 |
| | 0,3 | 0,3 | 0,026 | 16101 |
| | 0,6 | 0,6 | 0,037 | 6201 |
| | 1 | 1 | 0,06 | 6301 |
| 15 | 0,3 | 0,3 | 0,007 | 61802 |
| | 0,3 | 0,3 | 0,016 | 61902 |
| | 0,3 | 0,3 | 0,03 | 16002 |
| | 0,3 | 0,3 | 0,03 | 6002 |
| | 0,6 | 0,6 | 0,045 | 6202 |
| | 1 | 1 | 0,082 | 6302 |
| 17 | 0,3 | 0,3 | 0,008 | 61803 |
| | 0,3 | 0,3 | 0,016 | 61903 |
| | 0,3 | 0,3 | 0,038 | 16003 |
| | 0,3 | 0,3 | 0,038 | 6003 |
| | 0,6 | 0,6 | 0,065 | 6203 |
| | 1 | 1 | 0,11 | 6303 |
| | 1,1 | 1 | 0,27 | 6403 |
| 20 | 0,3 | 0,3 | 0,018 | 61804 |
| | 0,3 | 0,3 | 0,037 | 61904 |
| | 0,3 | 0,3 | 0,05 | 16004 |
| | 0,6 | 0,6 | 0,067 | 6004 |
| | 1 | 1 | 0,11 | 6204 |

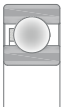



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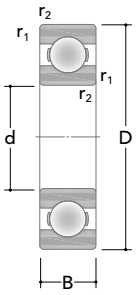



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **20** | 52 | 15 | 16,8 | 7,80 | 0,329 | 30000 | 19000 | **6304** |
| (cont.) | 72 | 19 | 31,9 | 16,0 | 0,683 | 24200 | 15100 | **6404** |
| **22** | 50 | 14 | 14,0 | 8,02 | 0,341 | 30000 | 19000 | **62/22** |
| | 56 | 16 | 19,2 | 9,62 | 0,403 | 28300 | 18000 | **63/22** |
| **25** | 37 | 7 | 4,48 | 2,79 | 0,134 | 38000 | 24400 | **61805** |
| | 42 | 9 | 7,31 | 4,62 | 0,207 | 36000 | 22800 | **61905** |
| | 47 | 8 | 8,06 | 4,75 | 0,210 | 32300 | 20600 | **16005** |
| | 47 | 12 | 11,9 | 6,55 | 0,270 | 32000 | 20000 | **6005** |
| | 52 | 15 | 14,8 | 7,80 | 0,331 | 28000 | 18000 | **6205** |
| | 62 | 17 | 23,6 | 11,6 | 0,482 | 24000 | 16000 | **6305** |
| | 80 | 21 | 35,8 | 19,9 | 0,840 | 20000 | 13000 | **6405** |
| **28** | 58 | 16 | 17,3 | 10,2 | 0,435 | 26000 | 16400 | **62/28** |
| | 68 | 18 | 25,8 | 14,0 | 0,598 | 22000 | 14000 | **63/28** |
| **30** | 42 | 7 | 4,61 | 2,98 | 0,150 | 32000 | 20600 | **61806** |
| | 47 | 9 | 7,62 | 4,72 | 0,220 | 30000 | 19200 | **61906** |
| | 55 | 9 | 12,0 | 7,36 | 0,305 | 28200 | 17100 | **16006** |
| | 55 | 13 | 13,9 | 8,30 | 0,354 | 28000 | 17000 | **6006** |
| | 62 | 16 | 20,3 | 11,2 | 0,467 | 24000 | 15000 | **6206** |
| | 72 | 19 | 29,9 | 16,0 | 0,662 | 20000 | 13000 | **6306** |
| | 90 | 23 | 44,5 | 24,3 | 1,03 | 18400 | 11000 | **6406** |
| **35** | 47 | 7 | 4,59 | 3,43 | 0,143 | 30000 | 18100 | **61807** |
| | 55 | 10 | 11,3 | 8,30 | 0,346 | 26100 | 16200 | **61907** |
| | 62 | 9 | 13,3 | 8,15 | 0,369 | 24000 | 15000 | **16007** |
| | 62 | 14 | 16,9 | 10,2 | 0,440 | 24200 | 15100 | **6007** |
| | 72 | 17 | 27,5 | 15,3 | 0,646 | 20000 | 13000 | **6207** |
| | 80 | 21 | 35,8 | 19,4 | 0,831 | 19000 | 12000 | **6307** |
| | 100 | 25 | 55,9 | 32,6 | 1,36 | 16000 | 10100 | **6407** |

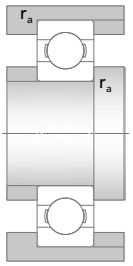

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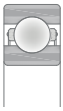
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 20 | 1,1 | 1 | 0,14 | 6304 |
| (cont.) | 1,1 | 1 | 0,41 | 6404 |
| 22 | 1 | 1 | 0,13 | 62/22 |
| | 1,1 | 1 | 0,18 | 63/22 |
| 25 | 0,3 | 0,3 | 0,022 | 61805 |
| | 0,3 | 0,3 | 0,045 | 61905 |
| | 0,3 | 0,3 | 0,06 | 16005 |
| | 0,6 | 0,6 | 0,078 | 6005 |
| | 1 | 1 | 0,13 | 6205 |
| | 1,1 | 1 | 0,23 | 6305 |
| | 1,5 | 1,5 | 0,54 | 6405 |
| 28 | 1 | 1 | 0,17 | 62/28 |
| | 1,1 | 1 | 0,3 | 63/28 |
| 30 | 0,3 | 0,3 | 0,025 | 61806 |
| | 0,3 | 0,3 | 0,049 | 61906 |
| | 0,3 | 0,3 | 0,089 | 16006 |
| | 1 | 1 | 0,12 | 6006 |
| | 1 | 1 | 0,2 | 6206 |
| | 1,1 | 1 | 0,35 | 6306 |
| | 1,5 | 1,5 | 0,75 | 6406 |
| 35 | 0,3 | 0,3 | 0,029 | 61807 |
| | 0,6 | 0,6 | 0,08 | 61907 |
| | 0,3 | 0,3 | 0,11 | 16007 |
| | 1 | 1 | 0,15 | 6007 |
| | 1,1 | 1 | 0,29 | 6207 |
| | 1,5 | 1,5 | 0,46 | 6307 |
| | 1,5 | 1,5 | 0,97 | 6407 |



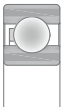

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **40** | 52 | 7 | 4,65 | 3,96 | 0,169 | 26000 | 16200 | **61808** |
| | 62 | 12 | 14,0 | 10,3 | 0,438 | 24000 | 14100 | **61908** |
| | 68 | 9 | 13,9 | 10,2 | 0,436 | 22000 | 14100 | **16008** |
| | 68 | 15 | 17,8 | 11,0 | 0,481 | 22000 | 14100 | **6008** |
| | 80 | 18 | 33,2 | 19,0 | 0,796 | 18000 | 16000 | **6208** |
| | 90 | 23 | 42,3 | 24,0 | 1,01 | 17000 | 11000 | **6308** |
| | 110 | 27 | 65,8 | 37,8 | 1,58 | 14000 | 9000 | **6408** |
| **45** | 58 | 7 | 6,92 | 6,26 | 0,267 | 22000 | 14000 | **61809** |
| | 68 | 12 | 14,1 | 11,0 | 0,474 | 20400 | 13600 | **61909** |
| | 75 | 10 | 16,8 | 10,9 | 0,510 | 20400 | 12200 | **16009** |
| | 75 | 16 | 22,1 | 14,6 | 0,636 | 20000 | 12000 | **6009** |
| | 85 | 19 | 35,1 | 21,6 | 0,902 | 17000 | 15000 | **6209** |
| | 100 | 25 | 55,9 | 31,5 | 1,33 | 15000 | 14000 | **6309** |
| | 120 | 29 | 78,6 | 48,0 | 2,03 | 13000 | 8500 | **6409** |
| **50** | 65 | 7 | 7,07 | 7,00 | 0,293 | 20300 | 13300 | **61810** |
| | 72 | 12 | 14,8 | 12,2 | 0,517 | 19000 | 12400 | **61910** |
| | 80 | 10 | 17,1 | 11,4 | 0,555 | 18000 | 11000 | **16010** |
| | 80 | 16 | 22,9 | 16 | 0,701 | 18000 | 15900 | **6010** |
| | 90 | 20 | 37,1 | 23,2 | 0,970 | 15000 | 14000 | **6210** |
| | 110 | 27 | 65,0 | 38,0 | 1,59 | 13000 | 12000 | **6310** |
| | 130 | 31 | 90,9 | 53,9 | 2,28 | 12000 | 7500 | **6410** |
| **55** | 72 | 9 | 9,48 | 9,32 | 0,397 | 19000 | 12600 | **61811** |
| | 80 | 13 | 16,6 | 15,1 | 0,647 | 17000 | 11200 | **61911** |
| | 90 | 11 | 20,3 | 14,00 | 0,690 | 16000 | 10000 | **16011** |
| | 90 | 18 | 29,6 | 21,2 | 0,887 | 16000 | 14000 | **6011** |
| | 100 | 21 | 46,7 | 29,0 | 1,23 | 14000 | 13000 | **6211** |
| | 120 | 29 | 74,1 | 45,0 | 1,88 | 12000 | 11000 | **6311** |
| | 140 | 33 | 102 | 64,7 | 2,71 | 11000 | 7000 | **6411** |
| **60** | 78 | 10 | 12,3 | 11,6 | 0,499 | 17000 | 11000 | **61812** |

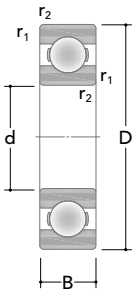


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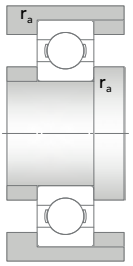


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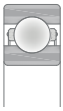
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 40 | 0,3 | 0,3 | 0,032 | 61808 |
| | 0,6 | 0,6 | 0,12 | 61908 |
| | 0,3 | 0,3 | 0,13 | 16008 |
| | 1 | 1 | 0,19 | 6008 |
| | 1,1 | 1 | 0,37 | 6208 |
| | 1,5 | 1,5 | 0,63 | 6308 |
| | 2 | 2 | 1,25 | 6408 |
| 45 | 0,3 | 0,3 | 0,04 | 61809 |
| | 0,6 | 0,6 | 0,14 | 61909 |
| | 0,6 | 0,6 | 0,17 | 16009 |
| | 1 | 1 | 0,24 | 6009 |
| | 1,1 | 1 | 0,42 | 6209 |
| | 1,5 | 1,5 | 0,84 | 6309 |
| | 2 | 2 | 1,55 | 6409 |
| 50 | 0,3 | 0,3 | 0,052 | 61810 |
| | 0,6 | 0,6 | 0,14 | 61910 |
| | 0,6 | 0,6 | 0,18 | 16010 |
| | 1 | 1 | 0,26 | 6010 |
| | 1,1 | 1 | 0,45 | 6210 |
| | 2 | 2 | 1,1 | 6310 |
| | 2,1 | 2 | 1,95 | 6410 |
| 55 | 0,3 | 0,3 | 0,083 | 61811 |
| | 1 | 1 | 0,19 | 61911 |
| | 0,6 | 0,6 | 0,27 | 16011 |
| | 1,1 | 1 | 0,39 | 6011 |
| | 1,5 | 1,5 | 0,61 | 6211 |
| | 2 | 2 | 1,35 | 6311 |
| | 2,1 | 2 | 2,35 | 6411 |
| 60 | 0,3 | 0,3 | 0,11 | 61812 |



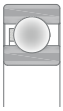

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **60** | 85 | 13 | 16,6 | 12,1 | 0,638 | 16000 | 10000 | **61912** |
| (cont.) | 95 | 11 | 20,8 | 15,0 | 0,735 | 15000 | 9500 | **16012** |
| | 95 | 18 | 30,7 | 23,2 | 0,972 | 15000 | 13500 | **6012** |
| | 110 | 22 | 55,3 | 36,0 | 1,52 | 13000 | 11000 | **6212** |
| | 130 | 31 | 85,2 | 52,0 | 2,18 | 11000 | 10000 | **6312** |
| | 150 | 35 | 113 | 72,2 | 3,01 | 10000 | 6300 | **6412** |
| **65** | 85 | 10 | 12,8 | 13,3 | 0,566 | 16000 | 10000 | **61813** |
| | 90 | 13 | 17,5 | 16,4 | 0,697 | 15000 | 9500 | **61913** |
| | 100 | 11 | 22,5 | 19,6 | 0,822 | 14000 | 9000 | **16013** |
| | 100 | 18 | 32,2 | 25,0 | 1,05 | 14000 | 12500 | **6013** |
| | 120 | 23 | 58,9 | 40,5 | 1,71 | 12000 | 10000 | **6213** |
| | 140 | 33 | 98,5 | 60,0 | 2,46 | 10000 | 9500 | **6313** |
| | 160 | 37 | 120 | 83,5 | 3,37 | 9500 | 6000 | **6413** |
| **70** | 90 | 10 | 12,8 | 13,7 | 0,581 | 15000 | 9000 | **61814** |
| | 100 | 16 | 24,9 | 21,8 | 0,925 | 14000 | 8500 | **61914** |
| | 110 | 13 | 29,1 | 25,6 | 1,04 | 13000 | 8100 | **16014** |
| | 110 | 20 | 40,1 | 31,8 | 1,31 | 13000 | 11200 | **6014** |
| | 125 | 24 | 63,7 | 45,0 | 1,87 | 11000 | 10000 | **6214** |
| | 150 | 35 | 112 | 68,0 | 2,70 | 9500 | 9050 | **6314** |
| | 180 | 42 | 151 | 109 | 4,09 | 8500 | 5300 | **6414** |
| **75** | 95 | 10 | 13,1 | 11,1 | 0,644 | 14000 | 8500 | **61815** |
| | 105 | 16 | 24,4 | 19,3 | 0,995 | 13000 | 8000 | **61915** |
| | 115 | 13 | 30,5 | 27,0 | 1,14 | 12000 | 7500 | **16015** |
| | 115 | 20 | 41,6 | 33,5 | 1,42 | 12000 | 10000 | **6015** |
| | 130 | 25 | 68,9 | 49,0 | 2,01 | 10000 | 9700 | **6215** |
| | 160 | 37 | 121 | 76,5 | 2,95 | 9000 | 8030 | **6315** |
| | 190 | 45 | 159 | 117 | 4,26 | 8000 | 5000 | **6415** |
| **80** | 100 | 10 | 13,4 | 11,8 | 0,674 | 13000 | 8000 | **61816** |
| | 110 | 16 | 26,5 | 21,7 | 1,09 | 12000 | 7500 | **61916** |

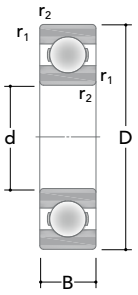


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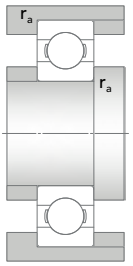


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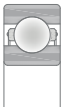
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **60** | 1 | 1 | 0,2 | **61912** |
| (cont.) | 0,6 | 0,6 | 0,29 | **16012** |
| | 1,1 | 1 | 0,41 | **6012** |
| | 1,5 | 1,5 | 0,78 | **6212** |
| | 2,1 | 2 | 1,7 | **6312** |
| | 2,1 | 2 | 2,85 | **6412** |
| **65** | 0,6 | 0,6 | 0,13 | **61813** |
| | 1 | 1 | 0,22 | **61913** |
| | 0,6 | 0,6 | 0,3 | **16013** |
| | 1,1 | 1 | 0,44 | **6013** |
| | 1,5 | 1,5 | 1 | **6213** |
| | 2,1 | 2 | 2,1 | **6313** |
| | 2,1 | 2 | 3,35 | **6413** |
| **70** | 0,6 | 0,6 | 0,14 | **61814** |
| | 1 | 1 | 0,35 | **61914** |
| | 0,6 | 0,6 | 0,44 | **16014** |
| | 1,1 | 1 | 0,61 | **6014** |
| | 1,5 | 1,5 | 1,1 | **6214** |
| | 2,1 | 2 | 2,55 | **6314** |
| | 3 | 2,5 | 4,95 | **6414** |
| **75** | 0,6 | 0,6 | 0,15 | **61815** |
| | 1 | 1 | 0,37 | **61915** |
| | 0,6 | 0,6 | 0,46 | **16015** |
| | 1,1 | 1 | 0,65 | **6015** |
| | 1,5 | 1,5 | 1,2 | **6215** |
| | 2,1 | 2 | 3,05 | **6315** |
| | 3 | 2,5 | 5,8 | **6415** |
| **80** | 0,6 | 0,6 | 0,15 | **61816** |
| | 1 | 1 | 0,38 | **61916** |



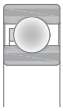

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| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **80** | 125 | 14 | 35,8 | 31,5 | 1,31 | 11000 | 7000 | **16016** |
| (cont.) | 125 | 22 | 49,4 | 40,0 | 1,66 | 11000 | 9700 | **6016** |
| | 140 | 26 | 72,8 | 55,0 | 2,19 | 9500 | 8600 | **6216** |
| | 170 | 39 | 130 | 86,5 | 3,19 | 8500 | 7500 | **6316** |
| | 200 | 48 | 171 | 133 | 4,79 | 7500 | 4800 | **6416** |
| **85** | 110 | 13 | 19,8 | 17,0 | 0,888 | 12000 | 7600 | **61817** |
| | 120 | 18 | 32,1 | 30,9 | 1,29 | 11000 | 7000 | **61917** |
| | 130 | 14 | 36,2 | 33,6 | 1,35 | 11000 | 6700 | **16017** |
| | 130 | 22 | 52,5 | 43,5 | 1,74 | 11000 | 9300 | **6017** |
| | 150 | 28 | 87,1 | 64,8 | 2,49 | 9000 | 8000 | **6217** |
| | 180 | 41 | 140 | 96,5 | 3,50 | 8000 | 7500 | **6317** |
| | 210 | 52 | 174 | 143 | 4,96 | 7000 | 4500 | **6417** |
| **90** | 115 | 13 | 19,7 | 17,3 | 0,961 | 11000 | 7000 | **61818** |
| | 125 | 18 | 34,2 | 33,8 | 1,38 | 11000 | 6700 | **61918** |
| | 140 | 16 | 43,7 | 39,5 | 1,54 | 10000 | 6300 | **16018** |
| | 140 | 24 | 60,5 | 50,0 | 1,95 | 10000 | 8600 | **6018** |
| | 160 | 30 | 102 | 73,5 | 2,77 | 8500 | 7580 | **6218** |
| | 190 | 43 | 154 | 108 | 3,76 | 7500 | 7000 | **6318** |
| | 225 | 54 | 190 | 153 | 5,10 | 6700 | 4300 | **6418** |
| **95** | 120 | 13 | 20,3 | 17,6 | 0,99 | 11000 | 6700 | **61819** |
| | 130 | 18 | 34,9 | 34,3 | 1,37 | 10000 | 6300 | **61919** |
| | 145 | 16 | 44,9 | 41,5 | 1,61 | 9500 | 6000 | **16019** |
| | 145 | 24 | 64,3 | 54,8 | 2,07 | 9500 | 8200 | **6019** |
| | 170 | 32 | 116 | 81,7 | 2,97 | 8000 | 6910 | **6219** |
| | 200 | 45 | 159 | 118 | 4,11 | 7000 | 6400 | **6319** |
| **100** | 125 | 13 | 17,9 | 19,2 | 1,00 | 10000 | 6300 | **61820** |
| | 140 | 20 | 42,6 | 44,0 | 1,73 | 9500 | 6000 | **61920** |
| | 150 | 16 | 46,7 | 44,4 | 1,68 | 9500 | 5600 | **16020** |
| | 150 | 24 | 65,0 | 54,0 | 2,00 | 9500 | 7560 | **6020** |

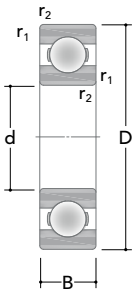


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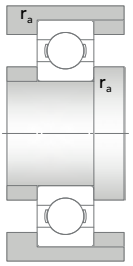


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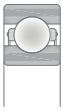
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **80** | 0,6 | 0,6 | 0,61 | **16016** |
| (cont.) | 1,1 | 1 | 0,87 | **6016** |
| | 2 | 2 | 1,45 | **6216** |
| | 2,1 | 2 | 3,65 | **6316** |
| | 3 | 2,5 | 6,85 | **6416** |
| **85** | 1 | 1 | 0,27 | **61817** |
| | 1,1 | 1 | 0,55 | **61917** |
| | 0,6 | 0,6 | 0,64 | **16017** |
| | 1,1 | 1 | 0,92 | **6017** |
| | 2 | 2 | 1,8 | **6217** |
| | 3 | 2,5 | 4,25 | **6317** |
| | 4 | 3 | 8,05 | **6417** |
| **90** | 1 | 1 | 0,28 | **61818** |
| | 1,1 | 1 | 0,59 | **61918** |
| | 1 | 1 | 0,85 | **16018** |
| | 1,5 | 1,5 | 1,15 | **6018** |
| | 2 | 2 | 2,2 | **6218** |
| | 3 | 2,5 | 4,95 | **6318** |
| | 4 | 3 | 9,8 | **6418** |
| **95** | 1 | 1 | 0,3 | **61819** |
| | 1,1 | 1 | 0,61 | **61919** |
| | 1 | 1 | 0,89 | **16019** |
| | 1,5 | 1,5 | 1,1 | **6019** |
| | 2,1 | 2 | 2,65 | **6219** |
| | 3 | 2,5 | 5,75 | **6319** |
| **100** | 1 | 1 | 0,31 | **61820** |
| | 1,1 | 1 | 0,83 | **61920** |
| | 1 | 1 | 0,94 | **16020** |
| | 1,5 | 1,5 | 1,25 | **6020** |



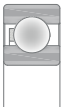

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **100** | 180 | 34 | 128 | 93,0 | 3,34 | 7500 | 7000 | **6220** |
| (cont.) | 215 | 47 | 180 | 145 | 4,92 | 6700 | 6000 | **6320** |
| **105** | 130 | 13 | 21,9 | 20,3 | 1,04 | 10000 | 6300 | **61821** |
| | 145 | 20 | 45,6 | 45,0 | 1,74 | 9500 | 5600 | **61921** |
| | 160 | 18 | 54,9 | 51,6 | 1,85 | 8500 | 5300 | **16021** |
| | 160 | 26 | 76,9 | 65,5 | 2,37 | 8500 | 7500 | **6021** |
| | 190 | 36 | 141 | 104 | 3,61 | 7000 | 6100 | **6221** |
| | 225 | 49 | 185 | 162 | 5,40 | 6300 | 5300 | **6321** |
| **110** | 140 | 16 | 29,2 | 27,0 | 1,30 | 9500 | 5600 | **61822** |
| | 150 | 20 | 44,6 | 46,5 | 1,72 | 9000 | 7500 | **61922** |
| | 170 | 19 | 60,5 | 57,4 | 2,02 | 8000 | 5000 | **16022** |
| | 170 | 28 | 86,9 | 73,5 | 2,56 | 8000 | 7000 | **6022** |
| | 200 | 38 | 153 | 118 | 3,97 | 6700 | 5830 | **6222** |
| | 240 | 50 | 209 | 189 | 5,99 | 6000 | 5300 | **6322** |
| **120** | 150 | 16 | 29,3 | 28,8 | 1,33 | 8500 | 5300 | **61824** |
| | 165 | 22 | 55,9 | 58,9 | 2,11 | 8000 | 6700 | **61924** |
| | 180 | 19 | 65,0 | 64,2 | 2,17 | 7500 | 4800 | **16024** |
| | 180 | 28 | 88,4 | 80,0 | 2,72 | 7500 | 6500 | **6024** |
| | 215 | 40 | 152 | 122 | 4,03 | 6300 | 5600 | **6224** |
| | 260 | 55 | 215 | 200 | 6,13 | 5600 | 5000 | **6324** |
| **130** | 165 | 18 | 38,5 | 46,1 | 1,72 | 8000 | 4800 | **61826** |
| | 180 | 24 | 67,8 | 71,3 | 2,43 | 7500 | 4500 | **61926** |
| | 200 | 22 | 84,9 | 81,5 | 2,70 | 7000 | 4300 | **16026** |
| | 200 | 33 | 112 | 100 | 3,35 | 7000 | 5600 | **6026** |
| | 230 | 40 | 159 | 137 | 4,31 | 5600 | 5300 | **6226** |
| | 280 | 58 | 235 | 223 | 6,50 | 5000 | 4500 | **6326** |
| **140** | 175 | 18 | 40,8 | 49,2 | 1,76 | 7500 | 6700 | **61828** |
| | 190 | 24 | 67,5 | 74,2 | 2,43 | 7000 | 5600 | **61928** |

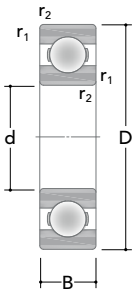


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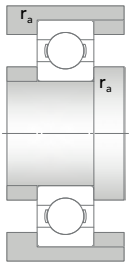


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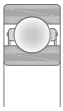
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 100 | 2,1 | 2 | 3,15 | 6220 |
| (cont.) | 3 | 2,5 | 7,1 | 6320 |
| 105 | 1 | 1 | 0,32 | 61821 |
| | 1,1 | 1 | 0,87 | 61921 |
| | 1 | 1 | 1,2 | 16021 |
| | 2 | 2 | 1,6 | 6021 |
| | 2,1 | 2 | 3,8 | 6221 |
| | 3 | 2,5 | 8,15 | 6321 |
| 110 | 1 | 1 | 0,49 | 61822 |
| | 1,1 | 1 | 0,9 | 61922 |
| | 1 | 1 | 1,45 | 16022 |
| | 2 | 2 | 1,95 | 6022 |
| | 2,1 | 2 | 4,45 | 6222 |
| | 3 | 2,5 | 9,65 | 6322 |
| 120 | 1 | 1 | 0,54 | 61824 |
| | 1,1 | 1 | 1,2 | 61924 |
| | 1 | 1 | 1,55 | 16024 |
| | 2 | 2 | 2,1 | 6024 |
| | 2,1 | 2 | 5,25 | 6224 |
| | 3 | 2,5 | 12,5 | 6324 |
| 130 | 1,1 | 1 | 0,77 | 61826 |
| | 1,5 | 1,5 | 1,6 | 61926 |
| | 1,1 | 1 | 2,35 | 16026 |
| | 2 | 2 | 3,25 | 6026 |
| | 3 | 2,5 | 5,85 | 6226 |
| | 4 | 3 | 17,5 | 6326 |
| 140 | 1,1 | 1 | 0,85 | 61828 |
| | 1,5 | 1,5 | 2 | 61928 |



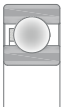

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **140** | 210 | 22 | 86,2 | 89,8 | 2,91 | 6700 | 5700 | **16028** |
| (cont.) | 210 | 33 | 114 | 110 | 3,51 | 6700 | 5350 | **6028** |
| | 250 | 42 | 167 | 152 | 4,61 | 5300 | 4800 | **6228** |
| | 300 | 62 | 259 | 258 | 7,48 | 4800 | 4300 | **6328** |
| **150** | 190 | 20 | 50,8 | 63,0 | 2,02 | 6700 | 6100 | **61830** |
| | 210 | 28 | 91,2 | 97,8 | 3,05 | 6300 | 5300 | **61930** |
| | 225 | 24 | 95,3 | 101 | 3,16 | 6000 | 5300 | **16030** |
| | 225 | 35 | 128 | 132 | 4,12 | 6000 | 5100 | **6030** |
| | 230 | 35 | 177 | 164 | 4,85 | 2600 | 2500 | **306891** |
| | 270 | 45 | 174 | 166 | 7,64 | 5000 | 4500 | **6230** |
| | 320 | 65 | 284 | 294 | 8,05 | 4300 | 4000 | **6330** |
| **160** | 200 | 20 | 51,3 | 68,4 | 2,14 | 6300 | 5800 | **61832** |
| | 220 | 28 | 95,3 | 102 | 3,19 | 6000 | 5100 | **61932** |
| | 240 | 25 | 109 | 116 | 3,31 | 5600 | 5000 | **16032** |
| | 240 | 38 | 150 | 149 | 4,48 | 5600 | 4800 | **6032** |
| | 290 | 48 | 192 | 190 | 5,41 | 4500 | 4300 | **6232** |
| | 340 | 68 | 292 | 293 | 7,86 | 4000 | 3800 | **6332** |
| **170** | 215 | 22 | 61,8 | 82,8 | 2,55 | 6000 | 5310 | **61834** |
| | 230 | 28 | 95,3 | 112 | 3,33 | 5600 | 4800 | **61934** |
| | 260 | 28 | 119 | 131 | 3,81 | 5300 | 4600 | **16034** |
| | 260 | 42 | 170 | 179 | 5,17 | 5300 | 4350 | **6034** |
| | 310 | 52 | 220 | 236 | 6,43 | 4300 | 3800 | **6234** |
| | 360 | 72 | 315 | 354 | 9,16 | 3800 | 3400 | **6334** |
| **180** | 225 | 22 | 65,8 | 83,6 | 2,51 | 5600 | 4550 | **61836** |
| | 250 | 33 | 120 | 139 | 4,18 | 5300 | 4300 | **61936** |
| | 259,5 | 33 | 145 | 153 | 4,45 | 2400 | 2100 | **306840** |
| | 280 | 31 | 141 | 151 | 4,29 | 4800 | 3500 | **16036** |
| | 280 | 46 | 190 | 215 | 6,02 | 4800 | 4000 | **6036** |
| | 320 | 52 | 241 | 244 | 6,51 | 4000 | 3800 | **6236** |

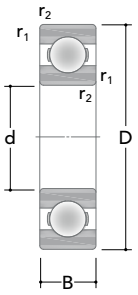


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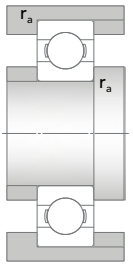


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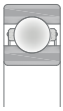
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **140** | 1,1 | 1 | 2,55 | **16028** |
| (cont.) | 2 | 2 | 3,45 | **6028** |
| | 3 | 2,5 | 7,75 | **6228** |
| | 4 | 3 | 21,5 | **6328** |
| **150** | 1,1 | 1 | 1,2 | **61830** |
| | 2 | 2 | 3,05 | **61930** |
| | 1,1 | 1 | 3,15 | **16030** |
| | 2,1 | 2 | 4,3 | **6030** |
| | 2,1 | 2 | 5,3 | **306891** |
| | 3 | 2,5 | 10 | **6230** |
| | 4 | 3 | 26 | **6330** |
| **160** | 1,1 | 1 | 1,25 | **61832** |
| | 2 | 2 | 3,2 | **61932** |
| | 1,5 | 1,5 | 3,65 | **16032** |
| | 2,1 | 2 | 5,2 | **6032** |
| | 3 | 2,5 | 13 | **6232** |
| | 4 | 3 | 30,5 | **6332** |
| **170** | 1,1 | 1 | 1,65 | **61834** |
| | 2 | 2 | 3,4 | **61934** |
| | 1,5 | 1,5 | 5 | **16034** |
| | 2,1 | 2 | 8,15 | **6034** |
| | 4 | 3 | 18 | **6234** |
| | 4 | 3 | 36 | **6334** |
| **180** | 1,1 | 1 | 1,75 | **61836** |
| | 2 | 2 | 5 | **61936** |
| | 2,7 | 2,5 | 5,95 | **306840** |
| | 2 | 2 | 6,5 | **16036** |
| | 2,1 | 2 | 10,5 | **6036** |
| | 4 | 3 | 18,5 | **6236** |

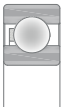



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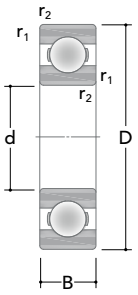



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **180** (cont.) | 380 | 75 | 356 | 419 | 10,76 | 3600 | 3200 | **6336** |
| **190** | 240 | 24 | 80,6 | 103 | 2,94 | 5300 | 4300 | **61838** |
| | 260 | 33 | 121 | 142 | 4,03 | 5000 | 4300 | **61938** |
| | 269,5 | 33 | 119 | 141 | 4,00 | 2300 | 2100 | **306627** |
| | 290 | 31 | 156 | 175 | 4,80 | 4800 | 4050 | **16038** |
| | 290 | 46 | 204 | 222 | 6,01 | 4800 | 3800 | **6038** |
| | 340 | 55 | 262 | 293 | 7,69 | 3800 | 3400 | **6238** |
| | 400 | 78 | 378 | 452 | 11,35 | 3400 | 3000 | **6338** |
| **190,5** | 290 | 46 | 197 | 222 | 6,01 | 2200 | 1900 | **408997** |
| **200** | 250 | 24 | 79,5 | 109 | 3,10 | 5000 | 4300 | **61840** |
| | 250 | 24 | 149 | 169 | 4,64 | 2000 | 1800 | **306870** |
| | 279,5 | 38 | 152 | 172 | 4,71 | 2100 | 1900 | **360278** |
| | 280 | 38 | 149 | 177 | 4,85 | 4800 | 3800 | **61940** |
| | 289,5 | 38 | 162 | 190 | 5,07 | 2000 | 1800 | **306841** |
| | 310 | 34 | 189 | 202 | 5,42 | 4300 | 3700 | **16040** |
| | 310 | 51 | 217 | 261 | 6,82 | 4300 | 3600 | **6040** |
| | 360 | 58 | 271 | 321 | 8,08 | 3600 | 3200 | **6240** |
| | 420 | 80 | 385 | 485 | 11,68 | 3000 | 2700 | **6340** |
| **220** | 270 | 24 | 82,0 | 118 | 3,22 | 4500 | 4150 | **61844** |
| | 300 | 38 | 156 | 192 | 5,07 | 4300 | 3600 | **61944** |
| | 300 | 25 | 83,0 | 126 | 3,31 | 2000 | 1800 | **60944** |
| | 309,5 | 38 | 159 | 190 | 5,01 | 1900 | 1800 | **306867** |
| | 340 | 37 | 178 | 211 | 5,38 | 4000 | 3400 | **16044** |
| | 340 | 56 | 257 | 303 | 7,68 | 4000 | 3200 | **6044** |
| | 400 | 65 | 296 | 384 | 9,26 | 3200 | 3050 | **6244** |
| | 460 | 88 | 415 | 527 | 12,2 | 3000 | 2600 | **6344** |
| **230** | 329,5 | 40 | 193 | 243 | 6,08 | 1800 | 1700 | **306842** |

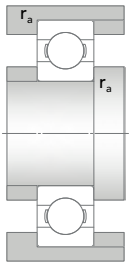

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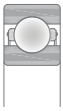
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 180 (cont.) | 4 | 3 | 42 | 6336 |
| 190 | 1,5 | 1,5 | 2,25 | 61838 |
| | 2 | 2 | 5,2 | 61938 |
| | 2 | 2 | 6,25 | 306627 |
| | 2 | 2 | 6,9 | 16038 |
| | 2,1 | 2 | 11 | 6038 |
| | 4 | 3 | 22 | 6238 |
| | 5 | 4 | 48,5 | 6338 |
| 190,5 | 2 | 2 | 11 | 408997 |
| 200 | 1,5 | 1,5 | 2,35 | 61840 |
| | 1,9 | 1,5 | 2,65 | 306870 |
| | 2,1 | 2 | 7,25 | 360278 |
| | 2,1 | 2 | 7,3 | 61940 |
| | 2,1 | 2 | 8,7 | 306841 |
| | 2 | 2 | 8,8 | 16040 |
| | 2,1 | 2 | 14,5 | 6040 |
| | 4 | 3 | 26,5 | 6240 |
| | 5 | 4 | 55,5 | 6340 |
| 220 | 1,5 | 1,5 | 2,55 | 61844 |
| | 2,1 | 2 | 7,95 | 61944 |
| | 1,5 | 1,5 | 5 | 60944 |
| | 2,1 | 2 | 9,25 | 306867 |
| | 2,1 | 2 | 11,5 | 16044 |
| | 3 | 2,5 | 19 | 6044 |
| | 4 | 3 | 37 | 6244 |
| | 5 | 4 | 72,5 | 6344 |
| 230 | 2,1 | 2 | 12 | 306842 |

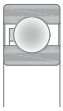



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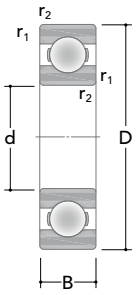



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **240** | 300 | 28 | 110 | 150 | 4,05 | 4000 | 4400 | **61848** |
| | 320 | 38 | 159 | 206 | 5,25 | 4000 | 4300 | **61948** |
| | 360 | 37 | 206 | 264 | 6,52 | 3600 | 3800 | **16048** |
| | 360 | 56 | 257 | 324 | 8,02 | 3600 | 3000 | **6048** |
| | 440 | 72 | 372 | 500 | 11,6 | 3000 | 3400 | **6248** |
| | 500 | 95 | 445 | 601 | 13,3 | 2600 | 3000 | **6348** |
| **260** | 320 | 28 | 112 | 173 | 4,25 | 3800 | 4300 | **61852** |
| | 360 | 46 | 217 | 288 | 6,99 | 3600 | 3800 | **61952** |
| | 369,5 | 46 | 217 | 290 | 7,25 | 1530 | 1500 | **306862** |
| | 400 | 44 | 251 | 325 | 7,55 | 3200 | 3600 | **16052** |
| | 400 | 65 | 305 | 389 | 9,13 | 3200 | 3400 | **6052** |
| | 480 | 80 | 393 | 561 | 12,5 | 2600 | 3000 | **6252** |
| | 540 | 102 | 521 | 745 | 15,7 | 2300 | 2800 | **6352** |
| **280** | 350 | 33 | 143 | 208 | 4,94 | 3400 | 3800 | **61856** |
| | 380 | 46 | 216 | 302 | 7,10 | 3200 | 3600 | **61956** |
| | 389,5 | 46 | 218 | 296 | 6,22 | 2900 | 2000 | **306861** |
| | 420 | 44 | 253 | 358 | 8,01 | 3000 | 3400 | **16056** |
| | 420 | 65 | 309 | 430 | 9,87 | 3000 | 3400 | **6056** |
| | 500 | 80 | 439 | 605 | 13,7 | 2600 | 3000 | **6256** |
| | 580 | 108 | 592 | 880 | 17,9 | 2200 | 2600 | **6356** |
| **300** | 380 | 38 | 176 | 258 | 5,90 | 3200 | 3600 | **61860** |
| | 420 | 56 | 275 | 386 | 8,54 | 3000 | 3200 | **61960** |
| | 460 | 50 | 286 | 416 | 9,04 | 2800 | 3200 | **16060** |
| | 460 | 74 | 364 | 514 | 11,2 | 2800 | 3000 | **6060** |
| | 540 | 85 | 470 | 708 | 14,5 | 2400 | 2800 | **6260** |
| **320** | 400 | 38 | 173 | 263 | 6,08 | 3000 | 3400 | **61864** |
| | 440 | 37 | 218 | 325 | 7,02 | 2800 | 3200 | **60964** |
| | 440 | 56 | 277 | 430 | 9,30 | 2800 | 3200 | **61964** |
| | 480 | 50 | 291 | 416 | 8,88 | 2600 | 3000 | **16064** |

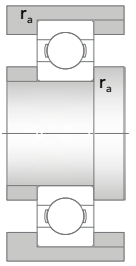

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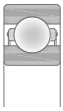
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **240** | 2 | 2 | 3,9 | **61848** |
| | 2,1 | 2 | 8,55 | **61948** |
| | 2,1 | 2 | 14 | **16048** |
| | 3 | 2,5 | 20,5 | **6048** |
| | 4 | 3 | 51 | **6248** |
| | 5 | 4 | 92,5 | **6348** |
| **260** | 2 | 2 | 4,15 | **61852** |
| | 2,1 | 2 | 14,5 | **61952** |
| | 2,1 | 2 | 16,5 | **306862** |
| | 3 | 2,5 | 22,5 | **16052** |
| | 4 | 3 | 30 | **6052** |
| | 5 | 4 | 65,5 | **6252** |
| | 6 | 5 | 115 | **6352** |
| **280** | 2 | 2 | 6,25 | **61856** |
| | 2,1 | 2 | 15,5 | **61956** |
| | 2,1 | 2 | 18 | **306861** |
| | 3 | 2,5 | 24 | **16056** |
| | 4 | 3 | 31,5 | **6056** |
| | 5 | 4 | 71 | **6256** |
| | 6 | 5 | 140 | **6356** |
| **300** | 2,1 | 2 | 10,5 | **61860** |
| | 3 | 2,5 | 24,5 | **61960** |
| | 4 | 3 | 32 | **16060** |
| | 4 | 3 | 44 | **6060** |
| | 5 | 4 | 88,5 | **6260** |
| **320** | 2,1 | 2 | 11 | **61864** |
| | 2,1 | 2 | 16 | **60964** |
| | 3 | 2,5 | 25,5 | **61964** |
| | 4 | 3 | 34 | **16064** |



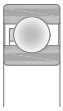

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| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **320** | 480 | 74 | 376 | 564 | 11,9 | 2600 | 3000 | **6064** |
| (cont.) | 580 | 92 | 535 | 829 | 16,6 | 2000 | 2600 | **6264** |
| **330** | 460 | 56 | 291 | 449 | 9,51 | 2500 | 1600 | **306728** |
| **340** | 420 | 38 | 183 | 286 | 6,24 | 2800 | 3200 | **61868** |
| | 460 | 56 | 281 | 439 | 9,30 | 2600 | 3000 | **61968** |
| | 480 | 60 | 305 | 451 | 9,44 | 1100 | 1000 | **306890** |
| | 520 | 57 | 353 | 549 | 11,2 | 2400 | 2800 | **16068** |
| | 520 | 82 | 437 | 649 | 13,4 | 2400 | 2800 | **6068** |
| | 620 | 92 | 585 | 961 | 18,5 | 1800 | 2400 | **6268** |
| **350** | 500 | 70 | 320 | 500 | 10,3 | 2400 | 1300 | **306674** |
| **360** | 440 | 38 | 182 | 294 | 6,29 | 2600 | 3200 | **61872** |
| | 440 | 25 | 126 | 226 | 4,80 | 2500 | 3200 | **60872** |
| | 480 | 56 | 308 | 476 | 9,68 | 2600 | 3000 | **61972** |
| | 540 | 57 | 368 | 593 | 11,9 | 2300 | 2800 | **16072** |
| | 540 | 82 | 445 | 735 | 14,8 | 2400 | 2600 | **6072** |
| **380** | 480 | 46 | 244 | 413 | 8,47 | 2400 | 3000 | **61876** |
| | 520 | 65 | 340 | 555 | 11,1 | 2400 | 2800 | **61976** |
| | 550 | 82 | 414 | 720 | 15,3 | 2600 | 2200 | **306682** |
| | 560 | 57 | 383 | 637 | 12,5 | 2200 | 2600 | **16076** |
| | 560 | 82 | 446 | 796 | 14,3 | 2200 | 2600 | **6076** |
| **400** | 500 | 46 | 249 | 413 | 8,31 | 2400 | 2800 | **61880** |
| | 500 | 31 | 170 | 297 | 5,94 | 2350 | 2800 | **60880** |
| | 540 | 65 | 360 | 601 | 11,8 | 2200 | 2600 | **61980** |
| | 540 | 44 | 263 | 471 | 9,1 | 2300 | 2800 | **60980** |
| | 590 | 74 | 450 | 762 | 14,4 | 2050 | 1600 | **306614** |
| | 600 | 90 | 542 | 911 | 17,2 | 2000 | 2200 | **6080** |

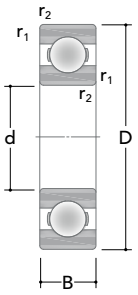


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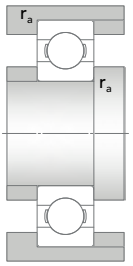


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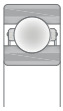
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **320** | 4 | 3 | 46 | **6064** |
| (cont.) | 5 | 4 | 110 | **6264** |
| **330** | 3 | 2,5 | 30 | **306728** |
| **340** | 2,1 | 2 | 11,5 | **61868** |
| | 3 | 2,5 | 26,5 | **61968** |
| | 4 | 3 | 36 | **306890** |
| | 4 | 3 | 45 | **16068** |
| | 5 | 4 | 62 | **6068** |
| | 6 | 5 | 110 | **6268** |
| **350** | 4 | 3 | 46 | **306674** |
| **360** | 2,1 | 2 | 12 | **61872** |
| | 1,5 | 1,5 | 6,5 | **60872** |
| | 3 | 2,5 | 28 | **61972** |
| | 4 | 3 | 49 | **16072** |
| | 5 | 4 | 64,5 | **6072** |
| **380** | 2,1 | 2 | 20 | **61876** |
| | 4 | 3 | 40 | **61976** |
| | 5 | 4 | 65 | **306682** |
| | 4 | 3 | 51 | **16076** |
| | 5 | 4 | 70,5 | **6076** |
| **400** | 2,1 | 2 | 20,5 | **61880** |
| | 2 | 2 | 15,5 | **60880** |
| | 4 | 3 | 41,5 | **61980** |
| | 3 | 2,5 | 27,5 | **60980** |
| | 4 | 3 | 70 | **306614** |
| | 5 | 4 | 87,5 | **6080** |

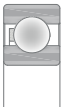



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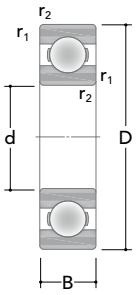



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **420** | 520 | 46 | 253 | 433 | 8,46 | 2200 | 2800 | **61884** |
| | 560 | 65 | 368 | 607 | 11,53 | 2200 | 2600 | **61984** |
| | 620 | 90 | 535 | 920 | 17,04 | 2000 | 2200 | **6084** |
| **440** | 540 | 46 | 260 | 453 | 8,75 | 2200 | 2600 | **61888** |
| | 540 | 31 | 158 | 304 | 5,87 | 2200 | 2600 | **60888** |
| | 600 | 74 | 413 | 747 | 13,7 | 2000 | 2200 | **61988** |
| | 600 | 50 | 328 | 590 | 10,9 | 1900 | 2400 | **60988** |
| | 650 | 94 | 585 | 1031 | 18,8 | 1900 | 2000 | **6088** |
| **460** | 580 | 56 | 337 | 597 | 11,1 | 2000 | 2400 | **61892** |
| | 620 | 74 | 432 | 759 | 13,9 | 1900 | 2200 | **61992** |
| | 680 | 100 | 595 | 1113 | 20,0 | 1800 | 1900 | **6092** |
| **480** | 600 | 56 | 336 | 616 | 11,1 | 1900 | 2200 | **61896** |
| | 650 | 78 | 470 | 864 | 15,5 | 1800 | 2000 | **61996** |
| | 700 | 100 | 624 | 1210 | 21,2 | 1700 | 1900 | **6096** |
| **487,5** | 650 | 78 | 445 | 855 | 15,0 | 980 | 1000 | **614885** |
| **500** | 620 | 56 | 332 | 661 | 11,9 | 1800 | 2000 | **618/500** |
| | 620 | 37 | 233 | 462 | 8,19 | 1600 | 2200 | **608/500** |
| **500** | 670 | 78 | 478 | 881 | 15,3 | 1700 | 1900 | **619/500** |
| | 720 | 100 | 633 | 1198 | 20,6 | 1600 | 1800 | **60/500** |
| **530** | 650 | 56 | 347 | 672 | 11,5 | 1700 | 2000 | **618/530** |
| | 710 | 82 | 500 | 963 | 16,2 | 1600 | 1800 | **619/530** |
| | 710 | 57 | 448 | 872 | 14,7 | 1500 | 1900 | **609/530** |
| | 760 | 100 | 601 | 1177 | 19,5 | 1400 | 1200 | **360476** |
| | 780 | 112 | 660 | 1313 | 21,5 | 1500 | 1700 | **60/530** |
| **560** | 680 | 56 | 345 | 722 | 12,3 | 1600 | 1900 | **618/560** |

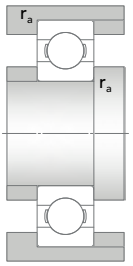

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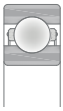
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **420** | 2,1 | 2 | 21,5 | **61884** |
| | 4 | 3 | 43 | **61984** |
| | 5 | 4 | 91,5 | **6084** |
| **440** | 2,1 | 2 | 22,5 | **61888** |
| | 2 | 2 | 16,5 | **60888** |
| | 4 | 3 | 60,5 | **61988** |
| | 4 | 3 | 40 | **60988** |
| | 6 | 5 | 105 | **6088** |
| **460** | 3 | 2,5 | 35 | **61892** |
| | 4 | 3 | 62,5 | **61992** |
| | 6 | 5 | 120 | **6092** |
| **480** | 3 | 2,5 | 36,5 | **61896** |
| | 5 | 4 | 74 | **61996** |
| | 6 | 5 | 125 | **6096** |
| **487,5** | 5 | 4 | 65 | **614885** |
| **500** | 3 | 2,5 | 40,5 | **618/500** |
| | 2,1 | 2 | 20 | **608/500** |
| **500** | 5 | 4 | 77 | **619/500** |
| | 6 | 5 | 135 | **60/500** |
| **530** | 3 | 2,5 | 39,5 | **618/530** |
| | 5 | 4 | 90,5 | **619/530** |
| | 4 | 3 | 61 | **609/530** |
| | 6 | 5 | 150 | **360476** |
| | 6 | 5 | 185 | **60/530** |
| **560** | 3 | 2,5 | 42 | **618/560** |

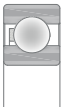



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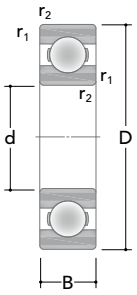



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **560** | 680 | 37 | 230 | 482 | 8,29 | 1400 | 1900 | **608/560** |
| (cont.) | 750 | 85 | 508 | 1019 | 16,9 | 1500 | 1700 | **619/560** |
| | 820 | 115 | 666 | 1469 | 23,6 | 1400 | 1600 | **60/560** |
| **600** | 730 | 60 | 368 | 774 | 12,6 | 1500 | 1800 | **618/600** |
| | 730 | 42 | 276 | 563 | 9,21 | 1400 | 1800 | **608/600** |
| | 800 | 90 | 610 | 1246 | 20,0 | 1400 | 1600 | **619/600** |
| | 870 | 118 | 754 | 1569 | 24,7 | 1300 | 1500 | **60/600** |
| **630** | 780 | 69 | 444 | 1026 | 16,3 | 1400 | 1600 | **618/630** |
| | 780 | 48 | 373 | 785 | 12,5 | 1300 | 1700 | **608/630** |
| | 850 | 100 | 640 | 1399 | 22,1 | 1300 | 1500 | **619/630** |
| | 850 | 71 | 500 | 1102 | 17,3 | 1200 | 1500 | **609/630** |
| | 920 | 128 | 822 | 1810 | 27,8 | 1200 | 1300 | **60/630** |
| **650** | 920 | 118 | 794 | 1789 | 26,9 | 1050 | 900 | **306708** |
| **670** | 820 | 69 | 449 | 1029 | 16,1 | 1300 | 1550 | **618/670** |
| | 900 | 103 | 688 | 1539 | 23,0 | 1200 | 1400 | **619/670** |
| | 900 | 73 | 573 | 1307 | 19,9 | 1100 | 1500 | **609/670** |
| | 980 | 136 | 912 | 2140 | 31,5 | 1100 | 1300 | **60/670** |
| **710** | 870 | 74 | 475 | 1113 | 16,8 | 1200 | 1400 | **618/710** |
| | 950 | 106 | 701 | 1594 | 23,4 | 1100 | 1300 | **619/710** |
| | 950 | 78 | 570 | 1357 | 20,0 | 1000 | 1300 | **609/710** |
| | 1000 | 140 | 856 | 1972 | 28,5 | 890 | 600 | **306704** |
| | 1030 | 140 | 990 | 2344 | 33,6 | 1000 | 1200 | **60/710** |
| | 1080 | 160 | 1040 | 2460 | 34,9 | 900 | 600 | **360141** |
| **730** | 940 | 100 | 671 | 1535 | 22,5 | 1050 | 800 | **361840** |
| **750** | 920 | 78 | 542 | 1257 | 18,4 | 1100 | 1300 | **618/750** |
| | 1000 | 112 | 771 | 1844 | 26,1 | 1000 | 1300 | **619/750** |

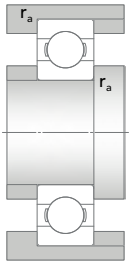

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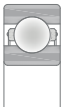
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **560** | 2,1 | 2 | 30,5 | **608/560** |
| (cont.) | 5 | 4 | 105 | **619/560** |
| | 6 | 5 | 210 | **60/560** |
| **600** | 3 | 2,5 | 52 | **618/600** |
| | 3 | 2,5 | 40 | **608/600** |
| | 5 | 4 | 125 | **619/600** |
| | 6 | 5 | 230 | **60/600** |
| **630** | 4 | 3 | 73 | **618/630** |
| | 3 | 2,5 | 41 | **608/630** |
| | 6 | 5 | 160 | **619/630** |
| | 5 | 4 | 110 | **609/630** |
| | 7,5 | 6 | 285 | **60/630** |
| **650** | 6 | 5 | 250 | **306708** |
| **670** | 4 | 3 | 83,5 | **618/670** |
| | 6 | 5 | 185 | **619/670** |
| | 5 | 4 | 145 | **609/670** |
| | 7,5 | 6 | 345 | **60/670** |
| **710** | 4 | 3 | 93,5 | **618/710** |
| | 6 | 5 | 220 | **619/710** |
| | 5 | 4 | 150 | **609/710** |
| | 7,5 | 6 | 335 | **306704** |
| | 7,5 | 6 | 375 | **60/710** |
| | 7,5 | 6 | 505 | **360141** |
| **730** | 6 | 5 | 175 | **361840** |
| **750** | 5 | 4 | 110 | **618/750** |
| | 6 | 5 | 255 | **619/750** |



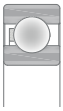

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **750** | 1090 | 150 | 1033 | 2516 | 35,7 | 950 | 1100 | **60/750** |
| (cont.) | | | | | | | | |
| **760** | 1080 | 150 | 967 | 2257 | 31,8 | 910 | 700 | **306474** |
| **800** | 980 | 82 | 560 | 1428 | 20,1 | 1000 | 1300 | **618/800** |
| | 980 | 57 | 418 | 1049 | 15,0 | 1100 | 1300 | **608/800** |
| | 1060 | 115 | 851 | 2120 | 29,6 | 950 | 1200 | **619/800** |
| | 1080 | 115 | 828 | 2121 | 29,6 | 980 | 700 | **361844** |
| | 1150 | 155 | 1130 | 2700 | 36,5 | 900 | 1100 | **60/800** |
| **850** | 1030 | 82 | 580 | 1477 | 20,2 | 950 | 1200 | **618/850** |
| | 1030 | 57 | 396 | 1081 | 14,8 | 940 | 1200 | **608/850** |
| | 1120 | 118 | 852 | 2258 | 30,3 | 850 | 1100 | **619/850** |
| | 1220 | 165 | 1080 | 2900 | 38,1 | 820 | 600 | **306493** |
| | 1220 | 165 | 1140 | 3010 | 39,4 | 810 | 1000 | **60/850** |
| **900** | 1090 | 85 | 631 | 1627 | 22,0 | 850 | 1100 | **618/900** |
| | 1180 | 122 | 868 | 2319 | 30,5 | 780 | 1000 | **619/900** |
| | 1280 | 170 | 1130 | 3300 | 41,5 | 770 | 950 | **60/900** |
| **950** | 1150 | 90 | 646 | 1802 | 23,3 | 800 | 1100 | **618/950** |
| | 1250 | 132 | 1030 | 2990 | 38,4 | 760 | 950 | **619/950** |
| | 1360 | 180 | 1150 | 3450 | 43,0 | 720 | 900 | **60/950** |
| **1000** | 1220 | 100 | 668 | 1833 | 23,2 | 750 | 1000 | **618/1000** |
| | 1220 | 71 | 549 | 1576 | 20,2 | 740 | 1000 | **608/1000** |
| | 1320 | 103 | 832 | 2468 | 31,4 | 690 | 950 | **609/1000** |
| | 1320 | 140 | 1000 | 2950 | 37,4 | 690 | 900 | **619/1000** |
| | 1420 | 185 | 1350 | 4050 | 49,3 | 620 | 850 | **60/1000** |
| **1060** | 1280 | 100 | 728 | 2194 | 27,4 | 670 | 950 | **618/1060** |
| | 1400 | 150 | 1030 | 3080 | 37,0 | 610 | 850 | **619/1060** |
| | 1500 | 195 | 1561 | 4590 | 54,1 | 610 | 800 | **60/1060** |

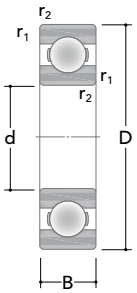


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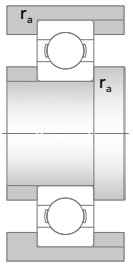


TN

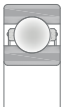
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 750 | 7,5 | 6 | 485 | 60/750 |
| (cont.) | | | | |
| 760 | 7,5 | 6 | 430 | 306474 |
| 800 | 5 | 4 | 130 | 618/800 |
| | 4 | 3 | 100 | 608/800 |
| | 6 | 5 | 275 | 619/800 |
| | 6 | 5 | 320 | 361844 |
| | 7,5 | 6 | 535 | 60/800 |
| 850 | 5 | 4 | 140 | 618/850 |
| | 4 | 3 | 75 | 608/850 |
| | 6 | 5 | 310 | 619/850 |
| | 7,5 | 6 | 630 | 306493 |
| | 7,5 | 6 | 630 | 60/850 |
| 900 | 5 | 4 | 160 | 618/900 |
| | 6 | 5 | 350 | 619/900 |
| | 7,5 | 6 | 720 | 60/900 |
| 950 | 5 | 4 | 190 | 618/950 |
| | 7,5 | 6 | 390 | 619/950 |
| | 7,5 | 6 | 860 | 60/950 |
| 1000 | 6 | 5 | 245 | 618/1000 |
| | 5 | 4 | 175 | 608/1000 |
| | 6 | 5 | 410 | 609/1000 |
| | 7,5 | 6 | 515 | 619/1000 |
| | 7,5 | 6 | 930 | 60/1000 |
| 1060 | 6 | 5 | 260 | 618/1060 |
| | 7,5 | 6 | 620 | 619/1060 |
| | 9,5 | 8 | 1080 | 60/1060 |



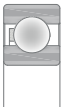

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **1120** | 1360 | 106 | 763 | 2354 | 28,4 | 630 | 900 | **618/1120** |
| | 1460 | 150 | 1040 | 3180 | 37,4 | 580 | 800 | **619/1120** |
| | 1580 | 200 | 1480 | 4740 | 53,9 | 530 | 750 | **60/1120** |
| **1180** | 1420 | 106 | 761 | 2459 | 28,7 | 560 | 850 | **618/1180** |
| | 1540 | 160 | 1130 | 3770 | 43,5 | 250 | 750 | **619/1180** |
| **1250** | 1500 | 112 | 900 | 2867 | 32,8 | 550 | 800 | **618/1250** |
| **1320** | 1600 | 122 | 968 | 3183 | 35,9 | 480 | 400 | **618/1320** |
| | 1720 | 128 | 1260 | 4190 | 45,5 | 420 | 300 | **609/1320** |
| **1400** | 1700 | 132 | 1160 | 4140 | 44,0 | 420 | 300 | **618/1400** |
| | 1820 | 185 | 1697 | 5830 | 60,4 | 400 | 300 | **619/1400** |
| **1500** | 1820 | 140 | 1240 | 4620 | 47,9 | 380 | 240 | **618/1500** |
| | 1950 | 195 | 1710 | 6280 | 63,8 | 320 | 300 | **619/1500** |
| **1600** | 1950 | 155 | 1290 | 4940 | 49,4 | 300 | 300 | **618/1600** |
| | 2060 | 200 | 1850 | 7360 | 73,6 | 300 | 300 | **619/1600** |
| **1700** | 2060 | 160 | 1250 | 5090 | 49,9 | 300 | 200 | **618/1700** |
| | 2180 | 212 | 2020 | 8200 | 79,1 | 290 | 200 | **619/1700** |

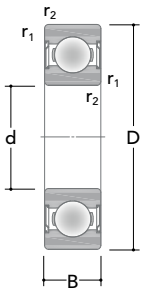


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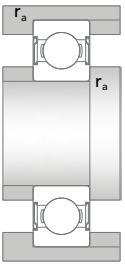


TN

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **1120** | 6 | 5 | 315 | **618/1120** |
| | 7,5 | 6 | 650 | **619/1120** |
| | 9,5 | 8 | 1250 | **60/1120** |
| **1180** | 6 | 5 | 330 | **618/1180** |
| | 7,5 | 6 | 775 | **619/1180** |
| **1250** | 6 | 5 | 385 | **618/1250** |
| **1320** | 6 | 5 | 500 | **618/1320** |
| | 7,5 | 6 | 830 | **609/1320** |
| **1400** | 7,5 | 6 | 615 | **618/1400** |
| | 9,5 | 8 | 1250 | **619/1400** |
| **1500** | 7,5 | 6 | 745 | **618/1500** |
| | 9,5 | 8 | 1500 | **619/1500** |
| **1600** | 7,5 | 6 | 965 | **618/1600** |
| | 9,5 | 8 | 1650 | **619/1600** |
| **1700** | 7,5 | 6 | 1100 | **618/1700** |
| | 9,5 | 8 | 1950 | **619/1700** |

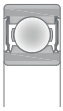



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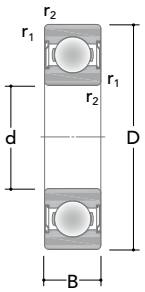

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **3** | 10 | 4 | 0,55 | 0,19 | 0,007 | 122200 | 55800 | **623** |
| | 10 | 4 | 0,55 | 0,19 | 0,007 | - | 36800 | **623** |
| **4** | 9 | 3,5 | 0,55 | 0,18 | 0,07 | 127400 | 60300 | **628/4** |
| | 9 | 4 | 0,53 | 0,18 | 0,07 | 126000 | 63700 | **638/4** |
| | 11 | 4 | 0,62 | 0,18 | 0,008 | 122200 | 58000 | **619/4** |
| | 12 | 4 | 0,94 | 0,32 | 0,014 | 112800 | 55200 | **604** |
| | 13 | 5 | 1,04 | 0,31 | 0,013 | 103400 | 47700 | **624** |
| | 16 | 5 | 1,24 | 0,43 | 0,018 | 88400 | 43200 | **634** |
| | 16 | 5 | 1,24 | 0,43 | 0,018 | - | 25200 | **634** |
| **5** | 11 | 4 | 0,64 | 0,26 | 0,011 | 108000 | 56400 | **628/5** |
| | 11 | 5 | 0,63 | 0,26 | 0,011 | 109200 | 52100 | **638/5** |
| | 13 | 4 | 1,00 | 0,37 | 0,015 | 99000 | 51000 | **619/5** |
| | 16 | 5 | 1,16 | 0,38 | 0,016 | 85500 | 43700 | **625** |
| | 19 | 6 | 2,32 | 0,95 | 0,040 | 73600 | 37200 | **635** |
| | 19 | 6 | 2,32 | 0,95 | 0,040 | - | 20500 | **635** |
| **6** | 13 | 5 | 0,88 | 0,35 | 0,015 | 102300 | 45300 | **628/6** |
| | 15 | 5 | 0,98 | 0,31 | 0,013 | 91000 | 46500 | **619/6** |
| | 19 | 6 | 2,29 | 0,94 | 0,040 | 75200 | 36000 | **626** |
| | 19 | 6 | 2,29 | 0,94 | 0,040 | - | 22100 | **626** |
| **7** | 14 | 5 | 0,96 | 0,4 | 0,017 | 94000 | 42900 | **628/7** |
| | 17 | 5 | 1,16 | 0,41 | 0,017 | 81900 | 40500 | **619/7** |
| | 19 | 6 | 2,34 | 0,95 | 0,040 | 85000 | 43000 | **607** |
| | 19 | 6 | 2,34 | 0,95 | 0,040 | - | 22300 | **607** |
| | 22 | 7 | 3,38 | 1,35 | 0,056 | 65100 | 33100 | **627** |
| | 22 | 7 | 3,38 | 1,35 | 0,056 | - | 19000 | **627** |
| **8** | 16 | 5 | 1,36 | 0,57 | 0,024 | 83700 | 41400 | **628/8** |
| | 16 | 5 | 1,36 | 0,57 | 0,024 | - | 23900 | **628/8** |
| | 16 | 6 | 1,33 | 0,57 | 0,024 | 82800 | 41900 | **638/8** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

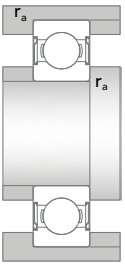


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 3 | 0,15 | 0,1 | 0,002 | 623 ZZ | 623 Z |
| | 0,15 | 0,1 | 0,002 | 623 2RS | 623 RS |
| 4 | 0,1 | 0,1 | 0,001 | 628/4 ZZ | - |
| | 0,1 | 0,1 | 0,001 | 638/4 ZZ | - |
| | 0,15 | 0,1 | 0,002 | 619/4 ZZ | - |
| | 0,2 | 0,2 | 0,002 | 604 ZZ | 604 Z |
| | 0,2 | 0,2 | 0,003 | 624 ZZ | 624 Z |
| | 0,3 | 0,3 | 0,005 | 634 ZZ | 634 Z |
| | 0,3 | 0,3 | 0,005 | 634 2RS | 634 RS |
| 5 | 0,15 | 0,1 | 0,001 | 628/5 ZZ | - |
| | 0,15 | 0,1 | 0,002 | 638/5 ZZ | - |
| | 0,2 | 0,2 | 0,003 | 619/5 ZZ | - |
| | 0,3 | 0,3 | 0,005 | 625 ZZ | 625 Z |
| | 0,3 | 0,3 | 0,009 | 635 ZZ | 635 Z |
| | 0,3 | 0,3 | 0,009 | 635 2RS | 635 RS |
| 6 | 0,15 | 0,1 | 0,003 | 628/6 ZZ | - |
| | 0,2 | 0,2 | 0,004 | 619/6 ZZ | - |
| | 0,3 | 0,3 | 0,008 | 626 ZZ | 626 Z |
| | 0,3 | 0,3 | 0,008 | 626 2RS | 626 RS |
| 7 | 0,15 | 0,1 | 0,003 | 628/7 ZZ | - |
| | 0,3 | 0,3 | 0,005 | 619/7 ZZ | - |
| | 0,3 | 0,3 | 0,008 | 607 ZZ | 607 Z |
| | 0,3 | 0,3 | 0,008 | 607 2RS | 607 RS |
| | 0,3 | 0,3 | 0,013 | 627 ZZ | 627 Z |
| | 0,3 | 0,3 | 0,013 | 627 2RS | 627 RS |
| 8 | 0,2 | 0,2 | 0,004 | 628/8 ZZ | - |
| | 0,2 | 0,2 | 0,004 | 628/8 2RS | - |
| | 0,2 | 0,2 | 0,004 | 638/8 ZZ | - |

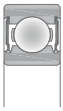



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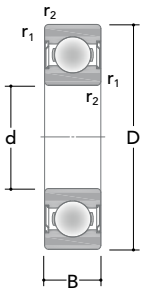

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| 8 | 19 | 6 | 1,51 | 0,50 | 0,022 | 78200 | 43600 | 619/8 |
| (cont.) | 19 | 6 | 1,51 | 0,50 | 0,022 | - | 24600 | 619/8 |
| | 19 | 6 | 2,34 | 0,95 | 0,04 | 85000 | 43000 | 607/8 |
| | 22 | 7 | 3,52 | 1,37 | 0,057 | 75300 | 38200 | 608 |
| | 22 | 7 | 3,52 | 1,37 | 0,057 | - | 22000 | 608 |
| | 22 | 11 | 3,45 | 1,37 | 0,057 | - | 22000 | 630/8 |
| | 24 | 8 | 3,98 | 1,66 | 0,071 | 63000 | 32000 | 628 |
| | 24 | 8 | 3,98 | 1,66 | 0,071 | - | 19000 | 628 |
| | 28 | 6 | 1,34 | 0,57 | 0,024 | 54600 | 27900 | 638 |
| 9 | 17 | 5 | 1,42 | 0,64 | 0,027 | 85100 | 43000 | 628/9 |
| | 17 | 5 | 1,42 | 0,64 | 0,027 | - | 24000 | 628/9 |
| | 20 | 6 | 2,43 | 1,01 | 0,044 | 80000 | 40000 | 619/9 |
| | 24 | 7 | 3,94 | 1,66 | 0,071 | 70000 | 34000 | 609 |
| | 24 | 7 | 3,94 | 1,66 | 0,071 | - | 19000 | 609 |
| | 26 | 8 | 4,75 | 1,96 | 0,083 | 60000 | 30000 | 629 |
| | 26 | 8 | 4,70 | 1,96 | 0,083 | - | 19000 | 629 |
| 10 | 19 | 5 | 1,75 | 0,86 | 0,037 | 80000 | 38000 | 61800 |
| | 19 | 5 | 1,75 | 0,86 | 0,037 | - | 22000 | 61800 |
| | 22 | 6 | 2,81 | 1,30 | 0,055 | 70000 | 36000 | 61900 |
| | 22 | 6 | 2,81 | 1,30 | 0,055 | - | 20000 | 61900 |
| | 26 | 8 | 4,75 | 1,96 | 0,082 | 67000 | 34000 | 6000 |
| | 26 | 8 | 4,75 | 1,96 | 0,082 | - | 19000 | 6000 |
| | 26 | 12 | 4,66 | 1,96 | 0,082 | - | 19000 | 63000 |
| | 28 | 8 | 5,26 | 2,53 | 0,107 | 60000 | 30000 | 16100 |
| | 30 | 9 | 5,45 | 2,36 | 0,100 | 56000 | 28000 | 6200 |
| | 30 | 9 | 5,45 | 2,36 | 0,100 | - | 17000 | 6200 |
| | 30 | 14 | 5,51 | 2,36 | 0,099 | - | 17000 | 62200 |
| | 35 | 11 | 8,52 | 3,40 | 0,142 | 50000 | 26000 | 6300 |
| | 35 | 11 | 8,52 | 3,40 | 0,142 | - | 15000 | 6300 |
| | 35 | 17 | 8,43 | 3,40 | 0,142 | - | 15000 | 62300 |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

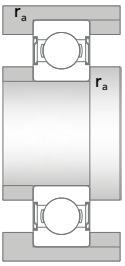


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 8 | 0,3 | 0,3 | 0,007 | 619/8 ZZ | - |
| (cont.) | 0,3 | 0,3 | 0,007 | 619/8 2RS | - |
| | 0,3 | 0,3 | 0,007 | 607/8 ZZ | 607/8 Z |
| | 0,3 | 0,3 | 0,013 | 608 ZZ | 608 Z |
| | 0,3 | 0,3 | 0,013 | 608 2RS | 608 RS |
| | 0,3 | 0,3 | 0,016 | 630/8 2RS | - |
| | 0,3 | 0,3 | 0,018 | 628 ZZ | 628 Z |
| | 0,3 | 0,3 | 0,018 | 628 2RS | 628 RS |
| | 0,3 | 0,3 | 0,03 | 638 ZZ | 638 Z |
| 9 | 0,2 | 0,2 | 0,004 | 628/9 ZZ | 628/9 Z |
| | 0,2 | 0,2 | 0,004 | 628/9 2RS | - |
| | 0,3 | 0,3 | 0,008 | 619/9 ZZ | - |
| | 0,3 | 0,3 | 0,015 | 609 ZZ | 609 Z |
| | 0,3 | 0,3 | 0,015 | 609 2RS | 609 RS |
| | 0,3 | 0,3 | 0,021 | 629 ZZ | 629 Z |
| | 0,3 | 0,3 | 0,021 | 629 2RS | 629 RS |
| 10 | 0,3 | 0,3 | 0,006 | 61800 ZZ | - |
| | 0,3 | 0,3 | 0,006 | 61800 2RS | - |
| | 0,3 | 0,3 | 0,01 | 61900 ZZ | - |
| | 0,3 | 0,3 | 0,01 | 61900 2RS | - |
| | 0,3 | 0,3 | 0,02 | 6000 ZZ | 6000 Z |
| | 0,3 | 0,3 | 0,02 | 6000 2RS | 6000 RS |
| | 0,3 | 0,3 | 0,025 | 63000 2RS | - |
| | 0,3 | 0,3 | 0,026 | 16100 ZZ | - |
| | 0,6 | 0,6 | 0,034 | 6200 ZZ | 6200 Z |
| | 0,6 | 0,6 | 0,034 | 6200 2RS | 6200 RS |
| | 0,6 | 0,6 | 0,04 | 62200 2RS | - |
| | 0,6 | 0,6 | 0,055 | 6300 ZZ | 6300 Z |
| | 0,6 | 0,6 | 0,055 | 6300 2RS | 6300 RS |
| | 0,6 | 0,6 | 0,06 | 62300 2RS | - |

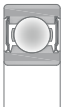



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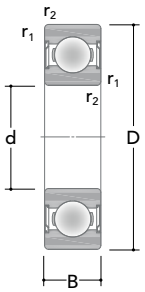

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **12** | 21 | 5 | 1,83 | 0,96 | 0,041 | 70000 | 36000 | **61801** |
| | 21 | 5 | 1,83 | 0,96 | 0,041 | - | 20000 | **61801** |
| | 24 | 6 | 3,07 | 1,56 | 0,066 | 67300 | 32000 | **61901** |
| | 24 | 6 | 3,07 | 1,56 | 0,066 | - | 19000 | **61901** |
| | 28 | 8 | 5,45 | 2,36 | 0,100 | 60400 | 30000 | **6001** |
| | 28 | 8 | 5,45 | 2,36 | 0,100 | - | 17000 | **6001** |
| | 28 | 12 | 5,4 | 2,36 | 0,099 | - | 17000 | **63001** |
| | 30 | 8 | 5,07 | 2,46 | 0,104 | 55200 | 25900 | **16101** |
| | 30 | 8 | 5,07 | 2,46 | 0,104 | - | 13900 | **16101** |
| | 32 | 10 | 7,28 | 3,10 | 0,133 | 50500 | 26000 | **6201** |
| | 32 | 10 | 7,28 | 3,10 | 0,133 | - | 15000 | **6201** |
| | 32 | 14 | 7,28 | 3,10 | 0,131 | - | 15000 | **62201** |
| | 37 | 12 | 10,2 | 4,15 | 0,176 | 45000 | 22000 | **6301** |
| | 37 | 12 | 10,2 | 4,15 | 0,176 | - | 14000 | **6301** |
| **15** | 24 | 5 | 1,90 | 1,13 | 0,049 | 60200 | 60000 | **61802** |
| | 24 | 5 | 1,90 | 1,13 | 0,049 | - | 17000 | **61802** |
| | 28 | 7 | 4,46 | 2,30 | 0,098 | 56000 | 28000 | **61902** |
| | 28 | 7 | 4,46 | 2,30 | 0,098 | - | 16000 | **61902** |
| | 32 | 8 | 5,85 | 2,85 | 0,118 | 50000 | 26000 | **16002** |
| | 32 | 9 | 5,85 | 2,86 | 0,119 | 50000 | 26000 | **6002** |
| | 32 | 9 | 5,85 | 2,86 | 0,119 | - | 14000 | **6002** |
| | 32 | 13 | 5,97 | 2,86 | 0,119 | - | 14000 | **63002** |
| | 35 | 11 | 8,09 | 3,75 | 0,158 | 43000 | 22000 | **6202** |
| | 35 | 11 | 8,09 | 3,75 | 0,158 | - | 13000 | **6202** |
| | 35 | 14 | 8,22 | 3,75 | 0,157 | - | 13000 | **62202** |
| | 42 | 13 | 11,90 | 5,40 | 0,228 | 38000 | 19000 | **6302** |
| | 42 | 13 | 11,90 | 5,40 | 0,228 | - | 12000 | **6302** |
| | 42 | 17 | 11,90 | 5,40 | 0,223 | - | 12000 | **62302** |
| **17** | 26 | 5 | 2,04 | 1,35 | 0,057 | 56000 | 28000 | **61803** |
| | 26 | 5 | 2,04 | 1,35 | 0,057 | - | 16000 | **61803** |
| | 30 | 7 | 4,81 | 2,68 | 0,114 | 50000 | 26000 | **61903** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

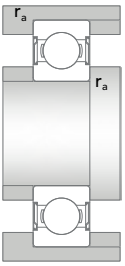


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 12 | 0,3 | 0,3 | 0,006 | 61801 ZZ | - |
| | 0,3 | 0,3 | 0,006 | 61801 2RS | - |
| | 0,3 | 0,3 | 0,011 | 61901 ZZ | - |
| | 0,3 | 0,3 | 0,011 | 61901 2RS | - |
| | 0,3 | 0,3 | 0,022 | 6001 ZZ | 6001 Z |
| | 0,3 | 0,3 | 0,022 | 6001 2RS | 6001 RS |
| | 0,3 | 0,3 | 0,029 | 63001 2RS | - |
| | 0,3 | 0,3 | 0,028 | 16101 ZZ | - |
| | 0,3 | 0,3 | 0,028 | 16101 2RS | - |
| | 0,6 | 0,6 | 0,039 | 6201 ZZ | 6201 Z |
| | 0,6 | 0,6 | 0,039 | 6201 2RS | 6201 RS |
| | 0,6 | 0,6 | 0,045 | 62201 2RS | - |
| | 1 | 1 | 0,063 | 6301 ZZ | 6301 Z |
| | 1 | 1 | 0,063 | 6301 2RS | 6301 RS |
| 15 | 0,3 | 0,3 | 0,007 | 61802 ZZ | - |
| | 0,3 | 0,3 | 0,007 | 61802 2RS | - |
| | 0,3 | 0,3 | 0,016 | 61902 ZZ | - |
| | 0,3 | 0,3 | 0,016 | 61902 2RS | - |
| | 0,3 | 0,3 | 0,025 | 16002 ZZ | 16002 Z |
| | 0,3 | 0,3 | 0,032 | 6002 ZZ | 6002 Z |
| | 0,3 | 0,3 | 0,032 | 6002 2RS | 6002 RS |
| | 0,3 | 0,3 | 0,039 | 63002 2RS | - |
| | 0,6 | 0,6 | 0,048 | 6202 ZZ | 6202 Z |
| | 0,6 | 0,6 | 0,048 | 6202 2RS | 6202 RS |
| | 0,6 | 0,6 | 0,054 | 62202 2RS | - |
| | 1 | 1 | 0,086 | 6302 ZZ | 6302 Z |
| | 1 | 1 | 0,086 | 6302 2RS | 6302 RS |
| | 1 | 1 | 0,11 | 62302 2RS | - |
| 17 | 0,3 | 0,3 | 0,008 | 61803 ZZ | - |
| | 0,3 | 0,3 | 0,008 | 61803 2RS | - |
| | 0,3 | 0,3 | 0,017 | 61903 ZZ | - |

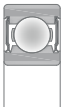



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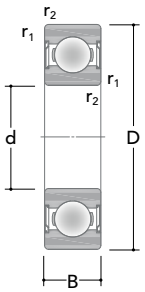

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **17** | 30 | 7 | 4,81 | 2,68 | 0,114 | - | 14000 | **61903** |
| (cont.) | 35 | 8 | 6,50 | 3,25 | 0,137 | 45000 | 22000 | **16003** |
| | 35 | 10 | 6,37 | 3,25 | 0,136 | 45000 | 22000 | **6003** |
| | 35 | 10 | 6,37 | 3,25 | 0,136 | - | 13000 | **6003** |
| | 35 | 14 | 6,37 | 3,25 | 0,134 | - | 13000 | **63003** |
| | 40 | 12 | 9,95 | 4,75 | 0,199 | 38000 | 19000 | **6203** |
| | 40 | 12 | 9,95 | 4,75 | 0,199 | - | 12000 | **6203** |
| | 40 | 16 | 10,15 | 4,75 | 0,204 | - | 12000 | **62203** |
| | 47 | 14 | 14,3 | 6,55 | 0,272 | 34000 | 17000 | **6303** |
| | 47 | 14 | 14,3 | 6,55 | 0,272 | - | 11000 | **6303** |
| | 47 | 19 | 14,59 | 6,55 | 0,272 | - | 11000 | **62303** |
| **20** | 32 | 7 | 4,10 | 2,36 | 0,106 | 45000 | 22000 | **61804** |
| | 32 | 7 | 4,10 | 2,36 | 0,106 | - | 13000 | **61804** |
| | 37 | 9 | 6,66 | 3,83 | 0,164 | 43000 | 20000 | **61904** |
| | 37 | 9 | 6,66 | 3,83 | 0,164 | - | 12000 | **61904** |
| | 42 | 12 | 9,95 | 5,0 | 0,210 | 38000 | 19000 | **6004** |
| | 42 | 12 | 9,95 | 5,0 | 0,210 | - | 11000 | **6004** |
| | 42 | 16 | 10,15 | 5,0 | 0,212 | - | 11000 | **63004** |
| | 47 | 14 | 13,5 | 6,55 | 0,275 | 32000 | 17000 | **6204** |
| | 47 | 14 | 13,5 | 6,55 | 0,275 | - | 10000 | **6204** |
| | 47 | 18 | 13,23 | 6,55 | 0,277 | - | 10000 | **62204** |
| | 52 | 15 | 16,8 | 7,80 | 0,329 | 30000 | 15000 | **6304** |
| | 52 | 15 | 16,8 | 7,80 | 0,329 | - | 9500 | **6304** |
| | 52 | 21 | 16,63 | 7,80 | 0,332 | - | 9500 | **62304** |
| **22** | 50 | 14 | 14,0 | 8,02 | 0,341 | - | 9000 | **62/22** |
| **25** | 37 | 7 | 4,48 | 2,79 | 0,134 | 38000 | 19000 | **61805** |
| | 37 | 7 | 4,48 | 2,79 | 0,134 | - | 11000 | **61805** |
| | 42 | 9 | 7,31 | 4,62 | 0,207 | 36100 | 18000 | **61905** |
| | 42 | 9 | 7,31 | 4,62 | 0,207 | - | 10000 | **61905** |
| | 47 | 12 | 11,9 | 6,55 | 0,270 | 32000 | 16000 | **6005** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

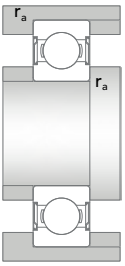


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 17 | 0,3 | 0,3 | 0,017 | 61903 2RS | - |
| (cont.) | 0,3 | 0,3 | 0,032 | 16003 ZZ | - |
| | 0,3 | 0,3 | 0,041 | 6003 ZZ | 6003 Z |
| | 0,3 | 0,3 | 0,041 | 6003 2RS | 6003 RS |
| | 0,3 | 0,3 | 0,052 | 63003 2RS | - |
| | 0,6 | 0,6 | 0,068 | 6203 ZZ | 6203 Z |
| | 0,6 | 0,6 | 0,068 | 6203 2RS | 6203 RS |
| | 0,6 | 0,6 | 0,089 | 62203 2RS | - |
| | 1 | 1 | 0,12 | 6303 ZZ | 6303 Z |
| | 1 | 1 | 0,12 | 6303 2RS | 6303 RS |
| | 1 | 1 | 0,16 | 62303 2RS | - |
| 20 | 0,3 | 0,3 | 0,018 | 61804 ZZ | - |
| | 0,3 | 0,3 | 0,018 | 61804 2RS | - |
| | 0,3 | 0,3 | 0,038 | 61904 ZZ | - |
| | 0,3 | 0,3 | 0,038 | 61904 2RS | - |
| | 0,6 | 0,6 | 0,071 | 6004 ZZ | 6004 Z |
| | 0,6 | 0,6 | 0,071 | 6004 2RS | 6004 RS |
| | 0,6 | 0,6 | 0,086 | 63004 2RS | - |
| | 1 | 1 | 0,11 | 6204 ZZ | 6204 Z |
| | 1 | 1 | 0,11 | 6204 2RS | 6204 RS |
| | 1 | 1 | 0,13 | 62204 2RS | - |
| | 1,1 | 1 | 0,15 | 6304 ZZ | 6304 Z |
| | 1,1 | 1 | 0,15 | 6304 2RS | 6304 RS |
| | 1,1 | 1 | 0,21 | 62304 2RS | - |
| 22 | 1 | 1 | 0,12 | 62/22 2RS | - |
| 25 | 0,3 | 0,3 | 0,022 | 61805 ZZ | - |
| | 0,3 | 0,3 | 0,022 | 61805 2RS | - |
| | 0,3 | 0,3 | 0,045 | 61905 ZZ | - |
| | 0,3 | 0,3 | 0,045 | 61905 2RS | - |
| | 0,6 | 0,6 | 0,083 | 6005 ZZ | 6005 Z |

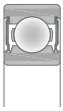



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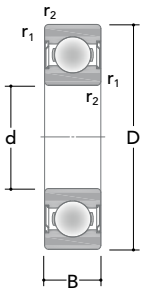

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **25** | 47 | 12 | 11,9 | 6,55 | 0,270 | - | 9500 | **6005** |
| (cont.) | 47 | 16 | 12,14 | 6,55 | 0,278 | - | 9500 | **63005** |
| | 52 | 15 | 14,8 | 7,80 | 0,331 | 28000 | 14000 | **6205** |
| | 52 | 15 | 14,8 | 7,80 | 0,331 | - | 8500 | **6205** |
| | 52 | 18 | 14,5 | 7,80 | 0,342 | - | 8500 | **62205** |
| | 62 | 17 | 23,6 | 11,6 | 0,482 | 24000 | 13000 | **6305** |
| | 62 | 17 | 23,6 | 11,6 | 0,482 | - | 7500 | **6305** |
| | 62 | 24 | 23,63 | 11,6 | 0,49 | - | 7500 | **62305** |
| **30** | 42 | 7 | 4,61 | 2,98 | 0,150 | 32000 | 16000 | **61806** |
| | 42 | 7 | 4,61 | 2,98 | 0,150 | - | 9500 | **61806** |
| | 47 | 9 | 7,62 | 4,72 | 0,220 | 30000 | 15000 | **61906** |
| | 47 | 9 | 7,62 | 4,72 | 0,220 | - | 8500 | **61906** |
| | 55 | 13 | 13,9 | 8,3 | 0,354 | 28000 | 14000 | **6006** |
| | 55 | 13 | 13,9 | 8,3 | 0,354 | - | 8000 | **6006** |
| | 55 | 19 | 13,66 | 8,3 | 0,362 | - | 8000 | **63006** |
| | 62 | 16 | 20,3 | 11,2 | 0,467 | 24000 | 12000 | **6206** |
| | 62 | 16 | 20,3 | 11,2 | 0,467 | - | 7500 | **6206** |
| | 62 | 20 | 20,5 | 11,2 | 0,485 | - | 7500 | **62206** |
| | 72 | 19 | 29,9 | 16,0 | 0,662 | 20000 | 11000 | **6306** |
| | 72 | 19 | 29,9 | 16,0 | 0,662 | - | 6300 | **6306** |
| | 72 | 27 | 29,9 | 16,0 | 0,663 | - | 6300 | **62306** |
| **35** | 47 | 7 | 4,59 | 3,43 | 0,143 | 30000 | 15000 | **61807** |
| | 47 | 7 | 4,59 | 3,43 | 0,143 | - | 8500 | **61807** |
| | 55 | 10 | 11,3 | 8,30 | 0,346 | 26000 | 13000 | **61907** |
| | 55 | 10 | 11,3 | 8,30 | 0,346 | - | 7500 | **61907** |
| | 62 | 14 | 16,8 | 10,2 | 0,440 | 24000 | 12000 | **6007** |
| | 62 | 14 | 16,8 | 10,2 | 0,440 | - | 7000 | **6007** |
| | 62 | 20 | 16,63 | 10,2 | 0,449 | - | 7000 | **63007** |
| | 72 | 17 | 27,54 | 15,3 | 0,646 | 20000 | 10000 | **6207** |
| | 72 | 17 | 27,54 | 15,3 | 0,646 | - | 6300 | **6207** |
| | 72 | 23 | 27,54 | 15,3 | 0,642 | - | 6300 | **62207** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

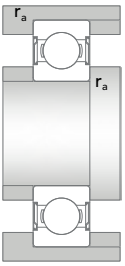


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 25 | 0,6 | 0,6 | 0,083 | 6005 2RS | 6005 RS |
| (cont.) | 0,6 | 0,6 | 0,11 | 63005 2RS | - |
| | 1 | 1 | 0,13 | 6205 ZZ | 6205 Z |
| | 1 | 1 | 0,13 | 6205 2RS | 6205 RS |
| | 1 | 1 | 0,15 | 62205 2RS | - |
| | 1,1 | 1 | 0,23 | 6305 ZZ | 6305 Z |
| | 1,1 | 1 | 0,23 | 6305 2RS | 6305 RS |
| | 1,1 | 1 | 0,32 | 62305 2RS | - |
| 30 | 0,3 | 0,3 | 0,025 | 61806 ZZ | - |
| | 0,3 | 0,3 | 0,025 | 61806 2RS | - |
| | 0,3 | 0,3 | 0,05 | 61906 ZZ | - |
| | 0,3 | 0,3 | 0,05 | 61906 2RS | - |
| | 1 | 1 | 0,12 | 6006 ZZ | 6006 Z |
| | 1 | 1 | 0,12 | 6006 2RS | 6006 RS |
| | 1 | 1 | 0,17 | 63006 2RS | - |
| | 1 | 1 | 0,2 | 6206 ZZ | 6206 Z |
| | 1 | 1 | 0,25 | 6206 2RS | 6206 RS |
| | 1 | 1 | 0,25 | 62206 2RS | - |
| | 1,1 | 1 | 0,36 | 6306 ZZ | 6306 Z |
| | 1,1 | 1 | 0,36 | 6306 2RS | 6306 RS |
| | 1,1 | 1 | 0,5 | 62306 2RS | - |
| 35 | 0,3 | 0,3 | 0,03 | 61807 ZZ | - |
| | 0,3 | 0,3 | 0,03 | 61807 2RS | - |
| | 0,6 | 0,6 | 0,08 | 61907 ZZ | - |
| | 0,6 | 0,6 | 0,08 | 61907 2RS | - |
| | 1 | 1 | 0,16 | 6007 ZZ | 6007 Z |
| | 1 | 1 | 0,16 | 6007 2RS | 6007 RS |
| | 1 | 1 | 0,23 | 63007 2RS | - |
| | 1,1 | 1 | 0,3 | 6207 ZZ | 6207 Z |
| | 1,1 | 1 | 0,3 | 6207 2RS | 6207 RS |
| | 1,1 | 1 | 0,4 | 62207 2RS | - |

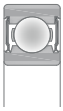



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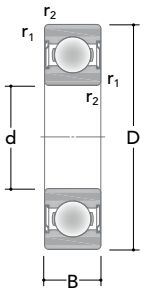

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **35** | 80 | 21 | 35,8 | 19,4 | 0,831 | 19000 | 9500 | **6307** |
| (cont.) | 80 | 21 | 35,8 | 19,4 | 0,831 | - | 6000 | **6307** |
| | 80 | 31 | 35,8 | 19,4 | 0,799 | - | 6000 | **62307** |
| **40** | 52 | 7 | 4,65 | 3,96 | 0,169 | 26000 | 13000 | **61808** |
| | 52 | 7 | 4,65 | 3,96 | 0,169 | - | 7500 | **61808** |
| | 62 | 12 | 14,0 | 10,3 | 0,438 | 24000 | 12000 | **61908** |
| | 62 | 12 | 14,0 | 10,3 | 0,438 | - | 6700 | **61908** |
| | 68 | 15 | 17,84 | 11,0 | 0,481 | 22000 | 11000 | **6008** |
| | 68 | 15 | 17,84 | 11,0 | 0,481 | - | 6300 | **6008** |
| | 68 | 21 | 17,44 | 11,0 | 0,48 | - | 6300 | **63008** |
| | 80 | 18 | 33,2 | 19,0 | 0,796 | 18000 | 9000 | **6208** |
| | 80 | 18 | 33,2 | 19,0 | 0,796 | - | 5600 | **6208** |
| | 80 | 23 | 33,2 | 19,0 | 0,792 | - | 5600 | **62208** |
| | 90 | 23 | 42,3 | 24,0 | 1,01 | 17000 | 8500 | **6308** |
| | 90 | 23 | 42,3 | 24,0 | 1,01 | - | 5000 | **6308** |
| | 90 | 33 | 42,3 | 24,0 | 1 | - | 5000 | **62308** |
| **45** | 58 | 7 | 6,92 | 6,26 | 0,267 | 22000 | 11000 | **61809** |
| | 58 | 7 | 6,92 | 6,26 | 0,267 | - | 6700 | **61809** |
| | 68 | 12 | 14,1 | 11,0 | 0,474 | 20000 | 10000 | **61909** |
| | 68 | 12 | 14,1 | 11,0 | 0,474 | - | 6000 | **61909** |
| | 75 | 16 | 22,10 | 14,6 | 0,636 | 20000 | 10000 | **6009** |
| | 75 | 16 | 22,10 | 14,6 | 0,636 | - | 5600 | **6009** |
| | 75 | 23 | 21,88 | 14,6 | 0,64 | - | 5600 | **63009** |
| | 85 | 19 | 35,8 | 21,6 | 0,902 | 17000 | 8500 | **6209** |
| | 85 | 19 | 35,8 | 21,6 | 0,902 | - | 5000 | **6209** |
| | 85 | 23 | 35,8 | 21,6 | 0,906 | - | 5000 | **62209** |
| | 100 | 25 | 56,41 | 31,5 | 1,33 | 15000 | 7500 | **6309** |
| | 100 | 25 | 56,41 | 31,5 | 1,33 | - | 4500 | **6309** |
| | 100 | 36 | 56,41 | 31,5 | 1,313 | - | 4500 | **62309** |
| **50** | 65 | 7 | 7,07 | 7,00 | 0,293 | 20000 | 10000 | **61810** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

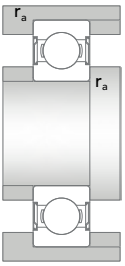


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 35 | 1,5 | 1,5 | 0,48 | 6307 ZZ | 6307 Z |
| (cont.) | 1,5 | 1,5 | 0,48 | 6307 2RS | 6307 RS |
| | 1,5 | 1,5 | 0,68 | 62307 2RS | - |
| 40 | 0,3 | 0,3 | 0,034 | 61808 ZZ | - |
| | 0,3 | 0,3 | 0,034 | 61808 2RS | - |
| | 0,6 | 0,6 | 0,12 | 61908 ZZ | - |
| | 0,6 | 0,6 | 0,12 | 61908 2RS | - |
| | 1 | 1 | 0,2 | 6008 ZZ | 6008 Z |
| | 1 | 1 | 0,2 | 6008 2RS | 6008 RS |
| | 1 | 1 | 0,27 | 63008 2RS | - |
| | 1,1 | 1 | 0,38 | 6208 ZZ | 6208 Z |
| | 1,1 | 1 | 0,38 | 6208 2RS | 6208 RS |
| | 1,1 | 1 | 0,47 | 62208 2RS | - |
| | 1,5 | 1,5 | 0,65 | 6308 ZZ | 6308 Z |
| | 1,5 | 1,5 | 0,65 | 6308 2RS | 6308 RS |
| | 1,5 | 1,5 | 0,92 | 62308 2RS | - |
| 45 | 0,3 | 0,3 | 0,04 | 61809 ZZ | - |
| | 0,3 | 0,3 | 0,04 | 61809 2RS | - |
| | 0,6 | 0,6 | 0,14 | 61909 ZZ | - |
| | 0,6 | 0,6 | 0,14 | 61909 2RS | - |
| | 1 | 1 | 0,25 | 6009 ZZ | 6009 Z |
| | 1 | 1 | 0,25 | 6009 2RS | 6009 RS |
| | 1 | 1 | 0,36 | 63009 2RS | - |
| | 1,1 | 1 | 0,43 | 6209 ZZ | 6209 Z |
| | 1,1 | 1 | 0,43 | 6209 2RS | 6209 RS |
| | 1,1 | 1 | 0,51 | 62209 2RS | - |
| | 1,5 | 1,5 | 0,87 | 6309 ZZ | 6309 Z |
| | 1,5 | 1,5 | 0,87 | 6309 2RS | 6309 RS |
| | 1,5 | 1,5 | 1,2 | 62309 2RS | - |
| 50 | 0,3 | 0,3 | 0,052 | 61810 ZZ | - |

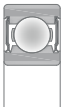



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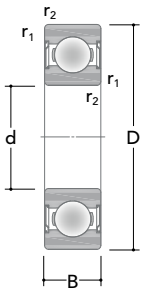

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **50** | 65 | 7 | 7,07 | 7,00 | 0,293 | - | 6000 | **61810** |
| (cont.) | 72 | 12 | 14,8 | 12,2 | 0,517 | 19000 | 9500 | **61910** |
| | 72 | 12 | 14,8 | 12,2 | 0,517 | - | 5600 | **61910** |
| | 80 | 16 | 22,9 | 15,8 | 0,701 | 18000 | 9000 | **6010** |
| | 80 | 16 | 22,9 | 15,8 | 0,701 | - | 5000 | **6010** |
| | 80 | 23 | 22,9 | 15,8 | 0,696 | - | 5000 | **63010** |
| | 90 | 20 | 37,84 | 23,2 | 0,970 | 15000 | 8000 | **6210** |
| | 90 | 20 | 37,84 | 23,2 | 0,970 | - | 4800 | **6210** |
| | 90 | 23 | 37,84 | 23,2 | 0,97 | - | 4800 | **62210** |
| | 110 | 27 | 65,0 | 38,0 | 1,59 | 13000 | 6700 | **6310** |
| | 110 | 27 | 65,0 | 38,0 | 1,59 | - | 4300 | **6310** |
| | 110 | 40 | 65,0 | 38,0 | 1,632 | - | 4300 | **62310** |
| **55** | 72 | 9 | 9,48 | 9,32 | 0,397 | 19000 | 9500 | **61811** |
| | 72 | 9 | 9,48 | 9,32 | 0,397 | - | 5300 | **61811** |
| | 80 | 13 | 16,6 | 15,1 | 0,647 | 17000 | 8500 | **61911** |
| | 80 | 13 | 16,6 | 15,1 | 0,647 | - | 5000 | **61911** |
| | 90 | 18 | 29,6 | 21,2 | 0,887 | 16000 | 8000 | **6011** |
| | 90 | 18 | 29,6 | 21,2 | 0,887 | - | 4500 | **6011** |
| | 100 | 21 | 46,7 | 29,0 | 1,23 | 14000 | 7000 | **6211** |
| | 100 | 21 | 46,7 | 29,0 | 1,23 | - | 4300 | **6211** |
| | 100 | 25 | 46,7 | 29,0 | 1,25 | - | 4300 | **62211** |
| | 120 | 29 | 74,1 | 45,0 | 1,88 | 12000 | 6300 | **6311** |
| | 120 | 29 | 74,1 | 45,0 | 1,88 | - | 3800 | **6311** |
| | 120 | 43 | 74,1 | 45,0 | 1,9 | - | 3800 | **62311** |
| **60** | 78 | 10 | 12,3 | 11,6 | 0,499 | 17000 | 8500 | **61812** |
| | 78 | 10 | 12,3 | 11,6 | 0,499 | - | 4800 | **61812** |
| | 85 | 13 | 16,6 | 15,2 | 0,638 | 16000 | 8000 | **61912** |
| | 85 | 13 | 16,6 | 15,2 | 0,638 | - | 4500 | **61912** |
| | 95 | 18 | 30,7 | 23,2 | 0,972 | 15000 | 7500 | **6012** |
| | 95 | 18 | 30,7 | 23,2 | 0,972 | - | 4300 | **6012** |
| | 110 | 22 | 55,3 | 36,0 | 1,52 | 13000 | 6300 | **6212** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

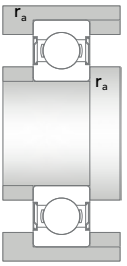


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 50 | 0,3 | 0,3 | 0,052 | 61810 2RS | - |
| (cont.) | 0,6 | 0,6 | 0,14 | 61910 ZZ | - |
| | 0,6 | 0,6 | 0,14 | 61910 2RS | - |
| | 1 | 1 | 0,27 | 6010 ZZ | 6010 Z |
| | 1 | 1 | 0,27 | 6010 2RS | 6010 RS |
| | 1 | 1 | 0,38 | 63010 2RS | - |
| | 1,1 | 1 | 0,47 | 6210 ZZ | 6210 Z |
| | 1,1 | 1 | 0,47 | 6210 2RS | 6210 RS |
| | 1,1 | 1 | 0,54 | 62210 2RS | - |
| | 2 | 2 | 1,1 | 6310 ZZ | 6310 Z |
| | 2 | 2 | 1,1 | 6310 2RS | 6310 RS |
| | 2 | 2 | 1,6 | 62310 2RS | - |
| 55 | 0,3 | 0,3 | 0,083 | 61811 ZZ | - |
| | 0,3 | 0,3 | 0,083 | 61811 2RS | - |
| | 1 | 1 | 0,19 | 61911 ZZ | - |
| | 1 | 1 | 0,19 | 61911 2RS | - |
| | 1,1 | 1 | 0,4 | 6011 ZZ | 6011 Z |
| | 1,1 | 1 | 0,4 | 6011 2RS | 6011 RS |
| | 1,5 | 1,5 | 0,64 | 6211 ZZ | 6211 Z |
| | 1,5 | 1,5 | 0,64 | 6211 2RS | 6211 RS |
| | 1,5 | 1,5 | 0,75 | 62211 2RS | - |
| | 2 | 2 | 1,4 | 6311 ZZ | 6311 Z |
| | 2 | 2 | 1,4 | 6311 2RS | 6311 RS |
| | 2 | 2 | 2,05 | 62311 2RS | - |
| 60 | 0,3 | 0,3 | 0,11 | 61812 ZZ | - |
| | 0,3 | 0,3 | 0,11 | 61812 2RS | - |
| | 1 | 1 | 0,2 | 61912 ZZ | - |
| | 1 | 1 | 0,2 | 61912 2RS | - |
| | 1,1 | 1 | 0,43 | 6012 ZZ | 6012 Z |
| | 1,1 | 1 | 0,43 | 6012 2RS | 6012 RS |
| | 1,5 | 1,5 | 0,81 | 6212 ZZ | 6212 Z |

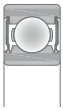



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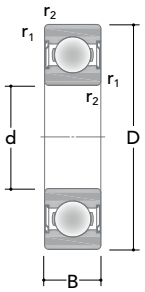

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **60** | 110 | 22 | 55,3 | 36,0 | 1,52 | - | 4000 | **6212** |
| (cont.) | 110 | 28 | 55,3 | 36,0 | 1,545 | - | 4000 | **62212** |
| | 130 | 31 | 86,05 | 52,0 | 2,18 | 11000 | 5600 | **6312** |
| | 130 | 31 | 86,05 | 52,0 | 2,18 | - | 3400 | **6312** |
| | 130 | 46 | 86,05 | 52,0 | 2,156 | - | 3400 | **62312** |
| **65** | 85 | 10 | 12,8 | 13,3 | 0,566 | 16000 | 8000 | **61813** |
| | 85 | 10 | 12,8 | 13,3 | 0,566 | - | 4500 | **61813** |
| | 90 | 13 | 17,5 | 16,4 | 0,697 | 15000 | 7500 | **61913** |
| | 90 | 13 | 17,5 | 16,4 | 0,697 | - | 4300 | **61913** |
| | 100 | 18 | 32,2 | 25,0 | 1,05 | 14000 | 7000 | **6013** |
| | 100 | 18 | 32,2 | 25,0 | 1,05 | - | 4000 | **6013** |
| | 120 | 23 | 58,5 | 40,5 | 1,71 | 12000 | 6000 | **6213** |
| | 120 | 23 | 58,5 | 40,5 | 1,71 | - | 3600 | **6213** |
| | 120 | 31 | 58,5 | 40,5 | 1,747 | - | 3600 | **62213** |
| | 140 | 33 | 98,5 | 60,0 | 2,46 | 10000 | 5300 | **6313** |
| | 140 | 33 | 98,5 | 60,0 | 2,46 | - | 3200 | **6313** |
| | 140 | 48 | 98,5 | 60,0 | 2,45 | - | 3200 | **62313** |
| **70** | 90 | 10 | 12,8 | 13,7 | 0,581 | 15000 | 7500 | **61814** |
| | 90 | 10 | 12,8 | 13,7 | 0,581 | - | 4300 | **61814** |
| | 100 | 16 | 24,9 | 21,8 | 0,925 | 14000 | 7000 | **61914** |
| | 100 | 16 | 24,9 | 21,8 | 0,925 | - | 4000 | **61914** |
| | 110 | 20 | 40,1 | 31,0 | 1,31 | 13000 | 6300 | **6014** |
| | 110 | 20 | 40,1 | 31,0 | 1,31 | - | 3600 | **6014** |
| | 125 | 24 | 64,97 | 45,0 | 1,87 | 11000 | 5600 | **6214** |
| | 125 | 24 | 64,97 | 45,0 | 1,87 | - | 3400 | **6214** |
| | 125 | 31 | 64,97 | 45,0 | 1,919 | - | 3400 | **62214** |
| | 150 | 35 | 112,11 | 68,0 | 2,70 | 9500 | 5000 | **6314** |
| | 150 | 35 | 112,11 | 68,0 | 2,70 | - | 3000 | **6314** |
| | 150 | 51 | 112,11 | 68,0 | 2,695 | - | 3000 | **62314** |
| **75** | 95 | 10 | 13,1 | 15,1 | 0,644 | 14000 | 7000 | **61815** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

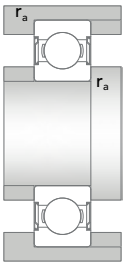


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 60 | 1,5 | 1,5 | 0,81 | 6212 2RS | 6212 RS |
| (cont.) | 1,5 | 1,5 | 1 | 62212 2RS | - |
| | 2,1 | 2 | 1,8 | 6312 ZZ | 6312 Z |
| | 2,1 | 2 | 1,8 | 6312 2RS | 6312 RS |
| | 2,1 | 2 | 2,55 | 62312 2RS | - |
| 65 | 0,6 | 0,6 | 0,13 | 61813 ZZ | - |
| | 0,6 | 0,6 | 0,13 | 61813 2RS | - |
| | 1 | 1 | 0,22 | 61913 ZZ | - |
| | 1 | 1 | 0,22 | 61913 2RS | - |
| | 1,1 | 1 | 0,46 | 6013 ZZ | 6013 Z |
| | 1,1 | 1 | 0,46 | 6013 2RS | 6013 RS |
| | 1,5 | 1,5 | 1,05 | 6213 ZZ | 6213 Z |
| | 1,5 | 1,5 | 1,05 | 6213 2RS | 6213 RS |
| | 1,5 | 1,5 | 1,4 | 62213 2RS | - |
| | 2,1 | 2 | 2,15 | 6313 ZZ | 6313 Z |
| | 2,1 | 2 | 2,15 | 6313 2RS | 6313 RS |
| | 2,1 | 2 | 3 | 62313 2RS | - |
| 70 | 0,6 | 0,6 | 0,14 | 61814 ZZ | - |
| | 0,6 | 0,6 | 0,14 | 61814 2RS | - |
| | 1 | 1 | 0,35 | 61914 ZZ | - |
| | 1 | 1 | 0,35 | 61914 2RS | - |
| | 1,1 | 1 | 0,64 | 6014 ZZ | 6014 Z |
| | 1,1 | 1 | 0,64 | 6014 2RS | 6014 RS |
| | 1,5 | 1,5 | 1,15 | 6214 ZZ | 6214 Z |
| | 1,5 | 1,5 | 1,15 | 6214 2RS | 6214 RS |
| | 1,5 | 1,5 | 1,4 | 62214 2RS | - |
| | 2,1 | 2 | 2,65 | 6314 ZZ | 6314 Z |
| | 2,1 | 2 | 2,65 | 6314 2RS | 6314 RS |
| | 2,1 | 2 | 3,75 | 62314 2RS | - |
| 75 | 0,6 | 0,6 | 0,15 | 61815 ZZ | - |

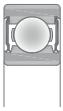



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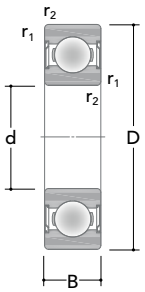

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **75** | 95 | 10 | 13,1 | 15,1 | 0,644 | - | 4000 | **61815** |
| (cont.) | 105 | 16 | 24,4 | 23,1 | 0,995 | 13000 | 6300 | **61915** |
| | 105 | 16 | 24,4 | 23,1 | 0,995 | - | 3600 | **61915** |
| | 115 | 20 | 41,6 | 33,5 | 1,42 | 12000 | 6000 | **6015** |
| | 115 | 20 | 41,6 | 33,5 | 1,42 | - | 3400 | **6015** |
| | 130 | 25 | 68,9 | 49,3 | 2,01 | 10000 | 5300 | **6215** |
| | 130 | 25 | 68,9 | 49,3 | 2,01 | - | 3200 | **6215** |
| | 160 | 37 | 121 | 76,5 | 2,95 | 9000 | 4500 | **6315** |
| | 160 | 37 | 121 | 76,5 | 2,95 | - | 2800 | **6315** |
| **80** | 100 | 10 | 13,4 | 15,8 | 0,674 | 11800 | 5700 | **61816** |
| | 100 | 10 | 13,4 | 15,8 | 0,674 | - | 3600 | **61816** |
| | 110 | 16 | 26,5 | 21,7 | 1,09 | 12000 | 6000 | **61916** |
| | 110 | 16 | 26,5 | 21,7 | 1,09 | - | 3400 | **61916** |
| | 125 | 22 | 49,4 | 40,0 | 1,66 | 11000 | 5600 | **6016** |
| | 125 | 22 | 49,4 | 40,0 | 1,66 | - | 3200 | **6016** |
| | 140 | 26 | 72,8 | 55,0 | 2,19 | 9500 | 4800 | **6216** |
| | 140 | 26 | 72,8 | 55,0 | 2,19 | - | 3000 | **6216** |
| | 170 | 39 | 130 | 86,5 | 3,19 | 8500 | 4300 | **6316** |
| | 170 | 39 | 130 | 86,5 | 3,19 | - | 2600 | **6316** |
| **85** | 110 | 13 | 19,8 | 16,6 | 0,888 | 12000 | 6000 | **61817** |
| | 110 | 13 | 19,8 | 16,6 | 0,888 | - | 3400 | **61817** |
| | 130 | 22 | 52,5 | 43 | 1,74 | 11000 | 5300 | **6017** |
| | 130 | 22 | 52,5 | 43 | 1,74 | - | 3000 | **6017** |
| | 150 | 28 | 87,1 | 64,0 | 2,49 | 9000 | 4500 | **6217** |
| | 150 | 28 | 87,1 | 64,0 | 2,49 | - | 2800 | **6217** |
| | 180 | 41 | 140 | 96,5 | 3,50 | 8000 | 4000 | **6317** |
| | 180 | 41 | 140 | 96,5 | 3,50 | - | 2400 | **6317** |
| **90** | 115 | 13 | 19,7 | 17,1 | 0,961 | 11000 | 5600 | **61818** |
| | 115 | 13 | 19,7 | 17,1 | 0,961 | - | 3200 | **61818** |
| | 140 | 24 | 60,9 | 50,0 | 1,95 | 10000 | 5000 | **6018** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

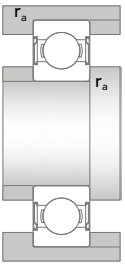


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 75 | 0,6 | 0,6 | 0,15 | 61815 2RS | - |
| (cont.) | 1 | 1 | 0,37 | 61915 ZZ | - |
| | 1 | 1 | 0,37 | 61915 2RS | - |
| | 1,1 | 1 | 0,7 | 6015 ZZ | 6015 Z |
| | 1,1 | 1 | 0,7 | 6015 2RS | 6015 RS |
| | 1,5 | 1,5 | 1,25 | 6215 ZZ | 6215 Z |
| | 1,5 | 1,5 | 1,25 | 6215 2RS | 6215 RS |
| | 2,1 | 2 | 3,15 | 6315 ZZ | 6315 Z |
| | 2,1 | 2 | 3,15 | 6315 2RS | 6315 RS |
| 80 | 0,6 | 0,6 | 0,15 | 61816 ZZ | - |
| | 0,6 | 0,6 | 0,15 | 61816 2RS | - |
| | 1 | 1 | 0,4 | 61916 ZZ | - |
| | 1 | 1 | 0,4 | 61916 2RS | - |
| | 1,1 | 1 | 0,91 | 6016 ZZ | 6016 Z |
| | 1,1 | 1 | 0,91 | 6016 2RS | 6016 RS |
| | 2 | 2 | 1,55 | 6216 ZZ | 6216 Z |
| | 2 | 2 | 1,55 | 6216 2RS | 6216 RS |
| | 2,1 | 2 | 3,75 | 6316 ZZ | 6316 Z |
| | 2,1 | 2 | 3,75 | 6316 2RS | 6316 RS |
| 85 | 1 | 1 | 0,27 | 61817 ZZ | - |
| | 1 | 1 | 0,27 | 61817 2RS | - |
| | 1,1 | 1 | 0,96 | 6017 ZZ | 6017 Z |
| | 1,1 | 1 | 0,96 | 6017 2RS | 6017 RS |
| | 2 | 2 | 1,9 | 6217 ZZ | 6217 Z |
| | 2 | 2 | 1,9 | 6217 2RS | 6217 RS |
| | 3 | 2,5 | 4,4 | 6317 ZZ | 6317 Z |
| | 3 | 2,5 | 4,4 | 6317 2RS | 6317 RS |
| 90 | 1 | 1 | 0,28 | 61818 ZZ | - |
| | 1 | 1 | 0,28 | 61818 2RS | - |
| | 1,5 | 1,5 | 1,2 | 6018 ZZ | 6018 Z |

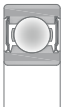



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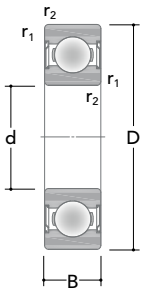

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **90** | 140 | 24 | 60,9 | 50,0 | 1,95 | - | 2800 | **6018** |
| (cont.) | 160 | 30 | 102 | 73,5 | 2,77 | 8500 | 4300 | **6218** |
| | 160 | 30 | 102 | 73,5 | 2,77 | - | 2600 | **6218** |
| | 190 | 43 | 154 | 108 | 3,76 | 7500 | 3800 | **6318** |
| | 190 | 43 | 154 | 108 | 3,76 | - | 2400 | **6318** |
| **95** | 120 | 13 | 20,3 | 17,6 | 0,99 | 10100 | 4900 | **61819** |
| | 120 | 13 | 20,3 | 17,6 | 0,99 | - | 3000 | **61819** |
| | 130 | 18 | 34,9 | 34,3 | 1,37 | - | 3000 | **61919** |
| | 145 | 24 | 64,3 | 54,0 | 2,07 | 9500 | 4800 | **6019** |
| | 145 | 24 | 64,3 | 54,0 | 2,07 | - | 2800 | **6019** |
| | 170 | 32 | 116 | 81,7 | 2,97 | 8000 | 4000 | **6219** |
| | 170 | 32 | 116 | 81,7 | 2,97 | - | 2400 | **6219** |
| | 200 | 45 | 159 | 118 | 4,11 | 7000 | 3600 | **6319** |
| | 200 | 45 | 159 | 118 | 4,11 | - | 2200 | **6319** |
| **100** | 125 | 13 | 17,9 | 19,2 | 1,00 | 10000 | 5300 | **61820** |
| | 125 | 13 | 17,9 | 19,2 | 1,00 | - | 3000 | **61820** |
| | 150 | 24 | 65,0 | 54,0 | 2,00 | 9500 | 4500 | **6020** |
| | 150 | 24 | 65,0 | 54,0 | 2,00 | - | 2600 | **6020** |
| | 180 | 34 | 128 | 93,0 | 3,34 | 7500 | 3800 | **6220** |
| | 180 | 34 | 128 | 93,0 | 3,34 | - | 2400 | **6220** |
| | 215 | 47 | 180 | 145 | 4,92 | 6700 | 3400 | **6320** |
| | 215 | 47 | 180 | 145 | 4,92 | - | 2000 | **6320** |
| **105** | 130 | 13 | 21,9 | 20,3 | 1,04 | 10000 | 5000 | **61821** |
| | 130 | 13 | 21,9 | 20,3 | 1,04 | - | 2800 | **61821** |
| | 160 | 26 | 76,9 | 65,6 | 2,37 | 8500 | 4300 | **6021** |
| | 160 | 26 | 76,9 | 65,6 | 2,37 | - | 2400 | **6021** |
| | 190 | 36 | 141 | 104 | 3,61 | 7000 | 3600 | **6221** |
| | 190 | 36 | 141 | 104 | 3,61 | - | 2200 | **6221** |
| | 225 | 49 | 185 | 162 | 5,40 | 6300 | 3200 | **6321** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

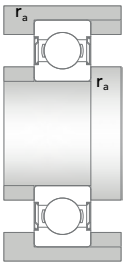


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 90 | 1,5 | 1,5 | 1,2 | 6018 2RS | 6018 RS |
| (cont.) | 2 | 2 | 2,3 | 6218 ZZ | 6218 Z |
| | 2 | 2 | 2,3 | 6218 2RS | 6218 RS |
| | 3 | 2,5 | 5,1 | 6318 ZZ | 6318 Z |
| | 3 | 2,5 | 5,1 | 6318 2RS | 6318 RS |
| 95 | 1 | 1 | 0,3 | 61819 ZZ | - |
| | 1 | 1 | 0,3 | 61819 2RS | - |
| | 1,1 | 1 | 0,65 | 61919 2RS | - |
| | 1,5 | 1,5 | 1,25 | 6019 ZZ | 6019 Z |
| | 1,5 | 1,5 | 1,25 | 6019 2RS | 6019 RS |
| | 2,1 | 2 | 2,75 | 6219 ZZ | 6219 Z |
| | 2,1 | 2 | 2,75 | 6219 2RS | 6219 RS |
| | 3 | 2,5 | 5,85 | 6319 ZZ | 6319 Z |
| | 3 | 2,5 | 5,85 | 6319 2RS | 6319 RS |
| 100 | 1 | 1 | 0,31 | 61820 ZZ | - |
| | 1 | 1 | 0,31 | 61820 2RS | 61820 RS |
| | 1,5 | 1,5 | 1,35 | 6020 ZZ | 6020 Z |
| | 1,5 | 1,5 | 1,35 | 6020 2RS | 6020 RS |
| | 2,1 | 2 | 3,3 | 6220 ZZ | 6220 Z |
| | 2,1 | 2 | 3,3 | 6220 2RS | 6220 RS |
| | 3 | 2,5 | 7,3 | 6320 ZZ | 6320 Z |
| | 3 | 2,5 | 7,3 | 6320 2RS | 6320 RS |
| 105 | 1 | 1 | 0,32 | 61821 ZZ | - |
| | 1 | 1 | 0,32 | 61821 2RS | 61821 RS |
| | 2 | 2 | 1,65 | 6021 ZZ | 6021 Z |
| | 2 | 2 | 1,65 | 6021 2RS | 6021 RS |
| | 2,1 | 2 | 3,95 | 6221 ZZ | 6221 Z |
| | 2,1 | 2 | 3,95 | 6221 2RS | 6221 RS |
| | 3 | 2,5 | 8,25 | 6321 ZZ | 6321 Z |

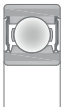



ZZ



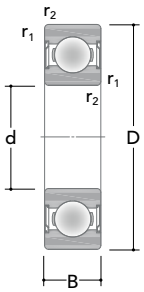

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **110** | 140 | 16 | 29,2 | 27,0 | 1,30 | 9500 | 4500 | **61822** |
| | 140 | 16 | 29,2 | 27,0 | 1,30 | - | 2600 | **61822** |
| | 170 | 28 | 86,9 | 73,5 | 2,56 | 8000 | 4000 | **6022** |
| | 170 | 28 | 86,9 | 73,5 | 2,56 | - | 2400 | **6022** |
| | 200 | 38 | 153 | 118 | 3,97 | 6700 | 3400 | **6222** |
| | 200 | 38 | 153 | 118 | 3,97 | - | 2000 | **6222** |
| | 240 | 50 | 209 | 189 | 5,99 | 5800 | 2800 | **6322** |
| | 240 | 50 | 209 | 189 | 5,99 | - | 1800 | **6322** |
| **120** | 150 | 16 | 29,3 | 28,8 | 1,33 | 8500 | 4300 | **61824** |
| | 150 | 16 | 29,3 | 28,8 | 1,33 | - | 2400 | **61824** |
| | 180 | 28 | 88,6 | 80,1 | 2,72 | 7500 | 3800 | **6024** |
| | 180 | 28 | 88,6 | 80,1 | 2,72 | - | 2200 | **6024** |
| | 215 | 40 | 152 | 122 | 4,03 | 6300 | 3200 | **6224** |
| | 215 | 40 | 152 | 122 | 4,03 | - | 1900 | **6224** |
| | 260 | 55 | 215 | 200 | 6,13 | 5600 | 2800 | **6324** |
| | 260 | 55 | 215 | 200 | 6,13 | - | 1700 | **6324** |
| **130** | 165 | 18 | 38,5 | 46,1 | 1,72 | 8000 | 3800 | **61826** |
| | 165 | 18 | 38,5 | 46,1 | 1,72 | - | 2200 | **61826** |
| | 200 | 33 | 112 | 100 | 3,35 | 7000 | 3400 | **6026** |
| | 200 | 33 | 112 | 100 | 3,35 | - | 2000 | **6026** |
| | 230 | 40 | 159 | 137 | 4,31 | 5600 | 3000 | **6226** |
| | 230 | 40 | 159 | 137 | 4,31 | - | 1800 | **6226** |
| **140** | 175 | 18 | 40,8 | 49,2 | 1,76 | 7500 | 3600 | **61828** |
| | 175 | 18 | 40,8 | 49,2 | 1,76 | - | 2000 | **61828** |
| | 210 | 33 | 114 | 110 | 3,51 | 6700 | 3200 | **6028** |
| | 210 | 33 | 114 | 110 | 3,51 | - | 1800 | **6028** |
| **150** | 225 | 35 | 128 | 132 | 4,12 | 6000 | 3000 | **6030** |
| | 225 | 35 | 128 | 132 | 4,12 | - | 1700 | **6030** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values

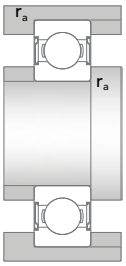


2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 110 | 1 | 1 | 0,6 | 61822 ZZ | - |
| | 1 | 1 | 0,6 | 61822 2RS | - |
| | 2 | 2 | 2,05 | 6022 ZZ | 6022 Z |
| | 2 | 2 | 2,05 | 6022 2RS | 6022 RS |
| | 2,1 | 2 | 4,5 | 6222 ZZ | 6222 Z |
| | 2,1 | 2 | 4,5 | 6222 2RS | 6222 RS |
| | 3 | 2,5 | 9,7 | 6322 ZZ | 6322 Z |
| | 3 | 2,5 | 9,7 | 6322 2RS | 6322 RS |
| 120 | 1 | 1 | 0,65 | 61824 ZZ | - |
| | 1 | 1 | 0,65 | 61824 2RS | 61824 RS |
| | 2 | 2 | 2,2 | 6024 ZZ | 6024 Z |
| | 2 | 2 | 2,2 | 6024 2RS | 6024 RS |
| | 2,1 | 2 | 5,35 | 6224 ZZ | 6224 Z |
| | 2,1 | 2 | 5,35 | 6224 2RS | 6224 RS |
| | 3 | 2,5 | 12,7 | 6324 ZZ | 6324 Z |
| | 3 | 2,5 | 12,7 | 6324 2RS | 6324 RS |
| 130 | 1,1 | 1 | 0,93 | 61826 ZZ | - |
| | 1,1 | 1 | 0,93 | 61826 2RS | 61826 RS |
| | 2 | 2 | 3,35 | 6026 ZZ | 6026 Z |
| | 2 | 2 | 3,35 | 6026 2RS | 6026 RS |
| | 3 | 2,5 | 6 | 6226 ZZ | 6226 Z |
| | 3 | 2,5 | 6 | 6226 2RS | 6226 RS |
| 140 | 1,1 | 1 | 0,99 | 61828 ZZ | - |
| | 1,1 | 1 | 0,99 | 61828 2RS | 61828 RS |
| | 2 | 2 | 3,6 | 6028 ZZ | 6028 Z |
| | 2 | 2 | 3,6 | 6028 2RS | 6028 RS |
| 150 | 2,1 | 2 | 4,35 | 6030 ZZ | 6030 Z |
| | 2,1 | 2 | 4,35 | 6030 2RS | 6030 RS |

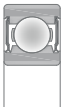



ZZ




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting [1] | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **160** | 240 | 38 | 150 | 149 | 4,48 | 5600 | 2800 | **6032** |
| | 240 | 38 | 150 | 149 | 4,48 | - | 1600 | **6032** |

[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values



2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 160 | 2,1 | 2 | 5,35 | 6032 ZZ | 6032 Z |
| | 2,1 | 2 | 5,35 | 6032 2RS | 6032 RS |

# Angular contact ball bearings

The angular contact ball bearings (ACBBs) produced by RKB are used in a wide array of machines where combined loads, high speeds and runout accuracy are required. Available in single or double row configuration, they can be manufactured with different types of cage (machined brass, pressed steel or polyamide) and dimensional precisions.

Single row ACBBs can be directly paired by RKB in face-to-face (DF) or back-to-back (DB) configuration, depending on load conditions, presence of tilting moments and misalignment magnitude in the application.



Single row angular contact ball bearings

## Single row angular contact ball bearings

### Misalignment

For single row angular contact ball bearing is not possible to determine a unique value of the shaft and housing misalignment. Permissible misalignment depends on several factors such as: the bearing size, internal axial clearance, arrangement, loads and moments acting on it. A limited misalignment can be accommodated by paired bearings in back-to-back arrangement, even if the stresses inside the balls increase and consequently the bearing life will be reduced.

### Minimum load

The minimum radial load is requested for single row angular contact ball bearing to guarantee an adequate operating condition, especially in particularly difficult working conditions like: high speed, high acceleration and sudden changes of direction. In these operating conditions, a skidding movement between the balls and raceways can be generated by the inertial forces, influencing negatively the bearing life.

Minimum radial load for single bearing and paired bearings in tandem arrangement can be theoretically estimated using this formula:

$$\frac{F_{rm}}{C_r} > 0{,}015$$

where:

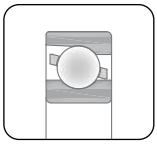
- $F_{rm}$ minimum radial load, [kN];
- $C_r$ basic dynamic radial load, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the single row angular contact ball bearing. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a larger value of the minimum radial load is required.

It is possible to apply an axial preload for single bearing and paired bearings in tandem arrangement by adjusting one ring against the other one or by using springs.

## Designs and variants

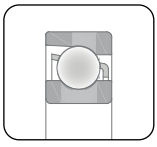
### Type M



HB BAINITE HT
S STABILIZATION

- One-piece inner and outer ring
- One-piece machined brass cage guided on balls (M)
- Available with machined brass cage guided on inner ring (MB)
- Single (non-universal) bearing execution
- Suitable for very high operating speeds
- Available with 25°, 30° or 40° contact angle

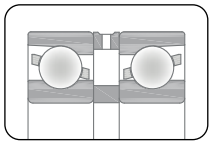
### Type J



HB BAINITE HT
S STABILIZATION

- One-piece inner and outer ring
- One-piece pressed steel cage guided on balls (J)
- Single (non-universal) bearing execution
- Suitable for very high operating speeds
- Available with 25°, 30° or 40° contact angle

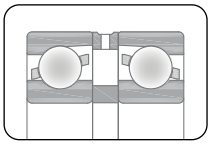
### Type DB



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED

- Back-to-back arrangement (DB) of two ACBBs
- One-piece machined brass cage guided on balls (M)
- Preset or adjusted BEP on customer's request
- Available with machined brass cage guided on inner ring (MB)
- Available with inner and/or outer spacers featuring lubrication grooves and/or lubrication holes
- Stiffer arrangement to withstand tilting moments

### Type DF



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED

- Face-to-face arrangement (DF) of two ACBBs
- One-piece machined brass cage guided on balls (M)
- Preset or adjusted BEP on customer's request

| Prefixes | |
|---|---|
| ACBB | Out of standard single row angular contact ball bearing followed by drawing number |
| ACBBF | Out of standard single row angular contact ball bearing with flanged outer ring followed by drawing number |

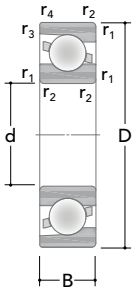
| Suffixes | Internal design |
|---|---|
| A | Bearing with a 30° contact angle |
| AC | Bearing with a 25° contact angle |
| B | Bearing with a 40° contact angle |

| Suffixes | Cage |
|---|---|
| M | Step-type or straight-type machined brass cage guided on balls |
| J or without suffix | Pressed steel cage guided on balls |
| MB | Machined brass cage guided on inner ring |
| MBS | Machined brass cage guided on inner ring with lubrication grooves in the guiding surface |
| TN or ATN | Molded polyamide cage (PA66) guided on balls |
| TN9 | Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on balls |

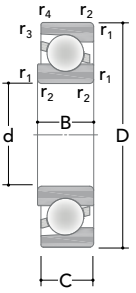
| Suffixes | Accuracy, clearance, running |
|---|---|
| A… - … | Special axial internal clearance. The two numbers immediately following the A give minimum and maximum axial internal clearance in µm |
| A… | Special axial internal clearance. The number immediately following the A gives mean axial internal clearance in µm |
| U | Bearing for universal paired mounting. When in back-to-back or face-to-face arrangement there will be axial internal clearance |
| GA | Bearing for paired mounting. When in back-to-back or face-to-face arrangement there will be a light preload |
| GB | Bearing for paired mounting. When in back-to-back or face-to-face arrangement there will be a moderate preload |
| GC | Bearing for paired mounting. When in back-to-back or face-to-face arrangement there will be a heavy preload |
| CA | Bearing for paired mounting. When in back-to-back or face-to-face arrangement the axial internal clearance will be smaller than normal (CB) |
| CB | Bearing for paired mounting. When in back-to-back or face-to-face arrangement the axial internal clearance will be normal |
| CC | Bearing for paired mounting. When in back-to-back or face-to-face arrangement the axial internal clearance will be greater than normal (CB) |

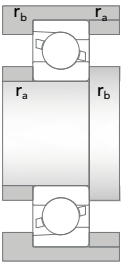
| Suffixes | External design |
|---|---|
| Z | Shield on one side |
| ZZ or 2Z | Shield on both sides |
| N1 | One locating slot in outer ring |
| N2 | Two locating slots in outer ring |

| Suffixes | Set |
|---|---|
| DB | Two bearings matched for mounting back-to-back |
| DF | Two bearings matched for mounting face-to-face |
| DT | Two bearings matched for mounting in tandem |

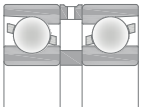



M

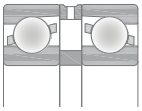



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **10** | 30 | 9 | - | 7,09 | 3,35 | 0,140 | 30000 | 30000 | **7200** |
| **12** | 32 | 10 | - | 7,61 | 3,80 | 0,160 | 26000 | 26000 | **7201** |
| | 37 | 12 | - | 10,60 | 5,10 | 0,210 | 26000 | 24000 | **7301** |
| **15** | 35 | 11 | - | 9,50 | 5,1 | 0,216 | 26000 | 26000 | **7202** |
| | 42 | 13 | - | 13,30 | 6,70 | 0,280 | 20000 | 20000 | **7302** |
| **17** | 40 | 12 | - | 11,10 | 5,85 | 0,250 | 22000 | 22000 | **7203** |
| | 47 | 14 | - | 15,90 | 8,30 | 0,355 | 19000 | 19000 | **7303** |
| **20** | 47 | 14 | - | 14,30 | 8,15 | 0,345 | 19000 | 19000 | **7204** |
| | 52 | 15 | - | 19,00 | 10,02 | 0,425 | 17000 | 22000 | **7304** |
| **25** | 52 | 15 | - | 15,60 | 10,08 | 0,420 | 16000 | 20000 | **7205** |
| | 62 | 17 | - | 26,50 | 15,5 | 0,660 | 14000 | 19000 | **7305** |
| **30** | 62 | 16 | - | 24,00 | 15,6 | 0,650 | 13200 | 18000 | **7206** |
| | 72 | 19 | - | 35,50 | 21,2 | 0,900 | 12000 | 16000 | **7306** |
| **35** | 72 | 17 | - | 31,10 | 20,9 | 0,880 | 11000 | 15000 | **7207** |
| | 80 | 21 | - | 41,50 | 26,5 | 1,140 | 11000 | 14000 | **7307** |
| **40** | 80 | 18 | - | 36,80 | 26,0 | 1,100 | 10000 | 13000 | **7208** |
| | 90 | 23 | - | 50,00 | 32,5 | 1,360 | 9500 | 12000 | **7308** |
| **45** | 85 | 19 | - | 40,0 | 28,5 | 1,220 | 9500 | 12000 | **7209** |
| | 100 | 25 | - | 61,00 | 40,5 | 1,730 | 8500 | 11000 | **7309** |
| **50** | 90 | 20 | - | 40,50 | 31,1 | 1,320 | 9000 | 11000 | **7210** |
| | 110 | 27 | - | 75,50 | 51,2 | 2,160 | 7500 | 10000 | **7310** |
| **55** | 100 | 21 | - | 49,90 | 40,0 | 1,660 | 8000 | 10000 | **7211** |

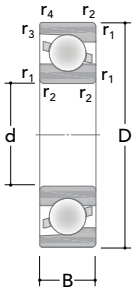


DB

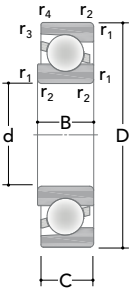


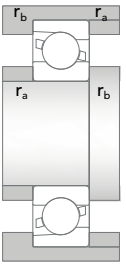
DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 10 | 0,6 | 0,3 | 0,6 | 0,3 | 0,03 | 7200 |
| 12 | 0,6 | 0,3 | 0,6 | 0,3 | 0,036 | 7201 |
| | 1 | 0,6 | 1 | 0,6 | 0,06 | 7301 |
| 15 | 0,6 | 0,3 | 0,6 | 0,3 | 0,045 | 7202 |
| | 1 | 0,6 | 1 | 0,6 | 0,08 | 7302 |
| 17 | 0,6 | 0,6 | 0,6 | 0,6 | 0,065 | 7203 |
| | 1 | 0,6 | 1 | 0,6 | 0,11 | 7303 |
| 20 | 1 | 0,6 | 1 | 0,6 | 0,11 | 7204 |
| | 1,1 | 0,6 | 1 | 0,6 | 0,14 | 7304 |
| 25 | 1 | 0,6 | 1 | 0,6 | 0,13 | 7205 |
| | 1,1 | 0,6 | 1 | 0,6 | 0,23 | 7305 |
| 30 | 1 | 0,6 | 1 | 0,6 | 0,2 | 7206 |
| | 1,1 | 0,6 | 1 | 0,6 | 0,34 | 7306 |
| 35 | 1,1 | 0,6 | 1 | 0,6 | 0,28 | 7207 |
| | 1,5 | 1 | 1,5 | 1 | 0,45 | 7307 |
| 40 | 1,1 | 0,6 | 1 | 0,6 | 0,37 | 7208 |
| | 1,5 | 1 | 1,5 | 1 | 0,68 | 7308 |
| 45 | 1,1 | 0,6 | 1 | 0,6 | 0,42 | 7209 |
| | 1,5 | 1 | 1,5 | 1 | 0,91 | 7309 |
| 50 | 1,1 | 0,6 | 1 | 0,6 | 0,47 | 7210 |
| | 2 | 1 | 2 | 1 | 1,1 | 7310 |
| 55 | 1,5 | 1 | 1,5 | 1 | 0,62 | 7211 |

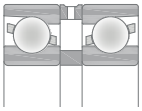


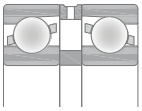

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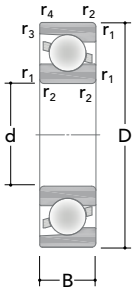




| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **55** | 120 | 29 | - | 85,90 | 60 | 2,550 | 7000 | 9000 | **7311** |
| (cont.) | | | | | | | | | |
| **60** | 110 | 22 | - | 62,80 | 50,0 | 2,120 | 7000 | 9500 | **7212** |
| | 130 | 31 | - | 104,00 | 76,5 | 3,200 | 6300 | 8500 | **7312** |
| **65** | 120 | 23 | - | 69,90 | 57,1 | 2,450 | 6700 | 8500 | **7213** |
| | 140 | 33 | - | 117,20 | 86,5 | 3,650 | 6000 | 8000 | **7313** |
| **70** | 125 | 24 | - | 74,80 | 60,0 | 2,550 | 6300 | 8000 | **7214** |
| | 150 | 35 | - | 127,00 | 98,0 | 3,900 | 5600 | 7000 | **7314** |
| **75** | 130 | 25 | - | 73,80 | 65,5 | 2,700 | 6000 | 6300 | **7215** |
| | 160 | 37 | - | 142,00 | 107 | 4,150 | 5300 | 6700 | **7315** |
| **80** | 140 | 26 | - | 85,20 | 75,0 | 3,050 | 5600 | 7000 | **7216** |
| | 170 | 39 | - | 143,10 | 118 | 4,500 | 5000 | 6300 | **7316** |
| **85** | 150 | 28 | - | 103,00 | 90,0 | 3,550 | 5300 | 6700 | **7217** |
| | 180 | 41 | - | 156,00 | 132 | 4,900 | 4500 | 6000 | **7317** |
| **90** | 160 | 30 | - | 116,70 | 104 | 4,020 | 5000 | 6300 | **7218** |
| | 190 | 43 | - | 166,30 | 146 | 5,300 | 4300 | 5600 | **7318** |
| **95** | 170 | 32 | - | 129,00 | 118 | 4,400 | 4500 | 6000 | **7219** |
| | 200 | 45 | - | 181,20 | 163 | 5,700 | 4000 | 5300 | **7319** |
| **100** | 180 | 34 | - | 143,0 | 134 | 4,750 | 4300 | 5600 | **7220** |
| | 215 | 47 | - | 216,00 | 208 | 6,950 | 3800 | 5000 | **7320** |
| **105** | 190 | 36 | - | 156,00 | 150 | 5,200 | 4000 | 5300 | **7221** |
| | 225 | 49 | - | 218,20 | 208 | 6,950 | 3600 | 4800 | **7321** |
| **110** | 170 | 21 | - | 76,1 | 82,4 | 2,980 | 2700 | 3600 | **307536** |

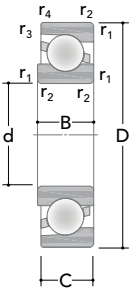

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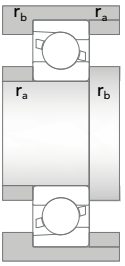

DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 55 | 2 | 1 | 2 | 1 | 1,4 | 7311 |
| (cont.) | | | | | | |
| 60 | 1,5 | 1 | 1,5 | 1 | 0,8 | 7212 |
| | 2,1 | 1,1 | 2 | 1 | 1,75 | 7312 |
| 65 | 1,5 | 1 | 1,5 | 1 | 1 | 7213 |
| | 2,1 | 1,1 | 2 | 1 | 2,15 | 7313 |
| 70 | 1,5 | 1 | 1,5 | 1 | 1,1 | 7214 |
| | 2,1 | 1,1 | 2 | 1 | 2,65 | 7314 |
| 75 | 1,5 | 1 | 1,5 | 1 | 1,2 | 7215 |
| | 2,1 | 1,1 | 2 | 1 | 3,2 | 7315 |
| 80 | 2 | 1 | 2 | 1 | 1,45 | 7216 |
| | 2,1 | 1,1 | 2 | 1 | 3,8 | 7316 |
| 85 | 2 | 1 | 2 | 1 | 1,85 | 7217 |
| | 3 | 1,1 | 2,5 | 1 | 4,45 | 7317 |
| 90 | 2 | 1 | 2 | 1 | 2,3 | 7218 |
| | 3 | 1,1 | 2,5 | 1 | 5,2 | 7318 |
| 95 | 2,1 | 1,1 | 2 | 1 | 2,7 | 7219 |
| | 3 | 1,1 | 2,5 | 1 | 6,05 | 7319 |
| 100 | 2,1 | 1,1 | 2 | 1 | 3,3 | 7220 |
| | 3 | 1,1 | 2,5 | 1 | 7,5 | 7320 |
| 105 | 2,1 | 1,1 | 2 | 1 | 3,95 | 7221 |
| | 3 | 1,1 | 2,5 | 1 | 8,55 | 7321 |
| 110 | 1 | 1 | 1 | 1 | 1,7 | 307536 |

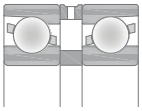


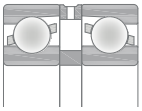

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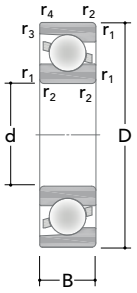




| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **110** | 200 | 38 | - | 163,7 | 156 | 5,300 | 4000 | 5000 | **7222** |
| (cont.) | 240 | 50 | - | 240,2 | 245 | 7,800 | 3400 | 4500 | **7322** |
| **120** | 180 | 28 | - | 88,8 | 93,0 | 3,200 | 4000 | 4000 | **7024** |
| | 215 | 40 | - | 165,0 | 163 | 5,300 | 3600 | 4000 | **7224** |
| | 260 | 55 | - | 239,00 | 250 | 7,650 | 3000 | 3600 | **7324** |
| **130** | 230 | 40 | - | 186,00 | 193 | 6,100 | 3400 | 3800 | **7226** |
| | 280 | 58 | - | 276,00 | 305 | 9,020 | 2800 | 3400 | **7326** |
| **140** | 210 | 33 | - | 116,0 | 129 | 4,150 | 3400 | 3400 | **7028** |
| | 250 | 42 | - | 199,0 | 212 | 6,400 | 3000 | 3600 | **7228** |
| | 300 | 62 | - | 303,0 | 345 | 9,800 | 2600 | 3000 | **7328** |
| **150** | 210 | 28 | 25 | 98,0 | 111 | 3,620 | 1700 | 2600 | **466895/307377** |
| | 225 | 35 | - | 133,0 | 146 | 4,550 | 3200 | 3200 | **7030** |
| | 270 | 45 | - | 216,00 | 240 | 6,950 | 2800 | 3200 | **7230** |
| | 320 | 65 | - | 339,00 | 390 | 10,800 | 2400 | 2800 | **7330** |
| **160** | 215 | 28 | - | 82,0 | 108 | 3,340 | 1800 | 2500 | **466896** |
| | 240 | 38 | - | 142,0 | 164 | 4,940 | 3000 | 3000 | **7032** |
| | 290 | 48 | - | 255,0 | 300 | 8,500 | 2600 | 3000 | **7232** |
| **170** | 260 | 42 | - | 175,00 | 204 | 5,850 | 2800 | 2800 | **7034** |
| | 310 | 52 | - | 281,00 | 345 | 9,500 | 2400 | 2800 | **7234** |
| | 360 | 72 | - | 394,0 | 490 | 12,700 | 2200 | 2600 | **7334** |
| **175** | 235 | 30 | 27 | 100,0 | 120 | 3,840 | 1600 | 2300 | **468325** |
| **180** | 280 | 46 | - | 197,0 | 240 | 6,700 | 2600 | 2600 | **7036** |
| | 320 | 52 | - | 294,0 | 375 | 9,99 | 2400 | 2600 | **7236** |
| | 380 | 75 | - | 414,00 | 540 | 13,700 | 2000 | 2400 | **7336** |

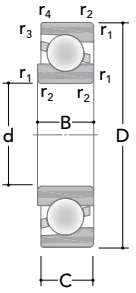

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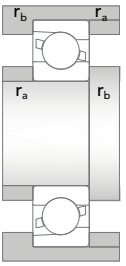

DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 110 | 2,1 | 1,1 | 2 | 1 | 4,6 | 7222 |
| (cont.) | 3 | 1,1 | 2,5 | 1 | 10 | 7322 |
| 120 | 2 | 1 | 2 | 1 | 2,4 | 7024 |
| | 2,1 | 1,1 | 2 | 1 | 5,9 | 7224 |
| | 3 | 1,5 | 2,5 | 1 | 14,5 | 7324 |
| 130 | 3 | 1,1 | 2,5 | 1 | 6,95 | 7226 |
| | 4 | 1,5 | 3 | 1,5 | 17 | 7326 |
| 140 | 2 | 1 | 2 | 1 | 3,85 | 7028 |
| | 3 | 1,1 | 2,5 | 1 | 8,85 | 7228 |
| | 4 | 1,5 | 3 | 1,5 | 21,5 | 7328 |
| 150 | 2 | 1 | 2 | 1 | 295 | 466895/307377 |
| | 2,1 | 1,1 | 2 | 1 | 4,7 | 7030 |
| | 3 | 1,1 | 2,5 | 1 | 11,5 | 7230 |
| | 4 | 1,5 | 3 | 1,5 | 26 | 7330 |
| 160 | 2 | 1 | 2 | 1 | 2,7 | 466896 |
| | 2,1 | 1,1 | 2 | 1 | 5,75 | 7032 |
| | 3 | 1,1 | 2,5 | 1 | 14 | 7232 |
| 170 | 2,1 | 1,1 | 2 | 1 | 7,65 | 7034 |
| | 4 | 1,5 | 3 | 1,5 | 17,5 | 7234 |
| | 4 | 2 | 3 | 2 | 36 | 7334 |
| 175 | 1,5 | 1 | 1,5 | 1 | 3,5 | 468325 |
| 180 | 2,1 | 1,1 | 2 | 1 | 10 | 7036 |
| | 4 | 1,5 | 3 | 1,5 | 18 | 7236 |
| | 4 | 2 | 3 | 2 | 42 | 7336 |

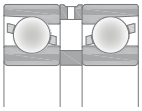



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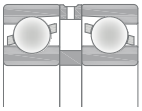



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **190** | 255 | 33 | 29 | 113,0 | 141 | 4,340 | 1500 | 2200 | **466880** |
| | 290 | 46 | - | 199,0 | 255 | 6,950 | 2400 | 2400 | **7038** |
| | 340 | 55 | - | 307,0 | 405 | 10,400 | 2000 | 2600 | **7238** |
| | 400 | 78 | - | 442,0 | 600 | 14,600 | 2000 | 2200 | **7338** |
| **200** | 310 | 51 | - | 225,0 | 290 | 7,80 | 2200 | 2200 | **7040** |
| | 360 | 58 | - | 325,00 | 430 | 11,050 | 2000 | 2400 | **7240** |
| | 420 | 80 | - | 462,00 | 655 | 15,600 | 1900 | 2200 | **7340** |
| **220** | 300 | 38 | 35 | 162,0 | 223 | 5,820 | 1400 | 1800 | **466931** |
| | 340 | 56 | - | 255,0 | 355 | 8,990 | 2000 | 2000 | **7044** |
| | 400 | 65 | - | 398,0 | 560 | 13,400 | 1900 | 2200 | **7244** |
| | 460 | 88 | - | 489,0 | 713 | 16,44 | 1500 | 1500 | **7344** |
| **240** | 360 | 56 | - | 260,00 | 375 | 9,150 | 1900 | 1900 | **7048** |
| | 440 | 72 | - | 449,00 | 670 | 15,300 | 1600 | 2600 | **7248** |
| | 500 | 95 | - | 570,0 | 808 | 14,650 | 1300 | 1400 | **7348** |
| **260** | 320 | 28 | - | 128,0 | 190 | 5,300 | 1300 | 1700 | **71852** |
| | 360 | 46 | - | 244,0 | 342 | 8,570 | 1600 | 1700 | **71952** |
| | 400 | 65 | - | 339,0 | 510 | 11,79 | 1700 | 1700 | **7052** |
| | 480 | 80 | - | 507,0 | 769 | 17,06 | 1300 | 1400 | **7252** |
| **280** | 350 | 33 | - | 156,00 | 240 | 6,300 | 1100 | 1500 | **71856** |
| | 380 | 46 | - | 252,0 | 378 | 9,250 | 1000 | 1500 | **71956** |
| | 420 | 65 | - | 338,0 | 540 | 12,200 | 1600 | 1600 | **7056** |
| | 500 | 80 | - | 507,0 | 836 | 17,730 | 1400 | 1400 | **7256** |
| **285** | 380 | 46 | - | 216,0 | 333 | 7,75 | 1000 | 1400 | **466951** |
| **300** | 460 | 74 | - | 413 | 685 | 14,900 | 1300 | 1400 | **7060** |
| | 540 | 85 | - | 557,0 | 930 | 19,300 | 1300 | 1300 | **7260** |

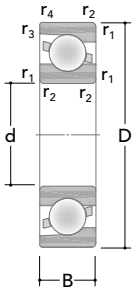


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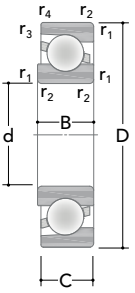


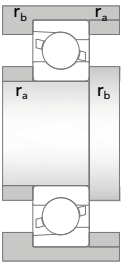
DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **190** | 1,5 | 1 | 1,5 | 1 | 4,5 | **466880** |
| | 2,1 | 1,1 | 2 | 1 | 10,5 | **7038** |
| | 4 | 1,5 | 3 | 1,5 | 22 | **7238** |
| | 5 | 2 | 4 | 2 | 48,5 | **7338** |
| **200** | 2,1 | 1,1 | 2,1 | 1,1 | 18 | **7040** |
| | 4 | 1,5 | 3 | 1,5 | 25 | **7240** |
| | 5 | 2 | 4 | 2 | 53 | **7340** |
| **220** | 2 | 1 | 2 | 1 | 7,35 | **466931** |
| | 3 | 1,1 | 2,5 | 1,1 | 18 | **7044** |
| | 4 | 1,5 | 3 | 1,5 | 37 | **7244** |
| | 5 | 2 | 4 | 2 | 70 | **7344** |
| **240** | 3 | 1,1 | 2,5 | 1,1 | 19 | **7048** |
| | 4 | 1,5 | 3 | 1,5 | 49 | **7248** |
| | 5 | 2 | 4 | 2 | 89,4 | **7348** |
| **260** | 2 | 1,1 | 2 | 1 | 4,85 | **71852** |
| | 2,1 | 1,1 | 2 | 1 | 13,5 | **71952** |
| | 4 | 1,5 | 3 | 1,5 | 30 | **7052** |
| | 5 | 2 | 4 | 2 | 66 | **7252** |
| **280** | 2 | 1 | 2 | 1 | 7,2 | **71856** |
| | 2,1 | 1,1 | 2 | 1 | 15 | **71956** |
| | 4 | 1,5 | 3 | 1,5 | 30 | **7056** |
| | 5 | 2 | 4 | 2 | 67,5 | **7256** |
| **285** | 2,1 | 1 | 2 | 1 | 14 | **466951** |
| **300** | 4 | 1,5 | 3 | 1,5 | 42,5 | **7060** |
| | 5 | 2,1 | 4 | 2 | 86,5 | **7260** |

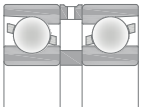


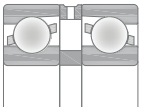

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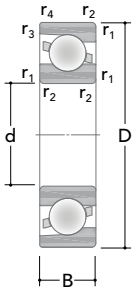




| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **320** | 480 | 74 | - | 423,0 | 721 | 15,070 | 1200 | 1300 | **7064** |
| | 580 | 92 | - | 583,0 | 1000 | 20,000 | 770 | 1100 | **7264** |
| **335** | 450 | 56 | - | 278,0 | 478 | 10,36 | 1200 | 1300 | **466952** |
| **340** | 420 | 38 | - | 220 | 386 | 8,210 | 860 | 1300 | **71868** |
| | 460 | 56 | - | 338,0 | 579 | 12,370 | 1400 | 1400 | **71968** |
| | 520 | 82 | - | 493,0 | 885 | 18,030 | 1100 | 1200 | **7068** |
| | 620 | 92 | - | 695,0 | 1320 | 25,610 | 1010 | 990 | **7268** |
| **360** | 440 | 38 | - | 239,0 | 419 | 8,87 | 1400 | 1400 | **71872** |
| | 480 | 56 | - | 326,0 | 600 | 12,22 | 1300 | 1400 | **71972** |
| | 540 | 82 | - | 504 | 940 | 18,80 | 1100 | 1100 | **7072** |
| | 650 | 95 | - | 790 | 1560 | 22,680 | 1800 | 1600 | **7272** |
| **380** | 480 | 31 | - | 186,0 | 362,1 | 7,660 | 1200 | 1300 | **70876** |
| | 480 | 46 | - | 294,0 | 497 | 10,93 | 1200 | 1300 | **71876** |
| | 520 | 65 | - | 406,0 | 723 | 14,76 | 1200 | 1200 | **71976** |
| | 560 | 82 | - | 496,0 | 940 | 18,36 | 990 | 1100 | **7076** |
| **400** | 540 | 65 | - | 409 | 777 | 16,17 | 1100 | 1100 | **71980** |
| | 600 | 90 | - | 611,00 | 1170 | 22,210 | 880 | 1100 | **307238** |
| | 600 | 90 | - | 522,0 | 1030,2 | 19,200 | 920 | 1000 | **7080** |
| | 720 | 103 | - | 743,0 | 1480 | 26,150 | 820 | 870 | **7280** |
| **410** | 560 | 70 | - | 419,0 | 820 | 15,81 | 1000 | 1000 | **468431** |
| **420** | 560 | 65 | - | 408 | 795 | 16,26 | 1100 | 1100 | **71984** |
| | 620 | 90 | - | 592 | 1160 | 21,89 | 910 | 900 | **7084** |
| **440** | 650 | 94 | - | 626,0 | 1310 | 23,980 | 890 | 870 | **7088** |
| **460** | 580 | 37 | - | 262,0 | 554 | 10,29 | 1000 | 1000 | **70892** |

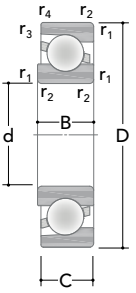

DB

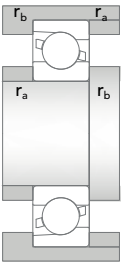

DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 320 | 4 | 1,5 | 3 | 1,5 | 44,5 | 7064 |
| | 5 | 2 | 4 | 2 | 110 | 7264 |
| 335 | 3 | 1 | 2,5 | 1 | 25,5 | 466952 |
| 340 | 2,1 | 1 | 2 | 1 | 10,5 | 71868 |
| | 3 | 1,1 | 2,5 | 1 | 24 | 71968 |
| | 5 | 2 | 4 | 2 | 59,5 | 7068 |
| | 6 | 3 | 5 | 2,5 | 125 | 7268 |
| 360 | 2,1 | 1,1 | 2 | 1 | 12 | 71872 |
| | 3 | 1,1 | 2,5 | 1 | 28,5 | 71972 |
| | 5 | 2 | 4 | 2 | 61,8 | 7072 |
| | 6 | 4 | 6 | 2,5 | 145 | 7272 |
| 380 | 2 | 1 | 2 | 1 | 14,4 | 70876 |
| | 2,1 | 1,1 | 2 | 1 | 18 | 71876 |
| | 4 | 1,5 | 3 | 1,5 | 40,5 | 71976 |
| | 5 | 2 | 4 | 2 | 65,5 | 7076 |
| 400 | 4 | 1,5 | 3 | 1,5 | 39 | 71980 |
| | 5 | 2 | 4 | 2 | 89,5 | 307238 |
| | 5 | 2 | 4 | 2 | 90,5 | 7080 |
| | 6 | 3 | 5 | 2,5 | 190 | 7280 |
| 410 | 4 | 1 | 3 | 1 | 49,5 | 468431 |
| 420 | 4 | 1,5 | 3 | 1,5 | 44,5 | 71984 |
| | 5 | 2 | 4 | 2 | 88 | 7084 |
| 440 | 6 | 3 | 5 | 2,5 | 100 | 7088 |
| 460 | 2,1 | 1 | 2 | 1 | 24,5 | 70892 |

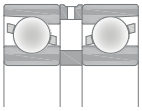


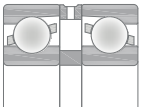

M



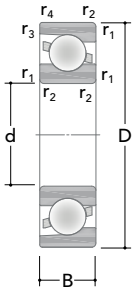



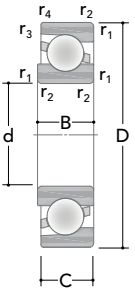

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **460** | 580 | 56 | - | 371,0 | 752 | 14,06 | 990 | 1030 | **71892** |
| (cont.) | 620 | 74 | - | 512,0 | 1020 | 18,63 | 1000 | 1000 | **71992** |
| | 680 | 100 | - | 662 | 1430 | 25,72 | 830 | 850 | **7092** |
| **465** | 635 | 76 | - | 459,00 | 978 | 17,560 | 850 | 860 | **307352** |
| **480** | 700 | 100 | - | 687,0 | 1520 | 27,22 | 770 | 830 | **7096** |
| **500** | 620 | 37 | - | 282,0 | 617 | 10,95 | 920 | 910 | **708/500** |
| | 620 | 56 | - | 382,0 | 842 | 15,16 | 910 | 900 | **718/500** |
| | 670 | 78 | - | 553 | 1210 | 21,03 | 880 | 930 | **719/500** |
| | 720 | 100 | - | 686 | 1560 | 27,30 | 720 | 770 | **70/500** |
| **530** | 650 | 56 | - | 401,0 | 918 | 15,910 | 860 | 940 | **718/530** |
| | 710 | 82 | - | 618,0 | 1330 | 23,42 | 800 | 850 | **719/530** |
| | 760 | 100 | - | 702,0 | 1580 | 27,16 | 710 | 750 | **307368** |
| | 780 | 112 | - | 876,0 | 2150 | 35,41 | 700 | 720 | **70/530** |
| **540** | 630 | 45 | - | 260 | 597 | 10,55 | 770 | 830 | **311585** |
| **560** | 680 | 56 | - | 393,00 | 926 | 15,930 | 780 | 810 | **718/560** |
| | 750 | 85 | - | 604,0 | 1270 | 22,45 | 730 | 770 | **719/560** |
| | 820 | 115 | - | 881,0 | 2120 | 34,03 | 660 | - | **70/560** |
| **600** | 730 | 42 | - | 331,0 | 735 | 14,00 | 720 | 770 | **708/600** |
| | 730 | 60 | - | 458 | 1080 | 17,97 | 720 | 790 | **718/600** |
| | 800 | 90 | - | 729 | 1710 | 27,18 | 680 | 720 | **719/600** |
| | 870 | 118 | - | 884,00 | 2150 | 33,84 | 650 | 710 | **70/600** |
| **630** | 700 | 22 | - | 135,0 | 434 | 7,10 | 680 | 710 | **311712** |
| | | | | 956,0 | 2401 | | 530 | 640 | |
| **670** | 820 | 69 | - | 535 | 1280 | 22,12 | 650 | 680 | **718/670** |


DB

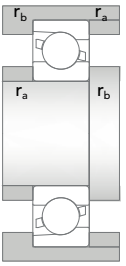

DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **460** | 3 | 3 | 2,5 | 2,5 | 35 | **71892** |
| (cont.) | 4 | 1,5 | 3 | 1,5 | 58 | **71992** |
| | 6 | 3 | 5 | 2,5 | 120 | **7092** |
| **465** | 4 | 4 | 3 | 3 | 70,5 | **307352** |
| **480** | 6 | 3 | 5 | 2,5 | 125 | **7096** |
| **500** | 2,1 | 1,1 | 2 | 1 | 26 | **708/500** |
| | 3 | 1,1 | 2,5 | 1 | 38 | **718/500** |
| | 5 | 2 | 4 | 2 | 78 | **719/500** |
| | 6 | 3 | 5 | 2,5 | 130 | **70/500** |
| **530** | 3 | 1,1 | 2,5 | 1 | 39,5 | **718/530** |
| | 5 | 2 | 4 | 2 | 92 | **719/530** |
| | 6 | 6 | 5 | 5 | 150 | **307368** |
| | 6 | 3 | 5 | 2,5 | 180 | **70/530** |
| **540** | 3 | 3 | 2,5 | - | 21,5 | **311585** |
| **560** | 3 | 1,1 | 2,5 | 1 | 41,5 | **718/560** |
| | 5 | 2 | 4 | 2 | 105 | **719/560** |
| | 6 | 3 | 5 | 2,5 | 203 | **70/560** |
| **600** | 3 | 1,1 | 2,5 | 1 | 38,5 | **708/600** |
| | 3 | 1,1 | 2,5 | 1 | 52 | **718/600** |
| | 5 | 2 | 4 | 2 | 125 | **719/600** |
| | 6 | 3 | 5 | 2,5 | 236 | **70/600** |
| **630** | 0,6 | - | 0,6 | - | 11,5 | **311712** |
| | 7,5 | 4 | 6 | 3 | 270 | |
| **670** | 4 | 1,5 | 3 | 1,5 | 77 | **718/670** |

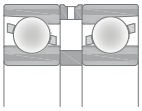


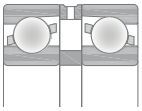




M

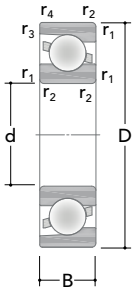



| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **670** | 980 | 136 | - | 1170 | 3080 | 45,21 | 500 | - | **70/670** |
| (cont.) | | | | | | | | | |
| **710** | 870 | 74 | - | 585,0 | 1600 | 24,21 | 590 | 630 | **718/710** |
| | 950 | 106 | - | 852,0 | 2160 | 33,87 | 550 | 590 | **719/710** |
| | 1030 | 140 | - | 1202,0 | 3217,5 | 45,50 | 500 | 560 | **70/710** |
| **750** | 920 | 78 | - | 650 | 1800 | 25,91 | 560 | 590 | **718/750** |
| | 1090 | 150 | - | 1287 | 3590 | 51,15 | 490 | 520 | **70/750** |
| **762** | 889 | 63,5 | - | 453,0 | 1244,6 | 18,16 | 520 | 550 | **311576** |
| **800** | 1130 | 120 | - | 1102,0 | 3190 | 43,86 | 410 | 440 | **311745** |
| | 1150 | 155 | - | 1290,0 | 3720 | 50,96 | 420 | - | **70/800** |
| **850** | 1030 | 82 | - | 675 | 1841,4 | 28,38 | 460 | 500 | **718/850** |
| | 1220 | 165 | - | 1480,00 | 4560 | 60,43 | 370 | - | **70/850** |
| **900** | 1280 | 170 | - | 1544,0 | 4850 | 62,36 | 380 | 400 | **70/900** |
| **950** | 1360 | 180 | - | 1597,0 | 5180 | 65,25 | 360 | 380 | **70/950** |
| **1000** | 1220 | 100 | - | 923 | 2700 | 38,29 | 370 | 400 | **718/1000** |
| | 1320 | 103 | - | 840,00 | 2401 | 33,80 | 320 | 330 | **307101** |
| | 1420 | 185 | - | 1663,0 | 5300 | 65,76 | 340 | 350 | **70/1000** |
| **1060** | 1500 | 195 | - | 1697,0 | 5670 | 70,63 | 290 | 310 | **70/1060** |
| **1120** | 1360 | 106 | - | 1049 | 3700 | 44,40 | 310 | 330 | **718/1120** |
| | 1580 | 200 | - | 1686 | 5770 | 70,03 | 280 | 290 | **70/1120** |
| **1180** | 1660 | 212 | - | 1705,0 | 6110 | 72,43 | 260 | 250 | **70/1180** |
| **1250** | 1500 | 80 | - | 868,0 | 3510 | 46,80 | 250 | 270 | **708/1250** |

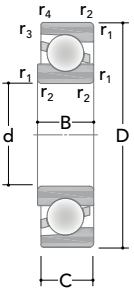

DB

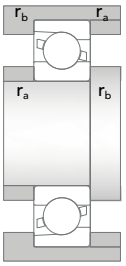

DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 670 | 7,5 | 4 | 6 | 3 | 353 | 70/670 |
| (cont.) | | | | | | |
| 710 | 4 | 1,5 | 3 | 1,5 | 93,5 | 718/710 |
| | 6 | 3 | 5 | 2,5 | 195 | 719/710 |
| | 7,5 | 4 | 6 | 3 | 370 | 70/710 |
| 750 | 5 | 2 | 4 | 2 | 110 | 718/750 |
| | 7,5 | 4 | 6 | 3 | 445 | 70/750 |
| 762 | 2,1 | 2,1 | 2 | 2 | 58 | 311576 |
| 800 | 7,5 | 4 | 6 | 3 | 395 | 311745 |
| | 7,5 | 4 | 6 | 3 | 524 | 70/800 |
| 850 | 5 | 2 | 4 | 2 | 140 | 718/850 |
| | 7,5 | 4 | 6 | 3 | 626 | 70/850 |
| 900 | 7,5 | 4 | 6 | 3 | 665 | 70/900 |
| 950 | 7,5 | 4 | 6 | 3 | 805 | 70/950 |
| 1000 | 6 | 3 | 5 | 2,5 | 243 | 718/1000 |
| | 6 | 6 | 5 | 5 | 370 | 307101 |
| | 7,5 | 4 | 6 | 3 | 890 | 70/1000 |
| 1060 | 9,5 | 5 | 8 | 4 | 1050 | 70/1060 |
| 1120 | 6 | 3 | 5 | 2,5 | 320 | 718/1120 |
| | 9,5 | 5 | 8 | 4 | 1150 | 70/1120 |
| 1180 | 9,5 | 5 | 8 | 4 | 1350 | 70/1180 |
| 1250 | 6 | 3 | 5 | 2,5 | 295 | 708/1250 |

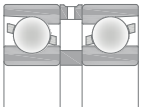



M

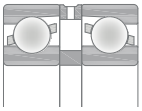



| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **1250** | 1500 | 112 | - | 1117 | 3850 | 49,36 | 260 | 270 | **718/1250** |
| (cont.) | 1750 | 218 | - | 1816 | 6450 | 75,33 | 220 | 230 | **70/1250** |
| **1700** | 1900 | 80 | - | 975,00 | 4470 | 44,70 | 150 | 150 | **307756** |



DB



DF

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **1250** | 6 | 3 | 5 | 2,5 | 390 | **718/1250** |
| (cont.) | 9,5 | 5 | 8 | 4 | 1600 | **70/1250** |
| **1700** | 7,5 | - | 6 | - | 310 | **307756** |

# Double row angular contact ball bearings

Can be considered in design similar to a pair of single row angular contact ball bearings in "O arrangement" or in a "X arrangement".

