BEARING CATALOGUE

RKB
BEARING INDUSTRIES
SWITZERLAND

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Introduction

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
	Part 1: Dimensions for adapter sleeve assemblies and withdrawal sleeves
	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
	Part 1: Steel balls
	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
	Part 1: Radial spherical plain bearings
	Part 2: Angular contact radial spherical plain bearings
	Part 3: Thrust spherical plain bearings
	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
	Part 1: Single row with cage, separate thrust collars
	Part 4: Double row, with cage, increased accuracy
	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
	Part 1: Radial internal clearance for radial bearings
	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

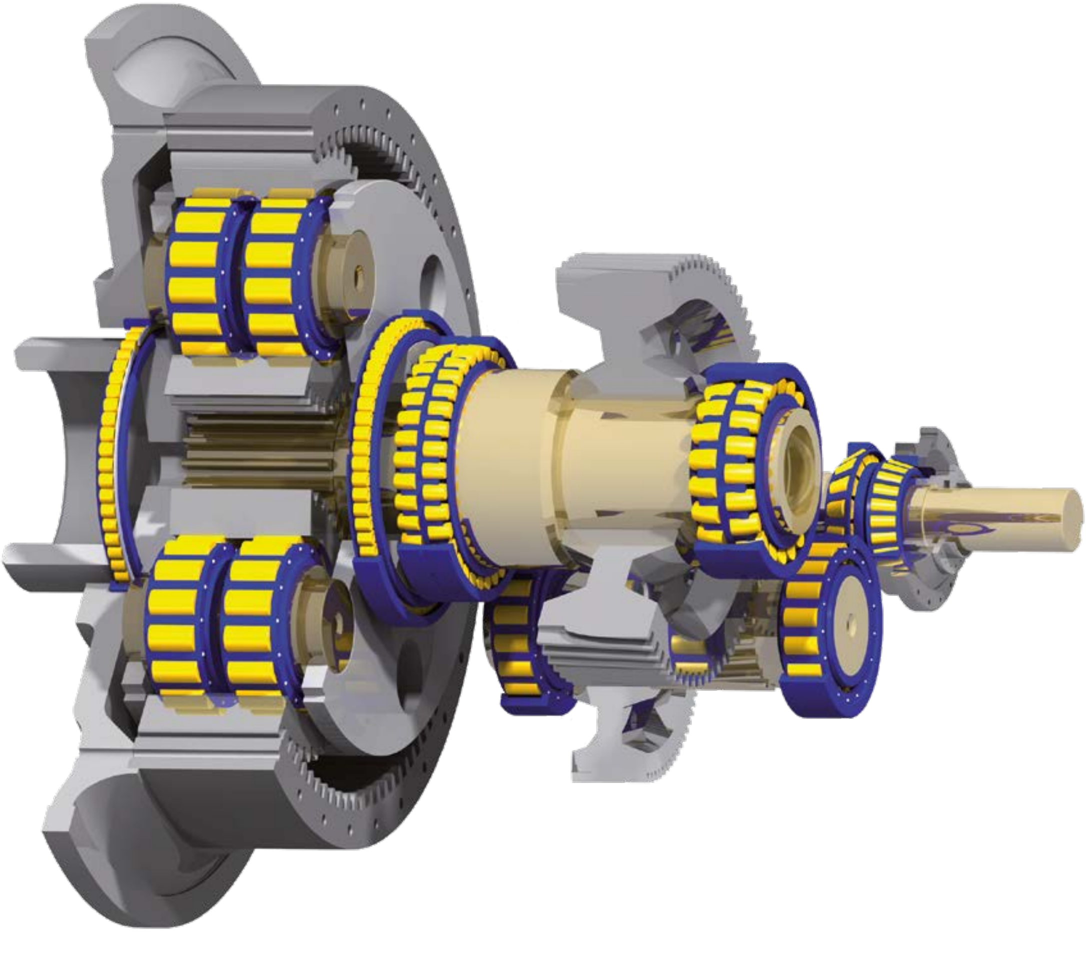
Standard	Description
ISO 377	Steel and steel products -- Location and preparation of samples and test pieces for mechanical testing
ISO 377	Steel and steel products -- Location and preparation of samples and test pieces for mechanical testing
ISO 642	Steel -- Hardenability test by end quenching (Jominy 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
	Part 1: Classification of steels into unalloyed and alloy steels based on chemical composition
	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



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.

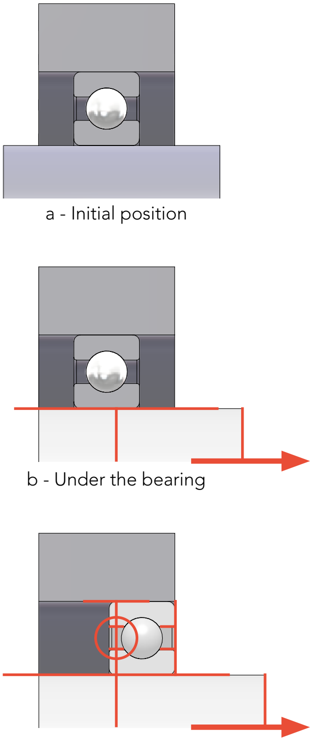


Fig. 1 - Possible axial movements of the shaft if the bearing is not located

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.

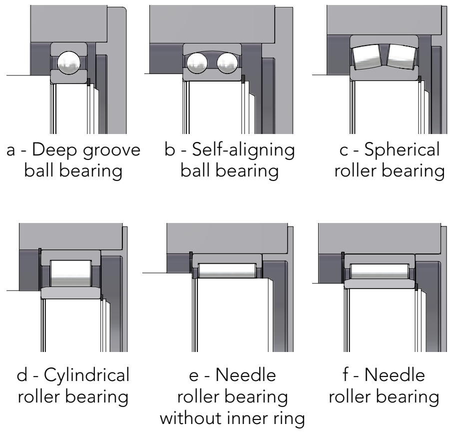

a - Deep groove ball bearing
b - Self-aligning ball bearing
c - Spherical roller bearing
d - Cylindrical roller bearing
e - Needle roller bearing without inner ring
f - Needle roller bearing

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.

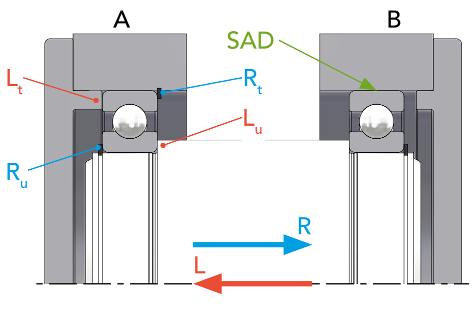


Fig. 3 - Shaft mounted on two deep groove ball bearings (locating bearing and non-locating bearing)

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.

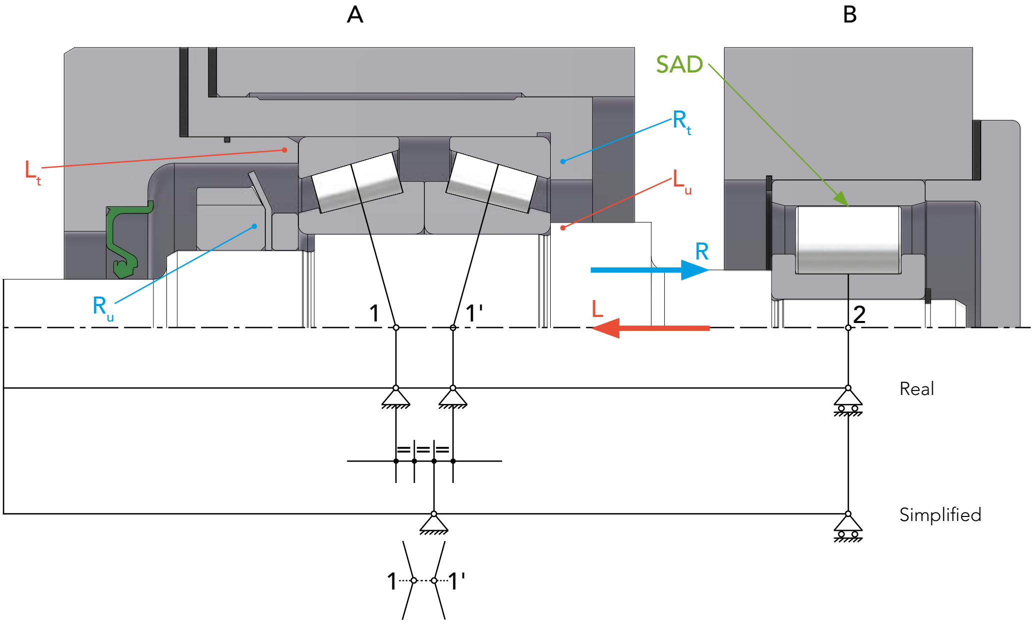


Fig. 4 - Shaft mounted on two tapered roller bearings in face-to-face configuration as locating bearing and a cylindrical roller bearing as non-locating bearing

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

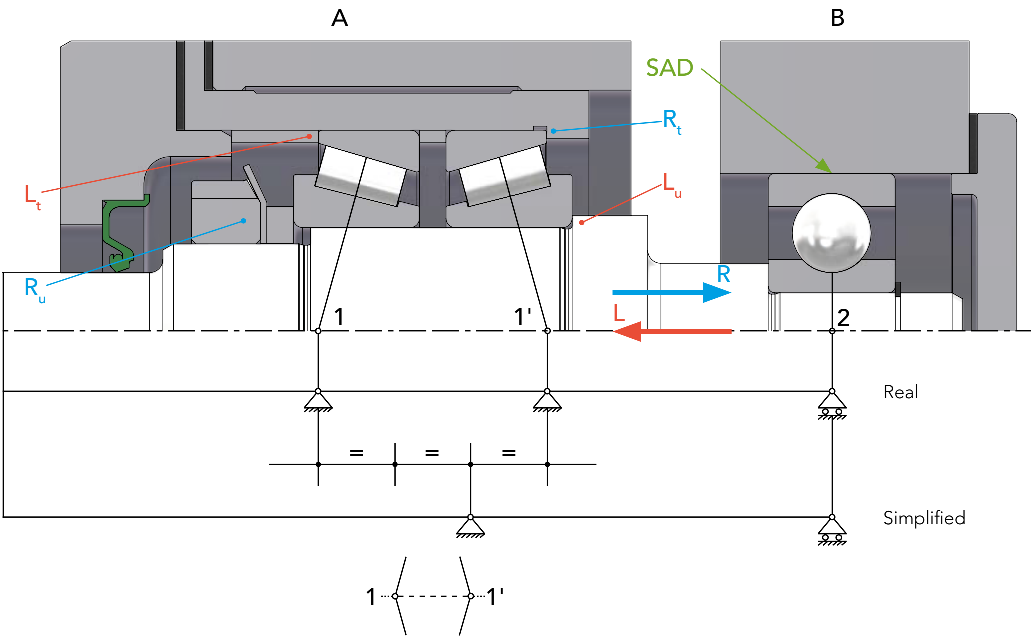


Fig. 5 - Shaft mounted on two tapered roller bearings in back-to-back configuration as locating bearing and a deep groove ball bearing as non-locating bearing

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

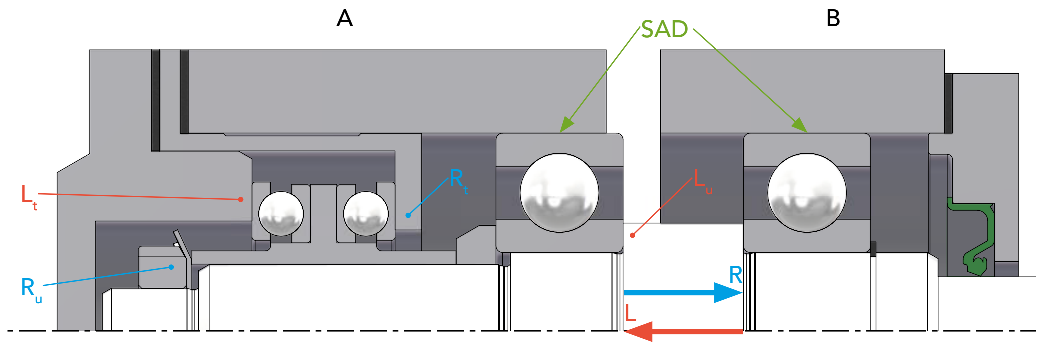


Fig. 6 - Shaft mounted on two single direction thrust ball bearings and a deep groove ball bearing as locating bearing and a deep groove ball bearing as non-locating bearing

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.).

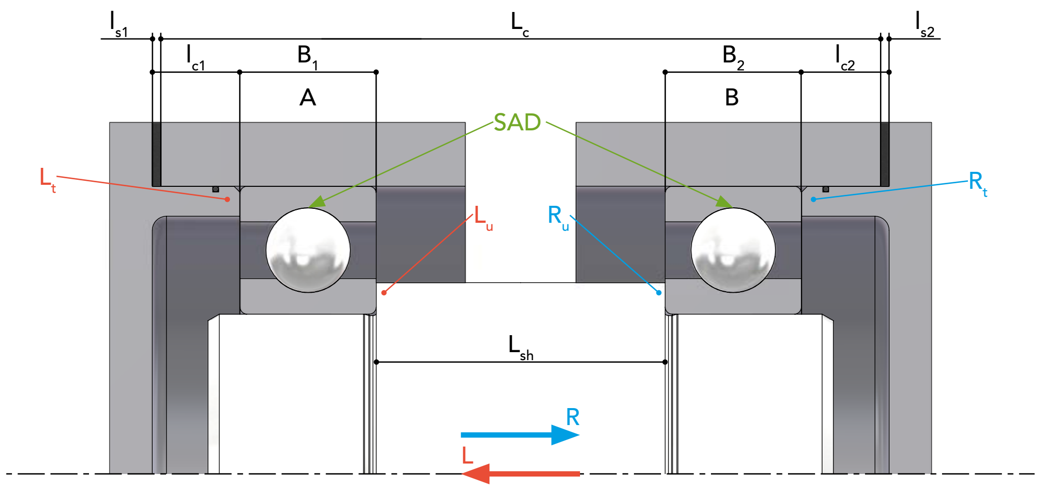


Fig. 7 - Shaft mounted on two adjusted deep groove ball bearings

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.

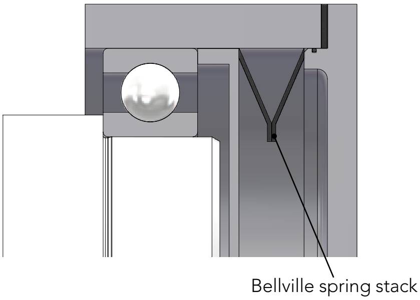


Fig. 8 - Deep groove ball bearing preloaded by Bellville spring stack

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

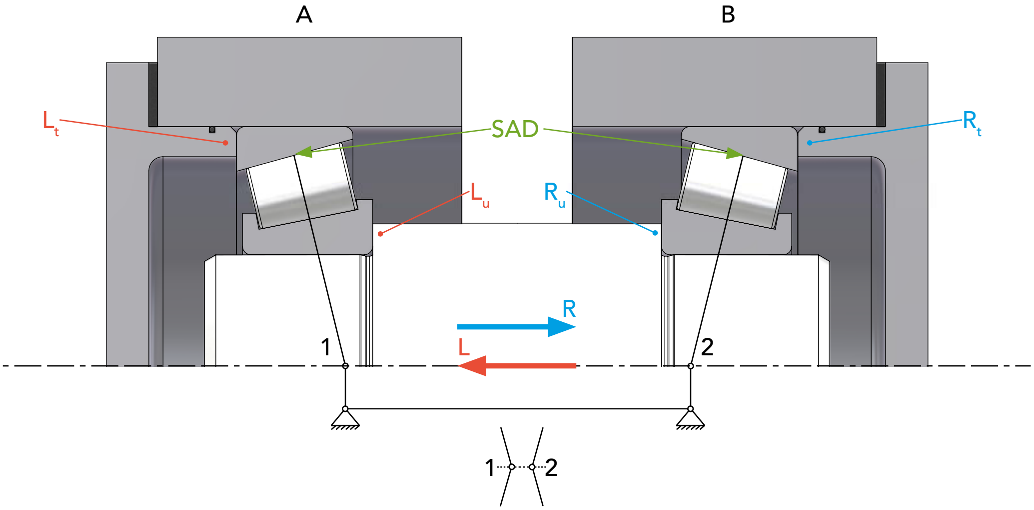


Fig. 9 - Shaft mounted on two adjusted tapered roller bearings in face-to-face configuration

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.

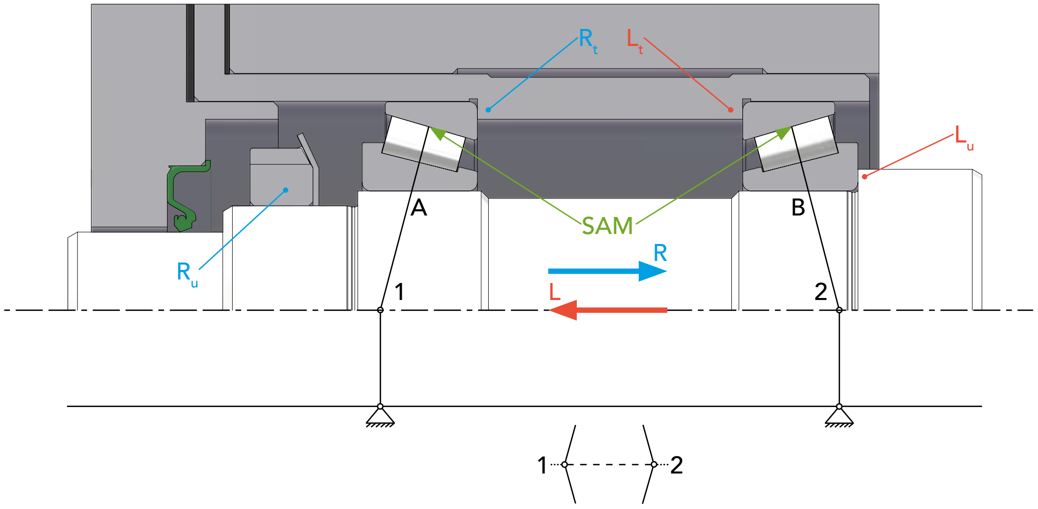


Fig. 10 - Shaft mounted on two adjusted tapered roller bearings in back-to-back configuration

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.

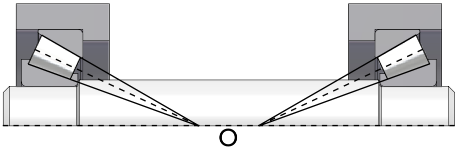
The axial location of the shaft is ensured as depicted in **Fig. 10 page 29**. If the shaft has the tendency to move to the left (L) because of external axial loads, this displacement under the bearings (considered fixed) is prevented by the shaft abutment shoulder (L_u), and together with the bearings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

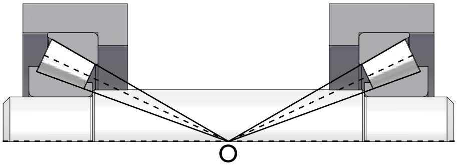
The free thermal expansion/contraction of the shaft at the working temperature is possible only within the available axial clearance (SAD, **Fig. 10 page 29**). When the axial internal clearance is set during installation, it is very important to consider the thermal expansion of the shaft, housing, 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:

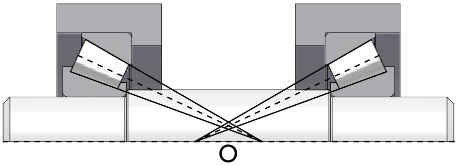
- increases with the increase of the bearing operating temperature, if the bearing roller cones do not meet **(Fig. 11a)**;
- remains the same with the increase of the bearing operating temperature, if the bearing roller cones apexes coincide **(Fig. 11b)**;
- decreases with the increase of the bearing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



a - Clearance increases with the increase of the operating temperature



b - Clearance remains the same with the increase of the operating temperature



c - Clearance decreases with the increase of the operating temperature

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, α_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.

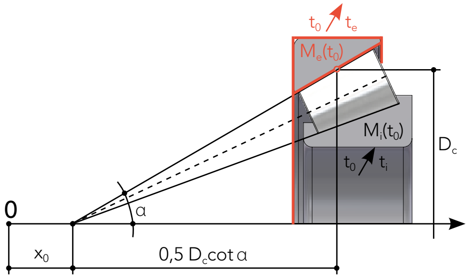


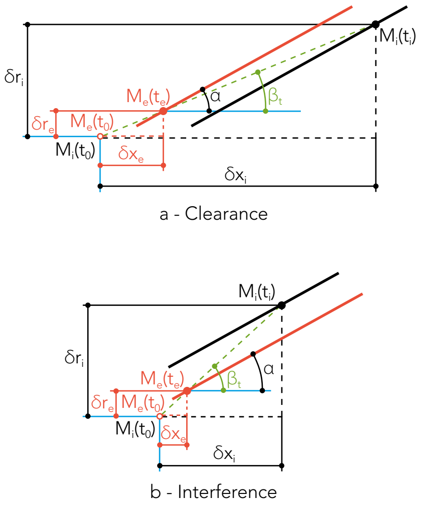
Fig. 12 - Tapered roller bearing with zero mounting clearance before heating

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 β_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**).



a - Clearance

b - Interference

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

On the other hand, between the two angles β_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;

- β_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.

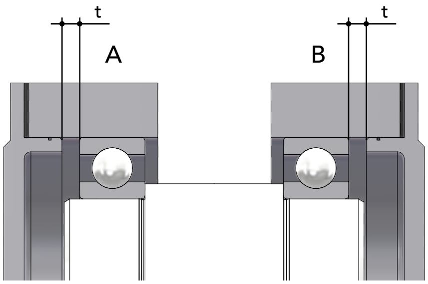


Fig. 14 - Shaft mounted on two deep groove ball bearings (floating bearings)

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).

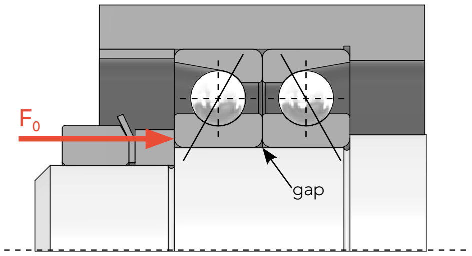
When bearings are mounted in back-to-back arrangement the axial preload load should be applied on the inner ring **(Fig. 15a page 35** and **Fig. 17a page 36)** or cone **(Fig. 16a page 35)**, and when bearings are mounted in face-to-face arrangement it is necessary to load the outer ring **(Fig. 15b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

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

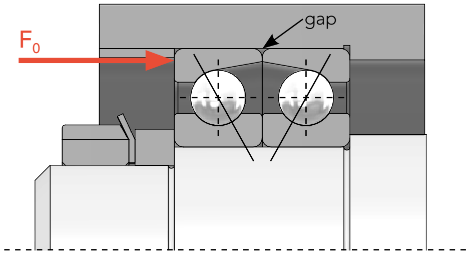
Internal clearance class	Recommendations
C1	Very precise positioning of the shaft High stiffness of the mounted assembly
C2	Variable loads Silent running without vibrations
CN	Normal operating conditions
C3	One or both bearing rings mounted with interference fits High operating temperature Important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



a - Back-to-back arrangement



b - Face-to-face arrangement

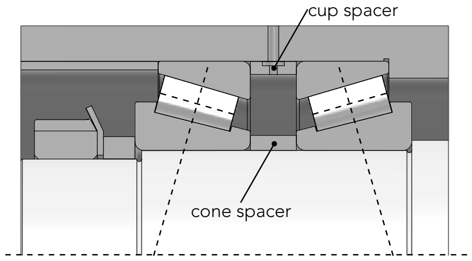
Fig. 15 - Matched single row angular contact ball bearing

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.

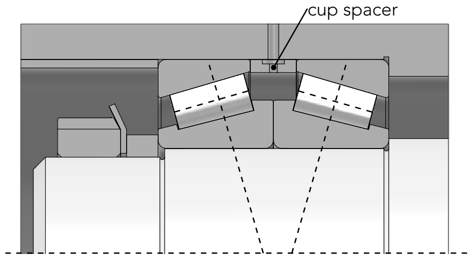
During mounting, the bearing set should be tightened until the provided gap between the spacer and appropriate bearing rings is eliminated. Note that the preload in the bearing set can be adjusted by grinding the side face of the inner or outer spacer. In operation, a matched bearing set can experience 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.



a - Back-to-back arrangement



b - Face-to-face arrangement

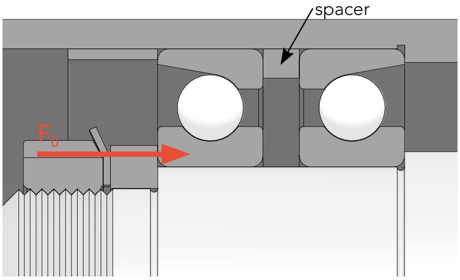
Fig. 16 - Matched single row tapered roller bearing

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.

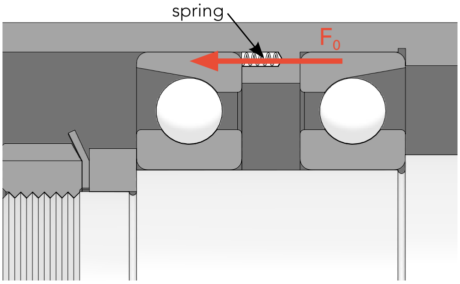
Usage of spacers is an important option when:

- 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).



a - Using a spacer



b - Using springs

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).

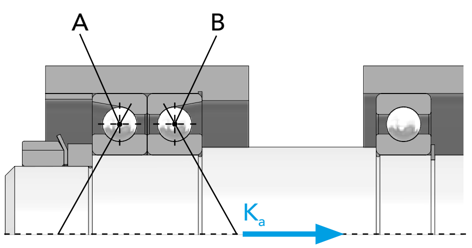


Fig. 18 - Preloaded matched angular contact ball bearing pair in back-to-back arrangement

Linear model

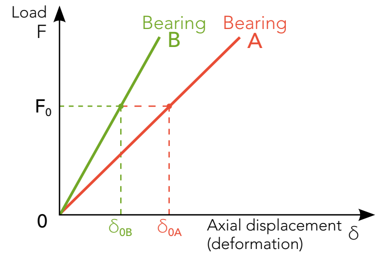
This model is used here only to explain the behavior of preloaded paired ball or roller bearings and supposes a linear dependence described by the following equation between the axial load and axial deformation of the bearing under the load (i.e. relative axial displacement of one bearing ring relative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

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

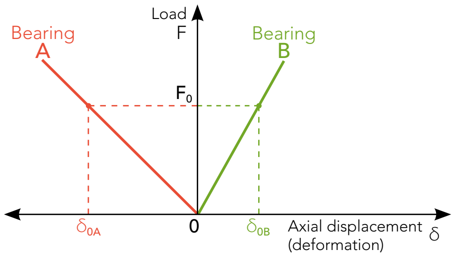
where

- F_a axial load on bearing, N;
- C_b spring constant of the bearing, N/mm;
- δ 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.



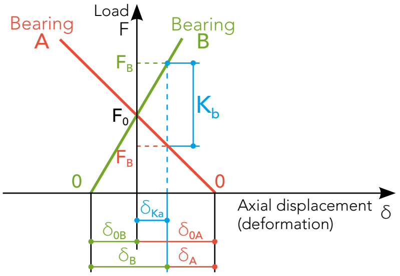
a - Same system of coordinates



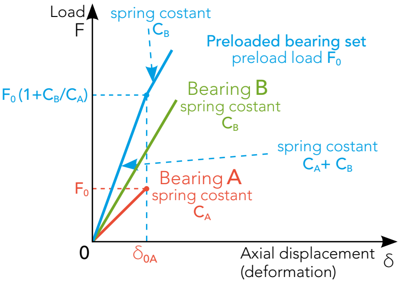
b - Natural representation

Fig. 19 - Bearing A and B spring linear characteristics

Fig. 19a shows the preloading axial deformations δ_{0A} and δ_{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 δ_{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 δ_B is the increased axial deformation of bearing B, while δ_A is the remaining preload on bearing A. The following equations can be written immediately:

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

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

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

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

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

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 δ_{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:

$$K_a = \begin{cases} (C_A + C_B) \cdot \delta_{Ka} & \text{if } \delta_{Ka} \leq \delta_{0A} \\ C_B \cdot (\delta_{0B} + \delta_{Ka}) & \text{if } \delta_{Ka} > \delta_{0A} \end{cases} [N]$$

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:

$$F_a = C_b \cdot \delta^n \, [N]$$

Eq. 11

where:

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

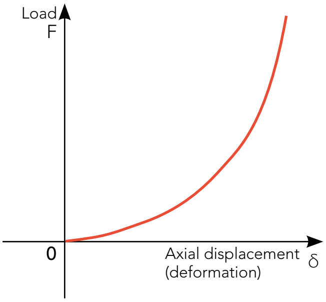


Fig. 21 - Non-linear dependency between axial load and bearing axial deformation

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:

$$F_0 = C_A \cdot \delta_{0A}^n = C_B \cdot \delta_{0B}^n \quad [N]$$

Eq. 12

$$F_A = C_A \cdot \delta_A^n = C_A \cdot (\delta_{0A} - \delta_{Ka})^n \, [N]$$

Eq. 13

$$F_B = C_B \cdot \delta_B^n = C_B \cdot (\delta_{0B} + \delta_{Ka})^n \, [N]$$

Eq. 14

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

$$K_{a\_lim} = \left[1 + \left(\frac{C_B}{C_A}\right)^{1/n}\right]^n \cdot F_0 \, [N]$$

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:

$$F_0 = \left\{ F_{A\_min}^{1/n} + \frac{K_a^{1/n}}{\left[1 + \left(\frac{C_B}{C_A}\right)^{1/n}\right]} \right\}^n [N]$$

Eq. 16

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

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

Eq. 17

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

$$K_{a\_lim} = 2^n \cdot F_0 \, [N]$$

Eq. 18

$$F_0 = \left(F_{A\_min}^{1/n} + K_a^{1/n}/2\right)^n \, [N]$$

Eq. 19

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

Eq. 20

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

$$F_{0\_min} = 0{,}35 \cdot K_a \, [N]$$

Eq. 21

$$F_0 = [F_{A\_min}^{0{,}9} + K_a^{0{,}9}/2]^{1{,}11} \, [N]$$

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**

$$F_0 = [F_{A\_min}^{0,67} + K_a^{0,67}/2]^{1,5} \, [N]$$ **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:

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

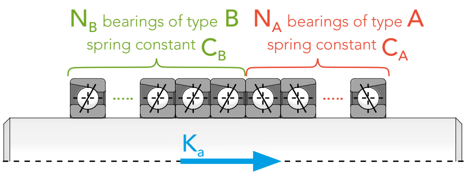


Fig. 22 - Sets of tandem single row angular contact ball bearings mounted in back-to-back arrangement

$$q = \frac{N_B}{N_A} \cdot \frac{C_B}{C_A}$$

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:

- α_B nominal contact angle of bearings B (those that become more loaded under the action of external axial force K_a);
- α_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**:

$$K_{a\_lim} = (1 + 3^{2/3})^{3/2} \cdot F_0 = 5,41 \cdot F_0$$ **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	$2,83 \cdot F_0$
1	2	$2,08 \cdot F_0$
1	3	$1,80 \cdot F_0$
1	4	$1,65 \cdot F_0$
2	1	$4,16 \cdot F_0$
2	2	$2,83 \cdot F_0$
2	3	$2,34 \cdot F_0$
2	4	$2,08 \cdot F_0$
3	1	$5,41 \cdot F_0$
3	2	$3,51 \cdot F_0$
3	3	$2,83 \cdot F_0$
3	4	$2,47 \cdot F_0$
4	1	$6,60 \cdot F_0$
4	2	$4,16 \cdot F_0$
4	3	$3,29 \cdot F_0$
4	4	$2,83 \cdot F_0$

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:

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

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

$$BPFO = Z \cdot FTFO\,[Hz]$$ **Eq. 34**

$$BPFI = Z \cdot FTFI\,[Hz]$$ **Eq. 35**

$$BSF = FTFO \cdot \left(1 + \frac{1}{\gamma}\right) \cdot \cos\alpha\,[Hz]$$ **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:

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

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

$$\gamma = \frac{D_{w(e)} \cdot \cos\alpha}{D_{pw}}$$ **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:

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

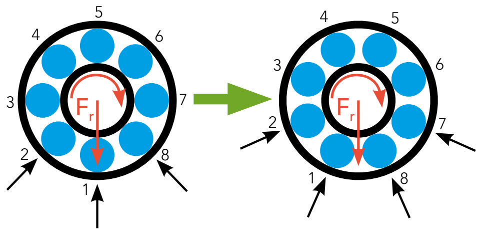
Compared to some specific installations, bearings produce less noise intensity, although vibration and noise are present and do not degrade their performance, if maintained within reasonable limits, being accepted as standard bearing characteristics. Obviously the presence of vibrations and noises in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

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.



a - Load supported by three rolling elements

b - Load supported by four rolling elements

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

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.

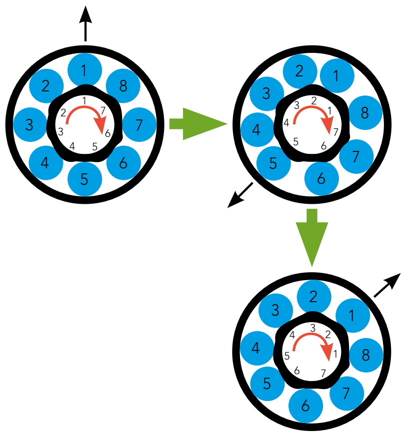


Fig. 24 - Vibration generation due to waviness of inner ring raceway surface

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.

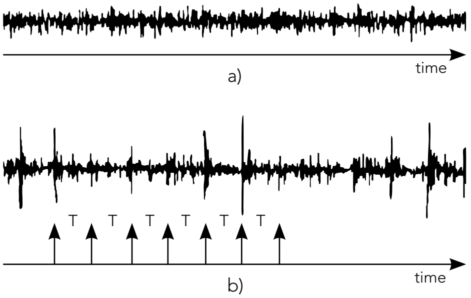


Fig. 25 - Bearing noise: a) without flaws on bearing components b) with flaws on bearing components

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.

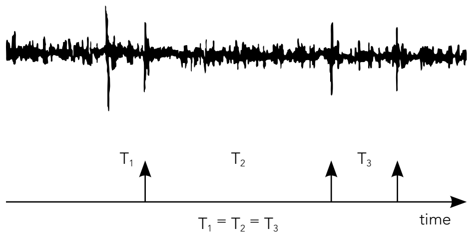


Fig. 26 - Noise emitted by a contaminated bearing

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**.

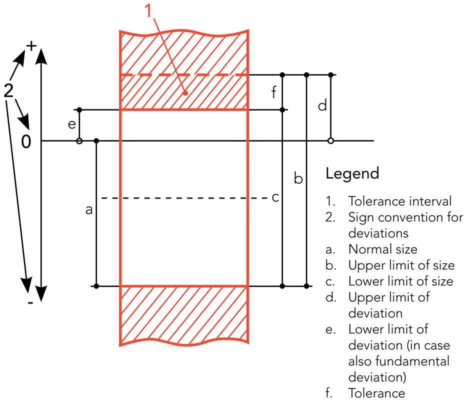


Fig. 27 - Illustration of definitions (a hole is used in the example)

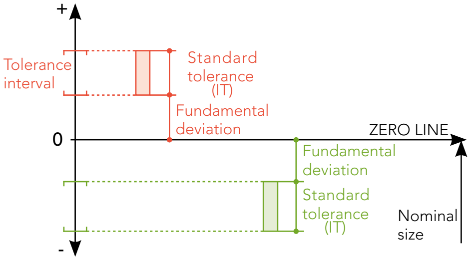


Fig. 28 - ISO tolerance class concept

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**).

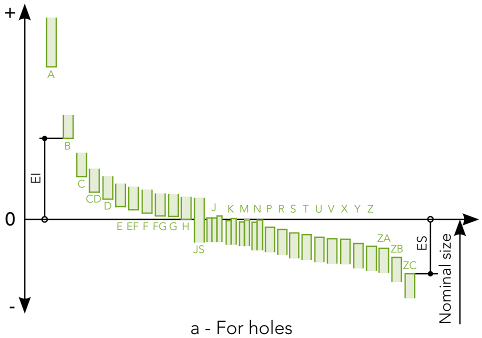
The fundamental deviation is a function of the identifier (letter) and the nominal size of the toleranced feature. They are not defined individually for each specific nominal size, but for ranges of nominal sizes. Tolerance limits may be one-sided (both values on one side of the nominal size line) or 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).

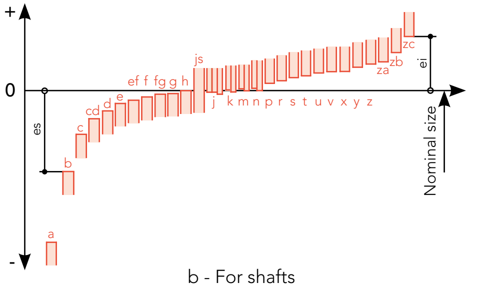
With all these, the tolerance class shall be designated by the combination of an upper case letter (for holes) or lower case letter (for shafts) identifying the fundamental deviation and the number representing the standard tolerance grade (e.g. H7, h7).

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**).



a - For holes



b - For shafts

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.

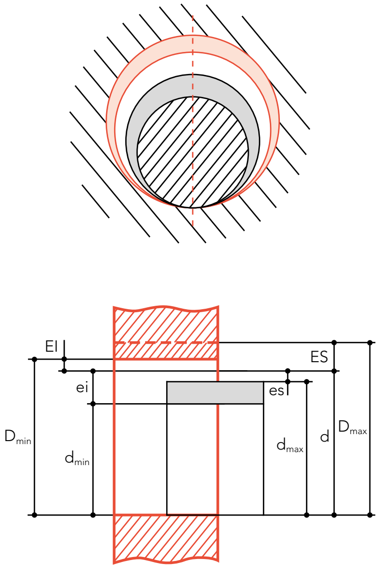
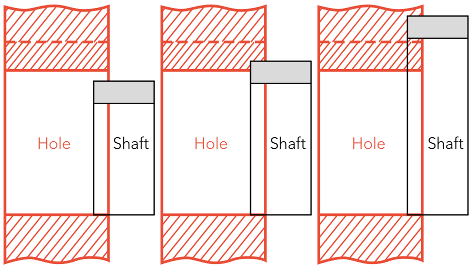


Fig. 30 - Shaft-hole fit

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**).



a - Clearance fit b - Transition fit c - Interference fit

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 Δ_{dmp} **(Fig. 32)** and to the deviation of the mean bearing outer diameter from the nominal value Δ_{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

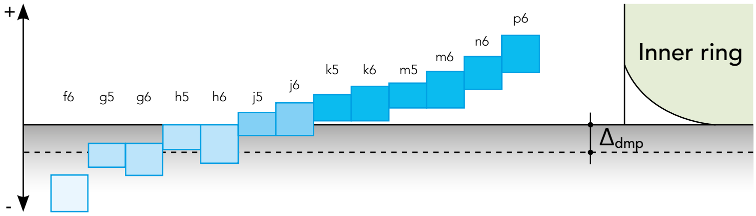


Fig. 32 - Shaft-bearing bore fit

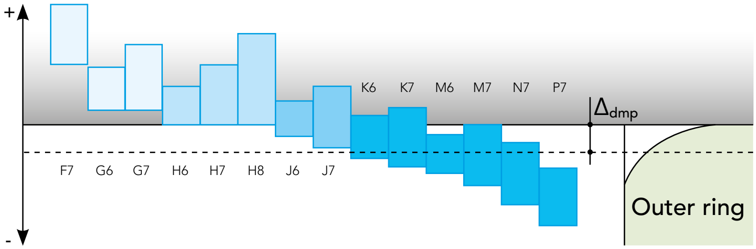


Fig. 33 - Bearing-housing bore fit

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:

$$\Delta_{dmp\_low} = -12\ \mu m = -0{,}012\ mm$$ **Eq. 40**

$$\Delta_{dmp\_high} = 0$$ **Eq. 41**

Tolerance of mean bearing bore diameter is:

$$T_{dh} = \Delta_{dmp\_high} - \Delta_{dmp\_low} = \\ = 0 - (-0{,}012) = 0{,}012\ mm$$ **Eq. 42**

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

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

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

Tolerance of the shaft diameter is:

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

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:

$$\Delta_{dmp\_low} - es = -0{,}012 - 0{,}033 = \\ = -0{,}045\ mm$$ **Eq. 46**

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

$$\Delta_{dmp\_high} - ei = 0 - 0{,}017 = -0{,}017\ mm$$ **Eq. 47**

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

$$I_{d\_min} = -0{,}017\ mm$$ **Eq. 48**

$$I_{d\_max} = -0{,}045\ mm$$ **Eq. 49**

The mean value of the theoretical interference interval is:

$$I_{d\_m} = \frac{I_{d\_min} + I_{d\_max}}{2} = \\ = \frac{-0{,}017 + (-0{,}045)}{2} = -0{,}031\ mm$$ **Eq. 50**

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

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

The limits of the interference probable range are:

$$I_{d\_prob\_min} = I_{d\_m} + \frac{T_{dlC}}{2} = -0{,}031 + \frac{0{,}020}{2} = \\ = -0{,}021\ mm$$ **Eq. 52**

$$I_{d\_prob\_max} = I_{d\_m} - \frac{T_{dlC}}{2} = -0{,}031 - \frac{0{,}020}{2} = \\ = -0{,}041\ mm$$ **Eq. 53**

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

$$\Delta_{Dmp\_low} = -15\ \mu m = -0{,}015\ mm$$ **Eq. 54**

$$\Delta_{Dmp\_high} = 0$$ **Eq. 55**

Tolerance of mean bearing outer diameter is:

$$T_{Ds} = \Delta_{dmp\_high} - \Delta_{dmp\_low} = 0 - (-0{,}015) = = 0{,}015\,mm$$ **Eq. 56**

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:

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

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

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

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

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

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:

$$I_{D\_m} = \frac{I_{D\_min} + I_{D\_max}}{2} = = \frac{-0{,}009 + (-0{,}059)}{2} = -0{,}034\,mm$$ **Eq. 64**

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

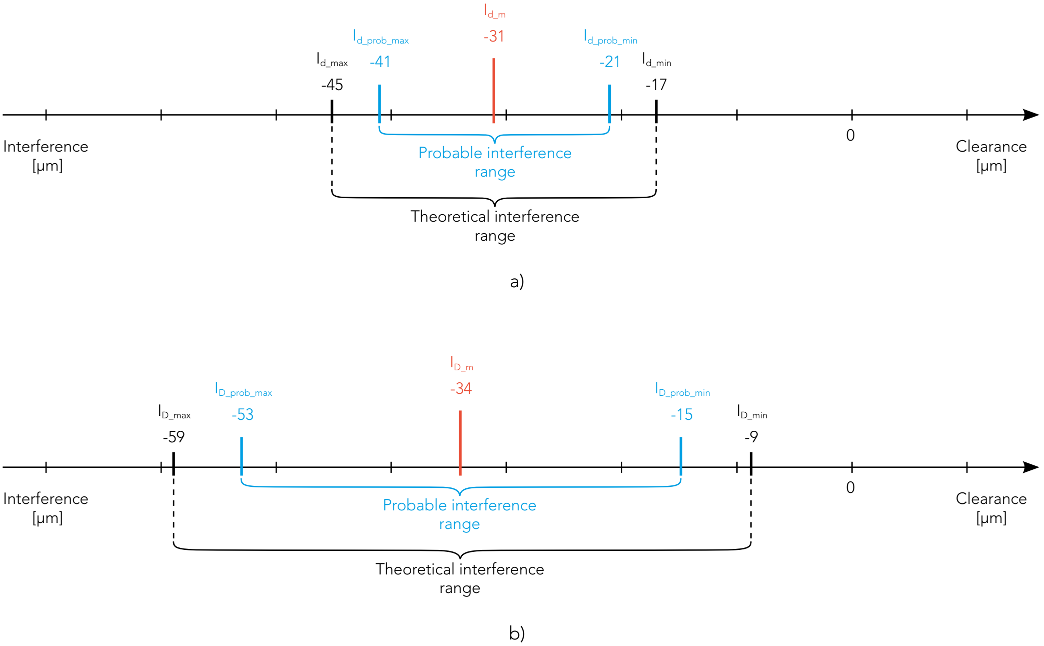


Fig. 34 - Bearing fits: a) shaft-bearing bore b) bearing-housing bore

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

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

The limits of the interference probable range are:

$$I_{D\_prob\_min} = I_{D\_m} + \frac{T_{DIC}}{2} = \quad \textbf{Eq. 66}$$
$$= -\,0{,}034 + \frac{0{,}038}{2} = -\,0{,}015\,\text{mm}$$

$$I_{d\_prob\_max} = I_{D\_m} - \frac{T_{DIC}}{2} = \quad \textbf{Eq. 67}$$
$$= -\,0{,}034 - \frac{0{,}038}{2} = -\,0{,}053\,\text{mm}$$

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	$P/C \le 0{,}05$
Normal	$0{,}05 < P/C \le 0{,}1$
Heavy	$0{,}1 < P/C \le 0{,}15$
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).

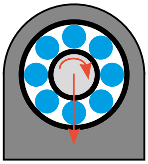
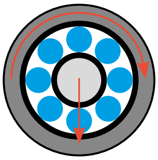
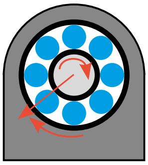
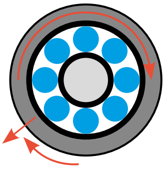
Rotating load acts on every point of the raceway and can turn the ring relative to its seating surface if clearance fit is used. In this case the contact surfaces will be worn out (fretting corrosion) and to prevent this phenomenon interference fits have to be used. Note that the level of the interference 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 Outer ring Load direction	Rotating Stationary Constant		Rotating	Stationary	Interference	Clearance
Inner ring Outer ring Load direction	Stationary Rotating Constant		Stationary	Rotating	Clearance	Interference
Inner ring Outer ring Load direction	Rotating Stationary Rotates with inner ring		Stationary	Rotating	Interference	Clearance
Inner ring Outer ring Load direction	Stationary Rotating Rotates with outer ring		Rotating	Stationary	Interference	Clearance

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**		n5b		n5^{b}
	60	**65**				
	65	**85**	m6	n6^{b}		n6^{b}
	85	**100**				p6^{c}
	100	**140**		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**				n6^{b}
	65	**110**	m6	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 $(P/C \leq 0{,}05)$	M7	Non-displaceable
		Normal to heavy loads $(0{,}05 < P/C \leq 0{,}1)$	N7	
		Heavy loads or shocks on bearing in thin-wall housings $(P/C > 0{,}1)$	P7	
	Load of indeterminate direction	Normal to heavy loads $(0{,}05 < P/C \leq 0{,}1)$	K7	
		Heavy shock loads $(P/C > 0{,}1)$	M7	
Solid (non-split) or split housing	Load of indeterminate direction	Light or normal loads $(P/C \leq 0{,}1)$	J7, JS7[a]	Displaceable
	Stationary load on outer ring[c]	Loads of all kinds	H7, G7[b]	
		Light to normal loads $(P/C \leq 0{,}1)$	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.

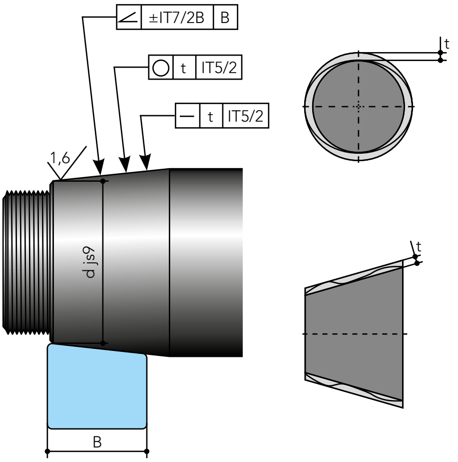
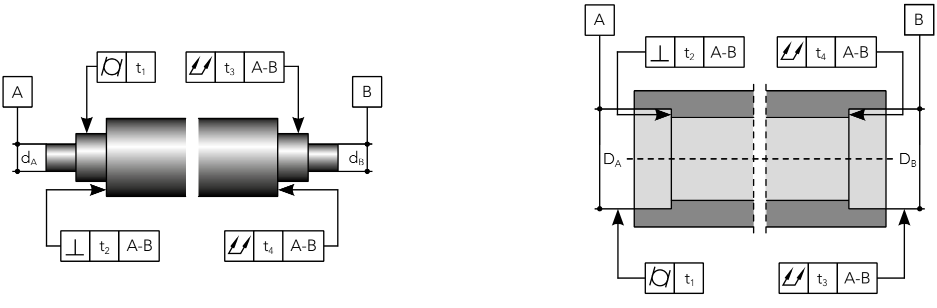


Fig. 36 - Dimensional, form and orientation accuracy for tapered bearing seats on shafts

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:

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

$$V_K = \frac{1}{30} \pm \frac{IT7}{2 \cdot B} \quad \text{if} \quad \text{taper}\, 1{:}30$$ **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**).

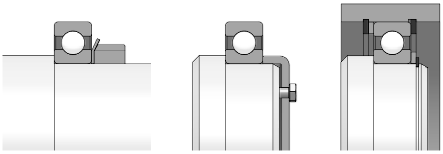

a - Locknut b - End plate c - Snap ring

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**).

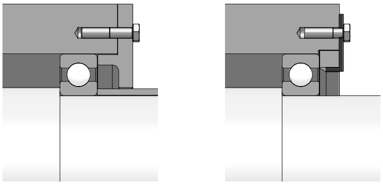

a - Housing end cover b - Threaded ring

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**).

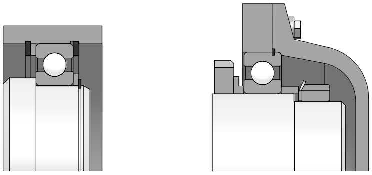
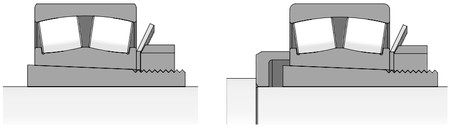

a - Snap rings mounted in housing bore grooves b - Snap ring mounted in outer ring groove

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)**.

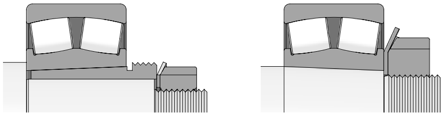
This fault is avoided by using a stepped shaft and a spacer ring inserted between the shaft shoulder and inner ring on the other side **(Fig. 40b)**. The presence of a shoulder (with or without a spacer ring) is mandatory when a withdrawal sleeve is used **(Fig. 41a)**.


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)**.

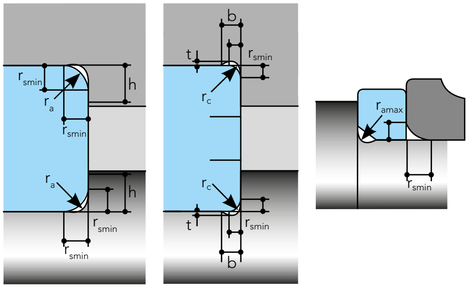

a - Withdrawal sleeve

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.

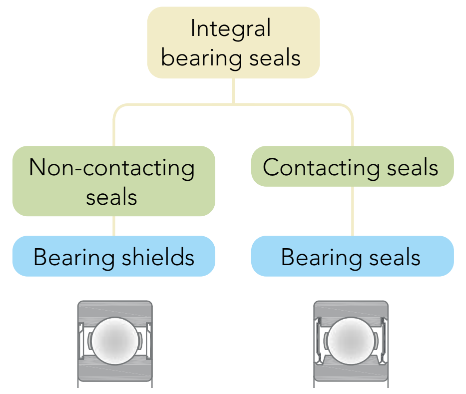


Diagram 1 - Integral bearing seals types

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.

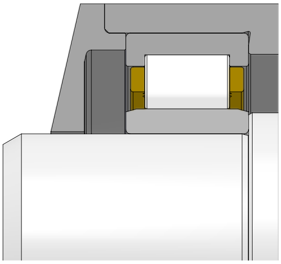


Fig. 43 - Simple gap type seal

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.

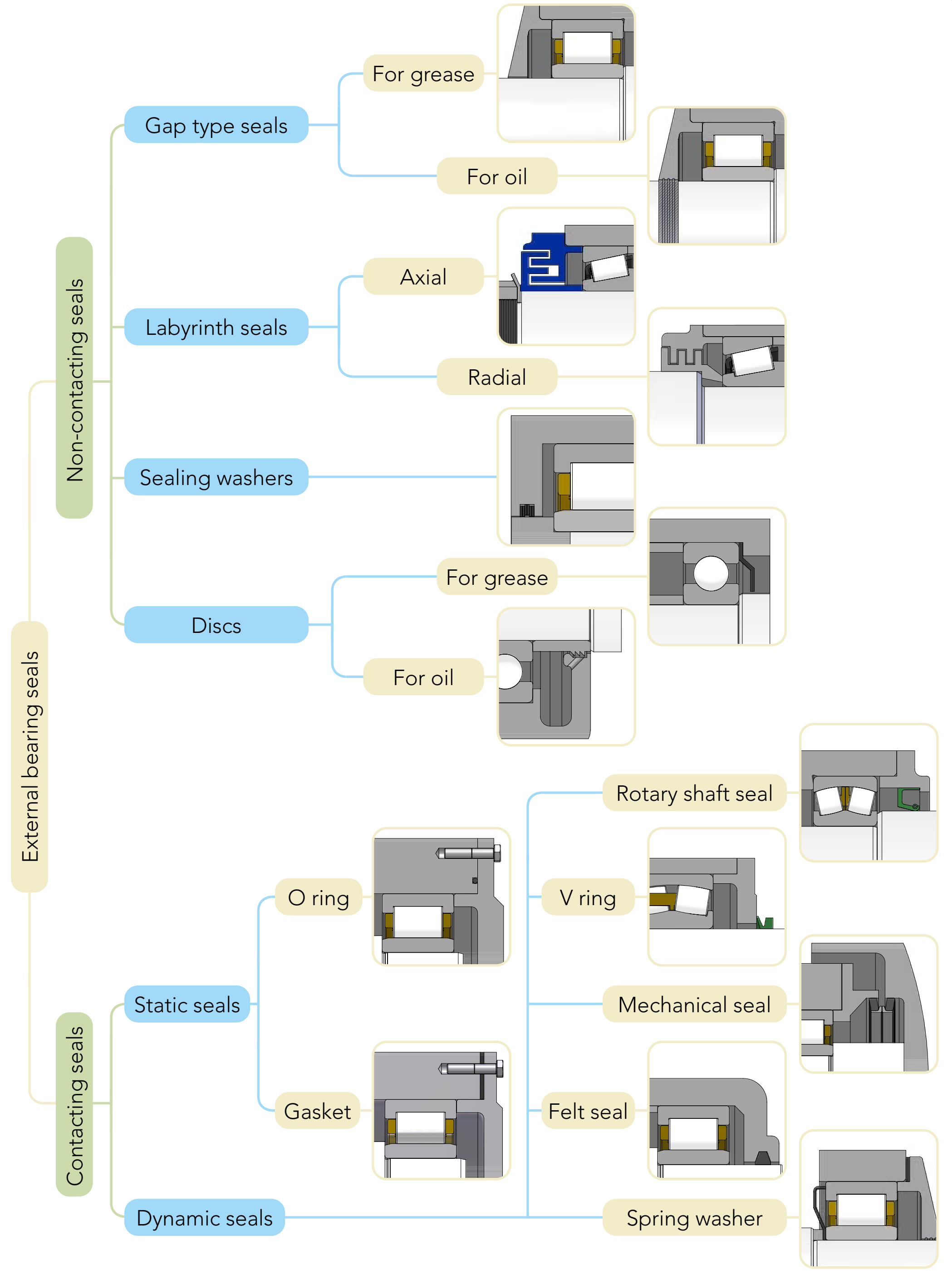


Diagram 2 - External bearing seals types

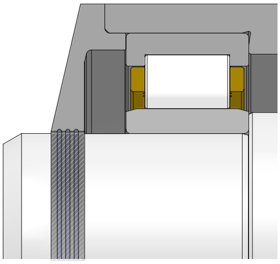


Fig. 44 - Gap type seal with annular grooves

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.

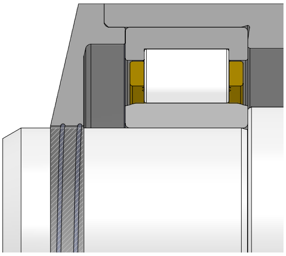
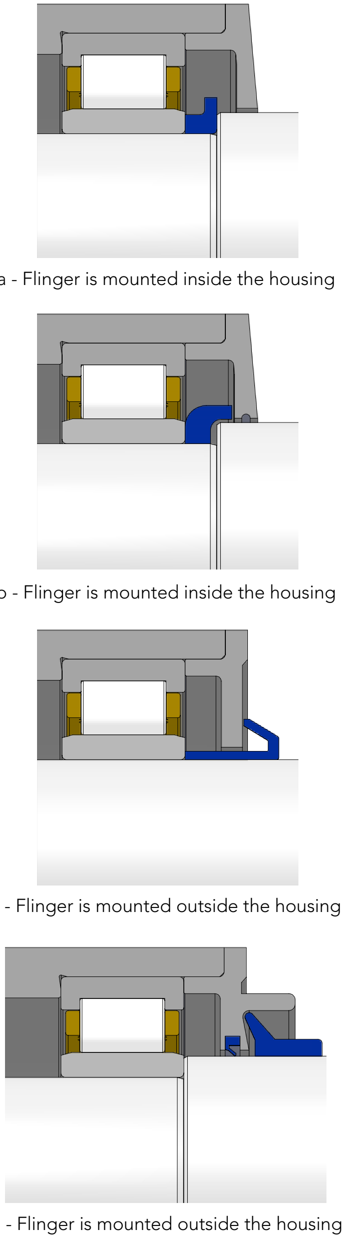


Fig. 45 - Gap type seal with helical grooves

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.

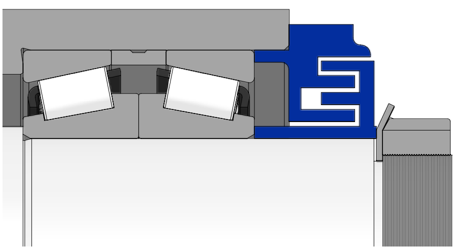


Fig. 47 - Labyrinth seal

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.

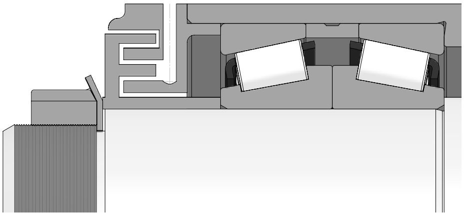


Fig. 48 - Axial labyrinth seal

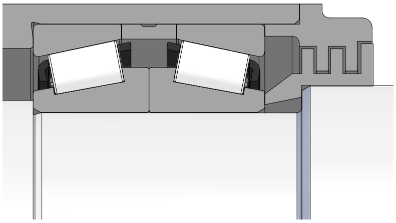


Fig. 49 - Radial labyrinth seal

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.

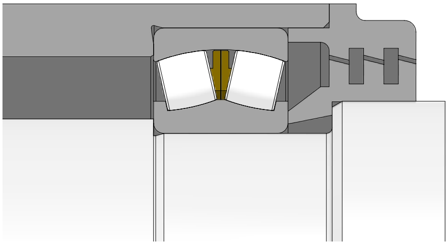


Fig. 51 - Labyrinth seal for self-aligning shaft

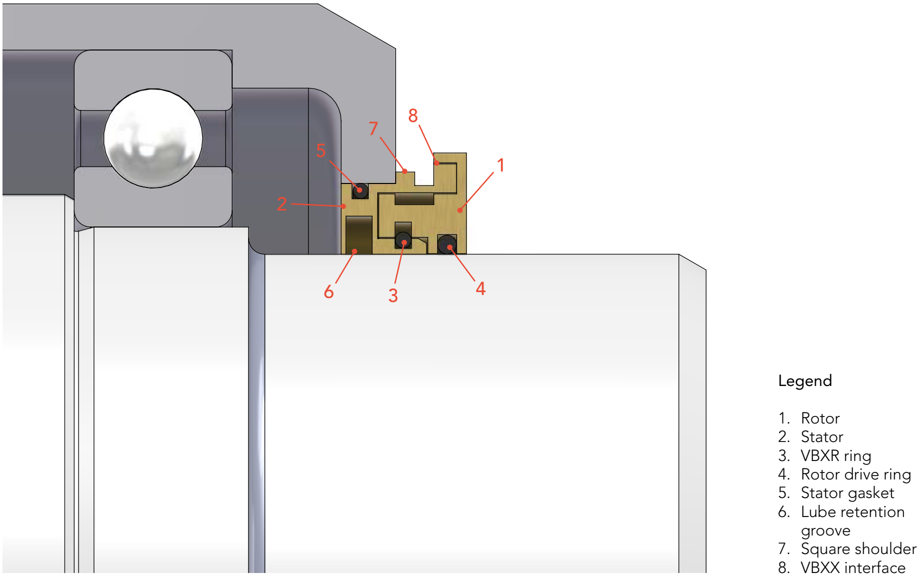


Fig. 50 - Complex labyrinth seal design

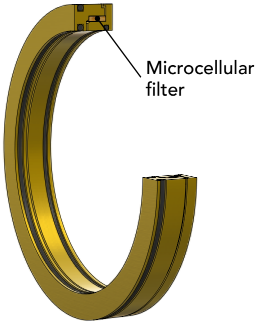


Fig. 52 - Axial labyrinth seal

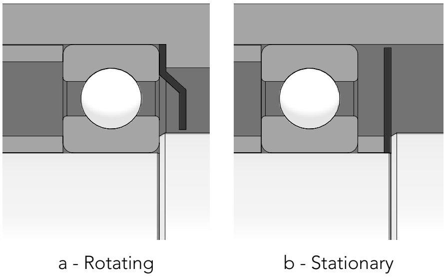


Fig. 54 - Discs for grease lubricated bearings

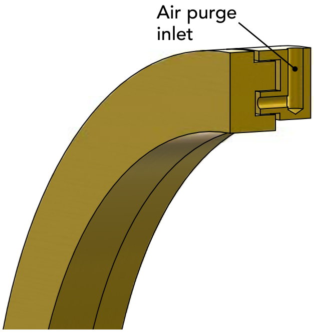


Fig. 53 - Axial labyrinth seal

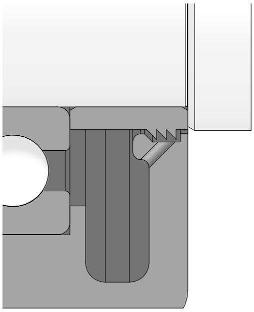


Fig. 55 - Rotating disc for oil lubricated bearings

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.

