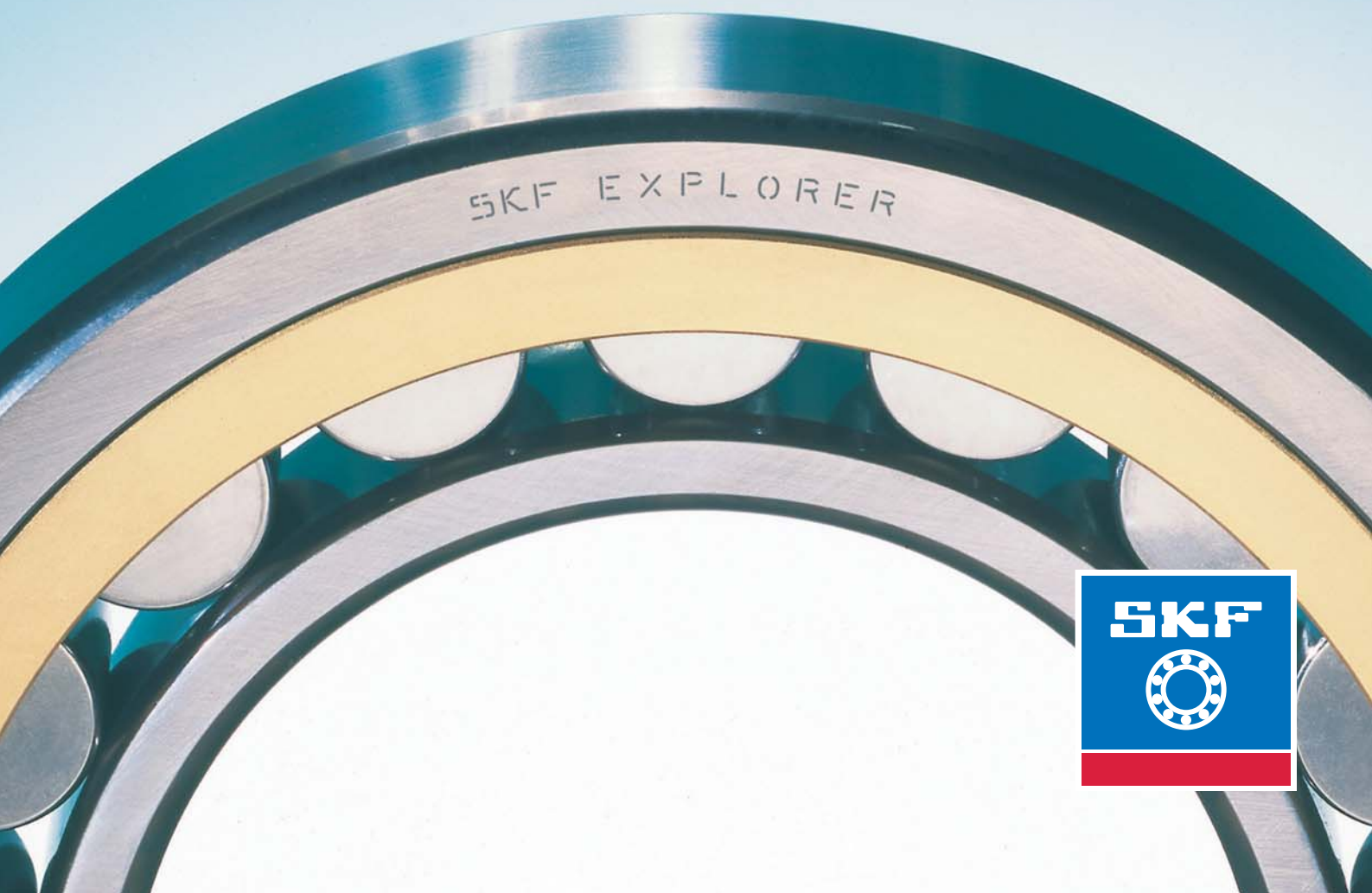


**SKF**

# **SKF cylindrical roller bearings - always in the lead**



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The SKF brand now stands for more than ever before, and means more to you as a valued customer.