RKB double row angular contact ball bearings can accommodate thrust load as well as high radial load.

The bearings are normally used in arrangement requiring a rigid axial guidance. They can also withstand tilting moments.



Double row angular contact ball bearings

## Misalignment

According to the bearing internal design of double row angular contact ball bearings any misalignment may shorten the bearing service life, as well as give an increase of rotation noise.

## Minimum load

A minimum axial load is requested for a thrust ball bearing, like for all ball and roller bearings, to guarantee an adequate operating conditions, especially in critical application requirements like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions a skidding between balls and raceways can be generated by the inertial forces, influencing negatively the bearing life.

The requested minimum axial load can be theoretically estimated as follows:

$$\frac{F_{rm}}{C_r} > 0{,}015$$

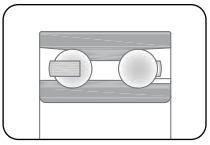
where:

- $F_{rm}$ minimum radial load, [kN];
- $C_r$ basic dynamic radial load, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the single row angular contact ball bearing. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a larger value of the minimum radial load is required.

## Designs and variants

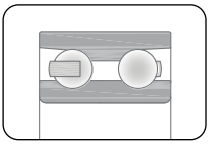
### Type DBA



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Filling slot on inner ring
- Non-separable open design
- Moulded glass fiber reinforced polyamide snap-in cage guided on balls (TN)
- Available with lubrication holes in the inner ring
- Supports high combined loads

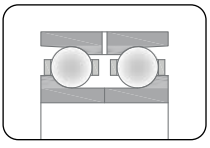
### Type DB1



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Non-separable open design
- Moulded glass fiber reinforced polyamide snap-in cage guided on balls (TN)
- Available with lubrication holes in the inner ring
- Supports high combined loads

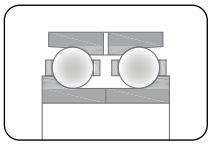
### Type DB2



HB BAINITE HT · S STABILIZATION · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Machined brass cage guided on inner ring (MB)
- Lubrication grooves and holes in outer ring
- Two-piece inner ring
- Supports high combined loads

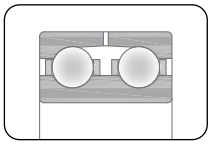
### Type DB3



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Machined brass cage guided on inner ring (MB)
- Lubrication grooves and holes in outer ring
- Narrower outer ring compared to type DB2 design
- Two-piece inner ring
- Supports high combined loads

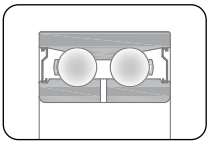
### Type DF



HB BAINITE HT · S STABILIZATION

- Double row ACBB face-to-face arrangement (DF)
- Separable open design
- Machined brass cage guided on inner ring (MB)
- Lubrication grooves and holes in outer rings
- Supports high combined loads

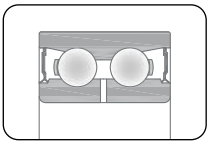
## Seal type DB/ZZ



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Non-separable shielded design (ZZ)
- Moulded glass fiber reinforced polyamide snap-in cage guided on balls (TN)
- Available with lubrication holes in the inner ring
- Shielded type to keep the grease inside the bearing without compromising the limiting speed
- Supports high combined loads

## Type DB/2RS



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Double row ACBB back-to-back arrangement (DB)
- Non-separable sealed design (2RS)
- Moulded glass fiber reinforced polyamide snap-in cage guided on balls (TN)
- Available with lubrication holes in the inner ring
- Sealed type to keep the grease inside the bearing without compromising the limiting speed
- Supports high combined loads

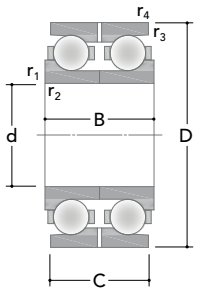
| Suffixes | Internal Design |
|---|---|
| D | Two-piece inner ring |
| A | No filling slots |
| SP | Special or non-standard bearing |

| Suffixes | Cage |
|---|---|
| TN or ATN | Molded polyamide cage (PA66) guided on balls |
| TN9 | Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on balls |
| M | Machined brass cage guided on balls |
| J or without suffix | Pressed steel cage guided on balls |

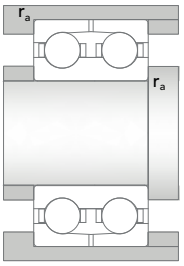
| Suffixes | Accuracy, clearance, running |
|---|---|
| ABEC1 | Approximated to tolerance class P0 |
| ABEC3 | Approximated to tolerance class P6 |
| ABEC5 | Approximated to tolerance class P5 |

| Suffixes | External design |
|---|---|
| N | Snap ring groove in outer ring |
| N2 | Two locating slots in outer ring |
| RS | Contact seal on one side |
| 2RS | Contact seal on both sides |
| Z | Shield on one side |
| ZZ or 2Z | Shield on both sides |

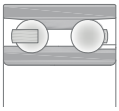
| Suffixes | Set |
|---|---|
| DF or X or DFX | Double row angular contact ball bearing in X arrangement |
| DB | Double row angular contact ball bearing in O arrangement |

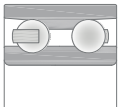


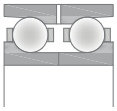

DB3

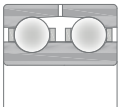



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **10** | 30 | 14 | - | 7,76 | 4,30 | 0,18 | 26000 | 24000 | **3200** |
| **12** | 32 | 15,9 | - | 10,3 | 5,61 | 0,24 | 24000 | 22000 | **3201** |
| **15** | 35 | 15,9 | - | 11,42 | 6,8 | 0,28 | 22000 | 18000 | **3202** |
| | 42 | 19 | - | 15,4 | 9,3 | 0,4 | 18000 | 16000 | **3302** |
| **17** | 40 | 17,5 | - | 14,3 | 8,8 | 0,37 | 19000 | 16000 | **3203** |
| | 47 | 22,2 | - | 21,82 | 12,7 | 0,54 | 17000 | 14000 | **3303** |
| **20** | 47 | 20,6 | - | 20,8 | 12,9 | 0,55 | 16000 | 14000 | **3204** |
| | 52 | 22,2 | - | 23,6 | 14,6 | 0,62 | 15000 | 13000 | **3304** |
| **25** | 52 | 20,6 | - | 21,6 | 14,3 | 0,60 | 14000 | 12000 | **3205** |
| | 62 | 25,4 | - | 32,60 | 20,4 | 0,865 | 12000 | 11000 | **3305** |
| **30** | 62 | 23,8 | - | 30,3 | 20,4 | 0,86 | 11000 | 10000 | **3206** |
| | 72 | 30,2 | - | 42,53 | 30,0 | 1,27 | 10000 | 9000 | **3306** |
| **35** | 72 | 27 | - | 40,4 | 28 | 1,18 | 10000 | 9000 | **3207** |
| | 80 | 34,9 | - | 52 | 35,5 | 1,5 | 9500 | 8500 | **3307** |
| **40** | 80 | 30,2 | - | 48,5 | 36,5 | 1,41 | 9000 | 8000 | **3208** |
| | 90 | 36,5 | - | 65,3 | 44,0 | 1,86 | 8000 | 7500 | **3308** |
| **45** | 85 | 30,2 | - | 52 | 39,0 | 1,63 | 8500 | 7500 | **3209** |
| | 100 | 39,7 | - | 75 | 53 | 2,24 | 7500 | 6700 | **3309** |
| **50** | 90 | 30,2 | - | 51 | 42,5 | 1,80 | 8000 | 7000 | **3210** |
| | 110 | 44,4 | - | 90 | 64 | 2,75 | 6700 | 6000 | **3310** |
| **55** | 100 | 33,3 | - | 60,6 | 47,9 | 1,99 | 6300 | 6300 | **3211** |
| | 120 | 49,2 | - | 112 | 81,5 | 3,45 | 5300 | 5300 | **3311** |

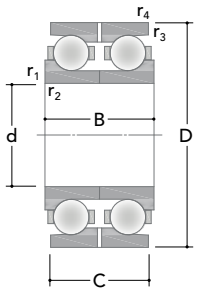

DBA


$DB_1$

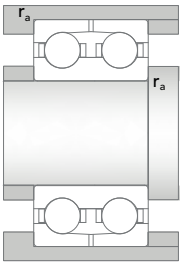

$DB_2$


DF

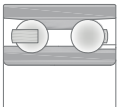
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 10 | 0,6 | 0,6 | 0,6 | 0,6 | 0,051 | 3200 |
| 12 | 0,6 | 0,6 | 0,6 | 0,6 | 0,058 | 3201 |
| 15 | 0,6 | 0,6 | 0,6 | 0,6 | 0,066 | 3202 |
| | 1 | 1 | 1 | 1 | 0,13 | 3302 |
| 17 | 0,6 | 0,6 | 0,6 | 0,6 | 0,096 | 3203 |
| | 1 | 1 | 1 | 1 | 0,18 | 3303 |
| 20 | 1 | 1 | 1 | 1 | 0,16 | 3204 |
| | 1,1 | 1,1 | 1 | 1 | 0,22 | 3304 |
| 25 | 1 | 1 | 1 | 1 | 0,18 | 3205 |
| | 1,1 | 1,1 | 1 | 1 | 0,35 | 3305 |
| 30 | 1 | 1 | 1 | 1 | 0,29 | 3206 |
| | 1,1 | 1,1 | 1 | 1 | 0,52 | 3306 |
| 35 | 1,1 | 1,1 | 1 | 1 | 0,44 | 3207 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,74 | 3307 |
| 40 | 1,1 | 1,1 | 1 | 1 | 0,57 | 3208 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,93 | 3308 |
| 45 | 1,1 | 1,1 | 1 | 1 | 0,63 | 3209 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,25 | 3309 |
| 50 | 1,1 | 1,1 | 1 | 1 | 0,65 | 3210 |
| | 2 | 2 | 2 | 2 | 1,7 | 3310 |
| 55 | 1,5 | 1,5 | 1,5 | 1,5 | 0,91 | 3211 |
| | 2 | 2 | 2 | 2 | 2,65 | 3311 |

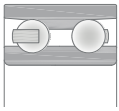


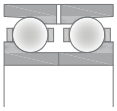

DB3

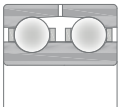



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **60** | 110 | 36,5 | - | 74,2 | 58,5 | 2,50 | 6300 | 5600 | **3212** |
| | 130 | 54 | - | 127 | 95 | 4,05 | 5600 | 5000 | **3312** |
| **65** | 120 | 38,1 | - | 82,2 | 73,5 | 3,1 | 5600 | 4800 | **3213** |
| **70** | 125 | 39,7 | - | 90,2 | 80,1 | 3,39 | 5600 | 4500 | **3214** |
| | 150 | 63,5 | - | 163 | 125 | 5 | 5000 | 4300 | **3314** |
| **75** | 130 | 41,3 | - | 96,6 | 88 | 3,75 | 5300 | 4500 | **3215** |
| | 160 | 68,3 | - | 179,5 | 140 | 5,5 | 4500 | 4000 | **3315** |
| **80** | 140 | 44,4 | - | 107,06 | 95,0 | 3,89 | 5000 | 4300 | **3216** |
| | 170 | 68,3 | - | 194,93 | 156 | 5,99 | 4300 | 3800 | **3316** |
| **85** | 150 | 49,2 | - | 126,48 | 110 | 4,39 | 4500 | 3800 | **3217** |
| | 180 | 73 | - | 212,16 | 176 | 6,55 | 4000 | 3600 | **3317** |
| **90** | 160 | 52,4 | - | 131,3 | 120 | 4,55 | 4300 | 3600 | **3218** |
| | 190 | 73 | - | 212,16 | 180 | 6,40 | 3800 | 3400 | **3318** |
| **95** | 170 | 55,6 | - | 159 | 146 | 5,4 | 4000 | 3400 | **3219** |
| | 200 | 77,8 | - | 240,6 | 216 | 7,5 | 3600 | 3200 | **3319** |
| **100** | 170 | 60,3 | - | 132,3 | 144 | 5,81 | 2600 | 2900 | **305397** |
| | 180 | 60,3 | - | 178,2 | 166 | 6,01 | 3800 | 3200 | **3220** |
| | 215 | 82,6 | - | 260,1 | 255 | 8,65 | 3400 | 2800 | **3320** |
| **110** | 200 | 69,8 | - | 214,12 | 213 | 7,17 | 3400 | 2800 | **3222** |
| | 240 | 92,1 | - | 293,91 | 305 | 9,803 | 3000 | 2600 | **3322** |
| **120** | 190 | 66 | - | 190 | 236 | 7,87 | 2700 | 3200 | **309733** |

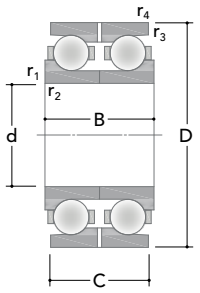

DBA


$DB_1$

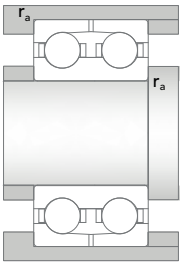

$DB_2$


DF

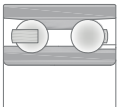
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 60 | 1,5 | 1,5 | 1,5 | 1,5 | 1,2 | 3212 |
| | 2,1 | 2,1 | 2 | 2 | 2,8 | 3312 |
| 65 | 1,5 | 1,5 | 1,5 | 1,5 | 1,75 | 3213 |
| 70 | 1,5 | 1,5 | 1,5 | 1,5 | 1,9 | 3214 |
| | 2,1 | 2,1 | 2 | 2 | 5,05 | 3314 |
| 75 | 1,5 | 1,5 | 1,5 | 1,5 | 2,1 | 3215 |
| | 2,1 | 2,1 | 2 | 2 | 5,55 | 3315 |
| 80 | 2 | 2 | 2 | 2 | 2,65 | 3216 |
| | 2,1 | 2,1 | 2 | 2 | 6,8 | 3316 |
| 85 | 2 | 2 | 2 | 2 | 3,4 | 3217 |
| | 3 | 3 | 2,5 | 2,5 | 8,3 | 3317 |
| 90 | 2 | 2 | 2 | 2 | 4,15 | 3218 |
| | 3 | 3 | 2,5 | 2,5 | 9,25 | 3318 |
| 95 | 2,1 | 2,1 | 2 | 2 | 5 | 3219 |
| | 3 | 3 | 2,5 | 2,5 | 11 | 3319 |
| 100 | 2,1 | 2,1 | 2 | 2 | 5,35 | 305397 |
| | 2,1 | 2,1 | 2 | 2 | 6,1 | 3220 |
| | 3 | 3 | 2,5 | 2,5 | 13,5 | 3320 |
| 110 | 2,1 | 2,1 | 2 | 2 | 8,8 | 3222 |
| | 3 | 3 | 2,5 | 2,5 | 19 | 3322 |
| 120 | 2 | 2 | 2 | 2 | 6,6 | 309733 |

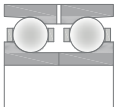


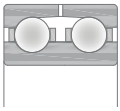

DB3



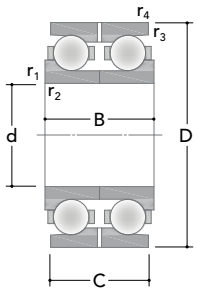

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **140** | 209,5 | 66 | - | 181,6 | 248 | 7,94 | 2600 | 2500 | **309515** |
| **150** | 225 | 73 | - | 191 | 273 | 7,73 | 1500 | 1800 | **305286** |
| | 230 | 70 | - | 200,97 | 285 | 9 | 2200 | 2700 | **305283** |
| | 240 | 84 | - | 253,51 | 335 | 10,25 | 2100 | 2700 | **305248** |
| **160** | 215 | 56 | 50 | 137,7 | 216 | 6,68 | 2200 | 2700 | **305608** |
| | 240 | 76 | - | 231,66 | 331 | 9,88 | 2000 | 2600 | **305183** |
| **170** | 260 | 84 | - | 281 | 399 | 11,43 | 1800 | 2400 | **305180** |
| **175** | 280 | 92 | - | 300,9 | 452 | 12,62 | 1900 | 2300 | **305351** |
| **180** | 250 | 70 | - | 194 | 281 | 8,53 | 1800 | 2400 | **305288** |
| | 250 | 70 | - | 186,2 | 282 | 8,56 | 1800 | 2300 | **305455** |
| | 259,5 | 66 | - | 257 | 396 | 11,24 | 1800 | 2400 | **305262** |
| | 280 | 92 | - | 322,19 | 479 | 13,37 | 1900 | 2400 | **305172** |
| **190** | 255 | 66 | 58 | 174,4 | 283 | 8,59 | 1900 | 2400 | **305609** |
| | 269,5 | 66 | - | 267,3 | 415 | 11,6 | 1700 | 2300 | **305338** |
| | 290 | 92 | - | 328,3 | 510 | 13,7 | 1800 | 2400 | **305178** |
| **200** | 279,5 | 76 | - | 246,8 | 374 | 10,24 | 1700 | 2100 | **305428** |
| | 280 | 76 | - | 239,58 | 360 | 9,85 | 1700 | 2100 | **305237** |
| | 280 | 80 | - | 239,58 | 376 | 10,29 | 1700 | 2200 | **305393** |
| | 289,5 | 76 | - | 294 | 468 | 12,71 | 1600 | 2000 | **305263** |
| | 310 | 96 | - | 365,2 | 551 | 14,76 | 1800 | 2400 | **305352** |
| **220** | 300 | 76 | 70 | 262,6 | 442 | 11,59 | 1500 | 2000 | **305610** |
| | 309,5 | 76 | - | 318,2 | 518 | 13,35 | 1500 | 1800 | **305272** |
| **230** | 329,5 | 80 | - | 351 | 592 | 15,1 | 1400 | 1800 | **305264** |


DBA

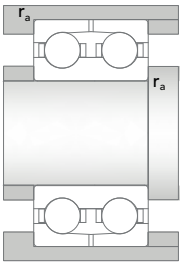

DB2


DF

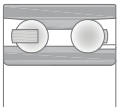
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 140 | 2 | 2 | 2 | 2 | 7,4 | 309515 |
| 150 | 2 | 2 | 2 | 2 | 9,5 | 305286 |
| | 2 | 2 | 2 | 2 | 10 | 305283 |
| | 2,1 | 2,1 | 2 | 2 | 16 | 305248 |
| 160 | 2 | 1,1 | 2 | 1 | 5,45 | 305608 |
| | 2,1 | 2,1 | 2 | 2 | 11 | 305183 |
| 170 | 2 | 2 | 2 | 2 | 15 | 305180 |
| 175 | 2,1 | 2,1 | 2 | 2 | 21 | 305351 |
| 180 | 2 | 2 | 2 | 2 | 10 | 305288 |
| | 2 | 2 | 2 | 2 | 9,95 | 305455 |
| | 2,1 | 2,1 | 2 | 2 | 11 | 305262 |
| | 2,1 | 2,1 | 2 | 2 | 21,9 | 305172 |
| 190 | 1,5 | 1,1 | 1,5 | 1 | 9 | 305609 |
| | 2,1 | 2,1 | 2 | 2 | 11 | 305338 |
| | 2,1 | 2,1 | 2 | 2 | 20,5 | 305178 |
| 200 | 2,1 | 2,1 | 2 | 2 | 13 | 305428 |
| | 2,1 | 2,1 | 2 | 2 | 12,5 | 305237 |
| | 2,1 | 2,1 | 2 | 2 | 14,5 | 305393 |
| | 2,1 | 2,1 | 2 | 2 | 15,5 | 305263 |
| | 3 | 3 | 2,5 | 2,5 | 25,5 | 305352 |
| 220 | 2 | 1,1 | 2 | 1 | 14,5 | 305610 |
| | 2,1 | 2,1 | 2 | 2 | 17 | 305272 |
| 230 | 2,1 | 2,1 | 2 | 2 | 21 | 305264 |

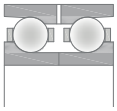


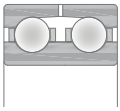

DB3



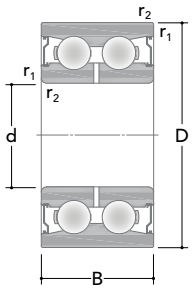

| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **250** | 340 | 76 | 70 | 325,4 | 566 | 14,2 | 1400 | 1800 | **305611** |
| **260** | 369,5 | 92 | - | 397 | 696 | 16,96 | 1200 | 1500 | **305270** |
| | 400 | 130 | - | 431,6 | 727 | 17,11 | 1200 | 1500 | **305174** |
| **280** | 389,5 | 92 | - | 398,97 | 747 | 17,93 | 1200 | 1500 | **305269** |
| **650** | 780 | 84 | - | 540 | 1730 | 27,52 | 490 | 600 | **309984** |
| **900** | 1030 | 135 | - | 669,2 | 2510 | 33,96 | 330 | 400 | **311631** |
| **1000** | 1170 | 140 | - | 815,4 | 3170 | 41,11 | 280 | 400 | **311495** |


DBA

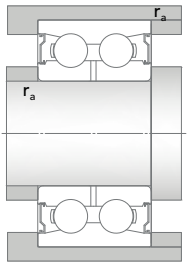

DB2


DF

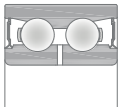
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **250** | 2,1 | 1,5 | 2 | 1,5 | 19 | **305611** |
| **260** | 2,1 | 2,1 | 2 | 2 | 30 | **305270** |
| | 4 | 4 | 3 | 3 | 56 | **305174** |
| **280** | 2,1 | 2,1 | 2 | 2 | 31,5 | **305269** |
| **650** | 4 | 2,1 | 3 | 2 | 81 | **309984** |
| **900** | 5 | 4 | 4 | 3 | 150 | **311631** |
| **1000** | 5 | 2,5 | 4 | 2 | 255 | **311495** |




DB/ZZ

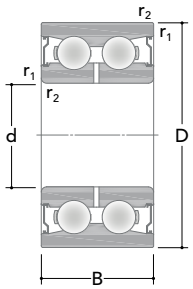



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Limiting speed | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Bearing featuring shields | seals | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **10** | 30 | 14,3 | 7,76 | 4,30 | 0,183 | 24000 | 17000 | **3200** |
| **12** | 32 | 15,9 | 10,3 | 5,61 | 0,24 | 22000 | 15000 | **3201** |
| **15** | 35 | 15,9 | 11,42 | 6,8 | 0,285 | 18000 | 14000 | **3202** |
| | 42 | 19 | 15,4 | 9,3 | 0,4 | 16000 | 12000 | **3302** |
| **17** | 40 | 17,5 | 14,3 | 8,8 | 0,37 | 16000 | 12000 | **3203** |
| | 47 | 22,2 | 21,82 | 12,7 | 0,54 | 14000 | 11000 | **3303** |
| **20** | 47 | 20,6 | 20,8 | 12,9 | 0,55 | 14000 | 10000 | **3204** |
| | 52 | 22,2 | 23,6 | 14,6 | 0,61 | 13000 | 9000 | **3304** |
| **25** | 52 | 20,6 | 21,6 | 14,3 | 0,59 | 12000 | 8500 | **3205** |
| | 62 | 25,4 | 32,60 | 20,4 | 0,865 | 11000 | 7500 | **3305** |
| **30** | 62 | 23,8 | 30,3 | 20,4 | 0,86 | 10000 | 7500 | **3206** |
| | 72 | 30,2 | 42,53 | 30,4 | 1,26 | 9000 | 6300 | **3306** |
| **35** | 72 | 27 | 40,4 | 28,0 | 1,18 | 9000 | 6300 | **3207** |
| | 80 | 34,9 | 52,5 | 35,5 | 1,5 | 8500 | 6000 | **3307** |
| **40** | 80 | 30,2 | 48,5 | 36,5 | 1,56 | 8000 | 5600 | **3208** |
| | 90 | 36,5 | 65,3 | 44 | 1,86 | 7500 | 5000 | **3308** |
| **45** | 85 | 30,2 | 52 | 39 | 1,63 | 7500 | 5300 | **3209** |
| | 100 | 39,7 | 75 | 53 | 2,24 | 6700 | 4800 | **3309** |
| **50** | 90 | 30,2 | 51 | 42,5 | 1,80 | 7000 | 4800 | **3210** |
| | 110 | 44,4 | 90,1 | 64,1 | 2,75 | 6000 | 4300 | **3310** |
| **55** | 100 | 33,3 | 60,6 | 47,9 | 1,99 | 6300 | 4500 | **3211** |
| | 120 | 49,2 | 112 | 81,5 | 3,45 | 5300 | 3800 | **3311** |

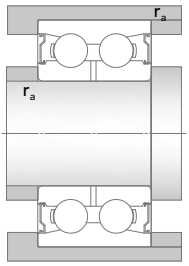


DB/2RS

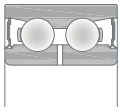
| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| 10 | 0,6 | 0,6 | 0,051 | 3200 ZZ | 3200 2RS |
| 12 | 0,6 | 0,6 | 0,058 | 3201 ZZ | 3201 2RS |
| 15 | 0,6 | 0,6 | 0,066 | 3202 ZZ | 3202 2RS |
| | 1 | 1 | 0,13 | 3302 ZZ | 3302 2RS |
| 17 | 0,6 | 0,6 | 0,1 | 3203 ZZ | 3203 2RS |
| | 1 | 1 | 0,18 | 3303 ZZ | 3303 2RS |
| 20 | 1 | 1 | 0,16 | 3204 ZZ | 3204 2RS |
| | 1,1 | 1 | 0,22 | 3304 ZZ | 3304 2RS |
| 25 | 1 | 1 | 0,18 | 3205 ZZ | 3205 2RS |
| | 1,1 | 1 | 0,35 | 3305 ZZ | 3305 2RS |
| 30 | 1 | 1 | 0,29 | 3206 ZZ | 3206 2RS |
| | 1,1 | 1 | 0,52 | 3306 ZZ | 3306 2RS |
| 35 | 1,1 | 1 | 0,44 | 3207 ZZ | 3207 2RS |
| | 1,5 | 1,5 | 0,74 | 3307 ZZ | 3307 2RS |
| 40 | 1,1 | 1 | 0,57 | 3208 ZZ | 3208 2RS |
| | 1,5 | 1,5 | 0,93 | 3308 ZZ | 3308 2RS |
| 45 | 1,1 | 1 | 0,63 | 3209 ZZ | 3209 2RS |
| | 1,5 | 1,5 | 1,25 | 3309 ZZ | 3309 2RS |
| 50 | 1,1 | 1 | 0,65 | 3210 ZZ | 3210 2RS |
| | 2 | 2 | 1,7 | 3310 ZZ | 3310 2RS |
| 55 | 1,5 | 1,5 | 0,91 | 3211 ZZ | 3211 2RS |
| | 2 | 2 | 2,65 | 3311 ZZ | 3311 2RS |




DB/ZZ




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Limiting speed | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Bearing featuring shields | seals | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **60** | 110 | 36,5 | 74,2 | 58,5 | 2,50 | 5600 | 4000 | **3212** |
| | 130 | 54 | 127,73 | 95 | 4,05 | 5000 | - | **3312** |
| **65** | 120 | 38,1 | 82,2 | 73,5 | 3,1 | 4800 | 3600 | **3213** |
| **70** | 125 | 39,7 | 90,2 | 80 | 3,39 | 4500 | - | **3214** |
| | 150 | 63,5 | 163 | 125 | 5 | 4300 | - | **3314** |
| **75** | 130 | 41,3 | 96,6 | 88 | 3,75 | 4500 | - | **3215** |
| | 160 | 68,3 | 179,5 | 140 | 5,5 | 4000 | - | **3315** |



DB/2RS

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Bearing sealed on | |
| | | | | both sides | one side |
| [mm] | | | [kg] | | |
| **60** | 1,5 | 1,5 | 1,2 | **3212 ZZ** | **3212 2RS** |
| | 2,1 | 2 | 2,8 | **3312 ZZ** | - |
| **65** | 1,5 | 1,5 | 1,75 | **3213 ZZ** | **3213 2RS** |
| **70** | 1,5 | 1,5 | 1,9 | **3214 ZZ** | - |
| | 2,1 | 2 | 5,05 | **3314 ZZ** | - |
| **75** | 1,5 | 1,5 | 2,1 | **3215 ZZ** | - |
| | 2,1 | 2 | 5,6 | **3315 ZZ** | - |

# Four-point contact ball bearings

Four-point contact ball bearings are single row angular contact ball bearings featuring raceways designed to accommodate thrust loads acting in both directions. However radial loads can be partially supported up to a proportional value of axial load. This kind of bearing requires less space in axial direction than double row bearings.

Normally single row four-point contact ball bearings supporting thrust load in both direction are mounted together with another pure radial bearigs. In this case the four-point contact ball bearings are mounted with radial clearance in the housing and they act as pure thrust bearings.



Four-point contact ball bearings

## Misalignment

Four-point contact ball bearings can compensate partially the misalignments. This property is strictly connected with the residual internal clearance in operation, as well as tilting moments applied on the bearing.

However misalignments increase the noise during rotation and reduce the service life of the bearing.

## Minimum load

In order to operate properly four-point contact ball bearings have to be subject to a minimum axial load. The requested value should prevent a higher level of friction as well as assure the contact among rolling elements and raceways only in one point.

According to these concepts the minimum axial load can be theoretically estimated as follows:

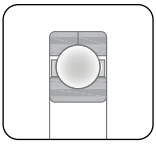
$$\frac{F_{am}}{F_r} > 1,25$$

where:

- $F_{am}$ minimum axial load, [kN];
- $F_r$ radial dynamic bearing load, [kN].

## Designs and variants

### Type Q

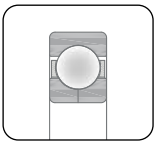


HB BAINITE HT

S STABILIZATION

- Two-piece outer ring circumferentially split
- One-piece inner ring
- One-piece machined brass cage guided on inner ring (MB)
- Supports mainly axial loads
- Two locating slots (N2)

### Type QJ



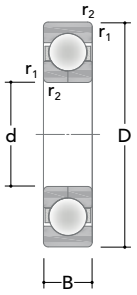
HB BAINITE HT

S STABILIZATION

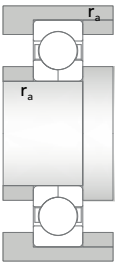
- One-piece outer ring
- Two-piece inner ring circumferentially split
- One-piece machined brass cage guided on outer ring (MA)
- Supports mainly axial loads
- Two locating slots (N2)

| Suffixes | Cage |
|---|---|
| MA | Machined brass cage guided on outer ring |
| MB | Machined brass cage guided on inner ring |

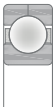
| Suffixes | External design |
|---|---|
| N1 | One locating slot in outer ring |
| N2 | Two locating slots in outer ring |




QJ

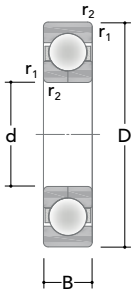



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **15** | 35 | 11 | 12,7 | 8,30 | 0,355 | | 36000 | **QJ 202** |
| **17** | 40 | 12 | 17,17 | 11,40 | 0,48 | | 30000 | **QJ 203** |
| | 47 | 14 | 23,87 | 15,00 | 0,64 | | 24000 | **QJ 303** |
| **20** | 52 | 15 | 32,36 | 21,60 | 0,93 | | 24000 | **QJ 304** |
| **25** | 52 | 15 | 27,10 | 21,20 | 0,89 | | 22000 | **QJ 205** |
| | 62 | 17 | 42,93 | 30,0 | 1,27 | | 20000 | **QJ 305** |
| **30** | 62 | 16 | 37,75 | 30,50 | 1,29 | | 19000 | **QJ 206** |
| | 72 | 19 | 53 | 41,50 | 1,76 | | 17000 | **QJ 306** |
| **35** | 72 | 17 | 49,02 | 41,50 | 1,76 | | 17000 | **QJ 207** |
| | 80 | 21 | 64,64 | 51,00 | 2,16 | | 15000 | **QJ 307** |
| **40** | 80 | 18 | 56,54 | 49,06 | 2,08 | | 15000 | **QJ 208** |
| | 90 | 23 | 79,56 | 64,00 | 2,70 | | 14000 | **QJ 308** |
| **45** | 85 | 19 | 63,0 | 56,0 | 2,35 | | 14000 | **QJ 209** |
| | 100 | 25 | 102 | 83,00 | 3,55 | | 12000 | **QJ 309** |
| **50** | 90 | 20 | 65,5 | 61,0 | 2,59 | | 13000 | **QJ 210** |
| | 110 | 27 | 118 | 100,00 | 4,25 | | 11000 | **QJ 310** |
| **55** | 100 | 21 | 85 | 83,00 | 3,55 | | 11000 | **QJ 211** |
| | 120 | 29 | 138,37 | 118,00 | 4,99 | | 10000 | **QJ 311** |
| **60** | 110 | 22 | 96,54 | 93,50 | 3,99 | | 10000 | **QJ 212** |
| | 130 | 31 | 156 | 137,00 | 5,85 | | 9000 | **QJ 312** |
| **65** | 120 | 23 | 111,1 | 112,00 | 4,75 | | 9500 | **QJ 213** |
| | 140 | 33 | 176,24 | 156,00 | 6,55 | | 8500 | **QJ 313** |

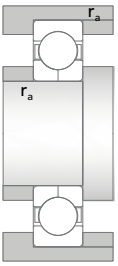


QJ

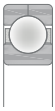
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **15** | 0,6 | 0,6 | 0,062 | **QJ 202** |
| **17** | 0,6 | 0,6 | 0,082 | **QJ 203** |
| | 1 | 1 | 0,14 | **QJ 303** |
| **20** | 1,1 | 1 | 0,18 | **QJ 304** |
| **25** | 1 | 1 | 0,16 | **QJ 205** |
| | 1,1 | 1 | 0,29 | **QJ 305** |
| **30** | 1 | 1 | 0,24 | **QJ 206** |
| | 1,1 | 1 | 0,42 | **QJ 306** |
| **35** | 1,1 | 1 | 0,35 | **QJ 207** |
| | 1,5 | 1,5 | 0,57 | **QJ 307** |
| **40** | 1,1 | 1 | 0,45 | **QJ 208** |
| | 1,5 | 1,5 | 0,78 | **QJ 308** |
| **45** | 1,1 | 1 | 0,52 | **QJ 209** |
| | 1,5 | 1,5 | 1,05 | **QJ 309** |
| **50** | 1,1 | 1 | 0,59 | **QJ 210** |
| | 2 | 2 | 1,35 | **QJ 310** |
| **55** | 1,5 | 1,5 | 0,77 | **QJ 211** |
| | 2 | 2 | 1,75 | **QJ 311** |
| **60** | 1,5 | 1,5 | 0,99 | **QJ 212** |
| | 2,1 | 2 | 2,15 | **QJ 312** |
| **65** | 1,5 | 1,5 | 1,2 | **QJ 213** |
| | 2,1 | 2 | 2,7 | **QJ 313** |




QJ

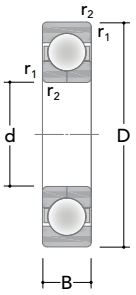



| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **70** | 125 | 24 | 120,6 | 122,00 | 5,20 | | 9000 | QJ 214 |
| | 150 | 35 | 202 | 180,00 | 7,35 | | 8000 | QJ 314 |
| **75** | 130 | 25 | 125 | 132,00 | 5,60 | | 8500 | QJ 215 |
| | 160 | 37 | 218,16 | 200,00 | 7,79 | | 7500 | QJ 315 |
| **80** | 140 | 26 | 147,46 | 156,00 | 6,39 | | 8000 | QJ 216 |
| | 170 | 39 | 232 | 228,00 | 8,65 | | 7000 | QJ 316 |
| **85** | 150 | 28 | 156,88 | 173,00 | 6,69 | | 7500 | QJ 217 |
| | 180 | 41 | 252,5 | 255,00 | 8,65 | | 6700 | QJ 317 |
| **90** | 160 | 30 | 186,14 | 200,00 | 7,65 | | 7000 | QJ 218 |
| | 190 | 43 | 285,15 | 305,00 | 10,99 | | 6300 | QJ 318 |
| **95** | 170 | 32 | 212,88 | 232,00 | 8,50 | | 6700 | QJ 219 |
| | 200 | 45 | 308,05 | 340,00 | 11,79 | | 6000 | QJ 319 |
| **100** | 150 | 24 | 104,94 | 133,00 | 5,06 | | 6300 | QJ 1020 |
| | 180 | 34 | 236,28 | 265,00 | 9,49 | | 6300 | QJ 220 |
| | 215 | 47 | 348,45 | 400,00 | 13,69 | | 5600 | QJ 320 |
| **105** | 160 | 26 | 135 | 170,00 | 5,71 | - | 6000 | QJ 1021 |
| | 190 | 36 | 237,16 | 265,00 | 9,32 | - | 4400 | QJ 221 |
| **110** | 170 | 28 | 151,47 | 196,9 | 6,45 | - | 5700 | QJ 1022 |
| | 200 | 38 | 280,2 | 325,0 | 11,20 | | 5600 | QJ 222 |
| | 240 | 50 | 390 | 480,00 | 15,29 | | 4800 | QJ 322 |
| **120** | 180 | 28 | 146,52 | 195,00 | 6,77 | - | 4400 | QJ 1024 |
| | 215 | 40 | 300 | 365,00 | 11,99 | | 5000 | QJ 224 |
| | 260 | 55 | 415 | 530,00 | 16,30 | | 4500 | QJ 324 |

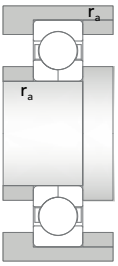


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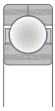
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **70** | 1,5 | 1,5 | 1,3 | **QJ 214** |
| | 2,1 | 2 | 3,15 | **QJ 314** |
| **75** | 1,5 | 1,5 | 1,45 | **QJ 215** |
| | 2,1 | 2 | 3,9 | **QJ 315** |
| **80** | 2 | 2 | 1,85 | **QJ 216** |
| | 2,1 | 2 | 4,6 | **QJ 316** |
| **85** | 2 | 2 | 2,25 | **QJ 217** |
| | 3 | 2,5 | 5,45 | **QJ 317** |
| **90** | 2 | 2 | 2,75 | **QJ 218** |
| | 3 | 2,5 | 6,45 | **QJ 318** |
| **95** | 2,1 | 2 | 3,35 | **QJ 219** |
| | 3 | 2,5 | 7,45 | **QJ 319** |
| **100** | 1,5 | 1,52 | 1,6 | **QJ 1020** |
| | 2,1 | 2 | 4,05 | **QJ 220** |
| | 3 | 2 | 9,3 | **QJ 320** |
| **105** | 2 | 2 | 2 | **QJ 1021** |
| | 2,1 | 2 | 4,8 | **QJ 221** |
| **110** | 2 | 2 | 2,5 | **QJ 1022** |
| | 2,1 | 2 | 5,6 | **QJ 222** |
| | 3 | 2,5 | 12,5 | **QJ 322** |
| **120** | 2 | 2 | 2,65 | **QJ 1024** |
| | 2,1 | 2 | 6,95 | **QJ 224** |
| | 3 | 2,5 | 16 | **QJ 324** |




QJ

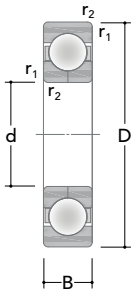



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **130** | 200 | 33 | 178,36 | 238,0 | 7,74 | - | 4300 | **QJ 1026** |
| | 230 | 40 | 310,8 | 400,0 | 12,69 | | 4800 | **QJ 226** |
| | 280 | 58 | 455 | 610,0 | 17,99 | | 4000 | **QJ 326** |
| **140** | 210 | 22 | 122,21 | 162,0 | 5,17 | - | 4300 | **305647** |
| | 210 | 33 | 191,9 | 264,00 | 8,47 | - | 4400 | **QJ 1028** |
| | 250 | 42 | 345,55 | 475,00 | 14,30 | | 4300 | **QJ 228** |
| | 300 | 62 | 500 | 695,00 | 19,99 | | 3800 | **QJ 328** |
| **150** | 225 | 35 | 239,58 | 341,7 | 9,34 | - | 4100 | **QJ 1030** |
| | 270 | 45 | 400 | 570,0 | 16,60 | | 4000 | **QJ 230** |
| | 320 | 65 | 535,3 | 765,0 | 21,20 | | 3600 | **QJ 330** |
| **160** | 240 | 38 | 270 | 372,4 | 10,5 | - | 3800 | **QJ 1032** |
| | 290 | 48 | 450 | 670 | 18,99 | | 3800 | **QJ 232** |
| | 340 | 68 | 570 | 880,0 | 23,60 | | 3400 | **QJ 332** |
| **170** | 260 | 42 | 288,86 | 404,00 | 11,77 | - | 3300 | **QJ 1034** |
| | 310 | 52 | 455,9 | 720,00 | 19,99 | | 3400 | **QJ 234** |
| | 360 | 72 | 661,55 | 1040,0 | 26,90 | | 3200 | **QJ 334** |
| **180** | 280 | 46 | 334,62 | 509,0 | 14,27 | - | 3000 | **QJ 1036** |
| | 320 | 52 | 475 | 765,0 | 20,80 | | 3400 | **QJ 236** |
| | 380 | 75 | 680 | 1100,0 | 28,00 | | 3000 | **QJ 336** |
| **190** | 290 | 46 | 344,76 | 500,00 | 13,73 | | 3100 | **QJ 1038** |
| | 340 | 55 | 520,2 | 850,0 | 22,42 | | 3200 | **QJ 238** |
| | 400 | 78 | 703,96 | 1160,4 | 28,5 | | 2800 | **QJ 338** |
| **200** | 250 | 24 | 77,71 | 137,0 | 3,9 | - | 3000 | **305419** |
| | 310 | 51 | 397,8 | 616,0 | 16,49 | | 3000 | **QJ 1040** |
| | 360 | 58 | 540 | 915,0 | 23,19 | | 3000 | **QJ 240** |
| | 360 | 70 | 530,4 | 863,00 | 21,55 | - | 2800 | **QJ 1240** |

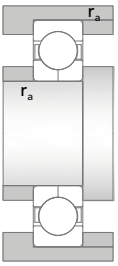


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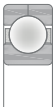
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **130** | 2 | 2 | 4,05 | **QJ 1026** |
| | 3 | 2,5 | 7,75 | **QJ 226** |
| | 4 | 3 | 19,5 | **QJ 326** |
| **140** | 1,1 | 1 | 2,6 | **305647** |
| | 2 | 2 | 4,3 | **QJ 1028** |
| | 3 | 2,5 | 9,85 | **QJ 228** |
| | 4 | 3 | 24 | **QJ 328** |
| **150** | 2,1 | 2 | 5,25 | **QJ 1030** |
| | 3 | 2,5 | 12,5 | **QJ 230** |
| | 4 | 3 | 29 | **QJ 330** |
| **160** | 2,1 | 2 | 6,45 | **QJ 1032** |
| | 3 | 2,5 | 15,5 | **QJ 232** |
| | 4 | 3 | 34,5 | **QJ 332** |
| **170** | 2,1 | 2 | 8,6 | **QJ 1034** |
| | 4 | 3 | 19,5 | **QJ 234** |
| | 4 | 3 | 41,5 | **QJ 334** |
| **180** | 2,1 | 2 | 11 | **QJ 1036** |
| | 4 | 3 | 20,5 | **QJ 236** |
| | 4 | 3 | 47,5 | **QJ 336** |
| **190** | 2,1 | 2 | 11,5 | **QJ 1038** |
| | 4 | 3 | 23,5 | **QJ 238** |
| | 5 | 4 | 49 | **QJ 338** |
| **200** | 0,5 | 0,5 | 2,5 | **305419** |
| | 2,1 | 2 | 15 | **QJ 1040** |
| | 4 | 3 | 28,5 | **QJ 240** |
| | 4 | 3 | 32,5 | **QJ 1240** |




QJ

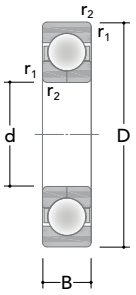



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **220** | 270 | 24 | 111 | 192,0 | 5,17 | - | 3000 | **305976** |
| | 340 | 56 | 450,84 | 736,0 | 18,65 | 1700 | 2800 | **QJ 1044** |
| | 400 | 65 | 547,47 | 979,0 | 23,58 | - | 2300 | **QJ 244** |
| | 400 | 78 | 580,16 | 1000,0 | 24,02 | - | 2400 | **QJ 1244** |
| | 460 | 88 | 780 | 1390,0 | 31,77 | - | 2200 | **QJ 344** |
| **240** | 360 | 56 | 449 | 772,00 | 19,1 | 1600 | 2200 | **QJ 1048** |
| | 440 | 72 | 663 | 1180,0 | 27,04 | - | 2100 | **QJ 248** |
| | 440 | 85 | 656,37 | 1200,0 | 27,54 | - | 2200 | **QJ 1248** |
| **260** | 360 | 46 | 382,2 | 709,0 | 16,98 | - | 2200 | **QJ 1952** |
| | 400 | 65 | 540 | 996,0 | 23,11 | - | 2100 | **QJ 1052** |
| | 480 | 80 | 728 | 1420,0 | 31,78 | - | 2100 | **QJ 252** |
| | 480 | 90 | 748,41 | 1450,00 | 31,78 | - | 2000 | **QJ 1252** |
| **280** | 420 | 65 | 573,3 | 1151,4 | 23,26 | 1500 | 2100 | **QJ 1056** |
| | 500 | 90 | 728 | 1450,0 | 31,28 | - | 1800 | **QJ 1256** |
| **300** | 460 | 74 | 709,02 | 1415,7 | 28,83 | 1500 | 2000 | **QJ 1060** |
| | 540 | 98 | 848,64 | 1730,0 | 35,88 | - | 1800 | **QJ 1260** |
| **320** | 480 | 74 | 722,15 | 1545,30 | 29,07 | 1300 | 1800 | **QJ 1064** |
| | 580 | 105 | 975,12 | 2100,80 | 40,5 | - | 1500 | **QJ 1264** |
| **335** | 450 | 56 | 566,28 | 1210,0 | 25,79 | - | 1700 | **309941** |
| **340** | 520 | 82 | 787,8 | 1670,0 | 34,87 | 1100 | 1600 | **QJ 1068** |
| | 620 | 118 | 1060 | 2410,0 | 46,72 | - | 1500 | **QJ 1268** |
| **360** | 540 | 82 | 869,04 | 1911 | 35,05 | 900 | 1500 | **QJ 1072** |
| | 650 | 122 | 1121,1 | 2560,0 | 48,25 | - | 1400 | **QJ 1272** |
| **380** | 560 | 82 | 901,68 | 2060,4 | 36,67 | 900 | 1400 | **QJ 1076** |

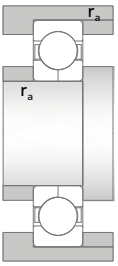


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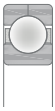
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **220** | 1,5 | 1 | 3 | **305976** |
| | 3 | 2,5 | 19,5 | **QJ 1044** |
| | 4 | 3 | 39,5 | **QJ 244** |
| | 4 | 3 | 45,5 | **QJ 1244** |
| | 5 | 4 | 78 | **QJ 344** |
| **240** | 3 | 2,5 | 21 | **QJ 1048** |
| | 4 | 3 | 53,2 | **QJ 248** |
| | 4 | 3 | 61 | **QJ 1248** |
| **260** | 2,1 | 2 | 15 | **QJ 1952** |
| | 4 | 3 | 31,5 | **QJ 1052** |
| | 5 | 4 | 68 | **QJ 252** |
| | 5 | 4 | 78,5 | **QJ 1252** |
| **280** | 4 | 3 | 33,5 | **QJ 1056** |
| | 5 | 4 | 82 | **QJ 1256** |
| **300** | 4 | 3 | 47,5 | **QJ 1060** |
| | 5 | 4 | 105 | **QJ 1260** |
| **320** | 5 | 3 | 50 | **QJ 1064** |
| | 5 | 4 | 130 | **QJ 1264** |
| **335** | 3 | 2,5 | 27 | **309941** |
| **340** | 5 | 4 | 67,5 | **QJ 1068** |
| | 6 | 5 | 165 | **QJ 1268** |
| **360** | 5 | 4 | 70,5 | **QJ 1072** |
| | 6 | 5 | 190 | **QJ 1272** |
| **380** | 5 | 4 | 72,5 | **QJ 1076** |




QJ




| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **380** | 680 | 132 | 1170 | 2820,0 | 51,45 | - | 1300 | **QJ 1276** |
| (cont.) | | | | | | | | |
| **400** | 600 | 90 | 913,04 | 2120,0 | 39,75 | 900 | 1400 | **QJ 1080** |
| | 720 | 140 | 1313 | 3190 | 57,42 | - | 1200 | **QJ 1280** |
| **420** | 560 | 65 | 624,26 | 1632,0 | 29,74 | - | 1500 | **QJ 1984** |
| | 620 | 90 | 923 | 2250,0 | 41,94 | 800 | 1400 | **QJ 1084** |
| | 760 | 150 | 1415,7 | 3675,0 | 62,63 | - | 1200 | **QJ 1284** |
| **440** | 600 | 74 | 753,39 | 1870,0 | 34,94 | - | 1400 | **QJ 1988** |
| | 650 | 94 | 985,05 | 2470,0 | 44,95 | 700 | 1300 | **QJ 1088** |
| | 790 | 155 | 1372 | 3690 | 62,98 | - | 1100 | **QJ 1288** |
| **460** | 680 | 100 | 1029,6 | 2600,0 | 45,62 | 700 | 1200 | **QJ 1092** |
| | 830 | 165 | 1560,6 | 4240,0 | 69,34 | - | 1000 | **QJ 1292** |
| **480** | 700 | 100 | 1081,2 | 2800,0 | 46,97 | 700 | 1200 | **QJ 1096** |
| | 870 | 170 | 1713,6 | 4680,0 | 75,37 | - | 1000 | **QJ 1296** |



Q

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **380** | 6 | 5 | 220 | **QJ 1276** |
| (cont.) | | | | |
| **400** | 5 | 4 | 95 | **QJ 1080** |
| | 6 | 5 | 265 | **QJ 1280** |
| **420** | 4 | 3 | 51 | **QJ 1984** |
| | 5 | 4 | 99,5 | **QJ 1084** |
| | 7,5 | 6 | 315 | **QJ 1284** |
| **440** | 4 | 3 | 65 | **QJ 1988** |
| | 6 | 5 | 115 | **QJ 1088** |
| | 7,5 | 6 | 350 | **QJ 1288** |
| **460** | 6 | 5 | 130 | **QJ 1092** |
| | 7,5 | 6 | 415 | **QJ 1292** |
| **480** | 6 | 5 | 135 | **QJ 1096** |
| | 7,5 | 6 | 470 | **QJ 1296** |



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SWITZERLAND

# Cylindrical roller bearings

The cylindrical roller bearings (CRBs) manufactured by RKB are produced in many designs, dimensions and series, to withstand heavy radial loads and medium speeds, covering most of the requirements in a variety of standard and special industrial applications. All CRBs manufactured by RKB offers the highest load rating capacities, improved internal geometry, high quality materials and special heat treatments for superior performance. RKB CRBs are available with cylindrical or tapered bore in single, double or multi row configuration. Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rollers. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Single row cylindrical roller bearings

## Single row cylindrical roller bearings

RKB offers a wide range of single row cylindrical roller bearing designs in normal or reinforced execution with increased performance in critical applications. Roller and raceway profiles are designed to attain optimized stress distribution while minimizing the edge effect, especially under critical conditions. The portfolio of RKB single row CRBs is finally enhanced by the high-capacity full complement bearings (cageless), which reach higher load carrying capacities within the same boundary dimensions.

### Radial internal clearance

Single row cylindrical roller bearings are produced as standard with Normal radial clearance CN, but they are available with C2, C3, C4 and C5 radial clearance, in accordance with the ISO 5753:2009.
Bearings with special radial clearance different than ISO 5753:2009 can be manufactured on request. The radial internal clearance of cylindrical roller bearings with cylindrical bore can be found in **Tab. 1 page 215.** The radial internal clearance of cylindrical roller bearings with tapered bore can be found in **Tab. 2 page 216** and they are valid only for bearing unmounted and unloaded.

| d [mm] | | Radial internal clearance [µm] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | | C5 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. |
| - | 10 | 0 | 25 | 20 | 45 | 35 | 60 | 50 | 75 | - | - |
| 10 | 24 | 0 | 25 | 20 | 45 | 35 | 60 | 50 | 75 | 65 | 90 |
| 24 | 30 | 0 | 25 | 20 | 45 | 35 | 60 | 50 | 75 | 70 | 95 |
| 30 | 40 | 5 | 30 | 25 | 50 | 45 | 70 | 60 | 85 | 80 | 105 |
| 40 | 50 | 5 | 35 | 30 | 60 | 50 | 80 | 70 | 100 | 95 | 125 |
| 50 | 65 | 10 | 40 | 40 | 70 | 60 | 90 | 80 | 110 | 110 | 140 |
| 65 | 80 | 10 | 45 | 40 | 75 | 65 | 100 | 90 | 125 | 130 | 165 |
| 80 | 100 | 15 | 50 | 50 | 85 | 75 | 110 | 105 | 140 | 155 | 190 |
| 100 | 120 | 15 | 55 | 50 | 90 | 85 | 125 | 125 | 165 | 180 | 220 |
| 120 | 140 | 15 | 60 | 60 | 105 | 100 | 145 | 145 | 190 | 200 | 245 |
| 140 | 160 | 20 | 70 | 70 | 120 | 115 | 165 | 165 | 215 | 225 | 275 |
| 160 | 180 | 25 | 75 | 75 | 125 | 120 | 170 | 170 | 220 | 250 | 300 |
| 180 | 200 | 35 | 90 | 90 | 145 | 140 | 195 | 195 | 250 | 275 | 330 |
| 200 | 225 | 45 | 105 | 105 | 165 | 160 | 220 | 220 | 280 | 305 | 365 |
| 225 | 250 | 45 | 110 | 110 | 175 | 170 | 235 | 235 | 300 | 330 | 395 |
| 250 | 280 | 55 | 125 | 125 | 195 | 190 | 260 | 260 | 330 | 370 | 440 |
| 280 | 315 | 55 | 130 | 130 | 205 | 200 | 275 | 275 | 350 | 410 | 485 |
| 315 | 355 | 65 | 145 | 145 | 225 | 225 | 305 | 305 | 385 | 455 | 535 |
| 355 | 400 | 100 | 190 | 190 | 280 | 280 | 370 | 370 | 460 | 510 | 600 |
| 400 | 450 | 110 | 210 | 210 | 310 | 310 | 410 | 410 | 510 | 565 | 665 |
| 450 | 500 | 110 | 220 | 220 | 330 | 330 | 440 | 440 | 550 | 625 | 735 |
| 500 | 560 | 120 | 240 | 240 | 360 | 360 | 480 | 480 | 600 | - | - |
| 560 | 630 | 140 | 260 | 260 | 380 | 380 | 500 | 500 | 620 | - | - |
| 630 | 710 | 145 | 285 | 285 | 425 | 425 | 565 | 565 | 705 | - | - |
| 710 | 800 | 150 | 310 | 310 | 470 | 470 | 630 | 630 | 790 | - | - |
| 800 | 900 | 180 | 350 | 350 | 520 | 520 | 690 | 690 | 860 | - | - |
| 900 | 1000 | 200 | 390 | 390 | 580 | 580 | 770 | 770 | 960 | - | - |
| 1000 | 1120 | 220 | 430 | 430 | 640 | 640 | 850 | 850 | 1060 | - | - |
| 1120 | 1250 | 230 | 470 | 470 | 710 | 710 | 950 | 950 | 1190 | - | - |
| 1250 | 1400 | 270 | 530 | 530 | 790 | 790 | 1050 | 1050 | 1310 | - | - |
| 1400 | 1600 | 330 | 610 | 610 | 890 | 890 | 1170 | 1170 | 1450 | - | - |
| 1600 | 1800 | 380 | 700 | 700 | 1020 | 1020 | 1340 | 1340 | 1660 | - | - |
| 1800 | 2000 | 400 | 760 | 760 | 1120 | 1120 | 1480 | 1480 | 1840 | - | - |

Tab. 1 - Radial internal clearance of cylindrical roller bearings with cylindrical bore

| d [mm] | | Radial internal clearance [µm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. |
| – | 10 | 15 | 40 | 30 | 55 | 40 | 65 | 50 | 75 |
| 10 | 24 | 15 | 40 | 30 | 55 | 40 | 65 | 50 | 75 |
| 24 | 30 | 20 | 45 | 35 | 60 | 45 | 70 | 55 | 80 |
| 30 | 40 | 20 | 45 | 40 | 65 | 55 | 80 | 70 | 95 |
| 40 | 50 | 25 | 55 | 45 | 75 | 60 | 90 | 75 | 105 |
| 50 | 65 | 30 | 60 | 50 | 80 | 70 | 100 | 90 | 120 |
| 65 | 80 | 35 | 70 | 60 | 95 | 85 | 120 | 110 | 145 |
| 80 | 100 | 40 | 75 | 70 | 105 | 95 | 130 | 120 | 155 |
| 100 | 120 | 50 | 90 | 90 | 130 | 115 | 155 | 140 | 180 |
| 120 | 140 | 55 | 100 | 100 | 145 | 130 | 175 | 160 | 205 |
| 140 | 160 | 60 | 110 | 110 | 160 | 145 | 195 | 180 | 230 |
| 160 | 180 | 75 | 125 | 125 | 175 | 160 | 210 | 195 | 245 |
| 180 | 200 | 85 | 140 | 140 | 195 | 180 | 235 | 220 | 275 |
| 200 | 225 | 95 | 155 | 155 | 215 | 200 | 260 | 245 | 305 |
| 225 | 250 | 105 | 170 | 170 | 235 | 220 | 285 | 270 | 335 |
| 250 | 280 | 115 | 185 | 185 | 255 | 240 | 310 | 295 | 365 |
| 280 | 315 | 130 | 205 | 205 | 280 | 265 | 340 | 325 | 400 |
| 315 | 355 | 145 | 225 | 225 | 305 | 290 | 370 | 355 | 435 |
| 355 | 400 | 165 | 255 | 255 | 345 | 330 | 420 | 405 | 495 |
| 400 | 450 | 185 | 285 | 285 | 385 | 370 | 470 | 455 | 555 |
| 450 | 500 | 205 | 315 | 315 | 425 | 410 | 520 | 505 | 615 |
| 500 | 560 | 230 | 350 | 350 | 470 | 455 | 575 | 560 | 680 |
| 560 | 630 | 260 | 380 | 380 | 500 | 500 | 620 | 620 | 740 |
| 630 | 710 | 295 | 435 | 435 | 575 | 565 | 705 | 695 | 835 |
| 710 | 800 | 325 | 485 | 485 | 645 | 630 | 790 | 775 | 935 |
| 800 | 900 | 370 | 540 | 540 | 710 | 700 | 870 | 860 | 1 030 |
| 900 | 1 000 | 410 | 600 | 600 | 790 | 780 | 970 | 960 | 1 150 |
| 1 000 | 1 120 | 455 | 665 | 665 | 875 | 865 | 1 075 | 1 065 | 1 275 |
| 1 120 | 1 250 | 490 | 730 | 730 | 970 | 960 | 1 200 | 1 200 | 1 440 |
| 1 250 | 1 400 | 550 | 810 | 810 | 1 070 | 1 070 | 1 330 | 1 330 | 1 590 |
| 1 400 | 1 600 | 640 | 920 | 920 | 1 200 | 1 200 | 1 480 | 1 480 | 1 760 |
| 1 600 | 1 800 | 700 | 1 020 | 1 020 | 1 340 | 1 340 | 1 660 | 1 660 | 1 980 |
| 1 800 | 2 000 | 760 | 1 120 | 1 120 | 1 480 | 1 480 | 1 840 | 1 840 | 2 200 |

Tab. 2 - Radial internal clearance of cylindrical roller bearings with tapered bore

## Misalignment

The permissible misalignment between the shaft and the seat of a single row cylindrical roller bearing is restricted to a few minutes of arc. In particular we can theoretically estimate:

- 4 minutes of arc for bearings in the 10, 12, 2, 3 and 4 series;
- 3 minutes of arc for bearings in the 18, 19, 20, 22 and 23 series.

These values are applied for the non-locating bearings, if the shaft and housing axes remain unchanged. Larger values of misalignment may be used, but with negative consequences regarding the bearing life. When the bearings are used in locating position, the permissible misalignments have to be reduced since an axial load in the bearing rib may generate heavy wear or a crack of the rib.

Bearing type NUP and NJ with HJ angle ring have two ribs on the inner ring and two ribs on the outer ring with a relatively small axial displacement. For this reason it is not possible to apply the permissible misalignment values given in the guideline since an axial stress may be generated, causing a premature failure of the bearing. For additional information, please consult the RKB application engineering service.

## Axial displacement

RKB cylindrical roller bearing NU, N and NJ design allow axial displacement of the shaft with respect to the housing in order to withstand thermal gradient of temperature that may lead to axial movement.

## Minimum load

A minimum radial load is requested for single row cylindrical roller bearings to allow the correct functioning, especially in critical working conditions like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions, a skidding between rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Assuming a continuous operation, the minimum radial load can be estimated using the following formula:

$$F_{rm} > \frac{C_{0r}}{50}$$

Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_{0r}$ static load rating, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a greater minimum radial load is required.

## Axial load carrying capacities

RKB cylindrical roller bearings featuring ribs on both inner and outer rings can withstand thrust load according to dissipation and lubrication among roller heads and rib contact surfaces.

In order to withstand continuous axial loads the bearings have to be subject to a simultaneous radial force, while bearing ribs have to be supported across their full height.

The maximum axial load has to be in compliance with the following disequations:

$$F_a \leq 0{,}4\, F_r$$

$$F_a \leq \frac{K_1 \cdot K_2 \cdot d_m^{1{,}5} \cdot n^{-0{,}6}}{1000}$$

$$F_a \leq \frac{K_2 \cdot d_m^2}{1000}$$

Where:

- $F_a$ maximum axial load, [kN];
- $K_1$ experimental factor connected with lubrication system, [kN] see following **Tab. 3 page 218**;
- $K_2$ experimental factor connected with bearing series see following **Tab. 4 page 218**;
- n operating speed [rpm];
- $d_m$ mean bearing diameter [mm];

| Lubrication system | Factor $K_1$ |
|---|---|
| Minimal heat dissipation | 122,7 |
| Average heat dissipation, oil splash system | 182,7 |
| Good heat dissipation, recirculating oil system | 213,4 |
| Very good heat dissipation, recirculating oil system with external cooler | 285,3 |

Tab. 3 - Experimental Factor $K_1$

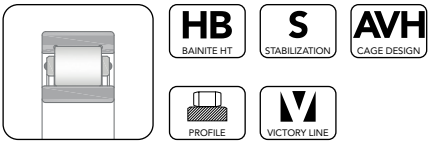
| Series | Factor $K_2$ |
|---|---|
| NJ2, NJ22, NUP2, NUP22 | 1,11 |
| NJ3, NJ23, NUP3, NUP23 | 1,47 |
| NJ4 | 1,52 |

Tab. 4 - Experimental Factor $K_2$

For additional information regarding the above limits please consult the RKB application engineering services.

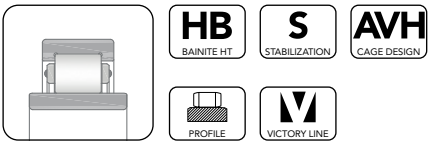
## Designs and variants

### Type NU



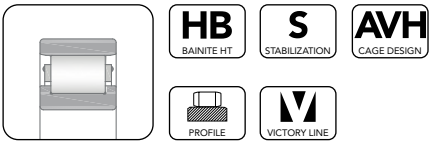

- Outer ring with two integral side ribs
- Ribless inner ring
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- To be used in non-locating position

### Type NUB



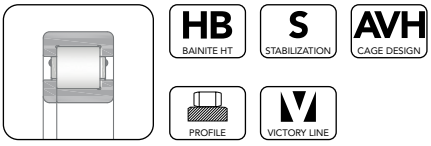

- Outer ring with two integral side ribs
- Wider ribless inner ring
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- To be used in non-locating position

### Type N



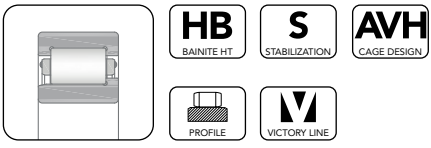

- Ribless outer ring
- Inner ring with two integral side ribs
- Two-piece machined brass cage guided on rollers (M) or inner ring (MB)
- Lubrication grooves in side faces of inner ring
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- To be used in non-locating position

### Type NUP



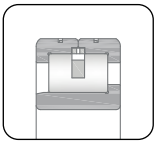

- Outer ring with two integral side ribs
- Inner ring with one integral side rib and one loose rib
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- Can be used in locating position

### Type NJ




- Outer ring with two integral side ribs
- Inner ring with one integral side rib
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position

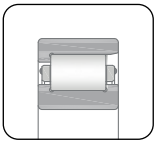
## Type NJGL



HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- Outer ring circumferentially split
- Inner ring with one integral side rib
- Lamellar brass cage design
- Designed to maintain high carrying capacities without compromising the rotational speed capability
- Optimized raceway geometry and roller profile

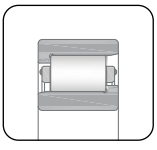
## Type NF



HB BAINITE HT · S STABILIZATION · AVH CAGE DESIGN · PROFILE · VICTORY LINE

- Outer ring with one integral side rib
- Inner ring with two integral side ribs
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position

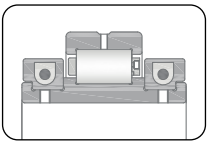
## Type NJF



HB BAINITE HT · S STABILIZATION · AVH CAGE DESIGN · PROFILE · VICTORY LINE

- Outer ring with one integral side rib
- Inner ring with one integral side rib
- Two-piece machined brass cage guided on rollers (M) or outer ring (MA)
- Available with riveted or AVH cage also with lubrication grooves
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position

## Split type SCRB FIXED/LOOSE



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · PROFILE

- Design used for medium and large size bearings
- Wider inner ring with integral side ribs
- Two-piece window type
- Engineered for hard-to-reach positions (e.g. universal joint drive shaft supporting)
- Design for easy mounting, dismounting and maintenance to reduced machine downtime
- Available in locating and non-locating configuration
- Available in taylor-made dimension
- Optimized raceway geometry and roller profile

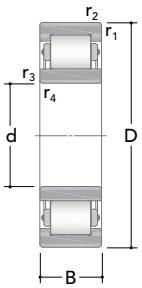
| Prefixes | |
|---|---|
| L | In a separable bearing: separate inner ring |
| R | In a separable bearing: outer ring with roller and cage assembly |
| SCRB | Out of standard split cylindrical roller bearing followed by drawing number |

| Suffixes | Internal Design |
|---|---|
| E | Optimized internal design with reinforced execution |
| EC | Optimized internal design for increased load ratings |
| SP | Special or non-standard bearing |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

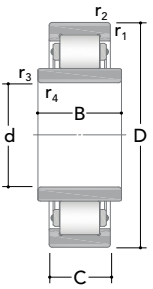
| Suffixes | Cage |
|---|---|
| MP1 | One-piece solid HBSC1 brass cage guided on rollers |
| MP1A | One-piece solid HBSC1 brass cage guided on outer ring |
| MP1B | One-piece solid HBSC1 brass cage guided on inner ring |
| M | Machined brass cage guided on rollers |
| MA | Machined brass cage guided on outer ring |
| MAS | Machined brass cage guided on outer ring with lubrication grooves in the guiding surface |
| MB | Machined brass cage guided on inner ring |
| MBS | Machined brass cage guided on inner ring with lubrication grooves in the guiding surface |
| J or without suffix | Pressed steel cage |
| TN or ATN | Molded polyamide cage (PA66) guided on rollers |
| TN9 | Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on rollers |
| AVH | Machined brass cage with round or square integral rivets guided on outer ring (MA), inner ring (MB) or rollers (M) |

| Suffixes | Accuracy, clearance, running |
|---|---|
| C2 | Radial internal clearance less than CN |
| CN | Standard radial internal clearance |
| C3 | Radial internal clearance greater than Normal (CN) |
| C4 | Radial internal clearance greater than C3 |
| C5 | Radial internal clearance greater than C4 |
| CS | Special radial internal clearance |
| P6 | Dimensional and running accuracy as per ISO tolerances Class 6 |

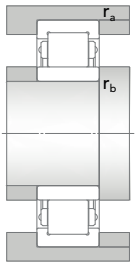
| Suffixes | External design |
|---|---|
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper 1:30 |
| N | Snap ring groove in outer ring |
| N1 | One locating slot in outer ring |
| N2 | Two locating slots in outer ring |



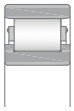

NU

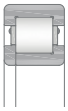


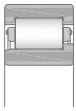

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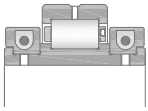


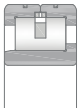

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **15** | 35 | 11 | - | 12,7 | 10,3 | 1,21 | 22400 | 26200 | **NU 202** |
| **17** | 40 | 12 | - | 20 | 14,6 | 1,71 | 20400 | 22700 | **NU 203** |
| | 40 | 16 | - | 27,5 | 21,6 | 2,63 | 20400 | 22600 | **NU 2203** |
| | 47 | 14 | - | 28,6 | 20,8 | 2,53 | 17600 | 20200 | **NU 303** |
| **20** | 47 | 14 | - | 28,6 | 22,9 | 2,74 | 17600 | 19400 | **NU 204** |
| | 47 | 18 | - | 34,6 | 27,6 | 3,39 | 17500 | 19200 | **NU 2204** |
| | 52 | 15 | - | 35,5 | 26,0 | 3,24 | 15500 | 18200 | **NU 304** |
| | 52 | 21 | - | 48 | 38,5 | 4,8 | 15050 | 18050 | **NU 2304** |
| **25** | 47 | 12 | - | 14,3 | 13,2 | 1,4 | 18000 | 18100 | **NU 1005** |
| | 52 | 15 | - | 32,6 | 27,7 | 3,31 | 15800 | 16800 | **NU 205** |
| | 52 | 18 | - | 39,6 | 34,7 | 4,21 | 15600 | 16300 | **NU 2205** |
| | 62 | 17 | - | 46,6 | 36,8 | 4,54 | 12800 | 15800 | **NU 305** |
| | 62 | 24 | - | 64,5 | 55,0 | 6,86 | 12600 | 15600 | **NU 2305** |
| **30** | 55 | 13 | - | 17,9 | 17,3 | 1,86 | 15000 | 15100 | **NU 1006** |
| | 62 | 16 | - | 44,5 | 36,6 | 4,5 | 13500 | 14800 | **NU 206** |
| | 62 | 20 | - | 55,5 | 49,6 | 6 | 13400 | 14600 | **NU 2206** |
| | 72 | 19 | - | 59,3 | 48,4 | 6,1 | 11100 | 12300 | **NU 306** |
| | 72 | 27 | - | 83,9 | 75 | 9,65 | 11050 | 12050 | **NU 2306** |
| | 90 | 23 | - | 60,5 | 53,5 | 6,7 | 11000 | 12000 | **NU 406** |
| **35** | 62 | 14 | - | 35,9 | 38,4 | 4,48 | 13000 | 13000 | **NU 1007** |
| | 72 | 17 | - | 56 | 48,0 | 6,1 | 11500 | 12500 | **NU 207** |
| | 72 | 23 | - | 69,5 | 63,0 | 8,05 | 11000 | 12000 | **NU 2207** |
| | 80 | 21 | - | 75,5 | 63,3 | 8,02 | 9550 | 11500 | **NU 307** |
| | 80 | 31 | - | 106 | 98,8 | 12,5 | 9500 | 11000 | **NU 2307** |
| | 100 | 25 | - | 77 | 69,6 | 9 | 8000 | 9500 | **NU 407** |
| **40** | 68 | 15 | - | 25,7 | 26,9 | 3 | 12700 | 18500 | **NU 1008** |
| | 80 | 18 | - | 62,6 | 53,5 | 6,7 | 9800 | 11500 | **NU 208** |

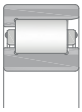

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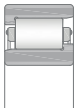

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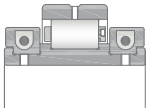

NJ


SCRB FIXED

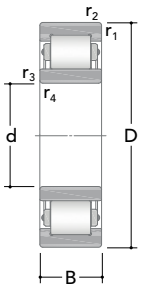

NJGL


NF

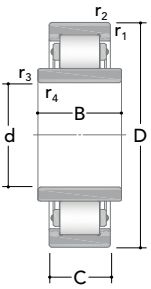

NJF


SCRB LOOSE

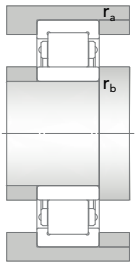
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 15 | 0,6 | 0,3 | 0,6 | 0,3 | 0,047 | NU 202 | N, NJ, NUP | - |
| 17 | 0,6 | 0,3 | 0,6 | 0,3 | 0,068 | NU 203 | N, NJ, NUP | - |
| | 0,6 | 0,3 | 0,6 | 0,3 | 0,087 | NU 2203 | N, NJ, NUP | - |
| | 1 | 0,6 | 1 | 0,6 | 0,12 | NU 303 | N, NJ, NUP | - |
| 20 | 1 | 0,6 | 1 | 0,6 | 0,11 | NU 204 | N, NJ, NUP | - |
| | 1 | 0,6 | 1 | 0,6 | 0,14 | NU 2204 | N, NJ, NUP | - |
| | 1,1 | 0,6 | 1 | 0,6 | 0,15 | NU 304 | N, NJ, NUP | HJ 304 |
| | 1,1 | 0,6 | 1 | 0,6 | 0,21 | NU 2304 | N, NJ, NUP | - |
| 25 | 0,6 | 0,3 | 0,6 | 0,3 | 0,083 | NU 1005 | N, NJ, NUP | - |
| | 1 | 0,6 | 1 | 0,6 | 0,13 | NU 205 | N, NJ, NUP | HJ 205 |
| | 1 | 0,6 | 1 | 0,6 | 0,16 | NU 2205 | N, NJ, NUP | HJ 2205 |
| | 1,1 | 1,1 | 1 | 1 | 0,23 | NU 305 | N, NJ, NUP | HJ 305 |
| | 1,1 | 1,1 | 1 | 1 | 0,34 | NU 2305 | N, NJ, NUP | HJ 2305 |
| 30 | 1 | 0,6 | 1 | 0,6 | 0,12 | NU 1006 | N, NJ, NUP | - |
| | 1 | 0,6 | 1 | 0,6 | 0,2 | NU 206 | N, NJ, NUP | HJ 206 |
| | 1 | 0,6 | 1 | 0,6 | 0,26 | NU 2206 | N, NJ, NUP | - |
| | 1,1 | 1,1 | 1 | 1 | 0,36 | NU 306 | N, NJ, NUP | HJ 306 |
| | 1,1 | 1,1 | 1 | 1 | 0,53 | NU 2306 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,75 | NU 406 | N, NJ, NUP | HJ 406 |
| 35 | 1 | 0,6 | 1 | 0,6 | 0,16 | NU 1007 | N, NJ, NUP | - |
| | 1,1 | 0,6 | 1 | 0,6 | 0,29 | NU 207 | N, NJ, NUP | HJ 207 |
| | 1,1 | 0,6 | 1 | 0,6 | 0,4 | NU 2207 | N, NJ, NUP | - |
| | 1,5 | 1,1 | 1,5 | 1 | 0,47 | NU 307 | N, NJ, NUP | HJ 307 |
| | 1,5 | 1,1 | 1,5 | 1 | 0,72 | NU 2307 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1 | NU 407 | N, NJ, NUP | - |
| 40 | 1 | 0,6 | 1 | 0,6 | 0,23 | NU 1008 | N, NJ, NUP | - |
| | 1,1 | 1,1 | 1 | 1 | 0,37 | NU 208 | N, NJ, NUP | HJ 208 |



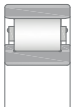

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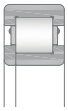


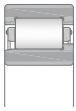

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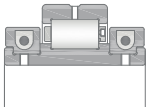


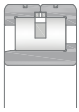

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **40** | 80 | 23 | - | 81,9 | 75,0 | 9,61 | 9500 | 11000 | **NU 2208** |
| (cont.) | 90 | 23 | - | 93,0 | 78,5 | 10,2 | 8000 | 9550 | **NU 308** |
| | 90 | 33 | - | 129 | 120 | 15 | 8000 | 9550 | **NU 2308** |
| | 110 | 27 | - | 100,8 | 95,0 | 11,5 | 7000 | 9050 | **NU 408** |
| **45** | 75 | 16 | - | 44,7 | 52,6 | 6,3 | 11000 | 11000 | **NU 1009** |
| | 85 | 19 | - | 69,5 | 64 | 8 | 9000 | 9550 | **NU 209** |
| | 85 | 23 | - | 86 | 81,5 | 10,4 | 9000 | 9550 | **NU 2209** |
| | 100 | 25 | - | 112 | 105 | 12,7 | 7550 | 8550 | **NU 309** |
| | 100 | 36 | - | 160 | 153 | 20 | 7550 | 8550 | **NU 2309** |
| | 120 | 29 | - | 106 | 102 | 13,3 | 6700 | 7500 | **NU 409** |
| **50** | 80 | 16 | - | 46,8 | 56,2 | 6,6 | 9500 | 9500 | **NU 1010** |
| | 90 | 20 | - | 74 | 69,5 | 8,7 | 8500 | 9000 | **NU 210** |
| | 90 | 23 | - | 90 | 88,5 | 11,4 | 8500 | 9000 | **NU 2210** |
| | 110 | 27 | - | 127 | 112 | 15 | 6700 | 8000 | **NU 310** |
| | 110 | 40 | - | 188 | 186 | 24,2 | 6700 | 8000 | **NU 2310** |
| | 130 | 31 | - | 130 | 127 | 16,3 | 6000 | 7000 | **NU 410** |
| **55** | 90 | 18 | - | 57,5 | 69,6 | 8,3 | 8500 | 8500 | **NU 1011** |
| | 100 | 21 | - | 97,0 | 95,0 | 12,1 | 7600 | 8100 | **NU 211** |
| | 100 | 25 | - | 117 | 119 | 15,2 | 7600 | 8100 | **NU 2211** |
| | 120 | 29 | - | 156 | 143 | 18,6 | 6200 | 7200 | **NU 311** |
| | 120 | 43 | - | 235 | 236 | 30 | 6200 | 7200 | **NU 2311** |
| | 140 | 33 | - | 142 | 141 | 18,5 | 5600 | 6300 | **NU 411** |
| **60** | 95 | 18 | - | 37,5 | 44,5 | 5,2 | 8000 | 13000 | **NU 1012** |
| | 110 | 22 | - | 108 | 105 | 13,3 | 6750 | 7550 | **NU 212** |
| | 110 | 28 | - | 148 | 153 | 20 | 6750 | 7550 | **NU 2212** |
| | 130 | 31 | - | 175 | 160 | 21,2 | 5650 | 6750 | **NU 312** |
| | 130 | 46 | - | 260 | 269 | 34 | 5650 | 6750 | **NU 2312** |
| | 150 | 35 | - | 170 | 173 | 22 | 4800 | 6200 | **NU 412** |

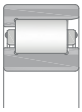

N

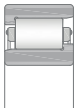

NUP

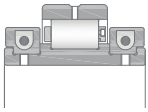

NJ


SCRB FIXED

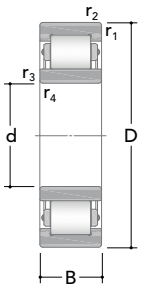

NJGL


NF

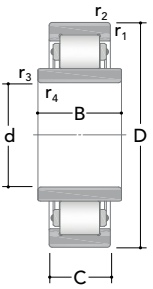

NJF


SCRB LOOSE

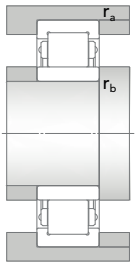
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 40 | 1,1 | 1,1 | 1 | 1 | 0,49 | NU 2208 | N, NJ, NUP | HJ 2208 |
| (cont.) | 1,5 | 1,5 | 1,5 | 1,5 | 0,65 | NU 308 | N, NJ, NUP | HJ 308 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,94 | NU 2308 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 1,3 | NU 408 | N, NJ, NUP | - |
| 45 | 1 | 0,6 | 1 | 0,6 | 0,25 | NU 1009 | N, NJ, NUP | - |
| | 1,1 | 1,1 | 1 | 1 | 0,43 | NU 209 | N, NJ, NUP | HJ 209 |
| | 1,1 | 1,1 | 1 | 1 | 0,52 | NU 2209 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,9 | NU 309 | N, NJ, NUP | HJ 309 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,3 | NU 2309 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 1,65 | NU 409 | N, NJ, NUP | HJ 409 |
| 50 | 1 | 0,6 | 1 | 0,6 | 0,27 | NU 1010 | N, NJ, NUP | - |
| | 1,1 | 1,1 | 1 | 1 | 0,48 | NU 210 | N, NJ, NUP | HJ 210 |
| | 1,1 | 1,1 | 1 | 1 | 0,56 | NU 2210 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 1,15 | NU 310 | N, NJ, NUP | HJ 310 |
| | 2 | 2 | 2 | 2 | 1,75 | NU 2310 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 2 | NU 410 | N, NJ, NUP | HJ 410 |
| 55 | 1,1 | 1 | 1 | 1 | 0,39 | NU 1011 | N, NJ, NUP | |
| | 1,5 | 1,1 | 1,5 | 1 | 0,66 | NU 211 | N, NJ, NUP | HJ 211 |
| | 1,5 | 1,1 | 1,5 | 1 | 0,79 | NU 2211 | N, NJ, NUP | HJ 2211 |
| | 2 | 2 | 2 | 2 | 1,45 | NU 311 | N, NJ, NUP | HJ 311 |
| | 2 | 2 | 2 | 2 | 2,2 | NU 2311 | N, NJ, NUP | HJ 2311 |
| | 2,1 | 2,1 | 2 | 2 | 2,5 | NU 411 | N, NJ, NUP | |
| 60 | 1,1 | 1 | 1 | 1 | 0,5 | NU 1012 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,8 | NU 212 | N, NJ, NUP | HJ 212 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,05 | NU 2212 | N, NJ, NUP | HJ 212 |
| | 2,1 | 2,1 | 2 | 2 | 1,75 | NU 312 | N, NJ, NUP | HJ 312 |
| | 2,1 | 2,1 | 2 | 2 | 2,75 | NU 2312 | N, NJ, NUP | HJ 2312 |
| | 2,1 | 2,1 | 2 | 2 | 3 | NU 412 | N, NJ, NUP | - |




NU

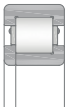


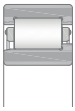

NUB

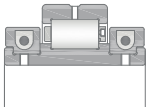


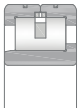

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **65** | 100 | 18 | - | 63 | 81,5 | 9,7 | 7500 | 12200 | **NU 1013** |
| | 120 | 23 | - | 122 | 118 | 15,5 | 6300 | 6700 | **NU 213** |
| | 120 | 31 | - | 170 | 180 | 24 | 6300 | 6700 | **NU 2213** |
| | 140 | 33 | - | 212 | 196 | 25,1 | 5300 | 6000 | **NU 313** |
| | 140 | 48 | - | 287 | 290 | 38 | 5300 | 6000 | **NU 2313** |
| | 160 | 37 | - | 183 | 193 | 24 | 4800 | 5600 | **NU 413** |
| **70** | 110 | 20 | - | 77,3 | 93,9 | 12 | 7000 | 11200 | **NU 1014** |
| | 125 | 24 | - | 137 | 137 | 18 | 6000 | 6300 | **NU 214** |
| | 125 | 31 | - | 182 | 193 | 25,2 | 6000 | 6300 | **NU 2214** |
| | 150 | 35 | - | 236 | 228 | 28 | 4800 | 5600 | **NU 314** |
| | 150 | 51 | - | 315 | 325 | 41,2 | 4800 | 5600 | **NU 2314** |
| | 180 | 42 | - | 231 | 240 | 30 | 4300 | 5000 | **NU 414** |
| **75** | 115 | 20 | - | 78,5 | 85,1 | 8,4 | 6700 | 10600 | **NU 1015** |
| | 130 | 25 | - | 150 | 156 | 20 | 5600 | 6000 | **NU 215** |
| | 130 | 31 | - | 188 | 208 | 26 | 5600 | 6000 | **NU 2215** |
| | 160 | 37 | - | 280 | 265 | 33,4 | 4500 | 5400 | **NU 315** |
| | 160 | 55 | - | 380 | 400 | 49 | 4500 | 5300 | **NU 2315** |
| | 190 | 45 | - | 265 | 282 | 33 | 4000 | 4800 | **NU 415** |
| **80** | 125 | 22 | - | 99,5 | 127,0 | 9,8 | 6300 | 9500 | **NU 1016** |
| | 140 | 26 | - | 160 | 166 | 20,8 | 5300 | 5600 | **NU 216** |
| | 140 | 33 | - | 214 | 245 | 31 | 5300 | 5600 | **NU 2216** |
| | 170 | 39 | - | 300 | 290 | 36 | 4300 | 5000 | **NU 316** |
| | 170 | 58 | - | 415 | 440 | 55 | 4300 | 5000 | **NU 2316** |
| | 200 | 48 | - | 303 | 323 | 39 | 3800 | 4500 | **NU 416** |
| **85** | 130 | 22 | - | 93,3 | 103,8 | 10,6 | 6000 | 9100 | **NU 1017** |
| | 150 | 28 | - | 190 | 200 | 25 | 4800 | 5300 | **NU 217** |
| | 150 | 36 | - | 250 | 280 | 34,4 | 4800 | 5300 | **NU 2217** |
| | 180 | 41 | - | 340 | 335 | 40,8 | 4000 | 4800 | **NU 317** |
| | 180 | 60 | - | 455 | 490 | 59 | 4000 | 4800 | **NU 2317** |

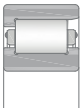

N

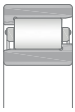

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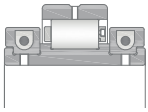

NJ


SCRB FIXED

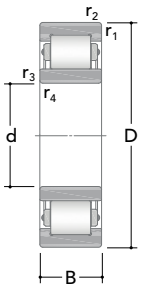

NJGL


NF

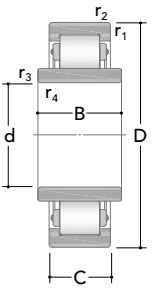

NJF


SCRB LOOSE

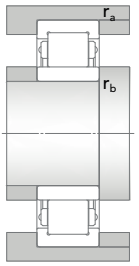
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 65 | 1,1 | 1 | 1 | 1 | 0,45 | NU 1013 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,05 | NU 213 | N, NJ, NUP | HJ 213 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,4 | NU 2213 | N, NJ, NUP | HJ 2213 |
| | 2,1 | 2,1 | 2 | 2 | 2,2 | NU 313 | N, NJ, NUP | HJ 313 |
| | 2,1 | 2,1 | 2 | 2 | 3,2 | NU 2313 | N, NJ, NUP | HJ 2313 |
| | 2,1 | 2,1 | 2 | 2 | 3,55 | NU 413 | N, NJ, NUP | HJ 413 |
| 70 | 1,1 | 1 | 1 | 1 | 0,62 | NU 1014 | N, NJ, NUP | HJ 1014 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,15 | NU 214 | N, NJ, NUP | HJ 214 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | NU 2214 | N, NJ, NUP | HJ 2214 |
| | 2,1 | 2,1 | 2 | 2 | 2,7 | NU 314 | N, NJ, NUP | HJ 314 |
| | 2,1 | 2,1 | 2 | 2 | 3,95 | NU 2314 | N, NJ, NUP | HJ 2314 |
| | 3 | 3 | 2,5 | 2,5 | 5,35 | NU 414 | N, NJ, NUP | HJ 414 |
| 75 | 1,1 | 1 | 1 | 1 | 0,75 | NU 1015 | N, NJ, NUP | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,25 | NU 215 | N, NJ, NUP | HJ 215 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 1,6 | NU 2215 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 3,3 | NU 315 | N, NJ, NUP | HJ 315 |
| | 2,1 | 2,1 | 2 | 2 | 4,8 | NU 2315 | N, NJ, NUP | HJ 2315 |
| | 3 | 3 | 2,5 | 2,5 | 6,2 | NU 415 | N, NJ, NUP | HJ 415 |
| 80 | 1,1 | 1 | 1 | 1 | 0,88 | NU 1016 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 1,55 | NU 216 | N, NJ, NUP | HJ 216 |
| | 2 | 2 | 2 | 2 | 2 | NU 2216 | N, NJ, NUP | HJ 216 |
| | 2,1 | 2,1 | 2 | 2 | 3,85 | NU 316 | N, NJ, NUP | HJ 316 |
| | 2,1 | 2,1 | 2 | 2 | 5,85 | NU 2316 | N, NJ, NUP | HJ 2316 |
| | 3 | 3 | 2,5 | 2,5 | 7,25 | NU 416 | N, NJ, NUP | HJ 416 |
| 85 | 1,1 | 1 | 1 | 1 | 1,05 | NU 1017 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 1,9 | NU 217 | N, NJ, NUP | HJ 217 |
| | 2 | 2 | 2 | 2 | 2,5 | NU 2217 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 4,65 | NU 317 | N, NJ, NUP | HJ 317 |
| | 3 | 3 | 2,5 | 2,5 | 6,85 | NU 2317 | N, NJ, NUP | HJ 2317 |



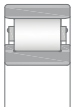

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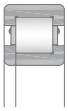


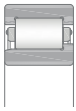

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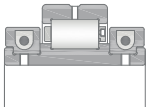


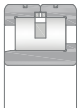

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **85** | 210 | 52 | - | 320 | 335 | 39 | 3600 | 4300 | **NU 417** |
| (cont.) | | | | | | | | | |
| **90** | 140 | 24 | - | 81,1 | 105 | 12,6 | 5600 | 8500 | **NU 1018** |
| | 160 | 30 | - | 208 | 220 | 27 | 4500 | 5000 | **NU 218** |
| | 160 | 40 | - | 281 | 315 | 39 | 4500 | 5000 | **NU 2218** |
| | 190 | 43 | - | 367 | 360 | 42 | 3800 | 4500 | **NU 318** |
| | 190 | 64 | - | 500 | 540 | 64,8 | 3800 | 4500 | **NU 2318** |
| | 225 | 54 | - | 381 | 418 | 47 | 3400 | 4000 | **NU 418** |
| **95** | 145 | 24 | - | 84,2 | 110 | 13,2 | 5300 | 8000 | **NU 1019** |
| | 170 | 32 | - | 255 | 265 | 32,4 | 4300 | 4800 | **NU 219** |
| | 170 | 43 | - | 327 | 375 | 45 | 4300 | 4800 | **NU 2219** |
| | 200 | 45 | - | 390 | 390 | 46,1 | 3600 | 4300 | **NU 319** |
| | 200 | 67 | - | 533 | 585 | 68,3 | 3600 | 4300 | **NU 2319** |
| | 240 | 55 | - | 413 | 456 | 52 | 3200 | 3600 | **NU 419** |
| **100** | 140 | 20 | - | 82,4 | 121 | 13,6 | 4900 | - | **NU 1920** |
| | 150 | 24 | - | 86,2 | 114 | 13,6 | 5000 | 7600 | **NU 1020** |
| | 150 | 30 | - | 167 | 239 | 30,4 | 3800 | - | **NU 2020** |
| | 165 | 52 | - | 307 | 448 | 55 | 3200 | - | **NU 3120** |
| | 180 | 34 | - | 289 | 305 | 36,5 | 4000 | 4500 | **NU 220** |
| | 180 | 46 | - | 383 | 450 | 53 | 4000 | 4500 | **NU 2220** |
| | 180 | 96 | 46 | 257 | 337 | 40,1 | 3400 | - | **NUB 313638** |
| | 180,075 | 60,325 | - | 412 | 581 | 69 | 3400 | - | **319897** |
| | 215 | 47 | - | 455 | 440 | 51 | 3200 | 3800 | **NU 320** |
| | 215 | 73 | - | 672 | 735 | 84 | 3200 | 3800 | **NU 2320** |
| | 250 | 58 | - | 463 | 520 | 58,2 | 3000 | 3600 | **NU 420** |
| **105** | 160 | 26 | - | 101,2 | 137 | 16 | 4800 | 7500 | **NU 1021** |
| | 190 | 36 | - | 300 | 315 | 36,3 | 3800 | 4300 | **NU 221** |
| | 225 | 49 | - | 500 | 500 | 56 | 3200 | 3800 | **NU 321** |
| | 260 | 60 | - | 508 | 571 | 63 | 2800 | 3400 | **NU 421** |

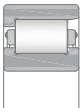

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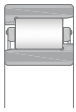

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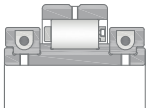

NJ


SCRB FIXED

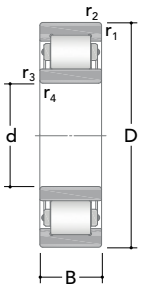

NJGL


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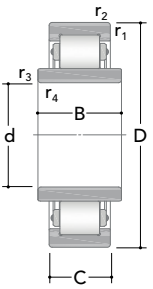

NJF


SCRB LOOSE

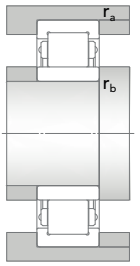
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 85 (cont.) | 4 | 4 | 3 | 3 | 8,7 | NU 417 | N, NJ, NUP | HJ 417 |
| 90 | 1,5 | 1,1 | 1,5 | 1 | 1,35 | NU 1018 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 2,3 | NU 218 | N, NJ, NUP | HJ 218 |
| | 2 | 2 | 2 | 2 | 3,15 | NU 2218 | N, NJ, NUP | HJ 2218 |
| | 3 | 3 | 2,5 | 2,5 | 5,25 | NU 318 | N, NJ, NUP | HJ 318 |
| | 3 | 3 | 2,5 | 2,5 | 8 | NU 2318 | N, NJ, NUP | HJ 2318 |
| | 4 | 4 | 3 | 3 | 10,5 | NU 418 | N, NJ, NUP | - |
| 95 | 1,5 | 1,1 | 1,5 | 1 | 1,45 | NU 1019 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 2,85 | NU 219 | N, NJ, NUP | HJ 219 |
| | 2,1 | 2,1 | 2 | 2 | 3,8 | NU 2219 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 6,2 | NU 319 | N, NJ, NUP | HJ 319 |
| | 3 | 3 | 2,5 | 2,5 | 9,35 | NU 2319 | N, NJ, NUP | HJ 2319 |
| | 4 | 4 | 3 | 3 | 13,5 | NU 419 | N, NJ, NUP | - |
| 100 | 1,1 | 1 | 1 | 1 | 1 | NU 1920 | N, NJ, NUP | - |
| | 1,5 | 1,1 | 1,5 | 1 | 1,45 | NU 1020 | N, NJ, NUP | - |
| | 1,5 | 1,1 | 1,5 | 1 | 1,8 | NU 2020 | N, NJ, NUP | - |
| | 2 | 1,1 | 2 | 1 | 4,4 | NU 3120 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 3,4 | NU 220 | N, NJ, NUP | HJ 220 |
| | 2,1 | 2,1 | 2 | 2 | 4,75 | NU 2220 | N, NJ, NUP | HJ 2220 |
| | 2,1 | 2,1 | 2 | 2 | 6,7 | NUB 313638 | - | - |
| | 2,6 | 2 | 2,5 | 2 | 7,1 | 319897 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 7,45 | NU 320 | N, NJ, NUP | HJ 320 |
| | 3 | 3 | 2,5 | 2,5 | 12 | NU 2320 | N, NJ, NUP | HJ 2320 |
| | 4 | 4 | 3 | 3 | 15,5 | NU 420 | N, NJ, NUP | HJ 420 |
| 105 | 2 | 1,1 | 2 | 1 | 1,9 | NU 1021 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 3,95 | NU 221 | N, NJ, NUP | HJ 221 |
| | 3 | 3 | 2,5 | 2,5 | 8,55 | NU 321 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 17,5 | NU 421 | N, NJ, NUP | - |




NU

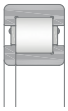


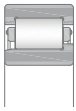

NUB

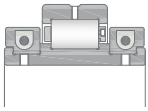


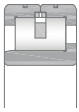

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **110** | 170 | 28 | - | 128 | 166 | 19,1 | 4500 | 7000 | **NU 1022** |
| | 200 | 38 | - | 335 | 365 | 42,5 | 3600 | 4000 | **NU 222** |
| | 200 | 53 | - | 440 | 520 | 61 | 3600 | 4000 | **NU 2222** |
| | 240 | 50 | - | 538 | 540 | 60 | 3000 | 3400 | **NU 322** |
| | 240 | 80 | - | 780 | 900 | 100 | 3000 | 3400 | **NU 2322** |
| | 280 | 65 | - | 550 | 630 | 69,5 | 2600 | 3200 | **NU 422** |
| | 260,324 | 90,075 | - | 750 | 955 | 105 | 2400 | - | **467062** |
| **120** | 165 | 22 | - | 111 | 170 | 19,3 | 5600 | - | **NU 1924** |
| | 180 | 28 | - | 134 | 183 | 20,6 | 4000 | 6300 | **NU 1024** |
| | 180 | 36 | - | 228 | 349 | 39,8 | 3000 | - | **NU 2024** |
| | 200 | 62 | - | 414 | 589 | 68,2 | 2700 | - | **315516** |
| | 215 | 40 | - | 395 | 430 | 48 | 3400 | 3600 | **NU 224** |
| | 215 | 58 | - | 521 | 631 | 71 | 3400 | 3600 | **NU 2224** |
| | 215 | 88 | 40 | 339 | 425 | 48 | 2800 | - | **NUB 322927** |
| | 240 | 80 | - | 569 | 764 | 85 | 2400 | - | **322870** |
| | 260 | 55 | - | 616 | 620 | 68,3 | 2800 | 3200 | **NU 324** |
| | 260 | 86 | - | 915 | 1040 | 115 | 2800 | 5000 | **NU 2324** |
| | 310 | 72 | - | 644 | 735 | 78 | 2400 | 2800 | **NU 424** |
| **129,921** | 228,6 | 79,375 | - | 666 | 1010 | 115 | 2400 | - | **322932** |
| **130** | 200 | 33 | - | 166 | 226 | 25 | 3800 | 5600 | **NU 1026** |
| | 200 | 42 | - | 296 | 439 | 51 | 2900 | - | **NU 2026** |
| | 200 | 52 | - | 352 | 586 | 67 | 2800 | - | **NU 3026** |
| | 230 | 40 | - | 421 | 455 | 50 | 3200 | 3400 | **NU 226** |
| | 230 | 64 | - | 615 | 736 | 82 | 3200 | 3400 | **NU 2226** |
| | 240 | 80 | - | 544 | 768 | 89 | 2500 | - | **235013** |
| | 250 | 75 | - | 529 | 747 | 83 | 2200 | - | **609341** |
| | 250 | 80 | - | 597 | 806 | 90,5 | 2100 | - | **322880** |
| | 260 | 86 | - | 715 | 965 | 106 | 2200 | - | **312733** |
| | 280 | 58 | - | 731 | 750 | 80,6 | 2400 | 3000 | **NU 326** |
| | 280 | 93 | - | 1060 | 1250 | 135 | 2400 | 4500 | **NU 2326** |

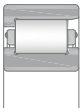

N

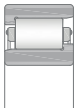

NUP

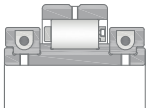

NJ


SCRB FIXED

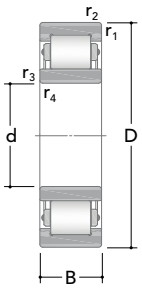

NJGL


NF

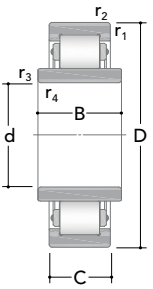

NJF


SCRB LOOSE

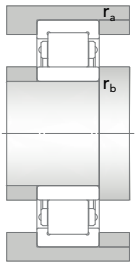
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 110 | 2 | 1,1 | 2 | 1 | 2,3 | NU 1022 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 4,7 | NU 222 | N, NJ, NUP | HJ 222 |
| | 2,1 | 2,1 | 2 | 2 | 6,7 | NU 2222 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 10,5 | NU 322 | N, NJ, NUP | HJ 322 |
| | 3 | 3 | 2,5 | 2,5 | 17 | NU 2322 | N, NJ, NUP | HJ 2322 |
| | 4 | 4 | 3 | 3 | 20,5 | NU 422 | N, NJ, NUP | HJ 422 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 27,3 | 467062 | - | |
| 120 | 1,1 | 0,6 | 1 | 0,6 | 1,4 | NU 1924 | N, NJ, NUP | - |
| | 2 | 1,1 | 2 | 1 | 2,45 | NU 1024 | N, NJ, NUP | - |
| | 2 | 1,1 | 1 | 1,1 | 3,1 | NU 2024 | N, NJ, NUP | - |
| | 2 | 1 | 1 | 1 | 7,8 | 315516 | - | - |
| | 2,1 | 2,1 | 2 | 2 | 5,6 | NU 224 | N, NJ, NUP | HJ 224 |
| | 2,1 | 2,1 | 2 | 2 | 8,3 | NU 2224 | N, NJ, NUP | HJ 2224 |
| | 2,1 | 2,1 | 2 | 2 | 7,6 | NUB 322927 | - | - |
| | 3,7 | 3 | 3,5 | 2,5 | 17,8 | 322870 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 13 | NU 324 | N, NJ, NUP | HJ 324 |
| | 3 | 3 | 2,5 | 2,5 | 23,5 | NU 2324 | N, NJ, NUP | HJ 2324 |
| | 5 | 5 | 4 | 4 | 27,5 | NU 424 | N, NJ, NUP | HJ 424 |
| 129,921 | 5 | 4 | 2,5 | 3 | 14 | 322932 | - | - |
| 130 | 2 | 1,1 | 2 | 1 | 3,75 | NU 1026 | N, NJ, NUP | - |
| | 2 | 1,1 | 1 | 1,1 | 4,6 | NU 2026 | N, NJ, NUP | - |
| | 1,1 | 1 | 1 | 1 | 6,1 | NU 3026 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 6,45 | NU 226 | N, NJ, NUP | HJ 226 |
| | 3 | 3 | 2,5 | 2,5 | 10 | NU 2226 | N, NJ, NUP | HJ 2226 |
| | 4 | 3 | 3 | 2,5 | 16,7 | 235013 | - | - |
| | 3 | 2,5 | 2,5 | 2 | 15 | 609341 | - | - |
| | 3,7 | 3 | 3,5 | 2,5 | 17,5 | 322880 | - | - |
| | 7,5 | 3 | 6 | 2,5 | 21,5 | 312733 | - | - |
| | 4 | 4 | 3 | 3 | 16 | NU 326 | N, NJ, NUP | HJ 326 |
| | 4 | 4 | 3 | 3 | 30 | NU 2326 | N, NJ, NUP | HJ 2326 |



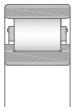

NU

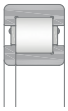


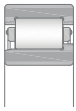

NUB

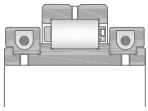


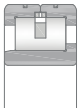

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| 130 | 281 | 58 | - | 634 | 740 | 80 | 2100 | - | 319926 |
| (cont.) | 340 | 78 | - | 835 | 994 | 101 | 2000 | - | NU 426 |
| 140 | 210 | 33 | - | 179 | 258 | 28 | 3600 | 5300 | NU 1028 |
| | 210 | 42 | - | 311 | 488 | 55 | 2800 | - | NU 2028 |
| | 250 | 42 | - | 456 | 510 | 57 | 2800 | 3200 | NU 228 |
| | 250 | 68 | - | 655 | 830 | 92 | 2800 | 4800 | NU 2228 |
| | 250 | 60 | 42 | 395 | 503 | 56 | 2400 | - | NUB 322883 |
| | 270 | 78 | - | 649 | 864 | 93 | 2000 | - | 614073 |
| | 300 | 62 | - | 787 | 830 | 88 | 2400 | 2800 | NU 328 |
| | 300 | 102 | - | 1214 | 1430 | 148 | 2400 | 4300 | NU 2328 |
| | 300 | 114,3 | - | 1109 | 1550 | 165 | 2000 | - | 467063 |
| | 360 | 82 | - | 915 | 1060 | 106 | 1800 | - | NU 428 |
| 149,969 | 320 | 65 | - | 818 | 1010 | 105 | 1800 | - | 313268 |
| 150 | 225 | 35 | - | 199 | 294 | 31,9 | 3200 | 5000 | NU 1030 |
| | 225 | 45 | - | 346 | 545 | 60 | 2500 | - | NU 2030 |
| | 225 | 56 | - | 411 | 707 | 78 | 2600 | - | NU 3030 |
| | 270 | 45 | - | 510 | 600 | 63 | 2600 | 2800 | NU 230 |
| | 270 | 73 | - | 735 | 930 | 98 | 2600 | 2800 | NU 2230 |
| | 300 | 102 | - | 875 | 1230 | 130 | 1800 | - | 314834 |
| | 320 | 65 | - | 900 | 965 | 100 | 2200 | 3500 | NU 330 |
| | 320 | 108 | - | 1370 | 1630 | 168 | 2200 | 4000 | NU 2330 |
| | 380 | 85 | - | 974 | 1160 | 114 | 1700 | - | NU 430 |
| 160 | 240 | 38 | - | 229 | 339 | 35,3 | 3000 | 4800 | NU 1032 |
| | 240 | 48 | - | 413 | 663 | 71 | 2400 | - | NU 2032 |
| | 240 | 60 | - | 441 | 780 | 86,5 | 2300 | - | NU 3032 |
| | 290 | 48 | - | 585 | 680 | 71 | 2400 | 4200 | NU 232 |
| | 290 | 80 | - | 930 | 1200 | 127 | 2400 | 4000 | NU 2232 |
| | 290 | 98425 | - | 1013 | 1450 | 152 | 1900 | - | 320151 |
| | 300 | 84 | - | 717 | 1050 | 111 | 1800 | - | 609099 |

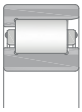

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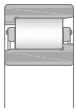

NUP

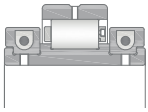

NJ


SCRB FIXED

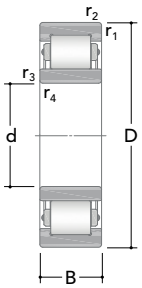

NJGL


NF

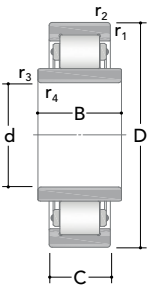

NJF


SCRB LOOSE

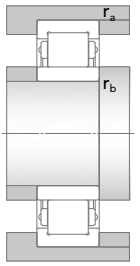
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 130 | 4 | 4 | 3 | 3 | 19 | 319926 | - | - |
| (cont.) | 5 | 5 | 4 | 4 | 36 | NU 426 | N, NJ, NUP | - |
| 140 | 2 | 1,1 | 2 | 1 | 4 | NU 1028 | N, NJ, NUP | - |
| | 2 | 1,1 | 1 | 1,1 | 4,9 | NU 2028 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 9,4 | NU 228 | N, NJ, NUP | HJ 228 |
| | 3 | 3 | 2,5 | 2,5 | 13,5 | NU 2228 | N, NJ, NUP | HJ 2228 |
| | 3 | 3 | 2,5 | 2,5 | 9,25 | NUB 322883 | - | - |
| | 3 | 2,5 | 2,5 | 2,5 | 22 | 614073 | - | - |
| | 4 | 3 | 3 | 3 | 22 | NU 328 | N, NJ, NUP | HJ 328 |
| | 4 | 4 | 3 | 3 | 37 | NU 2328 | N, NJ, NUP | HJ 2328 |
| | 3 | 3 | 2,5 | 2,5 | 41,8 | 467063 | - | - |
| | 5 | 5 | 4 | 4 | 47 | NU 428 | N, NJ, NUP | - |
| 149,969 | 4 | 4 | 3 | 3 | 24,5 | 313268 | - | - |
| 150 | 2,1 | 1,5 | 2 | 1,5 | 4,85 | NU 1030 | N, NJ, NUP | - |
| | 2,1 | 1,5 | 1,5 | 1 | 6 | NU 2030 | N, NJ, NUP | - |
| | 1,5 | 1,1 | 1 | 1 | 7,9 | NU 3030 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 11,5 | NU 230 | N, NJ, NUP | HJ 230 |
| | 3 | 3 | 2,5 | 2,5 | 18,5 | NU 2230 | N, NJ, NUP | HJ 2230 |
| | 4 | 4 | 3 | 3 | 35,5 | 314834 | - | - |
| | 4 | 4 | 3 | 3 | 28 | NU 330 | N, NJ, NUP | HJ 330 |
| | 4 | 4 | 3 | 3 | 45 | NU 2330 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 53,5 | NU 430 | N, NJ, NUP | - |
| 160 | 2,1 | 1,5 | 2 | 1,5 | 5,95 | NU 1032 | N, NJ, NUP | HJ 1032 |
| | 2,1 | 1,5 | 1,5 | 1 | 7,9 | NU 2032 | N, NJ, NUP | - |
| | 1,5 | 1 | 1 | 1 | 9,7 | NU 3032 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 14 | NU 232 | N, NJ, NUP | HJ 232 |
| | 3 | 3 | 2,5 | 2,5 | 24 | NU 2232 | N, NJ, NUP | HJ 2232 |
| | 3 | 3 | 2,5 | 2,5 | 31 | 320151 | - | - |
| | 7,5 | 4 | 3 | 3 | 28 | 609099 | - | - |



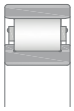

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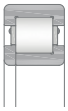


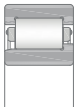

NUB

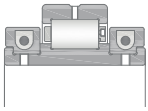


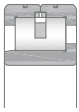

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **160** | 340 | 68 | - | 1007 | 1080 | 111 | 2000 | 3600 | **NU 332** |
| (cont.) | 340 | 114 | - | 1270 | 1850 | 185 | 1800 | 3600 | **NU 2332** |
| **165,1** | 279,4 | 61,912 | - | 631 | 892 | 95,6 | 2000 | - | **322832** |
| **170** | 230 | 28 | - | 185 | 287 | 30 | 2700 | - | **NU 1934** |
| | 260 | 42 | - | 360 | 400 | 41 | 2800 | 4300 | **NU 1034** |
| | 260 | 54 | - | 479 | 730 | 80,9 | 2200 | - | **NU 2034** |
| | 310 | 52 | - | 698 | 815 | 84 | 2200 | 3800 | **NU 234** |
| | 310 | 86 | - | 1061 | 1400 | 146 | 2200 | 3800 | **NU 2234** |
| | 360 | 72 | - | 952 | 1180 | 115 | 1700 | 2200 | **NU 334** |
| | 360 | 120 | - | 1570 | 2190 | 219 | 1700 | 3400 | **NU 2334** |
| **180** | 250 | 33 | - | 243 | 395 | 41 | 3600 | - | **NU 1936** |
| | 250 | 42 | - | 255 | 440 | 46,5 | 2500 | - | **NU 2936** |
| | 280 | 46 | - | 338 | 476 | 51 | 2600 | 4000 | **NU 1036** |
| | 280 | 60 | - | 625 | 966 | 103 | 2100 | - | **NU 2036** |
| | 280 | 74 | - | 699 | 1180 | 125 | 2000 | - | **NU 3036** |
| | 320 | 52 | - | 720 | 850 | 88 | 2200 | 3600 | **NU 236** |
| | 320 | 75 | - | 772 | 1080 | 110 | 1800 | - | **319641** |
| | 320 | 86 | - | 1100 | 1480 | 151 | 2200 | 3600 | **NU 2236** |
| | 340 | 100 | - | 1010 | 1470 | 150 | 1800 | - | **314525** |
| | 380 | 75 | - | 1031 | 1290 | 123 | 1600 | 2200 | **NU 336** |
| | 380 | 126 | - | 1687 | 2260 | 218 | 1600 | 3200 | **NU 2336** |
| | 440 | 95 | - | 1268 | 1580 | 148 | 1500 | - | **NU 436** |
| **190** | 260 | 33 | - | 246 | 400 | 40,5 | 2400 | - | **NU 1938** |
| | 260 | 42 | - | 260 | 449 | 46,9 | 2400 | - | **NU 2938** |
| | 290 | 46 | - | 347 | 500 | 53 | 2600 | 3800 | **NU 1038** |
| | 290 | 60 | - | 651 | 1030 | 107 | 2000 | - | **NU 2038** |
| | 290 | 75 | - | 730 | 1230 | 130 | 2000 | - | **NU 3038** |
| | 340 | 55 | - | 802 | 966 | 98 | 2000 | 3400 | **NU 238** |

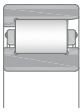

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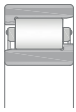

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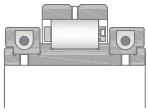

NJ


SCRB FIXED

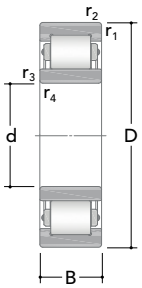

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NF

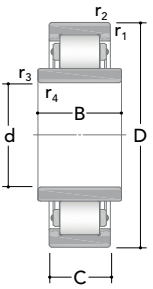

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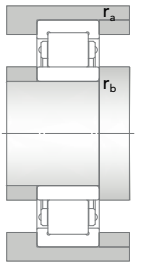
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 160 | 4 | 4 | 3 | 3 | 32,5 | NU 332 | N, NJ, NUP | HJ 332 |
| (cont.) | 4 | 4 | 3 | 3 | 53 | NU 2332 | N, NJ, NUP | - |
| 165,1 | 4 | 4 | 3 | 3 | 23 | 322832 | - | - |
| 170 | 2 | 1,1 | 1 | 1 | 3,55 | NU 1934 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 8 | NU 1034 | N, NJ, NUP | HJ 1034 |
| | 2,1 | 2,1 | 2 | 2 | 11 | NU 2034 | N, NJ, NUP | HJ 234 |
| | 4 | 4 | 3 | 3 | 19 | NU 234 | N, NJ, NUP | HJ 2234 |
| | 4 | 4 | 3 | 3 | 30 | NU 2234 | N, NJ, NUP | - |
| | 4 | 3 | 3 | 3 | 37,5 | NU 334 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 63 | NU 2334 | N, NJ, NUP | - |
| 180 | 2 | 1 | 2 | 1 | 5,05 | NU 1936 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 6,7 | NU 2936 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 10,5 | NU 1036 | N, NJ, NUP | HJ 1036 |
| | 2,1 | 2,1 | 2 | 2 | 14 | NU 2036 | N, NJ, NUP | - |
| | 2,1 | 1 | 1 | 1 | 17 | NU 3036 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 19,5 | NU 236 | N, NJ, NUP | HJ 236 |
| | 7,5 | 4 | 3 | 3 | 27,5 | 319641 | - | - |
| | 4 | 4 | 3 | 3 | 31,5 | NU 2236 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 43,5 | 314525 | - | HJ 2236 |
| | 4 | 3 | 3 | 3 | 44,5 | NU 336 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 72,5 | NU 2336 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 79 | NU 436 | N, NJ, NUP | - |
| 190 | 2 | 1,1 | 2 | 1 | 5,5 | NU 1938 | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 7 | NU 2938 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 11 | NU 1038 | N, NJ, NUP | HJ 1038 |
| | 2,1 | 2,1 | 2 | 2 | 15 | NU 2038 | N, NJ, NUP | - |
| | 2,1 | 1,7 | 2 | 1,5 | 18 | NU 3038 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 23,5 | NU 238 | N, NJ, NUP | HJ 238 |



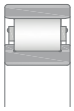

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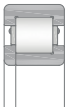


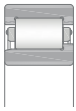

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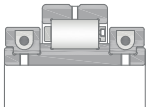


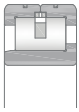

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **190** | 340 | 92 | - | 1232 | 1640 | 164 | 2000 | 3400 | **NU 2238** |
| (cont.) | 400 | 78 | - | 1141 | 1570 | 140 | 1500 | 2000 | **NU 338** |
| | 400 | 132 | - | 1851 | 2564 | 237 | 1500 | 3000 | **NU 2338** |
| **200** | 250 | 30 | - | 185 | 341 | 33,1 | 2500 | - | **NU 2840** |
| | 280 | 38 | - | 266 | 397 | 40,7 | 2600 | - | **NU 1940** |
| | 280 | 48 | - | 325 | 576 | 59 | 2400 | - | **NU 2940** |
| | 310 | 51 | - | 380 | 570 | 57,4 | 2400 | 3600 | **NU 1040** |
| | 310 | 66 | - | 744 | 1200 | 123 | 1800 | - | **NU 2040** |
| | 310 | 82 | - | 780 | 1390 | 145 | 1800 | - | **NU 3040** |
| | 340 | 112 | - | 1201 | 1880 | 191 | 1500 | - | **NU 3140** |
| | 360 | 58 | - | 880 | 1060 | 104 | 1900 | 3200 | **NU 240** |
| | 360 | 98 | - | 1370 | 1880 | 188 | 1900 | 3200 | **NU 2240** |
| | 360 | 128 | - | 1556 | 2440 | 244 | 1400 | - | **NU 3240** |
| | 360 | 143 | 98 | 1237 | 1870 | 187 | 1700 | - | **NUB 326518** |
| | 420 | 80 | - | 1230 | 1643 | 151 | 1400 | 2800 | **NU 340** |
| | 420 | 138 | - | 1990 | 2890 | 254 | 1400 | 2800 | **NU 2340** |
| **210** | 380 | 61 | - | 846 | 1160 | 114 | 1600 | - | **463553** |
| **220** | 300 | 38 | - | 338 | 551 | 54 | 2200 | - | **NU 1944** |
| | 300 | 38 | - | 279 | 465 | 45,5 | 2200 | - | **246312** |
| **220** | 300 | 48 | - | 455 | 830 | 83 | 2200 | - | **NU 2944** |
| | 340 | 56 | - | 495 | 735 | 72,6 | 2200 | 3200 | **NU 1044** |
| | 340 | 72 | - | 878 | 1450 | 145 | 1700 | - | **NU 2044** |
| | 340 | 90 | - | 924 | 1690 | 169 | 1600 | - | **NU 3044** |
| | 350 | 83 | - | 839 | 1350 | 138 | 1500 | - | **314591** |
| | 370 | 120 | - | 1305 | 2110 | 207 | 1400 | - | **NU 3144** |
| | 400 | 65 | - | 1060 | 1290 | 124 | 1700 | 3000 | **NU 244** |
| | 400 | 108 | - | 1576 | 2280 | 211 | 1600 | 3000 | **NU 2244** |
| | 460 | 88 | - | 1295 | 1630 | 148 | 1500 | 2170 | **NU 344** |
| | 460 | 145 | - | 2380 | 3450 | 306 | 1300 | 2600 | **NU 2344** |

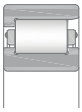

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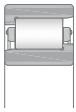

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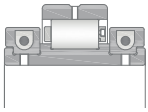

NJ


SCRB FIXED

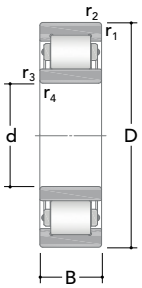

NJGL


NF

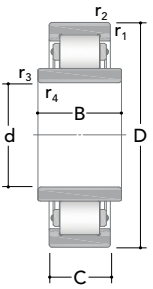

NJF


SCRB LOOSE

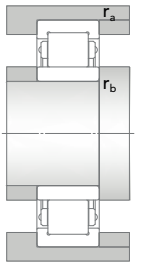
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 190 | 4 | 4 | 3 | 3 | 39 | NU 2238 | N, NJ, NUP | - |
| (cont.) | 5 | 5 | 4 | 4 | 50 | NU 338 | N, NJ, NUP | HJ 338 |
| | 5 | 5 | 4 | 4 | 82,5 | NU 2338 | N, NJ, NUP | - |
| 200 | 1,5 | 1,5 | 1,5 | 1,5 | 3,55 | NU 2840 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 7,4 | NU 1940 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 9,5 | NU 2940 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 14 | NU 1040 | N, NJ, NUP | HJ 1040 |
| | 2,1 | 2,1 | 2 | 2 | 19 | NU 2040 | N, NJ, NUP | - |
| | 2,1 | 1 | 2 | 1 | 23,5 | NU 3040 | N, NJ, NUP | - |
| | 3 | 2 | 2,5 | 2 | 41 | NU 3140 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 28,5 | NU 240 | N, NJ, NUP | HJ 240 |
| | 4 | 4 | 3 | 3 | 46 | NU 2240 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 59 | NU 3240 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 50 | NUB 326518 | - | - |
| | 5 | 5 | 4 | 4 | 56 | NU 340 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 96 | NU 2340 | N, NJ, NUP | - |
| 210 | 5 | 5 | 4 | 4 | 32 | 463553 | - | - |
| 220 | 2,1 | 1,5 | 2 | 1,5 | 8,3 | NU 1944 | N, NJ, NUP | - |
| | 4 | 2,1 | 3 | 2 | 8 | 246312 | - | - |
| 220 | 2,1 | 1,5 | 2 | 1,5 | 10 | NU 2944 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 18,5 | NU 1044 | N, NJ, NUP | HJ 1044 |
| | 3 | 3 | 2,5 | 2,5 | 25 | NU 2044 | N, NJ, NUP | - |
| | 3 | 1,1 | 2,5 | 1 | 31 | NU 3044 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 31,5 | 314591 | - | - |
| | 4 | 1,5 | 3 | 1,5 | 51,5 | NU 3144 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 38,5 | NU 244 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 62,5 | NU 2244 | N, NJ, NUP | HJ 244 |
| | 5 | 5 | 4 | 4 | 72,5 | NU 344 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 124 | NU 2344 | N, NJ, NUP | - |



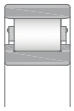

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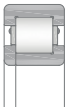


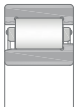

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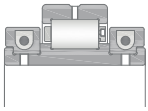


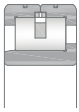

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **220,586** | 320 | 45 | - | 389 | 623 | 60 | 2000 | - | **411468** |
| **220,91** | 320 | 45 | - | 398 | 623 | 60 | 2000 | - | **413585** |
| **229,954** | 370 | 100 | - | 1175 | 2090 | 205 | 1400 | - | **475618** |
| **230** | 400 | 120 | - | 1684 | 2570 | 242 | 1500 | - | **322380** |
| **240** | 320 | 48 | - | 351 | 663 | 66 | 2000 | - | **NU 2948** |
| | 360 | 56 | - | 600 | 800 | 77 | 2000 | 3000 | **NU 1048** |
| | 360 | 72 | - | 900 | 1550 | 152 | 1500 | - | **NU 2048** |
| | 360 | 92 | - | 1008 | 1850 | 182 | 1500 | - | **NU 3048** |
| | 400 | 128 | - | 1452 | 2432 | 238 | 1300 | - | **NU 3148** |
| | 440 | 72 | - | 956 | 1370 | 127 | 1600 | 2200 | **NU 248** |
| | 440 | 120 | - | 1453 | 2360 | 221 | 1500 | 2200 | **NU 2248** |
| | 440 | 120 | - | 1587 | 2490 | 235 | 1400 | - | **313221** |
| | 500 | 95 | - | 1450 | 2090 | 179 | 1300 | 2000 | **NU 348** |
| | 500 | 155 | - | 2751 | 4000 | 346 | 1200 | 2400 | **NU 2348** |
| **250** | 380 | 83 | - | 908 | 1470 | 143 | 1500 | - | **314592** |
| **260** | 320 | 36 | - | 285 | 582 | 55 | 1800 | - | **NU 2852** |
| | 340 | 35 | - | 349 | 607 | 57 | 1800 | - | **312235** |
| | 340 | 38 | - | 344 | 618 | 58,3 | 1800 | - | **246313** |
| | 360 | 46 | - | 472 | 802 | 79 | 1700 | - | **NU 1952** |
| | 400 | 65 | - | 631 | 965 | 95,3 | 1800 | 2800 | **NU 1052** |
| **260** | 400 | 82 | - | 1195 | 2060 | 198 | 1400 | - | **NU 2052** |
| | 400 | 104 | - | 1340 | 2332 | 225 | 1400 | - | **NU 3052** |
| | 440 | 144 | - | 2080 | 3410 | 306 | 1200 | - | **NU 3152** |
| | 480 | 80 | - | 1170 | 1770 | 147 | 1400 | 2100 | **NU 252** |
| | 480 | 130 | - | 1796 | 3060 | 261 | 1300 | 2000 | **NU 2252** |
| | 540 | 102 | - | 1940 | 2780 | 234 | 1100 | 1850 | **NU 352** |

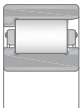

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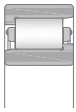

NUP

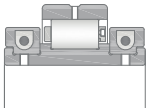

NJ


SCRB FIXED

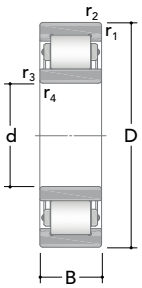

NJGL


NF

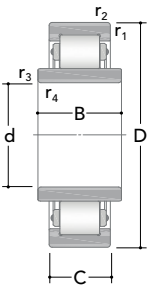

NJF


SCRB LOOSE

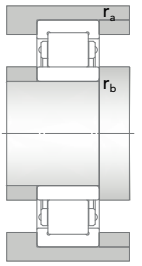
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| **220,586** | 3 | 3 | 2,5 | 2,5 | 12,3 | **411468** | - | - |
| **220,91** | 3 | 3 | 2,5 | 2,5 | 12,2 | **413585** | - | - |
| **229,954** | 3 | 3 | 2,5 | 2,5 | 44,5 | **475618** | - | - |
| **230** | 3 | 3 | 2,5 | 2,5 | 74 | **322380** | - | - |
| **240** | 2,1 | 2,1 | 2 | 2 | 11,5 | **NU 2948** | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 20 | **NU 1048** | N, NJ, NUP | HJ 1048 |
| | 3 | 3 | 2,5 | 2,5 | 26,5 | **NU 2048** | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 34 | **NU 3048** | N, NJ, NUP | - |
| | 3 | 1,1 | 2,5 | 1 | 64 | **NU 3148** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 51,5 | **NU 248** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 84 | **NU 2248** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 84 | **313221** | - | - |
| | 5 | 5 | 4 | 4 | 94,5 | **NU 348** | N, NJ, NUP | HJ 348 |
| | 5 | 5 | 4 | 4 | 155 | **NU 2348** | N, NJ, NUP | - |
| **250** | 3 | 3 | 2,5 | 2,5 | 35,5 | **314592** | - | - |
| **260** | 2 | 2 | 2 | 2 | 6,3 | **NU 2852** | N, NJ, NUP | - |
| | 2 | 2 | 2 | 2 | 8,7 | **312235** | - | - |
| | 4 | 2 | 3 | 2 | 9,3 | **246313** | - | - |
| | 2,1 | 1,5 | 2 | 1,5 | 14,5 | **NU 1952** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 29,5 | **NU 1052** | N, NJ, NUP | HJ 1052 |
| **260** | 4 | 4 | 3 | 3 | 39 | **NU 2052** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 48 | **NU 3052** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 98 | **NU 3152** | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 68,5 | **NU 252** | N, NJ, NUP | HJ 252 |
| | 5 | 5 | 4 | 4 | 110 | **NU 2252** | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 125 | **NU 352** | N, NJ, NUP | - |



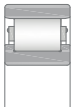

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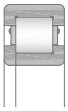


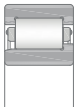

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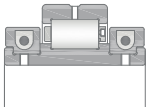


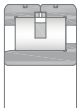

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **260** | 540 | 165 | - | 3192 | 4550 | 372 | 1100 | 1800 | **NU 2352** |
| (cont.) | | | | | | | | | |
| **280** | 350 | 42 | - | 362 | 742 | 67 | 1800 | - | **NU 2856** |
| | 360 | 38 | - | 378 | 697 | 64,3 | 1700 | - | **246314** |
| | 380 | 46 | - | 524 | 873 | 82 | 1700 | - | **NU 1956** |
| | 380 | 60 | - | 759 | 1380 | 132 | 1600 | - | **NU 2956** |
| | 420 | 65 | - | 668 | 1060 | 101 | 1700 | 2600 | **NU 1056** |
| | 420 | 82 | - | 1237 | 2130 | 201 | 1300 | - | **NU 2056** |
| | 420 | 82 | 65 | 652 | 1040 | 100 | 1500 | - | **NUB 312961** |
| | 460 | 146 | - | 2291 | 3900 | 334 | 1200 | 2000 | **NU 3156** |
| | 500 | 80 | - | 1406 | 2023 | 167 | 1400 | 2050 | **NU 256** |
| | 500 | 130 | - | 2330 | 3750 | 301 | 1200 | 2200 | **NU 2256** |
| | 500 | 165,1 | - | 2924 | 4930 | 424 | 1000 | - | **322312** |
| | 580 | 175 | - | 2723 | 4320 | 358 | 1000 | 1700 | **NU 2356** |
| **284,9** | 474,9 | 152,4 | - | 2256 | 4370 | 412 | 1100 | - | **475620** |
| **287,6** | 440 | 72 | - | 1066 | 1700 | 157 | 1200 | - | **463551** |
| **300** | 380 | 38 | - | 353 | 674 | 60 | 1600 | - | **NU 1860** |
| | 380 | 48 | - | 467 | 966 | 87 | 1600 | - | **NU 2860** |
| | 420 | 56 | - | 701 | 1130 | 109 | 1400 | - | **NU 1960** |
| | 420 | 72 | - | 997 | 1880 | 178 | 1400 | - | **NU 2960** |
| | 460 | 74 | - | 859 | 1377 | 130 | 1500 | 2000 | **NU 1060** |
| **300** | 460 | 95 | - | 1513 | 2730 | 253 | 1300 | 2000 | **NU 2060** |
| | 460 | 118 | - | 1635 | 3010 | 281 | 1200 | - | **NU 3060** |
| | 540 | 85 | - | 1435 | 2120 | 181 | 1300 | 1800 | **NU 260** |
| | 540 | 140 | - | 2097 | 3450 | 297 | 1200 | 1800 | **NU 2260** |
| | 620 | 185 | - | 4028 | 5850 | 476 | 950 | 1600 | **NU 2360** |
| **320** | 415 | 43 | - | 472 | 848 | 78 | 1500 | - | **246315** |
| | 440 | 72 | - | 763 | 1490 | 139 | 1400 | - | **314756** |

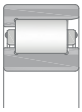

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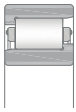

NUP

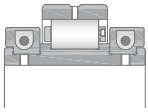

NJ


SCRB FIXED

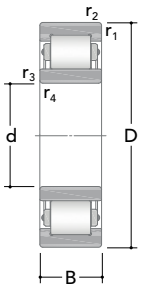

NJGL


NF

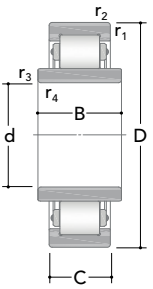

NJF


SCRB LOOSE

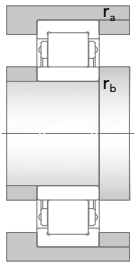
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| **260** (cont.) | 6 | 6 | 5 | 5 | 190 | NU 2352 | N, NJ, NUP | - |
| **280** | 2 | 1,1 | 2 | 1 | 9,6 | NU 2856 | N, NJ, NUP | - |
| | 4 | 2 | 3 | 2 | 9,6 | 246314 | - | - |
| | 2,1 | 2,1 | 2 | 2 | 15,5 | NU 1956 | N, NJ, NUP | - |
| | 2,1 | 2,1 | 2 | 2 | 20,5 | NU 2956 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 31,5 | NU 1056 | N, NJ, NUP | HJ 1056 |
| | 4 | 4 | 3 | 3 | 40 | NU 2056 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 34 | NUB 312961 | - | - |
| | 5 | 5 | 4 | 4 | 105 | NU 3156 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 71,5 | NU 256 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 115 | NU 2256 | N, NJ, NUP | HJ 2256 |
| | 4 | 4 | 3 | 3 | 160 | 322312 | - | - |
| | 6 | 6 | 5 | 5 | 232 | NU 2356 | N, NJ, NUP | - |
| **284,9** | 4 | 4 | 3 | 3 | 120 | 475620 | - | - |
| **287,6** | 6,4 | 6,4 | 6 | 6 | 42 | 463551 | - | - |
| **300** | 2,1 | 1,5 | 2 | 1,5 | 10,5 | NU 1860 | N, NJ, NUP | - |
| | 2,1 | 1,5 | 2 | 1,5 | 13,5 | NU 2860 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 24,5 | NU 1960 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 33 | NU 2960 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 46,5 | NU 1060 | N, NJ, NUP | HJ 1060 |
| **300** | 4 | 4 | 3 | 3 | 59,5 | NU 2060 | N, NJ, NUP | - |
| | 4 | 1,5 | 4 | 1,5 | 72 | NU 3060 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 88 | NU 260 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 145 | NU 2260 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 270 | NU 2360 | N, NJ, NUP | - |
| **320** | 4 | 2,1 | 3 | 2 | 16,2 | 246315 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 34,5 | 314756 | - | - |



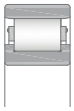

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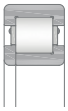


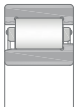

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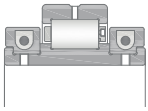


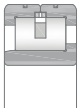

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **320** | 480 | 74 | - | 892 | 1430 | 130 | 1400 | 1900 | **NU 1064** |
| (cont.) | 480 | 95 | - | 1463 | 2610 | 241 | 1100 | 1700 | **NU 2064** |
| | 480 | 121 | - | 1857 | 3150 | 280 | 1100 | 1200 | **NU 3064** |
| | 540 | 176 | - | 3162 | 5340 | 445 | 900 | 1500 | **NU 3164** |
| | 580 | 92 | - | 1836 | 2750 | 201 | 1200 | 1600 | **NU 264** |
| | 580 | 150 | - | 3197 | 5000 | 414 | 1000 | 1900 | **NU 2264** |
| | 620 | 165 | - | 3439 | 5270 | 438 | 900 | - | **319915** |
| **330,15** | 558,8 | 141,29 | - | 2622 | 4440 | 375 | 1000 | - | **475622** |
| **340** | 420 | 35 | - | 213 | 395 | 33,1 | 1400 | - | **316197** |
| | 420 | 48 | - | 513 | 1100 | 96 | 1330 | - | **NU 2868** |
| | 460 | 56 | - | 692 | 1280 | 106 | 1400 | 1900 | **NU 1968** |
| | 460 | 72 | - | 1023 | 2040 | 183 | 1400 | 1900 | **NU 2968** |
| | 460,08 | 56 | - | 631 | 1100 | 100 | 1300 | - | **313816** |
| | 520 | 82 | - | 1120 | 1860 | 154 | 1300 | 2100 | **NU 1068** |
| | 520 | 133 | - | 2205 | 4180 | 359 | 1100 | 1700 | **NU 3068** |
| | 580 | 190 | - | 3477 | 5859 | 488 | 950 | 1600 | **NU 3168** |
| | 620 | 165 | - | 2649 | 4590 | 364 | 1000 | 1500 | **NU 2268** |
| **350** | 480 | 85 | - | 1054 | 2130 | 193 | 1100 | - | **612129** |
| **360** | 450 | 50 | - | 519 | 1010 | 90,6 | 1300 | - | **246316** |
| | 540 | 82 | - | 1116 | 1830 | 161 | 1300 | 1600 | **NU 1072** |
| | 540 | 106 | - | 1924 | 3590 | 309 | 1000 | 1400 | **NU 2072** |
| | 600 | 192 | - | 3439 | 6153 | 494 | 900 | 1500 | **NU 3172** |
| | 650 | 95 | - | 1965 | 3000 | 246 | 900 | - | **NU 272** |
| | 650 | 170 | - | 2952 | 4960 | 397 | 950 | 1400 | **NU 2272** |
| **360** | 750 | 224 | - | 5061 | 8150 | 622 | 850 | 1300 | **NU 2372** |
| **380** | 480 | 40 | - | 270 | 517 | 37,3 | 1200 | - | **316010** |
| | 480 | 46 | - | 563 | 1125 | 97 | 1300 | 2000 | **NU 1876** |

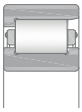

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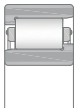

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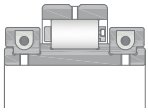

NJ


SCRB FIXED

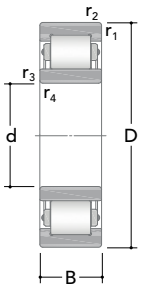

NJGL


NF

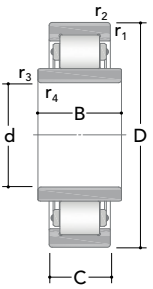

NJF


SCRB LOOSE

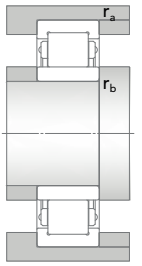
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 320 | 4 | 4 | 3 | 3 | 48,5 | NU 1064 | N, NJ, NUP | HJ 1064 |
| (cont.) | 4 | 4 | 3 | 3 | 62,5 | NU 2064 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 75 | NU 3064 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 175 | NU 3164 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 115 | NU 264 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 180 | NU 2264 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 235 | 319915 | - | - |
| 330,15 | | | | | 155 | 475622 | - | - |
| 340 | 2,1 | 2,1 | 2 | 2 | 9,6 | 316197 | - | - |
| | 2,1 | 2,1 | 2 | 2 | 15 | NU 2868 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 27,5 | NU 1968 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 37 | NU 2968 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 27,5 | 313816 | - | - |
| | 5 | 5 | 4 | 4 | 65 | NU 1068 | N, NJ, NUP | HJ 1068 |
| | 5 | 5 | 4 | 4 | 106 | NU 3068 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 210 | NU 3168 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 220 | NU 2268 | N, NJ, NUP | - |
| 350 | 4 | 4 | 3 | 3 | 48 | 612129 | - | - |
| 360 | 4 | 4 | 3 | 3 | 18,7 | 246316 | - | - |
| | 5 | 5 | 4 | 4 | 67,5 | NU 1072 | N, NJ, NUP | HJ 1072 |
| | 5 | 5 | 4 | 4 | 88,5 | NU 2072 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 225 | NU 3172 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 150 | NU 272 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 250 | NU 2272 | N, NJ, NUP | - |
| 360 | 7,5 | 7,5 | 6 | 6 | 510 | NU 2372 | N, NJ, NUP | - |
| 380 | 2,1 | 2,1 | 2 | 2 | 15,5 | 316010 | - | - |
| | 2,1 | 2,1 | 2 | 2 | 23 | NU 1876 | N, NJ, NUP | - |



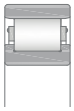

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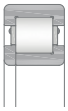


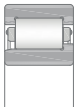

NUB

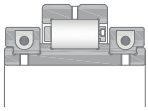


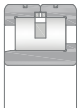

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **380** | 560 | 82 | - | 1152 | 1930 | 168 | 1200 | 1600 | **NU 1076** |
| (cont.) | 560 | 106 | - | 1910 | 3700 | 309 | 900 | 1400 | **NU 2076** |
| | 560 | 135 | - | 2414 | 4750 | 397 | 1000 | 1800 | **NU 3076** |
| | 680 | 175 | - | 4007 | 6460 | 507 | 900 | 1600 | **NU 2276** |
| **400** | 500 | 46 | - | 572 | 1190 | 99 | 1300 | 1900 | **NU 1880** |
| | 540 | 65 | - | 944 | 1700 | 150 | 1100 | 1400 | **NU 1980** |
| | 540 | 82 | - | 1401 | 2830 | 248 | 1200 | 1600 | **NU 2980** |
| | 600 | 90 | - | 1387 | 2320 | 194 | 1100 | 1500 | **NU 1080** |
| | 600 | 118 | - | 2447 | 4660 | 373 | 900 | - | **NU 2080** |
| | 600 | 148 | - | 2816 | 5450 | 437 | 900 | 1200 | **NU 3080** |
| **406,4** | 546,1 | 69,85 | - | 1118 | 2000 | 176 | 1100 | - | **322821** |
| | 603,25 | 82,55 | - | 1489 | 2512 | 205 | 800 | - | **322815** |
| **410** | 790 | 215 | - | 6131 | 9680 | 741 | 700 | - | **319896** |
| | 790 | 280 | - | 5575 | 9040 | 687 | 630 | - | **316931** |
| **420** | 520 | 40 | - | 295 | 608 | 47,3 | 1100 | - | **315932** |
| | 520 | 46 | - | 575 | 1200 | 89,9 | 1200 | 1800 | **NU 1884** |
| | 520 | 75 | - | 940 | 2220 | 191 | 1000 | 1400 | **NU 3884** |
| | 560 | 65 | - | 975 | 1789 | 155 | 1000 | 1300 | **NU 1984** |
| | 560 | 82 | - | 1421 | 2871 | 257 | 1100 | 1500 | **NU 2984** |
| | 620 | 90 | - | 1425 | 2473 | 202 | 1100 | 1400 | **NU 1084** |
| | 620 | 118 | - | 2460 | 4750 | 376 | 900 | 1680 | **NU 2084** |
| | 620 | 150 | - | 2921 | 5430 | 432 | 800 | 1200 | **NU 3084** |
| | 700 | 224 | - | 4981 | 9090 | 694 | 750 | 1300 | **NU 3184** |
| **430** | 530 | 40 | - | 294 | 601 | 45,8 | 1100 | - | **315834** |
| **440** | 540 | 40 | - | 292 | 600 | 40,8 | 1000 | - | **316011** |
| | 540 | 60 | - | 807 | 1899 | 153 | 1000 | 1300 | **NU 2888** |
| | 600 | 74 | - | 1068 | 2080 | 168 | 1100 | 1400 | **NU 1988** |

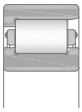

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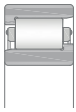

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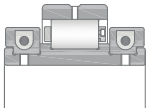

NJ


SCRB FIXED

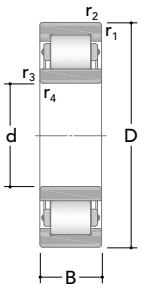

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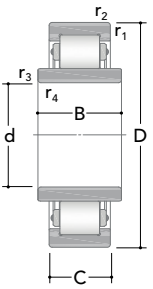

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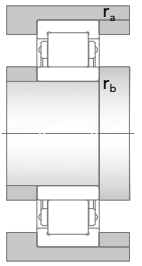
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 380 | 5 | 5 | 4 | 4 | 70 | NU 1076 | N, NJ, NUP | HJ 1076 |
| (cont.) | 5 | 5 | 4 | 4 | 92,5 | NU 2076 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 115 | NU 3076 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 275 | NU 2276 | N, NJ, NUP | - |
| 400 | 2,1 | 2,1 | 2 | 2 | 21 | NU 1880 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 41 | NU 1980 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 57 | NU 2980 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 91 | NU 1080 | N, NJ, NUP | HJ 1080 |
| | 5 | 5 | 4 | 4 | 120 | NU 2080 | N, NJ, NUP | - |
| | 5 | 3 | 4 | 2,5 | 175 | NU 3080 | N, NJ, NUP | - |
| 406,4 | 5 | 5 | 4 | 4 | 46,5 | 322821 | - | - |
| | 5 | 5 | 4 | 4 | 84 | 322815 | - | - |
| 410 | 7,5 | 7,5 | 6 | 6 | 500 | 319896 | - | - |
| | 7,5 | 7,5 | 6 | 6 | 610 | 316931 | - | - |
| 420 | 2,1 | 2,1 | 2 | 2 | 17,5 | 315932 | - | - |
| | 2,1 | 1,5 | 2 | 1,5 | 20 | NU 1884 | N, NJ, NUP | - |
| | 2,1 | 1,5 | 2 | 1,5 | 33 | NU 3884 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 48 | NU 1984 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 59 | NU 2984 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 94 | NU 1084 | N, NJ, NUP | HJ 1084 |
| | 5 | 5 | 4 | 4 | 125 | NU 2084 | N, NJ, NUP | - |
| | 5 | 3 | 4 | 3 | 160 | NU 3084 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 380 | NU 3184 | N, NJ, NUP | - |
| 430 | 2,1 | 2,1 | 2 | 2 | 18,5 | 315834 | - | - |
| 440 | 2,1 | 2,1 | 2 | 2 | 18,5 | 316011 | - | - |
| | 2,1 | 2,1 | 2 | 2 | 34 | NU 2888 | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 64 | NU 1988 | N, NJ, NUP | - |



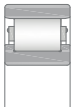

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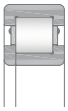


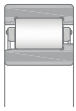

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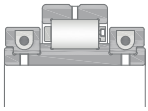


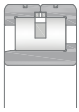

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **440** | 600 | 95 | - | 1883 | 3902 | 338 | 1100 | 1600 | **NU 2988** |
| (cont.) | 650 | 94 | - | 1493 | 2630 | 210 | 1000 | 1100 | **NU 1088** |
| | 650 | 122 | - | 2581 | 4960 | 387 | 850 | 1300 | **NU 2088** |
| | 650 | 157 | - | 2608 | 5360 | 422 | 800 | - | **NU 3088** |
| **440** | 720 | 226 | - | 5190 | 10057 | 769 | 700 | 1200 | **NU 3188** |
| **460** | 580 | 56 | - | 817 | 1690 | 139 | 1000 | - | **NU 1892** |
| | 580 | 72 | - | 1087 | 2400 | 191 | 1100 | 1400 | **NU 2892** |
| | 680 | 100 | - | 1653 | 2850 | 221 | 950 | 1200 | **NU 1092** |
| | 680 | 128 | - | 2843 | 5479 | 421 | 700 | 1100 | **NU 2092** |
| | 680 | 163 | - | 3432 | 6771 | 526 | 700 | 1120 | **NU 3092** |
| | 760 | 240 | - | 5280 | 9650 | 732 | 670 | 1100 | **NU 3192** |
| **460** | 830 | 165 | - | 4189 | 6850 | 506 | 750 | 1100 | **NU 1292** |
| | 830 | 212 | - | 5181 | 8650 | 644 | 700 | 1100 | **NU 2292** |
| **469,9** | 596,9 | 57,15 | - | 786 | 1600 | 120 | 900 | - | **635010** |
| | 698,5 | 139,7 | - | 2999 | 5590 | 429 | 700 | - | **326097** |
| **470** | 920 | 246 | - | 8203 | 13190 | 949 | 500 | - | **320362** |
| **480** | 600 | 56 | - | 764 | 1610 | 126 | 900 | 1900 | **NU 1896** |
| | 600 | 72 | - | 1103 | 2420 | 198 | 900 | 1100 | **NU 2896** |
| | 650 | 78 | - | 1176 | 2240 | 181 | 950 | 1300 | **NU 1996** |
| | 650 | 78 | - | 1332 | 2530 | 210 | 900 | - | **319164** |
| | 700 | 100 | - | 1681 | 3060 | 229 | 900 | 1200 | **NU 1096** |
| | 700 | 128 | - | 2862 | 5610 | 423 | 750 | 1200 | **NU 2096** |
| | 790 | 248 | - | 5975 | 10880 | 799 | 630 | 1100 | **NU 3196** |
| **500** | 620 | 45 | - | 402 | 827 | 45,3 | 900 | 900 | **316198** |
| | 620 | 56 | - | 798 | 1720 | 137 | 900 | 1800 | **NU 18/500** |
| | 670 | 78 | - | 1224 | 2395 | 196 | 800 | 1600 | **NU 19/500** |

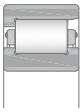

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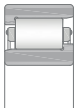

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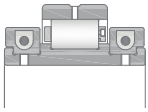

NJ


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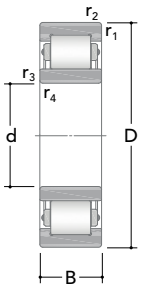

NJGL


NF

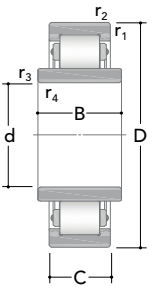

NJF


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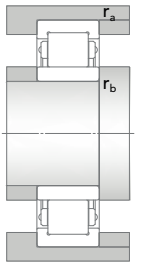
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 440 | 4 | 4 | 3 | 3 | 84 | NU 2988 | N, NJ, NUP | - |
| (cont.) | 6 | 6 | 5 | 5 | 105 | NU 1088 | N, NJ, NUP | HJ 1088 |
| | 6 | 6 | 5 | 5 | 145 | NU 2088 | N, NJ, NUP | - |
| | 6 | 4 | 5 | 4 | 180 | NU 3088 | N, NJ, NUP | - |
| 440 | 6 | 6 | 5 | 5 | 395 | NU 3188 | N, NJ, NUP | - |
| 460 | 3 | 3 | 2,5 | 2,5 | 37 | NU 1892 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 48 | NU 2892 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 125 | NU 1092 | N, NJ, NUP | HJ 1092 |
| | 6 | 6 | 5 | 5 | 165 | NU 2092 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 210 | NU 3092 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 455 | NU 3192 | N, NJ, NUP | - |
| 460 | 7,5 | 7,5 | 6 | 6 | 415 | NU 1292 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 530 | NU 2292 | N, NJ, NUP | - |
| 469,9 | 3 | 3 | 2,5 | 2,5 | 40,5 | 635010 | - | - |
| | 6 | 6 | 5 | 5 | 200 | 326097 | - | - |
| 470 | 9,5 | 9,5 | 8 | 8 | 750 | 320362 | - | - |
| 480 | 3 | 3 | 2,5 | 2,5 | 39 | NU 1896 | N, NJ, NUP | - |
| | 3 | 3 | 2,5 | 2,5 | 47,5 | NU 2896 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 75,5 | NU 1996 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 78 | 319164 | - | - |
| | 6 | 6 | 5 | 5 | 130 | NU 1096 | N, NJ, NUP | HJ 1096 |
| | 6 | 6 | 5 | 5 | 170 | NU 2096 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 500 | NU 3196 | N, NJ, NUP | - |
| 500 | 2,1 | 2,1 | 2 | 2 | 29 | 316198 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 39 | NU 18/500 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 79 | NU 19/500 | N, NJ, NUP | - |



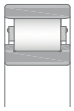

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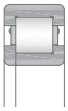


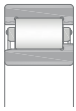

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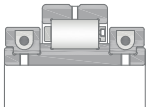


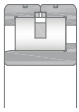

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **500** | 670 | 128 | - | 2504 | 5730 | 434 | 700 | 1400 | **NU 39/500** |
| (cont.) | 720 | 100 | - | 1769 | 3240 | 231 | 900 | 1500 | **NU 10/500** |
| | 720 | 128 | - | 3030 | 6050 | 439 | 750 | 1400 | **NU 20/500** |
| | 720 | 167 | - | 3870 | 7950 | 606 | 750 | 1400 | **NU 30/500** |
| | 830 | 264 | - | 6590 | 12500 | 869 | 600 | 1100 | **NU 31/500** |
| | 920 | 185 | - | 5789 | 8560 | 610 | 670 | 1100 | **NU 12/500** |
| **530** | 650 | 45 | - | 415 | 890 | 61 | 2000 | 3000 | **315835** |
| | 650 | 72 | - | 1163 | 2720 | 214 | 800 | 1500 | **NU 28/530** |
| | 710 | 106 | - | 2384 | 5000 | 411 | 850 | 1400 | **NU 29/530** |
| | 780 | 112 | - | 2510 | 4550 | 303 | 800 | 1300 | **NU 10/530** |
| | 780 | 145 | - | 3791 | 7360 | 549 | 670 | 1300 | **NU 20/530** |
| | 780 | 185 | - | 4123 | 8620 | 638 | 600 | - | **NU 30/530** |
| | 870 | 272 | - | 7483 | 14690 | 1046 | 560 | 1100 | **NU 31/530** |
| **560** | 680 | 45 | - | 435 | 940 | 61 | 1800 | 2700 | **316053** |
| | 680 | 56 | - | 897 | 2062 | 152 | 850 | 1600 | **NU 18/560** |
| | 750 | 85 | - | 1645 | 3405 | 250 | 700 | 1400 | **NU 19/560** |
| | 820 | 115 | - | 2759 | 5250 | 307 | 750 | 1200 | **NU 10/560** |
| | 820 | 150 | - | 3952 | 7850 | 553 | 630 | 1200 | **NU 20/560** |
| | 1030 | 206 | - | 7240 | 11200 | 766 | 560 | 950 | **NU 12/560** |
| **571,5** | 711,2 | 120,65 | - | 2457 | 6190 | 474 | 600 | - | **474795** |
| **600** | 730 | 52 | - | 465 | 1010 | 64,9 | 700 | - | **315836** |
| | 730 | 60 | - | 910 | 2080 | 107 | 800 | 1500 | **NU 18/600** |
| | 800 | 90 | - | 1914 | 3790 | 274 | 700 | 1400 | **NU 19/600** |
| | 800 | 118 | - | 2958 | 6520 | 473 | 700 | 850 | **NUP 29/600** |
| | 870 | 118 | - | 2861 | 5400 | 359 | 700 | 1100 | **NU 10/600** |
| | 870 | 155 | - | 4186 | 8080 | 561 | 600 | 900 | **NU 20/600** |
| | 870 | 200 | - | 5419 | 11080 | 764 | 600 | 1100 | **NU 30/600** |
| | 1090 | 155 | - | 7831 | 12590 | 669 | 500 | 900 | **NU 12/600** |

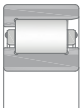

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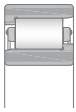

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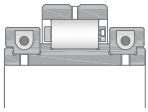

NJ


SCRB FIXED

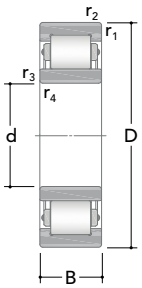

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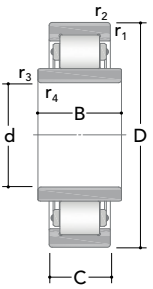

NJF


SCRB LOOSE

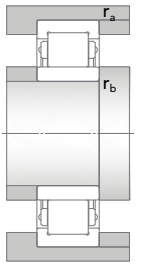
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 500 | 5 | 5 | 4 | 4 | 130 | NU 39/500 | N, NJ, NUP | - |
| (cont.) | 6 | 6 | 5 | 5 | 135 | NU 10/500 | N, NJ, NUP | HJ 10/500 |
| | 6 | 6 | 5 | 5 | 180 | NU 20/500 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 225 | NU 30/500 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 595 | NU 31/500 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 585 | NU 12/500 | N, NJ, NUP | - |
| 530 | 3 | 3 | 2,5 | 2,5 | 30 | 315835 | - | - |
| | 3 | 3 | 2,1 | 2,1 | 52 | NU 28/530 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 120 | NU 29/530 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 190 | NU 10/530 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 255 | NU 20/530 | N, NJ, NUP | - |
| | 6 | 3 | 5 | 3 | 310 | NU 30/530 | N, NJ, NUP | - |
| | 7,5 | 4 | 6 | 3 | 680 | NU 31/530 | N, NJ, NUP | - |
| 560 | 3 | 3 | 2,5 | 2,5 | 31,5 | 316053 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 44,5 | NU 18/560 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 110 | NU 19/560 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 210 | NU 10/560 | N, NJ, NUP | HJ 10/560 |
| | 6 | 6 | 5 | 5 | 290 | NU 20/560 | N, NJ, NUP | - |
| | 9,5 | 9,5 | 8 | 8 | 805 | NU 12/560 | N, NJ, NUP | - |
| 571,5 | 5 | 5 | 4 | 4 | 115 | 474795 | - | - |
| 600 | 3 | 3 | 2,5 | 2,5 | 41 | 315836 | - | - |
| | 3 | 3 | 2,5 | 2,5 | 50,5 | NU 18/600 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 130 | NU 19/600 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 165 | NUP 29/600 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 245 | NU 10/600 | N, NJ, NUP | HJ 10/600 |
| | 6 | 6 | 5 | 5 | 325 | NU 20/600 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 415 | NU 30/600 | N, NJ, NUP | - |
| | 9,5 | 9,5 | 8 | 8 | 710 | NU 12/600 | N, NJ, NUP | - |



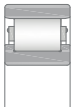

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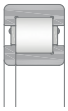


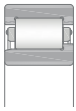

NUB

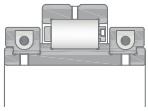


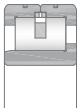

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **630** | 780 | 56 | - | 598 | 1270 | 84 | 1600 | 2200 | **315933** |
| | 780 | 88 | - | 1785 | 4450 | 289 | 700 | 1300 | **NU 28/630** |
| | 780 | 112 | - | 2191 | 5650 | 446 | 600 | 1300 | **NU 38/630** |
| | 850 | 100 | - | 2240 | 4400 | 315 | 700 | 1300 | **NU 19/630** |
| | 850 | 128 | - | 3350 | 7350 | 505 | 700 | 1100 | **NU 29/630** |
| | 920 | 128 | - | 3481 | 6210 | 424 | 630 | 1100 | **NU 10/630** |
| | 920 | 170 | - | 4731 | 9520 | 664 | 560 | 850 | **NU 20/630** |
| | 920 | 212 | - | 6407 | 14120 | 987 | 500 | - | **NU 30/630** |
| | 1150 | 230 | - | 8699 | 13740 | 900 | 450 | 800 | **NU 12/630** |
| **640** | 790 | 56 | - | 611 | 1294 | 83 | 1600 | 2000 | **315837** |
| **660,4** | 863,6 | 107,95 | - | 3119 | 6450 | 448 | 500 | 600 | **464777** |
| **670** | 820 | 56 | - | 615 | 1360 | 82 | 1500 | 2000 | **316012** |
| | 820 | 69 | - | 1236 | 2750 | 200 | 600 | 1400 | **NU 18/670** |
| | 900 | 103 | - | 2360 | 4660 | 319 | 600 | 1230 | **NU 19/670** |
| | 980 | 136 | - | 3749 | 6830 | 460 | 600 | 950 | **NU 10/670** |
| | 980 | 180 | - | 5438 | 11780 | 735 | 500 | 800 | **NU 20/670** |
| | 980 | 230 | - | 6953 | 14730 | 1021 | 450 | - | **NU 30/670** |
| **673,1** | 838,2 | 117,475 | - | 3000 | 7160 | 537 | 600 | - | **316912** |
| **710** | 870 | 74 | - | 1447 | 3328 | 189 | 600 | 1200 | **NU 18/710** |
| | 870 | 95 | - | 1940 | 5010 | 375 | 630 | 850 | **NU 28/710** |
| | 950 | 140 | - | 3767 | 8800 | 563 | 600 | 1000 | **NU 29/710** |
| | 1030 | 140 | - | 4747 | 8500 | 563 | 560 | 950 | **NU 10/710** |
| | 1030 | 185 | - | 5952 | 12140 | 804 | 500 | 700 | **NU 20/710** |
| **720** | 880 | 62 | - | 697 | 1540 | 90,3 | 1300 | 1625 | **315799** |
| **750** | 920 | 78 | - | 1474 | 3490 | 163 | 540 | 1100 | **NU 18/750** |
| | 1000 | 112 | - | 2716 | 5500 | 358 | 500 | - | **319166** |

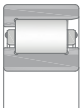

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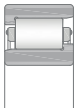

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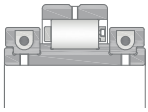

NJ


SCRB FIXED

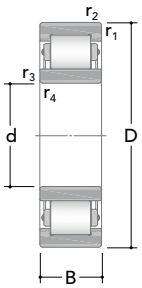

NJGL


NF

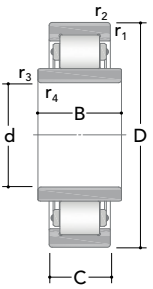

NJF


SCRB LOOSE

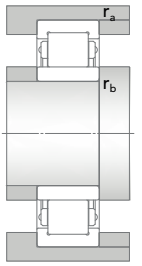
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| **630** | 4 | 4 | 3 | 3 | 55 | **315933** | - | - |
| | 4 | 4 | 3 | 3 | 100 | **NU 28/630** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 120 | **NU 38/630** | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 165 | **NU 19/630** | N, NJ, NU | - |
| | 6 | 6 | 5 | 5 | 220 | **NU 29/630** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 285 | **NU 10/630** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 400 | **NU 20/630** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 490 | **NU 30/630** | N, NJ, NUP | - |
| | 12 | 12 | 10 | 10 | 1110 | **NU 12/630** | N, NJ, NUP | - |
| **640** | 4 | 4 | 3 | 3 | 56 | **315837** | - | - |
| **660,4** | 5 | 5 | 4 | 4 | 177 | **464777** | - | - |
| **670** | 3 | 3 | 2,5 | 2,5 | 60 | **316012** | - | - |
| | 4 | 4 | 3 | 3 | 84,5 | **NU 18/670** | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 195 | **NU 19/670** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 350 | **NU 10/670** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 480 | **NU 20/670** | N, NJ, NUP | - |
| | 7,5 | 4 | 6 | 3 | 595 | **NU 30/670** | N, NJ, NUP | - |
| **673,1** | 5 | 5 | 4 | 4 | 160 | **316912** | - | - |
| **710** | 4 | 4 | 3 | 3 | 97,5 | **NU 18/710** | N, NJ, NUP | - |
| | 4 | 4 | 3 | 3 | 130 | **NU 28/710** | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 295 | **NU 29/710** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 415 | **NU 10/710** | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 540 | **NU 20/710** | N, NJ, NUP | - |
| **720** | 4 | 4 | 3 | 3 | 74,5 | **315799** | - | - |
| **750** | 5 | 5 | 4 | 4 | 110 | **NU 18/750** | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 255 | **319166** | - | - |



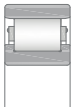

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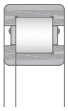


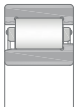

NUB

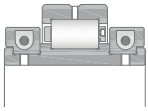


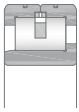

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **750** | 1090 | 150 | - | 4740 | 9020 | 580 | 430 | 850 | **NU 10/750** |
| (cont.) | 1090 | 195 | - | 7060 | 14608 | 980 | 430 | 670 | **NU 20/750** |
| **800** | 980 | 82 | - | 1769 | 4190 | 276 | 530 | 1100 | **NU 18/800** |
| | 1150 | 155 | - | 5456 | 10490 | 688 | 430 | 800 | **NU 10/800** |
| | 1150 | 200 | - | 7043 | 14600 | 937 | 400 | 630 | **NU 20/800** |
| **820** | 990 | 72 | - | 858 | 1930 | 110 | 1120 | 1400 | **315800** |
| **850** | 1030 | 74 | - | 934 | 2080 | 120 | 1110 | 1400 | **316200** |
| | 1030 | 106 | - | 2122 | 6000 | 240 | 500 | 670 | **NU 28/850** |
| | 1120 | 118 | - | 3347 | 7160 | 459 | 450 | 950 | **NU 19/850** |
| | 1120 | 155 | - | 4648 | 10990 | 707 | | | **NU 29/850** |
| **900** | 1090 | 85 | - | 1985 | 4910 | 240 | 450 | 600 | **NU 18/900** |
| | 1090 | 112 | - | 2666 | 7150 | 472 | 410 | 390 | **NU 28/900** |
| | 1180 | 122 | - | 4110 | 8700 | 554 | 390 | 500 | **NU 19/900** |
| | 1180 | 165 | - | 5590 | 13860 | 887 | 430 | 560 | **NU 29/900** |
| **1000** | 1220 | 100 | - | 2640 | 6550 | 400 | 400 | 530 | **NU 18/1000** |
| | 1220 | 128 | - | 3570 | 9890 | 609 | 370 | 470 | **NU 28/1000** |
| | 1220 | 128 | 100 | 2624 | 6510 | 398 | 350 | 460 | **NUB 18/1000** |
| | 1320 | 185 | - | 6994 | 17070 | 1066 | - | - | **NU 29/1000** |
| **1030** | 1250 | 100 | - | 1490 | 3440 | 172 | 290 | 330 | **319579** |
| **1060** | 1280 | 100 | - | 1493 | 3390 | 216 | - | - | **316789** |
| | 1280 | 128 | - | 3809 | 10220 | 631 | 280 | 320 | **NU 28/1060** |
| | 1400 | 195 | - | 7236 | 17260 | 1058 | 250 | 390 | **NU 29/1060** |
| | 1400 | 250 | - | 9136 | 23880 | 1453 | 240 | 290 | **NU 39/1060** |
| | 1500 | 325 | - | 13020 | 32280 | 1937 | - | - | **NU 30/1060** |
| **1120** | 1360 | 104 | - | 1632 | 3845 | 227 | 200 | 250 | **316201** |

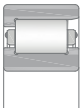

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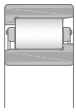

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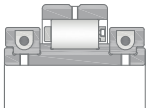

NJ


SCRB FIXED

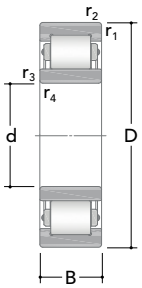

NJGL


NF

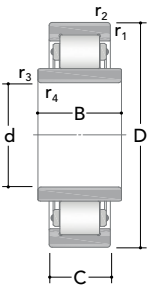

NJF


SCRB LOOSE

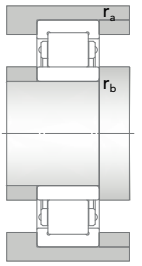
| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 750 | 7,5 | 7,5 | 6 | 6 | 490 | NU 10/750 | N, NJ, NUP | - |
| (cont.) | 7,5 | 7,5 | 6 | 6 | 635 | NU 20/750 | N, NJ, NUP | - |
| 800 | 5 | 5 | 4 | 4 | 145 | NU 18/800 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 560 | NU 10/800 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 715 | NU 20/800 | N, NJ, NUP | - |
| 820 | 5 | 5 | 4 | 4 | 100 | 315800 | - | - |
| 850 | 5 | 5 | 4 | 4 | 115 | 316200 | - | - |
| | 5 | 5 | 4 | 4 | 190 | NU 28/850 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 330 | NU 19/850 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 430 | NU 29/850 | N, NJ, NUP | - |
| 900 | 5 | 5 | 4 | 4 | 170 | NU 18/900 | N, NJ, NUP | - |
| | 5 | 5 | 4 | 4 | 235 | NU 28/900 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 380 | NU 19/900 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 560 | NU 29/900 | N, NJ, NUP | - |
| 1000 | 6 | 6 | 5 | 5 | 265 | NU 18/1000 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 350 | NU 28/1000 | N, NJ, NUP | - |
| | 6 | 6 | 5 | 5 | 287 | NUB 18/1000 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 700 | NU 29/1000 | N, NJ, NUP | - |
| 1030 | 6 | 6 | 5 | 5 | 225 | 319579 | - | - |
| 1060 | 6 | 6 | 5 | 5 | 230 | 316789 | - | - |
| | 6 | 6 | 5 | 5 | 360 | NU 28/1060 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 870 | NU 29/1060 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 1070 | NU 39/1060 | N, NJ, NUP | - |
| | 9,5 | 9,5 | 8 | 8 | 1900 | NU 30/1060 | N, NJ, NUP | - |
| 1120 | 6 | 6 | 5 | 5 | 285 | 316201 | - | - |



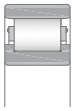

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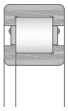


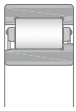

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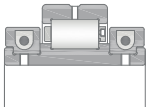


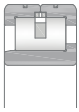

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | | |
| **1120** | 1360 | 106 | - | 3397 | 8620 | 508 | 320 | 380 | **NU 18/1120** |
| (cont.) | 1580 | 345 | - | 15683 | 38490 | 2290 | 180 | 210 | **NU 30/1120** |
| **1180** | 1420 | 106 | - | 3059 | 7730 | 451 | 290 | 360 | **NU 18/1180** |
| | 1540 | 206 | - | 9037 | 21500 | 1284 | 170 | 330 | **NU 29/1180** |
| | 1540 | 272 | - | 11221 | 28470 | 1698 | 180 | 340 | **NU 39/1180** |
| **1250** | 1500 | 106 | - | 1732 | 4080 | 236 | 200 | 250 | **315913** |
| | 1750 | 290 | - | 12950 | 30460 | 1758 | 150 | 170 | **NU 20/1250** |
| **1320** | 1600 | 122 | - | 4460 | 11241 | 646 | 240 | 300 | **NU 18/1320** |
| | | | | 11472 | 30090 | 1736 | - | - | |
| | 1720 | 300 | - | 13100 | 34719 | 1972 | 200 | 280 | **NU 39/1320** |
| | 1850 | 400 | - | 21359 | 54780 | 3088 | 170 | 210 | **NU 30/1320** |
| **1400** | 1700 | 175 | - | 6694 | 18250 | 1037 | 200 | 320 | **NU 28/1400** |
| **1500** | 1820 | 140 | - | 3317 | 7950 | 437 | 180 | 220 | **319301** |
| **1700** | 2060 | 160 | - | 3694 | 9040 | 484 | 150 | 180 | **319286** |
| **1900** | 2300 | 175 | - | 8693 | 24620 | 1270 | - | - | **NU 18/1900** |

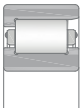

N

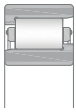

NUP

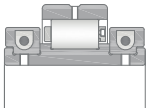

NJ


SCRB FIXED


NJGL


NF


NJF

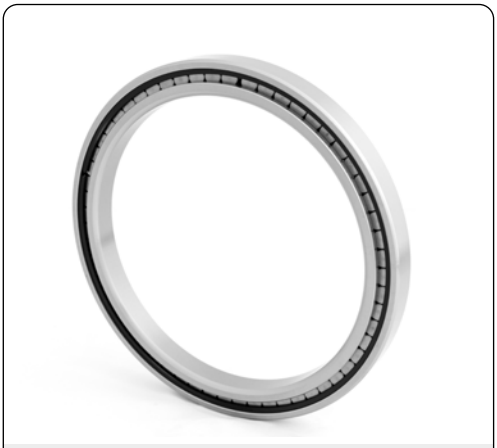

SCRB LOOSE

| Dimensions | | | | | Mass | Designation | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design | Alternative design | Angle ring |
| [mm] | | | | | [kg] | | | |
| 1120 | 6 | 6 | 5 | 5 | 335 | NU 18/1120 | N, NJ, NUP | - |
| (cont.) | 9,5 | 9,5 | 8 | 8 | 2150 | NU 30/1120 | N, NJ, NUP | - |
| 1180 | 6 | 6 | 5 | 5 | 350 | NU 18/1180 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 1050 | NU 29/1180 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 1400 | NU 39/1180 | N, NJ, NUP | - |
| 1250 | 6 | 6 | 5 | 5 | 330 | 315913 | - | - |
| | 9,5 | 9,5 | 8 | 8 | 2320 | NU 20/1250 | N, NJ, NUP | - |
| 1320 | 6 | 6 | 5 | 5 | 530 | NU 18/1320 | N, NJ, NUP | - |
| | 7,5 | 7,5 | 6 | 6 | 1900 | NU 39/1320 | N, NJ, NUP | - |
| | 12 | 12 | 10 | 10 | 3550 | NU 30/1320 | N, NJ, NUP | - |
| 1400 | 7,5 | 7,5 | 6 | 6 | 860 | NU 28/1400 | N, NJ, NUP | - |
| 1500 | 7,5 | 7,5 | 6 | 6 | 665 | 319301 | - | - |
| 1700 | 7,5 | 7,5 | 6 | 6 | 925 | 319286 | - | - |
| 1900 | 9,5 | 9,5 | 8 | 8 | 1480 | NU 18/1900 | N, NJ, NUP | - |

# Single row full complement cylindrical roller bearings

## Radial internal clearance

Single row full complement cylindrical roller bearings are produced as standard with Normal radial internal clearance CN, but they are available with C2, C3, C4 and C5 radial clearance, in accordance with the ISO 5753:2009.
The radial internal clearance values are reported in the previous **Tab. 1 page 215** and **Tab. 2 page 216**, for cylindrical and tapered bore respectively, and they are valid only for bearing unmounted and unloaded.