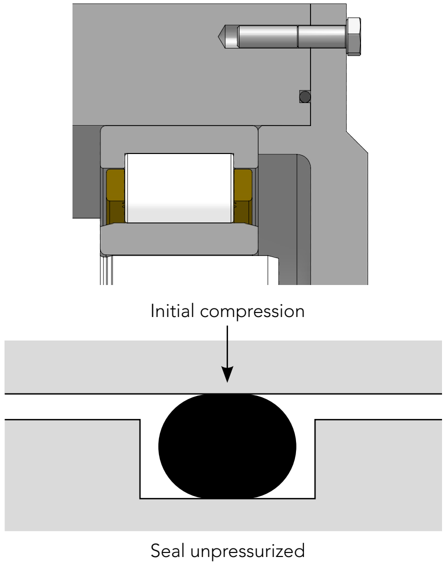
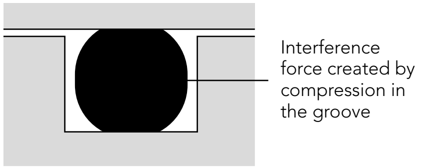
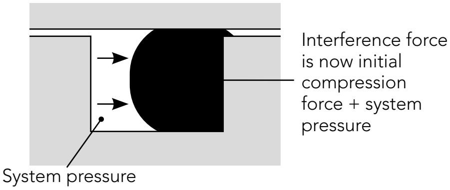


Fig. 56 - Typical arrangement for O-ring seal

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.



a - At mounting



b - In operation

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.

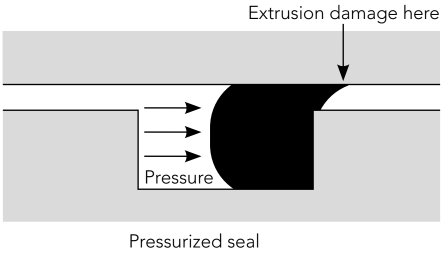


Fig. 58 - O-ring subjected to high pressure

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.

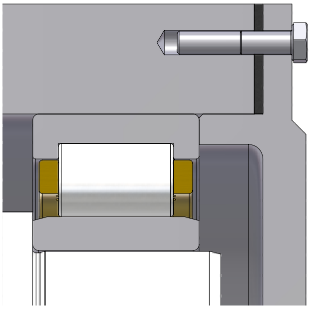


Fig. 59 - Typical gasket assembly

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**.

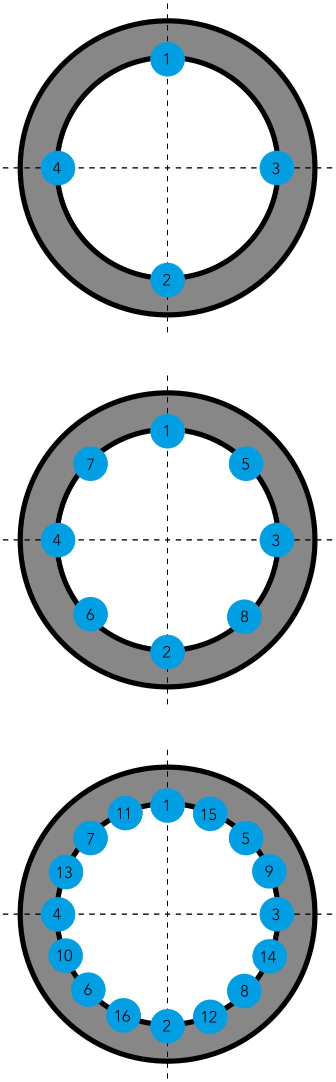


Fig. 60 - Screws or bolts tightening sequence

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.

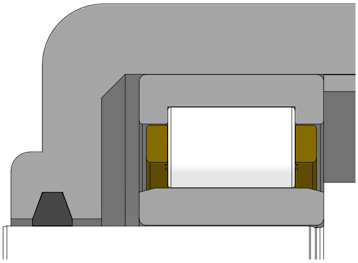


Fig. 61 - Felt seal

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.

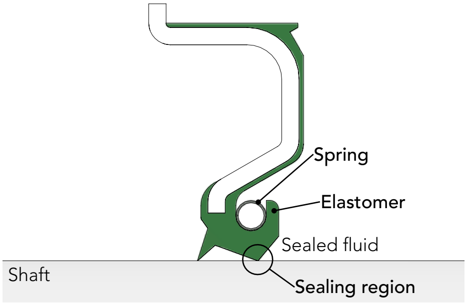


Fig. 62 - Rotary lip seal

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.

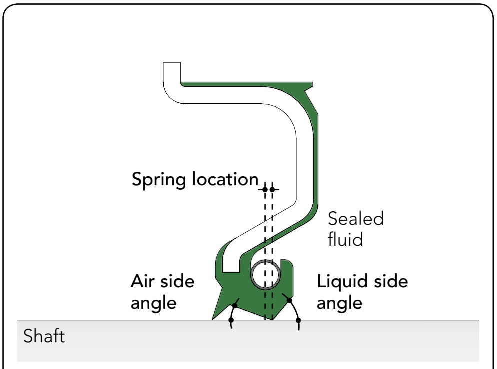


Fig. 63 - Lip seal geometry

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**.

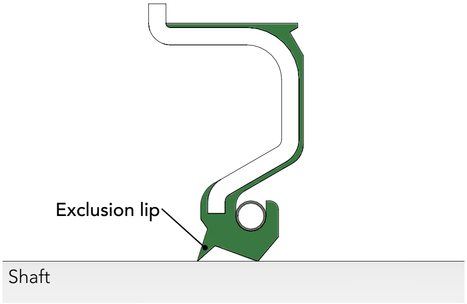
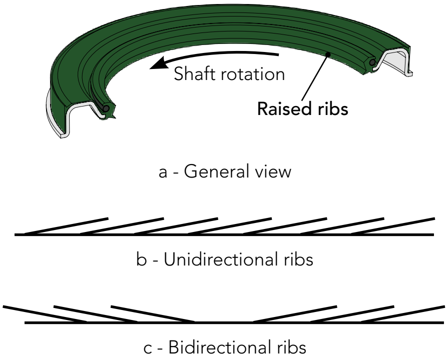


Fig. 64 - Rotary lip seal with contaminants exclusion lip

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.



a - General view

b - Unidirectional ribs

c - Bidirectional ribs

Fig. 65 - Rotary lip seal with sealing aids

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.

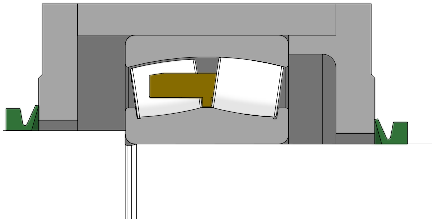


Fig. 66 - V-ring arrangement

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.

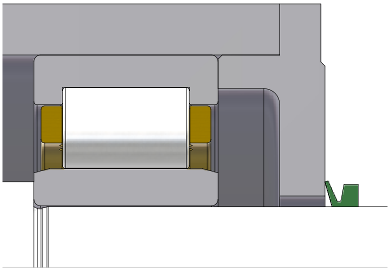


Fig. 67 - V-ring arrangement used as an excluder seal

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.

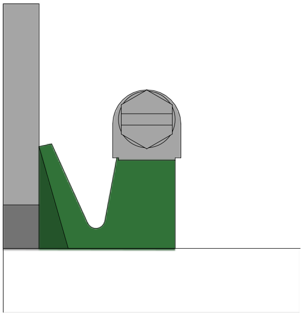
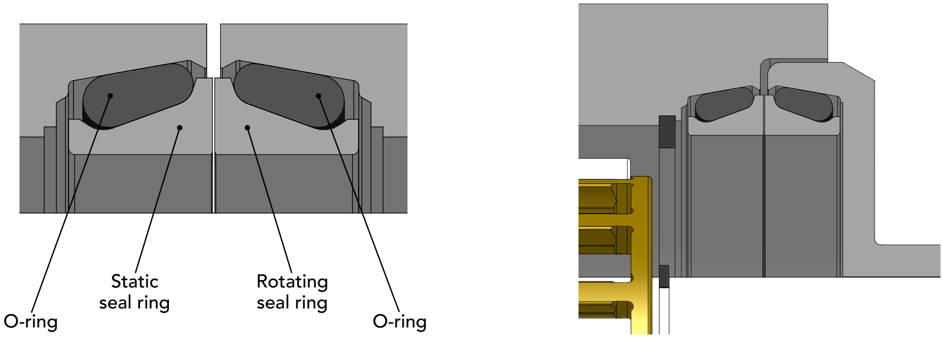


Fig. 68 - V-ring with a clamping band

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.

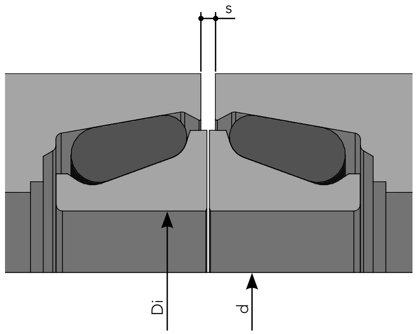


Fig. 71 - Adjusting the axial compression of the O-rings of a mechanical face seal

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

Tab. 10 - Bearing designation examples

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.

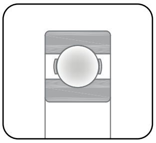
It has to be considered that an excessive axial load will influenced negatively the bearing life.

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

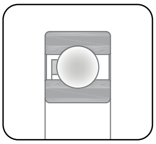
Type J



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)

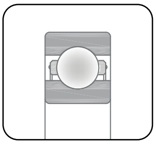
Type TN



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

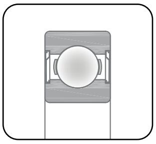


HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED

- 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

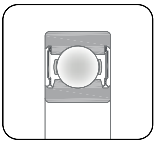
Seal type ZZ



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; see table below)

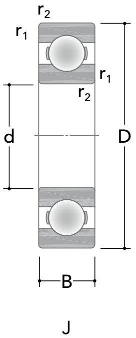
Radial internal clearance of extra small and miniature ball bearings Units: μm

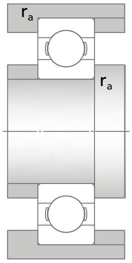
Clearance symbol	MC1		MC2		MC3		MC4		MC5		MC6	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
Clearance	0	5	3	8	5	10	8	13	13	20	20	28

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

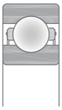
CS	Special radial internal clearance
EMQ	Electric motor quality: bearing specifically designed for quiet running in electric motors
S12	Special selection for extremely low noise running
P66	Vibration peaks and noise level lower than normal

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





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**



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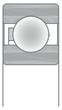
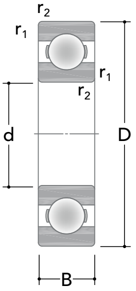


TN

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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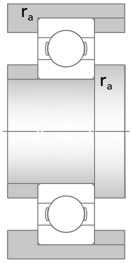
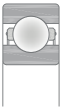


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
10	22	6	2,81	1,30	0,055	67400	45600	**61900**
(cont.)	26	8	4,75	1,96	0,082	64500	40400	**6000**
	28	8	5,26	2,53	0,107	58200	34200	**16100**
	30	9	5,45	2,36	0,100	54700	36000	**6200**
	35	11	8,52	3,48	0,142	48200	32500	**6300**
12	21	5	1,83	0,96	0,041	68100	37400	**61801**
	24	6	3,07	1,56	0,066	65300	34400	**61901**
	28	8	5,45	2,36	0,100	58700	38700	**6001**
	30	8	5,07	2,46	0,104	58200	34200	**16101**
	32	10	7,28	3,14	0,129	48500	32200	**6201**
	37	12	10,20	4,15	0,174	43600	28400	**6301**
15	24	5	1,90	1,13	0,049	57900	32800	**61802**
	28	7	4,46	2,30	0,098	54000	29600	**61902**
	32	8	5,85	2,81	0,118	48800	27800	**16002**
	32	9	5,85	2,85	0,119	50000	32000	**6002**
	35	11	8,09	3,75	0,158	41600	28800	**6202**
	42	13	11,90	5,49	0,228	37100	24100	**6302**
17	26	5	2,04	1,35	0,057	54000	30600	**61803**
	30	7	4,81	2,68	0,114	48100	28500	**61903**
	35	8	6,50	3,24	0,137	44000	24400	**16003**
	35	10	6,37	3,25	0,136	43800	28400	**6003**
	40	12	9,95	4,75	0,199	37000	24600	**6203**
	47	14	14,4	6,59	0,272	32900	22700	**6303**
	62	17	24,0	11,1	0,468	27100	18000	**6403**
20	32	7	4,10	2,36	0,106	44000	25200	**61804**
	37	9	6,66	3,83	0,164	41600	22900	**61904**
	42	8	7,28	3,98	0,170	36900	21100	**16004**
	42	12	9,95	5,06	0,210	36900	24400	**6004**
	47	14	13,5	6,55	0,275	31100	20000	**6204**



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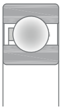
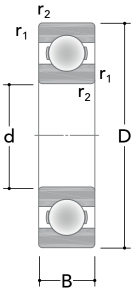


TN

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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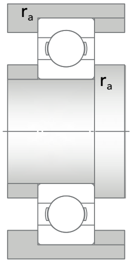
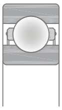
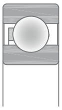
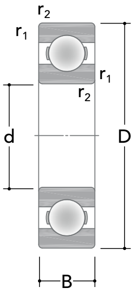


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
20	52	15	16,8	7,80	0,329	30000	19000	**6304**
(cont.)	72	19	31,9	16,0	0,683	23200	15100	**6404**
22	50	14	14,0	8,02	0,341	29000	16500	**62/22**
	56	16	19,2	9,62	0,403	27300	15700	**63/22**
25	37	7	4,48	2,79	0,134	36800	24400	**61805**
	42	9	7,31	4,62	0,207	34700	22800	**61905**
	47	8	8,06	4,75	0,210	31300	20600	**16005**
	47	12	11,9	6,55	0,270	30800	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	25000	14400	**62/28**
	68	18	25,8	14,0	0,598	21500	12000	**63/28**
30	42	7	4,61	2,98	0,150	31200	20600	**61806**
	47	9	7,62	4,72	0,220	29300	19200	**61906**
	55	9	12,0	7,36	0,305	27200	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	17400	11000	**6406**
35	47	7	4,59	3,43	0,143	29200	18100	**61807**
	55	10	11,3	8,30	0,346	25100	16200	**61907**
	62	9	13,3	8,15	0,369	23300	15000	**16007**
	62	14	16,9	10,2	0,440	23200	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	15400	10100	**6407**





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**



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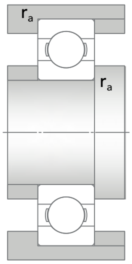
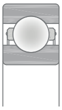


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
40	52	7	4,65	3,96	0,169	25400	16200	**61808**
	62	12	14,0	10,3	0,438	23400	14100	**61908**
	68	9	13,9	10,2	0,436	21500	14100	**16008**
	68	15	17,8	11,0	0,481	22000	14000	**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	13600	9000	**6408**
45	58	7	6,92	6,26	0,267	21200	14000	**61809**
	68	12	14,1	11,0	0,474	19400	13600	**61909**
	75	10	16,8	10,9	0,510	19400	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	19300	13300	**61810**
	72	12	14,8	12,2	0,517	18200	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	11600	7500	**6410**
55	72	9	9,48	9,32	0,397	18600	12600	**61811**
	80	13	16,6	15,1	0,647	16600	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	10600	7000	**6411**
60	78	10	12,3	11,6	0,499	16300	11000	**61812**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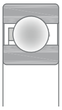
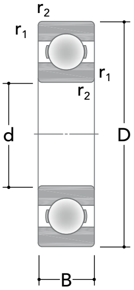

TN

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**



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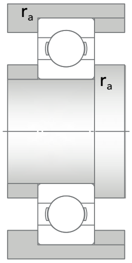
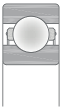


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
60	85	13	16,6	15,2	0,638	15600	10000	**61912**
(cont.)	95	11	20,8	15,0	0,735	14600	9500	**16012**
	95	18	30,7	23,2	0,972	15000	13500	**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	9700	6300	**6412**
65	85	10	12,8	13,3	0,566	15400	10000	**61813**
	90	13	17,5	16,4	0,697	14400	9500	**61913**
	100	11	22,5	19,6	0,822	13700	9000	**16013**
	100	18	32,2	25,0	1,05	14000	12500	**6013**
	120	23	58,9	40,5	1,71	11700	10000	**6213**
	140	33	98,5	60,0	2,46	10000	9500	**6313**
	160	37	120	83,5	3,37	9200	6000	**6413**
70	90	10	12,8	13,7	0,581	14400	9000	**61814**
	100	16	24,9	21,8	0,925	13700	8500	**61914**
	110	13	29,1	25,6	1,04	12600	8100	**16014**
	110	20	40,1	31,8	1,31	12600	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	8300	5300	**6414**
75	95	10	13,1	15,1	0,644	13400	8500	**61815**
	105	16	24,4	23,1	0,995	12600	8000	**61915**
	115	13	30,5	27,0	1,14	11600	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	7700	5000	**6415**
80	100	10	13,4	15,8	0,674	12500	8000	**61816**
	110	16	26,5	21,7	1,09	11600	7500	**61916**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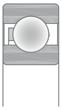
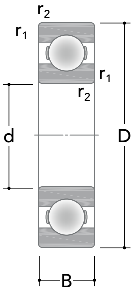

TN

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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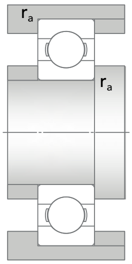
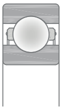


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
80	125	14	35,8	31,5	1,31	10700	7000	**16016**
(cont.)	125	22	49,4	40,0	1,66	11000	9700	**6016**
	140	26	72,8	55,0	2,19	9500	8600	**6216**
	170	39	130	86,5	3,19	8500	7500	**6316**
	200	48	171	133	4,79	7200	4800	**6416**
85	110	13	19,8	21,0	0,888	11600	7600	**61817**
	120	18	32,1	30,9	1,29	10700	7000	**61917**
	130	14	36,2	33,6	1,35	10700	6700	**16017**
	130	22	52,5	43,5	1,74	10700	9300	**6017**
	150	28	87,1	64,8	2,49	8700	8000	**6217**
	180	41	140	96,5	3,50	7700	7500	**6317**
	210	52	174	143	4,96	6700	4500	**6417**
90	115	13	19,7	23,1	0,961	10600	7000	**61818**
	125	18	34,2	33,8	1,38	10600	6700	**61918**
	140	16	43,7	39,5	1,54	9700	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	6400	4300	**6418**
95	120	13	20,3	24,2	0,99	10600	6700	**61819**
	130	18	34,9	34,3	1,37	9700	6300	**61919**
	145	16	44,9	41,5	1,61	9100	6000	**16019**
	145	24	64,3	54,8	2,07	9200	8200	**6019**
	170	32	116	81,7	2,97	7600	6910	**6219**
	200	45	159	118	4,11	6700	6400	**6319**
100	125	13	17,9	19,2	1,00	9700	6300	**61820**
	140	20	42,6	44,0	1,73	9100	6000	**61920**
	150	16	46,7	44,4	1,68	9200	5600	**16020**
	150	24	65,0	54,0	2,00	9500	7560	**6020**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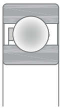
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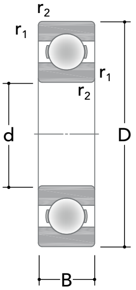
Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
80	0,6	0,6	0,61	**16016**
(cont.)	1,1	1	0,87	**6016**
	2	2	1,45	**6216**
	2,1	2	3,65	**6316**
	3	2,5	6,85	**6416**
85	1	1	0,27	**61817**
	1,1	1	0,55	**61917**
	0,6	0,6	0,64	**16017**
	1,1	1	0,92	**6017**
	2	2	1,8	**6217**
	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**



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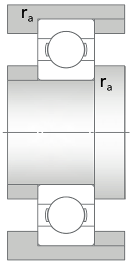
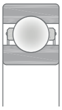


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
100	180	34	128	93,0	3,34	7500	7000	**6220**
(cont.)	215	47	180	145	4,92	6500	6000	**6320**
105	130	13	21,9	20,3	1,04	9700	6300	**61821**
	145	20	45,6	45,0	1,74	9200	5600	**61921**
	160	18	54,9	51,6	1,85	8100	5300	**16021**
	160	26	76,9	65,5	2,37	8500	7500	**6021**
	190	36	141	104	3,61	6700	6100	**6221**
	225	49	185	162	5,40	6300	5300	**6321**
110	140	16	29,2	27,0	1,30	9200	5600	**61822**
	150	20	44,6	46,5	1,72	9000	7500	**61922**
	170	19	60,5	57,4	2,02	7800	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	8200	5300	**61824**
	165	22	55,9	58,9	2,11	8000	6700	**61924**
	180	19	65,0	64,2	2,17	7200	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	5400	5000	**6324**
130	165	18	38,5	46,1	1,72	8000	4800	**61826**
	180	24	67,8	71,3	2,43	7300	4500	**61926**
	200	22	84,9	81,5	2,70	6700	4300	**16026**
	200	33	112	100	3,35	7000	5600	**6026**
	230	40	159	137	4,31	5300	5300	**6226**
	280	58	235	223	6,50	5000	4500	**6326**
140	175	18	40,8	49,2	1,76	7300	6700	**61828**
	190	24	67,5	74,2	2,43	7000	5600	**61928**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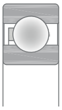
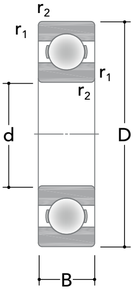

TN

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**



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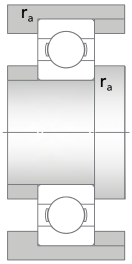
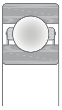


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
140	210	22	86,2	89,8	2,91	6700	5700	**16028**
(cont.)	210	33	114	110	3,51	6700	5350	**6028**
	250	42	167	152	4,61	5300	4800	**6228**
	300	62	259	258	7,48	4600	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	5800	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	4800	4500	**6230**
	320	65	284	294	8,05	4100	4000	**6330**
160	200	20	51,3	68,4	2,14	6100	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	3900	3800	**6332**
170	215	22	61,8	82,8	2,55	5700	5310	**61834**
	230	28	95,3	112	3,33	5600	4800	**61934**
	260	28	119	131	3,81	5100	4600	**16034**
	260	42	170	179	5,17	5300	4350	**6034**
	310	52	220	236	6,43	4100	3800	**6234**
	360	72	315	354	9,16	3600	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	4600	3500	**16036**
	280	46	190	215	6,02	4800	4000	**6036**
	320	52	241	244	6,51	4000	3800	**6236**



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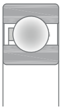
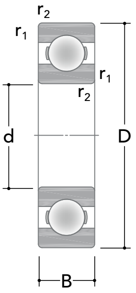


TN

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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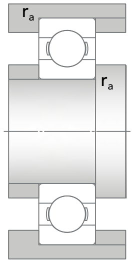
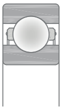


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
180	380	75	356	419	10,76	3400	3200	**6336**
(cont.)								
190	240	24	80,6	103	2,94	5100	4300	**61838**
	260	33	121	142	4,03	5000	4300	**61938**
	269,5	33	119	141	4,00	2300	2100	**306627**
	290	31	156	175	4,80	4600	4050	**16038**
	290	46	204	222	6,01	4600	3800	**6038**
	340	55	262	293	7,69	3600	3400	**6238**
	400	78	378	452	11,35	3200	3000	**6338**
190,5	290	46	197	222	6,01	2200	1900	**408997**
200	250	24	79,5	109	3,10	4800	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	3400	3200	**6240**
	420	80	385	485	11,68	3000	2700	**6340**
220	270	24	82,0	118	3,22	4300	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	3900	3400	**16044**
	340	56	257	303	7,68	4000	3200	**6044**
	400	65	296	384	9,26	3000	3050	**6244**
	460	88	415	527	12,2	2700	2600	**6344**
230	329,5	40	193	243	6,08	1800	1700	**306842**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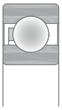
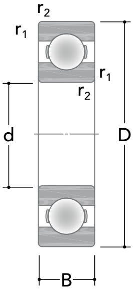

TN

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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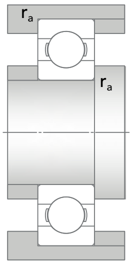
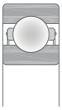


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
240	300	28	110	160	4,05	4000	4400	**61848**
	320	38	159	206	5,25	4000	4300	**61948**
	360	37	206	264	6,52	3500	3800	**16048**
	360	56	257	324	8,02	3600	3000	**6048**
	440	72	372	500	11,6	2900	3400	**6248**
	500	95	445	601	13,3	2500	3000	**6348**
260	320	28	112	173	4,25	3800	4300	**61852**
	360	46	217	288	6,99	3400	3800	**61952**
	369,5	46	217	290	7,25	1530	1500	**306862**
	400	44	251	325	7,55	3100	3600	**16052**
	400	65	305	389	9,13	3200	3400	**6052**
	480	80	393	561	12,5	2200	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	3000	3600	**61956**
	389,5	46	218	296	6,22	2900	2000	**306861**
	420	44	253	358	8,01	2900	3400	**16056**
	420	65	309	430	9,87	3000	3400	**6056**
	500	80	439	635	13,7	2500	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	2900	3200	**61960**
	460	50	285	416	9,04	2700	3200	**16060**
	460	74	364	514	11,2	2800	3000	**6060**
	540	85	470	708	14,5	2300	2800	**6260**
320	400	38	173	272	6,08	3000	3400	**61864**
	440	37	218	325	7,02	2800	3200	**60964**
	440	56	277	430	9,30	2700	3200	**61964**
	480	50	291	416	8,88	2500	3000	**16064**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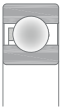
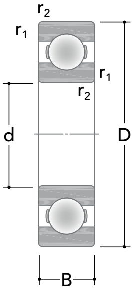

TN

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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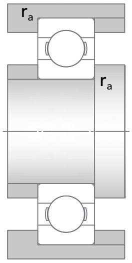
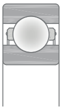


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
320	480	74	376	564	11,9	2600	3000	**6064**
(cont.)	580	92	535	829	16,6	2000	2600	**6264**
330	460	56	291	449	9,51	2500	1600	**306728**
340	420	38	183	286	6,24	2600	3200	**61868**
	460	56	281	439	9,30	2400	3000	**61968**
	480	60	305	451	9,44	1100	1000	**306890**
	520	57	353	549	11,2	2300	2800	**16068**
	520	82	437	649	13,4	2300	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	2500	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	2300	2800	**61976**
	550	82	414	720	15,3	2600	2200	**306682**
	560	57	383	637	12,5	2100	2600	**16076**
	560	82	446	726	14,3	2100	2600	**6076**
400	500	46	249	413	8,31	2300	2800	**61880**
	500	31	170	297	5,94	2350	2800	**60880**
	540	65	360	601	11,8	2100	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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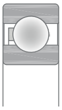
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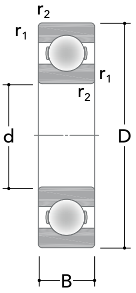
Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
320	4	3	46	**6064**
(cont.)	5	4	110	**6264**
330	3	2,5	30	**306728**
340	2,1	2	11,5	**61868**
	3	2,5	26,5	**61968**
	4	3	36	**306890**
	4	3	45	**16068**
	5	4	62	**6068**
	6	5	110	**6268**
350	4	3	46	**306674**
360	2,1	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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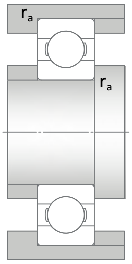
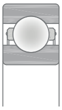


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
420	520	46	253	433	8,46	2200	2800	**61884**
	560	65	368	607	11,53	2100	2600	**61984**
	620	90	535	920	17,04	1900	2200	**6084**
440	540	46	260	453	8,75	2100	2600	**61888**
	540	31	158	304	5,87	2200	2600	**60888**
	600	74	413	747	13,7	1900	2200	**61988**
	600	50	328	590	10,9	1900	2400	**60988**
	650	94	585	1031	18,8	1800	2000	**6088**
460	580	56	337	597	11,1	1900	2400	**61892**
	620	74	432	759	13,9	1800	2200	**61992**
	680	100	595	1113	20,0	1800	1900	**6092**
480	600	56	336	616	11,1	1800	2200	**61896**
	650	78	470	864	15,5	1700	2000	**61996**
	700	100	624	1210	21,2	1600	1900	**6096**
487,5	650	78	445	855	15,0	980	1000	**614885**
500	620	56	331	661	11,9	1700	2000	**618/500**
	620	37	231	462	8,19	1600	2200	**608/500**
500	670	78	478	881	15,3	1600	1900	**619/500**
	720	100	633	1198	20,6	1500	1800	**60/500**
530	650	56	347	672	11,5	1700	2000	**618/530**
	710	82	500	963	16,2	1500	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	1400	1700	**60/530**
560	680	56	344	722	12,3	1500	1900	**618/560**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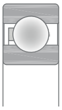
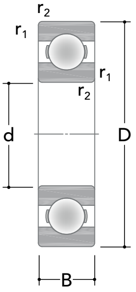

TN

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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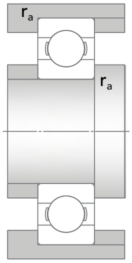
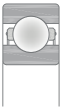
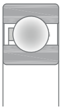
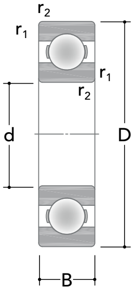


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
560	680	37	230	482	8,29	1400	1900	**608/560**
(cont.)	750	85	508	1019	16,9	1400	1700	**619/560**
	820	115	666	1469	23,6	1300	1600	**60/560**
600	730	60	368	774	12,6	1400	1800	**618/600**
	730	42	276	563	9,21	1400	1800	**608/600**
	800	90	610	1246	20,0	1300	1600	**619/600**
	870	118	754	1569	24,7	1200	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	1200	1500	**619/630**
	850	71	500	1102	17,3	1200	1500	**609/630**
	920	128	822	1810	27,8	1100	1300	**60/630**
650	920	118	794	1789	26,9	1050	900	**306708**
670	820	69	449	1029	16,1	1200	1550	**618/670**
	900	103	688	1539	23,0	1100	1400	**619/670**
	900	73	573	1307	19,9	1100	1500	**609/670**
	980	136	912	2140	31,5	1010	1300	**60/670**
710	870	74	475	1113	16,8	1200	1400	**618/710**
	950	106	701	1594	23,4	1000	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	960	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	1000	1300	**618/750**
	1000	112	771	1844	26,1	960	1300	**619/750**





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**



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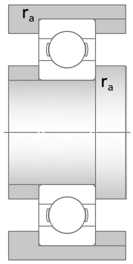
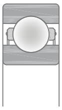


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
750 (cont.)	1090	150	1033	2516	35,7	950	1100	**60/750**
760	1080	150	967	2257	31,8	910	700	**306474**
800	980	82	560	1428	20,1	1000	1300	**618/800**
	980	57	418	1049	15,0	1100	1300	**608/800**
	1060	115	851	2120	29,6	910	1200	**619/800**
	1080	115	828	2121	29,6	980	700	**361844**
	1150	155	1030	2700	36,5	860	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	838	2258	30,3	820	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	6464	1802	23,3	780	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	730	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	725	2194	27,4	640	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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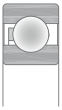
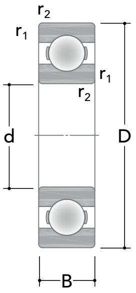

TN

Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
750 (cont.)	7,5	6	485	**60/750**
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**



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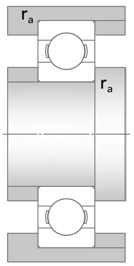
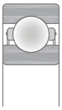


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
1120	1360	106	763	2354	28,4	600	900	**618/1120**
	1460	150	1040	3180	37,4	580	800	**619/1120**
	1580	200	1480	4740	53,9	530	750	**60/1120**
1180	1420	106	756	2459	28,7	540	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	460	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	360	200	**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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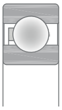
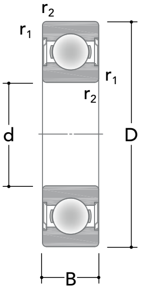

TN

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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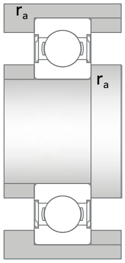
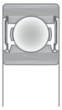


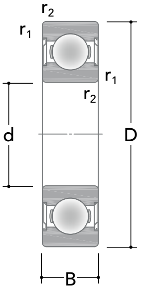
Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
3	10	4	0,55	0,19	0,007	122200	55800	**623**
	10	4	0,55	0,19	0,007	-	36800	**623**
4	9	3,5	0,55	0,18	0,07	127400	60300	**628/4**
	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	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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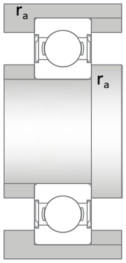
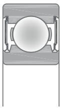


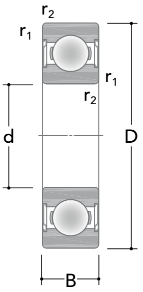
Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
8	19	6	1,51	0,50	0,022	78200	39600	**619/8**
(cont.)	19	6	1,51	0,50	0,022	-	22600	**619/8**
	19	6	2,29	0,94	0,04	79900	38700	**607/8**
	22	7	3,52	1,36	0,057	68300	34200	**608**
	22	7	3,52	1,36	0,057	-	20500	**608**
	22	11	3,45	1,36	0,057	-	20500	**630/8**
	24	8	3,98	1,65	0,071	56700	28800	**628**
	24	8	3,98	1,65	0,071	-	17300	**628**
	28	6	1,34	0,57	0,024	54600	27900	**638**
9	17	5	1,42	0,64	0,027	79100	37000	**628/9**
	17	5	1,42	0,64	0,027	-	21800	**628/9**
	20	6	2,43	1,01	0,044	72000	37600	**619/9**
	24	7	3,94	1,65	0,071	63700	30900	**609**
	24	7	3,94	1,65	0,071	-	16400	**609**
	26	8	4,70	1,95	0,083	55200	27900	**629**
	26	8	4,70	1,95	0,083	-	17900	**629**
10	19	5	1,75	0,86	0,037	73600	34600	**61800**
	19	5	1,75	0,86	0,037	-	20500	**61800**
	22	6	2,81	1,30	0,055	63700	32400	**61900**
	22	6	2,81	1,30	0,055	-	17300	**61900**
	26	8	4,75	1,93	0,082	63000	30900	**6000**
	26	8	4,75	1,93	0,082	-	17100	**6000**
	26	12	4,66	1,93	0,082	-	17100	**63000**
	28	8	5,26	2,53	0,107	54600	27000	**16100**
	30	9	5,45	2,35	0,100	51000	26300	**6200**
	30	9	5,45	2,35	0,100	-	16000	**6200**
	30	14	5,51	2,35	0,099	-	16000	**62200**
	35	11	8,52	3,38	0,142	45500	24400	**6300**
	35	11	8,52	3,38	0,142	-	14000	**6300**
	35	17	8,43	3,38	0,142	-	14000	**62300**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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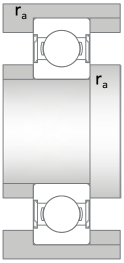
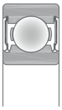
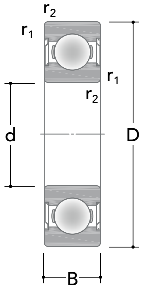


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
12	21	5	1,83	0,96	0,041	64400	32400	**61801**
	21	5	1,83	0,96	0,041	-	18200	**61801**
	24	6	3,07	1,56	0,066	62300	28800	**61901**
	24	6	3,07	1,56	0,066	-	17300	**61901**
	28	8	5,45	2,36	0,100	56400	27000	**6001**
	28	8	5,45	2,36	0,100	-	15600	**6001**
	28	12	5,4	2,36	0,099	-	15600	**63001**
	30	8	5,07	2,46	0,104	55200	25900	**16101**
	30	8	5,07	2,46	0,104	-	13900	**16101**
	32	10	7,21	3,04	0,133	45500	24400	**6201**
	32	10	7,21	3,04	0,133	-	12800	**6201**
	32	14	7,13	3,04	0,131	-	12800	**62201**
	37	12	10,2	4,11	0,176	41900	20000	**6301**
	37	12	10,2	4,11	0,176	-	12900	**6301**
15	24	5	1,90	1,13	0,049	55200	27000	**61802**
	24	5	1,90	1,13	0,049	-	15600	**61802**
	28	7	4,46	2,30	0,098	51500	25200	**61902**
	28	7	4,46	2,30	0,098	-	14900	**61902**
	32	8	5,85	2,81	0,118	47000	23700	**16002**
	32	9	5,73	2,82	0,119	45000	24400	**6002**
	32	9	5,73	2,82	0,119	-	12700	**6002**
	32	13	5,97	2,82	0,119	-	12700	**63002**
	35	11	7,90	3,71	0,158	40400	20500	**6202**
	35	11	7,90	3,71	0,158	-	11200	**6202**
	35	14	8,22	3,71	0,157	-	11200	**62202**
	42	13	11,90	5,39	0,228	34200	17300	**6302**
	42	13	11,90	5,39	0,228	-	10300	**6302**
	42	17	11,9	5,39	0,223	-	10300	**62302**
17	26	5	2,04	1,35	0,057	52600	25500	**61803**
	26	5	2,04	1,35	0,057	-	14700	**61803**
	30	7	4,81	2,68	0,114	47000	23900	**61903**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values


2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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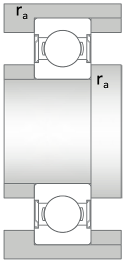
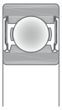


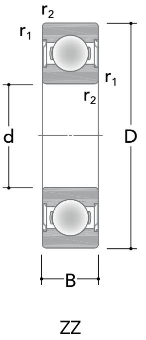
Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
17	30	7	4,81	2,68	0,114	-	12600	**61903**
(cont.)	35	8	6,50	3,24	0,137	42300	20200	**16003**
	35	10	6,24	3,23	0,136	41400	20500	**6003**
	35	10	6,24	3,23	0,136	-	11800	**6003**
	35	14	6,24	3,23	0,134	-	11800	**63003**
	40	12	9,95	4,73	0,199	35700	17700	**6203**
	40	12	9,95	4,73	0,199	-	11300	**6203**
	40	16	10,15	4,73	0,204	-	11300	**62203**
	47	14	14,2	6,49	0,272	31300	15800	**6303**
	47	14	14,2	6,49	0,272	-	10200	**6303**
	47	19	14,59	6,49	0,272	-	10200	**62303**
20	32	7	4,10	2,36	0,106	41400	20000	**61804**
	32	7	4,10	2,36	0,106	-	11100	**61804**
	37	9	6,66	3,83	0,164	39600	18800	**61904**
	37	9	6,66	3,83	0,164	-	10800	**61904**
	42	12	9,95	5,0	0,210	38000	19000	**6004**
	42	12	9,95	5,0	0,210	-	9900	**6004**
	42	16	10,15	4,96	0,212	-	9900	**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	6,44	0,277	-	9200	**62204**
	52	15	16,5	7,66	0,329	27300	14000	**6304**
	52	15	16,5	7,66	0,329	-	8600	**6304**
	52	21	16,63	7,66	0,332	-	8600	**62304**
22	50	14	14,0	8,02	0,341	-	7700	**62/22**
25	37	7	4,48	2,79	0,134	35000	17900	**61805**
	37	7	4,48	2,79	0,134	-	10100	**61805**
	42	9	7,31	4,62	0,207	33100	16700	**61905**
	42	9	7,31	4,62	0,207	-	9400	**61905**
	47	12	11,7	6,44	0,270	29400	14600	**6005**

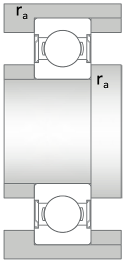
(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



2RS

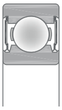
Dimensions			Mass	Designation	
d	$r_{1,2min}$	r_{amax}		Bearing sealed on	
				both sides	one side
[mm]			[kg]		
17	0,3	0,3	0,017	61903 2RS	-
(cont.)	0,3	0,3	0,032	16003 ZZ	-
	0,3	0,3	0,041	6003 ZZ	6003 Z
	0,3	0,3	0,041	6003 2RS	6003 RS
	0,3	0,3	0,052	63003 2RS	-
	0,6	0,6	0,068	6203 ZZ	6203 Z
	0,6	0,6	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



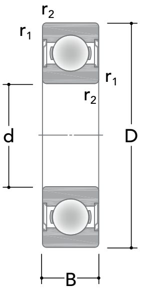


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting [1]	Standard design
[mm]			[kN]			[rpm]		
25	47	12	11,7	6,44	0,270	-	8100	**6005**
(cont.)	47	16	12,14	6,44	0,278	-	8100	**63005**
	52	15	14,8	7,80	0,331	28000	14000	**6205**
	52	15	14,8	7,80	0,331	-	7700	**6205**
	52	18	14,5	7,8	0,342	-	7700	**62205**
	62	17	23,6	11,4	0,482	21800	12200	**6305**
	62	17	23,6	11,4	0,482	-	6900	**6305**
	62	24	23,63	11,4	0,49	-	6900	**62305**
30	42	7	4,61	2,98	0,150	28800	14900	**61806**
	42	7	4,61	2,98	0,150	-	8600	**61806**
	47	9	7,62	4,72	0,220	28200	14100	**61906**
	47	9	7,62	4,72	0,220	-	7700	**61906**
	55	13	13,9	8,3	0,354	25200	13000	**6006**
	55	13	13,9	8,3	0,354	-	8000	**6006**
	55	19	13,66	8,3	0,362	-	7300	**63006**
	62	16	20,3	11,2	0,467	24000	12000	**6206**
	62	16	20,3	11,0	0,467	-	6400	**6206**
	62	20	20,5	11	0,485	-	6400	**62206**
	72	19	29,9	16,0	0,662	18600	10300	**6306**
	72	19	29,9	16,0	0,662	-	6300	**6306**
	72	27	29,9	16,0	0,663	-	5900	**62306**
35	47	7	4,59	3,43	0,143	27600	13800	**61807**
	47	7	4,59	3,43	0,143	-	7800	**61807**
	55	10	11,3	8,30	0,346	24400	12000	**61907**
	55	10	11,3	8,30	0,346	-	6900	**61907**
	62	14	16,6	10,2	0,440	22100	11200	**6007**
	62	14	16,6	10,2	0,440	-	6400	**6007**
	62	20	16,63	10,2	0,449	-	6400	**63007**
	72	17	27,54	15,3	0,646	20000	10000	**6207**
	72	17	27,54	15,3	0,646	-	5700	**6207**
	72	23	27,54	15,3	0,642	-	5700	**62207**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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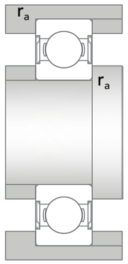
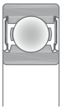
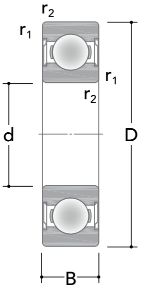


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
35	80	21	35,8	19,4	0,831	17500	8900	**6307**
(cont.)	80	21	35,8	19,4	0,831	-	5200	**6307**
	80	31	35,8	19,4	0,799	-	5200	**62307**
40	52	7	4,65	3,96	0,169	23700	11700	**61808**
	52	7	4,65	3,96	0,169	-	6900	**61808**
	62	12	14,0	10,3	0,438	22100	10800	**61908**
	62	12	14,0	10,3	0,438	-	6100	**61908**
	68	15	17,44	10,8	0,481	19800	10300	**6008**
	68	15	17,44	10,8	0,481	-	5900	**6008**
	68	21	17,44	10,8	0,48	-	5900	**63008**
	80	18	33,2	18,9	0,796	16900	8100	**6208**
	80	18	33,2	18,9	0,796	-	5200	**6208**
	80	23	33,2	18,9	0,792	-	5200	**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	-	4500	**62308**
45	58	7	6,92	6,26	0,267	20200	10100	**61809**
	58	7	6,92	6,26	0,267	-	5700	**61809**
	68	12	14,1	11,0	0,474	18600	9000	**61909**
	68	12	14,1	11,0	0,474	-	5500	**61909**
	75	16	21,88	14,5	0,636	18000	9000	**6009**
	75	16	21,88	14,5	0,636	-	4800	**6009**
	75	23	21,88	14,5	0,64	-	4800	**63009**
	85	19	35,8	21,3	0,902	15300	8000	**6209**
	85	19	35,8	21,3	0,902	-	4500	**6209**
	85	23	35,8	21,3	0,906	-	4500	**62209**
	100	25	56,41	31,3	1,33	14000	6800	**6309**
	100	25	5641	31,3	1,33	-	4200	**6309**
	100	36	56,41	31,3	1,313	-	4200	**62309**
50	65	7	7,07	7,00	0,293	18800	9100	**61810**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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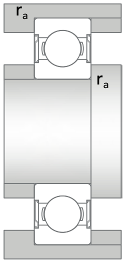
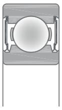
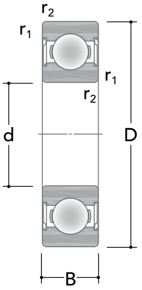


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting [1]	Standard design
[mm]			[kN]			[rpm]		
50	65	7	7,07	7,00	0,293	-	5600	**61810**
(cont.)	72	12	14,8	12,2	0,517	17700	8600	**61910**
	72	12	14,8	12,2	0,517	-	5200	**61910**
	80	16	22,9	15,8	0,701	18000	9000	**6010**
	80	16	22,9	15,8	0,701	-	4700	**6010**
	80	23	22,9	15,8	0,696	-	4700	**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	-	4100	**62210**
	110	27	65,0	37,8	1,59	12200	6200	**6310**
	110	27	65,0	37,8	1,59	-	4000	**6310**
	110	40	65,0	37,8	1,632	-	4000	**62310**
55	72	9	9,48	9,32	0,397	17900	8600	**61811**
	72	9	9,48	9,32	0,397	-	4600	**61811**
	80	13	16,6	15,1	0,647	15500	8000	**61911**
	80	13	16,6	15,1	0,647	-	4600	**61911**
	90	18	29,3	20,9	0,887	14900	7200	**6011**
	90	18	29,3	20,9	0,887	-	4200	**6011**
	100	21	46,7	28,5	1,23	13200	6500	**6211**
	100	21	46,7	28,5	1,23	-	3900	**6211**
	100	25	46,7	28,5	1,25	-	3900	**62211**
	120	29	74,1	44,6	1,88	10900	5900	**6311**
	120	29	74,1	44,6	1,88	-	3600	**6311**
	120	43	74,1	44,6	1,9	-	3600	**62311**
60	78	10	12,3	11,6	0,499	15800	7900	**61812**
	78	10	12,3	11,6	0,499	-	4300	**61812**
	85	13	16,6	15,2	0,638	15000	7400	**61912**
	85	13	16,6	15,2	0,638	-	4200	**61912**
	95	18	30,1	23,0	0,972	13800	6800	**6012**
	95	18	30,1	23,0	0,972	-	3900	**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	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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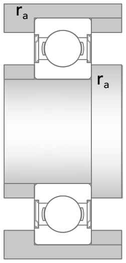
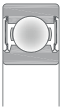
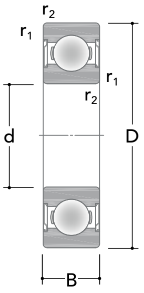


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
60	110	22	55,3	36,0	1,52	-	3600	**6212**
(cont.)	110	28	55,3	36,0	1,545	-	3600	**62212**
	130	31	86,05	51,6	2,18	10200	5100	**6312**
	130	31	86,05	51,6	2,18	-	3200	**6312**
	130	46	86,05	51,6	2,156	-	3200	**62312**
65	85	10	12,8	13,3	0,566	14600	7300	**61813**
	85	10	12,8	13,3	0,566	-	4200	**61813**
	90	13	17,5	16,4	0,697	13700	7100	**61913**
	90	13	17,5	16,4	0,697	-	3700	**61913**
	100	18	32,2	24,7	1,05	12600	6400	**6013**
	100	18	32,2	24,7	1,05	-	3700	**6013**
	120	23	58,5	40,0	1,71	11200	5500	**6213**
	120	23	58,5	40,0	1,71	-	3300	**6213**
	120	31	58,5	40,0	1,747	-	3300	**62213**
	140	33	98,5	60,0	2,46	10000	5300	**6313**
	140	33	98,5	60,0	2,46	-	2900	**6313**
	140	48	98,5	60,0	2,45	-	2900	**62313**
70	90	10	12,8	13,7	0,581	14000	7000	**61814**
	90	10	12,8	13,7	0,581	-	3700	**61814**
	100	16	24,9	21,8	0,925	13200	6400	**61914**
	100	16	24,9	21,8	0,925	-	3700	**61914**
	110	20	40,1	30,8	1,31	11800	5800	**6014**
	110	20	40,1	30,8	1,31	-	3300	**6014**
	125	24	64,97	45,0	1,87	10000	5000	**6214**
	125	24	64,97	45,0	1,87	-	3400	**6214**
	125	31	64,97	45,0	1,919	-	2900	**62214**
	150	35	112,11	66,7	2,70	8600	4600	**6314**
	150	35	112,11	66,7	2,70	-	2800	**6314**
	150	51	112,11	66,7	2,695	-	2800	**62314**
75	95	10	13,1	15,1	0,644	12700	6500	**61815**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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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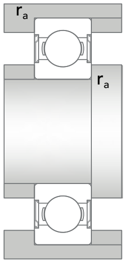
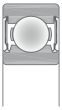


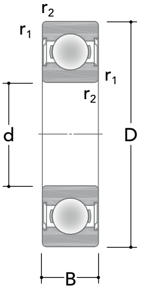
Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
75	95	10	13,1	15,1	0,644	-	3700	**61815**
(cont.)	105	16	24,4	23,1	0,995	12000	5900	**61915**
	105	16	24,4	23,1	0,995	-	3300	**61915**
	115	20	41,2	33,3	1,42	10900	5600	**6015**
	115	20	41,2	33,3	1,42	-	3100	**6015**
	130	25	68,2	48,3	2,01	9300	4800	**6215**
	130	25	68,2	48,3	2,01	-	3000	**6215**
	160	37	121	75,1	2,95	8200	4200	**6315**
	160	37	121	75,1	2,95	-	2500	**6315**
80	100	10	13,4	15,8	0,674	11800	5700	**61816**
	100	10	13,4	15,8	0,674	-	3300	**61816**
	110	16	26,5	21,7	1,09	11300	5500	**61916**
	110	16	26,5	21,7	1,09	-	2900	**61916**
	125	22	48,9	39,9	1,66	10200	5000	**6016**
	125	22	48,9	39,9	1,66	-	3000	**6016**
	140	26	72,8	55,0	2,19	9500	4800	**6216**
	140	26	72,8	55,0	2,19	-	2700	**6216**
	170	39	130	86,5	3,19	8000	3900	**6316**
	170	39	130	86,5	3,19	-	2600	**6316**
85	110	13	19,8	21,0	0,888	10900	5600	**61817**
	110	13	19,8	21,0	0,888	-	3100	**61817**
	130	22	52,5	43	1,74	11000	5300	**6017**
	130	22	52,5	43	1,74	-	2800	**6017**
	150	28	87,1	63,8	2,49	8400	4200	**6217**
	150	28	87,1	63,8	2,49	-	2500	**6217**
	180	41	140	96,5	3,50	7300	3600	**6317**
	180	41	140	96,5	3,50	-	2400	**6317**
90	115	13	19,7	23,1	0,961	10200	5100	**61818**
	115	13	19,7	23,1	0,961	-	2900	**61818**
	140	24	59,9	49,8	1,95	9300	4500	**6018**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values



2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		both sides	one side
[mm]			[kg]		
75 (cont.)	0,6	0,6	0,15	**61815 2RS**	-
	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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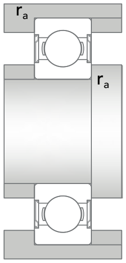
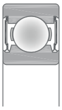
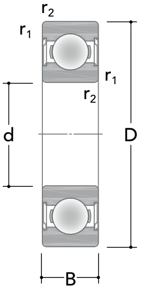


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
90	140	24	59,9	49,8	1,95	-	2600	**6018**
(cont.)	160	30	102	73,5	2,77	8500	4300	**6218**
	160	30	102	73,5	2,77	-	2600	**6218**
	190	43	154	107	3,76	7100	3500	**6318**
	190	43	154	107	3,76	-	2200	**6318**
95	120	13	20,3	24,2	0,99	10100	4900	**61819**
	120	13	20,3	24,2	0,99	-	2800	**61819**
	130	18	34,9	34,3	1,37	-	2800	**61919**
	145	24	64,3	53,8	2,07	8600	4500	**6019**
	145	24	64,3	53,8	2,07	-	2600	**6019**
	170	32	116	80,7	2,97	7300	3600	**6219**
	170	32	116	80,7	2,97	-	2200	**6219**
	200	45	156	117	4,11	6400	3300	**6319**
	200	45	156	117	4,11	-	2000	**6319**
100	125	13	17,9	19,2	1,00	9400	4800	**61820**
	125	13	17,9	19,2	1,00	-	2800	**61820**
	150	24	65,0	53,0	2,00	8800	4100	**6020**
	150	24	65,0	53,0	2,00	-	2400	**6020**
	180	34	128	92,7	3,34	7100	3400	**6220**
	180	34	128	92,7	3,34	-	2200	**6220**
	215	47	180	145	4,92	6100	3200	**6320**
	215	47	180	145	4,92	-	1800	**6320**
105	130	13	21,9	20,3	1,04	9000	4700	**61821**
	130	13	21,9	20,3	1,04	-	2500	**61821**
	160	26	76,9	64,6	2,37	8000	3900	**6021**
	160	26	76,9	64,6	2,37	-	2200	**6021**
	190	36	141	103	3,61	6600	3300	**6221**
	190	36	141	103	3,61	-	2000	**6221**
	225	49	185	162	5,40	5900	2900	**6321**

(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values


2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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



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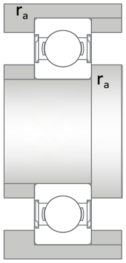
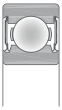
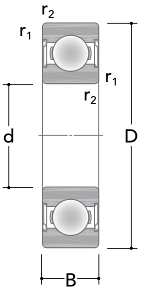


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting (1)	Standard design
[mm]			[kN]			[rpm]		
110	140	16	29,2	27,0	1,30	8600	4100	**61822**
	140	16	29,2	27,0	1,30	-	2400	**61822**
	170	28	86,9	72,4	2,56	7200	3800	**6022**
	170	28	86,9	72,4	2,56	-	2200	**6022**
	200	38	153	118	3,97	6100	3200	**6222**
	200	38	153	118	3,97	-	2000	**6222**
	240	50	209	189	5,99	5400	2800	**6322**
	240	50	209	189	5,99	-	1600	**6322**
120	150	16	29,3	28,8	1,33	7800	4000	**61824**
	150	16	29,3	28,8	1,33	-	2200	**61824**
	180	28	87,6	79,1	2,72	6800	3500	**6024**
	180	28	87,6	79,1	2,72	-	1900	**6024**
	215	40	152	122	4,03	6300	3200	**6224**
	215	40	152	122	4,03	-	1700	**6224**
	260	55	215	200	6,13	5000	2500	**6324**
	260	55	215	200	6,13	-	1500	**6324**
130	165	18	38,5	46,1	1,72	7300	3500	**61826**
	165	18	38,5	46,1	1,72	-	1900	**61826**
	200	33	110	100	3,35	6400	3100	**6026**
	200	33	110	100	3,35	-	1800	**6026**
	230	40	159	137	4,31	5300	2800	**6226**
	230	40	159	137	4,31	-	1600	**6226**
140	175	18	40,8	49,2	1,76	7000	3400	**61828**
	175	18	40,8	49,2	1,76	-	1800	**61828**
	210	33	114	110	3,51	6200	2900	**6028**
	210	33	114	110	3,51	-	1700	**6028**
150	225	35	128	132	4,12	5500	2800	**6030**
	225	35	128	132	4,12	-	1600	**6030**

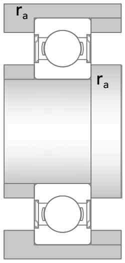
(1) Bearings featuring ZZ or 2RS suffixes may reach lower speed values


2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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	5200	2500	**6032**
	240	38	150	149	4,48	-	1500	**6032**

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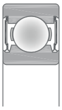
[1] Bearings featuring ZZ or 2RS suffixes may reach lower speed values



Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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:

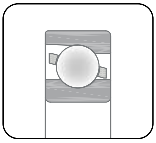
- F_{rm} minimum radial load, [kN];
- C_r basic dynamic radial load, [kN].