While SKF maintains its leadership as the hallmark of quality bearings throughout the world, new dimensions in technical advances, product support and services have evolved SKF into a truly solutions-oriented supplier, creating greater value for customers.

These solutions encompass ways to bring greater productivity to customers, not only with breakthrough application-specific products, but also through leading-edge design simulation tools and consultancy services, plant asset efficiency maintenance programmes, and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but it now stands for much more.

**SKF – The knowledge engineering company**



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# Accommodate heavy loads, high speeds and axial displacements

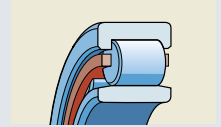
Cylindrical roller bearings are produced in many designs, ISO Dimension Series and sizes. The vast majority are single row cylindrical roller bearings with a cage. These bearings are an excellent choice for applications where there are particularly heavy radial loads combined with high speeds, especially if there is a limited amount of axial displacement of the shaft with respect to the housing as a result of thermal elongation. As axial displacement takes place within the bearing, there is practically no increase in friction as the bearing rotates.

Single row cylindrical roller bearings are separable, i.e. the ring with roller and cage assembly can be mounted independently of the other ring. This

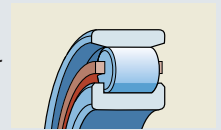
simplifies installation, particularly if an interference fit is required for both rings.

Single row cylindrical roller bearings with a cage are produced in many designs, differing primarily in the configuration of the flanges. The rollers are always guided between integral flanges on one of the rings. The ring with the integral flanges together with the cylindrical roller and cage assembly can be withdrawn from the other ring. The most popular single row cylindrical roller bearings are those of the NU, N, NJ and NUP designs.

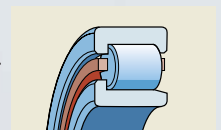
**NU design:** The outer ring has two integral flanges while the inner ring has no flanges



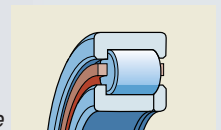
**N design:** The inner ring has two integral flanges while the outer ring has no flanges



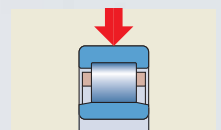
**NJ design:** The outer ring has two integral flanges while the inner ring has one integral flange



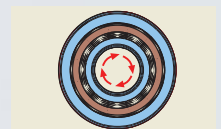
**NUP design:** The outer ring has two integral flanges while the inner ring has one integral flange and one loose flange ring



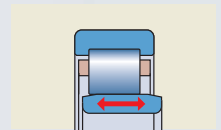
**High radial load carrying capacity**



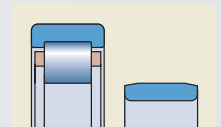
**High speed capability**



**Accommodate axial displacement**



**Separable design**



# SKF cylindrical roller bearings – better by design

## SKF milestones leading to the single row cylindrical roller bearings of today

- 1909: Patent granted to Dr.-Ing. Kirner for the “NU bearing”
- 1930: Participation in standardization of boundary dimensions
- 1950: Introduction of the “B” roller, slightly crowned toward the roller ends, in order to prevent damaging edge stresses
- 1962: Introduction of the E-type cylindrical roller bearings with reinforced roller complement
- 1981: Introduction of the EC cylindrical roller bearings with modified roller end/flange contact
- 1984: Introduction of the logarithmic contact profile providing excellent load distribution
- 2002: Introduction of SKF Explorer performance class bearings

Norma-Compagnie, Cannstatt, Germany. This company was incorporated into the SKF Group in 1914. Since then, the history of the single row cylindrical roller bearing has been intertwined with that of SKF and there have been many developmental milestones.

With each milestone, SKF offered design and maintenance engineers the option to power up, size-down and improve the performance of their application.