Single row full complement cylindrical roller bearing

## Misalignment

The permissible misalignment between the shaft and the seat of a single row full complement cylindrical roller bearing is restricted to a few minutes of arc:

- 4 minutes of arc for bearings of the narrow dimensional series 18
- 3 minutes of arc for bearings of the wider dimensional series 22, 23, 28, 29 and 30

The above values can be used for the non-locating bearings, if the shaft and housing axes remain unchanged. Larger values of misalignment may be used, but with negative consequences regarding the bearing life. For additional information, please consult the RKB application engineering service.

## Minimum load

A minimum radial load is requested for a single row full complement cylindrical roller bearings to allow an the correct functioning, especially in critical working conditions like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions, a sliding movement between rollers and raceways can take place by the inertial forces, influencing negatively the bearing life. Minimum radial load can be theoretically estimated using this formula:

$$F_{rm} > \frac{C_{0r}}{50}$$

Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_{0r}$ basic static load rating, [kN] .

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the single row full complement cylindrical roller bearing. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a larger value of the minimum radial load is required.

## Axial load carrying capacities

RKB Single row full complement cylindrical roller bearings can be used in one direction locating position, withstanding axial loads combined with radial force.
In order to support continuous axial loads in one direction the bearing ribs have to be supported across their full height. The maximum axial load has to be in compliance with the following disequations:

$$F_a \leq 0{,}4\, F_r$$

$$F_a \leq \frac{K_1 \cdot K_2 \cdot d_m^{1,5} \cdot n^{-0,6}}{1000}$$

$$F_a \leq \frac{K_2 \cdot d_m^2}{1000}$$

Where:

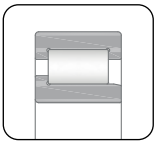
- $F_a$ maximum axial load, [kN];
- $K_1$ experimental factor connected with lubrication system, [kN] see following **Tab. 4 page 218**;
- $K_2$ experimental factor connected with bearing series see following **Tab. 5 page 259**;
- n operating speed [rpm];
- $d_m$ mean bearing diameter [mm];

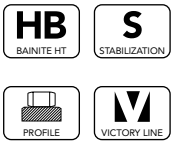
| Series | Factor $K_2$ |
|---|---|
| NCF18 | 0,33 |
| NCF29 | 0,75 |
| NCF30 | 1,23 |
| NCF22 | 1,43 |
| NJG23 | 2,18 |

Tab. 5 - Experimental Factor $K_2$

For additional information regarding the above limits please consult the RKB application engineering services.

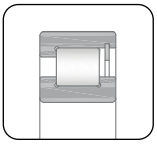
## Type NJG (SL19)

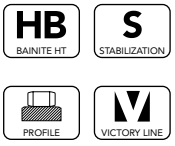





- Outer ring with two integral side ribs
- Inner ring with one integral side rib
- Full complement (cageless) separable design for increased carrying capacities
- Reduced maximum rotational speed compared to caged design
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position

## Type NCF (SL18)

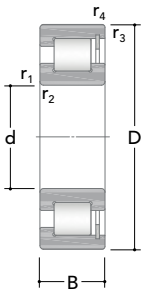




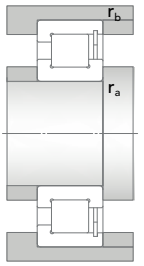

- Outer ring with one integral side rib and retaining ring
- Inner ring with two integral side ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position

| Suffixes | Internal Design |
|---|---|
| E | Optimized internal design with reinforced execution |
| EC | Optimized internal design for increased load ratings |
| SP | Special or non-standard bearing |
| V | Full complement of rolling elements (without cage) |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

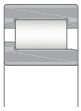
| Suffixes | Accuracy, clearance, running |
|---|---|
| C2 | Radial internal clearance less than CN |
| CN | Standard radial internal clearance |
| C3 | Radial internal clearance greater than Normal (CN) |
| C4 | Radial internal clearance greater than C3 |
| C5 | Radial internal clearance greater than C4 |
| CS | Special radial internal clearance |
| P6 | Dimensional and running accuracy as per ISO tolerances Class 6 |




NCF (SL18)

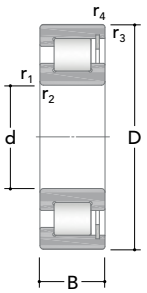



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **20** | 42 | 16 | 28,2 | 28,6 | 3,1 | 8500 | 10000 | NCF 3004 |
| | 47 | 18 | 46 | 37,2 | 3,8 | 6600 | 12000 | NCF 2204 |
| **25** | 47 | 16 | 32,4 | 35,5 | 3,8 | 7000 | 9000 | NCF 3005 |
| | 52 | 18 | 51,6 | 45,3 | 4,2 | 5500 | 10300 | NCF 2205 |
| | 62 | 24 | 69,1 | 68,8 | 8,5 | 4500 | 5600 | NJG 2305 |
| **30** | 55 | 19 | 39,6 | 44,4 | 11 | 6000 | 7500 | NCF 3006 |
| | 62 | 20 | 70,1 | 64,8 | 8,1 | 4600 | 8600 | NCF 2206 |
| | 72 | 27 | 85 | 86,5 | 5,2 | 4000 | 4800 | NJG 2306 |
| **35** | 62 | 20 | 48,6 | 56,4 | 6,48 | 5300 | 6700 | NCF 3007 |
| | 72 | 23 | 88 | 78,1 | 9,1 | 4100 | 7400 | NCF 2207 |
| | 80 | 31 | 109 | 114 | 14,2 | 3400 | 4300 | NJG 2307 |
| **40** | 68 | 21 | 57,2 | 69,7 | 8,14 | 4800 | 6000 | NCF 3008 |
| | 80 | 23 | 97,1 | 91,2 | 12,3 | 3470 | 6500 | NCF 2208 |
| | 90 | 33 | 145 | 156 | 20 | 3000 | 3600 | NJG 2308 |
| **45** | 75 | 23 | 60,8 | 78,5 | 8,97 | 4300 | 6300 | NCF 3009 |
| | 85 | 23 | 101,8 | 100 | 13,2 | 3480 | 6100 | NCF 2209 |
| | 100 | 36 | 173 | 197 | 25,6 | 2800 | 3400 | NJG 2309 |
| **50** | 80 | 23 | 76,6 | 98,2 | 11,7 | 4000 | 5000 | NCF 3010 |
| | 90 | 23 | 109 | 111 | 13,7 | 3400 | 5500 | NCF 2210 |
| **55** | 90 | 26 | 105 | 144 | 17,1 | 3400 | 4300 | NCF 3011 |
| | 100 | 25 | 140 | 149 | 18,4 | 2600 | 5000 | NCF 2211 |
| | 120 | 43 | 234 | 265 | 32,9 | 2200 | 2800 | NJG 2311 |
| **60** | 85 | 16 | 55,8 | 80,6 | 8,99 | 3600 | 4500 | NCF 2912 |
| | 95 | 26 | 106 | 147 | 18,2 | 3400 | 4000 | NCF 3012 |
| | 110 | 28 | 169 | 179 | 21,3 | 2500 | 4500 | NCF 2212 |

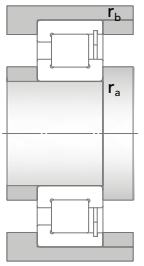


NJG (SL19)

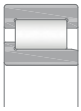
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 20 | 0,6 | 0,3 | 0,6 | 0,3 | 0,11 | NCF 3004 |
| | 1 | - | 1 | - | 0,16 | NCF 2204 |
| 25 | 0,6 | 0,3 | 0,6 | 0,3 | 0,12 | NCF 3005 |
| | 1 | - | 1 | - | 0,18 | NCF 2205 |
| | 1,1 | - | 1 | - | 0,38 | NJG 2305 |
| 30 | 1 | 0,3 | 1 | 0,3 | 0,2 | NCF 3006 |
| | 1 | - | 1 | - | 0,3 | NCF 2206 |
| | 1,1 | - | 1 | - | 0,56 | NJG 2306 |
| 35 | 1 | 0,3 | 1 | 0,3 | 0,26 | NCF 3007 |
| | 1,1 | - | 1,1 | - | 0,44 | NCF 2207 |
| | 1,5 | - | 1,5 | - | 0,75 | NJG 2307 |
| 40 | 1 | 0,3 | 1 | 0,3 | 0,31 | NCF 3008 |
| | 1,1 | - | 1,1 | - | 0,55 | NCF 2208 |
| | 1,5 | - | 1,5 | - | 1 | NJG 2308 |
| 45 | 1 | 0,3 | 1 | 0,3 | 0,4 | NCF 3009 |
| | 1,1 | - | 1,1 | - | 0,59 | NCF 2209 |
| | 1,5 | - | 1,5 | - | 1,45 | NJG 2309 |
| 50 | 1 | 0,3 | 1 | 0,3 | 0,43 | NCF 3010 |
| | 1,1 | - | 1,1 | - | 0,64 | NCF 2210 |
| 55 | 1,1 | 0,6 | 1 | 0,6 | 0,64 | NCF 3011 |
| | 1,5 | - | 1,5 | - | 0,87 | NCF 2211 |
| | 2 | - | 2 | - | 2,3 | NJG 2311 |
| 60 | 1 | 0,6 | 1 | 0,5 | 0,29 | NCF 2912 |
| | 1,1 | 0,6 | 1 | 0,5 | 0,69 | NCF 3012 |
| | 1,5 | - | 1,5 | - | 1,18 | NCF 2212 |




NCF (SL18)

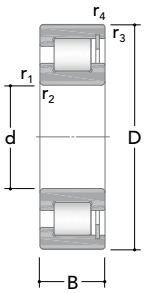



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **65** | 90 | 16 | 59,1 | 88,3 | 10,1 | 3200 | 4000 | NCF 2913 |
| | 100 | 26 | 113 | 163 | 20 | 3000 | 3800 | NCF 3013 |
| | 120 | 31 | 198 | 218 | 26,6 | 2370 | 4200 | NCF 2213 |
| | 140 | 48 | 303 | 367 | 46,1 | 1900 | 2400 | NJG 2313 |
| **70** | 100 | 19 | 76,6 | 116 | 13,7 | 3000 | 3800 | NCF 2914 |
| | 110 | 30 | 128 | 173 | 22,1 | 2800 | 3600 | NCF 3014 |
| | 125 | 31 | 189 | 229 | 27,1 | 2200 | 3450 | NCF 2214 |
| | 150 | 51 | 336 | 403 | 49 | 1800 | 2200 | NJG 2314 |
| **75** | 105 | 19 | 79,6 | 126 | 14,5 | 2800 | 3600 | NCF 2915 |
| | 115 | 30 | 135 | 193 | 24,4 | 2600 | 3200 | NCF 3015 |
| | 130 | 31 | 187 | 236 | 29,4 | 2210 | 3250 | NCF 2215 |
| | 160 | 55 | 399 | 488 | 60 | 1600 | 2000 | NJG 2315 |
| **80** | 110 | 19 | 81,2 | 132 | 15,4 | 2600 | 3400 | NCF 2916 |
| | 125 | 34 | 165 | 229 | 29 | 2400 | 3000 | NCF 3016 |
| | 140 | 33 | 223 | 287 | 35,2 | 2000 | 3000 | NCF 2216 |
| | 170 | 58 | 460 | 572 | 70 | 1500 | 1900 | NJG 2316 |
| **85** | 120 | 22 | 103 | 169 | 20 | 2500 | 3200 | NCF 2917 |
| | 130 | 34 | 174 | 236 | 30 | 2400 | 3000 | NCF 3017 |
| | 150 | 36 | 259 | 325 | 37,3 | 1970 | 2850 | NCF 2217 |
| | 180 | 60 | 487 | 627 | 76,1 | 1400 | 1800 | NJG 2317 |
| **90** | 125 | 22 | 106 | 176 | 20,8 | 2400 | 3000 | NCF 2918 |
| | 140 | 37 | 198 | 288 | 35,2 | 2200 | 2800 | NCF 3018 |
| | 160 | 40 | 285 | 366 | 46,8 | 1900 | 2700 | NCF 2218 |
| | 190 | 64 | 553 | 684 | 83 | 1400 | 1800 | NJG 2318 |
| **95** | 170 | 43 | 334 | 425 | 51,2 | 1800 | 2450 | NCF 2219 |
| **100** | 140 | 24 | 129 | 202 | 24,3 | 2100 | 2600 | NCF 2920 |

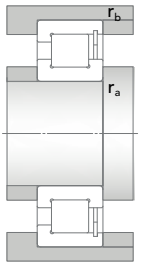


NJG (SL19)

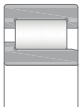
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 65 | 1 | 0,6 | 1 | 0,5 | 0,31 | NCF 2913 |
| | 1,1 | 0,6 | 1 | 0,5 | 0,73 | NCF 3013 |
| | 1,5 | - | 1,5 | - | 1,57 | NCF 2213 |
| | 2,1 | - | 2 | - | 3,55 | NJG 2313 |
| 70 | 1 | 0,6 | 1 | 0,5 | 0,49 | NCF 2914 |
| | 1,1 | 0,6 | 1 | 0,5 | 1 | NCF 3014 |
| | 1,5 | - | 1,5 | - | 1,66 | NCF 2214 |
| | 2,1 | - | 2 | - | 4,4 | NJG 2314 |
| 75 | 1 | 0,6 | 1 | 0,5 | 0,52 | NCF 2915 |
| | 1,1 | 1,1 | 1 | 1 | 1,05 | NCF 3015 |
| | 1,5 | - | 1,5 | - | 1,75 | NCF 2215 |
| | 2,1 | - | 2 | - | 5,35 | NJG 2315 |
| 80 | 1 | 0,6 | 1 | 0,5 | 0,55 | NCF 2916 |
| | 1,1 | 0,6 | 1 | 0,5 | 1,45 | NCF 3016 |
| | 2 | - | 2 | - | 2,15 | NCF 2216 |
| | 2,1 | - | 2 | - | 6,4 | NJG 2316 |
| 85 | 1,1 | 1 | 1 | 1 | 0,81 | NCF 2917 |
| | 1,1 | 0,6 | 1 | 0,5 | 1,5 | NCF 3017 |
| | 2 | - | 2 | - | 2,71 | NCF 2217 |
| | 3 | - | 2,5 | - | 7,4 | NJG 2317 |
| 90 | 1,1 | 1 | 1 | 1 | 0,84 | NCF 2918 |
| | 1,5 | 1 | 1,5 | 1 | 1,95 | NCF 3018 |
| | 2 | - | 2 | - | 3,46 | NCF 2218 |
| | 3 | - | 2,5 | - | 8,75 | NJG 2318 |
| 95 | 2,1 | - | 2 | - | 4,17 | NCF 2219 |
| 100 | 1,1 | 1 | 1 | 1 | 1,15 | NCF 2920 |




NCF (SL18)

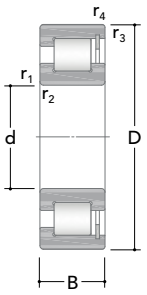



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **100** | 150 | 37 | 212 | 311 | 37,1 | 2000 | 2600 | NCF 3020 |
| (cont.) | 180 | 46 | 390 | 521 | 62 | 1700 | 2300 | NCF 2220 |
| | 215 | 73 | 704 | 908 | 107 | 1200 | 1500 | NJG 2320 |
| **110** | 150 | 24 | 134 | 221 | 26 | 1900 | 2400 | NCF 2922 |
| | 170 | 45 | 275 | 404 | 47 | 1800 | 2200 | NCF 3022 |
| | 200 | 53 | 452 | 595 | 68,9 | 1430 | 2150 | NCF 2222 |
| | 240 | 80 | 859 | 1060 | 121 | 1100 | 1300 | NJG 2322 |
| **120** | 165 | 27 | 172 | 291 | 34,5 | 1800 | 2200 | NCF 2924 |
| | 180 | 46 | 294 | 440 | 52 | 1700 | 2000 | NCF 3024 |
| | 215 | 58 | 530 | 735 | 84 | 1400 | 1950 | NCF 2224 |
| | 260 | 86 | 957 | 1250 | 138 | 1000 | 1200 | NJG 2324 |
| **130** | 180 | 30 | 207 | 360 | 40,5 | 1600 | 2000 | NCF 2926 |
| | 200 | 52 | 417 | 628 | 72 | 1500 | 1900 | NCF 3026 |
| | 230 | 64 | 621 | 868 | 97 | 1300 | 1800 | NCF 2226 |
| | 280 | 93 | 1080 | 1433 | 154 | 950 | 1200 | NJG 2326 |
| **140** | 190 | 30 | 220 | 390 | 43 | 1500 | 1900 | NCF 2928 |
| | 210 | 53 | 445 | 689 | 78 | 1400 | 1800 | NCF 3028 |
| | 250 | 68 | 693 | 1050 | 112 | 1200 | 1500 | NCF 2228 |
| | 300 | 102 | 1241 | 1660 | 179 | 850 | 1100 | NJG 2328 |
| **150** | 190 | 20 | 108 | 199 | 19,2 | 1400 | 1700 | NCF 1830 |
| | 190 | 24 | 147 | 282 | 30 | 1400 | 1700 | NCF 2830 |
| | 210 | 36 | 293 | 494 | 55 | 1400 | 1700 | NCF 2930 |
| | 225 | 56 | 457 | 710 | 80 | 1300 | 1700 | NCF 3030 |
| | 270 | 73 | 794 | 1220 | 131 | 1000 | 1400 | NCF 2230 |
| | 320 | 108 | 1455 | 1938 | 197 | 800 | 1000 | NJG 2330 |
| **160** | 200 | 20 | 110 | 210 | 20 | 1300 | 1540 | NCF 1832 |
| | 200 | 24 | 148 | 301 | 30,1 | 1300 | 1540 | NCF 2832 |

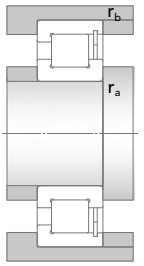


NJG (SL19)

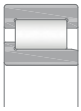
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 100 | 1,5 | 1 | 1,5 | 1 | 2,15 | NCF 3020 |
| (cont.) | 2,1 | 2,1 | 2 | 2 | 5,1 | NCF 2220 |
| | 3 | - | 2,5 | - | 13 | NJG 2320 |
| 110 | 1,1 | 1 | 1 | 1 | 1,25 | NCF 2922 |
| | 2 | 1 | 2 | 1 | 3,5 | NCF 3022 |
| | 2,1 | 2,1 | 2 | 2 | 7,15 | NCF 2222 |
| | 3 | - | 2,5 | - | 17,5 | NJG 2322 |
| 120 | 1,1 | 1 | 1 | 1 | 1,75 | NCF 2924 |
| | 2 | 1 | 2 | 1 | 3,8 | NCF 3024 |
| | 2,1 | 2,1 | 2 | 2 | 9,05 | NCF 2224 |
| | 3 | - | 2,5 | - | 22,5 | NJG 2324 |
| 130 | 1,5 | 1,1 | 1,5 | 1 | 2,35 | NCF 2926 |
| | 2 | 1 | 2 | 1 | 5,8 | NCF 3026 |
| | 3 | 3 | 2,5 | 2,5 | 11 | NCF 2226 |
| | 4 | - | 3 | - | 28 | NJG 2326 |
| 140 | 1,5 | 1,1 | 1,5 | 1 | 2,4 | NCF 2928 |
| | 2 | 1 | 2 | 1 | 6,1 | NCF 3028 |
| | 3 | 3 | 2,5 | 2,5 | 14,5 | NCF 2228 |
| | 4 | - | 3 | - | 35,5 | NJG 2328 |
| 150 | 1,1 | 1 | 1 | 1 | 1,3 | NCF 1830 |
| | 1,1 | 1 | 1 | 1 | 1,7 | NCF 2830 |
| | 2 | 1,1 | 2 | 1 | 3,75 | NCF 2930 |
| | 2,1 | 1,1 | 2 | 1 | 7,5 | NCF 3030 |
| | 3 | 3 | 2,5 | 2,5 | 18,5 | NCF 2230 |
| | 4 | - | 3 | - | 42,5 | NJG 2330 |
| 160 | 1,1 | 1 | 1 | 1 | 1,45 | NCF 1832 |
| | 1,1 | 1 | 1 | 1 | 1,65 | NCF 2832 |




NCF (SL18)

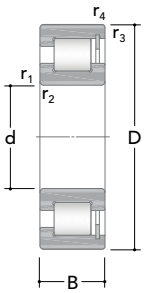



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| 160 | 220 | 36 | 303 | 530 | 57,8 | 1300 | 1600 | NCF 2932 |
| (cont.) | 240 | 60 | 515 | 804 | 88 | 1200 | 1500 | NCF 3032 |
| | 290 | 80 | 993 | 1500 | 158 | 950 | 1200 | NCF 2232 |
| 170 | 215 | 27 | 195 | 376 | 40 | 1200 | 1500 | NCF 2834 |
| | 230 | 36 | 314 | 563 | 59 | 1200 | 1500 | NCF 2934 |
| | 240 | 30 | 276 | 439 | 46,4 | 1100 | 1200 | 316900 |
| | 260 | 67 | 671 | 1060 | 116 | 1100 | 1400 | NCF 3034 |
| | 310 | 86 | 1111 | 1705 | 174 | 900 | 1100 | NCF 2234 |
| | 360 | 120 | 1773 | 2460 | 233 | 700 | 900 | NJG 2334 |
| 180 | 225 | 22 | 145 | 271 | 27 | 1100 | 1300 | NCF 1836 |
| | 225 | 27 | 198 | 397 | 40,7 | 1100 | 1300 | NCF 2836 |
| | 250 | 42 | 397 | 699 | 74 | 1100 | 1400 | NCF 2936 |
| | 280 | 74 | 787 | 1266 | 136 | 1100 | 1300 | NCF 3036 |
| | 320 | 86 | 1180 | 1767 | 184 | 900 | 1270 | NCF 2236 |
| | 380 | 126 | 1879 | 2660 | 252 | 670 | 800 | NJG 2336 |
| 190 | 240 | 24 | 173 | 315 | 31 | 1000 | 1200 | NCF 1838 |
| | 240 | 30 | 229 | 461 | 46,1 | 1000 | 1200 | NCF 2838 |
| | 260 | 42 | 444 | 783 | 81,4 | 1100 | 1400 | NCF 2938 |
| | 290 | 75 | 800 | 1290 | 138 | 1000 | 1300 | NCF 3038 |
| | 340 | 92 | 1263 | 1920 | 198 | 800 | 1000 | NCF 2238 |
| | 400 | 132 | 2186 | 3000 | 279 | 630 | 800 | NJG 2338 |
| 200 | 250 | 24 | 178 | 336 | 32 | 1100 | 1400 | NCF 1840 |
| | 250 | 30 | 230 | 473 | 47 | 1000 | 1400 | NCF 2840 |
| | 280 | 48 | 529 | 969 | 98 | 1000 | 1300 | NCF 2940 |
| | 310 | 82 | 923 | 1533 | 157 | 950 | 1200 | NCF 3040 |
| | 360 | 98 | 1410 | 2230 | 223 | 800 | 1150 | NCF 2240 |
| | 420 | 138 | 2299 | 3209 | 289 | 600 | 750 | NJG 2340 |
| 220 | 270 | 24 | 184 | 366 | 34,2 | 1000 | 1200 | NCF 1844 |

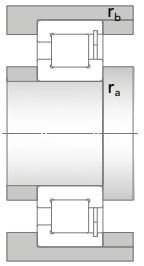


NJG (SL19)

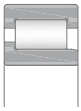
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 160 | 2 | 1,1 | 2 | 1 | 4 | NCF 2932 |
| (cont.) | 2,1 | 1,1 | 2 | 1 | 9,1 | NCF 3032 |
| | 3 | 3 | 2,5 | 2,5 | 23 | NCF 2232 |
| 170 | 1,1 | 1 | 1 | 1 | 2,3 | NCF 2834 |
| | 2 | 1,1 | 2 | 1 | 4,3 | NCF 2934 |
| | 2,7 | 2,7 | 2,5 | 2,5 | 4,1 | 316900 |
| | 2,1 | 1,1 | 2 | 1 | 12,5 | NCF 3034 |
| | 4 | 4 | 3 | 3 | 28,5 | NCF 2234 |
| | 4 | - | 3 | - | 59,5 | NJG 2334 |
| 180 | 1,1 | 1 | 1 | 1 | 1,95 | NCF 1836 |
| | 1,1 | 1 | 1 | 1 | 2,6 | NCF 2836 |
| | 2 | 1,1 | 2 | 1 | 6,2 | NCF 2936 |
| | 2,1 | 2,1 | 2 | 2 | 16,5 | NCF 3036 |
| | 4 | 4 | 3 | 3 | 29,5 | NCF 2236 |
| | 4 | - | 3 | - | 69,5 | NJG 2336 |
| 190 | 1,5 | 1,1 | 1,5 | 1 | 2,45 | NCF 1838 |
| | 1,5 | 1,1 | 1,5 | 1 | 3,1 | NCF 2838 |
| | 2 | 1,1 | 2 | 1 | 6,5 | NCF 2938 |
| | 2,1 | 2,1 | 2 | 2 | 17 | NCF 3038 |
| | 4 | 4 | 3 | 3 | 36 | NCF 2238 |
| | 5 | - | 4 | - | 80 | NJG 2338 |
| 200 | 1,5 | 1,1 | 1,5 | 1 | 2,6 | NCF 1840 |
| | 1,5 | 1,1 | 1,5 | 1 | 2,6 | NCF 2840 |
| | 2,1 | 1,5 | 2 | 1,5 | 9,1 | NCF 2940 |
| | 2,1 | 2,1 | 2 | 2 | 22,5 | NCF 3040 |
| | 4 | 4 | 3 | 3 | 43,5 | NCF 2240 |
| | 5 | - | 4 | - | 92 | NJG 2340 |
| 220 | 1,5 | 1,1 | 1,5 | 1 | 2,85 | NCF 1844 |




NCF (SL18)

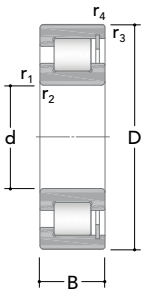



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **220** | 270 | 30 | 244 | 523 | 50 | 900 | 1100 | NCF 2844 |
| (cont.) | 300 | 48 | 552 | 1063 | 104 | 900 | 1200 | NCF 2944 |
| | 340 | 90 | 1087 | 1800 | 183 | 850 | 1100 | NCF 3044 |
| | 400 | 108 | 1832 | 2780 | 258 | 700 | 850 | NCF 2244 |
| | 460 | 145 | 2709 | 3750 | 335 | 530 | 670 | NJG 2344 |
| **240** | 300 | 28 | 261 | 512 | 46,8 | 900 | 1100 | NCF 1848 |
| | 300 | 36 | 339 | 709 | 68,4 | 900 | 1100 | NCF 2848 |
| | 320 | 48 | 584 | 1144 | 113 | 850 | 1100 | NCF 2948 |
| | 360 | 92 | 1146 | 1960 | 199 | 800 | 1000 | NCF 3048 |
| | 500 | 155 | 3140 | 4427 | 392 | 500 | 630 | NJG 2348 |
| **260** | 320 | 28 | 273 | 551 | 50 | 800 | 1000 | NCF 1852 |
| | 320 | 36 | 354 | 778 | 73,3 | 800 | 1000 | NCF 2852 |
| | 360 | 60 | 739 | 1433 | 141 | 750 | 950 | NCF 2952 |
| | 400 | 104 | 1544 | 2555 | 248 | 700 | 900 | NCF 3052 |
| **260** | 540 | 165 | 3583 | 5000 | 430 | 430 | 530 | NJG 2352 |
| | 540 | 206 | 4313 | 6240 | 535 | 300 | 440 | NCF 3352 |
| **280** | 350 | 33 | 345 | 695 | 64 | 750 | 950 | NCF 1856 |
| | 350 | 42 | 443 | 984 | 92 | 750 | 950 | NCF 2856 |
| | 380 | 60 | 888 | 1733 | 165 | 700 | 900 | NCF 2956 |
| | 420 | 106 | 1578 | 2650 | 257 | 700 | 850 | NCF 3056 |
| **300** | 380 | 38 | 420 | 855 | 75 | 670 | 850 | NCF 1860 |
| | 380 | 48 | 565 | 1230 | 114 | 670 | 850 | NCF 2860 |
| | 420 | 72 | 1120 | 2208 | 209 | 630 | 800 | NCF 2960 |
| | 460 | 118 | 1907 | 3290 | 294 | 600 | 750 | NCF 3060 |
| **320** | 400 | 38 | 442 | 905 | 79 | 630 | 800 | NCF 1864 |
| | 400 | 48 | 575 | 1300 | 118 | 630 | 800 | NCF 2864 |
| | 440 | 72 | 1140 | 2360 | 216 | 600 | 750 | NCF 2964 |
| | 480 | 121 | 1983 | 3460 | 307 | 560 | 700 | NCF 3064 |

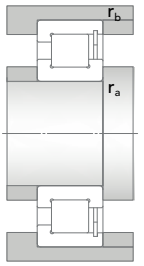


NJG (SL19)

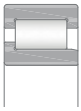
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 220 | 1,5 | 1,1 | 1,5 | 1 | 3,9 | NCF 2844 |
| (cont.) | 2,1 | 1,5 | 2 | 1,5 | 9,9 | NCF 2944 |
| | 3 | 3 | 2,5 | 2,5 | 29,5 | NCF 3044 |
| | 4 | 4 | 3 | 3 | 58 | NCF 2244 |
| | 5 | - | 4 | - | 111 | NJG 2344 |
| 240 | 2 | 1,1 | 2 | 1 | 4,4 | NCF 1848 |
| | 2 | 1,1 | 2 | 1 | 5,7 | NCF 2848 |
| | 2,1 | 1,5 | 2 | 1,5 | 10,5 | NCF 2948 |
| | 3 | 3 | 2,5 | 2,5 | 32 | NCF 3048 |
| | 5 | - | 4 | - | 147 | NJG 2348 |
| 260 | 2 | 1,1 | 2 | 1 | 4,75 | NCF 1852 |
| | 2 | 1,1 | 2 | 1 | 6,2 | NCF 2852 |
| | 2,1 | 1,5 | 2 | 1,5 | 18,5 | NCF 2952 |
| | 4 | 4 | 3 | 3 | 46,5 | NCF 3052 |
| 260 | 6 | - | 5 | - | 177 | NJG 2352 |
| | 6 | 6 | 5 | 5 | 220 | NCF 3352 |
| 280 | 2 | 1,1 | 2 | 1 | 7,1 | NCF 1856 |
| | 2 | 1,1 | 2 | 1 | 9 | NCF 2856 |
| | 2,1 | 1,5 | 2 | 1,5 | 19,5 | NCF 2956 |
| | 4 | 4 | 3 | 3 | 50 | NCF 3056 |
| 300 | 2,1 | 1,5 | 2 | 1,5 | 10 | NCF 1860 |
| | 2,1 | 1,5 | 2 | 1,5 | 12 | NCF 2860 |
| | 3 | 3 | 2,5 | 2,5 | 31 | NCF 2960 |
| | 4 | 4 | 3 | 3 | 69 | NCF 3060 |
| 320 | 2,1 | 1,5 | 2 | 1,5 | 10,5 | NCF 1864 |
| | 2,1 | 1,5 | 2 | 1,5 | 13,5 | NCF 2864 |
| | 3 | 3 | 2,5 | 2,5 | 33 | NCF 2964 |
| | 4 | 4 | 3 | 3 | 74,5 | NCF 3064 |




NCF (SL18)

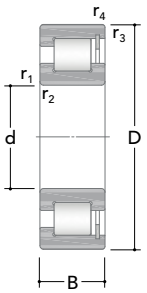



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **340** | 420 | 38 | 449 | 954 | 83 | 600 | 750 | NCF 1868 |
| | 460 | 72 | 1192 | 2500 | 225 | 560 | 700 | NCF 2968 |
| | 520 | 133 | 2387 | 4190 | 351 | 530 | 670 | NCF 3068 |
| **360** | 440 | 38 | 405 | 903 | 75,1 | 560 | 700 | NCF 1872 |
| | 440 | 48 | 629 | 1440 | 127 | 500 | 700 | NCF 2872 |
| | 480 | 72 | 1231 | 2670 | 237 | 530 | 670 | NCF 2972 |
| | 540 | 134 | 2497 | 4320 | 358 | 500 | 630 | NCF 3072 |
| **380** | 480 | 46 | 632 | 1292 | 112 | 530 | 670 | NCF 1876 |
| | 480 | 60 | 893 | 2050 | 183 | 530 | 670 | NCF 2876 |
| | 520 | 82 | 1571 | 3255 | 294 | 500 | 630 | NCF 2976 |
| | 560 | 135 | 2708 | 5100 | 425 | 500 | 600 | NCF 3076 |
| **400** | 500 | 46 | 667 | 1360 | 116 | 500 | 690 | NCF 1880 |
| | 500 | 60 | 917 | 2130 | 187 | 500 | 690 | NCF 2880 |
| | 540 | 82 | 1664 | 3451 | 308 | 500 | 600 | NCF 2980 |
| | 600 | 148 | 2971 | 5500 | 446 | 450 | 560 | NCF 3080 |
| **420** | 520 | 46 | 661 | 1444 | 123 | 500 | 600 | NCF 1884 |
| | 520 | 60 | 940 | 2250 | 197 | 500 | 600 | NCF 2884 |
| | 560 | 82 | 1655 | 3630 | 309 | 450 | 560 | NCF 2984 |
| | 620 | 150 | 3039 | 5790 | 454 | 430 | 530 | NCF 3084 |
| **440** | 540 | 46 | 672 | 1477 | 126 | 450 | 560 | NCF 1888 |
| | 540 | 60 | 1069 | 2790 | 231 | 450 | 560 | NCF 2888 |
| | 600 | 95 | 2024 | 4411 | 381 | 430 | 530 | NCF 2988 |
| | 650 | 157 | 3685 | 7250 | 562 | 400 | 500 | NCF 3088 |
| **460** | 580 | 56 | 940 | 1970 | 159 | 430 | 580 | NCF 1892 |
| | 580 | 72 | 1308 | 3050 | 257 | 430 | 580 | NCF 2892 |
| | 620 | 95 | 2070 | 4500 | 388 | 400 | 500 | NCF 2992 |
| | 680 | 163 | 3696 | 6960 | 531 | 400 | 480 | NCF 3092 |

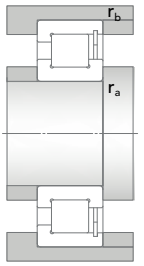


NJG (SL19)

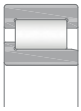
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 340 | 2,1 | 1,5 | 2 | 1,5 | 11 | NCF 1868 |
| | 3 | 3 | 2,5 | 2,5 | 35 | NCF 2968 |
| | 5 | 5 | 4 | 4 | 100 | NCF 3068 |
| 360 | 2,1 | 1,5 | 2 | 1,5 | 11,5 | NCF 1872 |
| | 2,1 | 1,5 | 2 | 1,5 | 15 | NCF 2872 |
| | 3 | 3 | 2,5 | 2,5 | 36,5 | NCF 2972 |
| | 5 | 5 | 4 | 4 | 105 | NCF 3072 |
| 380 | 2,1 | 1,5 | 2 | 1,5 | 19,5 | NCF 1876 |
| | 2,1 | 1,5 | 2 | 1,5 | 25 | NCF 2876 |
| | 4 | 4 | 3 | 3 | 52 | NCF 2976 |
| | 5 | 5 | 4 | 4 | 110 | NCF 3076 |
| 400 | 2,1 | 1,5 | 2 | 1,5 | 20,5 | NCF 1880 |
| | 2,1 | 1,5 | 2 | 1,5 | 26,5 | NCF 2880 |
| | 4 | 4 | 3 | 3 | 54,5 | NCF 2980 |
| | 5 | 5 | 4 | 4 | 145 | NCF 3080 |
| 420 | 2,1 | 1,5 | 2 | 1,5 | 20,5 | NCF 1884 |
| | 2,1 | 1,5 | 2 | 1,5 | 28 | NCF 2884 |
| | 4 | 4 | 3 | 3 | 57 | NCF 2984 |
| | 5 | 5 | 4 | 4 | 150 | NCF 3084 |
| 440 | 2,1 | 1,5 | 2 | 1,5 | 22 | NCF 1888 |
| | 2,1 | 1,5 | 2 | 1,5 | 30 | NCF 2888 |
| | 4 | 4 | 3 | 3 | 80 | NCF 2988 |
| | 6 | 6 | 5 | 5 | 175 | NCF 3088 |
| 460 | 3 | 3 | 2,5 | 2,5 | 34 | NCF 1892 |
| | 3 | 3 | 2,5 | 2,5 | 44 | NCF 2892 |
| | 4 | 4 | 3 | 3 | 83 | NCF 2992 |
| | 6 | 6 | 5 | 5 | 195 | NCF 3092 |




NCF (SL18)

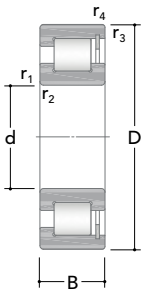



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **480** | 600 | 56 | 937 | 2050 | 168 | 400 | 500 | **NCF 1896** |
| | 600 | 72 | 1322 | 3150 | 262 | 400 | 500 | **NCF 2896** |
| | 650 | 100 | 2318 | 4950 | 401 | 400 | 480 | **NCF 2996** |
| | 700 | 165 | 3765 | 7260 | 539 | 360 | 450 | **NCF 3096** |
| **500** | 620 | 56 | 955 | 2180 | 170 | 400 | 480 | **NCF 18/500** |
| | 620 | 72 | 1340 | 3350 | 273 | 400 | 480 | **NCF 28/500** |
| | 670 | 100 | 2380 | 5327 | 432 | 400 | 450 | **NCF 29/500** |
| | 720 | 167 | 3802 | 7530 | 559 | 360 | 450 | **NCF 30/500** |
| **530** | 650 | 56 | 994 | 2244 | 179 | 360 | 450 | **NCF 18/530** |
| | 650 | 72 | 1409 | 3450 | 284 | 360 | 450 | **NCF 28/530** |
| | 710 | 106 | 2714 | 6180 | 456 | 340 | 430 | **NCF 29/530** |
| | 780 | 185 | 5231 | 10600 | 777 | 320 | 400 | **NCF 30/530** |
| **560** | 680 | 56 | 1022 | 2363 | 184 | 340 | 430 | **NCF 18/560** |
| | 680 | 72 | 1428 | 3680 | 294 | 340 | 430 | **NCF 28/560** |
| | 750 | 112 | 3087 | 6700 | 483 | 320 | 400 | **NCF 29/560** |
| | 820 | 195 | 5831 | 11840 | 853 | 300 | 380 | **NCF 30/560** |
| **600** | 730 | 60 | 1055 | 2555 | 194 | 320 | 400 | **NCF 18/600** |
| | 730 | 78 | 1590 | 4350 | 336 | 320 | 400 | **NCF 28/600** |
| | 800 | 118 | 3360 | 7548 | 554 | 300 | 380 | **NCF 29/600** |
| **630** | 780 | 69 | 1250 | 2910 | 230 | 300 | 360 | **NCF 18/630** |
| | 780 | 88 | 1967 | 5030 | 385 | 300 | 360 | **NCF 28/630** |
| | 850 | 128 | 3793 | 8650 | 602 | 300 | 340 | **NCF 29/630** |
| **670** | 820 | 69 | 1450 | 3300 | 244 | 300 | 405 | **NCF 18/670** |
| | 820 | 88 | 1962 | 5360 | 412 | 300 | 405 | **NCF 28/670** |
| | 900 | 136 | 3914 | 9050 | 620 | 260 | 320 | **NCF 29/670** |
| **710** | 870 | 74 | 1543 | 3790 | 280 | 260 | 320 | **NCF 18/710** |
| | 870 | 95 | 2336 | 6300 | 472 | 260 | 320 | **NCF 28/710** |

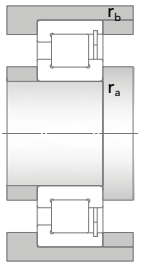


NJG (SL19)

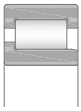
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 480 | 3 | 3 | 2,5 | 2,5 | 35,5 | NCF 1896 |
| | 3 | 3 | 2,5 | 2,5 | 46 | NCF 2896 |
| | 5 | 5 | 4 | 4 | 93 | NCF 2996 |
| | 6 | 6 | 5 | 5 | 205 | NCF 3096 |
| 500 | 3 | 3 | 2,5 | 2,5 | 35,5 | NCF 18/500 |
| | 3 | 3 | 2,5 | 2,5 | 48 | NCF 28/500 |
| | 5 | 5 | 4 | 4 | 100 | NCF 29/500 |
| | 6 | 6 | 5 | 5 | 215 | NCF 30/500 |
| 530 | 3 | 3 | 2,5 | 2,5 | 38,5 | NCF 18/530 |
| | 3 | 3 | 2,5 | 2,5 | 49,5 | NCF 28/530 |
| | 5 | 5 | 4 | 4 | 120 | NCF 29/530 |
| | 6 | 6 | 5 | 5 | 300 | NCF 30/530 |
| 560 | 3 | 3 | 2,5 | 2,5 | 40,5 | NCF 18/560 |
| | 3 | 3 | 2,5 | 2,5 | 54 | NCF 28/560 |
| | 5 | 5 | 4 | 4 | 140 | NCF 29/560 |
| | 6 | 6 | 5 | 5 | 345 | NCF 30/560 |
| 600 | 3 | 3 | 2,5 | 2,5 | 51,5 | NCF 18/600 |
| | 3 | 3 | 2,5 | 2,5 | 67,5 | NCF 28/600 |
| | 5 | 5 | 4 | 4 | 170 | NCF 29/600 |
| 630 | 4 | 4 | 3 | 3 | 72,5 | NCF 18/630 |
| | 4 | 4 | 3 | 3 | 92,5 | NCF 28/630 |
| | 6 | 6 | 5 | 5 | 205 | NCF 29/630 |
| 670 | 4 | 4 | 3 | 3 | 76,5 | NCF 18/670 |
| | 4 | 4 | 3 | 3 | 98 | NCF 28/670 |
| | 6 | 6 | 5 | 5 | 245 | NCF 29/670 |
| 710 | 4 | 4 | 3 | 3 | 92,5 | NCF 18/710 |
| | 4 | 4 | 3 | 3 | 115 | NCF 28/710 |




NCF (SL18)




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **710** | 950 | 140 | 4303 | 10020 | 689 | 240 | 300 | NCF 29/710 |
| (cont.) | | | | | | | | |
| **750** | 920 | 78 | 1890 | 4510 | 323 | 240 | 300 | NCF 18/750 |
| | 920 | 100 | 2662 | 6960 | 512 | 240 | 300 | NCF 28/750 |
| | 1000 | 145 | 4465 | 10680 | 709 | 220 | 280 | NCF 29/750 |
| **800** | 980 | 82 | 1957 | 4876 | 343 | 220 | 280 | NCF 18/800 |
| | 980 | 106 | 2753 | 7550 | 546 | 220 | 280 | NCF 28/800 |
| | 1060 | 150 | 4950 | 12900 | 793 | 200 | 260 | NCF 29/800 |
| **850** | 1030 | 82 | 2065 | 5200 | 375 | 200 | 260 | NCF 18/850 |
| | 1030 | 106 | 2860 | 8020 | 570 | 200 | 260 | NCF 28/850 |
| | 1120 | 155 | 5271 | 12730 | 830 | 190 | 240 | NCF 29/850 |
| **900** | 1090 | 85 | 2389 | 6060 | 402 | 190 | 240 | NCF 18/900 |
| | 1090 | 112 | 3218 | 9170 | 642 | 190 | 240 | NCF 28/900 |
| | 1180 | 165 | 6011 | 14620 | 945 | 170 | 220 | NCF 29/900 |
| **950** | 1150 | 90 | 2490 | 6340 | 421 | 170 | 220 | NCF 18/950 |
| | 1150 | 118 | 3412 | 9870 | 646 | 170 | 220 | NCF 28/950 |
| | 1250 | 175 | 6610 | 16390 | 1007 | 160 | 200 | NCF 29/950 |
| **1000** | 1220 | 100 | 2952 | 7520 | 450 | 160 | 200 | NCF 18/1000 |
| | 1220 | 128 | 4130 | 11660 | 711 | 160 | 200 | NCF 28/1000 |
| | 1320 | 185 | 7487 | 18670 | 1139 | 150 | 200 | NCF 29/1000 |
| **1120** | 1360 | 106 | 3757 | 9690 | 576 | 130 | 170 | NCF 18/1120 |



NJG (SL19)

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 710 | 6 | 6 | 5 | 5 | 275 | NCF 29/710 |
| (cont.) | | | | | | |
| 750 | 5 | 5 | 4 | 4 | 110 | NCF 18/750 |
| | 5 | 5 | 4 | 4 | 138 | NCF 28/750 |
| | 6 | 6 | 5 | 5 | 315 | NCF 29/750 |
| 800 | 5 | 5 | 4 | 4 | 126 | NCF 18/800 |
| | 5 | 5 | 4 | 4 | 165 | NCF 28/800 |
| | 6 | 6 | 5 | 5 | 359 | NCF 29/800 |
| 850 | 5 | 5 | 4 | 4 | 131 | NCF 18/850 |
| | 5 | 5 | 4 | 4 | 175 | NCF 28/850 |
| | 6 | 6 | 5 | 5 | 406 | NCF 29/850 |
| 900 | 5 | 5 | 4 | 4 | 154 | NCF 18/900 |
| | 5 | 5 | 4 | 4 | 208 | NCF 28/900 |
| | 6 | 6 | 5 | 5 | 472 | NCF 29/900 |
| 950 | 5 | 5 | 4 | 4 | 185 | NCF 18/950 |
| | 5 | 5 | 4 | 4 | 240 | NCF 28/950 |
| | 7,5 | 7,5 | 6 | 6 | 565 | NCF 29/950 |
| 1000 | 6 | 6 | 5 | 5 | 230 | NCF 18/1000 |
| | 6 | 6 | 5 | 5 | 310 | NCF 28/1000 |
| | 7,5 | 7,5 | 6 | 6 | 680 | NCF 29/1000 |
| 1120 | 6 | 6 | 5 | 5 | 298 | NCF 18/1120 |

# Double row cylindrical roller bearings

With a wide range of executions of double row cylindrical roller bearings, RKB is able to fulfil any requirement in demanding applications such as large size gearboxes, machine tools, grinding mills and crushers.

To ensure superior performance, RKB double row cylindrical roller bearings are manufactured from high quality special steels, heat treated in optimized automatic lines.

With improved internal geometry and profile, double row cylindrical roller bearings can withstand high radial loads within a narrow cross section.

## Internal clearance

Generally RKB double row cylindrical roller bearings are manufactured with normal radial clearance CN, but they can also feature C2, C3, C4 or C5 radial clearance in accordance to ISO 5753:2009. The radial internal clearance values are reported in the **Tab. 1 page 215** and **Tab. 2 page 216** and they are valid only for bearing unmounted and unloaded.



Double row cylindrical roller bearings

## Axial displacement

NNU and NN bearing can accommodate axial displacement between shaft and housing within certain limits. And can be used as non-locating bearings, supporting radial loads only. As a consequence of the fact that the axial displacement takes between the inner ring and outer ring and not between the inner ring and shaft and outer ring and housing, there is no additional friction during the bearing rotation.

## Misalignment

Any misalignment between shaft and seat of the double row cylindrical roller bearing creates a moment load inside the bearing. The bearing life will be obviously affected.

## Minimum load

A minimum radial load is requested for a double row cylindrical roller bearings to allow the correct functioning, especially in critical working conditions like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions, a skidding between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load can be theoretically estimated using the following formula:

$$F_{rm} > \frac{C_{0r}}{50}$$

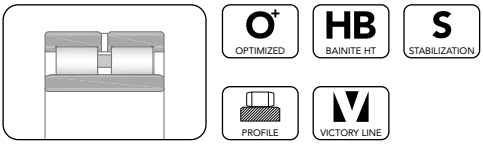
Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_{0r}$ basic static load rating, [kN] .

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the double row cylindrical roller bearing.

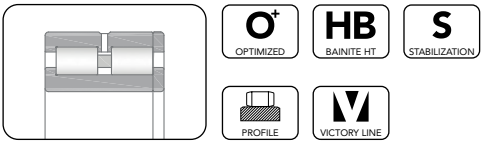
## Designs and variants

### Type NNU



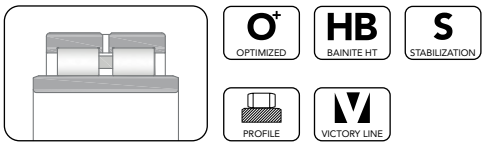

- Outer ring with three integral ribs
- Ribless inner ring
- One-piece double pronged machined brass or steel cage
- Annular groove and lubrication holes in outer ring
- Optimized raceway geometry and roller profile
- Available with cylindrical and tapered bore
- Available with locating slots in outer ring, lubrication holes in inner ring, lubrication grooves in side faces of inner and outer rings
- Available with steel pin-type cage and pierced roller design

### Type NNUP



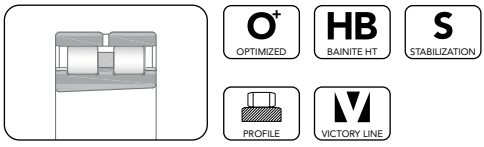

- Outer ring with two integral ribs and one loose rib
- Inner ring with one integral side rib and one loose rib
- One-piece double pronged machined brass or steel cage
- Annular groove and lubrication holes in outer ring
- Optimized raceway geometry and roller profile
- Available with locating slots in outer ring, lubrication holes in inner ring, lubrication grooves in side faces of inner and outer rings
- Available with steel pin-type cage and pierced roller design

### Type NNUB



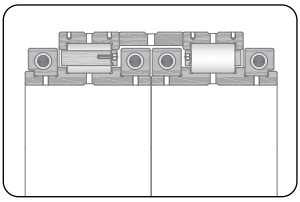

- Outer ring with three integral ribs
- Wider ribless inner ring
- One-piece double pronged machined brass or steel cage
- Annular groove and lubrication holes in outer ring
- Optimized raceway geometry and roller profile
- Available with locating slots in outer ring, lubrication holes in inner ring, lubrication grooves in side faces of inner and outer rings
- Available with steel pin-type cage and pierced roller design

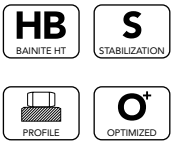
### Type NN




- Ribless outer ring
- Inner ring with three integral ribs
- One-piece double pronged machined brass cage
- Annular groove and lubrication holes in outer ring
- Optimized raceway geometry and roller profile
- Available with tapered and cylindrical bore
- Available with steel pin-type cage and pierced roller design

## Split type 2ROW SCRB






- Design used for medium and large size bearings
- Two wider inner ring with integral side ribs
- Two-piece window type for each bearing row
- Engineered for hard-to-reach positions (e.g. universal joint drive shaft supporting)
- Design for easy mounting, dismounting and maintenance to reduced machine downtime
- Available in locating and non-locating configuration

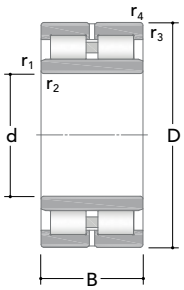
| Prefixes | |
|---|---|
| L | In a separable bearing: separate inner ring |
| R | In a separable bearing: outer ring with roller and cage assembly |
| SCRB | Out of standard double row cylindrical roller bearing followed by drawing number |
| 2CRB | Out of standard double row cylindrical roller bearing followed by drawing number |

| Suffixes | Internal Design |
|---|---|
| OD | Special outer diameter. The number immediately following the OD gives the outer diameter in mm |
| B | Special bearing width. The number immediately following the B gives the width in mm |
| SP | Special or non-standard bearing |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

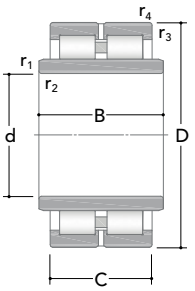
| Suffixes | Cage |
|---|---|
| M | Machined brass cage guided on rolling elements |
| MA | Machined brass cage guided on outer ring |
| MF | Machined steel cage |
| AVH | Machined brass cage with round or square integral rivets guided on outer ring (MA), inner ring (MB) or rollers (M) |

| Suffixes | Lubrication |
|---|---|
| G | Helical groove in inner ring bore (not necessarily stated) |
| ISR3 | Annular groove and three lubrication holes in inner ring |
| W33 | Annular groove and three lubrication holes in outer ring |
| W33X | Annular groove and more than three lubrication holes in outer ring |
| W77X | Annular groove and more than three plugged lubrication holes in outer ring |
| W | Lubrication grooves in the side faces of inner and outer rings (not necessarily stated) |
| WI | Lubrication grooves in the side face of inner ring (not necessarily stated) |
| WO | Lubrication grooves in the side face of outer ring (not necessarily stated) |

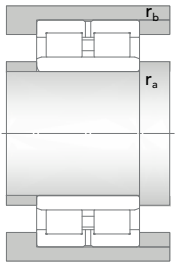
| Suffixes | External design |
|---|---|
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper 1:30 |



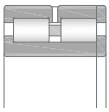

NNU

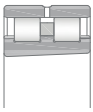


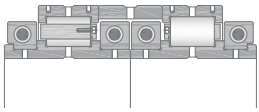

NNUB



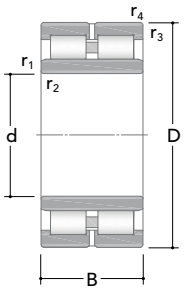

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **100** | 140 | 40 | - | 126 | 252 | 29 | 6700 | NNU 4920 |
| | 140 | 70 | 40 | 128 | 253 | 29 | 5100 | NNUB 315033 |
| | 140 | 80 | 40 | 128 | 251 | 29 | 5100 | NNUB 319114 |
| | 150 | 37 | - | 152 | 248 | 29 | 6400 | NN 3020 |
| | 165 | 65 | - | 356 | 563 | 70 | 3800 | NNU 4120 |
| **105** | 145 | 40 | - | 130 | 258 | 29 | 6400 | NNU 4921 |
| | 160 | 41 | - | 191 | 303 | 36 | 5900 | NN 3021 |
| | 175 | 69 | - | 415 | 668 | 80 | 3600 | NNU 4121 |
| **110** | 150 | 40 | - | 130 | 268 | 30 | 6300 | NNU 4922 |
| | 170 | 45 | - | 220 | 359 | 41,4 | 5600 | NN 3022 |
| | 180 | 69 | - | 423 | 702 | 82 | 3400 | NNU 4122 |
| **120** | 165 | 45 | - | 176 | 339 | 37,4 | 5600 | NNU 4924 |
| | 165 | 45 | - | 201 | 373 | 43 | 4200 | 319826 |
| | 180 | 46 | - | 228 | 389 | 44 | 5300 | NN 3024 |
| | 200 | 80 | - | 518 | 861 | 100 | 3200 | NNU 4124 |
| | 215 | 130 | 100 | 705 | 1110 | 129 | 2300 | NNUB 322978 |
| **127** | 174,65 | 75,41 | - | 315 | 651 | 76 | 3800 | 315643 |
| **130** | 180 | 50 | - | 186 | 383 | 40,8 | 5100 | NNU 4926 |
| | 200 | 52 | - | 287 | 467 | 52 | 4800 | NN 3026 |
| | 210 | 80 | - | 553 | 955 | 109 | 3000 | NNU 4126 |
| **140** | 190 | 50 | - | 192 | 395 | 41 | 4800 | NNU 4928 |
| | 210 | 53 | - | 294 | 517 | 56 | 4600 | NN 3028 |
| | 225 | 85 | - | 634 | 1030 | 117 | 2800 | NNU 4128 |
| **150** | 190 | 40 | - | 192 | 445 | 42 | 4800 | NN 4830 |
| | 210 | 60 | - | 331 | 647 | 70 | 4600 | NNU 4930 |
| | 225 | 56 | - | 334 | 566 | 62 | 4200 | NN 3030 |


NNUP

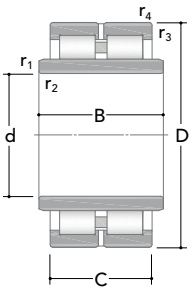

NN


2ROW SCRB

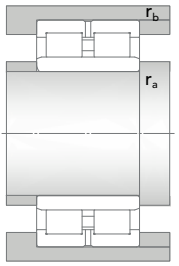
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 100 | 1,1 | 1,1 | 1 | 1 | 1,9 | NNU 4920 | NNU 4920 K |
| | 1,1 | 1,1 | 1 | 1 | 2,5 | NNUB 315033 | - |
| | 1,1 | 1,1 | 1 | 1 | 2,65 | NNUB 319114 | - |
| | 1,5 | 1,5 | 1,5 | 1,5 | 2,2 | NN 3020 | NN 3020 K |
| | 1,1 | 2 | 1 | 2 | 5,5 | NNU 4120 | NNU 4120 K30 |
| 105 | 1,1 | 1,1 | 1 | 1 | 2 | NNU 4921 | NNU 4921 K |
| | 2 | 2 | 2 | 2 | 2,8 | NN 3021 | NN 3021 K |
| | 1,1 | 2 | 1 | 2 | 6,7 | NNU 4121 | NNU 4121 K30 |
| 110 | 1,1 | 1,1 | 1 | 1 | 2,05 | NNU 4922 | NNU 4922 K |
| | 2 | 2 | 2 | 2 | 3,55 | NN 3022 | NN 3022 K |
| | 1,1 | 2 | 1 | 2 | 6,95 | NNU 4122 | NNU 4122 K30 |
| 120 | 1,1 | 1,1 | 1 | 1 | 2,8 | NNU 4924 | NNU 4924 K |
| | 1 | 1 | 1 | 1 | 2,8 | 319826 | - |
| | 2 | 2 | 2 | 2 | 3,85 | NN 3024 | NN 3024 K |
| | 1,1 | 2 | 1 | 2 | 11 | NNU 4124 | NNU 4124 K30 |
| | 2x60° | 1,1 | 2 | 1 | 15,5 | NNUB 322978 | - |
| 127 | 1,1 | 1,5 | 1 | 1,5 | 5,3 | 315643 | - |
| 130 | 1,5 | 1,5 | 1,5 | 1,5 | 3,85 | NNU 4926 | NNU 4926 K |
| | 1,1 | 2 | 2 | 2 | 5,75 | NN 3026 | NN 3026 K |
| | 2 | 1,1 | 1 | 2 | 10,5 | NNU 4126 | NNU 4126 K30 |
| 140 | 1,5 | 1,5 | 1,5 | 1,5 | 4,1 | NNU 4928 | NNU 4928 K |
| | 2 | 2 | 2 | 2 | 6,2 | NN 3028 | NN 3028 K |
| | 2,1 | 2,1 | 2 | 2 | 13 | NNU 4128 | NNU 4128 K30 |
| 150 | 1,1 | 1,1 | 1 | 1 | 2,75 | NN 4830 | NN 4830 K |
| | 2 | 2 | 2 | 2 | 6,25 | NNU 4930 | NNU 4930 K |
| | 2,1 | 2,1 | 2 | 2 | 7,5 | NN 3030 | NN 3030 K |



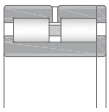

NNU

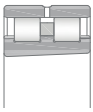


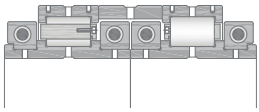

NNUB



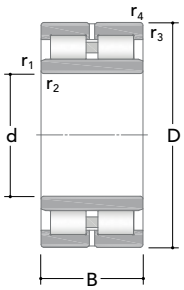

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **150** (cont.) | 250 | 100 | - | 748 | 1270 | 141 | 2500 | **NNU 4130** |
| **155** | 220 | 60 | - | 330 | 676 | 72 | 3200 | **314781** |
| **160** | 220 | 60 | - | 328 | 673 | 71 | 4200 | **NNU 4932** |
| | 240 | 60 | - | 371 | 650 | 69 | 4000 | **NN 3032** |
| | 265 | 120 | - | 1009 | 1770 | 190 | 2300 | **320160** |
| | 270 | 109 | - | 945 | 1510 | 164 | 2300 | **NNU 4132** |
| **165,1** | 225,45 | 84,15 | - | 507 | 1100 | 118 | 2960 | **315642** |
| **170** | 230 | 60 | - | 338 | 682 | 72,1 | 4000 | **NNU 4934** |
| | 230 | 80 | - | 554 | 1170 | 126 | 3000 | **322340** |
| | 260 | 67 | - | 457 | 802 | 84 | 3600 | **NN 3034** |
| | 260 | 115 | 112,5 | 827 | 1630 | 173 | 2500 | **NNUB 320687** |
| | 280 | 109 | - | 957 | 1600 | 170 | 2100 | **NNU 4134** |
| **180** | 250 | 69 | - | 401 | 842 | 87 | 3600 | **NNU 4936** |
| | 280 | 74 | - | 568 | 995 | 101 | 3400 | **NN 3036** |
| | 300 | 118 | - | 1077 | 1820 | 189 | 2000 | **NNU 4136** |
| **190** | 260 | 69 | - | 394 | 879 | 90 | 3400 | **NNU 4938** |
| | 290 | 75 | - | 594 | 1070 | 107 | 3200 | **NN3038** |
| | 320 | 128 | - | 1337 | 2160 | 224 | 1900 | **NNU 4138** |
| **200** | 250 | 50 | - | 246 | 593 | 49 | 2500 | **NNU 4840** |
| | 280 | 80 | - | 480 | 1020 | 104 | 3200 | **NNU 4940** |
| | 310 | 82 | - | 637 | 1120 | 116 | 3000 | **NN 3040** |
| | 310 | 115 | - | 1003 | 1830 | 190 | 2100 | **313639** |
| | 333,98 | 174,6 | - | 1808 | 2791 | 274 | 1800 | **322185** |
| | 340 | 140 | - | 1458 | 2520 | 257 | 1800 | **NNU 4140** |
| **210** | 320 | 195 | 115 | 1018 | 2050 | 209 | 2000 | **NNUB 322459** |


NNUP

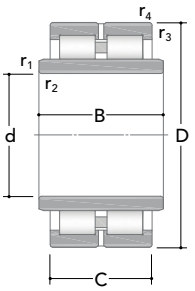

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2ROW SCRB

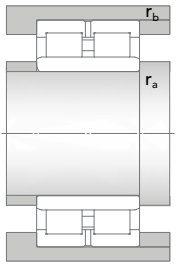
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 150 | 2,1 | 2,1 | 2 | 2 | 18 | NNU 4130 | NNU 4130 K30 |
| (cont.) | | | | | | | |
| 155 | 1 | 2 | 1 | 2 | 7,6 | - | 314781 K |
| 160 | 2 | 2 | 2 | 2 | 6,6 | NNU 4932 | NNU 4932 K |
| | 2,1 | 2,1 | 2 | 2 | 9,1 | - | NN 3032 K |
| | 3 | 3 | 2,5 | 2,5 | 27 | 320160 | - |
| | 2,1 | 2,1 | 2 | 2 | 25 | NNU 4132 | NNU 4132 K30 |
| 165,1 | 1,5 | 1,5 | 1,5 | 1,5 | 10 | 315642 | - |
| 170 | 2 | 2 | 2 | 2 | 6,95 | NNU 4934 | NNU 4934 K |
| | 2 | 2 | 2 | 2 | 9,55 | 322340 | - |
| | 2,1 | 2,1 | 2 | 2 | 12,5 | - | NN 3034 K |
| | 2,1 | 2,1 | 2 | 2 | 22 | NNUB 320687 | - |
| | 2,1 | 2,1 | 2 | 2 | 26 | NNU 4134 | NNU 4134 K30 |
| 180 | 2 | 2 | 2 | 2 | 10,5 | NNU 4936 | NNU 4936 K |
| | 2,1 | 2,1 | 2 | 2 | 16,5 | - | NN 3036 K |
| | 3 | 3 | 2,5 | 2,5 | 32,5 | NNU 4136 | NNU 4136 K30 |
| 190 | 2 | 2 | 2 | 2 | 11 | NNU 4938 | NNU 4938 K |
| | 2,1 | 2,1 | 2 | 2 | 17 | - | NN 3038 K |
| | 3 | 3 | 2,5 | 2,5 | 41 | NNU 4138 | NNU 4138 K30 |
| 200 | 1,1 | 1,5 | 1 | 1,5 | 5,75 | NNU 4840 | NNU 4840 K |
| | 2,1 | 2,1 | 2 | 2 | 15 | NNU 4940 | NNU 4940 K |
| | 2,1 | 2,1 | 2 | 2 | 22 | - | NN 3040 K |
| | 2,1 | 2,1 | 2 | 2 | 31,5 | 313639 | - |
| | 7x45° | 7x45° | 7 | 7 | 69,5 | 322185 | - |
| | 3 | 3 | 2,5 | 2,5 | 51 | NNU 4140 | NNU 4140 K30 |
| 210 | 2,1 | 2,1 | 2 | 2 | 40,5 | NNUB 322459 | - |



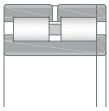

NNU

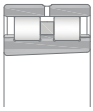


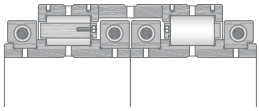

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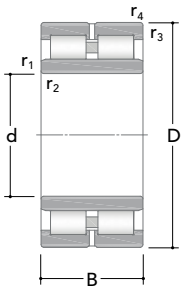

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **220** | 300 | 80 | - | 519 | 1140 | 112 | 3000 | **NNU 4944** |
| (cont.) | 300 | 100 | - | 890 | 1941 | 194 | 2300 | **322341** |
| | 330 | 115 | - | 1012 | 1930 | 197 | 1900 | **314889** |
| | 340 | 90 | - | 806 | 1440 | 141 | 2800 | **NN 3044** |
| | 370 | 150 | - | 1665 | 2890 | 284 | 1600 | **NNU 4144** |
| **240** | 300 | 60 | - | 363 | 924 | 81 | 2300 | **NNU 4848** |
| | 320 | 80 | - | 526 | 1210 | 117 | 2800 | **NNU 4948** |
| | 320 | 100 | - | 868 | 1950 | 192 | 1500 | **326257** |
| | 360 | 92 | - | 847 | 1540 | 151 | 2500 | **NN 3048** |
| | 400 | 160 | - | 1960 | 3580 | 348 | 1500 | **NNU 4148** |
| **260** | 360 | 100 | - | 747 | 1680 | 161 | 2500 | **NNU 4952** |
| | 360 | 102 | - | 981 | 2190 | 211 | 1900 | **314997** |
| | 370 | 110 | - | 1172 | 2320 | 228 | 1800 | **316028** |
| | 400 | 104 | - | 1028 | 1943 | 184 | 2300 | **NN 3052** |
| | 400 | 140 | - | 1641 | 3100 | 300 | 1600 | **NNU 4052** |
| | 440 | 180 | - | 2195 | 3870 | 362 | 1400 | **NNU 4152** |
| | 480 | 260 | - | 3184 | 5830 | 508 | 1100 | **313621** |
| **280** | 350 | 69 | - | 457 | 1197 | 100 | 1800 | **NNU 4856** |
| | 380 | 100 | - | 768 | 1808 | 171 | 2300 | **NNU 4956** |
| | 380 | 100 | - | 768 | 1808 | 171 | 2300 | **NNUP 4956** |
| | 400 | 142,5 | - | 1553 | 3710 | 351 | 1500 | **314070** |
| | 410 | 150 | - | 1759 | 3740 | 364 | 1500 | **314897** |
| | 420 | 106 | - | 1081 | 2040 | 192 | 2100 | **NN 3056** |
| | 420 | 140 | - | 1670 | 3090 | 299 | 1500 | **NNU 4056** |
| | 460 | 180 | - | 2587 | 4670 | 433 | 1300 | **NNU 4156** |
| | 470 | 200 | - | 2934 | 5550 | 515 | 1100 | **315976** |
| **300** | 380 | 80 | - | 580 | 1540 | 127 | 1700 | **NNU 4860** |
| | 420 | 118 | - | 1009 | 2330 | 221 | 2100 | **NNU 4960** |
| | 420 | 150 | - | 1886 | 4420 | 417 | 1700 | **326805** |


NNUP

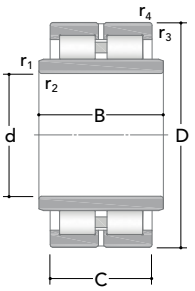

NN


2ROW SCRB

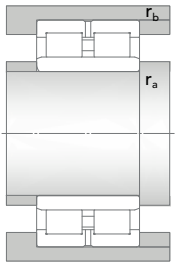
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 220 | 2,1 | 2,1 | 2 | 2 | 16,5 | NNU 4944 | NNU 4944 K |
| (cont.) | 2,1 | 2,1 | 2 | 2 | 20,5 | 322341 | - |
| | 2,1 | 2,1 | 2 | 2 | 34,5 | 314889 | - |
| | 3 | 3 | 2,5 | 2,5 | 28,5 | - | NN 3044 K |
| | 4 | 4 | 3 | 3 | 65 | NNU 4144 | NNU 4144 K30 |
| 240 | 1,1 | 2 | 1 | 2 | 9,9 | NNU 4848 | NNU 4848 K |
| | 2,1 | 2,1 | 2 | 2 | 17,5 | NNU 4948 | NNU 4948 K |
| | 2,1 | 2,1 | 2 | 2 | 22,5 | 326257 | - |
| | 3 | 3 | 2,5 | 2,5 | 32 | NN 3048 | NN 3048 K |
| | 4 | 4 | 3 | 3 | 85 | NNU 4148 | NNU 4148 K30 |
| 260 | 2,1 | 2,1 | 2 | 2 | 30,5 | NNU 4952 | NNU 4952 K |
| | 9x20° | 2,1 | - | 2 | 32 | 314997 | - |
| | 3 | 3 | 2 | 2 | 38,5 | 316028 | - |
| | 4 | 4 | 3 | 3 | 46 | - | NN 3052 K |
| | 4 | 4 | 3 | 3 | 63,5 | NNU 4052 | NNU 4052 K |
| | 4 | 4 | 3 | 3 | 110 | NNU 4152 | NNU 4152 K30 |
| | 5 | 5 | 4 | 4 | 205 | 313621 | - |
| 280 | 1,1 | 2 | 1 | 2 | 15,5 | NNU 4856 | NNU 4856 K |
| | 2,1 | 2,1 | 2 | 2 | 32,5 | NNU 4956 | NNU 4956 K |
| | 2,1 | 2,1 | 2 | 2 | 33,5 | NNUP 4956 | - |
| | 3 | 3 | 2,5 | 2,5 | 60 | 314070 | - |
| | 4 | 4 | 3 | 3 | 61 | 314897 | - |
| | 4 | 4 | 3 | 3 | 49,5 | - | NN 3056 K |
| | 4 | 4 | 3 | 3 | 66,5 | NNU 4056 | NNU 4056 K |
| | 5 | 5 | 4 | 4 | 120 | NNU 4156 | NNU 4156 K30 |
| | 3 | 5 | 2,5 | 4 | 150 | 315976 | - |
| 300 | 1,5 | 2,1 | 1,5 | 2 | 22 | NNU 4860 | NNU 4860 K |
| | 3 | 3 | 2,5 | 2,5 | 50 | NNU 4960 | NNU 4960 K |
| | 6,4x20° | 1,5 | 6 | 1,5 | 55,5 | 326805 | - |



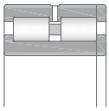

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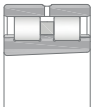


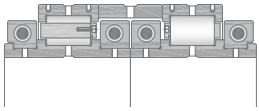

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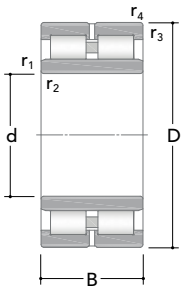

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **300** | 460 | 118 | - | 1247 | 2360 | 224 | 2000 | **NN 3060** |
| (cont.) | 460 | 160 | - | 2025 | 3990 | 374 | 1400 | **NNU 4060** |
| | 460 | 180 | - | 2569 | 5430 | 484 | 1100 | **320119** |
| | 500 | 200 | - | 2881 | 5270 | 452 | 1200 | **NNU 4160** |
| **320** | 400 | 80 | - | 771 | 2050 | 171 | 1600 | **NNU 4864** |
| | 440 | 118 | - | 1070 | 2450 | 237 | 2000 | **NNU 4964** |
| | 440 | 118 | - | 1070 | 2450 | 237 | 2000 | **NNUP 4964** |
| | 460 | 120 | - | 1741 | 3590 | 334 | 1000 | **322216** |
| | 480 | 121 | - | 1303 | 2550 | 235 | 1900 | **NN 3064** |
| | 480 | 160 | - | 2107 | 4290 | 399 | 1300 | **NNU 4064** |
| | 480 | 175 | - | 2486 | 5336 | 504 | 1000 | **315583** |
| | 540 | 218 | - | 3404 | 6170 | 527 | 1100 | **NNU 4164** |
| **340** | 420 | 80 | - | 642 | 1800 | 141 | 1480 | **NNU 4868** |
| | 420 | 80 | - | 642 | 1800 | 141 | 1480 | **NNUP 4868** |
| | 460 | 118 | - | 1112 | 2610 | 241 | 1810 | **NNU 4968** |
| | 520 | 133 | - | 1629 | 3190 | 285 | 1690 | **NN 3068** |
| | 520 | 180 | - | 2528 | 5070 | 452 | 1170 | **NNU 4068** |
| | 520 | 305 | 200 | 3287 | 7060 | 607 | 950 | **NNUB 320118** |
| | 580 | 243 | - | 4020 | 7390 | 611 | 1010 | **NNU 4168** |
| **350** | 500 | 190 | - | 2482 | 5600 | 511 | 1000 | **314563** |
| | 520 | 150 | - | 2116 | 4470 | 397 | 900 | **319878** |
| | | | | | | | 900 | |
| **355,59** | 558,8 | 279,4 | - | 4400 | 8330 | 706 | 1000 | **322186** |
| **360** | 480 | 118 | - | 1120 | 2770 | 247 | 1800 | **NNU 4972** |
| | 500 | 125 | - | 1787 | 3635 | 334 | 1270 | **320075** |
| | 500 | 125 | - | 2080 | 4280 | 358 | 1000 | **322217** |
| | 510 | 190 | - | 2573 | 6020 | 543 | 950 | **320299** |
| | 540 | 134 | - | 1721 | 3420 | 307 | 1590 | **NN 3072** |
| | 540 | 180 | - | 2815 | 5660 | 506 | 1170 | **NNU 4072** |


NNUP

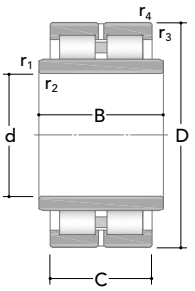

NN


2ROW SCRB

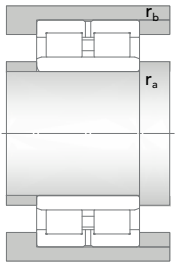
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 300 | 4 | 4 | 3 | 3 | 68,5 | - | NN 3060 K |
| (cont.) | 4 | 4 | 3 | 3 | 96 | NNU 4060 | NNU 4060 K |
| | 4 | 4 | 3 | 3 | 118 | 320119 | - |
| | 5 | 5 | 4 | 4 | 155 | NNU 4160 | NNU 4160 K30 |
| 320 | 1,5 | 2,1 | 1,5 | 2 | 23,5 | NNU 4864 | NNU 4864 K |
| | 3 | 3 | 2,5 | 2,5 | 53 | NNU 4964 | NNU 4964 K |
| | 3 | 3 | 2,5 | 2,5 | 55,5 | NNUP 4964 | - |
| | 3 | 3 | 2,5 | 2,5 | 70 | 322216 | - |
| | 4 | 4 | 3 | 3 | 74 | - | NN 3064 K |
| | 4 | 4 | 3 | 3 | 100 | NNU 4064 | NNU 4064 K |
| | 4 | 1,5 | 3 | 1,5 | 115 | 315583 | - |
| | 5 | 5 | 4 | 4 | 200 | NNU 4164 | NNU 4164 K30 |
| 340 | 1,5 | 2,1 | 1,5 | 2 | 25 | NNU 4868 | NNU 4868 K |
| | 2,1 | 2,1 | 2 | 2 | 24,5 | NNUP 4868 | - |
| | 3 | 3 | 2,5 | 2,5 | 56 | NNU 4968 | NNU 4968 K |
| | 5 | 5 | 4 | 4 | 97,5 | - | NN 3068 K |
| | 5 | 5 | 4 | 4 | 140 | NNU 4068 | NNU 4068 K |
| | 5 | 5 | 4 | 4 | 185 | NNUB 320118 | - |
| | 5 | 5 | 4 | 4 | 260 | NNU 4168 | NNU 4168 K30 |
| 350 | 5 | 5 | 4 | 4 | 115 | 314563 | - |
| | 5 | 5 | 4 | 4 | 110 | 319878 | - |
| 355,59 | 10,5x45° | 3x45° | 10 | 3 | 270 | 322186 | - |
| 360 | 3 | 3 | 2,5 | 2,5 | 58,5 | NNU 4972 | NNU 4972 K |
| | 3 | 3 | 2,5 | 2,5 | 72 | 320075 | - |
| | 3 | 3 | 2,5 | 2,5 | 80 | 322217 | - |
| | 5 | 5 | 4 | 4 | 120 | 320299 | - |
| | 5 | 5 | 4 | 4 | 105 | - | NN 3072 K |
| | 5 | 5 | 4 | 4 | 140 | NNU 4072 | NNU 4072 K |



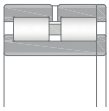

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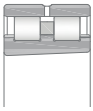


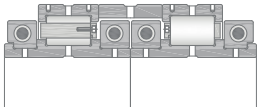

NNUB



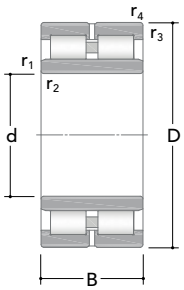

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **360** (cont.) | 600 | 243 | - | 4239 | 8420 | 688 | 950 | **NNU 4172** |
| **370** | 520 | 220 | 193 | 2762 | 6680 | 568 | 900 | **NNUB 319961** |
| **380** | 480 | 100 | - | 945 | 2530 | 210 | 1300 | **NNU 4876** |
| | 520 | 140 | - | 1456 | 3530 | 208 | 1300 | **NNU 4976** |
| | 540 | 130 | - | 2034 | 4270 | 377 | 900 | **326131** |
| | 540 | 150 | - | 2533 | 5450 | 476 | 900 | **316062** |
| | 540 | 200 | - | 3141 | 6890 | 593 | 800 | **320041** |
| | 560 | 135 | - | 1699 | 3410 | 301 | 1600 | **NN 3076** |
| | 560 | 180 | - | 2894 | 5940 | 525 | 1100 | **NNU 4076** |
| | 620 | 243 | - | 4320 | 8380 | 670 | 900 | **NNU 4176** |
| **400** | 500 | 100 | - | 961 | 2733 | 207 | 1200 | **NNU 4880** |
| | 500 | 100 | - | 961 | 2733 | 207 | 1200 | **NNUP 4880** |
| | 540 | 140 | - | 1679 | 4479 | 331 | 1600 | **NNU 4980** |
| | 560 | 205 | - | 3179 | 7740 | 650 | 800 | **314987** |
| | 590 | 220 | - | 3650 | 8190 | 686 | 800 | **315802** |
| | 600 | 148 | - | 2129 | 4450 | 376 | 1500 | **NN 3080** |
| | 600 | 200 | - | 3503 | 7060 | 588 | 1000 | **NNU 4080** |
| | 600,19 | 200 | - | 3477 | 7130 | 594 | 1000 | **326880** |
| | 600,19 | 200 | - | 3492 | 7120 | 593 | 800 | **326363** |
| | 650 | 250 | - | 4720 | 9340 | 737 | 800 | **NNU 4180** |
| **406,4** | 647,7 | 342,8 | - | 6355 | 12290 | 983 | 800 | **322187** |
| **410** | 600 | 140 | - | 3829 | 8570 | 713 | 800 | **316019** |
| **420** | 520 | 100 | - | 997 | 2810 | 193 | 1200 | **NNU 4884** |
| | 560 | 140 | - | 1523 | 3980 | 343 | 1500 | **NNU 4984** |
| | 580 | 130 | - | 2306 | 4710 | 407 | 1100 | **320074** |
| | 580 | 130 | - | 2522 | 5280 | 463 | 800 | **326137** |
| | 580 | 160 | - | 2316 | 5300 | 466 | 900 | **313555** |


NNUP

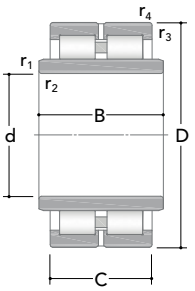

NN


2ROW SCRB

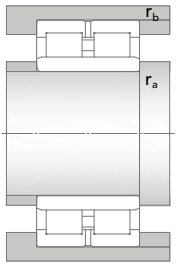
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 360 (cont.) | 5 | 5 | 4 | 4 | 275 | NNU 4172 | NNU 4172 K30 |
| 370 | 13,7x20° | 1,5 | - | 1,5 | 130 | NNUB 319961 | - |
| 380 | 1,5 | 2,1 | 1,5 | 2 | 44 | NNU 4876 | NNU 4876 K |
| | 4 | 4 | 3 | 3 | 87,5 | NNU 4976 | NNU 4976 K |
| | 4 | 4 | 3 | 3 | 100 | 326131 | - |
| | 8,5x20° | 2 | - | 2 | 110 | 316062 | - |
| | 5 | 2 | 4 | 2 | 145 | 320041 | - |
| | 5 | 5 | 4 | 4 | 110 | - | NN 3076 K |
| | 5 | 5 | 4 | 4 | 150 | NNU 4076 | NNU 4076 K |
| | 5 | 5 | 4 | 4 | 285 | NNU 4176 | NNU 4176 K30 |
| 400 | 1,5 | 2,1 | 1,5 | 2 | 46 | NNU 4880 | NNU 4880 K |
| | 2,1 | 2,1 | 2 | 2 | 45,5 | NNUP 4880 | - |
| | 4 | 4 | 3 | 3 | 91,5 | NNU 4980 | NNU 4980 K |
| | 5 | 2 | 4 | 2 | 160 | 314987 | - |
| | 5 | 5 | 4 | 4 | 210 | 315802 | - |
| | 5 | 5 | 4 | 4 | 140 | - | NN 3080 K |
| | 5 | 5 | 4 | 4 | 205 | NNU 4080 | NNU 4080 K |
| | 5 | 5 | 4 | 4 | 200 | 326880 | - |
| | 5 | 5 | 4 | 4 | 205 | 326363 | - |
| | 6 | 6 | 5 | 5 | 325 | NNU 4180 | NNU 4180 K30 |
| 406,4 | 13x45° | 5x45° | 12 | 5 | 435 | 322187 | - |
| 410 | 5 | 5 | 4 | 4 | 215 | 316019 | - |
| 420 | 1,5 | 2,1 | 1,5 | 2 | 48 | NNU 4884 | NNU 4884 K |
| | 4 | 4 | 3 | 3 | 95,5 | NNU 4984 | NNU 4984 K |
| | 4 | 4 | 3 | 3 | 110 | 320074 | - |
| | 4 | 4 | 3 | 3 | 110 | 326137 | - |
| | 4 | 4 | 3 | 3 | 125 | 313555 | - |



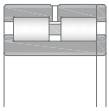

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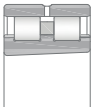


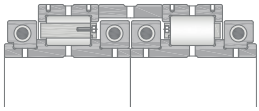

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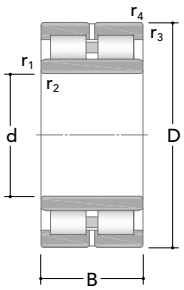

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **420** | 600 | 220 | - | 3609 | 8710 | 713 | 800 | **314982** |
| (cont.) | 620 | 150 | - | 2122 | 4480 | 378 | 1400 | **NN 3084** |
| | 620 | 200 | - | 3508 | 7460 | 607 | 1000 | **NNU 4084** |
| | 620 | 200 | - | 3494 | 7660 | 643 | 700 | **314391** |
| | 620 | 260 | - | 4340 | 10080 | 870 | 900 | **614844** |
| | 700 | 280 | - | 5457 | 11310 | 893 | 800 | **NNU 4184** |
| **440** | 540 | 100 | - | 1016 | 3399 | 216 | 1100 | **NNU 4888** |
| | 600 | 160 | - | 2072 | 5120 | 443 | 1400 | **NNU 4988** |
| | 620 | 225 | - | 3870 | 9670 | 789 | 700 | **316077** |
| | 640 | 230 | - | 4596 | 9790 | 779 | 900 | **316521** |
| | 650 | 157 | - | 2426 | 5020 | 418 | 1300 | **NN 3088** |
| | 650 | 212 | - | 3920 | 8250 | 666 | 900 | **NNU 4088** |
| | 720 | 280 | - | 5768 | 11660 | 889 | 700 | **NNU 4188** |
| **457,2** | 660,4 | 228,6 | 203,2 | 3651 | 7990 | 627 | 700 | **NNUB 322969** |
| **460** | 580 | 118 | - | 1199 | 3190 | 220 | 1100 | **NNU 4892** |
| | 620 | 160 | - | 2111 | 5390 | 456 | 1300 | **NNU 4992** |
| | 650 | 235 | - | 4429 | 11040 | 887 | 700 | **316739** |
| | 680 | 163 | - | 2585 | 5410 | 448 | 1300 | **NN 3092** |
| | 680 | 218 | - | 4267 | 8860 | 709 | 800 | **NNU 4092** |
| | 760 | 300 | - | 6496 | 13020 | 989 | 700 | **NNU 4192** |
| **480** | 650 | 170 | - | 2349 | 6010 | 502 | 1300 | **NNU 4996** |
| | 700 | 165 | - | 2668 | 5790 | 475 | 1200 | **NN 3096** |
| | 700 | 218 | - | 4353 | 9490 | 738 | 800 | **NNU 4096** |
| | 700 | 260 | - | 5352 | 12380 | 941 | 600 | **316189** |
| | 790 | 308 | - | 7090 | 14090 | 1064 | 700 | **NNU 4196** |
| **487,98** | 637 | 175 | - | 3040 | 7530 | 6044 | 700 | **326196** |
| **490** | 694 | 174 | - | 3733 | 8890 | 741 | 700 | **316639** |


NNUP

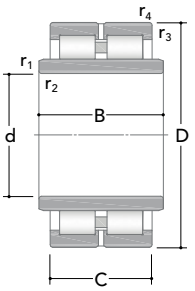

NN


2ROW SCRB

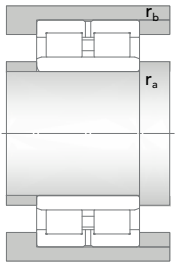
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| **420** | 2 | 2 | 2 | 2 | 205 | **314982** | - |
| (cont.) | 5 | 5 | 4 | 4 | 145 | - | NN 3084 K |
| | 5 | 5 | 4 | 4 | 183 | NNU 4084 | NNU 4084 K |
| | 4 | 4 | 3 | 3 | 220 | **314391** | - |
| | 6 | 6 | 5 | 5 | 280 | **614844** | - |
| | 6 | 6 | 5 | 5 | 440 | NNU 4184 | NNU 4184 K30 |
| **440** | 1,5 | 2,1 | 1,5 | 2 | 50 | NNU 4888 | NNU 4888 K |
| | 4 | 4 | 3 | 3 | 130 | NNU 4988 | NNU 4988 K |
| | 12x20° | 2 | - | 2 | 220 | **316077** | - |
| | 6 | 6 | 5 | 5 | 250 | **316521** | - |
| | 6 | 6 | 5 | 5 | 170 | - | NN 3088 K |
| | 6 | 6 | 5 | 5 | 215 | NNU 4088 | NNU 4088 K |
| | 6 | 6 | 5 | 5 | 450 | NNU 4188 | NNU 4188 K30 |
| **457,2** | 6 | 6 | 5 | 5 | 235 | NNUB 322969 | - |
| **460** | 3 | 3 | 2,5 | 2,5 | 75 | NNU 4892 | NNU 4892 K |
| | 4 | 4 | 3 | 3 | 135 | NNU 4992 | NNU 4992 K |
| | 12x20° | 3 | - | 2,5 | 260 | **316739** | - |
| | 6 | 6 | 5 | 5 | 195 | - | NN 3092 K |
| | 6 | 6 | 5 | 5 | 240 | NNU 4092 | NNU 4092 K |
| | 7,5 | 7,5 | 6 | 6 | 535 | NNU 4192 | NNU 4192 K30 |
| **480** | 5 | 5 | 4 | 4 | 160 | NNU 4996 | NNU 4996 K |
| | 6 | 6 | 5 | 5 | 200 | NN 3096 | NN 3096 K |
| | 6 | 6 | 5 | 5 | 275 | NNU 4096 | NNU 4096 K |
| | 6 | 6 | 5 | 5 | 345 | **316189** | - |
| | 7,5 | 7,5 | 6 | 6 | 590 | NNU 4196 | NNU 4196 K30 |
| **487,98** | 10x20° | 4 | - | 3 | 170 | **326196** | - |
| **490** | 16x20° | 5 | - | 4 | 215 | **316639** | - |



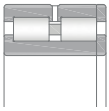

NNU

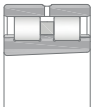


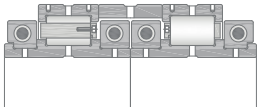

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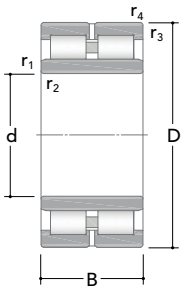

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **500** | 650 | 130 | - | 2035 | 5050 | 421 | 700 | **319254** |
| | 670 | 170 | - | 2295 | 6050 | 506 | 1200 | **NNU 49/500** |
| | 680 | 225 | - | 4166 | 10880 | 870 | 600 | **314990** |
| | 700 | 170 | - | 2688 | 5360 | 402 | 850 | **320570** |
| | 720 | 167 | - | 2705 | 5780 | 474 | 1200 | **NN 30/500** |
| | 720 | 218 | - | 4407 | 9800 | 750 | 800 | **NNU 40/500** |
| | 720 | 218 | - | 4668 | 10740 | 810 | 600 | **314419** |
| | 830 | 325 | - | 7446 | 14910 | 1113 | 600 | **NNU 41/500** |
| **510** | 760 | 400 | 275 | 5987 | 13180 | 998 | 600 | **NNUB 320996** |
| **529,91** | 870 | 335 | | 7809 | 16570 | 1218 | 500 | **312844** |
| **530** | 710 | 180 | - | 2828 | 7770 | 638 | 1060 | **NNU 49/530** |
| | 760 | 260 | - | 5888 | 14090 | 1044 | 600 | **316536** |
| | 780 | 185 | - | 3340 | 7100 | 523 | 1060 | **NN 30/530** |
| | 780 | 225 | - | 4456 | 9410 | 688 | 600 | **326064** |
| | 780 | 250 | - | 4736 | 10000 | 750 | 600 | **315040** |
| | 780 | 250 | - | 5481 | 12150 | 896 | 700 | **NNU 40/530** |
| | 780 | 475 | 285 | 7222 | 17220 | 1284 | 600 | **NNUB 320117** |
| | 870 | 335 | - | 7721 | 15990 | 1159 | 600 | **NNU 41/530** |
| **546,05** | 698,5 | 215,9 | - | 3586 | 7620 | 583 | 700 | **464787** |
| **550** | 800 | 260 | - | 5834 | 13146,5 | 961 | 600 | **316115** |
| **560** | 735 | 170 | - | 2951 | 6930 | 559 | 800 | **326061** |
| | 740 | 180 | - | 2674 | 7220 | 560 | 640 | **313191** |
| | 750 | 190 | - | 3189 | 8500 | 683 | 1010 | **NNU 49/560** |
| | 820 | 195 | - | 3744 | 7860 | 575 | 950 | **NN 30/560** |
| | 820 | 258 | - | 5681 | 12840 | 946 | 670 | **NNU 40/560** |
| | 920 | 355 | - | 8844 | 18160 | 1310 | 560 | **NNU 41/560** |


NNUP

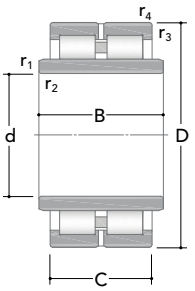

NN


2ROW SCRB

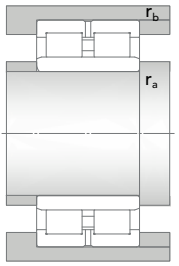
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| **500** | 5 | 5 | 4 | 4 | 120 | **319254** | - |
| | 5 | 5 | 4 | 4 | 165 | NNU 49/500 | NNU 49/500 K |
| | 5 | 2 | 4 | 2 | 250 | **314990** | - |
| | 5 | 5 | 4 | 4 | 210 | **320570** | - |
| | 6 | 6 | 5 | 5 | 210 | NN 30/500 | NN 30/500 K |
| | 6 | 6 | 5 | 5 | 285 | NNU 40/500 | NNU 40/500 K |
| | 13,5x20° | 6 | - | 5 | 310 | **314419** | - |
| | 7,5 | 7,5 | 6 | 6 | 710 | NNU 41/500 | NNU 41/500 K30 |
| **510** | 6 | 3 | 5 | 2,5 | 485 | NNUB 320996 | - |
| **529,91** | 7,5 | 7,5 | 6 | 6 | 830 | **312844** | - |
| **530** | 5 | 5 | 4 | 4 | 200 | NNU 49/530 | NNU 49/530 K |
| | 12x20° | 5 | - | 4 | 510 | **316536** | - |
| | 6 | 6 | 5 | 5 | 270 | NN 30/530 | NN 30/530 K |
| | 20x20° | 6 | - | 5 | 370 | **326064** | - |
| | 6 | 6 | 5 | 5 | 400 | **315040** | - |
| | 6 | 6 | 5 | 5 | 420 | NNU 40/530 | NNU 40/530 K |
| | 5 | 5 | 4 | 4 | 560 | NNUB 320117 | - |
| | 7,5 | 7,5 | 6 | 6 | 790 | NNU 41/530 | NNU 41/530 K30 |
| **546,05** | 4 | 4 | 3 | 3 | 215 | **464787** | - |
| **550** | 14x20° | 6 | - | 5 | 455 | **316115** | - |
| **560** | 5 | 5 | 4 | 4 | 165 | **326061** | - |
| | 5 | 5 | 4 | 4 | 215 | **313191** | - |
| | 5 | 5 | 4 | 4 | 235 | NNU 49/560 | NNU 49/560 K |
| | 6 | 6 | 5 | 5 | 315 | NN 30/560 | NN 30/560 K |
| | 6 | 6 | 5 | 5 | 475 | NNU 40/560 | NNU 40/560 K |
| | 7,5 | 7,5 | 6 | 6 | 930 | NNU 41/560 | NNU 41/560 K30 |



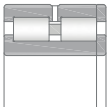

NNU

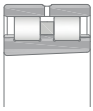


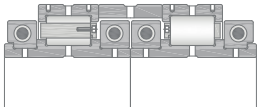

NNUB



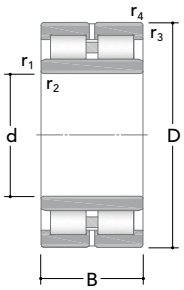

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **600** | 800 | 200 | - | 3583 | 10030 | 787 | 950 | **NNU 49/600** |
| | 820 | 287,5 | - | 6483 | 17900 | 1283 | 500 | **319584** |
| | 870 | 200 | - | 3827 | 8560 | 604 | 900 | **NN 30/600** |
| | 870 | 272 | - | 6850 | 15510 | 1114 | 600 | **NNU 40/600** |
| | 980 | 375 | - | 9802 | 21080 | 1452 | 500 | **NNU 41/600** |
| **630** | 850 | 218 | - | 4038 | 11260 | 869 | 900 | **NNU 49/630** |
| | 920 | 212 | - | 4278 | 9680 | 672 | 850 | **NN 30/630** |
| | 920 | 290 | - | 7730 | 17150 | 1196 | 600 | **NNU 40/630** |
| | 1030 | 400 | - | 10900 | 23550 | 1599 | 480 | **NNU 41/630** |
| **635** | 762 | 101,6 | - | 1670 | 4540 | 324 | 740 | **319943** |
| **650** | 920 | 335 | - | 8697 | 23080 | 1592 | 560 | **326894** |
| **660** | 880 | 225 | - | 4126 | 11770 | 828 | 490 | **313477** |
| **670** | 900 | 230 | - | 4988 | 13570 | 921 | 850 | **NNU 49/670** |
| | 980 | 230 | - | 5045 | 11290 | 772 | 800 | **NN 30/670** |
| | 980 | 308 | - | 8333 | 19510 | 1334 | 530 | **NNU 40/670** |
| | 1090 | 412 | - | 12233 | 25140 | 1706 | 450 | **NNU 41/670** |
| **710** | 950 | 243 | - | 5326 | 15110 | 1027 | 740 | **NNU 49/710** |
| | 1030 | 236 | - | 5792 | 13040 | 869 | 710 | **NN 30/710** |
| | 1030 | 315 | - | 9482 | 21580 | 1459 | 510 | **NNU 40/710** |
| | 1150 | 438 | - | 13517 | 28470 | 1898 | 400 | **NNU 41/710** |
| **723,975** | 927,2 | 190 | - | 4453 | 11900 | 813 | 500 | **322191** |
| **750** | 920 | 170 | - | 3440 | 10000 | 706 | 585 | **NN 48/750** |
| | 1000 | 250 | - | 5538 | 15920 | 1055 | 710 | **NNU 49/750** |
| | 1000 | 250 | - | 6199 | 16420 | 1108 | 420 | **314420** |
| | 1090 | 250 | - | 6976 | 15990 | 1039 | 660 | **NN 30/750** |


NNUP

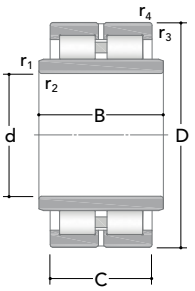

NN


2ROW SCRB

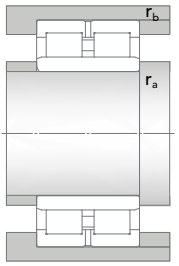
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| **600** | 5 | 5 | 4 | 4 | 280 | NNU 49/600 | NNU 49/600 K |
| | 15x20° | 3 | - | 2,5 | 470 | 319584 | - |
| | 6 | 6 | 5 | 5 | 355 | NN 30/600 | NN 30/600 K |
| | 6 | 6 | 5 | 5 | 530 | NNU 40/600 | NNU 40/600 K |
| | 7,5 | 7,5 | 6 | 6 | 1100 | NNU 41/600 | NNU 41/600 K30 |
| **630** | 6 | 6 | 5 | 5 | 355 | NNU 49/630 | NNU 49/630 K |
| | 7,5 | 7,5 | 6 | 6 | 430 | NN 30/630 | NN 30/630 K |
| | 7,5 | 7,5 | 6 | 6 | 635 | NNU 40/630 | NNU 40/630 K |
| | 7,5 | 7,5 | 6 | 6 | 1330 | NNU 41/630 | NNU 41/630 K30 |
| **635** | 5 | 5 | 4 | 4 | 86,5 | 319943 | - |
| **650** | 17x20° | 4 | - | 3 | 740 | 326894 | - |
| **660** | 6 | 6 | 5 | 5 | 390 | 313477 | - |
| **670** | 6 | 6 | 5 | 5 | 410 | NNU 49/670 | NNU 49/670 K |
| | 7,5 | 7,5 | 6 | 6 | 530 | NN 30/670 | NN 30/670 K |
| | 7,5 | 7,5 | 6 | 6 | 765 | NNU 40/670 | NNU 40/670 K |
| | 7,5 | 7,5 | 6 | 6 | 1500 | NNU 41/670 | NNU 41/670 K30 |
| **710** | 6 | 6 | 5 | 5 | 480 | NNU 49/710 | NNU 49/710 K |
| | 7,5 | 7,5 | 6 | 6 | 590 | NN 30/710 | NN 30/710 K |
| | 7,5 | 7,5 | 6 | 6 | 850 | NNU 40/710 | NNU 40/710 K |
| | 9,5 | 9,5 | 8 | 8 | 1790 | NNU 41/710 | NNU 41/710 K30 |
| **723,975** | 6 | 2 | 5 | 2 | 340 | 322191 | - |
| **750** | 5 | 5 | 4 | 4 | 240 | NN 48/750 | NN 48/750 K |
| | 6 | 6 | 5 | 5 | 540 | NNU 49/750 | NNU 49/750 K |
| | 6 | 6 | 5 | 5 | 575 | 314420 | - |
| | 7,5 | 7,5 | 6 | 6 | 705 | NN 30/750 | NN 30/750 K |



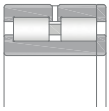

NNU

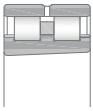


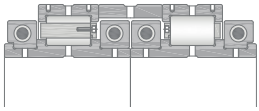

NNUB



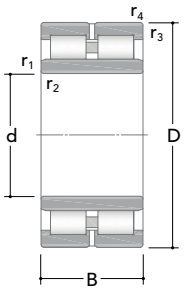

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **750** | 1090 | 335 | - | 10137 | 23730 | 1582 | 460 | **NNU 40/750** |
| (cont.) | 1220 | 475 | - | 16148 | 35390 | 2313 | 400 | **NNU 41/750** |
| **760** | 1030 | 400 | - | 12362 | 33820 | 2228 | - | **239503** |
| **800** | 1060 | 258 | - | 5877 | 16780 | 1106 | - | **NNU 49/800** |
| | 1150 | 258 | - | 7757 | 17940 | 1156 | - | **NN 30/800** |
| | 1150 | 345 | - | 10942 | 25890 | 1693 | - | **NNU 40/800** |
| | 1260 | 375 | - | 12836 | 27810 | 1788 | 320 | **326379** |
| | 1280 | 475 | - | 16320 | 40891 | 2625 | 360 | **NNU 41/800** |
| **850** | 1120 | 272 | - | 5944 | 17990 | 1139 | - | **NNU 49/850** |
| | 1220 | 272 | - | 7949 | 18250 | 1158 | - | **NN 30/850** |
| | 1220 | 365 | - | 11641 | 28100 | 1804 | - | **NNU 40/850** |
| **900** | 1180 | 280 | - | 6634 | 19720 | 1233 | - | **NNU 49/900** |
| | 1280 | 280 | - | 8327 | 19730 | 1233 | - | **NN 30/900** |
| | 1280 | 375 | - | 12880 | 31140 | 1977 | - | **NNU 40/900** |
| **950** | 1250 | 300 | - | 7364 | 22340 | 1396 | - | **NNU 49/950** |
| | 1360 | 300 | - | 9117 | 22220 | 1359 | - | **NN 30/950** |
| | 1360 | 412 | - | 14078 | 35210 | 2182 | - | **NNU 40/950** |
| **1000** | 1320 | 315 | - | 8676 | 25620 | 1577 | - | **NNU 49/1000** |
| | 1320 | 315 | - | 8676 | 25620 | 1606 | - | **NN 49/1000** |
| | 1420 | 308 | - | 10004 | 24200 | 1511 | - | **NN 30/1000** |
| | 1420 | 412 | - | 15489 | 37310 | 2317 | - | **NNU 40/1000** |
| **1060** | 1400 | 335 | - | 10635 | 30380 | 1853 | - | **NNU 49/1060** |
| | 1500 | 325 | - | 11156 | 27210 | 1642 | - | **NN 30/1060** |
| **1120** | 1460 | 335 | - | 10462 | 31250 | 1845 | - | **NNU 49/1120** |


NNUP

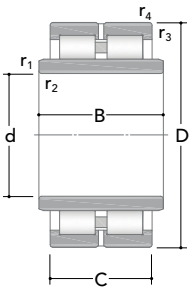

NN


2ROW SCRB

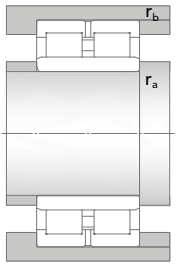
| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 750 | 7,5 | 7,5 | 6 | 6 | 925 | NNU 40/750 | NNU 40/750 K |
| (cont.) | 9,5 | 9,5 | 8 | 8 | 2230 | NNU 41/750 | NNU 41/750 K30 |
| 760 | 7,5 | 4 | 6 | 3 | 1280 | 239503 | - |
| 800 | 6 | 6 | 5 | 5 | 615 | NNU 49/800 | NNU 49/800 K |
| | 7,5 | 7,5 | 6 | 6 | 790 | NN 30/800 | NN 30/800 K |
| | 7,5 | 7,5 | 6 | 6 | 1140 | NNU 40/800 | NNU 40/800 K |
| | 9,5 | 9,5 | 8 | 8 | 1850 | 326379 | - |
| | 9,5 | 9,5 | 8 | 8 | 2390 | NNU 41/800 | NNU 41/800 K30 |
| 850 | 6 | 6 | 5 | 5 | 715 | NNU 49/850 | NNU 49/850 K |
| | 7,5 | 7,5 | 6 | 6 | 480 | NN 30/850 | NN 30/850 K |
| | 7,5 | 7,5 | 6 | 6 | 300 | NNU 40/850 | NNU 40/850 K |
| 900 | 6 | 6 | 5 | 5 | 805 | NNU 49/900 | NNU 49/900 K |
| | 7,5 | 7,5 | 6 | 6 | 1050 | NN 30/900 | NN 30/900 K |
| | 7,5 | 7,5 | 6 | 6 | 1500 | NNU 40/900 | NNU 40/900 K |
| 950 | 7,5 | 7,5 | 6 | 6 | 960 | NNU 49/950 | NNU 49/950 K |
| | 7,5 | 7,5 | 6 | 6 | 1300 | NN 30/950 | NN 30/950 K |
| | 7,5 | 7,5 | 6 | 6 | 1900 | NNU 40/950 | NNU 40/950 K |
| 1000 | 7,5 | 7,5 | 6 | 6 | 1250 | NNU 49/1000 | NNU 49/1000 K |
| | 7,5 | 7,5 | 6 | 6 | 1200 | NN 49/1000 | NN 49/1000 K |
| | 7,5 | 7,5 | 6 | 6 | 1400 | NN 30/1000 | NN 30/1000 K |
| | 7,5 | 7,5 | 6 | 6 | 2000 | NNU 40/1000 | NNU 40/1000 K |
| 1060 | 7,5 | 7,5 | 6 | 6 | 1350 | NNU 49/1060 | NNU 49/1060 K |
| | 9,5 | 9,5 | 8 | 8 | 1650 | NN 30/1060 | NN 30/1060 K |
| 1120 | 7,5 | 7,5 | 6 | 6 | 1450 | NNU 49/1120 | NNU 49/1120 K |



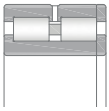

NNU

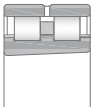


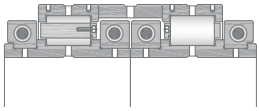

NNUB




| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Reference | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **1180** | 1540 | 355 | - | 11803 | 35290 | 2078 | - | **NNU 49/1180** |
| **1311** | 1720 | 300 | - | 12421 | 34120 | 1978 | 169 | **326372** |
| **1320** | 1720 | 400 | - | 13845 | 41980 | 2420 | - | **NNU 49/1320** |
| | 1720 | 400 | - | 13845 | 41980 | 2420 | - | **NN 49/1320** |


NNUP


NN


2ROW SCRB

| Dimensions | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | | | [kg] | | |
| 1180 | 7,5 | 7,5 | 6 | 6 | 1650 | NNU 49/1180 | NNU 49/1180 K |
| 1311 | 7,5 | 7,5 | 6 | 6 | 1820 | 326372 | - |
| 1320 | 7,5 | 7,5 | 6 | 6 | 3100 | NNU 49/1320 | NNU 49/1320 K |
| | 7,5 | 7,5 | 6 | 6 | 3060 | NN 49/1320 | NN 49/1320 K |

# Double row full complement cylindrical roller bearings

Double row full complement cylindrical roller bearings feature both solid inner and outer rings, as well as rolling elements proply guided between ribs. Due to that particular design (cageless) they can host the large numbers of rollers, leanding to the highest load rating values. On the otherside, they have allow a maximum rotating speed lower then the classical cage design. Available in non locating, semi-locating and locating design these bearings represent the proper technical solution in several fields and applications.

## Internal clearance

Double row full complement cylindrical roller bearings are produced as standard with Normal radial internal clearance CN, but they are also available with C2, C3, and C4 radial internal clearance, in accordance with the ISO 5753:2009. The radial internal clearance values are reported in the **Tab. 1 page 215** and **Tab. 2 page 216** and they are valid only for bearing unmounted and unloaded. The axial internal clearance of NNC and NNCF, which can axially locate the shaft in both directions, is in the range of 0.1 to 0.2 mm for all seizes.



Double row full complement cylindrical roller bearing

## Axial displacement

NNCL and NNCF bearing can accommodate axial displacement between shaft and housing within certain limits. As a consequence of the fact that the axial displacement takes between the inner ring and outer ring and not between the inner ring and shaft and outer ring and housing, there is no additional friction during the bearing rotation.

## Misalignment

Any misalignment between shaft and seat of the double row full complement cylindrical roller bearing creates a moment load inside the bearing. The bearing life will be obviously affected.

## Minimum load

A minimum radial load is requested for a double row full complement cylindrical roller bearings to allow the correct functioning, especially in critical working conditions like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions, a skidding between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load can be theoretically estimated using the following formula:

$$F_{rm} > \frac{C_{0r}}{50}$$

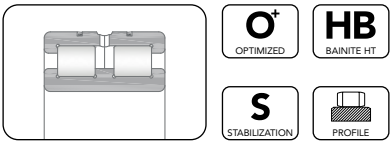
Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_{0r}$ basic static load rating, [kN] .

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the double row full complement cylindrical roller bearing.

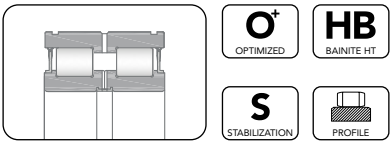
## Designs and variants

### Type NNC (SL01)



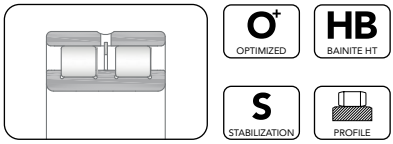

- Split outer ring with two integral ribs, clamped with a retaining ring
- Inner ring with three integral ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Annular groove and lubrication holes in outer ring
- Optimized raceway geometry and roller profile
- Can be used in locating position

### Type NNF (SL04)



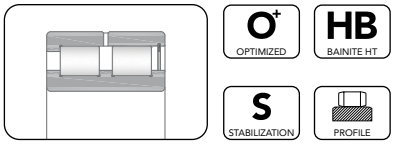

- Outer ring with one central integral rib
- Split inner ring with three integral ribs, clamped with a retaining ring
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed
- Annular groove and lubrication holes in outer and inner ring
- Optimized raceway geometry and roller profile
- Integrated rubber seals on both bearing sides to avoid contamination
- Available filled with grease
- Can be used in locating position

### Type NNCL (SL02)




- Ribless outer ring
- Inner ring with three integral ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Annular groove and lubrication holes in outer ring
- Separating ring between the two rows of rollers
- Optimized raceway geometry and roller profile
- Can be used in locating position

### Type NNCF



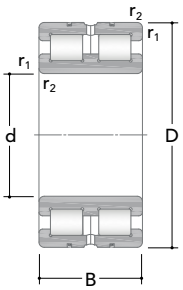

- Outer ring with one integral side rib and
- retaining ring
- Inner ring with three integral ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Optimized raceway geometry and roller profile
- Can be used in one direction locating position (semi-locating design)
- Available with annular groove and lubrication holes in outer or inner ring

| Suffixes | Internal Design |
|---|---|
| DA | Modified snap ring grooves in outer ring and two-piece inner ring held together by retaining ring |
| ADA | Wider snap ring grooves in outer ring and two-piece inner ring held together by retaining ring |
| OD | Special outer diameter. The number immediately following the OD gives the outer diameter in mm |
| B | Special bearing width. The number immediately following the B gives the width in mm |
| SP | Special or non-standard bearing |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

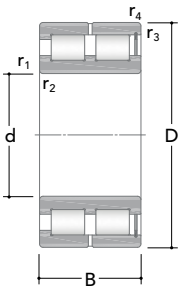
| Suffixes | Cage |
|---|---|
| V | Full complement of rolling elements (without cage) |

| Suffixes | Lubrication |
|---|---|
| G | Helical groove in inner ring bore (not necessarily stated) |
| ISR3 | Annular groove and three lubrication holes in inner ring |
| W33 | Annular groove and three lubrication holes in outer ring |
| W33X | Annular groove and more than three lubrication holes in outer ring |
| W77X | Annular groove and more than three plugged lubrication holes in outer ring |
| W | Lubrication grooves in the side faces of inner and outer rings (not necessarily stated) |
| WI | Lubrication grooves in the side face of inner ring (not necessarily stated) |
| WO | Lubrication grooves in the side face of outer ring (not necessarily stated) |

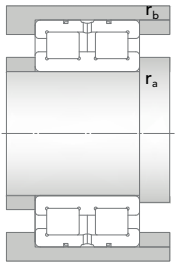
| Suffixes | External design |
|---|---|
| P | Contact seal on one side (3194 series) |
| PP | Contact seal on both sides (NNF 50 series) |
| LS | Contact seal on one side (NNF 50 series) |
| 2LS | Contact seal on both sides (3194 series) |
| NR | Snap ring groove in outer ring with suitable snap ring |



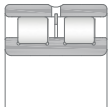

NNC (SL01)




NNCF

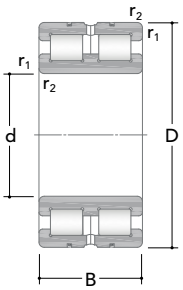



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **20** | 42 | 30 | 52,4 | 57,3 | 6,1 | 8500 | 10000 | NNCF 5004 V |
| **25** | 47 | 30 | 59,4 | 71,6 | 7,5 | 7000 | 9100 | NNCF 5005 V |
| **30** | 55 | 34 | 73,8 | 88,5 | 10 | 6000 | 7500 | NNCF 5006 V |
| **35** | 62 | 36 | 89,9 | 112 | 12,7 | 5300 | 6700 | NNCF 5007 V |
| **40** | 68 | 38 | 106 | 149 | 17 | 4800 | 6000 | NNCF 5008 V |
| **45** | 75 | 40 | 113 | 156 | 18,2 | 4300 | 5300 | NNCF 5009 V |
| **50** | 80 | 40 | 144 | 196 | 23,2 | 4000 | 5000 | NNCF 5010 V |
| **55** | 90 | 46 | 191 | 285 | 33,9 | 3400 | 4300 | NNCF 5011 V |
| **60** | 85 | 25 | 78,7 | 137 | 14,1 | 3600 | 4500 | NNCF 4912 V |
| | 85 | 25 | 78,7 | 137 | 14,1 | 3600 | 4500 | NNC 4912 V |
| | 85 | 25 | 78,7 | 137 | 14,1 | 3600 | 4500 | NNCL 4912 V |
| | 95 | 46 | 199 | 300 | 36,4 | 3400 | 4000 | NNCF 5012 V |
| **65** | 100 | 46 | 211 | 325 | 40 | 3000 | 3800 | NNCF 5013 V |
| **70** | 100 | 30 | 115 | 193 | 22,3 | 3000 | 3800 | NNCF 4914 V |
| | 100 | 30 | 115 | 193 | 22,3 | 3000 | 3800 | NNC 4914 V |
| | 100 | 30 | 115 | 193 | 22,3 | 3000 | 3800 | NNCL 4914 V |
| | 110 | 54 | 239 | 346 | 45 | 2800 | 3600 | NNCF 5014 V |
| **75** | 115 | 54 | 251 | 381 | 49 | 2600 | 3200 | NNCF 5015 V |
| **80** | 110 | 30 | 121 | 217 | 25 | 2600 | 3400 | NNCF 4916 V |
| | 110 | 30 | 121 | 217 | 25 | 2600 | 3400 | NNC 4916 V |
| | 110 | 30 | 121 | 217 | 25 | 2600 | 3400 | NNCL 4916 V |

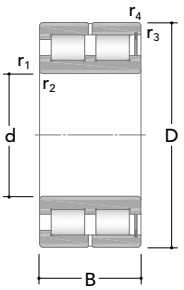


NNCL (SL02)

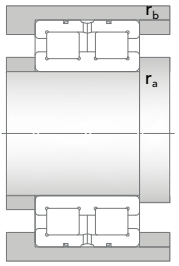
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 20 | 0,6 | 0,3 | 0,5 | 0,3 | 0,2 | NNCF 5004 V |
| 25 | 0,6 | 0,3 | 0,5 | 0,3 | 0,23 | NNCF 5005 V |
| 30 | 1 | 0,3 | 1 | 0,3 | 0,35 | NNCF 5006 V |
| 35 | 1 | 0,3 | 1 | 0,3 | 0,46 | NNCF 5007 V |
| 40 | 1 | 0,3 | 1 | 0,3 | 0,56 | NNCF 5008 V |
| 45 | 1 | 0,3 | 1 | 0,3 | 0,71 | NNCF 5009 V |
| 50 | 1 | 0,3 | 1 | 0,3 | 0,76 | NNCF 5010 V |
| 55 | 1,1 | 0,6 | 1 | 0,5 | 1,15 | NNCF 5011 V |
| 60 | 1 | 1 | 1 | 1 | 0,48 | NNCF 4912 V |
| | 1 | - | 1 | - | 0,49 | NNC 4912 V |
| | 1 | - | 1 | - | 0,47 | NNCL 4912 V |
| | 1,1 | 0,6 | 1 | 0,5 | 1,25 | NNCF 5012 V |
| 65 | 1,1 | 0,6 | 1 | 0,5 | 1,3 | NNCF 5013 V |
| 70 | 1 | 1 | 1 | 1 | 0,77 | NNCF 4914 V |
| | 1 | - | 1 | - | 0,78 | NNC 4914 V |
| | 1 | - | 1 | - | 0,75 | NNCL 4914 V |
| | 1,1 | 0,6 | 1 | 0,5 | 1,85 | NNCF 5014 V |
| 75 | 1,1 | 0,6 | 1 | 0,5 | 1,95 | NNCF 5015 V |
| 80 | 1 | 1 | 1 | 1 | 0,87 | NNCF 4916 V |
| | 1 | - | 1 | - | 0,88 | NNC 4916 V |
| | 1 | - | 1 | - | 0,85 | NNCL 4916 V |



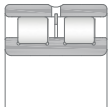

NNC (SL01)




NNCF

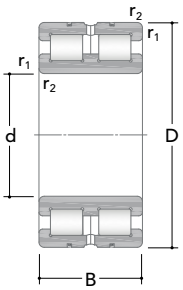



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **80** | 125 | 60 | 308 | 456 | 58,1 | 2400 | 3000 | NNCF 5016 V |
| (cont.) | | | | | | | | |
| **85** | 130 | 60 | 318 | 476 | 60 | 2400 | 3000 | NNCF 5017 V |
| **90** | 125 | 35 | 162 | 306 | 35 | 2400 | 3000 | NNCF 4918 V |
| | 125 | 35 | 162 | 306 | 35 | 2400 | 3000 | NNC 4918 V |
| | 125 | 35 | 162 | 306 | 35 | 2400 | 3000 | NNCL 4918 V |
| | 140 | 67 | 369 | 562 | 68,5 | 2200 | 2800 | NNCF 5018 V |
| **100** | 140 | 40 | 209 | 400 | 46,4 | 2000 | 2600 | NNCF 4920 V |
| | 140 | 40 | 209 | 400 | 46,4 | 2000 | 2600 | NNC 4920 V |
| | 140 | 40 | 209 | 400 | 46,4 | 2000 | 2600 | NNCL 4920 V |
| | 150 | 67 | 392 | 624 | 74 | 2000 | 2600 | NNCF 5020 V |
| **105** | 145 | 47 | 233 | 474 | 55 | 1960,000 | - | 319372 |
| **110** | 150 | 40 | 221 | 430 | 49 | 1900 | 2400 | NNCF 4922 V |
| | 150 | 40 | 221 | 430 | 49 | 1900 | 2400 | NNC 4922 V |
| | 150 | 40 | 221 | 430 | 49 | 1900 | 2400 | NNCL 4922 V |
| | 170 | 80 | 513 | 800 | 95 | 1800 | 2200 | NNCF 5022 V |
| **120** | 165 | 45 | 243 | 480 | 53 | 1700 | 2200 | NNCF 4924 V |
| | 165 | 45 | 243 | 480 | 53 | 1700 | 2200 | NNC 4924 V |
| | 165 | 45 | 243 | 480 | 53 | 1700 | 2200 | NNCL 4924 V |
| | 180 | 80 | 546 | 888 | 104 | 1700 | 2000 | NNCF 5024 V |
| **130** | 180 | 50 | 297 | 531 | 60 | 1600 | 2000 | NNCF 4926 V |
| | 180 | 50 | 297 | 531 | 60 | 1600 | 2000 | NNC 4926 V |
| | 180 | 50 | 297 | 531 | 60 | 1600 | 2000 | NNCL 4926 V |
| | 200 | 95 | 767 | 1258 | 142 | 1500 | 1900 | NNCF 5026 V |
| **140** | 190 | 50 | 308 | 576 | 63 | 1500 | 1900 | NNCF 4928 V |
| | 190 | 50 | 308 | 576 | 63 | 1500 | 1900 | NNC 4928 V |

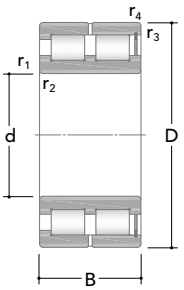


NNCL (SL02)

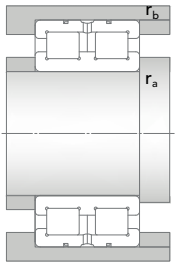
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 80 (cont.) | 1,1 | 0,6 | 1 | 0,5 | 2,6 | NNCF 5016 V |
| 85 | 1,1 | 0,6 | 1 | 0,5 | 2,7 | NNCF 5017 V |
| 90 | 1,1 | 1,1 | 1 | 1 | 1,35 | NNCF 4918 V |
| | 1,1 | - | 1 | - | 1,35 | NNC 4918 V |
| | 1,1 | - | 1 | - | 1,3 | NNCL 4918 V |
| | 1,5 | 1 | 1,5 | 1 | 3,6 | NNCF 5018 V |
| 100 | 1,1 | 1,1 | 1 | 1 | 1,95 | NNCF 4920 V |
| | 1,1 | - | 1 | - | 1,95 | NNC 4920 V |
| | 1,1 | - | 1 | - | 1,9 | NNCL 4920 V |
| | 1,5 | 1 | 1,5 | 1 | 3,95 | NNCF 5020 V |
| 105 | 1,1 | 1,1 | 1 | 1 | 2,4 | 319372 |
| 110 | 1,1 | 1,1 | 1 | 1 | 2,1 | NNCF 4922 V |
| | 1,1 | - | 1 | - | 2,15 | NNC 4922 V |
| | 1,1 | - | 1 | - | 2,1 | NNCL 4922 V |
| | 2 | 1 | 2 | 1 | 6,3 | NNCF 5022 V |
| 120 | 1,1 | 1,1 | 1 | 1 | 2,9 | NNCF 4924 V |
| | 1,1 | - | 1 | - | 2,95 | NNC 4924 V |
| | 1,1 | - | 1 | - | 2,85 | NNCL 4924 V |
| | 2 | 1 | 2 | 1 | 6,75 | NNCF 5024 V |
| 130 | 1,5 | 1,5 | 1,5 | 1,5 | 3,9 | NNCF 4926 V |
| | 1,5 | - | 1,5 | - | 3,95 | NNC 4926 V |
| | 1,5 | - | 1,5 | - | 3,8 | NNCL 4926 V |
| | 2 | 1 | 2 | 1 | 10 | NNCF 5026 V |
| 140 | 1,5 | 1,5 | 1,5 | 1,5 | 4,15 | NNCF 4928 V |
| | 1,5 | - | 1,5 | - | 4,2 | NNC 4928 V |



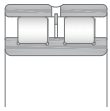

NNC (SL01)




NNCF

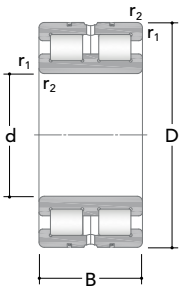



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **140** | 190 | 50 | 308 | 576 | 63 | 1500 | 1900 | NNCL 4928 V |
| (cont.) | 210 | 95 | 810 | 1370 | 151 | 1400 | 1800 | NNCF 5028 V |
| **150** | 190 | 40 | 257 | 586 | 59 | 1500 | 1800 | NNCF 4830 V |
| | 190 | 40 | 257 | 586 | 59 | 1500 | 1800 | NNC 4830 V |
| | 190 | 40 | 257 | 586 | 59 | 1500 | 1800 | NNCL 4830 V |
| | 210 | 60 | 432 | 836 | 90 | 1400 | 1700 | NNCF 4930 V |
| | 210 | 60 | 432 | 836 | 90 | 1400 | 1700 | NNC 4930 V |
| | 210 | 60 | 432 | 836 | 90 | 1400 | 1700 | NNCL 4930 V |
| | 225 | 100 | 847 | 1439 | 160 | 1300 | 1700 | NNCF 5030 V |
| **160** | 200 | 40 | 261 | 613 | 61 | 1400 | 1700 | NNCF 4832 V |
| | 200 | 40 | 261 | 613 | 61 | 1400 | 1700 | NNC 4832 V |
| | 200 | 40 | 261 | 613 | 61 | 1400 | 1700 | NNCL 4832 V |
| | 220 | 60 | 449 | 915 | 94,8 | 1300 | 1600 | NNCF 4932 V |
| | 220 | 60 | 449 | 915 | 94,8 | 1300 | 1600 | NNC 4932 V |
| | 220 | 60 | 449 | 915 | 94,8 | 1300 | 1600 | NNCL 4932 V |
| | 240 | 109 | 960 | 1603 | 179 | 1200 | 1500 | NNCF 5032 V |
| **170** | 215 | 45 | 286 | 657 | 64,7 | 1300 | 1600 | NNCF 4834 V |
| | 215 | 45 | 286 | 657 | 64,7 | 1300 | 1600 | NNC 4834 V |
| | 215 | 45 | 286 | 657 | 64,7 | 1300 | 1600 | NNCL 4834 V |
| | 230 | 60 | 459 | 952 | 98 | 1200 | 1500 | NNCF 4934 V |
| | 230 | 60 | 459 | 952 | 98 | 1200 | 1500 | NNC 4934 V |
| | 230 | 60 | 459 | 952 | 98 | 1200 | 1500 | NNCL 4934 V |
| | 260 | 122 | 1240 | 2120 | 233 | 1100 | 1400 | NNCF 5034 V |
| **180** | 225 | 45 | 297 | 695 | 68,9 | 1200 | 1500 | NNCF 4836 V |
| | 225 | 45 | 297 | 695 | 68,9 | 1200 | 1500 | NNC 4836 V |
| | 225 | 45 | 297 | 695 | 68,9 | 1200 | 1500 | NNCL 4836 V |
| | 250 | 69 | 595 | 1230 | 126 | 1100 | 1400 | NNCF 4936 V |
| | 250 | 69 | 595 | 1230 | 126 | 1100 | 1400 | NNC 4936 V |
| | 250 | 69 | 595 | 1230 | 126 | 1100 | 1400 | NNCL 4936 V |

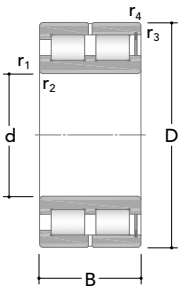


NNCL (SL02)

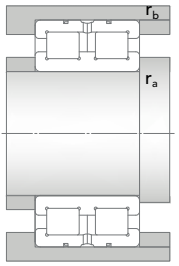
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 140 | 1,5 | - | 1,5 | - | 4,1 | NNCL 4928 V |
| (cont.) | 2 | 1 | 2 | 1 | 11 | NNCF 5028 V |
| 150 | 1,1 | 1,1 | 1 | 1 | 2,8 | NNCF 4830 V |
| | 1,1 | - | 1 | - | 2,9 | NNC 4830 V |
| | 1,1 | - | 1 | - | 2,7 | NNCL 4830 V |
| | 2 | 2 | 2 | 2 | 6,55 | NNCF 4930 V |
| | 2 | - | 2 | - | 6,65 | NNC 4930 V |
| | 2 | - | 2 | - | 6,45 | NNCL 4930 V |
| | 2 | 1,1 | 2 | 1 | 13,5 | NNCF 5030 V |
| 160 | 1,1 | 1,1 | 1 | 1 | 3 | NNCF 4832 V |
| | 1,1 | - | 1 | - | 3,1 | NNC 4832 V |
| | 1,1 | - | 1 | - | 2,9 | NNCL 4832 V |
| | 2 | 2 | 2 | 2 | 6,9 | NNCF 4932 V |
| | 2 | - | 2 | - | 7 | NNC 4932 V |
| | 2 | - | 2 | - | 6,8 | NNCL 4932 V |
| | 2,1 | 1,1 | 2 | 1 | 16 | NNCF 5032 V |
| 170 | 1,1 | 1,1 | 1 | 1 | 4 | NNCF 4834 V |
| | 1,1 | - | 1 | - | 4,1 | NNC 4834 V |
| | 1,1 | - | 1 | - | 3,9 | NNCL 4834 V |
| | 2 | 2 | 2 | 2 | 7,2 | NNCF 4934 V |
| | 2 | - | 2 | - | 7,35 | NNC 4934 V |
| | 2 | - | 2 | - | 7,1 | NNCL 4934 V |
| | 2,1 | 1,1 | 2 | 1 | 23 | NNCF 5034 V |
| 180 | 1,1 | 1,1 | 1 | 1 | 4,2 | NNCF 4836 V |
| | 1,1 | - | 1 | - | 4,3 | NNC 4836 V |
| | 1,1 | - | 1 | - | 4,1 | NNCL 4836 V |
| | 2 | 2 | 2 | 2 | 10,5 | NNCF 4936 V |
| | 2 | - | 2 | - | 11 | NNC 4936 V |
| | 2 | - | 2 | - | 10,5 | NNCL 4936 V |



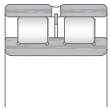

NNC (SL01)




NNCF

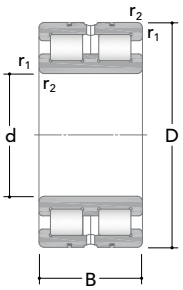



| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **180** (cont.) | 280 | 136 | 1441 | 2560 | 266 | 1100 | 1300 | NNCF 5036 V |
| **190** | 240 | 50 | 358 | 754 | 75,9 | 1100 | 1400 | NNCF 4838 V |
| | 240 | 50 | 358 | 754 | 75,9 | 1100 | 1400 | NNC 4838 V |
| | 240 | 50 | 358 | 754 | 75,9 | 1100 | 1400 | NNCL 4838 V |
| | 260 | 69 | 607 | 1298 | 132 | 1100 | 1400 | NNCF 4938 V |
| | 260 | 69 | 607 | 1298 | 131 | 1100 | 1400 | NNC 4938 V |
| | 260 | 69 | 607 | 1298 | 132 | 1100 | 1400 | NNCL 4938 V |
| | 290 | 136 | 1482 | 2600 | 279 | 1000 | 1300 | NNCF 5038 V |
| **200** | 250 | 50 | 369 | 803 | 79 | 1100 | 1400 | NNCF 4840 V |
| | 250 | 50 | 369 | 803 | 79 | 1100 | 1400 | NNC 4840 V |
| | 250 | 50 | 369 | 803 | 79 | 1100 | 1400 | NNCL 4840 V |
| | 280 | 80 | 706 | 1507 | 150 | 1000 | 1300 | NNCF 4940 V |
| | 280 | 80 | 706 | 1507 | 150 | 1000 | 1300 | NNC 4940 V |
| | 280 | 80 | 706 | 1507 | 150 | 1000 | 1300 | NNCL 4940 V |
| | 310 | 150 | 1705 | 3060 | 317 | 950 | 1200 | NNCF 5040 V |
| **220** | 270 | 50 | 380 | 865 | 84 | 1000 | 1200 | NNCF 4844 V |
| | 270 | 50 | 380 | 865 | 84 | 1000 | 1200 | NNC 4844 V |
| | 270 | 50 | 380 | 865 | 84 | 1000 | 1200 | NNCL 4844 V |
| | 300 | 80 | 739 | 1680 | 158 | 950 | 1200 | NNCF 4944 V |
| | 300 | 80 | 739 | 1680 | 158 | 950 | 1200 | NNC 4944 V |
| | 300 | 80 | 739 | 1680 | 158 | 950 | 1200 | NNCL 4944 V |
| | 340 | 160 | 2028 | 3608 | 373 | 850 | 1100 | NNCF 5044 V |
| **240** | 300 | 60 | 539 | 1305 | 127 | 900 | 1100 | NNCF 4848 V |
| | 300 | 60 | 539 | 1305 | 126 | 900 | 1100 | NNC 4848 V |
| | 300 | 60 | 539 | 1305 | 125 | 900 | 1100 | NNCL 4848 V |
| | 320 | 80 | 784 | 1770 | 172 | 850 | 1100 | NNCF 4948 V |
| | 320 | 80 | 784 | 1770 | 172 | 850 | 1100 | NNC 4948 V |
| | 320 | 80 | 784 | 1770 | 172 | 850 | 1100 | NNCL 4948 V |
| | 360 | 160 | 2143 | 3900 | 394 | 800 | 1000 | NNCF 5048 V |

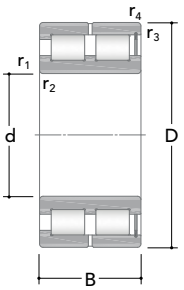


NNCL (SL02)

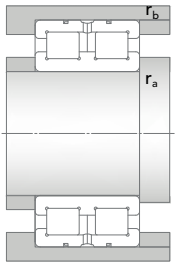
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 180 (cont.) | 2,1 | 2,1 | 2 | 2 | 30,5 | NNCF 5036 V |
| 190 | 1,5 | 1,5 | 1,5 | 1,5 | 5,5 | NNCF 4838 V |
| | 1,5 | - | 1,5 | - | 5,65 | NNC 4838 V |
| | 1,5 | - | 1,5 | - | 5,3 | NNCL 4838 V |
| | 2 | 2 | 2 | 2 | 11 | NNCF 4938 V |
| | 2 | - | 2 | - | 11 | NNC 4938 V |
| | 2 | - | 2 | - | 11 | NNCL 4938 V |
| | 2,1 | 2,1 | 2 | 2 | 31,5 | NNCF 5038 V |
| 200 | 1,5 | 1,5 | 1,5 | 1,5 | 5,8 | NNCF 4840 V |
| | 1,5 | - | 1,5 | - | 5,9 | NNC 4840 V |
| | 1,5 | - | 1,5 | - | 5,7 | NNCL 4840 V |
| | 2,1 | 2,1 | 2 | 2 | 15,5 | NNCF 4940 V |
| | 2,1 | - | 2 | - | 16 | NNC 4940 V |
| | 2,1 | - | 2 | - | 15,5 | NNCL 4940 V |
| | 2,1 | 2,1 | 2 | 2 | 41 | NNCF 5040 V |
| 220 | 1,5 | 1,5 | 1,5 | 1,5 | 6,3 | NNCF 4844 V |
| | 1,5 | - | 1,5 | - | 6,4 | NNC 4844 V |
| | 1,5 | - | 1,5 | - | 6,2 | NNCL 4844 V |
| | 2,1 | 2,1 | 2 | 2 | 17 | NNCF 4944 V |
| | 2,1 | - | 2 | - | 17 | NNC 4944 V |
| | 2,1 | - | 2 | - | 17 | NNCL 4944 V |
| | 3 | 3 | 2,5 | 2,5 | 52,5 | NNCF 5044 V |
| 240 | 2 | 2 | 2 | 2 | 9,9 | NNCF 4848 V |
| | 2 | - | 2 | - | 10 | NNC 4848 V |
| | 2 | - | 2 | - | 9,8 | NNCL 4848 V |
| | 2,1 | 2,1 | 2 | 2 | 18,5 | NNCF 4948 V |
| | 2,1 | - | 2 | - | 18,5 | NNC 4948 V |
| | 2,1 | - | 2 | - | 18 | NNCL 4948 V |
| | 3 | 3 | 2,5 | 2,5 | 56 | NNCF 5048 V |



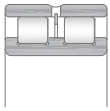

NNC (SL01)




NNCF

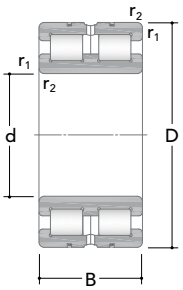



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **260** | 320 | 60 | 565 | 1400 | 130 | 800 | 1000 | NNCF 4852 V |
| | 320 | 60 | 565 | 1400 | 130 | 800 | 1000 | NNC 4852 V |
| | 320 | 60 | 565 | 1400 | 130 | 800 | 1000 | NNCL 4852 V |
| | 360 | 100 | 1178 | 2550 | 244 | 750 | 950 | NNCF 4952 V |
| | 360 | 100 | 1178 | 2550 | 244 | 750 | 950 | NNC 4952 V |
| | 360 | 100 | 1178 | 2550 | 244 | 750 | 950 | NNCL 4952 V |
| | 400 | 190 | 2863 | 5150 | 495 | 700 | 900 | NNCF 5052 V |
| **280** | 350 | 69 | 741 | 1860 | 170 | 750 | 950 | NNCF 4856 V |
| | 350 | 69 | 741 | 1860 | 170 | 750 | 950 | NNC 4856 V |
| | 350 | 69 | 741 | 1860 | 170 | 750 | 950 | NNCL 4856 V |
| | 380 | 100 | 1215 | 2705 | 252 | 700 | 900 | NNCF 4956 V |
| | 380 | 100 | 1215 | 2705 | 255 | 700 | 900 | NNC 4956 V |
| | 380 | 100 | 1215 | 2705 | 259 | 700 | 900 | NNCL 4956 V |
| | 420 | 190 | 2925 | 5320 | 512 | 700 | 850 | NNCF 5056 V |
| **300** | 380 | 80 | 858 | 2130 | 195 | 700 | 850 | NNCF 4860 V |
| | 380 | 80 | 858 | 2130 | 195 | 700 | 850 | NNC 4860 V |
| | 380 | 80 | 858 | 2130 | 195 | 700 | 850 | NNCL 4860 V |
| | 420 | 118 | 1681 | 3760 | 350 | 700 | 800 | NNCF 4960 V |
| | 420 | 118 | 1681 | 3760 | 350 | 700 | 800 | NNC 4960 V |
| | 420 | 118 | 1681 | 3760 | 350 | 700 | 800 | NNCL 4960 V |
| | 460 | 218 | 3530 | 6550 | 599 | 600 | 750 | NNCF 5060 V |
| **320** | 400 | 80 | 897 | 2280 | 207 | 630 | 800 | NNCF 4864 V |
| | 400 | 80 | 897 | 2280 | 207 | 630 | 800 | NNC 4864 V |
| | 400 | 80 | 897 | 2280 | 207 | 630 | 800 | NNCL 4864 V |
| | 440 | 118 | 1762 | 4060 | 369 | 600 | 750 | NNCF 4964 V |
| | 440 | 118 | 1762 | 4060 | 369 | 600 | 750 | NNC 4964 V |
| | 440 | 118 | 1762 | 4060 | 369 | 600 | 750 | NNCL 4964 V |
| | 480 | 218 | 3692 | 6960 | 619 | 560 | 700 | NNCF 5064 V |
| **340** | 420 | 80 | 925 | 2480 | 214 | 600 | 750 | NNCF 4868 V |

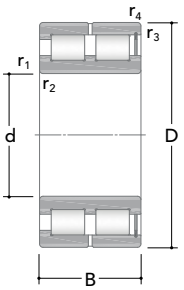


NNCL (SL02)

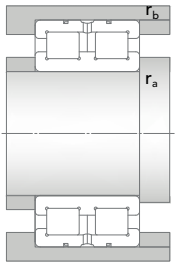
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 260 | 2 | 2 | 2 | 2 | 11 | NNCF 4852 V |
| | 2 | - | 2 | - | 11 | NNC 4852 V |
| | 2 | - | 2 | - | 10,5 | NNCL 4852 V |
| | 2,1 | 2,1 | 2 | 2 | 31,5 | NNCF 4952 V |
| | 2,1 | - | 2 | - | 32 | NNC 4952 V |
| | 2,1 | - | 2 | - | 31 | NNCL 4952 V |
| | 4 | 4 | 3 | 3 | 85,5 | NNCF 5052 V |
| 280 | 2 | 2 | 2 | 2 | 16 | NNCF 4856 V |
| | 2 | - | 2 | - | 16 | NNC 4856 V |
| | 2 | - | 2 | - | 15,5 | NNCL 4856 V |
| | 2,1 | 2,1 | 2 | 2 | 33,5 | NNCF 4956 V |
| | 2,1 | - | 2 | - | 34 | NNC 4956 V |
| | 2,1 | - | 2 | - | 33 | NNCL 4956 V |
| | 4 | 4 | 3 | 3 | 90,5 | NNCF 5056 V |
| 300 | 2,1 | 2,1 | 2 | 2 | 22,5 | NNCF 4860 V |
| | 2,1 | - | 2 | - | 23 | NNC 4860 V |
| | 2,1 | - | 2 | - | 22 | NNCL 4860 V |
| | 3 | 3 | 2,5 | 2,5 | 52,5 | NNCF 4960 V |
| | 3 | - | 2,5 | - | 53 | NNC 4960 V |
| | 3 | - | 2,5 | - | 52 | NNCL 4960 V |
| | 4 | 4 | 3 | 3 | 130 | NNCF 5060 V |
| 320 | 2,1 | 2,1 | 2 | 2 | 23,5 | NNCF 4864 V |
| | 2,1 | - | 2 | - | 24 | NNC 4864 V |
| | 2,1 | - | 2 | - | 23 | NNCL 4864 V |
| | 3 | 3 | 2,5 | 2,5 | 55,5 | NNCF 4964 V |
| | 3 | - | 2,5 | - | 56 | NNC 4964 V |
| | 3 | - | 2,5 | - | 55 | NNCL 4964 V |
| | 4 | 4 | 3 | 3 | 135 | NNCF 5064 V |
| 340 | 2,1 | 2,1 | 2 | 2 | 25 | NNCF 4868 V |



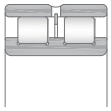

NNC (SL01)




NNCF

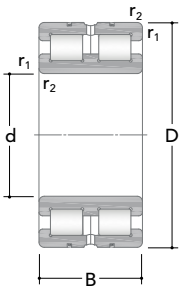



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **340** | 420 | 80 | 925 | 2480 | 214 | 600 | 750 | NNC 4868 V |
| (cont.) | 420 | 80 | 925 | 2480 | 214 | 600 | 750 | NNCL 4868 V |
| | 460 | 118 | 1795 | 4250 | 386 | 560 | 700 | NNCF 4968 V |
| | 460 | 118 | 1795 | 4250 | 386 | 560 | 700 | NNC 4968 V |
| | 460 | 118 | 1795 | 4250 | 386 | 560 | 700 | NNCL 4968 V |
| | 520 | 243 | 4434 | 8350 | 706 | 530 | 670 | NNCF 5068 V |
| **360** | 440 | 80 | 939 | 2560 | 221 | 560 | 700 | NNCF 4872 V |
| | 440 | 80 | 939 | 2560 | 221 | 560 | 700 | NNC 4872 V |
| | 440 | 80 | 939 | 2560 | 221 | 560 | 700 | NNCL 4872 V |
| | 480 | 118 | 1849 | 4570 | 402 | 530 | 670 | NNCF 4972 V |
| | 480 | 118 | 1849 | 4570 | 402 | 530 | 670 | NNC 4972 V |
| | 480 | 118 | 1849 | 4570 | 402 | 530 | 670 | NNCL 4972 V |
| | 540 | 243 | 4470 | 8680 | 721 | 500 | 630 | NNCF 5072 V |
| **380** | 480 | 100 | 1402 | 3650 | 312 | 530 | 670 | NNCF 4876 V |
| | 480 | 100 | 1402 | 3650 | 312 | 530 | 670 | NNC 4876 V |
| | 480 | 100 | 1402 | 3650 | 312 | 530 | 670 | NNCL 4876 V |
| | 520 | 140 | 2385 | 5730 | 494 | 500 | 630 | NNCF 4976 V |
| | 520 | 140 | 2385 | 5730 | 494 | 500 | 630 | NNC 4976 V |
| | 520 | 140 | 2385 | 5730 | 494 | 500 | 630 | NNCL 4976 V |
| | 560 | 243 | 4689 | 9250 | 742 | 500 | 600 | NNCF 5076 V |
| **400** | 500 | 100 | 1428 | 3760 | 324 | 500 | 630 | NNCF 4880 V |
| | 500 | 100 | 1428 | 3760 | 324 | 500 | 630 | NNC 4880 V |
| | 500 | 100 | 1428 | 3760 | 324 | 500 | 630 | NNCL 4880 V |
| | 540 | 140 | 2454 | 6000 | 519 | 500 | 600 | NNCF 4980 V |
| | 540 | 140 | 2454 | 6000 | 519 | 500 | 600 | NNC 4980 V |
| | 540 | 140 | 2454 | 6000 | 519 | 500 | 600 | NNCL 4980 V |
| | 600 | 272 | 5584 | 11090 | 899 | 450 | 560 | NNCF 5080 V |
| **420** | 520 | 100 | 1347 | 3920 | 319 | 460 | - | NNCF 4884 V |
| | 520 | 100 | 1347 | 3920 | 319 | 480 | - | NNC 4884 V |

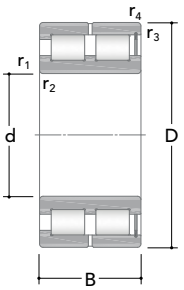


NNCL (SL02)

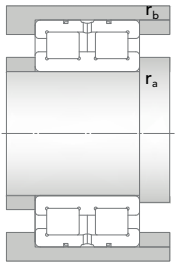
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 340 | 2,1 | - | 2 | - | 25,5 | NNC 4868 V |
| (cont.) | 2,1 | - | 2 | - | 25,5 | NNCL 4868 V |
| | 3 | 3 | 2,5 | 2,5 | 58,5 | NNCF 4968 V |
| | 3 | - | 2,5 | - | 59 | NNC 4968 V |
| | 3 | - | 2,5 | - | 58 | NNCL 4968 V |
| | 5 | 5 | 4 | 4 | 185 | NNCF 5068 V |
| 360 | 2,1 | 2,1 | 2 | 2 | 26,5 | NNCF 4872 V |
| | 2,1 | - | 2 | - | 27 | NNC 4872 V |
| | 2,1 | - | 2 | - | 26 | NNCL 4872 V |
| | 3 | 3 | 2,5 | 2,5 | 61,5 | NNCF 4972 V |
| | 3 | - | 2,5 | - | 62 | NNC 4972 V |
| | 3 | - | 2,5 | - | 61 | NNCL 4972 V |
| | 5 | 5 | 4 | 4 | 195 | NNCF 5072 V |
| 380 | 2,1 | 2,1 | 2 | 2 | 45 | NNCF 4876 V |
| | 2,1 | - | 2 | - | 45,5 | NNC 4876 V |
| | 2,1 | - | 2 | - | 44 | NNCL 4876 V |
| | 4 | 4 | 3 | 3 | 91,5 | NNCF 4976 V |
| | 4 | - | 3 | - | 92,5 | NNC 4976 V |
| | 4 | - | 3 | - | 90,5 | NNCL 4976 V |
| | 5 | 5 | 4 | 4 | 200 | NNCF 5076 V |
| 400 | 2,1 | 2,1 | 2 | 2 | 46 | NNCF 4880 V |
| | 2,1 | - | 2 | - | 46,5 | NNC 4880 V |
| | 2,1 | - | 2 | - | 46 | NNCL 4880 V |
| | 4 | 4 | 3 | 3 | 95,5 | NNCF 4980 V |
| | 4 | - | 3 | - | 96,5 | NNC 4980 V |
| | 4 | - | 3 | - | 94,5 | NNCL 4980 V |
| | 5 | 5 | 4 | 4 | 270 | NNCF 5080 V |
| 420 | 2,1 | 2,1 | 2 | 2 | 49,5 | NNCF 4884 V |
| | 2,1 | - | 2 | - | 49,5 | NNC 4884 V |



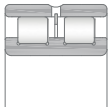

NNC (SL01)




NNCF

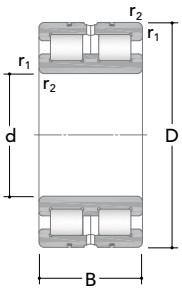



| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **420** | 520 | 100 | 1347 | 3920 | 319 | 500 | - | NNCL 4884 V |
| (cont.) | 560 | 140 | 2217 | 5980 | 508 | 430 | - | NNCF 4984 V |
| | 560 | 140 | 2217 | 5980 | 508 | 460 | - | NNC 4984 V |
| | 560 | 140 | 2217 | 5980 | 508 | 470 | - | NNCL 4984 V |
| **440** | 540 | 100 | 1414 | 4080 | 334 | 440 | - | NNCF 4888 V |
| | 540 | 100 | 1414 | 4080 | 334 | 450 | - | NNC 4888 V |
| | 540 | 100 | 1414 | 4080 | 334 | 460 | - | NNCL 4888 V |
| | 600 | 160 | 3000 | 7460 | 637 | 420 | - | NNCF 4988 V |
| | 600 | 160 | 3000 | 7460 | 635 | 450 | - | NNC 4988 V |
| | 600 | 160 | 3000 | 7460 | 635 | 420 | - | NNCL 4988 V |
| **460** | 580 | 118 | 1555 | 4470 | 373 | 420 | - | NNCF 4892 V |
| | 580 | 118 | 1555 | 4470 | 373 | 420 | - | NNC 4892 V |
| | 580 | 118 | 1555 | 4470 | 373 | 440 | - | NNCL 4892 V |
| | 620 | 160 | 3027 | 7590 | 650 | 390 | - | NNCF 4992 V |
| | 620 | 160 | 3027 | 7590 | 650 | 390 | - | NNC 4992 V |
| | 620 | 160 | 3027 | 7590 | 650 | 410 | - | NNCL 4992 V |
| **480** | 600 | 118 | 1572 | 4680 | 384 | 390 | - | NNCF 4896 V |
| | 600 | 118 | 1572 | 4680 | 384 | 410 | - | NNC 4896 V |
| | 600 | 118 | 1572 | 4680 | 384 | 390 | - | NNCL 4896 V |
| | 650 | 170 | 3314 | 8210 | 702 | 380 | - | NNCF 4996 V |
| | 650 | 170 | 3314 | 8210 | 702 | 390 | - | NNC 4996 V |
| | 650 | 170 | 3314 | 8210 | 702 | 370 | - | NNCL 4996 V |
| **500** | 620 | 118 | 1596 | 4840 | 385 | 420 | - | NNCF 48/500 V |
| | 620 | 118 | 1596 | 4840 | 385 | 390 | - | NNC 48/500 V |
| | 620 | 118 | 1596 | 4840 | 385 | 390 | - | NNCL 48/500 V |
| | 670 | 170 | 3364 | 8790 | 734 | 370 | - | NNCF 49/500 V |
| | 670 | 170 | 3364 | 8790 | 734 | 360 | - | NNC 49/500 V |
| | 670 | 170 | 3364 | 8790 | 734 | 370 | - | NNCL 49/500 V |

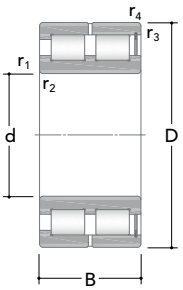


NNCL (SL02)

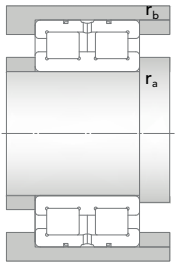
| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 420 | 2,1 | - | 2 | - | 49,5 | NNCL 4884 V |
| (cont.) | 4 | 4 | 3 | 3 | 99,5 | NNCF 4984 V |
| | 4 | - | 3 | - | 99,5 | NNC 4984 V |
| | 4 | - | 3 | - | 99,5 | NNCL 4984 V |
| 440 | 2,1 | 2,1 | 2 | 2 | 52 | NNCF 4888 V |
| | 2,1 | - | 2 | - | 52 | NNC 4888 V |
| | 2,1 | - | 2 | - | 52 | NNCL 4888 V |
| | 4 | 4 | 3 | 3 | 137 | NNCF 4988 V |
| | 4 | - | 3 | - | 137 | NNC 4988 V |
| | 4 | - | 3 | - | 137 | NNCL 4988 V |
| 460 | 3 | 3 | 2,5 | 2,5 | 76 | NNCF 4892 V |
| | 3 | - | 2,5 | - | 76 | NNC 4892 V |
| | 3 | - | 2,5 | - | 76 | NNCL 4892 V |
| | 4 | 4 | 3 | 3 | 140 | NNCF 4992 V |
| | 4 | - | 3 | - | 140 | NNC 4992 V |
| | 4 | - | 3 | - | 140 | NNCL 4992 V |
| 480 | 3 | 3 | 2,5 | 2,5 | 78,5 | NNCF 4896 V |
| | 3 | - | 2,5 | - | 78,5 | NNC 4896 V |
| | 3 | - | 2,5 | - | 78,5 | NNCL 4896 V |
| | 5 | 5 | 4 | 4 | 165 | NNCF 4996 V |
| | 5 | - | 4 | - | 165 | NNC 4996 V |
| | 5 | - | 4 | - | 165 | NNCL 4996 V |
| 500 | 3 | 3 | 2,5 | 2,5 | 81,5 | NNCF 48/500 V |
| | 3 | - | 2,5 | - | 81,5 | NNC 48/500 V |
| | 3 | - | 2,5 | - | 81,5 | NNCL 48/500 V |
| | 5 | 5 | 4 | 4 | 175 | NNCF 49/500 V |
| | 5 | - | 4 | - | 175 | NNC 49/500 V |
| | 5 | - | 4 | - | 175 | NNCL 49/500 V |



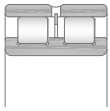

NNC (SL01)




NNCF

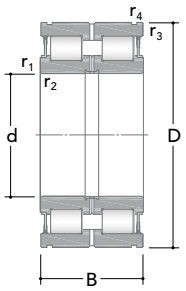



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **530** | 650 | 118 | 1695 | 5320 | 419 | 370 | - | NNCF 48/530 V |
| | 650 | 118 | 1695 | 5320 | 419 | 370 | - | NNC 48/530 V |
| | 650 | 118 | 1695 | 5320 | 419 | 350 | - | NNCL 48/530 V |
| | 710 | 180 | 3925 | 10160 | 827 | 330 | - | NNCF 49/530 V |
| | 710 | 180 | 3925 | 10160 | 827 | 330 | - | NNC 49/530 V |
| | 710 | 180 | 3925 | 10160 | 827 | 330 | - | NNCL 49/530 V |

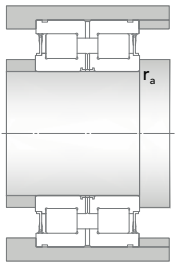


NNCL (SL02)

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 530 | 3 | 3 | 2,5 | 2,5 | 85 | NNCF 48/530 V |
| | 3 | - | 2,5 | - | 86 | NNC 48/530 V |
| | 3 | - | 2,5 | - | 84 | NNCL 48/530 V |
| | 5 | 5 | 4 | 4 | 200 | NNCF 49/530 V |
| | 5 | - | 4 | - | 200 | NNC 49/530 V |
| | 5 | - | 4 | - | 200 | NNCL 49/530 V |

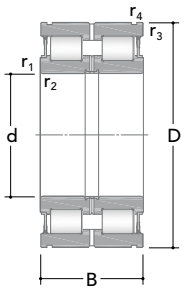



NNF (SL04)

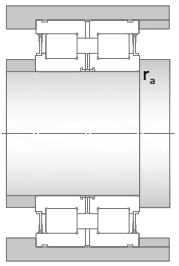



| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **20** | 42 | 30 | 29 | 45,8 | 54,6 | 5,7 | 3000 | **NNF 5004** |
| **25** | 47 | 30 | 29 | 50,7 | 65 | 6,7 | 2700 | **NNF 5005** |
| **30** | 55 | 34 | 33 | 57,8 | 74 | 7,7 | 2300 | **NNF 5006** |
| **35** | 62 | 36 | 35 | 69,4 | 97,9 | 10,6 | 1900 | **NNF 5007** |
| **40** | 68 | 38 | 37 | 85 | 114,3 | 13 | 1800 | **NNF 5008** |
| **45** | 75 | 40 | 39 | 101,7 | 145,7 | 17 | 1600 | **NNF 5009** |
| **50** | 80 | 40 | 39 | 109 | 158 | 18,4 | 1500 | **NNF 5010** |
| **55** | 90 | 46 | 45 | 128 | 195 | 23 | 1300 | **NNF 5011** |
| **60** | 95 | 46 | 45 | 136 | 207 | 25 | 1200 | **NNF 5012** |
| **65** | 100 | 46 | 45 | 136 | 220 | 26 | 1200 | **NNF 5013** |
| **70** | 110 | 54 | 53 | 187 | 284 | 34,4 | 1100 | **NNF 5014** |
| **75** | 115 | 54 | 53 | 227 | 309 | 40 | 1000 | **NNF 5015** |
| **80** | 125 | 60 | 59 | 251 | 411 | 52 | 900 | **NNF 5016** |
| **85** | 130 | 60 | 59 | 270 | 422 | 54 | 900 | **NNF 5017** |
| **90** | 140 | 67 | 66 | 317 | 545 | 68,9 | 800 | **NNF 5018** |
| **95** | 145 | 67 | 66 | 329 | 564 | 70 | 800 | **NNF 5019** |
| **100** | 150 | 67 | 66 | 335 | 569 | 68 | 800 | **NNF 5020** |

| Dimensions | | | | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | | [kg] | |
| 20 | 0,5 | 0,3 | 0,3 | 0,2 | NNF 5004 |
| 25 | 0,5 | 0,3 | 0,3 | 0,24 | NNF 5005 |
| 30 | 0,5 | 0,3 | 0,3 | 0,37 | NNF 5006 |
| 35 | 0,5 | 0,3 | 0,3 | 0,48 | NNF 5007 |
| 40 | 0,8 | 0,6 | 0,4 | 0,56 | NNF 5008 |
| 45 | 0,8 | 0,6 | 0,4 | 0,7 | NNF 5009 |
| 50 | 0,8 | 0,6 | 0,4 | 0,76 | NNF 5010 |
| 55 | 1 | 0,6 | 0,6 | 1,2 | NNF 5011 |
| 60 | 1 | 0,6 | 0,6 | 1,25 | NNF 5012 |
| 65 | 1 | 0,6 | 0,6 | 1,35 | NNF 5013 |
| 70 | 1 | 0,6 | 0,6 | 1,85 | NNF 5014 |
| 75 | 1 | 0,6 | 0,6 | 1,95 | NNF 5015 |
| 80 | 1,5 | 0,6 | 1 | 2,7 | NNF 5016 |
| 85 | 1,5 | 0,6 | 1 | 2,85 | NNF 5017 |
| 90 | 1,5 | 0,6 | 1 | 3,7 | NNF 5018 |
| 95 | 1,5 | 0,6 | 1 | 3,9 | NNF 5019 |
| 100 | 1,5 | 0,6 | 1 | 3,95 | NNF 5020 |

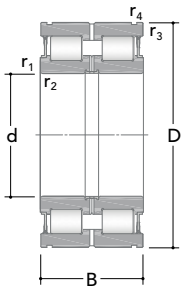



NNF (SL04)

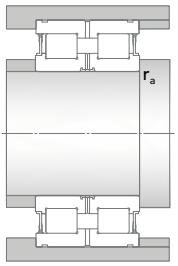



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **110** | 170 | 80 | 79 | 410 | 693 | 81,3 | 700 | **NNF 5022** |
| **120** | 180 | 80 | 79 | 426 | 851 | 85,1 | 620 | **NNF 5024** |
| **130** | 190 | 69 | 68 | 382 | 731 | 83 | 600 | **319110** |
| | 190 | 80 | 79 | 443 | 800 | 89,8 | 600 | **319426** |
| | 200 | 95 | 94 | 622 | 1044 | 118 | 600 | **NNF 5026** |
| **140** | 200 | 80 | 79 | 468 | 861 | 96,1 | 600 | **319428** |
| | 210 | 95 | 94 | 641 | 1100 | 125 | 530 | **NNF 5028** |
| **150** | 210 | 80 | 79 | 482 | 897 | 98 | 500 | **319430** |
| | 225 | 100 | 99 | 758 | 1272 | 141 | 500 | **NNF 5030** |
| **160** | 220 | 80 | 79 | 504 | 994 | 105 | 500 | **319432** |
| | 240 | 109 | 108 | 772 | 1390 | 152 | 430 | **NNF 5032** |
| **170** | 230 | 80 | 79 | 520 | 1040 | 108 | 500 | **319434** |
| | 260 | 122 | 121 | 1022 | 1780 | 191 | 430 | **NNF 5034** |
| **180** | 240 | 80 | 79 | 524 | 1080 | 112 | 440 | **319436** |
| | 280 | 136 | 135 | 1169 | 2090 | 225 | 400 | **NNF 5036** |
| **190** | 260 | 80 | 79 | 547 | 1170 | 119 | 400 | **319438** |
| | 290 | 136 | 135 | 1180 | 2160 | 232 | 400 | **NNF 5038** |
| **200** | 270 | 80 | 79 | 566 | 1230 | 123 | 400 | **319440** |
| | 310 | 150 | 149 | 1458 | 2860 | 296 | 400 | **NNF 5040** |
| **220** | 300 | 95 | 94 | 881 | 1850 | 185 | 340 | **322108** |
| | 340 | 160 | 159 | 1630 | 3060 | 311 | 320 | **NNF 5044** |
| **240** | 360 | 160 | 159 | 1677 | 3340 | 334 | 290 | **NNF 5048** |

| Dimensions | | | | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | | [kg] | |
| 110 | 1,8 | 0,6 | 1,5 | 6,45 | NNF 5022 |
| 120 | 1,8 | 0,6 | 1,5 | 6,9 | NNF 5024 |
| 130 | 1,8 | 0,6 | 1 | 6,5 | 319110 |
| | 1,8 | 0,6 | 1,5 | 7,5 | 319426 |
| | 1,8 | 0,6 | 1,5 | 10,5 | NNF 5026 |
| 140 | 1,8 | 0,6 | 1,5 | 8 | 319428 |
| | 1,8 | 0,6 | 1,5 | 11 | NNF 5028 |
| 150 | 1,8 | 0,6 | 1,5 | 8,4 | 319430 |
| | 2 | 0,6 | 2 | 13,5 | NNF 5030 |
| 160 | 1,8 | 0,6 | 1,5 | 8,8 | 319432 |
| | 2 | 0,6 | 2 | 16,5 | NNF 5032 |
| 170 | 1,8 | 0,6 | 1,5 | 9,3 | 319434 |
| | 2 | 0,6 | 2 | 22,5 | NNF 5034 |
| 180 | 1,8 | 0,6 | 1,5 | 9,8 | 319436 |
| | 2 | 0,6 | 2 | 30 | NNF 5036 |
| 190 | 1,8 | 0,6 | 1,5 | 12,5 | 319438 |
| | 2 | 0,6 | 2 | 31,5 | NNF 5038 |
| 200 | 1,8 | 0,6 | 1,5 | 13 | 319440 |
| | 2 | 0,6 | 2 | 42 | NNF 5040 |
| 220 | 2 | 1 | 1 | 19,5 | 322108 |
| | 2 | 1 | 2 | 53,5 | NNF 5044 |
| 240 | 2 | 1 | 2 | 57,5 | NNF 5048 |




NNF (SL04)




| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | | [kN] | | | [rpm] | |
| **260** | 400 | 160 | 159 | 1918 | 3510 | 341 | 270 | **320848** |

| Dimensions | | | | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | | [kg] | |
| **260** | 3 | 1,5 | 1,5 | 70 | **320848** |

# Multi row cylindrical roller bearings

Multi row cylindrical roller bearings, also known as Multiroll, are made up of two parts: inner ring (L) and outer assembly (R), which includes outer rings, cage and four rows of rollers.