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

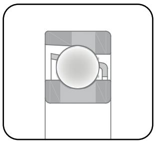
Type M



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

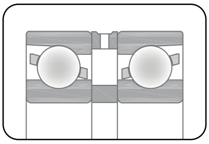
Type J



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

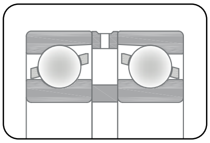
Type DB



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

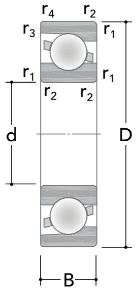
Suffixes	Internal design
A	Bearing with a 30° contact angle
AC	Bearing with a 25° contact angle
B	Bearing with a 40° contact angle

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

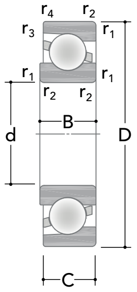
Suffixes	Accuracy, clearance, running
A… - …	Special axial internal clearance. The two numbers immediately following the A give minimum and maximum axial internal clearance in µm
A…	Special axial internal clearance. The number immediately following the A gives mean axial internal clearance in µm
U	Bearing 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)

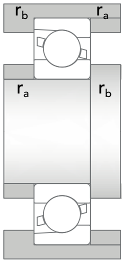
Suffixes	External design
Z	Shield on one side
ZZ or 2Z	Shield on both sides
N1	One locating slot in outer ring
N2	Two locating slots in outer ring

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

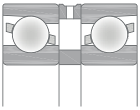


M

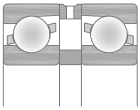




Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
10	30	9	-	7,09	3,34	0,140	28200	38200	**7200**
12	32	10	-	7,96	3,76	0,160	23900	33400	**7201**
	37	12	-	12,50	5,98	0,210	22300	28600	**7301**
15	35	11	-	10,10	5,25	0,200	17300	29500	**7202**
	42	13	-	15,30	7,57	0,270	18200	24800	**7302**
17	40	12	-	19,10	9,05	0,250	22000	26000	**7203**
	47	14	-	18,70	9,30	0,350	20000	21600	**7303**
20	47	14	-	14,90	8,04	0,340	17500	21900	**7204**
	52	15	-	21,70	11,92	0,420	16400	19400	**7304**
25	52	15	-	16,30	9,88	0,420	16000	19800	**7205**
	62	17	-	30,00	15,8	0,660	13800	15800	**7305**
30	62	16	-	24,50	15,6	0,650	13200	15900	**7206**
	72	19	-	37,50	22,2	0,900	11800	13500	**7306**
35	72	17	-	30,70	20,5	0,870	11000	13500	**7207**
	80	21	-	45,50	27,5	1,140	10300	11900	**7307**
40	80	18	-	36,80	26,0	1,100	10100	11900	**7208**
	90	23	-	57,00	34,5	1,360	9500	10400	**7308**
45	85	19	-	40,0	28,5	1,210	9500	11000	**7209**
	100	25	-	69,60	43	1,710	8200	9400	**7309**
50	90	20	-	41,50	30,9	1,320	8500	10300	**7210**
	110	27	-	80,50	50,2	2,130	7200	8400	**7310**
55	100	21	-	52,00	39,8	1,650	7400	11900	**7211**

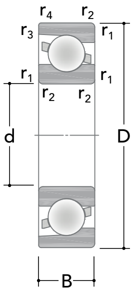


DB



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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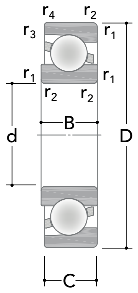
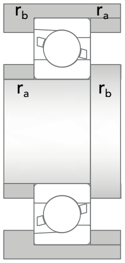
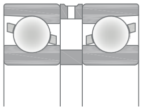




Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
55 (cont.)	120	29	-	91,90	61	2,510	6500	7700	**7311**
60	110	22	-	62,80	49,1	2,080	7000	8300	**7212**
	130	31	-	104,00	75,4	3,150	6200	7000	**7312**
65	120	23	-	71,10	56,1	2,410	6200	7600	**7213**
	140	33	-	117,20	84,9	3,580	5800	6500	**7313**
70	125	24	-	74,80	62,8	2,670	5900	7200	**7214**
	150	35	-	127,00	96,4	3,840	5200	6000	**7314**
75	130	25	-	73,80	64,5	2,660	5700	6900	**7215**
	160	37	-	142,00	107	4,150	5000	5600	**7315**
80	140	26	-	85,20	74,3	3,020	5000	6400	**7216**
	170	39	-	155,10	124	4,500	4600	5200	**7316**
85	150	28	-	103,00	90,0	3,480	5300	5900	**7217**
	180	41	-	167,00	138	4,860	4400	4900	**7317**
90	160	30	-	114,70	102	3,920	4600	5500	**7218**
	190	43	-	171,30	145	5,260	4300	4650	**7318**
95	170	32	-	124,00	116	4,300	3900	4200	**7219**
	200	45	-	189,20	167	5,630	3900	4400	**7319**
100	180	34	-	143,0	132	4,680	4100	4200	**7220**
	215	47	-	214,70	206	6,880	3600	4050	**7320**
105	190	36	-	153,00	148	5,130	3900	3900	**7221**
	225	49	-	218,20	204	6,820	3400	3500	**7321**
110	170	21	-	76,1	82,4	2,980	2700	3600	**307536**



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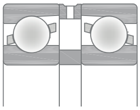
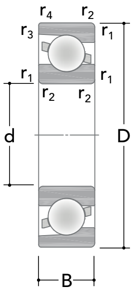


DF

Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
55 (cont.)	2	1	2	1	1,4	**7311**
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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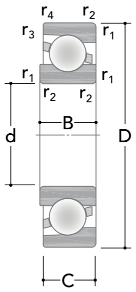
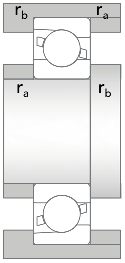
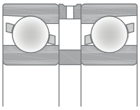
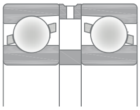




Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
110	200	38	-	159,7	155	5,270	3600	3600	**7222**
(cont.)	240	50	-	235,2	245	7,800	3400	3300	**7322**
120	180	28	-	88,8	91,6	3,150	3600	3600	**7024**
	215	40	-	165,0	162	5,270	3100	3300	**7224**
	260	55	-	236,00	248	7,590	2800	2800	**7324**
130	230	40	-	186,00	193	6,100	2900	3100	**7226**
	280	58	-	276,00	299	8,820	2600	2600	**7326**
140	210	33	-	116,0	128	4,120	2900	3000	**7028**
	250	42	-	197,0	210	6,340	2700	2700	**7228**
	300	62	-	296,0	343	9,740	2300	2400	**7328**
150	210	28	25	98,0	111	3,620	1700	2600	**466895/307377**
	225	35	-	130,0	144	4,490	2700	2900	**7030**
	270	45	-	216,00	239	6,920	2400	2500	**7230**
	320	65	-	339,00	390	10,800	2200	2200	**7330**
160	215	28	-	82,0	108	3,340	1800	2500	**466896**
	240	38	-	142,0	164	4,940	1600	2300	**7032**
	290	48	-	252,0	296	8,390	2200	2300	**7232**
170	260	42	-	175,00	203	5,820	2300	2500	**7034**
	310	52	-	281,00	343	9,440	2200	2300	**7234**
	360	72	-	394,0	482	12,490	1800	2000	**7334**
175	235	30	27	100,0	120	3,840	1600	2300	**468325**
180	280	46	-	197,0	238	6,640	2200	2300	**7036**
	320	52	-	294,0	371	9,89	2000	2200	**7236**
	380	75	-	414,00	539	13,670	1900	1800	**7336**

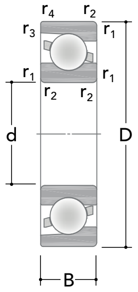


DB



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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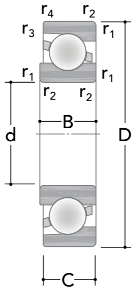
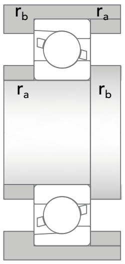
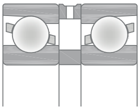




Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
190	255	33	29	113,0	141	4,340	1500	2200	**466880**
	290	46	-	199,0	251	6,840	2200	2200	**7038**
	340	55	-	307,0	402	10,320	1800	2100	**7238**
	400	78	-	442,0	596	14,500	1700	1800	**7338**
200	310	51	-	225,0	290	7,64	2000	2100	**7040**
	360	58	-	319,00	424	10,850	1800	1800	**7240**
	420	80	-	457,00	648	15,430	1600	1600	**7340**
220	300	38	35	162,0	223	5,820	1400	1800	**466931**
	340	56	-	252,0	354	8,970	1800	1800	**7044**
	400	65	-	398,0	554	13,260	1600	1600	**7244**
	460	88	-	489,0	713	16,44	1500	1500	**7344**
240	360	56	-	257,00	373	9,100	1600	1700	**7048**
	440	72	-	357,00	537	12,430	1500	1500	**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	506	11,71	1400	1500	**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	1400	1500	**7056**
	500	80	-	506,0	836	17,730	1300	1300	**7256**
285	380	46	-	216,0	333	7,75	1000	1400	**466951**
300	460	74	-	413	685	14,900	1300	1400	**7060**
	540	85	-	547,0	928	19,260	790	1200	**7260**



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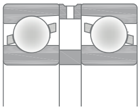
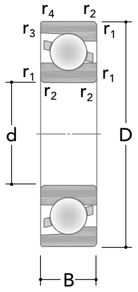


DF

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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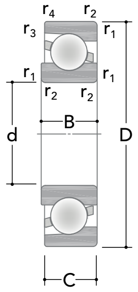
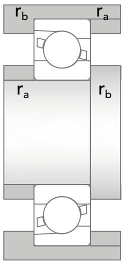
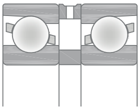




Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
320	480	74	-	423,0	721	15,070	1200	1300	**7064**
	580	92	-	583,0	1000	20,000	770	1100	**7264**
335	450	56	-	278,0	478	10,36	1200	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**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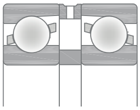
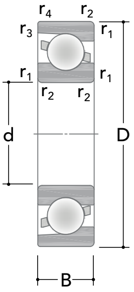

DF

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**



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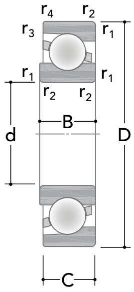
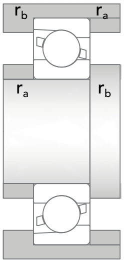
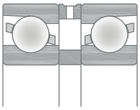




Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
460	580	56	-	371,0	752	14,06	990	1030	**71892**
(cont.)	620	74	-	512,0	1020	18,63	1000	1000	**71992**
	680	100	-	662	1430	25,72	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**



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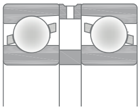
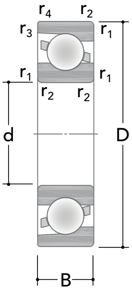


DF

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**



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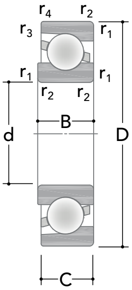
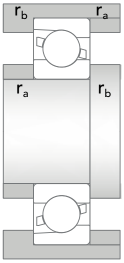
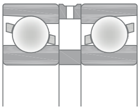




Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
670	980	136	-	1170	3080	45,21	500	-	**70/670**
(cont.)									
710	870	74	-	585,0	1600	24,21	590	630	**718/710**
	950	106	-	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**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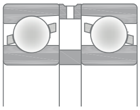
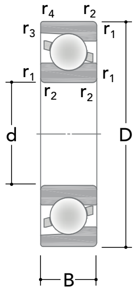

DF

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**



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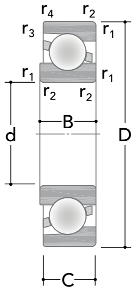
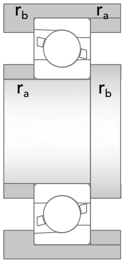
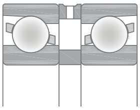




Main dimensions				Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
1250	1500	112	-	1117	3850	49,36	260	270	**718/1250**
(cont.)	1750	218	-	1816	6450	75,33	220	230	**70/1250**
1700	1900	80	-	975,00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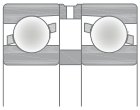

DF

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:

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

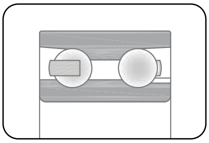
where:

- 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

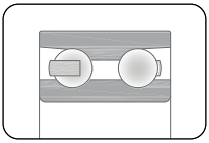
Type DBA



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

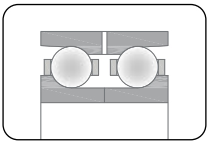
Type DB$_1$



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

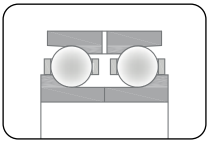
Type DB$_2$



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

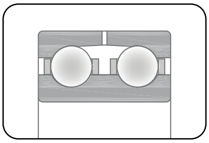
Type DB$_3$



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 DB$_2$ design
- Two-piece inner ring
- Supports high combined loads

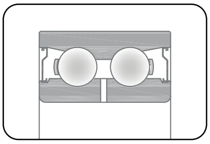
Type DF



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

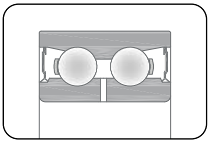
Seal type DB/ZZ



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

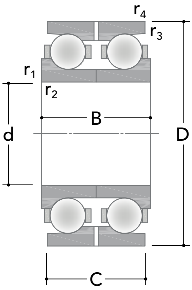
Suffixes	Internal Design
D	Two-piece inner ring
A	No filling slots
SP	Special or non-standard bearing

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



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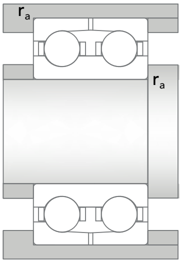
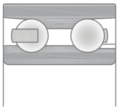
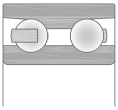
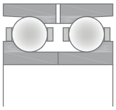
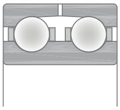


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
10	30	14	-	7,76	4,28	0,18	20500	21400	**3200**
12	32	15,9	-	10,3	5,51	0,24	18300	20500	**3201**
15	35	15,9	-	11,42	6,8	0,28	16000	16400	**3202**
	42	19	-	15,4	9,2	0,4	13400	14400	**3302**
17	40	17,5	-	14,3	8,8	0,37	13400	14500	**3203**
	47	22,2	-	21,82	12,6	0,54	12500	12300	**3303**
20	47	20,6	-	19,8	11,8	0,5	12700	12300	**3204**
	52	22,2	-	23,6	14,3	0,61	11400	11600	**3304**
25	52	20,6	-	21,4	14,1	0,59	11300	11000	**3205**
	62	25,4	-	32,60	20,1	0,85	10300	9900	**3305**
30	62	23,8	-	30,3	20,3	0,86	9000	9300	**3206**
	72	30,2	-	42,33	27,4	1,16	8100	8300	**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	43,4	1,83	6900	6800	**3308**
45	85	30,2	-	52	38,9	1,63	7000	7000	**3209**
	100	39,7	-	75	53	2,21	7500	6700	**3309**
50	90	30,2	-	51	42,5	1,64	8000	7000	**3210**
	110	44,4	-	90	64	2,71	6700	6000	**3310**
55	100	33,3	-	60,6	46,9	1,97	5600	5500	**3211**
	120	49,2	-	112	81,5	3,43	5300	5300	**3311**

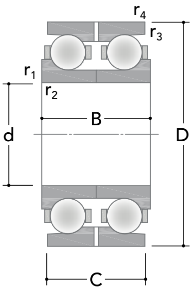

DBA


DB1

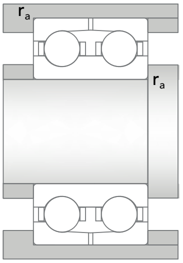

DB2


DF

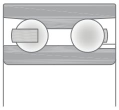
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
10	0,6	0,6	0,6	0,6	0,051	**3200**
12	0,6	0,6	0,6	0,6	0,058	**3201**
15	0,6	0,6	0,6	0,6	0,066	**3202**
	1	1	1	1	0,13	**3302**
17	0,6	0,6	0,6	0,6	0,096	**3203**
	1	1	1	1	0,18	**3303**
20	1	1	1	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	2,45	6300	5600	**3212**
	130	54	-	127	95	4,05	5600	5000	**3312**
65	120	38,1	-	82,2	73,4	3,1	4000	4400	**3213**
70	125	39,7	-	90,2	79,1	3,36	3900	4100	**3214**
	150	63,5	-	163	125	5	4000	3900	**3314**
75	130	41,3	-	96,6	87	3,71	3900	4200	**3215**
	160	68,3	-	179,5	140	5,5	3700	3600	**3315**
80	140	44,4	-	107,06	93,4	3,83	3600	3800	**3216**
	170	68,3	-	194,93	155	5,96	3500	3500	**3316**
85	150	49,2	-	126,48	109	4,36	3200	3400	**3217**
	180	73	-	212,16	173	6,44	3300	3300	**3317**
90	160	52,4	-	131,3	119	4,51	3000	3300	**3218**
	190	73	-	212,16	179	6,36	3200	3100	**3318**
95	170	55,6	-	159	146	5,4	3000	3100	**3219**
	200	77,8	-	237,6	216	7,5	2800	3000	**3319**
100	170	60,3	-	132,3	144	5,81	2600	2900	**305397**
	180	60,3	-	176,2	216	7,81	2600	2800	**3220**
	215	82,6	-	260,1	353	11,97	2300	2600	**3320**
110	200	69,8	-	214,12	270	9,17	2500	2600	**3222**
	240	92,1	-	293,91	418	13,43	2200	2300	**3322**
120	190	66	-	190	236	7,87	2700	3200	**309733**



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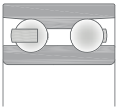
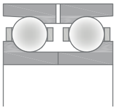
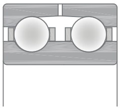


DB$_1$

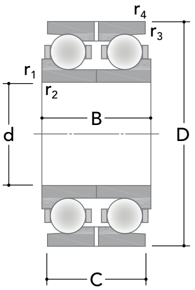


DB$_2$

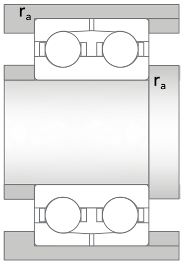


DF

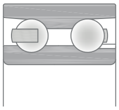
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
60	1,5	1,5	1,5	1,5	1,2	**3212**
	2,1	2,1	2	2	2,8	**3312**
65	1,5	1,5	1,5	1,5	1,75	**3213**
70	1,5	1,5	1,5	1,5	1,9	**3214**
	2,1	2,1	2	2	5,05	**3314**
75	1,5	1,5	1,5	1,5	2,1	**3215**
	2,1	2,1	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**



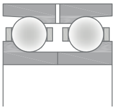
DB3



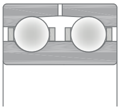
Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
140	209,5	66	-	181,6	248	7,94	2600	2500	**309515**
150	225	73	-	191	273	7,73	1500	1800	**305286**
	230	70	-	200,97	285	9	2200	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

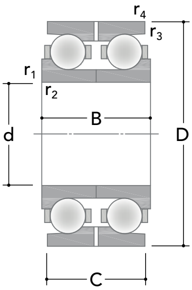


DB2

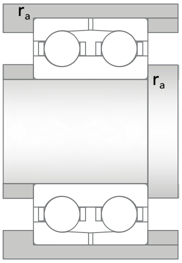


DF

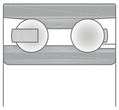
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
140	2	2	2	2	7,4	**309515**
150	2	2	2	2	9,5	**305286**
	2	2	2	2	10	**305283**
	2,1	2,1	2	2	16	**305248**
160	2	1,1	2	1	5,45	**305608**
	2,1	2,1	2	2	11	**305183**
170	2	2	2	2	15	**305180**
175	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**



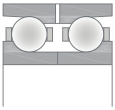
DB3



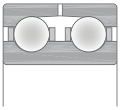
Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
250	340	76	70	325,4	566	14,2	1400	1800	**305611**
260	369,5	92	-	397	696	16,96	1200	1500	**305270**
	400	130	-	431,6	727	17,11	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

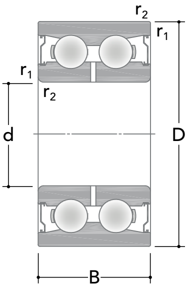


DB2

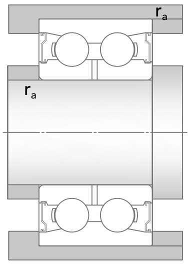


DF

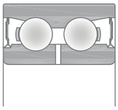
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
250	2,1	1,5	2	1,5	19	**305611**
260	2,1	2,1	2	2	30	**305270**
	4	4	3	3	56	**305174**
280	2,1	2,1	2	2	31,5	**305269**
650	4	2,1	3	2	81	**309984**
900	5	4	4	3	150	**311631**
1000	5	2,5	4	2	255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



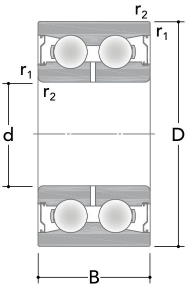
DB/ZZ



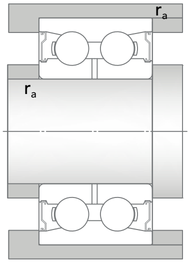
Main dimensions			Basic load ratings		Fatigue	Limiting speed		Designation
d	D	B	Dynamic	Static	load limit	Bearing featuring		Standard design
			C	C_0	C_u	shields	seals	
[mm]			[kN]			[rpm]		
10	30	14,3	7,76	4,28	0,18	21600	15800	**3200**
12	32	15,9	10,3	5,51	0,24	20200	13500	**3201**
15	35	15,9	11,42	6,8	0,28	16700	12700	**3202**
	42	19	15,4	9,2	0,4	14600	11300	**3302**
17	40	17,5	14,3	8,8	0,37	14200	10700	**3203**
	47	22,2	21,82	12,6	0,54	13000	9700	**3303**
20	47	20,6	19,8	11,8	0,5	12700	8900	**3204**
	52	22,2	23,6	14,3	0,61	12200	7900	**3304**
25	52	20,6	21,4	14,1	0,59	11200	7700	**3205**
	62	25,4	32,60	20,1	0,85	9900	6700	**3305**
30	62	23,8	30,3	20,3	0,86	9100	7100	**3206**
	72	30,2	42,33	27,4	1,16	8200	5900	**3306**
35	72	27	40,4	27,9	1,18	8200	5900	**3207**
	80	34,9	51,5	35,5	1,5	7800	5600	**3307**
40	80	30,2	48,5	36,1	1,41	7500	4900	**3208**
	90	36,5	65,3	43,4	1,83	6900	4500	**3308**
45	85	30,2	52	38,9	1,63	6800	4900	**3209**
	100	39,7	75	52,2	2,21	6100	4300	**3309**
50	90	30,2	51	38,5	1,64	6200	4500	**3210**
	110	44,4	89,1	63,1	2,71	5600	3900	**3310**
55	100	33,3	60,6	46,9	1,97	5800	4100	**3211**
	120	49,2	110,88	81	3,43	4800	3500	**3311**


DB/2RS

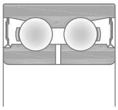
Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		both sides	one side
[mm]			[kg]		
10	0,6	0,6	0,051	3200 ZZ	3200 2RS
12	0,6	0,6	0,058	3201 ZZ	3201 2RS
15	0,6	0,6	0,066	3202 ZZ	3202 2RS
	1	1	0,13	3302 ZZ	3302 2RS
17	0,6	0,6	0,1	3203 ZZ	3203 2RS
	1	1	0,18	3303 ZZ	3303 2RS
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	Limiting speed		Designation
d	D	B	Dynamic	Static	load limit	Bearing featuring		Standard design
			C	C_0	C_u	shields	seals	
[mm]			[kN]			[rpm]		
60	110	36,5	74,2	57,4	2,45	5000	3600	**3212**
	130	54	125,73	94,5	4,05	4600	-	**3312**
65	120	38,1	82,2	73,4	3,1	4400	3300	**3213**
70	125	39,7	90,2	79,1	3,36	4100	-	**3214**
	150	63,5	163	125	5	3800	-	**3314**
75	130	41,3	96,6	87	3,71	4100	-	**3215**
	160	68,3	179,5	140	5,5	3600	-	**3315**



DB/2RS

Dimensions			Mass	Designation	
				Bearing sealed on	
d	$r_{1,2min}$	r_{amax}		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:

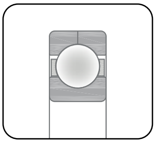
$$\frac{F_{am}}{F_r} > 1,25$$

where:

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

Designs and variants

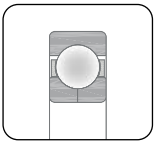
Type Q



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

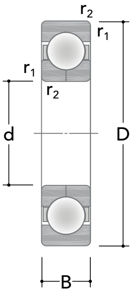


HB BAINITE HT **S** STABILIZATION

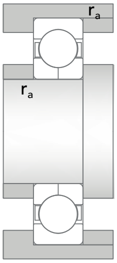
- One-piece outer ring
- Two-piece inner ring circumferentially split
- One-piece machined brass cage guided on outer ring (MA)
- Supports mainly axial loads
- Two locating slots (N2)

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

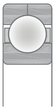
Suffixes	External design
N1	One locating slot in outer ring
N2	Two locating slots in outer ring



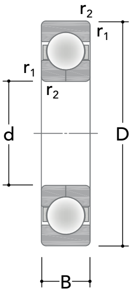
QJ



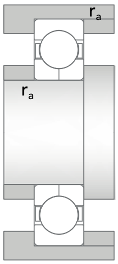
Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
15	35	11	12,7	8,19	0,35	19800	33100	**QJ 202**
17	40	12	17,17	11,40	0,48	19400	27000	**QJ 203**
	47	14	23,87	14,90	0,64	15000	24900	**QJ 303**
20	52	15	31,36	21,50	0,93	16700	21800	**QJ 304**
25	52	15	26,46	21,00	0,89	14600	20700	**QJ 205**
	62	17	42,93	30,0	1,27	14100	20000	**QJ 305**
30	62	16	36,75	30,40	1,29	12900	17500	**QJ 206**
	72	19	53	41,40	1,76	11000	15800	**QJ 306**
35	72	17	48,02	41,50	1,76	10900	15000	**QJ 207**
	80	21	64,64	51,00	2,12	10300	15000	**QJ 307**
40	80	18	55,44	48,60	2,06	10100	13200	**QJ 208**
	90	23	79,56	64,00	2,7	9100	14000	**QJ 308**
45	85	19	63,0	56,0	2,35	8800	14000	**QJ 209**
	100	25	102	81,60	3,49	8200	10600	**QJ 309**
50	90	20	65,5	61,0	2,55	8000	13000	**QJ 210**
	110	27	118	100,00	4,2	7000	11000	**QJ 310**
55	100	21	85	83,00	3,55	7500	9700	**QJ 211**
	120	29	138,37	118,00	4,96	6600	10000	**QJ 311**
60	110	22	95,54	92,50	3,98	6800	9000	**QJ 212**
	130	31	156	137,00	5,81	6300	9000	**QJ 312**
65	120	23	111,1	110,00	4,67	6000	8600	**QJ 213**
	140	33	174,24	155,00	6,51	5500	7700	**QJ 313**



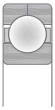
Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
15	0,6	0,6	0,062	**QJ 202**
17	0,6	0,6	0,082	**QJ 203**
	1	1	0,14	**QJ 303**
20	1,1	1	0,18	**QJ 304**
25	1	1	0,16	**QJ 205**
	1,1	1	0,29	**QJ 305**
30	1	1	0,24	**QJ 206**
	1,1	1	0,42	**QJ 306**
35	1,1	1	0,35	**QJ 207**
	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**



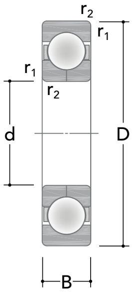
QJ



Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
70	125	24	117,6	120,00	5,11	5800	8400	**QJ 214**
	150	35	202	180,00	7,35	5000	8000	**QJ 314**
75	130	25	125	130,00	5,52	5700	7700	**QJ 215**
	160	37	218,16	198,00	7,72	4800	6800	**QJ 315**
80	140	26	147,46	155,00	6,36	5300	7000	**QJ 216**
	170	39	232	228,00	8,54	4400	7000	**QJ 316**
85	150	28	152,88	172,00	6,66	4900	6900	**QJ 217**
	180	41	252,5	251,00	8,51	4200	6000	**QJ 317**
90	160	30	184,14	199,00	7,61	4500	6600	**QJ 218**
	190	43	282,15	303,00	10,93	4100	5800	**QJ 318**
95	170	32	209,88	228,00	8,35	4500	6200	**QJ 219**
	200	45	308,05	338,00	11,73	3800	5500	**QJ 319**
100	150	24	104,94	133,00	5,06	-	6300	**QJ 1020**
	180	34	231,28	264,00	9,46	4200	5900	**QJ 220**
	215	47	348,45	400,00	13,63	3600	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	277,2	319,0	10,99	3500	5100	**QJ 222**
	240	50	390	480,00	15,27	3300	4800	**QJ 322**
120	180	28	146,52	195,00	6,77	-	4400	**QJ 1024**
	215	40	300	364,00	11,97	3200	4600	**QJ 224**
	260	55	415	530,00	16,05	3000	4500	**QJ 324**



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**



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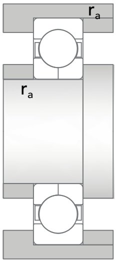
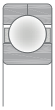
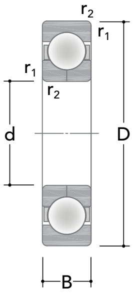


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
130	200	33	178,36	238,0	7,74	-	4300	**QJ 1026**
	230	40	303,8	397,0	12,6	3000	4400	**QJ 226**
	280	58	455	610,0	17,73	2700	4000	**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	341,55	467,00	14,06	2900	4000	**QJ 228**
	300	62	500	695,00	19,74	2500	3800	**QJ 328**
150	225	35	239,58	341,7	9,34	-	4100	**QJ 1030**
	270	45	392	566,0	16,48	2600	3700	**QJ 230**
	320	65	535,3	765,0	20,95	2400	3600	**QJ 330**
160	240	38	270	372,4	10,5	-	3800	**QJ 1032**
	290	48	450	670	18,77	2600	3800	**QJ 232**
	340	68	570	866,0	23,22	2100	3100	**QJ 332**
170	260	42	288,86	404,00	11,77	-	3300	**QJ 1034**
	310	52	445,9	710,00	19,72	2400	3100	**QJ 234**
	360	72	661,55	1020,0	26,48	2000	2900	**QJ 334**
180	280	46	334,62	509,0	14,27	-	3000	**QJ 1036**
	320	52	475	761,0	20,69	2200	3000	**QJ 236**
	380	75	680	1080,0	27,49	2000	2700	**QJ 336**
190	290	46	344,76	500,00	13,73	1800	3100	**QJ 1038**
	340	55	520,2	843,0	22,22	2000	2800	**QJ 238**
	400	78	687,96	1148,4	2,83	1500	2500	**QJ 338**
200	250	24	77,71	137,0	3,9	-	3000	**305419**
	310	51	397,8	616,0	16,49	1800	3000	**QJ 1040**
	360	58	540	915,0	23,15	1600	3000	**QJ 240**
	360	70	530,4	863,00	21,55	-	2800	**QJ 1240**



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**



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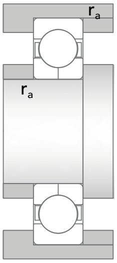
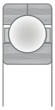
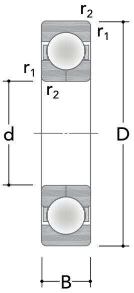


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
220	270	24	111	192,0	5,17	-	3000	**305976**
	340	56	450,84	736,0	18,65	1700	2800	**QJ 1044**
	400	65	547,47	979,0	23,58	-	2300	**QJ 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**



Q

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**



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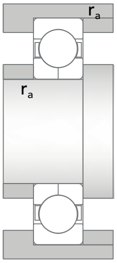
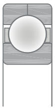


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
380 (cont.)	680	132	1170	2820,0	51,45	-	1300	**QJ 1276**
400	600	90	913,04	2120,0	39,75	900	1400	**QJ 1080**
	720	140	1313	3190	57,42	-	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**



Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
380 (cont.)	6	5	220	**QJ 1276**
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**

Cylindrical roller bearings

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

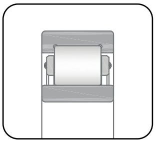
Series	Factor K_2
NJ2, NJ22, NUP2, NUP22	1,11
NJ3, NJ23, NUP3, NUP23	1,47
NJ4	1,52

Tab. 4 - Experimental Factor K_2

For additional information regarding the above limits please consult the RKB application engineering services.

Designs and variants

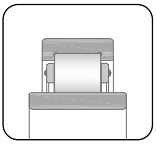
Type NU



HB BAINITE HT
S STABILIZATION
AVH CAGE DESIGN
PROFILE
VICTORY LINE

- 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

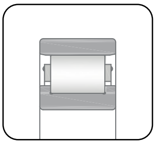
Type NUB



HB BAINITE HT
S STABILIZATION
AVH CAGE DESIGN
PROFILE
VICTORY LINE

- 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

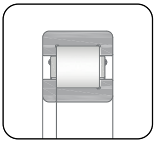
Type N



HB BAINITE HT
S STABILIZATION
AVH CAGE DESIGN
PROFILE
VICTORY LINE

- 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

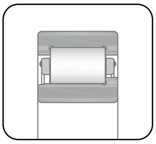
Type NUP



HB BAINITE HT
S STABILIZATION
AVH CAGE DESIGN
PROFILE
VICTORY LINE

- 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

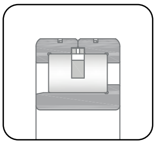
Type NJ



HB BAINITE HT
S STABILIZATION
AVH CAGE DESIGN
PROFILE
VICTORY LINE

- 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

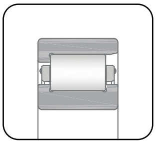
Type NJGL



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

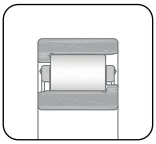
Type NF



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

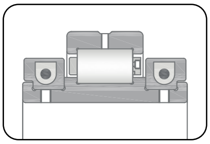
Type NJF



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

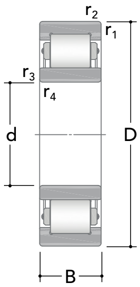
Prefixes	
L	In a separable bearing: separate inner ring
R	In a separable bearing: outer ring with roller and cage assembly
SCRB	Out of standard split cylindrical roller bearing followed by drawing number

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



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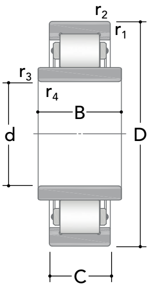

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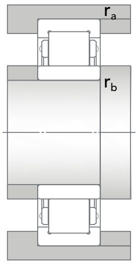
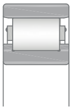


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
15	35	11	-	12,7	10,3	1,21	22400	26200	**NU 202**
17	40	12	-	20	14,6	1,71	20400	22700	**NU 203**
	40	16	-	27,5	21,6	2,63	20400	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	16300	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	13600	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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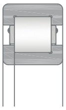
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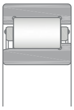
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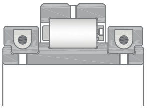
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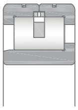
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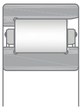
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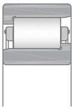
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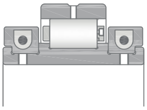
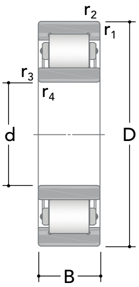

SCRB LOOSE

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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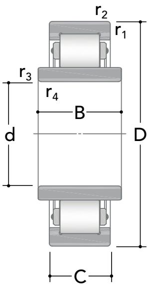

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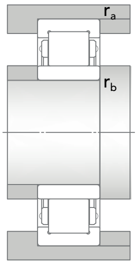
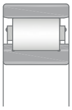


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
40	80	23	-	81,9	75,0	9,61	9500	11000	**NU 2208**
(cont.)	90	23	-	93,0	78,5	10,2	8000	9550	**NU 308**
	90	33	-	129	120	15	8000	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**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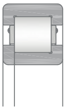
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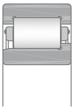
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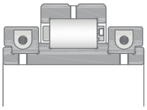
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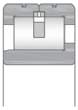
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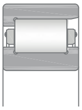
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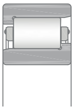
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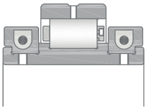
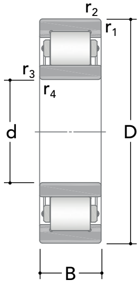

SCRB LOOSE

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	-



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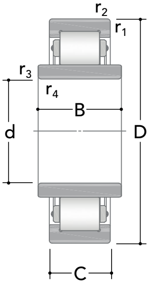

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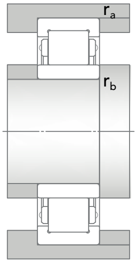
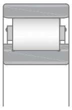


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
65	100	18	-	63	81,5	9,7	7000	12200	**NU 1013**
	120	23	-	122	118	15,5	6300	6700	**NU 213**
	120	31	-	170	180	24	6300	6700	**NU 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	4600	5600	**NU 413**
70	110	20	-	77,3	93,9	12	6300	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	6500	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	-	91,5	99,9	9,8	6300	9400	**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**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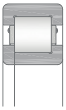
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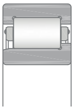
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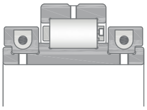
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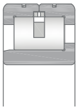
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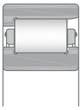
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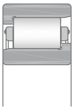
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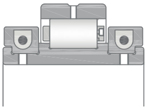
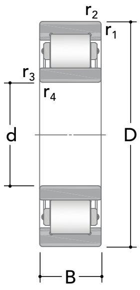

SCRB LOOSE

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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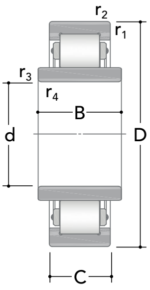

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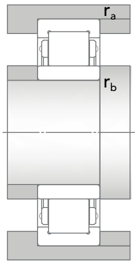
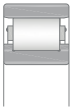


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
85 (cont.)	210	52	-	320	335	39	3600	4300	NU 417
90	140	24	-	81,1	105	12,6	5600	8500	NU 1018
	160	30	-	208	220	27	4500	5000	NU 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	5100	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	4800	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	517	58,2	2800	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	2700	3400	NU 421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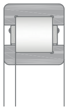
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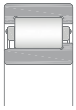
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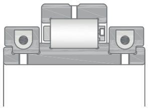
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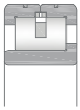
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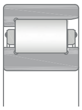
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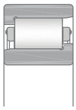
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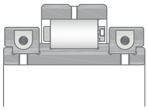
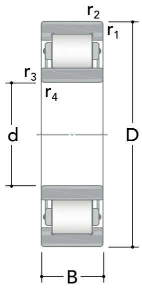

SCRB LOOSE

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	-



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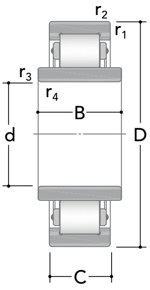

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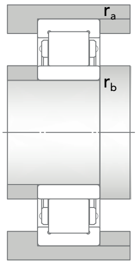
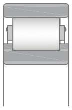


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
110	170	28	-	128	166	19,1	4500	7000	**NU 1022**
	200	38	-	335	365	42,5	3600	4000	**NU 222**
	200	53	-	440	520	61	3600	4000	**NU 2222**
	240	50	-	538	540	60	3000	3400	**NU 322**
	240	80	-	780	900	100	3000	3400	**NU 2322**
	280	65	-	535	589	63	2500	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	2300	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**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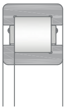
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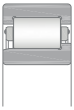
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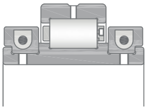
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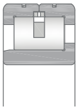
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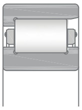
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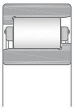
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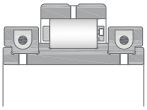
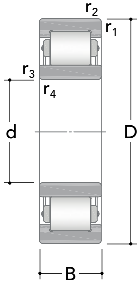

SCRB LOOSE

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



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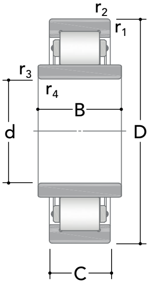

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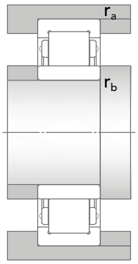

Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
130	281	58	-	634	740	80	2100	-	**319926**
(cont.)	340	78	-	835	994	101	2000	-	**NU 426**
140	210	33	-	179	258	28	3600	5300	**NU 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	3400	**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**
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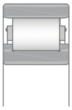
	300	84	-	717	1050	111	1800	-	**609099**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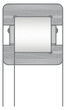
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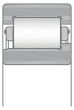
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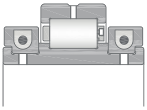
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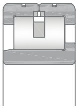
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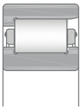
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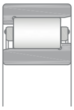
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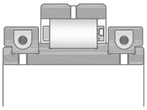
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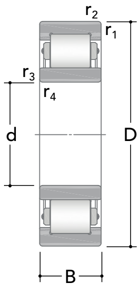
Dimensions					Mass	Designation		
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design	Alternative design	Angle ring
[mm]					[kg]			
130	4	4	3	3	19	319926	-	-
(cont.)	5	5	4	4	36	NU 426	N, NJ, NUP	-
140	2	1,1	2	1	4	NU 1028	N, NJ, NUP	-
	2	1,1	1	1,1	4,9	NU 2028	N, NJ, NUP	-
	3	3	2,5	2,5	9,4	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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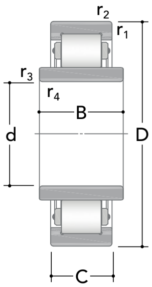

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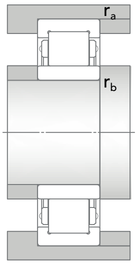
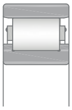


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
160	340	68	-	1007	1080	111	2000	3600	**NU 332**
(cont.)	340	114	-	1270	1850	185	1600	3200	**NU 2332**
165,1	279,4	61,912	-	631	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	1500	3000	**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	2800	**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	3000	**NU 238**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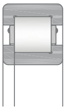
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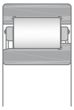
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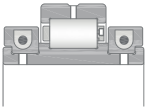
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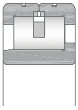
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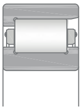
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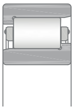
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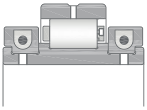
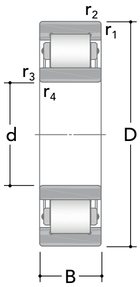

SCRB LOOSE

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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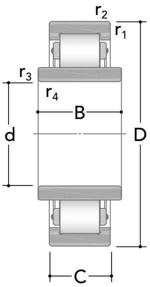

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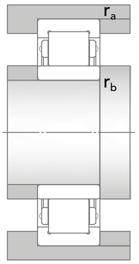
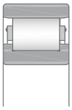


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
190	340	92	-	1232	1640	164	2000	3000	**NU 2238**
(cont.)	400	78	-	1141	1570	140	1500	2000	**NU 338**
	400	132	-	1851	2564	237	1500	2700	**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	-	879	1040	104	1900	2800	**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	1250	2400	**NU 340**
	420	138	-	1990	2890	254	1300	2500	**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	2600	**NU 2244**
	460	88	-	1295	1630	148	1500	2170	**NU 344**
	460	145	-	2907	3450	306	1300	2600	**NU 2344**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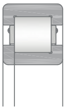
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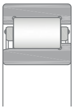
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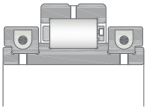
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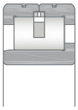
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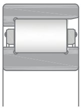
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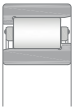
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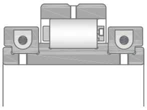
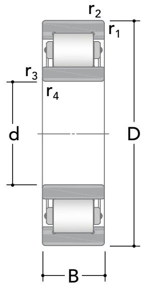

SCRB LOOSE

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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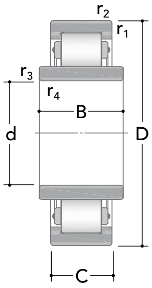

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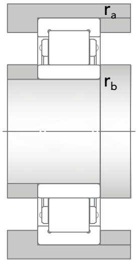
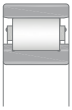


Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
220,586	320	45	-	389	623	60	2000	-	**411468**
220,91	320	45	-	398	623	60	2000	-	**413585**
229,954	370	100	-	1175	2090	205	1400	-	**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	-	2671	3650	316	1200	2000	**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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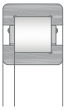

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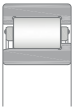

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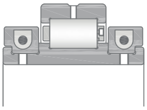

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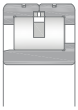

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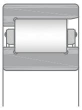

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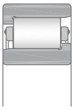

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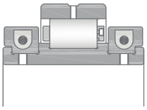
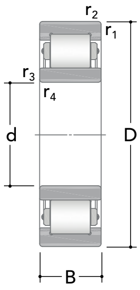


SCRB LOOSE

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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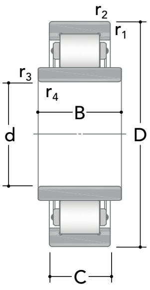

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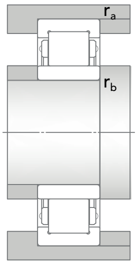
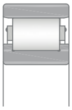


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
260	540	165	-	3192	4550	372	1000	1800	**NU 2352**
(cont.)									
280	350	42	-	362	742	67	1800	-	**NU 2856**
	360	38	-	378	697	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	-	2271	3890	334	1100	-	**NU 3156**
	500	80	-	1406	2023	167	1300	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	1400	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	900	1600	**NU 2360**
320	415	43	-	472	848	78	1500	-	**246315**
	440	72	-	763	1490	139	1400	-	**314756**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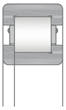
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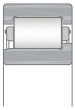
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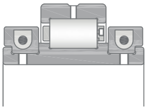
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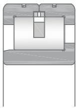
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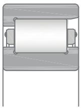
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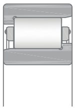
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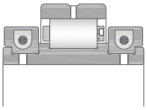
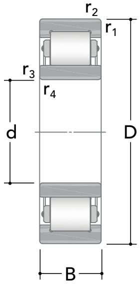

SCRB LOOSE

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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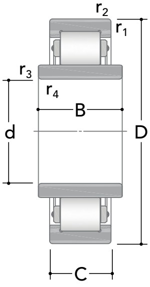

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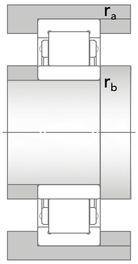
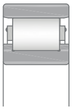


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
320	480	74	-	892	1430	130	1400	1900	**NU 1064**
(cont.)	480	95	-	1463	2610	241	1100	1700	**NU 2064**
	480	121	-	1857	3150	280	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	1300	1900	**NU 1968**
	460	72	-	1023	2010	183	1300	1700	**NU 2968**
	460,08	56	-	631	1100	100	1300	-	**313816**
	520	82	-	1120	1860	154	1300	2100	**NU 1068**
	520	133	-	2205	4180	359	1000	1700	**NU 3068**
	580	190	-	3477	5859	488	900	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	800	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	700	1300	**NU 2372**
380	480	40	-	270	517	37,3	1200	-	**316010**
	480	46	-	563	1125	97	1200	2000	**NU 1876**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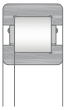
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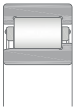
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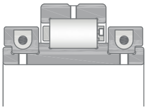
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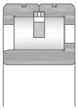
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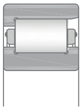
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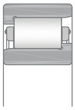
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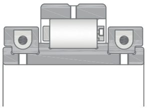
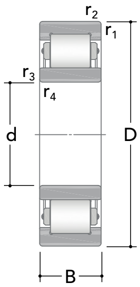

SCRB LOOSE

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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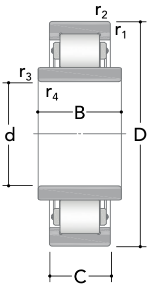

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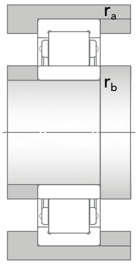
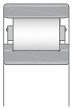


Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
380	560	82	-	1152	1930	168	1200	1600	**NU 1076**
(cont.)	560	106	-	1910	3700	309	900	1400	**NU 2076**
	560	135	-	2414	4750	397	900	1800	**NU 3076**
	680	175	-	4007	6460	507	900	1600	**NU 2276**
400	500	46	-	572	1190	99	1200	1900	**NU 1880**
	540	65	-	944	1700	150	1100	1400	**NU 1980**
	540	82	-	1401	2830	248	1100	1400	**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	1100	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	1000	1500	**NU 2984**
	620	90	-	1425	2473	202	1000	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	700	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	1000	1400	**NU 1988**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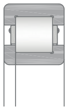
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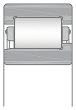
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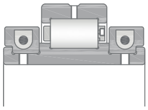
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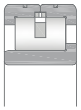
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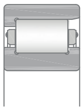
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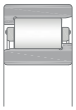
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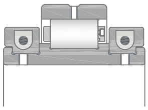
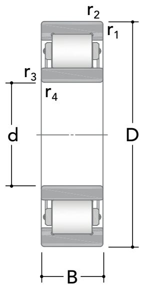

SCRB LOOSE

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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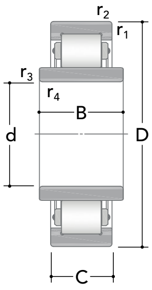

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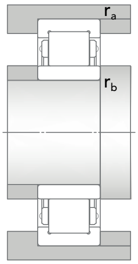
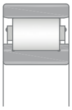


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
440	600	95	-	1883	3902	338	1000	1600	**NU 2988**
(cont.)	650	94	-	1493	2630	210	1000	1100	**NU 1088**
	650	122	-	2581	4960	387	7900	1300	**NU 2088**
	650	157	-	2608	5360	422	800	-	**NU 3088**
440	720	226	-	5190	10057	769	620	1200	**NU 3188**
460	580	56	-	817	1690	139	1000	-	**NU 1892**
	580	72	-	1087	2374	191	1000	1200	**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	600	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	900	1300	**NU 1996**
	650	78	-	1332	2530	210	900	-	**319164**
	700	100	-	1681	3060	229	900	1200	**NU 1096**
	700	128	-	2862	5610	423	700	1200	**NU 2096**
	790	248	-	5975	10880	799	600	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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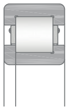
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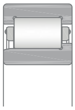
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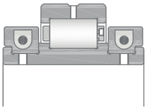
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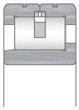
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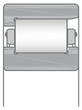
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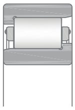
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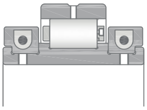
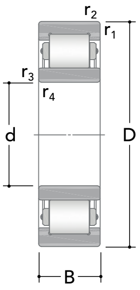

SCRB LOOSE

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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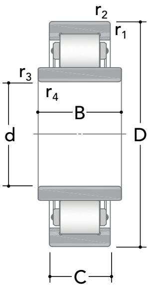

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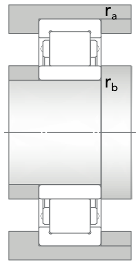
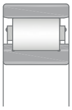


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
500	670	128	-	2504	5730	434	700	1400	**NU 39/500**
(cont.)	720	100	-	1769	3240	231	900	1500	**NU 10/500**
	720	128	-	3030	6050	439	700	1400	**NU 20/500**
	720	167	-	3870	7950	606	700	1400	**NU 30/500**
	830	264	-	6590	12500	869	550	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	800	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	500	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	2068	107	700	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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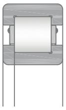
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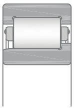
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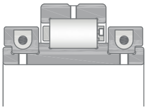
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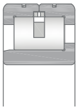
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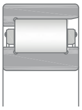
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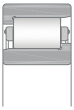
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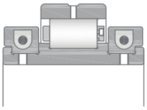
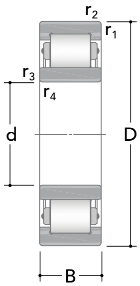

SCRB LOOSE

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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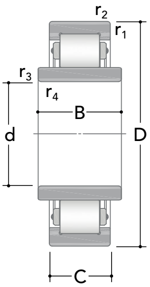

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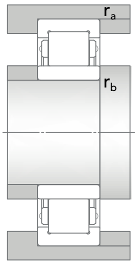
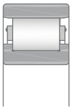


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
630	780	56	-	598	1270	84	1600	2200	**315933**
	780	88	-	1785	4450	289	700	1300	**NU 28/630**
	780	112	-	2191	5650	446	600	1300	**NU 38/630**
	850	100	-	2228	4350	311	630	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	-	1919	4930	360	600	740	**NU 28/710**
	950	140	-	3767	8800	563	600	1000	**NU 29/710**
	1030	140	-	4747	8500	563	500	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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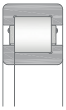
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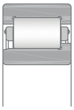
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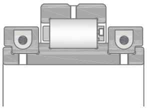
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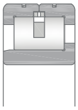
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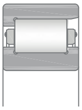
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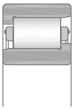
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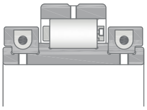
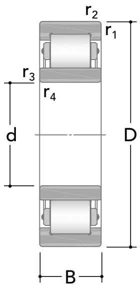

SCRB LOOSE

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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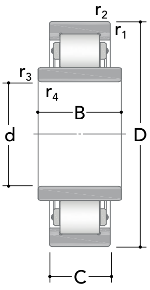

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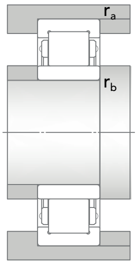
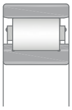


Main dimensions				Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
750	1090	150	-	4718	9020	580	410	850	**NU 10/750**
(cont.)	1090	195	-	7060	14428	968	410	600	**NU 20/750**
800	980	82	-	1769	4190	276	480	1100	**NU 18/800**
	1150	155	-	5456	10490	688	430	800	**NU 10/800**
	1150	200	-	7043	14600	937	380	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	5940	238	460	600	**NU 28/850**
	1120	118	-	3347	7160	459	450	950	**NU 19/850**
	1120	155	-	4648	10990	707			**NU 29/850**
900	1090	85	-	1965	4810	236	420	530	**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	380	480	**NU 29/900**
1000	1220	100	-	2614	6490	396	360	470	**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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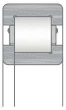

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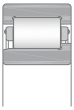

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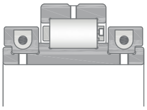
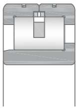


SCRB FIXED



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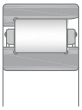

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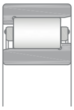

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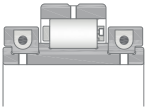
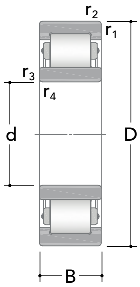


SCRB LOOSE

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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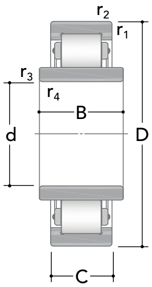

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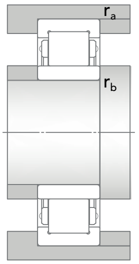
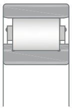


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]				[kN]			[rpm]		
1120	1360	106	-	3397	8620	508	320	380	**NU 18/1120**
(cont.)	1580	345	-	15683	38490	2290	180	210	**NU 30/1120**
1180	1420	106	-	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**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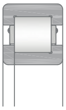
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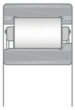
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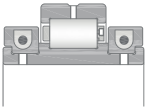
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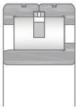
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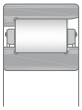
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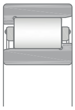
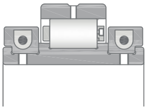

NJF


SCRB LOOSE

Dimensions					Mass	Designation		
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design	Alternative design	Angle ring
[mm]					[kg]			
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:

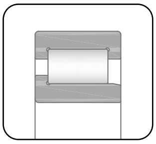
- F_a maximum axial load, [kN];
- K_1 experimental factor connected with lubrication system, [kN] see following **Tab. 4 page 218**;
- K_2 experimental factor connected with bearing series see following **Tab. 5 page 259**;
- n operating speed [rpm];
- d_m mean bearing diameter [mm];

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.

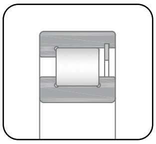
Type NJG (SL19)



HB BAINITE HT
S STABILIZATION
PROFILE
V VICTORY LINE

- 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)

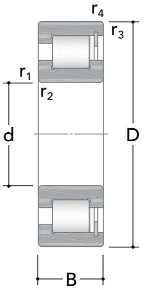


HB BAINITE HT
S STABILIZATION
PROFILE
V VICTORY LINE

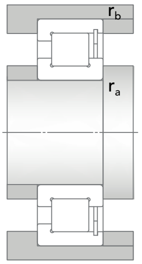
- Outer ring with one integral side rib and retaining ring
- Inner ring with two integral side ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Optimized raceway geometry and roller profile
- Can be used in one 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

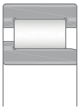
Suffixes	Accuracy, clearance, running
C2	Radial internal clearance less than CN
CN	Standard radial internal clearance
C3	Radial internal clearance greater than Normal (CN)
C4	Radial internal clearance greater than C3
C5	Radial internal clearance greater than C4
CS	Special radial internal clearance
P6	Dimensional and running accuracy as per ISO tolerances Class 6



NCF (SL18)

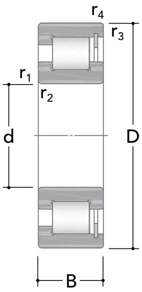


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
20	42	16	28,2	28,6	3,1	8200	10000	**NCF 3004**
	47	18	46	37,2	3,8	6600	12000	**NCF 2204**
25	47	16	32,4	35,5	3,8	7000	9000	**NCF 3005**
	52	18	51,6	45,3	4,2	5500	10300	**NCF 2205**
	62	24	69,1	68,8	8,5	4300	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	3800	4800	**NJG 2306**
35	62	20	48,6	56,4	6,48	5100	6700	**NCF 3007**
	72	23	88	78,1	9,1	4100	7400	**NCF 2207**
	80	31	109	114	14,2	3200	4300	**NJG 2307**
40	68	21	57,2	69,7	8,14	4600	6000	**NCF 3008**
	80	23	97,1	91,2	12,3	3470	6500	**NCF 2208**
	90	33	145	156	20	2800	3600	**NJG 2308**
45	75	23	60,8	78,5	8,97	4100	6300	**NCF 3009**
	85	23	101,8	100	13,2	3480	6100	**NCF 2209**
	100	36	173	197	25,6	2700	3400	**NJG 2309**
50	80	23	76,6	98,2	11,7	3800	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	2100	2800	**NJG 2311**
60	85	16	55,8	80,6	8,99	3400	4500	**NCF 2912**
	95	26	106	147	18,2	3200	4000	**NCF 3012**
	110	28	169	179	21,3	2500	4500	**NCF 2212**

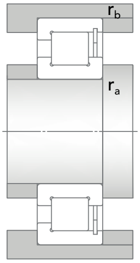


NJG (SL19)

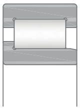
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
20	0,6	0,3	0,6	0,3	0,11	**NCF 3004**
	1	-	1	-	0,16	**NCF 2204**
25	0,6	0,3	0,6	0,3	0,12	**NCF 3005**
	1	-	1	-	0,18	**NCF 2205**
	1,1	-	1	-	0,38	**NJG 2305**
30	1	0,3	1	0,3	0,2	**NCF 3006**
	1	-	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)

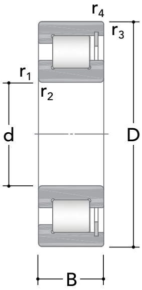


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
65	90	16	59,1	88,3	10,1	3100	4000	**NCF 2913**
	100	26	113	163	20	2900	3800	**NCF 3013**
	120	31	198	218	26,6	2370	4200	**NCF 2213**
	140	48	303	367	46,1	1800	2400	**NJG 2313**
70	100	19	76,6	116	13,7	2900	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	1700	2200	**NJG 2314**
75	105	19	79,6	126	14,5	2700	3600	**NCF 2915**
	115	30	135	193	24,4	2500	3200	**NCF 3015**
	130	31	187	236	29,4	2210	3250	**NCF 2215**
	160	55	399	488	60	1500	2000	**NJG 2315**
80	110	19	81,2	132	15,4	2500	3400	**NCF 2916**
	125	34	165	229	29	2300	3000	**NCF 3016**
	140	33	223	287	35,2	2000	3000	**NCF 2216**
	170	58	460	572	70	1400	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	1300	1800	**NJG 2317**
90	125	22	106	176	20,8	2300	3000	**NCF 2918**
	140	37	198	288	35,2	2100	2800	**NCF 3018**
	160	40	285	366	46,8	1900	2700	**NCF 2218**
	190	64	553	684	83	1300	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**

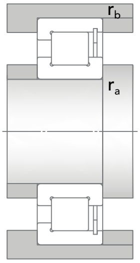


NJG (SL19)

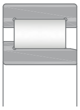
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
65	1	0,6	1	0,5	0,31	**NCF 2913**
	1,1	0,6	1	0,5	0,73	**NCF 3013**
	1,5	-	1,5	-	1,57	**NCF 2213**
	2,1	-	2	-	3,55	**NJG 2313**
70	1	0,6	1	0,5	0,49	**NCF 2914**
	1,1	0,6	1	0,5	1	**NCF 3014**
	1,5	-	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)

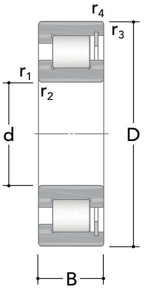


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
100	150	37	212	311	37,1	1900	2600	**NCF 3020**
(cont.)	180	46	390	521	62	1700	2300	**NCF 2220**
	215	73	694	908	107	1100	1500	**NJG 2320**
110	150	24	134	221	26	1800	2400	**NCF 2922**
	170	45	275	404	47	1700	2200	**NCF 3022**
	200	53	452	595	68,9	1430	2150	**NCF 2222**
	240	80	859	1060	121	1000	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	729	84	1300	1950	**NCF 2224**
	260	86	957	1250	138	1000	1200	**NJG 2324**
130	180	30	207	360	40,5	1500	2000	**NCF 2926**
	200	52	417	628	72	1400	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	1300	1800	**NCF 3028**
	250	68	693	1050	112	1100	1500	**NCF 2228**
	300	102	1241	1655	179	800	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	1200	1600	**NCF 3030**
	270	73	794	1209	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**

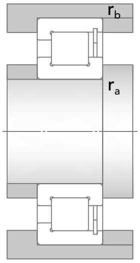


NJG (SL19)

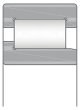
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
100	1,5	1	1,5	1	2,15	**NCF 3020**
(cont.)	2,1	2,1	2	2	5,1	**NCF 2220**
	3	-	2,5	-	13	**NJG 2320**
110	1,1	1	1	1	1,25	**NCF 2922**
	2	1	2	1	3,5	**NCF 3022**
	2,1	2,1	2	2	7,15	**NCF 2222**
	3	-	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)

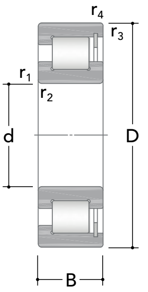


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
160	220	36	303	530	57,8	1300	1600	NCF 2932
(cont.)	240	60	515	804	88	1100	1500	NCF 3032
	290	80	993	1500	158	900	1200	NCF 2232
170	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	1000	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	1000	1400	NCF 2936
	280	74	787	1266	136	1000	1300	NCF 3036
	320	86	1180	1767	184	900	1270	NCF 2236
	380	126	1879	2660	252	600	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	710	1000	NCF 2238
	400	132	2186	3000	279	630	800	NJG 2338
200	250	24	178	336	32	1000	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

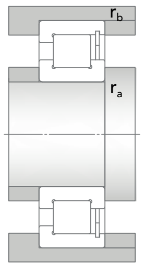


NJG (SL19)

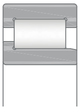
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
160	2	1,1	2	1	4	**NCF 2932**
(cont.)	2,1	1,1	2	1	9,1	**NCF 3032**
	3	3	2,5	2,5	23	**NCF 2232**
170	1,1	1	1	1	2,3	**NCF 2834**
	2	1,1	2	1	4,3	**NCF 2934**
	2,7	2,7	2,5	2,5	4,1	**316900**
	2,1	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)

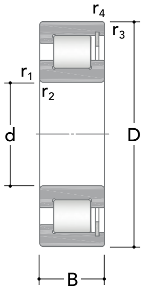


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
220	270	30	244	523	50	900	1100	**NCF 2844**
(cont.)	300	48	552	1063	104	900	1200	**NCF 2944**
	340	90	1087	1800	183	850	1100	**NCF 3044**
	400	108	1832	2780	258	700	850	**NCF 2244**
	460	145	2709	3700	331	500	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	1950	199	800	1000	**NCF 3048**
	500	155	3115	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	4970	427	400	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	500	700	**NCF 3064**

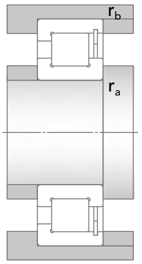


NJG (SL19)

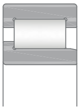
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
220	1,5	1,1	1,5	1	3,9	NCF 2844
(cont.)	2,1	1,5	2	1,5	9,9	NCF 2944
	3	3	2,5	2,5	29,5	NCF 3044
	4	4	3	3	58	NCF 2244
	5	-	4	-	111	NJG 2344
240	2	1,1	2	1	4,4	NCF 1848
	2	1,1	2	1	5,7	NCF 2848
	2,1	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)

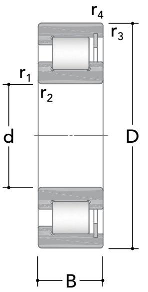


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
340	420	38	449	954	83	600	750	**NCF 1868**
	460	72	1192	2500	225	560	700	**NCF 2968**
	520	133	2387	4190	351	500	670	**NCF 3068**
360	440	38	405	903	75,1	500	700	**NCF 1872**
	440	48	629	1440	127	500	700	**NCF 2872**
	480	72	1231	2670	237	500	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	5040	420	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	400	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	400	560	**NCF 2984**
	620	150	3039	5790	454	400	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	400	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**

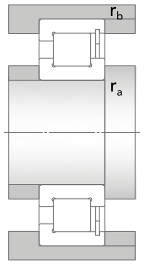


NJG (SL19)

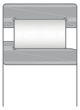
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
340	2,1	1,5	2	1,5	11	**NCF 1868**
	3	3	2,5	2,5	35	**NCF 2968**
	5	5	4	4	100	**NCF 3068**
360	2,1	1,5	2	1,5	11,5	**NCF 1872**
	2,1	1,5	2	1,5	15	**NCF 2872**
	3	3	2,5	2,5	36,5	**NCF 2972**
	5	5	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)

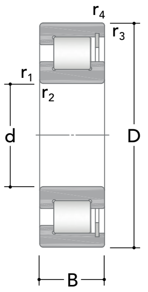


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
480	600	56	937	2050	168	400	500	**NCF 1896**
	600	72	1322	3150	262	400	500	**NCF 2896**
	650	100	2318	4950	401	400	480	**NCF 2996**
	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	2379	5327	432	400	450	**NCF 29/500**
	720	167	3802	7530	559	340	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	330	430	**NCF 29/530**
	780	185	5231	10600	777	300	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	300	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	250	320	**NCF 18/710**
	870	95	2336	6300	472	250	320	**NCF 28/710**

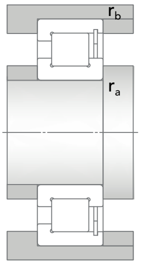


NJG (SL19)