In the 1960s, SKF’s development of the E-bearing, with its reinforced roller complement, increased the load carrying ability by an average of 35 %. Then, in the 1980’s when SKF introduced the single row EC cylindrical roller bearing, design engineers and end-users were

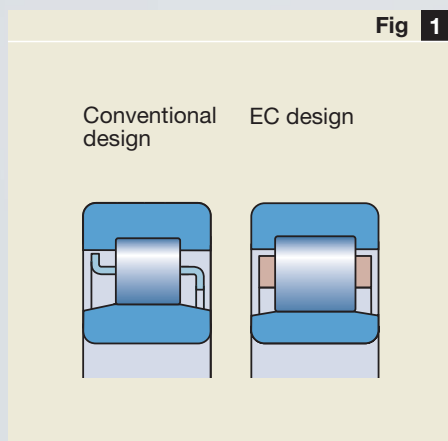
offered three additional advantages: increased axial load carrying ability, optimized running properties and reduced maintenance. These are just two of the SKF pioneering successes from the past.

In addition to the caged single row cylindrical roller bearings described and listed in this brochure, the comprehensive SKF cylindrical roller bearing assortment also includes single and double row full complement bearings (without cage), precision bearings, multi-row bearings, printing press bearings as well as support rollers (→ pages 62 and 63).

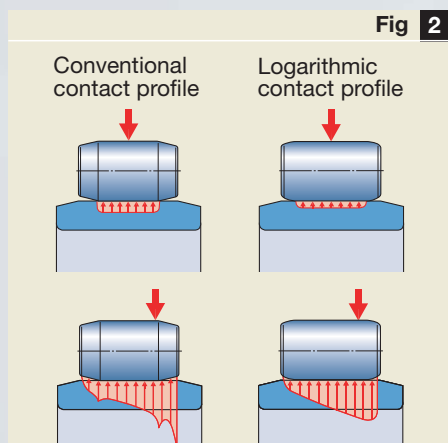
Cylindrical roller bearings are a tradition within SKF. It is hardly surprising that the major technical developments for these bearings have been initiated by SKF.

It all started in 1909 with the invention of the modern caged single row cylindrical roller bearing by Dr.-Ing. Josef Kirner, a leading engineer at the

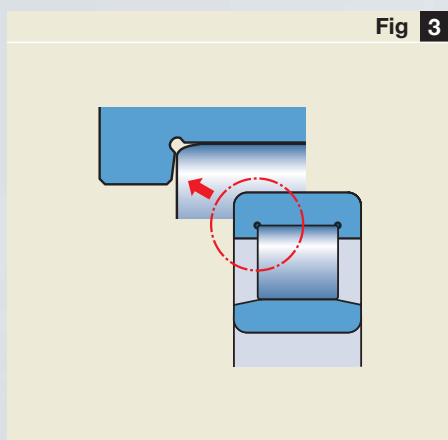




Optimized cross section



Optimal contact conditions



Opened flanges

## SKF standard bearings – benefits

When an application calls for bearings that can accommodate heavy radial loads, high speeds and axial displacement of the shaft with respect to the housing, SKF single row cylindrical roller bearings are an obvious choice. These bearings are always state-of-the-art and they feature

- an optimized cross section,
- excellent contact conditions,
- interchangeability of bearing components
- cages made of three different materials and
- a wide product range.

The result is an assortment of cylindrical roller bearings that will provide long service life even under the most arduous operating conditions.

### Optimized cross section

The cross section of SKF cylindrical roller bearings is optimally utilized. The diameter and length of the rollers and the wall thickness of the rings and retaining flanges have been optimized to provide maximum bearing service life (→ fig 1). The optimized cross section of SKF cylindrical roller bearings enables manufacturers to downsize their designs so that they are more cost-effective, lighter and consume less energy, without affecting performance.

### Optimal contact conditions

The internal geometry of SKF single row cylindrical roller bearings is special in two very significant ways.

First is the “logarithmic contact profile” between the rollers and raceways (→ fig 2). This profile provides optimal load distribution between the roller and raceway, to significantly reduce the risk of edge stresses and increase operational reliability even in applications where there is misalignment and shaft deflections.

The second improvement deals specifically with the roller end/flange contact. The geometry of the flange has an “opened” design (→ fig 3) and the roller ends are surface treated to improve the effectiveness of the lubricant, reduce friction and lower operating temperatures. The improved roller end/flange contact results also in higher axial load capability for those bearings with flanges on inner and outer rings.

The optimal internal geometry provides

- higher radial and axial load carrying capacity,
- higher operational reliability,
- longer service life,
- extended maintenance intervals,
- lighter, more compact, energy-saving designs.