They are mainly used in rolling mill stands, where they are subjected to very high radial loads and impacts combined with medium-low speeds.

RKB Multiroll bearings are manufactured in different executions, to suit a wide range of applications and environments, above all in the harsh conditions of the steel and aluminum industry. May be available with a cylindrical bore for special design and applications as well as featuring tapered bore (taper 1:12) normally required as replacement for oil film bearings.



Multi row cylindrical roller bearings

## Internal clearance

RKB multi row cylindrical roller bearings are usually manufactured in C3 or C4 radial internal clearance both typical in rolling mill application. Should the bearing be mounted loose fit on rolling mill neck, the radial clearance becomes C2. Standard radial internal clearance for multi row cylindrical roller bearings with a cylindrical bore are provided in **Tab. 1 page 215**. For Multi row cylindrical roller bearings with a taper bore are usually produced with an internal clearance reoprted in **Tab. 2 page 216**.

## Minimum load

A minimum radial load is requested for multi row cylindrical roller bearings to perform efficiently, especially in critical working conditions like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions, a skidding between rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Assuming a continuous operation, the minimum radial load can be estimated using the following formula:

$$F_{rm} > \frac{C_{0r}}{50}$$

Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_{0r}$ basic static load rating, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing together with the loads acting on it, otherwise supplementary radial load must be applied on the multi row cylindrical roller bearings. In application where a starting up at a low temperature is planned or a lubricant with high viscosity is used, a greater minimum radial load is required.

## Bearing fittings

Multi row cylindrical roller bearings can be mounted on the roll neck both "tight fit" and "loose fit".
Typical "tight fit" values for roll neck can be found in the following **Tab. 6 page 329**.

| Nominal bearing bore | | | Typical roll neck tolerance | |
|---|---|---|---|---|
| | | | Sup. | Inf. |
| [mm] | | | [mm] | |
| d < 200 | | | n6 | |
| 200 | <d ≤ | 400 | p6/r6 | |
| 400 | <d ≤ | 630 | +0,200 | +0,260 |
| 630 | <d ≤ | 800 | +0,250 | +0,330 |
| 900 | <d ≤ | 1250 | +0,320 | +0,420 |
| 1250 | <d ≤ | 1400 | +0,400 | +0,550 |
| 1400 | <d ≤ | 1600 | +0,520 | +0,650 |

Tab. 6 - General tight fit tolerances for roll neck

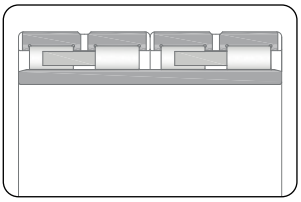
Viceversa, four row cylindrical roller bearings requesting an inner ring "loose fit", the roll neck typical tolerance is "e7".
As regards fitting tolerances for the chock bore, typical values are the following:

- "H6" for D ≤ 800 [mm]
- "H7" for D > 800 [mm]

With reference to four row cylindrical roller bearings featuring a tapered bore please consult the RKB application engineering services.

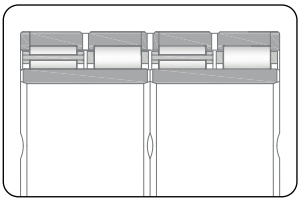
## Designs and variants

### Type AF2D/A2D



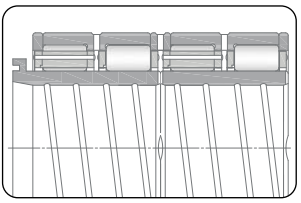

- Design used for small and medium size bearings
- One-piece ribless inner ring
- Two-piece outer ring with three integral ribs
- Double pronged high strength machined steel cage for increased stiffness and resistance to corrosive environments (AF2D)
- Annular groove and lubrication holes in outer ring
- Available with lubrication grooves in rings side faces
- Available with double pronged machined brass cage (A2D)

### Type F2CII/EVO



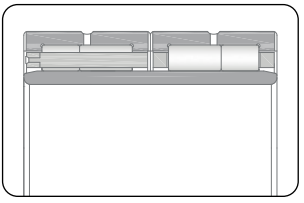

- Design used for large size bearings
- Two-piece ribless inner ring with lubrication grooves in side faces
- Two-piece outer ring with separated side flanges and one central spacer
- Two-piece pin-type steel cage with lightened design for optimized lubrication
- Pierced rollers design for increased carrying capacities
- Available with four window type machined brass cage (EVO)

### Type Q2AC



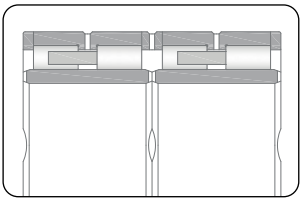

- Design used for large size bearings with increased shoulder on inner ring for seal seating
- Two-piece inner ring with lubrication grooves in side faces
- Two-piece outer ring with separated side flanges and one central spacer
- Four window type machined brass cage
- Annular groove and lubrication holes in outer ring

### Type GB2DX




- Designed for rolling mill stands with automatic roll changing device
- One-piece ribless inner ring with increased length of chamfers to facilitate mounting
- Two-piece outer ring with integral ribs
- Two-piece reinforced window type machined brass cage with integral rivets (AVH) for optimized roller drop
- Long-short roller arrangement for better load distribution and reduced edge stress
- Optimized for oil lubrication and automatic grease lubrication systems

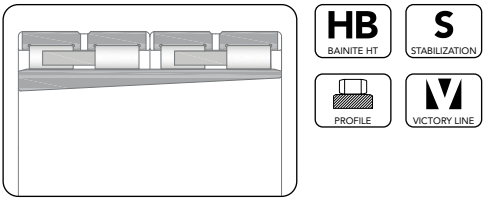
### Type D2CII




- Design used for medium and large size bearings
- Two-piece ribless inner ring with lubrication grooves in side faces
- Two-piece outer ring with separated side flanges and one central spacer
- Double pronged machined brass cage
- Annular groove and lubrication holes in outer ring
- Design for facilitated mounting and dismounting

## Special designs and variants

### Type AF2D/A2D K/K30




**Multi row cylindrical roller bearings with tapered bore**

RKB offers multi row cylindrical roller bearings both with 1:12 and 1:30 conicity depending on the bearing size. For additional information, please consult the RKB application engineering service.

| Prefixes | |
|---|---|
| L | In a separable bearing: separate inner ring |
| R | In a separable bearing: outer ring with roller and cage assembly |
| 4CRB | Out of standard four-row cylindrical roller bearing followed by drawing number |
| NNU 60 | Out of standard four-row cylindrical roller bearing followed by dimension indication |

Note: unless differently specified, by default the mating of L and its corresponding R always give a C4 internal radial clearance

| Suffixes | Main design |
|---|---|
| A | Two outer rings each with three integral ribs. One inner ring. Two double pronged machined brass cages guided on rolling elements |
| AF | As A, but with reinforced machined steel cage |
| B | As A, but with a spacer between the two outer rings |
| C or AII | As A, but with inner ring split into two halves |
| CF | As C, but with reinforced machined steel cage |
| DII | Two outer rings each with an integral central rib and one loose flange ring; one spacer. One inner ring split into two halves. Two double pronged machined brass cages guided on rolling elements |
| EII | Two outer rings each with three integral ribs. One inner ring split into two halves. Four steel pin-type cages and pierced rollers |
| FII | Two outer rings each with an integral central rib and one loose flange ring; one spacer. One inner ring split into two halves. Four steel pin-type cages and pierced rollers |
| FIIEVO | As FII, but with four window type machine brass cages |
| GII or GXII | Two outer rings each with two integral ribs. One inner ring split into two halves. Two double row window type machined brass cages |
| GB or GBX | As GII, but with one inner ring in one piece (not split) |
| H | One outer ring with three loose guide rings and two loose flange rings. One inner ring. Two double pronged machined brass cages |
| I | Two outer rings each with integral central rib and two loose flange rings; one spacer. Two inner rings. Four pressed steel cages |
| L | One outer ring with five integral ribs. One inner ring. Four pronged machined brass cages guided on rolling elements |
| M | As C, but with one wider inner ring |
| N | As D, but with one wider inner ring |
| O | As F, but with one wider inner ring |
| P | As H, but with one wider inner ring |
| Q | As F, but with one wider inner ring with concentric shoulder |
| R | As F, but with two wider inner rings; one inner ring with concentric shoulder |
| VJ 202 | Bearing set of two double row bearings |

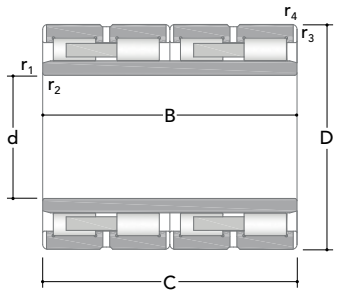
| Suffixes | Internal design |
|---|---|
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |
| SP | Special or non-standard bearing |
| W | One wider inner ring |
| WS | One wider inner ring with special concentric shoulder |

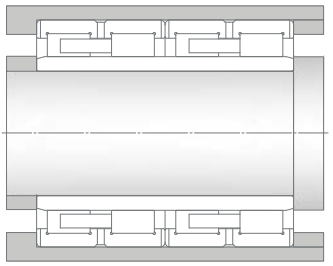
| Suffixes | Cage |
|---|---|
| S/F | Steel cage |

| Suffixes | Accuracy, clearance, running |
|---|---|
| HP | High precision running accuracy (better than P6) |

| Suffixes | Lubrication |
|---|---|
| 1 | Annular groove and lubrication holes in spacer between outer rings |
| 2 | Annular groove and lubrication holes in outer rings |
| 3 | Annular groove and lubrication holes in spacer between outer rings and Annular groove and lubrication holes in outer rings |
| A | Helical groove in inner ring bore |
| B | Scallops in the side faces of inner and outer rings |
| C | Scallops in the side face of inner ring |
| D | Scallops in the side face of outer ring |

| Suffixes | External design |
|---|---|
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper 1:30 |

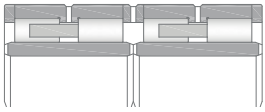


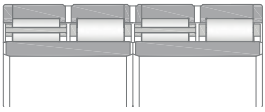



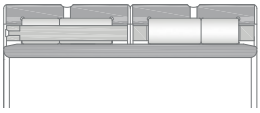
AF2D/A2D

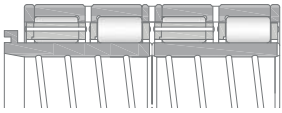
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **115** | 165 | 107,5 | 90 | 401 | 760 | 87 | **319738** |
| **127** | 174,625 | 150,812 | 150,812 | 624 | 1310 | 152 | **315643** |
| **139,7** | 215 | 195 | 187 | 1020 | 2260 | 258 | **466971** |
| | 215 | 195 | 187 | 1218 | 2530 | 288 | **459696** |
| **145** | 210 | 155 | 155 | 800 | 1550 | 172 | **314625** |
| | 225 | 156 | 156 | 906 | 1650 | 182 | **313924** |
| **150** | 230 | 156 | 156 | 894 | 1640 | 181 | **313891** |
| **160** | 230 | 130 | 130 | 773 | 1330 | 142 | **314190** |
| | 230 | 168 | 168 | 1100 | 2180 | 238 | **315189** |
| | 233 | 180 | 180 | 1147 | 2760 | 311 | **457627** |
| **165,1** | 225,425 | 168,275 | 168,275 | 1012 | 2210 | 237 | **315642** |
| **170** | 230 | 130 | 130 | 678 | 1390 | 145 | **313673** |
| | 230 | 160 | 160 | 1088 | 2350 | 254 | **322340** |
| | 240 | 130 | 130 | 912 | 1857 | 199 | **635122** |
| | 260 | 225 | 225 | 1658 | 3320 | 352 | **313587** |
| **180** | 260 | 168 | 168 | 1400 | 2470 | 262 | **313812** |
| **190** | 260 | 168 | 168 | 1128 | 2590 | 269 | **313651** |
| | 270 | 200 | 200 | 1500 | 3320 | 342 | **314199** |
| | 280 | 200 | 200 | 1726 | 3320 | 342 | **314049** |
| **200** | 270 | 170 | 170 | 1225 | 2690 | 274 | **314553** |
| | 280 | 170 | 170 | 1441 | 2990 | 304 | **314385** |
| | 280 | 170 | 170 | 1421 | 3136 | 322 | **314385 GB2** |
| | 280 | 180 | 170 | 1365 | 2970 | 302 | **319019** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

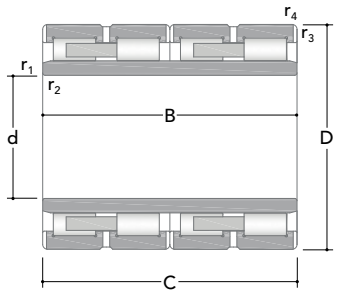

D2C

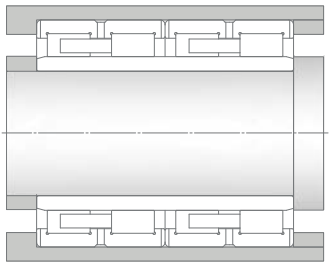

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **115** | 1,1 | 1,1 | 8,5 | **319738** |
| **127** | 1,1 | 1,5 | 10,5 | **315643** |
| **139,7** | 3 | 0,4 | 25 | **466971** |
| | 3 | 0,4 | 24 | **459696** |
| **145** | 1,1 | 1,1 | 18 | **314625** |
| | 2 | 2 | 23 | **313924** |
| **150** | 2 | 2 | 24 | **313891** |
| **160** | 1,5 | 1,5 | 17 | **314190** |
| | 2 | 2 | 23,5 | **315189** |
| | 2,5 | 1,8 | 26,5 | **457627** |
| **165,1** | 1,5 | 1,5 | 20 | **315642** |
| **170** | 2 | 2 | 15 | **313673** |
| | 2 | 2 | 19 | **322340** |
| | 2 | 2 | 19 | **635122** |
| | 2,1 | 2,1 | 43,5 | **313587** |
| **180** | 2,1 | 2,1 | 29,5 | **313812** |
| **190** | 2 | 2 | 27 | **313651** |
| | 2,1 | 2,1 | 37,5 | **314199** |
| | 2,1 | 2,1 | 41,5 | **314049** |
| **200** | 2,1 | 2,1 | 28,5 | **314553** |
| | 2,1 | 2,1 | 33,5 | **314385** |
| | 2,1 | 2,1 | 35 | **314385 GB2** |
| | 2,1 | 2,1 | 35 | **319019** |

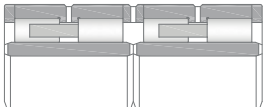


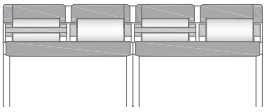



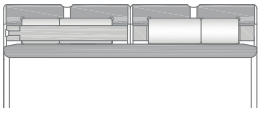
AF2D/A2D

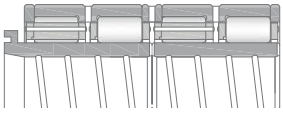
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore | |
| [mm] | | | | [kN] | | | | |
| **200** | 280 | 200 | 200 | 1492 | 3353 | 345 | **313893** | |
| (cont.) | 285 | 200 | 200 | 1466 | 3840 | 399 | **457628** | |
| | 290 | 192 | 192 | 1526 | 3190 | 319 | **313811** | |
| | 310 | 230 | 230 | 2038 | 3730 | 388 | **313639** | (1) |
| **210** | 290 | 192 | 192 | 1460 | 3390 | 354 | **313646** | |
| **220** | 300 | 200 | 200 | 1793 | 3823 | 382 | **322341** | |
| **230** | 330 | 206 | 206 | 2008 | 3920 | 382 | **313824** | |
| | 365 | 250 | 250 | 2657 | 4890 | 489 | **313581** | |
| **240** | 330 | 180 | 180 | 1739 | 3770 | 372 | **635194** | |
| | 330 | 220 | 220 | 1711 | 4322 | 417 | **313921** | |
| | 330 | 240 | 220 | 1709 | 4260 | 411 | **320415** | |
| | 360 | 290 | 290 | 3262 | 6500 | 635 | **322292** | |
| **250** | 340 | 230 | 230 | 1878 | 4920 | 502 | **457629** | |
| **260** | 360 | 204 | 204 | 1983 | 4360 | 421 | **314997** | |
| | 360 | 230 | 230 | 2008 | 4580 | 448 | **320956** | |
| | 370 | 220 | 220 | 2170 | 4570 | 457 | **313823** | |
| | 370 | 240 | 220 | 2185 | 4540 | 458 | **319464** | |
| | 400 | 290 | 290 | 3521 | 6980 | 669 | **313427** | |
| **265** | 370 | 234 | 234 | 2216 | 5330 | 513 | **313922** | |
| **270** | 380 | 295 | 275 | 3121 | 7140 | 689 | **315605** | |
| **280** | 390 | 220 | 220 | 2416 | 4960 | 486 | **313822** | |
| | 390 | 250 | 220 | 2227 | 4900 | 480 | **319259** | |
| | 390 | 275 | 275 | 3106 | 7130 | 688 | **314719** | |
| | 400 | 285 | 285 | 3182 | 7280 | 703 | **314070** | (1) |

(1) Bearing set of two double row bearings (Suffix VJ 202)

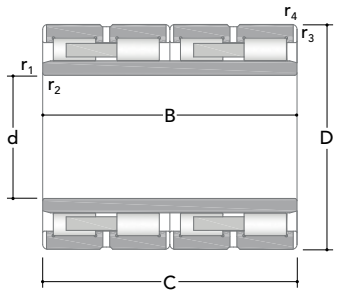

D2C


F2CII/EVO

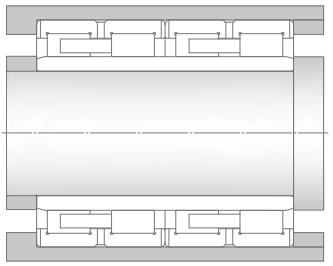

GB2


Q2AC

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore | |
| [mm] | | | [kg] | | |
| **200** | 0,6 | 2,1 | 39 | **313893** | |
| (cont.) | 2,1 | 2 | 44 | **457628** | |
| | 2,1 | 2,1 | 42,5 | **313811** | |
| | 2,1 | 2,1 | 63 | **313639** | (1) |
| **210** | 2,1 | 2,1 | 41 | **313646** | |
| **220** | 2,1 | 2,1 | 41 | **322341** | |
| **230** | 2,1 | 2,1 | 58 | **313824** | |
| | 3 | 3 | 100 | **313581** | |
| **240** | 2,1 | 2,1 | 49,5 | **635194** | |
| | 2,1 | 2,1 | 58 | **313921** | |
| | 2,1 | 2,1 | 60 | **320415** | |
| | 8x20° | 2 | 130 | **322292** | |
| **250** | 3 | 2,3x45° | 65 | **457629** | |
| **260** | 2,1 | 2,1 | 64,5 | **314997** | |
| | 3 | 3 | 73,5 | **320956** | |
| | 3 | 3 | 77,5 | **313823** | |
| | 3 | 3 | 78,5 | **319464** | |
| | 4 | 4 | 135 | **313427** | |
| **265** | 3 | 3 | 80,5 | **313922** | |
| **270** | 2 | 1 | 100 | **315605** | |
| **280** | 3 | 3 | 82,5 | **313822** | |
| | 3 | 3 | 84,5 | **319259** | |
| | 7x20° | 1,1 | 100 | **314719** | |
| | 3 | 3 | 120 | **314070** | (1) |

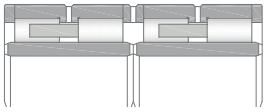


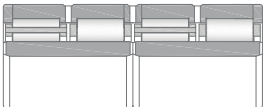

AF2D/A2D

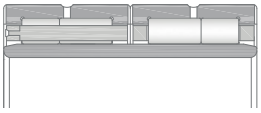


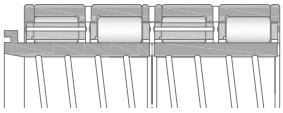
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **280** | 410 | 300 | 300 | 3493 | 7470 | 732 | **314897** |
| (cont.) | 420 | 300 | 300 | 3506 | 7260 | 686 | **313487** |
| **290** | 390 | 190 | 190 | 2060 | 4530 | 438 | **635195** |
| **300** | 420 | 300 | 300 | 4013 | 8670 | 837 | **314484** |
| | 420 | 320 | 300 | 3739 | 8680 | 838 | **319129** |
| **320** | 460 | 240 | 240 | 2939 | 7160 | 666 | **322216** |
| | 480 | 350 | 350 | 5017 | 10750 | 961 | **314274** |
| **330** | 460 | 340 | 340 | 4443 | 10080 | 939 | **313445** |
| **340** | 480 | 350 | 350 | 4900 | 10990 | 1019 | **314485** |
| | 480 | 370 | 350 | 4605 | 10890 | 1010 | **319040** |
| | 500 | 370 | 370 | 5274 | 11680 | 1069 | **322261** |
| | 560 | 380 | 380 | 6749 | 12820 | 1073 | **313404** |
| **350** | 500 | 380 | 380 | 4972 | 11270 | 1028 | **314563** |
| | 500 | 410 | 410 | 5816 | 13670 | 1197 | **322777** |
| | 520 | 300 | 300 | 4350 | 8920 | 793 | **319878** |
| | 520 | 300 | 300 | 4350 | 8920 | 793 | **326909** |
| | 520 | 320 | 300 | 4350 | 8920 | 789 | **326858** |
| **360** | 500 | 250 | 250 | 3599 | 7270 | 663 | **320075** |
| | 500 | 250 | 250 | 3506 | 8350 | 766 | **322217** |
| | 510 | 400 | 380 | 5283 | 12090 | 1090 | **316890** |
| **370** | 520 | 380 | 380 | 5468 | 12970 | 1140 | **314486** |
| **380** | 540 | 260 | 260 | 3426 | 8630 | 763 | **326131** |
| | 540 | 300 | 300 | 5008 | 10800 | 947 | **313030** |
| | 540 | 400 | 380 | 6126 | 13800 | 1183 | **320989** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

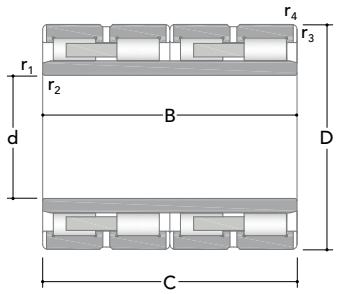

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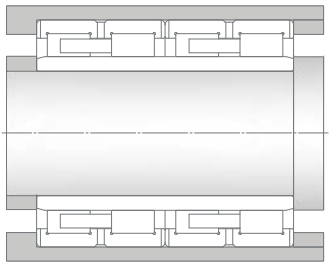

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **280** | 4 | 4 | 130 | **314897** |
| (cont.) | 4 | 4 | 150 | **313487** |
| **290** | 2,1 | 2,1 | 67 | **635195** |
| **300** | 7x20° | 1,5 | 130 | **314484** |
| | 4 | 1,5 | 135 | **319129** |
| **320** | 3 | 3 | 140 | **322216** |
| | 10x20° | 1,5 | 220 | **314274** |
| **330** | 10,5x20° | 1,5 | 175 | **313445** |
| **340** | 8x20° | 1,5 | 205 | **314485** |
| | 4 | 1,5 | 200 | **319040** |
| | 13x20° | 3 | 260 | **322261** |
| | 5 | 4 | 350 | **313404** |
| **350** | 5 | 5 | 240 | **314563** |
| | 11,5x20° | 3 | 285 | **322777** |
| | 5 | 5 | 220 | **319878** |
| | 8x20° | 5 | 220 | **326909** |
| | 8x20,5° | 5 | 240 | **326858** |
| **360** | 3 | 3 | 145 | **320075** |
| | 3 | 3 | 140 | **322217** |
| | 4 | 1,5 | 260 | **316890** |
| **370** | 10x20° | 1,5 | 255 | **314486** |
| **380** | 4 | 4 | 205 | **326131** |
| | 8,5x20° | 2 | 220 | **313030** |
| | 4 | 1,5 | 300 | **320989** |

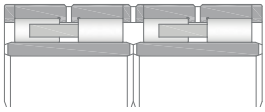


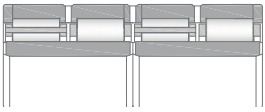



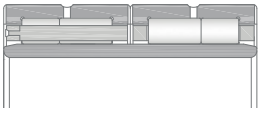
AF2D/A2D

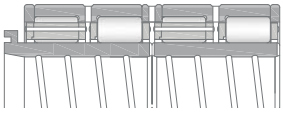
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **380** | 540 | 400 | 380 | 5771 | 13480 | 1141 | **315606** |
| (cont.) | 540 | 400 | 400 | 5845 | 13950 | 1216 | **313511** |
| | 540 | 400 | 400 | 6116 | 14940 | 1285 | **326366** |
| | 560 | 300 | 300 | 4995 | 9510 | 838 | **322189** |
| | 560 | 325 | 325 | 5181 | 10540 | 925 | **322264** |
| **390** | 540 | 320 | 320 | 5258 | 12010 | 1024 | **322498** |
| | 550 | 310 | 310 | 5155 | 11120 | 993 | **313190** |
| **399,93** | 590 | 440 | 440 | 8645 | 20060 | 1701 | **313038** |
| **400** | 560 | 410 | 410 | 6299 | 15330 | 1297 | **313015** |
| | 590 | 440 | 440 | 7267 | 16330 | 1377 | **315802** |
| **410** | 560 | 400 | 400 | 6393 | 15920 | 1363 | **316689** |
| | 560 | 400 | 400 | 5508 | 15920 | 1363 | **322038** |
| | 560 | 420 | 400 | 6002 | 14320 | 1226 | **320612** |
| | 600 | 440 | 440 | 7669 | 17120 | 1514 | **313877** |
| **420** | 580 | 260 | 260 | 3791 | 9630 | 828 | **320074** |
| | 580 | 320 | 320 | 4658 | 10770 | 947 | **313555** |
| | 600 | 440 | 440 | 7189 | 17520 | 1453 | **313513** |
| | 620 | 400 | 400 | 6948 | 15490 | 1281 | **314391** |
| **431,5** | 571,5 | 300 | 300 | 4412 | 10086 | 870 | **326361** |
| **440** | 620 | 450 | 450 | 7919 | 19310 | 1576 | **314554** |
| | 620 | 470 | 450 | 7203 | 17270 | 1433 | **320608** |
| | 650 | 355 | 355 | 6715 | 13770 | 1062 | **316899** |
| | 660 | 340 | 340 | 6628 | 13650 | 1076 | **635043** |
| **447,295** | 635,176 | 463,55 | 463,55 | 8263 | 19690 | 1605 | **314792** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

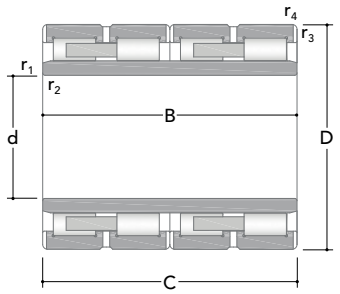

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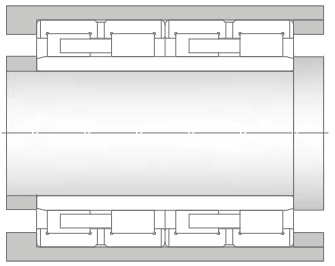

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **380** | 4 | 1,5 | 295 | **315606** |
| (cont.) | 10x20° | 2 | 295 | **313511** |
| | 10x20° | 2 | 305 | **326366** |
| | 13,5x20° | 2 | 260 | **322189** |
| | 13,5x20° | 5 | 265 | **322264** |
| **390** | 10x20° | 2 | 230 | **322498** |
| | 11x20° | 4 | 240 | **313190** |
| **399,93** | 10x20° | 5 | 420 | **313038** |
| **400** | 13,5x20° | 2 | 315 | **313015** |
| | 5 | 5 | 415 | **315802** |
| **410** | 11x20° | 2 | 290 | **316689** |
| | 14x20° | 2 | 295 | **322038** |
| | 13x20° | 2 | 275 | **320612** |
| | 5 | 5 | 425 | **313877** |
| **420** | 4 | 4 | 210 | **320074** |
| | 4 | 4 | 250 | **313555** |
| | 8x20° | 2 | 400 | **313513** |
| | 4 | 4 | 430 | **314391** |
| **431,5** | 10,5x20° | 4 | 210 | **326361** |
| **440** | 12x20° | 2 | 440 | **314554** |
| | 14x20° | 2 | 420 | **320608** |
| | 12,5x20° | 4 | 420 | **316899** |
| | 6 | 6 | 430 | **635043** |
| **447,295** | 13,5x20° | 5 | 460 | **314792** |

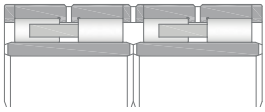


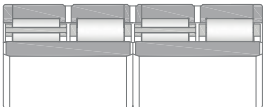



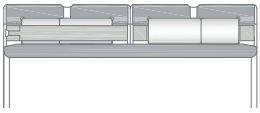
AF2D/A2D

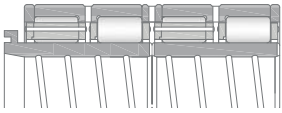
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **450** | 590 | 300 | 300 | 3861 | 11930 | 1014 | **315811** |
| **459,95** | 760 | 600 | 600 | 14101 | 30390 | 2312 | **312980** |
| **460** | 650 | 355 | 355 | 6301 | 14420 | 1205 | **313031** |
| | 650 | 424 | 424 | 7905 | 18160 | 1518 | **315196** |
| | 650 | 460 | 424 | 7892 | 17980 | 1503 | **322993** |
| | 650 | 470 | 470 | 8931 | 22270 | 1889 | **314560** |
| | 650 | 470 | 470 | 8931 | 22270 | 1889 | **319155** |
| | 680 | 400 | 400 | 8032 | 17080 | 1323 | **322374** |
| **475** | 600 | 368 | 368 | 5516 | 14590 | 1249 | **326261** |
| **480** | 650 | 450 | 450 | 8176 | 20780 | 1666 | **316690** |
| | 680 | 420 | 420 | 8328 | 19070 | 1482 | **319320** |
| | 680 | 500 | 500 | 9231 | 21650 | 1673 | **316624** |
| | 680 | 500 | 500 | 9639 | 23530 | 1892 | **313516** |
| **487,98** | 637,045 | 350 | 350 | 5078 | 15170 | 1210 | **326196** |
| **500** | 650 | 260 | 260 | 4064 | 10090 | 806 | **319254** |
| | 670 | 450 | 450 | 8148 | 21970 | 1798 | **316083** |
| | 670 | 480 | 450 | 8372 | 21880 | 1790 | **322039** |
| | 680 | 450 | 450 | 8218 | 21610 | 1729 | **316515** |
| | 710 | 480 | 480 | 8813 | 21460 | 1619 | **316968** |
| | 720 | 400 | 400 | 7846 | 17570 | 1318 | **322066** |
| | 720 | 530 | 530 | 10765 | 28000 | 2083 | **314441** |
| | 738 | 500 | 500 | 10657 | 23030 | 1747 | **326853** |
| **510** | 680 | 500 | 500 | 8861 | 25480 | 1960 | **319411** |
| **529,91** | 870 | 670 | 670 | 15665 | 33400 | 2443 | **312844** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

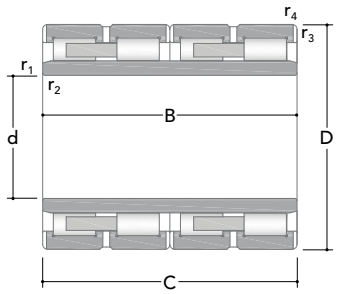

D2C

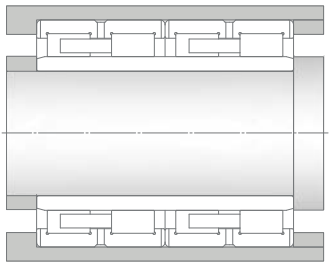

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **450** | 12x45° | 4 | 245 | **315811** |
| **459,95** | 15x20° | 6 | 1160 | **312980** |
| **460** | 12x20° | 3 | 380 | **313031** |
| | 12x20° | 3 | 450 | **315196** |
| | 12x20° | 3 | 490 | **322993** |
| | 12x20° | 3 | 510 | **314560** |
| | 3 | 3 | 510 | **319155** |
| | 6 | 6 | 640 | **322374** |
| **475** | 3 | 3 | 235 | **326261** |
| **480** | 12,5x20° | 2 | 440 | **316690** |
| | 12x20° | 3 | 515 | **319320** |
| | 13x20° | 3 | 605 | **316624** |
| | 13x20° | 3 | 585 | **313516** |
| **487,98** | 10,5x20° | 4 | 300 | **326196** |
| **500** | 5 | 5 | 225 | **319254** |
| | 12,5x20° | 5 | 460 | **316083** |
| | 12,5x20° | 5 | 485 | **322039** |
| | 5 | 2 | 500 | **316515** |
| | 18x20° | 5 | 610 | **316968** |
| | 6 | 3 | 530 | **322066** |
| | 13x20° | 5 | 730 | **314441** |
| | 1E0(20° | 6 | 735 | **326853** |
| **510** | 7,5x20° | 5 | 522 | **319411** |
| **529,91** | 7,5 | 7,5 | 1660 | **312844** |

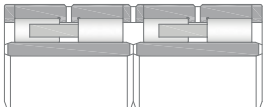


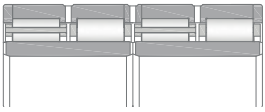



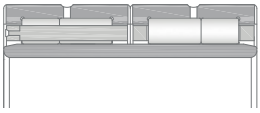
AF2D/A2D

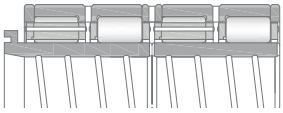
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **530** | 760 | 520 | 520 | 11621 | 28120 | 2092 | **314886** |
| | 780 | 500 | 500 | 9365 | 20030 | 1502 | **315040** |
| | 780 | 570 | 570 | 12646 | 31970 | 2361 | **314517** |
| **536,176** | 762,03 | 558,8 | 558,8 | 11449 | 28540 | 2126 | **313535** |
| | 762,03 | 558,8 | 558,8 | 11083 | 29470 | 2161 | **322142** |
| **549,85** | 740 | 510 | 510 | 10191 | 26690 | 2214 | **326897** |
| **550** | 740 | 510 | 510 | 10204 | 26570 | 2204 | **316691** |
| | 800 | 520 | 520 | 11667 | 26160 | 1935 | **316115** |
| | 800 | 560 | 560 | 12048 | 27580 | 2009 | **322719** |
| **559,84** | 920 | 710 | 710 | 20344 | 44600 | 3186 | **313189** |
| **560** | 820 | 600 | 600 | 14149 | 33720 | 2430 | **322930** |
| **571,1** | 812,97 | 594 | 594 | 13593 | 33120 | 2521 | **313499** |
| **580** | 780 | 521 | 486 | 9932 | 26990 | 2039 | **326140** |
| **600** | 820 | 575 | 575 | 13832 | 35790 | 2535 | **315175** |
| | 870 | 540 | 540 | 13137 | 31330 | 2228 | **315068** |
| | 870 | 578 | 540 | 13203 | 31440 | 2236 | **322497** |
| | 870 | 640 | 640 | 14957 | 39700 | 2829 | **314317** |
| | 870 | 640 | 640 | 15690 | 39700 | 2829 | **315513** |
| **610** | 820 | 430 | 430 | 9394 | 23430 | 1688 | **315257** |
| **628** | 922 | 600 | 600 | 16719 | 38640 | 2675 | **315071** |
| **634,5** | 901,87 | 674 | 674 | 16762 | 44480 | 3114 | **313705** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

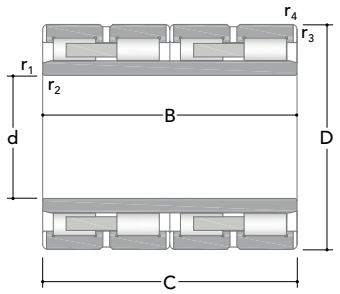

D2C

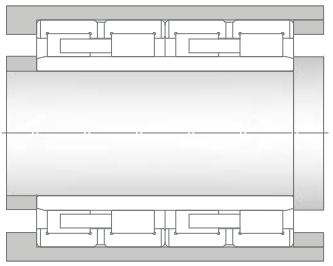

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **530** | 12x20° | 5 | 775 | **314886** |
| | 6 | 6 | 805 | **315040** |
| | 14x20° | 3 | 960 | **314517** |
| **536,176** | 16x20° | 4 | 830 | **313535** |
| | 16x20° | 4 | 820 | **322142** |
| **549,85** | 15x20° | 2 | 615 | **326897** |
| **550** | 15x20° | 2 | 615 | **316691** |
| | 10x20° | 6 | 895 | **316115** |
| | 18,5x20° | 6 | 930 | **322719** |
| **559,84** | 20x20° | 4 | 2000 | **313189** |
| **560** | 20x20° | 3 | 1080 | **322930** |
| **571,1** | 14x20° | 5 | 1000 | **313499** |
| **580** | 12x20° | 2 | 700 | **326140** |
| **600** | 15x20° | 3 | 910 | **315175** |
| | 22x20° | 4 | 1100 | **315068** |
| | 19,5x20° | 4 | 1150 | **322497** |
| | 17x20° | 4 | 1300 | **314317** |
| | 20x20° | 4 | 1340 | **315513** |
| **610** | 19x20° | 3 | 650 | **315257** |
| **628** | 17,5x20° | 6 | 1420 | **315071** |
| **634,5** | 18x20° | 4 | 1400 | **313705** |

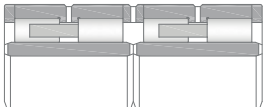


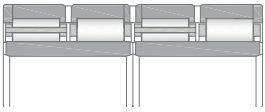



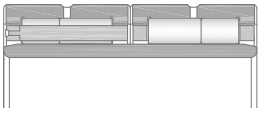
AF2D/A2D

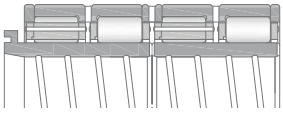
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **650** | 920 | 670 | 670 | 17334 | 46250 | 3183 | **313007** |
| **658** | 1075 | 650 | 650 | 20521 | 42820 | 2888 | **320525** |
| **660** | 820 | 440 | 440 | 7442 | 22500 | 1609 | **239509** |
| | 880 | 450 | 450 | 7260 | 23200 | 1730 | **313477** |
| **680** | 980 | 640 | 640 | 17012 | 43510 | 2967 | **313154** |
| **690** | 980 | 715 | 715 | 19748 | 53780 | 3635 | **313008** |
| **700** | 930 | 620 | 620 | 15032 | 42700 | 2979 | **316967** |
| **710** | 1000 | 715 | 715 | 19988 | 54900 | 3676 | **313403** |
| **730** | 960 | 620 | 620 | 15492 | 44920 | 2995 | **315982** |
| | 1030 | 750 | 750 | 20674 | 57760 | 3851 | **314518** |
| **748** | 1135 | 690 | 690 | 21920 | 50880 | 3342 | **420625** |
| **750** | 1000 | 500 | 500 | 12356 | 32950 | 2203 | **314420** |
| | 1000 | 670 | 670 | 17550 | 49260 | 3300 | **315973** |
| **759** | 1210 | 740 | 740 | 26985 | 83980 | 3754 | **313685** |
| **760** | 1080 | 790 | 790 | 23944 | 64730 | 4348 | **312979** |
| **761,425** | 1079,602 | 787,4 | 787,4 | 23589 | 65310 | 4387 | **312967** |
| | 1079,602 | 787,4 | 787,4 | 23471 | 65330 | 4389 | **322143** |
| **799** | 1080 | 700 | 700 | 20060 | 57610 | 3742 | **326892** |
| **800** | 1080 | 700 | 700 | 19565 | 58060 | 3771 | **315599** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

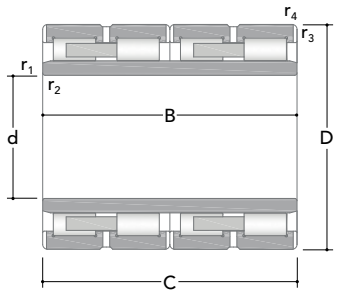

D2C

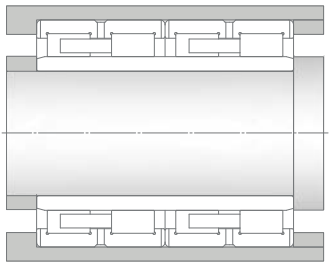

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **650** | 17x20° | 4 | 1450 | **313007** |
| **658** | 22x20° | 75 | 2490 | **320525** |
| **660** | 7,5 | 4 | 530 | **239509** |
| | 6 | 6 | 785 | **313477** |
| **680** | 20x20° | 4 | 1590 | **313154** |
| **690** | 20x20° | 4 | 1780 | **313008** |
| **700** | 18x20° | 3 | 1180 | **316967** |
| **710** | 17x20° | 4 | 1860 | **313403** |
| **730** | 20x20° | 3 | 1220 | **315982** |
| | 21x20° | 6 | 2040 | **314518** |
| **748** | 21x20° | 4 | 2635 | **420625** |
| **750** | 6 | 6 | 1150 | **314420** |
| | 20x20° | 3 | 1480 | **315973** |
| **759** | 4 | 4 | 3480 | **313685** |
| **760** | 7,5 | 7,5 | 2440 | **312979** |
| **761,425** | 19x20° | 7,5 | 2400 | **312967** |
| | 19x20° | 75 | 2410 | **322143** |
| **799** | 20x20° | 3 | 1955 | **326892** |
| **800** | 20x20° | 3 | 1950 | **315599** |

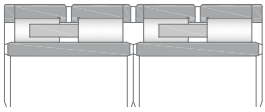


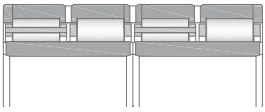



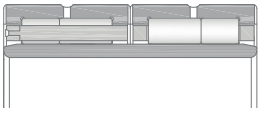
AF2D/A2D

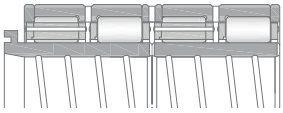
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Cylindrical bore |
| [mm] | | | | [kN] | | | |
| **820** | 1100 | 745 | 720 | 19593 | 56190 | 3697 | **316341** |
| | 1130 | 800 | 800 | 24143 | 67600 | 4374 | **320455** |
| | 1130 | 825 | 800 | 24339 | 66900 | 4329 | **319313** |
| **850** | 1150 | 840 | 840 | 25292 | 74630 | 4776 | **315826** |
| **862,98** | 1219,302 | 876,3 | 889 | 30121 | 85370 | 5428 | **312966** |
| **865** | 1180 | 750 | 750 | 23081 | 66020 | 4237 | **319668** |
| **900** | 1220 | 840 | 840 | 28582 | 78970 | 4936 | **316043** |
| | 1280 | 930 | 930 | 32974 | 91670 | 5914 | **313528** |
| **937,5** | 1270,25 | 825,5 | 825,5 | 28122 | 82070 | 5241 | **315265** |
| **950** | 1360 | 975 | 975 | 34207 | 98550 | 6110 | **319862** |
| | 1360 | 1000 | 1000 | 37911 | 109500 | 6769 | **314520** |
| **980** | 1310 | 880 | 880 | 28900 | 84840 | 5296 | **319303** |
| **1000** | 1360 | 800 | 800 | 27757 | 82950 | 5097 | **316234** |
| **1200** | 1590 | 1050 | 1050 | 41830 | 132600 | 7916 | **315494** |

(1) Bearing set of two double row bearings (Suffix VJ 202)

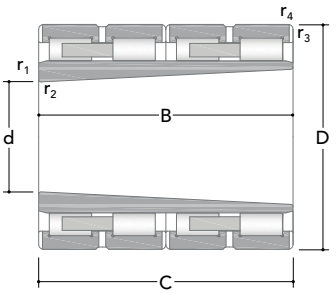

D2C

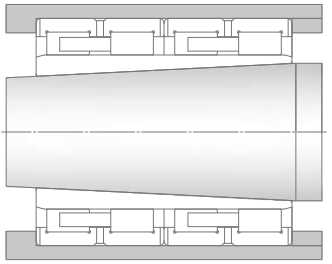

F2CII/EVO


GB2


Q2AC

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Cylindrical bore |
| [mm] | | | [kg] | |
| **820** | 22x20° | 3 | 2000 | **316341** |
| | 23x20° | 6 | 2540 | **320455** |
| | 23x20° | 6 | 2570 | **319313** |
| **850** | 23x20° | 4 | 2570 | **315826** |
| **862,98** | 7,5 | 4 | 3470 | **312966** |
| **865** | 20x20° | 8,5x45° | 2520 | **319668** |
| **900** | 24x24° | 4 | 3060 | **316043** |
| | 25x20° | 4 | 4080 | **313528** |
| **937,5** | 27x20° | 4 | 3160 | **315265** |
| **950** | 26x20° | 6 | 4900 | **319862** |
| | 22x20° | 5 | 5020 | **314520** |
| **980** | 20x20° | 14x45° | 3310 | **319303** |
| **1000** | 23x20° | 4 | 3560 | **316234** |
| **1200** | 30x20° | 6 | 5970 | **315494** |

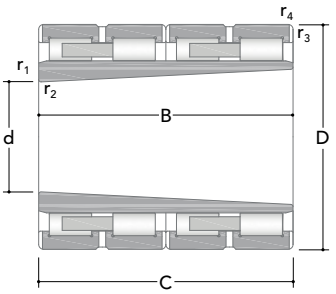


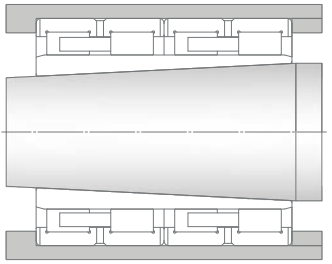



AF2D/A2D K/K30

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Tapered bore |
| [mm] | | | | [kN] | | | |
| **105** | 150 | 71 | 71 | 256 | 472 | 52 | **319148** |
| **125** | 180 | 100 | 90 | 428 | 863 | 94,6 | **319768** |
| **140** | 210 | 155 | 155 | 798 | 1530 | 173 | **313900** |
| **151,5** | 230 | 168 | 168 | 1042 | 2190 | 239 | **314024** |
| | 230 | 168 | 168 | 1090 | 2270 | 249 | **467334** |
| **160** | 240 | 175 | 175 | 1188 | 2510 | 271 | **313436** |
| **160,69** | 260 | 178,7 | 166 | 1089 | 2520 | 272 | **466949** |
| **162** | 230 | 130 | 130 | 664 | 1382 | 144 | **312863** |
| **170** | 260 | 160 | 160 | 1086 | 2120 | 224 | **313423** |
| **175** | 260 | 180 | 180 | 1223 | 3120 | 337 | **457919** |
| **181** | 260 | 180 | 180 | 1132 | 2600 | 270 | **314874** |
| | 260 | 180 | 180 | 969 | 2580 | 278 | **452683** |
| **181,5** | 260 | 168 | 168 | 1133 | 2530 | 258 | **314023** |
| | 260 | 168 | 168 | 956 | 2590 | 279 | **467333** |
| **182** | 260 | 168 | 183 | 1136 | 2570 | 267 | **312942** |
| **183,33** | 280 | 200 | 200 | 1383 | 3430 | 373 | **457920** |
| **190** | 280 | 200 | 200 | 1491 | 3320 | 342 | **313583** |
| | 290 | 180 | 180 | 1444 | 2800 | 285 | **313422** |
| **192** | 270 | 170 | 170 | 1225 | 2690 | 272 | **313153** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Tapered bore |
| [mm] | | | [kg] | |
| **105** | 0,6 | 1,1 | 4,1 | **319148** |
| **125** | 1 | 1,5 | 7,9 | **319768** |
| **140** | 1,1 | 1,1 | 17 | **313900** |
| **151,5** | 1,1 | 2 | 24 | **314024** |
| | 2 | 2x45° | 23 | **467334** |
| **160** | 1 | 2 | 24 | **313436** |
| **160,69** | 2,1 | 1,2x45° | 34 | **466949** |
| **162** | 1 | 2 | 16 | **312863** |
| **170** | 0,6 | 1,1 | 29,5 | **313423** |
| **175** | 1 | 1,8x45° | 32 | **457919** |
| **181** | 2 | 2 | 29,5 | **314874** |
| | 1 | 3,5x45° | 28 | **452683** |
| **181,5** | 1,1 | 2 | 27,5 | **314023** |
| | 1,5 | 1x45° | 27 | **467333** |
| **182** | 1 | 2 | 28 | **312942** |
| **183,33** | 1,5 | 2x45° | 43 | **457920** |
| **190** | 1,1 | 2,1 | 40 | **313583** |
| | 1 | 2,1 | 41 | **313422** |
| **192** | 1 | 2,1 | 28,5 | **313153** |

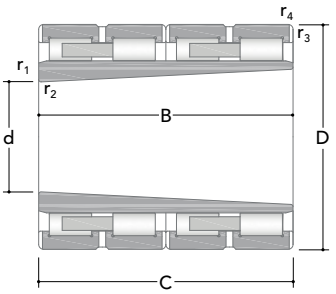


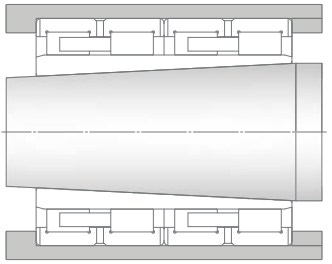



AF2D/A2D K/K30

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Tapered bore |
| [mm] | | | | [kN] | | | |
| **200,833** | 310 | 230 | 230 | 1880 | 4700 | 485 | **457922** |
| **202** | 290 | 192 | 192 | 1429 | 3360 | 351 | **313152** |
| | 290 | 202,23 | 192 | 1305 | 3580 | 378 | **467419** |
| | 290 | 207 | 192 | 1456 | 3350 | 350 | **312858** |
| **205** | 310 | 225 | 225 | 1940 | 4230 | 423 | **313584** |
| **228,33** | 325 | 200 | 200 | 1599 | 4480 | 468 | **461839** |
| **230** | 330 | 220 | 220 | 2016 | 4590 | 459 | **313438** |
| **231** | 330 | 235 | 220 | 1736 | 4310 | 416 | **312943** |
| **246,67** | 380 | 280 | 280 | 2670 | 7050 | 665 | **457927** |
| **255** | 370 | 249 | 234 | 2222 | 5380 | 518 | **312860** |
| **260** | 400 | 250 | 250 | 2718 | 5760 | 551 | **313439** |
| | 400 | 285 | 285 | 3127 | 7290 | 704 | **313532** |
| **266,25** | 400 | 285 | 285 | 2545 | 6680 | 629 | **457929** |
| **320** | 480 | 350 | 350 | 4553 | 10930 | 1014 | **316345** |
| **340** | 520 | 300 | 300 | 4271 | 8870 | 788 | **315767** |
| **356,67** | 550 | 400 | 400 | 5226 | 14780 | 1271 | **457939** |
| **365** | 540 | 300 | 300 | 5079 | 10790 | 947 | **313041** |
| **382,5** | 590 | 450 | 450 | 6915 | 15980 | 1402 | **319352** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Tapered bore |
| [mm] | | | [kg] | |
| **200,833** | 3 | 3,2x45° | 62,5 | **457922** |
| **202** | 1 | 2,1 | 39,5 | **313152** |
| | 1,5 | 2,5x45° | 49 | **467419** |
| | 1 | 2,1 | 42,5 | **312858** |
| **205** | 1,1 | 3 | 58 | **313584** |
| **228,33** | 1 | 2 | 48,5 | **461839** |
| **230** | 1,1 | 2,1 | 57,5 | **313438** |
| **231** | 1,1 | 2,1 | 59 | **312943** |
| **246,67** | 3 | 2,8x45° | 115 | **457927** |
| **255** | 1,1 | 3 | 82 | **312860** |
| **260** | 1,1 | 3 | 110 | **313439** |
| | 1,1 | 3 | 125 | **313532** |
| **266,25** | 4 | 3,2x45" | 120 | **457929** |
| **320** | 1,5 | 1,5 | 215 | **316345** |
| **340** | 2 | 5 | 215 | **315767** |
| **356,67** | 3,2 | 4x45° | 335 | **457939** |
| **365** | 2 | 2 | 230 | **313041** |
| **382,5** | 5 | 6,4x45° | 425 | **319352** |



AF2D/A2D K/K30

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | C | Dynamic C | Static $C_0$ | $C_u$ | Tapered bore |
| [mm] | | | | [kN] | | | |
| **412,335** | 650 | 488 | 480 | 7530 | 21000 | 1714 | **467373** |
| | 650 | 488 | 488 | 8518 | 18660 | 1473 | **314964** |
| **412,5** | 630 | 450 | 450 | 6689 | 18760 | 1580 | **457945** |
| **440** | 650 | 355 | 355 | 6281 | 14540 | 1215 | **313032** |
| **485** | 740 | 540 | 540 | 10853 | 28150 | 2133 | **315523** |
| **511,584** | 760 | 560 | 580 | 11848 | 34290 | 2214 | **457956** |
| **551,667** | 830 | 580 | 580 | 12223 | 32170 | 2296 | **457960** |
| **571,627** | 870 | 640 | 640 | 13529 | 40070 | 2869 | **319446** |
| **571,667** | 870 | 640 | 640 | 17852 | 49430 | 3510 | **457962** |
| **606,667** | 920 | 640 | 640 | 16711 | 44660 | 3077 | **315526** |
| **633,334** | 960 | 680 | 680 | 14468 | 44330 | 3103 | **457969** |
| **773,334** | 1120 | 800 | 800 | 23510 | 64650 | 4244 | **319991** |
| **811,692** | 1180 | 850 | 850 | 25442 | 66860 | 4326 | **457984** |
| **918,354** | 1330 | 950,125 | 950 | 26633 | 84380 | 5361 | **457995** |
| **950** | 1360 | 1000 | 1000 | 37600 | 109500 | 6769 | **314520** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | | Tapered bore |
| [mm] | | | [kg] | |
| **412,335** | 5 | 4,5x45" | 565 | **467373** |
| | 4 | 4 | 575 | **314964** |
| **412,5** | 1,5 | 4,5x45° | 490 | **457945** |
| **440** | 3 | 3 | 400 | **313032** |
| **485** | 5 | 5 | 830 | **315523** |
| **511,584** | 3 | 5,8x45° | 915 | **457956** |
| **551,667** | 3 | 6,1x45° | 1070 | **457960** |
| **571,627** | 3 | 4 | 1335 | **319446** |
| **571,667** | 4 | 6,4x45° | 1170 | **457962** |
| **606,667** | 4 | 5 | 1525 | **315526** |
| **633,334** | 4 | 6,4x45° | 1675 | **457969** |
| **773,334** | 4 | 8,5x45° | 2715 | **319991** |
| **811,692** | 1,5 | 8,5x45° | 2980 | **457984** |
| **918,354** | 6 | 6x45° | 4380 | **457995** |
| **950** | 4 | 5 | 4830 | **314520** |



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SWITZERLAND

# Tapered roller bearings

The tapered roller bearings manufactured by RKB are engineered to withstand combined radial and thrust loads. Available in a rich portfolio of designs and sizes, in standardized and non-standardized dimensional series, RKB tapered roller bearings can be in metric or inch measurements and represent the state of the art. Manufactured from high hardness materials, featuring unparalleled fatigue strength and resistance to wear, RKB TRBs provide excellent performance even under severe operating conditions.
RKB's single row, matched pair, double and four-row tapered roller bearings are optimized to ensure increased load carrying capacities and high stiffness in special applications. RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rollers.



Single row tapered roller bearings

## Single row tapered roller bearings

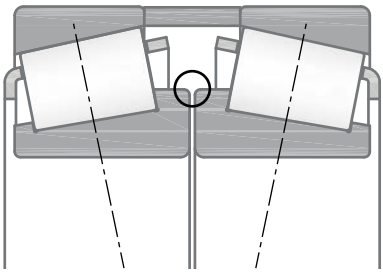
RKB single row and matched pair tapered roller bearings (SRTRBs) are widely used in all industrial segments, in standard and critical applications. The tighter dimensional tolerances, obtained through an extremely high precision manufacturing technology, and the optimized inner geometry (E-Type class) make of such bearings a reliable solution to improve the performance of any machine. Naturally, the matched pairs can be assembled according to the customer's special needs (e.g. a given axial internal clearance). The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.

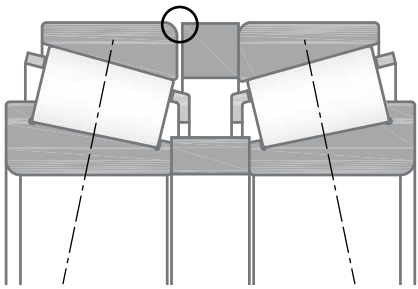
### Axial Internal clearance and preload

The internal axial load or preload of the single row taper roller bearing can be obtained only during the mounting by adjusting one bearing against to the second one, which guarantees the location on the opposite side.
For standard internal clearance of paired metric single row tapered roller bearings in face-to-face or back-to-back arrangement please see **Tab. 1 page 361**.

### Adjustment and running in

Before adjusting the taper roller bearings against each other, it is mandatory to rotate them in order to permit the rollers to find their final position. During the running-in, the working temperature of the taper roller bearings will increase rapidly due to the high frictional moment, but when the running-in period will be completed the temperature becomes stable and the thermal equilibrium takes place.





| Bore diameter | | Axial internal clearance of matched bearings in the series | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d | | 329 | | 320 | | 330 | | 331, 302, 322, 332 | | 303, 323 | | 313 | |
| over | incl. | low | high | low | high | low | high | low | high | low | high | low | high |
| [mm] | | [µm] | | | | | | | | | | | |
| - | 30 | - | - | 80 | 120 | - | - | 100 | 140 | 130 | 170 | 60 | 100 |
| 30 | 40 | - | - | 100 | 140 | - | - | 120 | 160 | 140 | 180 | 70 | 110 |
| 40 | 50 | - | - | 120 | 160 | 180 | 220 | 140 | 180 | 160 | 200 | 80 | 120 |
| 50 | 65 | - | - | 140 | 180 | 200 | 240 | 160 | 200 | 180 | 220 | 100 | 140 |
| 65 | 80 | - | - | 160 | 200 | 250 | 290 | 180 | 220 | 200 | 260 | 110 | 170 |
| 80 | 100 | 270 | 310 | 190 | 230 | 350 | 390 | 210 | 270 | 240 | 300 | 110 | 170 |
| 100 | 120 | 270 | 330 | 220 | 280 | 340 | 400 | 220 | 280 | 280 | 340 | 130 | 190 |
| 120 | 140 | 310 | 370 | 240 | 300 | 340 | 400 | 240 | 300 | 330 | 390 | 160 | 220 |
| 140 | 160 | 370 | 430 | 270 | 330 | 340 | 400 | 270 | 370 | 370 | 430 | 180 | 240 |
| 160 | 180 | 370 | 430 | 310 | 370 | - | - | 310 | 370 | 390 | 450 | - | - |
| 180 | 190 | 370 | 430 | 340 | 400 | - | - | 340 | 400 | 440 | 500 | - | - |
| 190 | 200 | 390 | 450 | 340 | 400 | - | - | 340 | 400 | 440 | 500 | - | - |
| 200 | 225 | 440 | 500 | 390 | 450 | - | - | 390 | 450 | 490 | 550 | - | - |
| 225 | 250 | 440 | 500 | 440 | 500 | - | - | 440 | 500 | 540 | 600 | - | - |
| 250 | 280 | 540 | 600 | 490 | 550 | - | - | 490 | 550 | - | - | - | - |
| 280 | 300 | 640 | 700 | 540 | 600 | - | - | 540 | 600 | - | - | - | - |
| 300 | 340 | 640 | 700 | 590 | 650 | - | - | 590 | 650 | - | - | - | - |

Tab. 1 - Axial internal clearance of paired metric single row tapered roller bearings in face-to-face or back-to-back arrangement

## Misalignment

The permissible misalignment between the shaft and seat of the single row tapered roller bearing is restricted to a few minutes of arc, approximately from 2 to 4 minutes of arc.
These values can be considered valid if the shaft and housing axes remain unchanged. Larger values of misalignment may be used, but with negative consequences regarding the bearing life. For additional information, please consult the RKB application engineering service.

## Minimum load

A minimum radial load is requested for single tapered roller bearings, like for all ball and roller bearings, in order to guarantee an adequate operation condition, especially in critical working conditions: high speed (n > 0.5 reference speed), high acceleration and sudden changes of rotating direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load can be calculated using the following formula:

$$\frac{F_{rm}}{C_r} > 0{,}02$$

Where

- $F_{rm}$ minimum radial load, [kN];
- $C_r$ basic dynamic radial load, [kN].

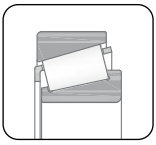
Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing and the loads acting on it, otherwise supplementary radial load must be applied on the single row tapered roller bearing. In application where a starting up at low temperature is planned or a lubricant with high viscosity is used, a greater minimum radial load is required.

## Cage

RKB single row tapered roller bearings feature one-piece window type pressed steel cage guided on rollers. In order to mount correctly the bearings, it is recomnended to keep a proper space to host laterally the cage protrusions. For additional informations please consult the RKB application enginnering services.

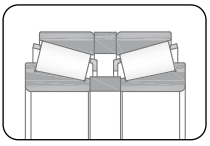
## Designs and variants

### Type TS



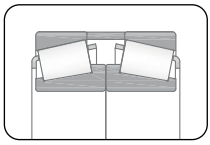

- Ribless outer ring (cup)
- Inner ring with two integral ribs (cone)
- One-piece window type pressed steel cage
- Supports radial and axial loads in one direction
- Suitable for medium to high operating speeds
- Separable design
- Optimized geometry (E-Type)
- Optimized roller profile
- Available in metric and inch sizes

### Type DB




- Matched set of single row TRBs (back-to-back arrangement)
- Available with cup and cone spacers (plain or with lubrication holes)
- Supports radial and axial loads in both directions
- High arrangement stiffness
- Reduced angular misalignment
- Optimized geometry (E-Type)
- Optimized roller profile
- Preset or adjusted BEP on customer's request
- Available in metric and inch sizes

### Type DF




- Matched set of single row TRBs (face-to-face arrangement)
- Available with cup and cone spacers (plain or with lubrication holes)
- Supports radial and axial loads in both directions
- Low arrangement stiffness
- Increased angular misalignment
- Optimized geometry (E-Type)
- Optimized roller profile
- Preset or adjusted BEP on customer's request
- Available in metric and inch sizes

| Suffixes | Internal design |
|---|---|
| A | Standard contact angle |
| B | Steep contact angle |
| SP | Special or non-standard bearing |
| BT1B | Single row tapered roller bearing |
| C | Cone with boundary dimensions same as basic part number but modified inner geometry |
| E | Optimized inner geometry |
| DRW | Special or non-standard bearing |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

| Suffixes | Cage |
|---|---|
| J or without suffix | Pressed steel cage |

| Suffixes | Accuracy, clearance, running |
|---|---|
| CL0 or CLN | Dimensional and running accuracy to ISO tolerance class 0 or normal |
| CL2 | Dimensional and running accuracy to ISO tolerance class 2 |
| CL3 | Dimensional and running accuracy to ISO tolerance class 3 |
| CL4 | Dimensional and running accuracy to ISO tolerance class 4 |

| Suffixes | External design |
|---|---|
| N1 or W | One locating slot in cup |
| N2 or W | Two locating slots in cup |

| Suffixes | Set |
|---|---|
| DB | Two bearings matched for mounting back-to-back |
| DF | Two bearings matched for mounting face-to-face |
| DT | Two bearings matched for mounting in tandem |
| DB… | Two bearings matched for mounting back-to-back. The number immediately following the DB identifies the design of the spacers |
| DF… | Two bearings matched for mounting face-to-face. The number immediately following the DF identifies the design of the spacers |

| Suffixes | Alternative designation |
|---|---|
| TS | Out of standard single row tapered roller bearing followed by drawing number |

## Part numbering

Several part-numbering systems have been developed in the last 70 years for tapered roller bearings. Inch size bearings are usually given individual part numbers for the cone and the cup, while ISO metric bearings are identified by means of a unique part number for the bearing assembly as a whole.

### Inch size

#### Original system

| | Section 1 | Section 2 | Section 3 |
|---|---|---|---|
| | Prefix | Numerical code | Suffix |
| Example | EE | 107060/107105 | C |

Tab. 2 - Original system: structure

| Prefix | Component | Description |
|---|---|---|
| - | Cone and cup | - |
| A | Cone and cup | Part of the standard basic series number |
| EE | Cone | Large and small ribs close guided rollers. It was originally used to designate close guided rollers. Even if this designation is no longer in use, the prefix has been maintained on existing part numbers |
| NA | Cone | Non-adjustable. Two single cones with front faces contacting, mated with a double cup to form a double row bearing with internal clearances preset |
| J | Cone and cup | A J preceding the prefix or numerical code indicates a metric design bearing component |

Tab. 3 - Original system: prefixes

#### ABMA system

| | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 |
|---|---|---|---|---|---|
| | Duty class | Angularity | Basic series | Component | Suffix |
| Example | HM | 3 | 226 | 49 | C |

Tab. 4 - ABMA system: structure

| Prefix | Component |
|---|---|
| EL | Extra Light |
| LL | Lighter than Light |
| L | Light |
| LM | Light Medium |
| M | Medium |
| HM | Heavy Medium |
| H | Heavy |
| HH | Heavier than Heavy |
| EH | Extra Heavy |
| T | Thrust only |
| J | Metric size |
| - | Different prefixes or absence of prefixes indicates original inch part numbering system |

Tab. 5 - ABMA system: duty class

| Cup angle | | Code |
|---|---|---|
| over | incl. | |
| 0 | to 23° 59′ 59,99″ | 1 |
| 24° | to 25° 29′ 59,99″ | 2 |
| 25° 30′ | to 26° 59′ 59,99″ | 3 |
| 27° | to 28° 29′ 59,99″ | 4 |
| 28° 30′ | to 30° 29′ 59,99″ | 5 |
| 30° 30′ | to 32° 29′ 59,99″ | 6 |
| 32° 30′ | to 35° 59′ 59,99″ | 7 |
| 36° | to 44° 59′ 59,99″ | 8 |
| 45° | Up, but not thrust only | 9 |
| 90° | Thrust only | 0 |

Tab. 6 - ABMA system: angularity

| Series indication | Maximum bore range [mm] | | Maximum bore range [inches] | |
|---|---|---|---|---|
| | over | incl. | over | incl. |
| 0-9 incl. | Extremely small tapered roller bearings | | | |
| 00-19 incl. | 0 | 25,4 | 0 | 1 |
| 20-99 incl. | 25,4 | 50,8 | 1 | 2 |
| 000-029 incl. | | | | |
| 039-129 incl. | 50,8 | 76,2 | 2 | 3 |
| 130-189 incl. | 76,2 | 101,6 | 3 | 4 |
| 190-239 incl. | 101,6 | 127,0 | 4 | 5 |
| 240-289 incl. | 127,0 | 152,4 | 5 | 6 |
| 290-339 incl. | 152,4 | 177,8 | 6 | 7 |
| 340-389 incl. | 177,8 | 203,2 | 7 | 8 |
| 390-429 incl. | 203,2 | 228,6 | 8 | 9 |
| 430-469 incl. | 228,6 | 254,0 | 9 | 10 |
| 470-509 incl. | 254,0 | 279,4 | 10 | 11 |
| 510-549 incl. | 279,4 | 304,8 | 11 | 12 |

Tab. 7 (1 of 2) - ABMA system: basic series

| Series indication | Maximum bore range [mm] | | Maximum bore range [inches] | |
|---|---|---|---|---|
| | over | incl. | over | incl. |
| 550-579 incl. | 304,8 | 330,2 | 12 | 13 |
| 580-609 incl. | 330,2 | 355,6 | 13 | 14 |
| 610-639 incl. | 355,6 | 381,0 | 14 | 15 |
| 640-659 incl. | 381,0 | 406,4 | 15 | 16 |
| 660-679 incl. | 406,4 | 431,8 | 16 | 17 |
| 680-699 incl. | 431,8 | 457,2 | 17 | 18 |
| 695-709 incl. | 457,2 | 482,6 | 18 | 19 |
| 710-724 incl. | 482,6 | 508,0 | 19 | 20 |
| 725-739 incl. | 508,0 | 534,4 | 20 | 21 |
| 740-754 incl. | 534,4 | 558,8 | 21 | 22 |
| 755-769 incl. | 558,8 | 584,2 | 22 | 23 |
| 770-784 incl. | 584,2 | 609,6 | 23 | 24 |
| 785-799 incl. | 609,6 | 635,0 | 24 | 25 |
| 800-829 incl. | 635,0 | 762,0 | 25 | 30 |
| 830-859 incl. | 762,0 | 889,0 | 30 | 35 |
| 860-879 incl. | 889,0 | 1016,0 | 35 | 40 |
| 880-889 incl. | 1016,0 | 1270,0 | 40 | 50 |
| 890-899 incl. | 1270,0 | 1841,5 | 50 | 72,5 |
| 900-999 incl. | Extremely large tapered roller bearings | | | |

Tab. 7 (2 of 2) - ABMA system: basic series

| Component | Component number |
|---|---|
| Cups | 10-19 (maximum section) |
| Cones | 30-49 (minimum section) |

Tab. 8 - Component

## Metric size

### First system

The J prefix placed at the beginning of an ABMA bearing code identifies metric dimensioned and toleranced cones and cups.

| | Section 0 | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 |
|---|---|---|---|---|---|---|
| | Prefix | Duty class | Angularity | Basic series | Component | Suffix |
| Example | J | HM | 3 | 226 | 49 | C |

Tab. 9 - Metric system: structure

### ISO 15 system

| | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 |
|---|---|---|---|---|---|
| | Bearing type | Width series | Diameter series | Bore indication | Suffix |
| Example | 3 | 2 | 2 | 18 | C |

Tab. 10 - ISO 15 system: structure

### ISO 355 system

| | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 | Section 6 |
|---|---|---|---|---|---|---|
| | Prefix (none or T) | Contact angle series (alpha) | Diameter series | Width series | Bore diameter | Suffix |
| Example | T | 4 | E | B | 240 | C |

Tab. 11 - ISO 15 system: structure

| Designation of contact angle series (alpha) | Alpha | |
|---|---|---|
| | over | incl. |
| 1 | Reserved for future use | |
| 2 | 10° | 13° 52' |
| 3 | 13° 52' | 15° 59' |
| 4 | 15° 59' | 18° 55' |
| 5 | 18° 55' | 23° |
| 6 | 23° | 27° |
| 7 | 27° | 30° |

Tab. 12 - ISO 355 system: contact angle series (alpha)

| Designation of diameter series | $D/d^{0,77}$ | |
|---|---|---|
| | over | incl. |
| A | Reserved for future use | |
| B | 3,4 | 3,8 |
| C | 3,8 | 4,4 |
| D | 4,4 | 4,7 |
| E | 4,7 | 5 |
| F | 5 | 5,6 |
| G | 5,6 | 7 |

Tab. 13 - ISO 355 system: diameter series

| Designation of width series | $T/(D-d)^{0,95}$ | |
|---|---|---|
| | over | incl. |
| A | Reserved for future use | |
| B | 0,5 | 0,68 |
| C | 0,68 | 0,8 |
| D | 0,8 | 0,88 |
| E | 0,88 | 1 |

Tab. 14 - ISO 355 system: width series

### Optimized bearing system

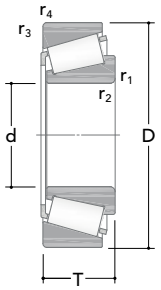
The J prefix identifies metric dimensioned and toleranced cones and cups.

| | Section 0 | Section 1 | Section 2 | Section 3 | Section 4 |
|---|---|---|---|---|---|
| | Prefix | Duty class | Bore diameter | Component | Suffix |
| Example | J | P | 130 | 49 | A |

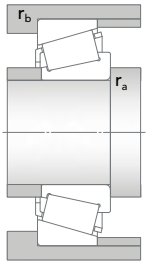
Tab. 15 - Optimized bearing system: structure

| Duty class | Application |
|---|---|
| C, D, F | General purpose |
| N | Combination of general purpose and pinion |
| P | High speed |
| S, T | Pinion |
| W | High axial loads |

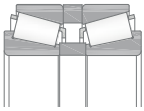
Tab. 16 - Optimized bearing system: duty class



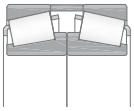

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **15** | 42 | 14,25 | 27,7 | 20 | 2,08 | 15050 | 18070 | **30302** |
| **17** | 40 | 13,25 | 23,5 | 19 | 1,84 | 15000 | 18000 | **30203** |
| | 47 | 15,25 | 34,7 | 25 | 2,70 | 13500 | 16300 | **30303** |
| | 47 | 20,25 | 42,8 | 34 | 3,63 | 12000 | 16030 | **32303** |
| **20** | 42 | 15 | 29,9 | 27 | 2,65 | 13000 | 16000 | **32004** |
| | 47 | 15,25 | 34,5 | 28 | 3,00 | 12000 | 15500 | **30204** |
| | 52 | 16,25 | 42,2 | 33 | 3,54 | 12000 | 14000 | **30304** |
| | 52 | 22,25 | 54,6 | 46,5 | 5,00 | 11500 | 14500 | **32304** |
| **22** | 44 | 15 | 31,3 | 29 | 2,85 | 13000 | 15000 | **320/22** |
| **25** | 47 | 15 | 33,5 | 32,5 | 3,28 | 12500 | 14080 | **32005** |
| | 52 | 16,25 | 38,3 | 33,5 | 3,50 | 11070 | 13040 | **30205** |
| | 52 | 19,25 | 50,8 | 46 | 4,90 | 11010 | 13000 | **32205** |
| | 52 | 22 | 57,9 | 56 | 6,00 | 10050 | 13000 | **33205** |
| | 62 | 18,25 | 56 | 43 | 4,75 | 9500 | 12080 | **30305** |
| | 62 | 18,25 | 46,8 | 40 | 4,50 | 8550 | 11050 | **31305** |
| | 62 | 25,25 | 74,1 | 63 | 7,20 | 9060 | 12000 | **32305** |
| **28** | 52 | 16 | 39,4 | 38 | 4,00 | 10000 | 13060 | **320/28** |
| | 58 | 17,25 | 47,2 | 41,5 | 4,40 | 10000 | 12000 | **302/28** |
| | 58 | 20,25 | 51,9 | 50 | 5,50 | 9540 | 12000 | **322/28** |
| **30** | 55 | 17 | 44 | 45 | 4,59 | 10200 | 12500 | **32006** |
| | 62 | 17,25 | 50,7 | 44 | 4,80 | 9500 | 11500 | **30206** |
| | 62 | 21,25 | 62,2 | 57,5 | 6,30 | 9000 | 11000 | **32206** |
| | 62 | 25 | 79,8 | 77 | 8,40 | 8580 | 11000 | **33206** |
| | 72 | 20,75 | 69,5 | 56 | 6,40 | 8050 | 10100 | **30306** |
| | 72 | 20,75 | 58,9 | 50 | 5,70 | 7550 | 9550 | **31306** |
| | 72 | 28,75 | 95 | 86 | 9,76 | 7500 | 10000 | **32306** |

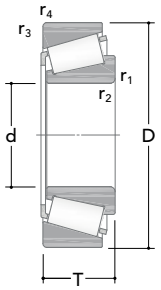


DB

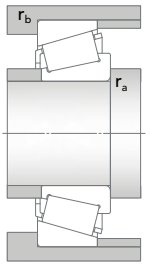


DF

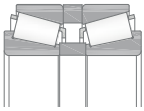
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 15 | 1 | 1 | 1 | 1 | 0,28 | 0,094 | 30302 |
| 17 | 1 | 1 | 1 | 1 | 0,35 | 0,079 | 30203 |
| | 1 | 1 | 1 | 1 | 0,28 | 0,13 | 30303 |
| | 1 | 1 | 1 | 1 | 0,28 | 0,17 | 32303 |
| 20 | 0,6 | 0,6 | 0,6 | 0,6 | 0,37 | 0,098 | 32004 |
| | 1 | 1 | 1 | 1 | 0,35 | 0,12 | 30204 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 0,17 | 30304 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 0,23 | 32304 |
| 22 | 0,6 | 0,6 | 0,6 | 0,6 | 0,4 | 0,1 | 320/22 |
| 25 | 0,6 | 0,6 | 0,6 | 0,6 | 0,43 | 0,11 | 32005 |
| | 1 | 1 | 1 | 1 | 0,37 | 0,15 | 30205 |
| | 1 | 1 | 1 | 1 | 0,57 | 0,19 | 32205 |
| | 1 | 1 | 1 | 1 | 0,35 | 0,22 | 33205 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 0,26 | 30305 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,83 | 0,27 | 31305 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 0,36 | 32305 |
| 28 | 1 | 1 | 1 | 1 | 0,43 | 0,14 | 320/28 |
| | 1 | 1 | 1 | 1 | 0,37 | 0,2 | 302/28 |
| | 1 | 1 | 1 | 1 | 0,57 | 0,25 | 322/28 |
| 30 | 1 | 1 | 1 | 1 | 0,43 | 0,17 | 32006 |
| | 1 | 1 | 1 | 1 | 0,37 | 0,23 | 30206 |
| | 1 | 1 | 1 | 1 | 0,37 | 0,29 | 32206 |
| | 1 | 1 | 1 | 1 | 0,35 | 0,35 | 33206 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,31 | 0,38 | 30306 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,83 | 0,39 | 31306 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,31 | 0,55 | 32306 |

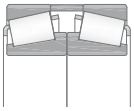



TS

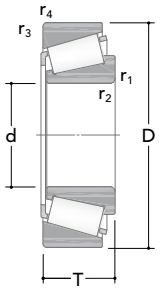



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **32** | 53 | 14,5 | 33,2 | 36 | 3,60 | 10000 | 12000 | **26749/710** |
| | 58 | 17 | 45,1 | 47 | 4,70 | 9000 | 11000 | **320/32** |
| **35** | 62 | 18 | 52,8 | 54 | 5,87 | 8500 | 10000 | **32007** |
| | 72 | 18,25 | 63,6 | 57 | 6,00 | 8000 | 9510 | **30207** |
| | 72 | 24,25 | 82,4 | 78 | 8,60 | 8000 | 9500 | **32207** |
| | 72 | 28 | 104,1 | 106 | 11,80 | 7500 | 9500 | **33207** |
| | 80 | 22,75 | 88,9 | 74 | 8,30 | 7500 | 9050 | **30307** |
| | 80 | 22,75 | 75,4 | 67 | 7,80 | 6500 | 8570 | **31307** |
| | 80 | 32,75 | 117,1 | 114 | 11,30 | 6700 | 9000 | **32307** |
| **37** | 80 | 32,75 | 94,4 | 114 | 12,90 | 6000 | 8200 | **32307/37** |
| **38** | 63 | 17 | 45,7 | 53 | 5,30 | 8500 | 10000 | **69349/310** |
| | 68 | 19 | 53,4 | 71 | 7,67 | 6800 | 8800 | **32008/38** |
| **40** | 68 | 19 | 65,2 | 72 | 7,55 | 7550 | 9550 | **32008** |
| | 75 | 26 | 98,8 | 104 | 11,50 | 7000 | 9000 | **33108** |
| | 80 | 19,75 | 75,9 | 69 | 7,76 | 7000 | 8500 | **30208** |
| | 80 | 24,75 | 91,8 | 86,7 | 9,90 | 7000 | 8500 | **32208** |
| | 80 | 32 | 128 | 133 | 15,00 | 6550 | 8500 | **33208** |
| | 85 | 33 | 150 | 150 | 17,30 | 6700 | 8000 | **T2EE 040** |
| | 90 | 25,25 | 106 | 97 | 10,70 | 6400 | 8200 | **30308** |
| | 90 | 25,25 | 91,5 | 81,7 | 9,50 | 5800 | 7700 | **31308** |
| | 90 | 35,25 | 143 | 142 | 16,00 | 6000 | 8000 | **32308** |
| **45** | 75 | 20 | 71,7 | 80 | 8,80 | 7000 | 8500 | **32009** |
| | 80 | 26 | 104,7 | 115 | 12,80 | 6700 | 8000 | **33109** |
| | 85 | 20,75 | 82,5 | 76,57 | 8,71 | 6300 | 8000 | **30209** |
| | 85 | 24,75 | 98,9 | 99 | 11,00 | 6300 | 8000 | **32209** |
| | 85 | 32 | 132 | 143 | 16,30 | 6000 | 7500 | **33209** |
| | 95 | 29 | 110,8 | 112 | 12,80 | 5300 | 7020 | **T7FC 045** |
| | 95 | 36 | 182 | 186 | 20,60 | 6000 | 7000 | **T2ED 045** |

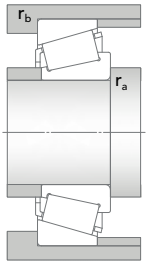

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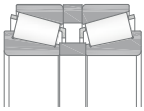
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 32 | 3,6 | 1,3 | 3 | 1,3 | 0,33 | 0,11 | 26749/710 |
| | 1 | 1 | 1 | 1 | 0,46 | 0,19 | 320/32 |
| 35 | 1 | 1 | 1 | 1 | 0,44 | 0,23 | 32007 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,33 | 30207 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,44 | 32207 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 0,53 | 33207 |
| | 2 | 1,5 | 2 | 1,5 | 0,31 | 0,51 | 30307 |
| | 2 | 1,5 | 2 | 1,5 | 0,83 | 0,52 | 31307 |
| | 2 | 1,5 | 2 | 1,5 | 0,31 | 0,8 | 32307 |
| 37 | 2 | 1,5 | 2 | 1,5 | 0,54 | 0,77 | 32307/37 |
| 38 | 1,3 | 1,3 | 1,3 | 1,3 | 0,43 | 0,21 | 69349/310 |
| | 1 | 1 | 1 | 1 | 0,37 | 0,3 | 32008/38 |
| 40 | 1 | 1 | 1 | 1 | 0,37 | 0,28 | 32008 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 0,5 | 33108 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,42 | 30208 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,53 | 32208 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 0,73 | 33208 |
| | 1 | 2 | 1 | 2 | 0,35 | 0,9 | T2EE 040 |
| | 2 | 1,5 | 2 | 1,5 | 0,35 | 0,73 | 30308 |
| | 2 | 1,5 | 2 | 1,5 | 0,83 | 0,72 | 31308 |
| | 2 | 1,5 | 2 | 1,5 | 0,35 | 1,05 | 32308 |
| 45 | 1 | 1 | 1 | 1 | 0,4 | 0,34 | 32009 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,55 | 33109 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,47 | 30209 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,58 | 32209 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,79 | 33209 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,88 | 0,93 | T7FC 045 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,33 | 1,2 | T2ED 045 |

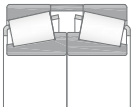



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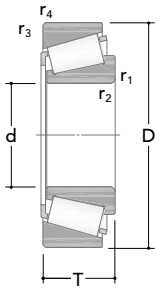



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **45** | 100 | 27,25 | 132 | 122 | 14,20 | 5600 | 7000 | **30309** |
| (cont.) | 100 | 27,25 | 113,5 | 103 | 12,40 | 5200 | 6800 | **31309** |
| | 100 | 38,25 | 173 | 172 | 20,20 | 5350 | 7000 | **32309** |
| **46** | 75 | 18 | 50 | 71 | 7,65 | 6100 | 8200 | **503349/310** |
| **50** | 80 | 20 | 75,5 | 89 | 9,54 | 6300 | 8000 | **32010** |
| | 80 | 24 | 85,4 | 102 | 11,50 | 6300 | 8000 | **33010** |
| | 82 | 21,5 | 89,9 | 100 | 11,00 | 6300 | 8000 | **104948/910** |
| | 85 | 26 | 106,4 | 122 | 13,40 | 6000 | 7500 | **33110** |
| | 90 | 21,75 | 93,1 | 91,5 | 10,50 | 6000 | 7500 | **30210** |
| | 90 | 24,75 | 101 | 100 | 11,60 | 6000 | 7500 | **32210** |
| | 90 | 28 | 132 | 140 | 16,00 | 6000 | 7500 | **205149/110** |
| | 90 | 32 | 142 | 162 | 18,10 | 5300 | 7000 | **33210** |
| | 100 | 36 | 189 | 200 | 22,40 | 5600 | 6700 | **T2ED 050** |
| | 105 | 32 | 134 | 138 | 16,00 | 4830 | 6400 | **T7FC 050** |
| | 110 | 29,25 | 154 | 140 | 16,60 | 5300 | 6300 | **30310** |
| | 110 | 29,25 | 131 | 120 | 14,40 | 4500 | 6000 | **31310** |
| | 110 | 42,25 | 211 | 212 | 24,00 | 4800 | 6300 | **32310** |
| **55** | 90 | 23 | 99,6 | 117 | 12,80 | 5600 | 7000 | **32011** |
| | 90 | 27 | 112 | 137 | 15,40 | 5600 | 7000 | **33011** |
| | 95 | 30 | 136 | 156 | 17,60 | 5600 | 6700 | **33111** |
| | 100 | 22,75 | 111 | 106 | 12,00 | 5700 | 6700 | **30211** |
| | 100 | 26,75 | 132 | 130 | 15,00 | 5300 | 6700 | **32211** |
| | 100 | 35 | 170 | 193 | 21,30 | 4800 | 6300 | **33211** |
| | 110 | 39 | 221 | 233 | 26,00 | 5000 | 6000 | **T2ED 055** |
| | 115 | 34 | 155 | 163 | 19,30 | 4300 | 5600 | **T7FC 055** |
| | 120 | 31,5 | 176 | 163 | 19,30 | 4800 | 5600 | **30311** |
| | 120 | 31,5 | 149 | 137 | 16,60 | 4300 | 5600 | **31311** |
| | 120 | 45,5 | 245 | 260 | 27,40 | 4300 | 5600 | **32311** |
| **60** | 95 | 23 | 101,9 | 123 | 13,30 | 5300 | 6700 | **32012** |

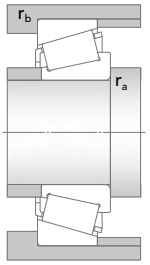

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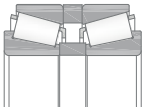
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 45 | 2 | 1,5 | 2 | 1,5 | 0,35 | 0,97 | 30309 |
| (cont.) | 2 | 1,5 | 2 | 1,5 | 0,83 | 0,95 | 31309 |
| | 2 | 1,5 | 2 | 1,5 | 0,35 | 1,4 | 32309 |
| 46 | 2,3 | 1,6 | 2,3 | 1,5 | 0,4 | 0,3 | 503349/310 |
| 50 | 1 | 1 | 1 | 1 | 0,43 | 0,38 | 32010 |
| | 1 | 1 | 1 | 1 | 0,31 | 0,45 | 33010 |
| | 3,6 | 1,2 | 3,4 | 1,2 | 0,3 | 0,43 | 104948/910 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,58 | 33110 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,43 | 0,54 | 30210 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,43 | 0,62 | 32210 |
| | 3 | 2,5 | 2,5 | 2,5 | 0,33 | 0,75 | 205149/110 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,86 | 33210 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,35 | 1,3 | T2ED 050 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 1,25 | T7FC 050 |
| | 2,5 | 2 | 2,5 | 2 | 0,35 | 1,25 | 30310 |
| | 2,5 | 2 | 2,5 | 2 | 0,83 | 1,2 | 31310 |
| | 2,5 | 2 | 2,5 | 2 | 0,35 | 1,95 | 32310 |
| 55 | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,56 | 32011 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,31 | 0,66 | 33011 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 0,85 | 33111 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 0,7 | 30211 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 0,84 | 32211 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,15 | 33211 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,35 | 1,7 | T2ED 055 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 1,6 | T7FC 055 |
| | 2,5 | 2 | 2,5 | 2 | 0,35 | 1,55 | 30311 |
| | 2,5 | 2 | 2,5 | 2 | 0,83 | 1,55 | 31311 |
| | 2,5 | 2 | 2,5 | 2 | 0,35 | 2,5 | 32311 |
| 60 | 1,5 | 1,5 | 1,5 | 1,5 | 0,43 | 0,59 | 32012 |

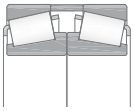



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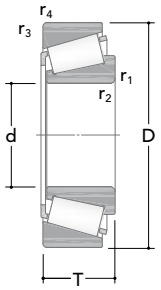



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| 60 | 95 | 27 | 113 | 143 | 16,00 | 5300 | 6700 | 33012 |
| (cont.) | 100 | 30 | 145 | 170 | 19,80 | 5300 | 6300 | 33112 |
| | 110 | 23,75 | 120 | 114 | 13,30 | 5000 | 6000 | 30212 |
| | 110 | 29,75 | 156 | 161 | 18,50 | 5000 | 6000 | 32212 |
| | 110 | 38 | 209 | 239 | 26,20 | 4500 | 6000 | 33212 |
| | 115 | 40 | 240 | 260 | 30,00 | 4800 | 5600 | T2EE 060 |
| | 125 | 37 | 190 | 204 | 24,70 | 4000 | 5300 | T7FC 060 |
| | 130 | 33,5 | 208 | 197 | 23,50 | 4300 | 5330 | 30312 |
| | 130 | 33,5 | 177 | 167 | 20,30 | 3800 | 5300 | 31312 |
| | 130 | 48,5 | 282 | 301 | 33,00 | 4000 | 5300 | 32312 |
| 65 | 100 | 23 | 103,4 | 127 | 14,00 | 5000 | 6000 | 32013 |
| | 100 | 27 | 120 | 153 | 17,50 | 5000 | 6300 | 33013 |
| | 110 | 28 | 152 | 183 | 21,20 | 4800 | 5600 | 511946/910 |
| | 110 | 31 | 172 | 194 | 22,30 | 4800 | 6000 | T2DD 065 |
| | 110 | 34 | 177 | 208 | 24,00 | 4800 | 5600 | 33113 |
| | 120 | 24,75 | 142 | 134 | 16,50 | 4550 | 5600 | 30213 |
| | 120 | 32,75 | 187 | 193 | 23,00 | 4500 | 5600 | 32213 |
| | 120 | 41 | 239 | 274 | 30,10 | 4000 | 5300 | 33213 |
| | 130 | 37 | 195 | 216 | 25,70 | 3800 | 5040 | T7FC 065 |
| | 140 | 36 | 243 | 228 | 27,50 | 4000 | 4860 | 30313 |
| | 140 | 36 | 204 | 194 | 23,50 | 3600 | 4820 | 31313 |
| | 140 | 51 | 323 | 337 | 40,00 | 3600 | 4820 | 32313 |
| 70 | 110 | 25 | 125 | 153 | 17,50 | 4500 | 5600 | 32014 |
| | 110 | 31 | 159 | 199 | 22,50 | 4800 | 5600 | 33014 |
| | 120 | 37 | 213 | 253 | 28,20 | 4300 | 5300 | 33114 |
| | 125 | 26,25 | 157 | 156 | 18,00 | 4300 | 5300 | 30214 |
| | 125 | 33,25 | 195 | 208 | 24,70 | 4300 | 5300 | 32214 |
| | 125 | 41 | 250 | 286 | 33,00 | 3850 | 5100 | 33214 |
| | 130 | 43 | 289 | 325 | 38,00 | 4000 | 5000 | T2ED 070 |
| | 140 | 39 | 219 | 240 | 27,70 | 3400 | 4500 | T7FC 070 |
| | 150 | 38 | 229 | 220 | 27,00 | 3450 | 4600 | 31314 |

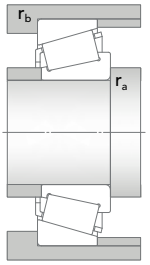

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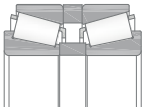
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 60 | 1,5 | 1,5 | 1,5 | 1,5 | 0,33 | 0,7 | 33012 |
| (cont.) | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 0,92 | 33112 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 0,88 | 30212 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,15 | 32212 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,55 | 33212 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,33 | 1,85 | T2EE 060 |
| | 3 | 3 | 2,5 | 2,5 | 0,83 | 2,05 | T7FC 060 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 1,95 | 30312 |
| | 3 | 2,5 | 3 | 2,5 | 0,83 | 1,9 | 31312 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 3,1 | 32312 |
| 65 | 1,5 | 1,5 | 1,5 | 1,5 | 0,46 | 0,63 | 32013 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 0,75 | 33013 |
| | 3 | 2,5 | 2,8 | 2,5 | 0,4 | 1,05 | 511946/910 |
| | 2 | 2 | 2 | 2 | 0,33 | 1,15 | T2DD 065 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 1,3 | 33113 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,1 | 30213 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,5 | 32213 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 2 | 33213 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 2,2 | T7FC 065 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 2,45 | 30313 |
| | 3 | 2,5 | 3 | 2,5 | 0,83 | 2,35 | 31313 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 3,75 | 32313 |
| 70 | 1,5 | 1,5 | 1,5 | 1,5 | 0,43 | 0,85 | 32014 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,28 | 1,05 | 33014 |
| | 2 | 1,5 | 2 | 1,5 | 0,37 | 1,7 | 33114 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,25 | 30214 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,6 | 32214 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 2,1 | 33214 |
| | 8 | 2,5 | 7 | 2,5 | 0,33 | 2,45 | T2ED 070 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 2,65 | T7FC 070 |
| | 3 | 2,5 | 3 | 2,5 | 0,83 | 2,9 | 31314 |

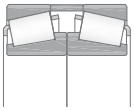



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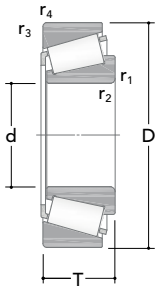



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **70** | 150 | 38 | 271 | 260 | 31,00 | 3800 | 4500 | **30314** |
| (cont.) | 150 | 54 | 363 | 396 | 43,00 | 3400 | 4500 | **32314** |
| **75** | 105 | 20 | 87,5 | 117 | 13,10 | 4800 | 5600 | **32915** |
| | 115 | 25 | 130 | 164 | 18,50 | 4300 | 5300 | **32015** |
| | 115 | 31 | 168 | 228 | 26,00 | 4300 | 5300 | **33015** |
| | 120 | 31 | 172 | 216 | 25,00 | 4300 | 5300 | **714249/210** |
| | 125 | 37 | 216 | 266 | 30,00 | 4000 | 5000 | **33115** |
| | 130 | 27,25 | 171 | 177 | 20,30 | 4000 | 5000 | **30215** |
| | 130 | 33,25 | 197 | 212 | 24,60 | 4000 | 5000 | **32215** |
| | 130 | 41 | 255 | 300 | 34,00 | 3600 | 4800 | **33215** |
| | 145 | 52 | 369 | 450 | 50,00 | 3600 | 4500 | **T3FE 075** |
| | 150 | 42 | 250 | 288 | 31,00 | 3200 | 4300 | **T7FC 075** |
| | 160 | 40 | 301 | 292 | 34,00 | 3400 | 4300 | **30315** |
| | 160 | 40 | 255 | 246 | 29,00 | 3200 | 4300 | **31315** |
| | 160 | 58 | 416 | 472 | 48,00 | 3200 | 4300 | **32315** |
| **80** | 125 | 29 | 168 | 218 | 24,30 | 4000 | 5000 | **32016** |
| | 125 | 36 | 208 | 285 | 32,00 | 4000 | 5000 | **33016** |
| | 130 | 35 | 216 | 278 | 31,00 | 4000 | 4800 | **515649/610** |
| | 130 | 37 | 222 | 281 | 31,00 | 4000 | 4800 | **33116** |
| | 140 | 28,25 | 184 | 183 | 21,30 | 3800 | 4800 | **30216** |
| | 140 | 35,25 | 231 | 245 | 28,90 | 3800 | 4500 | **32216** |
| | 140 | 46 | 308 | 375 | 41,90 | 3400 | 4500 | **33216** |
| | 160 | 45 | 287 | 321 | 36,00 | 3000 | 4000 | **T7FC 080** |
| | 170 | 42,5 | 276 | 267 | 30,30 | 3000 | 4000 | **31316** |
| | 170 | 42,5 | 337 | 324 | 36,00 | 3200 | 4000 | **30316** |
| | 170 | 61,5 | 468 | 500 | 56,00 | 3200 | 4000 | **32316** |
| **85** | 130 | 29 | 172 | 224 | 25,80 | 3800 | 4800 | **32017** |
| | 130 | 36 | 223 | 316 | 35,00 | 3800 | 4800 | **33017** |
| | 140 | 41 | 269 | 344 | 38,00 | 3600 | 4500 | **33117** |
| | 150 | 30,5 | 216 | 220 | 25,50 | 3600 | 4300 | **30217** |

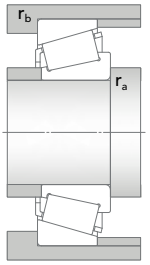

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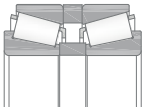
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 70 | 3 | 2,5 | 3 | 2,5 | 0,35 | 2,95 | 30314 |
| (cont.) | 3 | 2,5 | 3 | 2,5 | 0,35 | 4,55 | 32314 |
| 75 | 1 | 1 | 1 | 1 | 0,33 | 0,48 | 32915 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,46 | 0,91 | 32015 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 1,15 | 33015 |
| | 2,5 | 2,5 | 2,5 | 2 | 0,44 | 1,3 | 714249/210 |
| | 2 | 1,5 | 2 | 1,5 | 0,4 | 1,8 | 33115 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,4 | 30215 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,65 | 32215 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 2,2 | 33215 |
| | 11 | 3 | 11 | 3 | 0,43 | 3,9 | T3FE 075 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 3,25 | T7FC 075 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 3,5 | 30315 |
| | 3 | 2,5 | 3 | 2,5 | 0,83 | 3,5 | 31315 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 5,55 | 32315 |
| 80 | 1,5 | 1,5 | 1,5 | 1,5 | 0,43 | 1,3 | 32016 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,28 | 1,65 | 33016 |
| | 3 | 2,5 | 2,8 | 2,5 | 0,4 | 1,75 | 515649/610 |
| | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,85 | 33116 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 1,6 | 30216 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 2,05 | 32216 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 2,9 | 33216 |
| | 3 | 3 | 2,5 | 2,5 | 0,88 | 4 | T7FC 080 |
| | 3 | 2,5 | 3 | 2,5 | 0,83 | 4,05 | 31316 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 4,15 | 30316 |
| | 3 | 2,5 | 3 | 2,5 | 0,35 | 6,2 | 32316 |
| 85 | 1,5 | 1,5 | 1,5 | 1,5 | 0,44 | 1,35 | 32017 |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,3 | 1,75 | 33017 |
| | 2,5 | 2 | 2,5 | 2 | 0,4 | 2,45 | 33117 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 2,05 | 30217 |



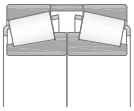

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **85** | 150 | 38,5 | 263 | 287 | 33,30 | 3600 | 4300 | **32217** |
| (cont.) | 150 | 49 | 356 | 430 | 48,00 | 3200 | 4300 | **33217** |
| | 180 | 44,5 | 372 | 368 | 40,20 | 3000 | 3800 | **30317** |
| | 180 | 44,5 | 297 | 287 | 32,00 | 2800 | 3800 | **31317** |
| | 180 | 63,5 | 455 | 552 | 58,00 | 3000 | 3800 | **32317** |
| **90** | 140 | 32 | 208 | 277 | 31,00 | 3600 | 4300 | **32018** |
| | 140 | 39 | 266 | 355 | 40,00 | 3600 | 4500 | **33018** |
| | 150 | 45 | 310 | 393 | 43,00 | 3400 | 4300 | **33118** |
| | 160 | 32,5 | 240 | 246 | 28,40 | 3400 | 4000 | **30218** |
| | 160 | 42,5 | 309 | 344 | 38,00 | 3400 | 4000 | **32218** |
| | 190 | 46,5 | 353 | 400 | 44,00 | 2600 | 3600 | **30318** |
| | 190 | 46,5 | 283 | 315 | 35,60 | 2400 | 3400 | **31318** |
| | 190 | 67,5 | 491 | 618 | 64,70 | 2600 | 3600 | **32318** |
| **95** | 145 | 32 | 206 | 275 | 30,70 | 3400 | 4300 | **32019** |
| | 145 | 39 | 275 | 375 | 40,60 | 3400 | 4300 | **33019** |
| | 170 | 34,5 | 266 | 276 | 31,40 | 3200 | 3800 | **30219** |
| | 170 | 45,5 | 348 | 392 | 43,00 | 3200 | 3800 | **32219** |
| | 180 | 49 | 274 | 398 | 44,00 | 2800 | 3600 | **T7FC 095** |
| | 200 | 49,5 | 355 | 395 | 42,00 | 2600 | 3400 | **30319** |
| | 200 | 49,5 | 314 | 357 | 39,00 | 2400 | 3400 | **31319** |
| | 200 | 71,5 | 535 | 675 | 71,00 | 2400 | 3400 | **32319** |
| **100** | 140 | 25 | 147 | 205 | 22,60 | 3400 | 4300 | **32920** |
| | 145 | 24 | 154 | 191 | 20,70 | 3400 | 4300 | **T4CB 100** |
| | 150 | 32 | 210 | 281 | 31,00 | 3200 | 4000 | **32020** |
| | 150 | 39 | 278 | 390 | 41,80 | 3400 | 4000 | **33020** |
| | 155 | 32 | 173 | 284 | 31,00 | 2680 | - | **332118** |
| | 157 | 42 | 248 | 404 | 42,10 | 2900 | 3700 | **220149/110** |
| | 157 | 42 | 246 | 404 | 43,00 | 2800 | - | **328115** |
| | 160 | 41 | 249 | 388 | 41,70 | 2700 | 3700 | **720249/210** |
| | 165 | 47 | 386 | 480 | 53,00 | 3200 | 3800 | **T2EE 100** |

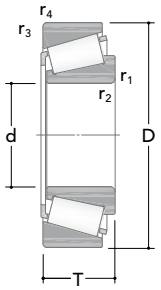


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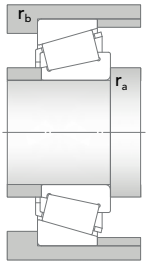


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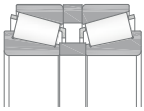
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 85 | 2,5 | 2 | 2,5 | 2 | 0,43 | 2,6 | 32217 |
| (cont.) | 2,5 | 2 | 2,5 | 2 | 0,43 | 3,55 | 33217 |
| | 4 | 3 | 4 | 3 | 0,35 | 4,85 | 30317 |
| | 4 | 3 | 4 | 3 | 0,83 | 4,6 | 31317 |
| | 4 | 3 | 4 | 3 | 0,35 | 7,6 | 32317 |
| 90 | 2 | 1,5 | 2 | 1,5 | 0,43 | 1,75 | 32018 |
| | 2 | 1,5 | 2 | 1,5 | 0,27 | 2,2 | 33018 |
| | 2,5 | 2 | 2,5 | 2 | 0,4 | 3,1 | 33118 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 2,5 | 30218 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 3,35 | 32218 |
| | 4 | 3 | 4 | 3 | 0,35 | 5,65 | 30318 |
| | 4 | 3 | 4 | 3 | 0,83 | 5,4 | 31318 |
| | 4 | 3 | 4 | 3 | 0,35 | 8,4 | 32318 |
| 95 | 2 | 1,5 | 2 | 1,5 | 0,44 | 1,85 | 32019 |
| | 2 | 1,5 | 2 | 1,5 | 0,28 | 2,3 | 33019 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 3 | 30219 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 4,1 | 32219 |
| | 4 | 4 | 3 | 3 | 0,88 | 5,25 | T7FC 095 |
| | 4 | 3 | 4 | 3 | 0,35 | 6,45 | 30319 |
| | 4 | 3 | 4 | 3 | 0,83 | 6,3 | 31319 |
| | 4 | 3 | 4 | 3 | 0,35 | 9,8 | 32319 |
| 100 | 1,5 | 1,5 | 1,5 | 1,5 | 0,33 | 1,15 | 32920 |
| | 3 | 3 | 2,5 | 2,5 | 0,48 | 1,2 | T4CB 100 |
| | 2 | 1,5 | 2 | 1,5 | 0,46 | 1,9 | 32020 |
| | 2 | 1,5 | 2 | 1,5 | 0,28 | 2,4 | 33020 |
| | 2,5 | 2,5 | 2,5 | 2,5 | 0,46 | 2,2 | 332118 |
| | 8 | 3,5 | 7 | 3,3 | 0,33 | 2,9 | 220149/110 |
| | 3 | 3,5 | 3 | 3 | 0,33 | 2,95 | 328115 |
| | 3 | 2,5 | 2,8 | 2,5 | 0,48 | 3,05 | 720249/210 |
| | 3 | 3 | 2,5 | 2,5 | 0,31 | 3,9 | T2EE 100 |

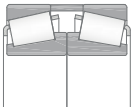



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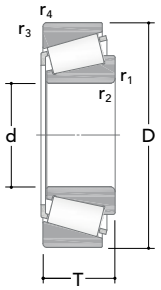



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **100** | 180 | 37 | 304 | 320 | 36,00 | 3000 | 3680 | **30220** |
| (cont.) | 180 | 49 | 391 | 446 | 47,00 | 3000 | 3600 | **32220** |
| | 180 | 63 | 536 | 655 | 71,00 | 2600 | 3600 | **33220** |
| | 215 | 45 | 258 | 319 | 35,10 | 1860 | - | **328180** |
| | 215 | 51,5 | 435 | 490 | 54,00 | 2400 | 3200 | **30320** |
| | 215 | 56,5 | 401 | 471 | 50,00 | 2200 | 3000 | **31320** |
| | 215 | 77,5 | 617 | 790 | 82,00 | 2200 | 3200 | **32320** |
| **105** | 160 | 35 | 248 | 338 | 37,20 | 3200 | 3800 | **32021** |
| | 160 | 43 | 304 | 435 | 45,00 | 3200 | 3800 | **33021** |
| | 190 | 39 | 334 | 356 | 40,00 | 2800 | 3400 | **30221** |
| | 190 | 53 | 443 | 510 | 55,00 | 2800 | 3400 | **32221** |
| | 225 | 53,5 | 466 | 538 | 57,00 | 2200 | 3000 | **30321** |
| | 225 | 81,5 | 650 | 817 | 86,00 | 2000 | 3000 | **32321** |
| **106** | 160 | 35 | 204 | 337 | 37,30 | 2610 | - | **331974** |
| **110** | 150 | 25 | 154 | 224 | 24,00 | 3200 | 4000 | **32922** |
| | 160 | 27 | 154 | 235 | 27,10 | 2540 | - | **T4CB 110** |
| | 170 | 38 | 289 | 390 | 40,00 | 3000 | 3600 | **32022** |
| | 170 | 47 | 348 | 500 | 53,00 | 3000 | 3600 | **33022** |
| | 180 | 47 | 323 | 513 | 57,00 | 2400 | - | **522649/10** |
| | 180 | 56 | 455 | 634 | 65,10 | 2800 | 3400 | **33122** |
| | 200 | 41 | 380 | 411 | 42,00 | 2600 | 3200 | **30222** |
| | 200 | 56 | 493 | 578 | 60,00 | 2600 | 3200 | **32222** |
| | 240 | 48 | 297 | 360 | 41,10 | 1700 | - | **328164** |
| | 240 | 54,5 | 510 | 588 | 63,00 | 2200 | 2800 | **30322** |
| | 240 | 63 | 493 | 585 | 62,00 | 1900 | 2800 | **31322** |
| | 240 | 84,5 | 675 | 839 | 85,60 | 1900 | 2800 | **32322** |
| **120** | 165 | 29 | 204 | 309 | 32,00 | 3000 | 3600 | **32924** |
| | 170 | 27 | 196 | 255 | 26,90 | 2800 | 3600 | **T4CB 120** |
| | 170 | 27 | 136 | 225 | 25,00 | 2200 | - | **328031** |

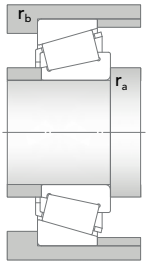

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DF

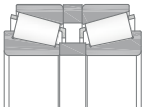
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 100 | 3 | 2,5 | 3 | 2,5 | 0,43 | 3,6 | 30220 |
| (cont.) | 3 | 2,5 | 3 | 2,5 | 0,43 | 4,95 | 32220 |
| | 3 | 2,5 | 3 | 2,5 | 0,4 | 6,7 | 33220 |
| | 3 | 3 | 2,5 | 2,5 | 1,05 | 6,5 | 328180 |
| | 4 | 3 | 4 | 3 | 0,35 | 7,95 | 30320 |
| | 4 | 3 | 4 | 3 | 0,83 | 8,6 | 31320 |
| | 4 | 3 | 4 | 3 | 0,35 | 12,5 | 32320 |
| 105 | 2,5 | 2 | 2,5 | 2 | 0,44 | 2,45 | 32021 |
| | 2,5 | 2 | 2,5 | 2 | 0,28 | 3 | 33021 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 4,3 | 30221 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 6,05 | 32221 |
| | 4 | 3 | 4 | 3 | 0,35 | 9,15 | 30321 |
| | 4 | 3 | 4 | 3 | 0,35 | 14 | 32321 |
| 106 | 6,4 | 2 | 6 | 2 | 0,44 | 2,3 | 331974 |
| 110 | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 1,25 | 32922 |
| | 3 | 3 | 2,5 | 2,5 | 0,44 | 1,6 | T4CB 110 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 3,05 | 32022 |
| | 2,5 | 2 | 2,5 | 2 | 0,28 | 3,85 | 33022 |
| | 3 | 2,5 | 2,5 | 2 | 0,40 | 4,65 | 522649/10 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 5,5 | 33122 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 5,05 | 30222 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 7,1 | 32222 |
| | 3 | 3 | 2,5 | 2,5 | 1,05 | 8,45 | 328164 |
| | 4 | 3 | 4 | 3 | 0,35 | 11 | 30322 |
| | 4 | 3 | 4 | 3 | 0,83 | 12 | 31322 |
| | 4 | 3 | 4 | 3 | 0,35 | 16,5 | 32322 |
| 120 | 1,5 | 1,5 | 1,5 | 1,5 | 0,35 | 1,8 | 32924 |
| | 3 | 3 | 2,5 | 2,5 | 0,48 | 1,75 | T4CB 120 |
| | 5 | 2,5 | 4 | 2,5 | 0,79 | 1,8 | 328031 |

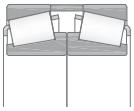



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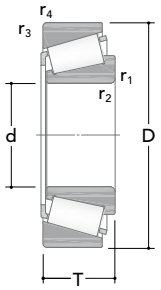



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **120** | 180 | 38 | 302 | 416 | 42,40 | 2800 | 3400 | **32024** |
| (cont.) | 180 | 48 | 356 | 541 | 56,00 | 2800 | 3400 | **33024** |
| | 215 | 43,5 | 417 | 465 | 49,00 | 2400 | 3000 | **30224** |
| | 215 | 61,5 | 578 | 695 | 73,00 | 2400 | 3000 | **32224** |
| | 260 | 59,5 | 602 | 712 | 73,60 | 2000 | 2600 | **30324** |
| | 260 | 68 | 578 | 695 | 73,00 | 1700 | 2400 | **31324** |
| | 260 | 90,5 | 855 | 1120 | 110,00 | 1800 | 2600 | **32324** |
| **130** | 180 | 32 | 245 | 370 | 37,00 | 2600 | 3200 | **32926** |
| | 185 | 29 | 195 | 314 | 32,60 | 2230 | - | **T4CB 130** |
| | 200 | 45 | 388 | 540 | 55,00 | 2400 | 3000 | **32026** |
| | 220 | 64 | 492 | 758 | 75,70 | 1950 | - | **442768** |
| | 230 | 43,75 | 454 | 493 | 51,00 | 2200 | 2800 | **30226** |
| | 230 | 64 | 514 | 739 | 75,00 | 1860 | - | **443742** |
| | 230 | 67,75 | 590 | 836 | 84,00 | 2000 | 2800 | **32226** |
| | 280 | 63,75 | 682 | 804 | 81,10 | 1800 | 2400 | **30326** |
| | 280 | 72 | 647 | 782 | 80,00 | 1600 | 2400 | **31326** |
| | 280 | 98,75 | 1022 | 1353 | 131,00 | 1600 | 2400 | **32326** |
| **140** | 190 | 32 | 253 | 392 | 40,00 | 2600 | 3000 | **32928** |
| | 195 | 29 | 245 | 327 | 33,30 | 2400 | 3000 | **T4CB 140** |
| | 210 | 45 | 404 | 593 | 57,70 | 2400 | 2800 | **32028** |
| | 250 | 45,75 | 454 | 578 | 57,70 | 1900 | 2600 | **30228** |
| | 250 | 71,75 | 691 | 1000 | 101,00 | 1900 | 2600 | **32228** |
| | 300 | 63,5 | 652 | 1011 | 94,00 | 1450 | - | **440740** |
| | 300 | 67,75 | 797 | 950 | 93,00 | 1700 | 2200 | **30328** |
| | 300 | 77 | 745 | 900 | 90,00 | 1500 | 2200 | **31328** |
| **150** | 210 | 32 | 287 | 390 | 40,00 | 2200 | 2800 | **T4DB 150** |
| | 225 | 48 | 458 | 657 | 65,30 | 2200 | 2600 | **32030** |
| | 225 | 59 | 487 | 865 | 85,00 | 2200 | 2600 | **33030** |
| | 270 | 49 | 456 | 560 | 57,00 | 1800 | 2400 | **30230** |
| | 270 | 77 | 782 | 1140 | 114,00 | 1700 | 2400 | **32230** |

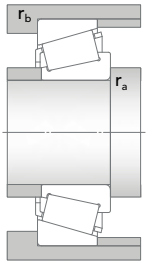

DB


DF

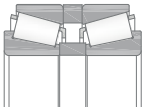
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 120 | 2,5 | 2 | 2,5 | 2 | 0,46 | 3,3 | 32024 |
| (cont.) | 2,5 | 2 | 2,5 | 2 | 0,3 | 4,15 | 33024 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 6,1 | 30224 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 9,05 | 32224 |
| | 4 | 3 | 4 | 3 | 0,35 | 13,5 | 30324 |
| | 4 | 3 | 4 | 3 | 0,83 | 15,5 | 31324 |
| | 4 | 3 | 4 | 3 | 0,35 | 21,5 | 32324 |
| 130 | 2 | 1,5 | 2 | 1,5 | 0,33 | 2,4 | 32926 |
| | 3 | 3 | 2 | 2,5 | 0,48 | 2,25 | T4CB 130 |
| | 2,5 | 2 | 2,5 | 2 | 0,43 | 4,95 | 32026 |
| | 3 | 3 | 2,5 | 2,5 | 0,33 | 9,4 | 442768 |
| | 4 | 3 | 4 | 3 | 0,43 | 6,85 | 30226 |
| | 3 | 2,5 | 2,5 | 2,5 | 0,43 | 10,5 | 443742 |
| | 4 | 3 | 4 | 3 | 0,43 | 11 | 32226 |
| | 5 | 4 | 5 | 4 | 0,35 | 17 | 30326 |
| | 5 | 4 | 5 | 4 | 0,83 | 18,5 | 31326 |
| | 5 | 4 | 3 | 3 | 0,35 | 30,5 | 32326 |
| 140 | 2 | 1,5 | 2 | 1,5 | 0,35 | 2,55 | 32928 |
| | 3 | 3 | 2,5 | 2,5 | 0,5 | 2,4 | T4CB 140 |
| | 2,5 | 2 | 2,5 | 2 | 0,46 | 5,25 | 32028 |
| | 4 | 3 | 4 | 3 | 0,43 | 8,7 | 30228 |
| | 4 | 3 | 4 | 3 | 0,43 | 14 | 32228 |
| | 7 | 3,3 | 6 | 3 | 0,31 | 21,5 | 440740 |
| | 5 | 4 | 3 | 3 | 0,35 | 21 | 30328 |
| | 5 | 4 | 5 | 4 | 0,83 | 22,5 | 31328 |
| 150 | 3 | 3 | 2,5 | 2,5 | 0,46 | 3,1 | T4DB 150 |
| | 3 | 2,5 | 3 | 2,5 | 0,46 | 6,4 | 32030 |
| | 3 | 2,5 | 3 | 2,5 | 0,37 | 8,05 | 33030 |
| | 4 | 3 | 4 | 3 | 0,43 | 10,5 | 30230 |
| | 4 | 3 | 4 | 3 | 0,43 | 18 | 32230 |

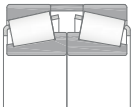



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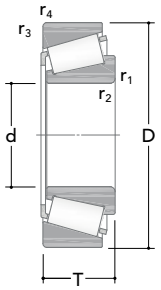



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| 150 | 320 | 72 | 879 | 1066 | 104,00 | 1600 | 2000 | 30330 |
| (cont.) | 320 | 82 | 835 | 1022 | 101,00 | 1400 | 2000 | 31330 |
| | 320 | 114 | 1167 | 1640 | 155,00 | 1290 | - | 32330 |
| 160 | 220 | 32 | 296 | 415 | 41,90 | 2200 | 2600 | T4DB 160 |
| | 240 | 51 | 534 | 780 | 77,30 | 2000 | 2400 | 32032 |
| | 245 | 61 | 650 | 981 | 96,40 | 2000 | 2400 | T4EE 160 |
| | 290 | 52 | 573 | 739 | 73,00 | 1600 | 2200 | 30232 |
| | 290 | 84 | 934 | 1412 | 131,00 | 1600 | 2200 | 32232 |
| | 340 | 75 | 979 | 1197 | 112,00 | 1500 | 2000 | 30332 |
| 165 | 290 | 63500 | 651 | 1004 | 95,00 | 1450 | - | 440771 |
| 170 | 230 | 32 | 311 | 449 | 43,00 | 2000 | 2600 | T4DB 170 |
| | 230 | 38 | 351 | 591 | 54,00 | 2000 | 2400 | 32934 |
| | 240 | 46 | 395 | 757 | 72,80 | 1630 | - | 734449/410 |
| | 260 | 57 | 657 | 918 | 88,00 | 1900 | 2200 | 32034 |
| | 310 | 57 | 659 | 865 | 83,00 | 1500 | 2000 | 30234 |
| | 310 | 91 | 1075 | 1630 | 151,00 | 1500 | 2000 | 32234 |
| | 360 | 80 | 1107 | 1354 | 131,00 | 1400 | 1800 | 30334 |
| 180 | 240 | 32 | 310 | 455 | 44,00 | 2000 | 2400 | T4DB 180 |
| | 250 | 45 | 439 | 735 | 68,00 | 1900 | 2200 | 32936 |
| | 250 | 47 | 370 | 690 | 67,00 | 1560 | - | 736149/110 |
| | 280 | 64 | 793 | 1161 | 110,00 | 1700 | 2200 | 32036 |
| | 320 | 57 | 636 | 818 | 80,00 | 1500 | 2000 | 30236 |
| | 320 | 91 | 1080 | 1641 | 149,00 | 1400 | 1900 | 32236 |
| 190 | 260 | 45 | 447 | 773 | 71,00 | 1800 | 2200 | 32938 |
| | 260 | 46 | 443 | 768 | 72,00 | 1800 | 2200 | 738249/210 |
| | 260 | 46 | 356 | 773 | 71,00 | 1460 | - | 332265 |
| | 280 | 50 | 479 | 826 | 79,00 | 1000 | 1400 | 328166 |
| | 290 | 64 | 808 | 1212 | 111,00 | 1600 | 2000 | 32038 |

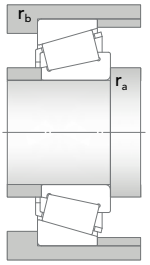

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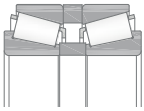
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 150 | 5 | 4 | 3 | 3 | 0,35 | 28,5 | 30330 |
| (cont.) | 5 | 4 | 5 | 4 | 0,83 | 27 | 31330 |
| | 5 | 4 | 3 | 3 | 0,35 | 46 | 32330 |
| 160 | 3 | 3 | 2,5 | 2,5 | 0,48 | 3,25 | T4DB 160 |
| | 3 | 2,5 | 3 | 2,5 | 0,46 | 7,85 | 32032 |
| | 3 | 2 | 3 | 2 | 0,44 | 10,5 | T4EE 160 |
| | 4 | 3 | 4 | 3 | 0,43 | 13 | 30232 |
| | 4 | 3 | 4 | 3 | 0,43 | 23 | 32232 |
| | 5 | 4 | 5 | 4 | 0,35 | 29 | 30332 |
| 165 | 7 | 3,3 | 6,5 | 3 | 0,31 | 17,5 | 440771 |
| 170 | 3 | 3 | 2,5 | 2,5 | 0,46 | 3,45 | T4DB 170 |
| | 2,5 | 2 | 2,5 | 2 | 0,37 | 4,5 | 32934 |
| | 3 | 2,5 | 2,5 | 2,5 | 0,44 | 6,5 | 734449/410 |
| | 3 | 2,5 | 3 | 2,5 | 0,44 | 10,5 | 32034 |
| | 5 | 4 | 5 | 4 | 0,43 | 16,5 | 30234 |
| | 5 | 4 | 5 | 4 | 0,43 | 28,5 | 32234 |
| | 5 | 4 | 3 | 3 | 0,35 | 35 | 30334 |
| 180 | 3 | 3 | 2,5 | 2,5 | 0,48 | 3,6 | T4DB 180 |
| | 2,5 | 2 | 2,5 | 2 | 0,48 | 6,65 | 32936 |
| | 3 | 2,5 | 2,5 | 2,5 | 0,48 | 6,65 | 736149/110 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 14 | 32036 |
| | 5 | 4 | 5 | 4 | 0,46 | 17 | 30236 |
| | 5 | 4 | 5 | 4 | 0,46 | 29,5 | 32236 |
| 190 | 2,5 | 2 | 2,5 | 2 | 0,48 | 7 | 32938 |
| | 3 | 4 | 2,8 | 2,5 | 0,48 | 7 | 738249/210 |
| | 3 | 2,5 | 2,5 | 2 | 0,48 | 7,2 | 332265 |
| | 3 | 4 | 2,5 | 3 | 0,30 | 10,7 | 328166 |
| | 3 | 2,5 | 3 | 2,5 | 0,44 | 15 | 32038 |

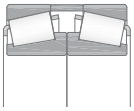



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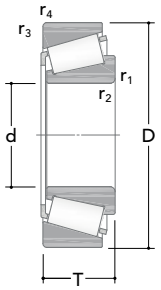



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **190** | 340 | 60 | 767 | 1013 | 94,00 | 1400 | 1800 | **30238** |
| (cont.) | 340 | 97 | 1268 | 1934 | 176,00 | 1300 | 1800 | **32238** |
| **200** | 260 | 28 | 198 | 416 | 39,00 | 1470 | - | **329053** |
| | 270 | 37 | 404 | 609 | 57,00 | 1700 | 2200 | **T4DB 200** |
| | 270 | 45 | 376 | 758 | 72,00 | 1450 | - | **331473** |
| | 280 | 51 | 588 | 954 | 88,00 | 1700 | 2000 | **32940** |
| | 300 | 54,5 | 558 | 1005 | 95,00 | 1360 | - | **330710** |
| | 300 | 65 | 660 | 1265 | 115,00 | 1300 | - | **840449/410** |
| | 310 | 70 | 807 | 1383 | 126,00 | 1400 | 1900 | **32040** |
| | 317,5 | 70 | 731 | 1333 | 119,00 | 1260 | - | **440408** |
| | 360 | 64 | 853 | 1126 | 105,00 | 1300 | 1700 | **30240** |
| | 360 | 104 | 1308 | 2004 | 180,00 | 1300 | 1700 | **32240** |
| **210** | 260 | 30 | 197 | 459 | 43,10 | 1470 | - | **332465** |
| | 300 | 54,5 | 552 | 987 | 96,00 | 1340 | - | **332284** |
| **215** | 340 | 76 | 900 | 1644 | 151,00 | 870 | 1150 | **332110** |
| **220** | 285 | 41 | 490 | 837 | 74,00 | 1600 | 2000 | **T2DC 220** |
| | 300 | 51 | 609 | 1050 | 92,30 | 1500 | 1900 | **32944** |
| | 340 | 76 | 955 | 1660 | 152,00 | 1300 | 1700 | **32044** |
| | 340 | 90,475 | 1053 | 2067 | 184,00 | 1150 | - | **328144** |
| | 400 | 72 | 1060 | 1405 | 127,00 | 1200 | 1600 | **30244** |
| | 400 | 90 | 1078 | 1734 | 158,00 | 890 | - | **332348** |
| | 400 | 114 | 1727 | 2724 | 230,00 | 1100 | 1500 | **32244** |
| **240** | 320 | 42 | 523 | 815 | 73,70 | 1400 | 1700 | **T4EB 240** |
| | 320 | 51 | 624 | 1090 | 97,40 | 1400 | 1700 | **32948** |
| | 320 | 57 | 762 | 1328 | 119,00 | 1400 | 1700 | **T2EE 240** |
| | 360 | 76 | 1000 | 1815 | 155,00 | 1200 | 1600 | **32048** |
| | 440 | 127 | 1997 | 3361 | 270,00 | 1000 | 1300 | **32248** |

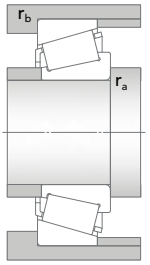

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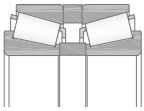
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| 190 | 5 | 4 | 5 | 4 | 0,43 | 20,5 | 30238 |
| (cont.) | 5 | 4 | 5 | 4 | 0,43 | 36 | 32238 |
| 200 | 1 | 1,5 | 1 | 1,5 | 0,30 | 4 | 329053 |
| | 3 | 3 | 2,5 | 2,5 | 0,48 | 5,5 | T4DB 200 |
| | 2,5 | 2 | 2 | 2 | 0,48 | 7 | 331473 |
| | 3 | 2,5 | 3 | 2,5 | 0,4 | 9,5 | 32940 |
| | 4 | 3 | 3 | 2,5 | 0,31 | 12,7 | 330710 |
| | 3,5 | 2,5 | 3 | 2 | 0,52 | 15,5 | 840449/410 |
| | 3 | 2,5 | 2,5 | 2,5 | 0,43 | 19 | 32040 |
| | 3,5 | 3,5 | 3 | 3 | 0,43 | 20,3 | 440408 |
| | 5 | 4 | 5 | 4 | 0,43 | 24,5 | 30240 |
| | 5 | 4 | 5 | 4 | 0,4 | 42,5 | 32240 |
| 210 | 2 | 1,5 | 2 | 1,5 | 0,52 | 3,4 | 332465 |
| | 4 | 3 | 4 | 2,5 | 0,31 | 11,4 | 332284 |
| 215 | 4 | 3 | 3 | 2,5 | 0,43 | 25,5 | 332110 |
| 220 | 4 | 3 | 3 | 2,5 | 0,31 | 6,45 | T2DC 220 |
| | 3 | 2,5 | 3 | 2,5 | 0,43 | 10 | 32944 |
| | 4 | 3 | 4 | 3 | 0,43 | 24,5 | 32044 |
| | 4 | 3 | 3 | 2,5 | 0,35 | 30,3 | 328144 |
| | 5 | 4 | 4 | 3 | 0,43 | 34,5 | 30244 |
| | 5 | 5 | 4 | 4 | 0,75 | 45,5 | 332348 |
| | 5 | 4 | 4 | 3 | 0,43 | 59,5 | 32244 |
| 240 | 3 | 3 | 2,5 | 2,5 | 0,46 | 8,45 | T4EB 240 |
| | 3 | 2,5 | 3 | 2,5 | 0,46 | 11 | 32948 |
| | 3 | 2 | 3 | 2 | 0,35 | 12,5 | T2EE 240 |
| | 4 | 3 | 4 | 3 | 0,46 | 26,5 | 32048 |
| | 5 | 4 | 4 | 3 | 0,43 | 83,5 | 32248 |

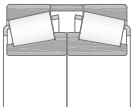



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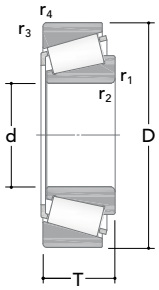



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **242** | 406 | 97 | 1413 | 2507 | 215,00 | 980 | - | **332255** |
| **255** | 560 | 123 | 1819 | 2688 | 225,00 | 700 | - | **328213** |
| **260** | 400 | 87 | 1244 | 2210 | 189,00 | 1100 | 1400 | **32052** |
| | 400 | 98 | 1433 | 2564 | 227,00 | 1020 | - | **329066** |
| | 410 | 95 | 1412 | 2595 | 224,00 | 1010 | - | **332551** |
| | 480 | 137 | 2369 | 3668 | 301,00 | 900 | 1200 | **32252** |
| | 540 | 109 | 2128 | 3063 | 249,00 | 790 | 1120 | **332973** |
| | 540 | 113 | 2291 | 3050 | 254,00 | 820 | 1620 | **30352** |
| **280** | 380 | 63,5 | 964 | 1661 | 145,00 | 1200 | 1400 | **32956** |
| | 420 | 87 | 1295 | 2360 | 200,00 | 1000 | 1300 | **32056** |
| **300** | 420 | 76 | 1128 | 2243 | 186,00 | 950 | 1300 | **32960** |
| | 460 | 100 | 1647 | 3010 | 244,00 | 900 | 1200 | **32060** |
| | 540 | 149 | 2976 | 4812 | 360,00 | 800 | 1100 | **32260** |
| **320** | 440 | 76 | 1159 | 2372 | 192,00 | 900 | 1200 | **32964** |
| | 480 | 100 | 1667 | 3179 | 252,00 | 850 | 1100 | **32064** |
| | 620 | 141 | 2811 | 4584 | 365,00 | 630 | - | **332303** |
| **340** | 460 | 76 | 1172 | 2416 | 195,00 | 850 | 1200 | **32968** |
| **360** | 480 | 76 | 1202 | 2561 | 206,00 | 800 | 1100 | **32972** |
| | 680 | 165 | 3675 | 6237 | 460,00 | 570 | - | **332302** |
| **460** | 860 | 210 | 5596 | 10293 | 689,00 | 450 | 580 | **332304** |
| **560** | 1080 | 265 | 9070 | 15804 | 1012,00 | 250 | - | **334018** |
| **680** | 1000 | 190 | 5677 | 12573 | 808,00 | 320 | 440 | **332787** |

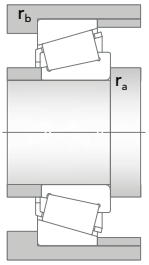

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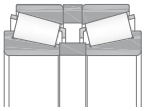
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| **242** | 4 | 4 | 3 | 3 | 0,43 | 49 | **332255** |
| **255** | 6 | 6 | 5 | 5 | 0,88 | 123 | **328213** |
| **260** | 5 | 4 | 5 | 4 | 0,43 | 38 | **32052** |
| | 4 | 1,5 | 3 | - | 0,30 | 42,5 | **329066** |
| | 5 | 5 | 4 | 4 | 0,37 | 45,5 | **332551** |
| | 6 | 5 | 5 | 4 | 0,43 | 105 | **32252** |
| | 6 | 6 | 5 | 5 | 0,35 | 107 | **332973** |
| | 7,5 | 6 | 7,5 | 6 | 0,35 | 110 | **30352** |
| **280** | 3 | 2,5 | 3 | 2,5 | 0,43 | 20 | **32956** |
| | 5 | 4 | 5 | 4 | 0,46 | 40,5 | **32056** |
| **300** | 4 | 3 | 4 | 3 | 0,4 | 31,5 | **32960** |
| | 5 | 4 | 5 | 4 | 0,43 | 58 | **32060** |
| | 6 | 5 | 5 | 4 | 0,43 | 140 | **32260** |
| **320** | 4 | 3 | 4 | 3 | 0,43 | 33,5 | **32964** |
| | 5 | 4 | 5 | 4 | 0,46 | 64 | **32064** |
| | 7,5 | 7,5 | 7 | 7 | 0,60 | 180 | **332303** |
| **340** | 4 | 3 | 4 | 3 | 0,44 | 35 | **32968** |
| **360** | 4 | 3 | 4 | 3 | 0,46 | 37 | **32972** |
| | 7,5 | 7,5 | 6 | 6 | 0,60 | 260 | **332302** |
| **460** | 7,5 | 7,5 | 6 | 6 | 0,57 | 510 | **332304** |
| **560** | 9,5 | 9,5 | 8 | 8 | 0,43 | 1060 | **334018** |
| **680** | 6 | 6 | 5 | 5 | 0,43 | 485 | **332787** |



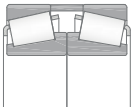

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | |
| [mm] | | | [kN] | | | [rpm] | | |
| **710** | 950 | 113 | 2861 | 6579 | 448,00 | 320 | 470 | **332890** |
| **900** | 1180 | 122 | 3931 | 9157 | 585,00 | 240 | 350 | **328214** |

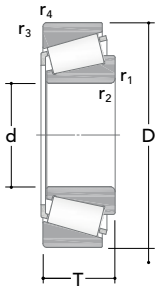


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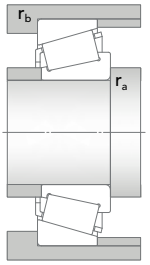


DF

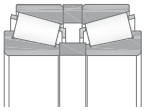
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | |
| [mm] | | | | | | [kg] | |
| **710** | 6 | 6 | 5 | 5 | 0,44 | 200 | **332890** |
| **900** | 6 | 6 | 5 | 5 | 0,40 | 340 | **328214** |

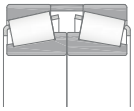



TS

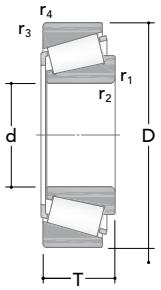



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **14,989** | 34,989 | 10,998 | 16,5 | 13 | 1,31 | 15500 | 18900 | **A 4059/A 4138** |
| **0,5901** | 1,3775 | 0,433 | | | | | | |
| **15,875** | 41,275 | 14,288 | 21,8 | 21 | 2,17 | 17910 | 19500 | **03062/03162** |
| **0,625** | 1,625 | 0,5625 | | | | | | |
| | 42,862 | 14,288 | 21 | 17 | 1,80 | 11500 | 14580 | **11590/11520** |
| | 1,6875 | 0,5625 | | | | | | |
| **17,462** | 39,878 | 13,843 | 25,9 | 21 | 2,09 | 13560 | 16500 | **LM 11749/710** |
| **0,6875** | 1,57 | 0,545 | | | | | | |
| **19,05** | 45,237 | 15,494 | 33,5 | 28 | 2,90 | 11700 | 15200 | **LM 11949/910** |
| **0,75** | 1,781 | 0,61 | | | | | | |
| | 49,225 | 18,034 | 47,2 | 52 | 5,60 | 10700 | 14700 | **09067/09195** |
| | 1,938 | 0,71 | | | | | | |
| | 49,225 | 19,845 | 39,3 | 40 | 4,30 | 10700 | 14700 | **09074/09195** |
| | 1,938 | 0,7813 | | | | | | |
| **21,43** | 45,237 | 15,492 | 27,7 | 31 | 3,20 | 10700 | 14700 | **LM 12748/710** |
| **0,8437** | 1,781 | 0,6099 | | | | | | |
| **21,987** | 45,237 | 15,494 | 33,9 | 31 | 3,20 | 10700 | 14500 | **LM 12749/710** |
| **0,8656** | 1,781 | 0,61 | | | | | | |
| | 45,974 | 15,494 | 33,9 | 31 | 3,20 | 10700 | 14500 | **LM 12749/711** |
| | 1,81 | 0,61 | | | | | | |
| **25,4** | 50,292 | 14,224 | 32,4 | 30 | 3,00 | 10130 | 12600 | **L 44643/610** |
| **1** | 1,98 | 0,56 | | | | | | |
| | 50,8 | 15,011 | 28 | 31 | 3,14 | 13970 | 14000 | **07100/07210** |
| | 2 | 0,591 | | | | | | |
| | 57,15 | 17,462 | 49,2 | 46 | 4,80 | 8800 | 10800 | **15578/15520** |
| | 2,25 | 0,6875 | | | | | | |

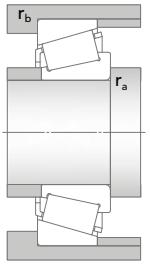

DB


DF

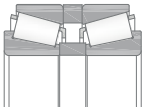
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **14,989**<br>**0,5901** | 0,8 | 1,3 | 0,8 | 1,3 | 0,46 | 0,051 | **A 4059/A 4138** |
| **15,875**<br>**0,625** | 1,3<br>0,05 | 2<br>0,08 | 1,3 | 2 | 0,31 | 0,095 | **03062/03162** |
| | 1,5<br>0,06 | 1,5<br>0,06 | 1,5 | 1,5 | 0,72 | 0,1 | **11590/11520** |
| **17,462**<br>**0,6875** | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,28 | 0,082 | **LM 11749/710** |
| **19,05**<br>**0,75** | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,3 | 0,12 | **LM 11949/910** |
| | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,27 | 0,17 | **09067/09195** |
| | 1,5<br>0,06 | 1,3<br>0,05 | 1,5 | 1,3 | 0,27 | 0,19 | **09074/09195** |
| **21,43**<br>**0,8437** | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,31 | 0,12 | **LM 12748/710** |
| **21,987**<br>**0,8656** | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,31 | 0,12 | **LM 12749/710** |
| | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,31 | 0,12 | **LM 12749/711** |
| **25,4**<br>**1** | 1,3<br>0,05 | 1,3<br>0,05 | 1,3 | 1,3 | 0,37 | 0,13 | **L 44643/610** |
| | 1,5<br>0,06 | 1,5<br>0,06 | 1,5 | 1,5 | 0,4 | 0,13 | **07100/07210** |
| | 1,3<br>0,05 | 1,5<br>0,06 | 1,3 | 1,5 | 0,35 | 0,22 | **15578/15520** |



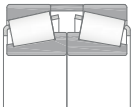

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **25,4** | 57,15 | 19,431 | 49,2 | 45 | 5,00 | 8800 | 10800 | **M 84548/510** |
| **1** | 2,25 | 0,765 | | | | | | |
| (cont.) | 62 | 19,05 | 60,4 | 58 | 6,10 | 8350 | 10200 | **15101/15245** |
| | 2,4409 | 0,75 | | | | | | |
| **26,162** | 61,912 | 19,05 | 60,4 | 58 | 6,10 | 8350 | 10200 | **15103 S/15243** |
| **1,03** | 2,4375 | 0,75 | | | | | | |
| | 62 | 19,05 | 60,4 | 58 | 6,10 | 8350 | 10200 | **15103 S/15245** |
| | 2,4409 | 0,75 | | | | | | |
| **26,988** | 50,292 | 14,224 | 32,4 | 30 | 3,00 | 10130 | 12600 | **L 44649/610** |
| **1,0625** | 1,98 | 0,56 | | | | | | |
| **28,575** | 57,15 | 19,845 | 59 | 55 | 6,00 | 9290 | 10900 | **1985/1922** |
| **1,125** | 2,25 | 0,7813 | | | | | | |
| | 57,15 | 19,845 | 59 | 55 | 6,00 | 9290 | 10900 | **1988/1922** |
| | 2,25 | 0,7813 | | | | | | |
| | 64,292 | 21,433 | 60,4 | 61 | 6,80 | 7700 | 9690 | **M 86647/610** |
| | 2,5312 | 0,8438 | | | | | | |
| | 73,025 | 22,225 | 56,8 | 70 | 7,50 | 6800 | 8670 | **02872/02820** |
| | 2,875 | 0,875 | | | | | | |
| **29** | 50,292 | 14,224 | 31,6 | 33 | 3,35 | 9940 | 11900 | **L 45449/410/Q** |
| **1,1417** | 1,98 | 0,56 | | | | | | |
| **30,162** | 64,292 | 21,433 | 60,4 | 61 | 6,80 | 7700 | 9690 | **M 86649/610** |
| **1,1875** | 2,5312 | 0,8438 | | | | | | |
| | 68,262 | 22,225 | 66,3 | 69 | 7,90 | 7300 | 9100 | **M 88043/010** |
| | 2,6875 | 0,875 | | | | | | |
| **31,75** | 59,131 | 15,875 | 43 | 42 | 4,30 | 8790 | 10100 | **LM 67048/010** |
| **1,25** | 2,328 | 0,625 | | | | | | |

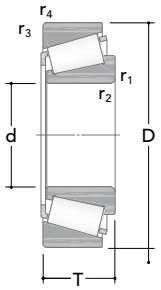


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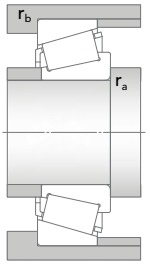


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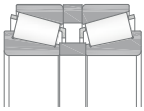
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **25,4** | 1,5 | 1,5 | 1,5 | 1,5 | 0,54 | 0,24 | **M 84548/510** |
| **1** | 0,06 | 0,06 | | | | | |
| (cont.) | 0,8 | 1,3 | 0,8 | 1,3 | 0,35 | 0,31 | **15101/15245** |
| | 0,03 | 0,05 | | | | | |
| **26,162** | 0,8 | 2 | 0,8 | 2 | 0,35 | 0,29 | **15103 S/15243** |
| **1,03** | 0,03 | 0,08 | | | | | |
| | 0,8 | 1,3 | 0,8 | 1,3 | 0,35 | 0,29 | **15103 S/15245** |
| | 0,03 | 0,05 | | | | | |
| **26,988** | 3,5 | 1,3 | 3,3 | 1,3 | 0,37 | 0,11 | **L 44649/610** |
| **1,0625** | 0,14 | 0,05 | | | | | |
| **28,575** | 0,8 | 1,5 | 0,8 | 1,5 | 0,33 | 0,23 | **1985/1922** |
| **1,125** | 0,03 | 0,06 | | | | | |
| | 3,5 | 1,5 | 3,3 | 1,5 | 0,33 | 0,22 | **1988/1922** |
| | 0,14 | 0,06 | | | | | |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,54 | 0,35 | **M 86647/610** |
| | 0,06 | 0,06 | | | | | |
| | 0,8 | 3,3 | 0,8 | 3,1 | 0,46 | 0,49 | **02872/02820** |
| | 0,03 | 0,13 | | | | | |
| **29** | 3,5 | 1,3 | 3,3 | 1,3 | 0,37 | 0,11 | **L 45449/410/Q** |
| **1,1417** | 0,14 | 0,05 | | | | | |
| **30,162** | 1,5 | 1,5 | 1,5 | 1,5 | 0,54 | 0,33 | **M 86649/610** |
| **1,1875** | 0,06 | 0,06 | | | | | |
| | 2,3 | 1,5 | 2,3 | 1,5 | 0,54 | 0,41 | **M 88043/010** |
| | 0,09 | 0,06 | | | | | |
| **31,75** | 3,6 | 1,3 | 3,4 | 1,3 | 0,4 | 0,18 | **LM 67048/010** |
| **1,25** | 0,14 | 0,05 | | | | | |



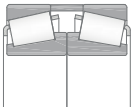

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **31,75** | 61,912 | 18,161 | 60,4 | 58 | 6,10 | 8350 | 10200 | **15123/15243** |
| **1,25** | 2,4375 | 0,715 | | | | | | |
| (cont.) | 62 | 18,161 | 60,4 | 58 | 6,10 | 8350 | 10200 | **15123/15245** |
| | 2,4409 | 0,715 | | | | | | |
| | 73,025 | 29,37 | 86,4 | 94 | 10,50 | 6930 | 8300 | **HM 88542/510** |
| | 2,875 | 1,1563 | | | | | | |
| **33,338** | 68,262 | 22,225 | 66,3 | 69 | 7,90 | 7300 | 9100 | **M 88048/010** |
| **1,3125** | 2,6875 | 0,875 | | | | | | |
| **34,925** | 65,088 | 18,034 | 58,6 | 57 | 6,20 | 7920 | 9400 | **LM 48548/510** |
| **1,375** | 2,5625 | 0,71 | | | | | | |
| | 65,088 | 18,034 | 58,6 | 57 | 6,20 | 7920 | 9400 | **LM 48548/510** |
| | 2,5625 | 0,71 | | | | | | |
| | 69,012 | 19,845 | 66 | 68 | 7,28 | 7200 | 9100 | **14137/14276** |
| | 2,717 | 0,7813 | | | | | | |
| | 72,233 | 25,4 | 81,8 | 90 | 10,00 | 6700 | 8300 | **HM 88649/610** |
| | 2,8438 | 1 | | | | | | |
| | 73,025 | 23,812 | 90 | 89 | 9,70 | 7170 | 8600 | **25877/25821** |
| | 2,875 | 0,9375 | | | | | | |
| | 73,025 | 26,988 | 93,9 | 93 | 10,40 | 7320 | 8600 | **23690/23620** |
| | 2,875 | 1,0625 | | | | | | |
| | 76,2 | 29,37 | 81,9 | 100 | 11,20 | 6500 | 8590 | **31594/31520** |
| | 3 | 1,1563 | | | | | | |
| | 76,2 | 29,37 | 96,4 | 107 | 11,70 | 6510 | 8200 | **HM 89446/410** |
| | 3 | 1,1563 | | | | | | |
| **34,988** | 59,131 | 15,875 | 41 | 44 | 4,50 | 7990 | 10300 | **L 68149/110** |
| **1,3775** | 2,328 | 0,625 | | | | | | |
| **36,512** | 76,2 | 29,37 | 96,4 | 107 | 11,70 | 6510 | 8200 | **HM 89449/410** |
| **1,4375** | 3 | 1,1563 | | | | | | |

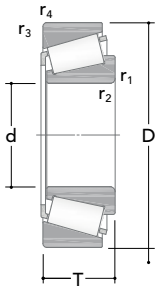


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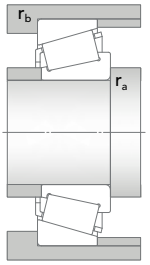


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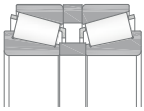
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **31,75** | 4 | 2 | 3,8 | 2 | 0,35 | 0,24 | **15123/15243** |
| **1,25** | 0,16 | 0,08 | | | | | |
| (cont.) | 4 | 1,3 | 3,8 | 1,3 | 0,35 | 0,24 | **15123/15245** |
| | 0,16 | 0,05 | | | | | |
| | 1,3 | 3,3 | 1,3 | 3,1 | 0,54 | 0,62 | **HM 88542/510** |
| | 0,05 | 0,13 | | | | | |
| **33,338** | 0,8 | 1,5 | 0,8 | 1,5 | 0,54 | 0,38 | **M 88048/010** |
| **1,3125** | 0,03 | 0,06 | | | | | |
| **34,925** | 0,8 | 1,3 | 0,8 | 1,3 | 0,37 | 0,26 | **LM 48548/510** |
| **1,375** | 0,03 | 0,05 | | | | | |
| | 3,5 | 1,3 | 3 | 1,3 | 0,37 | 0,25 | **LM 48548/510** |
| | 0,14 | 0,05 | | | | | |
| | 1,5 | 1,3 | 1,5 | 1,3 | 0,37 | 0,34 | **14137/14276** |
| | 0,06 | 0,05 | | | | | |
| | 2,3 | 2,3 | 2,3 | 2,3 | 0,54 | 0,5 | **HM 88649/610** |
| | 0,09 | 0,09 | | | | | |
| | 1,5 | 0,8 | 1,5 | 0,8 | 0,3 | 0,47 | **25877/25821** |
| | 0,06 | 0,03 | | | | | |
| | 3,5 | 1,5 | 3,3 | 1,5 | 0,37 | 0,52 | **23690/23620** |
| | 0,14 | 0,06 | | | | | |
| | 1,5 | 3,3 | 1,5 | 3,1 | 0,4 | 0,63 | **31594/31520** |
| | 0,06 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,54 | 0,66 | **HM 89446/410** |
| | 0,14 | 0,13 | | | | | |
| **34,988** | 3,5 | 1,3 | 3,3 | 1,3 | 0,43 | 0,17 | **L 68149/110** |
| **1,3775** | 0,14 | 0,05 | | | | | |
| **36,512** | 3,5 | 3,3 | 3,3 | 3,1 | 0,54 | 0,64 | **HM 89449/410** |
| **1,4375** | 0,14 | 0,13 | | | | | |

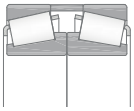



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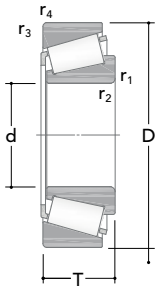



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **38,1** | 65,088 | 18,034 | 53,2 | 57 | 6,10 | 7300 | 9500 | **LM 29748/710** |
| **1,5** | 2,5625 | 0,71 | | | | | | |
| | 65,088 | 18,034 | 53,2 | 57 | 6,10 | 7300 | 9500 | **LM 29749/710** |
| | 2,5625 | 0,71 | | | | | | |
| | 65,088 | 19,812 | 53,2 | 57 | 6,10 | 7300 | 9500 | **LM 29749/711** |
| | 2,5625 | 0,78 | | | | | | |
| | 76,2 | 23,812 | 91,2 | 93 | 10,40 | 6760 | 8600 | **2788/2720** |
| | 3 | 0,9375 | | | | | | |
| | 79,375 | 29,37 | 113,1 | 111 | 12,40 | 6500 | 7800 | **3490/3420** |
| | 3,125 | 1,1563 | | | | | | |
| | 82,55 | 29,37 | 107,1 | 118 | 13,40 | 6250 | 7000 | **HM 801346/310** |
| | 3,25 | 1,1563 | | | | | | |
| | 82,55 | 29,37 | 107,1 | 118 | 13,40 | 6250 | 7000 | **HM 801346/310** |
| | 3,25 | 1,1563 | | | | | | |
| | 88,5 | 26,988 | 124,8 | 114 | 13,20 | 6000 | 7700 | **418/414** |
| | 3,4842 | 1,0625 | | | | | | |
| **41,275** | 73,431 | 19,558 | 67,8 | 69 | 7,54 | 6980 | 8500 | **LM 501349/310** |
| **1,625** | 2,891 | 0,77 | | | | | | |
| | 73,431 | 21,43 | 67,8 | 69 | 7,54 | 6980 | 8500 | **LM 501349/314** |
| | 2,891 | 0,8437 | | | | | | |
| | 76,2 | 18,009 | 56,4 | 56 | 6,10 | 6500 | 7900 | **11163/11300** |
| | 3 | 0,709 | | | | | | |
| | 76,2 | 18,009 | 56,4 | 56 | 6,10 | 6500 | 7900 | **11162/11300** |
| | 3 | 0,709 | | | | | | |
| | 76,2 | 22,225 | 84,7 | 86 | 9,66 | 6400 | 7800 | **24780/24720** |
| | 3 | 0,875 | | | | | | |
| | 82,55 | 26,543 | 92 | 91 | 10,70 | 6150 | 7600 | **M 802048/011** |
| | 3,25 | 1,045 | | | | | | |
| | 88,9 | 30,162 | 115 | 127 | 14,60 | 5300 | 6600 | **HM 803146/110** |
| | 3,5 | 1,1875 | | | | | | |

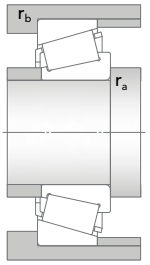

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DF

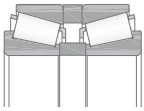
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **38,1** | 2,3 | 1,3 | 2,3 | 1,3 | 0,33 | 0,23 | **LM 29748/710** |
| **1,5** | 0,09 | 0,05 | | | | | |
| | 2,3 | 1,3 | 2 | 1,3 | 0,33 | 0,24 | **LM 29749/710** |
| | 0,09 | 0,05 | | | | | |
| | 2,3 | 1,3 | 2,3 | 1,3 | 0,33 | 0,24 | **LM 29749/711** |
| | 0,09 | 0,05 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,3 | 0,5 | **2788/2720** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,37 | 0,67 | **3490/3420** |
| | 0,14 | 0,13 | | | | | |
| | 2,3 | 3,3 | 2,3 | 3,1 | 0,54 | 0,78 | **HM 801346/310** |
| | 0,09 | 0,13 | | | | | |
| | 0,8 | 3,3 | 0,8 | 3,1 | 0,54 | 0,78 | **HM 801346/310** |
| | 0,03 | 0,13 | | | | | |
| | 3,5 | 1,5 | 3,3 | 1,5 | 0,26 | 0,83 | **418/414** |
| | 0,14 | 0,06 | | | | | |
| **41,275** | 3,5 | 0,8 | 3,3 | 0,8 | 0,4 | 0,34 | **LM 501349/310** |
| **1,625** | 0,14 | 0,03 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,4 | 0,36 | **LM 501349/314** |
| | 0,14 | 0,03 | | | | | |
| | 0,8 | 1,5 | 0,8 | 1,5 | 0,48 | 0,34 | **11163/11300** |
| | 0,03 | 0,06 | | | | | |
| | 1,5 | 1,5 | 1,5 | 1,5 | 0,48 | 0,34 | **11162/11300** |
| | 0,06 | 0,06 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,4 | 0,43 | **24780/24720** |
| | 0,14 | 0,03 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,54 | 0,62 | **M 802048/011** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,54 | 0,9 | **HM 803146/110** |
| | 0,14 | 0,13 | | | | | |



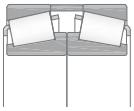

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **42,875** | 82,931 | 23,812 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25577/25520** |
| **1,688** | 3,265 | 0,9375 | | | | | | |
| | 82,931 | 26,988 | 100,1 | 107 | 12,00 | 6190 | 7700 | **25577/25523** |
| | 3,265 | 1,0629 | | | | | | |
| **44,45** | 82,931 | 23,812 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25580/25520** |
| **1,75** | 3,265 | 0,9375 | | | | | | |
| | 83,058 | 23,876 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25580/25522** |
| | 3,27 | 0,94 | | | | | | |
| | 82,931 | 26,988 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25580/25523** |
| | 3,265 | 1,0625 | | | | | | |
| | 88,9 | 30,162 | 115 | 127 | 14,60 | 5300 | 6600 | **HM 803149/110** |
| | 3,5 | 1,1875 | | | | | | |
| | 95,25 | 30,958 | 109 | 97 | 11,30 | 4800 | 6130 | **53178/53377** |
| | 3,75 | 1,2188 | | | | | | |
| | 95,25 | 30,958 | 124,2 | 121 | 14,00 | 4760 | 6090 | **HM 903249/210** |
| | 3,75 | 1,2188 | | | | | | |
| | 104,775 | 36,512 | 182 | 206 | 22,20 | 4630 | 5700 | **HM 807040/010** |
| | 4,125 | 1,4375 | | | | | | |
| | 107,95 | 36,512 | 185 | 193 | 21,30 | 4940 | 5900 | **535/532 X** |
| | 4,25 | 1,4375 | | | | | | |
| | 111,125 | 38,1 | 185 | 193 | 21,30 | 4940 | 5900 | **535/532 A** |
| | 4,375 | 1,5 | | | | | | |
| **45,237** | 87,312 | 30,162 | 127 | 133 | 15,00 | 5800 | 7100 | **3585/3525** |
| **1,781** | 3,4375 | 1,1875 | | | | | | |
| **45,242** | 73,431 | 19,558 | 65,4 | 75 | 8,15 | 6500 | 7900 | **LM 102949/910** |
| **1,7812** | 2,891 | 0,77 | | | | | | |
| | 77,788 | 19,842 | 67,4 | 71 | 7,54 | 6230 | 7700 | **LM 603049/011** |
| | 3,0625 | 0,7812 | | | | | | |

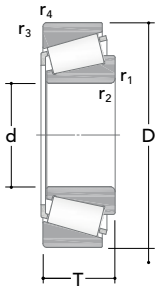


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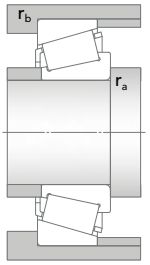


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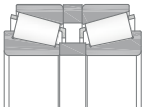
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **42,875** | 3,5 | 0,8 | 3,3 | 0,8 | 0,33 | 0,57 | **25577/25520** |
| **1,688** | 0,14 | 0,03 | | | | | |
| | 3,5 | 2,3 | 3,3 | 2,3 | 0,33 | 0,57 | **25577/25523** |
| | 0,14 | 0,09 | | | | | |
| **44,45** | 3,5 | 0,8 | 3,3 | 0,8 | 0,33 | 0,57 | **25580/25520** |
| **1,75** | 0,14 | 0,03 | | | | | |
| | 3,5 | 2 | 3,3 | 2 | 0,33 | 0,57 | **25580/25522** |
| | 0,14 | 0,08 | | | | | |
| | 3,5 | 2,3 | 3,3 | 2,3 | 0,33 | 0,57 | **25580/25523** |
| | 0,14 | 0,09 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,54 | 0,85 | **HM 803149/110** |
| | 0,14 | 0,13 | | | | | |
| | 2 | 2,3 | 2 | 2,3 | 0,75 | 0,93 | **53178/53377** |
| | 0,08 | 0,09 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,75 | 1 | **HM 903249/210** |
| | 0,14 | 0,03 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,48 | 1,5 | **HM 807040/010** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,3 | 1,7 | **535/532 X** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,3 | 1,85 | **535/532 A** |
| | 0,14 | 0,13 | | | | | |
| **45,237** | 3,5 | 3,3 | 3,3 | 3,1 | 0,31 | 0,85 | **3585/3525** |
| **1,781** | 0,14 | 0,13 | | | | | |
| **45,242** | 3,5 | 0,8 | 3,3 | 0,8 | 0,3 | 0,31 | **LM 102949/910** |
| **1,7812** | 0,14 | 0,03 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,43 | 0,37 | **LM 603049/011** |
| | 0,14 | 0,03 | | | | | |



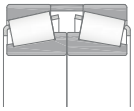

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **45,618** | 82,931 | 26,988 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25590/25523** |
| **1,796** | 3,265 | 1,0625 | | | | | | |
| | 83,058 | 23,876 | 100,1 | 107 | 11,70 | 6190 | 7700 | **25590/25522** |
| | 3,27 | 0,94 | | | | | | |
| **46,038** | 79,375 | 17,462 | 60 | 62 | 6,80 | 6370 | 7600 | **18690/18620** |
| **1,8125** | 3,125 | 0,6875 | | | | | | |
| | 85 | 20,638 | 88,1 | 82 | 9,20 | 6170 | 7000 | **359 S/354 X** |
| | 3,3465 | 0,8125 | | | | | | |
| **47,625** | 88,9 | 20,638 | 95,3 | 92 | 10,40 | 5730 | 6900 | **369 S/362 A** |
| **1,875** | 3,5 | 0,8125 | | | | | | |
| | 95,25 | 30,162 | 132 | 146 | 17,30 | 5230 | 6300 | **HM 804846/810** |
| | 3,75 | 1,1875 | | | | | | |
| | 101,6 | 34,925 | 183 | 190 | 21,60 | 5140 | 6300 | **528/522** |
| | 4 | 1,375 | | | | | | |
| **49,212** | 114,3 | 44,45 | 226 | 225 | 25,00 | 4550 | 5800 | **65390/65320** |
| **1,9375** | 4,5 | 1,75 | | | | | | |
| **50,8** | 88,9 | 20,638 | 95,3 | 92 | 10,40 | 5730 | 6900 | **368 A/362 A** |
| **2** | 3,5 | 0,8125 | | | | | | |
| | 90 | 25 | 95,3 | 92 | 10,40 | 5730 | 6900 | **368 A/362 X** |
| | 3,5433 | 0,9843 | | | | | | |
| | 93,264 | 30,162 | 135 | 147 | 17,00 | 5100 | 6100 | **3780/3720** |
| | 3,6718 | 1,1875 | | | | | | |
| | 104,775 | 36,512 | 182 | 206 | 22,20 | 4630 | 5700 | **HM 807046/010** |
| | 4,125 | 1,4375 | | | | | | |
| | 104,775 | 39,688 | 197 | 226 | 25,00 | 4850 | 5800 | **4580/4535** |
| | 4,125 | 1,5625 | | | | | | |
| **53,975** | 88,9 | 19,05 | 72,2 | 77 | 9,00 | 5500 | 6600 | **LM 806649/610** |
| **2,125** | 3,5 | 0,75 | | | | | | |

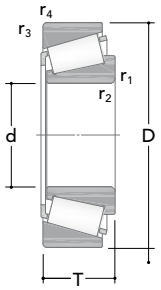


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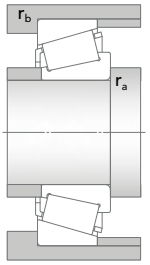