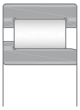
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
480	3	3	2,5	2,5	35,5	NCF 1896
	3	3	2,5	2,5	46	NCF 2896
	5	5	4	4	93	NCF 2996
	6	6	5	5	205	NCF 3096
500	3	3	2,5	2,5	35,5	NCF 18/500
	3	3	2,5	2,5	48	NCF 28/500
	5	5	4	4	100	NCF 29/500
	6	6	5	5	215	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 (cont.)	950	140	4303	10020	689	230	300	**NCF 29/710**
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	210	280	**NCF 29/750**
800	980	82	1957	4876	343	210	280	**NCF 18/800**
	980	106	2753	7550	546	210	280	**NCF 28/800**
	1060	150	4950	12900	793	190	260	**NCF 29/800**
850	1030	82	2065	5130	370	190	260	**NCF 18/850**
	1030	106	2837	8020	564	190	260	**NCF 28/850**
	1120	155	5271	12730	825	180	240	**NCF 29/850**
900	1090	85	2389	6060	402	180	240	**NCF 18/900**
	1090	112	3218	9170	642	180	240	**NCF 28/900**
	1180	165	6011	14620	945	160	220	**NCF 29/900**
950	1150	90	2490	6340	421	160	220	**NCF 18/950**
	1150	118	3412	9870	646	160	220	**NCF 28/950**
	1250	175	6610	16390	1007	150	200	**NCF 29/950**
1000	1220	100	2952	7520	450	150	200	**NCF 18/1000**
	1220	128	4130	11660	711	150	200	**NCF 28/1000**
	1320	185	7487	18670	1139	140	200	**NCF 29/1000**
1120	1360	106	3757	9690	576	120	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:

$$F_{rm} > \frac{C_{0r}}{50}$$

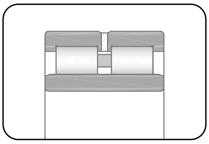
Where:

- 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

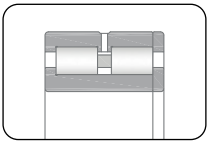
Type NNU



O⁺ OPTIMIZED · HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- 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

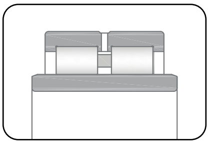
Type NNUP



O⁺ OPTIMIZED · HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- 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

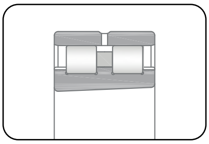
Type NNUB



O⁺ OPTIMIZED · HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- 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

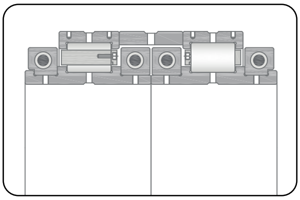
Type NN



O⁺ OPTIMIZED · HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- 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



HB BAINITE HT

S STABILIZATION

PROFILE

O+ OPTIMIZED

- 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

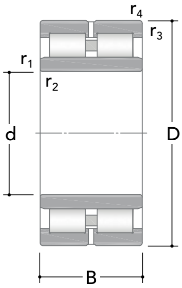
Prefixes	
L	In a separable bearing: separate inner ring
R	In a separable bearing: outer ring with roller and cage assembly
SCRB	Out of standard double row cylindrical roller bearing followed by drawing number
2CRB	Out of standard double row cylindrical roller bearing followed by drawing number

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

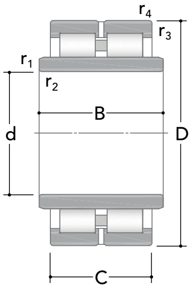
Suffixes	Cage
M	Machined brass cage guided on rolling elements
MA	Machined brass cage guided on outer ring
MF	Machined steel cage
AVH	Machined brass cage with round or square integral rivets guided on outer ring (MA), inner ring (MB) or rollers (M)

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



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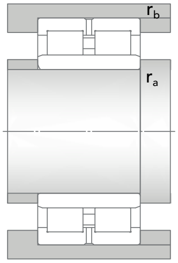
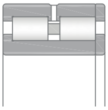


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
100	140	40	-	126	252	29	6700	**NNU 4920**
	140	70	40	128	253	29	5100	**NNUB 315033**
	140	80	40	128	251	29	5100	**NNUB 319114**
	150	37	-	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**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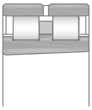
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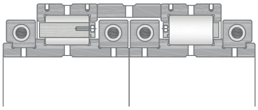
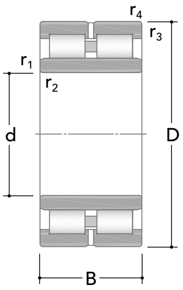

2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
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



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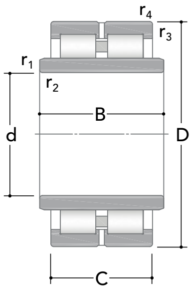

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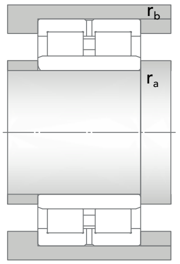
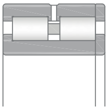
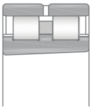


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
150 (cont.)	250	100	-	748	1270	141	2500	**NNU 4130**
155	220	60	-	330	676	72	3200	**314781**
160	220	60	-	328	673	71	4200	**NNU 4932**
	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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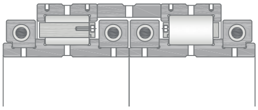
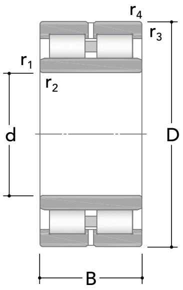
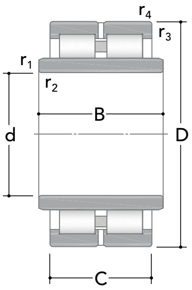


2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
150 (cont.)	2,1	2,1	2	2	18	NNU 4130	NNU 4130 K30
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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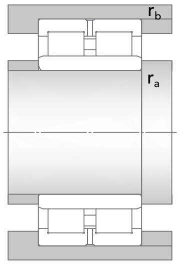
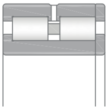


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
220	300	80	-	519	1140	112	3000	**NNU 4944**
(cont.)	300	100	-	890	1941	194	2300	**322341**
	330	115	-	1012	1930	197	1900	**314889**
	340	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**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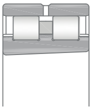
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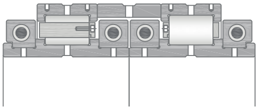
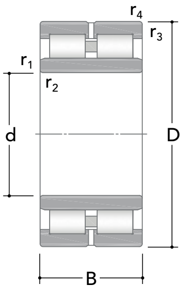
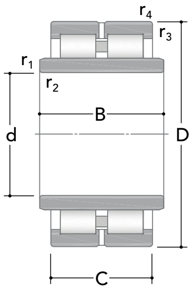

2ROW SCRB

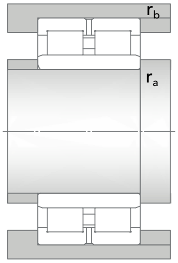
Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
220	2,1	2,1	2	2	16,5	NNU 4944	NNU 4944 K
(cont.)	2,1	2,1	2	2	20,5	322341	-
	2,1	2,1	2	2	34,5	314889	-
	3	3	2,5	2,5	28,5	-	NN 3044 K
	4	4	3	3	65	NNU 4144	NNU 4144 K30
240	1,1	2	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	-



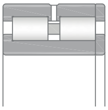
NNU

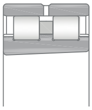


NNUB



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]	
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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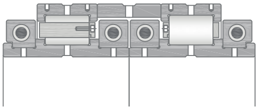
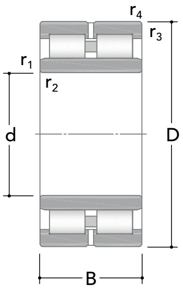
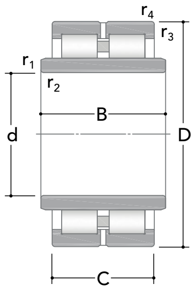

2ROW SCRB

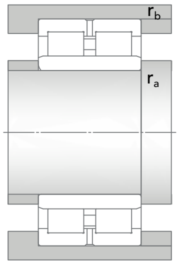
Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
300	4	4	3	3	68,5	-	NN 3060 K
(cont.)	4	4	3	3	96	NNU 4060	NNU 4060 K
	4	4	3	3	118	320119	-
	5	5	4	4	155	NNU 4160	NNU 4160 K30
320	1,5	2,1	1,5	2	23,5	NNU 4864	NNU 4864 K
	3	3	2,5	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



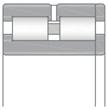
NNU

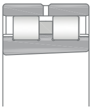


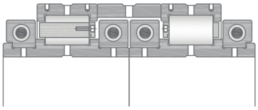
NNUB



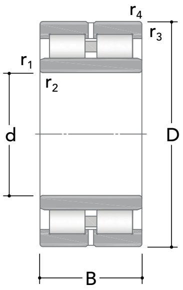
Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
360 (cont.)	600	243	-	4239	8420	688	950	**NNU 4172**
370	520	220	193	2762	6680	568	900	**NNUB 319961**
380	480	100	-	945	2530	210	1300	**NNU 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

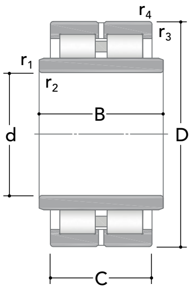

NN


2ROW SCRB

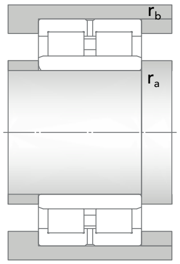
Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
360 (cont.)	5	5	4	4	275	**NNU 4172**	**NNU 4172 K30**
370	13,7x20°	1,5	-	1,5	130	**NNUB 319961**	-
380	1,5	2,1	1,5	2	44	**NNU 4876**	**NNU 4876 K**
	4	4	3	3	87,5	**NNU 4976**	**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**	-



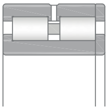
NNU

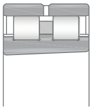


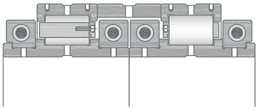
NNUB



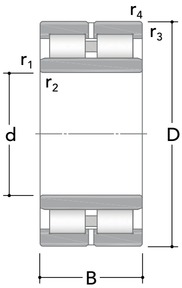
Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
420	600	220	-	3609	8710	713	800	**314982**
(cont.)	620	150	-	2122	4480	378	1400	**NN 3084**
	620	200	-	3508	7460	607	1000	**NNU 4084**
	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**	-



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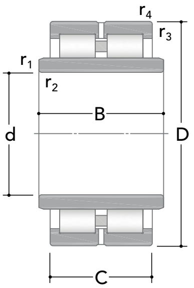
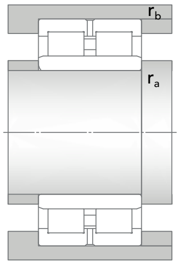
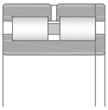


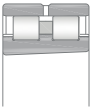
NNUB



Main dimensions				Basic load ratings		Fatigue load limit C_u	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0		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



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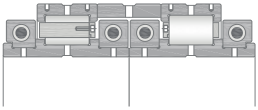
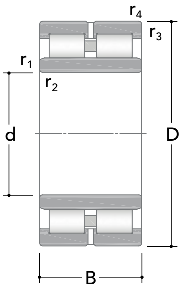


2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
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



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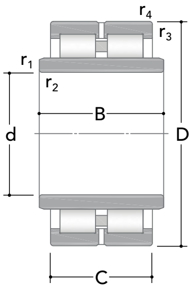

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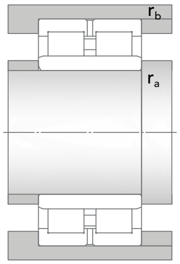
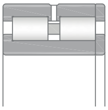


Main dimensions				Basic load ratings		Fatigue	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
600	800	200	-	3583	10030	787	950	**NNU 49/600**
	820	287,5	-	6483	17900	1283	500	**319584**
	870	200	-	3827	8560	604	900	**NN 30/600**
	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**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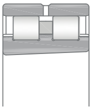
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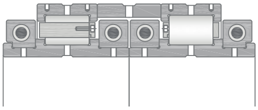
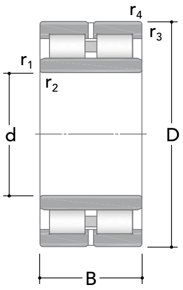

2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
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



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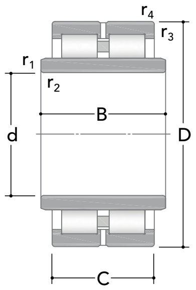

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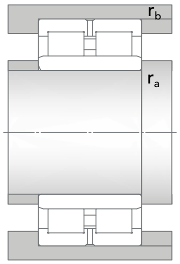
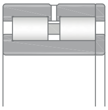


Main dimensions				Basic load ratings		Fatigue	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
750	1090	335	-	10137	23730	1582	460	**NNU 40/750**
(cont.)	1220	475	-	16148	35390	2313	400	**NNU 41/750**
760	1030	400	-	12362	33820	2228	-	**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**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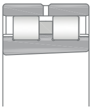
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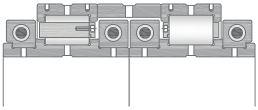
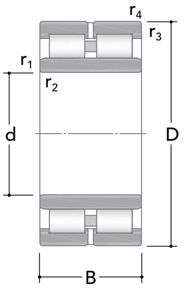

2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
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



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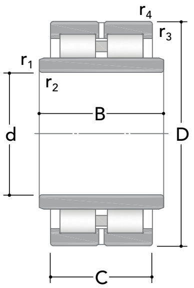

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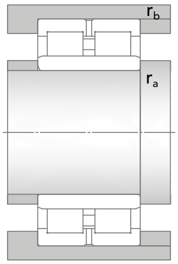
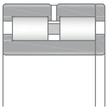


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Reference	Standard design
[mm]				[kN]			[rpm]	
1180	1540	355	-	11803	35290	2078	-	**NNU 49/1180**
1311	1720	300	-	12421	34120	1978	169	**326372**
1320	1720	400	-	13845	41980	2420	-	**NNU 49/1320**
	1720	400	-	13845	41980	2420	-	**NN 49/1320**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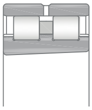
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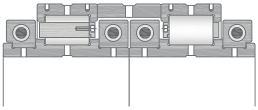

2ROW SCRB

Dimensions					Mass	Designation	
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Cylindrical bore	Tapered bore
[mm]					[kg]		
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:

$$F_{rm} > \frac{C_{0r}}{50}$$

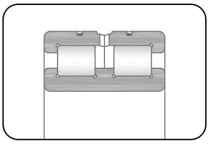
Where:

- 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

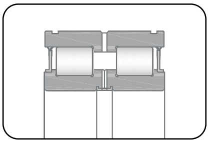
Type NNC (SL01)



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

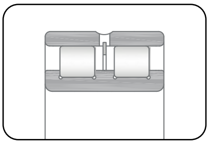
Type NNF (SL04)



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

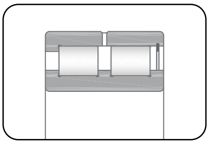
Type NNCL (SL02)



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

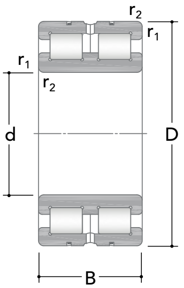
- Outer ring with one integral side rib and
- retaining ring
- Inner ring with three integral ribs
- Full complement (cageless) design for increased load carrying capacities
- Reduced maximum rotational speed compared to caged design
- Optimized raceway geometry and roller profile
- Can be used in one 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

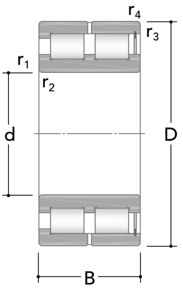
Suffixes	Cage
V	Full complement of rolling elements (without cage)

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)

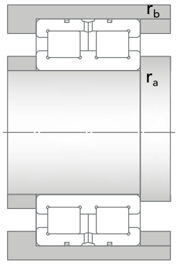
Suffixes	External design
P	Contact seal on one side (3194 series)
PP	Contact seal on both sides (NNF 50 series)
LS	Contact seal on one side (NNF 50 series)
2LS	Contact seal on both sides (3194 series)
NR	Snap ring groove in outer ring with suitable snap ring



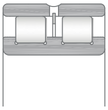
NNC (SL01)



NNCF

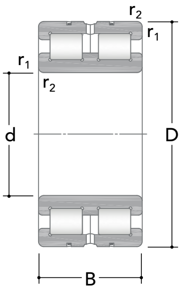


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
20	42	30	52,4	57,3	6,1	8300	10000	NNCF 5004 V
25	47	30	59,4	71,6	7,5	7000	9100	NNCF 5005 V
30	55	34	73,8	88,5	10	6000	7500	NNCF 5006 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	3300	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	2900	3800	NNCF 5013 V
70	100	30	115	193	22,3	2900	3800	NNCF 4914 V
	100	30	115	193	22,3	2900	3800	NNC 4914 V
	100	30	115	193	22,3	2900	3800	NNCL 4914 V
	110	54	239	346	45	2800	3600	NNCF 5014 V
75	115	54	251	381	49	2500	3200	NNCF 5015 V
80	110	30	121	217	25	2500	3400	NNCF 4916 V
	110	30	121	217	25	2500	3400	NNC 4916 V
	110	30	121	217	25	2500	3400	NNCL 4916 V

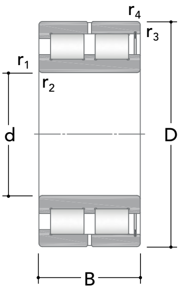


NNCL (SL02)

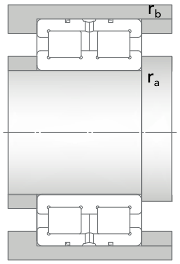
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
20	0,6	0,3	0,5	0,3	0,2	**NNCF 5004 V**
25	0,6	0,3	0,5	0,3	0,23	**NNCF 5005 V**
30	1	0,3	1	0,3	0,35	**NNCF 5006 V**
35	1	0,3	1	0,3	0,46	**NNCF 5007 V**
40	1	0,3	1	0,3	0,56	**NNCF 5008 V**
45	1	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**



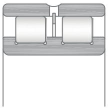
NNC (SL01)



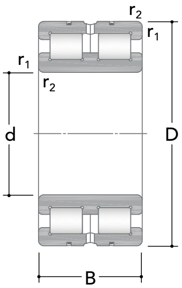
NNCF



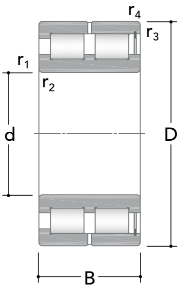
Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
80 (cont.)	125	60	308	456	58,1	2300	3000	NNCF 5016 V
85	130	60	318	476	60	2300	3000	NNCF 5017 V
90	125	35	162	306	35	2300	3000	NNCF 4918 V
	125	35	162	306	35	2300	3000	NNC 4918 V
	125	35	162	306	35	2300	3000	NNCL 4918 V
	140	67	369	562	68,5	2100	2800	NNCF 5018 V
100	140	40	209	400	46,4	1900	2600	NNCF 4920 V
	140	40	209	400	46,4	1900	2600	NNC 4920 V
	140	40	209	400	46,4	1900	2600	NNCL 4920 V
	150	67	392	624	74	1900	2600	NNCF 5020 V
105	145	47	233	474	55	1960,000	-	319372
110	150	40	221	430	49	1800	2400	NNCF 4922 V
	150	40	221	430	49	1800	2400	NNC 4922 V
	150	40	221	430	49	1800	2400	NNCL 4922 V
	170	80	513	800	95	1800	2200	NNCF 5022 V
120	165	45	243	480	53	1600	2200	NNCF 4924 V
	165	45	243	480	53	1600	2200	NNC 4924 V
	165	45	243	480	53	1600	2200	NNCL 4924 V
	180	80	546	888	104	1600	2000	NNCF 5024 V
130	180	50	297	531	60	1500	2000	NNCF 4926 V
	180	50	297	531	60	1500	2000	NNC 4926 V
	180	50	297	531	60	1500	2000	NNCL 4926 V
	200	95	767	1258	142	1400	1900	NNCF 5026 V
140	190	50	307	576	63	1400	1900	NNCF 4928 V
	190	50	307	576	63	1400	1900	NNC 4928 V


NNCL (SL02)

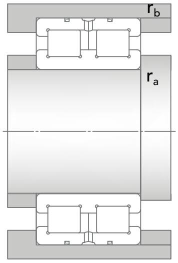
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
80 (cont.)	1,1	0,6	1	0,5	2,6	NNCF 5016 V
85	1,1	0,6	1	0,5	2,7	NNCF 5017 V
90	1,1	1,1	1	1	1,35	NNCF 4918 V
	1,1	-	1	-	1,35	NNC 4918 V
	1,1	-	1	-	1,3	NNCL 4918 V
	1,5	1	1,5	1	3,6	NNCF 5018 V
100	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



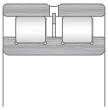
NNC (SL01)



NNCF

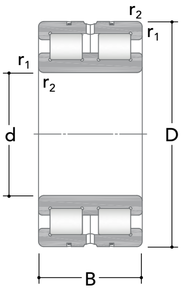


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
140	190	50	307	576	63	1400	1900	**NNCL 4928 V**
(cont.)	210	95	810	1370	151	1300	1800	**NNCF 5028 V**
150	190	40	257	586	59	1400	1800	**NNCF 4830 V**
	190	40	257	586	59	1400	1800	**NNC 4830 V**
	190	40	257	586	59	1400	1800	**NNCL 4830 V**
	210	60	432	836	90	1300	1700	**NNCF 4930 V**
	210	60	432	836	90	1300	1700	**NNC 4930 V**
	210	60	432	836	90	1300	1700	**NNCL 4930 V**
	225	100	847	1439	160	1200	1700	**NNCF 5030 V**
160	200	40	261	613	61	1300	1700	**NNCF 4832 V**
	200	40	261	613	61	1300	1700	**NNC 4832 V**
	200	40	261	613	61	1300	1700	**NNCL 4832 V**
	220	60	449	915	94,8	1200	1600	**NNCF 4932 V**
	220	60	449	915	94,8	1200	1600	**NNC 4932 V**
	220	60	449	915	94,8	1200	1600	**NNCL 4932 V**
	240	109	960	1603	179	1100	1500	**NNCF 5032 V**
170	215	45	286	657	64,7	1200	1600	**NNCF 4834 V**
	215	45	286	657	64,7	1200	1600	**NNC 4834 V**
	215	45	286	657	64,7	1200	1600	**NNCL 4834 V**
	230	60	459	952	98	1100	1500	**NNCF 4934 V**
	230	60	459	952	98	1100	1500	**NNC 4934 V**
	230	60	459	952	98	1100	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	1000	1400	**NNCF 4936 V**
	250	69	595	1230	126	1000	1400	**NNC 4936 V**
	250	69	595	1230	126	1000	1400	**NNCL 4936 V**

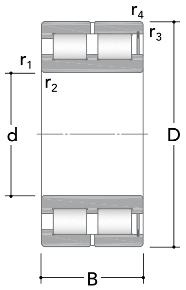


NNCL (SL02)

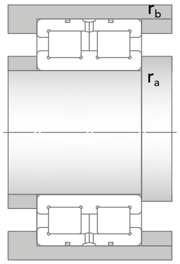
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
140	1,5	-	1,5	-	4,1	**NNCL 4928 V**
(cont.)	2	1	2	1	11	**NNCF 5028 V**
150	1,1	1,1	1	1	2,8	**NNCF 4830 V**
	1,1	-	1	-	2,9	**NNC 4830 V**
	1,1	-	1	-	2,7	**NNCL 4830 V**
	2	2	2	2	6,55	**NNCF 4930 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**



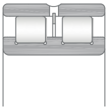
NNC (SL01)



NNCF

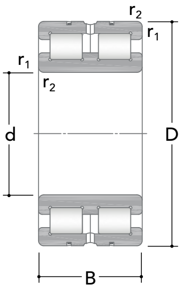


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
180 (cont.)	280	136	1441	2560	266	1000	1300	NNCF 5036 V
190	240	50	357	754	75,9	1000	1400	NNCF 4838 V
	240	50	357	754	75,9	1000	1400	NNC 4838 V
	240	50	357	754	75,9	1000	1400	NNCL 4838 V
	260	69	607	1298	132	1000	1400	NNCF 4938 V
	260	69	607	1298	131	1000	1400	NNC 4938 V
	260	69	607	1298	132	1000	1400	NNCL 4938 V
	290	136	1482	2600	279	1000	1300	NNCF 5038 V
200	250	50	366	803	79	1000	1400	NNCF 4840 V
	250	50	366	803	79	1000	1400	NNC 4840 V
	250	50	366	803	79	1000	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	900	1200	NNCF 5040 V
220	270	50	378	865	84	1000	1200	NNCF 4844 V
	270	50	378	865	84	1000	1200	NNC 4844 V
	270	50	378	865	84	1000	1200	NNCL 4844 V
	300	80	739	1680	158	900	1200	NNCF 4944 V
	300	80	739	1680	158	900	1200	NNC 4944 V
	300	80	739	1680	158	900	1200	NNCL 4944 V
	340	160	2028	3608	373	800	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	800	1100	NNCF 4948 V
	320	80	784	1770	172	800	1100	NNC 4948 V
	320	80	784	1770	172	800	1100	NNCL 4948 V
	360	160	2143	3900	394	800	1000	NNCF 5048 V

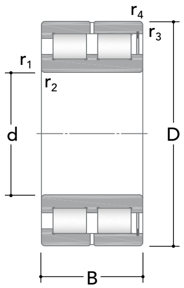


NNCL (SL02)

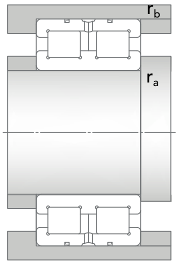
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
180 (cont.)	2,1	2,1	2	2	30,5	NNCF 5036 V
190	1,5	1,5	1,5	1,5	5,5	NNCF 4838 V
	1,5	-	1,5	-	5,65	NNC 4838 V
	1,5	-	1,5	-	5,3	NNCL 4838 V
	2	2	2	2	11	NNCF 4938 V
	2	-	2	-	11	NNC 4938 V
	2	-	2	-	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



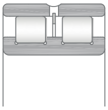
NNC (SL01)



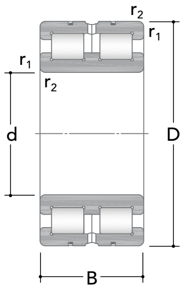
NNCF



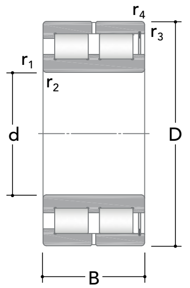
Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
260	320	60	565	1400	130	800	1000	NNCF 4852 V
	320	60	565	1400	130	800	1000	NNC 4852 V
	320	60	565	1400	130	800	1000	NNCL 4852 V
	360	100	1178	2550	244	700	950	NNCF 4952 V
	360	100	1178	2550	244	700	950	NNC 4952 V
	360	100	1178	2550	244	700	950	NNCL 4952 V
	400	190	2863	5150	495	700	900	NNCF 5052 V
280	350	69	741	1860	170	700	950	NNCF 4856 V
	350	69	741	1860	170	700	950	NNC 4856 V
	350	69	741	1860	170	700	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	600	800	NNCF 4864 V
	400	80	897	2280	207	600	800	NNC 4864 V
	400	80	897	2280	207	600	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	500	700	NNCF 5064 V
340	420	80	925	2480	214	600	750	NNCF 4868 V


NNCL (SL02)

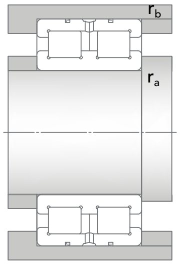
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
260	2	2	2	2	11	NNCF 4852 V
	2	-	2	-	11	NNC 4852 V
	2	-	2	-	10,5	NNCL 4852 V
	2,1	2,1	2	2	31,5	NNCF 4952 V
	2,1	-	2	-	32	NNC 4952 V
	2,1	-	2	-	31	NNCL 4952 V
	4	4	3	3	85,5	NNCF 5052 V
280	2	2	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



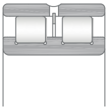
NNC (SL01)



NNCF

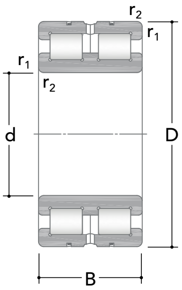


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
340	420	80	925	2480	214	600	750	NNC 4868 V
(cont.)	420	80	925	2480	214	600	750	NNCL 4868 V
	460	118	1795	4250	386	500	700	NNCF 4968 V
	460	118	1795	4250	386	500	700	NNC 4968 V
	460	118	1795	4250	386	500	700	NNCL 4968 V
	520	243	4434	8350	706	500	670	NNCF 5068 V
360	440	80	939	2560	221	500	700	NNCF 4872 V
	440	80	939	2560	221	500	700	NNC 4872 V
	440	80	939	2560	221	500	700	NNCL 4872 V
	480	118	1849	4570	402	500	670	NNCF 4972 V
	480	118	1849	4570	402	500	670	NNC 4972 V
	480	118	1849	4570	402	500	670	NNCL 4972 V
	540	243	4470	8680	721	500	630	NNCF 5072 V
380	480	100	1402	3650	312	500	670	NNCF 4876 V
	480	100	1402	3650	312	500	670	NNC 4876 V
	480	100	1402	3650	312	500	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	440	560	NNCF 5080 V
420	520	100	1347	3920	319	460	-	NNCF 4884 V
	520	100	1347	3920	319	480	-	NNC 4884 V

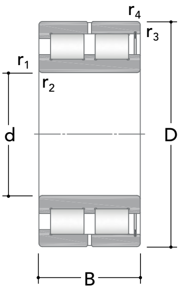


NNCL (SL02)

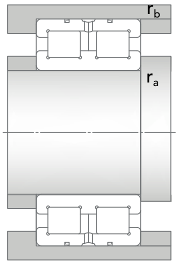
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
340	2,1	-	2	-	25,5	**NNC 4868 V**
(cont.)	2,1	-	2	-	25,5	**NNCL 4868 V**
	3	3	2,5	2,5	58,5	**NNCF 4968 V**
	3	-	2,5	-	59	**NNC 4968 V**
	3	-	2,5	-	58	**NNCL 4968 V**
	5	5	4	4	185	**NNCF 5068 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**



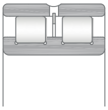
NNC (SL01)



NNCF

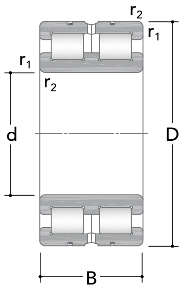


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
420	520	100	1347	3920	319	500	-	NNCL 4884 V
(cont.)	560	140	2217	5980	508	430	-	NNCF 4984 V
	560	140	2217	5980	508	460	-	NNC 4984 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

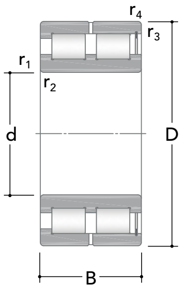


NNCL (SL02)

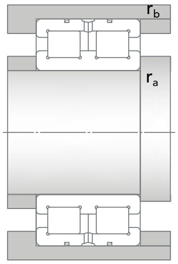
Dimensions					Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}		Standard design
[mm]					[kg]	
420	2,1	-	2	-	49,5	**NNCL 4884 V**
(cont.)	4	4	3	3	99,5	**NNCF 4984 V**
	4	-	3	-	99,5	**NNC 4984 V**
	4	-	3	-	99,5	**NNCL 4984 V**
440	2,1	2,1	2	2	52	**NNCF 4888 V**
	2,1	-	2	-	52	**NNC 4888 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**



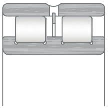
NNC (SL01)



NNCF



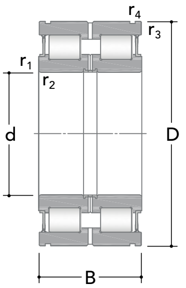
Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
530	650	118	1695	5320	419	370	-	NNCF 48/530 V
	650	118	1695	5320	419	370	-	NNC 48/530 V
	650	118	1695	5320	419	350	-	NNCL 48/530 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



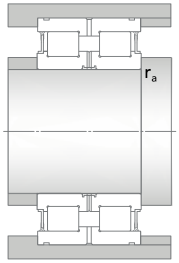
NNCL (SL02)

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**

Double row full complement cylindrical roller bearings with seals

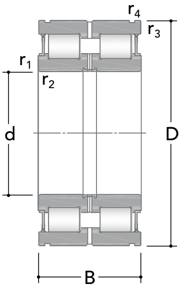


NNF (SL04)

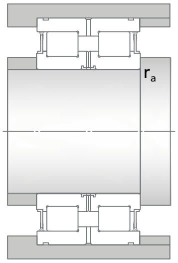


Main dimensions				Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]				[kN]			[rpm]	
20	42	30	29	45,8	54,6	5,7	3000	**NNF 5004**
25	47	30	29	50,7	65	6,7	2700	**NNF 5005**
30	55	34	33	57,8	74	7,7	2300	**NNF 5006**
35	62	36	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**

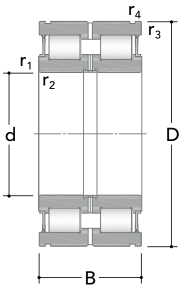


NNF (SL04)

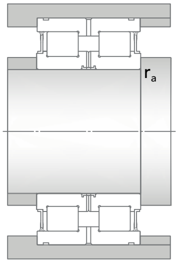


Main dimensions				Basic load ratings		Fatigue	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	load limit C_u	Limiting	Standard design
[mm]				[kN]			[rpm]	
110	170	80	79	410	693	81,3	700	**NNF 5022**
120	180	80	79	426	851	85,1	620	**NNF 5024**
130	190	69	68	382	731	83	600	**319110**
	190	80	79	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	Speed ratings	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	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

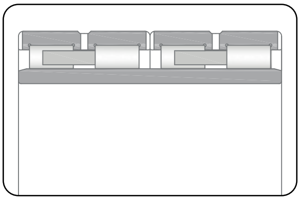
Viceversa, four row cylindrical roller bearings requesting an inner ring "loose fit", the roll neck typical tolerance is "e7".
As regards fitting tolerances for the chock bore, typical values are the following:

- "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

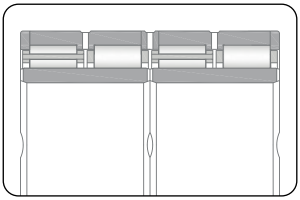
Type AF2D/A2D



HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE

- 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)

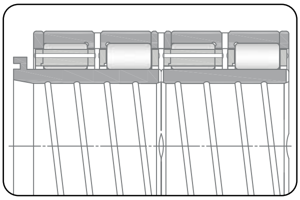
Type F2CII/EVO



HB BAINITE HT · S STABILIZATION · PROFILE

- 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)

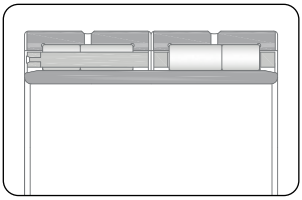
Type Q2AC



HB BAINITE HT · S STABILIZATION · PROFILE · AVH CAGE DESIGN

- 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

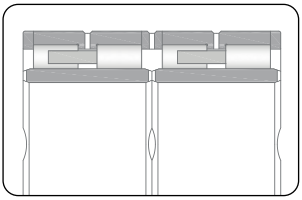
Type GB2DX



HB BAINITE HT · S STABILIZATION · PROFILE · VICTORY LINE · AVH CAGE DESIGN

- 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

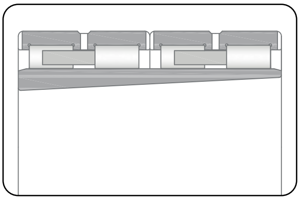


HB BAINITE HT
S STABILIZATION
PROFILE

- 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



HB BAINITE HT
S STABILIZATION
PROFILE
V VICTORY LINE

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

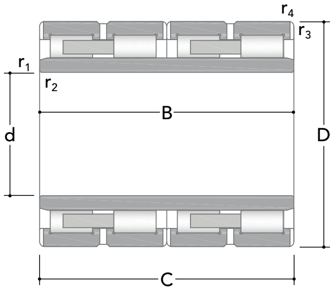
Suffixes	Internal design
ZB	Optimized roller profile for improved load distribution. It is not necessarily stated in the bearing code
SP	Special or non-standard bearing
W	One wider inner ring
WS	One wider inner ring with special concentric shoulder

Suffixes	Cage
S/F	Steel cage

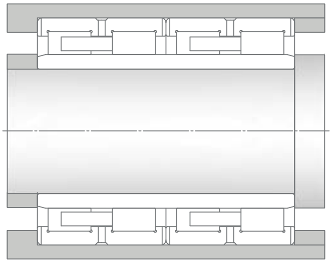
Suffixes	Accuracy, clearance, running
HP	High precision running accuracy (better than P6)

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

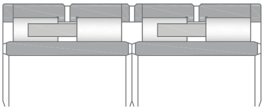


AF2D/A2D

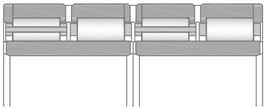


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Cylindrical bore
[mm]				[kN]			
115	165	107,5	90	401	760	87	**319738**
127	174,625	150,812	150,812	624	1310	152	**315643**
139,7	215	195	187	1020	2260	258	**466971**
	215	195	187	1218	2530	288	**459696**
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**

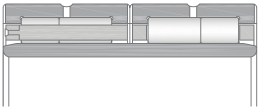
(1) Bearing set of two double row bearings (Suffix VJ 202)



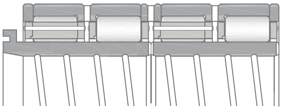
D2C



F2CII/EVO

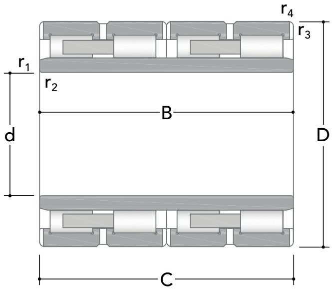


GB2

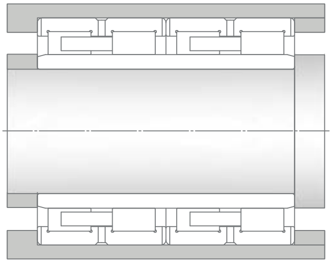


Q2AC

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**

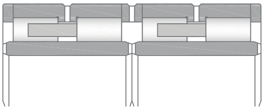


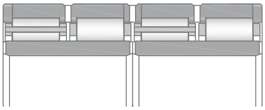
AF2D/A2D

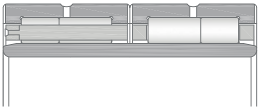


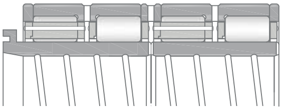
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Cylindrical bore
[mm]				[kN]			
200	280	200	200	1492	3353	345	**313893**
(cont.)	285	200	200	1466	3840	399	**457628**
	290	192	192	1526	3190	319	**313811**
	310	230	230	2038	3730	388	**313639** (1)
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)

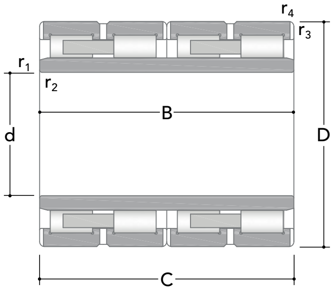

D2C


F2CII/EVO

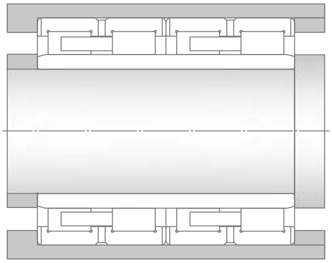

GB2


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)

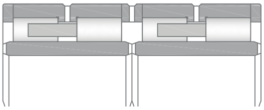


AF2D/A2D

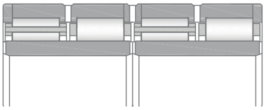


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	B	C	Dynamic C	Static C_0		Cylindrical bore
[mm]				[kN]			
280	410	300	300	3493	7470	732	**314897**
(cont.)	420	300	300	3506	7260	686	**313487**
290	390	190	190	2060	4530	438	**635195**
300	420	300	300	4013	8670	837	**314484**
	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**

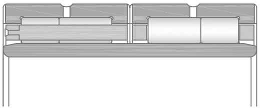
(1) Bearing set of two double row bearings (Suffix VJ 202)



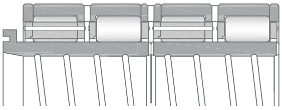
D2C



F2CII/EVO

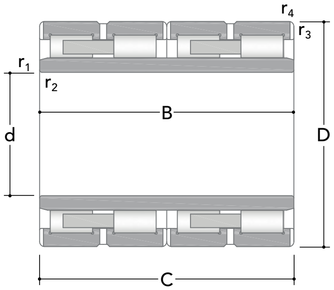


GB2

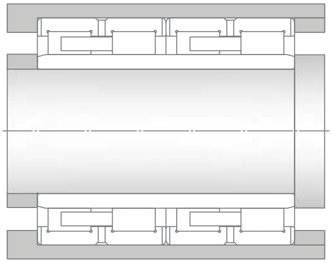


Q2AC

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**

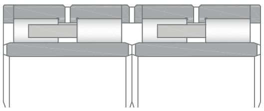


AF2D/A2D



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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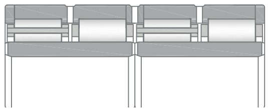
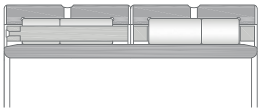


F2CII/EVO



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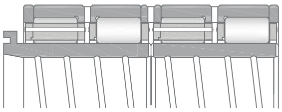
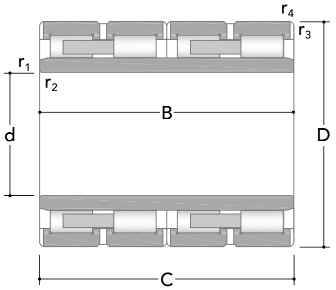


Q2AC

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**



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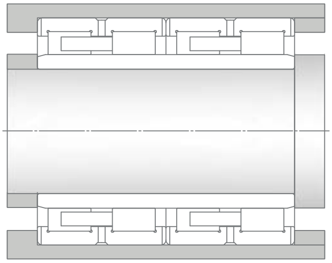
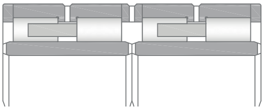
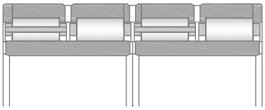
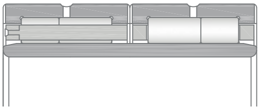


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Cylindrical bore
[mm]				[kN]			
450	590	300	300	3861	11930	1014	**315811**
459,95	760	600	600	14101	30390	2312	**312980**
460	650	355	355	6301	14420	1205	**313031**
	650	424	424	7905	18160	1518	**315196**
	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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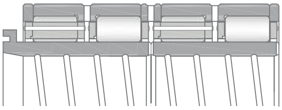
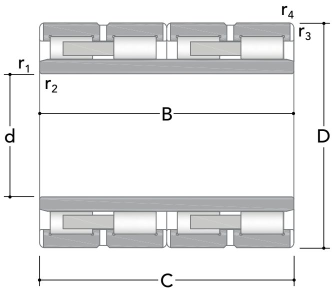
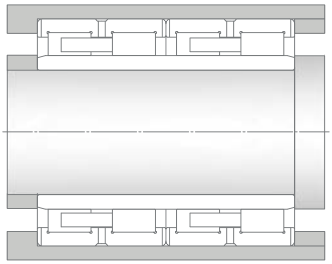

Q2AC

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**

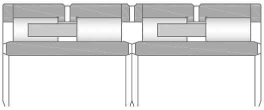


AF2D/A2D



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)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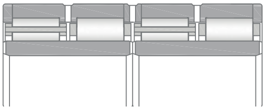
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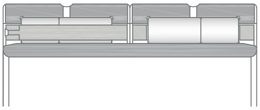
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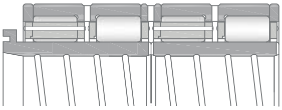
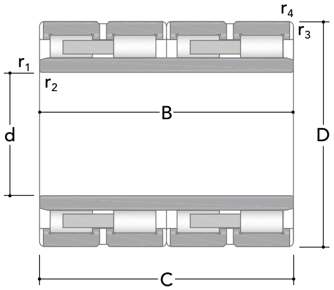

Q2AC

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**



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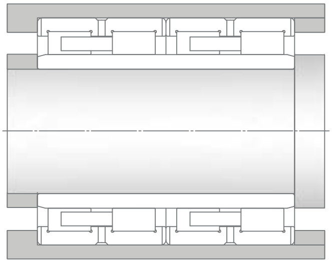
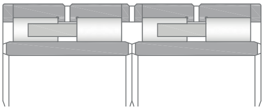


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	B	C	Dynamic C	Static C_0	C_u	Cylindrical bore
[mm]				[kN]			
650	920	670	670	17334	46250	3183	**313007**
658	1075	650	650	20521	42820	2888	**320525**
660	820	440	440	7442	22500	1609	**239509**
	880	450	450	7260	23200	1730	**313477**
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)



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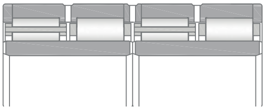
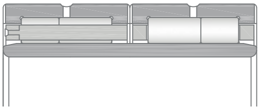


F2CII/EVO



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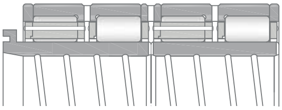
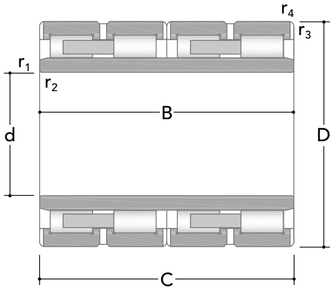
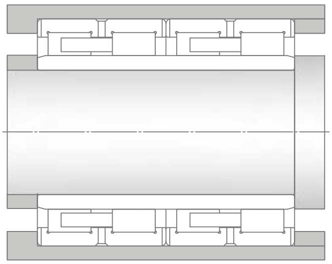


Q2AC

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**

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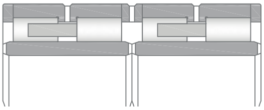
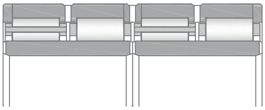
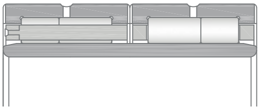
(1) Bearing set of two double row bearings (Suffix VJ 202)


D2C


F2CII/EVO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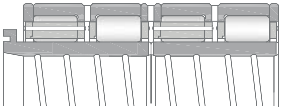
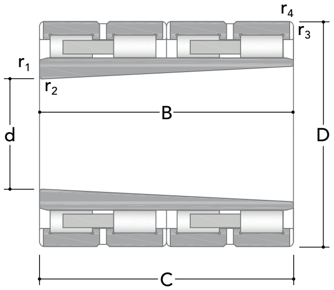
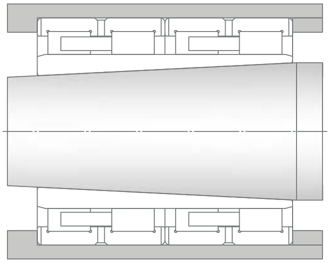

Q2AC

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**

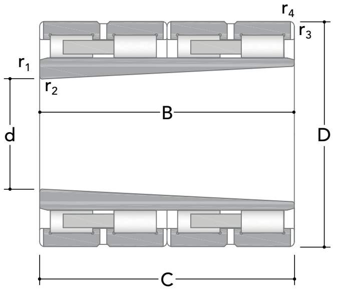


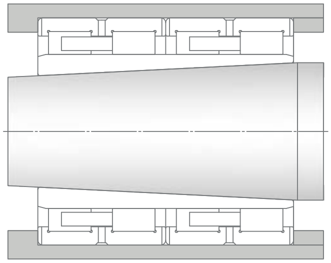


AF2D/A2D K/K30

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**

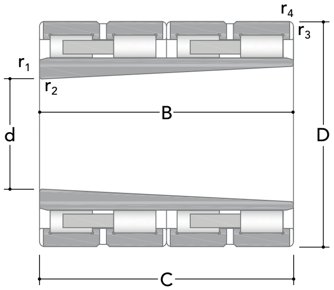




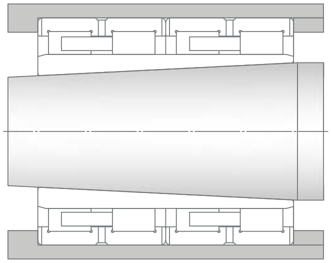
AF2D/A2D K/K30

Main dimensions				Basic load ratings		Fatigue	Designation
d	D	B	C	Dynamic C	Static C_0	load limit 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**

Tapered roller bearings

RKB
BEARING INDUSTRIES
SWITZERLAND

RKB
BEARING INDUSTRIES
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

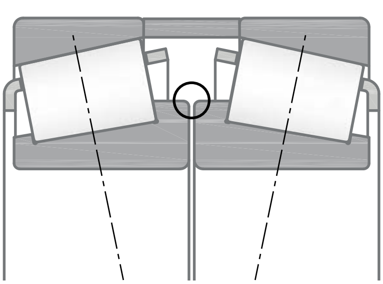
RKB single row and matched pair tapered roller bearings (SRTRBs) are widely used in all industrial segments, in standard and critical applications. The tighter dimensional tolerances, obtained through an extremely high precision manufacturing technology, and the optimized inner geometry (E-Type class) 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.

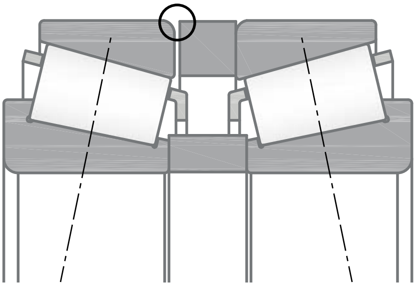
Axial Internal clearance and preload

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].

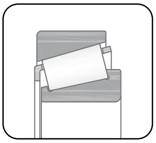
Usually, the minimum radial load is reached or surpassed by the weight of the components supported by the bearing and the loads acting on it, otherwise supplementary radial load must be applied on the single row tapered roller bearing. In application where a starting up at low temperature is planned 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

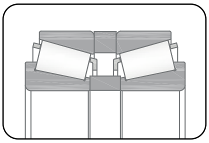
Type TS



HB BAINITE HT
S STABILIZATION
E-TYPE
PROFILE
VICTORY LINE

- 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

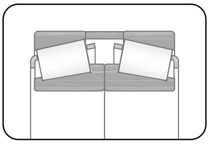
Type DB



HB BAINITE HT
S STABILIZATION
PROFILE

- 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



HB BAINITE HT
S STABILIZATION
PROFILE

- 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

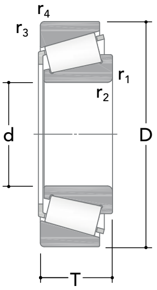
The J prefix identifies metric dimensioned and toleranced cones and cups.

	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



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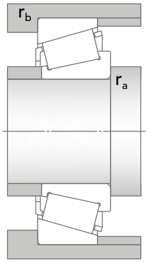
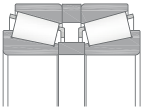
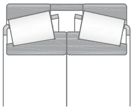
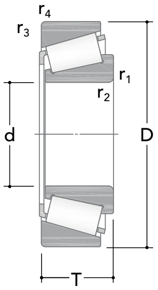


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
15	42	14,25	27,7	20	2,08	15050	18070	**30302**
17	40	13,25	23,5	19	1,84	15000	18000	**30203**
	47	15,25	34,7	25	2,70	13500	16300	**30303**
	47	20,25	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**





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**



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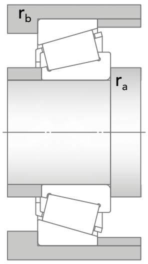
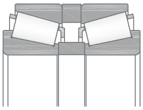


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
32	53	14,5	33,2	36	3,60	8800	10700	**26749/710**
	58	17	45,1	47	4,70	9000	11000	**320/32**
35	62	18	52,8	54	5,87	8500	10000	**32007**
	72	18,25	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	45,4	53	5,30	7690	9200	**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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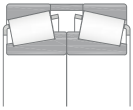
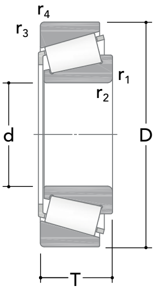

DF

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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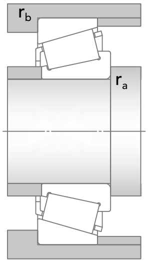
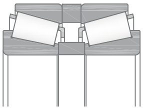


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
45	100	27,25	132	122	14,20	5600	7000	**30309**
(cont.)	100	27,25	113,5	103	12,40	5200	6800	**31309**
	100	38,25	173	172	20,20	5350	7000	**32309**
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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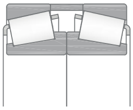
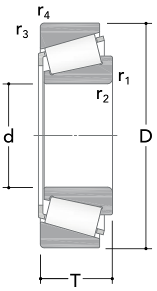

DF

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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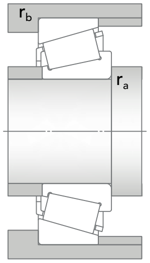
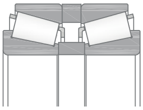


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
60 (cont.)	95	27	113	143	16,00	5300	6700	**33012**
	100	30	145	170	19,80	5300	6300	**33112**
	110	23,75	120	114	13,30	5000	6000	**30212**
	110	29,75	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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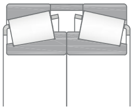
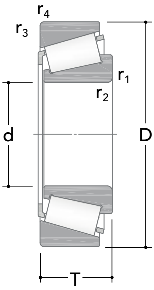

DF

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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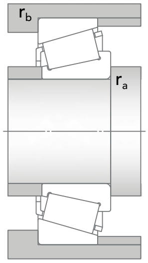
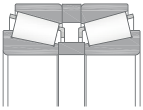


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0		Reference	Limiting	
[mm]			[kN]			[rpm]		
70	150	38	271	260	31,00	3800	4500	**30314**
(cont.)	150	54	363	396	43,00	3400	4500	**32314**
75	105	20	87,5	117	13,10	4800	5600	**32915**
	115	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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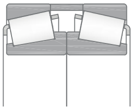
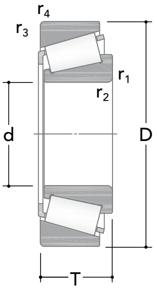


DF

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**



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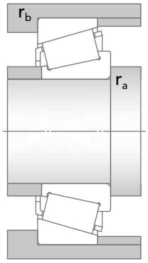
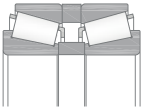


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
85	150	38,5	263	287	33,30	3600	4300	**32217**
(cont.)	150	49	356	430	48,00	3200	4300	**33217**
	180	44,5	372	368	40,20	3000	3800	**30317**
	180	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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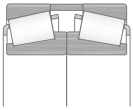
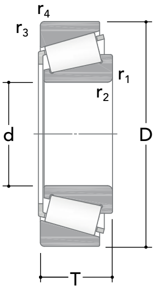


DF

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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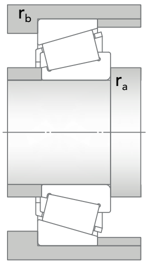
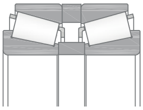


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
100	180	37	304	320	36,00	3000	3680	**30220**
(cont.)	180	49	391	446	47,00	3000	3600	**32220**
	180	63	536	655	71,00	2600	3600	**33220**
	215	45	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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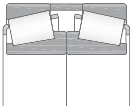
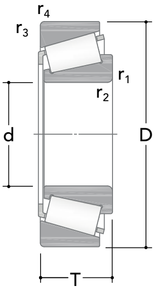


DF

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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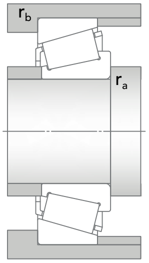
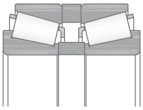


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
120	180	38	302	416	42,40	2800	3400	**32024**
(cont.)	180	48	356	541	56,00	2800	3400	**33024**
	215	43,5	417	465	49,00	2400	3000	**30224**
	215	61,5	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	220	2800	**T4DB 150**
	225	48	458	657	65,30	2200	2600	**32030**
	225	59	557	865	85,00	2200	2600	**33030**
	270	49	456	560	57,00	1800	2400	**30230**
	270	77	782	1140	114,00	1700	2400	**32230**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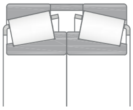
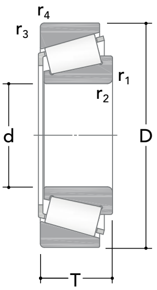

DF

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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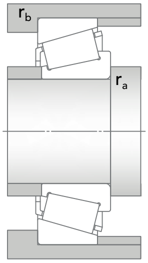
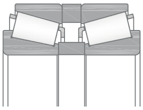


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
150	320	72	879	1066	104,00	1600	2000	**30330**
(cont.)	320	82	835	1022	101,00	1400	2000	**31330**
	320	114	1167	1640	155,00	1290	-	**32330**
160	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	1640	2000	**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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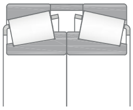
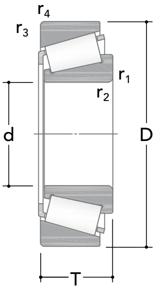

DF

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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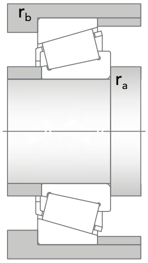
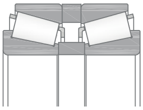


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
190	340	60	767	1013	94,00	1400	1800	**30238**
(cont.)	340	97	1268	1934	176,00	1300	1800	**32238**
200	260	28	198	416	39,00	1470	-	**329053**
	270	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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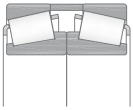
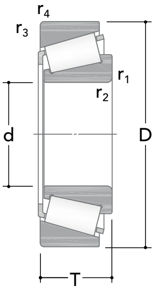


DF

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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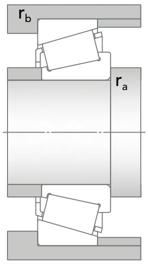
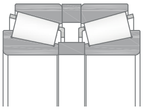


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	
[mm]			[kN]			[rpm]		
242	406	97	1413	2507	215,00	980	-	**332255**
255	560	123	1819	2688	225,00	700	-	**328213**
260	400	87	1244	2210	189,00	1100	1400	**32052**
	400	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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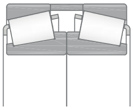
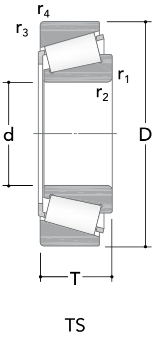
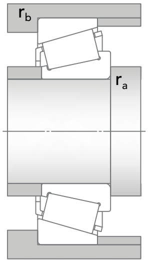
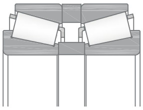

DF

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**
	6	6	5	5	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**





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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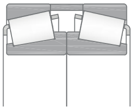
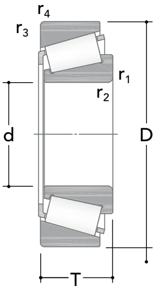


DF

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**



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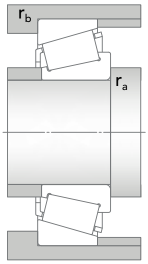
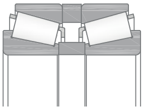


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
14,989	34,989	10,998	16,5	13	1,31	15500	18900	**A 4059/A 4138**
0,5901	1,3775	0,433						
15,875	41,275	14,288	21,8	21	2,17	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						



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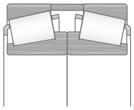
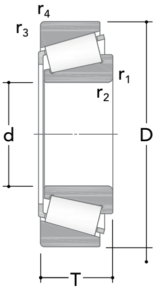


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
14,989 0,5901	0,8	1,3	0,8	1,3	0,46	0,051	A 4059/A 4138
15,875 0,625	1,3 0,05	2 0,08	1,3	2	0,31	0,095	03062/03162
	1,5 0,06	1,5 0,06	1,5	1,5	0,72	0,1	11590/11520
17,462 0,6875	1,3 0,05	1,3 0,05	1,3	1,3	0,28	0,082	LM 11749/710
19,05 0,75	1,3 0,05	1,3 0,05	1,3	1,3	0,3	0,12	LM 11949/910
	1,3 0,05	1,3 0,05	1,3	1,3	0,27	0,17	09067/09195
	1,5 0,06	1,3 0,05	1,5	1,3	0,27	0,19	09074/09195
21,43 0,8437	1,3 0,05	1,3 0,05	1,3	1,3	0,31	0,12	LM 12748/710
21,987 0,8656	1,3 0,05	1,3 0,05	1,3	1,3	0,31	0,12	LM 12749/710
	1,3 0,05	1,3 0,05	1,3	1,3	0,31	0,12	LM 12749/711
25,4 1	1,3 0,05	1,3 0,05	1,3	1,3	0,37	0,13	L 44643/610
	1,5 0,06	1,5 0,06	1,5	1,5	0,4	0,13	07100/07210
	1,3 0,05	1,5 0,06	1,3	1,5	0,35	0,22	15578/15520



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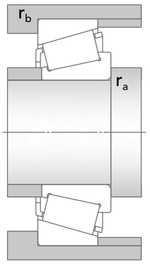
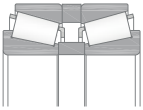


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
25,4	57,15	19,431	49,2	45	5,00	8800	10800	**M 84548/510**
1	2,25	0,765						
(cont.)	62	19,05	60,4	58	6,10	8350	10200	**15101/15245**
	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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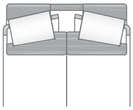
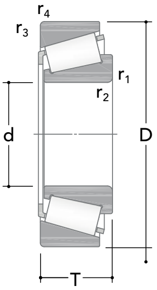

DF

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					



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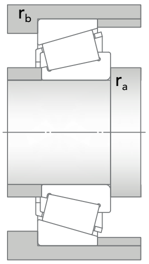
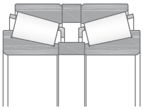


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
31,75	61,912	18,161	60,4	58	6,10	8350	10200	**15123/15243**
1,25	2,4375	0,715						
(cont.)	62	18,161	60,4	58	6,10	8350	10200	**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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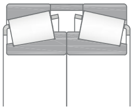
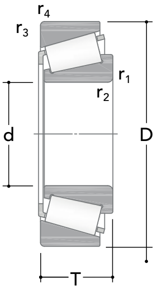


DF

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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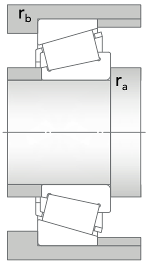
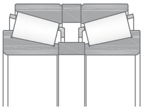


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
38,1	65,088	18,034	53,2	57	6,10	7300	9500	**LM 29748/710**
1,5	2,5625	0,71						
	65,088	18,034	53,2	57	6,10	7300	9500	**LM 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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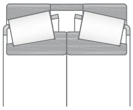
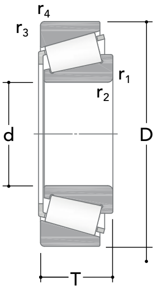

DF

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					



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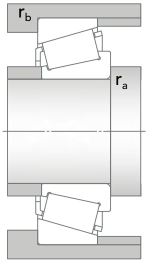
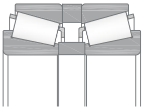