### Interchangeability of bearing components

Another advantage of SKF single row cylindrical roller bearings is that the bearing components are completely interchangeable. Any bearing ring with cage and roller assembly can be assembled with any removable ring of the same bearing type and size. This is particularly important with bearing components that have to be mounted independently of each other.

## Cages made of three different materials

SKF single row cylindrical roller bearings are used in a wide range of applications and subjected to very different operating conditions. As a result, no single cage could satisfy all possible demands. To meet the needs of design engineers, cages are made from three different materials:

- polyamide,
- steel and
- brass.

Bearings fitted with a polyamide cage are suitable for the majority of applications. Metal cages are usually used for difficult operating conditions.

### Polyamide cages

This injection moulded, window-type cage of glass fibre reinforced and heat stabilized polyamide 6,6 is the standard recommendation for SKF small and medium size single row cylindrical roller bearings. Its advantageous properties speak for themselves:

- high elasticity,
- light weight,
- quiet running from good damping,
- excellent tribological properties, and
- very good behaviour under emergency running.

These properties have been confirmed by the successful operation of millions of bearings. Bearings with this polyamide cage carry the designation suffix P, e.g. NU 203 ECP.

### Steel window-type cages

A pressed steel window-type cage is available for a large number of bearings, mainly as an alternative to the standard P cage. Bearings fitted with a pressed steel cage are an excellent choice for applications where high temperatures or aggressive lubricants make the use of a polyamide cage unsuitable. Such bearings are identified by the designation suffix J, e.g. NU 310 ECJ, or no suffix.

### Machined brass cages

There are several machined brass cage designs available for SKF single row cylindrical roller bearings: roller guided cages and shoulder guided cages. Roller guided cages are centred on the roller complement and are typically used for grease lubricated bearing arrangements. Shoulder guided cages are centred on one of the bearing rings and are typically used in oil lubricated applications.

### One-piece machined brass cages

The one-piece form-turned window-type brass cage is an SKF innovation and represents the new generation of machined brass cages for SKF single row cylindrical roller bearings.

The advantages of this machined brass cage include:

- very high strength,
- suitable for very high speeds and accelerations,
- suitable for high temperatures,
- high endurance limit,
- light weight design, and
- excellent lubrication conditions in the roller/cage contact zones.

Bearings fitted with an inner or outer ring centred, form-turned window-type brass cage are identified by the designation suffix ML, e.g. NU 2314 ECML.

### Two-piece machined brass pronged cages

This cage is designed as a pronged cage with a cover. It features strong cage bars with machined trapezoidal shaped prongs that are peened in place. As a result, heat-induced expansion has no influence on cage strength.

Depending on bearing size this brass cage is either

- roller guided, designation suffix M, e.g. NU 232 ECM, or
- outer ring guided, designation suffix MA, e.g. NU 232 ECMA,

and in some cases there is a choice of guidance for the same bearing size.