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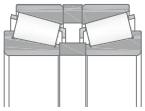
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **45,618** | 3,5 | 2,3 | 3,3 | 2,3 | 0,33 | 0,59 | **25590/25523** |
| **1,796** | 0,14 | 0,09 | | | | | |
| | 3,5 | 2 | 3,3 | 2 | 0,33 | 0,55 | **25590/25522** |
| | 0,14 | 0,08 | | | | | |
| **46,038** | 2,8 | 1,5 | 2,6 | 1,5 | 0,37 | 0,33 | **18690/18620** |
| **1,8125** | 0,11 | 0,06 | | | | | |
| | 2,3 | 1,5 | 2,3 | 1,5 | 0,31 | 0,49 | **359 S/354 X** |
| | 0,09 | 0,06 | | | | | |
| **47,625** | 2,3 | 1,3 | 2,3 | 1,3 | 0,31 | 0,55 | **369 S/362 A** |
| **1,875** | 0,09 | 0,05 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,54 | 0,95 | **HM 804846/810** |
| | 0,14 | 0,13 | | | | | |
| | 8 | 3,3 | 7 | 3,1 | 0,28 | 1,25 | **528/522** |
| | 0,31 | 0,13 | | | | | |
| **49,212** | 3,5 | 3,3 | 3,3 | 3,1 | 0,43 | 2,2 | **65390/65320** |
| **1,9375** | 0,14 | 0,13 | | | | | |
| **50,8** | 3,5 | 1,3 | 3,3 | 1,3 | 0,31 | 0,5 | **368 A/362 A** |
| **2** | 0,14 | 0,05 | | | | | |
| | 3,5 | 2 | 3,3 | 2 | 0,31 | 0,58 | **368 A/362 X** |
| | 0,14 | 0,08 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,33 | 0,87 | **3780/3720** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,48 | 1,5 | **HM 807046/010** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,33 | 1,65 | **4580/4535** |
| | 0,14 | 0,13 | | | | | |
| **53,975** | 2,3 | 2 | 2,3 | 2 | 0,54 | 0,44 | **LM 806649/610** |
| **2,125** | 0,09 | 0,08 | | | | | |



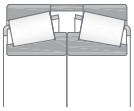

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **53,975** | 95,25 | 27,783 | 128 | 136 | 16,00 | 5100 | 6400 | **33895/33821** |
| **2,125** | 3,75 | 1,0938 | | | | | | |
| (cont.) | 95,25 | 27,783 | 128 | 136 | 16,00 | 5100 | 6400 | **33895/33822** |
| | 3,75 | 1,0938 | | | | | | |
| | 107,95 | 36,512 | 182 | 189 | 21,70 | 4930 | 5900 | **539/532 X** |
| | 4,25 | 1,4375 | | | | | | |
| | 111,125 | 38,1 | 182 | 189 | 21,70 | 4930 | 5900 | **539/532 A** |
| | 4,375 | 1,5 | | | | | | |
| | 123,825 | 36,512 | 174 | 158 | 19,80 | 3800 | 4900 | **72212/72487** |
| | 4,875 | 1,4375 | | | | | | |
| **57,15** | 96,838 | 21 | 100,8 | 103 | 11,50 | 4980 | 6200 | **387 A/382 A** |
| **2,25** | 3,8125 | 0,8268 | | | | | | |
| | 104,775 | 30,162 | 151 | 159 | 18,70 | 4770 | 5700 | **462/453 X** |
| | 4,125 | 1,1875 | | | | | | |
| | 112,712 | 30,162 | 177 | 206 | 23,40 | 4200 | 5300 | **39581/39520** |
| | 4,4375 | 1,1875 | | | | | | |
| | 119,985 | 32,75 | 177 | 206 | 23,40 | 4200 | 5300 | **39580/39528** |
| | 4,7238 | 1,2894 | | | | | | |
| | 119,985 | 32,75 | 177 | 206 | 23,40 | 4200 | 5300 | **39581/39528** |
| | 4,7238 | 1,2894 | | | | | | |
| **60,325** | 130,175 | 36,512 | 188 | 180 | 22,40 | 3400 | 4340 | **HM 911245/210** |
| **2,375** | 5,125 | 1,4375 | | | | | | |
| **61,912** | 146,05 | 41,275 | 200 | 237 | 29,00 | 3000 | 3960 | **H 913842/810** |
| **2,4375** | 5,75 | 1,625 | | | | | | |
| | 146,05 | 41,275 | 200 | 237 | 29,00 | 3000 | 3960 | **H 913843/810** |
| | 5,75 | 1,625 | | | | | | |
| **63,5** | 112,712 | 30,162 | 151 | 184 | 21,10 | 4460 | 5400 | **3982/3920** |
| **2,5** | 4,4375 | 1,1875 | | | | | | |

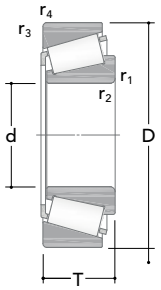


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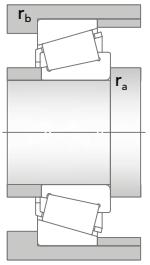


DF

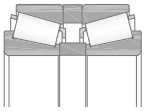
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **53,975** | 1,5 | 2,3 | 1,5 | 2,3 | 0,33 | 0,8 | **33895/33821** |
| **2,125** | 0,06 | 0,09 | | | | | |
| (cont.) | 1,5 | 0,8 | 1,5 | 0,8 | 0,33 | 0,81 | **33895/33822** |
| | 0,06 | 0,03 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,3 | 1,45 | **539/532 X** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,3 | 1,55 | **539/532 A** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,75 | 2 | **72212/72487** |
| | 0,14 | 0,13 | | | | | |
| **57,15** | 3,5 | 0,8 | 3,3 | 0,8 | 0,35 | 0,59 | **387 A/382 A** |
| **2,25** | 0,14 | 0,03 | | | | | |
| | 2,3 | 3,3 | 2,3 | 3,1 | 0,33 | 1,05 | **462/453 X** |
| | 0,09 | 0,13 | | | | | |
| | 8 | 3,3 | 7 | 3,1 | 0,33 | 1,35 | **39581/39520** |
| | 0,31 | 0,13 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,33 | 1,75 | **39580/39528** |
| | 0,14 | 0,03 | | | | | |
| | 8 | 0,8 | 7 | 0,8 | 0,33 | 1,75 | **39581/39528** |
| | 0,31 | 0,03 | | | | | |
| **60,325** | 5 | 3,3 | 4,6 | 3,1 | 0,83 | 2,1 | **HM 911245/210** |
| **2,375** | 0,2 | 0,13 | | | | | |
| **61,912** | 3,5 | 3,3 | 3,3 | 3,1 | 0,79 | 3,2 | **H 913842/810** |
| **2,4375** | 0,14 | 0,13 | | | | | |
| | 7 | 3,3 | 6,6 | 3,1 | 0,79 | 3,15 | **H 913843/810** |
| | 0,28 | 0,13 | | | | | |
| **63,5** | 3,5 | 3,3 | 3,3 | 3,1 | 0,4 | 1,25 | **3982/3920** |
| **2,5** | 0,14 | 0,13 | | | | | |



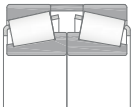

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **65,088** | 135,755 | 53,975 | 358 | 405 | 44,90 | 3600 | 4700 | **6379/6320** |
| **2,5625** | 5,3447 | 2,125 | | | | | | |
| **66,675** | 112,712 | 30,162 | 177 | 202 | 23,80 | 4100 | 5400 | **39590/39520** |
| **2,625** | 4,4375 | 1,1875 | | | | | | |
| | 112,712 | 30,162 | 151 | 184 | 21,10 | 4460 | 5400 | **3984/3920** |
| | 4,4375 | 1,1875 | | | | | | |
| | 119,985 | 32,75 | 177 | 202 | 23,80 | 4100 | 5400 | **39590/39528** |
| | 4,7238 | 1,2894 | | | | | | |
| | 135,755 | 53,975 | 358 | 405 | 44,90 | 3600 | 4700 | **6386/6320** |
| | 5,3447 | 2,125 | | | | | | |
| **69,85** | 120 | 32,545 | 189 | 226 | 26,70 | 3900 | 5100 | **47487/47420** |
| **2,75** | 4,7244 | 1,2813 | | | | | | |
| | 127 | 36,512 | 219 | 258 | 29,00 | 4010 | 4800 | **566/563** |
| | 5 | 1,4375 | | | | | | |
| **73,025** | 127 | 36,512 | 219 | 258 | 29,00 | 4010 | 4800 | **567/563** |
| **2,875** | 5 | 1,4375 | | | | | | |
| **76,2** | 109,538 | 19,05 | 71,4 | 102 | 11,00 | 4200 | 4900 | **L 814749/710** |
| **3** | 4,3125 | 0,75 | | | | | | |
| | 127 | 30,162 | 172 | 203 | 24,00 | 3700 | 4500 | **42687/42620** |
| | 5 | 1,1875 | | | | | | |
| | 133,35 | 33,338 | 200 | 262 | 30,00 | 3460 | 4100 | **47678/47620** |
| | 5,25 | 1,3125 | | | | | | |
| | 139,992 | 36,512 | 225 | 279 | 31,00 | 3450 | 4200 | **575/572** |
| | 5,5115 | 1,4375 | | | | | | |
| | 161,925 | 49,212 | 315 | 336 | 38,00 | 2780 | 3540 | **9285/9220** |
| | 6,375 | 1,9375 | | | | | | |
| **77,788** | 127 | 30,163 | 172 | 203 | 24,00 | 3700 | 4500 | **42690/42620** |
| **3,0625** | 5 | 1,1875 | | | | | | |

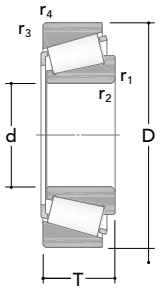


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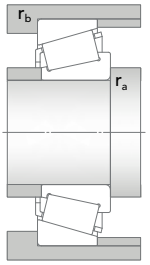


DF

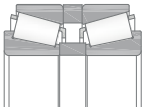
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **65,088** | 3,5 | 3,3 | 3,3 | 3,1 | 0,33 | 3,7 | **6379/6320** |
| **2,5625** | 0,14 | 0,13 | | | | | |
| **66,675** | 3,5 | 3,3 | 3,3 | 3,1 | 0,33 | 1,15 | **39590/39520** |
| **2,625** | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,4 | 1,15 | **3984/3920** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 0,8 | 3,3 | 0,8 | 0,33 | 1,2 | **39590/39528** |
| | 0,14 | 0,03 | | | | | |
| | 4,3 | 3,3 | 3,9 | 3,1 | 0,33 | 3,65 | **6386/6320** |
| | 0,17 | 0,13 | | | | | |
| **69,85** | 3,5 | 0,5 | 3 | 0,5 | 0,35 | 1,5 | **47487/47420** |
| **2,75** | 0,14 | 0,02 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,37 | 1,9 | **566/563** |
| | 0,14 | 0,13 | | | | | |
| **73,025** | 3,5 | 3,3 | 3,3 | 3,1 | 0,37 | 1,8 | **567/563** |
| **2,875** | 0,14 | 0,13 | | | | | |
| **76,2** | 1,5 | 1,5 | 1,5 | 1,5 | 0,5 | 0,6 | **L 814749/710** |
| **3** | 0,06 | 0,06 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,43 | 1,45 | **42687/42620** |
| | 0,14 | 0,13 | | | | | |
| | 6,4 | 3,3 | 6 | 3,1 | 0,4 | 1,95 | **47678/47620** |
| | 0,25 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,4 | 2,45 | **575/572** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,72 | 4,4 | **9285/9220** |
| | 0,14 | 0,13 | | | | | |
| **77,788** | 3,5 | 3,3 | 3 | 3 | 0,43 | 1,45 | **42690/42620** |
| **3,0625** | 0,14 | 0,13 | | | | | |



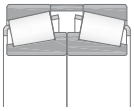

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **82,55**<br>**3,25** | 139,992<br>5,5115 | 36,512<br>1,4375 | 225 | 279 | 31,00 | 3450 | 4200 | **580/572** |
| **92,075**<br>**3,625** | 152,4<br>6 | 39,688<br>1,5625 | 240 | 308 | 33,20 | 3100 | 3800 | **598/592 A** |
| **95,25**<br>**3,75** | 152,4<br>6 | 39,688<br>1,5625 | 240 | 308 | 33,20 | 3100 | 3800 | **594/592 A** |
| | 168,275<br>6,625 | 41,275<br>1,625 | 285 | 362 | 39,00 | 2700 | 3300 | **683/672** |
| **100,012**<br>**3,9375** | 157,162<br>6,1875 | 36,512<br>1,4375 | 204 | 338 | 37,20 | 2520 | - | **52393/52618** |
| | 161,925<br>6,375 | 36,512<br>1,4375 | 204 | 338 | 37,20 | 2520 | - | **52393/52637** |
| **101,6**<br>**4** | 146,05<br>5,75 | 21,433<br>0,8438 | 80 | 152 | 16,40 | 2730 | - | **L 521945/L 521910** |
| | 157,162<br>6,1875 | 36,512<br>1,4375 | 204 | 338 | 36,20 | 2520 | - | **52400/52618** |
| | 157,162<br>6,1875 | 36,512<br>1,4375 | 204 | 338 | 36,20 | 2520 | - | **52401/52618** |
| | 161,925<br>6,375 | 36,512<br>1,4375 | 204 | 338 | 36,20 | 2520 | - | **52400/52637** |
| **109,538**<br>**4,3125** | 158,75<br>6,25 | 23,02<br>0,9063 | 101,2 | 161 | 18,50 | 2600 | - | **332727** |
| **109,975**<br>**4,3297** | 177,8<br>7 | 41,275<br>1,625 | 300 | 412 | 43,00 | 2660 | 2900 | **64432/64700** |
| | 179,975<br>7,0856 | 41,275<br>1,625 | 300 | 412 | 43,00 | 2660 | 2900 | **64432/64708** |

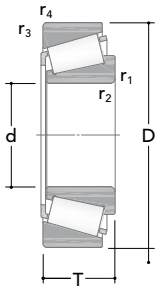


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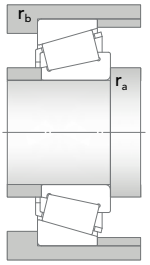


DF

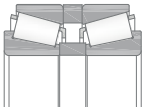
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **82,55**<br>**3,25** | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,4 | 2,2 | **580/572** |
| **92,075**<br>**3,625** | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,44 | 2,7 | **598/592 A** |
| **95,25**<br>**3,75** | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,44 | 2,55 | **594/592 A** |
| | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,48 | 3,75 | **683/672** |
| **100,012**<br>**3,9375** | 3,5 | 3,3 | 3 | 3 | 0,48 | 2,45 | **52393/52618** |
| | 3,5 | 3,3 | 3 | 3 | 0,48 | 2,8 | **52393/52637** |
| **101,6**<br>**4** | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 1,15 | **L 521945/L 521910** |
| | 3,5 | 3,3 | 3 | 3 | 0,48 | 2,45 | **52400/52618** |
| | 8 | 3,3 | 7 | 3 | 0,48 | 2,45 | **52401/52618** |
| | 3,5 | 3,3 | 3 | 3 | 0,48 | 2,65 | **52400/52637** |
| **109,538**<br>**4,3125** | 5 | 3,3 | 3 | 3 | 0,6 | 1,35 | **332727** |
| **109,975**<br>**4,3297** | 3,5 | 3,3 | 3 | 3 | 0,52 | 3,7 | **64432/64700** |
| | 3,5 | 3,3 | 3 | 3 | 0,52 | 3,9 | **64432/64708** |



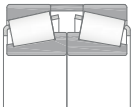

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **109,987**<br>**4,3302** | 159,987<br>6,2987 | 34,925<br>1,375 | 156 | 348 | 8,58 | 2540 | - | **LM 522548/LM 522510** |
| | 159,987<br>6,2987 | 34,925<br>1,375 | 156 | 348 | 8,58 | 2540 | - | **LM 522549/LM 522510** |
| **109,992**<br>**4,3304** | 177,8<br>7 | 41,275<br>1,625 | 246 | 412 | 43,00 | 2500 | - | **64433/64700** |
| | 180<br>7,0866 | 41,275<br>1,625 | 246 | 412 | 43,00 | 2500 | - | **64433/64708** |
| **114,3**<br>**4,5** | 177,8<br>7 | 41,275<br>1,625 | 309 | 416 | 42,40 | 2500 | 3200 | **64450/64700** |
| | 180<br>7,0866 | 41,275<br>1,625 | 246 | 412 | 42,80 | 2500 | - | **64450/64708** |
| | 180,975<br>7,125 | 34,925<br>1,375 | 227 | 280 | 30,00 | 2500 | 3100 | **68450/68712** |
| | 190,5<br>7,5 | 47,625<br>1,875 | 316 | 516 | 55,00 | 2190 | - | **71450/71750** |
| | 192<br>7,5591 | 47,625<br>1,875 | 316 | 516 | 56,00 | 2190 | - | **71450/71753** |
| | 212,725<br>8,375 | 66,675<br>2,625 | 625 | 766 | 81,40 | 2360 | 2790 | **938/932** |
| | 212,725<br>8,375 | 66,675<br>2,625 | 624 | 841 | 87,00 | 2010 | 2650 | **HH 224346/HH 224310** |
| | 228,6<br>9 | 53,975<br>2,125 | 732 | 938 | 97,70 | 1620 | - | **HM 926740/HM 926710** |
| **114,976**<br>**4,5266** | 177,8<br>7 | 41,275<br>1,625 | 252 | 413 | 42,70 | 2400 | - | **64452/64700** |
| | 180<br>7,0866 | 41,275<br>1,625 | 252 | 413 | 42,70 | 2400 | - | **64452/64708** |
| | 212,725<br>8,375 | 66,675<br>2,625 | 607 | 813 | 90,00 | 2100 | 2550 | **HH 224349/HH 224310** |

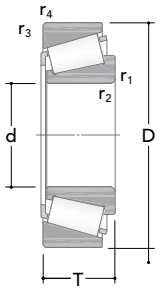


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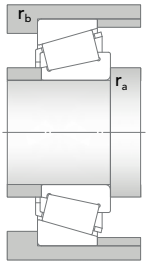


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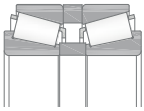
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **109,987** | 7,9 | 3,3 | 7 | 3 | 0,4 | 2,2 | **LM 522548/LM 522510** |
| **4,3302** | 3,5 | 3,3 | 3 | 3 | 0,4 | 2,3 | **LM 522549/LM 522510** |
| **109,992** | 3,5 | 3,3 | 3 | 3 | 0,52 | 3,7 | **64433/64700** |
| **4,3304** | 3,5 | 3,3 | 3 | 3 | 0,52 | 3,9 | **64433/64708** |
| **114,3** | 3,5 | 3,3 | 3,3 | 3,1 | 0,52 | 3,6 | **64450/64700** |
| **4,5** | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,52 | 3,8 | **64450/64708** |
| | 3,5 | 3,3 | 3,3 | 3,1 | 0,5 | 2,95 | **68450/68712** |
| | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,43 | 5,25 | **71450/71750** |
| | 3,5 | 3,3 | 3 | 3 | 0,43 | 5,4 | **71450/71753** |
| | 7 | 3,3 | 6 | 3 | 0,33 | 10 | **938/932** |
| | 7 | 3,3 | 6 | 3 | 0,33 | 10,5 | **HH 224346/HH 224310** |
| | 3,5 | 3,3 | 3 | 3 | 0,75 | 9,65 | **HM 926740/HM 926710** |
| **114,976** | 9 | 3,3 | 8 | 3 | 0,52 | 3,55 | **64452/64700** |
| **4,5266** | 9 | 3,3 | 8 | 3 | 0,52 | 3,75 | **64452/64708** |
| | 7 | 3,3 | 6 | 3 | 0,33 | 10,5 | **HH 224349/HH 224310** |



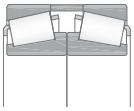

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **117,475**<br>**4,625** | 180,975<br>7,125 | 34,925<br>1,375 | 181 | 279 | 30,00 | 2410 | - | **68462/68712** |
| | 180,975<br>7,125 | 34,925<br>1,375 | 181 | 279 | 30,00 | 2410 | - | **68463/68712** |
| **120,65**<br>**4,75** | 169,862<br>6,6875 | 25,4<br>1 | 133 | 266 | 27,00 | 2420 | - | **L 225842/L 225810** |
| | 190,5<br>7,5 | 46,038<br>1,8125 | 394 | 539 | 56,00 | 2430 | 2740 | **HM 624749/HM 624710** |
| | 254<br>10 | 77,788<br>3,0625 | 730 | 1076 | 106,00 | 1710 | - | **HH 228340/HH 228310** |
| **127**<br>**5** | 169,862<br>6,6875 | 25,4<br>1 | 133 | 266 | 27,00 | 2420 | - | **L 225849/L 225810** |
| | 182,562<br>7,1875 | 39,688<br>1,5625 | 279 | 439 | 44,00 | 2400 | 2760 | **48290/48220** |
| | 196,85<br>7,75 | 46,038<br>1,8125 | 400 | 590 | 59,00 | 2180 | 2800 | **67388/67322** |
| | 215,9<br>8,5 | 47,625<br>1,875 | 342 | 605 | 63,00 | 1800 | - | **74500/74850** |
| | 228,6<br>9 | 53,975<br>2,125 | 416 | 619 | 64,00 | 1870 | - | **HM 926747/HM 926710** |
| | 254<br>10 | 77,788<br>3,0625 | 730 | 1076 | 106,00 | 1710 | - | **HH 228349/HH 228310** |
| **133,35**<br>**5,25** | 177,008<br>6,9688 | 25,4<br>1 | 164 | 277 | 28,00 | 2300 | 3000 | **L 327249/210** |
| | 190,5<br>7,5 | 39,688<br>1,5625 | 249 | 503 | 50,00 | 2220 | - | **48385/48320** |
| | 196,85<br>7,75 | 46,038<br>1,8135 | 323 | 588 | 60,00 | 2000 | 3010 | **67390/67322** |
| | 196,85<br>7,75 | 46,038<br>1,8125 | 323 | 588 | 60,00 | 2000 | 2930 | **67391/67322** |

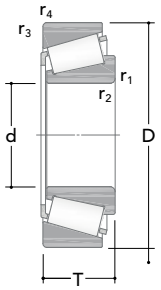


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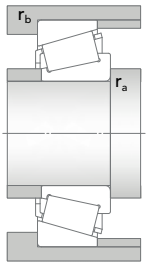


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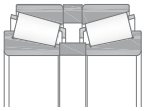
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| 117,475<br>4,625 | 3,5 | 3,3 | 3 | 3 | 0,5 | 2,8 | 68462/68712 |
| | 8 | 3,3 | 7 | 3 | 0,5 | 2,8 | 68463/68712 |
| 120,65<br>4,75 | 1,5 | 1,5 | 1 | 1 | 0,33 | 1,85 | L 225842/L 225810 |
| | 3,5 | 1,5 | 3 | 1 | 0,43 | 4,85 | HM 624749/HM 624710 |
| | 9,7 | 6,4 | 9 | 6 | 0,33 | 19,5 | HH 228340/HH 228310 |
| 127<br>5 | 1,5 | 1,5 | 1 | 1 | 0,33 | 1,6 | L 225849/L 225810 |
| | 3,5 | 3,3 | 3 | 3 | 0,3 | 3,3 | 48290/48220 |
| | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,35 | 5,15 | 67388/67322 |
| | 3,5 | 3,3 | 3 | 3 | 0,48 | 7 | 74500/74850 |
| | 3,5 | 3,3 | 3 | 3 | 0,75 | 8,9 | HM 926747/HM 926710 |
| | 9,7 | 6,4 | 9 | 6 | 0,33 | 18,5 | HH 228349/HH 228310 |
| 133,35<br>5,25 | 1,5<br>0,06 | 1,5<br>0,06 | 1,5 | 1,5 | 0,35 | 1,75 | L 327249/210 |
| | 3,5 | 3,3 | 3 | 3 | 0,33 | 3,55 | 48385/48320 |
| | 3,5 | 3,3 | 3 | 3 | 0,35 | 4,7 | 67390/67322 |
| | 8 | 3,3 | 7 | 3 | 0,35 | 4,65 | 67391/67322 |

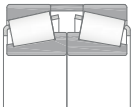



TS

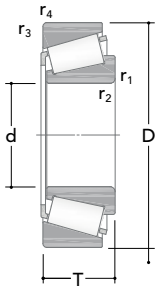



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **133,35** | 215,9 | 47,625 | 342 | 605 | 63,00 | 1800 | - | **74525/74850** |
| **5,25** | 8,5 | 1,875 | | | | | | |
| (cont.) | 234,95 | 63,5 | 676 | 912 | 90,30 | 2000 | 2450 | **95525/95925** |
| | 9,25 | 2,5 | | | | | | |
| | 234,95 | 63,5 | 547 | 893 | 91,00 | 1800 | - | **95528/95925** |
| | 9,25 | 2,5 | | | | | | |
| **136,525** | 190,5 | 39,688 | 249 | 503 | 49,00 | 2220 | - | **48393/48320** |
| **5,375** | 7,5 | 1,5625 | | | | | | |
| | 190,5 | 39,688 | 249 | 503 | 49,00 | 2220 | - | **48393/48320** |
| | 7,5 | 1,5625 | | | | | | |
| **139,7** | 215,9 | 47,625 | 342 | 605 | 63,00 | 1800 | - | **74550/74850** |
| **5,5** | 8,5 | 1,875 | | | | | | |
| | 236,538 | 57,15 | 507 | 841 | 87,40 | 1720 | - | **HM 231132/HM 231110** |
| | 9,3125 | 2,25 | | | | | | |
| **142,875** | 200,025 | 41,275 | 250 | 518 | 52,00 | 1960 | - | **48685/48620** |
| **5,625** | 7,875 | 1,625 | | | | | | |
| **146,05** | 193,675 | 28,575 | 173 | 358 | 36,00 | 2050 | - | **36690/36620** |
| **5,75** | 7,625 | 1,125 | | | | | | |
| | 193,675 | 28,575 | 173 | 358 | 36,00 | 2050 | - | **36691/36620** |
| | 7,625 | 1,125 | | | | | | |
| | 200,025 | 41,275 | 250 | 518 | 52,00 | 1960 | - | **BT1B 332808** |
| | 7,874 | 1,625 | | | | | | |
| | 241,3 | 57,15 | 476 | 840 | 82,00 | 1730 | - | **82576/82950** |
| | 9,5 | 2,25 | | | | | | |
| | 304,8 | 88,9 | 839 | 1164 | 114,00 | 1250 | - | **HH 932145/HH 932110** |
| | 12 | 3,5 | | | | | | |
| **149,225** | 236,538 | 57,15 | 623 | 848 | 86,70 | 2040 | 2300 | **HM 231148/110** |
| **5,875** | 9,3125 | 2,25 | | | | | | |

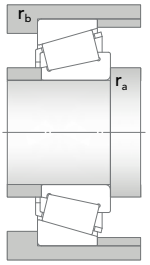

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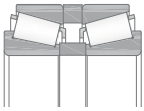
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **133,35** | 3,5 | 3,3 | 3 | 3 | 0,48 | 6,5 | **74525/74850** |
| **5,25** | | | | | | | |
| (cont.) | 9,7 | 3,3 | 9 | 3 | 0,37 | 11,5 | **95525/95925** |
| | 4,8 | 3,3 | 4 | 3 | 0,37 | 11,5 | **95528/95925** |
| **136,525** | 5,5 | 3,3 | 5 | 3 | 0,33 | 3,3 | **48393/48320** |
| **5,375** | | | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,33 | 3,3 | **48393/48320** |
| **139,7** | 3,5 | 3,3 | 3 | 3 | 0,48 | 6 | **74550/74850** |
| **5,5** | | | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,31 | 10 | **HM 231132/HM 231110** |
| **142,875** | 3,5 | 3,3 | 3 | 3 | 0,3 | 3,8 | **48685/48620** |
| **5,625** | | | | | | | |
| **146,05** | 1,5 | 1,5 | 1 | 1 | 0,37 | 2,3 | **36690/36620** |
| **5,75** | | | | | | | |
| | 4,8 | 1,5 | 4 | 1 | 0,37 | 2,3 | **36691/36620** |
| | 3,5 | 3,3 | 3 | 3 | 0,33 | 3,75 | **BT1B 332808** |
| | 3,5 | 3,3 | 3 | 3 | 0,44 | 10 | **82576/82950** |
| | 6,4 | 6,4 | 6 | 6 | 0,72 | 28 | **HH 932145/HH 932110** |
| **149,225** | 6,4 | 3,3 | 6 | 3,1 | 0,31 | 9,05 | **HM 231148/110** |
| **5,875** | 0,25 | 0,13 | | | | | |



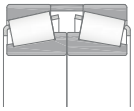

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **152,46** | 222,25<br>8,75 | 46,83<br>1,8437 | 399 | 638 | 61,00 | 2000 | 2500 | **M 231649/610** |
| | 254<br>10 | 66,675<br>2,625 | 584 | 990 | 95,50 | 1630 | - | **99600/99100** |
| **155,5756,125** | 336,55<br>13,25 | 85,725<br>3,375 | 837 | 1183 | 118,00 | 1200 | - | **BT1B 328833** |
| **158,756,25** | 205,583<br>8,0938 | 23,812<br>0,9375 | 170 | 280 | 27,00 | 1980 | 2500 | **L 432348/310** |
| | 225,425<br>8,875 | 41,275<br>1,625 | 262 | 582 | 56,00 | 1680 | - | **46780/46720** |
| **165,16,5** | 225,425<br>8,875 | 41,275<br>1,625 | 262 | 582 | 56,00 | 1680 | - | **46790/46720** |
| | 336,55<br>13,25 | 92,075<br>3,625 | 1187 | 1715 | 155,00 | 1270 | 1670 | **HH 437549/HH 437510** |
| **177,87** | 227,012<br>8,9375 | 30,162<br>1,1875 | 234 | 424 | 40,00 | 1830 | 2400 | **36990/36920** |
| | 260,35<br>10,25 | 53,975<br>2,125 | 489 | 895 | 88,00 | 1550 | - | **M 236849/M 236810** |
| **178,5957,0313** | 265,112<br>10,4375 | 51,595<br>2,0313 | 616 | 886 | 84,00 | 1600 | 2000 | **M 336948/912** |
| **179,9347,084** | 265,112<br>10,4375 | 51,595<br>2,0313 | 616 | 886 | 84,00 | 1600 | 2000 | **M 336949/912** |
| **184,157,25** | 266,7<br>10,5 | 47,625<br>1,875 | 372 | 798 | 75,00 | 1440 | - | **67883/67820** |

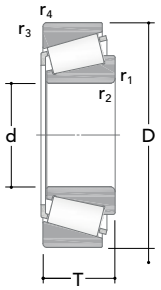


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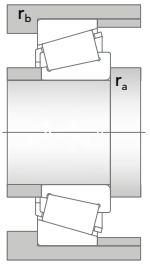


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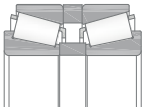
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **152,4** | 3,5 | 1,5 | 3,3 | 1,5 | 0,33 | 5,85 | **M 231649/610** |
| **6** | 0,14 | 0,06 | | | | | |
| | 7 | 3,3 | 6 | 3 | 0,4 | 12,5 | **99600/99100** |
| **155,575** | 6,4 | 6,4 | 6 | 6 | 0,79 | 33,5 | **BT1B 328833** |
| **6,125** | | | | | | | |
| **158,75** | 4,8 | 1,5 | 4,4 | 1,5 | 0,37 | 1,9 | **L 432348/310** |
| **6,25** | 0,19 | 0,06 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,37 | 5,3 | **46780/46720** |
| **165,1** | 3,5 | 3,3 | 3 | 3 | 0,37 | 4,75 | **46790/46720** |
| **6,5** | | | | | | | |
| | 3,3 | 6,4 | 3 | 6 | 0,37 | 37 | **HH 437549/HH 437510** |
| **177,8** | 1,5 | 1,5 | 1,5 | 1,5 | 0,44 | 2,95 | **36990/36920** |
| **7** | 0,06 | 0,06 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,33 | 9,35 | **M 236849/M 236810** |
| **178,595** | 3,3 | 3,3 | 3,1 | 3,1 | 0,33 | 9,55 | **M 336948/912** |
| **7,0313** | 0,13 | 0,13 | | | | | |
| **179,934** | 3,3 | 3,3 | 3,1 | 3,1 | 0,33 | 9,4 | **M 336949/912** |
| **7,084** | 0,13 | 0,13 | | | | | |
| **184,15** | 3,5 | 3,3 | 3 | 3 | 0,48 | 8,2 | **67883/67820** |
| **7,25** | | | | | | | |



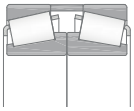

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **187,325**<br>**7,375** | 269,875<br>10,625 | 55,562<br>2,1875 | 475 | 957 | 90,80 | 1500 | - | **M 238849/M 238810** |
| | 282,575<br>11,125 | 50,8<br>2 | 498 | 701 | 66,00 | 1500 | 1900 | **87737/87111** |
| **189,738**<br>**7,47** | 279,4<br>11 | 52,388<br>2,0625 | 645 | 991 | 92,00 | 1560 | 1750 | **M 239447/M 239410** |
| **190,475**<br>**7,5** | 279,4<br>11 | 52,388<br>2,0625 | 528 | 985 | 93,00 | 1500 | 1950 | **M 239449/410** |
| **190,5**<br>**7,5** | 266,7<br>10,5 | 47,625<br>1,875 | 372 | 798 | 73,70 | 1440 | - | **67885/67820** |
| | 282,575<br>11,125 | 50,8<br>2 | 498 | 701 | 66,00 | 1500 | 1900 | **87750/87111** |
| **191,237**<br>**7,529** | 279,4<br>11 | 52,388<br>2,0625 | 528 | 985 | 95,00 | 1500 | 1950 | **M 239448 A/410** |
| **196,85**<br>**7,75** | 241,3<br>9,5 | 23,812<br>0,9375 | 190 | 319 | 29,00 | 1750 | 2200 | **LL 639249/210** |
| | 257,175<br>10,125 | 39,688<br>1,5625 | 337 | 665 | 57,60 | 1670 | 2000 | **LM 739749/710** |
| **200,025**<br>**7,875** | 276,225<br>10,875 | 42,862<br>1,6875 | 477 | 781 | 72,00 | 1580 | 1800 | **LM 241147/110** |
| **203,2**<br>**8** | 261,142<br>10,2812 | 28,575<br>1,125 | 218 | 442 | 41,30 | 1460 | - | **LL 641149/LL 641110** |
| | 282,575<br>11,125 | 46,038<br>1,8125 | 382 | 835 | 76,00 | 1340 | - | **67983/67920** |

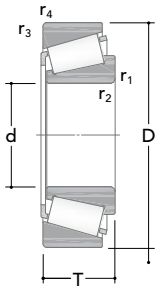


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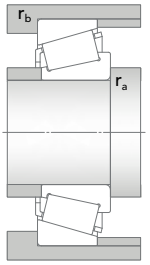


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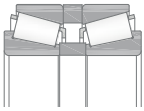
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **187,325**<br>**7,375** | 3,5 | 3,3 | 3 | 3 | 0,33 | 9,85 | **M 238849/M 238810** |
| | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,43 | 9,95 | **87737/87111** |
| **189,738**<br>**7,47** | 3,3 | 3,3 | 3 | 3 | 0,33 | 11 | **M 239447/M 239410** |
| **190,475**<br>**7,5** | 3,3<br>0,13 | 3,3<br>0,13 | 3,1 | 3,1 | 0,33 | 9,5 | **M 239449/410** |
| **190,5**<br>**7,5** | 3,5 | 3,3 | 3 | 3 | 0,48 | 8,2 | **67885/67820** |
| | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,43 | 9,55 | **87750/87111** |
| **191,237**<br>**7,529** | 3,3<br>0,13 | 3,3<br>0,13 | 3,1 | 3,1 | 0,33 | 9,2 | **M 239448 A/410** |
| **196,85**<br>**7,75** | 1,5<br>0,06 | 1,5<br>0,06 | 1,5 | 1,5 | 0,43 | 2,1 | **LL 639249/210** |
| | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,44 | 5,35 | **LM 739749/710** |
| **200,025**<br>**7,875** | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,31 | 7,7 | **LM 241147/110** |
| **203,2**<br>**8** | 1,5 | 1,5 | 1,5 | 1,5 | 0,4 | 3,75 | **LL 641149/LL 641110** |
| | 3,5 | 3,3 | 3 | 3 | 0,5 | 8,95 | **67983/67920** |



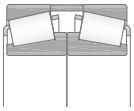

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **203,987**<br>**8,031** | 276,225<br>10,875 | 42,862<br>1,6875 | 477 | 781 | 72,00 | 1580 | 1800 | **LM 241148/110** |
| **206,375**<br>**8,125** | 282,575<br>11,125 | 46,038<br>1,8125 | 469 | 828 | 76,70 | 1470 | 1750 | **67985/67920** |
| | 336,55<br>13,25 | 98,425<br>3,875 | 1217 | 2153 | 191,00 | 1200 | 1580 | **H 242649/H 242610** |
| **212,725**<br>**8,375** | 285,75<br>11,25 | 46,038<br>1,8125 | 460 | 844 | 77,00 | 1490 | 1800 | **LM 742745/LM 742710** |
| **215,9**<br>**8,5** | 285,75<br>11,25 | 46,038<br>1,8125 | 460 | 844 | 77,00 | 1490 | 1800 | **LM 742749/LM 742710** |
| **216,408**<br>**8,52** | 285,75<br>11,25 | 46,038<br>1,8125 | 460 | 844 | 77,00 | 1490 | 1800 | **LM 742747/710** |
| | 285,75<br>11,25 | 46,038<br>1,8125 | 328 | 703 | 62,00 | 1360 | - | **BT1B 443786** |
| **216,713**<br>**8,532** | 285,75<br>11,25 | 46,038<br>1,8125 | 460 | 844 | 77,00 | 1490 | 1800 | **LM 742747 A/710** |
| **220,116**<br>**8,666** | 317,5<br>12,5 | 47,625<br>1,875 | 517 | 979 | 90,00 | 1200 | - | **LM 245832/LM 245810** |
| **220,878**<br>**8,696** | 317,5<br>12,5 | 47,625<br>1,875 | 517 | 979 | 90,00 | 1200 | - | **LM 245833/LM 245810** |
| **230,188**<br>**9,0625** | 317,5<br>12,5 | 47,625<br>1,875 | 643 | 977 | 90,00 | 1380 | 1570 | **LM 245846/LM 245810** |
| **231,775**<br>**9,125** | 300,038<br>11,8125 | 33,338<br>1,3125 | 266 | 426 | 39,00 | 1390 | 1650 | **544091/118** |

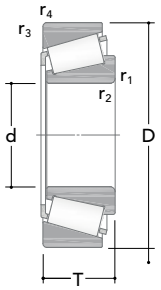


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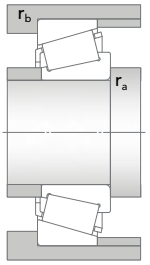


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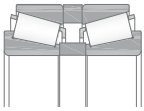
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **203,987** | 3,5 | 3,3 | 3,3 | 3,1 | 0,31 | 7,2 | **LM 241148/110** |
| **8,031** | 0,14 | 0,13 | | | | | |
| **206,375** | 3,5 | 3,3 | 3 | 3 | 0,5 | 8,6 | **67985/67920** |
| **8,125** | 0,14 | 0,13 | | | | | |
| | 3,3 | 3,3 | 3 | 3 | 0,33 | 34 | **H 242649/H 242610** |
| **212,725** | 3,5 | 3,3 | 3 | 3 | 0,48 | 8 | **LM 742745/LM 742710** |
| **8,375** | | | | | | | |
| **215,9** | 3,5 | 3,3 | 3 | 3 | 0,48 | 7,9 | **LM 742749/LM 742710** |
| **8,5** | | | | | | | |
| **216,408** | 3,5 | 3,3 | 3,3 | 3,1 | 0,48 | 7,9 | **LM 742747/710** |
| **8,52** | 0,14 | 0,13 | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,48 | 7,85 | **BT1B 443786** |
| **216,713** | 3,5 | 3,3 | 3,3 | 3,1 | 0,48 | 7,85 | **LM 742747 A/710** |
| **8,532** | 0,14 | 0,13 | | | | | |
| **220,116** | 3,3 | 3,3 | 3 | 3 | 0,31 | 12,5 | **LM 245832/LM 245810** |
| **8,666** | | | | | | | |
| **220,878** | 3,3 | 3,3 | 3 | 3 | 0,31 | 12,5 | **LM 245833/LM 245810** |
| **8,696** | | | | | | | |
| **230,188** | 3,3 | 3,3 | 3 | 3 | 0,31 | 11 | **LM 245846/LM 245810** |
| **9,0625** | | | | | | | |
| **231,775** | 3,5 | 3,3 | 3,3 | 3,1 | 0,4 | 5,3 | **544091/118** |
| **9,125** | 0,14 | 0,13 | | | | | |



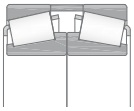

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **231,775**<br>**9,125**<br>(cont.) | 317,5<br>12,5 | 47,625<br>1,875 | 643 | 977 | 90,00 | 1380 | 1570 | **LM 245848/LM 245810** |
| **247,65**<br>**9,75** | 406,4<br>16 | 115,888<br>4,5625 | 1615 | 3136 | 256,00 | 990 | - | **HH 249949/HH 249910** |
| **254**<br>**10** | 533,4<br>21 | 133,35<br>5,25 | 2116 | 2908 | 239,00 | 720 | 970 | **332901** |
| | 533,4<br>21 | 133,35<br>5,25 | 1853 | 2753 | 228,00 | 730 | 950 | **HH 953749/HH 953710** |
| **255,6**<br>**10,063** | 342,9<br>13,5 | 57,15<br>2,25 | 800 | 1398 | 125,00 | 1210 | 1400 | **M 349547/510** |
| **255,625**<br>**10,064** | 342,945<br>13,5012 | 57,15<br>2,25 | 658 | 1388 | 126,00 | 1070 | - | **417708** |
| | 342,945<br>13,5012 | 57,15<br>2,25 | 658 | 1388 | 126,00 | 1070 | - | **255-417054** |
| **257,175**<br>**10,125** | 342,9<br>13,5 | 57,15<br>2,25 | 800 | 1398 | 125,00 | 1210 | 1400 | **M 349549/510** |
| | 358,775<br>14,125 | 71,438<br>2,8125 | 1022 | 1767 | 155,00 | 1200 | 1400 | **M 249747/710** |
| **263,525**<br>**10,375** | 325,438<br>12,8125 | 28,575<br>1,125 | 272 | 555 | 48,00 | 1290 | 1500 | **38880/38820** |
| **265**<br>**10,4331** | 355,6<br>14 | 57,15<br>2,25 | 647 | 1404 | 125,00 | 1080 | - | **LM 451347/LM 451310** |
| **266,56**<br>**10,4995** | 325,438<br>12,8125 | 29,5<br>1,1614 | 205 | 472 | 41,80 | 1180 | - | **446356** |

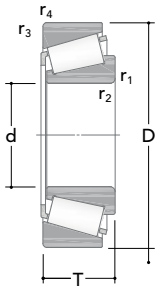


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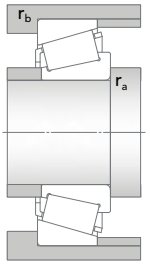


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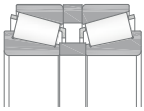
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **231,775**<br>**9,125**<br>(cont.) | 3,3 | 3,3 | 3 | 3 | 0,31 | 10,5 | **LM 245848/LM 245810** |
| **247,65**<br>**9,75** | 6,4 | 6,4 | 6 | 6 | 0,33 | 60 | **HH 249949/HH 249910** |
| **254**<br>**10** | 6,4 | 6,4 | 6 | 6 | 0,88 | 120 | **332901** |
| | 6,4 | 6,4 | 6 | 6 | 0,94 | 121 | **HH 953749/HH 953710** |
| **255,6**<br>**10,063** | 1,5<br>0,06 | 3,3<br>0,13 | 1,5 | 3 | 0,35 | 15 | **M 349547/510** |
| **255,625**<br>**10,064** | 6,4 | 3,3 | 6 | 3 | 0,35 | 14 | **417708** |
| | 6,4 | 3,3 | 6 | 3 | 0,35 | 14,4 | **255-417054** |
| **257,175**<br>**10,125** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3 | 0,35 | 14 | **M 349549/510** |
| | 1,5<br>0,06 | 3,3<br>0,13 | 1,5 | 3 | 0,33 | 21,5 | **M 249747/710** |
| **263,525**<br>**10,375** | 1,5<br>0,06 | 1,5<br>0,06 | 1,5 | 1,5 | 0,37 | 5,3 | **38880/38820** |
| **265**<br>**10,4331** | 3,5 | 3,3 | 3 | 3 | 0,35 | 16 | **LM 451347/LM 451310** |
| **266,56**<br>**10,4995** | 1 | 1,5 | 1 | 1,5 | 0,37 | 5,1 | **446356** |



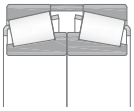

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **266,7** | 325,438 | 27,755 | 205 | 472 | 41,80 | 1180 | - | **443884** |
| **10,5** | 12,8125 | 1,0927 | | | | | | |
| | 355,6 | 57,15 | 647 | 1404 | 125,00 | 1080 | - | **LM 451349/LM 451310** |
| | 14 | 2,25 | | | | | | |
| **292,1** | 374,65 | 47,625 | 618 | 1129 | 99,00 | 1110 | 1300 | **L 555249/210** |
| **11,5** | 14,75 | 1,875 | | | | | | |
| **300** | 495,3 | 141,288 | 2345 | 4516 | 358,00 | 770 | 1120 | **HH 258248/HH 258210** |
| **11,811** | 19,5 | 5,5625 | | | | | | |
| **304,8** | 393,7 | 50,8 | 656 | 1220 | 104,00 | 1010 | 1200 | **L 357049/010** |
| **12** | 15,5 | 2 | | | | | | |
| | 546,1 | 171,053 | 3075 | 5560 | 418,00 | 730 | 970 | **617089** |
| | 21,5 | 6,7344 | | | | | | |
| **330,2** | 415,925 | 47,625 | 406 | 977 | 79,00 | 850 | - | **440009** |
| **13** | 16,375 | 1,875 | | | | | | |
| | 482,6 | 85,725 | 1201 | 2535 | 201,00 | 770 | 1030 | **EE 526130/526190** |
| | 19 | 3,375 | | | | | | |
| **333,375** | 469,9 | 90,488 | 1437 | 2874 | 230,00 | 780 | 1050 | **HM 261049/HM 261010** |
| **13,125** | 18,5 | 3,5625 | | | | | | |
| **342,9** | 450,85 | 66,675 | 1009 | 2218 | 179,00 | 870 | 1100 | **LM 361649 A/610** |
| **13,5** | 17,75 | 2,625 | | | | | | |
| **346,075** | 488,95 | 95,25 | 1533 | 3153 | 255,00 | 820 | 1100 | **HM 262749/710** |
| **13,625** | 19,25 | 3,75 | | | | | | |
| **355,6** | 482,6 | 60,32 | 565 | 1205 | 98,00 | 760 | 1130 | **431884** |
| **14** | 19 | 2,3748 | | | | | | |

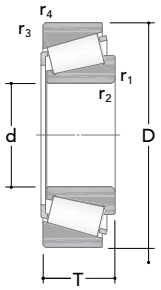


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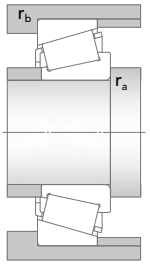


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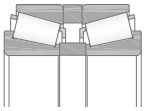
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **266,7** | 1,5 | 1,5 | 1,5 | 1,5 | 0,37 | 5,1 | **443884** |
| **10,5** | | | | | | | |
| | 3,5 | 3,3 | 3 | 3 | 0,35 | 15,5 | **LM 451349/LM 451310** |
| **292,1** | 3,5 | 3,3 | 3,3 | 3,1 | 0,4 | 12,5 | **L 555249/210** |
| **11,5** | 0,14 | 0,13 | | | | | |
| **300** | 6,4 | 6,4 | 6 | 6 | 0,33 | 107 | **HH 258248/HH 258210** |
| **11,811** | | | | | | | |
| **304,8** | 6,4 | 3,3 | 6 | 3,1 | 0,35 | 14,5 | **L 357049/010** |
| **12** | 0,25 | 0,13 | | | | | |
| | 8 | 8 | 7 | 7 | 0,35 | 170 | **617089** |
| **330,2** | 3,5 | 3,5 | 3 | 3 | 0,5 | 14,3 | **440009** |
| **13** | | | | | | | |
| | 6,4 | 3,3 | 6 | 3 | 0,4 | 48,5 | **EE 526130/526190** |
| **333,375** | 6,4 | 3,3 | 6 | 3 | 0,33 | 47 | **HM 261049/HM 261010** |
| **13,125** | | | | | | | |
| **342,9** | 8,5 | 3,5 | 7,5 | 3,3 | 0,35 | 28 | **LM 361649 A/610** |
| **13,5** | 0,33 | 0,14 | | | | | |
| **346,075** | 6,4 | 3,3 | 6 | 3,1 | 0,33 | 55 | **HM 262749/710** |
| **13,625** | 0,25 | 0,13 | | | | | |
| **355,6** | 7 | 7 | 6,5 | 6,5 | 0,48 | 26,5 | **431884** |
| **14** | | | | | | | |

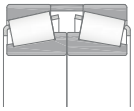



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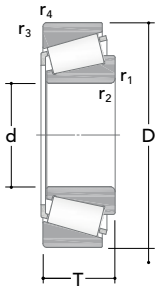



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **380,1**<br>**14,9606** | 480<br>18,8976 | 50<br>1,9685 | 594 | 1502 | 120,00 | 710 | - | **380-332420** |
| **381**<br>**15** | 479,425<br>18,875 | 49,213<br>1,9375 | 647 | 1488 | 121,00 | 770 | 1000 | **L 865547/512** |
| **384,175**<br>**15,125** | 546,1<br>21,5 | 104,775<br>4,125 | 1865 | 4092 | 325,00 | 720 | 950 | **HM 266449/410** |
| **403,225**<br>**15,875** | 460,375<br>18,125 | 28,575<br>1,125 | 249 | 764 | 58,60 | 780 | 1060 | **LL 566848/810** |
| **406,4**<br>**16** | 508<br>20 | 61,912<br>2,4375 | 829 | 2143 | 168,00 | 680 | 950 | **L 467549/L 467510** |
| | 549,275<br>21,625 | 85,725<br>3,375 | 1471 | 3072 | 234,00 | 680 | 850 | **LM 567949/910** |
| | 574,675<br>22,625 | 76,2<br>3 | 943 | 2029 | 164,00 | 640 | 860 | **EE 285160/285226** |
| | 762<br>30 | 180,975<br>7,125 | 3685 | 6033 | 445,00 | 450 | 600 | **H 969249/H 969210** |
| **415,925**<br>**16,375** | 590,55<br>23,25 | 114,3<br>4,5 | 2121 | 4736 | 370,00 | 620 | 860 | **M 268749/M 268710** |
| **430,212**<br>**16,9375** | 603,25<br>23,75 | 76,2<br>3 | 1086 | 2335 | 185,00 | 620 | 830 | **EE 241693/242375** |
| **431,8**<br>**17** | 571,5<br>22,5 | 89,694<br>3,5313 | 1448 | 3443 | 266,00 | 620 | 780 | **328284** |
| **431,902**<br>**17,004** | 685,698<br>26,996 | 177,8<br>7 | 3947 | 8669 | 584,00 | 500 | 730 | **332900** |

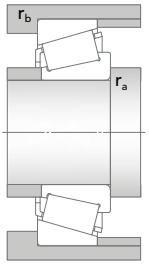

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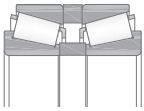
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **380,1**<br>**14,9606** | 6 | 4 | 5 | 3,5 | 0,5 | 20,5 | **380-332420** |
| **381**<br>**15** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3,1 | 0,5 | 20 | **L 865547/512** |
| **384,175**<br>**15,125** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,33 | 77 | **HM 266449/410** |
| **403,225**<br>**15,875** | 3,5<br>0,14 | 3,3<br>0,13 | 3,3 | 3,1 | 0,4 | 6,7 | **LL 566848/810** |
| **406,4**<br>**16** | 3,3 | 3,3 | 3 | 3 | 0,37 | 26,5 | **L 467549/L 467510** |
| | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3,1 | 0,4 | 53,5 | **LM 567949/910** |
| | 6,8 | 3,3 | 6 | 3 | 0,5 | 53,5 | **EE 285160/285226** |
| | 12,7 | 12,7 | 12 | 12 | 0,94 | 320 | **H 969249/H 969210** |
| **415,925**<br>**16,375** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,33 | 120 | **M 268749/M 268710** |
| **430,212**<br>**16,9375** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,52 | 59 | **EE 241693/242375** |
| **431,8**<br>**17** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,44 | 60 | **328284** |
| **431,902**<br>**17,004** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,48 | 253 | **332900** |



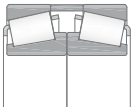

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **447,675** | 635 | 120,65 | 2361 | 5466 | 402,00 | 540 | 770 | **M 270749/M 270710** |
| **17,625** | 25 | 4,75 | | | | | | |
| **457,2** | 573,088 | 74,612 | 1205 | 2965 | 231,00 | 600 | 800 | **L 570649/L 570610** |
| **18** | 22,5625 | 2,9375 | | | | | | |
| | 603,25 | 85,725 | 1437 | 3430 | 263,00 | 610 | 840 | **LM 770949/910** |
| | 23,75 | 3,375 | | | | | | |
| | 615,95 | 85,725 | 1473 | 3785 | 281,00 | 540 | 780 | **LM 272235/LM 272210** |
| | 24,25 | 3,375 | | | | | | |
| | 660,4 | 91,28 | 1778 | 3605 | 278,00 | 540 | 690 | **EE 737181/737260** |
| | 26 | 3,5937 | | | | | | |
| **479,425** | 679,45 | 128,588 | 2767 | 6327 | 453,00 | 500 | 750 | **332529** |
| **18,875** | 26,75 | 5,0625 | | | | | | |
| **480** | 950 | 240 | 7033 | 12551 | 840,00 | 380 | - | **332263** |
| **18,8976** | 37,4016 | 9,4488 | | | | | | |
| **482,6** | 634,873 | 80,962 | 1468 | 3642 | 281,00 | 580 | 740 | **EE 243190/243250** |
| **19** | 24,995 | 3,1875 | | | | | | |
| **488,95** | 634,873 | 84,138 | 1430 | 3678 | 263,00 | 580 | 750 | **LM 772748/710** |
| **19,25** | 24,995 | 3,3125 | | | | | | |
| **498,323** | 634,873 | 80,962 | 1468 | 3642 | 281,00 | 580 | 740 | **EE 243196 AX/243250** |
| **19,619** | 24,995 | 3,1875 | | | | | | |
| **498,475** | 634,873 | 80,962 | 1468 | 3642 | 271,00 | 580 | 740 | **EE 243196/243250** |
| **19,625** | 24,995 | 3,1875 | | | | | | |
| **498,653** | 634,873 | 80,962 | 1468 | 3642 | 281,00 | 580 | 740 | **EE 243196/243250** |
| **19,632** | 24,995 | 3,1875 | | | | | | |

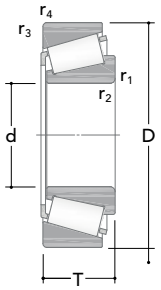


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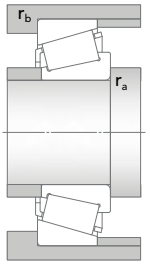


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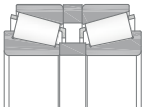
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **447,675**<br>**17,625** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,33 | 120 | **M 270749/M 270710** |
| **457,2**<br>**18** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,4 | 43,5 | **L 570649/L 570610** |
| | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3,1 | 0,46 | 61,5 | **LM 770949/910** |
| | 6,4 | 6,4 | 6 | 6 | 0,33 | 72 | **LM 272235/LM 272210** |
| | 10,5 | 6,4 | 10 | 6 | 0,37 | 91 | **EE 737181/737260** |
| **479,425**<br>**18,875** | 6,4 | 6,4 | 6 | 6 | 0,33 | 145 | **332529** |
| **480**<br>**18,8976** | 9,5 | 9,5 | 9 | 9 | 0,54 | 760 | **332263** |
| **482,6**<br>**19** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3 | 0,35 | 67,5 | **EE 243190/243250** |
| **488,95**<br>**19,25** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3,1 | 0,48 | 63,5 | **LM 772748/710** |
| **498,323**<br>**19,619** | 6,4 | 3,3 | 6 | 3 | 0,35 | 60 | **EE 243196 AX/243250** |
| **498,475**<br>**19,625** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3,1 | 0,35 | 59,5 | **EE 243196/243250** |
| **498,653**<br>**19,632** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3 | 0,35 | 59,5 | **EE 243196/243250** |

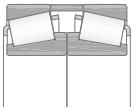



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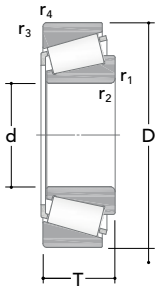



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **520,7**<br>**20,5** | 736,6<br>29 | 88,9<br>3,5 | 1631 | 3373 | 248,00 | 490 | 660 | **EE 982051/982900** |
| **536,575**<br>**21,125** | 761,873<br>29,995 | 146,05<br>5,75 | 3325 | 8090 | 544,00 | 440 | 580 | **M 276449/M 276410** |
| | 820<br>32,2835 | 152<br>5,9842 | 3930 | 7839 | 537,00 | 400 | 580 | **328017** |
| **539,75**<br>**21,25** | 635<br>25 | 50,8<br>2 | 774 | 2145 | 161,00 | 520 | 740 | **LL 575349/LL 575310** |
| **549,275**<br>**21,625** | 692,15<br>27,25 | 80,963<br>3,1875 | 1343 | 3492 | 252,00 | 670 | 960 | **L 476549/L 476510** |
| **558,8**<br>**22** | 736,6<br>29 | 88,108<br>3,4688 | 1827 | 4177 | 303,00 | 480 | 650 | **EE 843220/290** |
| | 736,6<br>29 | 104,775<br>4,125 | 2358 | 5725 | 403,00 | 480 | 650 | **LM 377449/410** |
| **607,72**<br>**23,926** | 787,4<br>31 | 93,662<br>3,6875 | 2164 | 5303 | 380,00 | 430 | 590 | **EE 649239/649310** |
| **609,6**<br>**24** | 787,4<br>31 | 93,662<br>3,6875 | 2164 | 5303 | 380,00 | 430 | 530 | **EE 649240/649310** |
| **635**<br>**25** | 736,6<br>29 | 57,15<br>2,25 | 863 | 2636 | 187,00 | 440 | 600 | **80780/80720** |
| **660,4**<br>**26** | 812,8<br>32 | 95,25<br>3,75 | 1955 | 5533 | 385,00 | 380 | 490 | **L 281147/L 281110** |
| | 939,8<br>37 | 136,525<br>5,375 | 3782 | 8130 | 551,00 | 340 | - | **332383** |

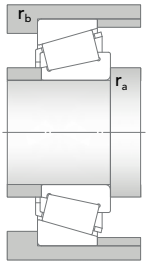

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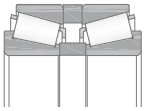
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **520,7** | 6,4 | 3,3 | 6 | 3 | 0,48 | 100 | **EE 982051/982900** |
| **20,5** | 0,25 | 0,13 | | | | | |
| **536,575** | 6,4 | 6,4 | 6 | 6 | 0,33 | 208 | **M 276449/M 276410** |
| **21,125** | 0,25 | 0,25 | | | | | |
| | 6 | 5 | 5 | 4 | 0,43 | 272 | **328017** |
| **539,75** | 6,4 | 6,4 | 6 | 6 | 0,4 | 27 | **LL 575349/LL 575310** |
| **21,25** | 0,25 | 0,25 | | | | | |
| **549,275** | 6,4 | 6,4 | 6 | 6 | 0,37 | 67 | **L 476549/L 476510** |
| **21,625** | 0,25 | 0,25 | | | | | |
| **558,8** | 6,4 | 6,4 | 6 | 6 | 0,35 | 92,5 | **EE 843220/290** |
| **22** | 0,25 | 0,25 | | | | | |
| | 6,4 | 6,4 | 6 | 6 | 0,35 | 115 | **LM 377449/410** |
| | 0,25 | 0,25 | | | | | |
| **607,72** | 6,4 | 6,4 | 6 | 6 | 0,37 | 110 | **EE 649239/649310** |
| **23,926** | 0,25 | 0,25 | | | | | |
| **609,6** | 6,4 | 6,4 | 6 | 6 | 0,37 | 110 | **EE 649240/649310** |
| **24** | 0,25 | 0,25 | | | | | |
| **635** | 3,3 | 3,3 | 3 | 3 | 0,44 | 37 | **80780/80720** |
| **25** | 0,13 | 0,13 | | | | | |
| **660,4** | 6,4 | 6,4 | 6 | 6 | 0,33 | 105 | **L 281147/L 281110** |
| **26** | 0,25 | 0,25 | | | | | |
| | 6,4 | 6,4 | 6 | 6 | 0,4 | 287 | **332383** |
| | 0,25 | 0,25 | | | | | |



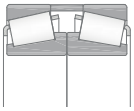

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **660,4** | 1000 | 152,4 | 4423 | 9595 | 614,00 | 320 | 460 | **334140** |
| **26** | 39,3701 | 6 | | | | | | |
| (cont.) | | | | | | | | |
| **679,45** | 901,7 | 142,875 | 3591 | 8956 | 603,00 | 340 | 480 | **LM 281849/LM 281810** |
| **26,75** | 35,5 | 5,625 | | | | | | |
| **682,625** | 965,2 | 185,738 | 5137 | 12609 | 793,00 | 330 | - | **332283** |
| **26,875** | 38 | 7,3125 | | | | | | |
| | 1080 | 200 | 6765 | 13097 | 837,00 | 290 | 420 | **332705** |
| | 42,5197 | 7,874 | | | | | | |
| **685,8** | 876,3 | 93,662 | 2091 | 5458 | 378,00 | 370 | 460 | **EE 655270/655345** |
| **27** | 34,5 | 3,6875 | | | | | | |
| **711,2** | 939,8 | 120,65 | 2644 | 6183 | 426,00 | 310 | 420 | **328068** |
| **28** | 37 | 4,75 | | | | | | |
| **723,9** | 914,4 | 84,138 | 2076 | 4881 | 336,00 | 350 | 490 | **EE 755285/755360** |
| **28,5** | 36 | 3,3125 | | | | | | |
| **736,6** | 825,5 | 31,75 | 425 | 1384 | 90,60 | 370 | - | **LL 582949/LL 582910** |
| **29** | 32,5 | 1,25 | | | | | | |
| **749,3** | 990,6 | 159,5 | 4593 | 12093 | 744,00 | 320 | 430 | **LM 283649/610** |
| **29,5** | 39 | 6,2795 | | | | | | |
| **759,925** | 889 | 69,85 | 1221 | 3786 | 256,00 | 370 | 480 | **LL 483448/LL 483418** |
| **29,9183** | 35 | 2,75 | | | | | | |
| | 889 | 88,9 | 1955 | 6120 | 410,00 | 330 | - | **L 183448/L 183410** |
| | 35 | 3,5 | | | | | | |
| **760** | 889 | 69,85 | 1221 | 3786 | 256,00 | 370 | 480 | **LL 483448/418** |
| **29,9212** | 35 | 2,75 | | | | | | |

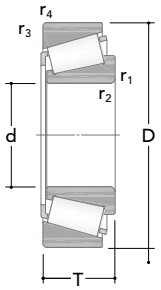


DB

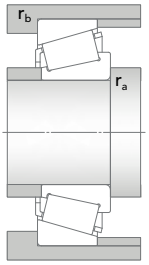


DF

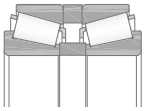
| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **660,4** | 6,4 | 6,4 | 6 | 6 | 0,43 | 410 | **334140** |
| **26** | 0,25 | 0,25 | | | | | |
| (cont.) | | | | | | | |
| **679,45** | 9,7 | 6,4 | 9 | 6 | 0,33 | 242 | **LM 281849/LM 281810** |
| **26,75** | | | | | | | |
| **682,625** | 6,4 | 6,4 | 6 | 6 | 0,33 | 420 | **332283** |
| **26,875** | 0,25 | 0,25 | | | | | |
| | 12 | 12 | 11 | 11 | 0,43 | 640 | **332705** |
| **685,8** | 6,4 | 6,4 | 6 | 6 | 0,43 | 130 | **EE 655270/655345** |
| **27** | 0,25 | 0,25 | | | | | |
| **711,2** | 6,4 | 6,4 | 6 | 6 | 0,75 | 206 | **328068** |
| **28** | 0,25 | 0,25 | | | | | |
| **723,9** | 5,5 | 6,4 | 5 | 6 | 0,37 | 115 | **EE 755285/755360** |
| **28,5** | | 0,25 | | | | | |
| **736,6** | 3,5 | 3,3 | 3 | 3 | 0,4 | 22,5 | **LL 582949/LL 582910** |
| **29** | | | | | | | |
| **749,3** | 6,4 | 6,4 | 6 | 6 | 0,33 | 330 | **LM 283649/610** |
| **29,5** | 0,25 | 0,25 | | | | | |
| **759,925** | 3,3 | 3,3 | 3 | 3 | 0,37 | 67,5 | **LL 483448/LL 483418** |
| **29,9183** | 0,13 | 0,13 | | | | | |
| | 3,3 | 3,3 | 3 | 3 | 0,3 | 94 | **L 183448/L 183410** |
| | 0,13 | 0,13 | | | | | |
| **760** | 3,3 | 3,3 | 3,1 | 3,1 | 0,37 | 67,5 | **LL 483448/418** |
| **29,9212** | 0,13 | 0,13 | | | | | |



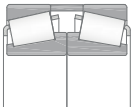

TS




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | T | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm]/[in] | | | [kN] | | | [rpm] | | |
| **760**<br>**29,9212** | 889<br>35 | 88,9<br>3,5 | 1876 | 5854 | 380,00 | 340 | 470 | **L 183448/L 183410** |
| (cont.) | | | | | | | | |
| **762**<br>**29,9999** | 889<br>35 | 69,85<br>2,75 | 1221 | 3786 | 256,00 | 370 | 480 | **LL 483449/LL 483418** |
| | 889<br>35 | 88,9<br>3,5 | 1876 | 5854 | 380,00 | 340 | 470 | **L 183449/410** |
| **774,7**<br>**30,5** | 965,2<br>38 | 93,662<br>3,6875 | 1929 | 4938 | 332,00 | 310 | 430 | **EE 752305/752380** |
| **801,688**<br>**31,5625** | 914,4<br>36 | 58,738<br>2,3125 | 1105 | 3529 | 237,00 | 330 | 460 | **LL 584449/LL 584410** |
| **838,2**<br>**33** | 1041,4<br>41 | 93,662<br>3,6875 | 2026 | 5183 | 346,00 | 290 | 370 | **EE 763330/763410** |
| **857,25**<br>**33,75** | 1092,2<br>43 | 120,65<br>4,75 | 2785 | 7325 | 477,00 | 280 | 370 | **EE 157337/157430** |
| **928**<br>**36,5354** | 1060<br>41,7323 | 92<br>3,622 | 2209 | 8004 | 318,00 | 260 | - | **JL 286948/JL 286910** |
| **930**<br>**36,6142** | 1060<br>41,7323 | 92<br>3,622 | 2209 | 8004 | 318,00 | 260 | - | **JL 286949/JL 286910** |
| **977,9**<br>**38,5** | 1130,3<br>44,5 | 66,675<br>2,625 | 1434 | 4440 | 282,00 | 240 | 330 | **LL 687949/LL 687910** |
| **1016**<br>**40** | 1270<br>50 | 101,6<br>4 | 2734 | 7470 | 467,00 | 210 | 280 | **EE 168400/168500** |



DB



DF

| Dimensions | | | | | Factor | Mass | Designation |
|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | e | | Standard design |
| [mm]/[in] | | | | | | [kg] | |
| **760**<br>**29,9212**<br>(cont.) | 3,3<br>0,13 | 3,3<br>0,13 | 3,1 | 3,1 | 0,3 | 94 | **L 183448/L 183410** |
| **762**<br>**29,9999** | 3,3<br>0,13 | 3,3<br>0,13 | 3 | 3 | 0,37 | 66,5 | **LL 483449/LL 483418** |
| | 3,3<br>0,13 | 3,3<br>0,13 | 3,1 | 3,1 | 0,3 | 94 | **L 183449/410** |
| **774,7**<br>**30,5** | 6,4<br>0,25 | 3,3<br>0,13 | 6 | 3 | 0,4 | 131 | **EE 752305/752380** |
| **801,688**<br>**31,5625** | 3,5 | 3,3 | 3 | 3 | 0,4 | 53,5 | **LL 584449/LL 584410** |
| **838,2**<br>**33** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,44 | 160 | **EE 763330/763410** |
| **857,25**<br>**33,75** | 19 | 6,4 | 18 | 6 | 0,57 | 245 | **EE 157337/157430** |
| **928**<br>**36,5354** | 3,3<br>0,13 | 3,3<br>0,13 | 3 | 3 | 0,33 | 119 | **JL 286948/JL 286910** |
| **930**<br>**36,6142** | 3,3<br>0,13 | 3,3<br>0,13 | 3 | 3 | 0,33 | 117 | **JL 286949/JL 286910** |
| **977,9**<br>**38,5** | 6,4<br>0,25 | 6,4<br>0,25 | 6 | 6 | 0,44 | 100 | **LL 687949/LL 687910** |
| **1016**<br>**40** | 9,7 | 9,7 | 9 | 9 | 0,5 | 275 | **EE 168400/168500** |

# Double row tapered roller bearings

RKB double row tapered roller bearings are produced in several configurations (TDO, TDONASW, TDI, TDIS) to support combined forces and locate the shaft in both directions.
Manufactured with a given axial clearance (BEP), RKB double row tapered roller bearings can fully exploit their potential in a variety of industries and applications. In order to manufacture products with the highest possible resistance to fatigue and wear, RKB makes use of different bearing steel grades and special heat treatments. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Double row tapered roller bearings

## Tolerances and accuracy

Dimensional and running tolerances for RKB double row tapered roller bearings are mostly in conformity with Normal class. Other specific tolerances may be available by customer request. For additional information please consult the RKB application engineering services.

## Axial internal clearance

RKB double row tapered roller bearings TDO and TDI configuration feature a specific Bench End Play (BEP) according to application type, contact angle and main boundary dimension. Different value of B.E.P. maybe provided according to customer request. For additional information please consult the RKB application engineering services.

## Misalignment

Angular misalignment lead to uneven load distribution among rollers and rows as well as local overloading. Thus reduction in terms of bearing life expectation may appear.

## Minimum load

In order to get a correct functioning double row tapered roller bearings have to be always loaded with a minimum value, in particular in case of application featuring high speed, high acceleration and/or quick variation of load direction. According to the above condition the minimum required load can be evaluated as following:

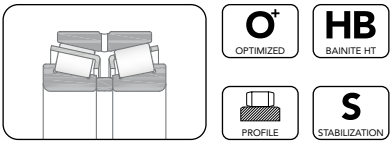
$$\frac{F_{rm}}{C} > 0{,}02$$

where:

- $F_{rm}$ minimum radial load, [kN];
- C dynamic load rating, [kN].

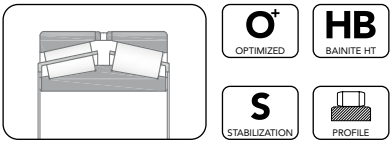
## Designs and variants

### Type TDO



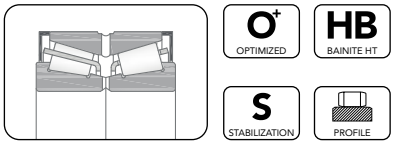

- One ribless outer ring (one double cup)
- Two inner rings with two ribs each (two single cones)
- Two one-piece window type pressed steel cages
- One single spacer between inner rings (plain or with lubrication grooves and holes)
- Supports radial and axial loads in both directions
- High arrangement stiffness
- Reduced angular misalignment
- Optimized roller profile
- Preset or adjusted BEP on customer's request
- Available in metric and inch sizes

### Type TDI



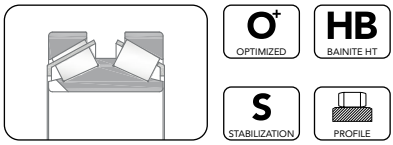

- Two ribless outer rings (two single cups)
- One inner ring with three ribs (one double cone)
- Two one-piece window type pressed steel cages
- One single spacer between outer rings (plain or with lubrication grooves and holes)
- Supports radial and axial loads in both directions
- Optimized roller profile
- Preset or adjusted BEP on customer's request
- Available in metric and inch sizes

### Type TDONASW



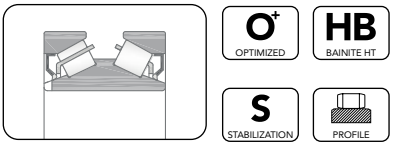

- One ribless outer ring (one double cup)
- Two inner rings with two ribs each (two single cones)
- Two one-piece window type pressed steel cages
- Lubrication grooves in cones internal side face
- Lateral shields or seals for contaminant exclusion
- Execution without spacer
- Supports radial and axial loads in both directions
- High arrangement stiffness
- Optimized roller profile
- Preset or adjusted BEP on customer's request
- Available in metric and inch sizes

### Type TDIS with steep contact angle



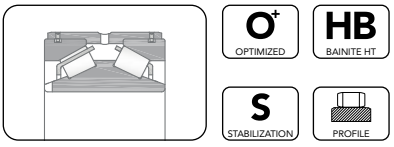

- Two ribless outer rings (two single cups)
- One inner ring with three ribs (one double cone)
- Two one-piece window type pressed steel cages
- Supports axial loads in both directions
- Designed with increased contact angle
- Suitable for high axial load carrying capacity
- Available with steel pin-type cage and pierced roller design
- Available with one or more antirotation keyway slots on each side of double cone
- Available in metric and inch sizes

## Type TDISS with steep contact angle



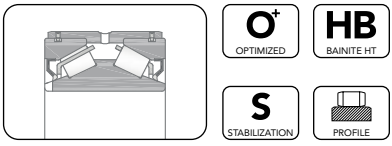

- Two ribless outer rings (two single cups)
- One inner ring with three ribs (one double cone)
- Two one-piece window type pressed steel cages
- Lateral seals for contaminant exclusion
- Supports axial loads in both directions
- Designed with increased contact angle
- Suitable for high axial load carrying capacity
- Available with steel pin-type cage and pierced roller design
- Available with one or more antirotation keyway slots on each side of double cone
- Available in metric and inch sizes

## Type TDIS with retention sleeve




- Two ribless outer rings (two single cups)
- One inner ring with three ribs (one double cone)
- Two one-piece window type pressed steel cages
- Preset or adjusted BEP on customer's request
- Designed with increased contact angle
- Suitable for high axial load carrying capacity
- Available with one or more antirotation keyway slots on each side of double cone
- Outer bush with annular groove and lubrication holes
- Available in metric and inch sizes

## Type TDISS with retention sleeve




- Two ribless outer rings (two single cups)
- One inner ring with three ribs (one double cone)
- Two one-piece window type pressed steel cages
- Lateral seals for contaminant exclusion
- Preset or adjusted BEP on customer's request
- Designed with increased contact angle
- Suitable for high axial load carrying capacity
- Available with one or more antirotation keyway slots on each side of double cone
- Outer bush with annular groove and lubrication holes
- Available in metric and inch sizes

| Suffixes | Internal design |
|---|---|
| B | In TDI bearings, special double cone width. The number immediately following the B gives the double cone width in mm (decimals excluded) |
| C | In TDO bearings, special double cup width. The number immediately following the C gives the double cone width in mm (decimals excluded) |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |
| SP | Special or non-standard bearing |
| BT2B | Double row tapered roller bearing |

| Suffixes | Accuracy, clearance, running |
|---|---|
| HP | High precision (better than P6) |

| Suffixes | External design |
|---|---|
| FF/1 | FKM seal on both sides |
| FF | NBR seal on both sides |

## Part numbering

### First system

| | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 |
|---|---|---|---|---|---|
| | Configuration | Boundary dimensions | Execution | Material and heat treatment of bearing components | Special surface treatment |
| | TDO, TDI, TDONA, TDIS, TDISS, TDIT, TDOS, TDONASW, TDONASWE, TDONASWB | dxDxT/DxTxd | A1…An, AA, AB, AD, AC1, A1B etc. indicating major or minor revision based on: customer's request, application requirement, technology or design advancement, presence of special features. The meaning of such combination of characters and numbers may vary from bearing to bearing | HB1…HB7 HA1…HA7 | PT1…PT7 AWT1…AWT7 ACT1…ACT3 |
| Example | TDO | 020503/519395 | AA3 | HA4 | PT4 |
| | One double cup, two single cones, and two one-piece window type pressed steel cages,one cone single spacer between cones. | d: 02,95 inches = 74,93 mm D: 05,51 inches = 139,95 mm T: 03,93 inches = 99,82 mm | As basic TDO configuration, but with counterbored hole for locking pin and special Bench End Play | Cones, cup and rollers in case hardening steel | Phosphate treated cones, cup and rollers |

Tab. 17 (1 of 2) - First system: structure

| Section 6 | Section 7 | Section 8 | Section 9 | Section 10 |
|---|---|---|---|---|
| Roller features | Final bearing specification | K | $r_{1,2\ min}$ $r_{3,4\ min}$ | Suffix |
| ZB | BT2B | The three figures immediately following the K indicates the K thrust value without a decimal mark | The four figures immediately following the three digits of the K value indicate the minimum values in mm of radii 1,2 and 3,4 without decimal marks | Different features from standard version |
| ZB | BT2B | K136 | 3506 | VL |
| Optimized roller profile for improved load distribution | Double row tapered roller bearing | K: 1,36 | $r_{1,2\ min}$: 3,5 mm<br>$r_{3,4\ min}$: 0,6 mm | Victory Line |

Tab. 17 (2 of 2) - First system: structure

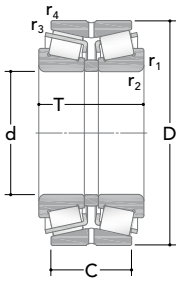
## Second system

| | Section 1 | Section 2 | Section 3 | Section 4 |
|---|---|---|---|---|
| | Configuration | Boundary dimensions | Execution | Material and heat treatment of bearing components |
| | TDO, TDI, TDONA, TDIS, TDISS, TDIT, TDOS, TDONASW, TDONASWE, TDONASWB | Up to six digits | A1…An, AA, AB, AD, AE1, A1B etc. indicating major or minor revision based on: customer's request, application requirement, technology or design advancement, presence of special features. Typically the meaning of such combination of alphabetical and numerical characters vary from bearing to bearing. | HB1…HB7<br>HA1…HA7 |
| Example | TDI | 331792 | A9 | HB1 |
| | Double row tapered roller bearing with one double cone, two one-piece window type pressed steel cages with rollers, two single cups, and one cup spacer. X configuration | No dimension indication | As basic TDI configuration, but with lubrication grooves in side faces of double cone | Cone and cups in through hardening steel with bainitic treatment |

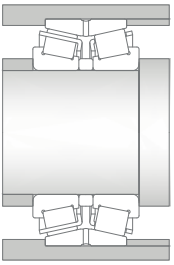
Tab. 18 (1 of 2) - Second system: structure

| Section 5 | Section 6 | Section 7 | Section 8 |
|---|---|---|---|
| Configuration | Boundary dimensions | Execution | Material and heat treatment of bearing components |
| PT1…PT7<br>AWT1…AWT7<br>ACT1…ACT3 | ZB | BT2B | Different features from standard version |
| ACT1 | ZB | BT2B | VL |
| Anticorrosion treated cone and cups | Optimized roller profile for improved load distribution | Double row tapered roller bearing | Victory Line |

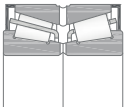
Tab. 18 (2 of 2) - Second system: structure




TDO

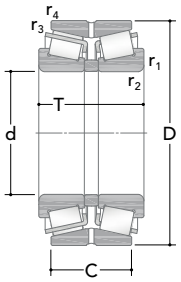


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **100** | 150 | 55 | 39,05 | 223 | 351 | 42 | **TDO 332759** |
| **3,937** | 5,906 | 2,165 | 1,537 | | | | |
| | 150 | 76,2 | 61,976 | 301 | 534 | 61 | **TDO 328818** |
| | 5,906 | 3 | 2,44 | | | | |
| | 180 | 80 | 64 | 458 | 638 | 72 | **TDO 617335** |
| | 7,087 | 3,150 | 2,520 | | | | |
| **101,6** | 146,05 | 49,212 | 38,94 | 268 | 370 | 41 | **TDO 332767** |
| **4** | 5,75 | 1,938 | 1,533 | | | | **(521945/910)** |
| **107,95** | 146,05 | 49,212 | 39,688 | 153 | 311 | 32,4 | **TDO 331392** |
| **4,25** | 5,75 | 1,938 | 1,563 | | | | **(521949/910)** |
| | 146,05 | 49,212 | 39,688 | 153 | 311 | 32,4 | **TDO 331571** |
| | 5,75 | 1,938 | 1,563 | | | | **(521949/910)** |
| | 158,75 | 53,978 | 39,688 | 127 | 321 | 37 | **TDO 614018** |
| | 6,25 | 2,125 | 1,563 | | | | **(37425/626)** |
| **110** | 200 | 90 | 72 | 561 | 790 | 91 | **TDO 328947** |
| **4,331** | 7,874 | 3,543 | 2,835 | | | | |
| **114,3** | 177,8 | 92,075 | 69,85 | 467 | 833 | 85 | **TDO 612700** |
| **4,5** | 7 | 3,625 | 2,75 | | | | **(64450/700)** |
| **120** | 180 | 86 | 68 | 421 | 828 | 90 | **TDO 331181** |
| **4,724** | 7,087 | 3,386 | 2,677 | | | | |
| **130** | 230 | 146 | 118,5 | 945 | 1690 | 171 | **TDO 330431** |
| **5,118** | 9,055 | 5,748 | 4,668 | | | | |
| **133,35** | 215,9 | 106,362 | 80,962 | 643 | 1220 | 125 | **TDO 332160** |
| **5,25** | 8,5 | 4,188 | 3,188 | | | | **(74525/851)** |

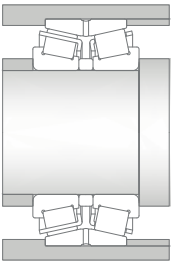


TDONASW

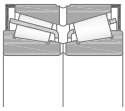
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 100<br>3,937 | 2,5 | 0,8 | 0,65 | 3,00 | TDO 332759 |
| | 3,5 | 0,6 | 0,40 | 4,25 | TDO 328818 |
| | 3 | 0,8 | 0,43 | 7,65 | TDO 617335 |
| 101,6<br>4 | 1,5 | 0,8 | 0,37 | 2,45 | TDO 332767<br>(521945/910) |
| 107,95<br>4,25 | 1,5 | 0,8 | 0,40 | 2,25 | TDO 331392<br>(521949/910) |
| | 1,5 | 0,8 | 0,40 | 2,25 | TDO 331571<br>(521949/910) |
| | 3,5 | 0,8 | 0,60 | 3,00 | TDO 614018<br>(37425/626) |
| 110<br>4,331 | 3 | 1 | 0,43 | 11,00 | TDO 328947 |
| 114,3<br>4,5 | 3,5 | 0,8 | 0,52 | 7,75 | TDO 612700<br>(64450/700) |
| 120<br>4,724 | 2,5 | 0,8 | 0,46 | 7,10 | TDO 331181 |
| 130<br>5,118 | 4 | 1,5 | 0,43 | 23,50 | TDO 330431 |
| 133,35<br>5,25 | 3,5 | 1,5 | 0,48 | 14,50 | TDO 332160<br>(74525/851) |




TDO

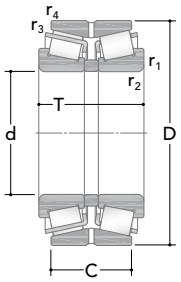


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **139,7**<br>**5,5** | 254<br>10 | 149,225<br>5,875 | 111,125<br>4,375 | 1086 | 1965 | 193 | **TDO 332750**<br>**(99550/102)** |
| **140**<br>**5,512** | 200<br>7,874 | 93,665<br>3,688 | 73,025<br>2,875 | 472 | 1042 | 102 | **TDO 442210** |
| **146,05**<br>**5,75** | 193,675<br>7,625 | 65,085<br>2,562 | 53,975<br>2,125 | 316 | 689 | 72 | **TDO 331943**<br>**(36690/620)** |
| **150**<br>**5,906** | 225<br>8,858 | 107<br>4,213 | 78<br>3,071 | 683 | 1325 | 132 | **TDO 442211** |
| **152,4**<br>**6** | 222,25<br>8,75 | 100,01<br>3,937 | 76,2<br>3 | 612 | 1268 | 123 | **TDO 613328**<br>**(231649/610)** |
| **155**<br>**6,102** | 200<br>7,874 | 66<br>2,598 | 54<br>2,126 | 311 | 613 | 61 | **TDO 328957** |
| **160**<br>**6,299** | 240<br>9,449 | 114<br>4,488 | 84<br>3,307 | 785 | 1544 | 158 | **TDO 442212** |
| | 270<br>10,630 | 150<br>5,906 | 120<br>4,724 | 1200 | 2279 | 220 | **TDO 332758** |
| **165,1**<br>**6,5** | 225,425<br>8,875 | 85,725<br>3,375 | 69,85<br>2,75 | 491 | 1167 | 113 | **TDO 331792**<br>**(46790/720)** |
| | 288,925<br>11,375 | 142,875<br>5,625 | 111,125<br>4,375 | 1183 | 2260 | 218 | **TDO 328697**<br>**(94649/114)** |
| **177,8**<br>**7** | 269,875<br>10,625 | 119,062<br>4,688 | 93,662<br>3,688 | 871 | 1872 | 186 | **TDO 332585**<br>**(238840/810)** |
| **180**<br>**7,087** | 270<br>10,630 | 109,538<br>4,313 | 84,138<br>3,313 | 676 | 1621 | 144 | **TDO 442213** |

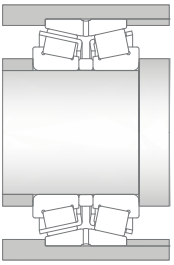


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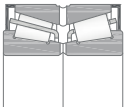
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 139,7<br>5,5 | 7 | 1,5 | 0,40 | 31,00 | TDO 332750<br>(99550/102) |
| 140<br>5,512 | 5 | 1 | 0,33 | 9,30 | TDO 442210 |
| 146,05<br>5,75 | 1,5 | 0,8 | 0,37 | 5,00 | TDO 331943<br>(36690/620) |
| 150<br>5,906 | 5 | 1 | 0,46 | 14,50 | TDO 442211 |
| 152,4<br>6 | 3,5 | 0,8 | 0,33 | 12,00 | TDO 613328<br>(231649/610) |
| 155<br>6,102 | 1,5 | 0,6 | 0,35 | 4,85 | TDO 328957 |
| 160<br>6,299 | 5 | 1 | 0,46 | 16,50 | TDO 442212 |
| | 4 | 1 | 0,40 | 32,50 | TDO 332758 |
| 165,1<br>6,5 | 8 | 0,8 | 0,37 | 10,00 | TDO 331792<br>(46790/720) |
| | 7 | 1,5 | 0,46 | 38,00 | TDO 328697<br>(94649/114) |
| 177,8<br>7 | 3,5 | 1,5 | 0,33 | 23,00 | TDO 332585<br>(238840/810) |
| 180<br>7,087 | 5 | 1 | 0,48 | 22,50 | TDO 442213 |




TDO

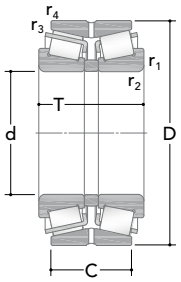


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **187,325**<br>**7,375** | 269,875<br>10,625 | 119,062<br>4,688 | 93,662<br>3,688 | 890 | 1896 | 183 | **TDO 328698**<br>**(238849/810)** |
| **200**<br>**7,874** | 290<br>11,417 | 121<br>4,764 | 88<br>3,465 | 1364 | 2724 | 257 | **TDO 442214** |
| **200,025**<br>**7,875** | 317,5<br>12,5 | 146,05<br>5,75 | 111,125<br>4,375 | 1181 | 2387 | 221 | **TDO 332459**<br>**(93787/127)** |
| **203,2**<br>**8** | 317,5<br>12,5 | 120,65<br>4,764 | 88,9<br>3,5 | 1011 | 1978 | 188 | **TDO 331785**<br>**(132083/126)** |
| **206,375**<br>**8,125** | 336,55<br>13,25 | 211,138<br>8,313 | 169,862<br>6,688 | 2098 | 4303 | 380 | **TDO 328270**<br>**(242649/610)** |
| **220**<br>**8,661** | 340<br>13,386 | 164<br>6,457 | 130<br>5,118 | 1645 | 3366 | 299 | **TDO 332473** |
| | 370<br>14,567 | 120<br>4,724 | 107<br>4,213 | 1305 | 2272 | 209 | **TDO 328794** |
| **228,6**<br>**9** | 327,025<br>12,875 | 114,3<br>4,5 | 82,55<br>3,25 | 830 | 2106 | 191 | **TDO 332584**<br>**(8573/8520)** |
| | 358,775<br>14,125 | 152,4<br>6 | 117,475<br>4,628 | 1531 | 3525 | 312 | **TDO 332766**<br>**(249732/710)** |
| | 488,95<br>19,25 | 254<br>10 | 152,4<br>6 | 3108 | 4554 | 385 | **TDO 331945**<br>**(949549/510)** |
| **241,3**<br>**9,5** | 368,3<br>14,5 | 120,65<br>4,75 | 85,725<br>3,375 | 995 | 2053 | 185 | **TDO 331783**<br>**(170950/451)** |
| **247,65**<br>**9,75** | 406,4<br>16 | 247,65<br>9,75 | 203,2<br>8 | 2985 | 6257 | 514 | **TDO 332443**<br>**(249949/910)** |

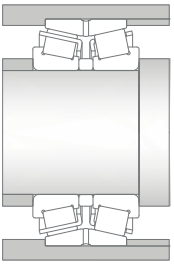


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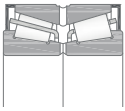
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 187,325<br>7,375 | 3,5 | 1,5 | 0,33 | 21,00 | TDO 328698<br>(238849/810) |
| 200<br>7,874 | 5 | 1 | 0,43 | 24,00 | TDO 442214 |
| 200,025<br>7,875 | 4,3 | 1,5 | 0,52 | 41,50 | TDO 332459<br>(93787/127) |
| 203,2<br>8 | 6,4 | 1,5 | 0,31 | 34,00 | TDO 331785<br>(132083/126) |
| 206,375<br>8,125 | 3,3 | 1,5 | 0,33 | 70,00 | TDO 328270<br>(242649/610) |
| 220<br>8,661 | 4 | 1 | 0,43 | 50,00 | TDO 332473 |
| | 5 | 1,5 | 0,40 | 49,00 | TDO 328794 |
| 228,6<br>9 | 6,4 | 1,5 | 0,40 | 30,00 | TDO 332584<br>(8573/8520) |
| | 3,5 | 1,5 | 0,33 | 57,00 | TDO 332766<br>(249732/710) |
| | 6,4 | 1,5 | 0,94 | 205,00 | TDO 331945<br>(949549/510) |
| 241,3<br>9,5 | 6,4 | 1,5 | 0,37 | 39,50 | TDO 331783<br>(170950/451) |
| 247,65<br>9,75 | 6,4 | 1,5 | 0,33 | 120,00 | TDO 332443<br>(249949/910) |




TDO

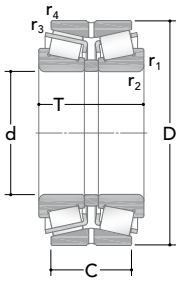


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **254**<br>**10** | 422,275<br>16,625 | 173,038<br>6,813 | 128,66<br>5,065 | 2420 | 4039 | 356 | **TDO 328615** |
| | 422,275<br>16,625 | 178,592<br>7,031 | 139,7<br>5,5 | 2420 | 4039 | 356 | **TDO 331782**<br>**(252343/310)** |
| | 533,4<br>21 | 276,225<br>10,875 | 165,1<br>6,5 | 3424 | 5534 | 452 | **TDO 331781**<br>**(953749/710)** |
| **260** | 360<br>14,173 | 105<br>4,134 | 76<br>2,992 | 979 | 1988 | 181 | **TDO 328027** |
| | 400<br>15,748 | 104<br>4,095 | 92<br>3,622 | 1108 | 2091 | 185 | **TDO 328795** |
| | 440<br>17,323 | 144<br>5,669 | 128<br>9,039 | 1994 | 3481 | 302 | **TDO 617479** |
| | 480<br>18,898 | 284<br>11,181 | 220<br>8,661 | 4320 | 7278 | 606 | **TDO 328130** |
| **260,35**<br>**10,25** | 422,275<br>16,625 | 178,592<br>7,031 | 139,7<br>5,5 | 2226 | 4038 | 356 | **TDO 328187**<br>**(252349/310)** |
| **280**<br>**11,024** | 470<br>18,504 | 250<br>9,843 | 180<br>7,087 | 3460 | 6399 | 530 | **TDO 331717** |
| **285,75**<br>**11,25** | 380,898<br>14,996 | 139,7<br>5,5 | 107,95<br>4,25 | 1221 | 3212 | 269 | **TDO 332449**<br>**(654648/610)** |
| **288,925**<br>**11,375** | 406,4<br>16 | 165,1<br>6,5 | 130,175<br>5,125 | 1960 | 4562 | 375 | **TDO 332503**<br>**(255449/410)** |
| **300**<br>**11,811** | 500<br>19,685 | 203<br>7,992 | 152<br>5,984 | 3013 | 5084 | 426 | **TDO 328383** |
| **300,038**<br>**11,813** | 422,275<br>16,625 | 174,625<br>6,875 | 136,525<br>5,375 | 2173 | 4745 | 400 | **TDO 332504**<br>**(256849/810)** |

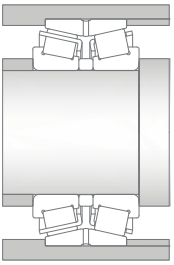


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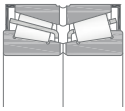
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 254<br>10 | 6,8 | 1,5 | 0,33 | 87,50 | TDO 328615 |
| | 6,8 | 1,5 | 0,33 | 97,50 | TDO 331782<br>(252343/310) |
| | 6,4 | 1,5 | 0,94 | 260,00 | TDO 331781<br>(953749/710) |
| 260 | 3 | 1 | 0,35 | 28,00 | TDO 328027 |
| | 5 | 1,5 | 0,40 | 44,00 | TDO 328795 |
| | 5 | 1,5 | 0,37 | 86,50 | TDO 617479 |
| | 5 | 1,5 | 0,43 | 210,00 | TDO 328130 |
| 260,35<br>10,25 | 6,8 | 1,5 | 0,33 | 86,50 | TDO 328187<br>(252349/310) |
| 280<br>11,024 | 6,4 | 1,5 | 0,46 | 155,00 | TDO 331717 |
| 285,75<br>11,25 | 3,5 | 1,5 | 0,43 | 42,00 | TDO 332449<br>(654648/610) |
| 288,925<br>11,375 | 6,4 | 1,5 | 0,33 | 63,00 | TDO 332503<br>(255449/410) |
| 300<br>11,811 | 5 | 1,5 | 0,40 | 140,00 | TDO 328383 |
| 300,038<br>11,813 | 6,4 | 1,5 | 0,33 | 71,50 | TDO 332504<br>(256849/810) |




TDO

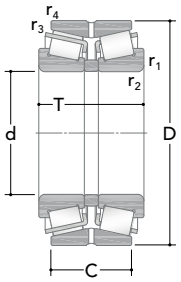


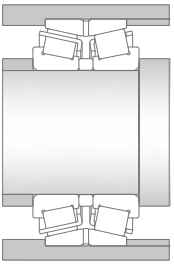
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **317,5** | 447,675 | 180,975 | 146,05 | 2519 | 5370 | 442 | **TDO 615058** |
| **12,5** | 17,625 | 7,125 | 5,75 | | | | **(259049/010)** |
| | 447,675 | 180,975 | 146,05 | 2519 | 5370 | 442 | **TDO 332516** |
| | 17,625 | 7,125 | 5,75 | | | | **(259049/010)** |
| **330,2** | 482,6 | 177,8 | 127 | 2150 | 5046 | 411 | **TDO 332845** |
| **13** | 19 | 7 | 5 | | | | **(526132/191)** |
| **333,375** | 469,9 | 190,5 | 152,4 | 2641 | 5784 | 458 | **TDO 331775** |
| **13,125** | 18,5 | 7,5 | 6 | | | | **(261049/100)** |
| **340** | 460 | 160 | 128 | 2168 | 4953 | 396 | **TDO 332830** |
| **13,386** | 18,110 | 6,299 | 5,039 | | | | |
| **342,9** | 533,4 | 174,625 | 123,825 | 2539 | 4368 | 368 | **TDO 332802** |
| **13,5** | 21 | 6,875 | 4,875 | | | | **(971354/103)** |
| **346,075** | 488,95 | 200,025 | 158,75 | 2799 | 6281 | 512 | **TDO 331981** |
| **13,625** | 19,25 | 7,875 | 6,25 | | | | **(262749/710)** |
| **355,6** | 444,5 | 136,525 | 111,125 | 1347 | 3620 | 302 | **TDO 332505** |
| **14** | 17,5 | 5,375 | 4,375 | | | | **(163149/110)** |
| | 501,65 | 155,575 | 107,95 | 1964 | 4202 | 349 | **TDO 332506** |
| | 19,75 | 6,125 | 4,25 | | | | **(231400/976)** |
| **360** | 480 | 160 | 128 | 2212 | 4936 | 410 | **TDO 332831** |
| **14,173** | 18,898 | 6,299 | 5,039 | | | | |
| **368,249** | 523,875 | 214,312 | 169,862 | 3389 | 7490 | 586 | **TDO 332603** |
| **14,498** | 20,625 | 8,438 | 6,688 | | | | **(265049/010)** |
| **368,3** | 596,9 | 203,2 | 133,35 | 3232 | 5905 | 461 | **TDO 332754** |
| **14,5** | 23,5 | 8 | 5,25 | | | | **(181453/351)** |



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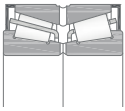
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 317,5<br>12,5 | 3,5 | 1,5 | 0,33 | 84,00 | TDO 615058<br>(259049/010) |
| | 3,5 | 1,5 | 0,33 | 84,00 | TDO 332516<br>(259049/010) |
| 330,2<br>13 | 3,3 | 1,5 | 0,40 | 100,00 | TDO 332845<br>(526132/191) |
| 333,375<br>13,125 | 6,4 | 1,5 | 0,33 | 98,00 | TDO 331775<br>(261049/100) |
| 340<br>13,386 | 3 | 1 | 0,31 | 71,00 | TDO 332830 |
| 342,9<br>13,5 | 4,8 | 1,5 | 0,33 | 130,00 | TDO 332802<br>(971354/103) |
| 346,075<br>13,625 | 6,4 | 1,5 | 0,33 | 110,00 | TDO 331981<br>(262749/710) |
| 355,6<br>14 | 3,5 | 1,5 | 0,31 | 46,00 | TDO 332505<br>(163149/110) |
| | 6,4 | 1,5 | 0,44 | 87,00 | TDO 332506<br>(231400/976) |
| 360<br>14,173 | 3 | 1 | 0,33 | 73,00 | TDO 332831 |
| 368,249<br>14,498 | 6,4 | 1,5 | 0,33 | 140,00 | TDO 332603<br>(265049/010) |
| 368,3<br>14,5 | 9,7 | 2,3 | 0,40 | 188,00 | TDO 332754<br>(181453/351) |



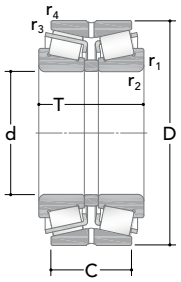
TDO

| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **371,475**<br>**14,625** | 501,65<br>19,75 | 155,575<br>6,125 | 107,95<br>4,25 | 1967 | 4302 | 341 | **TDO 331606**<br>**(231462/976)** |
| **380**<br>**14,961** | 520<br>20,472 | 148<br>5,827 | 112<br>4,410 | 2287 | 4453 | 369 | **TDO 328020** |
| | 660<br>25,984 | 380<br>14,961 | 310<br>12,205 | 7631 | 15863 | 1130 | **TDO 332823**<br>**(267648/610)** |
| **381**<br>**15** | 508<br>20 | 139,7<br>5,5 | 88,9<br>3,5 | 1360 | 3232 | 272 | **TDO 332507**<br>**(192150/201)** |
| **384,175**<br>**15,125** | 546,1<br>21,5 | 222,25<br>8,75 | 177,8<br>7 | 3703 | 8207 | 647 | **TDO 331197**<br>**(266449/410)** |
| **406,4**<br>**15** | 539,75<br>21,25 | 142,875<br>5,625 | 101,6<br>4 | 1832 | 4349 | 349 | **TDO 328389**<br>**(234160/213)** |
| **415,925**<br>**16,375** | 590,55<br>23,25 | 244,475<br>9,625 | 193,675<br>7,625 | 4164 | 9561 | 727 | **TDO 331656**<br>**(268749/710)** |
| **431,8**<br>**17** | 571,5<br>22,5 | 155,575<br>6,125 | 111,125<br>4,375 | 1920 | 5045 | 409 | **TDO 332604**<br>**(869449/410)** |
| | 571,5<br>22,5 | 192,088<br>7,563 | 146,05<br>5,75 | 2804 | 6985 | 527 | **TDO 332237**<br>**(769349/310)** |
| **440**<br>**17,323** | 650<br>25,591 | 196<br>7,717 | 157<br>6,181 | 3723 | 7722 | 580 | **TDO 328796** |
| **447,675**<br>**17,625** | 635<br>25 | 257,175<br>10,125 | 206,375<br>8,125 | 4444 | 11092 | 793 | **TDO 332176**<br>**(270749/710)** |
| **457,2**<br>**18** | 596,9<br>23,5 | 165,1<br>6,5 | 120,65<br>4,75 | 2139 | 5513 | 414 | **TDO 328980**<br>**(244180/236)** |

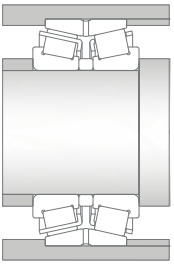


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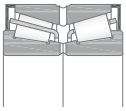
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 371,475<br>14,625 | 6,4 | 1,5 | 0,44 | 76,50 | TDO 331606<br>(231462/976) |
| 380<br>14,961 | 4 | 1,5 | 0,30 | 80,20 | TDO 328020 |
| | 14 | 3,5 | 0,33 | 520,00 | TDO 332823<br>(267648/610) |
| 381<br>15 | 6,4 | 1,5 | 0,54 | 67,00 | TDO 332507<br>(192150/201) |
| 384,175<br>15,125 | 6,4 | 1,6 | 0,33 | 161,00 | TDO 331197<br>(266449/410) |
| 406,4<br>15 | 6,4 | 1,5 | 0,48 | 82,40 | TDO 328389<br>(234160/213) |
| 415,925<br>16,375 | 6,4 | 1,5 | 0,33 | 205,00 | TDO 331656<br>(268749/710) |
| 431,8<br>17 | 3,3 | 1,5 | 0,54 | 100,00 | TDO 332604<br>(869449/410) |
| | 6,4 | 1,5 | 0,44 | 125,00 | TDO 332237<br>(769349/310) |
| 440<br>17,323 | 6 | 3 | 0,37 | 203,00 | TDO 328796 |
| 447,675<br>17,625 | 6,4 | 1,5 | 0,33 | 245,00 | TDO 332176<br>(270749/710) |
| 457,2<br>18 | 9,7 | 1,5 | 0,40 | 110,00 | TDO 328980<br>(244180/236) |




TDO

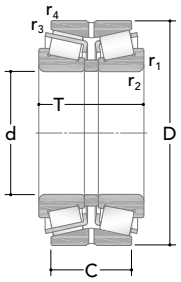


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **479,425**<br>**18,875** | 679,45<br>26,75 | 276,225<br>10,875 | 222,25<br>8,75 | 4978 | 12574 | 924 | **TDO 331657**<br>**(272749/710)** |
| **489,026**<br>**19,253** | 634,873<br>24,995 | 177,8<br>7 | 142,875<br>5,625 | 2787 | 7434 | 534 | **TDO 331776**<br>**(243192/251)** |
| **498,475**<br>**19,625** | 634,873<br>24,995 | 177,8<br>7 | 142,875<br>5,625 | 2774 | 7320 | 542 | **TDO 331605**<br>**(243196/251)** |
| | 634,873<br>24,995 | 177,8<br>7 | 142,875<br>5,625 | 2774 | 7320 | 542 | **TDO 331605**<br>**(243196/251)** |
| **501,65**<br>**19,75** | 711,2<br>28 | 292,1<br>11,5 | 231,775<br>9,125 | 5547 | 13874 | 968 | **TDO 332605**<br>**(274149/110)** |
| **508**<br>**20** | 838,2<br>33 | 304,8<br>12 | 222,25<br>8,75 | 6383 | 13852 | 1011 | **TDO 614995**<br>**(426200/331)** |
| **520,7**<br>**20,5** | 736,6<br>29 | 186,502<br>7,343 | 114,3<br>4,5 | 3018 | 6783 | 494 | **TDO 332761**<br>**(982051/901)** |
| **536,575**<br>**21,125** | 761,873<br>29,995 | 311,15<br>12,25 | 247,65<br>9,75 | 6360 | 15991 | 1101 | **TDO 332446**<br>**(276449/410)** |
| **558,8**<br>**22** | 736,6<br>29 | 187,328<br>7,375 | 138,112<br>5,438 | 3425 | 8401 | 613 | **TDO 331790**<br>**(843220/291)** |
| | 736,6<br>29 | 225,425<br>8,875 | 177,8<br>7 | 4230 | 11380 | 805 | **TDO 331640**<br>**(377449/410)** |
| **571,5**<br>**22,5** | 812,8<br>32 | 333,375<br>13,125 | 263,525<br>10,375 | 6392 | 16057 | 1076 | **TDO 332447**<br>**(278749/710)** |
| **602,945**<br>**23,738** | 787,4<br>31 | 206,375<br>8,125 | 158,75<br>6,25 | 4008 | 10748 | 740 | **TDO 331576** |

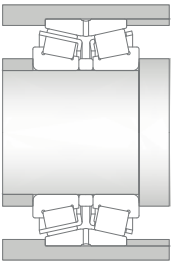


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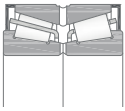
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 479,425<br>18,875 | 6,4 | 1,5 | 0,33 | 302,00 | TDO 331657<br>(272749/710) |
| 489,026<br>19,253 | 6,4 | 1,5 | 0,35 | 130,00 | TDO 331776<br>(243192/251) |
| 498,475<br>19,625 | 6,4 | 1,5 | 0,35 | 125,00 | TDO 331605<br>(243196/251) |
| | 6,4 | 1,5 | 0,35 | 125,00 | TDO 331605<br>(243196/251) |
| 501,65<br>19,75 | 6,4 | 1,5 | 0,33 | 343,00 | TDO 332605<br>(274149/110) |
| 508<br>20 | 9,7 | 3,3 | 0,48 | 630,00 | TDO 614995<br>(426200/331) |
| 520,7<br>20,5 | 6,4 | 1,5 | 0,48 | 210,00 | TDO 332761<br>(982051/901) |
| 536,575<br>21,125 | 6,4 | 1,5 | 0,33 | 430,00 | TDO 332446<br>(276449/410) |
| 558,8<br>22 | 6,4 | 1,5 | 0,35 | 190,00 | TDO 331790<br>(843220/291) |
| | 6,4 | 1,5 | 0,35 | 250,00 | TDO 331640<br>(377449/410) |
| 571,5<br>22,5 | 6,4 | 1,5 | 0,33 | 520,00 | TDO 332447<br>(278749/710) |
| 602,945<br>23,738 | 6,4 | 1,5 | 0,37 | 180,00 | TDO 331576 |




TDO

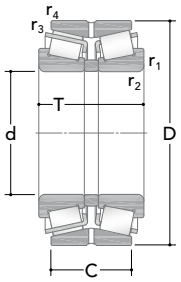


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **609,6** | 812,8 | 190,5 | 146,05 | 3594 | 8806 | 640 | **TDO 614609** |
| **24** | 32 | 7,5 | 5,75 | | | | |
| | 787,4 | 206,375 | 158,75 | 3978 | 10707 | 743 | **TDO 332448** |
| | 31 | 8,125 | 6,25 | | | | **(649240/311)** |
| | 820 | 206,375 | 158,75 | 4031 | 10749 | 740 | **TDO 331500** |
| | 32,284 | 8,125 | 6,25 | | | | |
| **635** | 990,6 | 339,725 | 212,725 | 8074 | 16178 | 1048 | **TDO 332493** |
| **25** | 39 | 13,375 | 8,375 | | | | |
| **685,8** | 876,3 | 200,025 | 152,4 | 3860 | 10869 | 759 | **TDO 331290** |
| **27** | 34,5 | 7,875 | 6 | | | | |
| **711,2** | 914,4 | 190,5 | 139,7 | 3809 | 9675 | 668 | **TDO 328028** |
| **28** | 36 | 7,5 | 5,5 | | | | **(755280/361)** |
| **723,9** | 914,4 | 187,325 | 139,7 | 3781 | 9704 | 666 | **TDO 331554** |
| **28,5** | 36 | 7,375 | 5,5 | | | | **(755285/361)** |
| **762** | 965,2 | 187,325 | 133,35 | 3624 | 9698 | 677 | **TDO 331780** |
| **30** | 38 | 7,375 | 5,25 | | | | **(752300/381)** |
| **774,7** | 965,2 | 187,325 | 133,35 | 3587 | 9683 | 678 | **TDO 332764** |
| **30,5** | 38 | 7,375 | 5,25 | | | | **(752305/381)** |
| **774,962** | 1016 | 266,7 | 209,55 | 6369 | 16963 | 1102 | **TDO 332625** |
| **30,510** | 40 | 10,5 | 8,25 | | | | |
| **812,8** | 1016 | 190,5 | 146,05 | 3595 | 10232 | 678 | **TDO 331291** |
| **32** | 40 | 7,5 | 5,75 | | | | **(762320/401)** |
| | 1066,8 | 190,5 | 146,05 | 3562 | 10269 | 675 | **TDO 328371** |
| | 42 | 7,5 | 5,75 | | | | **(762320/420)** |

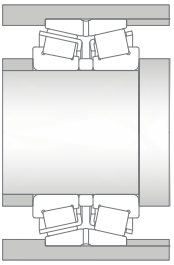


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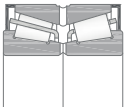
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 609,624 | 6,4 | 3,3 | 0,33 | 250,00 | TDO 614609 |
| | 6,4 | 1,5 | 0,37 | 232,00 | TDO 332448 (649240/311) |
| | 6,4 | 1,5 | 0,37 | 292,00 | TDO 331500 |
| 635 25 | 6,4 | 6,4 | 0,88 | 840,00 | TDO 332493 |
| 685,8 27 | 6,4 | 1,5 | 0,43 | 270,00 | TDO 331290 |
| 711,2 28 | 6,4 | 1,5 | 0,37 | 265,00 | TDO 328028 (755280/361) |
| 723,9 28,5 | 3,3 | 1,5 | 0,37 | 250,00 | TDO 331554 (755285/361) |
| 762 30 | 6,4 | 1,5 | 0,40 | 290,00 | TDO 331780 (752300/381) |
| 774,7 30,5 | 6,4 | 1,5 | 0,40 | 265,00 | TDO 332764 (752305/381) |
| 774,962 30,510 | 8 | 2,5 | 0,33 | 525,00 | TDO 332625 |
| 812,8 32 | 6,4 | 1,5 | 0,43 | 350,00 | TDO 331291 (762320/401) |
| | 6,4 | 1,5 | 0,43 | 445,00 | TDO 328371 (762320/420) |




TDO

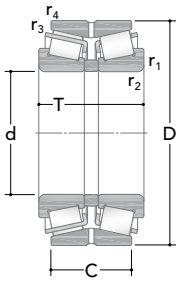


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **863,6<br>34** | 1371,6<br>54 | 469,9<br>18,5 | 285,75<br>11,25 | 14547 | 31596 | 1955 | **TDO 332494** |
| **914,4<br>36** | 1066,8<br>42 | 139,7<br>5,5 | 101,6<br>4 | 2601 | 8093 | 514 | **TDO 332501<br>(686947/910)** |
| | 1066,8<br>42 | 139,7<br>5,5 | 101,6<br>4 | 2601 | 8093 | 514 | **TDO 332501<br>(686947/910)** |
| **939,8<br>37** | 1270<br>50 | 457,2<br>18 | 317,5<br>12,5 | 9535 | 29316 | 1682 | **TDO 328304** |
| **1120<br>44,095** | 1480<br>58,268 | 400<br>15,748 | 296<br>11,654 | 13474 | 38400 | 2098 | **TDO 332756** |
| **1160<br>45,669** | 1540<br>60,630 | 400<br>15,748 | 290<br>11,417 | 14183 | 38377 | 2178 | **TDO 332780** |
| **1250<br>49,213** | 1500<br>59,055 | 250<br>9,843 | 190<br>7,480 | 7371 | 22701 | 1302 | **TDO 328339** |
| **1320,8<br>52** | 1727,2<br>68 | 412,75<br>16,25 | 254<br>10 | 13999 | 41102 | 2207 | **TDO 332495** |
| **1562,1<br>61,5** | 1806,575<br>71,125 | 279,4<br>11 | 196,85<br>7,75 | 7301 | 27789 | 1511 | **TDO 328310<br>(299615/711)** |
| **1778<br>70** | 2159<br>5 | 393,7<br>15,5 | 266,7<br>10,5 | 15581 | 53650 | 2667 | **TDO 332496** |
| **2133,6<br>84** | 2819,4<br>111 | 742<br>29,213 | 457,2<br>18 | 34928 | 107119 | 5041 | **TDO 332497** |

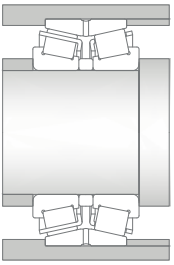


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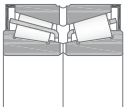
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 863,634 | 28 | 2 | 0,88 | 2250,00 | TDO 332494 |
| 914,436 | 6,4 | 3,3 | 0,40 | 190,00 | TDO 332501 (686947/910) |
| | 6,4 | 3,3 | 0,40 | 190,00 | TDO 332501 (686947/910) |
| 939,837 | 12,7 | 3,3 | 0,88 | 1540,00 | TDO 328304 |
| 1120 44,095 | 12 | 4 | 0,44 | 1760,00 | TDO 332756 |
| 1160 45,669 | 12 | 4 | 0,44 | 1900,00 | TDO 332780 |
| 1250 49,213 | 6 | 1,5 | 0,35 | 795,00 | TDO 328339 |
| 1320,852 | 28 | 2 | 0,83 | 2325,00 | TDO 332495 |
| 1562,161,5 | 9,7 | 3,3 | 0,48 | 1045,00 | TDO 328310 (299615/711) |
| 1778 70 | 12,7 | 3 | 0,79 | 2750,00 | TDO 332496 |
| 2133,684 | 15x45° | 3,5 | 0,94 | 11600,00 | TDO 332497 |




TDO

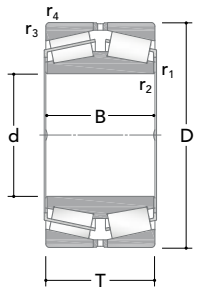


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | C | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **2184,486** | 2527,399,5 | 304,812 | 165,16,5 | 9351 | 37682 | 1891 | **TDO 332673** |
| **2616,2103** | 3048120 | 38115 | 209,558,25 | 12265 | 52386 | 2479 | **8020** |
| **3378,2133** | 3835,4151 | 393,715,5 | 203,28 | 15279 | 63065 | 2797 | **8019** |
| **3811150** | 4216,4166 | 419,116,5 | 274,710,815 | 19519 | 108618 | 4375 | **TDO 334004** |

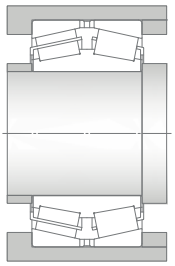


TDONASW

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **2184,486** | 16 | 5 | 1,15 | 2230,00 | **TDO 332673** |
| **2616,2103** | 25,4 | 6,4 | 1,50 | 4485,00 | **8020** |
| **3378,2133** | 25,4 | 6,4 | 1,50 | 6380,00 | **8019** |
| **3811150** | 9,7 | 6,4 | 1,05 | 6315,00 | **TDO 334004** |

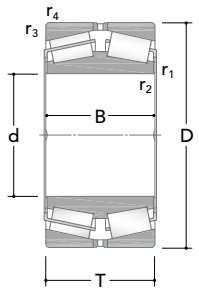



TDI

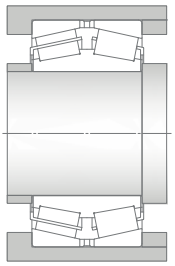


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **152,4** | 222,25 | 84,138 | 84,138 | 610 | 1254 | 125 | TDI 331387 |
| **6** | 8,75 | 3,313 | 3,313 | | | | (231649/610) |
| **177,8** | 247,65 | 90,488 | 90,488 | 669 | 1522 | 138 | TDI 331814 |
| **7** | 9,75 | 3,563 | 3,563 | | | | (67790/720) |
| | 288,925 | 123,825 | 123,825 | 1299 | 2262 | 218 | TDI 332534 |
| | 11,375 | 4,875 | 4,875 | | | | (237546/510) |
| **203,2** | 317,5 | 133,35 | 133,35 | 1170 | 2408 | 219 | TDI 332799 |
| **8** | 12,5 | 5,25 | 5,25 | | | | (93801D/125) |
| | 368,3 | 158,75 | 152,4 | 1977 | 3397 | 301 | TDI 332683 |
| | 14,5 | 6,25 | 6 | | | | (420800/450) |
| **206,375** | 282,575 | 87,312 | 87,312 | 696 | 1661 | 153 | TDI 331388 |
| **8,125** | 11,125 | 3,438 | 3,438 | | | | (67985/920) |
| | 336,55 | 180,975 | 184,15 | 2124 | 4273 | 382 | TDI 328834 |
| | 13,25 | 7,125 | 7,25 | | | | (242649/610) |
| **220** | 340 | 140 | 200 | 1660 | 3362 | 299 | TDI 332873 |
| **8,661** | 13,386 | 5,512 | 7,874 | | | | |
| **234,95** | 327,025 | 93,662 | 93,662 | 843 | 2150 | 187 | TDI 332492 |
| **9,25** | 12,875 | 3,688 | 3,688 | | | | (8576/8500) |
| **240** | 480 | 220 | 200 | 3637 | 5501 | 465 | TDI 332931 |
| **9,449** | 18,898 | 8,681 | 7,874 | | | | |
| **254** | 358,775 | 130,175 | 130,175 | 1545 | 3578 | 308 | TDI 332296 |
| **10** | 14,125 | 5,125 | 5,125 | | | | (249749/710) |
| | 438,15 | 165,1 | 165,1 | 2679 | 4252 | 365 | TDI 332536 |
| | 17,25 | 6,5 | 6,5 | | | | (738101/172) |
| **269,875** | 381 | 136,525 | 136,525 | 1630 | 3753 | 325 | TDI 331223 |
| **10,625** | 15 | 5,375 | 5,375 | | | | (252349/310) |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 152,46 | 1,5 | 1,5 | 0,33 | 11,50 | TDI 331387 (231649/610) |
| 177,87 | 1,5 | 3,3 | 0,44 | 13,00 | TDI 331814 (67790/720) |
| | 1,5 | 3,3 | 0,31 | 31,50 | TDI 332534 (237546/510) |
| 203,28 | 6,4 | 3,3 | 0,52 | 40,00 | TDI 332799 (93801D/125) |
| | 3,3 | 3,3 | 0,40 | 75,00 | TDI 332683 (420800/450) |
| 206,3758,125 | 0,8 | 3,3 | 0,50 | 17,00 | TDI 331388 (67985/920) |
| | 1,5 | 3,3 | 0,33 | 66,50 | TDI 328834 (242649/610) |
| 2208,661 | 1,5 | 3 | 0,43 | 50,50 | TDI 332873 |
| 234,959,25 | 1,5 | 3,3 | 0,40 | 25,50 | TDI 332492 (8576/8500) |
| 2409,449 | 2,5 | 5 | 0,72 | 183,00 | TDI 332931 |
| 254 10 | 1,5 | 3,3 | 0,33 | 43,50 | TDI 332296 (249749/710) |
| | 3,3 | 6,4 | 0,35 | 100,00 | TDI 332536 (738101/172) |
| 269,87510,625 | 3,3 | 3,3 | 0,33 | 51,00 | TDI 331223 (252349/310) |

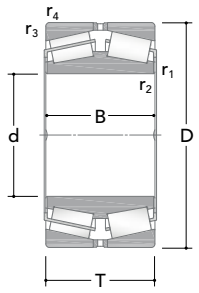



TDI

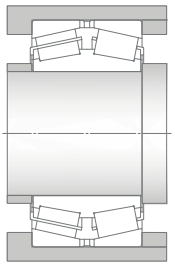


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **279,587** | 380,898 | 117,475 | 117,475 | 1227 | 3208 | 269 | **TDI 332899** |
| **11,007** | 14,996 | 4,625 | 4,625 | | | | **(654644/610)** |
| **288,925** | 406,4 | 165,1 | 234,95 | 2257 | 4851 | 419 | **TDI 332870** |
| **11,375** | 16 | 6,5 | 9,25 | | | | |
| **300,038** | 422,275 | 150,812 | 150,812 | 2180 | 4686 | 405 | **TDI 331951** |
| **11,813** | 16,625 | 5,938 | 5,938 | | | | **(256849/810)** |
| **303,212** | 495,3 | 263,525 | 263,525 | 4904 | 9720 | 756 | **TDI 332685** |
| **11,938** | 19,5 | 10,375 | 10,375 | | | | **(258249/210)** |
| **317,5** | 422,275 | 128,588 | 128,588 | 1777 | 4093 | 350 | **TDI 328699** |
| **12,5** | 16,625 | 5,063 | 5,063 | | | | **(528648/610)** |
| **333,375** | 469,9 | 166,688 | 166,688 | 2653 | 5750 | 461 | **TDI 328695** |
| **13,125** | 18,5 | 6,563 | 6,563 | | | | **(261049/010)** |
| | 469,9 | 166,688 | 231,775 | 2653 | 5750 | 461 | **TDI 332871** |
| | 18,5 | 6,563 | 9,125 | | | | |
| **342,9** | 533,4 | 139,7 | 146,05 | 2300 | 4363 | 368 | **TDI 331713** |
| **13,5** | 21 | 5,5 | 5,75 | | | | **(971355/100)** |
| **343,052** | 457,098 | 122,238 | 122,238 | 1604 | 3419 | 278 | **TDI 332240** |
| **13,506** | 17,996 | 4,813 | 4,813 | | | | **(76164/600)** |
| **346,075** | 488,95 | 104,775 | 95,25 | 1140 | 2770 | 226 | **TDI 332913** |
| **13,625** | 19,25 | 4,125 | 3,75 | | | | **(161362/925)** |
| | 488,95 | 174,625 | 174,625 | 2839 | 6239 | 515 | **TDI 331527** |
| | 19,25 | 6,875 | 6,875 | | | | **(262749/710)** |
| | 488,95 | 174,625 | 174,625 | 2802 | 6233 | 515 | **TDI 328410** |
| | 19,25 | 6,875 | 6,875 | | | | **(262749/710)** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **279,587**<br>**11,007** | 1,5 | 3,3 | 0,43 | 41,50 | **TDI 332899**<br>**(654644/610)** |
| **288,925**<br>**11,375** | 1,6 | 3,2 | 0,33 | 73,00 | **TDI 332870** |
| **300,038**<br>**11,813** | 3,3 | 3,3 | 0,33 | 70,00 | **TDI 331951**<br>**(256849/810)** |
| **303,212**<br>**11,938** | 3,3 | 6,4 | 0,33 | 212,00 | **TDI 332685**<br>**(258249/210)** |
| **317,5**<br>**12,5** | 1,5 | 3,3 | 0,31 | 51,50 | **TDI 328699**<br>**(528648/610)** |
| **333,375**<br>**13,125** | 3,3 | 3,3 | 0,33 | 92,50 | **TDI 328695**<br>**(261049/010)** |
| | 1,6 | 3,3 | 0,33 | 98,00 | **TDI 332871** |
| **342,9**<br>**13,5** | 3,3 | 3,3 | 0,33 | 115,00 | **TDI 331713**<br>**(971355/100)** |
| **343,052**<br>**13,506** | 1,5 | 3,3 | 0,48 | 54,00 | **TDI 332240**<br>**(76164/600)** |
| **346,075**<br>**13,625** | 1,5 | 6,4 | 0,50 | 62,00 | **TDI 332913**<br>**(161362/925)** |
| | 3,3 | 3,3 | 0,33 | 110,00 | **TDI 331527**<br>**(262749/710)** |
| | 3,3 | 3,3 | 0,33 | 113,00 | **TDI 328410**<br>**(262749/710)** |

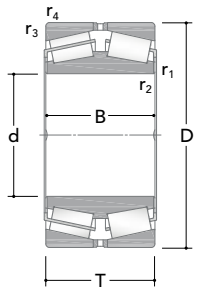



TDI

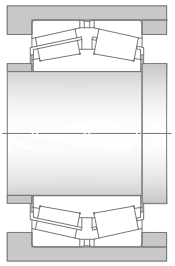


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **360** | 680 | 330 | 300 | 7268 | 13587 | 967 | **TDI 331729** |
| **14,173** | 26,772 | 12,992 | 11,811 | | | | |
| **368,3** | 523,875 | 185,738 | 185,738 | 3369 | 7523 | 583 | **TDI 331836** |
| **14,5** | 20,625 | 7,313 | 7,313 | | | | **(265049/010)** |
| | 523,875 | 185,738 | 185,738 | 3369 | 7523 | 583 | **TDI 332468** |
| | 20,625 | 7,313 | 7,313 | | | | **(265049/010)** |
| | 596,9 | 165,1 | 158,75 | 3066 | 5888 | 462 | **TDI 331905** |
| | 23,5 | 6,5 | 6,25 | | | | |
| **384,175** | 546,1 | 193,675 | 193,675 | 3737 | 8357 | 636 | **TDI 331158** |
| **15,125** | 21,5 | 7,625 | 7,625 | | | | **(266449/410)** |
| | 546,1 | 193,675 | 193,675 | 3737 | 8357 | 636 | **TDI 328580** |
| | 215000 | 7,625 | 7,625 | | | | **(266449/410)** |
| | 546,1 | 193,675 | 193,675 | 3737 | 8357 | 636 | **TDI 331837** |
| | 21,5 | 7,625 | 7,625 | | | | **(266449/410)** |
| **390** | 546,1 | 141,288 | 141,288 | 2353 | 5164 | 400 | **TDI 328705** |
| **15,354** | 21,5 | 5,563 | 5,563 | | | | |
| **406,4** | 546,1 | 138,113 | 138,113 | 2355 | 5155 | 401 | **TDI 331840** |
| **16** | 21,5 | 5,438 | 5,438 | | | | **(767749/710)** |
| **408,4** | 546,1 | 120 | 98 | 1587 | 3404 | 289 | **TDI 328874** |
| **16,079** | 21,5 | 4,724 | 3,858 | | | | |
| | 546,1 | 150 | 125 | 1986 | 4746 | 375 | **TDI 328466** |
| | 21,5 | 5,906 | 4,921 | | | | |
| **409,575** | 546,1 | 161,925 | 161,925 | 2692 | 6459 | 507 | **TDI 331714** |
| **16,125** | 21,5 | 6,375 | 6,375 | | | | **(667947/910)** |
| **415,925** | 590,55 | 209,55 | 209,55 | 4161 | 9719 | 715 | **TDI 328283** |
| **16,375** | 23,25 | 8,25 | 8,25 | | | | **(268749/710)** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **360**<br>**14,173** | 4 | 7,5 | 0,60 | 540,00 | **TDI 331729** |
| **368,3**<br>**14,5** | 3,3 | 6,4 | 0,33 | 133,00 | **TDI 331836**<br>**(265049/010)** |
| | 3,3 | 6,4 | 0,33 | 140,00 | **TDI 332468**<br>**(265049/010)** |
| | 6,4 | 6,4 | 0,40 | 160,00 | **TDI 331905** |
| **384,175**<br>**15,125** | 3,3 | 6,4 | 0,33 | 152,00 | **TDI 331158**<br>**(266449/410)** |
| | 3,3 | 6,4 | 0,33 | 166,00 | **TDI 328580**<br>**(266449/410)** |
| | 3,3 | 6,4 | 0,33 | 152,00 | **TDI 331837**<br>**(266449/410)** |
| **390**<br>**15,354** | 3,3 | 6,4 | 0,48 | 102,00 | **TDI 328705** |
| **406,4**<br>**16** | 1,5 | 6,4 | 0,48 | 89,00 | **TDI 331840**<br>**(767749/710)** |
| **408,4**<br>**16,079** | 1 | 3 | 0,88 | 76,50 | **TDI 328874** |
| | 1,5 | 3,3 | 0,83 | 99,00 | **TDI 328466** |
| **409,575**<br>**16,125** | 1,5 | 6,4 | 0,43 | 110,00 | **TDI 331714**<br>**(667947/910)** |
| **415,925**<br>**16,375** | 3,3 | 6,4 | 0,33 | 192,00 | **TDI 328283**<br>**(268749/710)** |

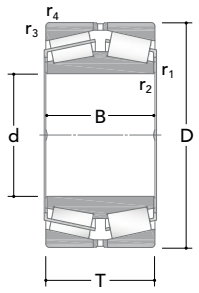



TDI

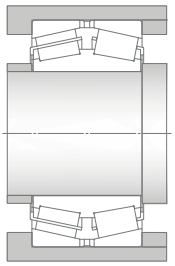


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **415,925** | 590,55 | 209,55 | 209,55 | 4161 | 9719 | 715 | **TDI 331445** |
| **16,375** | 23,25 | 8,25 | 8,25 | | | | **(268749/710)** |
| (cont.) | | | | | | | |
| **430** | 535 | 84 | 84 | 1072 | 3044 | 237 | **TDI 334013** |
| **16,929** | 21,063 | 3,307 | 3,307 | | | | |
| **447,675** | 635 | 223,838 | 223,838 | 4424 | 11052 | 796 | **TDI 331562** |
| **17,625** | 25 | 8,813 | 8,813 | | | | **(270749/710)** |
| | 635 | 223,838 | 223,838 | 4424 | 11052 | 796 | **TDI 332911** |
| | 25 | 8,813 | 8,813 | | | | **(270749/710)** |
| **450** | 595 | 178 | 178 | 3157 | 8065 | 616 | **TDI 328523** |
| **17,717** | 23,425 | 70,008 | 70,008 | | | | **(270449/410)** |
| **464** | 615,95 | 150 | 136 | 2134 | 5901 | 436 | **TDI 328361** |
| **18,268** | 24,25 | 5,906 | 5,354 | | | | |
| **489,026** | 634,873 | 152,4 | 152,4 | 2747 | 7405 | 536 | **TDI 331848** |
| **19,253** | 24,995 | 6 | 6 | | | | **(243193/250)** |
| **491** | 635 | 148 | 128 | 1912 | 5293 | 406 | **TDI 328381** |
| **19,331** | 25 | 5,827 | 5,039 | | | | |
| **500** | 730 | 280 | 280 | 6681 | 15810 | 1085 | **TDI 331676** |
| **19,685** | 28,740 | 11,024 | 11,024 | | | | |
| **501,65** | 673,1 | 184,15 | 184,15 | 3961 | 9665 | 719 | **TDI 332547** |
| **19,75** | 26,5 | 7,25 | 7,25 | | | | |
| | 711,2 | 250,825 | 250,825 | 5575 | 13827 | 956 | **TDI 331182** |
| | 28 | 9,875 | 9,875 | | | | **(274149/110)** |
| **519,112** | 736,6 | 258,762 | 258,762 | 6048 | 15591 | 1069 | **TDI 332662** |
| **20,438** | 29 | 10,188 | 10,188 | | | | **(275349/310)** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 415,925<br>16,375<br>(cont.) | 3,3 | 6,4 | 0,33 | 192,00 | TDI 331445<br>(268749/710) |
| 430<br>16,929 | 1 | 3 | 0,54 | 44,50 | TDI 334013 |
| 447,675<br>17,625 | 3,3 | 6,4 | 0,33 | 236,00 | TDI 331562<br>(270749/710) |
| | 3,3 | 6,4 | 0,33 | 246,00 | TDI 332911<br>(270749/710) |
| 450<br>17,717 | 3 | 6 | 0,33 | 140,00 | TDI 328523<br>(270449/410) |
| 464<br>18,268 | 1,5 | 4 | 0,83 | 125,00 | TDI 328361 |
| 489,026<br>19,253 | 3,3 | 3,3 | 0,35 | 130,00 | TDI 331848<br>(243193/250) |
| 491<br>19,331 | 1,5 | 3,3 | 1,00 | 120,00 | TDI 328381 |
| 500<br>19,685 | 3 | 6 | 0,31 | 420,00 | TDI 331676 |
| 501,65<br>19,75 | 3,3 | 6,4 | 0,31 | 190,00 | TDI 332547 |
| | 3,2 | 6,4 | 0,33 | 330,00 | TDI 331182<br>(274149/110) |
| 519,112<br>20,438 | 3,3 | 6,4 | 0,33 | 370,00 | TDI 332662<br>(275349/310) |

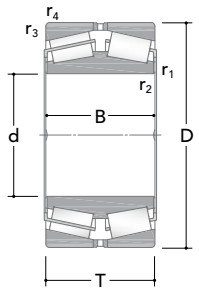



TDI

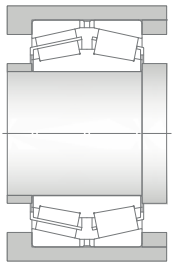


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **519,112**<br>**20,438**<br>(cont.) | 736,6<br>29 | 258,762<br>10,188 | 258,762<br>10,188 | 6048 | 15591 | 1069 | **TDI 334009**<br>**(275349/310)** |
| **522**<br>**20,551** | 690<br>27,165 | 180<br>7,087 | 160<br>6,299 | 2846 | 8273 | 602 | **TDI 328359** |
| **536,575**<br>**21,125** | 761,873<br>29,995 | 269,875<br>10,625 | 269,875<br>10,625 | 6320 | 15786 | 1115 | **TDI 331682**<br>**(276448/410)** |
| **558,8**<br>**22** | 736,6<br>29 | 196,85<br>7,75 | 196,85<br>7,75 | 4294 | 11448 | 826 | **TDI 331607**<br>**(377448/410)** |
| **560**<br>**22,047** | 820<br>32,284 | 242<br>9,528 | 242<br>9,528 | 5085 | 11333 | 820 | **TDI 332626** |
| **571,5**<br>**22,5** | 812,8<br>32 | 285,75<br>11,25 | 285,75<br>11,25 | 7206 | 17918 | 1205 | **TDI 331476**<br>**(278749/710)** |
| | 812,8<br>32 | 285,75<br>11,25 | 285,75<br>11,25 | 7206 | 17918 | 1205 | **TDI 331854**<br>**(278749/710)** |
| **580**<br>**22,835** | 830<br>32,677 | 280<br>11,024 | 280<br>11,024 | 6870 | 16448 | 1130 | **TDI 331677** |
| **609,6**<br>**24** | 787,4<br>31 | 171,45<br>6,75 | 171,45<br>6,75 | 4047 | 10715 | 742 | **TDI 331858**<br>**(649241/310)** |
| | 820<br>32,284 | 171,45<br>6,75 | 171,45<br>6,75 | 4075 | 10597 | 750 | **TDI 332424** |
| **650**<br>**25,591** | 1030<br>40,551 | 270<br>10,630 | 270<br>10,630 | 8694 | 18318 | 1249 | **TDI 328306** |
| **660,4**<br>**26** | 812,8<br>32 | 176,212<br>6,938 | 176,212<br>6,938 | 3540 | 11344 | 755 | **TDI 331198** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 519,112<br>20,438<br>(cont.) | 3,3 | 6,4 | 0,33 | 370,00 | TDI 334009<br>(275349/310) |
| 522<br>20,551 | 1,5 | 4 | 0,79 | 190,00 | TDI 328359 |
| 536,575<br>21,125 | 3,3 | 6,4 | 0,33 | 410,00 | TDI 331682<br>(276448/410) |
| 558,8<br>22 | 3,3 | 6,4 | 0,35 | 235,00 | TDI 331607<br>(377448/410) |
| 560<br>22,047 | 2,5 | 8 | 0,88 | 425,00 | TDI 332626 |
| 571,5<br>22,5 | 3,3 | 6,4 | 0,33 | 500,00 | TDI 331476<br>(278749/710) |
| | 3,3 | 6,4 | 0,33 | 500,00 | TDI 331854<br>(278749/710) |
| 580<br>22,835 | 3 | 6 | 0,31 | 515,00 | TDI 331677 |
| 609,6<br>24 | 3,3 | 6,4 | 0,37 | 218,00 | TDI 331858<br>(649241/310) |
| | 3,3 | 6,4 | 0,37 | 265,00 | TDI 332424 |
| 650<br>25,591 | 15 | 10 | 0,31 | 900,00 | TDI 328306 |
| 660,4<br>26 | 3,2 | 6,4 | 0,33 | 195,00 | TDI 331198 |

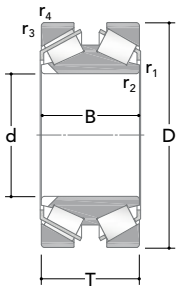



TDI

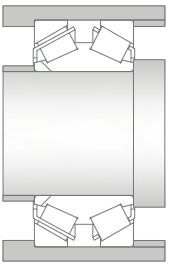


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **682,625**<br>**26,875** | 965,2<br>38 | 338,138<br>13,313 | 338,138<br>13,313 | 9653 | 24699 | 1619 | **TDI 332129**<br>**(282249/210)** |
| **710**<br>**27,953** | 900<br>35,433 | 197<br>7,756 | 197<br>7,756 | 4728 | 13378 | 868 | **TDI 331581** |
| **800**<br>**31,496** | 1260<br>49,606 | 375<br>14,764 | 375<br>14,764 | 14658 | 33205 | 2018 | **TDI 334032** |
| **863,6**<br>**34** | 1130,3<br>44,5 | 323,85<br>12,75 | 323,85<br>12,75 | 10717 | 30746 | 1875 | **TDI 331590**<br>**(286249/210)** |
| **901,7**<br>**35,5** | 1295,4<br>51 | 450,85<br>17,75 | 438,15<br>17,25 | 16563 | 43214 | 2488 | **TDI 331306**<br>**(634356/510)** |
| **939,8**<br>**37** | 1333,5<br>52,5 | 463,55<br>18,25 | 463,55<br>18,25 | 17583 | 49226 | 2737 | **TDI 331350**<br>**(287849/810)** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **682,625**<br>**26,875** | 3,3 | 6,4 | 0,33 | 815,00 | **TDI 332129**<br>**(282249/210)** |
| **710**<br>**27,953** | 3 | 6 | 0,35 | 325,00 | **TDI 331581** |
| **800**<br>**31,496** | 12 | 12 | 0,33 | 1850,00 | **TDI 334032** |
| **863,6**<br>**34** | 4,8 | 12,7 | 0,33 | 895,00 | **TDI 331590**<br>**(286249/210)** |
| **901,7**<br>**35,5** | 4,8 | 12,7 | 0,35 | 2000,00 | **TDI 331306**<br>**(634356/510)** |
| **939,8**<br>**37** | 4,8 | 12,7 | 0,33 | 2230,00 | **TDI 331350**<br>**(287849/810)** |




TDIS



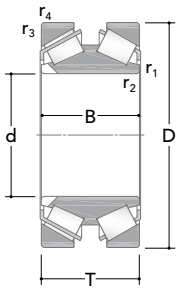
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| **300** | 440 | 105 | 105 | 1084 | 2053 | 179 | **TDIS 332168** |
| **305,033** | 560 | 200 | 200 | 2820 | 5229 | 436 | **TDIS 334087** |
| **305,07** | 500 | 200 | 200 | 2694 | 5266 | 420 | **TDIS 332169** |
| | 560 | 200 | 200 | 3106 | 5297 | 430 | **TDIS 332068** |
| | 560 | 200 | 200 | 3106 | 5297 | 430 | **TDIS 331617** |
| **360** | 560 | 160 | 160 | 2589 | 4641 | 391 | **8000** |
| | 600 | 200 | 200 | 3071 | 5851 | 465 | **8002** |
| **380** | 560 | 200 | 200 | 2784 | 6580 | 518 | **8009** |
| | 565 | 200 | 200 | 2784 | 6580 | 518 | **8003** |
| **386** | 574 | 220 | 220 | 2989 | 6557 | 509 | **TDISS 8010** (1) |
| **390** | 570 | 200 | 200 | 2942 | 6633 | 504 | **TDIS 328896** |
| **400** | 650 | 240 | 240 | 3904 | 8124 | 622 | **TDIS 332167** |
| **408,4** | 546,1 | 152 | 160 | 1530 | 3426 | 287 | **TDISS 334053** (1) |
| **445** | 620 | 160 | 160 | 2149 | 5163 | 395 | **TDIS 334069** |
| **460** | 680 | 180 | 180 | 3145 | 6973 | 528 | **TDIS 328876** |
| **510** | 733,5 | 200,025 | 200,025 | 3542 | 8385 | 639 | **TDIS 617670** |
| **510,13** | 800 | 285 | 285 | 5574 | 12722 | 898 | **TDIS 332171** |
| **520** | 660 | 140 | 140 | 2080 | 5664 | 428 | **8001** |
| **635** | 939,8 | 304,8 | 304,8 | 6694 | 16445 | 1110 | **TDIS 331555** |

(1) Bearing with steep contact angle and with seals

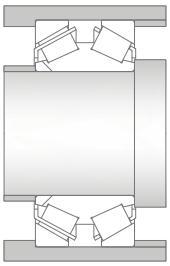


TDISS

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | |
| [mm] | | | | [kg] | |
| **300** | 4 | 4 | 0,88 | 48,50 | **TDIS 332168** |
| **305,033** | 3,3 | 6,4x45° | 0,88 | 205,00 | **TDIS 334087** |
| **305,07** | 6,4 | 4,8 | 0,88 | 150,00 | **TDIS 332169** |
| | 3,3 | 6 | 0,88 | 200,00 | **TDIS 332068** |
| | 3,3 | 18 | 0,88 | 200,00 | **TDIS 331617** |
| **360** | 3 | 5 | 0,72 | 140,00 | **8000** |
| | 3 | 5 | 0,94 | 220,00 | **8002** |
| **380** | 5 | 5 | 0,79 | 165,00 | **8009** |
| | 5 | 5 | 0,79 | 170,00 | **8003** |
| **386** | 3 | 5 | 0,83 | 185,00 | **TDISS 8010** (1) |
| **390** | 5 | 5 | 0,83 | 170,00 | **TDIS 328896** |
| **400** | 6,4 | 6,4 | 0,88 | 245,00 | **TDIS 332167** |
| **408,4** | 1 | 3 | 0,88 | 88,00 | **TDISS 334053** (1) |
| **445** | 2 | 5 | 0,83 | 135,00 | **TDIS 334069** |
| **460** | 2,5 | 6 | 0,99 | 210,00 | **TDIS 328876** |
| **510** | 3,3 | 4,8 | 0,88 | 265,00 | **TDIS 617670** |
| **510,13** | 4,8 | 10 | 0,88 | 505,00 | **TDIS 332171** |
| **520** | 3 | 5 | 0,68 | 115,00 | **8001** |
| **635** | 3,3 | 6,4 | 0,88 | 720,00 | **TDIS 331555** |




TDIS



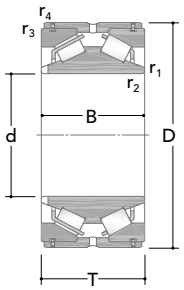
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| **800** | 1100 | 300 | 300 | 7733 | 21876 | 1323 | **TDIS 332394** |

(1) Bearing with steep contact angle and with seals

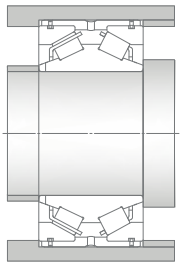


TDISS

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | |
| [mm] | | | | [kg] | |
| **800** | 1,5 | 6 | 0,79 | 850,00 | **TDIS 332394** |

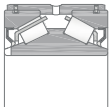



TDIS



| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| **305,07** | 524 | 200 | 200 | 2739 | 5213 | 424 | **TDIS 334110** |
| | 524 | 220 | 220 | 2739 | 5213 | 424 | **TDISS 8006** (1) |
| **320** | 524 | 185 | 185 | 2744 | 5202 | 425 | **TDIS 334152** |
| | 540 | 160 | 160 | 2416 | 4354 | 369 | **8017** |
| **390** | 568 | 180 | 180 | 2577 | 5904 | 451 | **TDIS 334045** |
| | 590 | 200 | 200 | 2959 | 6548 | 510 | **TDIS 328934** |
| | 590 | 220 | 220 | 2959 | 6548 | 510 | **TDISS 8011** (1) |
| | 615,95 | 220 | 220 | 2742 | 6503 | 514 | **TDISS 8014** (1) |
| **406,4** | 566,1 | 150 | 150 | 1948 | 4806 | 371 | **TDIS 334024** |
| | 580 | 164,275 | 164,275 | 1962 | 4680 | 313 | **TDISS 334085** (1) |
| **408,4** | 570,1 | 152 | 160 | 1614 | 3444 | 285 | **TDISS 334068** (1) |
| **420** | 620 | 200 | 200 | 2945 | 7144 | 564 | **8016** |
| **440** | 615,95 | 220 | 220 | 2101 | 5098 | 400 | **TDISS 8013** (1) |
| **445** | 620 | 180 | 180 | 2107 | 5118 | 399 | **TDISS 334113** (1) |
| **450** | 702 | 180 | 180 | 3178 | 6898 | 534 | **8018** |
| **460** | 702 | 180 | 180 | 3130 | 6929 | 532 | **TDIS 334030** |
| **480** | 660 | 150 | 150 | 1750 | 5173 | 392 | **TDIS 334100** |
| **482** | 640 | 160 | 160 | 1756 | 5241 | 387 | **TDIS 334112** |
| | 640 | 160 | 160 | 1701 | 4219 | 342 | **TDISS 334111** (1) |
| **520** | 715 | 180 | 180 | 2823 | 8208 | 607 | **TDISS 334041** (1) |

(1) Bearing with steep contact angle and with seals



TDISS

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | |
| [mm] | | | | [kg] | |
| **305,07** | 6,4 | 4,8 | 0,88 | 180,00 | **TDIS 334110** |
| | 6,4 | 4,8 | 0,88 | 195,00 | **TDISS 8006** (1) |
| **320** | 3 | 4,8 | 0,88 | 150,00 | **TDIS 334152** |
| | 2 | 5 | 0,83 | 160,00 | **8017** |
| **390** | 2 | 5 | 0,83 | 155,00 | **TDIS 334045** |
| | 5 | 5 | 0,83 | 200,00 | **TDIS 328934** |
| | 3 | 5 | 0,83 | 210,00 | **TDISS 8011** (1) |
| | 3 | 5 | 0,83 | 250,00 | **TDISS 8014** (1) |
| **406,4** | 1,5 | 3,3 | 0,83 | 120,00 | **TDIS 334024** |
| | 1,5 | 5 | 0,83 | 135,00 | **TDISS 334085** (1) |
| **408,4** | 1 | 3 | 0,88 | 115,00 | **TDISS 334068** (1) |
| **420** | 2 | 5 | 0,75 | 210,00 | **8016** |
| **440** | 2 | 5 | 0,83 | 185,00 | **TDISS 8013** (1) |
| **445** | 2 | 5 | 0,83 | 160,00 | **TDISS 334113** (1) |
| **450** | 2,5 | 6 | 0,99 | 260,00 | **8018** |
| **460** | 2,5 | 6 | 0,99 | 250,00 | **TDIS 334030** |
| **480** | 2 | 5 | 0,94 | 160,00 | **TDIS 334100** |
| **482** | 2 | 5 | 0,94 | 145,00 | **TDIS 334112** |
| | 2 | 5 | 0,88 | 130,00 | **TDISS 334111** (1) |
| **520** | 1,5 | 4 | 0,79 | 220,00 | **TDISS 334041** (1) |

# Four-row tapered roller bearings

RKB four-row tapered roller bearings are produced mainly in TQO and TQI configuration, in open and sealed version. Supplied with the required axial internal clearance, they are mainly employed on work rolls of rolling mill applications.
The use of high quality raw materials, special heat treatments, and innovative sealing solutions are at the base of their higher operating reliability and longer service life expectancy. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Four-row tapered roller bearings

## Bearing internal clearance

RKB four-row tapered roller bearings are normally provided in set right ready for mounting featuring a proper Bench End Play (BEP) suitable to the specific application. According to this concepts, bearing components have to be mounted strictly following a sequence and cannot be swapped each other nor used among different bearings. In order to establish the proper BEP specification for your applications, please contact the RKB application engineering services.

## Minimum load

In order to get a correct functioning, double row tapered roller bearings have to be always loaded with a minimum value, in particular in case of application featuring high speed, high acceleration and/or quick variation of load direction. According to the above condition the minimum required load can be evaluated as following:

$$\frac{F_{rm}}{C} > 0{,}02$$

where:

- $F_{rm}$ minimum radial load, [kN];
- C dynamic load rating, [kN].

## Bearings fitting

RKB four-row tapered roller bearings are generally mounted "loose fit" on the roll neck. Typical roll neck tolerances can be found in the following **Tab. 19 page 485**. As regards fitting tolerances for the choke bore, typical values can be found in the following **Tab. 20 page 485**.