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
42,875	82,931	23,812	100,1	107	11,70	6190	7700	**25577/25520**
1,688	3,265	0,9375						
	82,931	26,988	100,1	107	12,00	6190	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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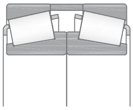
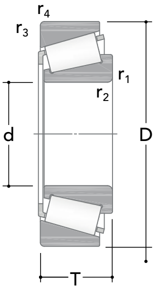

DF

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					



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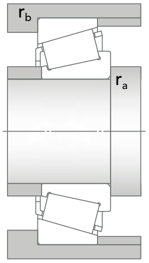
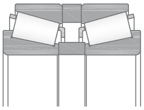


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
45,618	82,931	26,988	100,1	107	11,70	6190	7700	**25590/25523**
1,796	3,265	1,0625						
	83,058	23,876	100,1	107	11,70	6190	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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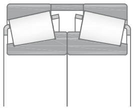
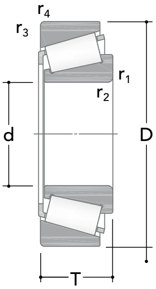


DF

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					



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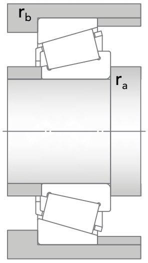
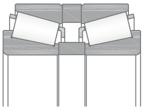


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
53,975	95,25	27,783	128	136	16,00	5100	6400	**33895/33821**
2,125	3,75	1,0938						
(cont.)	95,25	27,783	128	136	16,00	5100	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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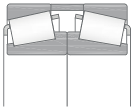
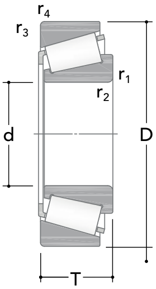


DF

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					



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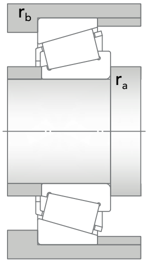
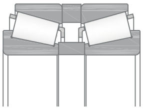


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
65,088	135,755	53,975	358	405	44,90	3600	4700	**6379/6320**
2,5625	5,3447	2,125						
66,675	112,712	30,162	177	202	23,80	4100	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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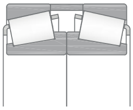
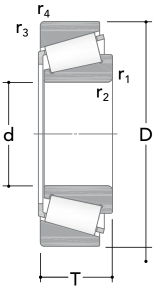

DF

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					



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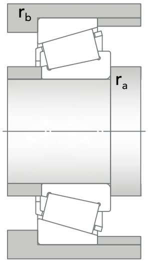
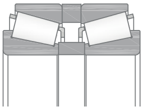


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
82,55	139,992	36,512	225	279	31,00	3450	4200	**580/572**
3,25	5,5115	1,4375						
92,075	152,4	39,688	240	308	33,20	3100	3800	**598/592 A**
3,625	6	1,5625						
95,25	152,4	39,688	240	308	33,20	3100	3800	**594/592 A**
3,75	6	1,5625						
	168,275	41,275	285	362	39,00	2700	3300	**683/672**
	6,625	1,625						
100,012	157,162	36,512	204	338	37,20	2520	-	**52393/52618**
3,9375	6,1875	1,4375						
	161,925	36,512	204	338	37,20	2520	-	**52393/52637**
	6,375	1,4375						
101,6	146,05	21,433	80	152	16,40	2730	-	**L 521945/L 521910**
4	5,75	0,8438						
	157,162	36,512	204	338	36,20	2520	-	**52400/52618**
	6,1875	1,4375						
	157,162	36,512	204	338	36,20	2520	-	**52401/52618**
	6,1875	1,4375						
	161,925	36,512	204	338	36,20	2520	-	**52400/52637**
	6,375	1,4375						
109,538	158,75	23,02	101,2	161	18,50	2600	-	**332727**
4,3125	6,25	0,9063						
109,975	177,8	41,275	300	412	43,00	2660	2900	**64432/64700**
4,3297	7	1,625						
	179,975	41,275	300	412	43,00	2660	2900	**64432/64708**
	7,0856	1,625						



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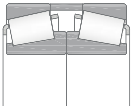
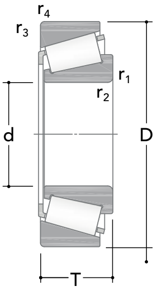


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
82,55 **3,25**	3,5 0,14	3,3 0,13	3,3	3,1	0,4	2,2	**580/572**
92,075 **3,625**	3,5 0,14	3,3 0,13	3,3	3,1	0,44	2,7	**598/592 A**
95,25 **3,75**	3,5 0,14	3,3 0,13	3,3	3,1	0,44	2,55	**594/592 A**
	3,5 0,14	3,3 0,13	3,3	3,1	0,48	3,75	**683/672**
100,012 **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 **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 **4,3125**	5	3,3	3	3	0,6	1,35	**332727**
109,975 **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**



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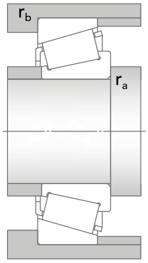
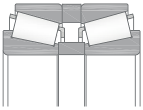


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
109,987 **4,3302**	159,987 6,2987	34,925 1,375	156	348	8,58	2540	-	**LM 522548/LM 522510**
	159,987 6,2987	34,925 1,375	156	348	8,58	2540	-	**LM 522549/LM 522510**
109,992 **4,3304**	177,8 7	41,275 1,625	246	412	43,00	2500	-	**64433/64700**
	180 7,0866	41,275 1,625	246	412	43,00	2500	-	**64433/64708**
114,3 **4,5**	177,8 7	41,275 1,625	309	416	42,40	2500	3200	**64450/64700**
	180 7,0866	41,275 1,625	246	412	42,80	2500	-	**64450/64708**
	180,975 7,125	34,925 1,375	227	280	30,00	2500	3100	**68450/68712**
	190,5 7,5	47,625 1,875	316	516	55,00	2190	-	**71450/71750**
	192 7,5591	47,625 1,875	316	516	56,00	2190	-	**71450/71753**
	212,725 8,375	66,675 2,625	625	766	81,40	2360	2790	**938/932**
	212,725 8,375	66,675 2,625	624	841	87,00	2010	2650	**HH 224346/HH 224310**
	228,6 9	53,975 2,125	732	938	97,70	1620	-	**HM 926740/HM 926710**
114,976 **4,5266**	177,8 7	41,275 1,625	252	413	42,70	2400	-	**64452/64700**
	180 7,0866	41,275 1,625	252	413	42,70	2400	-	**64452/64708**
	212,725 8,375	66,675 2,625	607	813	90,00	2100	2550	**HH 224349/HH 224310**



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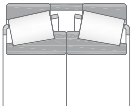
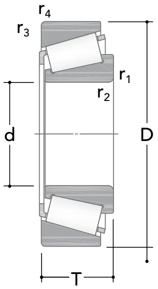


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
109,987 4,3302	7,9	3,3	7	3	0,4	2,2	**LM 522548/LM 522510**
	3,5	3,3	3	3	0,4	2,3	**LM 522549/LM 522510**
109,992 4,3304	3,5	3,3	3	3	0,52	3,7	**64433/64700**
	3,5	3,3	3	3	0,52	3,9	**64433/64708**
114,3 4,5	3,5 0,14	3,3 0,13	3,3	3,1	0,52	3,6	**64450/64700**
	3,5	3,3	3	3	0,52	3,8	**64450/64708**
	3,5 0,14	3,3 0,13	3,3	3,1	0,5	2,95	**68450/68712**
	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 4,5266	9	3,3	8	3	0,52	3,55	**64452/64700**
	9	3,3	8	3	0,52	3,75	**64452/64708**
	7	3,3	6	3	0,33	10,5	**HH 224349/HH 224310**



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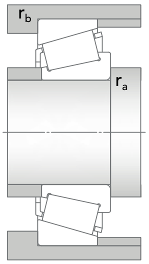
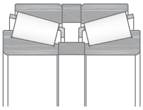


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
117,475	180,975	34,925	181	279	30,00	2410	-	**68462/68712**
4,625	7,125	1,375						
	180,975	34,925	181	279	30,00	2410	-	**68463/68712**
	7,125	1,375						
120,65	169,862	25,4	133	266	27,00	2420	-	**L 225842/L 225810**
4,75	6,6875	1						
	190,5	46,038	394	539	56,00	2430	2740	**HM 624749/HM 624710**
	7,5	1,8125						
	254	77,788	730	1076	106,00	1710	-	**HH 228340/HH 228310**
	10	3,0625						
127	169,862	25,4	133	266	27,00	2420	-	**L 225849/L 225810**
5	6,6875	1						
	182,562	39,688	279	439	44,00	2400	2760	**48290/48220**
	7,1875	1,5625						
	196,85	46,038	400	590	59,00	2180	2800	**67388/67322**
	7,75	1,8125						
	215,9	47,625	342	605	63,00	1800	-	**74500/74850**
	8,5	1,875						
	228,6	53,975	416	619	64,00	1870	-	**HM 926747/HM 926710**
	9	2,125						
	254	77,788	730	1076	106,00	1710	-	**HH 228349/HH 228310**
	10	3,0625						
133,35	177,008	25,4	164	277	28,00	2300	3000	**L 327249/210**
5,25	6,9688	1						
	190,5	39,688	249	503	50,00	2220	-	**48385/48320**
	7,5	1,5625						
	196,85	46,038	323	588	60,00	2000	3010	**67390/67322**
	7,75	1,8135						
	196,85	46,038	323	588	60,00	2000	2930	**67391/67322**
	7,75	1,8125						



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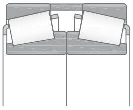
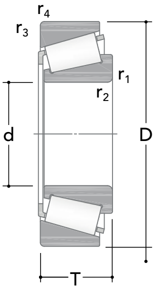


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
117,475 **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 **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 **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 0,14	3,3 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 **5,25**	1,5 0,06	1,5 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**



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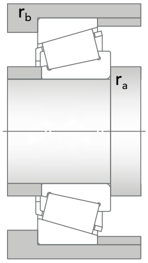
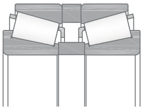


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
133,35	215,9	47,625	342	605	63,00	1800	-	**74525/74850**
5,25	8,5	1,875						
(cont.)	234,95	63,5	676	912	90,30	2000	2450	**95525/95925**
	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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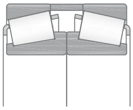
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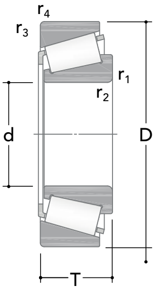
Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
133,35 **5,25**	3,5	3,3	3	3	0,48	6,5	**74525/74850**
(cont.)	9,7	3,3	9	3	0,37	11,5	**95525/95925**
	4,8	3,3	4	3	0,37	11,5	**95528/95925**
136,525 **5,375**	5,5	3,3	5	3	0,33	3,3	**48393/48320**
	3,5	3,3	3	3	0,33	3,3	**48393/48320**
139,7 **5,5**	3,5	3,3	3	3	0,48	6	**74550/74850**
	3,5	3,3	3	3	0,31	10	**HM 231132/HM 231110**
142,875 **5,625**	3,5	3,3	3	3	0,3	3,8	**48685/48620**
146,05 **5,75**	1,5	1,5	1	1	0,37	2,3	**36690/36620**
	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 **5,875**	6,4 0,25	3,3 0,13	6	3,1	0,31	9,05	**HM 231148/110**



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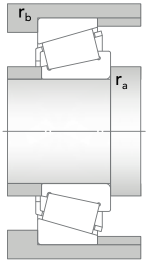
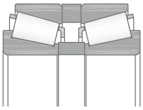


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
152,4	222,25	46,83	399	638	61,00	2000	2500	**M 231649/610**
6	8,75	1,8437						
	254	66,675	584	990	95,50	1630	-	**99600/99100**
	10	2,625						
155,575	336,55	85,725	837	1183	118,00	1200	-	**BT1B 328833**
6,125	13,25	3,375						
158,75	205,583	23,812	170	280	27,00	1980	2500	**L 432348/310**
6,25	8,0938	0,9375						
	225,425	41,275	262	582	56,00	1680	-	**46780/46720**
	8,875	1,625						
165,1	225,425	41,275	262	582	56,00	1680	-	**46790/46720**
6,5	8,875	1,625						
	336,55	92,075	1187	1715	155,00	1270	1670	**HH 437549/HH 437510**
	13,25	3,625						
177,8	227,012	30,162	234	424	40,00	1830	2400	**36990/36920**
7	8,9375	1,1875						
	260,35	53,975	489	895	88,00	1550	-	**M 236849/M 236810**
	10,25	2,125						
178,595	265,112	51,595	616	886	84,00	1600	2000	**M 336948/912**
7,0313	10,4375	2,0313						
179,934	265,112	51,595	616	886	84,00	1600	2000	**M 336949/912**
7,084	10,4375	2,0313						
184,15	266,7	47,625	372	798	75,00	1440	-	**67883/67820**
7,25	10,5	1,875						



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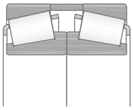
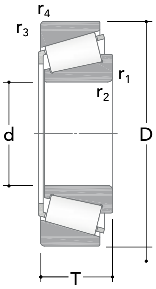


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
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							



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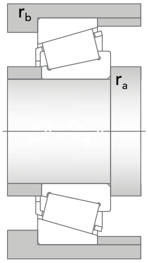
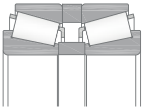


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
187,325	269,875	55,562	475	957	90,80	1500	-	**M 238849/M 238810**
7,375	10,625	2,1875						
	282,575	50,8	498	701	66,00	1500	1900	**87737/87111**
	11,125	2						
189,738	279,4	52,388	645	991	92,00	1560	1750	**M 239447/M 239410**
7,47	11	2,0625						
190,475	279,4	52,388	528	985	93,00	1500	1950	**M 239449/410**
7,5	11	2,0625						
190,5	266,7	47,625	372	798	73,70	1440	-	**67885/67820**
7,5	10,5	1,875						
	282,575	50,8	498	701	66,00	1500	1900	**87750/87111**
	11,125	2						
191,237	279,4	52,388	528	985	95,00	1500	1950	**M 239448 A/410**
7,529	11	2,0625						
196,85	241,3	23,812	190	319	29,00	1750	2200	**LL 639249/210**
7,75	9,5	0,9375						
	257,175	39,688	337	665	57,60	1670	2000	**LM 739749/710**
	10,125	1,5625						
200,025	276,225	42,862	477	781	72,00	1580	1800	**LM 241147/110**
7,875	10,875	1,6875						
203,2	261,142	28,575	218	442	41,30	1460	-	**LL 641149/LL 641110**
8	10,2812	1,125						
	282,575	46,038	382	835	76,00	1340	-	**67983/67920**
	11,125	1,8125						



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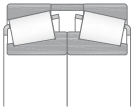
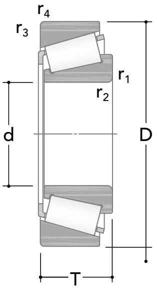


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
187,325	3,5	3,3	3	3	0,33	9,85	**M 238849/M 238810**
7,375							
	3,5	3,3	3,3	3,1	0,43	9,95	**87737/87111**
	0,14	0,13					
189,738	3,3	3,3	3	3	0,33	11	**M 239447/M 239410**
7,47							
190,475	3,3	3,3	3,1	3,1	0,33	9,5	**M 239449/410**
7,5	0,13	0,13					
190,5	3,5	3,3	3	3	0,48	8,2	**67885/67820**
7,5							
	3,5	3,3	3,3	3,1	0,43	9,55	**87750/87111**
	0,14	0,13					
191,237	3,3	3,3	3,1	3,1	0,33	9,2	**M 239448 A/410**
7,529	0,13	0,13					
196,85	1,5	1,5	1,5	1,5	0,43	2,1	**LL 639249/210**
7,75	0,06	0,06					
	3,5	3,3	3,3	3,1	0,44	5,35	**LM 739749/710**
	0,14	0,13					
200,025	3,5	3,3	3,3	3,1	0,31	7,7	**LM 241147/110**
7,875	0,14	0,13					
203,2	1,5	1,5	1,5	1,5	0,4	3,75	**LL 641149/LL 641110**
8							
	3,5	3,3	3	3	0,5	8,95	**67983/67920**



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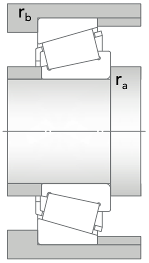
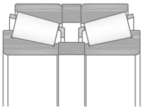


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
203,987	276,225	42,862	477	781	72,00	1580	1800	**LM 241148/110**
8,031	10,875	1,6875						
206,375	282,575	46,038	469	828	76,70	1470	1750	**67985/67920**
8,125	11,125	1,8125						
	336,55	98,425	1217	2153	191,00	1200	1580	**H 242649/H 242610**
	13,25	3,875						
212,725	285,75	46,038	460	844	77,00	1490	1800	**LM 742745/LM 742710**
8,375	11,25	1,8125						
215,9	285,75	46,038	460	844	77,00	1490	1800	**LM 742749/LM 742710**
8,5	11,25	1,8125						
216,408	285,75	46,038	460	844	77,00	1490	1800	**LM 742747/710**
8,52	11,25	1,8125						
	285,75	46,038	328	703	62,00	1360	-	**BT1B 443786**
	11,25	1,8125						
216,713	285,75	46,038	460	844	77,00	1490	1800	**LM 742747 A/710**
8,532	11,25	1,8125						
220,116	317,5	47,625	517	979	90,00	1200	-	**LM 245832/LM 245810**
8,666	12,5	1,875						
220,878	317,5	47,625	517	979	90,00	1200	-	**LM 245833/LM 245810**
8,696	12,5	1,875						
230,188	317,5	47,625	643	977	90,00	1380	1570	**LM 245846/LM 245810**
9,0625	12,5	1,875						
231,775	300,038	33,338	266	426	39,00	1390	1650	**544091/118**
9,125	11,8125	1,3125						



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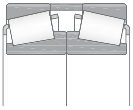

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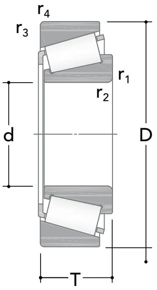
Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
203,987	3,5	3,3	3,3	3,1	0,31	7,2	**LM 241148/110**
8,031	0,14	0,13					
206,375	3,5	3,3	3	3	0,5	8,6	**67985/67920**
8,125	0,14	0,13					
	3,3	3,3	3	3	0,33	34	**H 242649/H 242610**
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					



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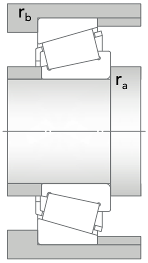
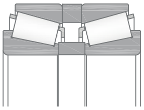


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
231,775 **9,125** (cont.)	317,5 12,5	47,625 1,875	643	977	90,00	1380	1570	**LM 245848/LM 245810**
247,65 **9,75**	406,4 16	115,888 4,5625	1615	3136	256,00	990	-	**HH 249949/HH 249910**
254 **10**	533,4 21	133,35 5,25	2116	2908	239,00	720	970	**332901**
	533,4 21	133,35 5,25	1853	2753	228,00	730	950	**HH 953749/HH 953710**
255,6 **10,063**	342,9 13,5	57,15 2,25	800	1398	125,00	1210	1400	**M 349547/510**
255,625 **10,064**	342,945 13,5012	57,15 2,25	658	1388	126,00	1070	-	**417708**
	342,945 13,5012	57,15 2,25	658	1388	126,00	1070	-	**255-417054**
257,175 **10,125**	342,9 13,5	57,15 2,25	800	1398	125,00	1210	1400	**M 349549/510**
	358,775 14,125	71,438 2,8125	1022	1767	155,00	1200	1400	**M 249747/710**
263,525 **10,375**	325,438 12,8125	28,575 1,125	272	555	48,00	1290	1500	**38880/38820**
265 **10,4331**	355,6 14	57,15 2,25	647	1404	125,00	1080	-	**LM 451347/LM 451310**
266,56 **10,4995**	325,438 12,8125	29,5 1,1614	205	472	41,80	1180	-	**446356**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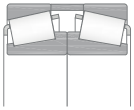
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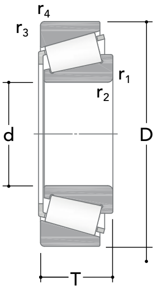
Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
231,775 **9,125** (cont.)	3,3	3,3	3	3	0,31	10,5	**LM 245848/LM 245810**
247,65 **9,75**	6,4	6,4	6	6	0,33	60	**HH 249949/HH 249910**
254 **10**	6,4	6,4	6	6	0,88	120	**332901**
	6,4	6,4	6	6	0,94	121	**HH 953749/HH 953710**
255,6 **10,063**	1,5 0,06	3,3 0,13	1,5	3	0,35	15	**M 349547/510**
255,625 **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 **10,125**	6,4 0,25	3,3 0,13	6	3	0,35	14	**M 349549/510**
	1,5 0,06	3,3 0,13	1,5	3	0,33	21,5	**M 249747/710**
263,525 **10,375**	1,5 0,06	1,5 0,06	1,5	1,5	0,37	5,3	**38880/38820**
265 **10,4331**	3,5	3,3	3	3	0,35	16	**LM 451347/LM 451310**
266,56 **10,4995**	1	1,5	1	1,5	0,37	5,1	**446356**



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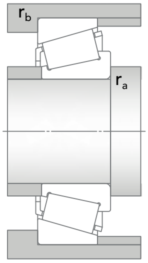
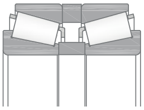


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
266,7	325,438	27,755	205	472	41,80	1180	-	**443884**
10,5	12,8125	1,0927						
	355,6	57,15	647	1404	125,00	1080	-	**LM 451349/LM 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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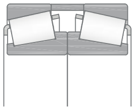
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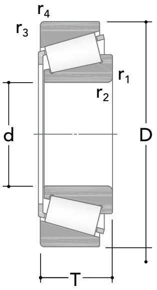
Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
266,7	1,5	1,5	1,5	1,5	0,37	5,1	**443884**
10,5							
	3,5	3,3	3	3	0,35	15,5	**LM 451349/LM 451310**
292,1	3,5	3,3	3,3	3,1	0,4	12,5	**L 555249/210**
11,5	0,14	0,13					
300	6,4	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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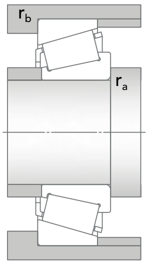
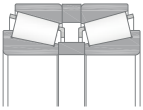


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
380,1	480	50	594	1502	120,00	710	-	**380-332420**
14,9606	18,8976	1,9685						
381	479,425	49,213	647	1488	121,00	770	1000	**L 865547/512**
15	18,875	1,9375						
384,175	546,1	104,775	1865	4092	325,00	720	950	**HM 266449/410**
15,125	21,5	4,125						
403,225	460,375	28,575	249	764	58,60	780	1060	**LL 566848/810**
15,875	18,125	1,125						
406,4	508	61,912	829	2143	168,00	680	950	**L 467549/L 467510**
16	20	2,4375						
	549,275	85,725	1471	3072	234,00	680	850	**LM 567949/910**
	21,625	3,375						
	574,675	76,2	943	2029	164,00	640	860	**EE 285160/285226**
	22,625	3						
	762	180,975	3685	6033	445,00	450	600	**H 969249/H 969210**
	30	7,125						
415,925	590,55	114,3	2121	4736	370,00	620	860	**M 268749/M 268710**
16,375	23,25	4,5						
430,212	603,25	76,2	1086	2335	185,00	620	830	**EE 241693/242375**
16,9375	23,75	3						
431,8	571,5	89,694	1448	3443	266,00	620	780	**328284**
17	22,5	3,5313						
431,902	685,698	177,8	3947	8669	584,00	500	730	**332900**
17,004	26,996	7						



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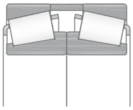
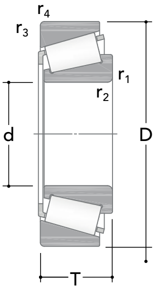


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
380,1 **14,9606**	6	4	5	3,5	0,5	20,5	**380-332420**
381 **15**	6,4 0,25	3,3 0,13	6	3,1	0,5	20	**L 865547/512**
384,175 **15,125**	6,4 0,25	6,4 0,25	6	6	0,33	77	**HM 266449/410**
403,225 **15,875**	3,5 0,14	3,3 0,13	3,3	3,1	0,4	6,7	**LL 566848/810**
406,4 **16**	3,3	3,3	3	3	0,37	26,5	**L 467549/L 467510**
	6,4 0,25	3,3 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 **16,375**	6,4 0,25	6,4 0,25	6	6	0,33	120	**M 268749/M 268710**
430,212 **16,9375**	6,4 0,25	6,4 0,25	6	6	0,52	59	**EE 241693/242375**
431,8 **17**	6,4 0,25	6,4 0,25	6	6	0,44	60	**328284**
431,902 **17,004**	6,4 0,25	6,4 0,25	6	6	0,48	253	**332900**



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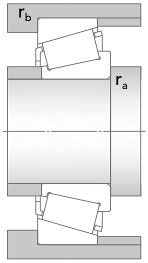
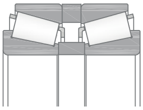


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
447,675	635	120,65	2361	5466	402,00	540	770	M 270749/M 270710
17,625	25	4,75						
457,2	573,088	74,612	1205	2965	231,00	600	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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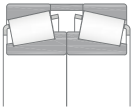
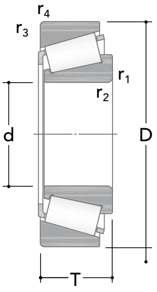


DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
447,675	6,4	6,4	6	6	0,33	120	**M 270749/M 270710**
17,625	0,25	0,25					
457,2	6,4	6,4	6	6	0,4	43,5	**L 570649/L 570610**
18	0,25	0,25					
	6,4	3,3	6	3,1	0,46	61,5	**LM 770949/910**
	0,25	0,13					
	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	6,4	6,4	6	6	0,33	145	**332529**
18,875							
480	9,5	9,5	9	9	0,54	760	**332263**
18,8976							
482,6	6,4	3,3	6	3	0,35	67,5	**EE 243190/243250**
19	0,25	0,13					
488,95	6,4	3,3	6	3,1	0,48	63,5	**LM 772748/710**
19,25	0,25	0,13					
498,323	6,4	3,3	6	3	0,35	60	**EE 243196 AX/243250**
19,619							
498,475	6,4	3,3	6	3,1	0,35	59,5	**EE 243196/243250**
19,625	0,25	0,13					
498,653	6,4	3,3	6	3	0,35	59,5	**EE 243196/243250**
19,632	0,25	0,13					



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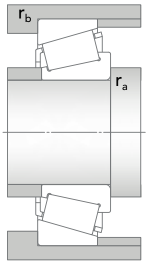
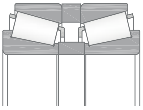


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
520,7	736,6	88,9	1631	3373	248,00	490	660	**EE 982051/982900**
20,5	29	3,5						
536,575	761,873	146,05	3325	8090	544,00	440	580	**M 276449/M 276410**
21,125	29,995	5,75						
	820	152	3930	7839	537,00	400	580	**328017**
	32,2835	5,9842						
539,75	635	50,8	774	2145	161,00	520	740	**LL 575349/LL 575310**
21,25	25	2						
549,275	692,15	80,963	1343	3492	252,00	670	960	**L 476549/L 476510**
21,625	27,25	3,1875						
558,8	736,6	88,108	1827	4177	303,00	480	650	**EE 843220/290**
22	29	3,4688						
	736,6	104,775	2358	5725	403,00	480	650	**LM 377449/410**
	29	4,125						
607,72	787,4	93,662	2164	5303	380,00	430	590	**EE 649239/649310**
23,926	31	3,6875						
609,6	787,4	93,662	2164	5303	380,00	430	530	**EE 649240/649310**
24	31	3,6875						
635	736,6	57,15	863	2636	187,00	440	600	**80780/80720**
25	29	2,25						
660,4	812,8	95,25	1955	5533	385,00	380	490	**L 281147/L 281110**
26	32	3,75						
	939,8	136,525	3782	8130	551,00	340	-	**332383**
	37	5,375						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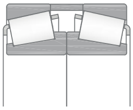
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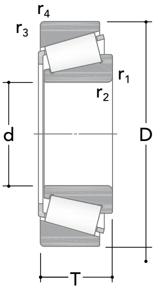
Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
520,7	6,4	3,3	6	3	0,48	100	**EE 982051/982900**
20,5	0,25	0,13					
536,575	6,4	6,4	6	6	0,33	208	**M 276449/M 276410**
21,125	0,25	0,25					
	6	5	5	4	0,43	272	**328017**
539,75	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					



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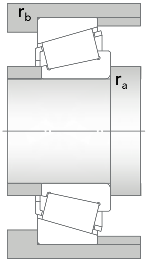
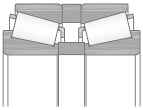


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
660,4	1000	152,4	4423	9595	614,00	320	460	**334140**
26	39,3701	6						
(cont.)								
679,45	901,7	142,875	3591	8956	603,00	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						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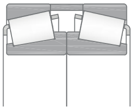
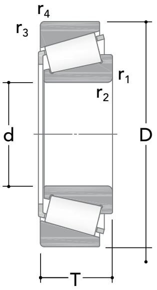

DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
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					



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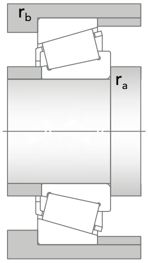
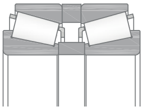


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	T	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]/[in]			[kN]			[rpm]		
760	889	88,9	1876	5854	380,00	340	470	**L 183448/L 183410**
29,9212	35	3,5						
(cont.)								
762	889	69,85	1221	3786	256,00	370	480	**LL 483449/LL 483418**
29,9999	35	2,75						
	889	88,9	1876	5854	380,00	340	470	**L 183449/410**
	35	3,5						
774,7	965,2	93,662	1929	4938	332,00	310	430	**EE 752305/752380**
30,5	38	3,6875						
801,688	914,4	58,738	1105	3529	237,00	330	460	**LL 584449/LL 584410**
31,5625	36	2,3125						
838,2	1041,4	93,662	2026	5183	346,00	290	370	**EE 763330/763410**
33	41	3,6875						
857,25	1092,2	120,65	2785	7325	477,00	280	370	**EE 157337/157430**
33,75	43	4,75						
928	1060	92	2209	8004	318,00	260	-	**JL 286948/JL 286910**
36,5354	41,7323	3,622						
930	1060	92	2209	8004	318,00	260	-	**JL 286949/JL 286910**
36,6142	41,7323	3,622						
977,9	1130,3	66,675	1434	4440	282,00	240	330	**LL 687949/LL 687910**
38,5	44,5	2,625						
1016	1270	101,6	2734	7470	467,00	210	280	**EE 168400/168500**
40	50	4						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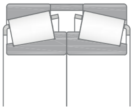

DF

Dimensions					Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}	r_{bmax}	e		Standard design
[mm]/[in]						[kg]	
760	3,3	3,3	3,1	3,1	0,3	94	**L 183448/L 183410**
29,9212	0,13	0,13					
(cont.)							
762	3,3	3,3	3	3	0,37	66,5	**LL 483449/LL 483418**
29,9999	0,13	0,13					
	3,3	3,3	3,1	3,1	0,3	94	**L 183449/410**
	0,13	0,13					
774,7	6,4	3,3	6	3	0,4	131	**EE 752305/752380**
30,5	0,25	0,13					
801,688	3,5	3,3	3	3	0,4	53,5	**LL 584449/LL 584410**
31,5625							
838,2	6,4	6,4	6	6	0,44	160	**EE 763330/763410**
33	0,25	0,25					
857,25	19	6,4	18	6	0,57	245	**EE 157337/157430**
33,75							
928	3,3	3,3	3	3	0,33	119	**JL 286948/JL 286910**
36,5354	0,13	0,13					
930	3,3	3,3	3	3	0,33	117	**JL 286949/JL 286910**
36,6142	0,13	0,13					
977,9	6,4	6,4	6	6	0,44	100	**LL 687949/LL 687910**
38,5	0,25	0,25					
1016	9,7	9,7	9	9	0,5	275	**EE 168400/168500**
40							

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:

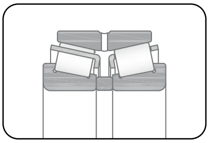
$$\frac{F_{rm}}{C} > 0,02$$

where:

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

Designs and variants

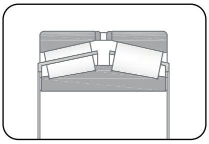
Type TDO



O+ OPTIMIZED
HB BAINITE HT
PROFILE
S STABILIZATION

- 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

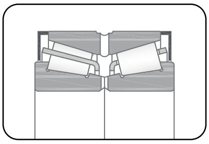
Type TDI



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

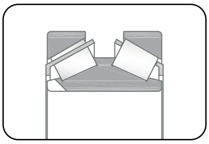
Type TDONASW



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

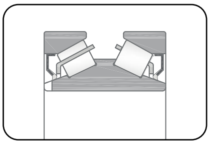
Type TDIS with steep contact angle



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

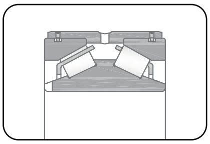
Type TDISS with steep contact angle



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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

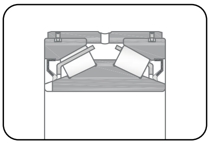
Type TDIS with retention sleeve



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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



O+ OPTIMIZED
HB BAINITE HT
S STABILIZATION
PROFILE

- 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 $r_{3,4\ min}$: 0,6 mm	Victory Line

Tab. 17 (2 of 2) - First system: structure

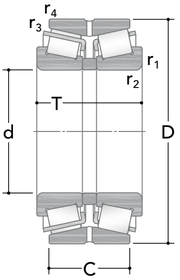
Second system

	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 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

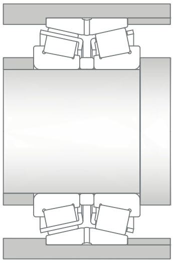
Tab. 18 (1 of 2) - Second system: structure

Section 5	Section 6	Section 7	Section 8
Configuration	Boundary dimensions	Execution	Material and heat treatment of bearing components
PT1…PT7 AWT1…AWT7 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

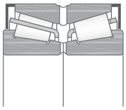
Tab. 18 (2 of 2) - Second system: structure



TDO

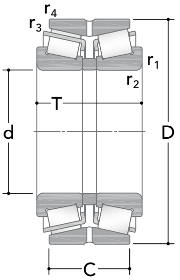


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	C	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
100 **3,937**	150 5,906	55 2,165	39,05 1,537	223	351	42	**TDO 332759**
	150 5,906	76,2 3	61,976 2,44	301	534	61	**TDO 328818**
	180 7,087	80 3,150	64 2,520	458	638	72	**TDO 617335**
101,6 **4**	146,05 5,75	49,212 1,938	38,94 1,533	268	370	41	**TDO 332767** **(521945/910)**
107,95 **4,25**	146,05 5,75	49,212 1,938	39,688 1,563	153	311	32,4	**TDO 331392** **(521949/910)**
	146,05 5,75	49,212 1,938	39,688 1,563	153	311	32,4	**TDO 331571** **(521949/910)**
	158,75 6,25	53,978 2,125	39,688 1,563	127	321	37	**TDO 614018** **(37425/626)**
110 **4,331**	200 7,874	90 3,543	72 2,835	561	790	91	**TDO 328947**
114,3 **4,5**	177,8 7	92,075 3,625	69,85 2,75	467	833	85	**TDO 612700** **(64450/700)**
120 **4,724**	180 7,087	86 3,386	68 2,677	421	828	90	**TDO 331181**
130 **5,118**	230 9,055	146 5,748	118,5 4,668	945	1690	171	**TDO 330431**
133,35 **5,25**	215,9 8,5	106,362 4,188	80,962 3,188	643	1220	125	**TDO 332160** **(74525/851)**

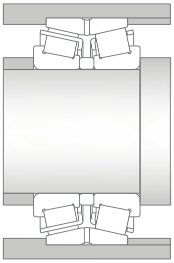


TDONASW

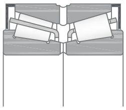
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
100 **3,937**	2,5	0,8	0,65	3,00	**TDO 332759**
	3,5	0,6	0,40	4,25	**TDO 328818**
	3	0,8	0,43	7,65	**TDO 617335**
101,6 **4**	1,5	0,8	0,37	2,45	**TDO 332767** **(521945/910)**
107,95 **4,25**	1,5	0,8	0,40	2,25	**TDO 331392** **(521949/910)**
	1,5	0,8	0,40	2,25	**TDO 331571** **(521949/910)**
	3,5	0,8	0,60	3,00	**TDO 614018** **(37425/626)**
110 **4,331**	3	1	0,43	11,00	**TDO 328947**
114,3 **4,5**	3,5	0,8	0,52	7,75	**TDO 612700** **(64450/700)**
120 **4,724**	2,5	0,8	0,46	7,10	**TDO 331181**
130 **5,118**	4	1,5	0,43	23,50	**TDO 330431**
133,35 **5,25**	3,5	1,5	0,48	14,50	**TDO 332160** **(74525/851)**



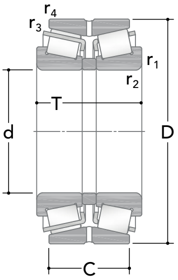
TDO



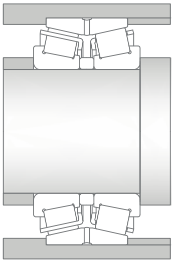
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	C	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
139,7	254	149,225	111,125	1086	1965	193	**TDO 332750**
5,5	10	5,875	4,375				**(99550/102)**
140	200	93,665	73,025	472	1042	102	**TDO 442210**
5,512	7,874	3,688	2,875				
146,05	193,675	65,085	53,975	316	689	72	**TDO 331943**
5,75	7,625	2,562	2,125				**(36690/620)**
150	225	107	78	683	1325	132	**TDO 442211**
5,906	8,858	4,213	3,071				
152,4	222,25	100,01	76,2	612	1268	123	**TDO 613328**
6	8,75	3,937	3				**(231649/610)**
155	200	66	54	311	613	61	**TDO 328957**
6,102	7,874	2,598	2,126				
160	240	114	84	785	1544	158	**TDO 442212**
6,299	9,449	4,488	3,307				
	270	150	120	1200	2279	220	**TDO 332758**
	10,630	5,906	4,724				
165,1	225,425	85,725	69,85	491	1167	113	**TDO 331792**
6,5	8,875	3,375	2,75				**(46790/720)**
	288,925	142,875	111,125	1183	2260	218	**TDO 328697**
	11,375	5,625	4,375				**(94649/114)**
177,8	269,875	119,062	93,662	871	1872	186	**TDO 332585**
7	10,625	4,688	3,688				**(238840/810)**
180	270	109,538	84,138	676	1621	144	**TDO 442213**
7,087	10,630	4,313	3,313				


TDONASW

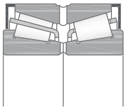
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
139,7 5,5	7	1,5	0,40	31,00	TDO 332750 (99550/102)
140 5,512	5	1	0,33	9,30	TDO 442210
146,05 5,75	1,5	0,8	0,37	5,00	TDO 331943 (36690/620)
150 5,906	5	1	0,46	14,50	TDO 442211
152,4 6	3,5	0,8	0,33	12,00	TDO 613328 (231649/610)
155 6,102	1,5	0,6	0,35	4,85	TDO 328957
160 6,299	5	1	0,46	16,50	TDO 442212
	4	1	0,40	32,50	TDO 332758
165,1 6,5	8	0,8	0,37	10,00	TDO 331792 (46790/720)
	7	1,5	0,46	38,00	TDO 328697 (94649/114)
177,8 7	3,5	1,5	0,33	23,00	TDO 332585 (238840/810)
180 7,087	5	1	0,48	22,50	TDO 442213



TDO

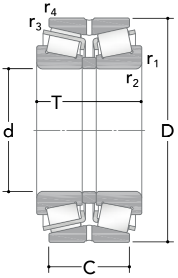


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	C	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
187,325	269,875	119,062	93,662	890	1896	183	**TDO 328698**
7,375	10,625	4,688	3,688				**(238849/810)**
200	290	121	88	1364	2724	257	**TDO 442214**
7,874	11,417	4,764	3,465				
200,025	317,5	146,05	111,125	1181	2387	221	**TDO 332459**
7,875	12,5	5,75	4,375				**(93787/127)**
203,2	317,5	120,65	88,9	1011	1978	188	**TDO 331785**
8	12,5	4,764	3,5				**(132083/126)**
206,375	336,55	211,138	169,862	2098	4303	380	**TDO 328270**
8,125	13,25	8,313	6,688				**(242649/610)**
220	340	164	130	1645	3366	299	**TDO 332473**
8,661	13,386	6,457	5,118				
	370	120	107	1305	2272	209	**TDO 328794**
	14,567	4,724	4,213				
228,6	327,025	114,3	82,55	830	2106	191	**TDO 332584**
9	12,875	4,5	3,25				**(8573/8520)**
	358,775	152,4	117,475	1531	3525	312	**TDO 332766**
	14,125	6	4,628				**(249732/710)**
	488,95	254	152,4	3108	4554	385	**TDO 331945**
	19,25	10	6				**(949549/510)**
241,3	368,3	120,65	85,725	995	2053	185	**TDO 331783**
9,5	14,5	4,75	3,375				**(170950/451)**
247,65	406,4	247,65	203,2	2985	6257	514	**TDO 332443**
9,75	16	9,75	8				**(249949/910)**

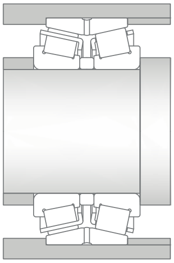


TDONASW

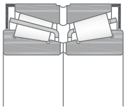
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
187,325 7,375	3,5	1,5	0,33	21,00	**TDO 328698 (238849/810)**
200 7,874	5	1	0,43	24,00	**TDO 442214**
200,025 7,875	4,3	1,5	0,52	41,50	**TDO 332459 (93787/127)**
203,2 8	6,4	1,5	0,31	34,00	**TDO 331785 (132083/126)**
206,375 8,125	3,3	1,5	0,33	70,00	**TDO 328270 (242649/610)**
220 8,661	4	1	0,43	50,00	**TDO 332473**
	5	1,5	0,40	49,00	**TDO 328794**
228,6 9	6,4	1,5	0,40	30,00	**TDO 332584 (8573/8520)**
	3,5	1,5	0,33	57,00	**TDO 332766 (249732/710)**
	6,4	1,5	0,94	205,00	**TDO 331945 (949549/510)**
241,3 9,5	6,4	1,5	0,37	39,50	**TDO 331783 (170950/451)**
247,65 9,75	6,4	1,5	0,33	120,00	**TDO 332443 (249949/910)**



TDO

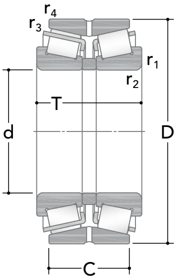


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	C	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
254	422,275	173,038	128,66	2420	4039	356	**TDO 328615**
10	16,625	6,813	5,065				
	422,275	178,592	139,7	2420	4039	356	**TDO 331782**
	16,625	7,031	5,5				**(252343/310)**
	533,4	276,225	165,1	3424	5534	452	**TDO 331781**
	21	10,875	6,5				**(953749/710)**
260	360	105	76	979	1988	181	**TDO 328027**
	14,173	4,134	2,992				
	400	104	92	1108	2091	185	**TDO 328795**
	15,748	4,095	3,622				
	440	144	128	1994	3481	302	**TDO 617479**
	17,323	5,669	9,039				
	480	284	220	4320	7278	606	**TDO 328130**
	18,898	11,181	8,661				
260,35	422,275	178,592	139,7	2226	4038	356	**TDO 328187**
10,25	16,625	7,031	5,5				**(252349/310)**
280	470	250	180	3460	6399	530	**TDO 331717**
11,024	18,504	9,843	7,087				
285,75	380,898	139,7	107,95	1221	3212	269	**TDO 332449**
11,25	14,996	5,5	4,25				**(654648/610)**
288,925	406,4	165,1	130,175	1960	4562	375	**TDO 332503**
11,375	16	6,5	5,125				**(255449/410)**
300	500	203	152	3013	5084	426	**TDO 328383**
11,811	19,685	7,992	5,984				
300,038	422,275	174,625	136,525	2173	4745	400	**TDO 332504**
11,813	16,625	6,875	5,375				**(256849/810)**

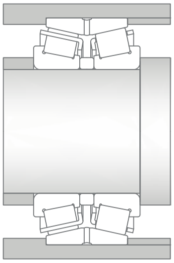


TDONASW

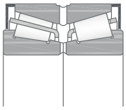
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
254 10	6,8	1,5	0,33	87,50	**TDO 328615**
	6,8	1,5	0,33	97,50	**TDO 331782** (252343/310)
	6,4	1,5	0,94	260,00	**TDO 331781** (953749/710)
260	3	1	0,35	28,00	**TDO 328027**
	5	1,5	0,40	44,00	**TDO 328795**
	5	1,5	0,37	86,50	**TDO 617479**
	5	1,5	0,43	210,00	**TDO 328130**
260,35 10,25	6,8	1,5	0,33	86,50	**TDO 328187** (252349/310)
280 11,024	6,4	1,5	0,46	155,00	**TDO 331717**
285,75 11,25	3,5	1,5	0,43	42,00	**TDO 332449** (654648/610)
288,925 11,375	6,4	1,5	0,33	63,00	**TDO 332503** (255449/410)
300 11,811	5	1,5	0,40	140,00	**TDO 328383**
300,038 11,813	6,4	1,5	0,33	71,50	**TDO 332504** (256849/810)



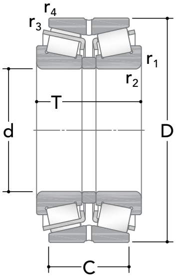
TDO



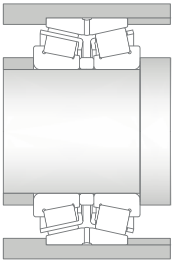
Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	C	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
317,5	447,675	180,975	146,05	2519	5370	442	TDO 615058
12,5	17,625	7,125	5,75				(259049/010)
	447,675	180,975	146,05	2519	5370	442	TDO 332516
	17,625	7,125	5,75				(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)


TDONASW

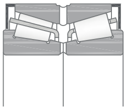
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
317,5 **12,5**	3,5	1,5	0,33	84,00	**TDO 615058** **(259049/010)**
	3,5	1,5	0,33	84,00	**TDO 332516** **(259049/010)**
330,2 **13**	3,3	1,5	0,40	100,00	**TDO 332845** **(526132/191)**
333,375 **13,125**	6,4	1,5	0,33	98,00	**TDO 331775** **(261049/100)**
340 **13,386**	3	1	0,31	71,00	**TDO 332830**
342,9 **13,5**	4,8	1,5	0,33	130,00	**TDO 332802** **(971354/103)**
346,075 **13,625**	6,4	1,5	0,33	110,00	**TDO 331981** **(262749/710)**
355,6 **14**	3,5	1,5	0,31	46,00	**TDO 332505** **(163149/110)**
	6,4	1,5	0,44	87,00	**TDO 332506** **(231400/976)**
360 **14,173**	3	1	0,33	73,00	**TDO 332831**
368,249 **14,498**	6,4	1,5	0,33	140,00	**TDO 332603** **(265049/010)**
368,3 **14,5**	9,7	2,3	0,40	188,00	**TDO 332754** **(181453/351)**



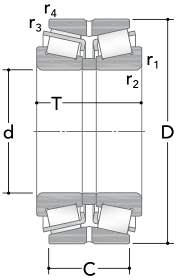
TDO



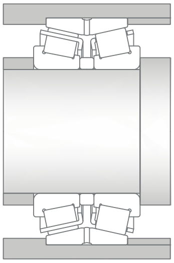
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	C	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
371,475 **14,625**	501,65 19,75	155,575 6,125	107,95 4,25	1967	4302	341	**TDO 331606** **(231462/976)**
380 **14,961**	520 20,472	148 5,827	112 4,410	2287	4453	369	**TDO 328020**
	660 25,984	380 14,961	310 12,205	7631	15863	1130	**TDO 332823** **(267648/610)**
381 **15**	508 20	139,7 5,5	88,9 3,5	1360	3232	272	**TDO 332507** **(192150/201)**
384,175 **15,125**	546,1 21,5	222,25 8,75	177,8 7	3703	8207	647	**TDO 331197** **(266449/410)**
406,4 **15**	539,75 21,25	142,875 5,625	101,6 4	1832	4349	349	**TDO 328389** **(234160/213)**
415,925 **16,375**	590,55 23,25	244,475 9,625	193,675 7,625	4164	9561	727	**TDO 331656** **(268749/710)**
431,8 **17**	571,5 22,5	155,575 6,125	111,125 4,375	1920	5045	409	**TDO 332604** **(869449/410)**
	571,5 22,5	192,088 7,563	146,05 5,75	2804	6985	527	**TDO 332237** **(769349/310)**
440 **17,323**	650 25,591	196 7,717	157 6,181	3723	7722	580	**TDO 328796**
447,675 **17,625**	635 25	257,175 10,125	206,375 8,125	4444	11092	793	**TDO 332176** **(270749/710)**
457,2 **18**	596,9 23,5	165,1 6,5	120,65 4,75	2139	5513	414	**TDO 328980** **(244180/236)**



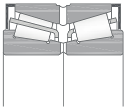
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
371,475 14,625	6,4	1,5	0,44	76,50	TDO 331606 (231462/976)
380 14,961	4	1,5	0,30	80,20	TDO 328020
	14	3,5	0,33	520,00	TDO 332823 (267648/610)
381 15	6,4	1,5	0,54	67,00	TDO 332507 (192150/201)
384,175 15,125	6,4	1,6	0,33	161,00	TDO 331197 (266449/410)
406,4 15	6,4	1,5	0,48	82,40	TDO 328389 (234160/213)
415,925 16,375	6,4	1,5	0,33	205,00	TDO 331656 (268749/710)
431,8 17	3,3	1,5	0,54	100,00	TDO 332604 (869449/410)
	6,4	1,5	0,44	125,00	TDO 332237 (769349/310)
440 17,323	6	3	0,37	203,00	TDO 328796
447,675 17,625	6,4	1,5	0,33	245,00	TDO 332176 (270749/710)
457,2 18	9,7	1,5	0,40	110,00	TDO 328980 (244180/236)



TDO

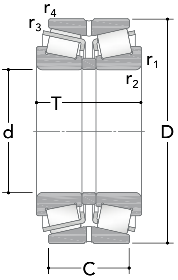


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	C	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
479,425	679,45	276,225	222,25	4978	12574	924	TDO 331657
18,875	26,75	10,875	8,75				(272749/710)
489,026	634,873	177,8	142,875	2787	7434	534	TDO 331776
19,253	24,995	7	5,625				(243192/251)
498,475	634,873	177,8	142,875	2774	7320	542	TDO 331605
19,625	24,995	7	5,625				(243196/251)
	634,873	177,8	142,875	2774	7320	542	TDO 331605
	24,995	7	5,625				(243196/251)
501,65	711,2	292,1	231,775	5547	13874	968	TDO 332605
19,75	28	11,5	9,125				(274149/110)
508	838,2	304,8	222,25	6383	13852	1011	TDO 614995
20	33	12	8,75				(426200/331)
520,7	736,6	186,502	114,3	3018	6783	494	TDO 332761
20,5	29	7,343	4,5				(982051/901)
536,575	761,873	311,15	247,65	6360	15991	1101	TDO 332446
21,125	29,995	12,25	9,75				(276449/410)
558,8	736,6	187,328	138,112	3425	8401	613	TDO 331790
22	29	7,375	5,438				(843220/291)
	736,6	225,425	177,8	4230	11380	805	TDO 331640
	29	8,875	7				(377449/410)
571,5	812,8	333,375	263,525	6392	16057	1076	TDO 332447
22,5	32	13,125	10,375				(278749/710)
602,945	787,4	206,375	158,75	4008	10748	740	TDO 331576
23,738	31	8,125	6,25				

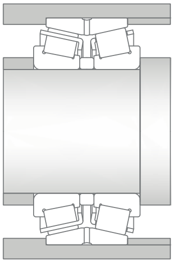


TDONASW

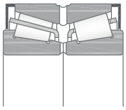
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
479,425 18,875	6,4	1,5	0,33	302,00	TDO 331657 (272749/710)
489,026 19,253	6,4	1,5	0,35	130,00	TDO 331776 (243192/251)
498,475 19,625	6,4	1,5	0,35	125,00	TDO 331605 (243196/251)
	6,4	1,5	0,35	125,00	TDO 331605 (243196/251)
501,65 19,75	6,4	1,5	0,33	343,00	TDO 332605 (274149/110)
508 20	9,7	3,3	0,48	630,00	TDO 614995 (426200/331)
520,7 20,5	6,4	1,5	0,48	210,00	TDO 332761 (982051/901)
536,575 21,125	6,4	1,5	0,33	430,00	TDO 332446 (276449/410)
558,8 22	6,4	1,5	0,35	190,00	TDO 331790 (843220/291)
	6,4	1,5	0,35	250,00	TDO 331640 (377449/410)
571,5 22,5	6,4	1,5	0,33	520,00	TDO 332447 (278749/710)
602,945 23,738	6,4	1,5	0,37	180,00	TDO 331576



TDO

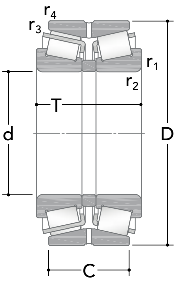


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	C	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
609,6	812,8	190,5	146,05	3594	8806	640	**TDO 614609**
24	32	7,5	5,75				
	787,4	206,375	158,75	3978	10707	743	**TDO 332448**
	31	8,125	6,25				**(649240/311)**
	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)**



TDONASW

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
609,6 **24**	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)



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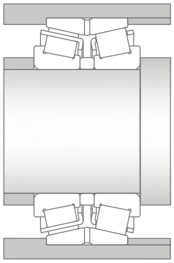
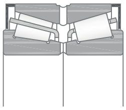
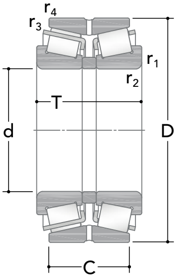


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	C	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
863,6	1371,6	469,9	285,75	14547	31596	1955	**TDO 332494**
34	54	18,5	11,25				
914,4	1066,8	139,7	101,6	2601	8093	514	**TDO 332501**
36	42	5,5	4				**(686947/910)**
	1066,8	139,7	101,6	2601	8093	514	**TDO 332501**
	42	5,5	4				**(686947/910)**
939,8	1270	457,2	317,5	9535	29316	1682	**TDO 328304**
37	50	18	12,5				
1120	1480	400	296	13474	38400	2098	**TDO 332756**
44,095	58,268	15,748	11,654				
1160	1540	400	290	14183	38377	2178	**TDO 332780**
45,669	60,630	15,748	11,417				
1250	1500	250	190	7371	22701	1302	**TDO 328339**
49,213	59,055	9,843	7,480				
1320,8	1727,2	412,75	254	13999	41102	2207	**TDO 332495**
52	68	16,25	10				
1562,1	1806,575	279,4	196,85	7301	27789	1511	**TDO 328310**
61,5	71,125	11	7,75				**(299615/711)**
1778	2159	393,7	266,7	15581	53650	2667	**TDO 332496**
70	5	15,5	10,5				
2133,6	2819,4	742	457,2	34928	107119	5041	**TDO 332497**
84	111	29,213	18				

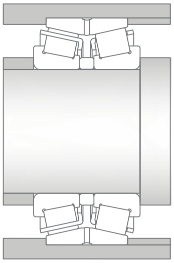


TDONASW

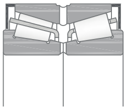
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
863,6 **34**	28	2	0,88	2250,00	**TDO 332494**
914,4 **36**	6,4	3,3	0,40	190,00	**TDO 332501** **(686947/910)**
	6,4	3,3	0,40	190,00	**TDO 332501** **(686947/910)**
939,8 **37**	12,7	3,3	0,88	1540,00	**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**
1320,8 **52**	28	2	0,83	2325,00	**TDO 332495**
1562,1 **61,5**	9,7	3,3	0,48	1045,00	**TDO 328310** **(299615/711)**
1778 **70**	12,7	3	0,79	2750,00	**TDO 332496**
2133,6 **84**	15x45°	3,5	0,94	11600,00	**TDO 332497**



TDO

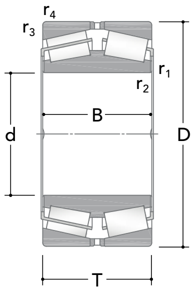


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	C	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
2184,4	2527,3	304,8	165,1	9351	37682	1891	**TDO 332673**
86	99,5	12	6,5				
2616,2	3048	381	209,55	12265	52386	2479	**8020**
103	120	15	8,25				
3378,2	3835,4	393,7	203,2	15279	63065	2797	**8019**
133	151	15,5	8				
3811	4216,4	419,1	274,7	19519	108618	4375	**TDO 334004**
150	166	16,5	10,815				

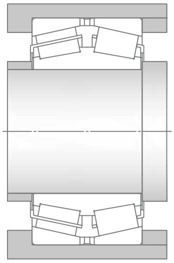


TDONASW

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
2184,4 **86**	16	5	1,15	2230,00	**TDO 332673**
2616,2 **103**	25,4	6,4	1,50	4485,00	**8020**
3378,2 **133**	25,4	6,4	1,50	6380,00	**8019**
3811 **150**	9,7	6,4	1,05	6315,00	**TDO 334004**

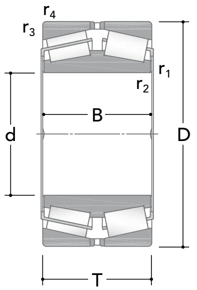


TDI

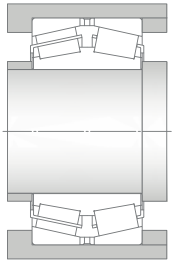


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
152,4	222,25	84,138	84,138	610	1254	125	**TDI 331387**
6	8,75	3,313	3,313				**(231649/610)**
177,8	247,65	90,488	90,488	669	1522	138	**TDI 331814**
7	9,75	3,563	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]	
152,4 **6**	1,5	1,5	0,33	11,50	**TDI 331387** **(231649/610)**
177,8 **7**	1,5	3,3	0,44	13,00	**TDI 331814** **(67790/720)**
	1,5	3,3	0,31	31,50	**TDI 332534** **(237546/510)**
203,2 **8**	6,4	3,3	0,52	40,00	**TDI 332799** **(93801D/125)**
	3,3	3,3	0,40	75,00	**TDI 332683** **(420800/450)**
206,375 **8,125**	0,8	3,3	0,50	17,00	**TDI 331388** **(67985/920)**
	1,5	3,3	0,33	66,50	**TDI 328834** **(242649/610)**
220 **8,661**	1,5	3	0,43	50,50	**TDI 332873**
234,95 **9,25**	1,5	3,3	0,40	25,50	**TDI 332492** **(8576/8500)**
240 **9,449**	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)**
269,875 **10,625**	3,3	3,3	0,33	51,00	**TDI 331223** **(252349/310)**

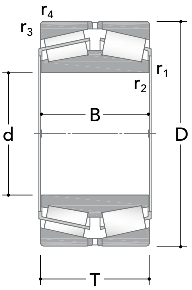


TDI

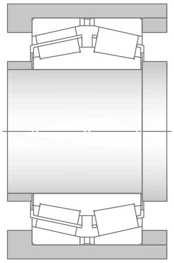


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	B	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
279,587	380,898	117,475	117,475	1227	3208	269	**TDI 332899**
11,007	14,996	4,625	4,625				**(654644/610)**
288,925	406,4	165,1	234,95	2257	4851	419	**TDI 332870**
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 **11,007**	1,5	3,3	0,43	41,50	**TDI 332899** **(654644/610)**
288,925 **11,375**	1,6	3,2	0,33	73,00	**TDI 332870**
300,038 **11,813**	3,3	3,3	0,33	70,00	**TDI 331951** **(256849/810)**
303,212 **11,938**	3,3	6,4	0,33	212,00	**TDI 332685** **(258249/210)**
317,5 **12,5**	1,5	3,3	0,31	51,50	**TDI 328699** **(528648/610)**
333,375 **13,125**	3,3	3,3	0,33	92,50	**TDI 328695** **(261049/010)**
	1,6	3,3	0,33	98,00	**TDI 332871**
342,9 **13,5**	3,3	3,3	0,33	115,00	**TDI 331713** **(971355/100)**
343,052 **13,506**	1,5	3,3	0,48	54,00	**TDI 332240** **(76164/600)**
346,075 **13,625**	1,5	6,4	0,50	62,00	**TDI 332913** **(161362/925)**
	3,3	3,3	0,33	110,00	**TDI 331527** **(262749/710)**
	3,3	3,3	0,33	113,00	**TDI 328410** **(262749/710)**

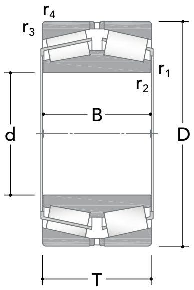


TDI

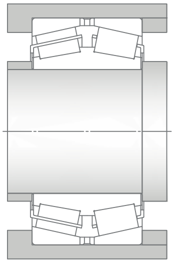


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	B	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
360	680	330	300	7268	13587	967	**TDI 331729**
14,173	26,772	12,992	11,811				
368,3	523,875	185,738	185,738	3369	7523	583	**TDI 331836**
14,5	20,625	7,313	7,313				**(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 **14,173**	4	7,5	0,60	540,00	**TDI 331729**
368,3 **14,5**	3,3	6,4	0,33	133,00	**TDI 331836** **(265049/010)**
	3,3	6,4	0,33	140,00	**TDI 332468** **(265049/010)**
	6,4	6,4	0,40	160,00	**TDI 331905**
384,175 **15,125**	3,3	6,4	0,33	152,00	**TDI 331158** **(266449/410)**
	3,3	6,4	0,33	166,00	**TDI 328580** **(266449/410)**
	3,3	6,4	0,33	152,00	**TDI 331837** **(266449/410)**
390 **15,354**	3,3	6,4	0,48	102,00	**TDI 328705**
406,4 **16**	1,5	6,4	0,48	89,00	**TDI 331840** **(767749/710)**
408,4 **16,079**	1	3	0,88	76,50	**TDI 328874**
	1,5	3,3	0,83	99,00	**TDI 328466**
409,575 **16,125**	1,5	6,4	0,43	110,00	**TDI 331714** **(667947/910)**
415,925 **16,375**	3,3	6,4	0,33	192,00	**TDI 328283** **(268749/710)**