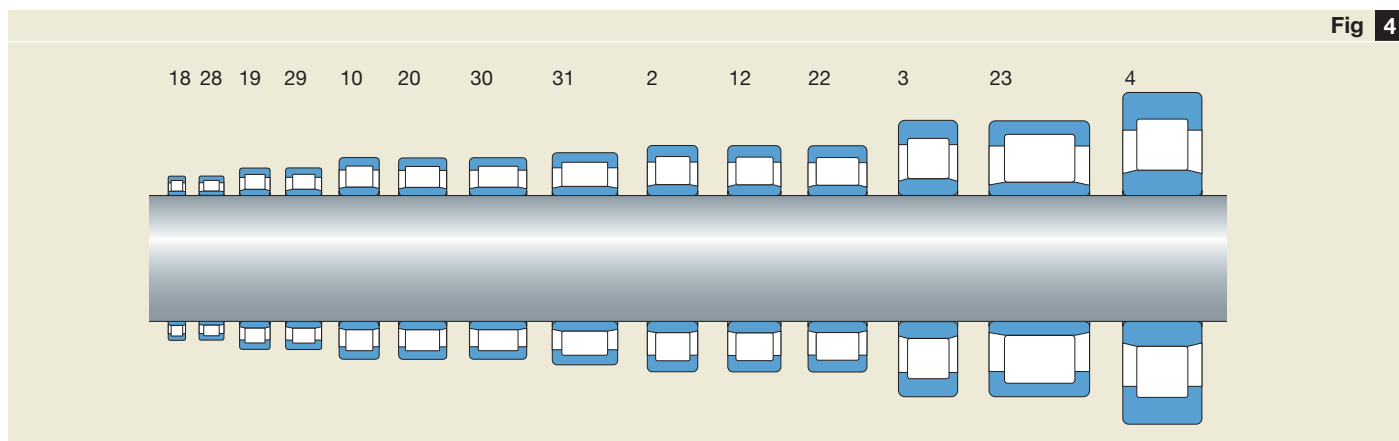


Fig 4

### Bearing series

## A wide product range

The SKF manufacturing programme of single row cylindrical roller bearings with a cage includes the Dimension Series shown in **fig 4**. The standard range comprises all flange configurations and sizes normally used, starting at 15 mm bore diameter up to 800 mm bore diameter. The SKF standard range of bearings covers the

- Dimension Series 2, 3, 4, 10, 12, 20, 22 and 23 and
- NU, N, NJ and NUP designs.

The SKF programme includes

- standard design bearings,
- standard design bearings without the removable ring,
- special design bearings,

as well as a large number of matching angle rings.

### Standard design bearings

Standard design SKF single row cylindrical roller bearings are manufactured in four different designs. The main difference between them is the flange configuration. These four designs (→ **fig 5**) are described below and listed in the product table starting on **page 32**.

### NU design

The outer ring of an NU-design bearing has two integral flanges while the inner ring has no flanges (**a**). Axial displacement of the shaft with respect to the housing can be accommodated in both directions.

### N design

The inner ring of an N-design bearing has two integral flanges while the outer ring has no flanges (**b**). Axial displacement of the shaft with respect to the housing can be accommodated in both directions.

### NJ design

The outer ring of an NJ-design bearing has two integral flanges and the inner ring has one integral flange (**c**). These bearings can locate the shaft axially in one direction only.

### NUP design

The outer ring of an NUP-design bearing has two integral flanges and the inner ring has one integral flange and one non-integral flange in the form of a loose flange ring (**d**). These bearings can be used as locating bearings to locate the shaft axially in both directions.

### Standard bearing designs

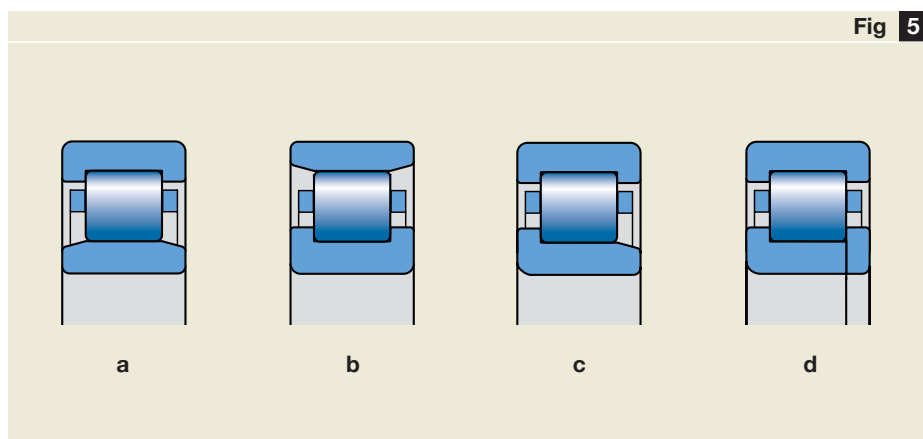
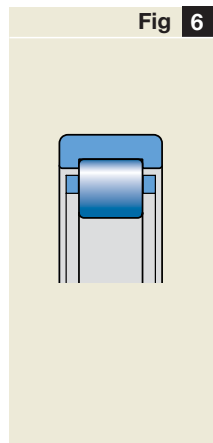
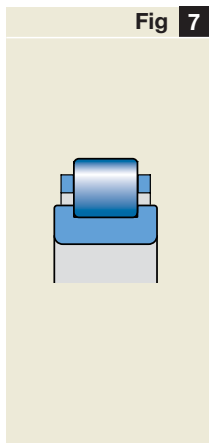