With reference to four-row tapered roller bearings featuring a tapered bore or applied in high speed application, please consult the application engineering services.

| Four-row tapered roller bearings tolerances | Nominal dimension | | | Tolerances | |
|---|---|---|---|---|---|
| | | | | Sup. | Inf. |
| [mm] | [mm] | | | [mm] | |
| Metric | d < 315 | | | -0,180 | -0,230 |
| | 315 | <d ≤ | 630 | -0,240 | -0,300 |
| | 630 | <d ≤ | 800 | -0,325 | -0,410 |
| | d > 800 | | | -0,350 | -0,450 |
| Inch | 152,4 | <d ≤ | 203,2 | -0,150 | -0,175 |
| | 203,2 | <d ≤ | 304,8 | -0,180 | -0,205 |
| | 304,8 | <d ≤ | 609,6 | -0,200 | -0,249 |
| | 609,6 | <d ≤ | 914,4 | -0,250 | -0,334 |
| | d > 914,4 | | | -0,300 | -0,400 |

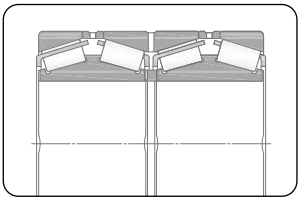
Tab. 19 - General "loose fit" roll neck tolerances

| Four-row tapered roller bearings tolerances | Nominal dimension | | | Tolerances | |
|---|---|---|---|---|---|
| | | | | Sup. | Inf. |
| [mm] | [mm] | | | [mm] | |
| Metric | d ≤ 800 | | | H6 | |
| | > 800 | | | H7 | |
| Inch | 304,8 | <d ≤ | +609,6 | +0,101 | +0,150 |
| | 609,6 | <d ≤ | +914,4 | +0,156 | +0,230 |
| | 914,4 | <d ≤ | +1219,2 | +0,202 | +0,300 |
| | d > 1219,6 | | | +0,257 | +0,380 |

Tab. 20 - General choke bore tolerances

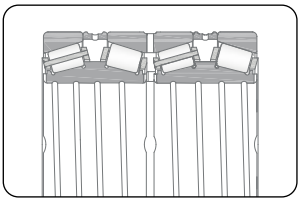
## Designs and variants

### Type TQO1



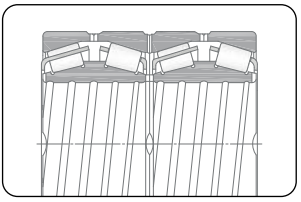

- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones, plus one cone spacer (plain or with lubrication holes)
- Four one-piece window type steel cages
- Supports radial and axial loads in both directions
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

### Type TQO2



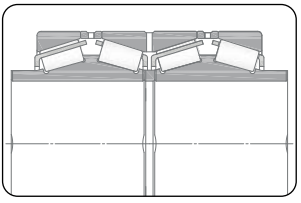

- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones, plus one cone spacer (plain or with lubrication holes)
- Four two-piece steel pin-type cages
- Pierced roller execution to increase load rating capacities
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

### Type TQO3




- One double cup, two single cups
- Two double cones
- Four one-piece window type pressed steel cages
- Supports radial and axial loads in both directions
- Available with helical groove in the bore (G)
- Lubrication grooves in double cone side faces
- Marked zones on cups sides face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

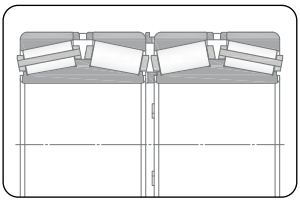
### Type TQOE




- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones, plus one cone spacer (plain or with lubrication holes)
- Four one-piece window type steel cages
- With extended inner ring on both sides for radial shaft seals
- Supports radial and axial loads in both directions

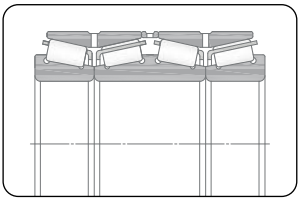
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

## Type SET2xTDI



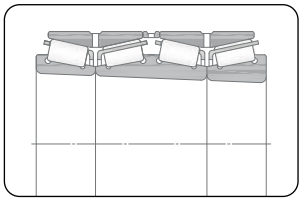

- Four ribless cups plus three spacers (plain or with lubrication grooves and holes)
- Two double cones with three ribs
- Four pin-type cages
- Preset or adjusted BEP on customer's request
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Better internal distribution of the external loads due to the four single cups compared with TQO design
- Optimized roller profile

## Type TQI



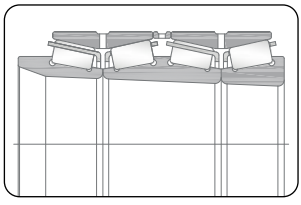

- Two double cup, plus one cup spacer (plain or with lubrication grooves and holes)
- One double cone, two single cones
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

## Type TQIT



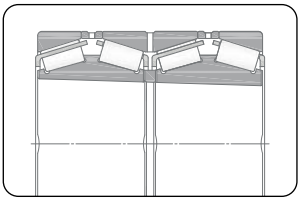

- Two double cup, plus one cup spacer (plain or with lubrication grooves and holes)
- One double cone, two single cones featuring tapered bore
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

## Type TQITE



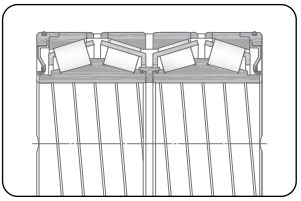

- Two double cup, plus one cup spacer (plain or with lubrication grooves and holes)
- One double cone, two single cones featuring tapered bore
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Available with helical groove in the bore (G)
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile
- With extended inner ring on one side for radial shaft seal

## Type TQOT



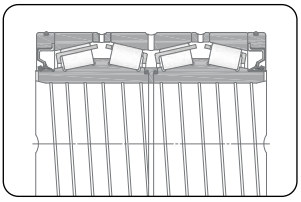

- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two two double cones, plus one cone spacer (plain or with lubrication holes)
- Four one-piece window type steel cages
- Supports radial and axial loads in both directions
- Preset or adjusted BEP on customer's request
- Tapered bore
- Marked zones on cups side face to easy mounting and maintenance operations
- Available in metric and inch sizes
- Optimized roller profile

## Type TQOS$_2$



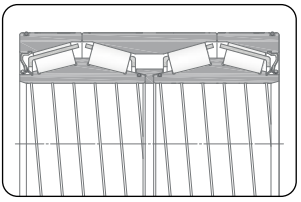

- One double cup, two single cups plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones with three ribs
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Marked zones on cups side faces to easy mounting and maintenance operations
- Lateral flanges, concentric to the single cups, with improved seal lip and O-rings
- Designed with Anti-Vortex System cone spacer seal set
- Available in metric and inch sizes
- Optimized roller profile

## Type TQOS$_1$



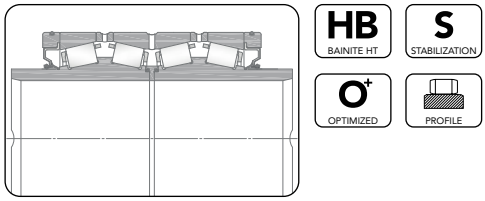

- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Marked zones on cups side face to facilitate mounting and maintenance operations
- Lateral flanges with lip seals and o-rings on bearing both sides
- Designed with Anti-Vortex System cone spacer seal set
- Available in metric and inch sizes
- Optimized roller profile

## Type TQOS$_3$




- One double cup, two single cups with integrated lateral flanges, featuring O-ring and rotating lip seals
- Two double cones with three ribs
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Marked zones on cups side face to easy mounting and maintenance operations
- Designed with Anti-Vortex System cone spacer seal set
- Available in metric and inch sizes
- Completely sealed (re-lubrication process is not possible!)
- Optimized roller profile

## Type TQOES




- One double cup, two single cups, plus two cup spacers (plain or with lubrication grooves and holes)
- Two double cones with extended inner ring on both sides for radial shaft seals
- Four one-piece window type steel cages
- Preset or adjusted BEP on customer's request
- Marked zones on cups side face to facilitate mounting and maintenance operations
- Lateral flanges with lip seals and o-rings on bearing both sides
- Designed with Anti-Vortex System cone spacer seal set
- Available in metric and inch sizes
- Optimized roller profile

| Suffixes | Internal design |
|---|---|
| B | In TQO bearings, special double cones width. The number immediately following the B gives the double cones width in mm |
| SP | Special or non-standard bearing |
| BT4B | Four-row tapered roller bearing |
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

| Suffixes | Accuracy, clearance, running |
|---|---|
| HP | High precision (better than P6) |
| ST | Special tolerance |

| Suffixes | External design |
|---|---|
| AVSx | Anti-vortex system |
| AVSxC | Anti-vortex system with compact seals |
| 1C | Compact seal and O-ring on both sides |

# Part numbering

## First system

| | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 |
|---|---|---|---|---|---|
| | Configuration | Boundary dimensions | Execution | Material and heat treatment of bearing components | Special surface treatment |
| | TQO, TQI, TQIT, TQOS, TQOE, TQITE, TQOT | dxDxT/DxTxd | A1…An, AA, AB, AD, AC1, A1B etc. indicating major or minor revision based on: customer's request; application requirement, echnology or design advancement, presence of special features. The meaning of such combination of characters and numbers may vary from bearing to bearing | HB1…HB7<br>HA1…HA7 | PT1…PT7<br>AWT1…AWT7<br>ACT1…ACT3 |
| Example | TQO | 101510/506250 | AA2 | HA4 | PT4 |
| | | d: 10,50 inches = 266,700 mm<br>D: 15,50 inches = 393,700 mm<br>T: 10,62 inches = 269,748 mm | As basic TQO configuration, but with special Bench End Play | Case hardened bearing components | Phosphate treated cones, cup and rollers |

Tab. 21 (1 of 2) - First system: structure

| Section 6 | Section 7 | Section 8 | Section 9 | Section 10 |
|---|---|---|---|---|
| Roller features | Final bearing specification | K | $r_{1,2\ min}$<br>$r_{3,4\ min}$ | Suffix |
| ZB | BT4B | The three figures immediately following the K indicates the K thrust value without a decimal mark | The four figures immediately following the three digits of the K value indicate the minimum values in mm of radii 1,2 and 3,4 without decimal marks | Different features from standard version |
| ZB | BT4B | K145 | 3364 | VL |
| Optimized roller profile for improved load distribution | Four-row tapered roller bearing | K: 1,45 | $r_{1,2\ min}$: 3,3 mm<br>$r_{3,4\ min}$: 6,4 mm | Victory Line |

Tab. 21 (2 of 2) - First system: structure

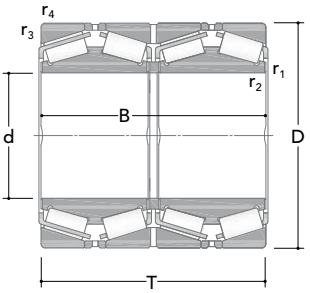
## Second system

| | Section 1 | Section 2 | Section 3 | Section 4 |
|---|---|---|---|---|
| | Configuration | Drawing number | Execution | Material and heat treatment of bearing components |
| | TQO, TQI, TQIT, TQOS, TQOE, TQITE, TQOT | Up to six digits | A1…An, AA, AB, AD, AE1, A1B etc. indicating major or minor revision based on: customer's request, application requirement, technology or design advancement, presence of special features. Tipically the meaning of such combination of alphabetical and numerical characters vary from bearing to bearing | HB1…HB7<br>HA1…HA7 |
| Example | TQIT | 101411 | AA | HB4 |
| | | No dimension indication | As basic TDI configuration, but with lubrication grooves in side faces of double cone | Bainite hardened bearing components |

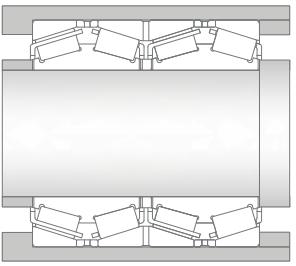
Tab. 22 (1 of 2) - Second system: structure

| Section 5 | Section 6 | Section 7 | Section 8 |
|---|---|---|---|
| Special surface treatment | Roller features | Final bearing specification | Suffix |
| PT1…PT7<br>AWT1…AWT7<br>ACT1…ACT3 | ZB | BT4B | Different features from standard version |
| ACT1 | ZB | BT4B | VL |
| Anticorrosion treated | Optimized roller profile for improved load distribution | Four-row tapered roller bearing | Victory Line |

Tab. 22 (2 of 2) - Second system: structure

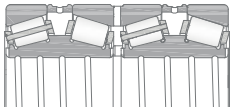


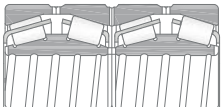

TQO1

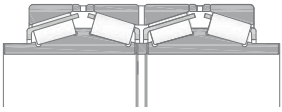


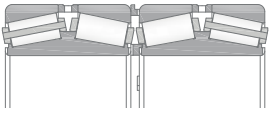
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **120,65** | 174,625 | 139,703 | 141,288 | 733 | 1542 | 172 | **TQO 332406** |
| **4,75** | 6,875 | 5,500 | 5,563 | | | | **(224749/710/710)** |
| **127** | 182,562 | 158,75 | 158,75 | 779 | 1743 | 182 | **TQO 330880** |
| **5** | 7,188 | 6,25 | 6,25 | | | | **(48290/220/220)** |
| **139,7** | 200,025 | 160,34 | 157,162 | 864 | 2079 | 204 | **TQO 331138** |
| **5,5** | 7,875 | 6,313 | 6,188 | | | | **(48685/620/620)** |
| **152,4** | 222,25 | 174,625 | 174,625 | 1136 | 2477 | 252 | **TQO 331329** |
| **6** | 8,75 | 6,875 | 6,875 | | | | **(231649/610/610)** |
| **165,1** | 225,425 | 168,275 | 165,1 | 868 | 2226 | 206 | **TQO 330835** |
| **6,5** | 8,875 | 6,625 | 6,5 | | | | **(46791/720/721)** |
| **177,8** | 247,65 | 192,088 | 192,088 | 1220 | 2985 | 281 | **TQO 331480** |
| **7** | 9,75 | 7,563 | 7,563 | | | | **(67790/720/721)** |
| **187,325** | 269,875 | 211,138 | 211,138 | 1655 | 3851 | 360 | **TQO 331382** |
| **7,375** | 10,625 | 8,313 | 8,313 | | | | **(238849/810/810)** |
| | 269,875 | 211,138 | 211,138 | 1655 | 3851 | 360 | **TQO 328881** |
| | 10,625 | 8,313 | 8,313 | | | | **(238849/810/810)** |
| **190,5** | 266,7 | 188,912 | 187,325 | 1349 | 3278 | 278 | **TQO 331249** |
| **7,5** | 10,5 | 7,438 | 7,375 | | | | **(67885/820/820)** |
| **198,438** | 284,162 | 225,425 | 225,425 | 1795 | 4124 | 392 | **TQO 330899** |
| **7,813** | 11,188 | 8,875 | 8,875 | | | | **(240648/611/611)** |
| **205** | 320 | 203,5 | 203,5 | 1896 | 3623 | 348 | **TQO 328065** |
| **8,071** | 12,598 | 8,012 | 8,012 | | | | |

(1) Bearing with inner ring extended at both sides

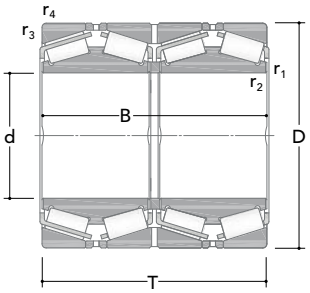

TQO2


TQO3

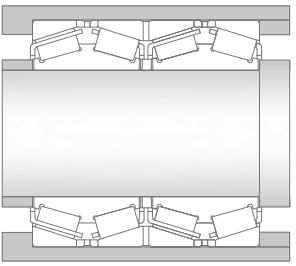

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 120,65<br>4,75 | 0,8 | 1,5 | 0,33 | 11,00 | TQO 332406<br>(224749/710/710) |
| 127<br>5 | 1,5 | 3,3 | 0,3 | 14 | TQO 330880<br>(48290/220/220) |
| 139,7<br>5,5 | 0,8 | 3,3 | 0,33 | 15,5 | TQO 331138<br>(48685/620/620) |
| 152,4<br>6 | 1,5 | 1,5 | 0,33 | 22,5 | TQO 331329<br>(231649/610/610) |
| 165,1<br>6,5 | 0,8 | 3,3 | 0,37 | 20,50 | TQO 330835<br>(46791/720/721) |
| 177,8<br>7 | 1,5 | 3,3 | 0,44 | 29,00 | TQO 331480<br>(67790/720/721) |
| 187,325<br>7,375 | 1,5 | 3,3 | 0,33 | 41 | TQO 331382<br>(238849/810/810) |
| | 1,5 | 3,3 | 0,33 | 41,00 | TQO 328881<br>(238849/810/810) |
| 190,5<br>7,5 | 1,5 | 3,3 | 0,48 | 33,50 | TQO 331249<br>(67885/820/820) |
| 198,438<br>7,813 | 1,5 | 3,3 | 0,33 | 47,50 | TQO 330899<br>(240648/611/611) |
| 205<br>8,071 | 4 | 3 | 0,46 | 54,50 | TQO 328065 |

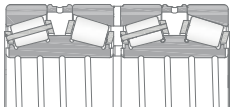


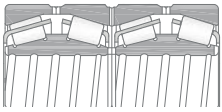

TQO1

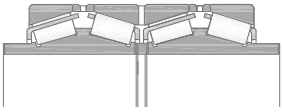


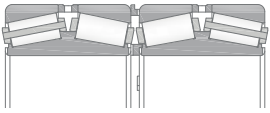
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **206,375** | 282,575 | 190,5 | 190,5 | 1314 | 3305 | 309 | **TQO 331486** |
| **8,125** | 11,125 | 7,5 | 7,5 | | | | **(67985/920/921)** |
| **220** | 320 | 200 | 200 | 1757 | 4009 | 384 | **TQO 328348** |
| **8,661** | 12,598 | 7,874 | 7,874 | | | | |
| | 340 | 303,5 | 303,5 | 3066 | 6695 | 600 | **TQO 328003** |
| | 13,386 | 11,949 | 11,949 | | | | |
| **220,662** | 314,325 | 239,712 | 239,712 | 2177 | 5185 | 466 | **TQO 331156** |
| **8,688** | 12,375 | 9,438 | 9,438 | | | | **(244249/210/210)** |
| **228,6** | 311,15 | 200,025 | 200,025 | 1775 | 4056 | 379 | **TQO 332637** |
| **9** | 12,25 | 7,875 | 7,875 | | | | **(245149/110/110)** |
| **234,95** | 327,025 | 196,85 | 196,85 | 1540 | 4251 | 380 | **TQO 331399** |
| **9,25** | 12,875 | 7,75 | 7,75 | | | | **(8576/20/20)** |
| **240** | 338 | 248 | 248 | 2396 | 5504 | 490 | **TQO 328015** |
| **9,449** | 13,307 | 9,764 | 9,764 | | | | |
| | 360 | 218 | 218 | 2467 | 4776 | 452 | **TQO 328663** |
| | 14,173 | 8,583 | 8,583 | | | | |
| | 360 | 308,5 | 308,5 | 3268 | 7308 | 659 | **TQO 328508** |
| | 14,173 | 12,146 | 12,146 | | | | |
| **241,224** | 355,498 | 228,6 | 228,6 | 2190 | 5064 | 449 | **TQO 331787** |
| **9,497** | 13,996 | 9 | 9 | | | | **(127094/138/139)** |
| **241,478** | 349,148 | 228,6 | 228,6 | 2190 | 5064 | 449 | **TQO 330782** |
| **9,507** | 13,746 | 9 | 9 | | | | **(127097/135/136)** |
| **244,475** | 327,025 | 193,675 | 193,675 | 1837 | 4325 | 388 | **TQO 330862** |
| **9,625** | 12,875 | 7,625 | 7,625 | | | | **(247748/710/710)** |

(1) Bearing with inner ring extended at both sides

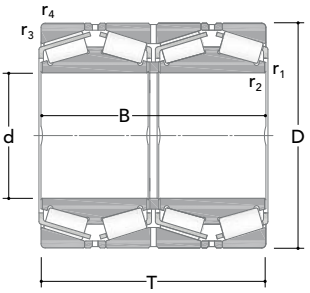

TQO2


TQO3

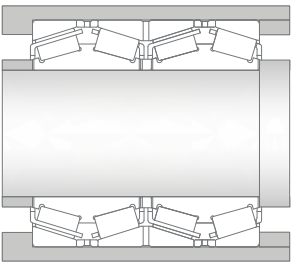

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 206,375<br>8,125 | 0,8 | 3,3 | 0,5 | 36,50 | TQO 331486<br>(67985/920/921) |
| 220<br>8,661 | 1 | 3 | 0,33 | 54 | TQO 328348 |
| | 4 | 3 | 0,43 | 100 | TQO 328003 |
| 220,662<br>8,688 | 1,5 | 3,3 | 0,33 | 61,50 | TQO 331156<br>(244249/210/210) |
| 228,6<br>9 | 1,5 | 3,3 | 0,33 | 43,5 | TQO 332637<br>(245149/110/110) |
| 234,95<br>9,25 | 1,5 | 3,3 | 0,4 | 54 | TQO 331399<br>(8576/20/20) |
| 240<br>9,449 | 4 | 3 | 0,4 | 70 | TQO 328015 |
| | 1,5 | 4 | 0,31 | 75,50 | TQO 328663 |
| | 4 | 3 | 0,33 | 110,00 | TQO 328508 |
| 241,224<br>9,497 | 1,5 | 3,3 | 0,35 | 81,50 | TQO 331787<br>(127094/138/139) |
| 241,478<br>9,507 | 1,5 | 3,3 | 0,35 | 74,50 | TQO 330782<br>(127097/135/136) |
| 244,475<br>9,625 | 1,5 | 3,3 | 0,33 | 46,00 | TQO 330862<br>(247748/710/710) |

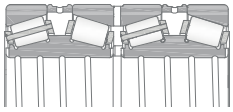


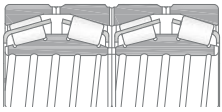

TQO1

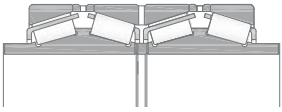


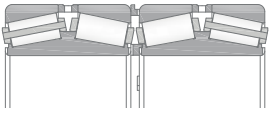
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **244,475** | 381 | 304,8 | 304,8 | 2934 | 6765 | 579 | **TQO 328690** |
| **9,625** | 15 | 12 | 12 | | | | **(126096/150/151)** |
| (cont.) | | | | | | | |
| **245** | 380 | 254 | 255,5 | 2670 | 5670 | 504 | **TQO 331398** |
| **9,646** | 14,961 | 10 | 10,059 | | | | |
| **247,65** | 400,05 | 253,995 | 249,235 | 2921 | 6287 | 561 | **TQO 614096** |
| **9,75** | 15,75 | 10,000 | 9,812 | | | | **(220975/1575/1576)** |
| **254** | 358,775 | 269,875 | 269,875 | 2884 | 7073 | 622 | **TQO 331275** |
| **10** | 14,125 | 10,625 | 10,625 | | | | **(249749/710/710)** |
| | 358,775 | 269,875 | 339,725 | 2884 | 7073 | 622 | **TQO 329070** (1) |
| | 14,125 | 10,625 | 13,375 | | | | |
| **260** | 440 | 298,5 | 298,5 | 3957 | 7450 | 661 | **TQO 328551** |
| **10,236** | 17,323 | 11,725 | 11,725 | | | | |
| **260,35** | 422,275 | 317,5 | 314,325 | 4102 | 8070 | 704 | **TQO 331487** |
| **10,25** | 16,625 | 12,5 | 12,375 | | | | **(252349/310/310)** |
| **266,7** | 355,6 | 228,6 | 230,188 | 2110 | 5599 | 500 | **TQO 330822** |
| **10,5** | 14 | 9 | 9,063 | | | | **(76589/520/520)** |
| | 355,6 | 228,6 | 230,188 | 2215 | 5600 | 500 | **TQO 328209** |
| | 14 | 9 | 9,063 | | | | **(451349/310/310)** |
| **269,875** | 381 | 282,575 | 282,575 | 3068 | 7410 | 663 | **TQO 331168** |
| **10,625** | 15 | 11,125 | 11,125 | | | | **(2523490/310/3100)** |
| **276,225** | 393,7 | 269,875 | 269,878 | 3001 | 6390 | 571 | **TQO 331288** |
| **10,875** | 15,5 | 10,625 | 10,625 | | | | **(275109/155/156)** |
| **279,4** | 381 | 269,875 | 269,875 | 2904 | 7393 | 649 | **TQO 328293** |
| **11** | 15 | 10,625 | 10,625 | | | | |

(1) Bearing with inner ring extended at both sides

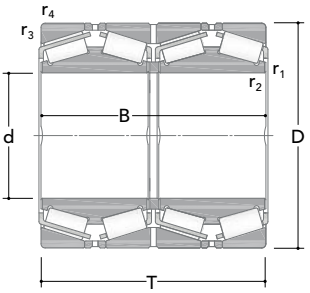

TQO2


TQO3

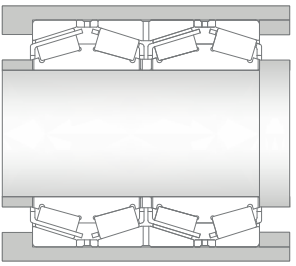

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **244,475** | 3,3 | 4,8 | 0,52 | 130,00 | **TQO 328690** |
| **9,625** | | | | | **(126096/150/151)** |
| (cont.) | | | | | |
| **245** | 1,5 | 4 | 0,44 | 105,00 | **TQO 331398** |
| **9,646** | | | | | |
| **247,65** | 1,5 | 6,4 | 0,4 | 120,00 | **TQO 614096** |
| **9,75** | | | | | **(220975/1575/1576)** |
| **254** | 1,5 | 3,3 | 0,33 | 88,00 | **TQO 331275** |
| **10** | | | | | **(249749/710/710)** |
| | 1,5 | 3,3 | 0,33 | 92,50 | **TQO 329070** (1) |
| **260** | 2,5 | 5 | 0,54 | 190,00 | **TQO 328551** |
| **10,236** | | | | | |
| **260,35** | 6,4 | 3,3 | 0,33 | 180,00 | **TQO 331487** |
| **10,25** | | | | | **(252349/310/310)** |
| **266,7** | 1,5 | 3,3 | 0,37 | 65,50 | **TQO 330822** |
| **10,5** | | | | | **(76589/520/520)** |
| | 1,5 | 3,3 | 0,35 | 65,50 | **TQO 328209** |
| | | | | | **(451349/310/310)** |
| **269,875** | 3,3 | 3,3 | 0,33 | 105,00 | **TQO 331168** |
| **10,625** | | | | | **(2523490/310/3100)** |
| **276,225** | 1,5 | 6,4 | 0,4 | 100 | **TQO 331288** |
| **10,875** | | | | | **(275109/155/156)** |
| **279,4** | 1,5 | 3,3 | 0,35 | 91 | **TQO 328293** |
| **11** | | | | | |

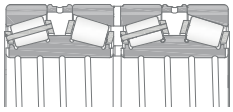


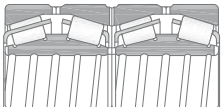

TQO1

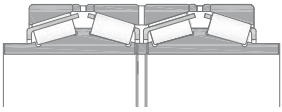


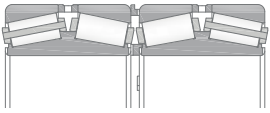
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **279,4** | 393,7 | 269,875 | 269,875 | 3026 | 7110 | 609 | **TQO 332390** |
| **11** | 15,5 | 10,625 | 10,625 | | | | **(135111/155/156)** |
| (cont.) | | | | | | | |
| **279,578** | 380,898 | 244,475 | 244,475 | 2283 | 6323 | 547 | **TQO 330540** |
| **11,007** | 14,996 | 9,625 | 9,625 | | | | **(654644/610/610)** |
| **280** | 380 | 290 | 290 | 3066 | 8055 | 690 | **TQO 328613** |
| **11,024** | 14,961 | 11,417 | 11,417 | | | | |
| | 380 | 290 | 290 | 2961 | 7700 | 679 | **TQO 328681** |
| | 14,961 | 11,417 | 11,417 | | | | |
| | 395 | 288 | 288 | 3499 | 8387 | 713 | **TQO 328807** |
| | 15,551 | 11,339 | 11,339 | | | | |
| | 395 | 288 | 288 | 2882 | 7440 | 660 | **TQO 328882** |
| | 15,551 | 11,339 | 11,339 | | | | |
| | 420 | 250 | 250 | 3202 | 6453 | 579 | **TQO 328664** |
| | 16,535 | 9,843 | 9,843 | | | | |
| | 460 | 324 | 324 | 4673 | 9342 | 811 | **TQO 332441** |
| | 18,110 | 12,756 | 12,756 | | | | |
| **285,75** | 380,898 | 244,475 | 244,475 | 2291 | 6445 | 536 | **TQO 330337** |
| **11,25** | 14,996 | 9,625 | 9,625 | | | | **(654648/610/610)** |
| **288,925** | 406,4 | 298,45 | 298,45 | 3581 | 9088 | 743 | **TQO 331452** |
| **11,375** | 16 | 11,75 | 11,75 | | | | **(255449/410/410)** |
| **292,1** | 422,275 | 269,875 | 269,875 | 3797 | 8039 | 677 | **TQO 331968** |
| **11,5** | 16,625 | 10,625 | 10,625 | | | | **(330116/166/167)** |
| **300** | 440 | 279,4 | 280,988 | 3206 | 7689 | 680 | **TQO 328725** |
| **11,811** | 17,323 | 11 | 11,063 | | | | |
| | 460 | 388,5 | 388,5 | 5454 | 12649 | 988 | **TQO 332472** |
| | 18,110 | 15,295 | 15,295 | | | | |

(1) Bearing with inner ring extended at both sides

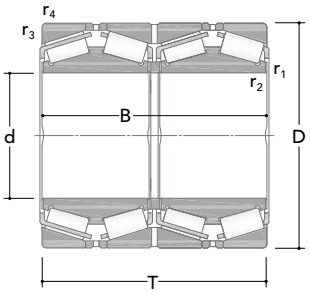

TQO2


TQO3

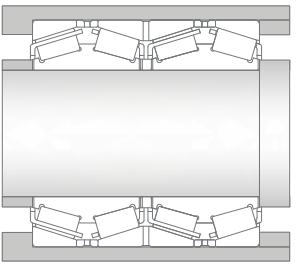

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 279,4<br>11<br>(cont.) | 1,5 | 6,4 | 0,37 | 102 | TQO 332390<br>(135111/155/156) |
| 279,578<br>11,007 | 1,5 | 3,3 | 0,43 | 86,00 | TQO 330540<br>(654644/610/610) |
| 280<br>11,024 | 1 | 2,5 | 0,28 | 95,00 | TQO 328613 |
| | 2,2 | 4,3 | 0,33 | 95,50 | TQO 328681 |
| | 2,5 | 4 | 0,28 | 110,00 | TQO 328807 |
| | 2 | 6 | 0,37 | 115,00 | TQO 328882 |
| | 2 | 5 | 0,35 | 115 | TQO 328664 |
| | 6 | 6 | 0,35 | 215,00 | TQO 332441 |
| 285,75<br>11,25 | 1,5 | 3,3 | 0,43 | 81 | TQO 330337<br>(654648/610/610) |
| 288,925<br>11,375 | 3,3 | 3,3 | 0,33 | 125,00 | TQO 331452<br>(255449/410/410) |
| 292,1<br>11,5 | 6,4 | 3,3 | 0,31 | 125 | TQO 331968<br>(330116/166/167) |
| 300<br>11,811 | 3,3 | 4,8 | 0,43 | 145 | TQO 328725 |
| | 5 | 5 | 0,33 | 240,00 | TQO 332472 |

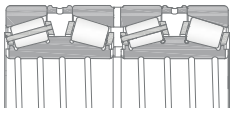


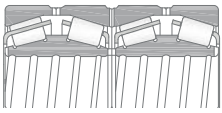

TQO1

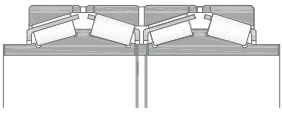


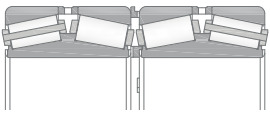
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **300,038** | 422,275 | 311,15 | 311,15 | 3838 | 9533 | 797 | **TQO 331287** |
| **11,813** | 16,625 | 12,25 | 12,25 | | | | (256849/810/810) |
| **304,648** | 438,048 | 279,4 | 280,99 | 3046 | 6941 | 586 | **TQO 328828** |
| **11,994** | 17,246 | 11 | 11,063 | | | | |
| | 438,048 | 279,4 | 280,99 | 3390 | 7990 | 509 | **TQO 331492** |
| | 17,246 | 11 | 11,063 | | | | (757448/410/410) |
| **304,8** | 419,1 | 269,875 | 269,875 | 3357 | 8076 | 686 | **TQO 331687** |
| **12** | 16,5 | 10,625 | 10,625 | | | | (257149/110/110) |
| | 482,6 | 377,825 | 365,125 | 4960 | 10297 | 874 | **TQO 330693** |
| | 19 | 14,875 | 14,375 | | | | |
| **304,902** | 412,648 | 266,7 | 266,7 | 2980 | 7990 | 601 | **TQO 330758** |
| **12,004** | 16,246 | 10,5 | 10,5 | | | | (257248/210/210) |
| **317,5** | 422,275 | 269,875 | 269,875 | 3333 | 8206 | 675 | **TQO 330870** |
| **12,5** | 16,625 | 10,625 | 10,625 | | | | (258648/610/610) |
| | 438,15 | 276,225 | 276,225 | 3515 | 8223 | 702 | **TQO 334020** |
| | 17,25 | 10,875 | 10,875 | | | | |
| | 447,675 | 327,025 | 327,025 | 4681 | 10949 | 868 | **TQO 331161** |
| | 17,625 | 12,875 | 12,875 | | | | (259049/010/010) |
| **330,2** | 444,5 | 301,625 | 301,625 | 3733 | 9725 | 794 | **TQO 332647** |
| **13** | 17,5 | 11,875 | 11,875 | | | | (260149/110/110) |
| **330,302** | 438,023 | 254 | 247,65 | 2577 | 7323 | 602 | **TQO 331664** |
| **13,004** | 17,245 | 10 | 9,75 | | | | (138131/172/173) |
| **333,375** | 469,9 | 342,9 | 342,9 | 4578 | 11419 | 928 | **TQO 331381** |
| **13,125** | 18,5 | 13,5 | 13,5 | | | | (261049/010/010) |

(1) Bearing with inner ring extended at both sides

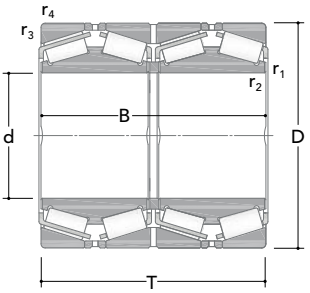

TQO2


TQO3

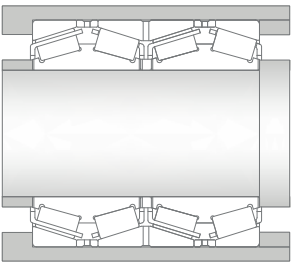

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **300,038**<br>**11,813** | 3,3 | 3,3 | 0,33 | 140,00 | **TQO 331287**<br>**(256849/810/810)** |
| **304,648**<br>**11,994** | 2x15° | 4,8 | 0,48 | 135,00 | **TQO 328828** |
| | 3,3 | 4,8 | 0,48 | 135,00 | **TQO 331492**<br>**(757448/410/410)** |
| **304,8**<br>**12** | 1,5 | 6,4 | 0,33 | 110,00 | **TQO 331687**<br>**(257149/110/110)** |
| | 3,3 | 3,3 | 0,35 | 265,00 | **TQO 330693** |
| **304,902**<br>**12,004** | 3,3 | 3,3 | 0,31 | 105,00 | **TQO 330758**<br>**(257248/210/210)** |
| **317,5**<br>**12,5** | 1,5 | 3,3 | 0,31 | 105,00 | **TQO 330870**<br>**(258648/610/610)** |
| | 1,5 | 3,3 | 0,43 | 125 | **TQO 334020** |
| | 3,3 | 3,3 | 0,33 | 165,00 | **TQO 331161**<br>**(259049/010/010)** |
| **330,2**<br>**13** | 3,3 | 3,3 | 0,33 | 135,00 | **TQO 332647**<br>**(260149/110/110)** |
| **330,302**<br>**13,004** | 1,5 | 3,3 | 0,46 | 110 | **TQO 331664**<br>**(138131/172/173)** |
| **333,375**<br>**13,125** | 3,3 | 3,3 | 0,33 | 190 | **TQO 331381**<br>**(261049/010/010)** |

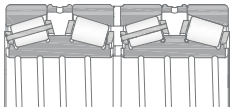


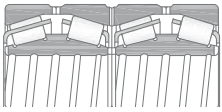

TQO1

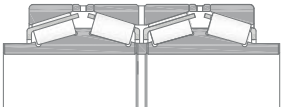


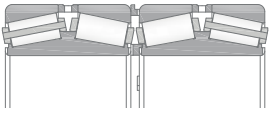
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **340** | 520 | 323,5 | 323,5 | 5529 | 10259 | 892 | **TQO 332963** |
| **13,386** | 20,472 | 12,736 | 12,736 | | | | |
| **342,9** | 571,5 | 342,9 | 342,54 | 6330 | 11767 | 937 | **TQO 331553** |
| **13,5** | 22,5 | 13,5 | 13,486 | | | | |
| **343,052** | 457,098 | 254 | 254 | 3411 | 6780 | 572 | **TQO 330661** |
| **13,506** | 17,996 | 10 | 10 | | | | **(761649/610/610)** |
| **346,075** | 488,95 | 358,775 | 358,775 | 5211 | 12657 | 1007 | **TQO 331228** |
| **13,625** | 19,508 | 14,125 | 14,125 | | | | **(262749/710/710)** |
| **347,662** | 469,9 | 260,35 | 260,35 | 3801 | 10147 | 834 | **TQO 331077** |
| **13,688** | 18,5 | 10,25 | 10,25 | | | | **(262449/410/410)** |
| | 469,9 | 292,1 | 292,1 | 3801 | 10147 | 834 | **TQO 331092** |
| | 18,5 | 11,5 | 11,5 | | | | **(262449/410/410)** |
| **355** | 490 | 316 | 316 | 4164 | 10859 | 891 | **TQO 331508** |
| **13,976** | 19,291 | 12,441 | 12,441 | | | | |
| **355,6** | 482,6 | 269,875 | 265,113 | 3962 | 7887 | 664 | **TQO 330662** |
| **14** | 19 | 10,625 | 10,438 | | | | **(763449/410/410)** |
| | 488,95 | 317,5 | 317,5 | 4090 | 11090 | 873 | **TQO 331271** |
| | 19,25 | 12,5 | 12,5 | | | | **(263349/310/310)** |
| **360** | 510 | 380 | 380 | 5678 | 14139 | 1133 | **TQO 332059** |
| **14,173** | 20,079 | 14,961 | 14,961 | | | | |
| | 540 | 280 | 280 | 4359 | 8886 | 744 | **TQO 328159** |
| | 21,26 | 11,024 | 11,024 | | | | |
| **368,3** | 523,875 | 382,588 | 382,588 | 6353 | 14841 | 1172 | **TQO 331159** |
| **14,5** | 20,625 | 15,063 | 15,063 | | | | **(265049/010/010)** |

(1) Bearing with inner ring extended at both sides

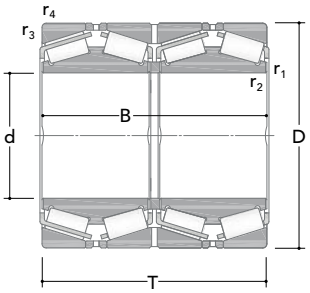

TQO2


TQO3

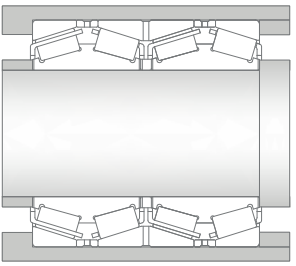

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **340**<br>**13,386** | 1,5 | 5 | 0,3 | 245 | **TQO 332963** |
| **342,9**<br>**13,5** | 3,3 | 6,4 | 0,33 | 365,00 | **TQO 331553** |
| **343,052**<br>**13,506** | 1,5 | 3,3 | 0,48 | 110,00 | **TQO 330661**<br>**(761649/610/610)** |
| **346,075**<br>**13,625** | 3,3 | 3,3 | 0,33 | 220,00 | **TQO 331228**<br>**(262749/710/710)** |
| **347,662**<br>**13,688** | 1,5 | 3,3 | 0,33 | 130 | **TQO 331077**<br>**(262449/410/410)** |
| | 3,3 | 3,3 | 0,33 | 150,00 | **TQO 331092**<br>**(262449/410/410)** |
| **355**<br>**13,976** | 1,5 | 3,3 | 0,33 | 185,00 | **TQO 331508** |
| **355,6**<br>**14** | 1,5 | 3,3 | 0,48 | 140,00 | **TQO 330662**<br>**(763449/410/410)** |
| | 1,5 | 3,3 | 0,33 | 195 | **TQO 331271**<br>**(263349/310/310)** |
| **360**<br>**14,173** | 2 | 6 | 0,33 | 255,00 | **TQO 332059** |
| | 5 | 5 | 0,44 | 230 | **TQO 328159** |
| **368,3**<br>**14,5** | 3,3 | 6,4 | 0,33 | 275 | **TQO 331159**<br>**(265049/010/010)** |

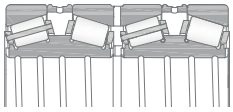


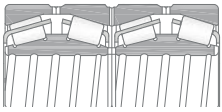

TQO1

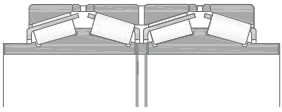


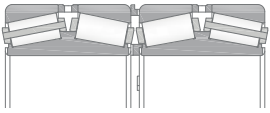
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **374,65** | 501,65 | 260,35 | 250,825 | 3362 | 8094 | 675 | **TQO 332188** |
| **14,75** | 19,75 | 10,25 | 9,875 | | | | **(765149/110/110)** |
| **380** | 560 | 325 | 325 | 5532 | 11867 | 945 | **TQO 328294** |
| **14,961** | 22,047 | 12,795 | 12,795 | | | | |
| | 560 | 360 | 360 | 6090 | 13552 | 1092 | **TQO 328816** |
| | 22,047 | 14,173 | 14,173 | | | | |
| | 620 | 388 | 388 | 6952 | 13609 | 1087 | **TQO 332889** |
| | 24,409 | 15,276 | 15,276 | | | | |
| **384,175** | 546,1 | 400,05 | 400,05 | 7999 | 16498 | 1298 | **TQO 331149** |
| **15,125** | 21,5 | 15,75 | 15,75 | | | | **(266449/410/410)** |
| **385,762** | 514,35 | 317,5 | 317,5 | 4248 | 12029 | 928 | **TQO 331202** |
| **15,188** | 20,25 | 12,5 | 12,5 | | | | **(665949/910/910)** |
| **395** | 545 | 288,9 | 268 | 4744 | 9641 | 739 | **TQO 332824** |
| **15,551** | 21,457 | 11,374 | 10,551 | | | | |
| **406,4** | 546,1 | 288,925 | 268,288 | 3953 | 9372 | 760 | **TQO 331465** |
| **16** | 21,5 | 11,375 | 10,563 | | | | **(234161/215/216)** |
| | 546,1 | 288,925 | 288,925 | 4900 | 10239 | 812 | **TQO 330650** |
| | 21,5 | 11,375 | 11,375 | | | | **(767749/710/710)** |
| | 565,15 | 381 | 381 | 5984 | 15429 | 1234 | **TQO 331347** |
| | 22,25 | 15 | 15 | | | | **(267949/910/910)** |
| | 590,55 | 400,05 | 400,05 | 6866 | 16731 | 1260 | **TQO 331133** |
| | 23,25 | 15,75 | 15,75 | | | | **(833161 /232/233)** |
| **409,575** | 546,1 | 334,962 | 334,962 | 4976 | 13159 | 1003 | **TQO 331333** |
| **16,125** | 21,5 | 13,188 | 13,188 | | | | **(667947/910/910)** |
| | 546,1 | 334,962 | 334,962 | 4443 | 12533 | 962 | **TQO 328967** |
| | 21,5 | 13,188 | 13,188 | | | | |

(1) Bearing with inner ring extended at both sides

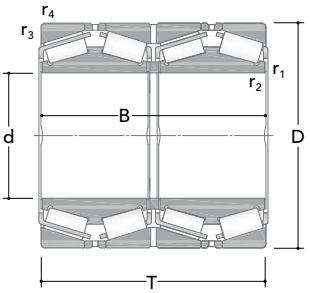

TQO2


TQO3

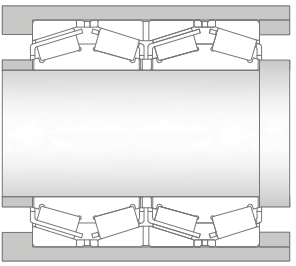

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **374,65**<br>**14,75** | 1,5 | 3,3 | 0,48 | 140 | **TQO 332188**<br>**(765149/110/110)** |
| **380**<br>**14,961** | 2 | 5 | 0,31 | 265,00 | **TQO 328294** |
| | 2 | 6 | 0,4 | 295 | **TQO 328816** |
| | 6 | 6 | 0,43 | 438,00 | **TQO 332889** |
| **384,175**<br>**15,125** | 3,3 | 6,4 | 0,33 | 310,00 | **TQO 331149**<br>**(266449/410/410)** |
| **385,762**<br>**15,188** | 3,3 | 3,3 | 0,43 | 190 | **TQO 331202**<br>**(665949/910/910)** |
| **395**<br>**15,551** | 5 | 10 | 0,48 | 195 | **TQO 332824** |
| **406,4**<br>**16** | 1,5 | 6,4 | 0,48 | 185 | **TQO 331465**<br>**(234161/215/216)** |
| | 1,5 | 6,4 | 0,48 | 185,00 | **TQO 330650**<br>**(767749/710/710)** |
| | 3,3 | 6,4 | 0,33 | 300,00 | **TQO 331347**<br>**(267949/910/910)** |
| | 3,3 | 6,4 | 0,33 | 370 | **TQO 331133**<br>**(833161 /232/233)** |
| **409,575**<br>**16,125** | 1,5 | 6,4 | 0,43 | 220,00 | **TQO 331333**<br>**(667947/910/910)** |
| | 6,4 | 6,4 | 0,43 | 220 | **TQO 328967** |

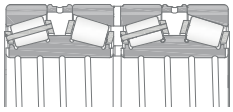


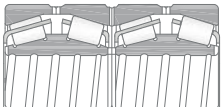

TQO1

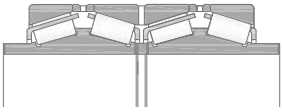


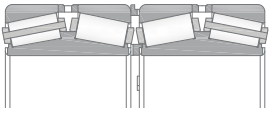
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) | |
| [mm] | | | | [kN] | | | | |
| **415,925** | 590,55 | 434,975 | 434,975 | 7260 | 19538 | 1442 | **TQO 331160** | |
| **16,375** | 23,25 | 17,125 | 17,125 | | | | **(268749/710/710)** | |
| **420** | 560 | 437 | 437 | 5906 | 16390 | 1213 | **TQO 328826** | |
| **16,535** | 22,047 | 17,205 | 17,205 | | | | | |
| | 620 | 355 | 355 | 6427 | 14516 | 1126 | **TQO 328374** | |
| | 24,409 | 13,976 | 13,976 | | | | | |
| **430** | 570 | 336,55 | 336,55 | 4977 | 14158 | 1048 | **TQO 331192** | |
| **16,923** | 22,441 | 13,25 | 13,25 | | | | | |
| **431,8** | 571,5 | 279,4 | 279,4 | 3716 | 9641 | 931 | **TQO 331125** | |
| **17** | 22,5 | 11 | 11 | | | | **(869449/410/410)** | |
| | 571,5 | 279,4 | 279,4 | 3716 | 9641 | 931 | **TQO 331125** | |
| | 22,5 | 11 | 11 | | | | **(869449/410/410)** | |
| | 571,5 | 336,55 | 336,55 | 5280 | 14128 | 1050 | **TQO 331226** | |
| | 22,5 | 13,25 | 13,25 | | | | **(769349/310/310)** | |
| | 635 | 355,6 | 355,6 | 6608 | 14840 | 1173 | **TQO 332060** | |
| | 25 | 14 | 14 | | | | **(931070/250/251)** | |
| | 635 | 355,6 | 440 | 6608 | 14840 | 1173 | **TQO 334019** | (1) |
| | 25 | 14 | 17,323 | | | | | |
| **440** | 580 | 420 | 420 | 6068 | 17671 | 1315 | **TQO 328829** | |
| **17,323** | 22,835 | 16,535 | 16,535 | | | | | |
| | 650 | 353,5 | 353,5 | 6578 | 15067 | 1155 | **TQO 332313** | |
| | 25,591 | 13,917 | 13,917 | | | | | |
| **444,5** | 571,5 | 336,55 | 336,55 | 4956 | 14334 | 1077 | **TQO 328670** | |
| **17,5** | 22,5 | 13,25 | 13,25 | | | | | |
| **447,675** | 635 | 463,55 | 463,55 | 8153 | 22238 | 1583 | **TQO 330608** | |
| **17,625** | 25 | 18,25 | 18,25 | | | | **(270749/710/710)** | |

(1) Bearing with inner ring extended at both sides

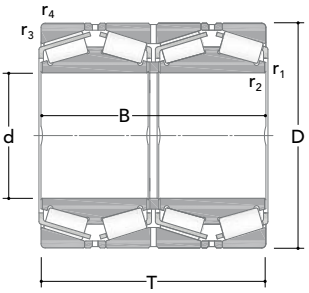

TQO2


TQO3

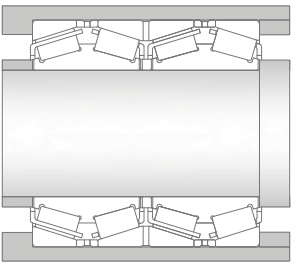

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **415,925** | 3,3 | 6,4 | 0,33 | 395 | **TQO 331160** |
| **16,375** | | | | | **(268749/710/710)** |
| **420** | 4 | 6 | 0,31 | 285,00 | **TQO 328826** |
| **16,535** | | | | | |
| | 2 | 5 | 0,31 | 375,00 | **TQO 328374** |
| **430** | 1,5 | 3,3 | 0,44 | 240,00 | **TQO 331192** |
| **16,923** | | | | | |
| **431,8** | 1,5 | 3,3 | 0,54 | 200,00 | **TQO 331125** |
| **17** | | | | | **(869449/410/410)** |
| | 1,5 | 3,3 | 0,54 | 200,00 | **TQO 331125** |
| | | | | | **(869449/410/410)** |
| | 1,5 | 3,3 | 0,44 | 240 | **TQO 331226** |
| | | | | | **(769349/310/310)** |
| | 6,4 | 6,4 | 0,33 | 385,00 | **TQO 332060** |
| | | | | | **(931070/250/251)** |
| | 6,4 | 6,4 | 0,33 | 405,00 | **TQO 334019** (1) |
| **440** | 4,5 | 6,7 | 0,26 | 300,00 | **TQO 328829** |
| **17,323** | | | | | |
| | 6,4 | 6,4 | 0,33 | 410 | **TQO 332313** |
| **444,5** | 1,5 | 3,3 | 0,31 | 215 | **TQO 328670** |
| **17,5** | | | | | |
| **447,675** | 3,3 | 6,4 | 0,33 | 485 | **TQO 330608** |
| **17,625** | | | | | **(270749/710/710)** |

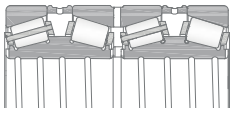


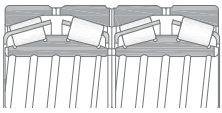

TQO1

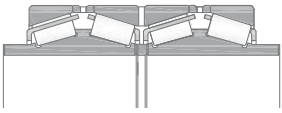


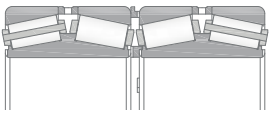
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **450** | 580 | 450 | 450 | 6155 | 19665 | 1395 | **TQO 328161** |
| **17,717** | 22,835 | 17,717 | 17,717 | | | | |
| | 595 | 368 | 368 | 6744 | 16295 | 1220 | **TQO 332773** |
| | 23,425 | 14,488 | 14,488 | | | | (270449/410/410) |
| | 595 | 404 | 404 | 6794 | 16367 | 1215 | **TQO 328365** |
| | 23,425 | 15,906 | 15,906 | | | | (270449/410) |
| **457,073** | 730,148 | 419,1 | 412,75 | 8927 | 19484 | 1469 | **TQO 328287** |
| **17,995** | 28,746 | 16,5 | 16,25 | | | | (671798/2873/2875) |
| **457,2** | 596,9 | 279,4 | 276,225 | 4515 | 10870 | 825 | **TQO 331169** |
| **18** | 23,5 | 11 | 10,875 | | | | (770847/810/810) |
| | 596,9 | 279,4 | 276,225 | 4515 | 10870 | 825 | **TQO 331169** |
| | 23,5 | 11 | 10,875 | | | | (770847/810/810) |
| | 596,9 | 320 | 320 | 4907 | 13663 | 1023 | **TQO 334006** |
| | 23,5 | 12,598 | 12,598 | | | | |
| **460** | 610 | 360 | 360 | 7462 | 16453 | 1238 | **TQO 331977** |
| **18,110** | 24,016 | 14,173 | 14,173 | | | | |
| | 610 | 400 | 400 | 6316 | 17344 | 1287 | **TQO 328285** |
| | 24,018 | 15,748 | 15,748 | | | | |
| | 625 | 421 | 421 | 7118 | 19864 | 1470 | **TQO 332502** |
| | 24,606 | 16,575 | 16,575 | | | | (271149/110/110) |
| **462** | 615,95 | 330,2 | 330,2 | 5544 | 15011 | 1119 | **TQO 328692** |
| **18,189** | 24,25 | 13 | 13 | | | | |
| **475** | 600 | 368 | 368 | 5652 | 16545 | 1254 | **TQO 328913** |
| **18,701** | 23,622 | 14,488 | 14,488 | | | | |
| | 660 | 450 | 450 | 8659 | 22666 | 1641 | **TQO 329007** |
| | 25,984 | 17,717 | 17,717 | | | | |

(1) Bearing with inner ring extended at both sides

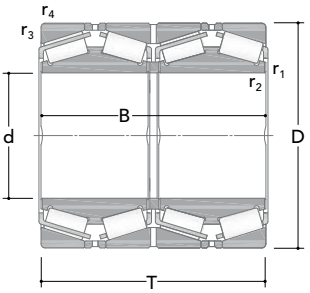

TQO2


TQO3

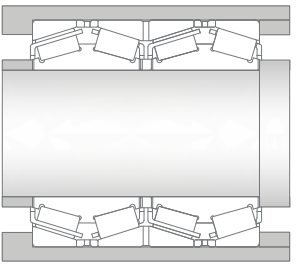

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 450<br>17,717 | 3 | 6 | 0,24 | 280,00 | TQO 328161 |
| | 3 | 6 | 0,33 | 285 | TQO 332773<br>(270449/410/410) |
| | 3 | 6 | 0,33 | 305,00 | TQO 328365<br>(270449/410) |
| 457,073<br>17,995 | 1,5 | 6,4 | 0,4 | 630,00 | TQO 328287<br>(671798/2873/2875) |
| 457,2<br>18 | 1,5 | 3,3 | 0,48 | 200 | TQO 331169<br>(770847/810/810) |
| | 1,5 | 3,3 | 0,48 | 200,00 | TQO 331169<br>(770847/810/810) |
| | 3,3 | 3,3 | 0,44 | 235,00 | TQO 334006 |
| 460<br>18,110 | 3 | 6 | 0,33 | 295,00 | TQO 331977 |
| | 2,5 | 4 | 0,28 | 315 | TQO 328285 |
| | 3 | 9 | 0,33 | 382,00 | TQO 332502<br>(271149/110/110) |
| 462<br>18,189 | 3,3 | 6,4 | 0,4 | 275,00 | TQO 328692 |
| 475<br>18,701 | 2 | 6 | 0,3 | 250,00 | TQO 328913 |
| | 4 | 6 | 0,3 | 460,00 | TQO 329007 |

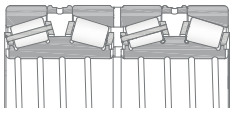


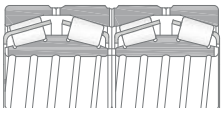

TQO1

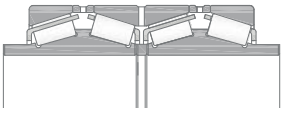


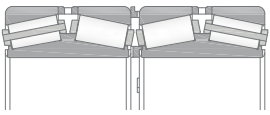
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **479,425** | 679,45 | 495,3 | 495,3 | 9477 | 22507 | 1829 | TQO 330886 |
| **18,875** | 26,75 | 19,5 | 19,5 | | | | (272749/710/710) |
| **482,6** | 615,95 | 330,2 | 330,2 | 6283 | 15204 | 1127 | TQO 332096 |
| **19** | 24,25 | 13 | 13 | | | | (272248/210/210) |
| | 615,95 | 330,2 | 330,2 | 6283 | 15204 | 1127 | TQO 330641 |
| | 24,25 | 13 | 13 | | | | (272249/210/210) |
| | 615,95 | 330,2 | 419,1 | 6283 | 15204 | 1127 | TQO 331626 (1) |
| | 24,25 | 13 | 16,5 | | | | (272249/210/210) |
| | 630 | 420 | 420 | 6681 | 19072 | 1417 | TQO 328773 |
| | 24,803 | 16,535 | 16,535 | | | | |
| | 647,7 | 417,512 | 417,512 | 7608 | 19801 | 1475 | TQO 331259 |
| | 25,5 | 16,438 | 16,438 | | | | (272647/610/610) |
| **488,95** | 622,3 | 365,125 | 365,125 | 5649 | 17213 | 1297 | TQO 328391 |
| **19,25** | 24,5 | 14,375 | 14,375 | | | | |
| **489,026** | 634,873 | 320,675 | 320,675 | 6261 | 14678 | 1074 | TQO 331090 |
| **19,253** | 24,995 | 12,625 | 12,625 | | | | (243193/250/251) |
| | 634,873 | 320,675 | 320,675 | 6261 | 14678 | 1074 | TQO 328282 |
| | 24,995 | 12,625 | 12,625 | | | | (772749/710/710) |
| **500** | 720 | 400 | 400 | 8235 | 20117 | 1481 | TQO 328524 |
| **19,685** | 28,347 | 15,748 | 15,748 | | | | |
| **501,65** | 673,1 | 387,35 | 400,05 | 7226 | 19251 | 1464 | TQO 331499 |
| **19,75** | 26,5 | 15,25 | 15,75 | | | | (641198/265/266) |
| | 711,2 | 520,7 | 520,7 | 10131 | 27268 | 1977 | TQO 331081 |
| | 28 | 20,5 | 20,5 | | | | (274149/110/110) |
| **508** | 762 | 463,55 | 463,55 | 10184 | 23202 | 1700 | TQO 332131 |
| **20** | 30 | 18,25 | 18,25 | | | | (531201/300/301) |

(1) Bearing with inner ring extended at both sides

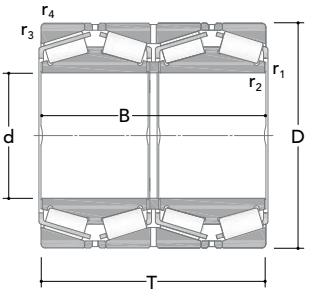

TQO2


TQO3

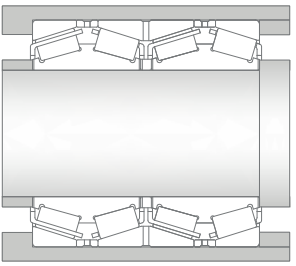

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **479,425**<br>**18,875** | 3,3 | 6,4 | 0,33 | 605,00 | **TQO 330886**<br>**(272749/710/710)** |
| **482,6**<br>**19** | 6,4 | 6,4 | 0,33 | 245 | **TQO 332096**<br>**(272248/210/210)** |
| | 3,3 | 6,4 | 0,33 | 245,00 | **TQO 330641**<br>**(272249/210/210)** |
| | 3,5 | 6,4 | 0,33 | 265,00 | **TQO 331626** (1)<br>**(272249/210/210)** |
| | 3,3 | 6,4 | 0,33 | 345 | **TQO 328773** |
| | 3,3 | 6,4 | 0,33 | 400,00 | **TQO 331259**<br>**(272647/610/610)** |
| **488,95**<br>**19,25** | 3 | 3 | 0,35 | 265 | **TQO 328391** |
| **489,026**<br>**19,253** | 3,3 | 3,3 | 0,35 | 270,00 | **TQO 331090**<br>**(243193/250/251)** |
| | 3,3 | 3,3 | 0,48 | 270,00 | **TQO 328282**<br>**(772749/710/710)** |
| **500**<br>**19,685** | 3 | 6 | 0,35 | 550,00 | **TQO 328524** |
| **501,65**<br>**19,75** | 3,3 | 6,4 | 0,31 | 395,00 | **TQO 331499**<br>**(641198/265/266)** |
| | 3,3 | 6,4 | 0,33 | 755,00 | **TQO 331081**<br>**(274149/110/110)** |
| **508**<br>**20** | 6,4 | 6,4 | 0,37 | 730,00 | **TQO 332131**<br>**(531201/300/301)** |

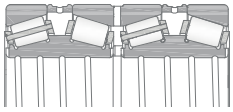


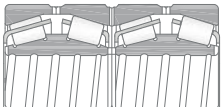

TQO1

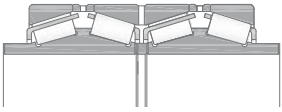


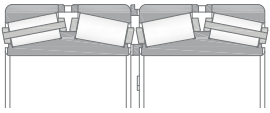
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **510**<br>**20,079** | 655<br>25,787 | 379<br>14,921 | 377<br>14,843 | 7751 | 19012 | 1369 | **TQO 331747** |
| **514,35**<br>**20,25** | 673,1<br>26,5 | 422,275<br>16,625 | 422,275<br>16,625 | 7314 | 21645 | 1557 | **TQO 331157**<br>**(274449/410/410)** |
| **519,112**<br>**20,438** | 736,6<br>29 | 536,575<br>21,125 | 536,575<br>21,125 | 11452 | 30993 | 2160 | **TQO 331078**<br>**(275349/310/310)** |
| **520,7**<br>**20,5** | 711,2<br>28 | 400,05<br>15,75 | 400,05<br>15,75 | 7485 | 19611 | 1459 | **TQO 331243**<br>**(275349/310/310)** |
| **536,575**<br>**21,125** | 761,873<br>29,995 | 558,8<br>22 | 558,8<br>22 | 11637 | 31563 | 2230 | **TQO 331174**<br>**(276449/410/410)** |
| **540**<br>**21,260** | 690<br>27,165 | 400<br>15,748 | 400<br>15,748 | 7452 | 20937 | 1519 | **TQO 331978** |
| | 690<br>27,165 | 400<br>15,748 | 434<br>17,087 | 7452 | 20937 | 1519 | **TQO 334038** [1] |
| **558,8**<br>**22** | 736,6<br>29 | 322,268<br>12,688 | 322,265<br>12,688 | 6196 | 16536 | 1225 | **TQO 331165**<br>**(843221/290/291)** |
| | 736,6<br>29 | 409,575<br>16,125 | 409,575<br>16,125 | 8459 | 23072 | 1639 | **TQO 330993**<br>**(377449/410/410)** |
| | 736,6<br>29 | 457,2<br>18 | 455,612<br>17,938 | 8363 | 25875 | 1809 | **TQO 331346**<br>**(277149/110/110)** |
| **560**<br>**22,047** | 920<br>36,221 | 618<br>24,331 | 618<br>24,331 | 16422 | 34130 | 2311 | **TQO 328509** |
| **571,5**<br>**22,5** | 812,8<br>32 | 593,725<br>23,375 | 593,725<br>23,375 | 11935 | 32353 | 2136 | **TQO 330529**<br>**(278749/710/710)** |

[1] Bearing with inner ring extended at both sides

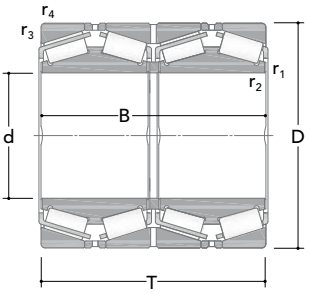

TQO2


TQO3

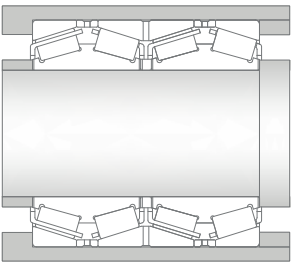

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **510**<br>**20,079** | 1,5 | 6,4 | 0,33 | 330,00 | **TQO 331747** |
| **514,35**<br>**20,25** | 3,3 | 6,4 | 0,31 | 410,00 | **TQO 331157**<br>**(274449/410/410)** |
| **519,112**<br>**20,438** | 3,3 | 6,4 | 0,33 | 755,00 | **TQO 331078**<br>**(275349/310/310)** |
| **520,7**<br>**20,5** | 3,3 | 6,4 | 0,33 | 460,00 | **TQO 331243**<br>**(275349/310/310)** |
| **536,575**<br>**21,125** | 3,3 | 6,4 | 0,33 | 835,00 | **TQO 331174**<br>**(276449/410/410)** |
| **540**<br>**21,260** | 3 | 6 | 0,33 | 375,00 | **TQO 331978** |
| | 1 | 5 | 0,33 | 400,00 | **TQO 334038** (1) |
| **558,8**<br>**22** | 3,3 | 6,4 | 0,35 | 375,00 | **TQO 331165**<br>**(843221/290/291)** |
| | 3,3 | 6,4 | 0,35 | 475,00 | **TQO 330993**<br>**(377449/410/410)** |
| | 3,3 | 6,4 | 0,33 | 545,00 | **TQO 331346**<br>**(277149/110/110)** |
| **560**<br>**22,047** | 7,5 | 7,5 | 0,4 | 1700,00 | **TQO 328509** |
| **571,5**<br>**22,5** | 3,3 | 6,4 | 0,33 | 1000,00 | **TQO 330529**<br>**(278749/710/710)** |

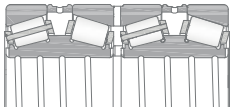


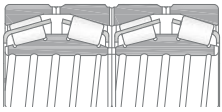

TQO1

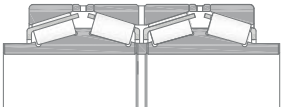


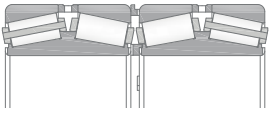
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **584,2** | 730,25 | 349,25 | 342,9 | 5930 | 16897 | 1207 | **TQO 331189** |
| **23** | 28,75 | 13,75 | 13,5 | | | | |
| | 762 | 401,638 | 396,875 | 7693 | 22714 | 1538 | **TQO 331148** |
| | 30 | 15,813 | 15,625 | | | | (778549/510/510) |
| | 901,7 | 539,747 | 523,08 | 13379 | 28233 | 1983 | **TQO 328314** |
| | 35,5 | 21,250 | 20,594 | | | | (665231/355/356) |
| **585,788** | 771,525 | 479,425 | 479,425 | 10485 | 29770 | 2056 | **TQO 331093** |
| **23,063** | 30,375 | 18,875 | 18,875 | | | | (278849/810/810) |
| **595,312** | 844,55 | 615,95 | 615,95 | 17180 | 38848 | 2560 | **TQO 331300** |
| **23,438** | 33,25 | 24,25 | 24,25 | | | | (280049/010/010) |
| **596,9** | 980 | 609,6 | 604,838 | 16947 | 36561 | 2446 | **TQO 331566** |
| **23,5** | 38,583 | 24 | 23,813 | | | | |
| **600** | 870 | 488 | 488 | 12548 | 29361 | 2015 | **TQO 328350** |
| **23,622** | 34,252 | 19,213 | 19,213 | | | | |
| **603,25** | 857,25 | 622,3 | 622,3 | 18223 | 40468 | 2702 | **TQO 331625** |
| **23,622** | 33,75 | 24,5 | 24,5 | | | | (280249/210/210) |
| **609,6** | 787,4 | 361,95 | 361,95 | 7344 | 21081 | 1508 | **TQO 331175** |
| **24** | 31 | 14,25 | 14,25 | | | | (649241/310/311) |
| | 813,562 | 479,425 | 479,425 | 10753 | 30094 | 2108 | **TQO 331925** |
| | 32,03 | 18,875 | 18,875 | | | | (280249/210/210) |
| | 863,6 | 660,4 | 660,4 | 14972 | 40963 | 2735 | **TQO 332391** |
| | 34 | 26 | 26 | | | | (280349/310/310) |
| **620** | 800 | 363,5 | 363,5 | 7589 | 21395 | 1545 | **TQO 328510** |
| **24,409** | 31,496 | 14,311 | 14,311 | | | | |

(1) Bearing with inner ring extended at both sides

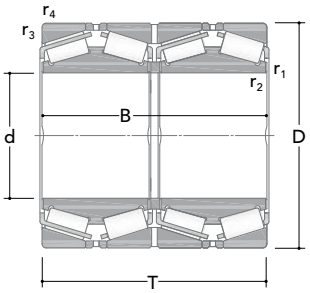

TQO2


TQO3

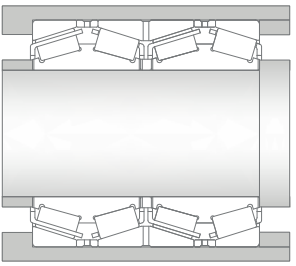

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **584,223** | 1,5 | 3,3 | 0,43 | 330,00 | **TQO 331189** |
| | 3,3 | 6,4 | 0,48 | 485,00 | **TQO 331148** (778549/510/510) |
| | 3,3 | 9,7 | 0,33 | 1250,00 | **TQO 328314** (665231/355/356) |
| **585,788 23,063** | 3,3 | 6,4 | 0,33 | 625,00 | **TQO 331093** (278849/810/810) |
| **595,312 23,438** | 3,3 | 6,4 | 0,33 | 1115,00 | **TQO 331300** (280049/010/010) |
| **596,9 23,5** | 6,4 | 12,7 | 0,4 | 1920,00 | **TQO 331566** |
| **600 23,622** | 3 | 6 | 0,33 | 940,00 | **TQO 328350** |
| **603,25 23,622** | 3,3 | 6,4 | 0,33 | 1235,00 | **TQO 331625** (280249/210/210) |
| **609,624** | 3,3 | 6,4 | 0,37 | 455,00 | **TQO 331175** (649241/310/311) |
| | 3,3 | 6,4 | 0,33 | 715,00 | **TQO 331925** (280249/210/210) |
| | 3,3 | 6,4 | 0,31 | 1240,00 | **TQO 332391** (280349/310/310) |
| **620 24,409** | 3 | 6 | 0,37 | 465,00 | **TQO 328510** |

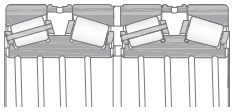


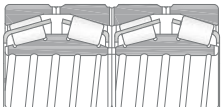

TQO1

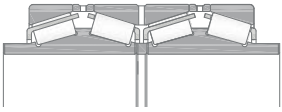


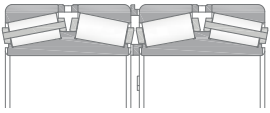
| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **635**<br>**25** | 901,7<br>35,5 | 654,05<br>25,75 | 654,05<br>25,75 | 15478 | 45405 | 2874 | **TQO 330990**<br>**(281049/010/010)** |
| **646,112**<br>**25,438** | 857,25<br>33,75 | 542,925<br>21,375 | 542,925<br>21,375 | 12168 | 36998 | 2368 | **TQO 332671**<br>**(281049/310/010)** |
| **650**<br>**25,591** | 915<br>36,024 | 674<br>26,535 | 674<br>26,535 | 16188 | 44652 | 2923 | **TQO 332307**<br>**(281349/310/310)** |
| | 1030<br>40,551 | 560<br>22,047 | 560<br>22,047 | 20507 | 37483 | 2585 | **TQO 332827** |
| **657,225**<br>**25,875** | 933,45<br>36,75 | 676,275<br>26,625 | 676,275<br>26,625 | 17055 | 49516 | 3117 | **TQO 330824**<br>**(281649/610/610)** |
| **660**<br>**25,984** | 855<br>33,661 | 318,48<br>12,539 | 319,192<br>12,567 | 6201 | 17127 | 1211 | **TQO 331065**<br>**(749259/334/335)** |
| | 855<br>33,661 | 318,5<br>12,539 | 318,5<br>12,539 | 7025 | 18368 | 1337 | **TQO 328511** |
| **660,4**<br>**26** | 812,8<br>32 | 365,125<br>14,375 | 365,125<br>14,375 | 7128 | 22674 | 1512 | **TQO 331190**<br>**(281149/110/110)** |
| **676**<br>**26,614** | 910<br>35,827 | 620<br>24,409 | 620<br>24,409 | 14192 | 41420 | 2705 | **TQO 332906** |
| **679,45**<br>**26,75** | 901,7<br>35,5 | 552,45<br>21,75 | 552,45<br>21,75 | 12240 | 36520 | 2359 | **TQO 331700**<br>**(281849/810/810)** |
| | 901,7<br>35,5 | 552,45<br>21,75 | 552,45<br>21,75 | 13063 | 38635 | 2574 | **TQO 331700**<br>**(281849/810/810)** |
| **682,625**<br>**26,875** | 965,2<br>38 | 701,675<br>27,625 | 701,675<br>27,625 | 17621 | 49690 | 3220 | **TQO 331503**<br>**(282249/210/210)** |

(1) Bearing with inner ring extended at both sides

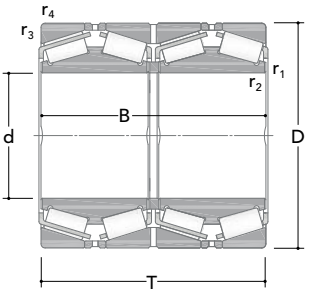

TQO2


TQO3

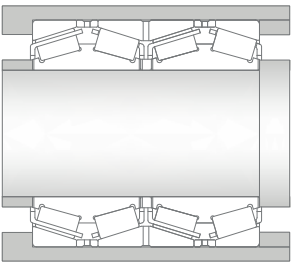

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **635**<br>**25** | 3,3 | 6,4 | 0,33 | 1420,00 | **TQO 330990**<br>**(281049/010/010)** |
| **646,112**<br>**25,438** | 3,3 | 6,4 | 0,33 | 875,00 | **TQO 332671**<br>**(281049/310/010)** |
| **650**<br>**25,591** | 3,3 | 6,4 | 0,33 | 1430,00 | **TQO 332307**<br>**(281349/310/310)** |
| | 15 | 10 | 0,31 | 1830,00 | **TQO 332827** |
| **657,225**<br>**25,875** | 3,3 | 6,4 | 0,33 | 1575,00 | **TQO 330824**<br>**(281649/610/610)** |
| **660**<br>**25,984** | 4,8 | 9,7 | 0,35 | 490,00 | **TQO 331065**<br>**(749259/334/335)** |
| | 5 | 7,5 | 0,35 | 490,00 | **TQO 328511** |
| **660,4**<br>**26** | 3,3 | 6,4 | 0,33 | 420,00 | **TQO 331190**<br>**(281149/110/110)** |
| **676**<br>**26,614** | 4 | 8 | 0,33 | 1150,00 | **TQO 332906** |
| **679,45**<br>**26,75** | 3,3 | 6,4 | 0,33 | 975,00 | **TQO 331700**<br>**(281849/810/810)** |
| | 3,3 | 6,4 | 0,33 | 975,00 | **TQO 331700**<br>**(281849/810/810)** |
| **682,625**<br>**26,875** | 3,3 | 6,4 | 0,33 | 1750,00 | **TQO 331503**<br>**(282249/210/210)** |

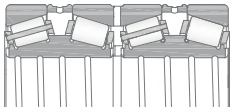


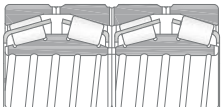

TQO1

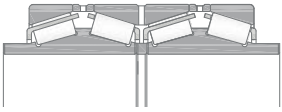


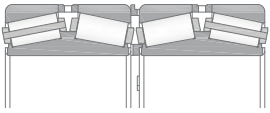
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **685,8** | 876,3 | 355,6 | 352,425 | 7748 | 21846 | 1511 | **TQO 331089** |
| **27** | 34,5 | 14 | 13,875 | | | | **(655271/345/346)** |
| | 876,3 | 355,6 | 434,975 | 7748 | 21846 | 1511 | **TQO 328704** [1] |
| | 34,5 | 14 | 17,185 | | | | **(655271/345/346)** |
| **708,025** | 930,275 | 565,15 | 565,15 | 12966 | 39519 | 2467 | **TQO 332098** |
| **27,875** | 36,625 | 22,25 | 22,25 | | | | **(282549/510/510)** |
| **710** | 900 | 410 | 410 | 9885 | 27367 | 1776 | **TQO 331351** |
| **27,953** | 35,433 | 16,142 | 16,142 | | | | **(882449/410/410)** |
| **711,2** | 914,4 | 317,5 | 317,5 | 7128 | 19399 | 1333 | **TQO 330882** |
| **28** | 36 | 12,5 | 12,5 | | | | **(755281/360/361)** |
| **714,375** | 1016 | 704,85 | 704,85 | 18561 | 52548 | 3379 | **TQO 331358** |
| **28,125** | 40 | 27,75 | 27,75 | | | | **(383240/210/210)** |
| **717,55** | 946,15 | 565,15 | 565,15 | 14600 | 41048 | 2565 | **TQO 332244** |
| **28,25** | 37,25 | 22,25 | 22,25 | | | | **(282847/810/810)** |
| **730** | 940 | 500 | 500 | 12042 | 35988 | 2361 | **TQO 331752** |
| **28,740** | 37,008 | 19,685 | 19,685 | | | | |
| **730,25** | 1035,05 | 755,65 | 755,65 | 20735 | 59334 | 3549 | **TQO 330803** |
| **28,75** | 40,75 | 29,75 | 29,75 | | | | **(283449/410/410)** |
| **749,3** | 990,6 | 605 | 605 | 15078 | 45533 | 2848 | **TQO 331616** |
| **29,5** | 39 | 23,819 | 23,819 | | | | **(283649/610/610)** |
| | 1066,8 | 736,6 | 723,9 | 20802 | 58386 | 3607 | **TQO 331094** |
| | 42 | 29 | 28,5 | | | | **(325296/420/421)** |
| **750** | 1130 | 690 | 690 | 20147 | 46755 | 2884 | **TQO 328376** |
| **29,528** | 44,488 | 27,165 | 27,165 | | | | |

[1] Bearing with inner ring extended at both sides

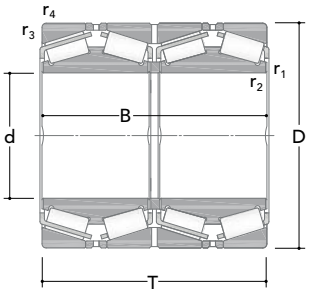

TQO2


TQO3

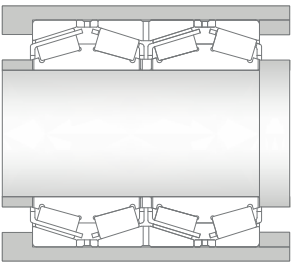

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **685,8<br>27** | 3,3 | 6,4 | 0,43 | 530,00 | **TQO 331089<br>(655271/345/346)** |
| | 3,3 | 6,4 | 0,43 | 580,00 | **TQO 328704** (1)<br>**(655271/345/346)** |
| **708,025<br>27,875** | 3,3 | 6,4 | 0,33 | 1030,00 | **TQO 332098<br>(282549/510/510)** |
| **710<br>27,953** | 3 | 6 | 0,35 | 660,00 | **TQO 331351<br>(882449/410/410)** |
| **711,2<br>28** | 3,3 | 6,4 | 0,37 | 525,00 | **TQO 330882<br>(755281/360/361)** |
| **714,375<br>28,125** | 3,3 | 6,4 | 0,35 | 1950,00 | **TQO 331358<br>(383240/210/210)** |
| **717,55<br>28,25** | 3,3 | 6,4 | 0,33 | 1090,00 | **TQO 332244<br>(282847/810/810)** |
| **730<br>28,740** | 3,5 | 8 | 0,35 | 925,00 | **TQO 331752** |
| **730,25<br>28,75** | 3,3 | 6,4 | 0,33 | 2170,00 | **TQO 330803<br>(283449/410/410)** |
| **749,3<br>29,5** | 3,3 | 6,4 | 0,33 | 1250,00 | **TQO 331616<br>(283649/610/610)** |
| | 25,4x20° | 12,7 | 0,33 | 2250,00 | **TQO 331094<br>(325296/420/421)** |
| **750<br>29,528** | 4 | 7,5 | 0,48 | 2430,00 | **TQO 328376** |

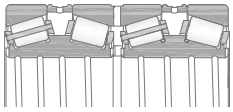


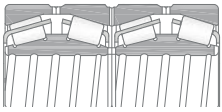

TQO1

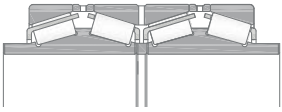


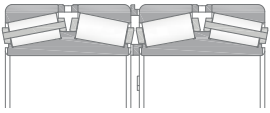
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **762** | 1066,8 | 736,6 | 723,9 | 20470 | 58999 | 3570 | **TQO 331907** |
| **30** | 42 | 29 | 28,5 | | | | **(284148/111/110)** |
| | 1079,5 | 787,4 | 787,4 | 22465 | 65453 | 3903 | **TQO 330676** |
| | 42,5 | 31 | 31 | | | | **(284249/210/210)** |
| **812,8** | 1143 | 768,35 | 768,35 | 22167 | 62211 | 3848 | **TQO 331248** |
| **32** | 45 | 30,25 | 30,25 | | | | |
| **825,5** | 1168,4 | 844,55 | 844,55 | 26136 | 76633 | 4492 | **TQO 331066** |
| **32,5** | 46 | 33,25 | 33,25 | | | | **(285848/810/810)** |
| **850** | 1360 | 910 | 910 | 34320 | 83506 | 4870 | **TQO 331069** |
| **33,465** | 53,543 | 35,827 | 35,827 | | | | |
| **863,6** | 1130,3 | 669,925 | 669,925 | 19881 | 61183 | 3800 | **TQO 331123** |
| **34** | 44,5 | 26,375 | 26,375 | | | | **(286249/210/210)** |
| | 1169,987 | 844,55 | 844,55 | 23750 | 75500 | 4458 | **TQO 332967** |
| | 46,063 | 33,25 | 33,25 | | | | |
| | 1181,1 | 666,75 | 666,75 | 21167 | 57246 | 3535 | **TQO 331649** |
| | 46,5 | 26,25 | 26,25 | | | | **(286449/410/410)** |
| | 1219,2 | 889 | 876,3 | 27993 | 81888 | 4727 | **TQO 330742** |
| | 48 | 35 | 34,5 | | | | **(547341/480/481)** |
| **877,888** | 1220 | 844,55 | 844,55 | 28498 | 76695 | 4538 | **TQO 332981** |
| **34,563** | 48,032 | 33,25 | 33,25 | | | | **(286749/711)** |
| **901,7** | 1295,4 | 914,4 | 901,7 | 30914 | 86063 | 5025 | **TQO 330903** |
| **35,5** | 51 | 36 | 35,5 | | | | **(634356/510/510)** |
| **938,213** | 1270 | 825,5 | 825,5 | 25894 | 81015 | 4678 | **TQO 330726** |
| **36,938** | 50 | 32,5 | 32,5 | | | | **(287649/610/610)** |

(1) Bearing with inner ring extended at both sides

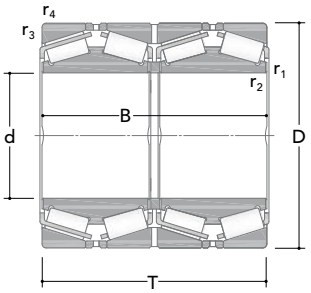

TQO2


TQO3

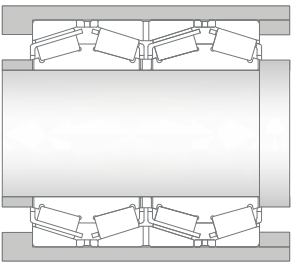

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 762<br>30 | 8 | 12,7 | 0,33 | 2145,00 | TQO 331907<br>(284148/111/110) |
| | 4,8 | 12,7 | 0,33 | 2480,00 | TQO 330676<br>(284249/210/210) |
| 812,8<br>32 | 6,4 | 12,7 | 0,33 | 2590,00 | TQO 331248 |
| 825,5<br>32,5 | 4,8 | 12,7 | 0,33 | 3050,00 | TQO 331066<br>(285848/810/810) |
| 850<br>33,465 | 6 | 12 | 0,35 | 5440,00 | TQO 331069 |
| 863,6<br>34 | 4,8 | 12,7 | 0,33 | 1900,00 | TQO 331123<br>(286249/210/210) |
| | 4,8 | 12,7 | 0,33 | 2700,00 | TQO 332967 |
| | 4,8 | 12,7 | 0,33 | 2150,00 | TQO 331649<br>(286449/410/410) |
| | 4,8 | 12,7 | 0,33 | 3470,00 | TQO 330742<br>(547341/480/481) |
| 877,888<br>34,563 | 4,8 | 12,7 | 0,33 | 3080,00 | TQO 332981<br>(286749/711) |
| 901,7<br>35,5 | 4,8 | 12,7 | 0,33 | 4170,00 | TQO 330903<br>(634356/510/510) |
| 938,213<br>36,938 | 4,8 | 12,7 | 0,35 | 3230,00 | TQO 330726<br>(287649/610/610) |

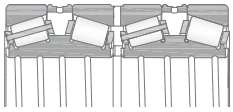


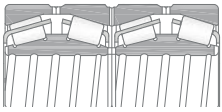

TQO1

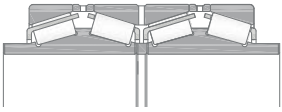


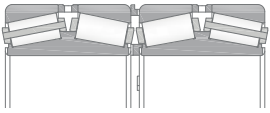
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **939,8**<br>**37** | 1333,5<br>52,5 | 952,5<br>37,5 | 952,5<br>37,5 | 31458 | 96192 | 5234 | **TQO 330944**<br>**(287849/210/210)** |
| **1001**<br>**39,409** | 1360<br>53,543 | 800<br>31,496 | 800<br>31,496 | 29448 | 84928 | 4804 | **TQO 334031** |
| **1003,3**<br>**39,5** | 1358,9<br>53,5 | 800,1<br>31,5 | 800,1<br>31,5 | 29448 | 84928 | 4804 | **TQO 331372** |
| **1070**<br>**42,126** | 1400<br>55,118 | 889,762<br>35,03 | 889,762<br>35,03 | 29880 | 99665 | 5518 | **TQO 328100** |
| **1080**<br>**42,520** | 1450<br>57,087 | 950<br>37,402 | 950<br>37,402 | 33924 | 107919 | 5854 | **TQO 331559** |
| **1139,825**<br>**44,875** | 1509,712<br>59,438 | 923,925<br>36,375 | 923,925<br>36,375 | 33681 | 108066 | 5846 | **TQO 331334** |
| **1200,15**<br>**47,25** | 1593,85<br>62,75 | 990,6<br>39 | 990,600<br>39 | 38465 | 126226 | 6635 | **TQO 331440**<br>**(288949/910/910)** |
| **1250**<br>**49,213** | 1550<br>61,024 | 890<br>35,039 | 890<br>35,039 | 30295 | 114505 | 5974 | **TQO 328819** |
| **1260**<br>**49,606** | 1640<br>64,567 | 1000<br>39,370 | 1000<br>39,370 | 39228 | 141797 | 7009 | **TQO 332124** |
| **1300**<br>**51,181** | 1720<br>67,717 | 1040<br>40,945 | 1040<br>40,945 | 43182 | 140847 | 7306 | **TQO 331950** |
| **1370**<br>**53,937** | 1765<br>69,488 | 1050<br>41,339 | 1035<br>40,748 | 43166 | 152304 | 7836 | **TQO 331349** |

(1) Bearing with inner ring extended at both sides

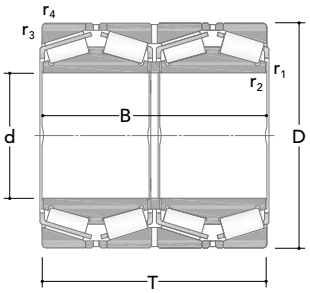

TQO2


TQO3

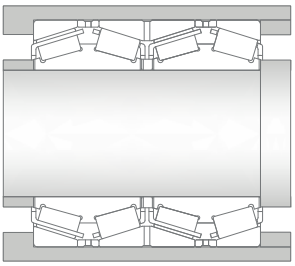

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 939,837 | 4,8 | 12,7 | 0,33 | 4510,00 | TQO 330944 (287849/210/210) |
| 1001 39,409 | 12 | 12,7 | 0,31 | 3390,00 | TQO 334031 |
| 1003,3 39,5 | 4,8 | 12,7 | 0,31 | 3450,00 | TQO 331372 |
| 1070 42,126 | 4 | 12 | 0,33 | 3730,00 | TQO 328100 |
| 1080 42,520 | 5 | 12 | 0,33 | 4450,00 | TQO 331559 |
| 1139,825 44,875 | 4,8 | 12,7 | 0,31 | 4840,00 | TQO 331334 |
| 1200,15 47,25 | 4,8 | 12,7 | 0,33 | 5635,00 | TQO 331440 (288949/910/910) |
| 1250 49,213 | 5 | 12 | 0,33 | 3820,00 | TQO 328819 |
| 1260 49,606 | 5 | 12 | 0,31 | 5800,00 | TQO 332124 |
| 1300 51,181 | 5 | 12 | 0,33 | 7000,00 | TQO 331950 |
| 1370 53,937 | 5 | 12 | 0,33 | 6960,00 | TQO 331349 |

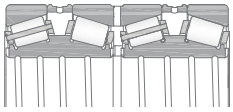


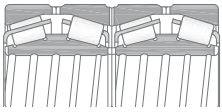

TQO1

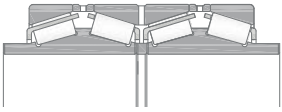


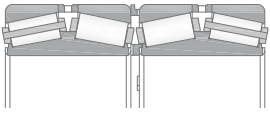
| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **1500**<br>**59,055** | 1900<br>74,803 | 1080<br>42,520 | 1080<br>42,520 | 46113 | 170498 | 8276 | **TQO 332078** |
| **1580**<br>**62,205** | 1960<br>77,165 | 1080<br>42,520 | 1080<br>42,520 | 45216 | 174547 | 8722 | **TQO 331934** |

(1) Bearing with inner ring extended at both sides

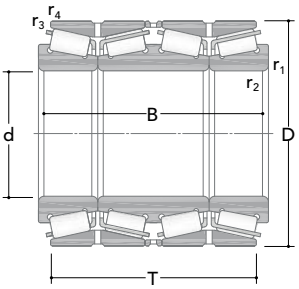

TQO2


TQO3

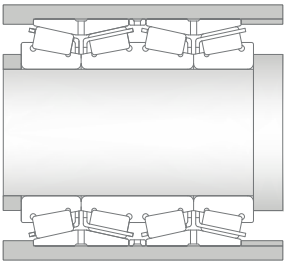

TQOE


SET2xTDI

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **1500**<br>**59,055** | 4 | 12 | 0,35 | 7700,00 | **TQO 332078** |
| **1580**<br>**62,205** | 5 | 12 | 0,33 | 7800,00 | **TQO 331934** |

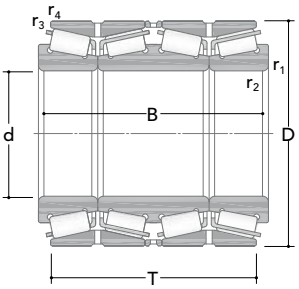



TQI

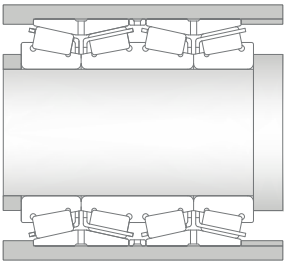


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **254**<br>**10** | 358,775<br>14,125 | 257,175<br>10,125 | 292,1<br>11,5 | 2833 | 7107 | 619 | **TQI 332610**<br>**(249749/710)** |
| **279,4**<br>**11** | 407<br>16,024 | 288<br>11,339 | 320<br>12,598 | 3526 | 9131 | 754 | **TQI 328345**<br>**(255449/411)** |
| **317,5**<br>**12,5** | 422,275<br>16,625 | 261,938<br>10,313 | 290,514<br>11,438 | 3108 | 8179 | 678 | **TQI 332642**<br>**(258649/610)** |
| **333,375**<br>**13,125** | 469,9<br>18,5 | 328,612<br>12,938 | 366,712<br>14,438 | 4582 | 11354 | 934 | **TQI 328083** |
| **347,662**<br>**13,688** | 469,9<br>18,5 | 246,063<br>9,688 | 280,194<br>11,031 | 3575 | 8523 | 708 | **TQI 331807** |
| **368,3**<br>**14,5** | 523,875<br>20,625 | 366,712<br>14,438 | 411,162<br>16,188 | 5856 | 14858 | 1171 | **TQI 334011** |
| **384,175**<br>**15,125** | 546,1<br>21,5 | 384,175<br>15,125 | 428,625<br>16,875 | 6477 | 16620 | 1288 | **TQI 331809** |
| **400**<br>**15,748** | 540<br>21,260 | 295<br>11,614 | 330<br>12,992 | 4858 | 12674 | 967 | **TQI 332297** |
| **406,4**<br>**16** | 590,55<br>23,25 | 381<br>15 | 434,975<br>17,125 | 7026 | 16586 | 1271 | **TQI 328923** |
| **415,925**<br>**16,375** | 590,55<br>23,25 | 419,1<br>16,5 | 469,9<br>18,5 | 7224 | 19443 | 1449 | **TQI 332814** |
| **431,8**<br>**17** | 571,5<br>22,5 | 320,675<br>12,625 | 366,713<br>14,438 | 5001 | 13824 | 1073 | **TQI 331999** |

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **254**<br>**10** | 3,5 | 1,5 | 0,33 | 90,50 | **TQI 332610**<br>**(249749/710)** |
| **279,4**<br>**11** | 3,5 | 1,5 | 0,33 | 140 | **TQI 328345**<br>**(255449/411)** |
| **317,5**<br>**12,5** | 6,5 | 1,5 | 0,31 | 110 | **TQI 332642**<br>**(258649/610)** |
| **333,375**<br>**13,125** | 6,4 | 1,5 | 0,33 | 190 | **TQI 328083** |
| **347,662**<br>**13,688** | 3,3 | 1,5 | 0,33 | 135,00 | **TQI 331807** |
| **368,3**<br>**14,5** | 6,4 | 1,5 | 0,33 | 275,00 | **TQI 334011** |
| **384,175**<br>**15,125** | 6,4 | 1,5 | 0,33 | 300 | **TQI 331809** |
| **400**<br>**15,748** | 3,3 | 1,5 | 0,31 | 210,00 | **TQI 332297** |
| **406,4**<br>**16** | 9,7 | 1,5 | 0,33 | 370 | **TQI 328923** |
| **415,925**<br>**16,375** | 6,4 | 1,5 | 0,33 | 405,00 | **TQI 332814** |
| **431,8**<br>**17** | 6,4 | 1,5 | 0,44 | 250 | **TQI 331999** |

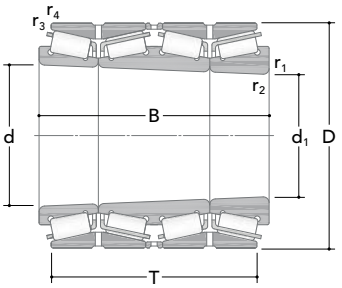



TQI

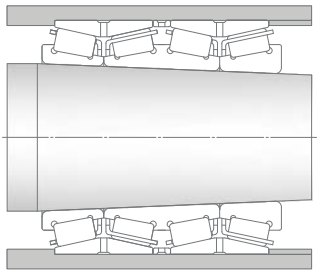


| Main dimensions | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | [kN] | | | |
| **431,8**<br>**17**<br>(cont.) | 647,7<br>25,5 | 338,138<br>13,313 | 387,35<br>15,25 | 6637 | 14987 | 1161 | **TQI 332590** |
| **447,675**<br>**17,625** | 635<br>25 | 446,088<br>17,563 | 496,888<br>19,563 | 8272 | 21982 | 1601 | **TQI 328922** |
| **450**<br>**17,717** | 595<br>23,425 | 352<br>13,858 | 390<br>15,354 | 5518 | 16126 | 1233 | **TQI 334147** |
| **482,6**<br>**19** | 615,95<br>24,25 | 317,5<br>12,5 | 355,6<br>14 | 5058 | 15506 | 1105 | **TQI 328268**<br>**(272249/210)** |
| **510** | 655 | 362 | 405 | 6272 | 19211 | 1355 | **TQI 328732** |

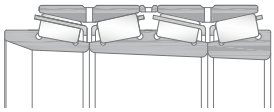
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **431,8<br>17** | 6,4 | 1,5 | 0,33 | 420,00 | **TQI 332590** |
| (cont.)<br>**447,675<br>17,625** | 6,4 | 1,5 | 0,33 | 475,00 | **TQI 328922** |
| **450<br>17,717** | 6 | 1,5 | 0,33 | 295 | **TQI 334147** |
| **482,6<br>19** | 6,4 | 1,5 | 0,33 | 245,00 | **TQI 328268<br>(272249/210)** |
| **510** | 6,4 | 1,5 | 0,33 | 330 | **TQI 328732** |



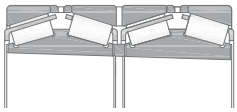

TQIT



| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|---|---|
| d | d1 | D | T | B | Dynamic C | Static $C_0$ | | (AFBMA Part number) |
| [mm] | | | | | [kN] | | | |
| **170,655**<br>**6,719** | 156,634<br>6,167 | 225,425<br>8,875 | 152,4<br>6 | 168,275<br>6,625 | 860 | 2228 | 205 | **TQIT 332646** |
| **200,82**<br>**7,906** | 180,843<br>7,120 | 284,162<br>11,188 | 219,075<br>8,625 | 239,715<br>9,438 | 1801 | 4140 | 391 | **TQIT 332800**<br>**(240631/644/647/611)** |
| **258,762**<br>**10,188** | 234,422<br>9,229 | 358,775<br>14,125 | 257,175<br>10,125 | 292,1<br>11,5 | 2881 | 7125 | 618 | **TQIT 332961**<br>**(249730/747/749/710)** |
| **271,462**<br>**10,688** | 246,327<br>9,694 | 381<br>15 | 269,875<br>10,625 | 301,625<br>11,875 | 4091 | 8080 | 703 | **TQIT 332719**<br>**(252330/345/349/310)** |
| **287,5**<br>**11,319** | 259,975<br>10,235 | 440<br>17,323 | 284<br>11,181 | 330,3<br>13,004 | 4196 | 8396 | 744 | **TQIT 332997** |
| **289,833**<br>**11,411** | 263,333<br>10,367 | 407<br>16,024 | 288<br>11,339 | 375<br>14,764 | 3532 | 9015 | 764 | **TQIT 328315** |
| **317,5**<br>**12,5** | 294,481<br>11,594 | 438,15<br>17,25 | 276,225<br>10,875 | 276,225<br>10,875 | 3519 | 8213 | 702 | **TQOT 328952** |
| **320**<br>**12,598** | 295,833<br>11,647 | 422,275<br>16,625 | 261,424<br>10,292 | 290<br>11,417 | 3052 | 8140 | 681 | **TQIT 332716**<br>**(258630/646/649/610)** |
| | | 422,275<br>16,625 | 261,424<br>15,292 | 336<br>13,228 | 3052 | 8140 | 681 | **TQITE 328344**<br>**(258630/646/649610)** |
| | | 422,275<br>16,625 | 261,424<br>10,292 | 336<br>13,228 | 3052 | 8140 | 681 | **TQITE 332962** |
| **323,85**<br>**12,75** | 293,952<br>11,573 | 447,675<br>17,625 | 323,85<br>12,75 | 414,338<br>16,313 | 4390 | 10702 | 888 | **TQIT 332668** |
| **345,281**<br>**13,594** | 315,383<br>12,417 | 488,95<br>19,25 | 358,775<br>14,125 | 358,775<br>14,125 | 4885 | 12607 | 1011 | **TQOT 334074** |

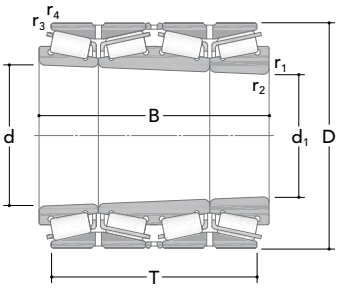


TQITE

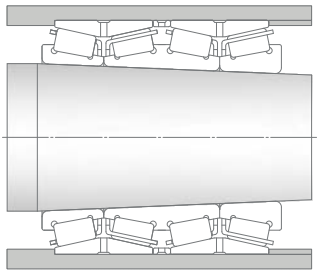


TQOT

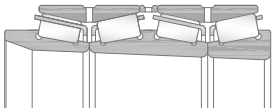
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 170,655<br>6,719 | 3,5 | 0,8 | 0,37 | 20,5 | TQIT 332646 |
| 200,82<br>7,906 | 3 | 1,5 | 0,33 | 50,5 | TQIT 332800<br>(240631/644/647/611) |
| 258,762<br>10,188 | 3,3 | 1,5 | 0,33 | 100 | TQIT 332961<br>(249730/747/749/710) |
| 271,462<br>10,688 | 6,4 | 1,5 | 0,33 | 80 | TQIT 332719<br>(252330/345/349/310) |
| 287,5<br>11,319 | 4 | 1 | 0,35 | 180 | TQIT 332997 |
| 289,833<br>11,411 | 3,5 | 1,5 | 0,37 | 125 | TQIT 328315 |
| 317,5<br>12,5 | 1,5 | 3,3 | 0,43 | 135 | TQOT 328952 |
| 320<br>12,598 | 6,5 | 1,5 | 0,31 | 120 | TQIT 332716<br>(258630/646/649/610) |
| | 6 | 1,5 | 0,31 | 125 | TQITE 328344<br>(258630/646/649610) |
| | 6,5 | 1,5 | 0,31 | 125 | TQITE 332962 |
| 323,85<br>12,75 | 6 | 1,5 | 0,33 | 200 | TQIT 332668 |
| 345,281<br>13,594 | 3,3 | 3,3 | 0,33 | 240 | TQOT 334074 |



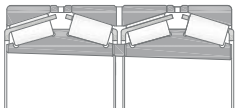

TQIT



| Main dimensions | | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|---|
| d | d1 | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | (AFBMA Part number) |
| [mm] | | | | | [kN] | | | |
| **352,425** | 320,411 | 488,95 | 342,9 | 384,175 | 3763 | 10157 | 834 | **TQIT 332654** |
| **13,875** | 12,615 | 19,25 | 13,5 | 15,125 | | | | **(262730/746/749/710)** |
| **384,175** | 350,838 | 546,1 | 400,05 | 400,05 | 6482 | 16525 | 1296 | **TQOT 334128** |
| **15,125** | 13,813 | 21,5 | 15,75 | 15,75 | | | | |
| **390,525** | 354,805 | 546,1 | 384,175 | 428,625 | 6482 | 16525 | 1296 | **TQIT 332664** |
| **15,375** | 13,969 | 21,5 | 15,125 | 16,875 | | | | **(266430/446/449/410)** |
| **391,071** | 355,352 | 550 | 384,175 | 428,625 | 6482 | 16525 | 1296 | **TQIT 328305** |
| **15,397** | 13,990 | 21,654 | 15,125 | 16,875 | | | | **(266432/445/448/413)** |
| **419,1** | 379,941 | 590,55 | 419,1 | 469,9 | 7157 | 19329 | 1458 | **TQIT 328203** |
| **16,5** | 14,958 | 23,25 | 16,5 | 18,5 | | | | **(268729/745/747/710)** |
| | | 590,64 | 419,1 | 469,9 | 7157 | 19329 | 1458 | **TQIT 328564** |
| | | 23,254 | 16,5 | 18,5 | | | | **(268729/7457/747/710)** |
| **453,39** | 411,982 | 635 | 446,088 | 496,888 | 8258 | 22000 | 1600 | **TQIT 332822** |
| **17,85** | 16,220 | 25 | 17,563 | 19,563 | | | | **(270730/746/749/710)** |
| **479,425** | 438,15 | 679,45 | 495,3 | 495,3 | 9043 | 24758 | 1742 | **TQOT 334057** |
| **18,875** | 17,25 | 26,75 | 19,5 | 19,5 | | | | |
| **488,95** | 444,5 | 679,45 | 479,425 | 533,4 | 9278 | 25686 | 1817 | **TQIT 332760** |
| **19,25** | 17,5 | 26,75 | 18,875 | 21 | | | | **(272730/746/749/710)** |
| **515** | 480 | 700 | 420 | 420 | 7987 | 21702 | 1553 | **TQOT 328965** |
| **20,276** | 18,898 | 27,559 | 16,535 | 16,535 | | | | |
| | | 700 | 370 | 420 | 7425 | 19568 | 1462 | **TQIT 334097** |
| | | 27,559 | 14,567 | 16,535 | | | | |
| **530,225** | 481,937 | 736,6 | 519,112 | 579,438 | 11312 | 30616 | 2187 | **TQIT 332933** |
| **20,875** | 18,974 | 29 | 20,438 | 22,813 | | | | **(275330/346/349/310)** |

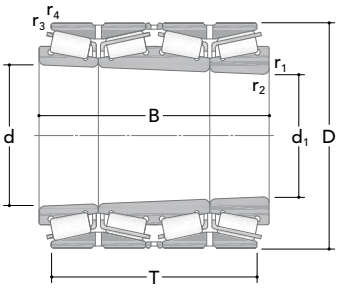


TQITE

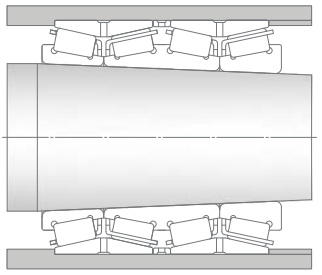


TQOT

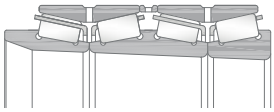
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 352,425<br>13,875 | 6,4 | 1,5 | 0,33 | 205 | TQIT 332654<br>(262730/746/749/710) |
| 384,175<br>15,125 | 3,3 | 3,3 | 0,33 | 340 | TQOT 334128 |
| 390,525<br>15,375 | 6,4 | 1,5 | 0,33 | 340 | TQIT 332664<br>(266430/446/449/410) |
| 391,071<br>15,397 | 6,4 | 1,5 | 0,33 | 345 | TQIT 328305<br>(266432/445/448/413) |
| 419,1<br>16,5 | 6,4 | 1,5 | 0,33 | 440 | TQIT 328203<br>(268729/745/747/710) |
| | 6,4 | 1,5 | 0,33 | 440 | TQIT 328564<br>(268729/7457/747/710) |
| 453,39<br>17,85 | 6,4 | 1,5 | 0,33 | 600 | TQIT 332822<br>(270730/746/749/710) |
| 479,425<br>18,875 | 3,3 | 6,4 | 0,33 | 645 | TQOT 334057 |
| 488,95<br>19,25 | 12,7 | 1,5 | 0,33 | 640 | TQIT 332760<br>(272730/746/749/710) |
| 515<br>20,276 | 3 | 6 | 0,43 | 515 | TQOT 328965 |
| | 6 | 2,5 | 0,35 | 490 | TQIT 334097 |
| 530,225<br>20,875 | 6,4 | 1,5 | 0,33 | 865 | TQIT 332933<br>(275330/346/349/310) |



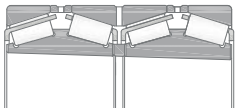

TQIT



| Main dimensions | | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|---|
| d | d1 | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | (AFBMA Part number) |
| [mm] | | | | | [kN] | | | |
| **547,688**<br>**21,563** | 497,683<br>19,594 | 761,873<br>29,995 | 536,575<br>21,125 | 600,075<br>23,625 | 11672 | 32092 | 2194 | **TQIT 332659**<br>**(276430/446/449/410)** |
| **555,233**<br>**21,860** | 497,556<br>19,589 | 761,873<br>29,995 | 536,575<br>21,125 | 692,15<br>27,25 | 11672 | 32092 | 2194 | **TQITE 334125**<br>**(276431/445/447410)** |
| **571,5**<br>**22,5** | 522,023<br>20,552 | 812,8<br>32 | 593,725<br>23,375 | 593,725<br>23,375 | 13266 | 35899 | 2407 | **TQOT 332666** |
| **581,025**<br>**22,875** | 527,579<br>20,771 | 812,8<br>32 | 571,5<br>22,5 | 641,35<br>25,25 | 11984 | 31963 | 2163 | **TQIT 332658** |
| **604,838**<br>**23,813** | 569,78<br>22,432 | 787,4<br>31 | 369,888<br>14,563 | 420,688<br>16,563 | 8482 | 23539 | 1636 | **TQIT 328045** |
| **644,525**<br>**25,375** | 595,313<br>23,438 | 857,25<br>33,75 | 523,875<br>20,625 | 590,55<br>23,25 | 12082 | 36119 | 2425 | **TQIT 332934**<br>**(281030/043/047/010)** |
| **669,925**<br>**26,375** | 621,667<br>24,475 | 933,45<br>36,75 | 649,288<br>25,563 | 725,488<br>28,563 | 17311 | 49070 | 3146 | **TQIT 332928**<br>**(281630/646/649/610)** |
| **680**<br>**26,772** | 621,667<br>24,475 | 930<br>36,614 | 700<br>27,559 | 700<br>27,559 | 18393 | 54489 | 3369 | **TQOT 328349** |
| **682,625**<br>**26,875** | 624,152<br>24,573 | 965,2<br>38 | 701,675<br>27,625 | 701,675<br>27,625 | 17385 | 49629 | 3061 | **TQOT 328558** |
| **744,538**<br>**29,313** | 676,806<br>26,646 | 1035,05<br>40,75 | 727,075<br>28,625 | 812,8<br>32 | 20665 | 57755 | 3646 | **TQIT 332943**<br>**(283430/446/449/410)** |
| **749,3**<br>**29,5** | 676,806<br>26,646 | 990,6<br>39 | 577<br>22,717 | 650<br>25,591 | 15164 | 44873 | 2890 | **TQIT 332596** |

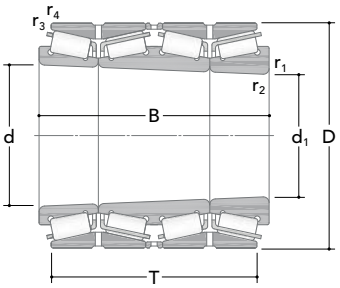


TQITE

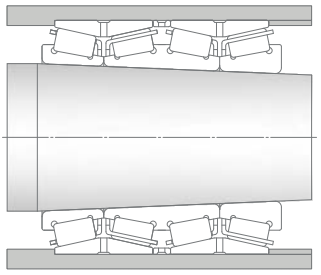


TQOT

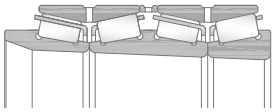
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **547,688**<br>**21,563** | 6,4 | 1,5 | 0,33 | 930 | **TQIT 332659**<br>**(276430/446/449/410)** |
| **555,233**<br>**21,860** | 6,4 | 1,5 | 0,33 | 990 | **TQITE 334125**<br>**(276431/445/447410)** |
| **571,5**<br>**22,5** | 3,3 | 6,4 | 0,33 | 1105 | **TQOT 332666** |
| **581,025**<br>**22,875** | 6,4 | 1,5 | 0,33 | 1100 | **TQIT 332658** |
| **604,838**<br>**23,813** | 6,4 | 1,5 | 0,33 | 580 | **TQIT 328045** |
| **644,525**<br>**25,375** | 6,4 | 1,5 | 0,33 | 1030 | **TQIT 332934**<br>**(281030/043/047/010)** |
| **669,925**<br>**26,375** | 6,4 | 1,5 | 0,33 | 1700 | **TQIT 332928**<br>**(281630/646/649/610)** |
| **680**<br>**26,772** | 3 | 6 | 0,31 | 1625 | **TQOT 328349** |
| **682,625**<br>**26,875** | 3,3 | 6,4 | 0,33 | 1825 | **TQOT 328558** |
| **744,538**<br>**29,313** | 9,7 | 1,5 | 0,33 | 2350 | **TQIT 332943**<br>**(283430/446/449/410)** |
| **749,3**<br>**29,5** | 6,4 | 3,3 | 0,33 | 1500 | **TQIT 332596** |



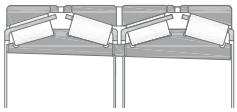

TQIT



| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation (AFBMA Part number) |
|---|---|---|---|---|---|---|---|---|
| d | d1 | D | T | B | Dynamic C | Static $C_0$ | | |
| [mm] | | | | | [kN] | | | |
| **770**<br>**30,315** | 709,167<br>27,92 | 1040<br>40,945 | 650<br>25,591 | 800<br>31,496 | 18476 | 52644 | 3272 | **TQITE 334099** |
| **777,672**<br>**30,617** | 707,294<br>27,846 | 1079,5<br>42,5 | 755,65<br>29,75 | 844,55<br>33,25 | 22078 | 63067 | 3796 | **TQIT 332959**<br>**(284229/244/248/210)** |
| **777,875**<br>**30,625** | 707,457<br>27,854 | 1079,5<br>42,5 | 755,65<br>29,75 | 844,55<br>33,25 | 22078 | 63067 | 3796 | **TQIT 332956**<br>**(284230/246/249/210)** |
| **825,5**<br>**32,5** | 755,121<br>29,729 | 1168,4<br>46 | 844,6<br>33,25 | 844,6<br>33,25 | 23514 | 76684 | 4389 | **TQOT 334040** |
| **828,675**<br>**32,625** | 759,883<br>29,917 | 1143<br>45 | 733,425<br>28,875 | 825,5<br>32,5 | 22426 | 65099 | 3924 | **TQIT 332663** |
| **863,6**<br>**34** | 803,853<br>31,624 | 1130,3<br>44,5 | 644,525<br>25,375 | 717,55<br>28,25 | 19867 | 62050 | 3747 | **TQIT 332571** |
| | 807,773<br>31,802 | 1130,3<br>44,5 | 669,925<br>26,375 | 669,925<br>26,375 | 19867 | 62050 | 3747 | **TQOT 328857** |
| **872,769**<br>**34,361** | 813,239<br>32,017 | 1179,805<br>46,449 | 628,65<br>24,75 | 793,75<br>31,25 | 20937 | 57036 | 3548 | **TQITE 332960**<br>**(286433/443/447/412)** |
| | | 1181,1<br>46,5 | 628,65<br>24,75 | 714,375<br>28,125 | 20937 | 57036 | 3548 | **TQIT 332786**<br>**(286433/443/447/410)** |
| **872,847**<br>**34,364** | 813,466<br>32,026 | 1181,1<br>46,5 | 628,65<br>24,75 | 714,375<br>28,125 | 20937 | 57036 | 3548 | **TQIT 328956**<br>**(286432/446/449/410)** |
| **879,475**<br>**34,625** | 801,688<br>31,563 | 1219,2<br>48 | 838,2<br>33 | 933,45<br>36,75 | 27924 | 80980 | 4781 | **TQIT 328074** |
| **889**<br>**35** | 815,667<br>32,113 | 1219,2<br>48 | 784,225<br>30,875 | 880<br>34,646 | 27349 | 78709 | 4509 | **TQIT 332602** |

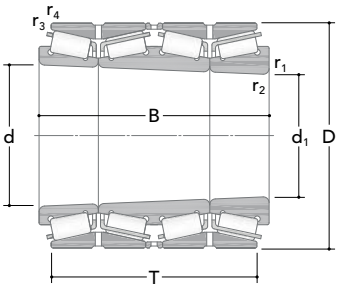


TQITE

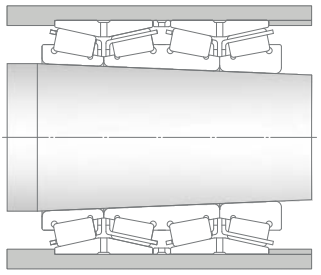


TQOT

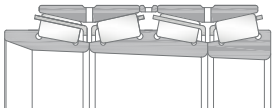
| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| 770<br>30,315 | 3 | 3 | 0,3 | 2015 | TQITE 334099 |
| 777,672<br>30,617 | 9,7 | 3,3 | 0,33 | 2650 | TQIT 332959<br>(284229/244/248/210) |
| 777,875<br>30,625 | 9,7 | 3,3 | 0,33 | 2650 | TQIT 332956<br>(284230/246/249/210) |
| 825,5<br>32,5 | 4,8 | 12,7 | 0,33 | 2800 | TQOT 334040 |
| 828,675<br>32,625 | 9,7 | 3,3 | 0,33 | 2475 | TQIT 332663 |
| 863,6<br>34 | 9,7 | 3,3 | 0,33 | 2100 | TQIT 332571 |
| | 4,8 | 12,7 | 0,33 | 2000 | TQOT 328857 |
| 872,769<br>34,361 | 9,7 | 3,3 | 0,33 | 2530 | TQITE 332960<br>(286433/443/447/412) |
| | 9,7 | 3,3 | 0,33 | 2450 | TQIT 332786<br>(286433/443/447/410) |
| 872,847<br>34,364 | 9,7 | 3,3 | 0,33 | 2450 | TQIT 328956<br>(286432/446/449/410) |
| 879,475<br>34,625 | 12,7 | 3,3 | 0,33 | 3680 | TQIT 328074 |
| 889<br>35 | 9,7 | 3,3 | 0,33 | 3340 | TQIT 332602 |



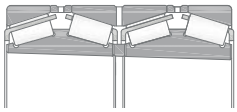

TQIT



| Main dimensions | | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|---|
| d | d1 | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | (AFBMA Part number) |
| [mm] | | | | | [kN] | | | |
| **896,903** | 833,07 | 1264 | 680 | 766 | 23240 | 64650 | 3762 | TQIT 334081 |
| **35,311** | 32,798 | 49,764 | 26,772 | 30,158 | | | | |
| **1004,634** | 936,901 | 1308,1 | 730,25 | 812,8 | 24955 | 77149 | 4363 | TQIT 332720 |
| **39,553** | 36,886 | 51,5 | 28,75 | 32 | | | | (288130/146/149/110) |

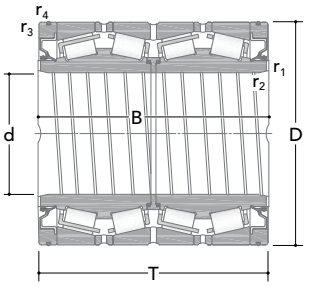


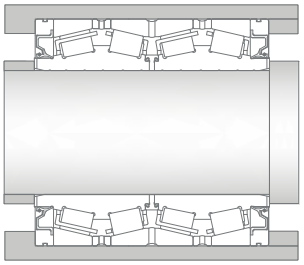
TQITE



TQOT

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | e | | (AFBMA Part number) |
| [mm] | | | | [kg] | |
| **896,903 35,311** | 12,7 | 3,3 | 0,37 | 3100 | **TQIT 334081** |
| **1004,634 39,553** | 12,7 | 3,3 | 0,33 | 3060 | **TQIT 332720** (288130/146/149/110) |

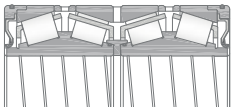


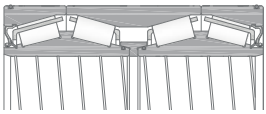



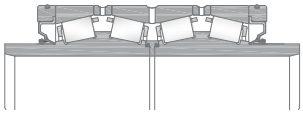
TQOS1

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| 152,46 | 244,475<br>9,625 | 187,325<br>7,375 | 192,088<br>7,5625 | 1306 | 2140 | 224 | TQOS 329121 |
| 203,28 | 317,5<br>12,5 | 266,7<br>10,5 | 266,7<br>10,5 | 2440 | 4846 | 476 | TQOS 329123 |
| 206,375<br>8,125 | 282,575<br>11,125 | 226<br>8,8976 | 226<br>8,8976 | 1284 | 3393 | 307 | TQOS 329090 |
| 220<br>8,6614 | 295<br>11,6142 | 315<br>12,4016 | 315<br>12,4016 | 1869 | 4007 | 360 | TQOS 328853 |
| 220,662<br>8,6875 | 314,325<br>12,375 | 239,712<br>9,4375 | 239,712<br>9,4375 | 1789 | 3805 | 355 | TQOS 328546 |
| 228,69 | 400,05<br>15,75 | 296,875<br>11,688 | 296,875<br>11,688 | 3386 | 5637 | 515 | TQOS 328918 |
| 240<br>9,4488 | 338<br>13,3071 | 340<br>13,3858 | 340<br>13,3858 | 2403 | 5441 | 486 | TQOS 328854 |
| 241,478<br>9,507 | 349,148<br>13,746 | 228,69 | 228,69 | 1912 | 3676 | 336 | TQOS 328668 |
| 254<br>10 | 358,775<br>14,125 | 269,875<br>10,625 | 269,875<br>10,625 | 2443 | 5776 | 505 | TQOS 329071 |
| 260<br>10,2362 | 365<br>14,3701 | 340<br>13,3858 | 340<br>13,3858 | 3165 | 7940 | 675 | TQOS 329093 |
| 266,7<br>10,5 | 355,6<br>14 | 228,69 | 230,188<br>9,0625 | 1708 | 4171 | 361 | TQOS 328468 |

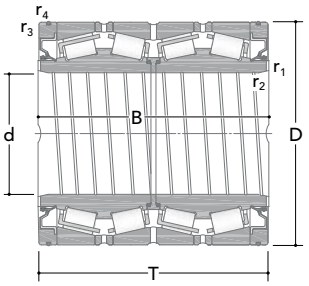
(1) Bearing with inner ring extended at both sides

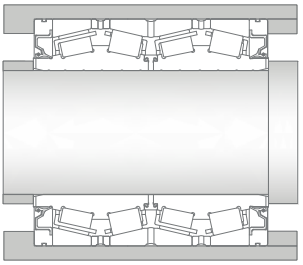

TQOS2


TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | |
| [mm] | | | | [kg] | |
| 152,46 | 1 | 3,3 | 0,33 | 30,00 | TQOS 329121 |
| 203,28 | 2,5 | 3,3 | 0,31 | 76 | TQOS 329123 |
| 206,3758,125 | 0,6 | 3,3 | 0,5 | 40 | TQOS 329090 |
| 2208,6614 | 0,6 | 2,5 | 0,4 | 55 | TQOS 328853 |
| 220,6628,6875 | 1,5 | 3,3 | 0,35 | 56,00 | TQOS 328546 |
| 228,69 | 2,5 | 3,3 | 0,44 | 148,00 | TQOS 328918 |
| 2409,4488 | 1,5 | 4 | 0,4 | 88 | TQOS 328854 |
| 241,4789,507 | 1,5 | 3,3 | 0,35 | 64,00 | TQOS 328668 |
| 25410 | 1,5 | 3,3 | 0,33 | 84 | TQOS 329071 |
| 26010,2362 | 2,5 | 3,5 | 0,35 | 112,00 | TQOS 329093 |
| 266,710,5 | 1,5 | 3,3 | 0,35 | 68 | TQOS 328468 |

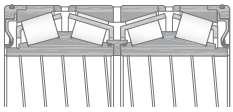


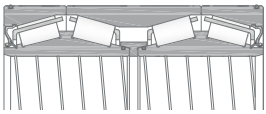



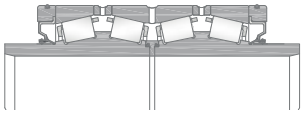
TQOS1

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| 266,7 | 355,6 | 228,6 | 230,188 | 1877 | 4658 | 412 | TQOS 328916 |
| 10,5 | 14 | 9 | 9,0625 | | | | |
| (cont.) | | | | | | | |
| 276,225 | 393,7 | 269,875 | 269,875 | 2709 | 5819 | 524 | TQOS 328920 |
| 10,875 | 15,5 | 10,625 | 10,625 | | | | |
| | 393,7 | 269,875 | 269,875 | 2662 | 5454 | 489 | TQOS 328554 |
| | 15,5 | 10,625 | 10,625 | | | | |
| 279,4 | 393,7 | 269,875 | 269,875 | 2726 | 5767 | 538 | TQOS 328917 |
| 11 | 15,5 | 10,625 | 10,625 | | | | |
| 280 | 395 | 340 | 340 | 3585 | 8590 | 745 | TQOS 329092 |
| 11,0236 | 15,5512 | 13,3858 | 13,3858 | | | | |
| 285,75 | 380,898 | 244,475 | 244,475 | 2185 | 5493 | 476 | TQOS 328878 |
| 11,25 | 14,996 | 9,625 | 9,625 | | | | |
| 300 | 440 | 279,4 | 280,99 | 3082 | 6725 | 583 | TQOS 334126 |
| 11,811 | 17,3228 | 11 | 11,0625 | | | | |
| 304,648 | 438,048 | 279,4 | 280,99 | 3082 | 6725 | 583 | TQOS 334008 |
| 11,994 | 17,246 | 11 | 11,0625 | | | | |
| 304,8 | 419,1 | 269,875 | 269,875 | 2821 | 6881 | 593 | TQOS 329067 |
| 12 | 16,5 | 10,625 | 10,625 | | | | |
| | 501,65 | 336,55 | 336,55 | 4740 | 9214 | 771 | TQOS 328909 |
| | 19,75 | 13,25 | 13,25 | | | | |
| 304,902 | 412,648 | 266,7 | 266,7 | 2478 | 6115 | 519 | TQOS 328278 |
| 12,004 | 16,246 | 10,5 | 10,5 | | | | |
| | 412,648 | 266,7 | 266,7 | 2726 | 6773 | 573 | TQOS 328945 |
| | 16,246 | 10,5 | 10,5 | | | | |

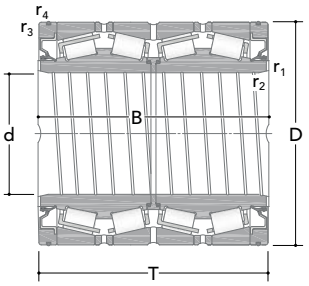
(1) Bearing with inner ring extended at both sides


TQOS2

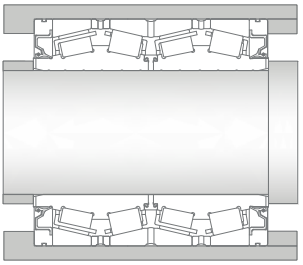

TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | |
| [mm] | | | | [kg] | |
| 266,7<br>10,5<br>(cont.) | 1,5 | 3,3 | 0,35 | 60,00 | TQOS 328916 |
| 276,225<br>10,875 | 1 | 6,4 | 0,37 | 96,00 | TQOS 328920 |
| | 1 | 6,4 | 0,4 | 96,00 | TQOS 328554 |
| 279,4<br>11 | 1 | 6,4 | 0,37 | 96,00 | TQOS 328917 |
| 280<br>11,0236 | 2,5 | 3,5 | 0,33 | 128,00 | TQOS 329092 |
| 285,75<br>11,25 | 1 | 3,3 | 0,43 | 74,00 | TQOS 328878 |
| 300<br>11,811 | 3,3 | 4,8 | 0,46 | 137,00 | TQOS 334126 |
| 304,648<br>11,994 | 2 | 4,8 | 0,46 | 129,00 | TQOS 334008 |
| 304,8<br>12 | 1 | 6,4 | 0,35 | 108,00 | TQOS 329067 |
| | 2 | 6,4 | 0,4 | 254,00 | TQOS 328909 |
| 304,902<br>12,004 | 1 | 3,3 | 0,33 | 98,00 | TQOS 328278 |
| | 1 | 3,3 | 0,31 | 100,00 | TQOS 328945 |

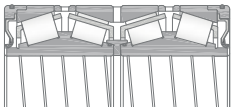


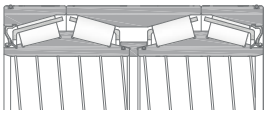

TQOS1

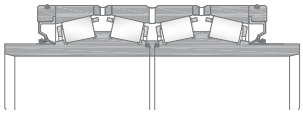


| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | | |
| [mm] | | | | [kN] | | | | |
| 305 | 438,048 | 279,4 | 280,99 | 3113 | 6648 | 589 | TQOS 334076 | |
| 12,0079 | 17,246 | 11 | 11,059 | | | | | |
| 317,5 | 422,275 | 269,875 | 269,875 | 2834 | 6521 | 569 | TQOS 334023 | |
| 12,5 | 16,625 | 10,625 | 10,625 | | | | | |
| 333,375 | 469,9 | 342,9 | 342,9 | 4150 | 10164 | 834 | TQOS 328921 | |
| 13,125 | 18,5 | 13,5 | 13,5 | | | | | |
| 343,052 | 457,098 | 254 | 254 | 3390 | 6449 | 537 | TQOS 328817 | |
| 13,506 | 17,996 | 10 | 10 | | | | | |
| | 457,098 | 254 | 254 | 2532 | 6065 | 536 | TQOS 334033 | |
| | 17,996 | 10 | 10 | | | | | |
| | 457,098 | 254 | 254 | 2343 | 6026 | 505 | TQOS 334106 | |
| | 17,996 | 10 | 10 | | | | | |
| | 457,098 | 254 | 323,85 | 2709 | 6425 | 533 | TQOS 328986 | (1) |
| | 17,996 | 10 | 12,75 | | | | | |
| 355,6 | 482,6 | 269,875 | 265,112 | 3071 | 7496 | 622 | TQOS 328870 | |
| 14 | 19 | 10,625 | 10,4375 | | | | | |
| | 488,95 | 317,5 | 317,5 | 4107 | 9901 | 840 | TQOS 328912 | |
| | 19,25 | 12,5 | 12,5 | | | | | |
| 385,762 | 514,35 | 317,5 | 317,5 | 3882 | 10049 | 776 | TQOS 334042 | |
| 15,1875 | 20,25 | 12,5 | 12,5 | | | | | |
| 406,4 | 546,1 | 288,925 | 288,925 | 3930 | 9415 | 759 | TQOS 328838 | |
| 16 | 21,5 | 11,375 | 11,375 | | | | | |
| | 546,1 | 330 | 330 | 4005 | 10305 | 809 | TQOS 334093 | |
| | 21,5 | 12,9921 | 12,9921 | | | | | |
| 409,575 | 546,1 | 334,962 | 334,962 | 4874 | 11880 | 929 | TQOS 329004 | |
| 16,125 | 21,5 | 13,1875 | 13,1875 | | | | | |

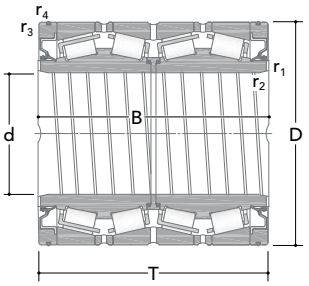
(1) Bearing with inner ring extended at both sides


TQOS2

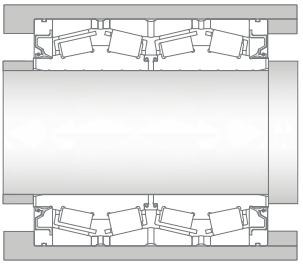

TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | | |
| [mm] | | | | [kg] | | |
| 305<br>12,0079 | 2 | 4,8 | 0,46 | 129 | TQOS 334076 | |
| 317,5<br>12,5 | 1,5 | 3,3 | 0,33 | 98,00 | TQOS 334023 | |
| 333,375<br>13,125 | 2,5 | 3,3 | 0,33 | 182,00 | TQOS 328921 | |
| 343,052<br>13,506 | 1 | 3,3 | 0,48 | 109,00 | TQOS 328817 | |
| | 1 | 3,3 | 0,54 | 109 | TQOS 334033 | |
| | 1 | 3,3 | 0,68 | 109,00 | TQOS 334106 | |
| | 1 | 3,3 | 0,48 | 120,00 | TQOS 328986 | (1) |
| 355,6<br>14 | 1,5 | 3,3 | 0,46 | 136,00 | TQOS 328870 | |
| | 1 | 3,3 | 0,33 | 172,00 | TQOS 328912 | |
| 385,762<br>15,1875 | 1 | 3,3 | 0,4 | 174,00 | TQOS 334042 | |
| 406,4<br>16 | 1,5 | 6,4 | 0,48 | 183,00 | TQOS 328838 | |
| | 1,5 | 6,4 | 0,48 | 202 | TQOS 334093 | |
| 409,575<br>16,125 | 1 | 6,4 | 0,4 | 210,00 | TQOS 329004 | |

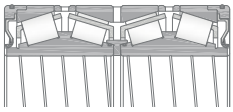


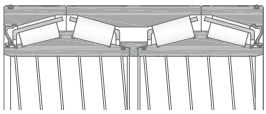

TQOS1

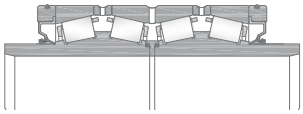


| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | | |
| [mm] | | | | [kN] | | | | |
| 415,925<br>16,375 | 590,55<br>23,25 | 434,975<br>17,125 | 434,975<br>17,125 | 6939 | 18238 | 1374 | TQOS 328893 | |
| 416<br>16,378 | 574<br>22,5984 | 440<br>17,3228 | 440<br>17,3228 | 6128 | 16830 | 1259 | TQOS 334130 | |
| 430<br>16,9291 | 575<br>22,6378 | 380<br>14,9606 | 380<br>14,9606 | 5233 | 14123 | 1087 | TQOS 334095 | |
| 440<br>17,3228 | 590<br>23,2283 | 480<br>18,8976 | 480<br>18,8976 | 7111 | 19204 | 1460 | TQOS 334055 | |
| | 650<br>25,5906 | 353,5<br>13,9173 | 353,5<br>13,9173 | 6696 | 13284 | 1017 | TQOS 328944 | |
| 450<br>17,7165 | 595<br>23,4252 | 398<br>15,6693 | 398<br>15,6693 | 5483 | 16079 | 1219 | TQOS 328846 | |
| 457,2<br>18 | 596,9<br>23,5 | 279,4<br>11 | 276,225<br>10,875 | 3956 | 10016 | 780 | TQOS 328827 | |
| 460<br>18,1102 | 610<br>24,0157 | 360<br>14,1732 | 360<br>14,1732 | 5044 | 12873 | 1029 | TQOS 328727 | |
| 475<br>18,7008 | 600<br>23,622 | 368<br>14,4882 | 368<br>14,4882 | 4683 | 13971 | 1029 | TQOS 334078 | |
| 479,425<br>18,875 | 679,45<br>26,75 | 495,3<br>19,5 | 495,3<br>19,5 | 8513 | 22165 | 1661 | TQOS 334116 | |
| 482,6<br>19 | 615,95<br>24,25 | 330,2<br>13 | 330,2<br>13 | 6049 | 13679 | 1062 | TQOS 328842 | |
| | 615,95<br>24,25 | 330,2<br>13 | 406,4<br>16 | 6049 | 13679 | 1062 | TQOS 328887 | (1) |

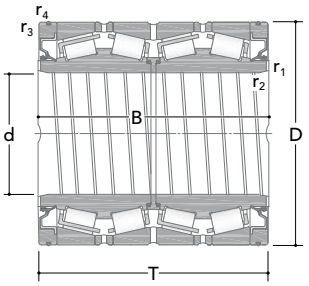
(1) Bearing with inner ring extended at both sides


TQOS2

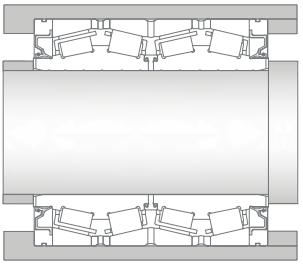

TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | | |
| [mm] | | | | [kg] | | |
| 415,925<br>16,375 | 3,3 | 6,4 | 0,33 | 379 | TQOS 328893 | |
| 416<br>16,378 | 2,5 | 5 | 0,33 | 341,00 | TQOS 334130 | |
| 430<br>16,9291 | 1,5 | 5 | 0,33 | 267,00 | TQOS 334095 | |
| 440<br>17,3228 | 1 | 5 | 0,28 | 371,00 | TQOS 334055 | |
| | 5,5 | 6,4 | 0,33 | 378,00 | TQOS 328944 | |
| 450<br>17,7165 | 2 | 6 | 0,33 | 301 | TQOS 328846 | |
| 457,2<br>18 | 1,5 | 3,3 | 0,48 | 191 | TQOS 328827 | |
| 460<br>18,1102 | 3 | 6 | 0,37 | 270 | TQOS 328727 | |
| 475<br>18,7008 | 2 | 6 | 0,33 | 235 | TQOS 334078 | |
| 479,425<br>18,875 | 3,3 | 6,4 | 0,33 | 565 | TQOS 334116 | |
| 482,6<br>19 | 1 | 6,4 | 0,33 | 232 | TQOS 328842 | |
| | 1 | 6,4 | 0,33 | 250 | TQOS 328887 | (1) |

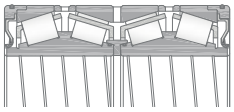


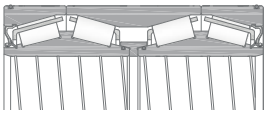

TQOS1

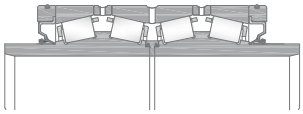


| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | | |
| [mm] | | | | [kN] | | | | |
| 482,6 | 615,95 | 330,2 | 406,4 | 4415 | 12360 | 922 | TQOS 328223 | (1) |
| 19 | 24,25 | 13 | 16 | | | | | |
| (cont.) | 615,95 | 330,2 | 419,1 | 6049 | 13679 | 1062 | TQOS 334072 | (1) |
| | 24,25 | 13 | 16,5 | | | | | |
| | 615,95 | 402,05 | 402,05 | 5566 | 17304 | 1296 | TQOS 328974 | |
| | 24,25 | 15,8465 | 15,8465 | | | | | |
| | 630 | 420 | 420 | 5925 | 16946 | 1287 | TQOS 328930 | |
| | 24,8031 | 16,5354 | 16,5354 | | | | | |
| 489,026 | 634,873 | 320,675 | 320,675 | 4787 | 12415 | 946 | TQOS 334014 | |
| 19,253 | 24,995 | 12,625 | 12,625 | | | | | |
| | 634,873 | 320,675 | 320,675 | 4041 | 11359 | 853 | TQOS 334115 | |
| | 24,995 | 12,625 | 12,625 | | | | | |
| 510 | 655 | 379 | 377 | 5744 | 16471 | 1185 | TQOS 334022 | |
| 20,0787 | 25,7874 | 14,9216 | 14,8425 | | | | | |
| 540 | 690 | 434 | 434 | 6954 | 20902 | 1498 | TQOS 334028 | |
| 21,2598 | 27,1654 | 17,0866 | 17,0866 | | | | | |
| 558,8 | 736,6 | 322,262 | 322,262 | 5813 | 14357 | 1072 | TQOS 328864 | |
| 22 | 29 | 12,6875 | 12,6875 | | | | | |
| | 736,6 | 409,575 | 409,575 | 6556 | 19911 | 1439 | TQOS 334080 | |
| | 29 | 16,125 | 16,125 | | | | | |
| | 736,6 | 457,2 | 455,612 | 7909 | 23404 | 1621 | TQOS 334136 | |
| | 29 | 18 | 17,9375 | | | | | |
| 571,5 | 812,8 | 593,725 | 593,725 | 12043 | 33133 | 2247 | TQOS 334144 | |
| 22,5 | 32 | 23,375 | 23,375 | | | | | |
| 585,788 | 771,525 | 479,425 | 479,425 | 9550 | 27413 | 1870 | TQOS 328888 | |
| 23,0625 | 30,375 | 18,875 | 18,875 | | | | | |

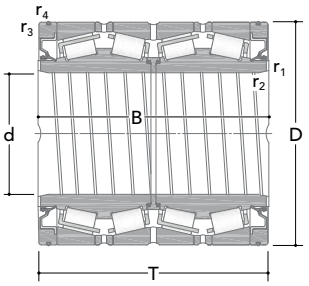
(1) Bearing with inner ring extended at both sides

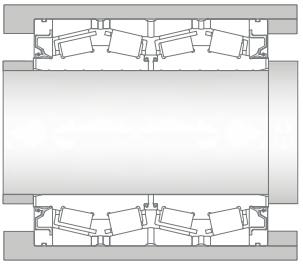

TQOS2


TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | | |
| [mm] | | | | [kg] | | |
| 482,6 | 1 | 6,4 | 0,33 | 237,00 | TQOS 328223 | (1) |
| 19 | | | | | | |
| (cont.) | 1 | 6,4 | 0,33 | 243,00 | TQOS 334072 | (1) |
| | 1 | 6,4 | 0,33 | 290,00 | TQOS 328974 | |
| | 3,3 | 6,4 | 0,33 | 325 | TQOS 328930 | |
| 489,026 | 1 | 3,3 | 0,37 | 248 | TQOS 334014 | |
| 19,253 | | | | | | |
| | 1 | 3,3 | 0,68 | 247,00 | TQOS 334115 | |
| 510 | 1,5 | 6,4 | 0,35 | 311,00 | TQOS 334022 | |
| 20,0787 | | | | | | |
| 540 | 2 | 5 | 0,33 | 392,00 | TQOS 334028 | |
| 21,2598 | | | | | | |
| 558,8 | 1,5 | 6,4 | 0,35 | 343,00 | TQOS 328864 | |
| 22 | | | | | | |
| | 3,3 | 6,4 | 0,48 | 475,00 | TQOS 334080 | |
| | 3,3 | 6,4 | 0,35 | 515,00 | TQOS 334136 | |
| 571,5 | 3,3 | 6,4 | 0,33 | 998,00 | TQOS 334144 | |
| 22,5 | | | | | | |
| 585,788 | 4 | 6,4 | 0,33 | 596,00 | TQOS 328888 | |
| 23,0625 | | | | | | |

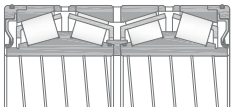


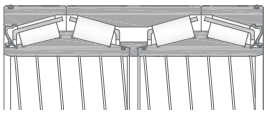



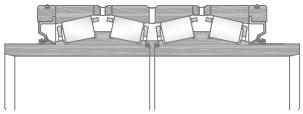
TQOS1

| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation | |
|---|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | | |
| [mm] | | | | [kN] | | | | |
| 609,6<br>24 | 787,4<br>31 | 361,95<br>14,25 | 361,95<br>14,25 | 6880 | 18334 | 1385 | TQOS 328871 | |
| | 813,562<br>32,03 | 479,425<br>18,875 | 479,425<br>18,875 | 9727 | 27890 | 1877 | TQOS 334108 | |
| 635<br>25 | 901,7<br>35,5 | 654,05<br>25,75 | 654,05<br>25,75 | 14342 | 41134 | 2677 | TQOS 334141 | |
| 660<br>25,9843 | 855<br>33,6614 | 318,48<br>12,5385 | 400,842<br>15,7812 | 6331 | 17304 | 1208 | TQOS 334002 | (1) |
| 660,4<br>26 | 812,8<br>32 | 365,125<br>14,375 | 385,424<br>15,1745 | 6567 | 20244 | 1440 | TQOS 328977 | (1) |
| 679,45<br>26,75 | 901,7<br>35,5 | 552,45<br>21,75 | 552,45<br>21,75 | 12027 | 36063 | 2396 | TQOS 334015 | |
| | 901,7<br>35,5 | 552,45<br>21,75 | 635<br>25 | 12027 | 36063 | 2396 | TQOS 334016 | (1) |
| 682,625<br>26,875 | 965,2<br>38 | 701,675<br>27,625 | 701,675<br>27,625 | 17288 | 49371 | 3101 | TQOS 334060 | |
| 685,8<br>27 | 876,3<br>34,5 | 355,6<br>14 | 352,425<br>13,875 | 7177 | 20093 | 1397 | TQOS 328955 | |
| 710<br>27,9528 | 900<br>35,4331 | 410<br>16,1417 | 410<br>16,1417 | 8246 | 24199 | 1638 | TQOS 334051 | |
| 711,2<br>28 | 914,4<br>36 | 317,5<br>12,5 | 317,5<br>125000 | 6555 | 17538 | 1198 | TQOS 329010 | |
| | 914,4<br>36 | 387,35<br>15,25 | 425,45<br>16,75 | 6947 | 19090 | 1349 | TQOS 328988 | (1) |

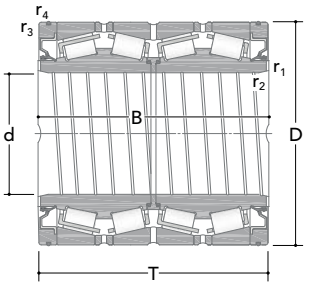
(1) Bearing with inner ring extended at both sides


TQOS2

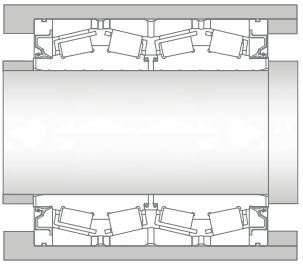

TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | | |
| [mm] | | | | [kg] | | |
| 609,6<br>24 | 3,3 | 6,4 | 0,37 | 430 | TQOS 328871 | |
| | 3,3 | 6,4 | 0,37 | 693,00 | TQOS 334108 | |
| 635<br>25 | 3,3 | 6,4 | 0,35 | 1354 | TQOS 334141 | |
| 660<br>25,9843 | 4 | 5 | 0,35 | 488,00 | TQOS 334002 | (1) |
| 660,4<br>26 | 2 | 6,4 | 0,33 | 396,00 | TQOS 328977 | (1) |
| 679,45<br>26,75 | 3,3 | 6,4 | 0,33 | 975,00 | TQOS 334015 | |
| | 3,3 | 6,4 | 0,33 | 1030 | TQOS 334016 | (1) |
| 682,625<br>26,875 | 3,3 | 6,4 | 0,35 | 651 | TQOS 334060 | |
| 685,8<br>27 | 3,3 | 6,4 | 0,37 | 506 | TQOS 328955 | |
| 710<br>27,9528 | 3 | 6 | 0,33 | 602,00 | TQOS 334051 | |
| 711,2<br>28 | 2,5 | 6,4 | 0,37 | 490,00 | TQOS 329010 | |
| | 5,5 | 3,3 | 0,37 | 602 | TQOS 328988 | (1) |

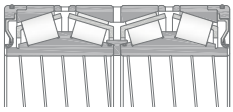


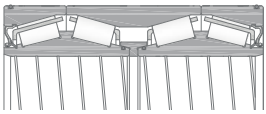

TQOS1

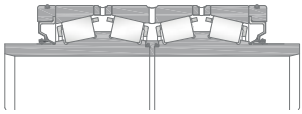


| Main dimensions | | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|---|
| d | D | T | B | Dynamic C | Static $C_0$ | $C_u$ | |
| [mm] | | | | [kN] | | | |
| 749,3<br>29,5 | 990,6<br>39 | 605<br>23,8189 | 605<br>23,8189 | 13083 | 40849 | 2565 | TQOS 334082 |
| 762<br>30 | 1079,5<br>42,5 | 787,4<br>31 | 787,4<br>31 | 21062 | 61002 | 3701 | TQOS 334075 |
| 825,5<br>32,5 | 1168,4<br>46 | 844,55<br>33,25 | 844,55<br>33,25 | 24725 | 73100 | 4349 | TQOS 334135 |
| 863,6<br>34 | 1169,987<br>46,0625 | 844,55<br>33,25 | 844,55<br>33,25 | 23214 | 70966 | 4079 | TQOS 334150 |

(1) Bearing with inner ring extended at both sides


TQOS2


TQOS3


TQOES

| Dimensions | | | Factor | Mass | Designation |
|---|---|---|---|---|---|
| d | r1,2min | r3,4min | e | | |
| [mm] | | | | [kg] | |
| 749,3<br>29,5 | 3,3 | 6,4 | 0,37 | 1274 | TQOS 334082 |
| 762<br>30 | 4,8 | 12,7 | 0,35 | 2248,00 | TQOS 334075 |
| 825,5<br>32,5 | 4,8 | 12,7 | 0,31 | 2958,00 | TQOS 334135 |
| 863,6<br>34 | 4,8 | 12,7 | 0,37 | 2630,00 | TQOS 334150 |


RKB

## Spherical roller bearings ..... 560

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RKB
BEARING INDUSTRIES
SWITZERLAND

# Spherical roller bearings

The spherical roller bearings (SRBs) manufactured by RKB are engineered to withstand high radial forces and moderate axial forces acting in both directions. RKB SRBs can dynamically accommodate misalignments due to shaft bending. They are produced with cylindrical or tapered bore, in open or sealed execution. Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rollers. Moreover, as for dimensions, RKB spherical roller bearings are manufactured according to ISO/ABMA/GOST specifications. As a consequence, they are fully interchangeable with all the bearings that meet the relevant international standards.



Spherical roller bearings

## SRB: a complete range

The range of RKB spherical roller bearings covers most requirements of standard and special industrial applications, in severe and critical working conditions. RKB offers a wide portfolio of open and sealed SRBs in all diameter and width series. While the narrow low-section bearings (e.g. 238 series) feature high speed capabilities as well as low weight and minimum space dimensions, the wide high-section bearings (e.g. 233 series) have higher load carrying capacities. All RKB SRBs put together experience in design with proven performance in all major industries.

## Tailor made solutions

Besides the main spherical roller bearing designs, RKB has developed new solutions according to specific application requirements. The special designs include SEALED SRBs, for smooth operation in contaminated environments, ROVSX type, expressly designed for vibratory equipment, WOR execution, suitable for gear output shaft of truck concrete mixers, and SPLIT bearings to make maintenance operations easier at hard-to-reach positions. If duly applied, these special designs are cost effective for the customer, since they allow increased bearing life expectancy and reduced machine downtime.

## Internal clearance

Spherical roller bearings are produced as standard with Normal radial internal clearance CN, but they are also available with C2, C3, C4 and C5 radial internal clearance, in accordance with the ISO 5753:2009.

Spherical roller bearings for vibratory applications are produced as standard with C4 radial clearance.

The radial internal clearances are reported for bearing with:

- cylindrical bore in the **Tab. 1 page 561**;
- tapered bore in the **Tab. 2 page 562**;

and they are valid only for bearing unmounted and unloaded.

| d [mm] | | Radial internal clearance [μm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. |
| 14 | 18 | 10 | 20 | 20 | 35 | 35 | 45 | 45 | 60 |
| 18 | 24 | 10 | 20 | 20 | 35 | 35 | 45 | 45 | 60 |
| 24 | 30 | 15 | 25 | 25 | 40 | 40 | 55 | 55 | 75 |
| 30 | 40 | 15 | 30 | 30 | 45 | 45 | 60 | 60 | 80 |
| 40 | 50 | 20 | 35 | 35 | 55 | 55 | 75 | 75 | 100 |
| 50 | 65 | 20 | 40 | 40 | 65 | 65 | 90 | 90 | 120 |
| 65 | 80 | 30 | 50 | 50 | 80 | 80 | 110 | 110 | 145 |
| 80 | 100 | 35 | 60 | 60 | 100 | 100 | 135 | 135 | 180 |
| 100 | 120 | 40 | 75 | 75 | 120 | 120 | 160 | 160 | 210 |
| 120 | 140 | 50 | 95 | 95 | 145 | 145 | 190 | 190 | 240 |
| 140 | 160 | 60 | 110 | 110 | 170 | 170 | 220 | 220 | 280 |
| 160 | 180 | 65 | 120 | 120 | 180 | 180 | 240 | 240 | 310 |
| 180 | 200 | 70 | 130 | 130 | 200 | 200 | 260 | 260 | 340 |
| 200 | 225 | 80 | 140 | 140 | 220 | 220 | 290 | 290 | 380 |
| 225 | 250 | 90 | 150 | 150 | 240 | 240 | 320 | 320 | 420 |
| 250 | 280 | 100 | 170 | 170 | 260 | 260 | 350 | 350 | 460 |
| 280 | 315 | 110 | 190 | 190 | 280 | 280 | 370 | 370 | 500 |
| 315 | 355 | 120 | 200 | 200 | 310 | 310 | 410 | 410 | 550 |
| 355 | 400 | 130 | 220 | 220 | 340 | 340 | 450 | 450 | 600 |
| 400 | 450 | 140 | 240 | 240 | 370 | 370 | 500 | 500 | 660 |
| 450 | 500 | 140 | 260 | 260 | 410 | 410 | 550 | 550 | 720 |
| 500 | 560 | 150 | 280 | 280 | 440 | 440 | 600 | 600 | 780 |
| 560 | 630 | 170 | 310 | 310 | 480 | 480 | 650 | 650 | 850 |
| 630 | 710 | 190 | 350 | 350 | 530 | 530 | 700 | 700 | 920 |
| 710 | 800 | 210 | 390 | 390 | 580 | 580 | 770 | 770 | 1 010 |
| 800 | 900 | 230 | 430 | 430 | 650 | 650 | 860 | 860 | 1 120 |
| 900 | 1 000 | 260 | 480 | 480 | 710 | 710 | 930 | 930 | 1 220 |
| 1 000 | 1 120 | 290 | 530 | 530 | 770 | 770 | 1 050 | 1 050 | 1 430 |
| 1 120 | 1 250 | 320 | 580 | 580 | 840 | 840 | 1 140 | 1 140 | 1 560 |
| 1 250 | 1 400 | 350 | 630 | 630 | 910 | 910 | 1 240 | 1 240 | 1 700 |
| 1 400 | 1 600 | 380 | 700 | 700 | 1 020 | 1 020 | 1 390 | 1 390 | 1 890 |
| 1 600 | 1 800 | 420 | 780 | 780 | 1 140 | 1 140 | 1 550 | 1 550 | 2 090 |
| 1 800 | 2 000 | 460 | 860 | 860 | 1 260 | 1 260 | 1 710 | 1 710 | 2 300 |
| 2 000 | 2 250 | 500 | 950 | 950 | 1 400 | 1 400 | 1 900 | 1 900 | 2 540 |
| 2 250 | 2 500 | 550 | 1 050 | 1 050 | 1 550 | 1 550 | 2 100 | 2 100 | 2 790 |

Tab. 1 - Radial internal clearance of spherical roller bearings with cylindrical bore

| d [mm] | | Radial internal clearance [µm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. |
| 18 | 24 | 15 | 25 | 25 | 35 | 35 | 45 | 45 | 60 |
| 24 | 30 | 20 | 30 | 30 | 40 | 40 | 55 | 55 | 75 |
| 30 | 40 | 25 | 35 | 35 | 50 | 50 | 65 | 65 | 85 |
| 40 | 50 | 30 | 45 | 45 | 60 | 60 | 80 | 80 | 100 |
| 50 | 65 | 40 | 55 | 55 | 75 | 75 | 95 | 95 | 120 |
| 65 | 80 | 50 | 70 | 70 | 95 | 95 | 120 | 120 | 150 |
| 80 | 100 | 55 | 80 | 80 | 110 | 110 | 140 | 140 | 180 |
| 100 | 120 | 65 | 100 | 100 | 135 | 135 | 170 | 170 | 220 |
| 120 | 140 | 80 | 120 | 120 | 160 | 160 | 200 | 200 | 260 |
| 140 | 160 | 90 | 130 | 130 | 180 | 180 | 230 | 230 | 300 |
| 160 | 180 | 100 | 140 | 140 | 200 | 200 | 260 | 260 | 340 |
| 180 | 200 | 110 | 160 | 160 | 220 | 220 | 290 | 290 | 370 |
| 200 | 225 | 120 | 180 | 180 | 250 | 250 | 320 | 320 | 410 |
| 225 | 250 | 140 | 200 | 200 | 270 | 270 | 350 | 350 | 450 |
| 250 | 280 | 150 | 220 | 220 | 300 | 300 | 390 | 390 | 490 |
| 280 | 315 | 170 | 240 | 240 | 330 | 330 | 430 | 430 | 540 |
| 315 | 355 | 190 | 270 | 270 | 360 | 360 | 470 | 470 | 590 |
| 355 | 400 | 210 | 300 | 300 | 400 | 400 | 520 | 520 | 650 |
| 400 | 450 | 230 | 330 | 330 | 440 | 440 | 570 | 570 | 720 |
| 450 | 500 | 260 | 370 | 370 | 490 | 490 | 630 | 630 | 790 |
| 500 | 560 | 290 | 410 | 410 | 540 | 540 | 680 | 680 | 870 |
| 560 | 630 | 320 | 460 | 460 | 600 | 600 | 760 | 760 | 980 |
| 630 | 710 | 350 | 510 | 510 | 670 | 670 | 850 | 850 | 1 090 |
| 710 | 800 | 390 | 570 | 570 | 750 | 750 | 960 | 960 | 1 220 |
| 800 | 900 | 440 | 640 | 640 | 840 | 840 | 1 070 | 1 070 | 1 370 |
| 900 | 1 000 | 490 | 710 | 710 | 930 | 930 | 1 190 | 1 190 | 1 520 |
| 1 000 | 1 120 | 540 | 780 | 780 | 1 020 | 1 020 | 1 300 | 1 300 | 1 650 |
| 1 120 | 1 250 | 600 | 860 | 860 | 1 120 | 1 120 | 1 420 | 1 420 | 1 800 |
| 1 250 | 1 400 | 660 | 940 | 940 | 1 220 | 1 220 | 1 550 | 1 550 | 1 960 |
| 1 400 | 1 600 | 740 | 1 060 | 1 060 | 1 380 | 1 380 | 1 750 | 1 750 | 2 200 |
| 1 600 | 1 800 | 820 | 1 180 | 1 180 | 1 540 | 1 540 | 1 950 | 1 950 | 2 500 |
| 1 800 | 2 000 | 910 | 1 310 | 1 310 | 1 710 | 1 710 | 2 150 | 2 150 | 2 750 |
| 2 000 | 2 250 | 1 000 | 1 450 | 1 450 | 1 900 | 1 900 | 2 400 | 2 400 | 3 050 |
| 2 250 | 2 500 | 1 100 | 1 600 | 1 600 | 2 100 | 2 100 | 2 650 | 2 650 | 3 350 |

Tab. 2 - Radial internal clearance of spherical roller bearings with tapered bore

## Misalignment

The internal design of the spherical roller bearings can accommodate some misalignment between inner ring and outer ring without affecting negatively the bearing life. If the misalignment is constant respect the outer ring and if the condition are relatively safety (C/P > 10) the misalignments reported onto the table are valid, however, depending on the configuration and the working conditions, the values given on the **Tab. 3** have to be properly reduced. In presence of the sealed bearing or in application where the misalignment is not constant like:

- vibration screens where the load is rotating on the outer ring and fixed on the inner ring (eccentric masses) that generates a bending on the shaft;
- deflection - compensation rolls of paper machines where the stationary shaft is bent.

It is suggested do not exceed a few tenths of degree, since the rolling element may be affected by possible sliding movements. Consequently, due to the friction between rolling elements and raceways, an increasing of temperature will be generated.

For the sealed versions, in order to guarantee the efficiency of the seals, a permissible misalignment value of approximatively 0.5° between inner ring and outer ring has to be considered.

| Bearing series | Maximum misalignment for $P < 0.1 \cdot C_r$ |
|---|---|
| 238 | ±1° |
| 213, 222, 230, 239, 240, 248, 249 | ±1.5° |
| 223, 231, 232, 233, 241 | ±2° |

Tab. 3 - SRBs max permissible angular misalignment

## Minimum load

A minimum radial load is requested for a spherical roller bearings, like for all ball and roller bearings, in order to operate correctly an adequate operation condition, especially in critical working conditions: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions a skidding between rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load can be estimated using the following formula:

$$\frac{F_{rm}}{C_r} > 0{,}015$$

Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_r$ basic dynamic radial load, [kN].

## Internal clearance and axial drive-up for spherical roller bearings with tapered bore

Specific and recommended values for radial clearance reduction and axial drive-up can be provided upon request. However, in the following tables (**Tab. 4 page 564**) is reported radial internal clearance reduction for general application, featuring solid steel shaft or hallow shaft with internal bore diameter lower than shaft diameter.

For additional information please consult the RKB application engineering services.

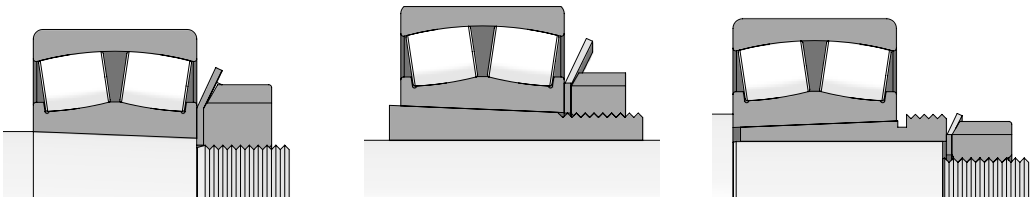
| Bore diameter d [mm] | | Radial internal clearance reduction [mm] | | Minimum radial internal clearance after mounting | | |
|---|---|---|---|---|---|---|
| | | | | CN | C3 | C4 |
| | | | | min. | min. | min. |
| over | incl. | min. | max. | [mm] | [mm] | [mm] |
| 24 | 30 | 0,015 | 0,02 | 0,015 | 0,02 | 0,035 |
| 30 | 40 | 0,02 | 0,025 | 0,015 | 0,025 | 0,04 |
| 40 | 50 | 0,025 | 0,03 | 0,02 | 0,03 | 0,05 |
| 50 | 65 | 0,03 | 0,04 | 0,025 | 0,035 | 0,055 |
| 65 | 80 | 0,04 | 0,05 | 0,025 | 0,04 | 0,07 |
| 80 | 100 | 0,045 | 0,06 | 0,035 | 0,05 | 0,08 |
| 100 | 120 | 0,05 | 0,07 | 0,05 | 0,065 | 0,01 |
| 120 | 140 | 0,065 | 0,09 | 0,055 | 0,08 | 0,11 |
| 140 | 160 | 0,075 | 0,1 | 0,055 | 0,09 | 0,13 |
| 160 | 180 | 0,08 | 0,11 | 0,06 | 0,1 | 0,15 |
| 180 | 200 | 0,09 | 0,13 | 0,07 | 0,1 | 0,16 |
| 200 | 225 | 0,1 | 0,14 | 0,08 | 0,12 | 0,18 |
| 225 | 250 | 0,11 | 0,15 | 0,09 | 0,13 | 0,2 |
| 250 | 280 | 0,12 | 0,17 | 0,1 | 0,14 | 0,22 |
| 280 | 315 | 0,13 | 0,19 | 0,11 | 0,15 | 0,24 |
| 315 | 355 | 0,15 | 0,21 | 0,12 | 0,17 | 0,26 |
| 355 | 400 | 0,17 | 0,23 | 0,13 | 0,19 | 0,29 |
| 400 | 450 | 0,2 | 0,26 | 0,13 | 0,2 | 0,31 |
| 450 | 500 | 0,21 | 0,28 | 0,16 | 0,23 | 0,35 |
| 500 | 560 | 0,24 | 0,32 | 0,17 | 0,25 | 0,36 |
| 560 | 630 | 0,26 | 0,35 | 0,2 | 0,29 | 0,41 |
| 630 | 710 | 0,3 | 0,4 | 0,21 | 0,31 | 0,45 |
| 710 | 800 | 0,34 | 0,45 | 0,23 | 0,35 | 0,51 |
| 800 | 900 | 0,37 | 0,5 | 0,27 | 0,39 | 0,57 |
| 900 | 1000 | 0,41 | 0,55 | 0,3 | 0,43 | 0,64 |
| 1000 | 1120 | 0,45 | 0,6 | 0,32 | 0,48 | 0,7 |
| 1120 | 1250 | 0,49 | 0,65 | 0,34 | 0,54 | 0,77 |
| 1250 | 1400 | 0,55 | 0,72 | 0,36 | 0,59 | 0,84 |
| 1400 | 1600 | 0,62 | 0,81 | 0,44 | 0,66 | 0,94 |
| 1600 | 1800 | 0,69 | 0,93 | 0,48 | 0,73 | 1,02 |
| 1800 | 2000 | 0,77 | 1,04 | 0,54 | 0,81 | 1,11 |
| 2000 | 2250 | 0,85 | 1,15 | 0,6 | 0,95 | 1,55 |
| 2250 | 2500 | 0,95 | 1,28 | 0,65 | 1,15 | 1,7 |

Tab. 4 - Radial internal clearance reduction for SRB bearings with tapered bore

## Mounting procedures for bearing with tapered bore

Spherical roller bearing with tapered bore have to be mounted always with a specific interference fit. Small and even medium size bearings may be driven up directly onto a tapered shaft using a locknut. The locknut and hook spanner are used for driving small bearings onto the tapered seat of the adapter sleeve **(figure 16b)**. Locknuts are also a convenient solution for pressing small withdrawal sleeves into the space between bearing inner ring and shaft **(figure 16c)**. Larger bearings with tapered bore are mounted using the hydraulic method because the fitting force is considerably large. In this case, hydraulic nuts **(figure 17a)** should be used in order to provide the drive-up force. The oil is pumped into the nut and the piston is pushed out with the right requisite force for the bearing mounting. **Figure 17b** shows a mounting method during which a special sleeve and hydraulic pressure are used. This special sleeve is provided with holes, through which oil is pumped under pressure, in order to reach the bearing seat. The bearing is subjected to a radial expansion, and the sleeve is introduced axially by means of adjusting bolts. Feeding oil under pressure underneath the inner ring also helps the bearing mounting using hydraulic nut **(figure 17a)**.