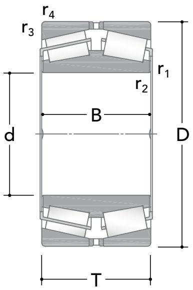


TDI

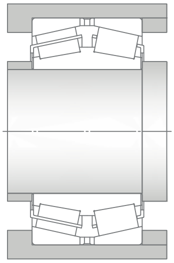


Main dimensions				Basic load ratings		Fatigue	Designation
d	D	T	B	Dynamic C	Static C_0	load limit C_u	(AFBMA Part number)
[mm]				[kN]			
415,925	590,55	209,55	209,55	4161	9719	715	**TDI 331445**
16,375	23,25	8,25	8,25				**(268749/710)**
(cont.)							
430	535	84	84	1072	3044	237	**TDI 334013**
16,929	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 **16,375** (cont.)	3,3	6,4	0,33	192,00	**TDI 331445** **(268749/710)**
430 **16,929**	1	3	0,54	44,50	**TDI 334013**
447,675 **17,625**	3,3	6,4	0,33	236,00	**TDI 331562** **(270749/710)**
	3,3	6,4	0,33	246,00	**TDI 332911** **(270749/710)**
450 **17,717**	3	6	0,33	140,00	**TDI 328523** **(270449/410)**
464 **18,268**	1,5	4	0,83	125,00	**TDI 328361**
489,026 **19,253**	3,3	3,3	0,35	130,00	**TDI 331848** **(243193/250)**
491 **19,331**	1,5	3,3	1,00	120,00	**TDI 328381**
500 **19,685**	3	6	0,31	420,00	**TDI 331676**
501,65 **19,75**	3,3	6,4	0,31	190,00	**TDI 332547**
	3,2	6,4	0,33	330,00	**TDI 331182** **(274149/110)**
519,112 **20,438**	3,3	6,4	0,33	370,00	**TDI 332662** **(275349/310)**

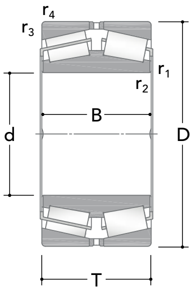


TDI

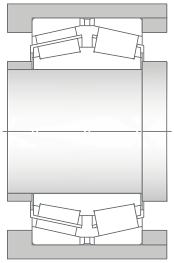


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
519,112	736,6	258,762	258,762	6048	15591	1069	**TDI 334009**
20,438	29	10,188	10,188				**(275349/310)**
(cont.)							
522	690	180	160	2846	8273	602	**TDI 328359**
20,551	27,165	7,087	6,299				
536,575	761,873	269,875	269,875	6320	15786	1115	**TDI 331682**
21,125	29,995	10,625	10,625				**(276448/410)**
558,8	736,6	196,85	196,85	4294	11448	826	**TDI 331607**
22	29	7,75	7,75				**(377448/410)**
560	820	242	242	5085	11333	820	**TDI 332626**
22,047	32,284	9,528	9,528				
571,5	812,8	285,75	285,75	7206	17918	1205	**TDI 331476**
22,5	32	11,25	11,25				**(278749/710)**
	812,8	285,75	285,75	7206	17918	1205	**TDI 331854**
	32	11,25	11,25				**(278749/710)**
580	830	280	280	6870	16448	1130	**TDI 331677**
22,835	32,677	11,024	11,024				
609,6	787,4	171,45	171,45	4047	10715	742	**TDI 331858**
24	31	6,75	6,75				**(649241/310)**
	820	171,45	171,45	4075	10597	750	**TDI 332424**
	32,284	6,75	6,75				
650	1030	270	270	8694	18318	1249	**TDI 328306**
25,591	40,551	10,630	10,630				
660,4	812,8	176,212	176,212	3540	11344	755	**TDI 331198**
26	32	6,938	6,938				

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
519,112 **20,438** (cont.)	3,3	6,4	0,33	370,00	**TDI 334009** **(275349/310)**
522 **20,551**	1,5	4	0,79	190,00	**TDI 328359**
536,575 **21,125**	3,3	6,4	0,33	410,00	**TDI 331682** **(276448/410)**
558,8 **22**	3,3	6,4	0,35	235,00	**TDI 331607** **(377448/410)**
560 **22,047**	2,5	8	0,88	425,00	**TDI 332626**
571,5 **22,5**	3,3	6,4	0,33	500,00	**TDI 331476** **(278749/710)**
	3,3	6,4	0,33	500,00	**TDI 331854** **(278749/710)**
580 **22,835**	3	6	0,31	515,00	**TDI 331677**
609,6 **24**	3,3	6,4	0,37	218,00	**TDI 331858** **(649241/310)**
	3,3	6,4	0,37	265,00	**TDI 332424**
650 **25,591**	15	10	0,31	900,00	**TDI 328306**
660,4 **26**	3,2	6,4	0,33	195,00	**TDI 331198**

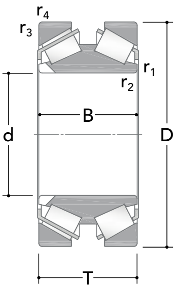


TDI

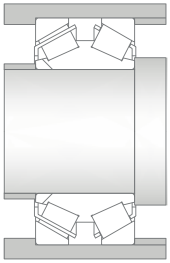


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
682,625	965,2	338,138	338,138	9653	24699	1619	**TDI 332129**
26,875	38	13,313	13,313				**(282249/210)**
710	900	197	197	4728	13378	868	**TDI 331581**
27,953	35,433	7,756	7,756				
800	1260	375	375	14658	33205	2018	**TDI 334032**
31,496	49,606	14,764	14,764				
863,6	1130,3	323,85	323,85	10717	30746	1875	**TDI 331590**
34	44,5	12,75	12,75				**(286249/210)**
901,7	1295,4	450,85	438,15	16563	43214	2488	**TDI 331306**
35,5	51	17,75	17,25				**(634356/510)**
939,8	1333,5	463,55	463,55	17583	49226	2737	**TDI 331350**
37	52,5	18,25	18,25				**(287849/810)**

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
682,625 **26,875**	3,3	6,4	0,33	815,00	**TDI 332129** **(282249/210)**
710 **27,953**	3	6	0,35	325,00	**TDI 331581**
800 **31,496**	12	12	0,33	1850,00	**TDI 334032**
863,6 **34**	4,8	12,7	0,33	895,00	**TDI 331590** **(286249/210)**
901,7 **35,5**	4,8	12,7	0,35	2000,00	**TDI 331306** **(634356/510)**
939,8 **37**	4,8	12,7	0,33	2230,00	**TDI 331350** **(287849/810)**

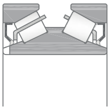


TDIS



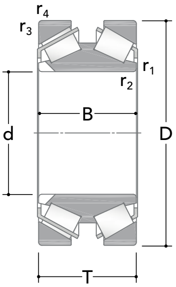
Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	B	Dynamic C	Static C_0		
[mm]				[kN]			
300	440	105	105	1084	2053	179	**TDIS 332168**
305,033	560	200	200	2820	5229	436	**TDIS 334087**
305,07	500	200	200	2694	5266	420	**TDIS 332169**
	560	200	200	3106	5297	430	**TDIS 332068**
	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

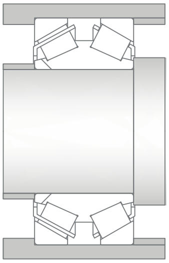


TDISS

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**	

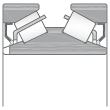


TDIS



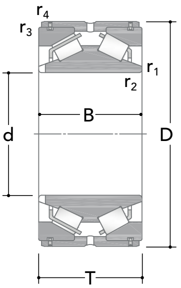
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	
[mm]				[kN]			
800	1100	300	300	7733	21876	1323	**TDIS 332394**

[1] Bearing with steep contact angle and with seals

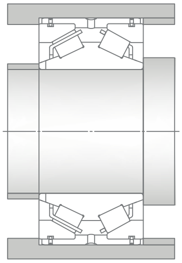


TDISS

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		
[mm]				[kg]	
800	1,5	6	0,79	850,00	**TDIS 332394**

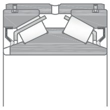


TDIS



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

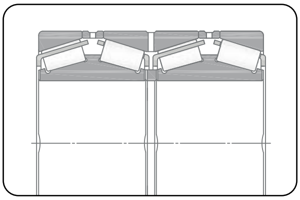
Tab. 19 - General "loose fit" roll neck tolerances

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

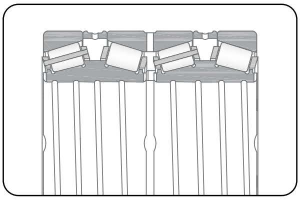
Type TQO1



HB BAINITE HT
S STABILIZATION
PROFILE
VICTORY LINE

- 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

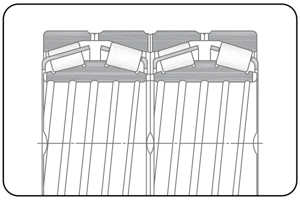
Type TQO2



HB BAINITE HT
S STABILIZATION
R⁺ REINFORCED
PROFILE

- 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

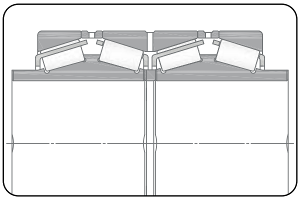
Type TQO3



HB BAINITE HT
S STABILIZATION
PROFILE
VICTORY LINE

- 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

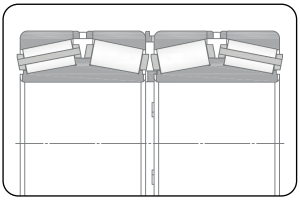


HB BAINITE HT
S STABILIZATION
PROFILE

- 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

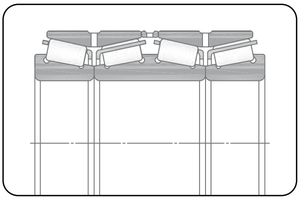
Type SET2xTDI



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- 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

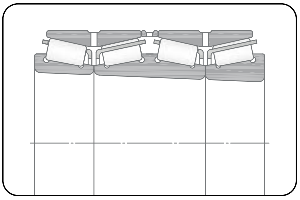
Type TQI



HB BAINITE HT
S STABILIZATION
PROFILE

- 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

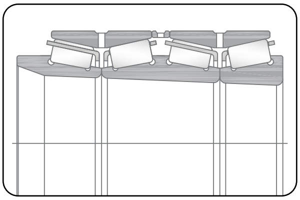
Type TQIT



HB BAINITE HT
S STABILIZATION
PROFILE

- 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

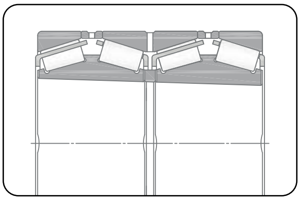
Type TQITE



HB BAINITE HT
S STABILIZATION
PROFILE

- 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

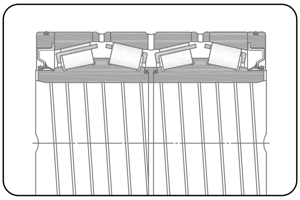
Type TQOT



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- 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

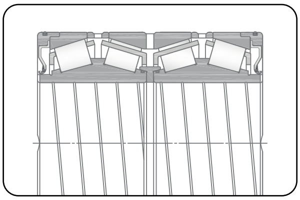
Type TQOS$_1$



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- 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

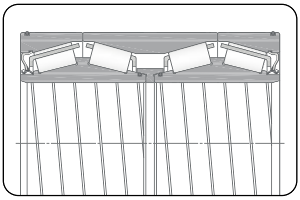
Type TQOS$_2$



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- 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

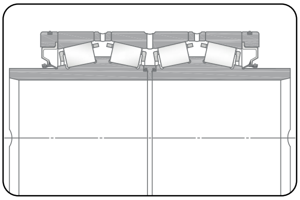
Type TQOS$_3$



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- 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



HB BAINITE HT

S STABILIZATION

O+ OPTIMIZED

PROFILE

- 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 HA1…HA7	PT1…PT7 AWT1…AWT7 ACT1…ACT3
Example	TQO	101510/506250	AA2	HA4	PT4
		d: 10,50 inches = 266,700 mm D: 15,50 inches = 393,700 mm 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	$r_{1,2\ min}$ $r_{3,4\ min}$	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 $r_{3,4\ min}$: 6,4 mm	Victory Line

Tab. 21 (2 of 2) - First system: structure

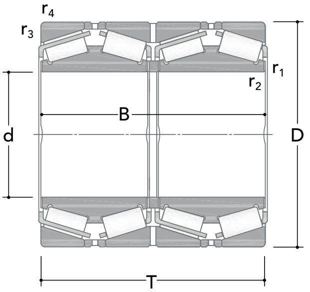
Second system

	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 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

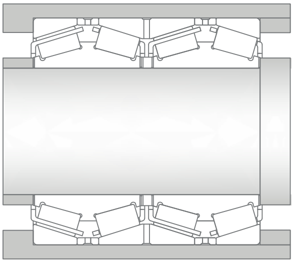
Tab. 22 (1 of 2) - Second system: structure

Section 5	Section 6	Section 7	Section 8
Special surface treatment	**Roller features**	**Final bearing specification**	**Suffix**
PT1…PT7 AWT1…AWT7 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

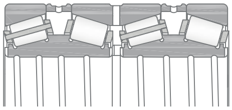


TQO1

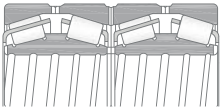


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
120,65 **4,75**	174,625 6,875	139,703 5,500	141,288 5,563	733	1542	172	**TQO 332406** **(224749/710/710)**
127 **5**	182,562 7,188	158,75 6,25	158,75 6,25	779	1743	182	**TQO 330880** **(48290/220/220)**
139,7 **5,5**	200,025 7,875	160,34 6,313	157,162 6,188	864	2079	204	**TQO 331138** **(48685/620/620)**
152,4 **6**	222,25 8,75	174,625 6,875	174,625 6,875	1136	2477	252	**TQO 331329** **(231649/610/610)**
165,1 **6,5**	225,425 8,875	168,275 6,625	165,1 6,5	868	2226	206	**TQO 330835** **(46791/720/721)**
177,8 **7**	247,65 9,75	192,088 7,563	192,088 7,563	1220	2985	281	**TQO 331480** **(67790/720/721)**
187,325 **7,375**	269,875 10,625	211,138 8,313	211,138 8,313	1655	3851	360	**TQO 331382** **(238849/810/810)**
	269,875 10,625	211,138 8,313	211,138 8,313	1655	3851	360	**TQO 328881** **(238849/810/810)**
190,5 **7,5**	266,7 10,5	188,912 7,438	187,325 7,375	1349	3278	278	**TQO 331249** **(67885/820/820)**
198,438 **7,813**	284,162 11,188	225,425 8,875	225,425 8,875	1795	4124	392	**TQO 330899** **(240648/611/611)**
205 **8,071**	320 12,598	203,5 8,012	203,5 8,012	1896	3623	348	**TQO 328065**

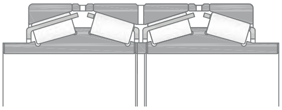
(1) Bearing with inner ring extended at both sides



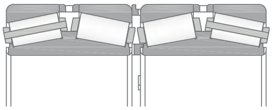
TQO2



TQO3

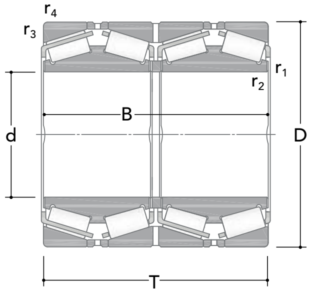


TQOE

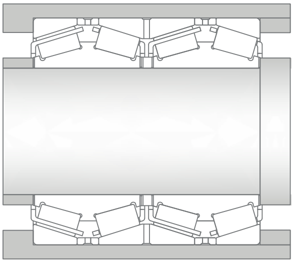


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
120,65 4,75	0,8	1,5	0,33	11,00	TQO 332406 (224749/710/710)
127 5	1,5	3,3	0,3	14	TQO 330880 (48290/220/220)
139,7 5,5	0,8	3,3	0,33	15,5	TQO 331138 (48685/620/620)
152,4 6	1,5	1,5	0,33	22,5	TQO 331329 (231649/610/610)
165,1 6,5	0,8	3,3	0,37	20,50	TQO 330835 (46791/720/721)
177,8 7	1,5	3,3	0,44	29,00	TQO 331480 (67790/720/721)
187,325 7,375	1,5	3,3	0,33	41	TQO 331382 (238849/810/810)
	1,5	3,3	0,33	41,00	TQO 328881 (238849/810/810)
190,5 7,5	1,5	3,3	0,48	33,50	TQO 331249 (67885/820/820)
198,438 7,813	1,5	3,3	0,33	47,50	TQO 330899 (240648/611/611)
205 8,071	4	3	0,46	54,50	TQO 328065



TQO[1]



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]			
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)**

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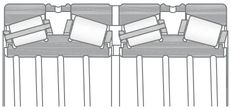
(1) Bearing with inner ring extended at both sides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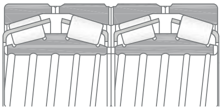
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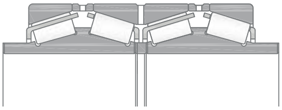
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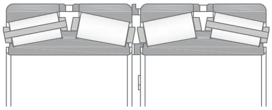
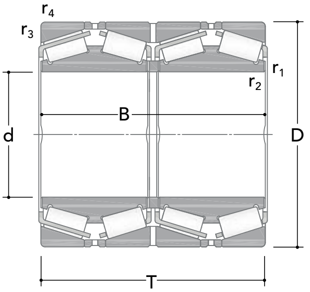
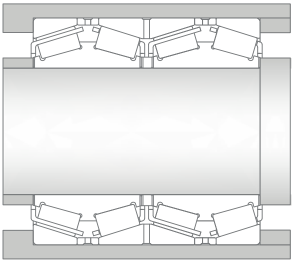

SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
206,375	0,8	3,3	0,5	36,50	TQO 331486
8,125					(67985/920/921)
220	1	3	0,33	54	TQO 328348
8,661					
	4	3	0,43	100	TQO 328003
220,662	1,5	3,3	0,33	61,50	TQO 331156
8,688					(244249/210/210)
228,6	1,5	3,3	0,33	43,5	TQO 332637
9					(245149/110/110)
234,95	1,5	3,3	0,4	54	TQO 331399
9,25					(8576/20/20)
240	4	3	0,4	70	TQO 328015
9,449					
	1,5	4	0,31	75,50	TQO 328663
	4	3	0,33	110,00	TQO 328508
241,224	1,5	3,3	0,35	81,50	TQO 331787
9,497					(127094/138/139)
241,478	1,5	3,3	0,35	74,50	TQO 330782
9,507					(127097/135/136)
244,475	1,5	3,3	0,33	46,00	TQO 330862
9,625					(247748/710/710)

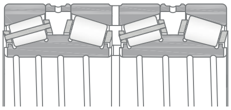


TQO1



Main dimensions				Basic load ratings		Fatigue	Designation
d	D	T	B	Dynamic C	Static C_0	load limit C_u	(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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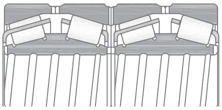
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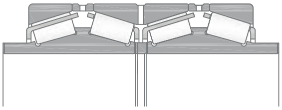
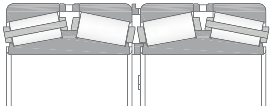
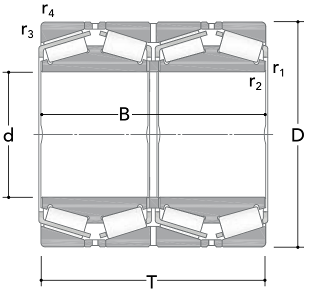

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
244,475 9,625 (cont.)	3,3	4,8	0,52	130,00	TQO 328690 (126096/150/151)
245 9,646	1,5	4	0,44	105,00	TQO 331398
247,65 9,75	1,5	6,4	0,4	120,00	TQO 614096 (220975/1575/1576)
254 10	1,5	3,3	0,33	88,00	TQO 331275 (249749/710/710)
	1,5	3,3	0,33	92,50	TQO 329070 (1)
260 10,236	2,5	5	0,54	190,00	TQO 328551
260,35 10,25	6,4	3,3	0,33	180,00	TQO 331487 (252349/310/310)
266,7 10,5	1,5	3,3	0,37	65,50	TQO 330822 (76589/520/520)
	1,5	3,3	0,35	65,50	TQO 328209 (451349/310/310)
269,875 10,625	3,3	3,3	0,33	105,00	TQO 331168 (2523490/310/3100)
276,225 10,875	1,5	6,4	0,4	100	TQO 331288 (275109/155/156)
279,4 11	1,5	3,3	0,35	91	TQO 328293



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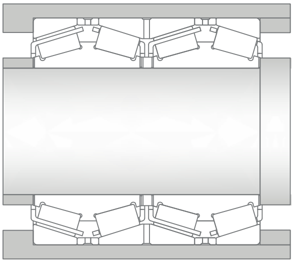
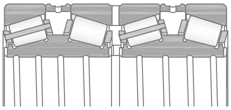
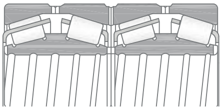


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation (AFBMA Part number)
d	D	T	B	Dynamic C	Static C_0		
[mm]				[kN]			
279,4	393,7	269,875	269,875	3026	7110	609	**TQO 332390**
11	15,5	10,625	10,625				**(135111/155/156)**
(cont.)							
279,578	380,898	244,475	244,475	2283	6323	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				

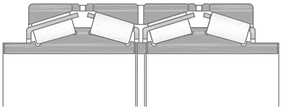
(1) Bearing with inner ring extended at both sides



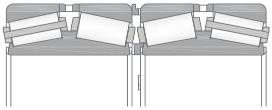
TQO2



TQO3

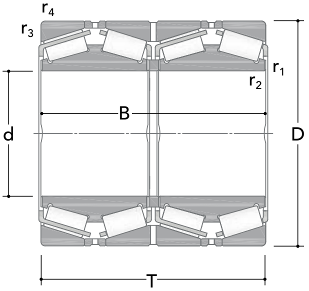


TQOE

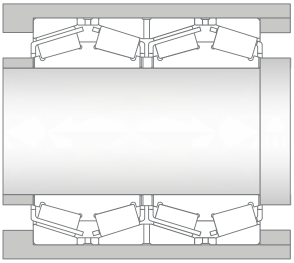


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
279,4 **11** (cont.)	1,5	6,4	0,37	102	**TQO 332390** **(135111/155/156)**
279,578 **11,007**	1,5	3,3	0,43	86,00	**TQO 330540** **(654644/610/610)**
280 **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 **11,25**	1,5	3,3	0,43	81	**TQO 330337** **(654648/610/610)**
288,925 **11,375**	3,3	3,3	0,33	125,00	**TQO 331452** **(255449/410/410)**
292,1 **11,5**	6,4	3,3	0,31	125	**TQO 331968** **(330116/166/167)**
300 **11,811**	3,3	4,8	0,43	145	**TQO 328725**
	5	5	0,33	240,00	**TQO 332472**

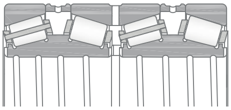


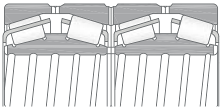
TQO[1]

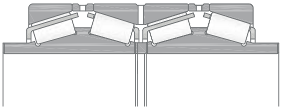


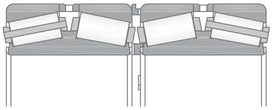
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
300,038	422,275	311,15	311,15	3838	9533	797	**TQO 331287**
11,813	16,625	12,25	12,25				**(256849/810/810)**
304,648	438,048	279,4	280,99	3046	6941	586	**TQO 328828**
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

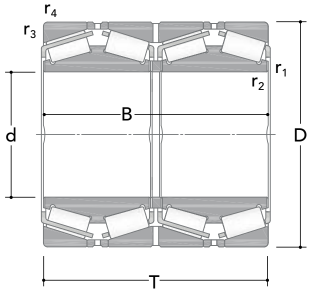

TQO2

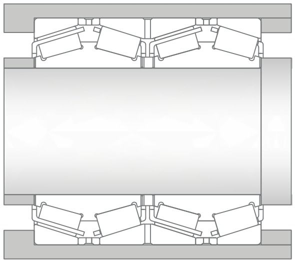

TQO3


TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
300,038 **11,813**	3,3	3,3	0,33	140,00	**TQO 331287** (256849/810/810)
304,648 **11,994**	2x15°	4,8	0,48	135,00	**TQO 328828**
	3,3	4,8	0,48	135,00	**TQO 331492** (757448/410/410)
304,8 **12**	1,5	6,4	0,33	110,00	**TQO 331687** (257149/110/110)
	3,3	3,3	0,35	265,00	**TQO 330693**
304,902 **12,004**	3,3	3,3	0,31	105,00	**TQO 330758** (257248/210/210)
317,5 **12,5**	1,5	3,3	0,31	105,00	**TQO 330870** (258648/610/610)
	1,5	3,3	0,43	125	**TQO 334020**
	3,3	3,3	0,33	165,00	**TQO 331161** (259049/010/010)
330,2 **13**	3,3	3,3	0,33	135,00	**TQO 332647** (260149/110/110)
330,302 **13,004**	1,5	3,3	0,46	110	**TQO 331664** (138131/172/173)
333,375 **13,125**	3,3	3,3	0,33	190	**TQO 331381** (261049/010/010)

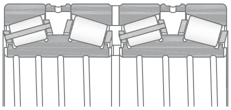


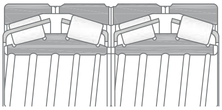


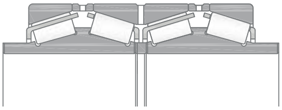
TQO[1]

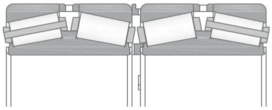
Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation
d	D	T	B	Dynamic C	Static C_0		(AFBMA Part number)
[mm]				[kN]			
340	520	323,5	323,5	5529	10259	892	**TQO 332963**
13,386	20,472	12,736	12,736				
342,9	571,5	342,9	342,54	6330	11767	937	**TQO 331553**
13,5	22,5	13,5	13,486				
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

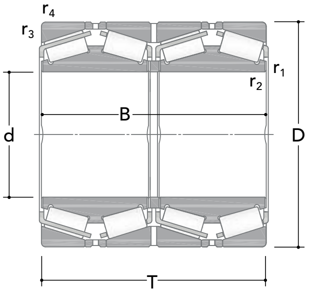

TQO2


TQO3

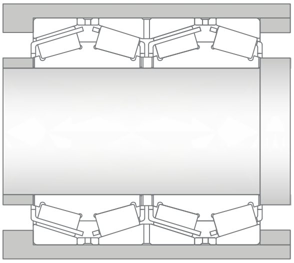

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
340 **13,386**	1,5	5	0,3	245	**TQO 332963**
342,9 **13,5**	3,3	6,4	0,33	365,00	**TQO 331553**
343,052 **13,506**	1,5	3,3	0,48	110,00	**TQO 330661** **(761649/610/610)**
346,075 **13,625**	3,3	3,3	0,33	220,00	**TQO 331228** **(262749/710/710)**
347,662 **13,688**	1,5	3,3	0,33	130	**TQO 331077** **(262449/410/410)**
	3,3	3,3	0,33	150,00	**TQO 331092** **(262449/410/410)**
355 **13,976**	1,5	3,3	0,33	185,00	**TQO 331508**
355,6 **14**	1,5	3,3	0,48	140,00	**TQO 330662** **(763449/410/410)**
	1,5	3,3	0,33	195	**TQO 331271** **(263349/310/310)**
360 **14,173**	2	6	0,33	255,00	**TQO 332059**
	5	5	0,44	230	**TQO 328159**
368,3 **14,5**	3,3	6,4	0,33	275	**TQO 331159** **(265049/010/010)**

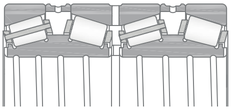


TQO[1]



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]			
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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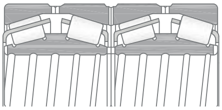
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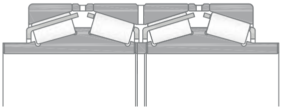
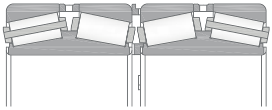
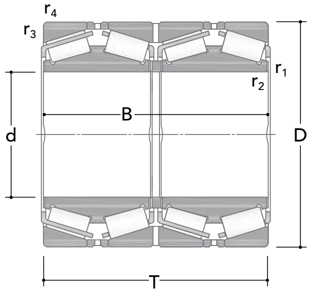
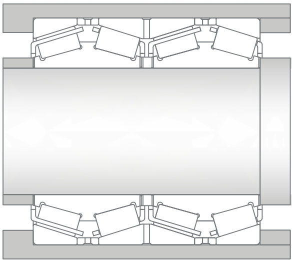

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
374,65 **14,75**	1,5	3,3	0,48	140	**TQO 332188** (765149/110/110)
380 **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 **15,125**	3,3	6,4	0,33	310,00	**TQO 331149** (266449/410/410)
385,762 **15,188**	3,3	3,3	0,43	190	**TQO 331202** (665949/910/910)
395 **15,551**	5	10	0,48	195	**TQO 332824**
406,4 **16**	1,5	6,4	0,48	185	**TQO 331465** (234161/215/216)
	1,5	6,4	0,48	185,00	**TQO 330650** (767749/710/710)
	3,3	6,4	0,33	300,00	**TQO 331347** (267949/910/910)
	3,3	6,4	0,33	370	**TQO 331133** (833161 /232/233)
409,575 **16,125**	1,5	6,4	0,43	220,00	**TQO 331333** (667947/910/910)
	6,4	6,4	0,43	220	**TQO 328967**

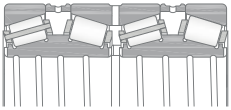


TQO1



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]			
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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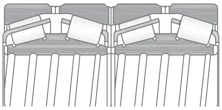
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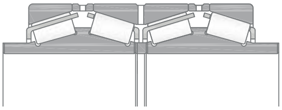
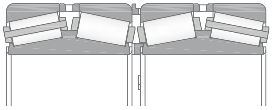
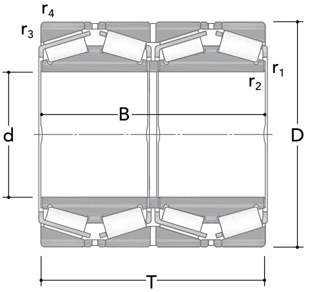

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
415,925 **16,375**	3,3	6,4	0,33	395	**TQO 331160** **(268749/710/710)**
420 **16,535**	4	6	0,31	285,00	**TQO 328826**
	2	5	0,31	375,00	**TQO 328374**
430 **16,923**	1,5	3,3	0,44	240,00	**TQO 331192**
431,8 **17**	1,5	3,3	0,54	200,00	**TQO 331125** **(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 **17,323**	4,5	6,7	0,26	300,00	**TQO 328829**
	6,4	6,4	0,33	410	**TQO 332313**
444,5 **17,5**	1,5	3,3	0,31	215	**TQO 328670**
447,675 **17,625**	3,3	6,4	0,33	485	**TQO 330608** **(270749/710/710)**



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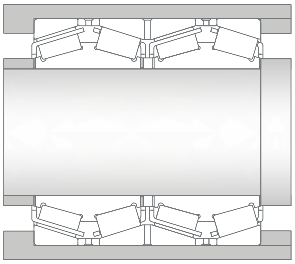
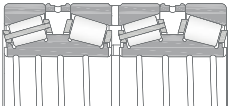
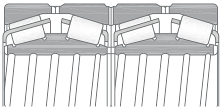
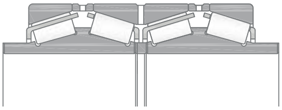


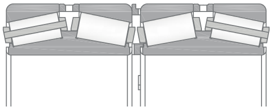
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
450	580	450	450	6155	19665	1395	**TQO 328161**
17,717	22,835	17,717	17,717				
	595	368	368	6744	16295	1220	**TQO 332773**
	23,425	14,488	14,488				**(270449/410/410)**
	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

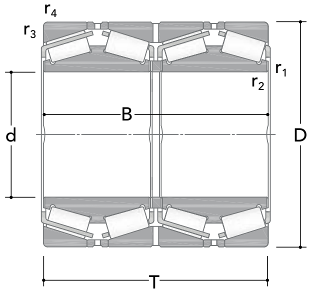

TQO2


TQO3

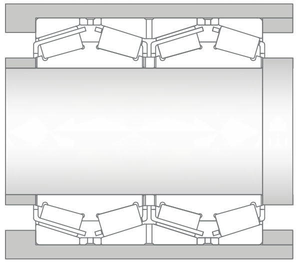

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
450 **17,717**	3	6	0,24	280,00	**TQO 328161**
	3	6	0,33	285	**TQO 332773** **(270449/410/410)**
	3	6	0,33	305,00	**TQO 328365** **(270449/410)**
457,073 **17,995**	1,5	6,4	0,4	630,00	**TQO 328287** **(671798/2873/2875)**
457,2 **18**	1,5	3,3	0,48	200	**TQO 331169** **(770847/810/810)**
	1,5	3,3	0,48	200,00	**TQO 331169** **(770847/810/810)**
	3,3	3,3	0,44	235,00	**TQO 334006**
460 **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** **(271149/110/110)**
462 **18,189**	3,3	6,4	0,4	275,00	**TQO 328692**
475 **18,701**	2	6	0,3	250,00	**TQO 328913**
	4	6	0,3	460,00	**TQO 329007**

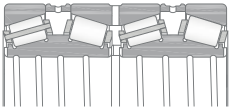


TQO1

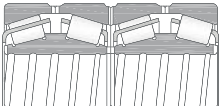


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
479,425	679,45	495,3	495,3	9477	22507	1829	**TQO 330886**
18,875	26,75	19,5	19,5				**(272749/710/710)**
482,6	615,95	330,2	330,2	6283	15204	1127	**TQO 332096**
19	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)**

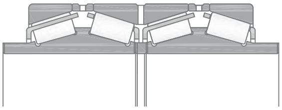
(1) Bearing with inner ring extended at both sides



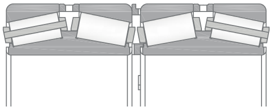
TQO2



TQO3

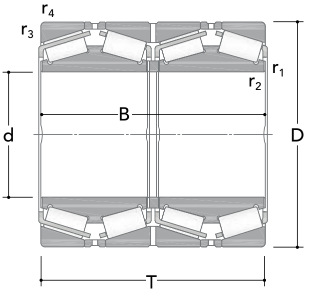


TQOE

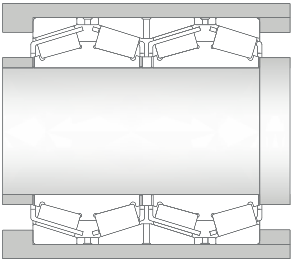


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
479,425 **18,875**	3,3	6,4	0,33	605,00	**TQO 330886** **(272749/710/710)**
482,6 **19**	6,4	6,4	0,33	245	**TQO 332096** **(272248/210/210)**
	3,3	6,4	0,33	245,00	**TQO 330641** **(272249/210/210)**
	3,5	6,4	0,33	265,00	**TQO 331626** (1) **(272249/210/210)**
	3,3	6,4	0,33	345	**TQO 328773**
	3,3	6,4	0,33	400,00	**TQO 331259** **(272647/610/610)**
488,95 **19,25**	3	3	0,35	265	**TQO 328391**
489,026 **19,253**	3,3	3,3	0,35	270,00	**TQO 331090** **(243193/250/251)**
	3,3	3,3	0,48	270,00	**TQO 328282** **(772749/710/710)**
500 **19,685**	3	6	0,35	550,00	**TQO 328524**
501,65 **19,75**	3,3	6,4	0,31	395,00	**TQO 331499** **(641198/265/266)**
	3,3	6,4	0,33	755,00	**TQO 331081** **(274149/110/110)**
508 **20**	6,4	6,4	0,37	730,00	**TQO 332131** **(531201/300/301)**

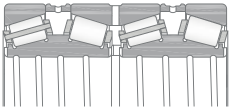


TQO1



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]			
510	655	379	377	7751	19012	1369	**TQO 331747**
20,079	25,787	14,921	14,843				
514,35	673,1	422,275	422,275	7314	21645	1557	**TQO 331157**
20,25	26,5	16,625	16,625				**(274449/410/410)**
519,112	736,6	536,575	536,575	11452	30993	2160	**TQO 331078**
20,438	29	21,125	21,125				**(275349/310/310)**
520,7	711,2	400,05	400,05	7485	19611	1459	**TQO 331243**
20,5	28	15,75	15,75				**(275349/310/310)**
536,575	761,873	558,8	558,8	11637	31563	2230	**TQO 331174**
21,125	29,995	22	22				**(276449/410/410)**
540	690	400	400	7452	20937	1519	**TQO 331978**
21,260	27,165	15,748	15,748				
	690	400	434	7452	20937	1519	**TQO 334038** (1)
	27,165	15,748	17,087				
558,8	736,6	322,268	322,265	6196	16536	1225	**TQO 331165**
22	29	12,688	12,688				**(843221/290/291)**
	736,6	409,575	409,575	8459	23072	1639	**TQO 330993**
	29	16,125	16,125				**(377449/410/410)**
	736,6	457,2	455,612	8363	25875	1809	**TQO 331346**
	29	18	17,938				**(277149/110/110)**
560	920	618	618	16422	34130	2311	**TQO 328509**
22,047	36,221	24,331	24,331				
571,5	812,8	593,725	593,725	11935	32353	2136	**TQO 330529**
22,5	32	23,375	23,375				**(278749/710/710)**

(1) Bearing with inner ring extended at both sides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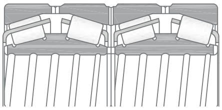
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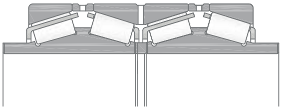
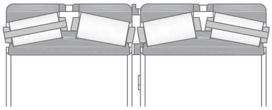
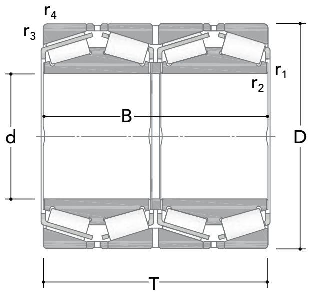
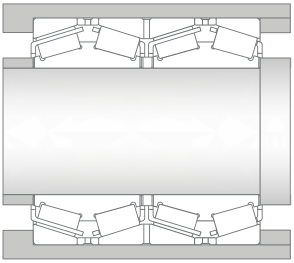

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
510 20,079	1,5	6,4	0,33	330,00	**TQO 331747**
514,35 20,25	3,3	6,4	0,31	410,00	**TQO 331157** **(274449/410/410)**
519,112 20,438	3,3	6,4	0,33	755,00	**TQO 331078** **(275349/310/310)**
520,7 20,5	3,3	6,4	0,33	460,00	**TQO 331243** **(275349/310/310)**
536,575 21,125	3,3	6,4	0,33	835,00	**TQO 331174** **(276449/410/410)**
540 21,260	3	6	0,33	375,00	**TQO 331978**
	1	5	0,33	400,00	**TQO 334038** (1)
558,8 22	3,3	6,4	0,35	375,00	**TQO 331165** **(843221/290/291)**
	3,3	6,4	0,35	475,00	**TQO 330993** **(377449/410/410)**
	3,3	6,4	0,33	545,00	**TQO 331346** **(277149/110/110)**
560 22,047	7,5	7,5	0,4	1700,00	**TQO 328509**
571,5 22,5	3,3	6,4	0,33	1000,00	**TQO 330529** **(278749/710/710)**



TQO[1]



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]			
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				

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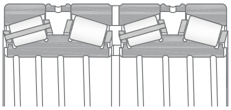
(1) Bearing with inner ring extended at both sides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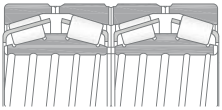
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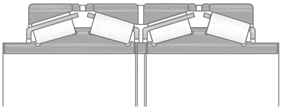
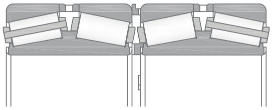
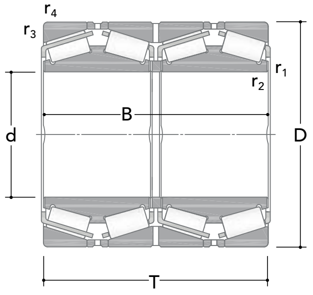
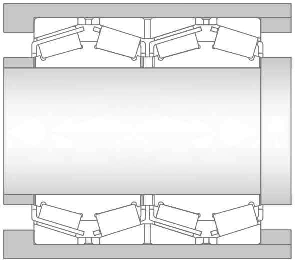

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
584,2 **23**	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)**
609,6 **24**	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**

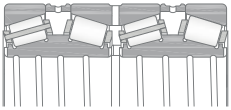


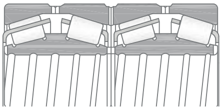
TQO[1]

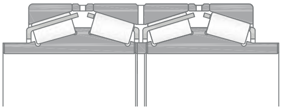


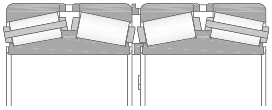
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
635	901,7	654,05	654,05	15478	45405	2874	**TQO 330990**
25	35,5	25,75	25,75				**(281049/010/010)**
646,112	857,25	542,925	542,925	12168	36998	2368	**TQO 332671**
25,438	33,75	21,375	21,375				**(281049/310/010)**
650	915	674	674	16188	44652	2923	**TQO 332307**
25,591	36,024	26,535	26,535				**(281349/310/310)**
	1030	560	560	20507	37483	2585	**TQO 332827**
	40,551	22,047	22,047				
657,225	933,45	676,275	676,275	17055	49516	3117	**TQO 330824**
25,875	36,75	26,625	26,625				**(281649/610/610)**
660	855	318,48	319,192	6201	17127	1211	**TQO 331065**
25,984	33,661	12,539	12,567				**(749259/334/335)**
	855	318,5	318,5	7025	18368	1337	**TQO 328511**
	33,661	12,539	12,539				
660,4	812,8	365,125	365,125	7128	22674	1512	**TQO 331190**
26	32	14,375	14,375				**(281149/110/110)**
676	910	620	620	14192	41420	2705	**TQO 332906**
26,614	35,827	24,409	24,409				
679,45	901,7	552,45	552,45	12240	36520	2359	**TQO 331700**
26,75	35,5	21,75	21,75				**(281849/810/810)**
	901,7	552,45	552,45	13063	38635	2574	**TQO 331700**
	35,5	21,75	21,75				**(281849/810/810)**
682,625	965,2	701,675	701,675	17621	49690	3220	**TQO 331503**
26,875	38	27,625	27,625				**(282249/210/210)**

(1) Bearing with inner ring extended at both sides

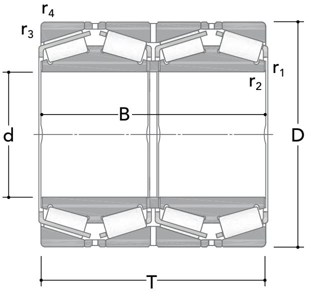

TQO2


TQO3

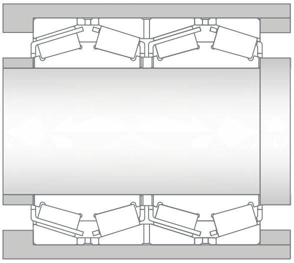

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
635 25	3,3	6,4	0,33	1420,00	TQO 330990 (281049/010/010)
646,112 25,438	3,3	6,4	0,33	875,00	TQO 332671 (281049/310/010)
650 25,591	3,3	6,4	0,33	1430,00	TQO 332307 (281349/310/310)
	15	10	0,31	1830,00	TQO 332827
657,225 25,875	3,3	6,4	0,33	1575,00	TQO 330824 (281649/610/610)
660 25,984	4,8	9,7	0,35	490,00	TQO 331065 (749259/334/335)
	5	7,5	0,35	490,00	TQO 328511
660,4 26	3,3	6,4	0,33	420,00	TQO 331190 (281149/110/110)
676 26,614	4	8	0,33	1150,00	TQO 332906
679,45 26,75	3,3	6,4	0,33	975,00	TQO 331700 (281849/810/810)
	3,3	6,4	0,33	975,00	TQO 331700 (281849/810/810)
682,625 26,875	3,3	6,4	0,33	1750,00	TQO 331503 (282249/210/210)

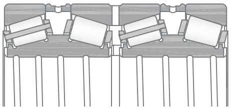


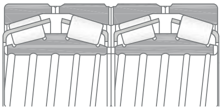
TQO1

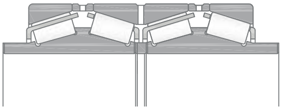


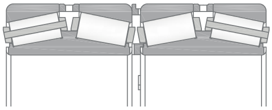
Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
685,8	876,3	355,6	352,425	7748	21846	1511	**TQO 331089**
27	34,5	14	13,875				**(655271/345/346)**
	876,3	355,6	434,975	7748	21846	1511	**TQO 328704** (1)
	34,5	14	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

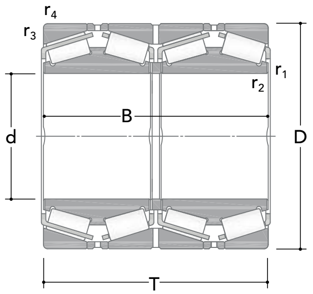

TQO2


TQO3

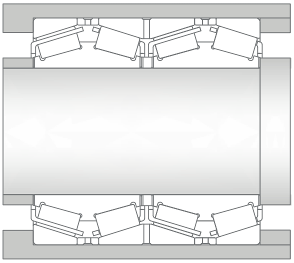

TQOE


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
685,8 27	3,3	6,4	0,43	530,00	TQO 331089 (655271/345/346)
	3,3	6,4	0,43	580,00	TQO 328704 (1) (655271/345/346)
708,025 27,875	3,3	6,4	0,33	1030,00	TQO 332098 (282549/510/510)
710 27,953	3	6	0,35	660,00	TQO 331351 (882449/410/410)
711,2 28	3,3	6,4	0,37	525,00	TQO 330882 (755281/360/361)
714,375 28,125	3,3	6,4	0,35	1950,00	TQO 331358 (383240/210/210)
717,55 28,25	3,3	6,4	0,33	1090,00	TQO 332244 (282847/810/810)
730 28,740	3,5	8	0,35	925,00	TQO 331752
730,25 28,75	3,3	6,4	0,33	2170,00	TQO 330803 (283449/410/410)
749,3 29,5	3,3	6,4	0,33	1250,00	TQO 331616 (283649/610/610)
	25,4x20°	12,7	0,33	2250,00	TQO 331094 (325296/420/421)
750 29,528	4	7,5	0,48	2430,00	TQO 328376



TQO[1]



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]			
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)**

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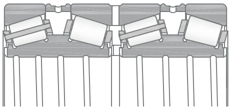
(1) Bearing with inner ring extended at both sides



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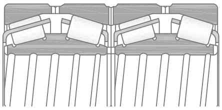

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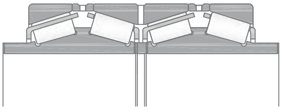

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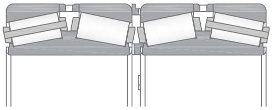
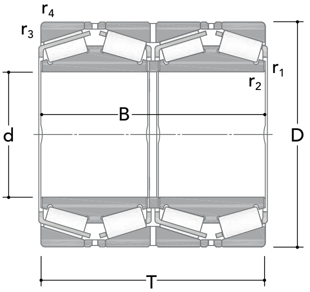


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
762 **30**	8	12,7	0,33	2145,00	**TQO 331907** **(284148/111/110)**
	4,8	12,7	0,33	2480,00	**TQO 330676** **(284249/210/210)**
812,8 **32**	6,4	12,7	0,33	2590,00	**TQO 331248**
825,5 **32,5**	4,8	12,7	0,33	3050,00	**TQO 331066** **(285848/810/810)**
850 **33,465**	6	12	0,35	5440,00	**TQO 331069**
863,6 **34**	4,8	12,7	0,33	1900,00	**TQO 331123** **(286249/210/210)**
	4,8	12,7	0,33	2700,00	**TQO 332967**
	4,8	12,7	0,33	2150,00	**TQO 331649** **(286449/410/410)**
	4,8	12,7	0,33	3470,00	**TQO 330742** **(547341/480/481)**
877,888 **34,563**	4,8	12,7	0,33	3080,00	**TQO 332981** **(286749/711)**
901,7 **35,5**	4,8	12,7	0,33	4170,00	**TQO 330903** **(634356/510/510)**
938,213 **36,938**	4,8	12,7	0,35	3230,00	**TQO 330726** **(287649/610/610)**



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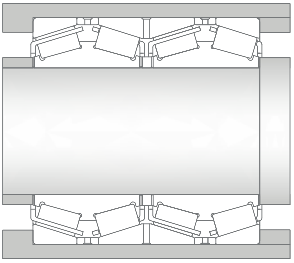
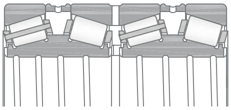


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
939,8	1333,5	952,5	952,5	31458	96192	5234	**TQO 330944**
37	52,5	37,5	37,5				**(287849/210/210)**
1001	1360	800	800	29448	84928	4804	**TQO 334031**
39,409	53,543	31,496	31,496				
1003,3	1358,9	800,1	800,1	29448	84928	4804	**TQO 331372**
39,5	53,5	31,5	31,5				
1070	1400	889,762	889,762	29880	99665	5518	**TQO 328100**
42,126	55,118	35,03	35,03				
1080	1450	950	950	33924	107919	5854	**TQO 331559**
42,520	57,087	37,402	37,402				
1139,825	1509,712	923,925	923,925	33681	108066	5846	**TQO 331334**
44,875	59,438	36,375	36,375				
1200,15	1593,85	990,6	990,600	38465	126226	6635	**TQO 331440**
47,25	62,75	39	39				**(288949/910/910)**
1250	1550	890	890	30295	114505	5974	**TQO 328819**
49,213	61,024	35,039	35,039				
1260	1640	1000	1000	39228	141797	7009	**TQO 332124**
49,606	64,567	39,370	39,370				
1300	1720	1040	1040	43182	140847	7306	**TQO 331950**
51,181	67,717	40,945	40,945				
1370	1765	1050	1035	43166	152304	7836	**TQO 331349**
53,937	69,488	41,339	40,748				

(1) Bearing with inner ring extended at both sides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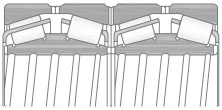
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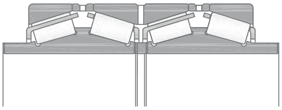
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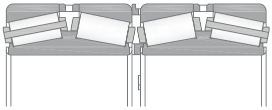
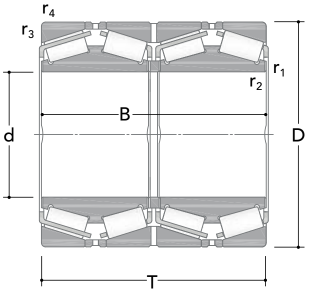

SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
939,8 **37**	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**



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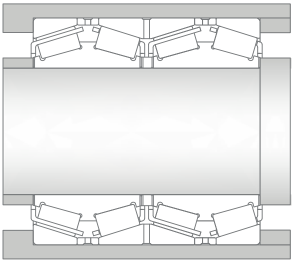

Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
1500	1900	1080	1080	46113	170498	8276	**TQO 332078**
59,055	74,803	42,520	42,520				
1580	1960	1080	1080	45216	174547	8722	**TQO 331934**
62,205	77,165	42,520	42,520				

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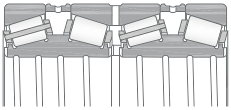
(1) Bearing with inner ring extended at both sides



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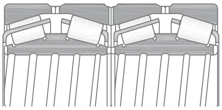
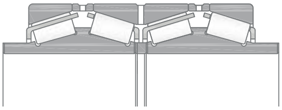
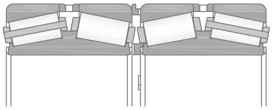


TQO3

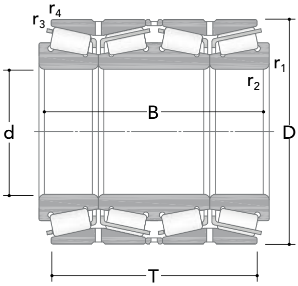


TQOE

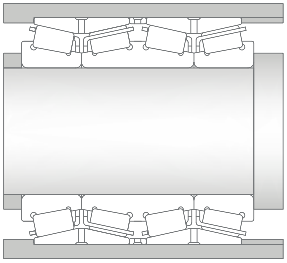


SET2xTDI

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
1500 **59,055**	4	12	0,35	7700,00	**TQO 332078**
1580 **62,205**	5	12	0,33	7800,00	**TQO 331934**

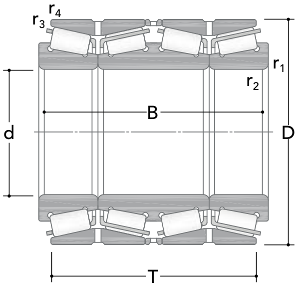


TQI

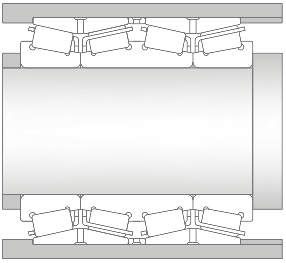


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
254	358,775	257,175	292,1	2833	7107	619	**TQI 332610**
10	14,125	10,125	11,5				**(249749/710)**
279,4	407	288	320	3526	9131	754	**TQI 328345**
11	16,024	11,339	12,598				**(255449/411)**
317,5	422,275	261,938	290,514	3108	8179	678	**TQI 332642**
12,5	16,625	10,313	11,438				**(258649/610)**
333,375	469,9	328,612	366,712	4582	11354	934	**TQI 328083**
13,125	18,5	12,938	14,438				
347,662	469,9	246,063	280,194	3575	8523	708	**TQI 331807**
13,688	18,5	9,688	11,031				
368,3	523,875	366,712	411,162	5856	14858	1171	**TQI 334011**
14,5	20,625	14,438	16,188				
384,175	546,1	384,175	428,625	6477	16620	1288	**TQI 331809**
15,125	21,5	15,125	16,875				
400	540	295	330	4858	12674	967	**TQI 332297**
15,748	21,260	11,614	12,992				
406,4	590,55	381	434,975	7026	16586	1271	**TQI 328923**
16	23,25	15	17,125				
415,925	590,55	419,1	469,9	7224	19443	1449	**TQI 332814**
16,375	23,25	16,5	18,5				
431,8	571,5	320,675	366,713	5001	13824	1073	**TQI 331999**
17	22,5	12,625	14,438				

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
254 **10**	3,5	1,5	0,33	90,50	**TQI 332610** **(249749/710)**
279,4 **11**	3,5	1,5	0,33	140	**TQI 328345** **(255449/411)**
317,5 **12,5**	6,5	1,5	0,31	110	**TQI 332642** **(258649/610)**
333,375 **13,125**	6,4	1,5	0,33	190	**TQI 328083**
347,662 **13,688**	3,3	1,5	0,33	135,00	**TQI 331807**
368,3 **14,5**	6,4	1,5	0,33	275,00	**TQI 334011**
384,175 **15,125**	6,4	1,5	0,33	300	**TQI 331809**
400 **15,748**	3,3	1,5	0,31	210,00	**TQI 332297**
406,4 **16**	9,7	1,5	0,33	370	**TQI 328923**
415,925 **16,375**	6,4	1,5	0,33	405,00	**TQI 332814**
431,8 **17**	6,4	1,5	0,44	250	**TQI 331999**

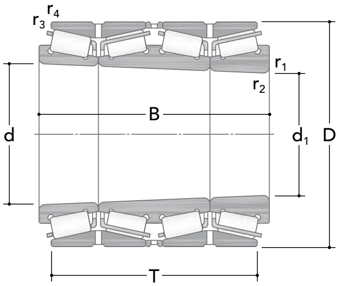


TQI

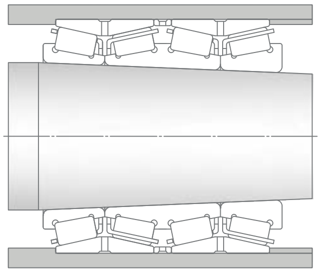


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]				[kN]			
431,8	647,7	338,138	387,35	6637	14987	1161	**TQI 332590**
17	25,5	13,313	15,25				
(cont.)							
447,675	635	446,088	496,888	8272	21982	1601	**TQI 328922**
17,625	25	17,563	19,563				
450	595	352	390	5518	16126	1233	**TQI 334147**
17,717	23,425	13,858	15,354				
482,6	615,95	317,5	355,6	5058	15506	1105	**TQI 328268**
19	24,25	12,5	14				**(272249/210)**
510	655	362	405	6272	19211	1355	**TQI 328732**

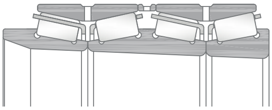
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
431,8 **17** (cont.)	6,4	1,5	0,33	420,00	**TQI 332590**
447,675 **17,625**	6,4	1,5	0,33	475,00	**TQI 328922**
450 **17,717**	6	1,5	0,33	295	**TQI 334147**
482,6 **19**	6,4	1,5	0,33	245,00	**TQI 328268** **(272249/210)**
510	6,4	1,5	0,33	330	**TQI 328732**



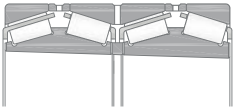
TQIT



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]			
170,655	156,634	225,425	152,4	168,275	860	2228	205	**TQIT 332646**
6,719	6,167	8,875	6	6,625				
200,82	180,843	284,162	219,075	239,715	1801	4140	391	**TQIT 332800**
7,906	7,120	11,188	8,625	9,438				**(240631/644/647/611)**
258,762	234,422	358,775	257,175	292,1	2881	7125	618	**TQIT 332961**
10,188	9,229	14,125	10,125	11,5				**(249730/747/749/710)**
271,462	246,327	381	269,875	301,625	4091	8080	703	**TQIT 332719**
10,688	9,694	15	10,625	11,875				**(252330/345/349/310)**
287,5	259,975	440	284	330,3	4196	8396	744	**TQIT 332997**
11,319	10,235	17,323	11,181	13,004				
289,833	263,333	407	288	375	3532	9015	764	**TQIT 328315**
11,411	10,367	16,024	11,339	14,764				
317,5	294,481	438,15	276,225	276,225	3519	8213	702	**TQOT 328952**
12,5	11,594	17,25	10,875	10,875				
320	295,833	422,275	261,424	290	3052	8140	681	**TQIT 332716**
12,598	11,647	16,625	10,292	11,417				**(258630/646/649/610)**
		422,275	261,424	336	3052	8140	681	**TQITE 328344**
		16,625	15,292	13,228				**(258630/646/649610)**
		422,275	261,424	336	3052	8140	681	**TQITE 332962**
		16,625	10,292	13,228				
323,85	293,952	447,675	323,85	414,338	4390	10702	888	**TQIT 332668**
12,75	11,573	17,625	12,75	16,313				
345,281	315,383	488,95	358,775	358,775	4885	12607	1011	**TQOT 334074**
13,594	12,417	19,25	14,125	14,125				

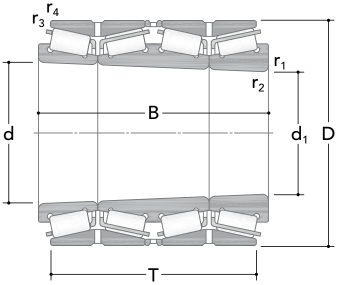


TQITE



TQOT

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
170,655 6,719	3,5	0,8	0,37	20,5	TQIT 332646
200,82 7,906	3	1,5	0,33	50,5	TQIT 332800 (240631/644/647/611)
258,762 10,188	3,3	1,5	0,33	100	TQIT 332961 (249730/747/749/710)
271,462 10,688	6,4	1,5	0,33	80	TQIT 332719 (252330/345/349/310)
287,5 11,319	4	1	0,35	180	TQIT 332997
289,833 11,411	3,5	1,5	0,37	125	TQIT 328315
317,5 12,5	1,5	3,3	0,43	135	TQOT 328952
320 12,598	6,5	1,5	0,31	120	TQIT 332716 (258630/646/649/610)
	6	1,5	0,31	125	TQITE 328344 (258630/646/649610)
	6,5	1,5	0,31	125	TQITE 332962
323,85 12,75	6	1,5	0,33	200	TQIT 332668
345,281 13,594	3,3	3,3	0,33	240	TQOT 334074



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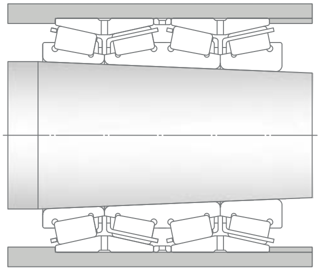
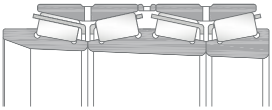


Main dimensions					Basic load ratings		Fatigue load limit	Designation
d	d1	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]					[kN]			
352,425	320,411	488,95	342,9	384,175	3763	10157	834	**TQIT 332654**
13,875	12,615	19,25	13,5	15,125				**(262730/746/749/710)**
384,175	350,838	546,1	400,05	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)**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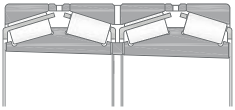
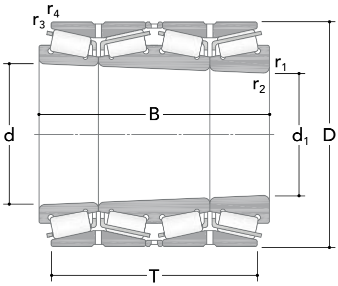

TQOT

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
352,425 13,875	6,4	1,5	0,33	205	TQIT 332654 (262730/746/749/710)
384,175 15,125	3,3	3,3	0,33	340	TQOT 334128
390,525 15,375	6,4	1,5	0,33	340	TQIT 332664 (266430/446/449/410)
391,071 15,397	6,4	1,5	0,33	345	TQIT 328305 (266432/445/448/413)
419,1 16,5	6,4	1,5	0,33	440	TQIT 328203 (268729/745/747/710)
	6,4	1,5	0,33	440	TQIT 328564 (268729/7457/747/710)
453,39 17,85	6,4	1,5	0,33	600	TQIT 332822 (270730/746/749/710)
479,425 18,875	3,3	6,4	0,33	645	TQOT 334057
488,95 19,25	12,7	1,5	0,33	640	TQIT 332760 (272730/746/749/710)
515 20,276	3	6	0,43	515	TQOT 328965
	6	2,5	0,35	490	TQIT 334097
530,225 20,875	6,4	1,5	0,33	865	TQIT 332933 (275330/346/349/310)