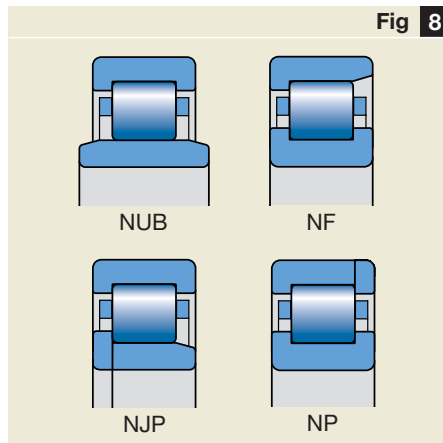
Fig 5



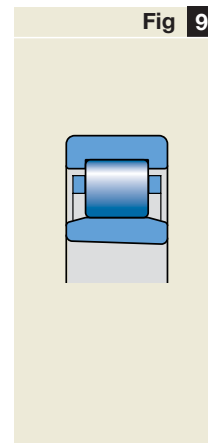
RNU design



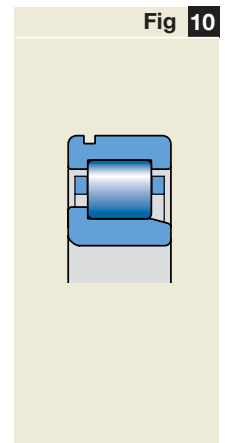
RN design



Special designs



Bearing with a tapered bore



Bearing with a snap ring groove in the outer ring

**Standard design bearings without the removable ring**

SKF supplies a selection of NU-design cylindrical roller bearings without an inner ring (→ fig 6) – designation prefix RNU – and N-design bearings without an outer ring (→ fig 7) – designation prefix RN. These bearings provide a solution for applications where hardened and ground raceways are provided on the shaft or in the housing bore.

Because RNU bearings, for example, do not need an inner ring, the shaft diameter can be larger to provide a stronger, stiffer arrangement. Additionally, the possible axial displacement of the shaft relative to the housing is only limited by the width of the raceway on the shaft.

**Special design bearings**

Other single row cylindrical roller bearings included in the SKF standard programme, but not shown in this brochure, are special design bearings

- with an extended inner ring (→ fig 8),
- with flange configurations (→ fig 8) that differ from the standard designs,
- with a tapered bore,
- with a snap ring groove in the outer ring,
- with location slots in the outer ring.

Please contact SKF for availability of these special design bearings before ordering. Details of these bearings can be found in the SKF Interactive

Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

**Bearings with a tapered bore**

SKF single row cylindrical roller bearings are produced as standard with a cylindrical bore. However, some bearings with a tapered bore 1:12 can be supplied (→ fig 9). Bearings with a tapered bore have a somewhat larger radial internal clearance than corresponding bearings with a cylindrical bore and are identified by the designation suffix K.

**Bearings with a snap ring groove**

Some single row cylindrical roller bearings are also produced with a snap ring groove in the outer ring (→ fig 10). These bearings are identified by the designation suffix N. Because they can be located axially in the housing bore by a retaining or snap ring, the design of the arrangement can be simplified and made more compact.

The dimensions of the snap ring groove and of the chamfer adjacent to the groove are in accordance with ISO 464:1995, which also specifies suitable snap ring dimensions.

**Bearings with locating slots**

In some applications where it is essential that mounting and dismounting can be done easily, outer rings have to be mounted with a clearance fit in the

housing. To restrain the outer ring from turning in the circumferential direction, SKF single row cylindrical roller bearings are also available with

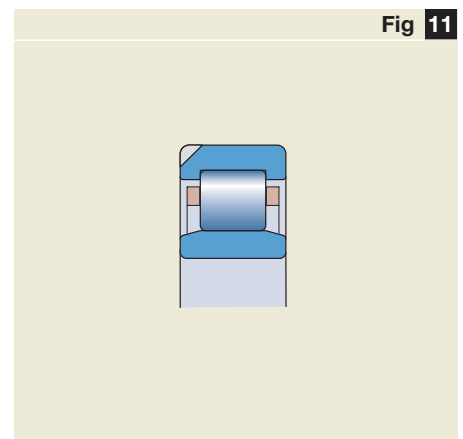
- one locating slot, designation suffix N1, or
- two locating slots positioned 180° apart, designation suffix N2,

in one outer ring side face (→ fig 11). The dimensions of the locating slots are in accordance with DIN 5412-1:2000.