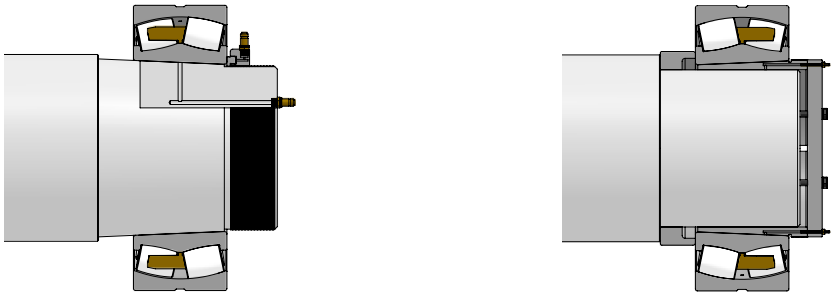
Fig.16



*a)* *b)* *c)*

Mounting tapered bore bearings using locknuts:
a) press-fitting a bearing directly on the shaft b) press-fitting an adapter sleeve c) press-fitting a withdrawal sleeve

Fig.17

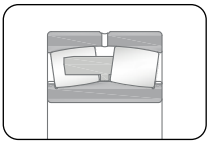


*a)* *b)*

Hydraulic methods for mounting tapered bore bearings: a) hydraulic nut b) special sleeve

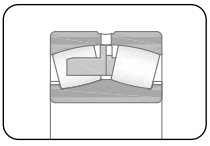
## Designs and variants

### Type CA/CAF



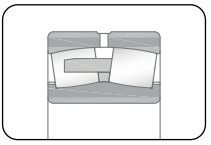

- Design used for large size bearings, withstanding high radial loads and moderate axial loads in both directions
- Inner ring with integral side ribs
- Symmetrical roller profile
- One-piece double pronged machined brass or steel (CAF) cage with integral slinger guided on the inner ring
- Lubrication groove and holes in the outer ring
- Available with lubrication groove and three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available with tapered bore (K/K30 suffixes)

### Type MA



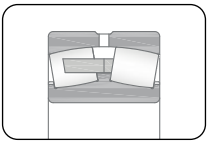

- Design used for medium and large size bearings
- Inner ring with integral side ribs
- Symmetrical roller profile
- Two-piece machined brass cage guided on the outer ring
- Lubrication groove and holes in the outer ring
- Optimized separable cage for better performance in case of different rolling element speed
- Available with lubrication groove and three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available with tapered bore (K/K30 suffixes)

### Type ECA



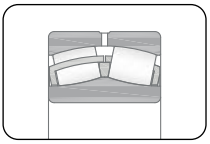

- Design used for large size bearings, based on CA design, with optimized roller set
- Inner ring with integral side ribs
- Symmetrical roller profile
- One-piece double pronged machined brass cage with or without separated slinger guided on the inner ring
- Lubrication groove and holes in the outer ring
- Available with lubrication groove and three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available with tapered bore (K/K30 suffixes)

### Type MB




- Design used for medium size bearings operating at medium to high speeds, featuring high load carrying capacities
- Inner ring with integral side and central ribs
- Two-piece machined brass cage guided on the inner ring
- Lubrication groove and holes in the outer ring
- Available with lubrication groove and three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available with tapered bore (K/K30 suffixes)

## Type CC

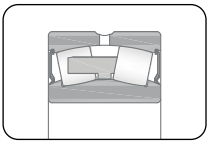


HB BAINITE HT · S STABILIZATION · TOUGH ROLLER · VICTORY LINE

- Design used for medium size bearings operating at medium to high speeds and featuring high load carrying capacities
- Ribless inner ring
- Symmetrical roller profile
- Two-piece window type pressed steel cage guided on the inner ring
- Lubrication groove and holes in the outer ring
- Available with lubrication groove and three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available with tapered bore (K/K30 suffixes)

## Special designs and variants

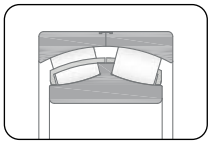
### Sealed type



HB BAINITE HT · S STABILIZATION · TOUGH ROLLER · VICTORY LINE

- Design used for medium and large size bearings operating at medium speeds
- Inner ring with integral side ribs
- Symmetrical roller profile
- One-piece double pronged machined brass cage with integral slinger guided on the inner ring
- Integral rubber seals on both bearing sides for harsh working conditions (2CZ)
- Lubrication groove and holes in the outer ring
- Available with plugged lubrication holes in the outer ring (W77)
- Available with two-piece window type pressed steel cage guided on the inner ring

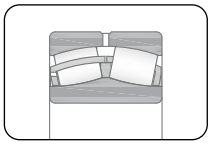
## Type WOR



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED

- Design used for gear output shaft of truck concrete mixers
- Inner ring with integral central rib
- Symmetrical or asymmetrical roller profile
- Two-piece pressed steel window type cage guided on the inner ring
- Wider outer ring (WOR) in one piece or split into two halves
- Permissible misalignment greater than standard execution
- Available with two-piece machined brass cage guided on the inner ring

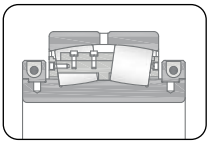
## Type ECCS



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED

- Design used for small to medium size bearings
- Ribless inner ring
- Symmetrical roller profile
- Two-piece pressed steel window type cage with slotted open face to improve lubricant flow and separated slinger guided on the inner ring
- Lubrication groove and six holes in the outer ring (W33X)
- Suitable for harsh environments
- Available with lubrication groove, three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)

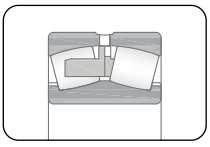
## Split type SSRB



HB BAINITE HT | S STABILIZATION | O+ OPTIMIZED

- Design used for medium and large size bearings
- Wider inner ring with integral side ribs
- Symmetrical roller profile
- Two-piece bolted double pronged machined brass cage guided on the inner ring
- Engineered for hard-to-reach positions (e.g. bucket wheel excavators)
- Design for easy mounting, dismounting and maintenance to reduced machine downtime
- Available in taylor-made dimension

## Type ROVSX/KROVSX



HB BAINITE HT | S STABILIZATION | O+ OPTIMIZED

- Design used for vibratory equipment
- Inner ring with integral side ribs
- Symmetrical roller profile
- Two-piece machined brass cage guided on the outer ring
- Radial internal clearance higher than normal CN
- Running accuracy higher than standard execution
- Available with lubrication groove, three lubrication holes in the outer ring and six lubrication holes in the inner ring (W513)
- Available both with cylindrical and tapered bore (K/K30 suffixes)

| Suffixes | Internal design |
|---|---|
| WOR | Wider outer ring. The value immediately following the WOR gives the width of the outer ring in mm |
| ROVS/ROVSX | Bearing for vibratory equipment |
| ID | Special inner diameter. The value immediately following the ID gives the inner diameter in mm |
| E | Optimized internal design for increased load ratings |
| SP | Special or non-standard bearing |

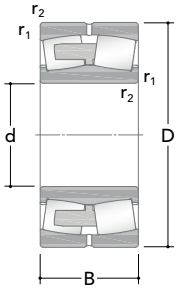
| Suffixes | Cage and design |
|---|---|
| M | Machined brass cage guided on rollers |
| MA | Machined brass cage guided on outer ring |
| MB | Machined brass cage guided on inner ring |
| CA | Double pronged machined brass cage |
| CAF | Double pronged machined steel cage |
| CAB | Steel pin-type cage with or without separate guiding slinger and pierced rollers |
| CC | Pressed steel cage |
| CCE1 | Pressed steel cage, floating slinger centred on outer ring |
| CCS | Pressed steel cage and axial lubrication grooves |

| Suffixes | Accuracy, clearance, running |
|---|---|
| ST | Special tolerance |

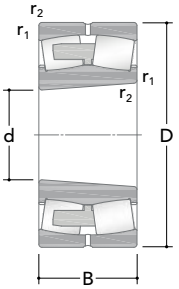
| Suffixes | Lubrication |
|---|---|
| W33 | Annular groove and three lubrication holes in outer ring |
| W33X | Annular groove and more than three lubrication holes in outer ring |
| W513 | W33 + six lubrication holes in inner ring |
| W513B | W33 + annular groove and six lubrication holes in inner ring |
| W513BX | W33X + annular groove and six lubrication holes in inner ring |
| W77 | Annular groove and plugged lubrication holes in outer ring |
| W77X | Annular groove and more than three plugged lubrication holes in outer ring |
| W20 | Three lubrication holes in the outer ring |
| WI | Lubrication grooves in side face of inner ring |
| G/R3 | Filled with exceptionally good low noise profile and long life grease usable over a wide range of temperatures |
| G/R4 | Filled with good low noise profile and high temperature, high speed and long life grease |
| C7A | Annular groove, seven lubrication holes and one blind counterbored hole in outer ring |

| Suffixes | External design |
|---|---|
| 2CZ | Bearing with NBR/FKM seal on both sides and filled with EP lithium base grease |
| 2CS | Bearing with NBR/FKM seal on both sides and filled with EP lithium base grease (BS2 series) |
| ZZ or 2Z | Shield on both sides |
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper |
| N1 | One locating slot in outer ring |
| N2I | Two slots in inner ring |
| N4I | Four slots in inner ring |

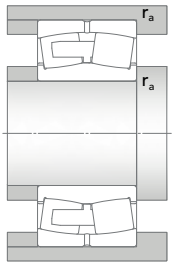
| Prefixes | Alternative designation |
|---|---|
| BS2 | Spherical roller bearing followed by size indication |
| SRB | Out of standard spherical roller bearing followed by drawing number |
| SSRB | Out of standard split spherical roller bearing followed by drawing number |



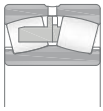

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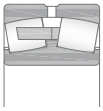


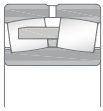

K/K30

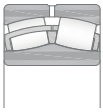



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **20** | 52 | 18 | 49,9 | 44,0 | 4,7 | 13000 | 17100 | **22205/20** |
| **25** | 52 | 18 | 49,9 | 44,0 | 4,7 | 13000 | 17100 | **22205** |
| | 62 | 17 | 49,1 | 41,5 | 4,5 | 9300 | 12000 | **21305** |
| **30** | 62 | 20 | 66,1 | 60,0 | 6,4 | 10000 | 14000 | **22206** |
| | 72 | 19 | 65,7 | 61,0 | 6,8 | 8200 | 10000 | **21306** |
| **35** | 72 | 23 | 88,8 | 85,0 | 9,1 | 9000 | 12000 | **22207** |
| | 80 | 21 | 79,2 | 72,9 | 8 | 7300 | 9500 | **21307** |
| **40** | 80 | 23 | 98,5 | 90,0 | 9,6 | 8000 | 11000 | **22208** |
| | 90 | 23 | 109 | 108 | 11,8 | 7000 | 9500 | **21308** |
| | 90 | 33 | 155 | 140 | 15 | 6000 | 8000 | **22308** |
| **45** | 85 | 23 | 104,5 | 98,9 | 10,8 | 7500 | 10000 | **22209** |
| | 100 | 25 | 129 | 127 | 13,5 | 6300 | 8500 | **21309** |
| | 100 | 36 | 190 | 183 | 19,6 | 5300 | 7000 | **22309** |
| **50** | 90 | 23 | 109 | 108 | 11,7 | 7000 | 9500 | **22210** |
| | 110 | 27 | 159 | 166 | 18,3 | 5600 | 7500 | **21310** |
| | 110 | 40 | 228 | 224 | 24 | 4800 | 6300 | **22310** |
| **55** | 100 | 25 | 131 | 127 | 13,7 | 6300 | 8500 | **22211** |
| | 120 | 29 | 159 | 166 | 18,3 | 5600 | 7500 | **21311** |
| | 120 | 43 | 280 | 280 | 29,9 | 4300 | 6120 | **22311** |
| **60** | 110 | 28 | 162 | 166 | 18,4 | 5600 | 7700 | **22212** |
| | 130 | 31 | 217 | 240 | 26,4 | 4800 | 6300 | **21312** |
| | 130 | 46 | 326 | 335 | 36 | 4000 | 5300 | **22312** |
| **65** | 100 | 35 | 137 | 173 | 20,3 | 4300 | 6300 | **24013** |
| | 120 | 31 | 198 | 216 | 23,7 | 5000 | 7550 | **22213** |

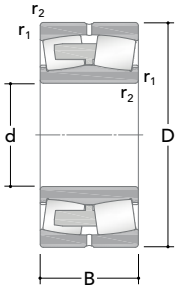

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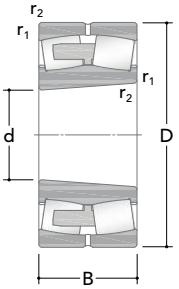

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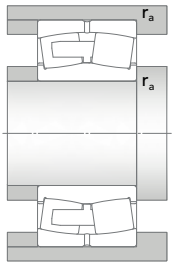
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 20 | 1 | 1 | 0,35 | 0,28 | 22205/20 | - |
| 25 | 1 | 1 | 0,35 | 0,26 | 22205 | 22205 K |
| | 1,1 | 1 | 0,3 | 0,28 | 21305 | - |
| 30 | 1 | 1 | 0,31 | 0,29 | 22206 | 22206 K |
| | 1,1 | 1 | 0,27 | 0,41 | 21306 | 21306 K |
| 35 | 1,1 | 1 | 0,31 | 0,45 | 22207 | 22207 K |
| | 1,5 | 1,5 | 0,28 | 0,55 | 21307 | 21307 K |
| 40 | 1,1 | 1 | 0,28 | 0,53 | 22208 | 22208 K |
| | 1,5 | 1,5 | 0,24 | 0,75 | 21308 | 21308 K |
| | 1,5 | 1,5 | 0,37 | 1,05 | 22308 | 22308 K |
| 45 | 1,1 | 1 | 0,26 | 0,58 | 22209 | 22209 K |
| | 1,5 | 1,5 | 0,24 | 0,99 | 21309 | 21309 K |
| | 1,5 | 1,5 | 0,37 | 1,4 | 22309 | 22309 K |
| 50 | 1,1 | 1 | 0,24 | 0,63 | 22210 | 22210 K |
| | 2 | 2 | 0,24 | 1,35 | 21310 | 21310 K |
| | 2 | 2 | 0,37 | 1,9 | 22310 | 22310 K |
| 55 | 1,5 | 1,5 | 0,24 | 0,84 | 22211 | 22211 K |
| | 2 | 2 | 0,24 | 1,7 | 21311 | 21311 K |
| | 2 | 2 | 0,35 | 2,45 | 22311 | 22311 K |
| 60 | 1,5 | 1,5 | 0,24 | 1,15 | 22212 | 22212 K |
| | 2,1 | 2 | 0,22 | 2,1 | 21312 | 21312 K |
| | 2,1 | 2 | 0,35 | 3,1 | 22312 | 22312 K |
| 65 | 1,1 | 1 | 0,27 | 0,95 | 24013 | 24013 K30 |
| | 1,5 | 1,5 | 0,24 | 1,55 | 22213 | 22213 K |



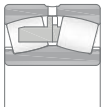

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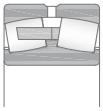


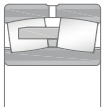

K/K30

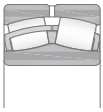



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **65** | 140 | 33 | 243 | 270 | 28,7 | 4300 | 6000 | **21313** |
| (cont.) | 140 | 48 | 361 | 360 | 37,3 | 3800 | 5080 | **22313** |
| **70** | 125 | 31 | 213 | 228 | 25,3 | 5000 | 6900 | **22214** |
| | 150 | 35 | 291 | 325 | 34,1 | 4000 | 5600 | **21314** |
| | 150 | 51 | 419 | 430 | 44,7 | 3400 | 5020 | **22314** |
| **75** | 115 | 40 | 181 | 232 | 28,1 | 3800 | 5300 | **24015** |
| | 130 | 31 | 217 | 240 | 26,5 | 4800 | 6700 | **22215** |
| | 160 | 37 | 291 | 325 | 34,1 | 4000 | 5600 | **21315** |
| | 160 | 55 | 470 | 475 | 47,9 | 3200 | 4750 | **22315** |
| **80** | 140 | 33 | 243 | 270 | 28,5 | 4300 | 6500 | **22216** |
| | 170 | 39 | 331 | 375 | 38,9 | 3800 | 5300 | **21316** |
| | 170 | 58 | 516 | 536 | 54,6 | 3000 | 4600 | **22316** |
| **85** | 150 | 36 | 291 | 325 | 34,3 | 4000 | 5900 | **22217** |
| | 180 | 41 | 331 | 376 | 38,6 | 3800 | 5300 | **21317** |
| | 180 | 60 | 586 | 620 | 60,7 | 2800 | 4320 | **22317** |
| **90** | 160 | 40 | 361 | 395 | 38,8 | 3800 | 5800 | **22218** |
| | 160 | 52,4 | 372 | 440 | 47,7 | 2800 | 3800 | **23218** |
| | 190 | 43 | 393 | 450 | 44,6 | 3600 | 4800 | **21318** |
| | 190 | 64 | 638 | 695 | 66,5 | 2600 | 4190 | **22318** |
| **95** | 170 | 43 | 393 | 450 | 45,1 | 3600 | 4800 | **22219** |
| | 200 | 45 | 433 | 490 | 48,8 | 3400 | 4500 | **21319** |
| | 200 | 67 | 699 | 765 | 73,2 | 2600 | 4020 | **22319** |
| **100** | 150 | 50 | 296 | 418 | 44,7 | 2800 | 4000 | **24020** |
| | 165 | 52 | 446 | 583 | 52,2 | 3000 | 4000 | **23120** |
| | 165 | 65 | 468 | 640 | 67 | 2400 | 3200 | **24120** |
| | 180 | 46 | 433 | 490 | 48,2 | 3400 | 4500 | **22220** |

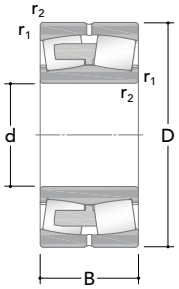

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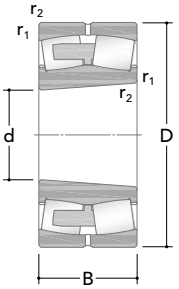

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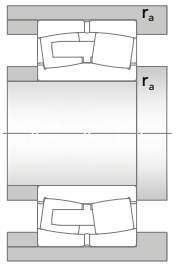
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **65** | 2,1 | 2 | 0,22 | 2,55 | **21313** | **21313 K** |
| (cont.) | 2,1 | 2 | 0,35 | 3,75 | **22313** | **22313 K** |
| **70** | 1,5 | 1,5 | 0,23 | 1,55 | **22214** | **22214 K** |
| | 2,1 | 2 | 0,22 | 3,1 | **21314** | **21314 K** |
| | 2,1 | 2 | 0,33 | 4,55 | **22314** | **22314 K** |
| **75** | 1,1 | 1 | 0,28 | 1,55 | **24015** | **24015 K30** |
| | 1,5 | 1,5 | 0,22 | 1,7 | **22215** | **22215 K** |
| | 2,1 | 2 | 0,22 | 3,75 | **21315** | **21315 K** |
| | 2,1 | 2 | 0,35 | 5,55 | **22315** | **22315 K** |
| **80** | 2 | 2 | 0,22 | 2,1 | **22216** | **22216 K** |
| | 2,1 | 2 | 0,24 | 4,45 | **21316** | **21316 K** |
| | 2,1 | 2 | 0,35 | 6,6 | **22316** | **22316 K** |
| **85** | 2 | 2 | 0,22 | 2,7 | **22217** | **22217 K** |
| | 3 | 2,5 | 0,24 | 5,2 | **21317** | **21317 K** |
| | 3 | 2,5 | 0,33 | 7,65 | **22317** | **22317 K** |
| **90** | 2 | 2 | 0,24 | 3,4 | **22218** | **22218 K** |
| | 2 | 2 | 0,31 | 4,65 | **23218** | **23218 K** |
| | 3 | 2,5 | 0,24 | 6,1 | **21318** | **21318 K** |
| | 3 | 2,5 | 0,33 | 9,05 | **22318** | **22318 K** |
| **95** | 2,1 | 2 | 0,24 | 4,15 | **22219** | **22219 K** |
| | 3 | 2,5 | 0,24 | 7,05 | **21319** | **21319 K** |
| | 3 | 2,5 | 0,33 | 10,5 | **22319** | **22319 K** |
| **100** | 1,5 | 1,5 | 0,28 | 3,15 | **24020** | **24020 K30** |
| | 2 | 2 | 0,3 | 4,55 | **23120** | **23120 K** |
| | 2 | 2 | 0,37 | 5,65 | **24120** | **24120 K30** |
| | 2,1 | 2 | 0,24 | 4,9 | **22220** | **22220 K** |



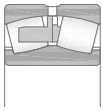

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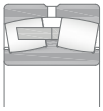


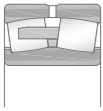

K/K30

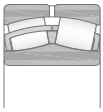



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **100** | 180 | 60,3 | 554 | 680 | 62 | 2400 | 3790 | **23220** |
| (cont.) | 215 | 47 | 433 | 496 | 48,6 | 3400 | 4500 | **21320** |
| | 215 | 73 | 860 | 950 | 87,8 | 2400 | 3810 | **22320** |
| **110** | 170 | 45 | 400 | 530 | 45,7 | 3400 | 4300 | **23022** |
| | 170 | 60 | 439 | 620 | 66,9 | 2400 | 3600 | **24022** |
| | 180 | 56 | 520 | 687 | 60,3 | 2800 | 3650 | **23122** |
| | 180 | 69 | 545 | 750 | 77,1 | 2000 | 3000 | **24122** |
| | 200 | 53 | 577 | 640 | 61,9 | 3000 | 4500 | **22222** |
| | 200 | 69,8 | 726 | 887 | 75,9 | 2200 | 3200 | **23222** |
| | 240 | 80 | 989 | 1120 | 98,2 | 2000 | 3550 | **22322** |
| **120** | 180 | 46 | 436 | 580 | 52,8 | 3200 | 4000 | **23024** |
| | 180 | 60 | 461 | 670 | 67,2 | 2400 | 3400 | **24024** |
| | 200 | 62 | 622 | 818 | 69,8 | 2600 | 3400 | **23124** |
| | 200 | 80 | 679 | 950 | 94 | 1900 | 2600 | **24124** |
| | 205 | 68 | 528 | 863 | 91,3 | 2300 | - | **231581** |
| | 215 | 58 | 660 | 775 | 72,3 | 2800 | 4450 | **22224** |
| | 215 | 76 | 845 | 1040 | 91,2 | 2000 | 2950 | **23224** |
| | 260 | 86 | 1080 | 1210 | 99,1 | 2000 | 3330 | **22324** |
| **130** | 200 | 52 | 542 | 730 | 61 | 2800 | 3600 | **23026** |
| | 200 | 69 | 569 | 815 | 81,4 | 2000 | 3000 | **24026** |
| | 210 | 64 | 695 | 980 | 76,6 | 2400 | 3300 | **23126** |
| | 210 | 80 | 703 | 1005 | 98,5 | 1700 | 2400 | **24126** |
| | 230 | 64 | 758 | 950 | 87,1 | 2600 | 4290 | **22226** |
| | 230 | 64 | 657 | 920 | 87,1 | 2200 | - | **29226** |
| | 230 | 80 | 927 | 1170 | 103 | 1900 | 2750 | **23226** |
| | 280 | 93 | 1278 | 1424 | 114 | 1800 | 3100 | **22326** |
| **140** | 210 | 53 | 586 | 810 | 67,2 | 2600 | 3600 | **23028** |
| | 210 | 69 | 610 | 900 | 87 | 2000 | 2800 | **24028** |
| | 225 | 68 | 663 | 900 | 87,8 | 2200 | 2920 | **23128** |
| | 225 | 85 | 811 | 1160 | 110 | 1600 | 2200 | **24128** |

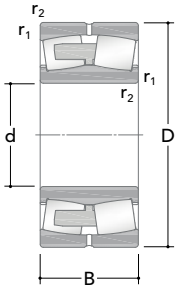

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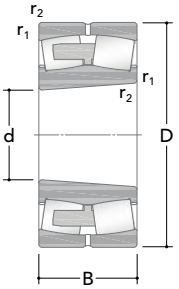

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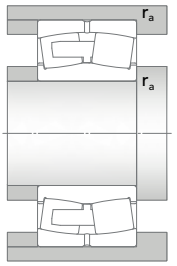
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 100 | 2,1 | 2 | 0,33 | 6,85 | 23220 | 23220 K |
| (cont.) | 3 | 2,5 | 0,24 | 8,6 | 21320 | 21320 K |
| | 3 | 2,5 | 0,33 | 13,5 | 22320 | 22320 K |
| 110 | 2 | 2 | 0,23 | 3,8 | 23022 | 23022 K |
| | 2 | 2 | 0,33 | 5 | 24022 | 24022 K30 |
| | 2 | 2 | 0,3 | 5,75 | 23122 | 23122 K |
| | 2 | 2 | 0,37 | 7,1 | 24122 | 24122 K30 |
| | 2,1 | 2 | 0,25 | 7 | 22222 | 22222 K |
| | 2,1 | 2 | 0,33 | 9,85 | 23222 | 23222 K |
| | 3 | 2,5 | 0,33 | 18,5 | 22322 | 22322 K |
| 120 | 2 | 2 | 0,22 | 4,2 | 23024 | 23024 K |
| | 2 | 2 | 0,3 | 5,45 | 24024 | 24024 K30 |
| | 2 | 2 | 0,28 | 8 | 23124 | 23124 K |
| | 2 | 2 | 0,37 | 10,5 | 24124 | 24124 K30 |
| | 2,1 | 2 | 0,31 | 9,2 | 231581 | - |
| | 2,1 | 2 | 0,26 | 8,7 | 22224 | 22224 K |
| | 2,1 | 2 | 0,35 | 12 | 23224 | 23224 K |
| | 3 | 2,5 | 0,35 | 23 | 22324 | 22324 K |
| 130 | 2 | 2 | 0,23 | 6 | 23026 | 23026 K |
| | 2 | 2 | 0,31 | 8,05 | 24026 | 24026 K30 |
| | 2 | 2 | 0,28 | 8,8 | 23126 | 23126 K |
| | 2 | 2 | 0,35 | 11 | 24126 | 24126 K30 |
| | 3 | 2,5 | 0,27 | 11 | 22226 | 22226 K |
| | 3 | 2,5 | 0,27 | 11 | 29226 | 29226 K |
| | 3 | 2,5 | 0,33 | 14,5 | 23226 | 23226 K |
| | 4 | 3 | 0,35 | 29 | 22326 | 22326 K |
| 140 | 2 | 2 | 0,22 | 6,55 | 23028 | 23028 K |
| | 2 | 2 | 0,3 | 8,55 | 24028 | 24028 K30 |
| | 2,1 | 2 | 0,28 | 10,5 | 23128 | 23128 K |
| | 2,1 | 2 | 0,35 | 13,5 | 24128 | 24128 K30 |



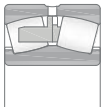

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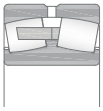


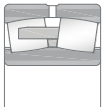

K/K30

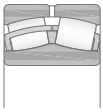



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **140** | 250 | 68 | 863 | 1090 | 85,8 | 2400 | 3600 | **22228** |
| (cont.) | 250 | 88 | 1094 | 1450 | 119 | 1700 | 2650 | **23228** |
| | 300 | 102 | 1454 | 1670 | 130 | 1700 | 2990 | **22328** |
| **150** | 225 | 56 | 538 | 750 | 73,5 | 2400 | 3200 | **23030** |
| | 225 | 75 | 682 | 1040 | 100 | 1800 | 2600 | **24030** |
| | 250 | 80 | 1090 | 1390 | 114 | 2000 | 2920 | **23130** |
| | 250 | 100 | 1054 | 1530 | 146 | 1400 | 2000 | **24130** |
| | 270 | 73 | 1005 | 1280 | 102 | 2200 | 3600 | **22230** |
| | 270 | 96 | 1275 | 1670 | 137 | 1600 | 2450 | **23230** |
| | 320 | 108 | 1639 | 1890 | 146 | 1600 | 2200 | **22330** |
| **160** | 220 | 60 | 413 | 840 | 85 | 1700 | - | **24932** |
| | 240 | 60 | 724 | 1050 | 83 | 2400 | 3100 | **23032** |
| | 240 | 80 | 787 | 1200 | 114 | 1700 | 2400 | **24032** |
| | 270 | 86 | 1165 | 1580 | 129 | 1900 | 2710 | **23132** |
| | 270 | 109 | 1229 | 1760 | 163 | 1300 | 1900 | **24132** |
| | 290 | 80 | 1148 | 1390 | 118 | 2000 | 3380 | **22232** |
| | 290 | 104 | 1481 | 1960 | 153 | 1500 | 2350 | **23232** |
| | 340 | 114 | 1894 | 2110 | 160 | 1500 | 2060 | **22332** |
| **170** | 260 | 67 | 745 | 1060 | 98 | 2200 | 2800 | **23034** |
| | 260 | 90 | 973 | 1460 | 135 | 1600 | 2400 | **24034** |
| | 280 | 88 | 1230 | 1720 | 136 | 1800 | 2620 | **23134** |
| | 280 | 109 | 1271 | 1890 | 173 | 1200 | 1800 | **24134** |
| | 310 | 86 | 1383 | 1591 | 131 | 1900 | 3180 | **22234** |
| | 310 | 110 | 1681 | 2230 | 171 | 1400 | 2200 | **23234** |
| | 360 | 120 | 2004 | 2360 | 174 | 1400 | 1800 | **22334** |
| **180** | 250 | 52 | 519 | 830 | 76 | 2600 | 2800 | **23936** |
| | 280 | 74 | 884 | 1250 | 113 | 2000 | 2600 | **23036** |
| | 280 | 100 | 1135 | 1740 | 154 | 1500 | 2200 | **24036** |
| | 300 | 96 | 1413 | 2060 | 157 | 1700 | 2500 | **23136** |

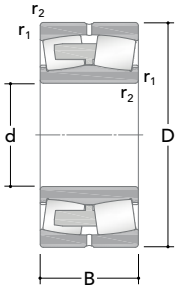

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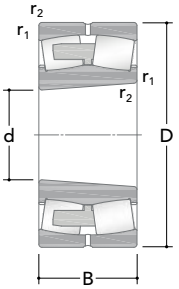

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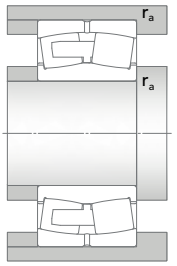
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **140** | 3 | 2,5 | 0,26 | 14 | **22228** | **22228 K** |
| (cont.) | 3 | 2,5 | 0,33 | 19 | **23228** | **23228 K** |
| | 4 | 3 | 0,35 | 36,5 | **22328** | **22328 K** |
| **150** | 2,1 | 2 | 0,22 | 7,95 | **23030** | **23030 K** |
| | 2,1 | 2 | 0,3 | 10,5 | **24030** | **24030 K30** |
| | 2,1 | 2 | 0,3 | 16 | **23130** | **23130 K** |
| | 2,1 | 2 | 0,37 | 20 | **24130** | **24130 K30** |
| | 3 | 2,5 | 0,26 | 18 | **22230** | **22230 K** |
| | 3 | 2,5 | 0,35 | 24,5 | **23230** | **23230 K** |
| | 4 | 3 | 0,35 | 43,5 | **22330** | **22330 K** |
| **160** | 2 | 2 | 0,24 | 6,85 | **24932** | - |
| | 2,1 | 2 | 0,22 | 9,7 | **23032** | **23032 K** |
| | 2,1 | 2 | 0,3 | 13 | **24032** | **24032 K30** |
| | 2,1 | 2 | 0,3 | 20,5 | **23132** | **23132 K** |
| | 2,1 | 2 | 0,4 | 25 | **24132** | **24132 K30** |
| | 3 | 2,5 | 0,26 | 22,5 | **22232** | **22232 K** |
| | 3 | 2,5 | 0,35 | 31 | **23232** | **23232 K** |
| | 4 | 3 | 0,35 | 52 | **22332** | **22332 K** |
| **170** | 2,1 | 2 | 0,23 | 13 | **23034** | **23034 K** |
| | 2,1 | 2 | 0,33 | 17,5 | **24034** | **24034 K30** |
| | 2,1 | 2 | 0,3 | 22 | **23134** | **23134 K** |
| | 2,1 | 2 | 0,37 | 27,5 | **24134** | **24134 K30** |
| | 4 | 3 | 0,27 | 28,5 | **22234** | **22234 K** |
| | 4 | 3 | 0,35 | 37,5 | **23234** | **23234 K** |
| | 4 | 3 | 0,33 | 61 | **22334** | **22334 K** |
| **180** | 2 | 2 | 0,18 | 7,9 | **23936** | **23936 K** |
| | 2,1 | 2 | 0,24 | 17 | **23036** | **23036 K** |
| | 2,1 | 2 | 0,33 | 23 | **24036** | **24036 K30** |
| | 3 | 2,5 | 0,3 | 28 | **23136** | **23136 K** |



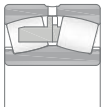

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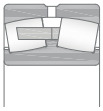


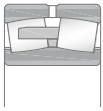

K/K30

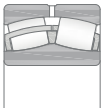



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **180** | 300 | 118 | 1464 | 2160 | 195 | 1100 | 1600 | **24136** |
| (cont.) | 320 | 86 | 1370 | 1710 | 138 | 1800 | 3060 | **22236** |
| | 320 | 112 | 1757 | 2293 | 185 | 1300 | 1900 | **23236** |
| | 380 | 126 | 2190 | 2650 | 191 | 1300 | 1700 | **22336** |
| **190** | 260 | 52 | 499 | 801 | 76 | 2400 | 2600 | **23938** |
| | 290 | 75 | 931 | 1340 | 121 | 1900 | 2400 | **23038** |
| | 290 | 100 | 1186 | 1807 | 160 | 1400 | 2000 | **24038** |
| | 320 | 104 | 1656 | 2380 | 181 | 1500 | 2340 | **23138** |
| | 320 | 128 | 1652 | 2500 | 209 | 1100 | 1500 | **24138** |
| | 340 | 92 | 1552 | 1960 | 148 | 1700 | 2540 | **22238** |
| | 340 | 120 | 1988 | 2620 | 204 | 1300 | 1800 | **23238** |
| | 400 | 132 | 2387 | 2850 | 207 | 1200 | 1640 | **22338** |
| **200** | 280 | 60 | 658 | 1040 | 91 | 2200 | 2400 | **23940** |
| | 310 | 82 | 1258 | 1830 | 134 | 1800 | 2400 | **23040** |
| | 310 | 109 | 1355 | 2120 | 183 | 1300 | 1900 | **24040** |
| | 340 | 112 | 1679 | 2360 | 203 | 1500 | 1900 | **23140** |
| | 340 | 140 | 1896 | 2800 | 228 | 1000 | 1400 | **24140** |
| | 360 | 98 | 1586 | 2030 | 165 | 1600 | 2480 | **22240** |
| | 360 | 128 | 2147 | 2900 | 227 | 1200 | 1700 | **23240** |
| | 420 | 138 | 2480 | 2960 | 223 | 1200 | 1640 | **22340** |
| **220** | 300 | 60 | 664 | 1080 | 91 | 2000 | 2200 | **23944** |
| | 340 | 90 | 1361 | 1990 | 160 | 1600 | 2300 | **23044** |
| | 340 | 118 | 1656 | 2600 | 209 | 1200 | 1700 | **24044** |
| | 370 | 120 | 1988 | 2750 | 231 | 1300 | 1790 | **23144** |
| | 370 | 150 | 2199 | 3360 | 283 | 850 | 1200 | **24144** |
| | 400 | 108 | 1853 | 2360 | 195 | 1500 | 2220 | **22244** |
| | 400 | 144 | 2534 | 3450 | 283 | 1100 | 1500 | **23244** |
| | 460 | 145 | 2839 | 3450 | 256 | 1000 | 1620 | **22344** |
| **240** | 320 | 60 | 688 | 1182 | 100 | 1900 | 2000 | **23948** |

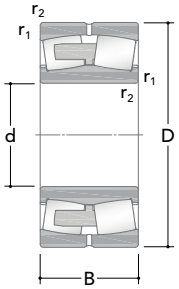

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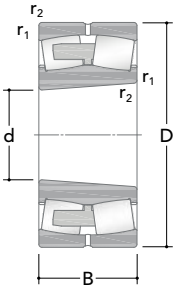

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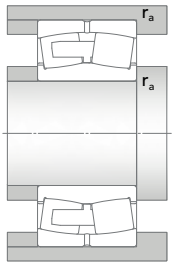
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **180** | 3 | 2,5 | 0,37 | 34,5 | **24136** | **24136 K30** |
| (cont.) | 4 | 3 | 0,26 | 29,5 | **22236** | **22236 K** |
| | 4 | 3 | 0,35 | 39,5 | **23236** | **23236 K** |
| | 4 | 3 | 0,35 | 71,5 | **22336** | **22336 K** |
| **190** | 2 | 2 | 0,16 | 8,3 | **23938** | **23938 K** |
| | 2,1 | 2 | 0,23 | 18 | **23038** | **23038 K** |
| | 2,1 | 2 | 0,31 | 24,5 | **24038** | **24038 K30** |
| | 3 | 2,5 | 0,31 | 35 | **23138** | **23138 K** |
| | 3 | 2,5 | 0,4 | 43 | **24138** | **24138 K30** |
| | 4 | 3 | 0,26 | 36,5 | **22238** | **22238 K** |
| | 4 | 3 | 0,35 | 48 | **23238** | **23238 K** |
| | 5 | 4 | 0,35 | 82,5 | **22338** | **22338 K** |
| **200** | 2,1 | 2 | 0,19 | 11,5 | **23940** | **23940 K** |
| | 2,1 | 2 | 0,24 | 23,5 | **23040** | **23040 K** |
| | 2,1 | 2 | 0,33 | 31 | **24040** | **24040 K30** |
| | 3 | 2,5 | 0,31 | 43 | **23140** | **23140 K** |
| | 3 | 2,5 | 0,4 | 53,5 | **24140** | **24140 K30** |
| | 4 | 3 | 0,26 | 43,5 | **22240** | **22240 K** |
| | 4 | 3 | 0,35 | 58 | **23240** | **23240 K** |
| | 5 | 4 | 0,33 | 95 | **22340** | **22340 K** |
| **220** | 2,1 | 2 | 0,16 | 12,5 | **23944** | **23944 K** |
| | 3 | 2,5 | 0,24 | 30,5 | **23044** | **23044 K** |
| | 3 | 2,5 | 0,33 | 40 | **24044** | **24044 K30** |
| | 4 | 3 | 0,3 | 53,5 | **23144** | **23144 K** |
| | 4 | 3 | 0,4 | 67 | **24144** | **24144 K30** |
| | 4 | 3 | 0,27 | 60,5 | **22244** | **22244 K** |
| | 4 | 3 | 0,35 | 81,5 | **23244** | **23244 K** |
| | 5 | 4 | 0,31 | 120 | **22344** | **22344 K** |
| **240** | 2,1 | 2 | 0,15 | 13,5 | **23948** | **23948 K** |



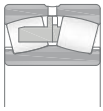

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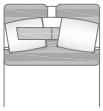


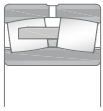

K/K30

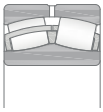



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **240** | 360 | 92 | 1340 | 2080 | 173 | 1500 | 1900 | **23048** |
| (cont.) | 360 | 118 | 1665 | 2700 | 225 | 1100 | 1600 | **24048** |
| | 400 | 128 | 2207 | 3200 | 253 | 1200 | 1600 | **23148** |
| | 400 | 160 | 2489 | 3900 | 318 | 750 | 1100 | **24148** |
| | 440 | 120 | 2358 | 3000 | 240 | 1300 | 2050 | **22248** |
| | 440 | 160 | 3052 | 4300 | 341 | 950 | 1300 | **23248** |
| | 500 | 155 | 3290 | 4000 | 286 | 950 | 1480 | **22348** |
| **260** | 320 | 45 | 379 | 915 | 82 | 1200 | - | **23852** |
| | 360 | 75 | 1155 | 1900 | 155 | 1700 | 2000 | **23952** |
| | 360 | 100 | 1122 | 2453 | 216 | 1200 | - | **24952** |
| | 400 | 104 | 1882 | 2750 | 210 | 1300 | 1700 | **23052** |
| | 400 | 140 | 2385 | 3850 | 284 | 1000 | 1400 | **24052** |
| | 440 | 144 | 2684 | 3950 | 276 | 1100 | 1400 | **23152** |
| | 440 | 180 | 3176 | 4830 | 374 | 670 | 980 | **24152** |
| | 480 | 130 | 2742 | 3550 | 283 | 1200 | 1650 | **22252** |
| | 480 | 174 | 3517 | 4850 | 358 | 850 | 1200 | **23252** |
| | 540 | 165 | 3810 | 4570 | 319 | 850 | 1350 | **22352** |
| **280** | 350 | 52 | 515 | 1189 | 105 | 1100 | - | **23856** |
| | 380 | 75 | 1182 | 2000 | 140 | 1600 | 1700 | **23956** |
| | 380 | 100 | 1060 | 2455 | 212 | 1100 | - | **24956** |
| | 420 | 106 | 1842 | 2850 | 222 | 1300 | 1650 | **23056** |
| | 420 | 140 | 2434 | 4100 | 282 | 950 | 1400 | **24056** |
| | 460 | 146 | 2784 | 4250 | 319 | 1000 | 1320 | **23156** |
| | 460 | 180 | 3225 | 5100 | 413 | 630 | 950 | **24156** |
| | 500 | 130 | 2844 | 3760 | 298 | 1100 | 1600 | **22256** |
| | 500 | 176 | 3753 | 5300 | 363 | 800 | 1100 | **23256** |
| | 580 | 175 | 4358 | 5300 | 360 | 800 | 1250 | **22356** |
| **300** | 380 | 60 | 512 | 1196 | 102 | 790 | - | **23860** |
| | 420 | 90 | 1600 | 2690 | 199 | 1400 | 1600 | **23960** |
| | 460 | 118 | 2350 | 3600 | 262 | 1200 | 1500 | **23060** |

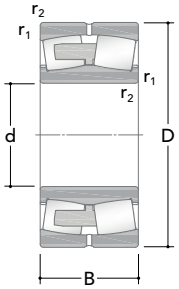

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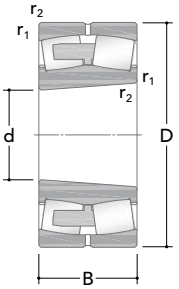

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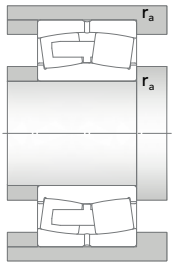
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **240** | 3 | 2,5 | 0,23 | 33,5 | **23048** | **23048 K** |
| (cont.) | 3 | 2,5 | 0,3 | 43 | **24048** | **24048 K30** |
| | 4 | 3 | 0,3 | 66,5 | **23148** | **23148 K** |
| | 4 | 3 | 0,4 | 83 | **24148** | **24148 K30** |
| | 4 | 3 | 0,27 | 83 | **22248** | **22248 K** |
| | 4 | 3 | 0,35 | 110 | **23248** | **23248 K** |
| | 5 | 4 | 0,31 | 155 | **22348** | **22348 K** |
| **260** | 2 | 2 | 0,12 | 8,05 | **23852** | **23852 K** |
| | 2,1 | 2 | 0,18 | 23,5 | **23952** | **23952 K** |
| | 2,1 | 2 | 0,24 | 32 | **24952** | - |
| | 4 | 3 | 0,23 | 48,5 | **23052** | **23052 K** |
| | 4 | 3 | 0,33 | 65,5 | **24052** | **24052 K30** |
| | 4 | 3 | 0,31 | 90,5 | **23152** | **23152 K** |
| | 4 | 3 | 0,4 | 110 | **24152** | **24152 K30** |
| | 5 | 4 | 0,27 | 110 | **22252** | **22252 K** |
| | 5 | 4 | 0,35 | 140 | **23252** | **23252 K** |
| | 6 | 5 | 0,31 | 190 | **22352** | **22352 K** |
| **280** | 2 | 2 | 0,12 | 12 | **23856** | **23856 K** |
| | 2,1 | 2 | 0,16 | 25 | **23956** | **23956 K** |
| | 2,1 | 2 | 0,23 | 34,5 | **24956** | - |
| | 4 | 3 | 0,23 | 52,5 | **23056** | **23056 K** |
| | 4 | 3 | 0,31 | 69,5 | **24056** | **24056 K30** |
| | 5 | 4 | 0,3 | 97 | **23156** | **23156 K** |
| | 5 | 4 | 0,4 | 120 | **24156** | **24156 K30** |
| | 5 | 4 | 0,26 | 115 | **22256** | **22256 K** |
| | 5 | 4 | 0,35 | 150 | **23256** | **23256 K** |
| | 6 | 5 | 0,3 | 235 | **22356** | **22356 K** |
| **300** | 2,1 | 2 | 0,13 | 17 | **23860** | **23860 K** |
| | 3 | 2,5 | 0,19 | 39,5 | **23960** | **23960 K** |
| | 4 | 3 | 0,23 | 71,5 | **23060** | **23060 K** |



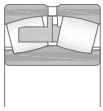

CA/CAF

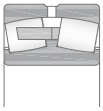


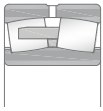

K/K30

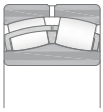



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **300** | 460 | 160 | 3079 | 5210 | 352 | 850 | 1250 | **24060** |
| (cont.) | 500 | 160 | 3388 | 5150 | 348 | 950 | 1200 | **23160** |
| | 500 | 200 | 4100 | 6300 | 464 | 560 | 900 | **24160** |
| | 540 | 140 | 3300 | 4450 | 323 | 1000 | 1450 | **22260** |
| | 540 | 192 | 4252 | 6200 | 422 | 750 | 1050 | **23260** |
| **320** | 400 | 60 | 661 | 1656 | 140 | 1200 | - | **23864** |
| | 440 | 90 | 1652 | 2823 | 214 | 1400 | 1500 | **23964** |
| | 480 | 121 | 2448 | 3900 | 281 | 1100 | 1400 | **23064** |
| | 480 | 160 | 3169 | 5380 | 397 | 800 | 1200 | **24064** |
| | 540 | 176 | 3993 | 6000 | 400 | 850 | 1150 | **23164** |
| | 540 | 218 | 4843 | 7600 | 509 | 500 | 750 | **24164** |
| | 580 | 150 | 3782 | 5050 | 382 | 950 | 1310 | **22264** |
| | 580 | 208 | 4800 | 7100 | 474 | 700 | 950 | **23264** |
| **340** | 420 | 60 | 699 | 1759 | 145 | 740 | - | **23868** |
| | 460 | 90 | 1685 | 3053 | 214 | 1300 | 1400 | **23968** |
| | 520 | 133 | 2913 | 4650 | 330 | 1000 | 1300 | **23068** |
| | 520 | 180 | 3859 | 6560 | 472 | 750 | 1110 | **24068** |
| | 580 | 190 | 4545 | 6850 | 474 | 800 | 1000 | **23168** |
| | 580 | 243 | 5709 | 8940 | 622 | 430 | 700 | **24168** |
| | 620 | 224 | 5362 | 8220 | 544 | 560 | 900 | **23268** |
| **360** | 440 | 60 | 701 | 1866 | 153 | - | - | **23872** |
| | 480 | 90 | 1770 | 3150 | 217 | 1200 | 1350 | **23972** |
| | 540 | 134 | 2850 | 4800 | 344 | 950 | 1250 | **23072** |
| | 540 | 180 | 3957 | 6852 | 481 | 700 | 1000 | **24072** |
| | 600 | 192 | 4711 | 7320 | 488 | 750 | 1000 | **23172** |
| | 600 | 243 | 5928 | 9590 | 669 | 400 | 650 | **24172** |
| | 650 | 170 | 4442 | 6380 | 431 | 630 | 1200 | **22272** |
| | 650 | 232 | 5694 | 8800 | 567 | 530 | 1000 | **23272** |
| **380** | 520 | 106 | 2211 | 3950 | 284 | 1100 | 1200 | **23976** |

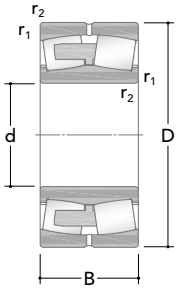

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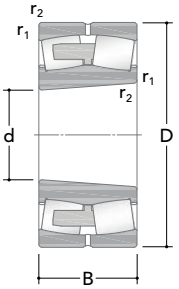

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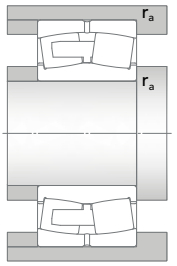
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **300** | 4 | 3 | 0,33 | 97 | **24060** | **24060 K30** |
| (cont.) | 5 | 4 | 0,3 | 125 | **23160** | **23160 K** |
| | 5 | 4 | 0,4 | 160 | **24160** | **24160 K30** |
| | 5 | 4 | 0,26 | 135 | **22260** | **22260 K** |
| | 5 | 4 | 0,35 | 190 | **23260** | **23260 K** |
| **320** | 2,1 | 2 | 0,12 | 17,5 | **23864** | **23864 K** |
| | 3 | 2,5 | 0,17 | 42 | **23964** | **23964 K** |
| | 4 | 3 | 0,23 | 78 | **23064** | **23064 K** |
| | 4 | 3 | 0,31 | 100 | **24064** | **24064 K30** |
| | 5 | 4 | 0,31 | 165 | **23164** | **23164 K** |
| | 5 | 4 | 0,4 | 210 | **24164** | **24164 K30** |
| | 5 | 4 | 0,26 | 175 | **22264** | **22264 K** |
| | 5 | 4 | 0,35 | 240 | **23264** | **23264 K** |
| **340** | 2,1 | 2 | 0,12 | 18,5 | **23868** | - |
| | 3 | 2,5 | 0,17 | 45,5 | **23968** | **23968 K** |
| | 5 | 4 | 0,24 | 105 | **23068** | **23068 K** |
| | 5 | 4 | 0,33 | 140 | **24068** | **24068 K30** |
| | 5 | 4 | 0,31 | 210 | **23168** | **23168 K** |
| | 5 | 4 | 0,4 | 280 | **24168** | **24168 K30** |
| | 6 | 5 | 0,35 | 295 | **23268** | **23268 K** |
| **360** | 2,1 | 1 | 0,11 | 20 | **23872** | **23872 K** |
| | 3 | 2,5 | 0,15 | 46 | **23972** | **23972 K** |
| | 5 | 4 | 0,23 | 110 | **23072** | **23072 K** |
| | 5 | 4 | 0,31 | 145 | **24072** | **24072 K30** |
| | 5 | 4 | 0,3 | 220 | **23172** | **23172 K** |
| | 5 | 4 | 0,4 | 280 | **24172** | **24172 K30** |
| | 6 | 5 | 0,26 | 255 | **22272** | **22272 K** |
| | 6 | 5 | 0,35 | 335 | **23272** | **23272 K** |
| **380** | 4 | 3 | 0,17 | 69 | **23976** | **23976 K** |



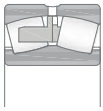

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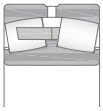


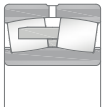

K/K30

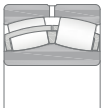



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **380** | 560 | 135 | 3084 | 5150 | 346 | 900 | 1250 | **23076** |
| (cont.) | 560 | 180 | 4058 | 7100 | 467 | 670 | 950 | **24076** |
| | 620 | 194 | 4561 | 7600 | 493 | 560 | 1140 | **23176** |
| | 620 | 243 | 5954 | 10130 | 705 | 360 | 650 | **24176** |
| | 680 | 240 | 6168 | 9550 | 615 | 500 | 950 | **23276** |
| **400** | 540 | 106 | 2200 | 4100 | 289 | 1100 | 1200 | **23980** |
| | 600 | 148 | 3651 | 5990 | 404 | 850 | 1250 | **23080** |
| | 600 | 200 | 4823 | 8500 | 550 | 630 | 1050 | **24080** |
| | 650 | 200 | 4864 | 8150 | 520 | 530 | 1060 | **23180** |
| | 650 | 250 | 6394 | 10650 | 720 | 340 | 600 | **24180** |
| | 720 | 256 | 6958 | 10900 | 672 | 480 | 900 | **23280** |
| | 820 | 243 | 7868 | 10480 | 669 | 430 | 950 | **22380** |
| **420** | 560 | 106 | 2283 | 4250 | 297 | 1000 | 1100 | **23984** |
| | 620 | 150 | 3651 | 6400 | 412 | 600 | 1250 | **23084** |
| | 620 | 200 | 4624 | 8690 | 577 | 530 | 1050 | **24084** |
| | 700 | 224 | 5919 | 9700 | 615 | 480 | 1000 | **23184** |
| | 700 | 280 | 7581 | 12520 | 851 | 320 | 550 | **24184** |
| | 760 | 272 | 7679 | 11800 | 759 | 450 | 800 | **23284** |
| **440** | 600 | 118 | 2806 | 5100 | 342 | 950 | 1200 | **23988** |
| | 650 | 157 | 3835 | 6980 | 449 | 560 | 1200 | **23088** |
| | 650 | 212 | 4992 | 9790 | 626 | 500 | 950 | **24088** |
| | 720 | 226 | 6215 | 10300 | 668 | 450 | 950 | **23188** |
| | 720 | 280 | 7816 | 13200 | 893 | 300 | 550 | **24188** |
| | 790 | 280 | 8216 | 13380 | 792 | 430 | 760 | **23288** |
| **460** | 580 | 118 | 2082 | 4900 | 340 | 630 | 1100 | **24892** |
| | 620 | 118 | 2558 | 5130 | 350 | 600 | 1260 | **23992** |
| | 680 | 163 | 4142 | 7650 | 456 | 560 | 1150 | **23092** |
| | 680 | 218 | 5459 | 10350 | 669 | 480 | 910 | **24092** |
| | 760 | 240 | 6773 | 11235 | 671 | 430 | 800 | **23192** |

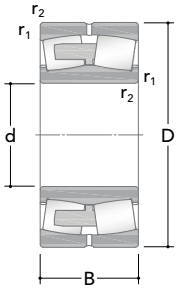

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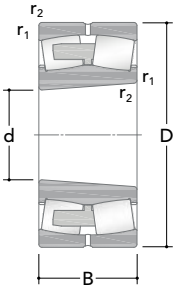

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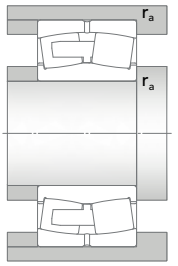
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **380** | 5 | 4 | 0,22 | 115 | **23076** | **23076 K** |
| (cont.) | 5 | 4 | 0,3 | 150 | **24076** | **24076 K30** |
| | 5 | 4 | 0,3 | 230 | **23176** | **23176 K** |
| | 5 | 4 | 0,37 | 300 | **24176** | **24176 K30** |
| | 6 | 5 | 0,35 | 375 | **23276** | **23276 K** |
| **400** | 4 | 3 | 0,16 | 71 | **23980** | **23980 K** |
| | 5 | 4 | 0,23 | 150 | **23080** | **23080 K** |
| | 5 | 4 | 0,3 | 205 | **24080** | **24080 K30** |
| | 6 | 5 | 0,28 | 265 | **23180** | **23180 K** |
| | 6 | 5 | 0,37 | 340 | **24180** | **24180 K30** |
| | 6 | 5 | 0,35 | 450 | **23280** | **23280 K** |
| | 7,5 | 6 | 0,3 | 650 | **22380** | **22380 K** |
| **420** | 4 | 3 | 0,16 | 74,5 | **23984** | **23984 K** |
| | 5 | 4 | 0,22 | 155 | **23084** | **23084 K** |
| | 5 | 4 | 0,3 | 210 | **24084** | **24084 K30** |
| | 6 | 5 | 0,3 | 350 | **23184** | **23184 K** |
| | 6 | 5 | 0,4 | 445 | **24184** | **24184 K30** |
| | 7,5 | 6 | 0,35 | 535 | **23284** | **23284 K** |
| **440** | 4 | 3 | 0,16 | 99,5 | **23988** | **23988 K** |
| | 6 | 5 | 0,22 | 180 | **23088** | **23088 K** |
| | 6 | 5 | 0,3 | 245 | **24088** | **24088 K30** |
| | 6 | 5 | 0,3 | 360 | **23188** | **23188 K** |
| | 6 | 5 | 0,37 | 460 | **24188** | **24188 K30** |
| | 7,5 | 6 | 0,35 | 590 | **23288** | **23288 K** |
| **460** | 3 | 2,5 | 0,17 | 75,5 | **24892** | **24892 K30** |
| | 4 | 3 | 0,16 | 105 | **23992** | **23992 K** |
| | 6 | 5 | 0,22 | 205 | **23092** | **23092 K** |
| | 6 | 5 | 0,28 | 275 | **24092** | **24092 K30** |
| | 7,5 | 6 | 0,3 | 440 | **23192** | **23192 K** |



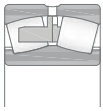

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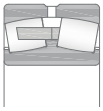


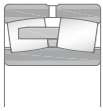

K/K30

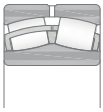



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **460** | 760 | 300 | 8664 | 14950 | 983 | 280 | 500 | **24192** |
| (cont.) | 830 | 296 | 8958 | 14100 | 867 | 400 | 700 | **23292** |
| **480** | 600 | 90 | 1922 | 3990 | 283 | 480 | 1150 | **23896** |
| | 650 | 128 | 2999 | 5930 | 400 | 560 | 1200 | **23996** |
| | 700 | 165 | 4216 | 8000 | 448 | 530 | 1100 | **23096** |
| | 700 | 218 | 5525 | 10900 | 688 | 450 | 850 | **24096** |
| | 790 | 248 | 7365 | 12450 | 777 | 400 | 850 | **23196** |
| | 790 | 308 | 9200 | 15920 | 1035 | 260 | 450 | **24196** |
| | 870 | 310 | 9891 | 16750 | 934 | 380 | 700 | **23296** |
| **500** | 620 | 90 | 1751 | 4035 | 293 | 470 | 1100 | **238/500** |
| | 670 | 128 | 2969 | 6110 | 409 | 530 | 1080 | **239/500** |
| | 720 | 167 | 4538 | 8200 | 504 | 500 | 1050 | **230/500** |
| | 720 | 218 | 5876 | 11240 | 731 | 430 | 820 | **240/500** |
| | 830 | 264 | 8075 | 13940 | 826 | 380 | 810 | **231/500** |
| | 830 | 325 | 10163 | 17720 | 1115 | 260 | 400 | **241/500** |
| | 920 | 336 | 11211 | 17950 | 1042 | 360 | 640 | **232/500** |
| **530** | 650 | 118 | 2124 | 5300 | 375 | 530 | 950 | **248/530** |
| | 710 | 136 | 3309 | 6890 | 457 | 500 | 1000 | **239/530** |
| | 780 | 185 | 5327 | 9760 | 607 | 450 | 950 | **230/530** |
| | 780 | 250 | 6974 | 13740 | 820 | 400 | 800 | **240/530** |
| | 870 | 272 | 8581 | 15140 | 864 | 360 | 750 | **231/530** |
| | 870 | 335 | 10955 | 19150 | 1212 | 240 | 400 | **241/530** |
| | 980 | 355 | 13324 | 20410 | 1209 | 320 | 550 | **232/530** |
| **560** | 750 | 140 | 3571 | 7300 | 490 | 450 | 900 | **239/560** |
| | 820 | 195 | 5793 | 10840 | 659 | 430 | 850 | **230/560** |
| | 820 | 258 | 7634 | 14890 | 979 | 380 | 700 | **240/560** |
| | 920 | 280 | 9596 | 16530 | 976 | 340 | 700 | **231/560** |
| | 920 | 355 | 12551 | 21850 | 1331 | 220 | 350 | **241/560** |
| | 1030 | 365 | 13983 | 22350 | 1300 | 280 | 560 | **232/560** |

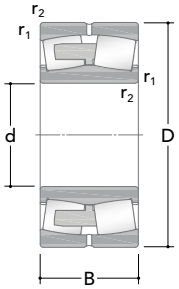

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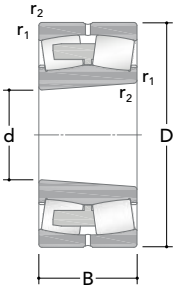

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CC

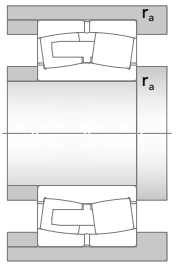
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **460** | 7,5 | 6 | 0,37 | 560 | **24192** | **24192 K30** |
| (cont.) | 7,5 | 6 | 0,35 | 695 | **23292** | **23292 K** |
| **480** | 3 | 2,5 | 0,13 | 61 | **23896** | **23896 K** |
| | 5 | 4 | 0,18 | 125 | **23996** | **23996 K** |
| | 6 | 5 | 0,21 | 215 | **23096** | **23096 K** |
| | 6 | 5 | 0,28 | 285 | **24096** | **24096 K30** |
| | 7,5 | 6 | 0,3 | 485 | **23196** | **23196 K** |
| | 7,5 | 6 | 0,37 | 605 | **24196** | **24196 K30** |
| | 7,5 | 6 | 0,35 | 800 | **23296** | **23296 K** |
| **500** | 3 | 2,5 | 0,12 | 62 | **238/500** | **238/500 K** |
| | 5 | 4 | 0,17 | 130 | **239/500** | **239/500 K** |
| | 6 | 5 | 0,21 | 225 | **230/500** | **230/500 K** |
| | 6 | 5 | 0,26 | 295 | **240/500** | **240/500 K30** |
| | 7,5 | 6 | 0,3 | 580 | **231/500** | **231/500 K** |
| | 7,5 | 6 | 0,37 | 700 | **241/500** | **241/500 K30** |
| | 7,5 | 6 | 0,35 | 985 | **232/500** | **232/500 K** |
| **530** | 3 | 2,5 | 0,15 | 86 | **248/530** | **248/530 K30** |
| | 5 | 4 | 0,17 | 155 | **239/530** | **239/530 K** |
| | 6 | 5 | 0,22 | 310 | **230/530** | **230/530 K** |
| | 6 | 5 | 0,28 | 410 | **240/530** | **240/530 K30** |
| | 7,5 | 6 | 0,3 | 645 | **231/530** | **231/530 K** |
| | 7,5 | 6 | 0,37 | 830 | **241/530** | **241/530 K30** |
| | 9,5 | 8 | 0,35 | 1200 | **232/530** | **232/530 K** |
| **560** | 5 | 4 | 0,16 | 175 | **239/560** | **239/560 K** |
| | 6 | 5 | 0,22 | 355 | **230/560** | **230/560 K** |
| | 6 | 5 | 0,28 | 465 | **240/560** | **240/560 K30** |
| | 7,5 | 6 | 0,3 | 740 | **231/560** | **231/560 K** |
| | 7,5 | 6 | 0,35 | 985 | **241/560** | **241/560 K30** |
| | 9,5 | 8 | 0,35 | 1350 | **232/560** | **232/560 K** |



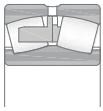

CA/CAF

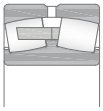


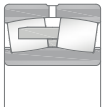

K/K30

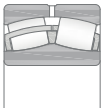



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **600** | 800 | 150 | 4022 | 8650 | 567 | 430 | 900 | **239/600** |
| | 870 | 200 | 6255 | 11800 | 725 | 400 | 800 | **230/600** |
| | 870 | 272 | 8716 | 17050 | 1061 | 340 | 700 | **240/600** |
| | 980 | 300 | 10814 | 18810 | 1088 | 320 | 650 | **231/600** |
| | 980 | 375 | 13584 | 23870 | 1458 | 200 | 350 | **241/600** |
| | 1090 | 388 | 15786 | 25730 | 1456 | 260 | 550 | **232/600** |
| **630** | 780 | 112 | 2550 | 6150 | 412 | 430 | 760 | **238/630** |
| | 850 | 165 | 4793 | 10160 | 621 | 400 | 800 | **239/630** |
| | 920 | 212 | 6968 | 13480 | 779 | 380 | 750 | **230/630** |
| | 920 | 290 | 9159 | 18900 | 1114 | 320 | 650 | **240/630** |
| | 1030 | 315 | 12778 | 21390 | 1196 | 260 | 600 | **231/630** |
| | 1030 | 400 | 15082 | 27230 | 1614 | 190 | 350 | **241/630** |
| **670** | 820 | 112 | 2843 | 6920 | 431 | 400 | 750 | **238/670** |
| | 900 | 170 | 5146 | 11060 | 677 | 360 | 750 | **239/670** |
| | 980 | 230 | 7919 | 15850 | 869 | 340 | 700 | **230/670** |
| | 980 | 308 | 10478 | 21850 | 1287 | 300 | 550 | **240/670** |
| | 1090 | 336 | 13199 | 23465 | 1324 | 240 | 550 | **231/670** |
| | 1090 | 412 | 16393 | 30100 | 1755 | 180 | 300 | **241/670** |
| | 1220 | 438 | 19011 | 31850 | 1687 | 220 | 450 | **232/670** |
| **710** | 870 | 118 | 3049 | 7590 | 499 | 360 | 700 | **238/710** |
| | 950 | 180 | 5702 | 12500 | 740 | 340 | 700 | **239/710** |
| | 950 | 243 | 6871 | 15680 | 929 | 300 | 500 | **249/710** |
| | 1030 | 236 | 8669 | 17800 | 964 | 330 | 650 | **230/710** |
| | 1030 | 315 | 11237 | 23380 | 1404 | 260 | 550 | **240/710** |
| | 1150 | 345 | 14737 | 26200 | 1506 | 240 | 500 | **231/710** |
| | 1150 | 438 | 17939 | 33900 | 1894 | 160 | 310 | **241/710** |
| | 1280 | 450 | 21348 | 35360 | 1969 | 200 | 450 | **232/710** |
| **750** | 920 | 128 | 3487 | 8560 | 547 | 340 | 600 | **238/750** |
| | 1000 | 185 | 6164 | 13500 | 792 | 320 | 650 | **239/750** |

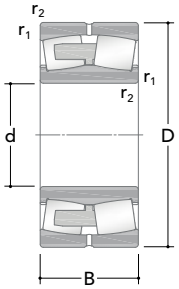

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MB

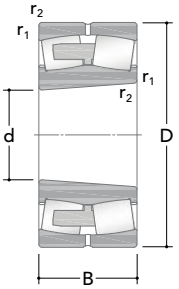

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CC

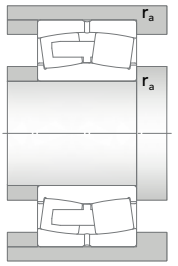
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **600** | 5 | 4 | 0,17 | 220 | **239/600** | **239/600 K** |
| | 6 | 5 | 0,22 | 405 | **230/600** | **230/600 K** |
| | 6 | 5 | 0,3 | 520 | **240/600** | **240/600 K30** |
| | 7,5 | 6 | 0,3 | 895 | **231/600** | **231/600 K** |
| | 7,5 | 6 | 0,37 | 1200 | **241/600** | **241/600 K30** |
| | 9,5 | 8 | 0,35 | 1600 | **232/600** | **232/600 K** |
| **630** | 4 | 3 | 0,12 | 120 | **238/630** | **238/630 K** |
| | 6 | 5 | 0,17 | 280 | **239/630** | **239/630 K** |
| | 7,5 | 6 | 0,21 | 485 | **230/630** | **230/630 K** |
| | 7,5 | 6 | 0,28 | 645 | **240/630** | **240/630 K30** |
| | 7,5 | 6 | 0,3 | 1050 | **231/630** | **231/630 K** |
| | 7,5 | 6 | 0,37 | 1400 | **241/630** | **241/630 K30** |
| **670** | 4 | 3 | 0,11 | 130 | **238/670** | **238/670 K** |
| | 6 | 5 | 0,17 | 315 | **239/670** | **239/670 K** |
| | 7,5 | 6 | 0,21 | 600 | **230/670** | **230/670 K** |
| | 7,5 | 6 | 0,28 | 790 | **240/670** | **240/670 K30** |
| | 7,5 | 6 | 0,3 | 1250 | **231/670** | **231/670 K** |
| | 7,5 | 6 | 0,37 | 1600 | **241/670** | **241/670 K30** |
| | 12 | 10 | 0,35 | 2270 | **232/670** | **232/670 K** |
| **710** | 4 | 3 | 0,11 | 153 | **238/710** | **238/710 K** |
| | 6 | 5 | 0,17 | 365 | **239/710** | **239/710 K** |
| | 6 | 5 | 0,22 | 495 | **249/710** | **249/710 K30** |
| | 7,5 | 6 | 0,21 | 670 | **230/710** | **230/710 K** |
| | 7,5 | 6 | 0,27 | 895 | **240/710** | **240/710 K30** |
| | 9,5 | 8 | 0,28 | 1450 | **231/710** | **231/710 K** |
| | 9,5 | 8 | 0,37 | 1900 | **241/710** | **241/710 K30** |
| | 12 | 10 | 0,35 | 2610 | **232/710** | **232/710 K** |
| **750** | 5 | 4 | 0,11 | 185 | **238/750** | **238/750 K** |
| | 6 | 5 | 0,16 | 420 | **239/750** | **239/750 K** |



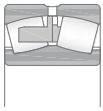

CA/CAF

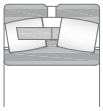


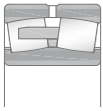

K/K30

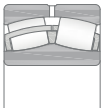



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **750** | 1000 | 250 | 7757 | 19900 | 1096 | 280 | 480 | **249/750** |
| (cont.) | 1090 | 250 | 10061 | 18790 | 1082 | 280 | 600 | **230/750** |
| | 1090 | 335 | 12254 | 26530 | 1438 | 240 | 500 | **240/750** |
| | 1220 | 365 | 16536 | 29030 | 1696 | 220 | 430 | **231/750** |
| | 1220 | 475 | 20491 | 37530 | 2144 | 150 | 220 | **241/750** |
| | 1360 | 475 | 21420 | 36390 | 1994 | 170 | 260 | **232/750** |
| **800** | 980 | 180 | 4811 | 12920 | 818 | 320 | 560 | **248/800** |
| | 1060 | 195 | 6795 | 15300 | 863 | 280 | 600 | **239/800** |
| | 1060 | 258 | 8136 | 19860 | 1058 | 240 | 450 | **249/800** |
| | 1150 | 258 | 10357 | 21790 | 1148 | 260 | 500 | **230/800** |
| | 1150 | 345 | 13547 | 28670 | 1652 | 220 | 500 | **240/800** |
| | 1280 | 375 | 18285 | 31500 | 1794 | 200 | 450 | **231/800** |
| | 1280 | 475 | 21893 | 40580 | 2313 | 140 | 250 | **241/800** |
| | 1420 | 488 | 25160 | 43610 | 2328 | 180 | 400 | **232/800** |
| **850** | 1030 | 136 | 3982 | 10500 | 629 | 260 | 600 | **238/850** |
| | 1120 | 200 | 7131 | 16420 | 919 | 260 | 600 | **239/850** |
| | 1120 | 272 | 9390 | 22800 | 1358 | 220 | 450 | **249/850** |
| | 1220 | 272 | 11300 | 23180 | 1226 | 240 | 500 | **230/850** |
| | 1220 | 365 | 15297 | 32230 | 1884 | 200 | 450 | **240/850** |
| | 1360 | 400 | 23963 | 45042 | 2502 | 121 | 400 | **231/850** |
| | 1360 | 500 | 28031 | 48742 | 2640 | 145 | 229 | **241/850** |
| **900** | 1090 | 190 | 5428 | 16900 | 941 | 240 | 480 | **248/900** |
| | 1180 | 206 | 7721 | 18220 | 995 | 240 | 550 | **239/900** |
| | 1280 | 280 | 12202 | 26600 | 1311 | 220 | 500 | **230/900** |
| | 1280 | 375 | 16375 | 35200 | 2022 | 190 | 400 | **240/900** |
| | 1420 | 515 | 25772 | 50900 | 2694 | 120 | 200 | **241/900** |
| **950** | 1250 | 224 | 8699 | 20420 | 1104 | 220 | 500 | **239/950** |
| | 1250 | 300 | 10761 | 26480 | 1470 | 180 | 340 | **249/950** |
| | 1360 | 300 | 14561 | 28530 | 1574 | 200 | 450 | **230/950** |
| | 1360 | 412 | 18280 | 41310 | 2200 | 170 | 400 | **240/950** |

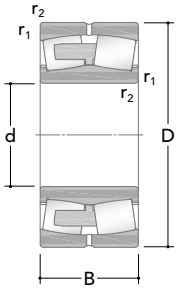

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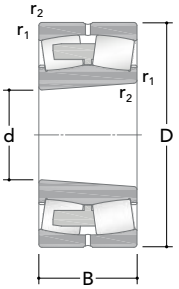

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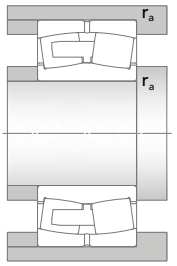
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **750** | 6 | 5 | 0,22 | 560 | **249/750** | **249/750 K30** |
| (cont.) | 7,5 | 6 | 0,21 | 795 | **230/750** | **230/750 K** |
| | 7,5 | 6 | 0,28 | 1070 | **240/750** | **240/750 K30** |
| | 9,5 | 8 | 0,28 | 1700 | **231/750** | **231/750 K** |
| | 9,5 | 8 | 0,37 | 2100 | **241/750** | **241/750 K30** |
| | 15 | 12 | 0,35 | 3050 | **232/750** | **232/750 K** |
| **800** | 5 | 4 | 0,15 | 300 | **248/800** | **248/800 K30** |
| | 6 | 5 | 0,16 | 470 | **239/800** | **239/800 K** |
| | 6 | 5 | 0,21 | 640 | **249/800** | **249/800 K30** |
| | 7,5 | 6 | 0,2 | 895 | **230/800** | **230/800 K** |
| | 7,5 | 6 | 0,27 | 1200 | **240/800** | **240/800 K30** |
| | 9,5 | 8 | 0,28 | 1920 | **231/800** | **231/800 K** |
| | 9,5 | 8 | 0,35 | 2300 | **241/800** | **241/800 K30** |
| | 15 | 12 | 0,33 | 3280 | **232/800** | **232/800 K** |
| **850** | 5 | 4 | 0,11 | 240 | **238/850** | **238/850 K** |
| | 6 | 5 | 0,16 | 560 | **239/850** | **239/850 K** |
| | 6 | 5 | 0,22 | 740 | **249/850** | **249/850 K30** |
| | 7,5 | 6 | 0,2 | 1050 | **230/850** | **230/850 K** |
| | 7,5 | 6 | 0,27 | 1410 | **240/850** | **240/850 K30** |
| | 12 | 10 | 0,28 | 2200 | **231/850** | **231/850 K** |
| | 12 | 10 | 0,35 | 2770 | **241/850** | **241/850 K30** |
| **900** | 5 | 4 | 0,14 | 370 | **248/900** | **248/900 K30** |
| | 6 | 5 | 0,15 | 605 | **239/900** | **239/900 K** |
| | 7,5 | 6 | 0,2 | 1200 | **230/900** | **230/900 K** |
| | 7,5 | 6 | 0,26 | 1570 | **240/900** | **240/900 K30** |
| | 12 | 10 | 0,35 | 3350 | **241/900** | **241/900 K30** |
| **950** | 7,5 | 6 | 0,15 | 755 | **239/950** | **239/950 K** |
| | 7,5 | 6 | 0,21 | 1020 | **249/950** | **249/950 K30** |
| | 7,5 | 6 | 0,2 | 1450 | **230/950** | **230/950 K** |
| | 7,5 | 6 | 0,27 | 1990 | **240/950** | **240/950 K30** |



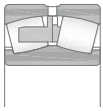

CA/CAF

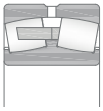


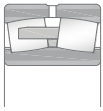

K/K30

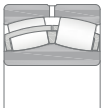



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **950** | 1500 | 545 | 28438 | 56490 | 2961 | 110 | 200 | **241/950** |
| (cont.) | | | | | | | | |
| **1000** | 1220 | 165 | 5465 | 14370 | 848 | 220 | 450 | **238/1000** |
| | 1320 | 315 | 11939 | 29660 | 1443 | 170 | 500 | **249/1000** |
| | 1420 | 308 | 14611 | 31850 | 1692 | 160 | 420 | **230/1000** |
| | 1420 | 412 | 18907 | 41390 | 2217 | 160 | 350 | **240/1000** |
| | 1580 | 462 | 25656 | 49060 | 2500 | 140 | 350 | **231/1000** |
| | 1580 | 580 | 31175 | 62060 | 3342 | 100 | 200 | **241/1000** |
| **1060** | 1280 | 165 | 5638 | 15010 | 848 | 200 | 450 | **238/1060** |
| | 1280 | 218 | 10831 | 25840 | 1190 | 180 | 450 | **248/1060** |
| | 1400 | 250 | 11436 | 26020 | 1415 | 180 | 360 | **239/1060** |
| | 1400 | 335 | 13371 | 32530 | 1791 | 160 | 280 | **249/1060** |
| | 1500 | 325 | 16398 | 35610 | 1809 | 150 | 400 | **230/1060** |
| | 1500 | 438 | 20759 | 47420 | 2430 | 150 | 350 | **240/1060** |
| **1120** | 1360 | 243 | 8357 | 23910 | 1395 | 160 | 300 | **248/1120** |
| | 1460 | 335 | 13811 | 34540 | 1816 | 140 | 260 | **249/1120** |
| | 1580 | 462 | 22569 | 52160 | 2655 | 130 | 300 | **240/1120** |
| **1180** | 1420 | 180 | 6851 | 18600 | 1072 | 170 | 400 | **238/1180** |
| | 1420 | 243 | 8965 | 26560 | 1535 | 150 | 280 | **248/1180** |
| | 1540 | 272 | 13119 | 31270 | 1658 | 150 | 410 | **239/1180** |
| | 1540 | 355 | 15786 | 40580 | 2148 | 130 | 240 | **249/1180** |
| | 1660 | 475 | 25876 | 58900 | 3019 | 130 | 300 | **240/1180** |
| **1250** | 1750 | 375 | 21256 | 46500 | 2274 | 130 | 350 | **230/1250** |
| **1320** | 1600 | 280 | 11276 | 33340 | 1851 | 130 | 230 | **248/1320** |
| | 1720 | 400 | 18889 | 49350 | 2467 | 110 | 200 | **249/1320** |
| **1500** | 1820 | 315 | 14757 | 45140 | 2354 | 110 | 220 | **248/1500** |
| | 1950 | 450 | 22889 | 62830 | 3142 | - | 190 | **249/1500** |

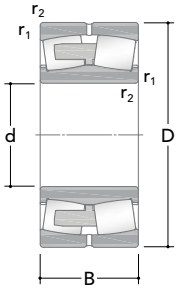

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MB

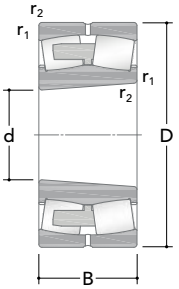

ECA


CC

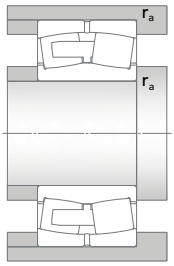
| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 950 (cont.) | 12 | 10 | 0,35 | 3540 | 241/950 | 241/950 K30 |
| 1000 | 6 | 5 | 0,12 | 410 | 238/1000 | 238/1000 K |
| | 7,5 | 6 | 0,21 | 1200 | 249/1000 | 249/1000 K30 |
| | 7,5 | 6 | 0,19 | 1600 | 230/1000 | 230/1000 K |
| | 7,5 | 6 | 0,26 | 2140 | 240/1000 | 240/1000 K30 |
| | 12 | 10 | 0,28 | 3500 | 231/1000 | 231/1000 K |
| | 12 | 10 | 0,35 | 4300 | 241/1000 | 241/1000 K30 |
| 1060 | 6 | 5 | 0,11 | 435 | 238/1060 | 238/1060 K |
| | 6 | 5 | 0,14 | 570 | 248/1060 | 248/1060 K30 |
| | 7,5 | 6 | 0,16 | 1100 | 239/1060 | 239/1060 K |
| | 7,5 | 6 | 0,21 | 1400 | 249/1060 | 249/1060 K30 |
| | 9,5 | 8 | 0,19 | 1840 | 230/1060 | 230/1060 K |
| | 9,5 | 8 | 0,26 | 2520 | 240/1060 | 240/1060 K30 |
| 1120 | 6 | 5 | 0,15 | 735 | 248/1120 | 248/1120 K30 |
| | 7,5 | 6 | 0,2 | 1500 | 249/1120 | 249/1120 K30 |
| | 9,5 | 8 | 0,26 | 2930 | 240/1120 | 240/1120 K30 |
| 1180 | 6 | 5 | 0,11 | 575 | 238/1180 | 238/1180 K |
| | 6 | 5 | 0,14 | 770 | 248/1180 | 248/1180 K30 |
| | 7,5 | 6 | 0,16 | 1400 | 239/1180 | 239/1180 K |
| | 7,5 | 6 | 0,2 | 1800 | 249/1180 | 249/1180 K30 |
| | 9,5 | 8 | 0,26 | 3320 | 240/1180 | 240/1180 K30 |
| 1250 | 9,5 | 8 | 0,19 | 2840 | 230/1250 | 230/1250 K |
| 1320 | 6 | 5 | 0,15 | 1160 | 248/1320 | 248/1320 K30 |
| | 7,5 | 6 | 0,21 | 2500 | 249/1320 | 249/1320 K30 |
| 1500 | 7,5 | 6 | 0,15 | 1710 | 248/1500 | 248/1500 K30 |
| | 9,5 | 8 | 0,2 | 3550 | 249/1500 | 249/1500 K30 |



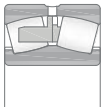

CA/CAF

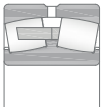


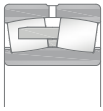

K/K30

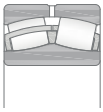



| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **1800** | 2180 | 375 | 20274 | 63090 | 3035 | 75 | 140 | **248/1800** |

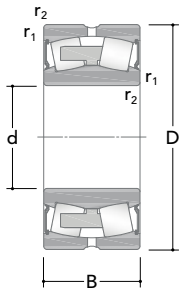

MA


MB

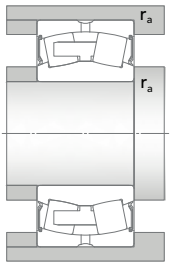

ECA


CC

| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **1800** | 9,5 | 8 | 0,15 | 2900 | **248/1800** | **248/1800 K30** |



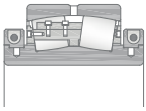

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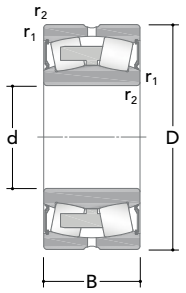

| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **25** | 52 | 23 | 49,7 | 43,8 | 4,73 | 5300 | **BS2 2205** |
| **30** | 62 | 25 | 65,3 | 59,3 | 6,3 | 4580 | **BS2 2206** |
| **35** | 72 | 28 | 87,5 | 84,4 | 9,2 | 3760 | **BS2 2207** |
| **40** | 80 | 28 | 100,4 | 88,5 | 9,6 | 3360 | **BS2 2208** |
| | 90 | 38 | 156,3 | 139,0 | 14,9 | 3390 | **BS2 2308** |
| **45** | 85 | 28 | 103,1 | 97,7 | 10,8 | 3100 | **BS2 2209** |
| | 100 | 42 | 193 | 180 | 19,3 | 2900 | **BS2 2309** |
| **50** | 90 | 28 | 106 | 107 | 11,7 | 2830 | **BS2 2210** |
| | 110 | 45 | 228 | 221 | 23,7 | 2600 | **BS2 2310** |
| **55** | 100 | 31 | 129 | 125 | 13,5 | 2560 | **BS2 2211** |
| | 120 | 49 | 279 | 278 | 29,8 | 2500 | **BS2 2311** |
| **60** | 110 | 34 | 159 | 166 | 18,6 | 2400 | **BS2 2212** |
| | 130 | 53 | 329 | 329 | 35,8 | 2150 | **BS2 2312** |
| **65** | 100 | 35 | 140 | 172 | 20,3 | 2300 | **24013** |
| | 120 | 38 | 194 | 214 | 23,8 | 2150 | **BS2 2213** |
| | 140 | 56 | 353 | 360 | 38 | 2045 | **BS2 2313** |
| **70** | 125 | 38 | 210 | 224 | 25,1 | 2000 | **BS2 2214** |
| | 150 | 60 | 416 | 426 | 44,6 | 1890 | **BS2 2314** |
| **75** | 115 | 40 | 180 | 229 | 28,1 | 1960 | **24015** |
| | 130 | 38 | 219 | 243 | 26,9 | 1900 | **BS2 2215** |
| | 160 | 64 | 463 | 472 | 47,7 | 1830 | **BS2 2315** |
| **80** | 140 | 40 | 246 | 270 | 29 | 1740 | **BS2 2216** |


WOR

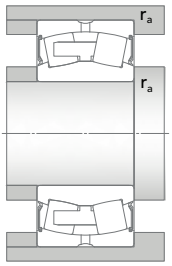

ECCS


SSRB

| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 25 | 1 | 1 | 0,35 | 0,26 | BS2 2205 2CS | - |
| 30 | 1 | 1 | 0,31 | 0,34 | BS2 2206 2CS | - |
| 35 | 1,1 | 1 | 0,31 | 0,52 | BS2 2207 2CS | - |
| 40 | 1,1 | 1 | 0,28 | 0,57 | BS2 2208 2CS | BS2 2208 K2CS |
| | 1,5 | 1,5 | 0,37 | 1,2 | BS2 2308 2CS | - |
| 45 | 1,1 | 1 | 0,26 | 0,66 | BS2 2209 2CS | BS2 2209 K2CS |
| | 1,5 | 1,5 | 0,37 | 1,6 | BS2 2309 2CS | - |
| 50 | 1,1 | 1 | 0,24 | 0,7 | BS2 2210 2CS | BS2 2210 K2CS |
| | 2 | 2 | 0,37 | 2,1 | BS2 2310 2CS | - |
| 55 | 1,5 | 1,5 | 0,24 | 1 | BS2 2211 2CS | BS2 2211 K2CS |
| | 2 | 2 | 0,35 | 2,8 | BS2 2311 2CS | - |
| 60 | 1,5 | 1,5 | 0,24 | 1,3 | BS2 2212 2CS | BS2 2212 K2CS |
| | 2,1 | 2 | 0,35 | 3,4 | BS2 2312 2CS | - |
| 65 | 1,1 | 1 | 0,27 | 0,95 | 24013 2CZ | - |
| | 1,5 | 1,5 | 0,24 | 1,6 | BS2 2213 2CS | BS2 2213 K2CS |
| | 2,1 | 2 | 0,35 | 4,15 | BS2 2313 2CS | - |
| 70 | 1,5 | 1,5 | 0,23 | 1,8 | BS2 2214 2CS | BS2 2214 K2CS |
| | 2,1 | 2 | 0,33 | 5,1 | BS2 2314 2CS | - |
| 75 | 1,1 | 1 | 0,28 | 1,55 | 24015 2CS | - |
| | 1,5 | 1,5 | 0,22 | 2,1 | BS2 2215 2CS | BS2 2215 K2CS |
| | 2,1 | 2 | 0,35 | 6,5 | BS2 2315 2CS | - |
| 80 | 2 | 2 | 0,22 | 2,4 | BS2 2216 2CS | BS2 2216 K2CS |



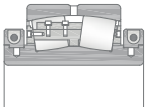

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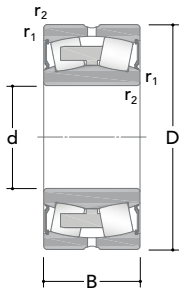

| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **80** | 170 | 67 | 519 | 533 | 54,3 | 1800 | **BS2 2316** |
| (cont.) | | | | | | | |
| **85** | 150 | 44 | 292 | 321 | 34,1 | 1640 | **BS2 2217** |
| **90** | 160 | 48 | 326 | 372 | 38,7 | 1568 | **BS2 2218** |
| | 160 | 52,4 | 350 | 437 | 47,7 | 1491 | **23218** |
| **95** | 170 | 51 | 401 | 445 | 45 | 1490 | **BS2 2219** |
| **100** | 150 | 50 | 296 | 408 | 44,7 | 1500 | **24020** |
| | 165 | 52 | 391 | 483 | 52,2 | 1490 | **23120** |
| | 165 | 65 | 467 | 631 | 67 | 1510 | **24120** |
| | 180 | 55 | 432 | 484 | 48,4 | 1400 | **BS2 2220** |
| | 180 | 60,3 | 508 | 590 | 62 | 1400 | **23220** |
| **110** | 170 | 45 | 325 | 432 | 46 | 1340 | **23022** |
| | 170 | 60 | 437 | 619 | 67 | 600 | **24022** |
| | 180 | 56 | 460 | 578 | 60 | 700 | **23122** |
| | 180 | 69 | 549 | 741 | 77 | 550 | **24122** |
| | 200 | 63 | 566 | 636 | 63 | 1280 | **BS2 2222** |
| | 200 | 69,8 | 631 | 758 | 76 | 550 | **23222** |
| **120** | 180 | 46 | 369 | 508 | 53 | 1220 | **23024** |
| | 180 | 60 | 452 | 662 | 67 | 600 | **24024** |
| | 200 | 80 | 675 | 940 | 94 | 500 | **24124** |
| | 215 | 69 | 641 | 750 | 72 | 1220 | **BS2 2224** |
| | 215 | 76 | 724 | 912 | 91 | 530 | **23224** |
| | 260 | 86 | 1025 | 1111 | 99 | 530 | **22324** |
| **130** | 200 | 52 | 458 | 610 | 62 | 700 | **23026** |
| | 200 | 69 | 559 | 814 | 80 | 540 | **24026** |
| | 210 | 80 | 713 | 985 | 99 | 460 | **24126** |
| | 230 | 75 | 762 | 926 | 88 | 600 | **BS2 2226** |


WOR

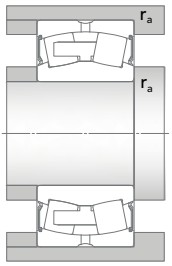

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SSRB

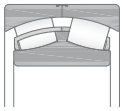
| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 80 (cont.) | 2,1 | 2 | 0,35 | 7,2 | BS2 2316 2CS | - |
| 85 | 2 | 2 | 0,22 | 3 | BS2 2217 2CS | BS2 2217 K2CS |
| 90 | 2 | 2 | 0,24 | 3,7 | BS2 2218 2CS | BS2 2218 K2CS |
| | 2 | 2 | 0,31 | 4,65 | 23218 2CZ | - |
| 95 | 2,1 | 2 | 0,24 | 4,65 | BS2 2219 2CS | BS2 2219 K2CS |
| 100 | 1,5 | 1,5 | 0,28 | 3,15 | 24020 2CZ | - |
| | 2 | 2 | 0,27 | 4,55 | 23120 2CZ | - |
| | 2 | 2 | 0,35 | 5,65 | 24120 2CZ | - |
| | 2,1 | 2 | 0,24 | 5,5 | BS2 2220 2CS | BS2 2220 K2CS |
| | 2,1 | 2 | 0,3 | 6,85 | 23220 2CZ | - |
| 110 | 2 | 2 | 0,23 | 3,8 | 23022 2CZ | - |
| | 2 | 2 | 0,33 | 5 | 24022 2CZ | - |
| | 2 | 2 | 0,27 | 5,75 | 23122 2CZ | 23122 K2CZ |
| | 2 | 2 | 0,35 | 7,1 | 24122 2CZ | - |
| | 2,1 | 2 | 0,25 | 7,6 | BS2 2222 2CS | BS2 2222 K2CS |
| | 2,1 | 2 | 0,33 | 9,85 | 23222 2CZ | 23222 K2CZ |
| 120 | 2 | 2 | 0,2 | 4,2 | 23024 2CZ | - |
| | 2 | 2 | 0,28 | 5,45 | 24024 2CZ | - |
| | 2 | 2 | 0,37 | 10,5 | 24124 2CZ | - |
| | 2,1 | 2 | 0,26 | 9,75 | BS2 2224 2CS | BS2 2224 K2CS |
| | 2,1 | 2 | 0,33 | 12 | 23224 2CZ | 23224 K2CZ |
| | 3 | 2,5 | 0,33 | 23 | 22324 2CZ | 22324 K2CZ |
| 130 | 2 | 2 | 0,21 | 6 | 23026 2CZ | 23026 K2CZ |
| | 2 | 2 | 0,3 | 8,05 | 24026 2CZ | - |
| | 2 | 2 | 0,33 | 11 | 24126 2CZ | - |
| | 3 | 2,5 | 0,27 | 11 | BS2 2226 2CS | BS2 2226 K2CS |



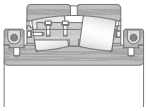

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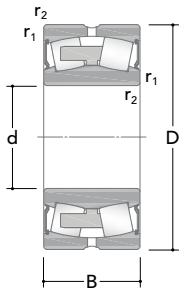

| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **130** | 230 | 80 | 821 | 1050 | 103 | 460 | **23226** |
| (cont.) | 280 | 93 | 1159 | 1304 | 113 | 450 | **22326** |
| **140** | 210 | 53 | 477 | 672 | 67 | 600 | **23028** |
| | 210 | 69 | 596 | 890 | 87 | 500 | **24028** |
| | 225 | 85 | 783 | 1140 | 110 | 400 | **24128** |
| | 250 | 68 | 742 | 893 | 86 | 600 | **22228** |
| | 250 | 88 | 970 | 1240 | 119 | 430 | **23228** |
| | 300 | 102 | 1364 | 1540 | 130 | 380 | **22328** |
| **150** | 225 | 56 | 528 | 749 | 73 | 600 | **23030** |
| | 225 | 75 | 669 | 1030 | 99 | 460 | **24030** |
| | 250 | 80 | 898 | 1190 | 113 | 500 | **23130** |
| | 250 | 100 | 1061 | 1510 | 144 | 360 | **24130** |
| | 270 | 73 | 912 | 1070 | 101 | 560 | **22230** |
| | 270 | 96 | 1118 | 1487 | 140 | 380 | **23230** |
| | 320 | 108 | 1519 | 1730 | 144 | 350 | **22330** |
| **160** | 240 | 60 | 624 | 879 | 83 | 600 | **23032** |
| | 240 | 80 | 779 | 1180 | 112 | 400 | **24032** |
| | 270 | 86 | 1043 | 1378 | 127 | 470 | **23132** |
| | 270 | 109 | 1214 | 1750 | 162 | 330 | **24132** |
| | 290 | 80 | 1033 | 1280 | 117 | 520 | **22232** |
| | 340 | 114 | 1680 | 1950 | 159 | 330 | **22332** |
| **170** | 260 | 67 | 761 | 1071 | 99 | 560 | **23034** |
| | 260 | 90 | 951 | 1488 | 136 | 350 | **24034** |
| | 280 | 88 | 1079 | 1490 | 136 | 420 | **23134** |
| | 280 | 109 | 1288 | 1887 | 172 | 310 | **24134** |
| | 310 | 86 | 1189 | 1450 | 133 | 440 | **22234** |
| **180** | 280 | 74 | 900 | 1267 | 114 | 500 | **23036** |
| | 280 | 100 | 1155 | 1710 | 154 | 330 | **24036** |


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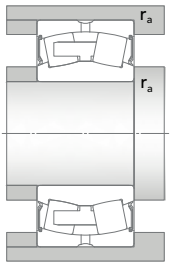

ECCS


SSRB

| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 130 | 3 | 2,5 | 0,31 | 14,5 | 23226 2CZ | 23226 K2CZ |
| (cont.) | 4 | 3 | 0,33 | 29 | 22326 2CZ | 22326 K2CZ |
| 140 | 2 | 2 | 0,2 | 6,55 | 23028 2CZ | 23028 K2CZ |
| | 2 | 2 | 0,28 | 8,55 | 24028 2CZ | - |
| | 2,1 | 2 | 0,35 | 13,5 | 24128 2CZ | - |
| | 3 | 2,5 | 0,24 | 14 | 22228 2CZ | 22228 K2CZ |
| | 3 | 2,5 | 0,33 | 19 | 23228 2CZ | 23228 K2CZ |
| | 4 | 3 | 0,33 | 36,5 | 22328 2CZ | 22328 K2CZ |
| 150 | 2,1 | 2 | 0,2 | 7,95 | 23030 2CZ | 23030 K2CZ |
| | 2,1 | 2 | 0,28 | 10,5 | 24030 2CZ | - |
| | 2,1 | 2 | 0,28 | 16 | 23130 2CZ | 23130 K2CZ |
| | 2,1 | 2 | 0,37 | 20 | 24130 2CZ | - |
| | 3 | 2,5 | 0,24 | 18 | 22230 2CZ | 22230 K2CZ |
| | 3 | 2,5 | 0,33 | 24,5 | 23230 2CZ | 23230 K2CZ |
| | 4 | 3 | 0,33 | 43,5 | 22330 2CZ | 22330 K2CZ |
| 160 | 2,1 | 2 | 0,2 | 9,7 | 23032 2CZ | 23032 K2CZ |
| | 2,1 | 2 | 0,28 | 13 | 24032 2CZ | - |
| | 2,1 | 2 | 0,28 | 20,5 | 23132 2CZ | 23132 K2CZ |
| | 2,1 | 2 | 0,37 | 25 | 24132 2CZ | - |
| | 3 | 2,5 | 0,25 | 22,5 | 22232 2CZ | 22232 K2CZ |
| | 4 | 3 | 0,33 | 52 | 22332 2CZ | 22332 K2CZ |
| 170 | 2,1 | 2 | 0,22 | 13 | 23034 2CZ | 23034 K2CZ |
| | 2,1 | 2 | 0,3 | 17,5 | 24034 2CZ | - |
| | 2,1 | 2 | 0,28 | 22 | 23134 2CZ | 23134 K2CZ |
| | 2,1 | 2 | 0,37 | 27,5 | 24134 2CZ | - |
| | 4 | 3 | 0,25 | 28,5 | 22234 2CZ | 22234 K2CZ |
| 180 | 2,1 | 2 | 0,22 | 17 | 23036 2CZ | 23036 K2CZ |
| | 2,1 | 2 | 0,31 | 23 | 24036 2CZ | - |



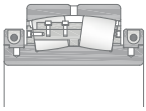

Sealed



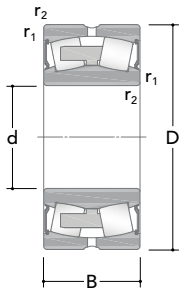

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **180** | 300 | 96 | 1259 | 1775 | 158 | 370 | **23136** |
| (cont.) | 300 | 118 | 1424 | 2150 | 195 | 320 | **24136** |
| | 320 | 86 | 1248 | 1540 | 138 | 470 | **22236** |
| **190** | 320 | 104 | 1431 | 2060 | 181 | 350 | **23138** |
| | 320 | 128 | 1643 | 2470 | 209 | 300 | **24138** |
| | 340 | 92 | 1355 | 1680 | 148 | 430 | **22238** |
| **200** | 310 | 82 | 1060 | 1500 | 134 | 420 | **23040** |
| | 340 | 112 | 1645 | 2350 | 203 | 330 | **23140** |
| | 340 | 140 | 1899 | 2750 | 228 | 280 | **24140** |
| | 360 | 98 | 1503 | 1920 | 165 | 380 | **22240** |
| | 360 | 128 | 1917 | 2690 | 231 | 300 | **23240** |
| **220** | 300 | 60 | 673 | 1060 | 91 | 540 | **23944** |
| | 340 | 90 | 1240 | 1830 | 160 | 380 | **23044** |
| | 370 | 120 | 1870 | 2740 | 231 | 320 | **23144** |
| | 400 | 108 | 1828 | 2350 | 199 | 340 | **22244** |
| | 460 | 145 | 2788 | 3400 | 256 | 270 | **22344** |
| **240** | 360 | 92 | 1319 | 2040 | 173 | 360 | **23048** |
| | 400 | 128 | 2169 | 3180 | 253 | 290 | **23148** |
| **260** | 400 | 104 | 1653 | 2520 | 210 | 310 | **23052** |
| | 440 | 144 | 2621 | 3830 | 285 | 280 | **23152** |
| **280** | 460 | 146 | 2812 | 4170 | 329 | 260 | **23156** |
| **300** | 500 | 160 | 3321 | 5066 | 377 | 230 | **23160** |
| **320** | 540 | 176 | 3978 | 6186 | 446 | 230 | **23164** |
| **340** | 580 | 190 | 4411 | 6678 | 481 | 210 | **23168** |


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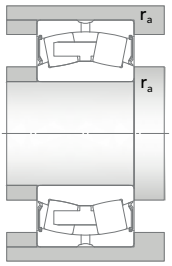

ECCS


SSRB

| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **180** | 3 | 2,5 | 0,28 | 28 | **23136 2CZ** | **23136 K2CZ** |
| (cont.) | 3 | 2,5 | 0,37 | 34,5 | **24136 2CZ** | - |
| | 4 | 3 | 0,24 | 29 | **22236 2CZ** | **22236 K2CZ** |
| **190** | 3 | 2,5 | 0,3 | 35 | **23138 2CZ** | **23138 K2CZ** |
| | 3 | 2,5 | 0,4 | 43 | **24138 2CZ** | - |
| | 4 | 3 | 0,24 | 35 | **22238 2CZ** | **22238 K2CZ** |
| **200** | 2,1 | 2 | 0,22 | 22 | **23040 2CZ** | **23040 K2CZ** |
| | 3 | 2,5 | 0,3 | 43 | **23140 2CZ** | **23140 K2CZ** |
| | 3 | 2,5 | 0,4 | 53,5 | **24140 2CZ** | - |
| | 4 | 3 | 0,24 | 42 | **22240 2CZ** | **22240 K2CZ** |
| | 4 | 3 | 0,35 | 58 | **23240 2CZ** | **23240 K2CZ** |
| **220** | 2,1 | 2 | 0,15 | 12,5 | **23944 2CZ** | - |
| | 3 | 2,5 | 0,22 | 29 | **23044 2CZ** | **23044 K2CZ** |
| | 4 | 3 | 0,28 | 53,5 | **23144 2CZ** | **23144 K2CZ** |
| | 4 | 3 | 0,25 | 58 | **22244 2CZ** | **22244 K2CZ** |
| | 5 | 4 | 0,3 | 115 | **22344 2CZ** | **22344 K2CZ** |
| **240** | 3 | 2,5 | 0,21 | 32 | **23048 2CZ** | **23048 K2CZ** |
| | 4 | 3 | 0,28 | 66,5 | **23148 2CZ** | **23148 K2CZ** |
| **260** | 4 | 3 | 0,22 | 46 | **23052 2CZ** | **23052 K2CZ** |
| | 4 | 3 | 0,3 | 90,5 | **23152 2CZ** | **23152 K2CZ** |
| **280** | 5 | 4 | 0,28 | 97 | **23156 2CZ** | **23156 K2CZ** |
| **300** | 5 | 4 | 0,28 | 125 | **23160 2CZ** | **23160 K2CZ** |
| **320** | 5 | 4 | 0,3 | 165 | **23164 2CZ** | **23164 K2CZ** |
| **340** | 5 | 4 | 0,3 | 210 | **23168 2CZ** | **23168 K2CZ** |



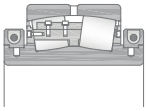

Sealed



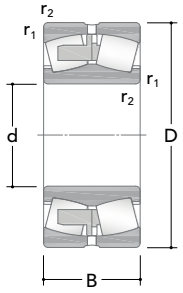

| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **360** | 600 | 192 | 4551 | 6922 | 488 | 190 | **23172** |
| **400** | 650 | 200 | 4785 | 7509 | 520 | 130 | **23180** |


WOR

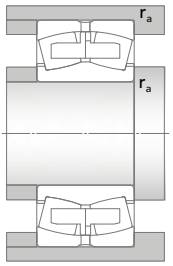

ECCS


SSRB

| Dimensions | | | Calculation factor e | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| **360** | 5 | 4 | 0,28 | 214 | **23172 2CZ** | **23172 K2CZ** |
| **400** | 6 | 5 | 0,28 | 255 | **23180 2CZ** | **23180 K2CZ** |




ROVSX

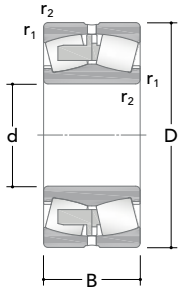



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **40** | 90 | 33 | 153 | 140 | 15 | 5400 | 7100 | **22308** |
| **45** | 100 | 36 | 187 | 183 | 19,6 | 4900 | 6300 | **22309** |
| **50** | 110 | 40 | 225 | 224 | 24 | 4300 | 5600 | **22310** |
| **55** | 120 | 43 | 279 | 279 | 29,9 | 3900 | 4800 | **22311** |
| **60** | 130 | 46 | 326 | 333 | 36,0 | 3600 | 4600 | **22312** |
| **65** | 140 | 48 | 361 | 353 | 37,3 | 3500 | 4300 | **22313** |
| **70** | 150 | 51 | 419 | 427 | 44,7 | 3100 | 3900 | **22314** |
| **75** | 160 | 55 | 470 | 474 | 47,9 | 3000 | 3800 | **22315** |
| **80** | 170 | 58 | 514 | 536 | 54,6 | 2800 | 3400 | **22316** |
| **85** | 180 | 60 | 586 | 617 | 60,7 | 2600 | 3400 | **22317** |
| **90** | 190 | 64 | 638 | 690 | 66,5 | 2400 | 3200 | **22318** |
| **95** | 200 | 67 | 693 | 762 | 73 | 2400 | 3000 | **22319** |
| **100** | 215 | 73 | 860 | 948 | 87,8 | 2200 | 2700 | **22320** |
| | 215 | 82,6 | 675 | 912 | 69,9 | 1800 | 2400 | **23320** |
| **110** | 240 | 80 | 985 | 1100 | 98,2 | 1800 | 2500 | **22322** |
| | 240 | 92,1 | 823 | 1100 | 87,6 | 1800 | 2300 | **23322** |
| **120** | 260 | 86 | 1030 | 1110 | 99,1 | 1850 | 2300 | **22324** |
| | 260 | 106 | 1000 | 1449 | 104 | 1500 | 2100 | **23324** |

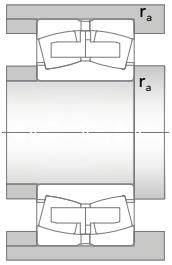


KROVSX

| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 40 | 1,5 | 1,5 | 0,37 | 1,05 | 22308 ROVSX | 22308 KROVSX |
| 45 | 1,5 | 1,5 | 0,37 | 1,4 | 22309 ROVSX | 22309 KROVSX |
| 50 | 2 | 2 | 0,37 | 1,9 | 22310 ROVSX | 22310 KROVSX |
| 55 | 2 | 2 | 0,35 | 2,45 | 22311 ROVSX | 22311 KROVSX |
| 60 | 2,1 | 2 | 0,35 | 3,1 | 22312 ROVSX | 22312 KROVSX |
| 65 | 2,1 | 2 | 0,35 | 3,75 | 22313 ROVSX | 22313 KROVSX |
| 70 | 2,1 | 2 | 0,33 | 4,55 | 22314 ROVSX | 22314 KROVSX |
| 75 | 2,1 | 2 | 0,35 | 5,55 | 22315 ROVSX | 22315 KROVSX |
| 80 | 2,1 | 2 | 0,35 | 6,6 | 22316 ROVSX | 22316 KROVSX |
| 85 | 3 | 2,5 | 0,33 | 7,65 | 22317 ROVSX | 22317 KROVSX |
| 90 | 3 | 2,5 | 0,33 | 9,05 | 22318 ROVSX | 22318 KROVSX |
| 95 | 3 | 2,5 | 0,33 | 10,5 | 22319 ROVSX | 22319 KROVSX |
| 100 | 3 | 2,5 | 0,33 | 13,5 | 22320 ROVSX | 22320 KROVSX |
| | 3 | 2,5 | 0,43 | 15,5 | 23320 ROVSX | 23320 KROVSX |
| 110 | 3 | 2,5 | 0,33 | 18,5 | 22322 ROVSX | 22322 KROVSX |
| | 3 | 2,5 | 0,43 | 21,3 | 23322 ROVSX | 23322 KROVSX |
| 120 | 3 | 2,5 | 0,35 | 23 | 22324 ROVSX | 22324 KROVSX |
| | 3 | 2,5 | 0,45 | 29,1 | 23324 ROVSX | 23324 KROVSX |




ROVSX




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **130** | 280 | 93 | 1178 | 1324 | 114 | 1650 | 2100 | **22326** |
| | 280 | 112 | 1160 | 1610 | 109 | 1450 | 1900 | **23326** |
| **140** | 300 | 102 | 1344 | 1540 | 130 | 1500 | 1900 | **22328** |
| | 300 | 118 | 1294 | 1812 | 124 | 1400 | 1700 | **23328** |
| **150** | 320 | 108 | 1523 | 1740 | 146 | 1500 | 1800 | **22330** |
| | 320 | 128 | 1470 | 2101 | 134 | 1350 | 1700 | **23330** |
| **160** | 340 | 114 | 1694 | 1950 | 160 | 1400 | 1700 | **22332** |
| | 340 | 136 | 1627 | 2336 | 153 | 1300 | 1700 | **23332** |
| **170** | 360 | 120 | 1894 | 2130 | 174 | 1300 | 1600 | **22334** |
| **180** | 380 | 126 | 2110 | 2420 | 191 | 1200 | 1500 | **22336** |
| **190** | 400 | 132 | 2267 | 2640 | 207 | 1100 | 1400 | **22338** |
| | 400 | 155 | 2156 | 3256 | 227 | 800 | 1200 | **23338** |
| **200** | 420 | 138 | 2450 | 2890 | 223 | 1100 | 1300 | **22340** |
| | 420 | 165 | 2493 | 3651 | 241 | 650 | 1150 | **23340** |
| **220** | 460 | 145 | 2834 | 3400 | 256 | 900 | 1200 | **22344** |
| **240** | 500 | 155 | 3194 | 3940 | 286 | 850 | 1150 | **22348** |



KROVSX

| Dimensions | | | Calculation factor | Mass | Designation | |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | e | | Cylindrical bore | Tapered bore |
| [mm] | | | | [kg] | | |
| 130 | 4 | 3 | 0,35 | 29 | 22326 ROVSX | 22327 KROVSX |
| | 4 | 3 | 0,45 | 34,2 | 23326 ROVSX | 23326 KROVSX |
| 140 | 4 | 3 | 0,35 | 36,5 | 22328 ROVSX | 22328 KROVSX |
| | 4 | 3 | 0,43 | 40,9 | 23328 ROVSX | 23328 KROVSX |
| 150 | 4 | 3 | 0,35 | 43,5 | 22330 ROVSX | 22330 KROVSX |
| | 4 | 3 | 0,44 | 49,8 | 23330 ROVSX | 23330 KROVSX |
| 160 | 4 | 3 | 0,35 | 52 | 22332 ROVSX | 22332 KROVSX |
| | 4 | 3 | 0,44 | 61,3 | 23332 ROVSX | 23332 KROVSX |
| 170 | 4 | 3 | 0,33 | 61 | 22334 ROVSX | 22334 KROVSX |
| 180 | 4 | 3 | 0,35 | 71,5 | 22336 ROVSX | 22336 KROVSX |
| 190 | 5 | 4 | 0,35 | 82,5 | 22338 ROVSX | 22338 KROVSX |
| | 5 | 4 | 0,43 | 97,1 | 23338 ROVSX | 23338 KROVSX |
| 200 | 5 | 4 | 0,33 | 95 | 22340 ROVSX | 22340 KROVSX |
| | 5 | 4 | 0,43 | 108 | 23340 ROVSX | 23340 KROVSX |
| 220 | 5 | 4 | 0,31 | 120 | 22344 ROVSX | 22344 KROVSX |
| 240 | 5 | 4 | 0,31 | 155 | 22348 ROVSX | 22348 KROVSX |



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RKB
BEARING INDUSTRIES
SWITZERLAND

# Toroidal roller bearings

The RKB toroidal roller bearings (TORB) are single row pure radial roller bearings featuring slim symmetrical barrel rollers, properly profiled to grant an uniform stress distribution, as well as a proper roller/raceway contact.

This proper pressure distribution along all the roller profile allow to control rolling friction and working temperature, keeping them at their minimum values. Consequently the lube film gap remains stable and the lubricant ageing process is reduced also, improving the application reliability.

According to the internal design RKB TORB bearings are conceived to be mounted as non-locating bearings, since they can face the thermal expansion along the shaft. RKB TORB bearings are manufactured offering the highest load rating capacities, improved internal geometry, high quality materials and special heat treatments for superior performance.



TORB bearings

## Internal clearance

TORB bearings are produced as standard with Normal radial internal clearance CN, but they are also available with C2, C3, C4 and C5 radial internal clearance.

The radial internal clearance are reported for bearing with:

- cylindrical bore in the **Tab. 5 page 615;**
- tapered bore in the **Tab. 6 page 616;**

and they are valid only for bearing unmounted, unloaded and without any axial displacement of one ring in respect to the other one.

Axial displacement of one ring in respect to the other one reduces gradually the radial internal clearance, but if the axial displacement is not generated by the shaft thermal expansion, the radial internal clearance will be lightly affected (see the following paragraph "Axial displacement").

TORB bearings are often used together with the spherical roller bearings and their radial internal clearance is slightly larger than the spherical roller bearings of the same size. In order to achieve approximatively the same operational clearance value of spherical roller bearing of the same size, it is required only an axial displacement between one ring in respect to the other one of 6 - 8 % of TORB bearing width.

## Misalignment

The internal design of the TORB bearings can accommodate a misalignment of approximatively 0.5° between inner ring and outer ring without affects negatively the bearing life. Greater misalignments increase the friction inside, so the bearing life will be negatively influenced. For additional information, please consult the RKB application engineering service.

In case of TORB bearing with brass cage guided on the inner ring, a misalignment value of 0.5° must not be exceeded. Also in application considered stationary, the value of the misalignment has to be reduced. Considering also that the axial displacement leads the rollers head to approach the ring faces, its reduction is suggested (please see the following axial displacement paragraph).

| d [mm] | | Radial internal clearance [µm] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | | C5 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. |
| 24 | 30 | 15 | 35 | 30 | 50 | 45 | 60 | 60 | 80 | 75 | 95 |
| 30 | 40 | 20 | 40 | 35 | 55 | 55 | 75 | 70 | 95 | 90 | 120 |
| 40 | 50 | 25 | 45 | 45 | 65 | 65 | 85 | 85 | 110 | 105 | 140 |
| 50 | 65 | 30 | 55 | 50 | 80 | 75 | 105 | 100 | 140 | 135 | 175 |
| 65 | 80 | 40 | 70 | 65 | 100 | 95 | 125 | 120 | 165 | 160 | 210 |
| 80 | 100 | 50 | 85 | 80 | 120 | 120 | 160 | 155 | 210 | 205 | 260 |
| 100 | 120 | 60 | 100 | 100 | 145 | 140 | 190 | 185 | 245 | 240 | 310 |
| 120 | 140 | 75 | 120 | 115 | 170 | 165 | 215 | 215 | 280 | 280 | 350 |
| 140 | 160 | 85 | 140 | 135 | 195 | 195 | 250 | 250 | 325 | 320 | 400 |
| 160 | 180 | 95 | 155 | 150 | 220 | 215 | 280 | 280 | 365 | 360 | 450 |
| 180 | 200 | 105 | 175 | 170 | 240 | 235 | 310 | 305 | 395 | 390 | 495 |
| 200 | 225 | 115 | 190 | 185 | 265 | 260 | 340 | 335 | 435 | 430 | 545 |
| 225 | 250 | 125 | 205 | 200 | 285 | 280 | 370 | 365 | 480 | 475 | 605 |
| 250 | 280 | 135 | 225 | 220 | 310 | 305 | 410 | 405 | 520 | 515 | 655 |
| 280 | 315 | 150 | 240 | 235 | 330 | 330 | 435 | 430 | 570 | 570 | 715 |
| 315 | 355 | 160 | 260 | 255 | 360 | 360 | 485 | 480 | 620 | 620 | 790 |
| 355 | 400 | 175 | 280 | 280 | 395 | 395 | 530 | 525 | 675 | 675 | 850 |
| 400 | 450 | 190 | 310 | 305 | 435 | 435 | 580 | 575 | 745 | 745 | 930 |
| 450 | 500 | 205 | 335 | 335 | 475 | 475 | 635 | 630 | 815 | 810 | 1 015 |
| 500 | 560 | 220 | 360 | 360 | 520 | 510 | 690 | 680 | 890 | 890 | 1 110 |
| 560 | 630 | 240 | 400 | 390 | 570 | 560 | 760 | 750 | 980 | 970 | 1 220 |
| 630 | 710 | 260 | 440 | 430 | 620 | 610 | 840 | 830 | 1 080 | 1 070 | 1 340 |
| 710 | 800 | 300 | 500 | 490 | 680 | 680 | 920 | 920 | 1 200 | 1 200 | 1 480 |
| 800 | 900 | 320 | 540 | 530 | 760 | 750 | 1 020 | 1 010 | 1 330 | 1 320 | 1 660 |
| 900 | 1 000 | 370 | 600 | 590 | 830 | 830 | 1 120 | 1 120 | 1 460 | 1 460 | 1 830 |
| 1 000 | 1 120 | 410 | 660 | 660 | 930 | 930 | 1 260 | 1 260 | 1 640 | 1 640 | 2 040 |
| 1 120 | 1 250 | 450 | 720 | 720 | 1 020 | 1 020 | 1 380 | 1 380 | 1 800 | 1 800 | 2 240 |
| 1 250 | 1 400 | 490 | 800 | 800 | 1 130 | 1 130 | 1 510 | 1 510 | 1 970 | 1 970 | 2 460 |
| 1 400 | 1 600 | 570 | 890 | 890 | 1 250 | 1 250 | 1 680 | 1 680 | 2 200 | 2 200 | 2 740 |
| 1 600 | 1 800 | 650 | 1 010 | 1 010 | 1 390 | 1 390 | 1 870 | 1 870 | 2 430 | 2 430 | 3 000 |

Tab. 5 - Radial internal clearance of TORB bearings with cylindrical bore

| d [mm] | | Radial internal clearance [µm] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C2 | | CN | | C3 | | C4 | | C5 | |
| over | incl. | min. | max. | min. | max. | min. | max. | min. | max. | min. | max. |
| 24 | 30 | 20 | 40 | 35 | 55 | 50 | 65 | 65 | 85 | 80 | 100 |
| 30 | 40 | 25 | 50 | 45 | 65 | 60 | 80 | 80 | 100 | 100 | 125 |
| 40 | 50 | 30 | 55 | 50 | 75 | 70 | 95 | 90 | 120 | 115 | 145 |
| 50 | 65 | 40 | 65 | 60 | 90 | 85 | 115 | 110 | 150 | 145 | 185 |
| 65 | 80 | 50 | 80 | 75 | 110 | 105 | 140 | 135 | 180 | 175 | 220 |
| 80 | 100 | 60 | 100 | 95 | 135 | 130 | 175 | 170 | 220 | 215 | 275 |
| 100 | 120 | 75 | 115 | 115 | 155 | 155 | 205 | 200 | 255 | 255 | 325 |
| 120 | 140 | 90 | 135 | 135 | 180 | 180 | 235 | 230 | 295 | 290 | 365 |
| 140 | 160 | 100 | 155 | 155 | 215 | 210 | 270 | 265 | 340 | 335 | 415 |
| 160 | 180 | 115 | 175 | 170 | 240 | 235 | 305 | 300 | 385 | 380 | 470 |
| 180 | 200 | 130 | 195 | 190 | 260 | 260 | 330 | 325 | 420 | 415 | 520 |
| 200 | 225 | 140 | 215 | 210 | 290 | 285 | 365 | 360 | 460 | 460 | 575 |
| 225 | 250 | 160 | 235 | 235 | 315 | 315 | 405 | 400 | 515 | 510 | 635 |
| 250 | 280 | 170 | 260 | 255 | 345 | 340 | 445 | 440 | 560 | 555 | 695 |
| 280 | 315 | 195 | 285 | 280 | 380 | 375 | 485 | 480 | 620 | 615 | 765 |
| 315 | 355 | 220 | 320 | 315 | 420 | 415 | 545 | 540 | 680 | 675 | 850 |
| 355 | 400 | 250 | 350 | 350 | 475 | 470 | 600 | 595 | 755 | 755 | 920 |
| 400 | 450 | 280 | 385 | 380 | 525 | 525 | 655 | 650 | 835 | 835 | 1 005 |
| 450 | 500 | 305 | 435 | 435 | 575 | 575 | 735 | 730 | 915 | 910 | 1 115 |
| 500 | 560 | 330 | 480 | 470 | 640 | 630 | 810 | 800 | 1 010 | 1 000 | 1 230 |
| 560 | 630 | 380 | 530 | 530 | 710 | 700 | 890 | 880 | 1 110 | 1 110 | 1 350 |
| 630 | 710 | 420 | 590 | 590 | 780 | 770 | 990 | 980 | 1 230 | 1 230 | 1 490 |
| 710 | 800 | 480 | 680 | 670 | 860 | 860 | 1 100 | 1 100 | 1 380 | 1 380 | 1 660 |
| 800 | 900 | 520 | 740 | 730 | 960 | 950 | 1 220 | 1 210 | 1 530 | 1 520 | 1 860 |
| 900 | 1 000 | 580 | 820 | 810 | 1 040 | 1 040 | 1 340 | 1 340 | 1 670 | 1 670 | 2 050 |
| 1 000 | 1 120 | 640 | 900 | 890 | 1 170 | 1 160 | 1 500 | 1 490 | 1 880 | 1 870 | 2 280 |
| 1 120 | 1 250 | 700 | 980 | 970 | 1 280 | 1 270 | 1 640 | 1 630 | 2 060 | 2 050 | 2 500 |
| 1 250 | 1 400 | 770 | 1 080 | 1 080 | 1 410 | 1 410 | 1 790 | 1 780 | 2 250 | 2 250 | 2 740 |
| 1 400 | 1 600 | 870 | 1 200 | 1 200 | 1 550 | 1 550 | 1 990 | 1 990 | 2 500 | 2 500 | 3 050 |
| 1 600 | 1 800 | 950 | 1 320 | 1 320 | 1 690 | 1 690 | 2 180 | 2 180 | 2 730 | 2 730 | 3 310 |

Tab. 6 - Radial internal clearance of TORB bearings with tapered bore

## Axial displacement

The internal design of the TORB bearings can accommodate axial displacements between inner rings and outer rings, which can be generated by a thermal expansion or its deviation from a determinate position. Any misalignment or axial displacement reduces the bearing radial internal clearance. In order to accommodate the axial displacement it is necessary a defined space on both bearing sides and that the rollers must remaining inside the bearing raceways without touching eventual seals or locking rings.

With this axial displacement the bearing radial internal clearance decreases and it is important that it remains acceptable for the application. The maximum value of the axial displacement from the normal position of one ring relative to the other one has to be the lower among:

- the clearance reduction,
- the axial displacement of the rollers.

For additional information, please consult the RKB application engineering service.

## Minimum load

A minimum radial load is requested for a TORB bearing, like for all ball and roller bearings, in order to guarantee the correct functioning condition, especially in particularly difficult working conditions: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. Minimum radial load for TORB bearing with/ without cage can be theoretically estimated using this formula:

$$\frac{F_{rm}}{C_0} > 0{,}023$$

Where:

- $F_{rm}$ minimum radial load, [kN];
- $C_0$ basic static radial load, [kN].

Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing and the loads acting on it, otherwise supplementary radial load must be applied on the TORB bearing.

## Mounting prescription

Since the RKB toroidal roller bearings are pure radial, both inner and outer rings have to be axially located on both sides. On the other hand during handling of toroidal roller bearings the rings and the rollers can be displaced from their nominal position, thus it is highly suggested to mount the bearings featuring housing and shaft in horizontal position, rotating one of the rings to rearrange the roller elements in their nominal position.

## Internal clearance and axial drive-up for TORB bearings with tapered bore

Specific and recommended values for radial internal clearance reduction and axial drive-up can be provided upon request. However, in the following table (**Tab. 7 page 618**) is reported radial internal clearance reduction for general application, featuring solid steel shaft or hallow shaft with internal bore diameter lower than shaft diameter.

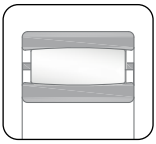
For additional information please consult the RKB application engineering services.

| Bore diameter d [mm] | | Radial internal clearance reduction [mm] | | Minimum radial internal clearance after mounting | | |
|---|---|---|---|---|---|---|
| | | | | CN | C3 | C4 |
| | | | | min. | min. | min. |
| over | incl. | min. | max. | [mm] | [mm] | [mm] |
| 24 | 30 | 0,010 | 0,017 | 0,025 | 0,035 | 0,048 |
| 30 | 40 | 0,014 | 0,021 | 0,031 | 0,041 | 0,059 |
| 40 | 50 | 0,018 | 0,028 | 0,033 | 0,046 | 0,062 |
| 50 | 65 | 0,024 | 0,035 | 0,036 | 0,054 | 0,075 |
| 65 | 80 | 0,030 | 0,046 | 0,045 | 0,065 | 0,090 |
| 80 | 100 | 0,040 | 0,056 | 0,056 | 0,080 | 0,114 |
| 100 | 120 | 0,049 | 0,069 | 0,066 | 0,093 | 0,131 |
| 120 | 140 | 0,060 | 0,083 | 0,075 | 0,105 | 0,147 |
| 140 | 160 | 0,072 | 0,095 | 0,083 | 0,123 | 0,170 |
| 160 | 180 | 0,081 | 0,107 | 0,089 | 0,137 | 0,193 |
| 180 | 200 | 0,090 | 0,121 | 0,100 | 0,150 | 0,204 |
| 200 | 225 | 0,101 | 0,134 | 0,109 | 0,162 | 0,226 |
| 225 | 250 | 0,113 | 0,151 | 0,123 | 0,177 | 0,249 |
| 250 | 280 | 0,126 | 0,168 | 0,129 | 0,186 | 0,273 |
| 280 | 315 | 0,142 | 0,188 | 0,138 | 0,203 | 0,292 |
| 315 | 355 | 0,160 | 0,211 | 0,155 | 0,221 | 0,329 |
| 355 | 400 | 0,180 | 0,238 | 0,170 | 0,251 | 0,357 |
| 400 | 450 | 0,203 | 0,268 | 0,178 | 0,279 | 0,382 |
| 450 | 500 | 0,225 | 0,300 | 0,210 | 0,300 | 0,430 |
| 500 | 560 | 0,250 | 0,335 | 0,220 | 0,325 | 0,465 |
| 560 | 630 | 0,285 | 0,375 | 0,245 | 0,355 | 0,505 |
| 630 | 710 | 0,320 | 0,420 | 0,270 | 0,380 | 0,560 |
| 710 | 800 | 0,360 | 0,475 | 0,310 | 0,425 | 0,625 |
| 800 | 900 | 0,405 | 0,535 | 0,325 | 0,460 | 0,675 |
| 900 | 1000 | 0,450 | 0,605 | 0,360 | 0,490 | 0,735 |
| 1000 | 1120 | 0,505 | 0,670 | 0,385 | 0,545 | 0,820 |
| 1120 | 1250 | 0,565 | 0,750 | 0,410 | 0,580 | 0,880 |
| 1250 | 1400 | 0,630 | 0,840 | 0,450 | 0,640 | 0,940 |
| 1400 | 1600 | 0,720 | 0,940 | 0,480 | 0,685 | 1,050 |
| 1600 | 1800 | 0,810 | 1,070 | 0,510 | 0,705 | 1,110 |

Tab. 7 - Radial internal clearance reduction of toroidal roller bearings with tapered bore

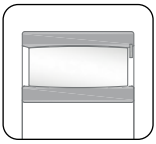
## Designs and variants

### Type J




- Non-separable compact design
- Can be used only in a non-locating position
- Available with tapered and cylindrical bore
- Very high self-aligning and axial displacement properties
- The radial internal clearance depends on the rings axial relative position

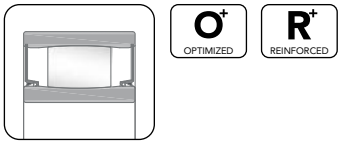
### Type V




- Non-separable compact design
- Can be used only in a non-locating position
- Available with tapered and cylindrical bore
- Very high self-aligning and axial displacement properties
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Asymmetrical permissible axial displacement (limited in snap ring side)

## Special designs and variants

### Sealed type

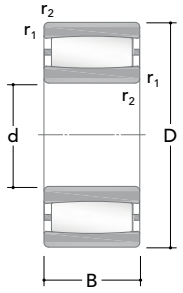



- Non-separable compact design
- Can be used only in a non-locating position
- High self-aligning and axial displacement properties
- Full complement (cageless) design
- Integral rubber seals on both bearing sides for harsh working conditions
- Supplied already filled with grease for maintenance free operations

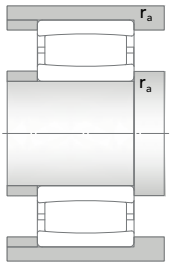
| Prefixes | Basic designation |
|---|---|
| TORB | Toroidal roller bearing followed by size indication or drawing number |
| SB | Toroidal roller bearing followed by size indication or drawing number |

| Suffixes | Cage |
|---|---|
| V | Full complement of rolling elements (without cage) |
| J | Pressed steel cage |

| Suffixes | External design |
|---|---|
| 2CS | NBR seal on both sides |
| FF | FKM seal on both sides |
| K | Tapered bore, taper 1:12 |
| K30 | Tapered bore, taper 1:30 |



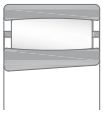

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **25** | 52 | 18 | 42,6 | 39,5 | 4,6 | 13300 | 16200 | **TORB 2205** |
| | 52 | 18 | 48,2 | 48,2 | 5,6 | - | 6200 | **TORB 2205** |
| **30** | 55 | 45 | 129 | 178 | 20,8 | - | 2800 | **TORB 6006** |
| | 62 | 20 | 67,4 | 60,8 | 7,1 | 11100 | 13500 | **TORB 2206** |
| | 62 | 20 | 74,7 | 70 | 8,3 | - | 5300 | **TORB 2206** |
| **35** | 72 | 23 | 81,3 | 79,2 | 9,4 | 9200 | 11600 | **TORB 2207** |
| | 72 | 23 | 92,8 | 94,7 | 11,2 | - | 4800 | **TORB 2207** |
| **40** | 62 | 22 | 73,6 | 99,2 | 11,9 | - | 3800 | **TORB 4908** |
| | 62 | 30 | 102 | 142 | 16,1 | - | 3100 | **TORB 5908** |
| | 62 | 40 | 118 | 180 | 21,2 | - | 2500 | **TORB 6908** |
| | 80 | 23 | 86,7 | 85,9 | 10,3 | 7900 | 9700 | **TORB 2208** |
| | 80 | 23 | 98,2 | 103 | 12,3 | - | 4000 | **TORB 2208** |
| **45** | 68 | 22 | 79 | 111 | 13,3 | - | 3400 | **TORB 4909** |
| | 68 | 30 | 106 | 162 | 18,4 | - | 2800 | **TORB 5909** |
| | 68 | 40 | 127 | 197 | 23,6 | - | 2300 | **TORB 6909** |
| | 85 | 23 | 89,5 | 91,4 | 10,8 | 7400 | 9800 | **TORB 2209** |
| | 85 | 23 | 102 | 109 | 13,0 | - | 3800 | **TORB 2209** |
| **50** | 72 | 22 | 83,6 | 125 | 14,6 | - | 3200 | **TORB 4910** |
| | 72 | 30 | 110 | 173 | 20,8 | - | 2500 | **TORB 5910** |
| | 72 | 40 | 135 | 220 | 25,7 | - | 2100 | **TORB 6910** |
| | 80 | 30 | 112 | 138 | 16,1 | 5700 | 6600 | **TORB 4010** |
| | 80 | 30 | 133 | 174 | 21,0 | - | 2700 | **TORB 4010** |
| | 90 | 23 | 95,1 | 99,1 | 11,9 | 7100 | 8500 | **TORB 2210** |
| | 90 | 23 | 111 | 122 | 14,3 | - | 3400 | **TORB 2210** |
| **55** | 80 | 25 | 103 | 151 | 17,8 | - | 2800 | **TORB 4911** |
| | 80 | 34 | 138 | 221 | 25,3 | - | 2300 | **TORB 5911** |
| | 80 | 45 | 173 | 295 | 35,5 | - | 1900 | **TORB 6911** |

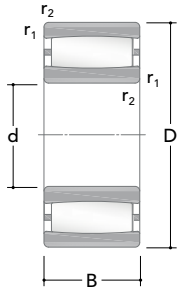


V

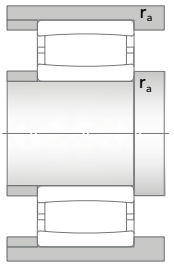


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 25 | 1 | 1 | 0,17 | TORB 2205 | TORB 2205 K |
| | 1 | 1 | 0,18 | TORB 2205 V | TORB 2205 KV |
| 30 | 1 | 1 | 0,49 | TORB 6006 V | - |
| | 1 | 1 | 0,28 | TORB 2206 | TORB 2206 K |
| | 1 | 1 | 0,29 | TORB 2206 V | TORB 2206 KV |
| 35 | 1,1 | 1 | 0,44 | TORB 2207 | TORB 2207 K |
| | 1,1 | 1 | 0,46 | TORB 2207 V | TORB 2207 KV |
| 40 | 0,6 | 0,6 | 0,25 | TORB 4908 V | TORB 4908 K30V |
| | 0,6 | 0,6 | 0,35 | TORB 5908 V | - |
| | 0,6 | 0,6 | 0,45 | TORB 6908 V | - |
| | 1,1 | 1 | 0,51 | TORB 2208 | TORB 2208 K |
| | 1,1 | 1 | 0,53 | TORB 2208 V | TORB 2208 KV |
| 45 | 0,6 | 0,6 | 0,29 | TORB 4909 V | TORB 4909 K30V |
| | 0,6 | 0,6 | 0,41 | TORB 5909 V | - |
| | 0,6 | 0,6 | 0,53 | TORB 6909 V | - |
| | 1,1 | 1 | 0,56 | TORB 2209 | TORB 2209 K |
| | 1,1 | 1 | 0,58 | TORB 2209 V | TORB 2209 KV |
| 50 | 0,6 | 0,6 | 0,29 | TORB 4910 V | TORB 4910 K30V |
| | 0,6 | 0,6 | 0,41 | TORB 5910 V | - |
| | 0,6 | 0,6 | 0,54 | TORB 6910 V | - |
| | 1 | 1 | 0,55 | TORB 4010 | TORB 4010 K30 |
| | 1 | 1 | 0,58 | TORB 4010 V | TORB 4010 K30V |
| | 1,1 | 1 | 0,6 | TORB 2210 | TORB 2210 K |
| | 1,1 | 1 | 0,63 | TORB 2210 V | TORB 2210 KV |
| 55 | 1,5 | 1,5 | 0,42 | TORB 4911 V | TORB 4911 K30V |
| | 1 | 1 | 0,6 | TORB 5911 V | - |
| | 1 | 1 | 0,78 | TORB 6911 V | - |



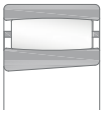

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **55** | 100 | 25 | 112 | 112 | 13,3 | 6400 | 8100 | **TORB 2211** |
| (cont.) | 100 | 25 | 128 | 132 | 15,8 | - | 3000 | **TORB 2211** |
| **60** | 85 | 25 | 109 | 169 | 19,7 | - | 2700 | **TORB 4912** |
| | 85 | 34 | 144 | 236 | 26,2 | - | 2100 | **TORB 5912** |
| | 110 | 28 | 140 | 154 | 17,9 | 5800 | 6800 | **TORB 2212** |
| | 110 | 28 | 160 | 188 | 22,6 | - | 2500 | **TORB 2212** |
| **65** | 90 | 25 | 113 | 179 | 20,9 | - | 2500 | **TORB 4913** |
| | 90 | 34 | 150 | 258 | 30,7 | - | 1900 | **TORB 5913** |
| | 90 | 45 | 191 | 352 | 41,9 | - | 1600 | **TORB 6913** |
| | 100 | 35 | 187 | 297 | 32,8 | - | 2200 | **TORB 4013** |
| | 120 | 31 | 173 | 179 | 21,3 | 5400 | 6800 | **TORB 2213** |
| | 120 | 31 | 197 | 215 | 25,6 | - | 2100 | **TORB 2213** |
| **70** | 100 | 30 | 157 | 160 | 28,0 | - | 2300 | **TORB 4914** |
| | 100 | 40 | 192 | 307 | 36,9 | - | 1800 | **TORB 5914** |
| | 100 | 54 | 259 | 449 | 48,0 | - | 1500 | **TORB 6914** |
| | 125 | 31 | 181 | 193 | 22,8 | 4900 | 6200 | **TORB 2214** |
| | 125 | 31 | 204 | 226 | 26,7 | - | 2200 | **TORB 2214** |
| | 150 | 51 | 395 | 428 | 49,2 | 3800 | 4500 | **TORB 2314** |
| **75** | 105 | 30 | 160 | 253 | 30,2 | - | 2100 | **TORB 4915** |
| | 105 | 40 | 200 | 321 | 38,0 | - | 1700 | **TORB 5915** |
| | 105 | 54 | 199 | 321 | 37,9 | - | 1700 | **TORB 6915** |
| | 115 | 40 | 201 | 340 | 40,5 | - | 1800 | **TORB 4015** |
| | 130 | 31 | 190 | 208 | 24,0 | 4900 | 5900 | **TORB 2215** |
| | 130 | 31 | 215 | 237 | 28,3 | - | 2000 | **TORB 2215** |
| | 160 | 55 | 416 | 464 | 52,1 | 3500 | 4200 | **TORB 2315** |
| **80** | 110 | 30 | 169 | 274 | 32,1 | - | 2000 | **TORB 4916** |
| | 110 | 40 | 204 | 341 | 39,7 | - | 1600 | **TORB 5916** |

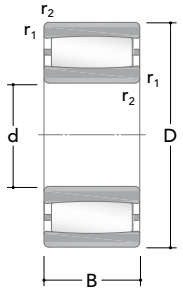


V

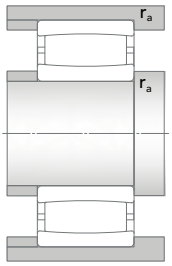


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 55 | 1,5 | 1,5 | 0,8 | TORB 2211 | TORB 2211 K |
| (cont.) | 1,5 | 1,5 | 0,82 | TORB 2211 V | TORB 2211 KV |
| 60 | 1 | 1 | 0,46 | TORB 4912 V | TORB 4912 K30V |
| | 1 | 1 | 0,64 | TORB 5912 V | - |
| | 1,5 | 1,5 | 1,1 | TORB 2212 | TORB 2212 K |
| | 1,5 | 1,5 | 1,15 | TORB 2212 V | TORB 2212 KV |
| 65 | 1 | 1 | 0,5 | TORB 4913 V | TORB 4913 K30V |
| | 1 | 1 | 0,68 | TORB 5913 V | - |
| | 1 | 1 | 0,9 | TORB 6913 V | - |
| | 1,1 | 1 | 1,05 | TORB 4013 V | TORB 4013 K30V |
| | 1,5 | 1,5 | 1,45 | TORB 2213 | TORB 2213 K |
| | 1,5 | 1,5 | 1,5 | TORB 2213 V | TORB 2213 KV |
| 70 | 1 | 1 | 0,78 | TORB 4914 V | TORB 4914 K30V |
| | 1 | 1 | 1 | TORB 5914 V | - |
| | 1 | 1 | 1,4 | TORB 6914 V | - |
| | 1,5 | 1,5 | 1,5 | TORB 2214 | TORB 2214 K |
| | 1,5 | 1,5 | 1,55 | TORB 2214 V | TORB 2214 KV |
| | 2,1 | 2 | 4,3 | TORB 2314 | TORB 2314 K |
| 75 | 1 | 1 | 0,82 | TORB 4915 V | TORB 4915 K30V |
| | 1 | 1 | 1,1 | TORB 5915 V | - |
| | 1 | 1 | 1,4 | TORB 6915 V | - |
| | 1,1 | 1 | 1,6 | TORB 4015 V | TORB 4015 K30V |
| | 1,5 | 1,5 | 1,6 | TORB 2215 | TORB 2215 K |
| | 1,5 | 1,5 | 1,65 | TORB 2215 V | TORB 2215 KV |
| | 2,1 | 2 | 5,3 | TORB 2315 | TORB 2315 K |
| 80 | 1 | 1 | 0,86 | TORB 4916 V | TORB 4916 K30V |
| | 1 | 1 | 1,15 | TORB 5916 V | - |



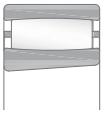

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **80** | 140 | 33 | 212 | 246 | 28,8 | 4200 | 5300 | **TORB 2216** |
| (cont.) | 140 | 33 | 246 | 300 | 33,8 | - | 1800 | **TORB 2216** |
| | 170 | 58 | 495 | 550 | 60,0 | 3500 | 4100 | **TORB 2316** |
| **85** | 120 | 35 | 217 | 351 | 39,7 | - | 1800 | **TORB 4917** |
| | 120 | 46 | 265 | 463 | 52,2 | - | 1500 | **TORB 5917** |
| | 150 | 36 | 264 | 314 | 35,9 | 3900 | 5000 | **TORB 2217** |
| | 150 | 36 | 307 | 388 | 43,2 | - | 1600 | **TORB 2217** |
| | 180 | 60 | 523 | 599 | 64,1 | 3200 | 3800 | **TORB 2317** |
| **90** | 125 | 35 | 181 | 313 | 35,7 | - | 1800 | **TORB 4918** |
| | 125 | 46 | 187 | 324 | 37,6 | 2700 | 3500 | **TORB 5918** |
| | 125 | 46 | 217 | 399 | 45,6 | - | 1400 | **TORB 5918** |
| | 160 | 40 | 312 | 373 | 41,9 | 3800 | 4700 | **TORB 2218** |
| | 160 | 40 | 352 | 433 | 47,5 | - | 1400 | **TORB 2218** |
| | 190 | 64 | 588 | 690 | 74,0 | 2900 | 3500 | **TORB 2318** |
| **95** | 170 | 43 | 316 | 373 | 41,1 | 3900 | 4800 | **TORB 2219** |
| | 200 | 67 | 587 | 683 | 73,5 | 2900 | 3600 | **TORB 2319** |
| **100** | 140 | 40 | 233 | 447 | 50,5 | - | 1600 | **TORB 4920** |
| | 140 | 54 | 362 | 636 | 68,4 | - | 1200 | **TORB 5920** |
| | 150 | 50 | 345 | 520 | 58,5 | - | 1300 | **TORB 4020** |
| | 150 | 67 | 492 | 860 | 95,6 | - | 1000 | **TORB 5020** |
| | 165 | 52 | 462 | 651 | 71,4 | - | 1200 | **TORB 3120** |
| | 165 | 65 | 460 | 653 | 71,2 | - | 1200 | **TORB 4120** |
| | 180 | 46 | 406 | 464 | 69,6 | 3500 | 4300 | **TORB 2220** |
| | 215 | 73 | 774 | 869 | 26,2 | 2600 | 3200 | **TORB 2320** |
| **110** | 170 | 45 | 341 | 471 | 51,0 | 3200 | 4000 | **TORB 3022** |
| | 170 | 60 | 416 | 653 | 69,7 | 2500 | 3100 | **TORB 4022** |
| | 170 | 60 | 490 | 800 | 85,0 | - | 1100 | **TORB 4022** |

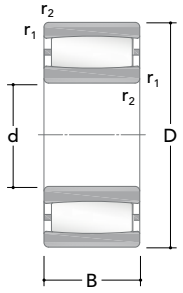


V

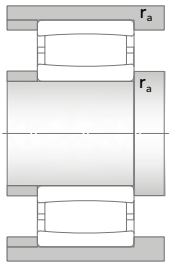


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 80 | 2 | 2 | 2,05 | TORB 2216 | TORB 2216 K |
| (cont.) | 2 | 2 | 2,15 | TORB 2216 V | TORB 2216 KV |
| | 2,1 | 2 | 6,3 | TORB 2316 | TORB 2316 K |
| 85 | 1,1 | 1 | 1,3 | TORB 4917 V | TORB 4917 K30V |
| | 1,1 | 1 | 1,7 | TORB 5917 V | - |
| | 2 | 2 | 2,65 | TORB 2217 | TORB 2217 K |
| | 2 | 2 | 2,8 | TORB 2217 V | TORB 2217 KV |
| | 3 | 2,5 | 7,4 | TORB 2317 | TORB 2317 K |
| 90 | 1,1 | 1 | 1,3 | TORB 4918 V | TORB 4918 K30V |
| | 1,1 | 1 | 1,75 | TORB 5918 | - |
| | 1,1 | 1 | 1,75 | TORB 5918 V | - |
| | 2 | 2 | 3,3 | TORB 2218 | TORB 2218 K |
| | 2 | 2 | 3,45 | TORB 2218 V | TORB 2218 KV |
| | 3 | 2,5 | 8,65 | TORB 2318 | TORB 2318 K |
| 95 | 2,1 | 2 | 4,1 | TORB 2219 | TORB 2219 K |
| | 3 | 2,5 | 10 | TORB 2319 | TORB 2319 K |
| 100 | 1,1 | 1 | 2,05 | TORB 4920 V | TORB 4920 K30V |
| | 1,1 | 1 | 2,7 | TORB 5920 V | - |
| | 1,5 | 1,5 | 3,05 | TORB 4020 V | TORB 4020 K30V |
| | 1,5 | 1,5 | 4,3 | TORB 5020 V | - |
| | 2 | 2 | 4,45 | TORB 3120 V | TORB 3120 KV |
| | 2 | 2 | 5,3 | TORB 4120 V | TORB 4120 K30V |
| | 2,1 | 2 | 4,95 | TORB 2220 | TORB 2220 K |
| | 3 | 2,5 | 12,5 | TORB 2320 | TORB 2320 K |
| 110 | 2 | 2 | 3,6 | TORB 3022 | TORB 3022 K |
| | 2 | 2 | 5,3 | TORB 4022 | TORB 4022 K30 |
| | 2 | 2 | 5,2 | TORB 4022 V | TORB 4022 K30V |



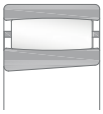

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| 110 | 180 | 69 | 652 | 984 | 102 | - | 800 | TORB 4122 |
| (cont.) | 200 | 53 | 510 | 609 | 64,6 | 3300 | 3900 | TORB 2222 |
| 120 | 180 | 46 | 364 | 520 | 53,9 | 3000 | 3800 | TORB 3024 |
| | 180 | 46 | 418 | 628 | 66,2 | - | 1200 | TORB 3024 |
| | 180 | 60 | 419 | 630 | 92,4 | - | 1200 | TORB 4024 |
| | 180 | 60 | 514 | 870 | 48,2 | - | 1200 | TORB 4024 |
| | 200 | 80 | 758 | 1090 | 112 | - | 700 | TORB 4124 |
| | 215 | 58 | 591 | 702 | 69,6 | 2800 | 3600 | TORB 2224 |
| | 215 | 76 | 734 | 968 | 99,0 | 2400 | 2800 | TORB 3224 |
| 130 | 200 | 52 | 381 | 577 | 58,5 | 2800 | 3400 | TORB 3026 |
| | 200 | 69 | 603 | 913 | 92,1 | 2200 | 2500 | TORB 4026 |
| | 200 | 69 | 702 | 1110 | 113 | - | 800 | TORB 4026 |
| | 210 | 80 | 727 | 1090 | 111 | - | 700 | TORB 4126 |
| | 230 | 64 | 707 | 922 | 92,3 | 2700 | 3300 | TORB 2226 |
| 140 | 210 | 53 | 480 | 727 | 72,7 | 2700 | 3000 | TORB 3028 |
| | 210 | 69 | 723 | 1210 | 121 | - | 700 | TORB 4028 |
| | 225 | 85 | 762 | 1180 | 115 | - | 700 | TORB 4128 |
| | 250 | 68 | 801 | 1040 | 101 | 2300 | 2900 | TORB 2228 |
| 150 | 225 | 56 | 519 | 833 | 79,9 | 2300 | 2800 | TORB 3030 |
| | 225 | 56 | 564 | 955 | 93,5 | - | 900 | TORB 3030 |
| | 225 | 75 | 751 | 1310 | 128 | - | 700 | TORB 4030 |
| 150 | 250 | 80 | 860 | 1270 | 122 | 2000 | 2500 | TORB 3130 |
| | 250 | 100 | 1180 | 1840 | 176 | - | 400 | TORB 4130 |
| | 270 | 73 | 949 | 1200 | 115 | 2400 | 2800 | TORB 2230 |
| 160 | 240 | 60 | 587 | 978 | 93,2 | 2200 | 2600 | TORB 3032 |
| | 240 | 80 | 736 | 1130 | 109 | 1600 | 2200 | TORB 4032 |

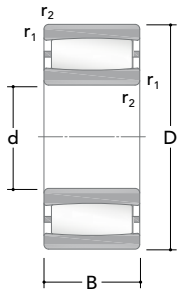


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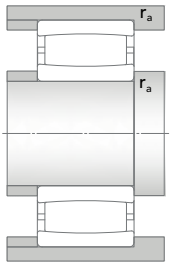


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 110 | 2 | 2 | 7,1 | TORB 4122 V | TORB 4122 K30V |
| (cont.) | 2,1 | 2 | 7 | TORB 2222 | TORB 2222 K |
| 120 | 2 | 2 | 3,95 | TORB 3024 | TORB 3024 K |
| | 2 | 2 | 4,1 | TORB 3024 V | TORB 3024 KV |
| | 2 | 2 | 5,05 | TORB 4024 | TORB 4024 K30 |
| | 2 | 2 | 5,55 | TORB 4024 V | TORB 4024 K30V |
| | 2 | 2 | 10 | TORB 4124 V | TORB 4124 K30V |
| | 2,1 | 2 | 8,65 | TORB 2224 | TORB 2224 K |
| | 2,1 | 2 | 12 | TORB 3224 | TORB 3224 K |
| 130 | 2 | 2 | 5,9 | TORB 3026 | TORB 3026 K |
| | 2 | 2 | 7,85 | TORB 4026 | TORB 4026 K30 |
| | 2 | 2 | 8,15 | TORB 4026 V | TORB 4026 K30V |
| | 2 | 2 | 10,5 | TORB 4126 V | TORB 4126 K30V |
| | 3 | 2,5 | 11,5 | TORB 2226 | TORB 2226 K |
| 140 | 2 | 2 | 6,3 | TORB 3028 | TORB 3028 K |
| | 2 | 2 | 8,6 | TORB 4028 V | TORB 4028 K30V |
| | 2,1 | 2 | 12,5 | TORB 4128 V | TORB 4128 K30V |
| | 3 | 2,5 | 14 | TORB 2228 | TORB 2228 K |
| 150 | 2,1 | 2 | 8,45 | TORB 3030 | TORB 3030 K |
| | 2,1 | 2 | 8 | TORB 3030 V | TORB 3030 KV |
| | 2,1 | 2 | 10,5 | TORB 4030 V | TORB 4030 K30V |
| 150 | 2,1 | 2 | 15,5 | TORB 3130 | TORB 3130 K |
| | 2,1 | 2 | 20 | TORB 4130 V | TORB 4130 K30V |
| | 3 | 2,5 | 18 | TORB 2230 | TORB 2230 K |
| 160 | 2,1 | 2 | 9,6 | TORB 3032 | TORB 3032 K |
| | 2,1 | 2 | 12,5 | TORB 4032 | TORB 4032 K30 |

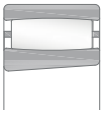



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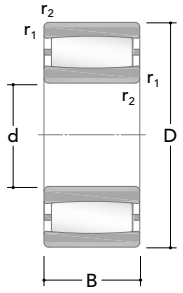



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **160** | 240 | 80 | 895 | 1440 | 137 | - | 500 | **TORB 4032** |
| (cont.) | 270 | 86 | 967 | 1380 | 130 | 1900 | 2300 | **TORB 3132** |
| | 270 | 109 | 1410 | 2150 | 201 | - | 300 | **TORB 4132** |
| | 290 | 104 | 1330 | 1790 | 172 | 1800 | 2100 | **TORB 3232** |
| **170** | 260 | 67 | 727 | 1140 | 99 | 2100 | 2500 | **TORB 3034** |
| | 260 | 90 | 1110 | 1850 | 174 | - | 500 | **TORB 4034** |
| | 280 | 88 | 1010 | 1450 | 138 | 1800 | 2300 | **TORB 3134** |
| | 280 | 109 | 1490 | 2270 | 209 | - | 300 | **TORB 4134** |
| | 310 | 86 | 1240 | 1610 | 145 | 1900 | 2300 | **TORB 2234** |
| **180** | 280 | 74 | 846 | 1310 | 120 | 1900 | 2300 | **TORB 3036** |
| | 280 | 100 | 1290 | 2110 | 197 | - | 400 | **TORB 4036** |
| | 300 | 96 | 1200 | 1720 | 157 | 1700 | 2200 | **TORB 3136** |
| | 300 | 118 | 1700 | 2660 | 238 | - | 200 | **TORB 4136** |
| | 320 | 112 | 1480 | 2190 | 194 | 1500 | 1800 | **TORB 3236** |
| **190** | 290 | 75 | 899 | 1450 | 133 | 1700 | 2200 | **TORB 3038** |
| | 290 | 100 | 1310 | 2300 | 210 | - | 300 | **TORB 4038** |
| | 320 | 104 | 1630 | 2500 | 192 | - | 200 | **TORB 3138** |
| | 320 | 128 | 1970 | 3130 | 277 | - | 100 | **TORB 4138** |
| | 340 | 92 | 1310 | 1700 | 155 | 1700 | 2100 | **TORB 2238** |
| **200** | 310 | 82 | 1080 | 1700 | 153 | 1700 | 2100 | **TORB 3040** |
| | 310 | 109 | 1560 | 2600 | 231 | - | 200 | **TORB 4040** |
| | 340 | 112 | 1560 | 2290 | 196 | 1500 | 1800 | **TORB 3140** |
| | 340 | 140 | 2260 | 3610 | 318 | - | 100 | **TORB 4140** |
| **220** | 340 | 90 | 1280 | 2020 | 178 | 1600 | 1900 | **TORB 3044** |
| | 340 | 118 | 1860 | 3230 | 277 | - | 200 | **TORB 4044** |
| | 370 | 120 | 1820 | 2840 | 245 | 1400 | 1600 | **TORB 3144** |
| | 400 | 108 | 1930 | 2490 | 209 | 1500 | 1800 | **TORB 2244** |

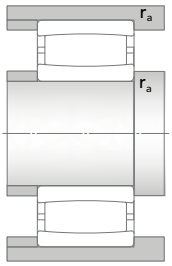

V


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 160 | 2,1 | 2 | 13 | TORB 4032 V | TORB 4032 K30V |
| (cont.) | 2,1 | 2 | 21,5 | TORB 3132 | TORB 3132 K |
| | 2,1 | 2 | 26 | TORB 4132 V | TORB 4132 K30V |
| | 3 | 2,5 | 29,5 | TORB 3232 | TORB 3232 K |
| 170 | 2,1 | 2 | 12,5 | TORB 3034 | TORB 3034 K |
| | 2,1 | 2 | 17,5 | TORB 4034 V | TORB 4034 K30V |
| | 2,1 | 2 | 21 | TORB 3134 | TORB 3134 K |
| | 2,1 | 2 | 27 | TORB 4134 V | TORB 4134 K30V |
| | 4 | 3 | 28 | TORB 2234 | TORB 2234 K |
| 180 | 2,1 | 2 | 17 | TORB 3036 | TORB 3036 K |
| | 2,1 | 2 | 23,5 | TORB 4036 V | TORB 4036 K30 |
| | 3 | 2,5 | 26,5 | TORB 3136 | TORB 3136 K |
| | 3 | 2,5 | 34,5 | TORB 4136 V | TORB 4136 K30 |
| | 4 | 3 | 38 | TORB 3236 | TORB 3236 K |
| 190 | 2,1 | 2 | 17,5 | TORB 3038 | TORB 3038 K |
| | 2,1 | 2 | 24 | TORB 4038 V | TORB 4038 K30V |
| | 3 | 2,5 | 34,5 | TORB 3138 V | TORB 3138 KV |
| | 3 | 2,5 | 43 | TORB 4138 V | TORB 4138 K30V |
| | 4 | 3 | 34,5 | TORB 2238 | TORB 2238 K |
| 200 | 2,1 | 2 | 22,5 | TORB 3040 | TORB 3040 K |
| | 2,1 | 2 | 30,5 | TORB 4040 V | TORB 4040 K30V |
| | 3 | 2,5 | 41 | TORB 3140 | TORB 3140 K |
| | 3 | 2,5 | 54 | TORB 4140 V | - |
| 220 | 3 | 2,5 | 29,5 | TORB 3044 | TORB 3044 K |
| | 3 | 2,5 | 40 | TORB 4044 V | TORB 4044 K30V |
| | 4 | 3 | 52 | TORB 3144 | TORB 3144 K |
| | 4 | 3 | 57,5 | TORB 2244 | TORB 2244 K |



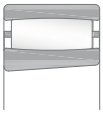

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **240** | 360 | 92 | 1280 | 2110 | 183 | 1500 | 1800 | **TORB 3048** |
| **240** | 400 | 128 | 2240 | 3400 | 282 | 1300 | 1500 | **TORB 3148** |
| **260** | 400 | 104 | 1700 | 2810 | 227 | 1200 | 1600 | **TORB 3052** |
| | 440 | 144 | 2540 | 4010 | 328 | 1100 | 1300 | **TORB 3152** |
| **280** | 420 | 106 | 1790 | 3080 | 252 | 1200 | 1400 | **TORB 3056** |
| | 460 | 146 | 2790 | 4490 | 356 | 1100 | 1200 | **TORB 3156** |
| **300** | 460 | 118 | 2110 | 3740 | 291 | 1100 | 1300 | **TORB 3060** |
| | 460 | 160 | 2830 | 4830 | 394 | 900 | 1060 | **TORB 4060** |
| | 500 | 160 | 3120 | 5100 | 400 | 910 | 1140 | **TORB 3160** |
| **320** | 480 | 121 | 2210 | 3960 | 299 | 970 | 1250 | **TORB 3064** |
| | 540 | 176 | 4000 | 6190 | 480 | 900 | 1160 | **TORB 3164** |
| **340** | 520 | 133 | 2820 | 4970 | 377 | 910 | 1170 | **TORB 3068** |
| | 580 | 190 | 4770 | 7390 | 549 | 820 | 990 | **TORB 3168** |
| **360** | 480 | 90 | 1690 | 3220 | 247 | 1020 | 1260 | **TORB 3972** |
| | 540 | 134 | 2780 | 4900 | 368 | 920 | 1140 | **TORB 3072** |
| | 600 | 192 | 4820 | 7950 | 589 | 780 | 980 | **TORB 3172** |
| **380** | 520 | 106 | 2060 | 3940 | 300 | 940 | 1140 | **TORB 3976** |
| | 560 | 135 | 2880 | 5100 | 373 | 880 | 1080 | **TORB 3076** |
| | 620 | 194 | 4300 | 7110 | 510 | 760 | 880 | **TORB 3176** |
| **400** | 540 | 106 | 2040 | 3980 | 291 | 880 | 1160 | **TORB 3980** |
| | 600 | 148 | 3510 | 6160 | 453 | 820 | 970 | **TORB 3080** |
| | 650 | 200 | 4630 | 8260 | 588 | 680 | 860 | **TORB 3180** |

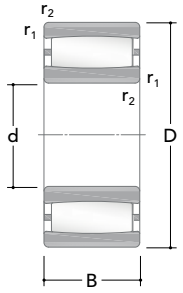


V

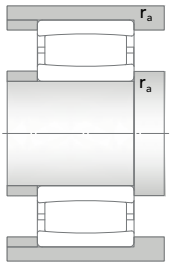


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 240 | 3 | 2,5 | 32 | TORB 3048 | TORB 3048 K |
| 240 | 4 | 3 | 64 | TORB 3148 | TORB 3148 K |
| 260 | 4 | 3 | 47 | TORB 3052 | TORB 3052 K |
| | 4 | 3 | 88 | TORB 3152 | TORB 3152 K |
| 280 | 4 | 3 | 50,5 | TORB 3056 | TORB 3056 K |
| | 5 | 4 | 94,5 | TORB 3156 | TORB 3156 K |
| 300 | 4 | 3 | 72 | TORB 3060 | TORB 3060 K |
| | 4 | 3 | 95,5 | TORB 4060 | TORB 4060 K30 |
| | 5 | 4 | 125 | TORB 3160 | TORB 3160 K |
| 320 | 4 | 3 | 78 | TORB 3064 | TORB 3064 K |
| | 5 | 4 | 164 | TORB 3164 | TORB 3164 K |
| 340 | 5 | 4 | 100 | TORB 3068 | TORB 3068 K |
| | 5 | 4 | 205 | TORB 3168 | TORB 3168 K |
| 360 | 3 | 2,5 | 45 | TORB 3972 | TORB 3972 K |
| | 5 | 4 | 106 | TORB 3072 | TORB 3072 K |
| | 5 | 4 | 220 | TORB 3172 | TORB 3172 K |
| 380 | 4 | 3 | 66 | TORB 3976 | TORB 3976 K |
| | 5 | 4 | 110 | TORB 3076 | TORB 3076 K |
| | 5 | 4 | 243 | TORB 3176 | TORB 3176 K |
| 400 | 4 | 3 | 68,5 | TORB 3980 | TORB 3980 K |
| | 5 | 4 | 145 | TORB 3080 | TORB 3080 K |
| | 6 | 5 | 258 | TORB 3180 | TORB 3180 K |



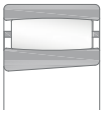

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **420** | 560 | 106 | 2100 | 4220 | 312 | 820 | 1080 | **TORB 3984** |
| | 620 | 150 | 3650 | 6340 | 459 | 800 | 980 | **TORB 3084** |
| | 700 | 224 | 5780 | 10330 | 725 | 650 | 790 | **TORB 3184** |
| **440** | 600 | 118 | 2530 | 5270 | 377 | 810 | 980 | **TORB 3988** |
| | 650 | 157 | 3640 | 6350 | 454 | 770 | 880 | **TORB 3088** |
| | 720 | 226 | 6540 | 11360 | 783 | 620 | 750 | **TORB 3188** |
| | 720 | 280 | 7260 | 12740 | 900 | 490 | 590 | **TORB 4188** |
| **460** | 620 | 118 | 2610 | 5290 | 376 | 820 | 970 | **TORB 3992** |
| | 680 | 163 | 3890 | 7450 | 523 | 700 | 840 | **TORB 3092** |
| **460** | 760 | 240 | 6650 | 11870 | 807 | 610 | 710 | **TORB 3192** |
| | 760 | 300 | 8430 | 14760 | 1020 | 460 | 570 | **TORB 4192** |
| **480** | 650 | 128 | 3020 | 6010 | 425 | 730 | 880 | **TORB 3996** |
| | 700 | 165 | 3890 | 7730 | 535 | 650 | 800 | **TORB 3096** |
| | 790 | 248 | 6710 | 12440 | 834 | 580 | 660 | **TORB 3196** |
| **500** | 670 | 128 | 3070 | 6270 | 432 | 680 | 860 | **TORB 39/500** |
| | 720 | 167 | 4130 | 8160 | 566 | 640 | 790 | **TORB 30/500** |
| | 830 | 264 | 7260 | 12680 | 851 | 510 | 660 | **TORB 31/500** |
| | 830 | 325 | 9590 | 17410 | 1160 | 430 | 490 | **TORB 41/500** |
| **530** | 710 | 136 | 3410 | 7050 | 483 | 640 | 790 | **TORB 39/530** |
| | 780 | 185 | 4910 | 9330 | 636 | 610 | 700 | **TORB 30/530** |
| | 870 | 272 | 8610 | 15580 | 1021 | 490 | 600 | **TORB 31/530** |
| **560** | 750 | 140 | 3510 | 7320 | 492 | 590 | 750 | **TORB 39/560** |
| | 820 | 195 | 5460 | 10840 | 720 | 510 | 660 | **TORB 30/560** |
| | 920 | 280 | 8840 | 16240 | 1044 | 470 | 600 | **TORB 31/560** |
| | 920 | 355 | 10030 | 19500 | 1277 | 380 | 450 | **TORB 41/560** |

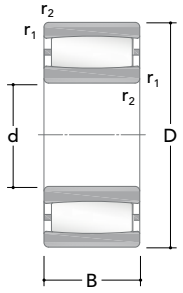


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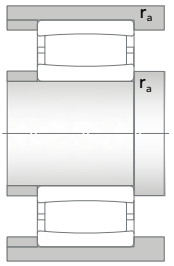


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 420 | 4 | 3 | 72 | TORB 3984 | TORB 3984 K |
| | 5 | 4 | 150 | TORB 3084 | TORB 3084 K |
| | 6 | 5 | 355 | TORB 3184 | TORB 3184 K |
| 440 | 4 | 3 | 99 | TORB 3988 | TORB 3988 K |
| | 6 | 5 | 190 | TORB 3088 | TORB 3088 K |
| | 6 | 5 | 385 | TORB 3188 | TORB 3188 K |
| | 6 | 5 | 471 | TORB 4188 | TORB 4188 K30 |
| 460 | 4 | 3 | 100 | TORB 3992 | TORB 3992 K |
| | 6 | 5 | 205 | TORB 3092 | TORB 3092 K |
| 460 | 7,5 | 6 | 435 | TORB 3192 | TORB 3192 K |
| | 7,5 | 6 | 571 | TORB 4192 | TORB 4192 K30 |
| 480 | 5 | 4 | 120 | TORB 3996 | TORB 3996 K |
| | 6 | 5 | 215 | TORB 3096 | TORB 3096 K |
| | 7,5 | 6 | 523 | TORB 3196 | TORB 3196 K |
| 500 | 5 | 4 | 125 | TORB 39/500 | TORB 39/500 K |
| | 6 | 5 | 225 | TORB 30/500 | TORB 30/500 K |
| | 7,5 | 6 | 560 | TORB 31/500 | TORB 31/500 K |
| | 7,5 | 6 | 710 | TORB 41/500 | TORB 41/500 K30 |
| 530 | 5 | 4 | 150 | TORB 39/530 | TORB 39/530 K |
| | 6 | 5 | 300 | TORB 30/530 | TORB 30/530 K |
| | 7,5 | 6 | 636 | TORB 31/530 | TORB 31/530 K |
| 560 | 5 | 4 | 175 | TORB 39/560 | TORB 39/560 K |
| | 6 | 5 | 350 | TORB 30/560 | TORB 30/560 K |
| | 7,5 | 6 | 789 | TORB 31/560 | TORB 31/560 K |
| | 7,5 | 6 | 1010 | TORB 41/560 | TORB 41/560 K30 |



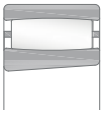

J




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **600** | 800 | 150 | 3860 | 8750 | 573 | 580 | 670 | **TORB 39/600** |
| | 870 | 200 | 6150 | 12040 | 772 | 480 | 620 | **TORB 30/600** |
| | 980 | 300 | 9860 | 17760 | 1152 | 440 | 530 | **TORB 31/600** |
| | 980 | 375 | 12460 | 22880 | 1431 | 330 | 400 | **TORB 41/600** |
| **630** | 850 | 165 | 4530 | 9860 | 627 | 540 | 620 | **TORB 39/630** |
| | 920 | 212 | 6580 | 12750 | 807 | 470 | 600 | **TORB 30/630** |
| | 1030 | 315 | 11480 | 20650 | 1299 | 390 | 500 | **TORB 31/630** |
| **670** | 900 | 170 | 4730 | 11040 | 695 | 480 | 550 | **TORB 39/670** |
| | 980 | 230 | 7930 | 16180 | 1007 | 440 | 530 | **TORB 30/670** |
| | 1090 | 336 | 11480 | 20850 | 1303 | 390 | 450 | **TORB 31/670** |
| **710** | 950 | 180 | 5840 | 12430 | 784 | 450 | 560 | **TORB 39/710** |
| | 1030 | 236 | 8450 | 16970 | 1071 | 410 | 500 | **TORB 30/710** |
| | 1030 | 315 | 10290 | 21410 | 1332 | 320 | 380 | **TORB 40/710** |
| | 1150 | 345 | 12930 | 25370 | 1538 | 340 | 430 | **TORB 31/710** |
| **750** | 1000 | 185 | 5880 | 13320 | 820 | 420 | 500 | **TORB 39/750** |
| | 1000 | 250 | 7580 | 17160 | 1069 | 330 | 430 | **TORB 49/750** |
| **750** | 1090 | 250 | 9190 | 19060 | 1137 | 380 | 480 | **TORB 30/750** |
| | 1220 | 365 | 15440 | 30040 | 1800 | 330 | 400 | **TORB 31/750** |
| **800** | 1060 | 195 | 6150 | 14320 | 880 | 370 | 470 | **TORB 39/800** |
| | 1150 | 258 | 8930 | 19120 | 1151 | 370 | 420 | **TORB 30/800** |
| | 1280 | 375 | 15140 | 26480 | 1529 | 290 | 350 | **TORB 31/800** |
| **850** | 1120 | 200 | 7200 | 16130 | 970 | 360 | 420 | **TORB 39/850** |
| | 1220 | 272 | 11150 | 24050 | 1444 | 320 | 410 | **TORB 30/850** |
| | 1360 | 400 | 16250 | 33460 | 1902 | 280 | 340 | **TORB 31/850** |
| **900** | 1180 | 206 | 8060 | 18240 | 1091 | 370 | 400 | **TORB 39/900** |

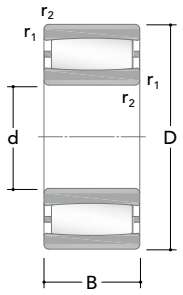


V

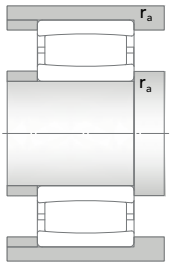


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 600 | 5 | 4 | 215 | TORB 39/600 | TORB 39/600 K |
| | 6 | 5 | 395 | TORB 30/600 | TORB 30/600 K |
| | 7,5 | 6 | 929 | TORB 31/600 | TORB 31/600 K |
| | 7,5 | 6 | 1150 | TORB 41/600 | TORB 41/600 K30 |
| 630 | 6 | 5 | 275 | TORB 39/630 | TORB 39/630 K |
| | 7,5 | 6 | 470 | TORB 30/630 | TORB 30/630 K |
| | 7,5 | 6 | 1090 | TORB 31/630 | TORB 31/630 K |
| 670 | 6 | 5 | 315 | TORB 39/670 | TORB 39/670 K |
| | 7,5 | 6 | 590 | TORB 30/670 | TORB 30/670 K |
| | 7,5 | 6 | 1300 | TORB 31/670 | TORB 31/670 K |
| 710 | 6 | 5 | 360 | TORB 39/710 | TORB 39/710 K |
| | 7,5 | 6 | 655 | TORB 30/710 | TORB 30/710 K |
| | 7,5 | 6 | 865 | TORB 40/710 | TORB 40/710 K30 |
| | 9,5 | 8 | 1470 | TORB 31/710 | TORB 31/710 K |
| 750 | 6 | 5 | 410 | TORB 39/750 | TORB 39/750 K |
| | 6 | 5 | 604 | TORB 49/750 | TORB 49/750 K |
| 750 | 7,5 | 6 | 838 | TORB 30/750 | TORB 30/750 K |
| | 9,5 | 8 | 1810 | TORB 31/750 | TORB 31/750 K |
| 800 | 6 | 5 | 480 | TORB 39/800 | TORB 39/800 K |
| | 7,5 | 6 | 941 | TORB 30/800 | TORB 30/800 K |
| | 9,5 | 8 | 2030 | TORB 31/800 | TORB 31/800 K |
| 850 | 6 | 5 | 540 | TORB 39/850 | TORB 39/850 K |
| | 7,5 | 6 | 1110 | TORB 30/850 | TORB 30/850 K |
| | 12 | 10 | 2450 | TORB 31/850 | TORB 31/850 K |
| 900 | 6 | 5 | 633 | TORB 39/900 | TORB 39/900 K |

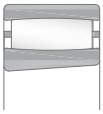



J

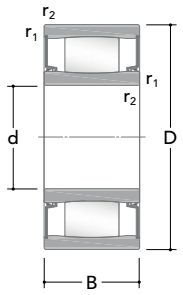



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **900** | 1280 | 280 | 12220 | 26310 | 1541 | 290 | 360 | **TORB 30/900** |
| (cont.) | | | | | | | | |
| **950** | 1250 | 224 | 9100 | 21750 | 1263 | 290 | 390 | **TORB 39/950** |
| | 1360 | 300 | 12860 | 28070 | 1616 | 270 | 330 | **TORB 30/950** |
| **1000** | 1420 | 308 | 13200 | 30000 | 1683 | 270 | 320 | **TORB 30/1000** |
| | 1580 | 462 | 19590 | 45060 | 2524 | 220 | 260 | **TORB 31/1000** |
| **1060** | 1400 | 250 | 10690 | 25790 | 1442 | 250 | 320 | **TORB 39/1060** |
| **1180** | 1540 | 272 | 13020 | 33240 | 1814 | 230 | 260 | **TORB 39/1180** |
| **1250** | 1750 | 375 | 21540 | 48470 | 2525 | 180 | 210 | **TORB 30/1250** |
| **1320** | 1600 | 280 | 10310 | 30270 | 1612 | 200 | 230 | **TORB 48/1320** |
| **1500** | 1950 | 335 | 18900 | 47260 | 2353 | 130 | 180 | **TORB 39/1500** |

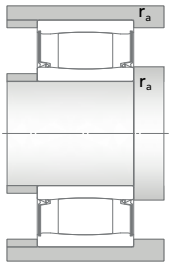

V


K/K30

| Dimensions | | | Mass | Designation | |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Cylindrical bore | Tapered bore |
| [mm] | | | [kg] | | |
| 900 (cont.) | 7,5 | 6 | 1200 | TORB 30/900 | TORB 30/900 K |
| 950 | 7,5 | 6 | 784 | TORB 39/950 | TORB 39/950 K |
| | 7,5 | 6 | 1480 | TORB 30/950 | TORB 30/950 K |
| 1000 | 7,5 | 6 | 1680 | TORB 30/1000 | TORB 30/1000 K |
| | 12 | 10 | 3800 | TORB 31/1000 | TORB 31/1000 K |
| 1060 | 7,5 | 6 | 1120 | TORB 39/1060 | TORB 39/1060 K |
| 1180 | 7,5 | 6 | 1400 | TORB 39/1180 | TORB 39/1180 K |
| 1250 | 9,5 | 8 | 2980 | TORB 30/1250 | TORB 30/1250 K |
| 1320 | 6 | 5 | 1250 | TORB 48/1320 | TORB 48/1320 K30 |
| 1500 | 9,5 | 8 | 2710 | TORB 39/1500 | TORB 39/1500 K |

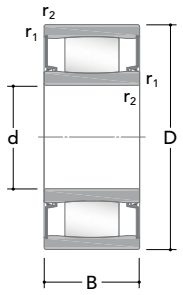


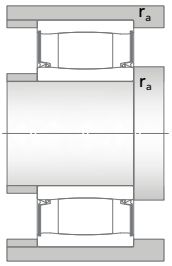

Sealed




| Main dimensions | | | Basic load ratings | | Fatigue | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | load limit $C_u$ | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **50** | 72 | 40 | 144 | 220 | 25 | 182 | TORB 6910 V2CS |
| **65** | 100 | 35 | 100 | 180 | 19,6 | 137 | TORB 4013 V2CS |
| **75** | 105 | 54 | 200 | 325 | 37,5 | 120 | TORB 6915 V2CS |
| | 115 | 40 | 147 | 192 | 23,3 | 117 | TORB 4015 V2CS |
| **90** | 125 | 46 | 222 | 399 | 44 | 100 | TORB 5918 V2CS |
| **100** | 150 | 50 | 313 | 450 | 50 | 81 | TORB 4020 V2CS |
| | 165 | 65 | 470 | 649 | 70 | 82 | TORB 4120 V2CS |
| **110** | 170 | 60 | 407 | 573 | 64 | 77 | TORB 4022 V2CS |
| | 180 | 69 | 515 | 738 | 72 | 72 | TORB 4122 V2CS |
| **120** | 180 | 60 | 426 | 634 | 68 | 72 | TORB 4024 V2CS |
| | 200 | 80 | 738 | 1010 | 99 | 65 | TORB 4124 V2CS |
| **130** | 200 | 69 | 550 | 825 | 86 | 64 | TORB 4026 V2CS |
| | 210 | 80 | 780 | 1098 | 108 | 64 | TORB 4126 V2CS |
| **140** | 210 | 69 | 576 | 900 | 88 | 60 | TORB 4028 V2CS |
| | 225 | 85 | 788 | 1200 | 116 | 58 | TORB 4128 V2CS |
| **150** | 225 | 75 | 597 | 984 | 91 | 58 | TORB 4030 V2CS |
| | 250 | 100 | 1257 | 1850 | 174 | 55 | TORB 4130 V2CS |
| **160** | 240 | 80 | 662 | 1144 | 100 | 55 | TORB 4032 V2CS |
| | 270 | 109 | 1475 | 2160 | 200 | 48 | TORB 4132 V2CS |
| **170** | 260 | 90 | 994 | 1614 | 152 | 49 | TORB 4034 V2CS |
| | 280 | 109 | 1499 | 2260 | 210 | 48 | TORB 4134 V2CS |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 50 | 0,6 | 0,6 | 0,56 | TORB 6910 V2CS |
| 65 | 1,1 | 1 | 1,05 | TORB 4013 V2CS |
| 75 | 1 | 1 | 1,4 | TORB 6915 V2CS |
| | 1,1 | 1 | 1,4 | TORB 4015 V2CS |
| 90 | 1,1 | 1 | 1,75 | TORB 5918 V2CS |
| 100 | 1,5 | 1,5 | 2,9 | TORB 4020 V2CS |
| | 2 | 2 | 5,2 | TORB 4120 V2CS |
| 110 | 2 | 2 | 4,6 | TORB 4022 V2CS |
| | 2 | 2 | 6,6 | TORB 4122 V2CS |
| 120 | 2 | 2 | 5,1 | TORB 4024 V2CS |
| | 2 | 2 | 9,7 | TORB 4124 V2CS |
| 130 | 2 | 2 | 7,5 | TORB 4026 V2CS |
| | 2 | 2 | 10,5 | TORB 4126 V2CS |
| 140 | 2 | 2 | 7,9 | TORB 4028 V2CS |
| | 2,1 | 2 | 12,5 | TORB 4128 V2CS |
| 150 | 2,1 | 2 | 10 | TORB 4030 V2CS |
| | 2,1 | 2 | 20,5 | TORB 4130 V2CS |
| 160 | 2,1 | 2 | 12 | TORB 4032 V2CS |
| | 2,1 | 2 | 26 | TORB 4132 V2CS |
| 170 | 2,1 | 2 | 17 | TORB 4034 V2CS |
| | 2,1 | 2 | 27 | TORB 4134 V2CS |




Sealed

| Main dimensions | | | Basic load ratings | | Fatigue | Speed ratings | Designation |
|---|---|---|---|---|---|---|---|
| d | D | B | Dynamic C | Static $C_0$ | load limit $C_u$ | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | |
| **180** | 280 | 100 | 1320 | 2099 | 195 | 46 | **TORB 4036 V2CS** |
| | 300 | 118 | 1725 | 2808 | 231 | 41 | **TORB 4136 V2CS** |
| **190** | 290 | 100 | 1343 | 2413 | 196 | 43 | **TORB 4038 V2CS** |
| | 320 | 128 | 2122 | 3130 | 277 | 41 | **TORB 4138 V2CS** |
| **200** | 310 | 109 | 1597 | 2630 | 234 | 41 | **TORB 4040 V2CS** |
| | 340 | 140 | 2313 | 3723 | 309 | 39 | **TORB 4140 V2CS** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 180 | 2,1 | 2 | 23,5 | TORB 4036 V2CS |
| | 3 | 2,5 | 35 | TORB 4136 V2CS |
| 190 | 2,1 | 2 | 24,5 | TORB 4038 V2CS |
| | 3 | 2,5 | 43,5 | TORB 4138 V2CS |
| 200 | 2,1 | 2 | 31 | TORB 4040 V2CS |
| | 3 | 2,5 | 54,5 | TORB 4140 V2CS |



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  - Minimum load ..... 702
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RKB
BEARING INDUSTRIES
SWITZERLAND

# Thrust ball bearings

The thrust ball bearings (TBBs) manufactured by RKB are designed to support high axial loads and, in some cases, even moderate radial loads. The manufacturing program includes single and double direction TBBs with flat or spherical housing washers to meet any requirements in various industrial applications. Thanks to the improved internal geometry and the use of the most suitable raw materials, all RKB TBBs attain the highest axial load ratings and the best reliability.
Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rolling elements. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Single direction thrust ball bearings

## Single direction thrust ball bearings

Single direction thrust ball bearings are composed of a shaft washers, housing washers and cage-balls assembly. Bearings are separable so washers and cage-balls assembly can be mounted separately. Axial deep groove ball bearings of series 511, 512, 513, 514 that have an flat housing washers, can support only axial forces in one direction and they cannot support any radial load and any misalignment.