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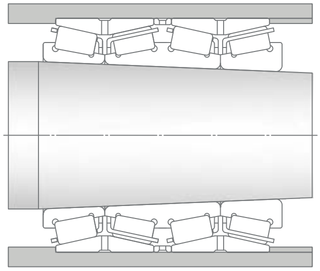
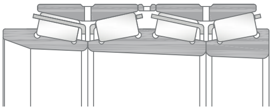


Main dimensions					Basic load ratings		Fatigue load limit	Designation
d	d1	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]					[kN]			
547,688	497,683	761,873	536,575	600,075	11672	32092	2194	**TQIT 332659**
21,563	19,594	29,995	21,125	23,625				**(276430/446/449/410)**
555,233	497,556	761,873	536,575	692,15	11672	32092	2194	**TQITE 334125**
21,860	19,589	29,995	21,125	27,25				**(276431/445/447410)**
571,5	522,023	812,8	593,725	593,725	13266	35899	2407	**TQOT 332666**
22,5	20,552	32	23,375	23,375				
581,025	527,579	812,8	571,5	641,35	11984	31963	2163	**TQIT 332658**
22,875	20,771	32	22,5	25,25				
604,838	569,78	787,4	369,888	420,688	8482	23539	1636	**TQIT 328045**
23,813	22,432	31	14,563	16,563				
644,525	595,313	857,25	523,875	590,55	12082	36119	2425	**TQIT 332934**
25,375	23,438	33,75	20,625	23,25				**(281030/043/047/010)**
669,925	621,667	933,45	649,288	725,488	17311	49070	3146	**TQIT 332928**
26,375	24,475	36,75	25,563	28,563				**(281630/646/649/610)**
680	621,667	930	700	700	18393	54489	3369	**TQOT 328349**
26,772	24,475	36,614	27,559	27,559				
682,625	624,152	965,2	701,675	701,675	17385	49629	3061	**TQOT 328558**
26,875	24,573	38	27,625	27,625				
744,538	676,806	1035,05	727,075	812,8	20665	57755	3646	**TQIT 332943**
29,313	26,646	40,75	28,625	32				**(283430/446/449/410)**
749,3	676,806	990,6	577	650	15164	44873	2890	**TQIT 332596**
29,5	26,646	39	22,717	25,591				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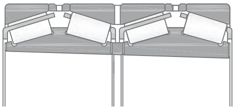
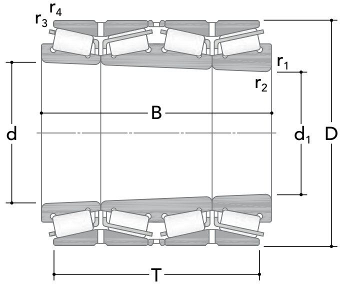

TQOT

Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
547,688 21,563	6,4	1,5	0,33	930	TQIT 332659 (276430/446/449/410)
555,233 21,860	6,4	1,5	0,33	990	TQITE 334125 (276431/445/447410)
571,5 22,5	3,3	6,4	0,33	1105	TQOT 332666
581,025 22,875	6,4	1,5	0,33	1100	TQIT 332658
604,838 23,813	6,4	1,5	0,33	580	TQIT 328045
644,525 25,375	6,4	1,5	0,33	1030	TQIT 332934 (281030/043/047/010)
669,925 26,375	6,4	1,5	0,33	1700	TQIT 332928 (281630/646/649/610)
680 26,772	3	6	0,31	1625	TQOT 328349
682,625 26,875	3,3	6,4	0,33	1825	TQOT 328558
744,538 29,313	9,7	1,5	0,33	2350	TQIT 332943 (283430/446/449/410)
749,3 29,5	6,4	3,3	0,33	1500	TQIT 332596



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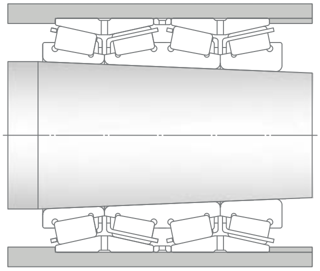
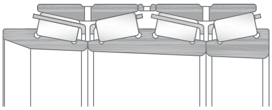


Main dimensions					Basic load ratings		Fatigue load limit	Designation
d	d1	D	T	B	Dynamic C	Static C_0	C_u	(AFBMA Part number)
[mm]					[kN]			
770	709,167	1040	650	800	18476	52644	3272	**TQITE 334099**
30,315	27,92	40,945	25,591	31,496				
777,672	707,294	1079,5	755,65	844,55	22078	63067	3796	**TQIT 332959**
30,617	27,846	42,5	29,75	33,25				**(284229/244/248/210)**
777,875	707,457	1079,5	755,65	844,55	22078	63067	3796	**TQIT 332956**
30,625	27,854	42,5	29,75	33,25				**(284230/246/249/210)**
825,5	755,121	1168,4	844,6	844,6	23514	76684	4389	**TQOT 334040**
32,5	29,729	46	33,25	33,25				
828,675	759,883	1143	733,425	825,5	22426	65099	3924	**TQIT 332663**
32,625	29,917	45	28,875	32,5				
863,6	803,853	1130,3	644,525	717,55	19867	62050	3747	**TQIT 332571**
34	31,624	44,5	25,375	28,25				
	807,773	1130,3	669,925	669,925	19867	62050	3747	**TQOT 328857**
	31,802	44,5	26,375	26,375				
872,769	813,239	1179,805	628,65	793,75	20937	57036	3548	**TQITE 332960**
34,361	32,017	46,449	24,75	31,25				**(286433/443/447/412)**
		1181,1	628,65	714,375	20937	57036	3548	**TQIT 332786**
		46,5	24,75	28,125				**(286433/443/447/410)**
872,847	813,466	1181,1	628,65	714,375	20937	57036	3548	**TQIT 328956**
34,364	32,026	46,5	24,75	28,125				**(286432/446/449/410)**
879,475	801,688	1219,2	838,2	933,45	27924	80980	4781	**TQIT 328074**
34,625	31,563	48	33	36,75				
889	815,667	1219,2	784,225	880	27349	78709	4509	**TQIT 332602**
35	32,113	48	30,875	34,646				



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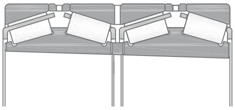
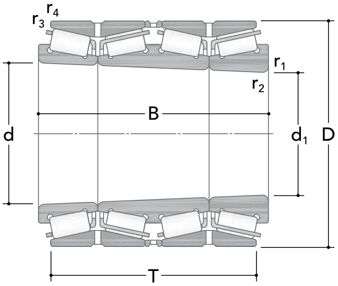
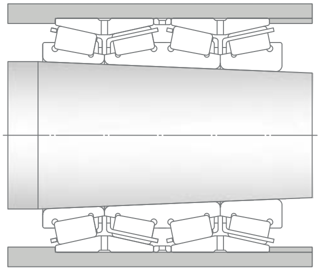


TQOT

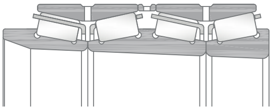
Dimensions			Factor	Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	e		(AFBMA Part number)
[mm]				[kg]	
770 30,315	3	3	0,3	2015	TQITE 334099
777,672 30,617	9,7	3,3	0,33	2650	TQIT 332959 (284229/244/248/210)
777,875 30,625	9,7	3,3	0,33	2650	TQIT 332956 (284230/246/249/210)
825,5 32,5	4,8	12,7	0,33	2800	TQOT 334040
828,675 32,625	9,7	3,3	0,33	2475	TQIT 332663
863,6 34	9,7	3,3	0,33	2100	TQIT 332571
	4,8	12,7	0,33	2000	TQOT 328857
872,769 34,361	9,7	3,3	0,33	2530	TQITE 332960 (286433/443/447/412)
	9,7	3,3	0,33	2450	TQIT 332786 (286433/443/447/410)
872,847 34,364	9,7	3,3	0,33	2450	TQIT 328956 (286432/446/449/410)
879,475 34,625	12,7	3,3	0,33	3680	TQIT 328074
889 35	9,7	3,3	0,33	3340	TQIT 332602



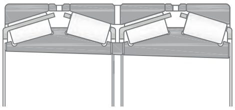
TQIT



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)**

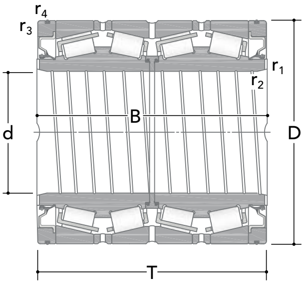


TQITE

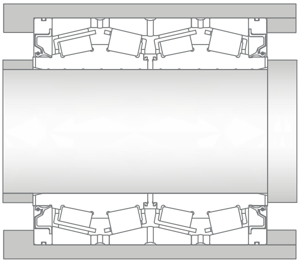


TQOT

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)**

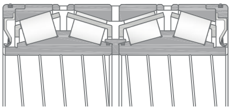


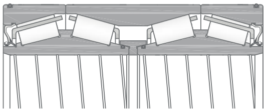
TQOS[1]



Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	
[mm]				[kN]			
152,4	244,475	187,325	192,088	1306	2140	224	TQOS 329121
6	9,625	7,375	7,5625				
203,2	317,5	266,7	266,7	2440	4846	476	TQOS 329123
8	12,5	10,5	10,5				
206,375	282,575	226	226	1284	3393	307	TQOS 329090
8,125	11,125	8,8976	8,8976				
220	295	315	315	1869	4007	360	TQOS 328853
8,6614	11,6142	12,4016	12,4016				
220,662	314,325	239,712	239,712	1789	3805	355	TQOS 328546
8,6875	12,375	9,4375	9,4375				
228,6	400,05	296,875	296,875	3386	5637	515	TQOS 328918
9	15,75	11,688	11,688				
240	338	340	340	2403	5441	486	TQOS 328854
9,4488	13,3071	13,3858	13,3858				
241,478	349,148	228,6	228,6	1912	3676	336	TQOS 328668
9,507	13,746	9	9				
254	358,775	269,875	269,875	2443	5776	505	TQOS 329071
10	14,125	10,625	10,625				
260	365	340	340	3165	7940	675	TQOS 329093
10,2362	14,3701	13,3858	13,3858				
266,7	355,6	228,6	230,188	1708	4171	361	TQOS 328468
10,5	14	9	9,0625				

(1) Bearing with inner ring extended at both sides


TQOS$_2$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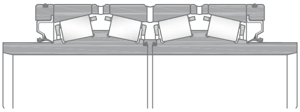
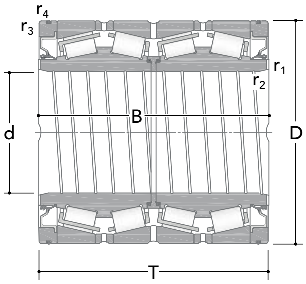
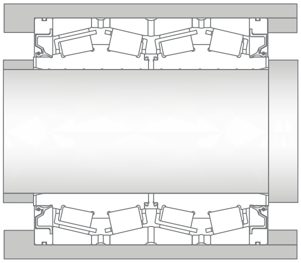

TQOES

Dimensions			Factor	Mass	Designation
d	r1,2min	r3,4min	e		
[mm]				[kg]	
152,4 6	1	3,3	0,33	30,00	TQOS 329121
203,2 8	2,5	3,3	0,31	76	TQOS 329123
206,375 8,125	0,6	3,3	0,5	40	TQOS 329090
220 8,6614	0,6	2,5	0,4	55	TQOS 328853
220,662 8,6875	1,5	3,3	0,35	56,00	TQOS 328546
228,6 9	2,5	3,3	0,44	148,00	TQOS 328918
240 9,4488	1,5	4	0,4	88	TQOS 328854
241,478 9,507	1,5	3,3	0,35	64,00	TQOS 328668
254 10	1,5	3,3	0,33	84	TQOS 329071
260 10,2362	2,5	3,5	0,35	112,00	TQOS 329093
266,7 10,5	1,5	3,3	0,35	68	TQOS 328468

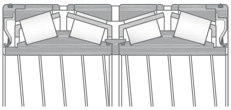


TQOS[1]



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



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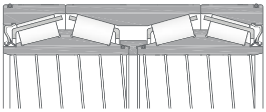
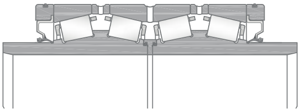
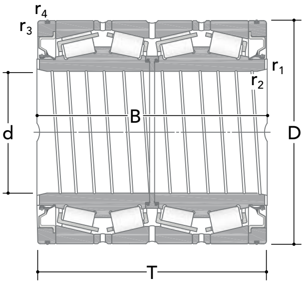


TQOS$_3$

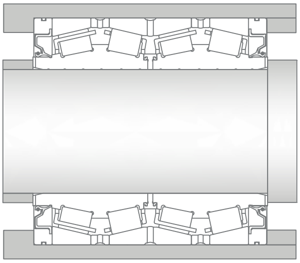


TQOES

Dimensions			Factor	Mass	Designation
d	r1,2min	r3,4min	e		
[mm]				[kg]	
266,7 10,5 (cont.)	1,5	3,3	0,35	60,00	TQOS 328916
276,225 10,875	1	6,4	0,37	96,00	TQOS 328920
	1	6,4	0,4	96,00	TQOS 328554
279,4 11	1	6,4	0,37	96,00	TQOS 328917
280 11,0236	2,5	3,5	0,33	128,00	TQOS 329092
285,75 11,25	1	3,3	0,43	74,00	TQOS 328878
300 11,811	3,3	4,8	0,46	137,00	TQOS 334126
304,648 11,994	2	4,8	0,46	129,00	TQOS 334008
304,8 12	1	6,4	0,35	108,00	TQOS 329067
	2	6,4	0,4	254,00	TQOS 328909
304,902 12,004	1	3,3	0,33	98,00	TQOS 328278
	1	3,3	0,31	100,00	TQOS 328945

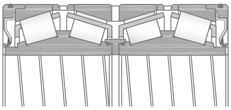


TQOS1

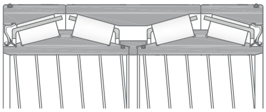


Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	
[mm]				[kN]			
305	438,048	279,4	280,99	3113	6648	589	TQOS 334076
12,0079	17,246	11	11,059				
317,5	422,275	269,875	269,875	2834	6521	569	TQOS 334023
12,5	16,625	10,625	10,625				
333,375	469,9	342,9	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				

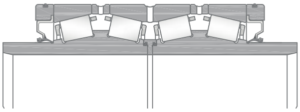
(1) Bearing with inner ring extended at both sides



TQOS$_2$

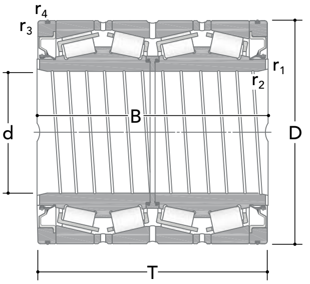


TQOS$_3$

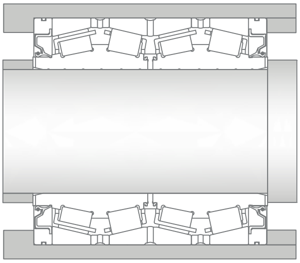


TQOES

Dimensions			Factor	Mass	Designation	
d	r1,2min	r3,4min	e			
[mm]				[kg]		
305 12,0079	2	4,8	0,46	129	TQOS 334076	
317,5 12,5	1,5	3,3	0,33	98,00	TQOS 334023	
333,375 13,125	2,5	3,3	0,33	182,00	TQOS 328921	
343,052 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 14	1,5	3,3	0,46	136,00	TQOS 328870	
	1	3,3	0,33	172,00	TQOS 328912	
385,762 15,1875	1	3,3	0,4	174,00	TQOS 334042	
406,4 16	1,5	6,4	0,48	183,00	TQOS 328838	
	1,5	6,4	0,48	202	TQOS 334093	
409,575 16,125	1	6,4	0,4	210,00	TQOS 329004	

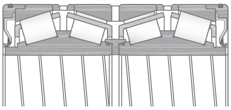


TQOS$_1$

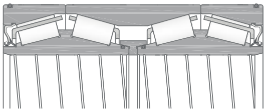


Main dimensions				Basic load ratings		Fatigue	Designation
d	D	T	B	Dynamic C	Static C_0	load limit C_u	
[mm]				[kN]			
415,925	590,55	434,975	434,975	6939	18238	1374	TQOS 328893
16,375	23,25	17,125	17,125				
416	574	440	440	6128	16830	1259	TQOS 334130
16,378	22,5984	17,3228	17,3228				
430	575	380	380	5233	14123	1087	TQOS 334095
16,9291	22,6378	14,9606	14,9606				
440	590	480	480	7111	19204	1460	TQOS 334055
17,3228	23,2283	18,8976	18,8976				
	650	353,5	353,5	6696	13284	1017	TQOS 328944
	25,5906	13,9173	13,9173				
450	595	398	398	5483	16079	1219	TQOS 328846
17,7165	23,4252	15,6693	15,6693				
457,2	596,9	279,4	276,225	3956	10016	780	TQOS 328827
18	23,5	11	10,875				
460	610	360	360	5044	12873	1029	TQOS 328727
18,1102	24,0157	14,1732	14,1732				
475	600	368	368	4683	13971	1029	TQOS 334078
18,7008	23,622	14,4882	14,4882				
479,425	679,45	495,3	495,3	8513	22165	1661	TQOS 334116
18,875	26,75	19,5	19,5				
482,6	615,95	330,2	330,2	6049	13679	1062	TQOS 328842
19	24,25	13	13				
	615,95	330,2	406,4	6049	13679	1062	TQOS 328887 (1)
	24,25	13	16				

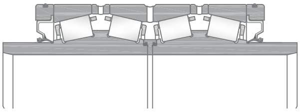
(1) Bearing with inner ring extended at both sides



TQOS2

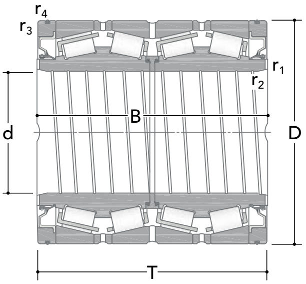


TQOS3

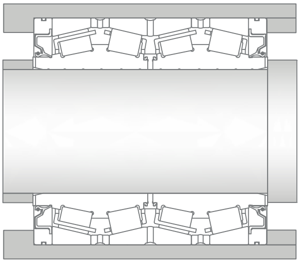


TQOES

Dimensions			Factor	Mass	Designation	
d	r1,2min	r3,4min	e			
[mm]				[kg]		
415,925 16,375	3,3	6,4	0,33	379	TQOS 328893	
416 16,378	2,5	5	0,33	341,00	TQOS 334130	
430 16,9291	1,5	5	0,33	267,00	TQOS 334095	
440 17,3228	1	5	0,28	371,00	TQOS 334055	
	5,5	6,4	0,33	378,00	TQOS 328944	
450 17,7165	2	6	0,33	301	TQOS 328846	
457,2 18	1,5	3,3	0,48	191	TQOS 328827	
460 18,1102	3	6	0,37	270	TQOS 328727	
475 18,7008	2	6	0,33	235	TQOS 334078	
479,425 18,875	3,3	6,4	0,33	565	TQOS 334116	
482,6 19	1	6,4	0,33	232	TQOS 328842	
	1	6,4	0,33	250	TQOS 328887	(1)

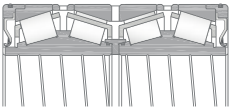


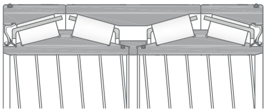
TQOS1

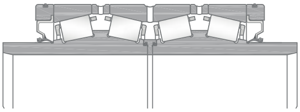


Main dimensions				Basic load ratings		Fatigue load limit C_u	Designation	
d	D	T	B	Dynamic C	Static C_0			
[mm]				[kN]				
482,6	615,95	330,2	406,4	4415	12360	922	TQOS 328223	(1)
19	24,25	13	16					
(cont.)	615,95	330,2	419,1	6049	13679	1062	TQOS 334072	(1)
	24,25	13	16,5					
	615,95	402,05	402,05	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					

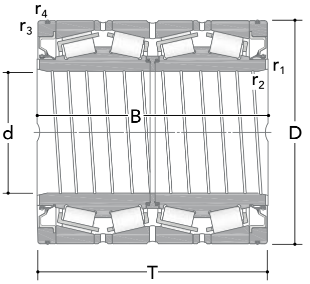
(1) Bearing with inner ring extended at both sides

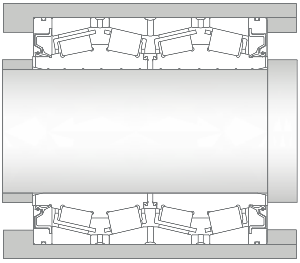

TQOS2


TQOS3


TQOES

Dimensions			Factor	Mass	Designation	
d	r1,2min	r3,4min	e			
[mm]				[kg]		
482,6 19	1	6,4	0,33	237,00	TQOS 328223	(1)
(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 19,253	1	3,3	0,37	248	TQOS 334014	
	1	3,3	0,68	247,00	TQOS 334115	
510 20,0787	1,5	6,4	0,35	311,00	TQOS 334022	
540 21,2598	2	5	0,33	392,00	TQOS 334028	
558,8 22	1,5	6,4	0,35	343,00	TQOS 328864	
	3,3	6,4	0,48	475,00	TQOS 334080	
	3,3	6,4	0,35	515,00	TQOS 334136	
571,5 22,5	3,3	6,4	0,33	998,00	TQOS 334144	
585,788 23,0625	4	6,4	0,33	596,00	TQOS 328888	

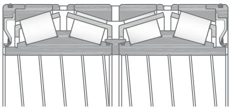




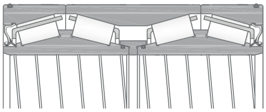
TQOS$_1$

Main dimensions				Basic load ratings		Fatigue load limit	Designation	
d	D	T	B	Dynamic C	Static C_0	C_u		
[mm]				[kN]				
609,6	787,4	361,95	361,95	6880	18334	1385	TQOS 328871	
24	31	14,25	14,25					
	813,562	479,425	479,425	9727	27890	1877	TQOS 334108	
	32,03	18,875	18,875					
635	901,7	654,05	654,05	14342	41134	2677	TQOS 334141	
25	35,5	25,75	25,75					
660	855	318,48	400,842	6331	17304	1208	TQOS 334002	(1)
25,9843	33,6614	12,5385	15,7812					
660,4	812,8	365,125	385,424	6567	20244	1440	TQOS 328977	(1)
26	32	14,375	15,1745					
679,45	901,7	552,45	552,45	12027	36063	2396	TQOS 334015	
26,75	35,5	21,75	21,75					
	901,7	552,45	635	12027	36063	2396	TQOS 334016	(1)
	35,5	21,75	25					
682,625	965,2	701,675	701,675	17288	49371	3101	TQOS 334060	
26,875	38	27,625	27,625					
685,8	876,3	355,6	352,425	7177	20093	1397	TQOS 328955	
27	34,5	14	13,875					
710	900	410	410	8246	24199	1638	TQOS 334051	
27,9528	35,4331	16,1417	16,1417					
711,2	914,4	317,5	317,5	6555	17538	1198	TQOS 329010	
28	36	12,5	125000					
	914,4	387,35	425,45	6947	19090	1349	TQOS 328988	(1)
	36	15,25	16,75					

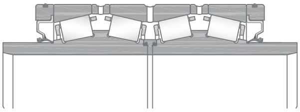
(1) Bearing with inner ring extended at both sides



TQOS$_2$

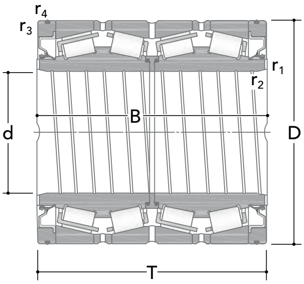


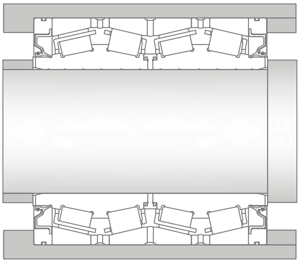
TQOS$_3$



TQOES

Dimensions			Factor	Mass	Designation
d	r1,2min	r3,4min	e		
[mm]				[kg]	
609,6 24	3,3	6,4	0,37	430	TQOS 328871
	3,3	6,4	0,37	693,00	TQOS 334108
635 25	3,3	6,4	0,35	1354	TQOS 334141
660 25,9843	4	5	0,35	488,00	TQOS 334002 (1)
660,4 26	2	6,4	0,33	396,00	TQOS 328977 (1)
679,45 26,75	3,3	6,4	0,33	975,00	TQOS 334015
	3,3	6,4	0,33	1030	TQOS 334016 (1)
682,625 26,875	3,3	6,4	0,35	651	TQOS 334060
685,8 27	3,3	6,4	0,37	506	TQOS 328955
710 27,9528	3	6	0,33	602,00	TQOS 334051
711,2 28	2,5	6,4	0,37	490,00	TQOS 329010
	5,5	3,3	0,37	602	TQOS 328988 (1)





TQOS[1]

Main dimensions				Basic load ratings		Fatigue load limit	Designation
d	D	T	B	Dynamic C	Static C_0	C_u	
[mm]				[kN]			
749,3	990,6	605	605	13083	40849	2565	TQOS 334082
29,5	39	23,8189	23,8189				
762	1079,5	787,4	787,4	21062	61002	3701	TQOS 334075
30	42,5	31	31				
825,5	1168,4	844,55	844,55	24725	73100	4349	TQOS 334135
32,5	46	33,25	33,25				
863,6	1169,987	844,55	844,55	23214	70966	4079	TQOS 334150
34	46,0625	33,25	33,25				

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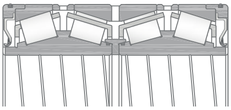
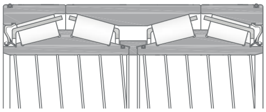
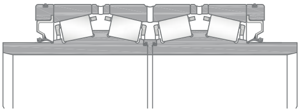
(1) Bearing with inner ring extended at both sides



TQOS2



TQOS3



TQOES

Dimensions			Factor	Mass	Designation
d	r1,2min	r3,4min	e		
[mm]				[kg]	
749,3 29,5	3,3	6,4	0,37	1274	TQOS 334082
762 30	4,8	12,7	0,35	2248,00	TQOS 334075
825,5 32,5	4,8	12,7	0,31	2958,00	TQOS 334135
863,6 34	4,8	12,7	0,37	2630,00	TQOS 334150


RKB

Spherical roller bearings

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.

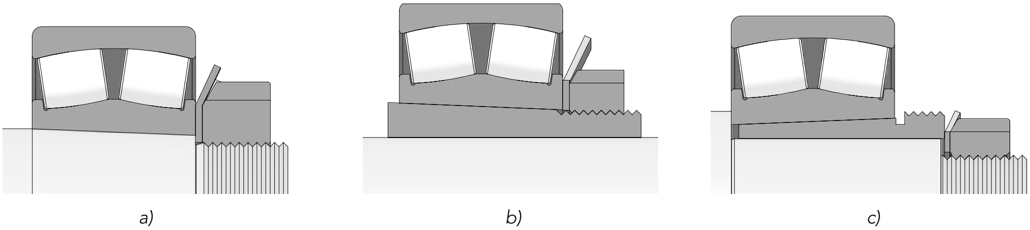
Bore diameter d [mm]		Radial internal clearance reduction [mm]		Minimum radial internal clearance after mounting		
				CN	C3	C4
over	incl.	min.	max.	min. [mm]	min. [mm]	min. [mm]
24	30	0,015	0,02	0,015	0,02	0,035
30	40	0,02	0,025	0,015	0,025	0,04
40	50	0,025	0,03	0,02	0,03	0,05
50	65	0,03	0,04	0,025	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)**.

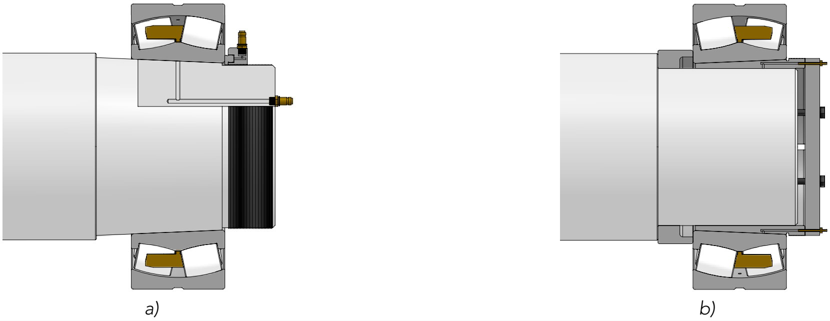
Fig.16



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

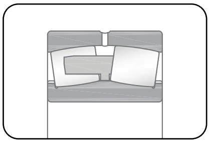


a) b)

Hydraulic methods for mounting tapered bore bearings: a) hydraulic nut b) special sleeve

Designs and variants

Type CA/CAF



HB BAINITE HT

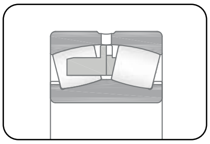
S STABILIZATION

TOUGH ROLLER

VICTORY LINE

- 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



HB BAINITE HT

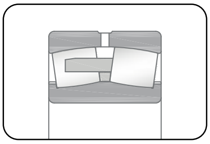
S STABILIZATION

TOUGH ROLLER

VICTORY LINE

- 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



E-TYPE

HB BAINITE HT

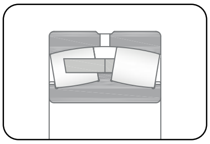
S STABILIZATION

TOUGH ROLLER

VICTORY LINE

- 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



HB BAINITE HT

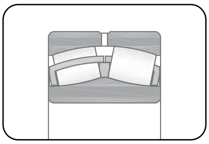
S STABILIZATION

TOUGH ROLLER

VICTORY LINE

- 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

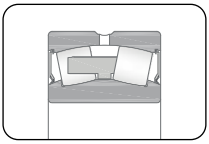


HB BAINITE HT
S STABILIZATION
TOUGH ROLLER
V VICTORY LINE

- 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

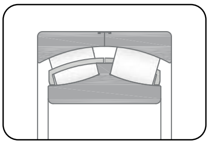
Sealed type



HB BAINITE HT
S STABILIZATION
TOUGH ROLLER
V 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

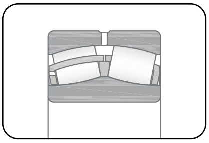
Type WOR



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

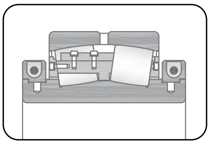
Type ECCS



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)

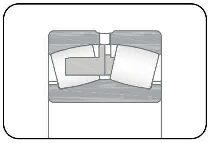
Split type SSRB



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

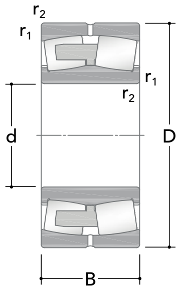
Suffixes	Cage and design
M	Machined brass cage guided on rollers
MA	Machined brass cage guided on outer ring
MB	Machined brass cage guided on inner ring
CA	Double pronged machined brass cage
CAF	Double pronged machined steel cage
CAB	Steel pin-type cage with or without separate guiding slinger and pierced 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

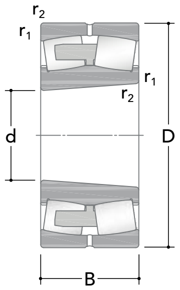
Suffixes	Lubrication
W33	Annular groove and three lubrication holes in outer ring
W33X	Annular groove and more than three lubrication holes in outer ring
W513	W33 + six lubrication holes in inner ring
W513B	W33 + annular groove and six lubrication holes in inner ring
W513BX	W33X + annular groove and 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

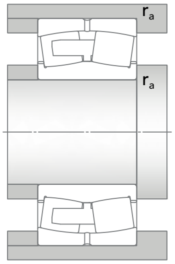
Prefixes	Alternative designation
BS2	Spherical roller bearing followed by size indication
SRB	Out of standard spherical roller bearing followed by drawing number
SSRB	Out of standard split spherical roller bearing followed by drawing number



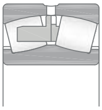
CA/CAF



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]		
20	52	18	49,1	43,8	4,7	12200	15100	**22205/20**
25	52	18	49,9	44,8	4,7	12200	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	6700	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	7000	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	4400	6300	**21312**
	130	46	326	335	36	4000	5300	**22312**
65	100	35	137	173	20,3	4000	6300	**24013**
	120	31	198	216	23,7	5000	7550	**22213**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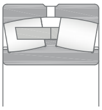
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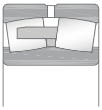
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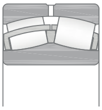
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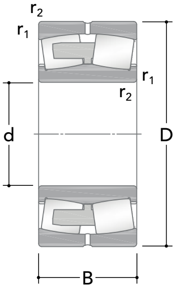
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
20	1	1	0,35	0,28	**22205/20**	-
25	1	1	0,35	0,26	**22205**	**22205 K**
	1,1	1	0,3	0,28	**21305**	-
30	1	1	0,31	0,29	**22206**	**22206 K**
	1,1	1	0,27	0,41	**21306**	**21306 K**
35	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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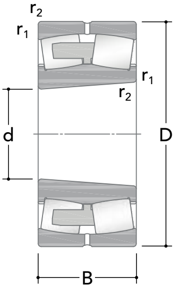

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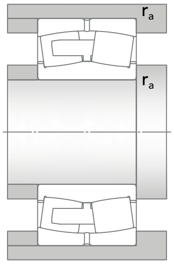
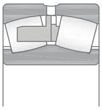


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
65	140	33	243	270	28,7	4300	6000	**21313**
(cont.)	140	48	361	360	37,3	3800	5080	**22313**
70	125	31	213	228	25,3	5000	6900	**22214**
	150	35	291	325	34,1	3700	5600	**21314**
	150	51	419	430	44,7	3400	5020	**22314**
75	115	40	181	232	28,1	3500	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	6700	**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	3500	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	2600	4000	**24020**
	165	52	446	583	52,2	2800	4060	**23120**
	165	65	468	640	67	2400	3200	**24120**
	180	46	433	490	48,2	3400	4500	**22220**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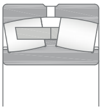
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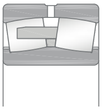
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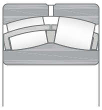
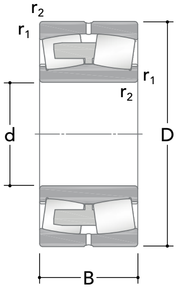

CC

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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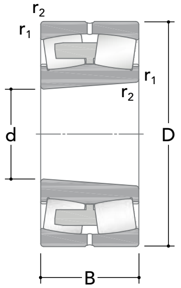

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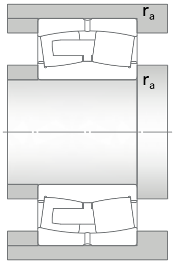
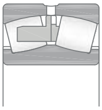


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
100	180	60,3	554	680	62	2400	3790	**23220**
(cont.)	215	47	433	496	48,6	2700	4550	**21320**
	215	73	860	950	87,8	2400	3810	**22320**
110	170	45	400	530	45,7	3400	4300	**23022**
	170	60	439	620	66,9	2200	3600	**24022**
	180	56	520	687	60,3	2600	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	2400	3450	**23124**
	200	80	679	950	94	1700	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	1800	3000	**24026**
	210	64	695	980	76,6	2400	3300	**23126**
	210	80	703	1005	98,5	1500	2400	**24126**
	230	64	758	950	87,1	2600	4290	**22226**
	230	64	657	920	87,1	2200	-	**29226**
	230	80	927	1170	103	1700	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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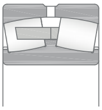
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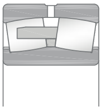
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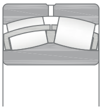
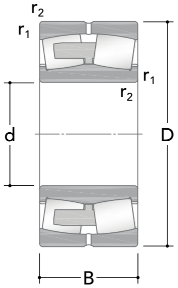

CC

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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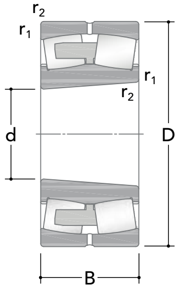

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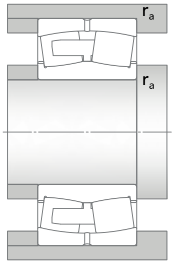
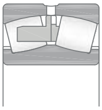


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
140	250	68	863	1090	85,8	2400	3600	**22228**
(cont.)	250	88	1094	1450	119	1700	2650	**23228**
	300	102	1454	1670	130	1700	2990	**22328**
150	225	56	538	750	73,5	2400	3200	**23030**
	225	75	682	1040	100	1600	2600	**24030**
	250	80	1090	1390	114	1800	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	1500	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	1100	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	1400	2200	**24036**
	300	96	1413	2060	157	1700	2500	**23136**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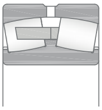
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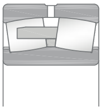
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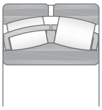
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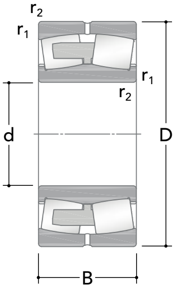
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
140	3	2,5	0,26	14	**22228**	**22228 K**
(cont.)	3	2,5	0,33	19	**23228**	**23228 K**
	4	3	0,35	36,5	**22328**	**22328 K**
150	2,1	2	0,22	7,95	**23030**	**23030 K**
	2,1	2	0,3	10,5	**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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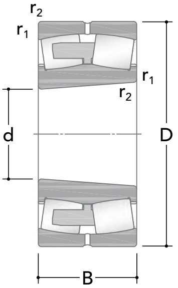
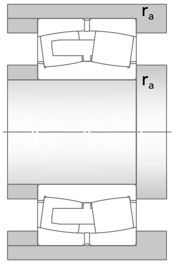
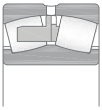


K/K30



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	2200	2600	**23938**
	290	75	931	1340	121	1900	2400	**23038**
	290	100	1186	1807	160	1300	2000	**24038**
	320	104	1656	2380	181	1500	2340	**23138**
	320	128	1652	2500	209	1000	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	2000	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	1800	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	790	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	1750	2000	**23948**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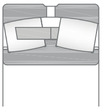
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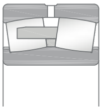
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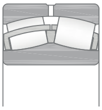
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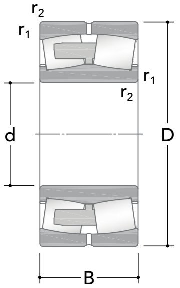
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
180	3	2,5	0,37	34,5	**24136**	**24136 K30**
(cont.)	4	3	0,26	29,5	**22236**	**22236 K**
	4	3	0,35	39,5	**23236**	**23236 K**
	4	3	0,35	71,5	**22336**	**22336 K**
190	2	2	0,16	8,3	**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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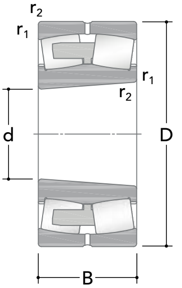
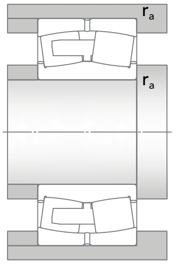
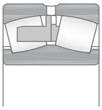


K/K30



Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit 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	610	980	**24152**
	480	130	2742	3550	283	1200	1650	**22252**
	480	174	3517	4850	358	850	1200	**23252**
	540	165	3810	4570	319	780	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	860	1400	**24056**
	460	146	2784	4250	319	1000	1320	**23156**
	460	180	3225	5100	413	560	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	1300	1600	**23960**
	460	118	2350	3600	262	1200	1500	**23060**



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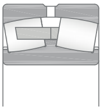

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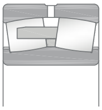

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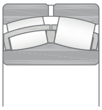

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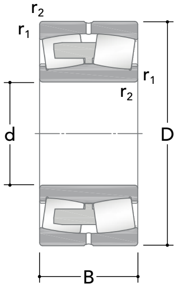
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
240	3	2,5	0,23	33,5	**23048**	**23048 K**
(cont.)	3	2,5	0,3	43	**24048**	**24048 K30**
	4	3	0,3	66,5	**23148**	**23148 K**
	4	3	0,4	83	**24148**	**24148 K30**
	4	3	0,27	83	**22248**	**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**



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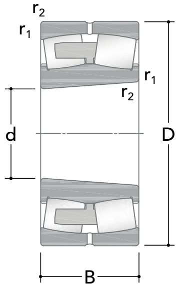
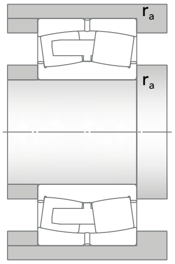
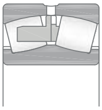


K/K30



Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
300	460	160	3079	5210	352	790	1250	**24060**
(cont.)	500	160	3388	5150	348	950	1200	**23160**
	500	200	4100	6300	464	510	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	1250	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	1200	1400	**23968**
	520	133	2913	4650	330	1000	1300	**23068**
	520	180	3859	6560	472	700	1110	**24068**
	580	190	4545	6850	474	800	1000	**23168**
	580	243	5709	8940	622	400	700	**24168**
	620	224	5362	8220	544	500	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	690	1000	**23172**
	600	243	5928	9590	669	366	650	**24172**
	650	170	4442	6380	431	580	1200	**22272**
	650	232	5694	8800	567	530	1000	**23272**
380	520	106	2211	3950	284	1100	1200	**23976**



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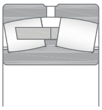

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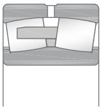

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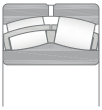
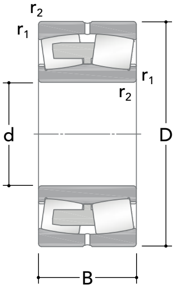


CC

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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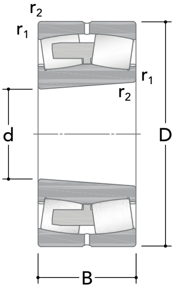
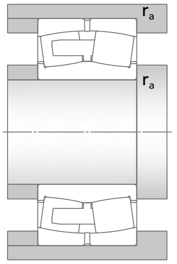
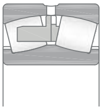


K/K30



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	600	950	**24076**
	620	194	4561	7600	493	520	1140	**23176**
	620	243	5954	10130	705	330	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	580	1050	**24080**
	650	200	4864	8150	520	530	1060	**23180**
	650	250	6394	10650	720	310	600	**24180**
	720	256	6958	10900	672	480	900	**23280**
	820	243	7868	10480	669	400	950	**22380**
420	560	106	2283	4250	297	1000	1100	**23984**
	620	150	3651	6400	412	600	1250	**23084**
	620	200	4624	8690	577	470	1050	**24084**
	700	224	5919	9700	615	480	1000	**23184**
	700	280	7581	12520	851	290	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	450	950	**24088**
	720	226	6215	10300	668	450	950	**23188**
	720	280	7816	13200	893	280	550	**24188**
	790	280	8216	13380	792	390	760	**23288**
460	580	118	2042	4830	340	560	990	**24892**
	620	118	2558	5130	350	540	1260	**23992**
	680	163	4142	7650	456	560	1150	**23092**
	680	218	5459	10350	669	450	910	**24092**
	760	240	6773	11235	671	430	800	**23192**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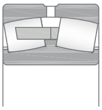
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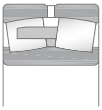
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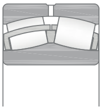
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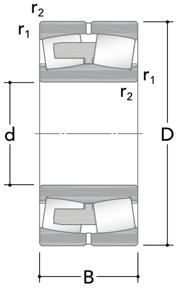
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
380	5	4	0,22	115	**23076**	**23076 K**
(cont.)	5	4	0,3	150	**24076**	**24076 K30**
	5	4	0,3	230	**23176**	**23176 K**
	5	4	0,37	300	**24176**	**24176 K30**
	6	5	0,35	375	**23276**	**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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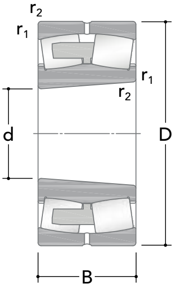
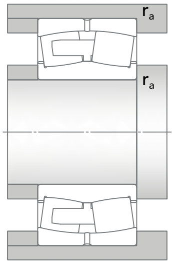
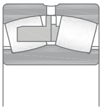


K/K30



Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
460	760	300	8664	14950	983	260	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	520	1200	**23996**
	700	165	4216	8000	448	490	1100	**23096**
	700	218	5525	10900	688	420	850	**24096**
	790	248	7365	12450	777	370	850	**23196**
	790	308	9200	15920	1035	240	450	**24196**
	870	310	9891	16750	934	350	700	**23296**
500	620	90	1751	4035	293	470	1100	**238/500**
	670	128	2969	6110	409	472	1080	**239/500**
	720	167	4538	8200	504	500	1050	**230/500**
	720	218	5876	11240	731	400	820	**240/500**
	830	264	8075	13940	826	350	810	**231/500**
	830	325	10163	17720	1115	240	400	**241/500**
	920	336	11211	17950	1042	330	640	**232/500**
530	650	118	2124	5300	375	490	950	**248/530**
	710	136	3309	6890	457	460	1000	**239/530**
	780	185	5327	9760	607	420	950	**230/530**
	780	250	6974	13740	820	370	800	**240/530**
	870	272	8581	15140	864	330	750	**231/530**
	870	335	10955	19150	1212	240	400	**241/530**
	980	355	13324	20410	1209	300	550	**232/530**
560	750	140	3571	7300	490	450	900	**239/560**
	820	195	5793	10840	659	400	850	**230/560**
	820	258	7534	14890	979	350	700	**240/560**
	920	280	9596	16530	976	310	700	**231/560**
	920	355	12551	21850	1331	200	350	**241/560**
	1030	365	13983	22350	1300	260	560	**232/560**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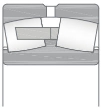
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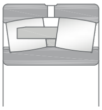
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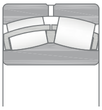
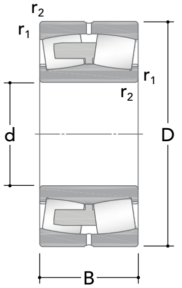
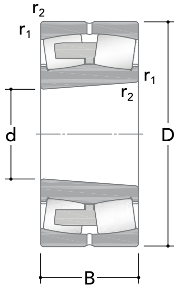

CC

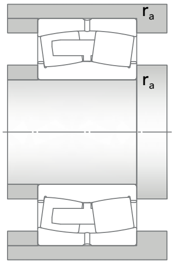
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
460	7,5	6	0,37	560	**24192**	**24192 K30**
(cont.)	7,5	6	0,35	695	**23292**	**23292 K**
480	3	2,5	0,13	61	**23896**	**23896 K**
	5	4	0,18	125	**23996**	**23996 K**
	6	5	0,21	215	**23096**	**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**



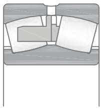
CA/CAF



K/K30



Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit 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	310	700	**240/600**
	980	300	10814	18810	1088	290	650	**231/600**
	980	375	13584	23870	1458	180	350	**241/600**
	1090	388	15786	25730	1456	230	550	**232/600**
630	780	112	2550	6150	412	400	760	**238/630**
	850	165	4793	10160	621	370	800	**239/630**
	920	212	6968	13480	779	350	750	**230/630**
	920	290	9159	18900	1114	300	650	**240/630**
	1030	315	12778	21390	1196	240	600	**231/630**
	1030	400	15082	27230	1614	170	350	**241/630**
670	820	112	2843	6920	431	400	750	**238/670**
	900	170	5146	11060	677	330	750	**239/670**
	980	230	7919	15850	869	340	700	**230/670**
	980	308	10478	21850	1287	270	550	**240/670**
	1090	336	13199	23465	1324	220	550	**231/670**
	1090	412	16393	30100	1755	160	300	**241/670**
	1220	438	19011	31850	1687	200	450	**232/670**
710	870	118	3049	7590	499	330	700	**238/710**
	950	180	5702	12500	740	340	700	**239/710**
	950	243	6871	15680	929	270	500	**249/710**
	1030	236	8669	17800	964	330	650	**230/710**
	1030	315	11237	23380	1404	240	550	**240/710**
	1150	345	14737	26200	1506	220	500	**231/710**
	1150	438	17939	33900	1894	150	310	**241/710**
	1280	450	21348	35360	1969	180	450	**232/710**
750	920	128	3487	8560	547	310	600	**238/750**
	1000	185	6164	13500	792	320	650	**239/750**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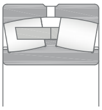
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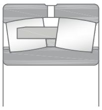
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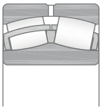
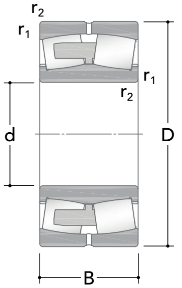

CC

Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
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**



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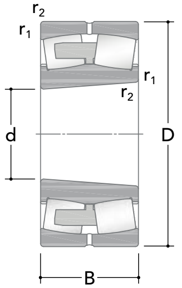
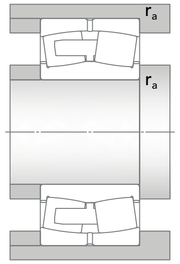
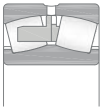


K/K30



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]		
750	1000	250	7757	19900	1096	280	480	**249/750**
(cont.)	1090	250	10061	18790	1082	260	600	**230/750**
	1090	335	12254	26530	1438	220	500	**240/750**
	1220	365	16536	29030	1696	200	430	**231/750**
	1220	475	20491	37530	2144	140	220	**241/750**
	1360	475	21420	36390	1994	170	260	**232/750**
800	980	180	4811	12920	818	300	560	**248/800**
	1060	195	6795	15300	863	280	600	**239/800**
	1060	258	8136	19860	1058	220	450	**249/800**
	1150	258	10357	21790	1148	230	500	**230/800**
	1150	345	13547	28670	1652	200	500	**240/800**
	1280	375	18285	31500	1794	180	450	**231/800**
	1280	475	21893	40580	2313	130	250	**241/800**
	1420	488	25160	43610	2328	160	400	**232/800**
850	1030	136	3982	10500	629	260	600	**238/850**
	1120	200	7131	16420	919	240	600	**239/850**
	1120	272	9390	22800	1358	200	450	**249/850**
	1220	272	11300	23180	1226	220	500	**230/850**
	1220	365	15297	32230	1884	180	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	220	550	**239/900**
	1280	280	12202	26600	1311	220	500	**230/900**
	1280	375	16375	35200	2022	170	400	**240/900**
	1420	515	25772	50900	2694	110	200	**241/900**
950	1250	224	8699	20420	1104	200	500	**239/950**
	1250	300	10761	26480	1470	160	340	**249/950**
	1360	300	14561	28530	1574	180	450	**230/950**
	1360	412	18280	41310	2200	150	400	**240/950**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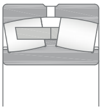
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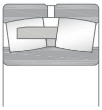
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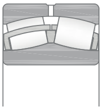
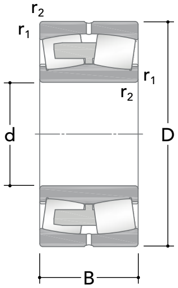
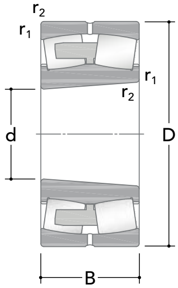

CC

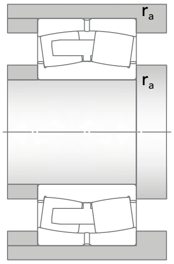
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
750	6	5	0,22	560	249/750	249/750 K30
(cont.)	7,5	6	0,21	795	230/750	230/750 K
	7,5	6	0,28	1070	240/750	240/750 K30
	9,5	8	0,28	1700	231/750	231/750 K
	9,5	8	0,37	2100	241/750	241/750 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



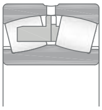
CA/CAF



K/K30



Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
950 (cont.)	1500	545	28438	56490	2961	100	200	**241/950**
1000	1220	165	5465	14370	848	200	450	**238/1000**
	1320	315	11935	29660	1443	150	500	**249/1000**
	1420	308	14611	31850	1692	160	420	**230/1000**
	1420	412	18907	41390	2217	150	350	**240/1000**
	1580	462	25656	49060	2500	130	350	**231/1000**
	1580	580	31175	62060	3342	90	200	**241/1000**
1060	1280	165	5638	15010	848	180	450	**238/1060**
	1280	218	10831	25840	1190	180	450	**248/1060**
	1400	250	11436	26020	1415	160	360	**239/1060**
	1400	335	13371	32530	1791	150	280	**249/1060**
	1500	325	16398	35610	1809	150	400	**230/1060**
	1500	438	20759	47420	2430	140	350	**240/1060**
1120	1360	243	8357	23910	1395	160	300	**248/1120**
	1460	335	13811	34540	1816	130	260	**249/1120**
	1580	462	22569	52160	2655	120	300	**240/1120**
1180	1420	180	6851	18600	1072	150	400	**238/1180**
	1420	243	8965	26560	1535	150	280	**248/1180**
	1540	272	13119	31270	1658	140	410	**239/1180**
	1540	355	15786	40580	2148	120	240	**249/1180**
	1660	475	25876	58900	3019	120	300	**240/1180**
1250	1750	375	21256	46500	2274	120	350	**230/1250**
1320	1600	280	11276	33340	1851	130	230	**248/1320**
	1720	400	18889	49350	2467	100	200	**249/1320**
1500	1820	315	14757	45140	2354	100	220	**248/1500**
	1950	450	22889	62830	3142	-	190	**249/1500**



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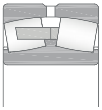

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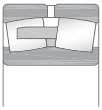

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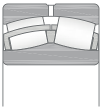
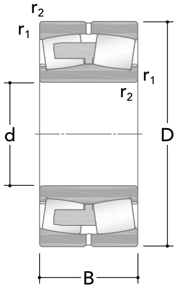
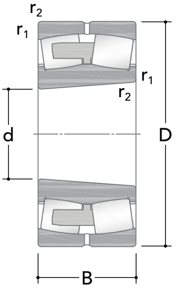


CC

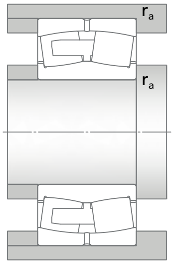
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
950	12	10	0,35	3540	**241/950**	**241/950 K30**
(cont.)						
1000	6	5	0,12	410	**238/1000**	**238/1000 K**
	7,5	6	0,21	1200	**249/1000**	**249/1000 K30**
	7,5	6	0,19	1600	**230/1000**	**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**



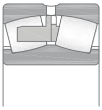
CA/CAF



K/K30



Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
1800	2180	375	20274	63090	3035	70	140	**248/1800**



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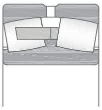

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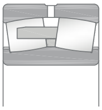

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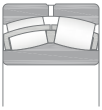
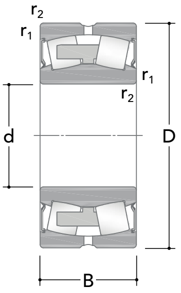


CC

Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
1800	9,5	8	0,15	2900	**248/1800**	**248/1800 K30**



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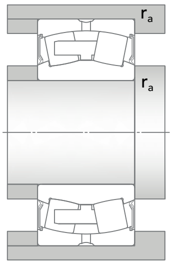
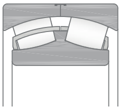


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
25	52	23	49,7	43,8	4,73	5300	**BS2 2205**
30	62	25	65,3	59,3	6,3	4580	**BS2 2206**
35	72	28	87,5	84,4	9,2	3760	**BS2 2207**
40	80	28	100,4	88,5	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**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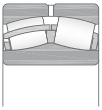
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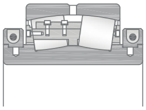
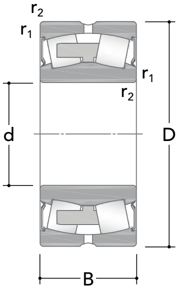

SSRB

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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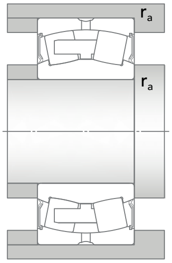
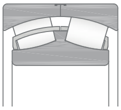


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
80 (cont.)	170	67	519	533	54,3	1800	**BS2 2316**
85	150	44	292	321	34,1	1640	**BS2 2217**
90	160	48	326	372	38,7	1568	**BS2 2218**
	160	52,4	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**



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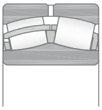

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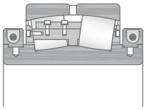
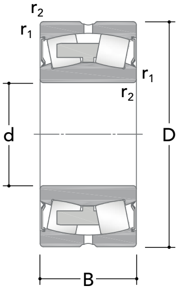


SSRB

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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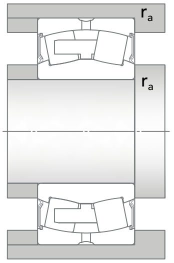
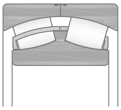


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
130	230	80	821	1050	103	460	**23226**
(cont.)	280	93	1159	1304	113	450	**22326**
140	210	53	477	672	67	600	**23028**
	210	69	596	890	87	500	**24028**
	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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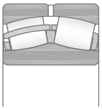

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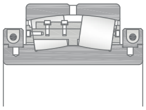
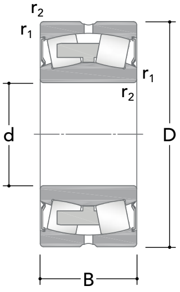


SSRB

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	-



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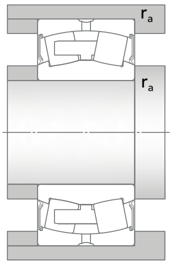
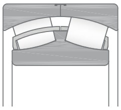


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
180	300	96	1259	1775	158	370	**23136**
(cont.)	300	118	1424	2150	195	320	**24136**
	320	86	1248	1540	138	470	**22236**
190	320	104	1431	2060	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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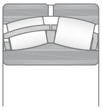

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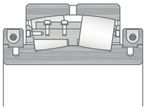
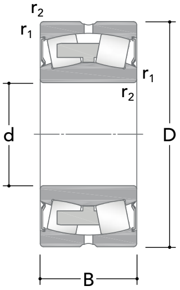


SSRB

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**



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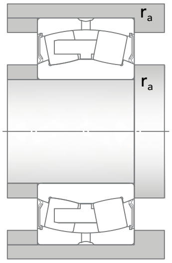
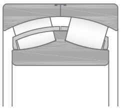


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
d	D	B	Dynamic C	Static C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
360	600	192	4551	6922	488	190	**23172**
400	650	200	4785	7509	520	130	**23180**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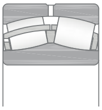
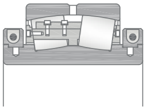
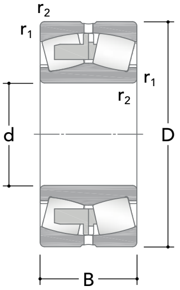
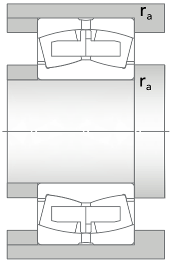

ECCS


SSRB

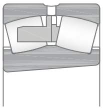
Dimensions			Calculation factor e	Mass	Designation	
d	$r_{1,2min}$	r_{amax}			Cylindrical bore	Tapered bore
[mm]				[kg]		
360	5	4	0,28	214	**23172 2CZ**	**23172 K2CZ**
400	6	5	0,28	255	**23180 2CZ**	**23180 K2CZ**



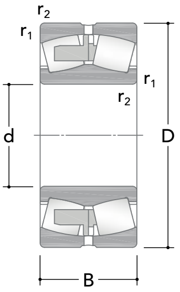
ROVSX



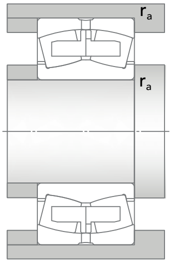
Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
40	90	33	153	140	15	5400	7100	**22308**
45	100	36	187	183	19,6	4900	6300	**22309**
50	110	40	225	224	24	4300	5600	**22310**
55	120	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

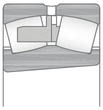
Dimensions			Calculation factor	Mass	Designation	
d	$r_{1,2min}$	r_{amax}	e		Cylindrical bore	Tapered bore
[mm]				[kg]		
40	1,5	1,5	0,37	1,05	22308 ROVSX	22308 KROVSX
45	1,5	1,5	0,37	1,4	22309 ROVSX	22309 KROVSX
50	2	2	0,37	1,9	22310 ROVSX	22310 KROVSX
55	2	2	0,35	2,45	22311 ROVSX	22311 KROVSX
60	2,1	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 C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		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**

Toroidal roller bearings

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.

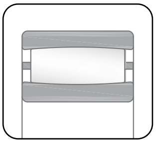
For additional information please consult the RKB application engineering services.