Bearings of series 532 and 533 can support axial force in one direction, but having a spherical housing washer and matched with seating washer U2 and U3, they are able to compensate a misalignment between shaft and housing. No radial load can be supported.

### Misalignment

Thrust ball bearings with flat washers do not have possibility to accommodate any misalignment between shaft and housing and any alignment errors between support surfaces in the housing and on the shaft. In presence of misalignment between the support surfaces in the housing and on the shaft, a thrust ball bearing with sphered housing washers matched with sphered seat washers should be used.

### Minimum load

A minimum axial load is requested for a thrust ball bearing, like for all ball and roller bearings, to operate correctly, especially in critical application requirements like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions a skidding between the balls and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.
However, the minimum axial load is reached or surpassed by the weight of the components

supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the thrust ball bearings by springs or shaft nut. For additional information, please consult the RKB application engineering service.

## Designs and variants

### Type 51M

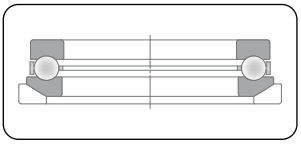


HB BAINITE HT

S STABILIZATION

- Flat housing locating washer
- Separable design
- One-piece machined brass cage (M) guided on balls
- Supports unidirectional axial loads

### Variant 53M+U



HB BAINITE HT

S STABILIZATION

- Sphered housing washer
- Separable design
- One-piece machined brass cage (M) guided on balls
- Supports unidirectional axial loads
- The sphered housing washer is mounted on a locating sphered seating washer to accommodate shaft misalignment

### Type 51J



HB BAINITE HT

S STABILIZATION

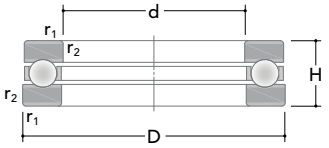
- Flat housing locating washer
- Separable design
- One-piece pressed steel cage (J) guided on balls
- Supports unidirectional axial load

| Prefixes | |
|---|---|
| TBB | Out of standard thrust ball bearing followed by drawing number |
| U | Sphered housing washer associated to related thrust ball bearing |

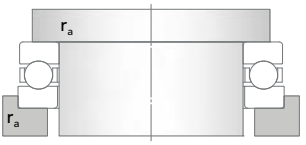
| Suffixes | Internal design |
|---|---|
| SP | Special or non-standard bearing |

| Suffixes | Cage |
|---|---|
| M | Machined brass cage guided on balls |
| F or MF | Machined steel cage guided on balls |
| J or without suffix | Pressed steel cage guided on balls |

| Suffixes | Accuracy, clearance, running |
|---|---|
| P6 | Dimensional and running accuracy P6 |

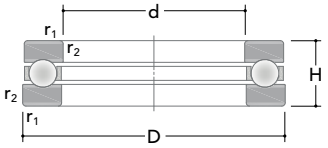



51M

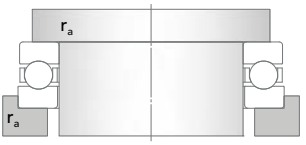



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **10** | 24 | 9 | 9,95 | 15,3 | 0,57 | 9550 | 13200 | **51100** |
| | 26 | 11 | 12,7 | 18,6 | 0,706 | 8050 | 11050 | **51200** |
| **12** | 26 | 9 | 10,4 | 16,6 | 0,63 | 9000 | 13000 | **51101** |
| | 28 | 11 | 13,3 | 20,8 | 0,76 | 8000 | 11000 | **51201** |
| **15** | 28 | 9 | 10,6 | 18,3 | 0,68 | 8500 | 12000 | **51102** |
| | 32 | 12 | 16,0 | 27,5 | 0,915 | 7000 | 10000 | **51202** |
| **17** | 30 | 9 | 11,5 | 21,2 | 0,77 | 8500 | 12000 | **51103** |
| | 35 | 12 | 16,3 | 25,0 | 1 | 6700 | 9500 | **51203** |
| **20** | 35 | 10 | 15,1 | 29,5 | 1,07 | 7600 | 10000 | **51104** |
| | 40 | 14 | 21,5 | 37,5 | 1,4 | 6000 | 8000 | **51204** |
| **25** | 42 | 11 | 18,2 | 39,3 | 1,44 | 6300 | 9000 | **51105** |
| | 47 | 15 | 26,6 | 50,0 | 1,86 | 5300 | 7500 | **51205** |
| | 52 | 18 | 34,8 | 60,0 | 2,23 | 4500 | 6400 | **51305** |
| | 60 | 24 | 42,3 | 67,0 | 2,45 | 3600 | 5000 | **51405** |
| **30** | 47 | 11 | 19 | 43,0 | 1,6 | 6000 | 8500 | **51106** |
| | 52 | 16 | 25,5 | 51 | 1,86 | 4800 | 6700 | **51206** |
| | 60 | 21 | 35,9 | 65,6 | 2,4 | 3800 | 5300 | **51306** |
| | 70 | 28 | 72,8 | 122 | 4,5 | 3000 | 4300 | **51406** |
| **35** | 52 | 12 | 20,1 | 51,0 | 1,87 | 5600 | 7500 | **51107** |
| | 62 | 18 | 35,6 | 73,5 | 2,7 | 4000 | 5600 | **51207** |
| | 68 | 24 | 49,9 | 96,5 | 3,55 | 3400 | 4800 | **51307** |
| | 80 | 32 | 76,1 | 137 | 5,1 | 2600 | 3600 | **51407** |
| **40** | 60 | 13 | 26,4 | 63,1 | 2,32 | 5000 | 7050 | **51108** |
| | 68 | 19 | 44,8 | 96,5 | 3,6 | 3800 | 5300 | **51208** |
| | 78 | 26 | 61,8 | 122 | 4,5 | 3000 | 4300 | **51308** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 10 | 0,3 | 0,3 | 0,02 | 51100 |
| | 0,6 | 0,6 | 0,03 | 51200 |
| 12 | 0,3 | 0,3 | 0,022 | 51101 |
| | 0,6 | 0,6 | 0,034 | 51201 |
| 15 | 0,3 | 0,3 | 0,023 | 51102 |
| | 0,6 | 0,6 | 0,046 | 51202 |
| 17 | 0,3 | 0,3 | 0,025 | 51103 |
| | 0,6 | 0,6 | 0,053 | 51203 |
| 20 | 0,3 | 0,3 | 0,037 | 51104 |
| | 0,6 | 0,6 | 0,083 | 51204 |
| 25 | 0,6 | 0,6 | 0,056 | 51105 |
| | 0,6 | 0,6 | 0,11 | 51205 |
| | 1 | 1 | 0,17 | 51305 |
| | 1 | 1 | 0,34 | 51405 |
| 30 | 0,6 | 0,6 | 0,063 | 51106 |
| | 0,6 | 0,6 | 0,13 | 51206 |
| | 1 | 1 | 0,26 | 51306 |
| | 1 | 1 | 0,52 | 51406 |
| 35 | 0,6 | 0,6 | 0,08 | 51107 |
| | 1 | 1 | 0,22 | 51207 |
| | 1 | 1 | 0,39 | 51307 |
| | 1,1 | 1 | 0,79 | 51407 |
| 40 | 0,6 | 0,6 | 0,12 | 51108 |
| | 1 | 1 | 0,28 | 51208 |
| | 1 | 1 | 0,53 | 51308 |

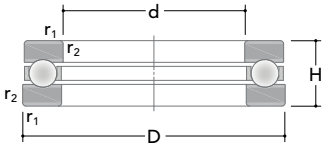



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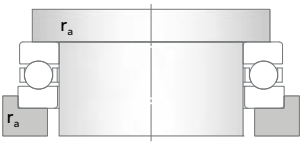



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **40** | 90 | 36 | 95,6 | 183 | 6,8 | 2400 | 3400 | **51408** |
| (cont.) | | | | | | | | |
| **45** | 65 | 14 | 26,7 | 69,5 | 2,55 | 4500 | 6300 | **51109** |
| **50** | 70 | 14 | 27 | 75,0 | 2,8 | 4300 | 6300 | **51110** |
| | 78 | 22 | 49,9 | 116 | 4,3 | 3400 | 4550 | **51210** |
| | 95 | 31 | 82,0 | 170 | 6,3 | 2600 | 3600 | **51310** |
| | 110 | 43 | 159 | 340 | 12,5 | 2000 | 2850 | **51410** |
| **55** | 78 | 16 | 30,7 | 81,5 | 3 | 3800 | 5300 | **51111** |
| | 90 | 25 | 58,5 | 134 | 4,9 | 2800 | 4000 | **51211** |
| | 105 | 35 | 104 | 225 | 8,5 | 2200 | 3200 | **51311** |
| | 120 | 48 | 195 | 400 | 14,6 | 1800 | 2400 | **51411** |
| **60** | 85 | 17 | 42,1 | 122 | 4,59 | 3600 | 5000 | **51112** |
| | 95 | 26 | 59,4 | 140 | 5,1 | 2800 | 3800 | **51212** |
| | 110 | 35 | 101 | 225 | 8,4 | 2250 | 3050 | **51312** |
| | 130 | 51 | 202 | 430 | 16 | 1650 | 2250 | **51412** |
| **65** | 90 | 18 | 38 | 108 | 4 | 3400 | 4800 | **51113** |
| | 100 | 27 | 60,8 | 150 | 5,5 | 2600 | 3600 | **51213** |
| | 115 | 36 | 106 | 240 | 8,8 | 2000 | 3000 | **51313** |
| | 140 | 56 | 216 | 491 | 18 | 1500 | 2200 | **51413** |
| **70** | 95 | 18 | 40,4 | 120 | 4,4 | 3400 | 4500 | **51114** |
| | 105 | 27 | 62,8 | 160 | 5,85 | 2600 | 3600 | **51214** |
| | 125 | 40 | 135 | 320 | 11,8 | 1900 | 2600 | **51314** |
| | 150 | 60 | 235 | 550 | 19,3 | 1400 | 2000 | **51414** |
| **75** | 100 | 19 | 44,3 | 134 | 4,9 | 3200 | 4300 | **51115** |
| | 110 | 27 | 63,7 | 170 | 6,2 | 2400 | 3400 | **51215** |
| | 135 | 44 | 165 | 390 | 14 | 1700 | 2400 | **51315** |
| | 160 | 65 | 254 | 612 | 20,8 | 1300 | 1800 | **51415** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 40 | 1,1 | 1 | 1,1 | 51408 |
| (cont.) | | | | |
| 45 | 0,6 | 0,6 | 0,14 | 51109 |
| 50 | 0,6 | 0,6 | 0,16 | 51110 |
| | 1 | 1 | 0,37 | 51210 |
| | 1,1 | 1 | 0,94 | 51310 |
| | 1,5 | 1,5 | 2 | 51410 |
| 55 | 0,6 | 0,6 | 0,23 | 51111 |
| | 1 | 1 | 0,59 | 51211 |
| | 1,1 | 1 | 1,3 | 51311 |
| | 1,5 | 1,5 | 2,55 | 51411 |
| 60 | 1 | 1 | 0,27 | 51112 |
| | 1 | 1 | 0,65 | 51212 |
| | 1,1 | 1 | 1,35 | 51312 |
| | 1,5 | 1,5 | 3,1 | 51412 |
| 65 | 1 | 1 | 0,33 | 51113 |
| | 1 | 1 | 0,72 | 51213 |
| | 1,1 | 1 | 1,5 | 51313 |
| | 2 | 2 | 4 | 51413 |
| 70 | 1 | 1 | 0,35 | 51114 |
| | 1 | 1 | 0,79 | 51214 |
| | 1,1 | 1 | 2 | 51314 |
| | 2 | 2 | 5 | 51414 |
| 75 | 1 | 1 | 0,4 | 51115 |
| | 1 | 1 | 0,83 | 51215 |
| | 1,5 | 1,5 | 2,6 | 51315 |
| | 2 | 2 | 6,75 | 51415 |

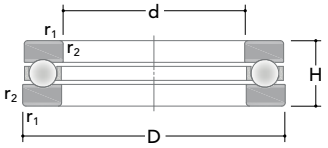



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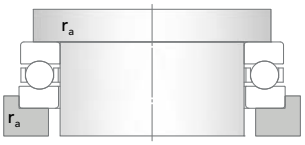



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **80** | 105 | 19 | 44,9 | 140 | 5,1 | 3100 | 4400 | **51116** |
| | 115 | 28 | 76,1 | 208 | 7,65 | 2400 | 3400 | **51216** |
| | 140 | 44 | 159 | 390 | 13,8 | 1700 | 2400 | **51316** |
| | 170 | 68 | 302 | 750 | 25 | 1250 | 1750 | **51416** |
| **85** | 110 | 19 | 45,2 | 146 | 5,4 | 3000 | 4300 | **51117** |
| | 125 | 31 | 97,5 | 275 | 9,8 | 2200 | 3000 | **51217** |
| | 150 | 49 | 174 | 405 | 14 | 1600 | 2200 | **51317** |
| | 180 | 72 | 287 | 750 | 24 | 1200 | 1600 | **51417** |
| **90** | 120 | 22 | 59,2 | 208 | 7,6 | 2600 | 3800 | **51118** |
| | 135 | 35 | 119 | 290 | 10,5 | 2000 | 2800 | **51218** |
| | 155 | 50 | 182 | 440 | 14,6 | 1500 | 2200 | **51318** |
| | 190 | 77 | 308 | 815 | 25,6 | 1100 | 1500 | **51418** |
| **100** | 135 | 25 | 80,6 | 265 | 9,15 | 2400 | 3200 | **51120** |
| | 150 | 38 | 120 | 325 | 11 | 1800 | 2400 | **51220** |
| | 170 | 55 | 229 | 570 | 18,3 | 1400 | 1900 | **51320** |
| | 210 | 85 | 371 | 1060 | 31,5 | 950 | 1400 | **51420** |
| **110** | 145 | 25 | 83,4 | 285 | 9,5 | 2200 | 3200 | **51122** |
| | 160 | 38 | 125 | 365 | 11,6 | 1700 | 2400 | **51222** |
| | 190 | 63 | 281 | 815 | 24,5 | 1200 | 1700 | **51322** |
| | 197 | 86 | 452 | 1230 | 41,2 | | | **351977** |
| | 230 | 95 | 410 | 1230 | 34,8 | 900 | 1300 | **51422** |
| **120** | 155 | 25 | 85,2 | 305 | 9,65 | 2200 | 3000 | **51124** |
| | 170 | 39 | 127 | 391 | 12 | 1600 | 2200 | **51224** |
| | 210 | 70 | 329 | 980 | 28,5 | 1100 | 1500 | **51324** |
| | 250 | 102 | 432 | 1320 | 36 | 800 | 1100 | **51424** |
| **130** | 170 | 30 | 119 | 440 | 13,4 | 1900 | 2600 | **51126** |
| | 190 | 45 | 186 | 585 | 17 | 1400 | 2000 | **51226** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 80 | 1 | 1 | 0,42 | 51116 |
| | 1 | 1 | 0,91 | 51216 |
| | 1,5 | 1,5 | 2,7 | 51316 |
| | 2,1 | 2 | 7,95 | 51416 |
| 85 | 1 | 1 | 0,44 | 51117 |
| | 1 | 1 | 1,2 | 51217 |
| | 1,5 | 1,5 | 3,55 | 51317 |
| | 2,1 | 2 | 9,45 | 51417 |
| 90 | 1 | 1 | 0,67 | 51118 |
| | 1,1 | 1 | 1,7 | 51218 |
| | 1,5 | 1,5 | 3,8 | 51318 |
| | 2,1 | 2 | 11 | 51418 |
| 100 | 1 | 1 | 0,97 | 51120 |
| | 1,1 | 1 | 2,2 | 51220 |
| | 1,5 | 1,5 | 4,95 | 51320 |
| | 3 | 2,5 | 15 | 51420 |
| 110 | 1 | 1 | 1,05 | 51122 |
| | 1,1 | 1 | 2,4 | 51222 |
| | 2 | 2 | 7,85 | 51322 |
| | 3 | 2,5 | 11,5 | 351977 |
| | 3 | 2,5 | 20 | 51422 |
| 120 | 1 | 1 | 1,15 | 51124 |
| | 1,1 | 1 | 2,65 | 51224 |
| | 2,1 | 2 | 11 | 51324 |
| | 4 | 3 | 25,5 | 51424 |
| 130 | 1 | 1 | 1,85 | 51126 |
| | 1,5 | 1,5 | 4 | 51226 |

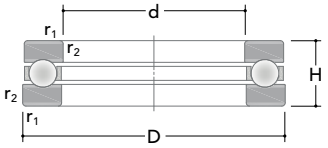



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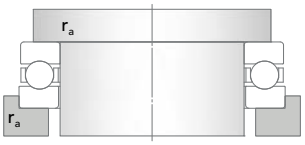



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **130** | 225 | 75 | 359 | 1150 | 32 | 1000 | 1400 | **51326** |
| (cont.) | 270 | 110 | 528 | 1730 | 45 | 750 | 1000 | **51426** |
| **140** | 180 | 31 | 112 | 440 | 13 | 1800 | 2600 | **51128** |
| | 200 | 46 | 190 | 620 | 17,6 | 1400 | 1900 | **51228** |
| | 240 | 80 | 377 | 1220 | 32,5 | 950 | 1300 | **51328** |
| | 280 | 112 | 520 | 1730 | 44 | 700 | 1000 | **51428** |
| **150** | 165 | 15,175 | 16 | 77,3 | 2,5 | 2580 | - | **634133** |
| | 190 | 31 | 111 | 440 | 12,6 | 1750 | 2450 | **51130** |
| | 215 | 50 | 240 | 800 | 22 | 1300 | 1800 | **51230** |
| | 250 | 80 | 390 | 1290 | 34 | 900 | 1300 | **51330** |
| | 300 | 120 | 559 | 1960 | 48 | 670 | 950 | **51430** |
| **160** | 200 | 31 | 112 | 465 | 12,9 | 1700 | 2400 | **51132** |
| | 225 | 51 | 242 | 830 | 22,4 | 1200 | 1700 | **51232** |
| | 270 | 87 | 450 | 1660 | 41,5 | 850 | 1200 | **51332** |
| **170** | 215 | 34 | 134 | 540 | 14,4 | 1600 | 2200 | **51134** |
| | 240 | 55 | 272 | 930 | 24 | 1200 | 1700 | **51234** |
| | 280 | 87 | 468 | 1760 | 43 | 800 | 1100 | **51334** |
| **180** | 225 | 34 | 136 | 570 | 15 | 1500 | 2200 | **51136** |
| | 250 | 56 | 304 | 1120 | 28,5 | 1200 | 1600 | **51236** |
| | 300 | 95 | 527 | 2000 | 47,5 | 750 | 1100 | **51336** |
| **190** | 240 | 37 | 173 | 710 | 18 | 1400 | 2000 | **51138** |
| | 270 | 62 | 334 | 1270 | 31 | 1100 | 1600 | **51238** |
| | 320 | 105 | 559 | 2200 | 51 | 700 | 950 | **51338** |
| **200** | 250 | 37 | 168 | 710 | 17,6 | 1400 | 1900 | **51140** |
| | 280 | 62 | 340 | 1320 | 31,5 | 1100 | 1500 | **51240** |
| | 340 | 110 | 625 | 2600 | 58,5 | 630 | 900 | **51340** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 130 | 2,1 | 2 | 13 | 51326 |
| (cont.) | 4 | 3 | 32 | 51426 |
| 140 | 1 | 1 | 2,05 | 51128 |
| | 1,5 | 1,5 | 4,35 | 51228 |
| | 2,1 | 2 | 15,5 | 51328 |
| | 4 | 3 | 34,5 | 51428 |
| 150 | 0,6 | 0,5 | 0,4 | 634133 |
| | 1 | 1 | 2,2 | 51130 |
| | 1,5 | 1,5 | 6,1 | 51230 |
| | 2,1 | 2 | 16,5 | 51330 |
| | 4 | 3 | 42,5 | 51430 |
| 160 | 1 | 1 | 2,35 | 51132 |
| | 1,5 | 1,5 | 6,55 | 51232 |
| | 3 | 2,5 | 21 | 51332 |
| 170 | 1,1 | 1 | 3,3 | 51134 |
| | 1,5 | 1,5 | 8,15 | 51234 |
| | 3 | 2,5 | 22 | 51334 |
| 180 | 1,1 | 1 | 3,5 | 51136 |
| | 1,5 | 1,5 | 8,6 | 51236 |
| | 3 | 2,5 | 28,5 | 51336 |
| 190 | 1,1 | 1 | 4,05 | 51138 |
| | 2 | 2 | 12 | 51238 |
| | 4 | 3 | 36,5 | 51338 |
| 200 | 1,1 | 1 | 4,25 | 51140 |
| | 2 | 2 | 12 | 51240 |
| | 4 | 3 | 44,5 | 51340 |

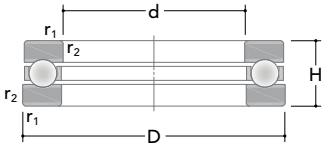



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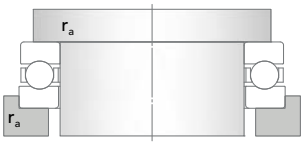



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **220** | 270 | 37 | 180 | 800 | 19 | 1320 | 1920 | **51144** |
| | 300 | 63 | 359 | 1460 | 33,5 | 970 | 1320 | **51244** |
| **240** | 300 | 45 | 240 | 1060 | 24,1 | 1120 | 1650 | **51148** |
| | 340 | 78 | 450 | 1960 | 42,5 | 800 | 1100 | **51248** |
| **260** | 320 | 45 | 238 | 1100 | 24 | 1100 | 1500 | **51152** |
| | 360 | 79 | 491 | 2240 | 46,5 | 750 | 1100 | **51252** |
| | 480 | 175 | 1111 | 5400 | 108 | 360 | - | **51452** |
| **280** | 350 | 53 | 319 | 1460 | 30,5 | 950 | 1300 | **51156** |
| | 380 | 80 | 489 | 2320 | 47,5 | 750 | 1000 | **51256** |
| **300** | 380 | 62 | 368 | 1760 | 35,5 | 850 | 1200 | **51160** |
| | 420 | 95 | 585 | 3000 | 57 | 650 | 850 | **51260** |
| **320** | 360 | 30 | 115 | 730 | 14,7 | 1200 | - | **51064** |
| | 400 | 48 | 243 | 1302,9 | 25,8 | 850 | - | **59164** |
| | 400 | 63 | 371 | 1860 | 36,5 | 800 | 1100 | **51164** |
| | 440 | 95 | 572 | 3000 | 56 | 600 | 800 | **51264** |
| **340** | 420 | 64 | 377 | 1960 | 37,5 | 800 | 1100 | **51168** |
| | 460 | 96 | 606 | 3200 | 59,2 | 600 | 800 | **51268** |
| | 540 | 160 | 1040 | 5770 | 10,5 | 360 | 490 | **51368** |
| **360** | 400 | 30 | 119 | 810 | 15,7 | 1120 | - | **51072** |
| | 440 | 48 | 257 | 1490 | 27,7 | 810 | 1050 | **59172** |
| | 440 | 65 | 394 | 2080 | 38 | 750 | 1100 | **51172** |
| | 500 | 110 | 747 | 4150 | 73,5 | 500 | 700 | **51272** |
| **366** | 440 | 65 | 296 | 1450 | 27 | 690 | - | **634132** |
| **380** | 460 | 36 | 186 | 1130 | 21 | 890 | 1210 | **351793** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 220 | 1,1 | 1 | 4,6 | 51144 |
| | 2 | 2 | 13 | 51244 |
| 240 | 1,5 | 1,5 | 7,55 | 51148 |
| | 2,1 | 2 | 23 | 51248 |
| 260 | 1,5 | 1,5 | 8,1 | 51152 |
| | 2,1 | 2 | 25 | 51252 |
| | 6 | 5 | 135 | 51452 |
| 280 | 1,5 | 1,5 | 12 | 51156 |
| | 2,1 | 2 | 26,5 | 51256 |
| 300 | 2 | 2 | 17,5 | 51160 |
| | 3 | 2,5 | 42 | 51260 |
| 320 | 1 | 1 | 4,3 | 51064 |
| | 2 | 2 | 13,5 | 59164 |
| | 2 | 2 | 19 | 51164 |
| | 3 | 2,5 | 45,5 | 51264 |
| 340 | 2 | 2 | 20,5 | 51168 |
| | 3 | 2,5 | 48,5 | 51268 |
| | 5 | 4 | 135 | 51368 |
| 360 | 1 | 1 | 4,85 | 51072 |
| | 2 | 2 | 15 | 59172 |
| | 2 | 2 | 22 | 51172 |
| | 4 | 3 | 70 | 51272 |
| 366 | 1,1 | 1 | 19,5 | 634132 |
| 380 | 2 | 2 | 12,5 | 351793 |

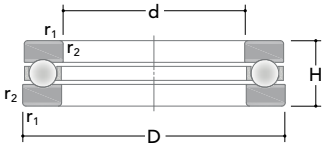



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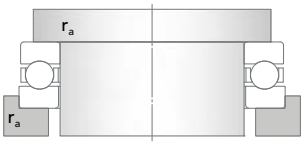



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **380** | 460 | 48 | 254 | 1510 | 28 | 780 | 1040 | **59176** |
| (cont.) | 460 | 65 | 397 | 2200 | 40 | 750 | 1000 | **51176** |
| | 520 | 112 | 728 | 4150 | 72 | 500 | 700 | **51276** |
| | 670 | 224 | 1635 | 10310 | 167 | 250 | - | **51476** |
| **385** | 510 | 110 | 612 | 3420 | 61 | 460 | - | **350550** |
| **400** | 480 | 48 | 257 | 1600 | 29 | 770 | 1050 | **59180** |
| | 480 | 65 | 403 | 2280 | 40,5 | 700 | 1000 | **51180** |
| | 540 | 112 | 764 | 4490 | 76,7 | 450 | 610 | **51280** |
| **415,2** | 544,9 | 125 | 931 | 5660 | 97,2 | - | - | **351955** |
| **420** | 500 | 48 | 262 | 1670 | 31 | 780 | 1040 | **59184** |
| | 500 | 65 | 413 | 2400 | 41,5 | 700 | 1000 | **51184** |
| | 580 | 130 | 886 | 5400 | 92 | 390 | 520 | **51284** |
| **440** | 520 | 65 | 303 | 1620 | 27,7 | 600 | 840 | **634131** |
| | 540 | 60 | 239 | 1490 | 25 | 630 | 860 | **59188** |
| | 540 | 80 | 527 | 3250 | 55 | 600 | 850 | **51188** |
| | 600 | 130 | 911 | 5590 | 95 | 390 | 520 | **51288** |
| **460** | 560 | 80 | 527 | 3250 | 54 | 600 | 800 | **51192** |
| | 620 | 130 | 922 | 5800 | 96 | 390 | 520 | **51292** |
| **480** | 580 | 80 | 545 | 3550 | 56 | 560 | 800 | **51196** |
| | 650 | 135 | 1003 | 6460 | 103 | 360 | 480 | **51296** |
| **500** | 540 | 30 | 133 | 1110 | 18,5 | 900 | 1210 | **510/500** |
| | 600 | 60 | 245 | 1680 | 26 | 620 | 840 | **591/500** |
| | 600 | 80 | 555 | 3600 | 57 | 560 | 800 | **511/500** |
| | 670 | 135 | 1002 | 6750 | 105 | 350 | 470 | **512/500** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **380** | 2 | 2 | 15 | **59176** |
| (cont.) | 2 | 2 | 23 | **51176** |
| | 4 | 3 | 73 | **51276** |
| | 7,5 | 6 | 330 | **51476** |
| **385** | 4,3 | 3 | 66 | **350550** |
| **400** | 2 | 2 | 16,5 | **59180** |
| | 2 | 2 | 24 | **51180** |
| | 4 | 3 | 78,5 | **51280** |
| **415,2** | 4,5 | 4 | 81 | **351955** |
| **420** | 2 | 2 | 17 | **59184** |
| | 2 | 2 | 25,5 | **51184** |
| | 5 | 4 | 110 | **51284** |
| **440** | 1,1 | 1 | 24 | **634131** |
| | 2,1 | 2 | 28 | **59188** |
| | 2,1 | 2 | 42 | **51188** |
| | 5 | 4 | 115 | **51288** |
| **460** | 2,1 | 2 | 43,5 | **51192** |
| | 5 | 4 | 120 | **51292** |
| **480** | 2,1 | 2 | 45,5 | **51196** |
| | 5 | 4 | 130 | **51296** |
| **500** | 1 | 1 | 6,55 | **510/500** |
| | 2,1 | 2 | 32 | **591/500** |
| | 2,1 | 2 | 47 | **511/500** |
| | 5 | 4 | 135 | **512/500** |

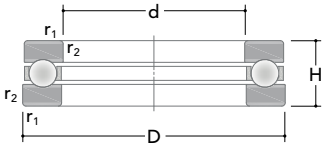



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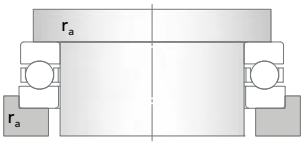



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **522** | 600 | 40 | 279 | 2230 | 34,7 | - | - | **351796** |
| **530** | 580 | 38 | 200 | 1580 | 25 | 770 | 1060 | **510/530** |
| | 590 | 36 | 178 | 1360 | 21,8 | 820 | 1050 | **351794** |
| | 640 | 67 | 468 | 3110 | 49 | 560 | 750 | **591/530** |
| | 640 | 85 | 659 | 4400 | 68 | 530 | 750 | **511/530** |
| **560** | 610 | 38 | 201 | 1680 | 25 | 780 | 1030 | **510/560** |
| | 670 | 67 | 463 | 3190 | 49 | 540 | 710 | **591/560** |
| | 670 | 85 | 659 | 4400 | 68 | 500 | 700 | **511/560** |
| **600** | 650 | 38 | 215 | 1790 | 26,6 | 740 | 950 | **510/600** |
| | 710 | 67 | 472 | 3380 | 49 | 510 | 700 | **591/600** |
| | 710 | 85 | 663 | 4800 | 69,5 | 500 | 700 | **511/600** |
| | 800 | 90 | 677 | 4930 | 70,5 | 410 | 540 | **350769** |
| **630** | 680 | 38 | 221 | 1900 | 28 | 730 | 970 | **510/630** |
| | 750 | 73 | 538 | 3990 | 57 | 500 | 640 | **591/630** |
| | 750 | 95 | 730 | 5400 | 76,5 | 450 | 630 | **511/630** |
| **670** | 730 | 45 | 282 | 2390 | 34 | 640 | 830 | **510/670** |
| | 800 | 78 | 534 | 4080 | 58 | 440 | 590 | **591/670** |
| | 800 | 105 | 852 | 6700 | 91,5 | 400 | 560 | **511/670** |
| **710** | 780 | 53 | 358 | 2800 | 40 | 550 | 730 | **510/710** |
| | 850 | 85 | 677 | 5390 | 72 | 410 | 550 | **591/710** |
| | 850 | 112 | 948 | 7640 | 100 | 350 | 460 | **511/710** |
| **730** | 850 | 85 | 669 | 5370 | 72 | 420 | - | **350627** |
| **750** | 820 | 53 | 368 | 3000 | 41,2 | 540 | 750 | **510/750** |
| | 900 | 90 | 732 | 6300 | 79 | 360 | 530 | **591/750** |
| | 900 | 120 | 1020 | 8480 | 112 | 310 | 420 | **511/750** |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **522** | 1,5 | 1,5 | 17,5 | **351796** |
| **530** | 1,1 | 1 | 11 | **510/530** |
| | 1 | 1 | 12,5 | **351794** |
| | 3 | 2,5 | 43,5 | **591/530** |
| | 3 | 2,5 | 58,5 | **511/530** |
| **560** | 1,1 | 1 | 11,5 | **510/560** |
| | 3 | 2,5 | 45,5 | **591/560** |
| | 3 | 2,5 | 61 | **511/560** |
| **600** | 1,1 | 1 | 12 | **510/600** |
| | 3 | 2,5 | 48 | **591/600** |
| | 3 | 2,5 | 65 | **511/600** |
| | 5 | 4 | 117 | **350769** |
| **630** | 1,1 | 1 | 12,5 | **510/630** |
| | 3 | 2,5 | 62,5 | **591/630** |
| | 3 | 2,5 | 84 | **511/630** |
| **670** | 1,5 | 1,5 | 21 | **510/670** |
| | 4 | 3 | 74 | **591/670** |
| | 4 | 3 | 105 | **511/670** |
| **710** | 1,5 | 1,5 | 28 | **510/710** |
| | 4 | 3 | 88,5 | **591/710** |
| | 4 | 3 | 130 | **511/710** |
| **730** | 3 | 2,5 | 88 | **350627** |
| **750** | 1,5 | 1,5 | 30 | **510/750** |
| | 4 | 3 | 105 | **591/750** |
| | 4 | 3 | 155 | **511/750** |

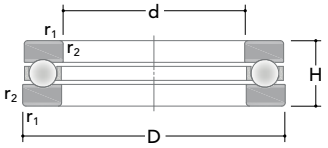



51M

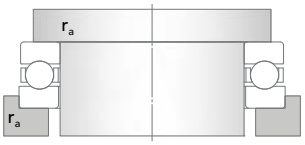



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **800** | 870 | 53 | 369 | 3160 | 41 | 510 | 690 | **510/800** |
| | 950 | 90 | 751 | 6450 | 84 | 360 | 480 | **591/800** |
| | 950 | 120 | 1020 | 8920 | 113 | 310 | 410 | **511/800** |
| **850** | 920 | 53 | 381 | 3390 | 44 | - | - | **510/850** |
| | 1000 | 90 | 768 | 6790 | 83 | - | - | **591/850** |
| | 1000 | 120 | 1070 | 9460 | 116 | - | - | **511/850** |
| | | | | | | - | - | |
| **900** | 980 | 63 | 526 | 4810 | 59,6 | - | - | **510/900** |
| | 1060 | 95 | 622 | 7530 | 91 | - | - | **591/900** |
| | 1060 | 130 | 1110 | 10600 | 123 | - | - | **511/900** |
| | | | | | | - | - | |
| **950** | 1080 | 63 | 537 | 5000 | 61 | - | - | **510/950** |
| | 1120 | 103 | 851 | 8130 | 96 | - | - | **591/950** |
| | 1120 | 135 | 1330 | 11840 | 139 | - | - | **511/950** |
| | | | | | | - | - | |
| **980** | 1120 | 120 | 1020 | 9900 | 116 | - | - | **351883** |
| | | | | | | - | - | |
| **1000** | 1090 | 70 | 571 | 5440 | 64 | - | - | **510/1000** |
| | 1180 | 109 | 931 | 9060 | 103 | - | - | **591/1000** |
| | 1180 | 140 | 1320 | 13100 | 151 | - | - | **511/1000** |
| | | | | | | - | - | |
| **1060** | 1150 | 70 | 724 | 5750 | 65 | - | - | **510/1060** |
| | 1250 | 115 | 1000 | 10300 | 113 | 290 | 350 | **591/1060** |
| | 1250 | 150 | 1410 | 15000 | 163 | - | - | **511/1060** |
| | | | | | | - | - | |
| **1120** | 1320 | 160 | 1540 | 16200 | 174 | 210 | 270 | **511/1120** |
| | | | | | | - | - | |
| **1180** | 1400 | 175 | 1760 | 19700 | 207 | - | - | **511/1180** |
| **1250** | 1500 | 150 | 1420 | 16000 | 160 | - | - | **351006 A** |
| | | | | | | - | - | |
| **1380** | 1540 | 130 | 1330 | 16200 | 157 | - | - | **351890** |
| | | | | | | - | - | |

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 800 | 1,5 | 1,5 | 32,5 | 510/800 |
| | 4 | 3 | 110 | 591/800 |
| | 4 | 3 | 155 | 511/800 |
| 850 | 1,5 | 1,5 | 34,5 | 510/850 |
| | 4 | 3 | 115 | 591/850 |
| | 4 | 3 | 165 | 511/850 |
| 900 | 2 | 2 | 49 | 510/900 |
| | 5 | 4 | 140 | 591/900 |
| | 5 | 4 | 205 | 511/900 |
| 950 | 2 | 2 | 52 | 510/950 |
| | 5 | 4 | 170 | 591/950 |
| | 5 | 4 | 235 | 511/950 |
| 980 | 5 | 4 | 185 | 351883 |
| 1000 | 2,1 | 2 | 68,5 | 510/1000 |
| | 5 | 4 | 210 | 591/1000 |
| | 5 | 4 | 275 | 511/1000 |
| 1060 | 2,1 | 2 | 72,5 | 510/1060 |
| | 5 | 4 | 240 | 591/1060 |
| | 5 | 4 | 330 | 511/1060 |
| 1120 | 5 | 4 | 395 | 511/1120 |
| 1180 | 6 | 5 | 495 | 511/1180 |
| 1250 | 6 | 5 | 515 | 351006 A |
| 1380 | 5 | 4 | 310 | 351890 |

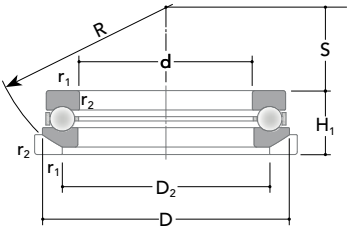


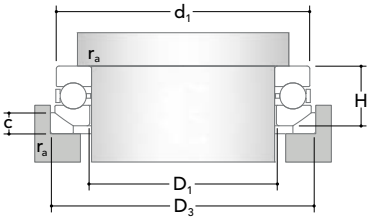

51M




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **1400** | 1630 | 180 | 1830 | 23300 | 200 | - | - | **511/1400** |

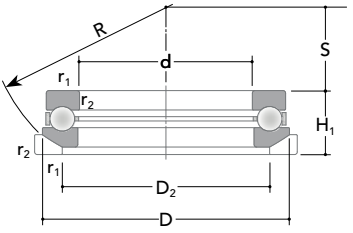
| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| 1400 | 8 | 6 | 665 | 511/1400 |

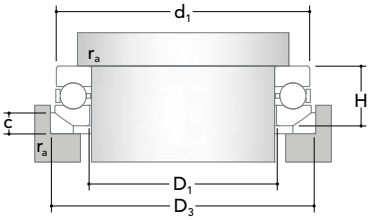



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | $H_1$ | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **12** | 28 | 13 | 13,30 | 20,8 | 0,765 | 8000 | 11000 | **53201** |
| **15** | 32 | 15 | 16,7 | 25,0 | 0,915 | 7000 | 10000 | **53202** |
| **17** | 35 | 15 | 17,2 | 27 | 1 | 6700 | 9500 | **53203** |
| **20** | 40 | 17 | 21,9 | 37,5 | 1,4 | 5600 | 8000 | **53204** |
| **25** | 47 | 19 | 26,6 | 50 | 1,86 | 5000 | 7000 | **53205** |
| **30** | 52 | 20 | 25,9 | 51,0 | 1,87 | 4500 | 6300 | **53206** |
| | 60 | 25 | 35,9 | 65,5 | 2,4 | 3800 | 5300 | **53306** |
| **35** | 62 | 22 | 35,7 | 73,5 | 2,7 | 4000 | 5600 | **53207** |
| | 68 | 28 | 49,7 | 96,5 | 3,55 | 3200 | 4500 | **53307** |
| **40** | 68 | 23 | 44,2 | 96,5 | 3,6 | 3600 | 5300 | **53208** |
| | 78 | 31 | 62,0 | 122 | 4,5 | 2800 | 4000 | **53308** |
| | 90 | 42 | 95,6 | 183 | 6,8 | 2400 | 3200 | **53408** |
| **45** | 73 | 24 | 40 | 86,5 | 3,2 | 3400 | 4800 | **53209** |
| | 85 | 33 | 77 | 153 | 5,6 | 2600 | 3800 | **53309** |
| **50** | 78 | 26 | 50,1 | 116 | 4,3 | 3200 | 4500 | **53210** |
| | 95 | 37 | 81,9 | 170 | 6,3 | 2400 | 3400 | **53310** |
| | 110 | 50 | 159,0 | 340 | 12,5 | 1900 | 2600 | **53410** |
| **55** | 90 | 30 | 58,5 | 134 | 5 | 2800 | 3800 | **53211** |
| | 105 | 42 | 102,2 | 224 | 8,3 | 2200 | 3000 | **53311** |
| | 120 | 55 | 196,0 | 400 | 14,6 | 1700 | 2400 | **53411** |
| **60** | 95 | 31 | 59,2 | 140 | 5,1 | 2600 | 3600 | **53212** |
| | 110 | 42 | 101,6 | 224 | 8,3 | 2000 | 3000 | **53312** |

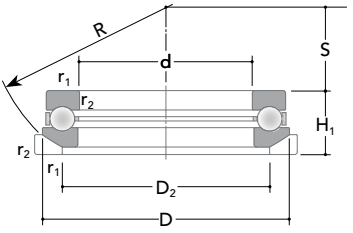
| Dimensions | | | | | | | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | $d_1$ | $D_1$ | $D_2$ | $D_3$ | H | C | R | s | | Standard design | Seat washer |
| [mm] | | | | | | | | | | | [kg] | | |
| **12** | 0,6 | 0,6 | 28 | 14 | 20 | 30 | 11,4 | 3,5 | 25 | 11,5 | 0,045 | **53201** | **U 201** |
| **15** | 0,6 | 0,6 | 32 | 17 | 24 | 35 | 13,3 | 4 | 28 | 12 | 0,063 | **53202** | **U 202** |
| **17** | 0,6 | 0,6 | 35 | 19 | 26 | 38 | 13,2 | 4 | 32 | 16 | 0,071 | **53203** | **U 203** |
| **20** | 0,6 | 0,6 | 40 | 22 | 30 | 42 | 14,7 | 5 | 36 | 18 | 0,1 | **53204** | **U 204** |
| **25** | 0,6 | 0,6 | 47 | 27 | 36 | 50 | 16,7 | 5,5 | 40 | 19 | 0,15 | **53205** | **U 205** |
| **30** | 0,6 | 0,6 | 52 | 32 | 42 | 55 | 17,8 | 5,5 | 45 | 22 | 0,18 | **53206** | **U 206** |
| | 1 | 1 | 60 | 32 | 45 | 62 | 22,6 | 7 | 50 | 22 | 0,33 | **53306** | **U 306** |
| **35** | 1 | 1 | 62 | 37 | 48 | 65 | 19,9 | 7 | 50 | 24 | 0,28 | **53207** | **U 207** |
| | 1 | 1 | 68 | 37 | 52 | 72 | 25,6 | 7,5 | 56 | 24 | 0,46 | **53307** | **U 307** |
| **40** | 1 | 1 | 68 | 42 | 55 | 72 | 20,3 | 7 | 56 | 28,5 | 0,35 | **53208** | **U 208** |
| | 1 | 1 | 78 | 42 | 60 | 82 | 28,5 | 8,5 | 64 | 28 | 0,67 | **53308** | **U 308** |
| | 1,1 | 1 | 90 | 42 | 65 | 95 | 38,2 | 12 | 72 | 26 | 1,35 | **53408** | **U 408** |
| **45** | 1 | 1 | 73 | 47 | 60 | 78 | 21,3 | 7,5 | 56 | 26 | 0,39 | **53209** | **U 209** |
| | 1 | 1 | 85 | 47 | 65 | 90 | 30,1 | 10 | 64 | 25 | 0,83 | **53309** | **U 309** |
| **50** | 1 | 1 | 78 | 52 | 62 | 82 | 23,5 | 7,5 | 64 | 32,5 | 0,47 | **53210** | **U 210** |
| | 1,1 | 1 | 95 | 52 | 72 | 100 | 34,3 | 11 | 72 | 28 | 1,2 | **53310** | **U 310** |
| | 1,5 | 1,5 | 110 | 52 | 80 | 115 | 45,6 | 14 | 90 | 35 | 2,3 | **53410** | **U 410** |
| **55** | 1 | 1 | 90 | 57 | 72 | 95 | 27,3 | 9 | 72 | 35 | 0,75 | **53211** | **U 211** |
| | 1,1 | 1 | 105 | 57 | 80 | 110 | 39,3 | 11,5 | 80 | 30 | 1,7 | **53311** | **U 311** |
| | 1,5 | 1,5 | 120 | 57 | 88 | 125 | 50,5 | 15,5 | 90 | 28 | 3,1 | **53411** | **U 411** |
| **60** | 1 | 1 | 95 | 62 | 78 | 100 | 28 | 9 | 72 | 32,5 | 0,82 | **53212** | **U 212** |
| | 1,1 | 1 | 110 | 62 | 85 | 115 | 38,3 | 11,5 | 90 | 41 | 1,7 | **53312** | **U 312** |

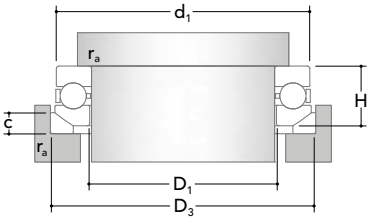



| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | $H_1$ | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **60** | 130 | 58 | 199 | 430 | 16 | 1600 | 2200 | **53412** |
| (cont.) | | | | | | | | |
| **65** | 100 | 32 | 60,6 | 150 | 5,5 | 2600 | 3600 | **53213** |
| | 115 | 43 | 106,0 | 240 | 8,8 | 2000 | 2800 | **53313** |
| **70** | 105 | 32 | 62,4 | 160 | 5,85 | 2600 | 3600 | **53214** |
| | 125 | 48 | 135,0 | 320 | 11,8 | 1800 | 2600 | **53314** |
| | 150 | 69 | 236 | 550 | 19,3 | 1400 | 2000 | **53414** |
| **75** | 110 | 32 | 64 | 170 | 6,2 | 2400 | 3400 | **53215** |
| | 135 | 52 | 164,0 | 390 | 14 | 1700 | 2400 | **53315** |
| | 160 | 75 | 251 | 610 | 20,8 | 1300 | 1800 | **53415** |
| **80** | 115 | 33 | 76,1 | 208 | 7,65 | 2400 | 3200 | **53216** |
| | 140 | 52 | 160,0 | 390 | 13,7 | 1600 | 2200 | **53316** |
| **85** | 125 | 37 | 99 | 275 | 9 | 2000 | 3000 | **53217** |
| | 150 | 58 | 174 | 405 | 14 | 1500 | 2000 | **53317** |
| **90** | 135 | 42 | 112 | 290 | 10,4 | 1900 | 2600 | **53218** |
| | 155 | 59 | 184 | 438 | 14,6 | 1400 | 2000 | **53318** |
| | 190 | 88 | 309 | 815 | 25,5 | 1100 | 1500 | **53418** |
| **100** | 150 | 45 | 120,0 | 325 | 10,8 | 1700 | 2400 | **53220** |
| | 170 | 64 | 225,0 | 570 | 18,3 | 1300 | 1800 | **53320** |
| | 210 | 98 | 372,0 | 1060 | 31,5 | 950 | 1300 | **53420** |
| **110** | 160 | 45 | 126 | 365 | 11,6 | 1700 | 2400 | **53222** |
| | 190 | 72 | 281,0 | 815 | 24,5 | 1100 | 1600 | **53322** |
| **120** | 170 | 46 | 128,0 | 390 | 11,8 | 1500 | 2200 | **53224** |
| | 210 | 80 | 327 | 980 | 28,5 | 1000 | 1400 | **53324** |

| Dimensions | | | | | | | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | $d_1$ | $D_1$ | $D_2$ | $D_3$ | H | C | R | s | | Standard design | Seat washer |
| [mm] | | | | | | | | | | | [kg] | | |
| **60** (cont.) | 1,5 | 1,5 | 130 | 62 | 95 | 135 | 54 | 16 | 100 | 34 | 3,8 | **53412** | **U 412** |
| **65** | 1 | 1 | 100 | 67 | 82 | 105 | 28,7 | 9 | 80 | 40 | 0,91 | **53213** | **U 213** |
| | 1,1 | 1 | 115 | 67 | 90 | 120 | 39,4 | 12,5 | 90 | 38,5 | 1,9 | **53313** | **U 313** |
| **70** | 1 | 1 | 105 | 72 | 88 | 110 | 27 | 9 | 80 | 38 | 0,97 | **53214** | **U 214** |
| | 1,1 | 1 | 125 | 72 | 98 | 130 | 44,2 | 13 | 100 | 43 | 2,5 | **53314** | **U 314** |
| | 2 | 2 | 150 | 73 | 110 | 155 | 63,6 | 19,5 | 112 | 34 | 6,5 | **53414** | **U 414** |
| **75** | 1 | 1 | 110 | 77 | 92 | 115 | 28,3 | 9,5 | 90 | 49 | 1 | **53215** | **U 215** |
| | 1,5 | 1,5 | 135 | 77 | 105 | 140 | 48,1 | 15 | 100 | 37 | 3,2 | **53315** | **U 315** |
| | 2 | 2 | 160 | 78 | 115 | 165 | 69 | 21 | 125 | 42 | 8,1 | **53415** | **U 415** |
| **80** | 1 | 1 | 115 | 82 | 98 | 120 | 29,5 | 10 | 90 | 46 | 1,1 | **53216** | **U 216** |
| | 1,5 | 1,5 | 140 | 82 | 110 | 145 | 47,6 | 15 | 112 | 50 | 3,2 | **53316** | **U 316** |
| **85** | 1 | 1 | 125 | 88 | 105 | 130 | 33,1 | 11 | 100 | 52 | 1,5 | **53217** | **U 217** |
| | 1,5 | 1,5 | 150 | 88 | 115 | 155 | 53,1 | 17,5 | 112 | 43 | 4,35 | **53317** | **U 317** |
| **90** | 1,1 | 1 | 135 | 93 | 110 | 140 | 38,5 | 13,5 | 100 | 45 | 2,1 | **53218** | **U 218** |
| | 1,5 | 1,5 | 155 | 93 | 120 | 160 | 54,6 | 18 | 112 | 40 | 4,7 | **53318** | **U 318** |
| | 2,1 | 2 | 187 | 93 | 140 | 195 | 81,2 | 25,5 | 140 | 40 | 13 | **53418** | **U 418** |
| **100** | 1,1 | 1 | 150 | 103 | 125 | 155 | 40,9 | 14 | 112 | 52 | 2,7 | **53220** | **U 220** |
| | 1,5 | 1,5 | 170 | 103 | 135 | 175 | 59,2 | 18 | 125 | 46 | 5,95 | **53320** | **U 320** |
| | 3 | 2,5 | 205 | 103 | 155 | 220 | 90 | 27 | 160 | 50 | 18 | **53420** | **U 420** |
| **110** | 1,1 | 1 | 160 | 113 | 135 | 165 | 40,2 | 14 | 125 | 65 | 2,9 | **53222** | **U 222** |
| | 2 | 2 | 187 | 113 | 150 | 195 | 67,2 | 20 | 140 | 51 | 9,1 | **53322** | **U 322** |
| **120** | 1,1 | 1 | 170 | 123 | 145 | 175 | 40,8 | 15 | 125 | 61 | 3,2 | **53224** | **U 224** |
| | 2,1 | 2 | 205 | 123 | 165 | 220 | 74,1 | 22 | 160 | 63 | 12,5 | **53324** | **U 324** |




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | $H_1$ | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **130** | 190 | 53 | 188,0 | 585 | 17 | 1300 | 1800 | **53226** |
| **140** | 200 | 55 | 190 | 620 | 17,6 | 1300 | 1800 | **53228** |

| Dimensions | | | | | | | | | | | Mass | Designation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | $d_1$ | $D_1$ | $D_2$ | $D_3$ | H | C | R | s | | Standard design | Seat washer |
| [mm] | | | | | | | | | | | [kg] | | |
| **130** | 1,5 | 1,5 | 187 | 133 | 160 | 195 | 47,9 | 17 | 140 | 67 | 4,85 | **53226** | **U 226** |
| **140** | 1,5 | 1,5 | 197 | 143 | 170 | 210 | 48,6 | 17 | 160 | 87 | 5,45 | **53228** | **U 228** |

# Double direction thrust ball bearings

Double direction thrust ball bearings are composed of one shaft washers, two housing washers and two cage-balls assemblies. Bearings are separable so, washers and cage-balls assemblies can be mounted separately. Axial deep groove ball bearings of series 522, 523 that have flat housing washers, can support axial forces in both direction but they cannot withstand any radial load and any misalignment.

Bearings of series 542 and 543 can support axial force in both direction, but having a spherical housing washers and matched with seating washer U2 and U3, they are able to compensate a misalignment between shaft and housing. No radial load can be supported.

The main boundary dimensions of axial deep groove ball bearings with flat and sphered housing washers are in conformity with ISO 104:2015 and DIN 711:2010 and DIN 715:2011 (ISO 20516:2007), respectively. They are manufactured with tolerances according to ISO 199:2014.



Double direction thrust ball bearings

## Minimum load

A minimum axial load is requested for a thrust ball bearing, like for all ball and roller bearings, to operate correctly, especially in critical application requirements like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions a skidding between the balls and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.

## Designs and variants

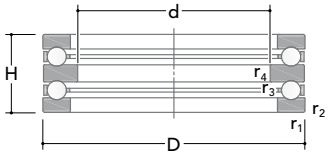
### Type 52M



**HB** BAINITE HT

**S** STABILIZATION

- Flat housing washers
- One-piece machined brass cage (M) guided on balls
- Separable design
- Supports medium to high bidirectional axial loads
- Suitable for applications requiring good limiting speeds

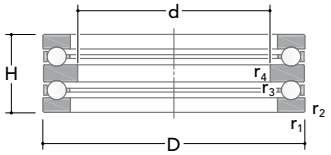


52M




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **10** | 32 | 22 | 15,90 | 25,0 | 0,915 | 5300 | 7500 | **52202** |
| **15** | 40 | 26 | 21,5 | 37,5 | 1,4 | 4300 | 6000 | **52204** |
| **20** | 47 | 28 | 26,8 | 50,5 | 1,88 | 3800 | 5300 | **52205** |
| | 52 | 34 | 35,0 | 60,0 | 2,24 | 3200 | 4500 | **52305** |
| | 70 | 52 | 70,9 | 122 | 4,5 | 2200 | 3200 | **52406** |
| **25** | 52 | 29 | 25,5 | 51,4 | 1,85 | 3600 | 5000 | **52206** |
| | 60 | 38 | 35,9 | 65,5 | 2,4 | 2800 | 4000 | **52306** |
| | 80 | 59 | 76,1 | 137 | 5,1 | 2000 | 2800 | **52407** |
| **30** | 62 | 34 | 35,2 | 73,9 | 2,7 | 3000 | 4300 | **52207** |
| | 68 | 36 | 44,8 | 96,5 | 3,6 | 2800 | 3800 | **52208** |
| | 68 | 44 | 50,0 | 96,5 | 3,55 | 2400 | 3400 | **52307** |
| | 78 | 49 | 63 | 122 | 4,5 | 2200 | 3000 | **52308** |
| | 90 | 65 | 95,6 | 183 | 6,8 | 1800 | 2400 | **52408** |
| **35** | 73 | 37 | 39,5 | 86,7 | 3,2 | 2600 | 3600 | **52209** |
| | 85 | 52 | 76,7 | 153 | 5,6 | 2000 | 2800 | **52309** |
| | 100 | 72 | 125 | 240 | 9 | 1600 | 2200 | **52409** |
| **40** | 78 | 39 | 49,9 | 116,5 | 4,3 | 2400 | 3400 | **52210** |
| | 95 | 58 | 81,9 | 170 | 6,3 | 1800 | 2600 | **52310** |
| **45** | 90 | 45 | 61,8 | 134 | 5 | 2200 | 3000 | **52211** |
| | 105 | 64 | 104,4 | 225 | 8,4 | 1600 | 2200 | **52311** |
| | 120 | 87 | 195,0 | 400 | 14,6 | 1300 | 1800 | **52411** |
| **50** | 95 | 46 | 60,0 | 140 | 5,2 | 2000 | 2800 | **52212** |
| | 110 | 64 | 101 | 224 | 8,3 | 1600 | 2200 | **52312** |
| | 130 | 93 | 199,0 | 430 | 16 | 1200 | 1700 | **52412** |

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 10 | 0,6 | 0,3 | 0,6 | 0,3 | 0,081 | 52202 |
| 15 | 0,6 | 0,3 | 0,6 | 0,3 | 0,15 | 52204 |
| 20 | 0,6 | 0,3 | 0,6 | 0,3 | 0,22 | 52205 |
| | 1 | 0,3 | 1 | 0,3 | 0,33 | 52305 |
| | 1 | 0,6 | 1 | 0,6 | 1 | 52406 |
| 25 | 0,6 | 0,3 | 0,6 | 0,3 | 0,25 | 52206 |
| | 1 | 0,3 | 1 | 0,3 | 0,47 | 52306 |
| | 1,1 | 0,6 | 1 | 0,6 | 1,45 | 52407 |
| 30 | 1 | 0,3 | 1 | 0,3 | 0,41 | 52207 |
| | 1 | 0,6 | 1 | 0,6 | 0,55 | 52208 |
| | 1 | 0,3 | 1 | 0,3 | 0,68 | 52307 |
| | 1 | 0,6 | 1 | 0,6 | 1,05 | 52308 |
| | 1,1 | 0,6 | 1 | 0,6 | 2,05 | 52408 |
| 35 | 1 | 0,6 | 1 | 0,6 | 0,6 | 52209 |
| | 1 | 0,6 | 1 | 0,6 | 1,25 | 52309 |
| | 1,1 | 0,6 | 1 | 0,6 | 2,7 | 52409 |
| 40 | 1 | 0,6 | 1 | 0,6 | 0,71 | 52210 |
| | 1,1 | 0,6 | 1 | 0,6 | 1,75 | 52310 |
| 45 | 1 | 0,6 | 1 | 0,6 | 1,1 | 52211 |
| | 1,1 | 0,6 | 1 | 0,6 | 2,4 | 52311 |
| | 1,5 | 0,6 | 1,5 | 0,6 | 4,7 | 52411 |
| 50 | 1 | 0,6 | 1 | 0,6 | 1,2 | 52212 |
| | 1,1 | 0,6 | 1 | 0,6 | 2,55 | 52312 |
| | 1,5 | 0,6 | 1,5 | 0,6 | 6,35 | 52412 |




52M




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **55** | 100 | 47 | 60,7 | 150 | 5,5 | 2000 | 2800 | **52213** |
| | 105 | 47 | 62,4 | 160 | 5,85 | 1900 | 2600 | **52214** |
| | 115 | 64 | 106,0 | 240 | 8,8 | 1600 | 2200 | **52313** |
| | 125 | 72 | 136,0 | 320 | 11,8 | 1400 | 2000 | **52314** |
| | 250 | 107 | 234 | 550 | 19,3 | 800 | 1100 | **52414** |
| **60** | 110 | 47 | 63,9 | 170 | 6,2 | 1900 | 2600 | **52215** |
| | 135 | 79 | 163 | 390 | 14 | 1300 | 1800 | **52315** |
| **65** | 115 | 48 | 77 | 209 | 7,69 | 2400 | 3400 | **52216** |
| | 140 | 79 | 159,0 | 390 | 13,8 | 1300 | 1800 | **52316** |
| **70** | 125 | 55 | 98 | 276 | 9,9 | 1600 | 2200 | **52217** |
| **75** | 135 | 62 | 112,5 | 290 | 116 | 1500 | 2000 | **52218** |
| **85** | 150 | 67 | 119 | 325 | 10,8 | 1300 | 1800 | **52220** |
| | 170 | 97 | 229 | 570 | 18,3 | 1000 | 1400 | **52320** |
| **95** | 160 | 67 | 130 | 365 | 11,6 | 1300 | 1800 | **52222** |
| **100** | 170 | 68 | 140 | 390 | 11,8 | 1200 | 1700 | **52224** |
| **110** | 190 | 80 | 190,0 | 586 | 16,6 | 1100 | 1500 | **52226** |
| **120** | 200 | 81 | 194,0 | 621 | 17,6 | 1000 | 1400 | **52228** |
| **130** | 215 | 89 | 238 | 800 | 22 | 950 | 1300 | **52230** |
| **140** | 225 | 90 | 238,0 | 830 | 22,4 | 900 | 1300 | **52232** |
| **150** | 240 | 97 | 270 | 930 | 24 | 850 | 1200 | **52234** |
| | 250 | 98 | 303 | 1120 | 28,5 | 800 | 1100 | **52236** |

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| 55 | 1 | 0,6 | 1 | 0,6 | 1,35 | 52213 |
| | 1 | 1 | 1 | 1 | 1,5 | 52214 |
| | 1,1 | 0,6 | 1 | 0,6 | 2,75 | 52313 |
| | 1,1 | 1 | 1 | 1 | 3,65 | 52314 |
| | 2 | 1 | 1,5 | 1 | 9,7 | 52414 |
| 60 | 1 | 1 | 1 | 1 | 1,55 | 52215 |
| | 1,5 | 1 | 1,5 | 1 | 4,8 | 52315 |
| 65 | 1 | 1 | 1 | 1 | 1,7 | 52216 |
| | 1,5 | 1 | 1 | 1 | 4,95 | 52316 |
| 70 | 1 | 1 | 1 | 1 | 2,4 | 52217 |
| 75 | 1,1 | 1 | 1 | 1 | 3,2 | 52218 |
| 85 | 1,1 | 1 | 1 | 1 | 4,2 | 52220 |
| | 1,5 | 1 | 1 | 1 | 8,95 | 52320 |
| 95 | 1,1 | 1 | 1 | 1 | 4,65 | 52222 |
| 100 | 1,1 | 1,1 | 1 | 1 | 5,25 | 52224 |
| 110 | 1,5 | 1,1 | 1,5 | 1 | 8 | 52226 |
| 120 | 1,5 | 1,1 | 1,5 | 1 | 8,65 | 52228 |
| 130 | 1,5 | 1,1 | 1,5 | 1 | 11,5 | 52230 |
| 140 | 1,5 | 1,1 | 1,5 | 1 | 12 | 52232 |
| 150 | 1,5 | 1,1 | 1,5 | 1 | 15 | 52234 |
| | 1,5 | 2 | 1,5 | 2 | 16 | 52236 |

# Cylindrical roller thrust bearings

The cylindrical roller thrust bearings manufactured by RKB are designed to support high axial loads (no radial loads are allowed on this kind of bearing). The manufacturing program includes single and double direction cylindrical roller thrust bearings with flat or spherical housing washers to meet any requirements in various industrial applications. Thanks to the improved internal geometry and the use of the most suitable raw materials, all RKB cylindrical roller thrust bearings attain the highest axial load ratings and the best reliability. Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rolling elements. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Single direction cylindrical roller thrust bearing

## Single direction cylindrical roller thrust bearings

Single direction cylindrical roller thrust bearings are composed of a housing washers GS, shaft washers WS and cage-cylindrical rollers assembly. Bearings are separable so, washers and cage-cylindrical rollers assembly can be mounted separately. These bearings are characterized by a very low axial section, high load capacity and high stiffness. They can support only axial loads in one direction and are not available to support radial force and tilting moments. Axial cylindrical roller bearings of series 811 and 812 are single raw bearings while the bearings of series 893 and 894 are double row bearings and their presence is required for heavy loads.
Shaft washers WS are centered on the shaft while housing washers are centered in the housing. Both washers have a bore diameter, outer diameter and rolling surface precision machined.

### Misalignment

Cylindrical roller thrust bearings do not allow any misalignment between shaft and housing and any alignment errors between support surfaces in the housing and on the shaft.

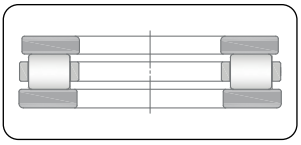
### Minimum load

A minimum axial load is requested for a cylindrical roller thrust bearing bearing, like for all ball and roller bearings, to operate correctly, especially in critical application requirements like: high speed, high acceleration and sudden changes of rotating direction. In these operating conditions a skidding between the cylindrical rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.

However, the minimum axial load is reached or surpassed by the weight of the components supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the thrust cylindrical bearings by springs or shaft nut.
For additional information, please consult the RKB application engineering service.

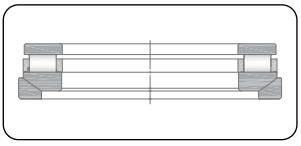
## Designs and variants

### Type 81M



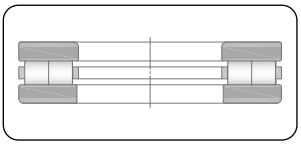

- Flat housing locating washer
- Low cross section separable design
- Two-piece machined brass cage (M) guided on rollers
- Supports unidirectional axial loads

### Type TCRBU




- Sphered housing washer
- Low cross section separable design
- Two-piece machined brass cage (M) guided on rollers
- Supports unidirectional axial loads
- The sphered housing washer is mounted on a locating sphered seating washer to accommodate shaft misalignment

### Type 89M




- Flat housing locating washer
- Two rows of rollers
- Two-piece machined brass cage (M) guided on rollers
- Low cross section separable design
- Supports unidirectional axial loads

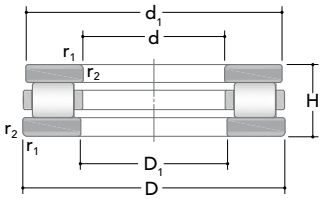
| Prefixes | |
|---|---|
| T | Single direction cylindrical roller thrust bearing followed by size indication |
| AT | Self-aligning single direction cylindrical roller thrust bearing followed by size indication |
| GS | Housing washer |
| WS | Shaft washer |
| K | Cylindrical roller and cage thrust assembly |
| LS | Universal washer |

| Suffixes | Internal design |
|---|---|
| SP | Special or non-standard bearing |

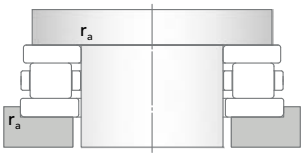
| Suffixes | Cage |
|---|---|
| M | Machined brass cage guided on rollers |
| TN or ATN | Molded polyamide cage (PA66) guided on rollers |
| TN9 | Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on rollers |

| Suffixes | Accuracy, clearance, running |
|---|---|
| P6S | Dimensional and running accuracy between P6 and P5 |

| Prefixes | Alternative designation |
|---|---|
| TCRB | Out of standard single direction cylindrical roller thrust bearing followed by drawing number |
| TTCRB | Out of standard double direction cylindrical roller thrust bearing followed by drawing number |
| TCRBU | Out of standard single direction cylindrical roller thrust bearing with sphered housing washer followed by drawing number |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **15** | 28 | 9 | 28 | 16 | 11,20 | 27,0 | 2,45 | 4300 | 8500 | **81102** |
| **17** | 30 | 9 | 30 | 18 | 12,2 | 31,5 | 2,9 | 4300 | 8500 | **81103** |
| **20** | 35 | 10 | 35 | 21 | 19,0 | 48,0 | 4,65 | 3800 | 7500 | **81104** |
| **25** | 42 | 11 | 42 | 26 | 25,0 | 69,5 | 6,8 | 3200 | 6300 | **81105** |
| **30** | 47 | 11 | 47 | 32 | 27,1 | 78,0 | 7,65 | 3000 | 6000 | **81106** |
| | 52 | 16 | 52 | 32 | 50,3 | 134 | 13,4 | 2400 | 4800 | **81206** |
| | 60 | 18 | 60 | 32 | 52,6 | 182 | 18,4 | 2300 | 4600 | **89306** |
| **35** | 52 | 12 | 52 | 37 | 29 | 93 | 9,15 | 2800 | 5600 | **81107** |
| | 62 | 18 | 62 | 37 | 62,0 | 190 | 19,3 | 2000 | 4000 | **81207** |
| | 68 | 20 | 68 | 37 | 61,7 | 219 | 22 | 2200 | 4100 | **89307** |
| **40** | 60 | 13 | 60 | 42 | 43,3 | 137 | 13,8 | 2400 | 5000 | **81108** |
| | 68 | 19 | 68 | 42 | 83,9 | 255 | 26,5 | 1900 | 3800 | **81208** |
| | 78 | 22 | 78 | 42 | 96,0 | 365 | 36,5 | 2000 | 4000 | **89308** |
| **45** | 65 | 14 | 65 | 47 | 45 | 153 | 15,3 | 2200 | 4500 | **81109** |
| | 73 | 20 | 73 | 47 | 84 | 255 | 26,5 | 1800 | 3600 | **81209** |
| | 85 | 24 | 85 | 47 | 108,0 | 422 | 43 | 1600 | 3100 | **89309** |
| **50** | 70 | 14 | 70 | 52 | 47,5 | 166 | 16,6 | 2200 | 4300 | **81110** |
| | 78 | 22 | 78 | 52 | 91,5 | 300 | 31 | 1700 | 3400 | **81210** |
| | 95 | 27 | 95 | 52 | 131,0 | 526 | 54 | 1500 | 2800 | **89310** |
| **55** | 78 | 16 | 78 | 57 | 69,6 | 285 | 29 | 1900 | 3800 | **81111** |
| | 90 | 25 | 90 | 57 | 122,0 | 390 | 40 | 1400 | 2800 | **81211** |
| | 105 | 30 | 105 | 57 | 145,0 | 566 | 58,9 | 1400 | 2600 | **89311** |
| **60** | 85 | 17 | 85 | 62 | 80,2 | 300 | 30,5 | 1800 | 3600 | **81112** |

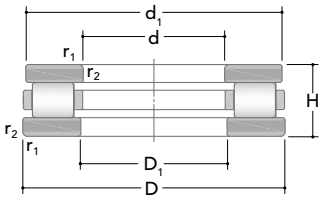


TCRBU

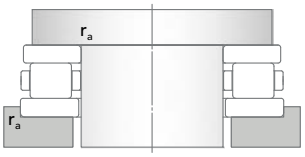


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **15** | 0,3 | 0,3 | 0,024 | **81102** | K 81102 | WS 81102 | GS 81102 | LS 1528 |
| **17** | 0,3 | 0,3 | 0,027 | **81103** | K 81103 | WS 81103 | GS 81103 | LS 1730 |
| **20** | 0,3 | 0,3 | 0,037 | **81104** | K 81104 | WS 81104 | GS 81104 | LS 2035 |
| **25** | 0,6 | 0,6 | 0,053 | **81105** | K 81105 | WS 81105 | GS 81105 | LS 2542 |
| **30** | 0,6 | 0,6 | 0,057 | **81106** | K 81106 | WS 81106 | GS 81106 | LS 3047 |
| | 0,6 | 0,6 | 0,12 | **81206** | K 81206 | WS 81206 | GS 81206 | - |
| | 1 | 1 | 0,24 | **89306** | K 89306 | WS 89306 | GS 89306 | - |
| **35** | 0,6 | 0,6 | 0,073 | **81107** | K 81107 | WS 81107 | GS 81107 | LS 3552 |
| | 1 | 1 | 0,21 | **81207** | K 81207 | WS 81207 | GS 81207 | - |
| | 1 | 1 | 0,34 | **89307** | K 89307 | WS 89307 | GS 89307 | - |
| **40** | 0,6 | 0,6 | 0,11 | **81108** | K 81108 | WS 81108 | GS 81108 | LS 4060 |
| | 1 | 1 | 0,25 | **81208** | K 81208 | WS 81208 | GS 81208 | - |
| | 1 | 1 | 0,48 | **89308** | K 89308 | WS 89308 | GS 89308 | - |
| **45** | 0,6 | 0,6 | 0,13 | **81109** | K 81109 | WS 81109 | GS 81109 | LS 4565 |
| | 1 | 1 | 0,29 | **81209** | K 81209 | WS 81209 | GS 81209 | - |
| | 1 | 1 | 0,62 | **89309** | K 89309 | WS 89309 | GS 89309 | - |
| **50** | 0,6 | 0,6 | 0,14 | **81110** | K 81110 | WS 81110 | GS 81110 | LS 5070 |
| | 1 | 1 | 0,36 | **81210** | K 81210 | WS 81210 | GS 81210 | - |
| | 1,1 | 1,1 | 0,89 | **89310** | K 89310 | WS 89310 | GS 89310 | - |
| **55** | 0,6 | 0,6 | 0,23 | **81111** | K 81111 | WS 81111 | GS 81111 | LS 5578 |
| | 1 | 1 | 0,57 | **81211** | K 81211 | WS 81211 | GS 81211 | - |
| | 1,1 | 1,1 | 1,2 | **89311** | K 89311 | WS 89311 | GS 89311 | - |
| **60** | 1 | 1 | 0,27 | **81112** | K 81112 | WS 81112 | GS 81112 | LS 6085 |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **60** | 95 | 26 | 95 | 62 | 137 | 465 | 47,5 | 1400 | 2900 | **81212** |
| (cont.) | 110 | 30 | 110 | 62 | 153,0 | 640 | 65,5 | 1400 | 2800 | **89312** |
| | 130 | 42 | 130 | 62 | 311,0 | 1160 | 127 | 1100 | 2100 | **89412** |
| **65** | 90 | 18 | 90 | 67 | 83 | 320 | 32,5 | 1700 | 3400 | **81113** |
| | 100 | 27 | 100 | 67 | 142,0 | 490 | 50 | 1300 | 2600 | **81213** |
| | 115 | 30 | 115 | 67 | 153,0 | 640 | 65,5 | 1400 | 2800 | **89313** |
| | 140 | 45 | 140 | 68 | 356 | 1378 | 142 | 1000 | 1900 | **89413** |
| **70** | 95 | 18 | 95 | 72 | 86,5 | 345 | 34,5 | 1700 | 3400 | **81114** |
| | 105 | 27 | 105 | 72 | 148,0 | 530 | 55 | 1300 | 2600 | **81214** |
| | 125 | 34 | 125 | 72 | 186 | 800 | 81,5 | 1300 | 2600 | **89314** |
| | 150 | 48 | 150 | 73 | 375 | 1440 | 152 | 970 | 1700 | **89414** |
| **75** | 100 | 19 | 100 | 77 | 83,5 | 338 | 34 | 1600 | 3200 | **81115** |
| | 110 | 27 | 110 | 77 | 137,0 | 490 | 50 | 1200 | 2400 | **81215** |
| | 135 | 36 | 135 | 77 | 228 | 946 | 100 | 1100 | 2100 | **89315** |
| | 160 | 51 | 160 | 78 | 394 | 1520 | 157 | 920 | 1600 | **89415** |
| **80** | 105 | 19 | 105 | 82 | 81,5 | 335 | 34 | 1500 | 3000 | **81116** |
| | 115 | 28 | 115 | 82 | 160 | 610 | 63 | 1200 | 2400 | **81216** |
| | 140 | 36 | 140 | 82 | 240 | 1060 | 108 | 1200 | 2400 | **89316** |
| | 170 | 54 | 170 | 83 | 440 | 1730 | 173 | 900 | 1800 | **89416** |
| **85** | 110 | 19 | 110 | 87 | 88,0 | 365 | 37,5 | 1500 | 3000 | **81117** |
| | 125 | 31 | 125 | 88 | 170,0 | 640 | 67 | 1100 | 2200 | **81217** |
| | 150 | 39 | 150 | 88 | 254 | 1080 | 112 | 1000 | 1900 | **89317** |
| | 180 | 58 | 180 | 88 | 491 | 1910 | 192 | 810 | 1500 | **89417** |
| **90** | 120 | 22 | 120 | 92 | 111,0 | 450 | 46 | 1300 | 2600 | **81118** |
| | 135 | 35 | 135 | 93 | 234,0 | 865 | 90 | 1000 | 2000 | **81218** |
| | 155 | 39 | 155 | 93 | 262 | 1140 | 116 | 970 | 1700 | **89318** |
| | 190 | 60 | 190 | 93 | 536 | 2090 | 211 | 780 | 1400 | **89418** |

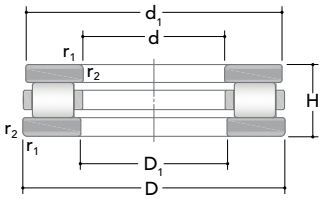


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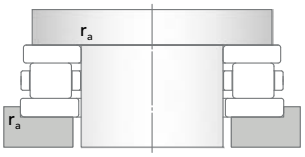


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| 60 | 1 | 1 | 0,65 | **81212** | K 81212 | WS 81212 | GS 81212 | - |
| (cont.) | 1,1 | 1,1 | 1,25 | **89312** | K 89312 | WS 89312 | GS 89312 | - |
| | 1,5 | 1,5 | 2,8 | **89412** | K 89412 | WS 89412 | GS 89412 | - |
| 65 | 1 | 1 | 0,31 | **81113** | K 81113 | WS 81113 | GS 81113 | LS 6590 |
| | 1 | 1 | 0,72 | **81213** | K 81213 | WS 81213 | GS 81213 | - |
| | 1,1 | 1,1 | 1,35 | **89313** | K 89313 | WS 89313 | GS 89313 | - |
| | 2 | 2 | 3,5 | **89413** | K 89413 | WS 89413 | GS 89413 | - |
| 70 | 1 | 1 | 0,33 | **81114** | K 81114 | WS 81114 | GS 81114 | LS 7095 |
| | 1 | 1 | 0,77 | **81214** | K 81214 | WS 81214 | GS 81214 | - |
| | 1,1 | 1,1 | 1,8 | **89314** | K 89314 | WS 89314 | GS 89314 | - |
| | 2 | 2 | 4,2 | **89414** | K 89414 | WS 89414 | GS 89414 | - |
| 75 | 1 | 1 | 0,39 | **81115** | K 81115 | WS 81115 | GS 81115 | LS 75100 |
| | 1 | 1 | 0,8 | **81215** | K 81215 | WS 81215 | GS 81215 | - |
| | 1,5 | 1,5 | 2,25 | **89315** | K 89315 | WS 89315 | GS 89315 | - |
| | 2 | 2 | 5,95 | **89415** | K 89415 | WS 89415 | GS 89415 | - |
| 80 | 1 | 1 | 0,4 | **81116** | K 81116 | WS 81116 | GS 81116 | LS 80105 |
| | 1 | 1 | 0,9 | **81216** | K 81216 | WS 81216 | GS 81216 | - |
| | 1,5 | 1,5 | 2,35 | **89316** | K 89316 | WS 89316 | GS 89316 | - |
| | 2,1 | 2,1 | 7,05 | **89416** | K 89416 | WS 89416 | GS 89416 | - |
| 85 | 1 | 1 | 0,42 | **81117** | K 81117 | WS 81117 | GS 81117 | LS 85110 |
| | 1 | 1 | 1,2 | **81217** | K 81217 | WS 81217 | GS 81217 | - |
| | 1,5 | 1,5 | 3,4 | **89317** | K 89317 | WS 89317 | GS 89317 | - |
| | 2,1 | 2,1 | 8,65 | **89417** | K 89417 | WS 89417 | GS 89417 | - |
| 90 | 1 | 1 | 0,62 | **81118** | K 81118 | WS 81118 | GS 81118 | LS 90120 |
| | 1,1 | 1,1 | 1,75 | **81218** | K 81218 | WS 81218 | GS 81218 | - |
| | 1,5 | 1,5 | 3,65 | **89318** | K 89318 | WS 89318 | GS 89318 | - |
| | 2,1 | 2,1 | 9,95 | **89418** | K 89418 | WS 89418 | GS 89418 | - |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **100** | 135 | 25 | 135 | 102 | 156,0 | 630 | 62 | 1200 | 2400 | **81120** |
| | 150 | 38 | 150 | 103 | 270 | 1060 | 104 | 900 | 1800 | **81220** |
| | 170 | 42 | 170 | 103 | 300 | 1370 | 132 | 950 | 1900 | **89320** |
| | 210 | 67 | 210 | 103 | 679,0 | 2780 | 267 | 670 | 1200 | **89420** |
| **110** | 145 | 25 | 145 | 112 | 164,0 | 680 | 65,5 | 1100 | 2200 | **81122** |
| | 160 | 38 | 160 | 113 | 260 | 1000 | 98 | 850 | 1700 | **81222** |
| | 190 | 48 | 190 | 113 | 400 | 1830 | 173 | 850 | 1700 | **89322** |
| | 230 | 73 | 230 | 113 | 791,0 | 3320 | 313 | 600 | 1100 | **89422** |
| **120** | 155 | 25 | 155 | 122 | 170 | 735 | 68 | 1100 | 2200 | **81124** |
| | 170 | 39 | 170 | 123 | 257 | 1000 | 96,5 | 800 | 1600 | **81224** |
| | 210 | 54 | 210 | 123 | 510 | 2360 | 216 | 750 | 1500 | **89324** |
| | 250 | 78 | 250 | 123 | 928,0 | 3870 | 358 | 570 | 1050 | **89424** |
| **130** | 170 | 30 | 170 | 132 | 200 | 880 | 81,5 | 950 | 1900 | **81126** |
| | 190 | 45 | 187 | 133 | 382 | 1460 | 137 | 700 | 1400 | **81226** |
| | 225 | 58 | 225 | 134 | 556 | 2610 | 244 | 670 | 1200 | **89326** |
| | 270 | 85 | 270 | 134 | 1076 | 4480 | 402 | 510 | 950 | **89426** |
| **140** | 180 | 31 | 178 | 142 | 208,0 | 930 | 85 | 900 | 1800 | **81128** |
| | 200 | 46 | 197 | 143 | 360 | 1400 | 129 | 700 | 1400 | **81228** |
| | 240 | 60 | 240 | 144 | 641 | 3070 | 278 | 650 | 1150 | **89328** |
| | 280 | 85 | 280 | 144 | 1097 | 4740 | 430 | 510 | 1000 | **89428** |
| **150** | 190 | 31 | 188 | 152 | 212,0 | 1000 | 88 | 850 | 1700 | **81130** |
| | 215 | 50 | 212 | 153 | 469,0 | 1900 | 170 | 630 | 1300 | **81230** |
| | 250 | 60 | 250 | 154 | 665,0 | 3200 | 289 | 600 | 1100 | **89330** |
| | 300 | 90 | 300 | 154 | 1245 | 5570 | 483 | 480 | 900 | **89430** |
| **160** | 200 | 31 | 198 | 162 | 216 | 1020 | 90 | 850 | 1700 | **81132** |
| | 225 | 51 | 220 | 163 | 482 | 2000 | 176 | 600 | 1200 | **81232** |
| | 320 | 95 | 320 | 164 | 1448 | 6478 | 533 | 480 | 950 | **89432** |

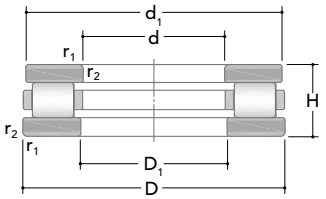


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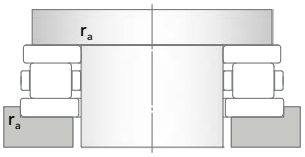


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **100** | 1 | 1 | 0,95 | **81120** | K 81120 | WS 81120 | GS 81120 | LS 100135 |
| | 1,1 | 1,1 | 2,2 | **81220** | K 81220 | WS 81220 | GS 81220 | - |
| | 1,5 | 1,5 | 4,55 | **89320** | K 89320 | WS 89320 | GS 89320 | - |
| | 3 | 3 | 13,5 | **89420** | K 89420 | WS 89420 | GS 89420 | - |
| **110** | 1 | 1 | 1,05 | **81122** | K 81122 | WS 81122 | GS 81122 | LS 110145 |
| | 1,1 | 1,1 | 2,3 | **81222** | K 81222 | WS 81222 | GS 81222 | - |
| | 2 | 2 | 6,7 | **89322** | K 89322 | WS 89322 | GS 89322 | - |
| | 3 | 3 | 17,5 | **89422** | K 89422 | WS 89422 | GS 89422 | - |
| **120** | 1 | 1 | 1,1 | **81124** | K 81124 | WS 81124 | GS 81124 | LS 120155 |
| | 1,1 | 1,1 | 2,55 | **81224** | K 81224 | WS 81224 | GS 81224 | - |
| | 2,1 | 2,1 | 9,45 | **89324** | K 89324 | WS 89324 | GS 89324 | - |
| | 4 | 4 | 22 | **89424** | K 89424 | WS 89424 | GS 89424 | - |
| **130** | 1 | 1 | 1,65 | **81126** | K 81126 | WS 81126 | GS 81126 | LS 130170 |
| | 1,5 | 1,5 | 4 | **81226** | K 81226 | WS 81226 | GS 81226 | - |
| | 2,1 | 2,1 | 11 | **89326** | K 89326 | WS 89326 | GS 89326 | - |
| | 4 | 4 | 27 | **89426** | K 89426 | WS 89426 | GS 89426 | - |
| **140** | 1 | 1 | 1,9 | **81128** | K 81128 | WS 81128 | GS 81128 | LS 140180 |
| | 1,5 | 1,5 | 5,05 | **81228** | K 81228 | WS 81228 | GS 81228 | - |
| | 2,1 | 2,1 | 12,5 | **89328** | K 89328 | WS 89328 | GS 89328 | - |
| | 4 | 4 | 29,5 | **89428** | K 89428 | WS 89428 | GS 89428 | - |
| **150** | 1 | 1 | 2,2 | **81130** | K 81130 | WS 81130 | GS 81130 | LS 150190 |
| | 1,5 | 1,5 | 7,2 | **81230** | K 81230 | WS 81230 | GS 81230 | - |
| | 2,1 | 2,1 | 14 | **89330** | K 89330 | WS 89330 | GS 89330 | - |
| | 4 | 4 | 35,5 | **89430** | K 89430 | WS 89430 | GS 89430 | - |
| **160** | 1 | 1 | 2,1 | **81132** | K 81132 | WS 81132 | GS 81132 | LS 160200 |
| | 1,5 | 1,5 | 7,6 | **81232** | K 81232 | WS 81232 | GS 81232 | - |
| | 5 | 5 | 42 | **89432** | K 89432 | WS 89432 | GS 89432 | - |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **170** | 215 | 34 | 215 | 172 | 287 | 1340 | 118 | 800 | 1600 | **81134** |
| | 240 | 55 | 237 | 173 | 544 | 2280 | 201 | 560 | 1100 | **81234** |
| | 340 | 103 | 340 | 174 | 1613 | 7200 | 600 | 430 | 850 | **89434** |
| **180** | 225 | 34 | 222 | 183 | 272 | 1270 | 110 | 750 | 1500 | **81136** |
| | 250 | 56 | 247 | 183 | 550 | 2400 | 204 | 560 | 1100 | **81236** |
| | 360 | 109 | 360 | 184 | 1760 | 8000 | 655 | 400 | 800 | **89436** |
| **190** | 240 | 37 | 237 | 193 | 311 | 1460 | 125 | 700 | 1400 | **81138** |
| | 270 | 62 | 267 | 194 | 696 | 2900 | 250 | 500 | 1000 | **81238** |
| | 380 | 115 | 380 | 195 | 1969 | 9000 | 720 | 380 | 750 | **89438** |
| **200** | 250 | 37 | 250 | 203 | 312 | 1500 | 125 | 700 | 1400 | **81140** |
| | 280 | 62 | 277 | 204 | 722 | 3100 | 255 | 500 | 1000 | **81240** |
| | 400 | 122 | 400 | 205 | 2171 | 10000 | 800 | 360 | 700 | **89440** |
| **220** | 270 | 37 | 267 | 223 | 335 | 1700 | 137 | 670 | 1300 | **81144** |
| | 300 | 63 | 297 | 224 | 753 | 3350 | 275 | 480 | 950 | **81244** |
| | 420 | 122 | 420 | 225 | 2320 | 11200 | 880 | 340 | 700 | **89444** |
| **240** | 300 | 45 | 297 | 243 | 478 | 2450 | 196 | 560 | 1100 | **81148** |
| | 340 | 78 | 335 | 244 | 1106 | 4900 | 390 | 400 | 800 | **81248** |
| **260** | 320 | 45 | 317 | 263 | 490 | 2600 | 200 | 530 | 1100 | **81152** |
| | 360 | 79 | 355 | 264 | 1157 | 5300 | 415 | 380 | 750 | **81252** |
| **280** | 350 | 53 | 347 | 283 | 681 | 3550 | 275 | 480 | 950 | **81156** |
| | 380 | 80 | 375 | 284 | 1159 | 5390 | 434 | 340 | 650 | **81256** |
| **300** | 380 | 62 | 376 | 304 | 850 | 4400 | 335 | 430 | 850 | **81160** |
| | 420 | 95 | 415 | 304 | 1536 | 7200 | 540 | 320 | 630 | **81260** |

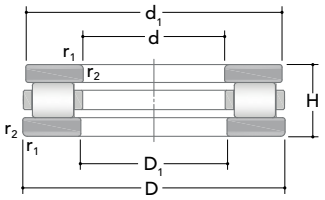


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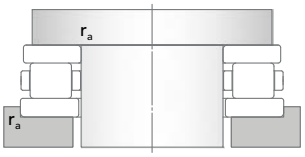


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **170** | 1,1 | 1,1 | 2,4 | **81134** | K 81134 | WS 81134 | GS 81134 | - |
| | 1,5 | 1,5 | 9,3 | **81234** | K 81234 | WS 81234 | GS 81234 | - |
| | 5 | 5 | 52 | **89434** | K 89434 | WS 89434 | GS 89434 | - |
| **180** | 1,1 | 1,1 | 3,7 | **81136** | K 81136 | WS 81136 | GS 81136 | - |
| | 1,5 | 1,5 | 9,95 | **81236** | K 81236 | WS 81236 | GS 81236 | - |
| | 5 | 5 | 60 | **89436** | K 89436 | WS 89436 | GS 89436 | - |
| **190** | 1,1 | 1,1 | 4,75 | **81138** | K 81138 | WS 81138 | GS 81138 | - |
| | 2 | 2 | 12 | **81238** | K 81238 | WS 81238 | GS 81238 | - |
| | 5 | 5 | 65,5 | **89438** | K 89438 | WS 89438 | GS 89438 | - |
| **200** | 1,1 | 1,1 | 4,95 | **81140** | K 81140 | WS 81140 | GS 81140 | - |
| | 2 | 2 | 13,5 | **81240** | K 81240 | WS 81240 | GS 81240 | - |
| | 5 | 5 | 75 | **89440** | K 89440 | WS 89440 | GS 89440 | - |
| **220** | 1,1 | 1,1 | 5,2 | **81144** | K 81144 | WS 81144 | GS 81144 | - |
| | 2 | 2 | 15 | **81244** | K 81244 | WS 81244 | GS 81244 | - |
| | 6 | 6 | 84,5 | **89444** | K 89444 | WS 89444 | GS 89444 | - |
| **240** | 1,5 | 1,5 | 8,45 | **81148** | K 81148 | WS 81148 | GS 81148 | - |
| | 2,1 | 2,1 | 22 | **81248** | K 81248 | WS 81248 | GS 81248 | - |
| **260** | 1,5 | 1,5 | 9,1 | **81152** | K 81152 | WS 81152 | GS 81152 | - |
| | 2,1 | 2,1 | 27 | **81252** | K 81252 | WS 81252 | GS 81252 | - |
| **280** | 1,5 | 1,5 | 12,5 | **81156** | K 81156 | WS 81156 | GS 81156 | - |
| | 2,1 | 2,1 | 30 | **81256** | K 81256 | WS 81256 | GS 81256 | - |
| **300** | 2 | 2 | 19,5 | **81160** | K 81160 | WS 81160 | GS 81160 | - |
| | 3 | 3 | 43 | **81260** | K 81260 | WS 81260 | GS 81260 | - |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **320** | 400 | 63 | 396 | 324 | 880 | 4650 | 345 | 400 | 800 | **81164** |
| | 440 | 95 | 435 | 325 | 1500 | 7450 | 518 | 280 | 550 | **81264** |
| **340** | 420 | 64 | 416 | 344 | 896 | 4840 | 359 | 360 | 700 | **81168** |
| | 460 | 96 | 455 | 345 | 1613 | 7850 | 566 | 280 | 510 | **81268** |
| **360** | 440 | 65 | 436 | 364 | 891 | 4860 | 358 | 360 | 660 | **81172** |
| | 500 | 110 | 495 | 365 | 2110 | 10280 | 680 | 250 | 460 | **81272** |
| **380** | 460 | 65 | 456 | 384 | 909 | 5280 | 345 | 350 | 650 | **81176** |
| **400** | 480 | 65 | 476 | 404 | 966 | 5530 | 395 | 340 | 600 | **81180** |
| **420** | 500 | 65 | 495 | 424 | 973 | 5820 | 402 | 320 | 600 | **81184** |
| **440** | 540 | 80 | 535 | 444 | 1441 | 7870 | 559 | 280 | 550 | **81188** |
| **460** | 560 | 80 | 555 | 464 | 1463 | 8460 | 573 | 280 | 520 | **81192** |
| **480** | 580 | 80 | 575 | 484 | 1475 | 8530 | 558 | 270 | 500 | **81196** |
| **500** | 600 | 80 | 595 | 505 | 1545 | 9166 | 629 | 260 | 490 | **811/500** |
| **530** | 640 | 85 | 635 | 535 | 1713 | 10450 | 690 | 250 | 470 | **811/530** |
| **560** | 670 | 85 | 665 | 565 | 1738 | 10910 | 716 | 250 | 430 | **811/560** |
| **600** | 710 | 85 | 705 | 605 | 1782 | 11590 | 721 | 230 | 430 | **811/600** |
| **630** | 750 | 73 | 746 | 634 | 1631 | 11190 | 696 | 220 | 420 | **891/630** |
| | 750 | 95 | 746 | 634 | 2133 | 13630 | 869 | 210 | 390 | **811/630** |
| | 850 | 175 | 842 | 638 | 4778 | 25650 | 1581 | 130 | 250 | **812/630** |

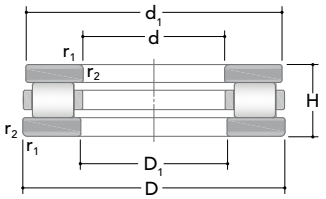


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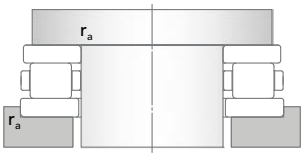


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **320** | 2 | 2 | 20,5 | **81164** | K 81164 | WS 81164 | GS 81164 | - |
| | 3 | 2,5 | 42,5 | **81264** | - | - | - | - |
| **340** | 2 | 2 | 22,5 | **81168** | K 81168 | WS 81168 | GS 81168 | - |
| | 3 | 2,5 | 47 | **81268** | - | - | - | - |
| **360** | 2 | 2 | 19,5 | **81172** | - | - | - | - |
| | 4 | 3 | 65,5 | **81272** | - | - | - | - |
| **380** | 2 | 2 | 22 | **81176** | - | - | - | - |
| **400** | 2 | 2 | 23 | **81180** | - | - | - | - |
| **420** | 2 | 2 | 24 | **81184** | - | - | - | - |
| **440** | 2,1 | 2 | 39,5 | **81188** | - | - | - | - |
| **460** | 2,1 | 2 | 41 | **81192** | - | - | - | - |
| **480** | 2,1 | 2 | 43 | **81196** | - | - | - | - |
| **500** | 2,1 | 2 | 44 | **811/500** | - | - | - | - |
| **530** | 3 | 2,5 | 55,5 | **811/530** | - | - | - | - |
| **560** | 3 | 2,5 | 58 | **811/560** | - | - | - | - |
| **600** | 3 | 2,5 | 62 | **811/600** | - | - | - | - |
| **630** | 3 | 2,5 | 62 | **891/630** | | | | |
| | 3 | 2,5 | 80 | **811/630** | - | - | - | - |
| | 6 | 5 | 295 | **812/630** | | | | |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **650** | 920 | 140 | 920 | 655 | 5402 | 37680 | 2340 | 90 | 120 | **358130** |
| | 930 | 130 | 930 | 650 | 5419 | 37460 | 2353 | 90 | 120 | **358162** |
| **655** | 765 | 45 | 765 | 650 | 1171 | 8950 | 553 | 280 | - | **634147** |
| **670** | 800 | 78 | 795 | 675 | 1999 | 13380 | 816 | 200 | 390 | **891/670** |
| | 800 | 105 | 795 | 675 | 2567 | 16160 | 988 | 180 | 350 | **811/670** |
| | 900 | 180 | 892 | 678 | 5759 | 30320 | 1811 | 130 | 250 | **812/670** |
| **673,227** | 876,173 | 111,125 | 876,173 | 673,227 | 4110 | 25540 | 1558 | 180 | - | **464790** |
| **710** | 850 | 85 | 845 | 715 | 2196 | 14860 | 908 | 180 | 350 | **891/710** |
| | 850 | 112 | 845 | 715 | 2937 | 18060 | 1135 | 170 | 330 | **811/710** |
| | 950 | 190 | 942 | 718 | 5910 | 31580 | 1854 | 120 | 230 | **812/710** |
| **711,327** | 964,26 | 127,127 | 964,26 | 711,327 | 5276 | 35340 | 2119 | 170 | - | **475623** |
| **750** | 900 | 90 | 895 | 755 | 2374 | 16530 | 1004 | 170 | 330 | **891/750** |
| | 900 | 120 | 895 | 755 | 3213 | 21040 | 1260 | 150 | 300 | **811/750** |
| | 1000 | 195 | 992 | 758 | 6573 | 35370 | 2117 | 110 | 210 | **812/750** |
| **762,127** | 964,946 | 111,125 | 964,946 | 762,127 | 4354 | 28530 | 1687 | 170 | - | **464789** |
| **780** | 890 | 50 | 890 | 780 | 1180 | 9830 | 580 | 240 | - | **634055** |
| **800** | 950 | 90 | 945 | 805 | 2505 | 17750 | 1055 | 170 | 340 | **891/800** |
| | 950 | 120 | 945 | 805 | 3468 | 21770 | 1304 | 150 | 290 | **811/800** |
| | 1060 | 205 | 1050 | 810 | 7415 | 40490 | 2281 | 100 | 190 | **812/800** |
| **812,8** | 1016 | 127,127 | 1016 | 812,8 | 5242 | 33680 | 1948 | 150 | - | **464973** |
| **850** | 1000 | 90 | 995 | 955 | 2576 | 18840 | 1109 | 170 | 310 | **891/850** |
| | 1000 | 120 | 995 | 855 | 3449 | 22910 | 1357 | 150 | 280 | **811/850** |

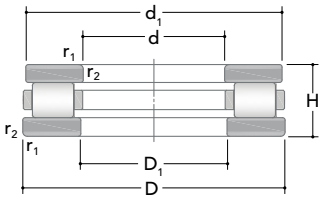


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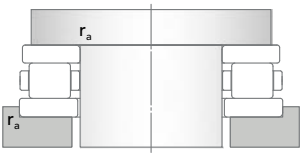


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **650** | 6 | 5 | 325 | **358130** | - | - | - | - |
| | 4 | 3 | 315 | **358162** | - | - | - | - |
| **655** | 1,9 | 1,5 | 39 | **634147** | - | - | - | - |
| **670** | 4 | 3 | 75,5 | **891/670** | - | - | - | - |
| | 4 | 3 | 110 | **811/670** | - | - | - | - |
| | 6 | 5 | 335 | **812/670** | - | - | - | - |
| **673,227** | 4 | 3 | 185 | **464790** | - | - | - | - |
| **710** | 4 | 3 | 95 | **891/710** | - | - | - | - |
| | 4 | 3 | 155 | **811/710** | - | - | - | - |
| | 6 | 5 | 395 | **812/710** | - | - | - | - |
| **711,327** | 7,6 | 7 | 300 | **475623** | - | - | - | - |
| **750** | 4 | 3 | 115 | **891/750** | - | - | - | - |
| | 4 | 3 | 155 | **811/750** | - | - | - | - |
| | 6 | 5 | 445 | **812/750** | - | - | - | - |
| **762,127** | 4 | 3 | 210 | **464789** | - | - | - | - |
| **780** | 1,5 | 1,5 | 52 | **634055** | - | - | - | - |
| **800** | 4 | 3 | 120 | **891/800** | - | - | - | - |
| | 4 | 3 | 165 | **811/800** | - | - | - | - |
| | 7,5 | 6 | 515 | **812/800** | - | - | - | - |
| **812,8** | 2,3 | 2 | 250 | **464973** | - | - | - | - |
| **850** | 4 | 3 | 130 | **891/850** | - | - | - | - |
| | 4 | 3 | 170 | **811/850** | - | - | - | - |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **850** | 1120 | 212 | 1110 | 860 | 8189 | 45100 | 2573 | 100 | 190 | **812/850** |
| (cont.) | | | | | | | | | | |
| **900** | 1060 | 95 | 1055 | 905 | 3021 | 21850 | 1259 | 150 | 300 | **891/900** |
| | 1060 | 130 | 1054 | 906 | 3952 | 26950 | 1503 | 140 | 270 | **811/900** |
| | 1180 | 220 | 1170 | 910 | 8482 | 48380 | 2684 | 90 | 170 | **812/900** |
| **950** | 1120 | 103 | 1115 | 955 | 3416 | 24810 | 1411 | 150 | - | **891/950** |
| | 1120 | 135 | 1114 | 956 | 4452 | 29700 | 1646 | 130 | - | **811/950** |
| **950** | 1250 | 236 | 1240 | 960 | 9878 | 57740 | 3191 | 80 | 160 | **812/950** |
| **980** | 1120 | 120 | 1115 | 985 | 3176 | 21770 | 1233 | - | - | **358272** |
| **1000** | 1090 | 70 | 1090 | 1003,5 | 1852 | 15100 | 861 | - | - | **351585** |
| | 1120 | 52 | 1120 | 1000 | 1591 | 13810 | 745 | - | - | **634146** |
| | 1180 | 109 | 1175 | 1005 | 3883 | 28340 | 1569 | - | - | **891/1000** |
| | 1160 | 140 | 1174 | 1006 | 4737 | 32470 | 1762 | - | - | **811/1000** |
| | 1320 | 250 | 1308 | 1012 | 10239 | 59380 | 3233 | - | - | **812/1000** |
| **1003,35** | 1117,6 | 50,8 | 1117,6 | 1003,35 | 1958 | 18290 | 1017 | - | - | **358391** |
| **1060** | 1250 | 115 | 1245 | 1065 | 4209 | 30520 | 1686 | - | - | **891/1060** |
| | 1250 | 150 | 1244 | 1066 | 5331 | 36130 | 1950 | 115 | 200 | **811/1060** |
| | 1400 | 265 | 1388 | 1972 | 11949 | 70210 | 3691 | - | - | **812/1060** |
| **1120** | 1320 | 122 | 1315 | 1125 | 4840 | 36390 | 1906 | - | - | **891/1120** |
| | 1320 | 160 | 1314 | 1126 | 6000 | 40720 | 2201 | - | - | **811/1120** |
| **1200** | 1660 | 300 | 1655 | 1205 | 20663 | 124900 | 6304 | - | - | **358235** |
| **1280** | 1400 | 60 | 1396 | 1284 | 1703 | 18880 | 956 | - | - | **634152** |

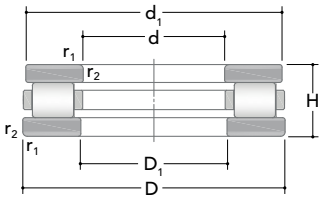


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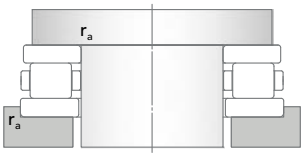


89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| **850** (cont.) | 7,5 | 6 | 580 | **812/850** | - | - | - | - |
| **900** | 5 | 4 | 150 | **891/900** | - | - | - | - |
| | 5 | 4 | 210 | **811/900** | - | - | - | - |
| | 7,5 | 6 | 665 | **812/900** | - | - | - | - |
| **950** | 5 | 4 | 185 | **891/950** | - | - | - | - |
| | 5 | 4 | 250 | **811/950** | - | - | - | - |
| **950** | 7,5 | 6 | 805 | **812/950** | - | - | - | - |
| **980** | 5 | 4 | 180 | **358272** | - | - | - | - |
| **1000** | 2,1 | 2 | 68 | **351585** | - | - | - | - |
| | 2,1 | 2 | 75 | **634146** | - | - | - | - |
| | 5 | 4 | 220 | **891/1000** | - | - | - | - |
| | 5 | 4 | 285 | **811/1000** | - | - | - | - |
| | 9,5 | 8 | 965 | **812/1000** | - | - | - | - |
| **1003,35** | 2 | 2 | 64,5 | **358391** | - | - | - | - |
| **1060** | 5 | 4 | 260 | **891/1060** | - | - | - | - |
| | 5 | 4 | 225 | **811/1060** | - | - | - | - |
| | 9,5 | 8 | 1150 | **812/1060** | - | - | - | - |
| **1120** | 5 | 4 | 305 | **891/1120** | - | - | - | - |
| | 5 | 4 | 410 | **811/1120** | - | - | - | - |
| **1200** | 6 | 5 | 2140 | **358235** | - | - | - | - |
| **1280** | 3 | 2,5 | 102 | **634152** | - | - | - | - |




81M




| Main dimensions | | | | | Basic load ratings | | Fatigue load limit $C_u$ | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|
| d | D | H | d1 | D1 | Dynamic C | Static $C_0$ | | Reference | Limiting | Standard design |
| [mm] | | | | | [kN] | | | [rpm] | | |
| **1400** | 1520 | 52 | 1515 | 1405 | 1815 | 23240 | 1178 | - | - | **358156** |
| | 1640 | 150 | 1632 | 1408 | 6113 | 47800 | 2330 | - | - | **358316** |
| **1560** | 1650 | 57 | 1650 | 1560 | 773 | 8030 | 396 | - | - | **358395** |
| **1680** | 1800 | 75 | 1796 | 1684 | 2118 | 23580 | 1081 | - | - | **634150** |
| **1750** | 1895 | 76 | 1890 | 1755 | 3157 | 41120 | 1918 | - | - | **358157** |
| **2130** | 2250 | 76 | 2245 | 2135 | 2351 | 10070 | 3495 | - | - | **634099** |
| **2305** | 2450 | 76 | 2445 | 2310 | 3784 | 53920 | 2283 | - | - | **358158** |
| **2540** | 2700 | 80 | 2695 | 2545 | 4370 | 62730 | 2704 | - | - | **358155** |



TCRBU



89M

| Dimensions | | | Mass | Designation | Designation of components | | | |
|---|---|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design | Roller thrust cage assembly | Washer type | | |
| | | | | | | Shaft | Housing | Universal |
| [mm] | | | [kg] | | | | | |
| 1400 | 2 | 2 | 97 | 358156 | - | - | - | - |
| | 6 | 5 | 575 | 358316 | - | - | - | - |
| 1560 | 2 | 2 | 97 | 358395 | - | - | - | - |
| 1680 | 4 | 3 | 175 | 634150 | - | - | - | - |
| 1750 | 3 | 2,5 | 215 | 358157 | - | - | - | - |
| 2130 | 3 | 2,5 | 235 | 634099 | - | - | - | - |
| 2305 | 3 | 2,5 | 285 | 358158 | - | - | - | - |
| 2540 | 3 | 2,5 | 365 | 358155 | - | - | - | - |

# Double direction cylindrical roller thrust bearings

Double direction cylindrical roller thrust bearings are composed of two housing washers GS, one shaft washers WS and two cage-cylindrical rollers assemblies. Bearings are separable so washers and axial cylindrical roller and cage-cylindrical rollers assemblies can be mounted separately to easy the operations. These bearings are characterized by a very high load capacity and high stiffness. They can support axial loads in both direction and are not able to withstand radial force and tilting moments.
The main boundary dimensions of axial cylindrical roller bearings are in conformity with ISO 104:2015. They are manufactured with tolerances according to ISO 199:2014.



Double direction cylindrical roller thrust bearings

## Misalignment

Thrust roller bearings do not allow any misalignment between shaft and housing and any alignment errors between support surfaces in the housing and on the shaft.

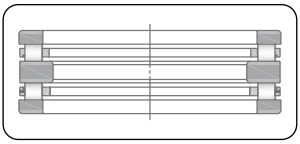
## Minimum load

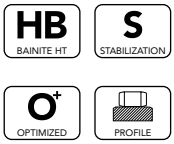
A minimum axial load is requested for a thrust roller bearing, like for all roller bearings, to operate correctly, especially in particularly application requirements like: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.

However, the minimum axial load is reached or surpassed by the weight of the components supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the cylindrical roller thrust bearings by springs or shaft nut.

## Designs and variants

### Type WS+GS






- Flat housing washers
- Separable components unit: shaft washers (WS) plus housing washers (GS)
- Two-piece machined brass cage (M) guided on rollers
- Sensitive to misalignments
- Supports very high bidirectional axial loads

# Tapered roller thrust bearings

The tapered roller thrust bearings manufactured by RKB are designed to support very high axial loads and even moderate shock loads. Their particular design features a true rolling motion, minimizing roller friction and allowing a better running compared to other thrust bearings. According to this feature, tapered roller thrust bearings meet any requirements in various industrial applications. Thanks to the improved internal geometry and the use of the most suitable raw materials, all RKB TBs attain the highest axial load ratings and the best reliability. Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rolling elements. The bearing dimensional and running accuracy conforms to ISO/ ABMA/ GOST specifications.



Single direction tapered roller thrust bearings

## Single direction tapered roller thrust bearings

Single direction tapered roller thrust bearings are produced in three different designs. The first one features a shaft washer with a tapered raceway, a two-piece machined brass cage, one row of tapered rollers and a flat housing washer. They have a separable design so, washers and cage-tapered roller assembly can be mounted separately. They can accommodate axial forces only in one direction and are able to accept a small eccentricity between shaft and housing without compromising their performances.
The second design has two identical tapered washers and a two-piece machined brass cage. It has a separable design so, washers and cage-tapered roller assembly can be mounted separately. This configuration is normally suggested where very heavy axial loads acting only in one direction have to be supported. On request for an increased carrying capacity, a full complement (cageless design) can be manufactured.
Bearing TKSD design for screw down mechanism is subjected to extremely heavy axial loads in one direction and, in order to maximize the load carrying capacity, this kind of bearing is normally full complement (cageless). Moreover, they have to able to permit angular movement of the screw spindle respect to the support without affect negatively the bearing life. The angular movement may be accommodated by one sphered washer, that can be either shaft washer or housing washer. The pressure plate can be supplied by RKB.

### Misalignment

Tapered roller thrust bearings do not allow any misalignment between shaft and housing and any alignment errors between support surfaces in the housing and on the shaft.

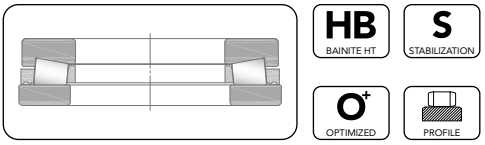
## Minimum load

A minimum axial load is requested for a a tapered roller thrust bearing, like for all roller bearings, to operate correctly, especially in particularly application requirements like: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.

However, the minimum axial load is reached or surpassed by the weight of the components supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the tapered roller thrust bearings by springs or shaft nut.

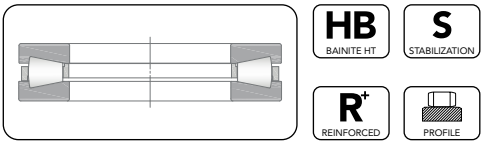
## Designs and variants

### Type TK1



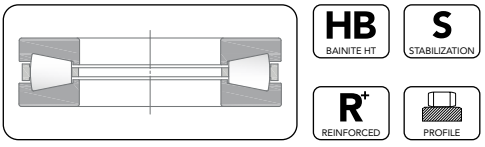

- Support unidirectional axial loads
- Tapered raceway on shaft washer and flat on housing washer
- Cage guided on both washers
- Optimized roller profile

### Type TK2



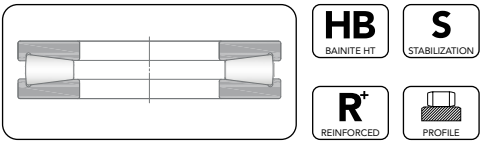

- Support unidirectional axial loads
- Cage guided on washers
- Symmetrical washers featuring taper raceway
- Optimized roller profile

### Type TK3



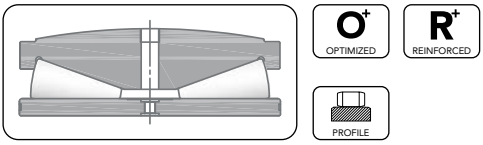

- Support unidirectional axial loads
- Cage guided on rollers
- Symmetrical washers featuring taper raceway
- Optimized roller profile

### Type TK4



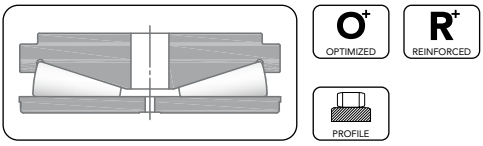

- Full complement (cageless) design for increased carrying capacities
- Support unidirectional axial loads
- Symmetrical washers featuring taper raceway
- Optimized roller profile

## Type TKSD1



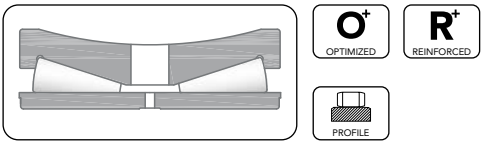

- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Convex sphered shaft washer outer surface (suitable for concave screw spindles)
- Designed to accommodate misalignment angle on the sphered surface
- Optimized roller profile

## Type TKSD2



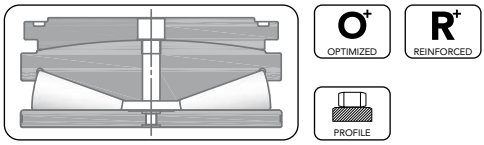

- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Flat shaft washer outer surface
- No misalignment angle can be accommodated
- Optimized roller profile

## Type TKSD3



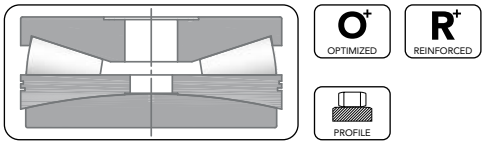

- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Concave sphered shaft washer outer surface (suitable for convex screw spindles)
- Designed to accommodate misalignment angle on the sphered surface
- Optimized roller profile

## Type TKSD4




- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Convex sphered shaft washer outer surface, mating a concave sphered pressure plate surface
- Designed to accommodate misalignment angle
- Optimized roller profile

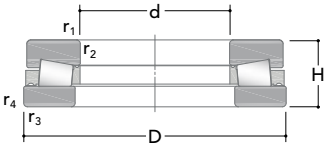
## Type TKSD5



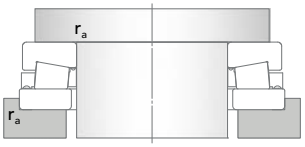

- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Concave sphered housing washer outer surface, mating a convex sphered pressure plate surface
- Designed to accommodate misalignment angle
- Optimized roller profile

| Suffixes | Internal design |
|---|---|
| ZB | Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code |

| Prefixes | Alternative designation |
|---|---|
| TK | Out of standard single direction tapered roller thrust bearing followed by drawing number |
| TKFL | Out of standard single direction tapered roller thrust bearing with flat shaft washer followed by drawing number |
| TTK | Out of standard double direction tapered roller thrust bearing followed by drawing number |
| TKSD | Out of standard screw-down bearing followed by drawing number |



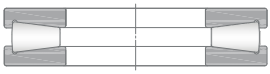

TK1



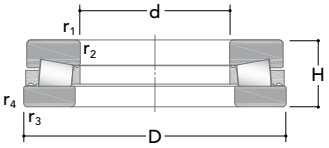

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Standard design |
| [mm] | | | [kN] | | | |
| **100** | 260 | 65 | 1150,00 | 4700 | 350 | **351137** |
| **120** | 300 | 75 | 1500,0 | 6280 | 430 | **351139** |
| | 300 | 79 | 2100,0 | 6570 | 540 | **353332** |
| **140** | 230 | 75 | 630,0 | 1914 | 175 | **350726** |
| **177,8** | 368,3 | 82,55 | 2400,0 | 10200 | 710 | **353286** |
| **180** | 500 | 145 | 5530,0 | 25300 | 1540 | **353022** |
| **190** | 330 | 77 | 1480,0 | 5770 | 460 | **353348** |
| **220** | 500 | 125 | 3540,0 | 15700 | 980 | **351148** |
| **260** | 580 | 145 | 4650 | 21000 | 1230 | **351153** |
| **279,4** | 603,25 | 136,525 | 7150,0 | 28400 | 1800 | **353316** |
| **290** | 400 | 73 | 1070,0 | 4630 | 335 | **350888** |
| **300** | 660 | 165 | 5920 | 26600 | 1520 | **351195** |
| | 660 | 165 | 6630,0 | 27800 | 1740 | **353916** |
| **340** | 460 | 73 | 1230,0 | 5660 | 405 | **350565** |
| **347,5** | 710 | 160 | 7830,0 | 39200 | 2300 | **351468** |
| **370** | 560 | 115 | 3570,0 | 14100 | 1050 | **353205** |
| **380** | 560 | 110 | 2860,0 | 11900 | 850 | **353164** |
| **480** | 730 | 112 | 3630,0 | 18800 | 1180 | **350998** |


TK2

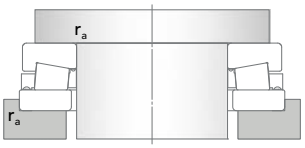

TK3


TK4

| Dimensions | | | | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | | [kg] | |
| **100** | 4 | 4 | 3 | 20,5 | **351137** |
| **120** | 5 | 5 | 3 | 33,5 | **351139** |
| | 4,8 | 4,8 | 4 | 30 | **353332** |
| **140** | 2,1 | 2,1 | 2 | 14,5 | **350726** |
| **177,8** | 8 | 8 | 6 | 47 | **353286** |
| **180** | 6 | 6 | 5 | 195 | **353022** |
| **190** | 3,3 | 3,3 | 3 | 30 | **353348** |
| **220** | 7,5 | 7,5 | 6 | 160 | **351148** |
| **260** | 7,5 | 7,5 | 6 | 210 | **351153** |
| **279,4** | 4,8 | 4,8 | 4 | 205 | **353316** |
| **290** | 3 | 3 | 2,5 | 32,5 | **350888** |
| **300** | 7,5 | 7,5 | 6 | 350 | **351195** |
| | 10 | 10 | 9 | 315 | **353916** |
| **340** | 3 | 3 | 2,5 | 37 | **350565** |
| **347,5** | 4 | 4 | 3 | 345 | **351468** |
| **370** | 5 | 5 | 4 | 110 | **353205** |
| **380** | 3 | 3 | 2,5 | 110 | **353164** |
| **480** | 6 | 6 | 5 | 180 | **350998** |



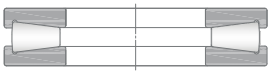

TK1



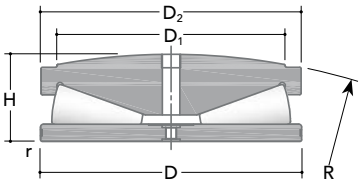

| Main dimensions | | | Basic load ratings | | Fatigue load limit $C_u$ | Designation |
|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | | Standard design |
| [mm] | | | [kN] | | | |
| **558,8** | 1066,8 | 285,75 | 19520,0 | 73700 | 4200 | **353285** |
| **600** | 900 | 170 | 6970,0 | 32000 | 1900 | **353201** |
| **749,3** | 952,5 | 127 | 5830,0 | 29800 | 1750 | **353247** |
| **840** | 1140 | 195 | 11250 | 63100 | 3450 | **351573** |
| **1002** | 1274 | 150 | 9100 | 56400 | 3050 | **353901** |
| **1005** | 1280 | 150 | 8330 | 50900 | 2650 | **353210** |
| **1770** | 1930 | 80 | 3250,0 | 31700 | 1400 | **353312** |
| **1828,8** | 2184,4 | 203,2 | 20200,0 | 141000 | 6300 | **353320** |


TK2

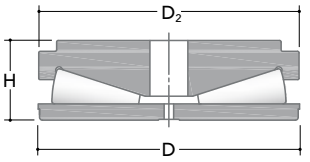

TK3


TK4

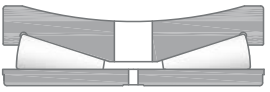
| Dimensions | | | | Mass | Designation |
|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | | [kg] | |
| **558,8** | 12,7 | – | 12 | 1200 | **353285** |
| **600** | 7,5 | 7,5 | 6 | 405 | **353201** |
| **749,3** | 5 | 2,5 | 4 | 230 | **353247** |
| **840** | 7,5 | 7,5 | 6 | 575 | **351573** |
| **1002** | 7,5 | 7,5 | 6 | 465 | **353901** |
| **1005** | 7,5 | 7,5 | 6 | 505 | **353210** |
| **1770** | 5 | 5 | 4 | 250 | **353312** |
| **1828,8** | 10,2 | 10,2 | 9 | 1450 | **353320** |




TKSD1



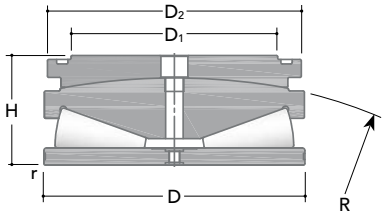

TKSD2



TKSD3

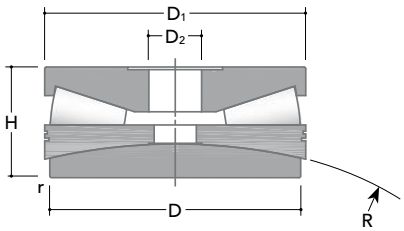
| Main dimensions | | | | | Basic load rating | Dimensions | Mass | Designation |
|---|---|---|---|---|---|---|---|---|
| D | $D_1$ | $D_2$ | H | R | Static $C_0$ | $r_{min}$ | | Standard design |
| [mm] | | | | | [kN] | [mm] | [kg] | |
| **203,2** | 177,8 | 200,84 | 75620 | 508 | 3930,00 | 1,6 | 16,5 | **353108** |
| **266,7** | 228,6 | 264,34 | 94,41 | 609,6 | 7070,0 | 1,6 | 35,5 | **353038** |
| **320,68** | 279,4 | 318,31 | 110,97 | 762 | 10250,0 | 1,6 | 61,5 | **353065** |
| **377,83** | 330,2 | 375,46 | 129,01 | 914,4 | 14890,0 | 1,6 | 96 | **353107** |
| **409,58** | 355,6 | 407,21 | 140,77 | 1016 | 16980,0 | 3,2 | 125 | **353058** |
| **438,15** | 381 | 435,79 | 150,67 | 1016 | 19860,0 | 3,2 | 170 | **353059** |
| **495,3** | 431,8 | 492,94 | 170,61 | 1066,8 | 25960 | 3,2 | 205 | **353024** |
| | 431,8 | 492,94 | 170,61 | 1066,8 | 25960,0 | 3,2 | 205 | **353295** |
| **508** | 440 | 504,825 | 177,419 | 1143 | 30970 | 2,5 | 225 | **353322** |
| **523,875** | 457,2 | 521,51 | 175,77 | 1270 | 29930,0 | 3,2 | 245 | **353020** |
| **533,4** | 457,2 | 533,4 | 177,8 | 1981,2 | 30380,0 | 3,2 | 280 | **353129** |
| **555,63** | 482,6 | 553,26 | 190,86 | 1270 | 33090 | 3,2 | 275 | **616674** |
| | 482,6 | 553,26 | 190,86 | 1270 | 33090,0 | 3,2 | 275 | **353078** |
| | 482,6 | 553,26 | 205,74 | 1270 | 33190,0 | 3,2 | 305 | **353260** |
| **581,03** | 508 | 578,66 | 193,78 | 1422,4 | 37270,0 | 3,2 | 290 | **353124** |
| | 508 | 578,66 | 196,65 | 1308,1 | 37270,0 | 3,2 | 330 | **353288** |
| **609,6** | 533,4 | 607,24 | 204,01 | 1524 | 38930,0 | 3,2 | 400 | **353093** |
| | - | 607,24 | 177,038 | - | 38930,0 | 3,2 | 375 | **353262** |
| **641,35** | 560 | 638,99 | 178,1 | 1524 | 44690,0 | 3.2 | 455 | **353134** |

| Main dimensions | | | | | Basic load rating | Dimensions | Mass | Designation |
|---|---|---|---|---|---|---|---|---|
| D | $D_1$ | $D_2$ | H | R | Static $C_0$ | $r_{min}$ | | Standard design |
| [mm] | | | | | [kN] | [mm] | [kg] | |
| **920** | 830 | 920 | 280 | 2300 | 91590 | 7,5 | 1180 | **353193** |




TKSD4

| Main dimensions | | | | | Basic load rating | Dimensions | Mass | Designation |
|---|---|---|---|---|---|---|---|---|
| D | $D_1$ | $D_2$ | H | R | Static $C_0$ | $r_{min}$ | | Standard design |
| [mm] | | | | | [kN] | [mm] | [kg] | |
| **174,63** | 150 | 173 | 76 | 457,2 | 2950,0 | 1,5 | 12 | **353305** |
| **203,2** | 170 | 200 | 90 | 508 | 3950,0 | 1,1 | 16,5 | **353108** |
| **266,7** | 225 | 264,34 | 120 | 609,6 | 7050,0 | 1,6 | 47 | **353038** |
| **409,58** | 355 | 410 | 188 | 1016 | 17000,0 | 3,2 | 170 | **353058** |
| **533,4** | 410 | 500 | 245 | 1981,2 | 30400,0 | 3,2 | 360 | **353129** |
| **581,03** | 460 | 565 | 243,78 | 1422,4 | 37000,0 | 3,2 | 400 | **353124** |
| | 500 | 570 | 243,78 | 1422,4 | 37000 | 3,2 | 425 | **353124** |
| **609,6** | 585 | 710 | 254,01 | 1524 | 38500,0 | 3,2 | 565 | **353093** |
| **641,35** | 560 | 635 | 260 | 1524 | 44200,0 | 3,2 | 560 | **353134** |
| **920** | 768 | 915 | 370 | 2300 | 92000,0 | 7,5 | 1700 | **353195** |




TKSD5

| Main dimensions | | | | | Basic load rating | Dimensions | Mass | Designation |
|---|---|---|---|---|---|---|---|---|
| D | $D_1$ | $D_2$ | H | R | Static $C_0$ | $r_{min}$ | | Standard design |
| [mm] | | | | | [kN] | [mm] | [kg] | |
| **476** | 495,3 | 100 | 210 | 1075 | 25700,0 | - | 310 | **353075** |
| **515** | 520 | 60 | 220 | 1160 | 35600,0 | 3,3 | 290 | **353231** |
| **571,5** | 581,03 | - | 240,77 | 1270 | 34900,0 | - | 460 | **353067** |
| **582,625** | 609,6 | - | 249,96 | 1270 | 38400,0 | 3 | 410 | **353142** |
| | 670 | - | 248,46 | 1270 | 42500,0 | 3 | 530 | **353903** |
| **740** | 800 | 340 | 320 | 1500 | 45300,0 | 8 | 1010 | **353070** |
| **775** | 850 | 340 | 360 | 1500 | 56600 | 5 | 1330 | **353045** |
| **830** | 900 | 320 | 390 | 1500 | 80900,0 | 10 | 1640 | **353029** |

# Double direction tapered roller thrust bearings

Double direction tapered roller thrust bearings (TTK) can support high bidirectional axial loads and are able to accommodate a small eccentricity between shaft and housing, without affecting negatively their performance. Due to a large number of a tapered rollers, this bearing has also an high rigidity. TTK is available in two main configurations. The first one has two tapered housing washers, a flat shaft washer, two tapered rows of rollers and two two-pieced machined brass cage guided on shaft washer. A spacer sleeve is arranged between the two housing washers in order to adjust the correct Bench End Play (BEP) requested by the customer.
A second version has an intermediate washer with external housing centering. Both bearings designs are separable, so washers, cage-tapered rollers assemblies and spacer sleeve can be mounted separately.



Double direction tapered roller thrust bearings

## Misalignment

Double direction tapered roller thrust bearings featuring a flat washer do not allow any misalignment of the shaft as well as any other perpendicular error of the supporting parts.

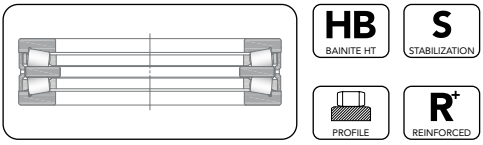
## Minimum load

A minimum axial load is requested for a double tapered roller thrust bearing, like for all roller bearings, to operate correctly, especially in particularly application requirements like: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.

However, the minimum axial load is reached or surpassed by the weight of the components supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the tapered roller thrust bearing by springs or shaft nut.
For additional information, please consult the RKB application engineering service.

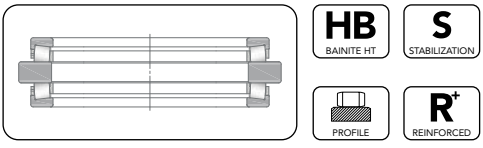
## Designs and variants

### Type TTK1



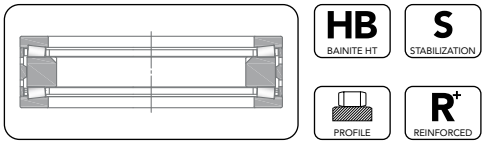

- Separable compact units
- Two-piece machined brass cage (M) guided on shaft washer (intermediate washer)
- Intermediate washer with internal centering on shaft
- Preset or adjusted BEP on customer's request
- Very sensitive to misalignments
- Supports very high bidirectional axial loads
- Available with lubrication grooves and holes in outer spacer

### Type TTK2

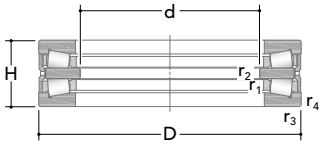



- Low cross section separable compact units
- Two-piece machined brass cage (M) guided on shaft washer (intermediate washer)
- Intermediate washer with external centering on the housing
- Very sensitive to misalignments
- Supports very high bidirectional axial loads

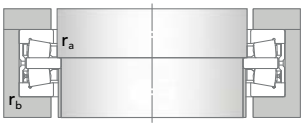
### Type TTKSP




- Separable compact units
- Two-piece machined brass cage (M) guided on shaft washer (intermediate washer)
- Shaft washer with internal centering on shaft
- Preset or adjusted BEP on customer's request
- Very sensitive to misalignments
- Support very high bidirectional axial loads
- Available with lubrication grooves and holes in outer spacer




TTK1




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Standard design |
| [mm] | | | [kN] | | | |
| **170** | 240 | 84 | 325,00 | 1300 | 103 | **350980** |
| **180** | 280 | 90 | 560,0 | 2350 | 197 | **353162** |
| **220** | 300 | 96 | 435,0 | 1650 | 133 | **351019** |
| **240** | 320 | 96 | 420,0 | 1880 | 145 | **351182** |
| **250** | 380 | 100 | 910,0 | 4500 | 340 | **353005** |
| **260** | 360 | 92 | 600,0 | 2650 | 190 | **350981** |
| **270** | 450 | 180 | 1645 | 5900 | 460 | **351164** |
| **305,07** | 530 | 200 | 2395,0 | 10500 | 685 | **353194** |
| **320** | 440 | 108 | 1000,0 | 4900 | 340 | **353102** |
| | 470 | 130 | 1320,0 | 5650 | 410 | **350982** |
| **350** | 490 | 130 | 1150,0 | 5100 | 345 | **351100** |
| | 540 | 135 | 1700 | 9100 | 625 | **353006** |
| **380** | 560 | 130 | 1800,0 | 9900 | 675 | **351175** |
| | 650 | 215 | 3350,0 | 16300 | 1080 | **353204** |
| **400** | 650 | 200 | 2750,0 | 13500 | 825 | **353106** |
| **420** | 620 | 170 | 2400,0 | 12100 | 805 | **351121** |
| | 620 | 185 | 2400,0 | 12120 | 805 | **353200** |
| **440** | 645 | 167 | 1950,0 | 10640 | 705 | **353152** |
| **450** | 645 | 155 | 1950,0 | 10900 | 690 | **350916** |

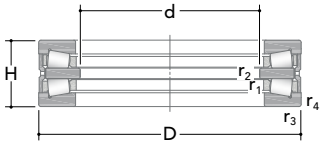


TTK2

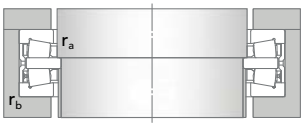


TTKSP

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **170** | 0,6 | 2 | 0,6 | 2 | 12,5 | **350980** |
| **180** | 1 | 2 | 1 | 2 | 22 | **353162** |
| **220** | 0,6 | 2 | 0,6 | 2 | 20 | **351019** |
| **240** | 0,6 | 2 | 0,6 | 2 | 21,5 | **351182** |
| **250** | 0,6 | 2 | 0,6 | 2 | 43,5 | **353005** |
| **260** | 1 | 2 | 1 | 2 | 28 | **350981** |
| **270** | 2 | 5 | 2 | 4 | 120 | **351164** |
| **305,07** | 6,4 | 6,4 | 6 | 6 | 185 | **353194** |
| **320** | 1,1 | 3 | 1 | 2,5 | 48,5 | **353102** |
| | 1,1 | 3 | 1 | 2,5 | 80 | **350982** |
| **350** | 1,1 | 3 | 1 | 2,5 | 73,5 | **351100** |
| | 1,1 | 4 | 1 | 3 | 115 | **353006** |
| **380** | 1,5 | 3 | 1,5 | 2,5 | 110 | **351175** |
| | 2 | 4 | 2 | 3 | 275 | **353204** |
| **400** | 4 | 4 | 4 | 4 | 235 | **353106** |
| **420** | 1,5 | 3 | 1,5 | 3 | 185 | **351121** |
| | 1,5 | 3 | 1,5 | 3 | 200 | **353200** |
| **440** | 3 | 4 | 2,5 | 3 | 190 | **353152** |
| **450** | 4 | 4 | 3 | 3 | 170 | **350916** |




TTK1




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Designation |
|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Standard design |
| [mm] | | | [kN] | | | |
| **470** | 720 | 200 | 3350,0 | 17540 | 1100 | **353151** |
| | 720 | 200 | 3450,0 | 17540 | 1100 | **351301** |
| | 720 | 210 | 3400,0 | 17540 | 1100 | **353238** |
| **530** | 710 | 218 | 2170,0 | 10890 | 700 | **351475** |
| **550** | 760 | 230 | 2950 | 13100 | 835 | **350976** |
| **600** | 880 | 290 | 4750 | 20940 | 1280 | **350824** |
| | 910 | 290 | 4750,0 | 21110 | 1280 | **350901** |
| **670** | 900 | 230 | 3550 | 18640 | 1140 | **351761** |



TTK2



TTKSP

| Dimensions | | | | | Mass | Designation |
|---|---|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{3,4min}$ | $r_{amax}$ | $r_{bmax}$ | | Standard design |
| [mm] | | | | | [kg] | |
| **470** | 2 | 4 | 2 | 3 | 285 | **353151** |
| | 2 | 4 | 2 | 3 | 285 | **351301** |
| | 2 | 4 | 2 | 3 | 305 | **353238** |
| **530** | 2 | 3 | 2 | 2,5 | 245 | **351475** |
| **550** | 2 | 5 | 2 | 4 | 310 | **350976** |
| **600** | 5 | 6 | 4 | 5 | 550 | **350824** |
| | 5 | 6 | 4 | 5 | 655 | **350901** |
| **670** | 2 | 5 | 2 | 4 | 425 | **351761** |

# Spherical roller thrust bearings

The spherical roller thrust bearings manufactured by RKB are designed to support high axial loads and, in some cases, even moderate radial loads. The manufacturing program includes single and double direction spherical roller thrust bearings to meet any requirements in various industrial applications. Thanks to the improved internal geometry and the use of the most suitable raw materials, all RKB TBs attain the highest axial load ratings and the best reliability. Depending on application requirements, RKB Bainite Hardening Treatment (HB) and High Temperature Dimensional Stabilization (S) can be applied on bearing rings and rolling elements. The bearing dimensional and running accuracy conforms to ISO/ABMA/GOST specifications.



Single direction spherical roller thrust bearings

## Single direction spherical roller thrust bearings

Single direction spherical roller thrust bearings are composed by a shaft washer, housing washer and one row of asymmetrical barrel roller with cage. They have a separable design: the cage, rollers and shaft washer together form an assembly, while the housing washer can be mounted separately.
Due to their raceways design, they are self-aligning, making the bearing insensitive to the shaft deflection or misalignment between shaft and housing. Axial spherical roller bearings can accommodate radial and unidirectional axial load acting simultaneously on it, even if they are suitable to work under heavy axial loads and high speed rotation.

They are manufactured mainly in three different configurations, depending on the bearing size. "EM type" with one piece machine brass cage guided on the shaft washer; "EMEVO type" has one piece "EVO" machine brass cage guided on the shaft where the axial forces are transmitted via the cage-guiding sleeve and "EJ type" with one high strength pressed steel cage guided on shaft washer.
In application where the "EMEVO type" bearing has to be replaced with "EM type" or "EJ type", it is necessary to insert a spacer sleeve between the shaft abutment and the shaft washer.

The main boundary dimensions of spherical roller bearings are in conformity with ISO 104:2015. They are manufactured with tolerances according to ISO 199:2014.

## Misalignment

Due to its self alignment internal design, the spherical roller thrust bearings can accommodate misalignment between shaft and housing and a shaft bending during the operation. Full capacity of misalignment can be used when the shaft is rotating and the misalignment is constant.
Depending on the configuration, for example the presence of seals or the working conditions, the following values given in **Tab. 1** have to be reduced. Generally speaking the reduced values of misalignment have to be used when the load increases. Contact RKB application engineering service when:

- the housing washer is rotating with misalignment;
- shaft wobbles in relation to the housing.

## Minimum load

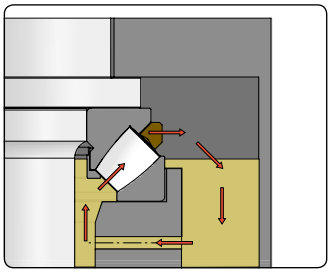
A minimum axial load is requested for thrust roller bearings, like for all rolling bearings, to operate correctly, especially in particularly application requirements like: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers and raceways can be generated by the inertial forces, influencing negatively the bearing life. To calculate the minimum axial load please consult the RKB application engineering service.
However, the minimum axial load is reached or surpassed by the weight of the components supported by the bearing, mostly when the shaft is vertical and the loads acting on it. If the minimum axial load is not reached or in case of application where a starting up at low temperature is planned or a lubricant with high viscosity is used, it will be necessary to preload the spherical roller thrust bearings by springs or shaft nut.
For additional information, please consult the RKB application engineering service.

| Bearing series | Maximum misalignment for P or $P_0 < 0.05 \cdot C_{0a}$ |
|---|---|
| 292 | ±1.5° |
| 293 | ±2.5° |
| 294 | ±3° |

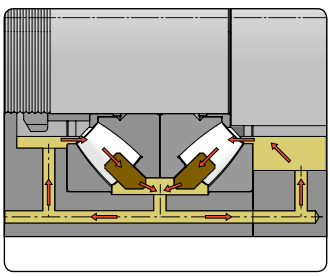
Tab. 1 - Spherical roller thrust bearings max misalignment

## Lubrication and mounting

RKB spherical roller thrust bearing feature a separable design, thus shaft washer with cage and roller assy can be mounted separately from housing washer. This kind of bearing can be lubricated both oil and grease. Due to its specifical internal design a spherical roller thrust bearing features a pumping effect to allow the oil recirculation when mounted both on vertical shaft (**Fig. 1a**) and horizontal shaft (**Fig. 1b**).



a - Vertical

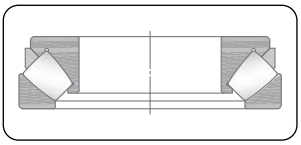


b - Horizontal

Fig. 1 - Oil pumping effect of single direction spherical roller thrust bearings

## Designs and variants

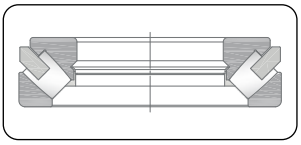
### Type EM



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Asymmetrical roller profile
- One-piece machined brass cage guided on rollers (M)
- Reinforced and optimized execution (E)
- Supports unidirectional axial loads and angular misalignment

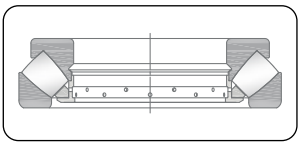
### Type EMB



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Asymmetrical roller profile
- One-piece machined brass cage guided on rollers and featuring a retaining sleeve held in the shaft washer bore (MB)
- Reinforced and optimized execution (E)
- Supports unidirectional axial loads and angular misalignment

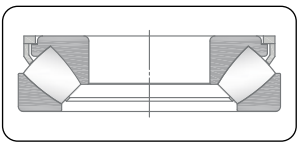
### Type EM$_{EVO}$



HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Asymmetrical roller profile
- One-piece EVO type machined brass cage guided by a retaining sleeve held in the shaft washer bore
- Reinforced and optimized execution (E)
- Supports unidirectional axial loads and angular misalignment

### Type EJ



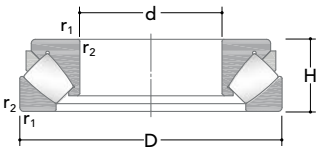
HB BAINITE HT · S STABILIZATION · O+ OPTIMIZED · R+ REINFORCED

- Asymmetrical roller profile
- High strength pressed steel cage (J) guided on shaft washer
- Reinforced and optimized execution (E)
- Supports unidirectional axial loads and angular misalignment

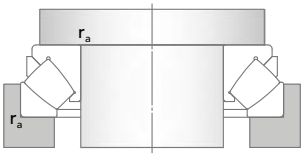
| Suffixes | Internal design |
|---|---|
| E | Optimized internal design with reinforced execution |
| EVO | Cage guided by a retaining sleeve held in the shaft washer bore |
| SP | Special or non-standard bearing |
| AOB | Application optimized bearing |

| Suffixes | Cage |
|---|---|
| M | Machined brass cage guided on rollers |
| MB | Machined brass cage guided on rollers and featuring a retaining sleeve held in the shaft washer bore |
| F | Machined steel cage |
| J | Pressed steel cage |

| Suffixes | External design |
|---|---|
| N1 | One locating slot in housing washer |
| N2 | Two locating slots in housing washer |
| EB | Lifting threaded holes for eye bolts in shaft washer |




EM



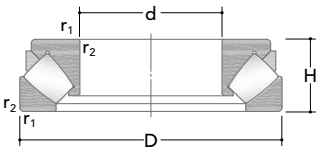

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **60** | 130 | 42 | 395 | 915 | 116 | 2850 | 5050 | **29412** |
| **65** | 140 | 45 | 455 | 1080 | 138 | 2600 | 4800 | **29413** |
| **70** | 150 | 48 | 525 | 1260 | 155 | 2400 | 4350 | **29414** |
| **75** | 160 | 51 | 610 | 1440 | 175 | 2400 | 4100 | **29415** |
| **80** | 170 | 54 | 680 | 1640 | 195 | 2200 | 3800 | **29416** |
| **85** | 150 | 39 | 385 | 1080 | 130 | 2500 | 4000 | **29317** |
| | 180 | 58 | 736 | 1810 | 215 | 2000 | 3650 | **29417** |
| **90** | 155 | 39 | 405 | 1080 | 133 | 2400 | 4000 | **29318** |
| | 190 | 60 | 820 | 2050 | 233 | 1950 | 3450 | **29418** |
| **100** | 170 | 42 | 475 | 1295 | 157 | 2200 | 3600 | **29320** |
| | 210 | 67 | 980 | 2560 | 280 | 1700 | 3050 | **29420** |
| **110** | 190 | 48 | 615 | 1735 | 205 | 1950 | 3200 | **29322** |
| | 230 | 73 | 1190 | 3070 | 328 | 1600 | 2800 | **29422** |
| **120** | 210 | 54 | 765 | 2125 | 250 | 1700 | 2850 | **29324** |
| | 250 | 78 | 1373 | 3460 | 375 | 1500 | 2650 | **29424** |
| **130** | 225 | 58 | 870 | 2580 | 280 | 1600 | 2650 | **29326** |
| | 270 | 85 | 1560 | 4090 | 435 | 1300 | 2450 | **29426** |
| **140** | 240 | 60 | 985 | 2850 | 318 | 1500 | 2600 | **29328** |
| | 280 | 85 | 1630 | 4342 | 450 | 1300 | 2400 | **29428** |
| **150** | 215 | 39 | 415 | 1670 | 183 | 1800 | 2800 | **29230** |
| | 250 | 60 | 1050 | 2850 | 320 | 1500 | 2400 | **29330** |


EMB

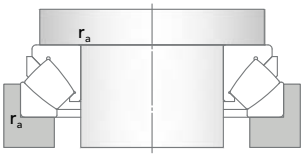

EMEVO


EJ

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **60** | 1,5 | 1,5 | 2,6 | **29412** |
| **65** | 2 | 2 | 3,2 | **29413** |
| **70** | 2 | 2 | 3,9 | **29414** |
| **75** | 2 | 2 | 4,7 | **29415** |
| **80** | 2,1 | 2 | 5,6 | **29416** |
| **85** | 1,5 | 1,5 | 2,75 | **29317** |
| | 2,1 | 2 | 6,75 | **29417** |
| **90** | 1,5 | 1,5 | 2,85 | **29318** |
| | 2,1 | 2 | 7,75 | **29418** |
| **100** | 1,5 | 1,5 | 3,65 | **29320** |
| | 3 | 2,5 | 10,5 | **29420** |
| **110** | 2 | 2 | 5,3 | **29322** |
| | 3 | 2,5 | 13,5 | **29422** |
| **120** | 2,1 | 2 | 7,35 | **29324** |
| | 4 | 3 | 17,5 | **29424** |
| **130** | 2,1 | 2 | 9 | **29326** |
| | 4 | 3 | 22 | **29426** |
| **140** | 2,1 | 2 | 10,5 | **29328** |
| | 4 | 3 | 23 | **29428** |
| **150** | 1,5 | 1,5 | 4,3 | **29230** |
| | 2,1 | 2 | 11 | **29330** |




EM



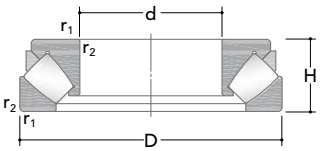

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **150** | 300 | 90 | 1880 | 5150 | 525 | 1200 | 2200 | **29430** |
| (cont.) | | | | | | | | |
| **160** | 270 | 67 | 1190 | 3450 | 378 | 1350 | 2200 | **29332** |
| | 320 | 95 | 2090 | 5610 | 580 | 1100 | 2000 | **29432** |
| **170** | 280 | 67 | 1290 | 3550 | 370 | 1300 | 2200 | **29334** |
| | 340 | 103 | 2360 | 6630 | 650 | 1100 | 1900 | **29434** |
| **180** | 250 | 42 | 500 | 2060 | 215 | 1600 | 2600 | **29236** |
| | 300 | 73 | 1430 | 4340 | 445 | 1200 | 2000 | **29336** |
| | 360 | 109 | 2650 | 7410 | 725 | 1050 | 1800 | **29436** |
| **190** | 320 | 78 | 1650 | 4760 | 500 | 1100 | 1900 | **29338** |
| | 380 | 115 | 2850 | 8000 | 775 | 950 | 1700 | **29438** |
| **200** | 280 | 48 | 660 | 2660 | 285 | 1400 | 2200 | **29240** |
| | 340 | 85 | 1860 | 5590 | 550 | 1000 | 1700 | **29340** |
| | 400 | 122 | 3250 | 9070 | 855 | 850 | 1600 | **29440** |
| **220** | 300 | 48 | 690 | 3080 | 312 | 1300 | 2200 | **29244** |
| | 360 | 85 | 2080 | 6390 | 620 | 1000 | 1700 | **29344** |
| | 420 | 122 | 3390 | 9730 | 910 | 850 | 1500 | **29444** |
| **240** | 340 | 60 | 800 | 3450 | 335 | 1100 | 1900 | **29248** |
| | 380 | 85 | 2050 | 6560 | 630 | 1000 | 1650 | **29348** |
| | 440 | 122 | 3400 | 10210 | 940 | 850 | 1500 | **29448** |
| **260** | 360 | 60 | 817 | 3650 | 345 | 1100 | 1800 | **29252** |
| | 420 | 95 | 2550 | 8400 | 790 | 850 | 1400 | **29352** |
| | 480 | 132 | 4100 | 12900 | 1090 | 750 | 1350 | **29452** |
| **280** | 380 | 60 | 863 | 4000 | 375 | 1000 | 1700 | **29256** |
| | 440 | 95 | 2550 | 8700 | 805 | 850 | 1400 | **29356** |


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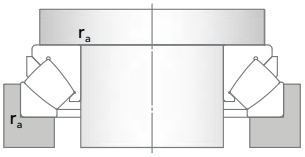

EMEVO


EJ

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **150** | 4 | 3 | 28 | **29430** |
| (cont.) | | | | |
| **160** | 3 | 2,5 | 14,5 | **29332** |
| | 5 | 4 | 32 | **29432** |
| **170** | 3 | 2,5 | 15 | **29334** |
| | 5 | 4 | 44,5 | **29434** |
| **180** | 1,5 | 1,5 | 5,8 | **29236** |
| | 3 | 2,5 | 19,5 | **29336** |
| | 5 | 4 | 52,5 | **29436** |
| **190** | 4 | 3 | 23,5 | **29338** |
| | 5 | 4 | 60,5 | **29438** |
| **200** | 2 | 2 | 9,3 | **29240** |
| | 4 | 3 | 28,5 | **29340** |
| | 5 | 4 | 72 | **29440** |
| **220** | 2 | 2 | 10 | **29244** |
| | 4 | 3 | 31 | **29344** |
| | 6 | 5 | 75 | **29444** |
| **240** | 2,1 | 2 | 16,5 | **29248** |
| | 4 | 3 | 35,5 | **29348** |
| | 6 | 5 | 80 | **29448** |
| **260** | 2,1 | 2 | 18,5 | **29252** |
| | 5 | 4 | 49 | **29352** |
| | 6 | 5 | 105 | **29452** |
| **280** | 2,1 | 2 | 19,5 | **29256** |
| | 5 | 4 | 53 | **29356** |




EM



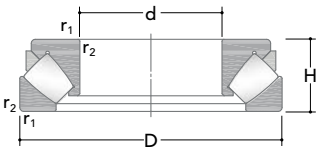

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **280** | 520 | 145 | 4950 | 15300 | 1350 | 670 | 1200 | **29456** |
| (cont.) | | | | | | | | |
| **300** | 420 | 73 | 1070 | 4800 | 465 | 900 | 1500 | **29260** |
| | 480 | 109 | 3150 | 10600 | 950 | 750 | 1200 | **29360** |
| | 540 | 145 | 5000 | 16600 | 1340 | 670 | 1200 | **29460** |
| **320** | 440 | 73 | 1100 | 5100 | 465 | 850 | 1400 | **29264** |
| | 500 | 109 | 3370 | 11250 | 1000 | 750 | 1200 | **29364** |
| | 580 | 155 | 5700 | 19200 | 1550 | 600 | 1100 | **29464** |
| **340** | 460 | 73 | 1150 | 5400 | 480 | 850 | 1300 | **29268** |
| | 540 | 122 | 2710 | 11000 | 960 | 600 | 1100 | **29368** |
| | 620 | 170 | 6700 | 22500 | 1780 | 560 | 1000 | **29468** |
| **360** | 500 | 85 | 1460 | 6800 | 585 | 750 | 1200 | **29272** |
| | 560 | 122 | 2760 | 11600 | 990 | 600 | 1100 | **29372** |
| | 640 | 170 | 6200 | 21200 | 1630 | 560 | 950 | **29472** |
| **380** | 520 | 85 | 1600 | 7650 | 655 | 700 | 1100 | **29276** |
| | 600 | 132 | 3350 | 14500 | 1160 | 530 | 1000 | **29376** |
| | 670 | 175 | 6800 | 24000 | 1860 | 530 | 900 | **29476** |
| **400** | 540 | 85 | 1620 | 8000 | 695 | 700 | 1100 | **29280** |
| | 620 | 132 | 3450 | 14600 | 1210 | 530 | 950 | **29380** |
| | 710 | 185 | 7650 | 26500 | 1960 | 480 | 850 | **29480** |
| **420** | 580 | 95 | 2000 | 9800 | 815 | 630 | 1000 | **29284** |
| | 650 | 140 | 3750 | 16000 | 1300 | 500 | 900 | **29384** |
| | 730 | 185 | 7800 | 27500 | 2100 | 480 | 850 | **29484** |
| **440** | 600 | 95 | 2070 | 10400 | 850 | 630 | 1000 | **29288** |
| | 680 | 145 | 5200 | 19400 | 1590 | 530 | 850 | **29388** |
| | 780 | 206 | 9050 | 32600 | 2350 | 430 | 750 | **29488** |


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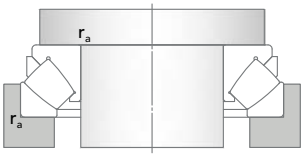

EMEVO


EJ

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **280** (cont.) | 6 | 5 | 135 | **29456** |
| **300** | 3 | 2,5 | 30,5 | **29260** |
| | 5 | 4 | 75 | **29360** |
| | 6 | 5 | 140 | **29460** |
| **320** | 3 | 2,5 | 33 | **29264** |
| | 5 | 4 | 78 | **29364** |
| | 7,5 | 6 | 175 | **29464** |
| **340** | 3 | 2,5 | 33,5 | **29268** |
| | 5 | 4 | 105 | **29368** |
| | 7,5 | 6 | 220 | **29468** |
| **360** | 4 | 3 | 52 | **29272** |
| | 5 | 4 | 110 | **29372** |
| | 7,5 | 6 | 230 | **29472** |
| **380** | 4 | 3 | 53 | **29276** |
| | 6 | 5 | 140 | **29376** |
| | 7,5 | 6 | 260 | **29476** |
| **400** | 4 | 3 | 55,5 | **29280** |
| | 6 | 5 | 150 | **29380** |
| | 7,5 | 6 | 310 | **29480** |
| **420** | 5 | 4 | 75,5 | **29284** |
| | 6 | 5 | 170 | **29384** |
| | 7,5 | 6 | 325 | **29484** |
| **440** | 5 | 4 | 78 | **29288** |
| | 6 | 5 | 180 | **29388** |
| | 9,5 | 8 | 410 | **29488** |




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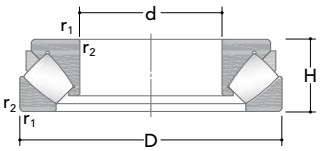

| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **460** | 620 | 95 | 2070 | 10600 | 865 | 600 | 950 | **29292** |
| | 710 | 150 | 4350 | 19200 | 1520 | 450 | 850 | **29392** |
| | 800 | 206 | 9300 | 33500 | 2460 | 430 | 750 | **29492** |
| **480** | 650 | 103 | 2370 | 11800 | 950 | 560 | 900 | **29296** |
| | 730 | 150 | 4370 | 19600 | 1480 | 450 | 800 | **29396** |
| | 850 | 224 | 9550 | 39400 | 2850 | 340 | 670 | **29496** |
| **500** | 670 | 103 | 2390 | 12500 | 1000 | 560 | 900 | **292/500** |
| | 750 | 150 | 4550 | 20500 | 1580 | 430 | 800 | **293/500** |
| | 870 | 224 | 9400 | 40500 | 2850 | 340 | 670 | **294/500** |
| **530** | 710 | 109 | 3110 | 15400 | 1230 | 530 | 850 | **292/530** |
| | 800 | 160 | 5870 | 26500 | 2080 | 400 | 750 | **293/530** |
| | 920 | 236 | 10500 | 44500 | 3150 | 320 | 630 | **294/530** |
| **560** | 750 | 115 | 2990 | 16000 | 1220 | 480 | 800 | **292/560** |
| | 980 | 250 | 12000 | 51100 | 3600 | 300 | 560 | **294/560** |
| **600** | 800 | 122 | 3750 | 18600 | 1460 | 450 | 700 | **292/600** |
| | 1030 | 258 | 13200 | 56200 | 4060 | 300 | 530 | **294/600** |
| **630** | 850 | 132 | 4800 | 23700 | 1830 | 400 | 670 | **292/630** |
| | 950 | 190 | 8500 | 38500 | 2950 | 320 | 620 | **293/630** |
| | 1090 | 280 | 14500 | 62300 | 4200 | 260 | 500 | **294/630** |
| **670** | 900 | 140 | 4200 | 22800 | 1680 | 380 | 630 | **292/670** |
| | 1150 | 290 | 15500 | 68800 | 4520 | 240 | 450 | **294/670** |
| **710** | 1060 | 212 | 10000 | 45900 | 3440 | 280 | 500 | **293/710** |
| | 1220 | 308 | 17800 | 76500 | 5000 | 220 | 430 | **294/710** |
| **750** | 1000 | 150 | 6100 | 31500 | 2330 | 340 | 560 | **292/750** |


EMB

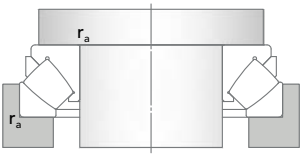

EMEVO


EJ

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **460** | 5 | 4 | 81 | **29292** |
| | 6 | 5 | 215 | **29392** |
| | 9,5 | 8 | 425 | **29492** |
| **480** | 5 | 4 | 98 | **29296** |
| | 6 | 5 | 220 | **29396** |
| | 9,5 | 8 | 550 | **29496** |
| **500** | 5 | 4 | 100 | **292/500** |
| | 6 | 5 | 235 | **293/500** |
| | 9,5 | 8 | 560 | **294/500** |
| **530** | 5 | 4 | 115 | **292/530** |
| | 7,5 | 6 | 270 | **293/530** |
| | 9,5 | 8 | 650 | **294/530** |
| **560** | 5 | 4 | 140 | **292/560** |
| | 12 | 10 | 810 | **294/560** |
| **600** | 5 | 4 | 170 | **292/600** |
| | 12 | 10 | 845 | **294/600** |
| **630** | 6 | 5 | 210 | **292/630** |
| | 9,5 | 8 | 485 | **293/630** |
| | 12 | 10 | 1040 | **294/630** |
| **670** | 6 | 5 | 255 | **292/670** |
| | 15 | 12 | 1210 | **294/670** |
| **710** | 9,5 | 8 | 610 | **293/710** |
| | 15 | 12 | 1500 | **294/710** |
| **750** | 6 | 5 | 325 | **292/750** |




EM




| Main dimensions | | | Basic load ratings | | Fatigue load limit | Speed ratings | | Designation |
|---|---|---|---|---|---|---|---|---|
| d | D | H | Dynamic C | Static $C_0$ | $C_u$ | Reference | Limiting | Standard design |
| [mm] | | | [kN] | | | [rpm] | | |
| **750** | 1120 | 224 | 9500 | 45400 | 3090 | 260 | 480 | **293/750** |
| (cont.) | 1280 | 315 | 18920 | 85600 | 5530 | 200 | 400 | **294/750** |
| **800** | 1060 | 155 | 6560 | 34500 | 2560 | 320 | 530 | **292/800** |
| | 1180 | 230 | 11300 | 55000 | 3900 | 240 | 450 | **293/800** |
| | 1360 | 335 | 20200 | 93000 | 5850 | 190 | 360 | **294/800** |
| **850** | 1120 | 160 | 6800 | 36500 | 2560 | 300 | 500 | **292/850** |
| | 1440 | 354 | 23900 | 108000 | 7160 | 170 | 340 | **294/850** |
| **900** | 1180 | 170 | 7800 | 42000 | 3030 | 260 | 450 | **292/900** |
| | 1520 | 372 | 26700 | 122000 | 7260 | 160 | 300 | **294/900** |
| **950** | 1250 | 180 | 8350 | 45600 | 3090 | 260 | 430 | **292/950** |
| | 1600 | 390 | 28400 | 132000 | 7860 | 140 | 280 | **294/950** |
| **1000** | 1670 | 402 | 31700 | 140800 | 8800 | 130 | 260 | **294/1000** |
| **1060** | 1400 | 206 | 10600 | 58600 | 3750 | 220 | 360 | **292/1060** |
| | 1770 | 426 | 34800 | 156000 | 8600 | 120 | 240 | **294/1060** |
| **1180** | 1520 | 206 | 10900 | 64800 | 3800 | 220 | 340 | **292/1180** |
| **1250** | 1800 | 330 | 24800 | 129000 | 7600 | 130 | 240 | **293/1250** |
| **1600** | 2280 | 408 | 36800 | 200500 | 12000 | 90 | 160 | **293/1600** |


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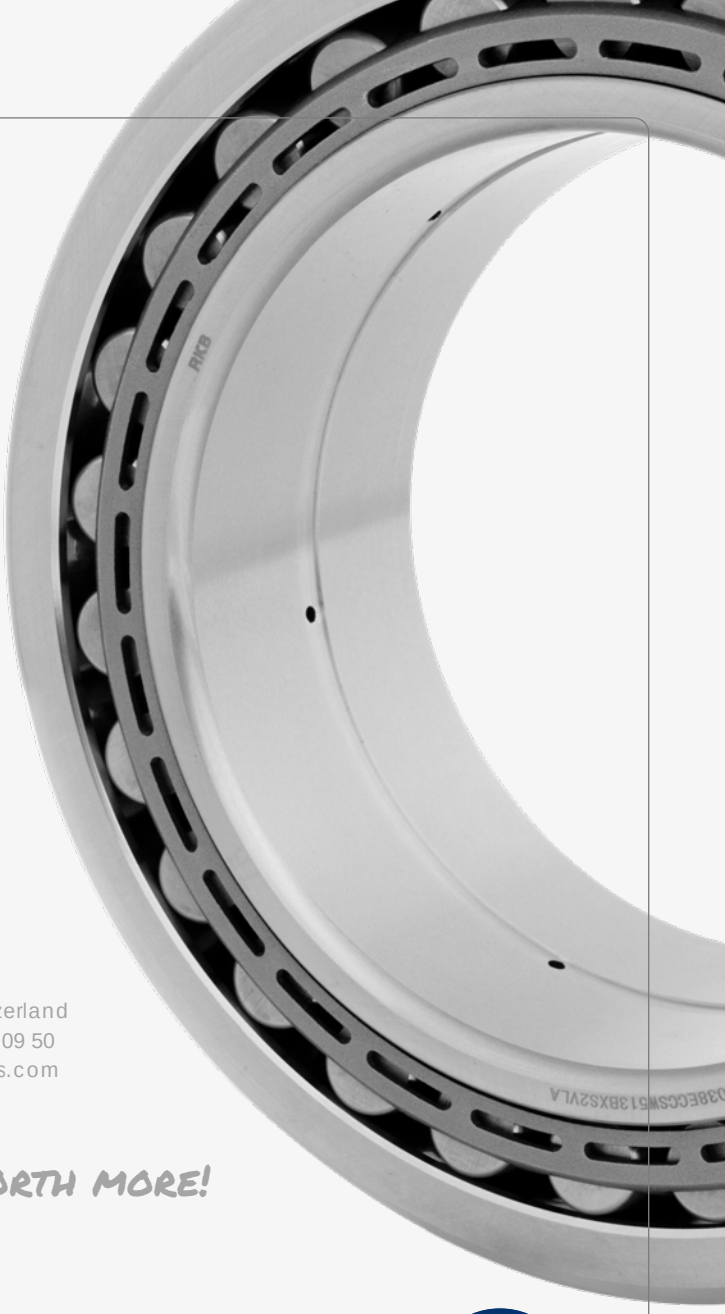

EMEVO


EJ

| Dimensions | | | Mass | Designation |
|---|---|---|---|---|
| d | $r_{1,2min}$ | $r_{amax}$ | | Standard design |
| [mm] | | | [kg] | |
| **750** | 9,5 | 8 | 770 | **293/750** |
| (cont.) | 15 | 12 | 1650 | **294/750** |
| **800** | 7,5 | 6 | 380 | **292/800** |
| | 9,5 | 8 | 865 | **293/800** |
| | 15 | 12 | 2030 | **294/800** |
| **850** | 7,5 | 6 | 425 | **292/850** |
| | 15 | 12 | 2390 | **294/850** |
| **900** | 7,5 | 6 | 475 | **292/900** |
| | 15 | 12 | 2650 | **294/900** |
| **950** | 7,5 | 6 | 600 | **292/950** |
| | 15 | 12 | 3070 | **294/950** |
| **1000** | 15 | 12 | 3390 | **294/1000** |
| **1060** | 9,5 | 8 | 860 | **292/1060** |
| | 15 | 12 | 4280 | **294/1060** |
| **1180** | 9,5 | 8 | 950 | **292/1180** |
| **1250** | 12 | 10 | 2770 | **293/1250** |
| **1600** | 19 | 15 | 5380 | **293/1600** |

NOTES

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Via Primo Agosto 1 · 6828 Balerna · Switzerland
Phone +41 91 260 09 30 · Fax +41 91 260 09 50
info@rkbeurope.com · www.rkbbearings.com

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