Bore diameter d [mm]		Radial internal clearance reduction [mm]		Minimum radial internal clearance after mounting		
				CN	C3	C4
over	incl.	min.	max.	min. [mm]	min. [mm]	min. [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

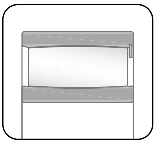
Type J



OPTIMIZED R&D

- 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

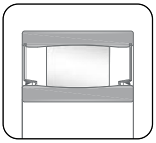


OPTIMIZED REINFORCED

- 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



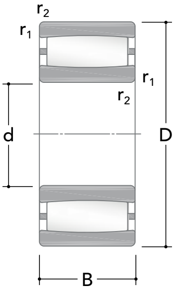
OPTIMIZED REINFORCED

- 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

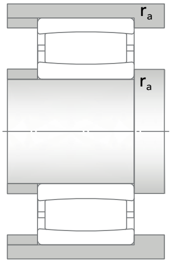
Prefixes	Basic designation
TORB	Toroidal roller bearing followed by size indication or drawing number
SB	Toroidal roller bearing followed by size indication or drawing number

Suffixes	Cage
V	Full complement of rolling elements (without cage)
J	Pressed steel cage

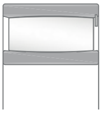
Suffixes	External design
2CS	NBR seal on both sides
FF	FKM seal on both sides
K	Tapered bore, taper 1:12
K30	Tapered bore, taper 1:30



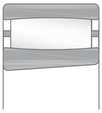
J



Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	load limit 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

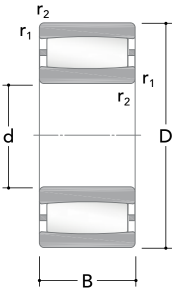


V



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	-



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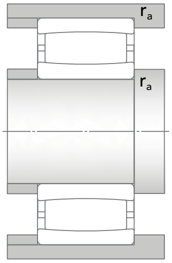
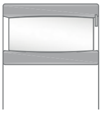


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
55	100	25	112	112	13,3	6400	8100	**TORB 2211**
(cont.)	100	25	128	132	15,8	-	3000	**TORB 2211**
60	85	25	109	169	19,7	-	2700	**TORB 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**



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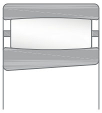
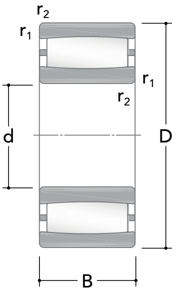


K/K30

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	-



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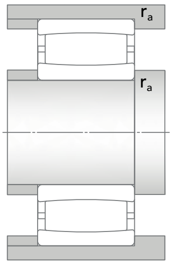
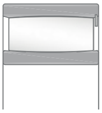


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
80	140	33	212	246	28,8	4200	5300	**TORB 2216**
(cont.)	140	33	246	300	33,8	-	1800	**TORB 2216**
	170	58	495	550	60,0	3500	4100	**TORB 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**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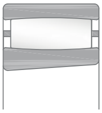
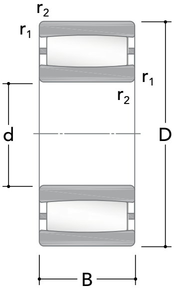

K/K30

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



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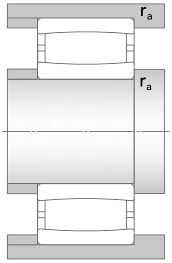
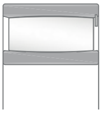


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
110	180	69	652	984	102	-	800	**TORB 4122**
(cont.)	200	53	510	609	64,6	3300	3900	**TORB 2222**
120	180	46	364	520	53,9	3000	3800	**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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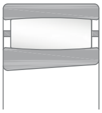
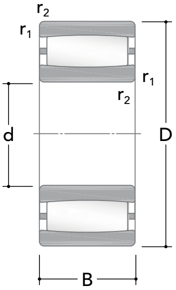

K/K30

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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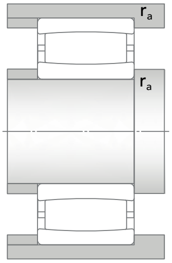
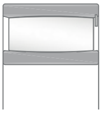


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
160	240	80	895	1440	137	-	500	**TORB 4032**
(cont.)	270	86	967	1380	130	1900	2300	**TORB 3132**
	270	109	1410	2150	201	-	300	**TORB 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**



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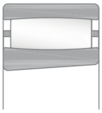
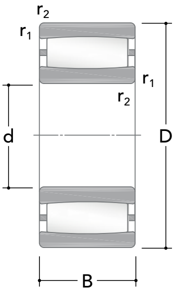


K/K30

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



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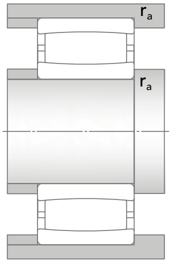
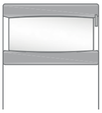


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
240	360	92	1280	2110	183	1500	1800	**TORB 3048**
240	400	128	2240	3400	282	1300	1500	**TORB 3148**
260	400	104	1700	2810	227	1200	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**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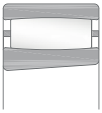
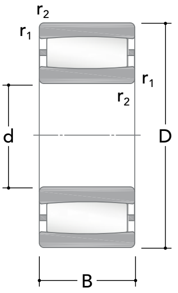

K/K30

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



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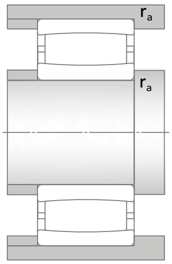
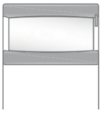


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
420	560	106	2100	4220	312	820	1080	**TORB 3984**
	620	150	3650	6340	459	800	980	**TORB 3084**
	700	224	5780	10330	725	650	790	**TORB 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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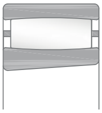
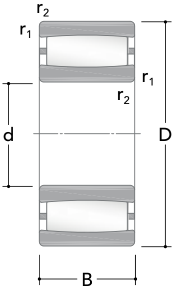


K/K30

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



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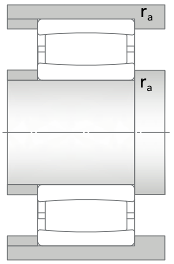
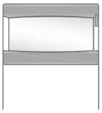


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
600	800	150	3860	8750	573	580	670	**TORB 39/600**
	870	200	6150	12040	772	480	620	**TORB 30/600**
	980	300	9860	17760	1152	440	530	**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**



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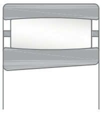
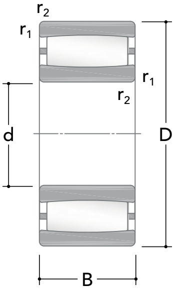


K/K30

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



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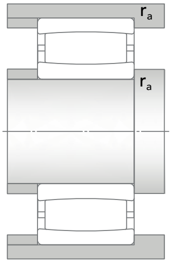
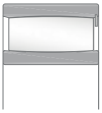


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	B	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
900 (cont.)	1280	280	12220	26310	1541	290	360	**TORB 30/900**
950	1250	224	9100	21750	1263	290	390	**TORB 39/950**
	1360	300	12860	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**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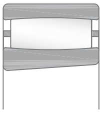
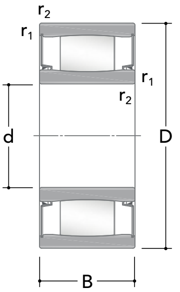

K/K30

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



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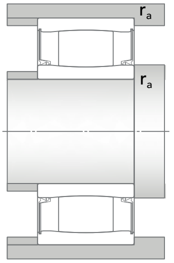
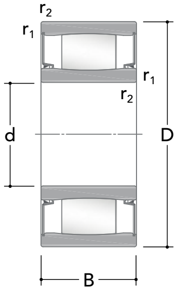


Main dimensions			Basic load ratings		Fatigue	Speed ratings	Designation
d	D	B	Dynamic	Static	load limit	Limiting	Standard design
			C	C_0	C_u		
[mm]			[kN]			[rpm]	
50	72	40	144	220	25	182	**TORB 6910 V2CS**
65	100	35	100	180	19,6	137	**TORB 4013 V2CS**
75	105	54	200	325	37,5	120	**TORB 6915 V2CS**
	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**



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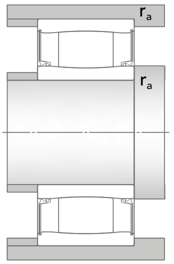


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings	Designation
			Dynamic	Static			
d	D	B	C	C_0	C_u	Limiting	Standard design
[mm]			[kN]			[rpm]	
180	280	100	1320	2099	195	46	**TORB 4036 V2CS**
	300	118	1725	2808	231	41	**TORB 4136 V2CS**
190	290	100	1343	2413	196	43	**TORB 4038 V2CS**
	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

Thrust bearings

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.

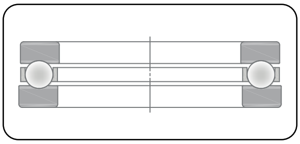
Minimum load

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

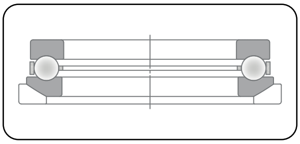


HB BAINITE HT

S STABILIZATION

- Flat housing locating washer
- Separable design
- One-piece machined brass cage (M) guided on balls
- Supports unidirectional axial loads

Variant 53M+U

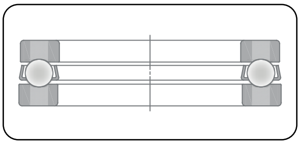


HB BAINITE HT

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

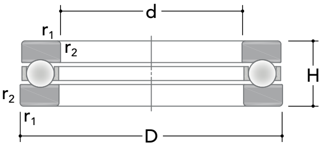
- Flat housing locating washer
- Separable design
- One-piece pressed steel cage (J) guided on balls
- Supports unidirectional axial load

Prefixes	
TBB	Out of standard thrust ball bearing followed by drawing number
U	Sphered housing washer associated to related thrust ball bearing

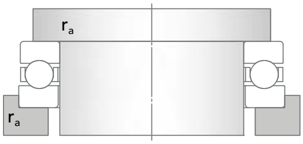
Suffixes	Internal design
SP	Special or non-standard bearing

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

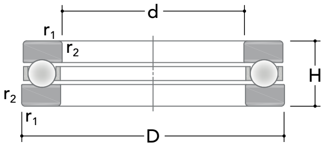


51M

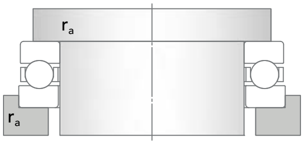


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
10	24	9	9,95	15.3	0,57	9550	13200	**51100**
	26	11	12,7	18,6	0,706	8050	11050	**51200**
12	26	9	10,4	16,6	0,63	9000	13000	**51101**
	28	11	13,3	20,8	0,776	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	17,2	30,6	1	6800	9500	**51203**
20	35	10	15,1	29,5	1,07	7600	10000	**51104**
	40	14	22,5	40,5	1,4	6000	8000	**51204**
25	42	11	18,2	39,3	1,44	6300	9000	**51105**
	47	15	27,6	55,1	1,9	5300	7500	**51205**
	52	18	34,8	60,9	2,23	4500	6400	**51305**
	60	24	55,5	96,5	2,49	3600	5000	**51405**
30	47	11	19	43,9	1,6	6000	8500	**51106**
	52	16	25,5	51	1,9	4800	6700	**51206**
	60	21	37,9	71,6	2,4	3800	4600	**51306**
	70	28	72,8	137	4,5	3000	4300	**51406**
35	52	12	20,1	51,5	1,87	5600	7500	**51107**
	62	18	35,6	73,9	2,6	4000	5600	**51207**
	68	24	49,9	96,9	3,61	3400	4800	**51307**
	80	32	87,2	170	5,1	2600	3800	**51407**
40	60	13	26,4	63,1	2,36	5000	7050	**51108**
	68	19	46.8	106	3,7	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**

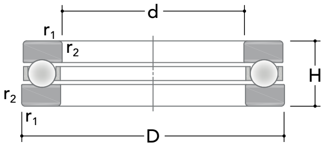


51M



Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
40 (cont.)	90	36	114	225	6,9	2400	3400	**51408**
45	65	14	26,7	69,5	2,53	5500	6300	**51109**
50	70	14	27	73,7	2,8	4500	6400	**51110**
	78	22	49,9	116	4,3	3500	4550	**51210**
	95	31	88,5	190	6,4	2600	3650	**51310**
	110	43	159	345	12,7	2800	2850	**51410**
55	78	16	30,7	85,5	3	3800	5300	**51111**
	90	25	62,1	146	4,9	2800	4000	**51211**
	105	35	104	225	8,5	2200	3200	**51311**
	120	48	195	400	14,6	1850	2500	**51411**
60	85	17	42,1	122	4,59	3650	5000	**51112**
	95	26	62,4	155	5,1	2850	3850	**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	4850	**51113**
	100	27	63,8	165	5,6	2650	3650	**51213**
	115	36	106	240	8,8	2000	3000	**51313**
	140	56	216	491	18	1550	2250	**51413**
70	95	18	40,4	120	4,4	3400	4550	**51114**
	105	27	65,8	175	5,85	2600	3600	**51214**
	125	40	135	320	11,8	1900	2650	**51314**
	150	60	235	550	19,7	1450	2100	**51414**
75	100	19	44,3	145	4,9	3250	4350	**51115**
	110	27	67,8	185	6,2	2400	3450	**51215**
	135	44	165	390	14	1750	2420	**51315**
	160	65	254	612	20,8	1350	1900	**51415**

Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
40 (cont.)	1,1	1	1,1	**51408**
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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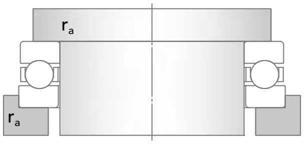
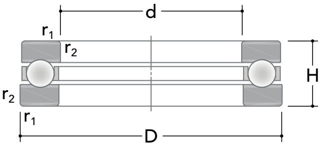


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
80	105	19	44,9	153	5,1	3100	4400	**51116**
	115	28	76,1	208	7,69	2400	3450	**51216**
	140	44	159	390	13,8	1700	2450	**51316**
	170	68	302	750	25	1250	1750	**51416**
85	110	19	46,2	146	5,4	3000	4300	**51117**
	125	31	97,5	275	9,8	2200	3000	**51217**
	150	49	193	465	14	1600	2200	**51317**
	180	72	287	756	24	1200	1600	**51417**
90	120	22	59,2	208	7,6	2600	3800	**51118**
	135	35	119	325	10,5	2000	2850	**51218**
	155	50	195	505	14,8	1500	2200	**51318**
	190	77	308	815	25,6	1100	1500	**51418**
100	135	25	85.2	290	9,15	2400	3200	**51120**
	150	38	124	345	11	1800	2450	**51220**
	170	55	229	610	18,6	1400	1900	**51320**
	210	85	371	1060	32,1	950	1400	**51420**
110	145	25	87,4	315	9,7	2200	3200	**51122**
	160	38	130	390	11,8	1700	2450	**51222**
	190	63	281	815	24,8	1200	1700	**51322**
	197	86	452	1230	41,2			**351977**
	230	95	410	1230	34,8	900	1300	**51422**
120	155	25	88,6	335	9,65	2200	3000	**51124**
	170	39	140	445	12	1600	2200	**51224**
	210	70	329	980	28,8	1100	1500	**51324**
	250	102	527	1730	36	800	1100	**51424**
130	170	30	118	435	13,6	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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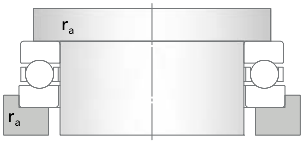
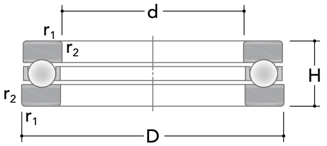


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
130	225	75	359	1150	32	1000	2400	**51326**
(cont.)	270	110	528	1750	46	750	1000	**51426**
140	180	31	112	440	13	1850	2750	**51128**
	200	46	208	630	17,9	1400	1950	**51228**
	240	80	397	1340	32	950	1300	**51328**
	280	112	520	1740	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	247	800	22	1300	1850	**51230**
	250	80	410	1400	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	850	22,4	1200	1700	**51232**
	270	87	450	1660	41,8	850	1200	**51332**
170	215	34	134	545	14,4	1650	2350	**51134**
	240	55	286	1020	24	1100	1800	**51234**
	280	87	468	1760	43	800	1100	**51334**
180	225	34	136	575	15	1500	2200	**51136**
	250	56	304	1110	28,8	1100	1500	**51236**
	300	95	527	2000	48,2	750	1100	**51336**
190	240	37	173	710	18	1400	2000	**51138**
	270	62	334	1270	31	1000	1400	**51238**
	320	105	593	2400	51	700	950	**51338**
200	250	37	168	710	17,9	1400	1900	**51140**
	280	62	340	1350	31,7	1000	1400	**51240**
	340	110	625	2670	59,2	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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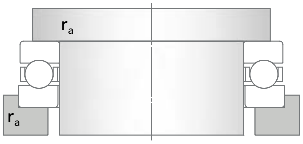
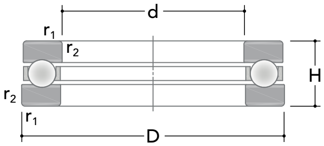


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
220	270	37	180	800	19	1320	1920	**51144**
	300	63	359	1460	33,7	970	1320	**51244**
240	300	45	240	1060	24,1	1120	1650	**51148**
	340	78	470	2000	42,3	800	1120	**51248**
260	320	45	238	1100	24	1120	1520	**51152**
	360	79	491	2210	47,1	750	1100	**51252**
	480	175	1111	5400	108	360	-	**51452**
280	350	53	319	1460	30,9	950	1300	**51156**
	380	80	494	2330	47,9	750	1000	**51256**
300	380	62	368	1760	35,9	850	1200	**51160**
	420	95	610	3050	57	650	900	**51260**
320	360	30	115	730	14,7	1200	-	**51064**
	400	48	243	1302,9	25,8	850	-	**59164**
	400	63	371	1860	36,9	800	1100	**51164**
	440	95	572	3070	57	600	850	**51264**
340	420	64	377	1960	37,7	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	39	750	1100	**51172**
	500	110	747	4150	74,2	530	750	**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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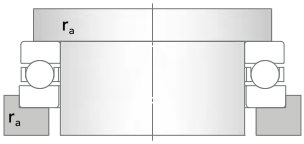
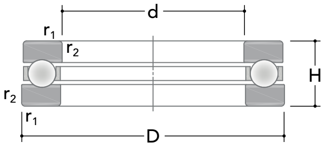


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
380	460	48	254	1510	28	780	1040	**59176**
(cont.)	460	65	397	2200	40	750	1000	**51176**
	520	112	728	4180	73	500	700	**51276**
	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	2290	41	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	2420	41,7	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	3290	56	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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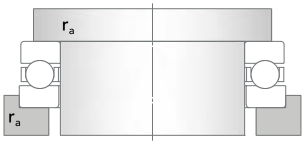
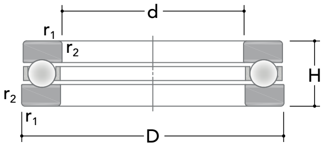


Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
522	600	40	279	2230	34,7	-	-	**351796**
530	580	38	200	1580	25	770	1060	**510/530**
	590	36	178	1360	21,8	820	1050	**351794**
	640	67	468	3110	49	560	750	**591/530**
	640	85	659	4470	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	651	4610	69	480	600	**511/560**
600	650	38	215	1790	26,6	740	950	**510/600**
	710	67	472	3380	49	510	700	**591/600**
	710	85	657	4720	70,7	480	600	**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	5410	77,8	450	600	**511/630**
670	730	45	282	2390	34	640	830	**510/670**
	800	78	534	4080	58	440	590	**591/670**
	800	105	852	6730	92,5	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**



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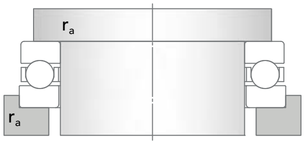
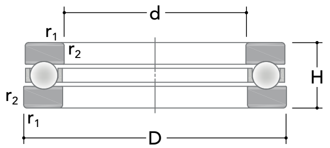
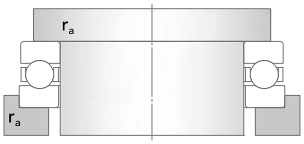


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
800	870	53	369	3160	41	510	690	**510/800**
	950	90	751	6450	84	360	480	**591/800**
	950	120	1020	8920	113	310	410	**511/800**
850	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**

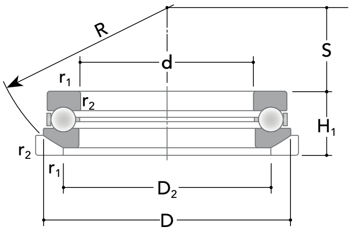


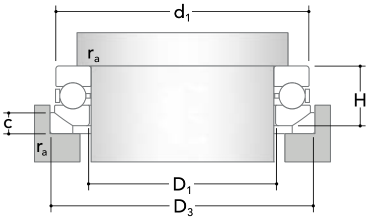
51M



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**

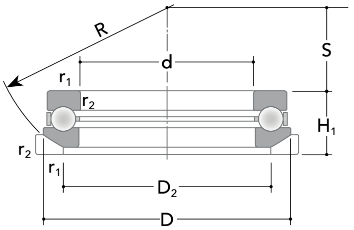
Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
1400	8	6	665	**511/1400**

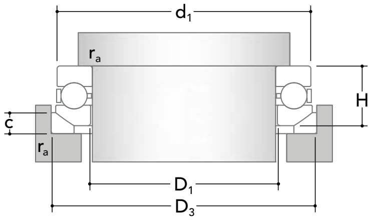




Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H_1	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
12	28	13	13,30	20,8	0,78	8000	11000	**53201**
15	32	15	16,7	27,8	0,926	7000	10000	**53202**
17	35	15	17,2	30	1	6700	9500	**53203**
20	40	17	22,9	40,5	1,4	6000	8000	**53204**
25	47	19	27,6	55	1,89	5300	7500	**53205**
30	52	20	25,9	51,7	1,87	4800	6700	**53206**
	60	25	37,9	71,3	2,4	3800	5300	**53306**
35	62	22	35,7	72,9	2,7	3800	4900	**53207**
	68	28	48,7	95,7	3,58	3000	3900	**53307**
40	68	23	44,0	96,5	3,6	3500	4600	**53208**
	78	31	62,0	121	4,5	2700	3500	**53308**
	90	42	95,5	181	6,9	2300	2800	**53408**
45	73	24	40	85,4	3,2	3200	4200	**53209**
	85	33	77	152	5,6	2500	3300	**53309**
50	78	26	50,1	114	4,4	3100	3900	**53210**
	95	37	81,0	169	6,3	2300	3000	**53310**
	110	50	157,0	335	12,7	1800	2300	**53410**
55	90	30	58,3	132	5	2700	3300	**53211**
	105	42	102,2	223	8,3	2100	2600	**53311**
	120	55	196,0	398	14,7	1600	2100	**53411**
60	95	31	59,0	138	5,2	2500	3100	**53212**
	110	42	99,6	222	8,4	1900	2700	**53312**

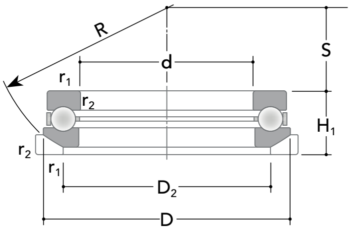
Dimensions											Mass	Designation	
d	$r_{1,2min}$	r_{amax}	d_1	D_1	D_2	D_3	H	C	R	s		Standard design	Seat washer
[mm]											[kg]		
12	0,6	0,6	28	14	20	30	11,4	3,5	25	11,5	0,045	**53201**	**U 201**
15	0,6	0,6	32	17	24	35	13,3	4	28	12	0,063	**53202**	**U 202**
17	0,6	0,6	35	19	26	38	13,2	4	32	16	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**

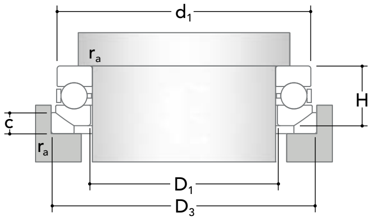




Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H_1	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
60 (cont.)	130	58	198	424	16	1500	1900	**53412**
65	100	32	60,6	149	5,5	2500	3100	**53213**
	115	43	105,0	237	8,9	1900	2400	**53313**
70	105	32	62,1	157	5,96	2500	3200	**53214**
	125	48	135,0	315	12	1700	2300	**53314**
	150	69	236	545	19,5	1300	1700	**53414**
75	110	32	64	167	6,3	2300	2900	**53215**
	135	52	164,0	387	14	1600	2100	**53315**
	160	75	249	599	21,2	1200	1600	**53415**
80	115	33	75,1	206	7,72	2300	2800	**53216**
	140	52	160,0	387	13,8	1500	1900	**53316**
85	125	37	99	270	9	1900	2600	**53217**
	150	58	173	397	14	1400	1700	**53317**
90	135	42	110	287	10,5	1800	2300	**53218**
	155	59	184	438	14,7	1300	1700	**53318**
	190	88	301	806	25,8	1000	1300	**53418**
100	150	45	120,0	324	10,8	1600	2100	**53220**
	170	64	224,0	562	18,6	1200	1600	**53320**
	210	98	372,0	1050	31,8	920	1150	**53420**
110	160	45	126	360	11,8	1600	2100	**53222**
	190	72	278,0	801	24,9	1000	1400	**53322**
120	170	46	128,0	385	12	1400	1900	**53224**
	210	80	327	977	28,6	960	1200	**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	580	17	1200	1600	**53226**
140	200	55	189	614	17,8	1200	1600	**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.

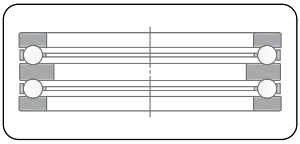
Double direction thrust ball bearings

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

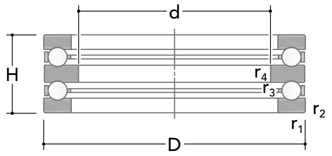
Type 52M



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



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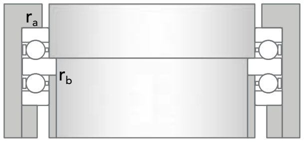
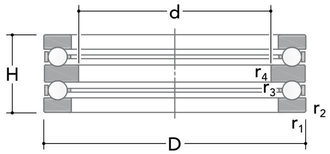


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
10	32	22	16,70	27,7	0,926	7000	10000	**52202**
15	40	26	22,5	40,8	1,4	6000	8000	**52204**
20	47	28	28,1	55,5	1,88	5300	7500	**52205**
	52	34	35,0	59,5	2,26	3100	3900	**52305**
	70	52	72,9	137	4,5	3600	5000	**52406**
25	52	29	25,5	51,4	1,85	4800	6700	**52206**
	60	38	37,9	71,5	2,4	3800	5300	**52306**
	80	59	87,1	170	5,1	3000	4300	**52407**
30	62	34	35,2	73,9	2,7	4000	5600	**52207**
	68	36	46,8	106,1	3,7	3800	5300	**52208**
	68	44	50,0	96,5	3,59	3200	4500	**52307**
	78	49	63	122	4,5	3000	4300	**52308**
	90	65	112	225	6,9	2400	3420	**52408**
35	73	37	39,5	86,7	3,2	3650	5100	**52209**
	85	52	76,7	153	5,6	2900	4100	**52309**
	100	72	131	265	9	2200	3050	**52409**
40	78	39	49,9	116,5	4,3	3400	4500	**52210**
	95	58	88,9	193	6,3	2600	3600	**52310**
45	90	45	61,8	146	5	2800	4050	**52211**
	105	64	104,4	225	8,4	2200	3200	**52311**
	120	87	194,0	395	14,8	1800	2400	**52411**
50	95	46	63,0	150	5,2	2200	3050	**52212**
	110	64	101	224	8,4	1650	2250	**52312**
	130	93	199,0	432	16	1600	2200	**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**



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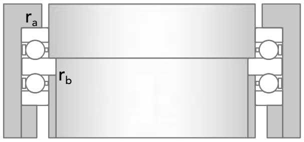


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
55	100	47	63,7	163	5,6	2600	3600	**52213**
	105	47	65,3	173	5,89	2600	3600	**52214**
	115	64	106,0	237	8,9	2000	3050	**52313**
	125	72	136,0	320	11,8	1900	2700	**52314**
	250	107	234	555	19,7	1400	2100	**52414**
60	110	47	67,6	188	6,3	2400	3400	**52215**
	135	79	163	394	14	1750	2500	**52315**
65	115	48	77	209	7,69	2400	3400	**52216**
	140	79	159,0	390	13,8	1700	2400	**52316**
70	125	55	98	276	9,9	2200	3000	**52217**
75	135	62	119,5	325	118	2000	2800	**52218**
85	150	67	124	354	10,8	1800	2400	**52220**
	170	97	229	617	18,4	1470	1900	**52320**
95	160	67	130	390	11,8	1700	2400	**52222**
100	170	68	140	440	11,9	1600	2200	**52224**
110	190	80	190,0	586	16,6	1400	2000	**52226**
120	200	81	194,0	621	17,9	1400	1900	**52228**
130	215	89	238	809	22	1300	1800	**52230**
140	225	90	245,0	859	22,4	1200	1700	**52232**
150	240	97	286	1020	24	1100	1600	**52234**
	250	98	303	1110	28,8	1100	1500	**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.

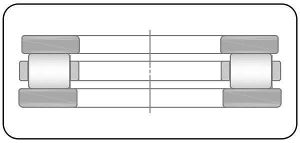
Minimum load

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



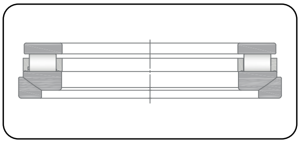
HB BAINITE HT

S STABILIZATION

PROFILE

- Flat housing locating washer
- Low cross section separable design
- Two-piece machined brass cage (M) guided on rollers
- Supports unidirectional axial loads

Type TCRBU



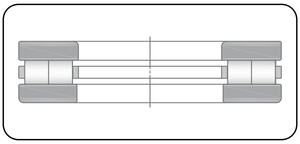
HB BAINITE HT

S STABILIZATION

PROFILE

- 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



HB BAINITE HT

S STABILIZATION

PROFILE

R+ REINFORCED

- 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

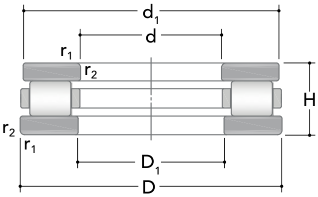
Prefixes	
T	Single direction cylindrical roller thrust bearing followed by size indication
AT	Self-aligning single direction cylindrical roller thrust bearing followed by size indication
GS	Housing washer
WS	Shaft washer
K	Cylindrical roller and cage thrust assembly
LS	Universal washer

Suffixes	Internal design
SP	Special or non-standard bearing

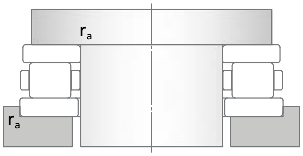
Suffixes	Cage
M	Machined brass cage guided on rollers
TN or ATN	Molded polyamide cage (PA66) guided on rollers
TN9	Molded glass fiber-reinforced polyamide cage (PA66-GF25) guided on rollers

Suffixes	Accuracy, clearance, running
P6S	Dimensional and running accuracy between P6 and P5

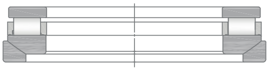
Prefixes	Alternative designation
TCRB	Out of standard single direction cylindrical roller thrust bearing followed by drawing number
TTCRB	Out of standard double direction cylindrical roller thrust bearing followed by drawing number
TCRBU	Out of standard single direction cylindrical roller thrust bearing 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	11,10	26,7	2,48	4000	7500	**81102**
17	30	9	30	18	12,1	31	2,9	3900	7400	**81103**
20	35	10	35	21	19,0	47,3	4,72	3500	6400	**81104**
25	42	11	42	26	25,0	68,2	6,9	3000	5400	**81105**
30	47	11	47	32	27,1	77,7	7,68	2700	5100	**81106**
	52	16	52	32	49,3	132	13,6	2200	4100	**81206**
	60	18	60	32	52,6	182	18,4	2300	4600	**89306**
35	52	12	52	37	29	93	9,15	2500	4800	**81107**
	62	18	62	37	62,0	188	19,5	1800	3400	**81207**
	68	20	68	37	61,7	219	22	2200	4100	**89307**
40	60	13	60	42	43,3	136	13,8	2200	4400	**81108**
	68	19	68	42	82,9	252	26,8	1700	3300	**81208**
	78	22	78	42	96,0	361	36,9	1800	3500	**89308**
45	65	14	65	47	45	150	15,6	2000	3900	**81109**
	73	20	73	47	84	254	26,6	1600	3200	**81209**
	85	24	85	47	108,0	422	43	1600	3100	**89309**
50	70	14	70	52	47,1	163	16,9	2100	3700	**81110**
	78	22	78	52	91,2	299	31	1600	3000	**81210**
	95	27	95	52	131,0	526	54	1500	2800	**89310**
55	78	16	78	57	68,6	284	29	1800	3300	**81111**
	90	25	90	57	122,0	386	40	1300	2400	**81211**
	105	30	105	57	145,0	566	58,9	1400	2600	**89311**
60	85	17	85	62	80,2	294	31,1	1700	3200	**81112**



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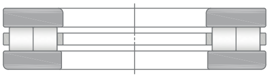
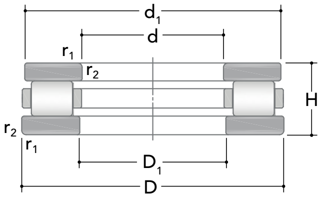


89M

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]					
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



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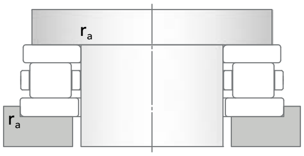
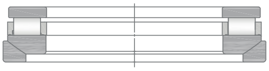


Main dimensions					Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
60	95	26	95	62	136	463	47,7	1300	2500	**81212**
(cont.)	110	30	110	62	150,0	633	66,2	1300	2400	**89312**
	130	42	130	62	311,0	1160	127	1100	2100	**89412**
65	90	18	90	67	83	317	32,8	1600	3000	**81113**
	100	27	100	67	142,0	483	51	1200	2300	**81213**
	115	30	115	67	150,0	639	65,6	1300	2400	**89313**
	140	45	140	68	356	1378	142	1000	1900	**89413**
70	95	18	95	72	86	340	35	1600	2900	**81114**
	105	27	105	72	148,0	525	56	1200	2300	**81214**
	125	34	125	72	186	798	81,7	1200	2200	**89314**
	150	48	150	73	375	1440	152	970	1700	**89414**
75	100	19	100	77	82,5	338	34	1500	2800	**81115**
	110	27	110	77	137,0	484	51	1100	2100	**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	331	34	1400	2600	**81116**
	115	28	115	82	157	603	64	1100	2100	**81216**
	140	36	140	82	238	1050	109	1100	2100	**89316**
	170	54	170	83	436	1720	174	870	1500	**89416**
85	110	19	110	87	87,0	360	38	1400	2600	**81117**
	125	31	125	88	169,0	639	67	1000	1900	**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	445	46	1260	2300	**81118**
	135	35	135	93	234,0	855	91	960	1800	**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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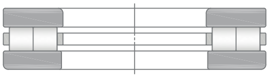
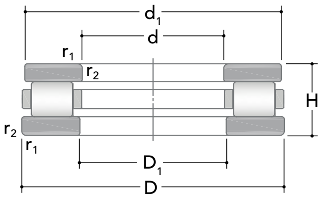

89M

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	-



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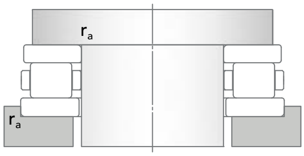
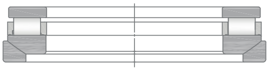


Main dimensions					Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
100	135	25	135	102	154,0	619	63	1150	2100	**81120**
	150	38	150	103	267	1040	106	860	1600	**81220**
	170	42	170	103	296	1350	134	920	1600	**89320**
	210	67	210	103	679,0	2780	267	670	1200	**89420**
110	145	25	145	112	164,0	676	65,9	1060	1900	**81122**
	160	38	160	113	258	988	99	820	1500	**81222**
	190	48	190	113	399	1810	175	820	1500	**89322**
	230	73	230	113	791,0	3320	313	600	1100	**89422**
120	155	25	155	122	168	731	68	1070	1900	**81124**
	170	39	170	123	257	986	97,9	770	1400	**81224**
	210	54	210	123	500	2350	217	730	1300	**89324**
	250	78	250	123	928,0	3870	358	570	1050	**89424**
130	170	30	170	132	196	869	82,5	920	1700	**81126**
	190	45	187	133	382	1445	138	670	1200	**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	207,0	914	86	870	1600	**81128**
	200	46	197	143	355	1388	130	670	1200	**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	211,0	990	89	820	1500	**81130**
	215	50	212	153	469,0	1870	173	610	1100	**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	214	1000	92	820	1500	**81132**
	225	51	220	163	482	1980	178	580	1050	**81232**
	320	95	320	164	1448	6478	533	460	850	**89432**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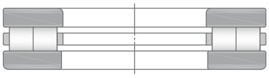
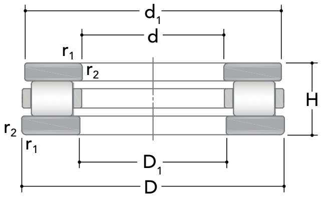

89M

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	-



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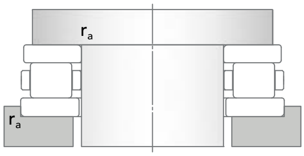
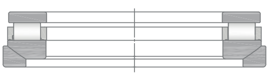


Main dimensions					Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
170	215	34	215	172	287	1320	120	770	1400	**81134**
	240	55	237	173	544	2270	201	540	950	**81234**
	340	103	340	174	1613	7120	607	410	750	**89434**
180	225	34	222	183	272	1250	112	720	1300	**81136**
	250	56	247	183	548	2390	205	540	950	**81236**
	360	109	360	184	1738	7880	665	390	700	**89436**
190	240	37	237	193	311	1453	126	670	1200	**81138**
	270	62	267	194	696	2850	254	480	900	**81238**
	380	115	380	195	1969	8880	730	360	650	**89438**
200	250	37	250	203	312	1480	127	670	1200	**81140**
	280	62	277	204	722	3080	257	480	900	**81240**
	400	122	400	205	2171	9830	814	350	600	**89440**
220	270	37	267	223	331	1680	139	650	-	**81144**
	300	63	297	224	753	3330	277	460	850	**81244**
	420	122	420	225	2304	10980	898	320	600	**89444**
240	300	45	297	243	478	2430	198	540	950	**81148**
	340	78	335	244	1086	4880	392	380	700	**81248**
260	320	45	317	263	483	2550	204	510	950	**81152**
	360	79	355	264	1157	5250	419	360	650	**81252**
280	350	53	347	283	681	3490	280	460	850	**81156**
	380	80	375	284	1159	5390	434	340	650	**81256**
300	380	62	376	304	843	4350	339	410	750	**81160**
	420	95	415	304	1536	7100	548	300	550	**81260**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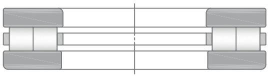
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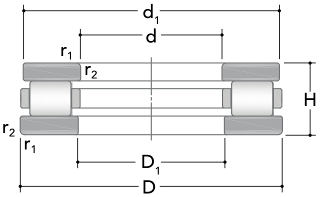
Dimensions			Mass	Designation	Designation of components			
d	$r_{1,2min}$	r_{amax}		Standard design	Roller thrust cage assembly	Washer type		
						Shaft	Housing	Universal
[mm]			[kg]					
170	1,1	1,1	2,4	**81134**	K 81134	WS 81134	GS 81134	-
	1,5	1,5	9,3	**81234**	K 81234	WS 81234	GS 81234	-
	5	5	52	**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	-



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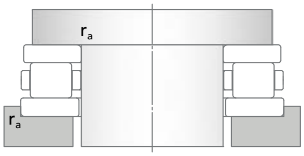
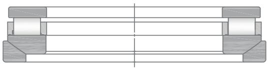


Main dimensions					Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
320	400	63	396	324	880	4560	352	380	700	**81164**
	440	95	435	325	1500	7450	518	280	550	**81264**
340	420	64	416	344	896	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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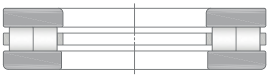

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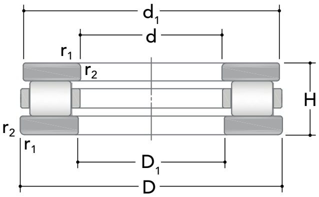
Dimensions			Mass	Designation	Designation of components			
d	$r_{1,2min}$	r_{amax}		Standard design	Roller thrust cage assembly	Washer type		
						Shaft	Housing	Universal
[mm]			[kg]					
320	2	2	20,5	**81164**	K 81164	WS 81164	GS 81164	-
	3	2,5	42,5	**81264**	-	-	-	-
340	2	2	22,5	**81168**	K 81168	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**				



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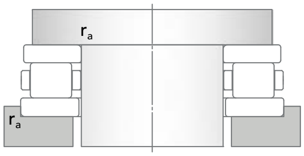
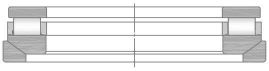


Main dimensions					Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
650	920	140	920	655	5402	37680	2340	90	120	**358130**
	930	130	930	650	5419	37460	2353	90	120	**358162**
655	765	45	765	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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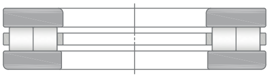

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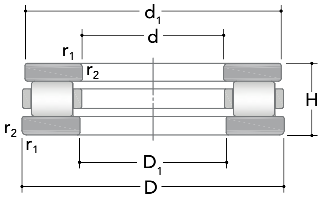
Dimensions			Mass	Designation	Designation of components			
d	$r_{1,2min}$	r_{amax}		Standard design	Roller thrust cage assembly	Washer type Shaft	Housing	Universal
[mm]			[kg]					
650	6	5	325	**358130**	-	-	-	-
	4	3	315	**358162**	-	-	-	-
655	1,9	1,5	39	**634147**	-	-	-	-
670	4	3	75,5	**891/670**	-	-	-	-
	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**	-	-	-	-



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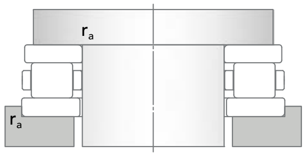
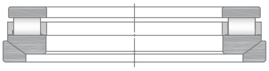


Main dimensions					Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
850	1120	212	1110	860	8189	45100	2573	100	190	**812/850**
(cont.)										
900	1060	95	1055	905	3021	21850	1259	150	300	**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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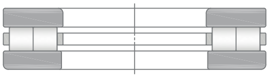
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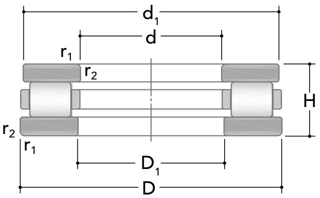
Dimensions			Mass	Designation	Designation of components			
d	$r_{1,2min}$	r_{amax}		Standard design	Roller thrust cage assembly	Washer type Shaft	Housing	Universal
[mm]			[kg]					
850 (cont.)	7,5	6	580	**812/850**	-	-	-	-
900	5	4	150	**891/900**	-	-	-	-
	5	4	210	**811/900**	-	-	-	-
	7,5	6	665	**812/900**	-	-	-	-
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**	-	-	-	-



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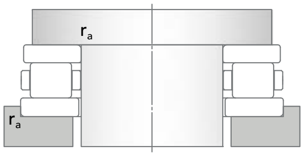
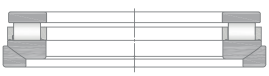


Main dimensions					Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	d1	D1	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]					[kN]			[rpm]		
1400	1520	52	1515	1405	1815	23240	1178	-	-	**358156**
	1640	150	1632	1408	6113	47800	2330	-	-	**358316**
1560	1650	57	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**



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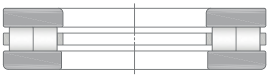


89M

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]					
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

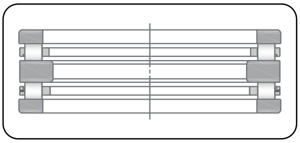
Thrust roller bearings do not allow any misalignment between shaft and housing and any alignment errors between support surfaces in the housing and on the shaft.

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

HB BAINITE HT

S STABILIZATION

O+ OPTIMIZED

PROFILE

- 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.

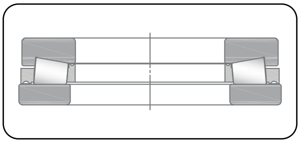
Minimum load

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

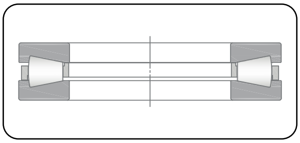
Type TK$_1$



HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
PROFILE

- Support unidirectional axial loads
- Tapered raceway on shaft washer and flat on housing washer
- Cage guided on both washers
- Optimized roller profile

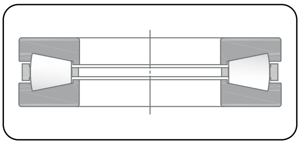
Type TK$_2$



HB BAINITE HT
S STABILIZATION
R+ REINFORCED
PROFILE

- Support unidirectional axial loads
- Cage guided on washers
- Symmetrical washers featuring taper raceway
- Optimized roller profile

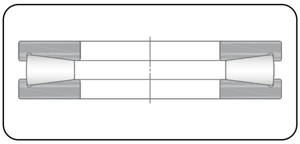
Type TK$_3$



HB BAINITE HT
S STABILIZATION
R+ REINFORCED
PROFILE

- Support unidirectional axial loads
- Cage guided on rollers
- Symmetrical washers featuring taper raceway
- Optimized roller profile

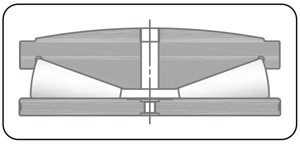
Type TK$_4$



HB BAINITE HT
S STABILIZATION
R+ REINFORCED
PROFILE

- Full complement (cageless) design for increased carrying capacities
- Support unidirectional axial loads
- Symmetrical washers featuring taper raceway
- Optimized roller profile

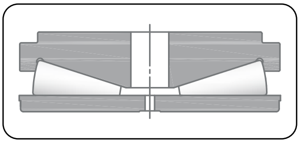
Type TKSD$_1$



OPTIMIZED REINFORCED PROFILE

- 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

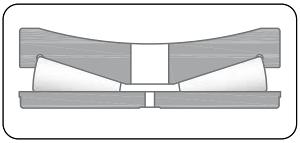
Type TKSD$_2$



OPTIMIZED REINFORCED PROFILE

- 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

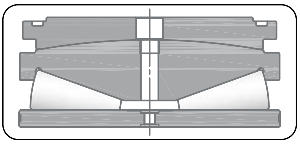
Type TKSD$_3$



OPTIMIZED REINFORCED PROFILE

- 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

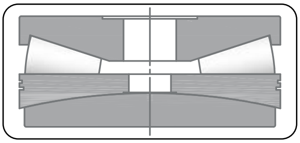
Type TKSD$_4$



OPTIMIZED REINFORCED PROFILE

- 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 TKSD$_5$

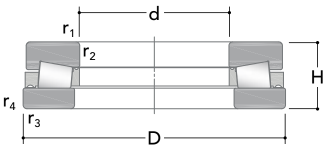


OPTIMIZED REINFORCED PROFILE

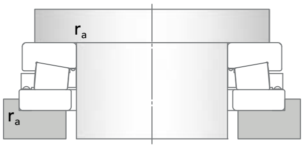
- Full complement (cageless) design, conceived for extremely high axial loads
- Special execution for screw-down mechanism
- Concave sphered housing washer outer surface, mating a convex sphered pressure plate surface
- Designed to accommodate misalignment angle
- Optimized roller profile

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



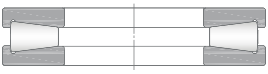
TK1



Main dimensions			Basic load ratings		Fatigue	Designation
d	D	H	Dynamic C	Static C_0	load limit 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**

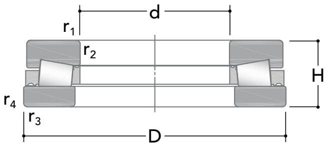
TK2

TK3

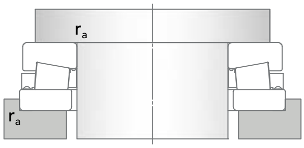


TK4

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**



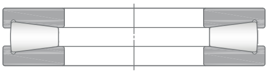
TK1



Main dimensions			Basic load ratings		Fatigue load limit	Designation
d	D	H	Dynamic C	Static C_0	C_u	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**

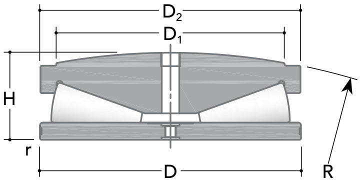
TK2

TK3

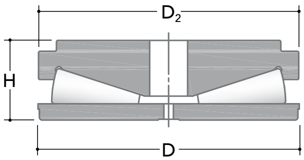


TK4

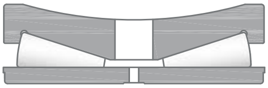
Dimensions				Mass	Designation
d	$r_{1,2min}$	$r_{3,4min}$	r_{amax}		Standard design
[mm]				[kg]	
558,8	12,7	–	12	1200	**353285**
600	7,5	7,5	6	405	**353201**
749,3	5	2,5	4	230	**353247**
840	7,5	7,5	6	575	**351573**
1002	7,5	7,5	6	465	**353901**
1005	7,5	7,5	6	505	**353210**
1770	5	5	4	250	**353312**
1828,8	10,2	10,2	9	1450	**353320**



TKSD1



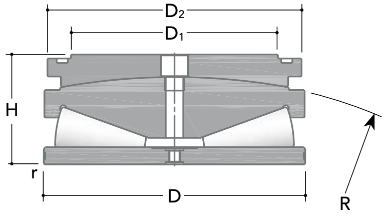
TKSD2



TKSD3

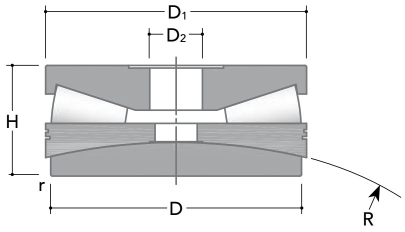
Main dimensions					Basic load rating	Dimensions	Mass	Designation
D	D_1	D_2	H	R	Static C_0	r_{min}		Standard design
[mm]					[kN]	[mm]	[kg]	
203,2	177,8	200,84	75620	508	3930,00	1,6	16,5	**353108**
266,7	228,6	264,34	94,41	609,6	7070,0	1,6	35,5	**353038**
320,68	279,4	318,31	110,97	762	10250,0	1,6	61,5	**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.

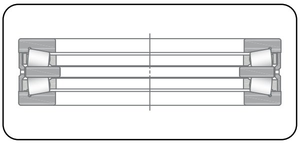
Minimum load

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

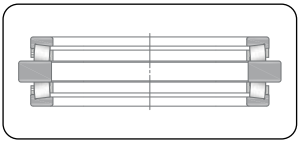
Type TTK$_1$



HB BAINITE HT
S STABILIZATION
PROFILE
R$^+$ REINFORCED

- 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

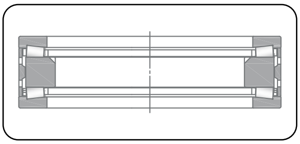
Type TTK$_2$



HB BAINITE HT
S STABILIZATION
PROFILE
R$^+$ REINFORCED

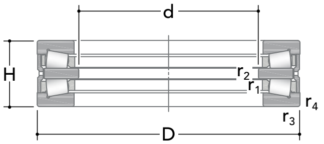
- Low cross section separable compact units
- Two-piece machined brass cage (M) guided on shaft washer (intermediate washer)
- Intermediate washer with external centering on the housing
- Very sensitive to misalignments
- Supports very high bidirectional axial loads

Type TTK$_{SP}$

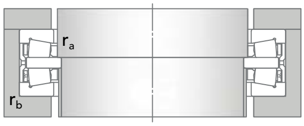


HB BAINITE HT
S STABILIZATION
PROFILE
R$^+$ REINFORCED

- 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

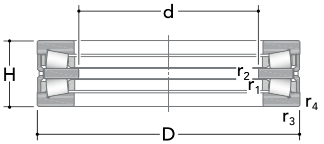


Main dimensions			Basic load ratings		Fatigue load limit	Designation
d	D	H	Dynamic C	Static C_0	C_u	Standard design
[mm]			[kN]			
170	240	84	325,00	1300	103	**350980**
180	280	90	560,0	2350	197	**353162**
220	300	96	435,0	1650	133	**351019**
240	320	96	420,0	1880	145	**351182**
250	380	100	910,0	4500	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**

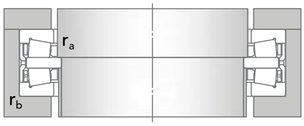

TTK2


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	Designation
d	D	H	Dynamic C	Static C_0	load limit 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

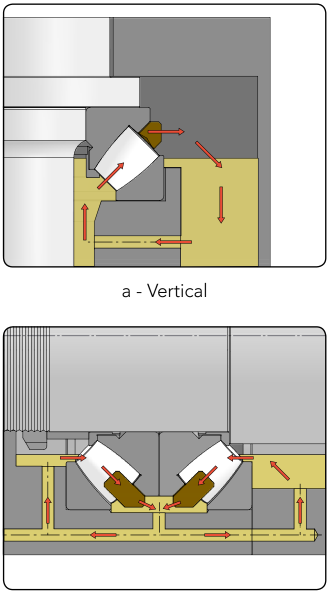
A minimum axial load is requested for thrust roller bearings, like for all rolling bearings, to operate correctly, especially in particularly application requirements like: high speed, high acceleration and sudden changes of direction. In these operating conditions a sliding movement between the rollers 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**).

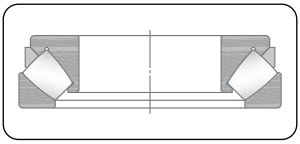

a - Vertical

b - Horizontal

Fig. 1 - Oil pumping effect of single direction spherical roller thrust bearings

Designs and variants

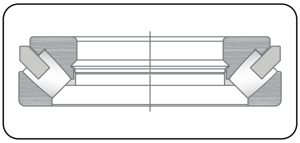
Type EM



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

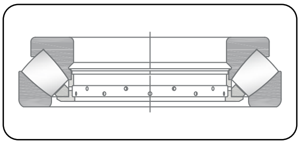
Type EMB



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

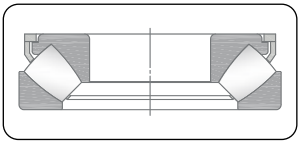
Type EMEVO



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



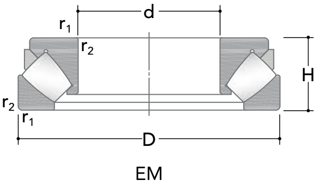
HB BAINITE HT
S STABILIZATION
O+ OPTIMIZED
R+ REINFORCED

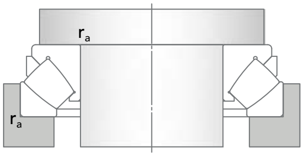
- Asymmetrical roller profile
- High strength pressed steel cage (J) guided on shaft washer
- Reinforced and optimized execution (E)
- Supports unidirectional axial loads and angular misalignment

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

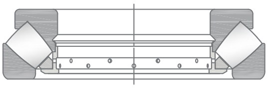
Suffixes	External design
N1	One locating slot in housing washer
N2	Two locating slots in housing washer
EB	Lifting threaded holes for eye bolts in shaft washer



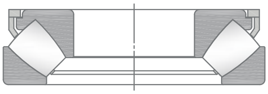


Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
60	130	42	395	915	116	2850	5050	**29412**
65	140	45	455	1080	138	2600	4800	**29413**
70	150	48	525	1260	155	2400	4350	**29414**
75	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

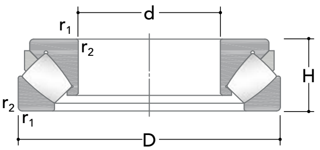


EMEVO

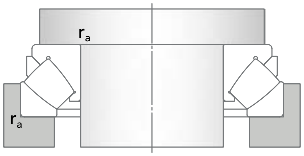


EJ

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**

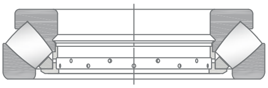


EM

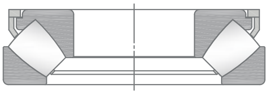


Main dimensions			Basic load ratings		Fatigue	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	load limit C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
150 (cont.)	300	90	1880	5150	525	1200	2200	**29430**
160	270	67	1190	3450	378	1350	2200	**29332**
	320	95	2090	5610	580	1100	2000	**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	1080	4160	339	1100	1900	**29248**
	380	85	2050	6560	630	1000	1650	**29348**
	440	122	3400	10210	940	850	1500	**29448**
260	360	60	1040	4650	345	1100	1800	**29252**
	420	95	2550	8400	790	850	1400	**29352**
	480	132	4100	12900	1090	750	1350	**29452**
280	380	60	1070	4700	375	1000	1700	**29256**
	440	95	2550	8700	805	850	1400	**29356**

EMB

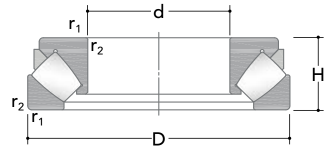


EMEVO



EJ

Dimensions			Mass	Designation
d	$r_{1,2min}$	r_{amax}		Standard design
[mm]			[kg]	
150 (cont.)	4	3	28	**29430**
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**



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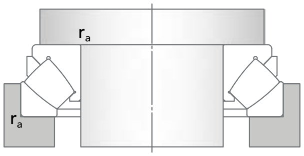

Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
280 (cont.)	520	145	4950	15300	1350	670	1200	**29456**
300	420	73	1400	6200	465	900	1500	**29260**
	480	109	3150	10600	950	750	1200	**29360**
	540	145	4950	16700	1350	640	1200	**29460**
320	440	73	1450	6500	475	850	1420	**29264**
	500	109	3370	11250	1000	750	1200	**29364**
	580	155	5700	19200	1550	570	1100	**29464**
340	460	73	1450	6500	470	850	1350	**29268**
	540	122	2710	11000	960	600	1100	**29368**
	620	170	6700	22500	1780	540	1070	**29468**
360	500	85	1875	8500	595	755	1250	**29272**
	560	122	2760	11600	990	600	1100	**29372**
	640	170	6180	21500	1650	540	950	**29472**
380	520	85	2000	9600	660	700	1180	**29276**
	600	132	3350	14500	1170	530	1000	**29376**
	670	175	6800	24600	1900	510	900	**29476**
400	540	85	2040	9800	700	700	1130	**29280**
	620	132	3450	14600	1210	530	950	**29380**
	710	185	7600	26500	1980	460	850	**29480**
420	580	95	2500	11100	820	630	1040	**29284**
	650	140	3750	16000	1300	500	900	**29384**
	730	185	7800	27500	2100	460	850	**29484**
440	600	95	2570	12400	860	630	1010	**29288**
	680	145	5150	19400	1590	500	850	**29388**
	780	206	9050	32600	2350	410	750	**29488**


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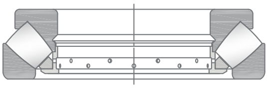
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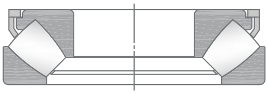
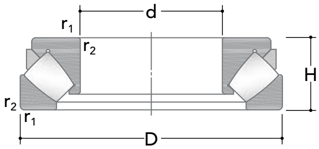

EJ

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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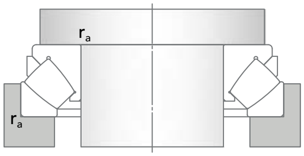

Main dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0	C_u	Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
460	620	95	2550	12800	870	600	970	**29292**
	710	150	4350	19200	1520	450	800	**29392**
	800	206	9300	33500	2460	410	750	**29492**
480	650	103	2670	13800	860	560	920	**29296**
	730	150	4370	19600	1480	450	800	**29396**
	850	224	9550	39400	2850	340	670	**29496**
500	670	103	2790	14700	1010	560	900	**292/500**
	750	150	4550	20500	1580	430	800	**293/500**
	870	224	9400	40500	2880	340	670	**294/500**
530	710	109	3110	15400	1230	530	850	**292/530**
	800	160	5800	26400	2090	400	750	**293/530**
	920	236	10500	44500	3150	320	630	**294/530**
560	750	115	3450	18500	1230	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**


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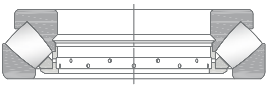
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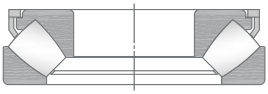
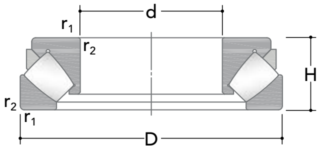

EJ

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**



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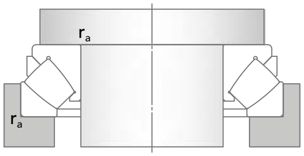

Main dimensions			Basic load ratings		Fatigue load limit C_u	Speed ratings		Designation
d	D	H	Dynamic C	Static C_0		Reference	Limiting	Standard design
[mm]			[kN]			[rpm]		
750	1120	224	9500	45400	3090	260	480	**293/750**
(cont.)	1280	315	19920	85600	5530	200	400	**294/750**
800	1060	155	6560	34500	2560	320	530	**292/800**
	1180	230	11100	54000	3970	240	450	**293/800**
	1360	335	20200	93000	5910	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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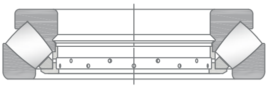

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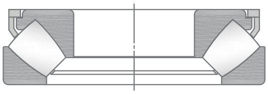
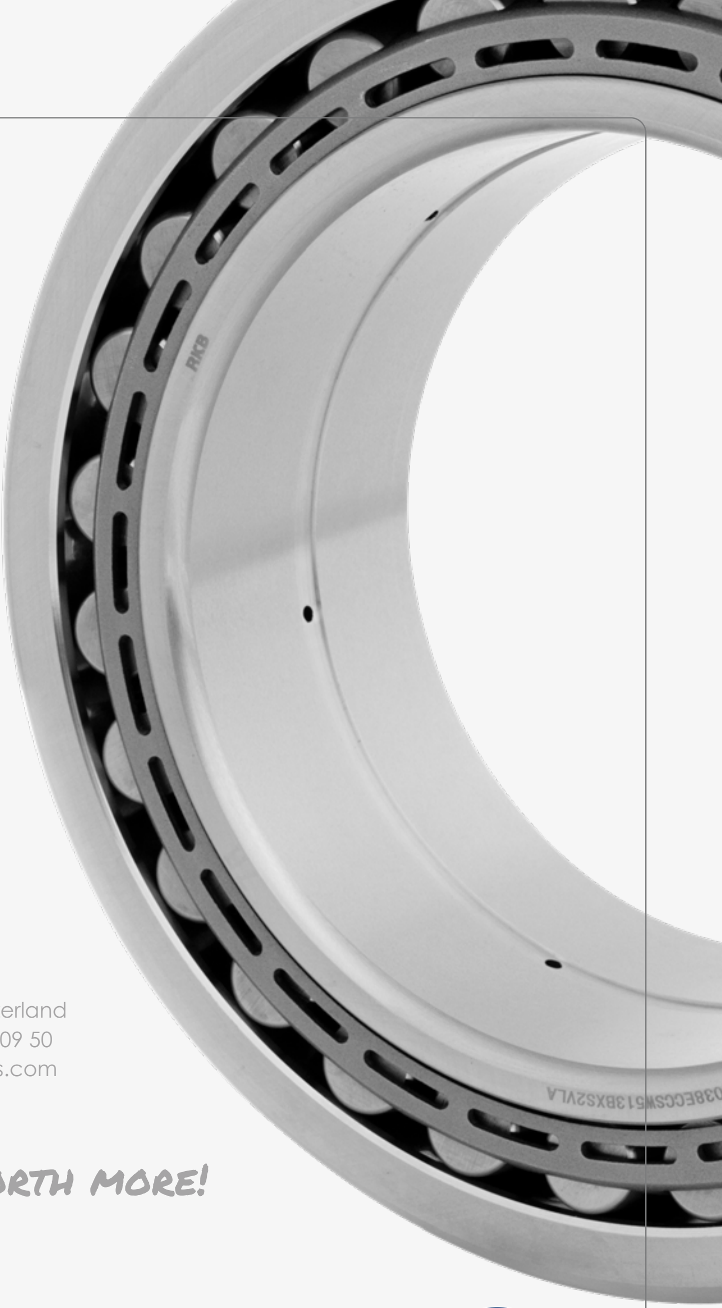


EJ

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

BB
ACBB
CRB
TRB
SRB
TORB
TBB
CRTB
TRTB
SRTB



RKB
BEARING INDUSTRIES
SWITZERLAND

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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