**Additional SKF cylindrical roller bearings**

Information on additional SKF cylindrical roller bearings belonging to the SKF product range can be found on pages 62 and 63.

**Bearing with a locating slot**





**Angle rings**

Angle rings, series designation HJ, are designed to stabilize NU- and NJ-type cylindrical roller bearings in the axial direction (→ **fig 12**). They are used in heavily loaded applications instead of an NUP-type bearing because the full width inner ring of the NU- or NJ-type bearing provides a more stable seating than the shorter inner ring and loose flange of an NUP-type bearing. Also, angle rings very often simplify mounting and dismounting.

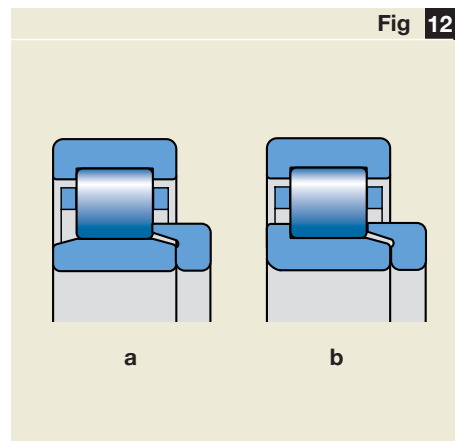
SKF angle rings, manufactured from carbon chromium steel are hardened and ground. The side face runout conforms to the SKF Normal tolerance class of the appropriate bearing. HJ angle rings, where available, are listed in the product table with their designation and dimensions together with the relevant bearing.

**NU + HJ execution**

NU-design bearings combined with an HJ angle ring (**a**) can be used to locate the shaft axially in one direction.

**NJ + HJ execution**

NJ-design bearings combined with an HJ angle ring (**b**) can be used as locating bearings to provide axial shaft location in both directions.

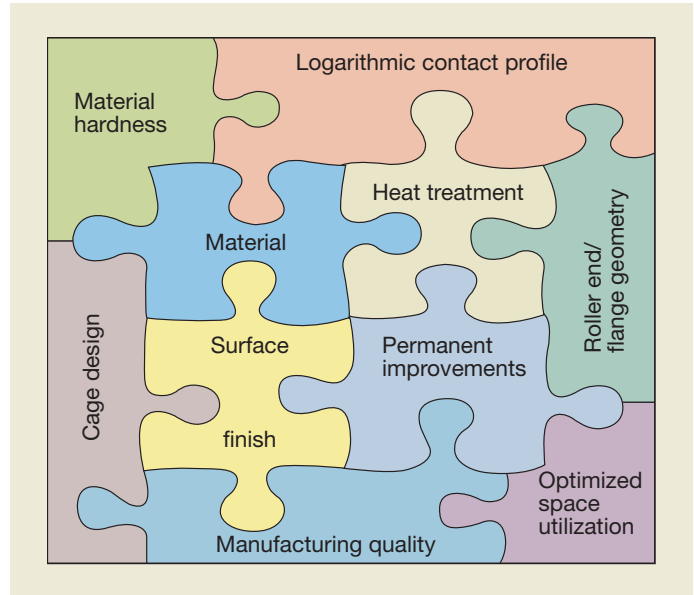


**Bearings with an angle ring**

# SKF Explorer cylindrical roller bearings – a new level of performance

Single row cylindrical roller bearings are also available in the new SKF Explorer performance class for endurance and reliability. They are the result of many years of intensive research by an international team of SKF scientists and engineers. During this time SKF materials and manufacturing specialists together with those responsible for production have successfully completed the puzzle of how to combine the pieces

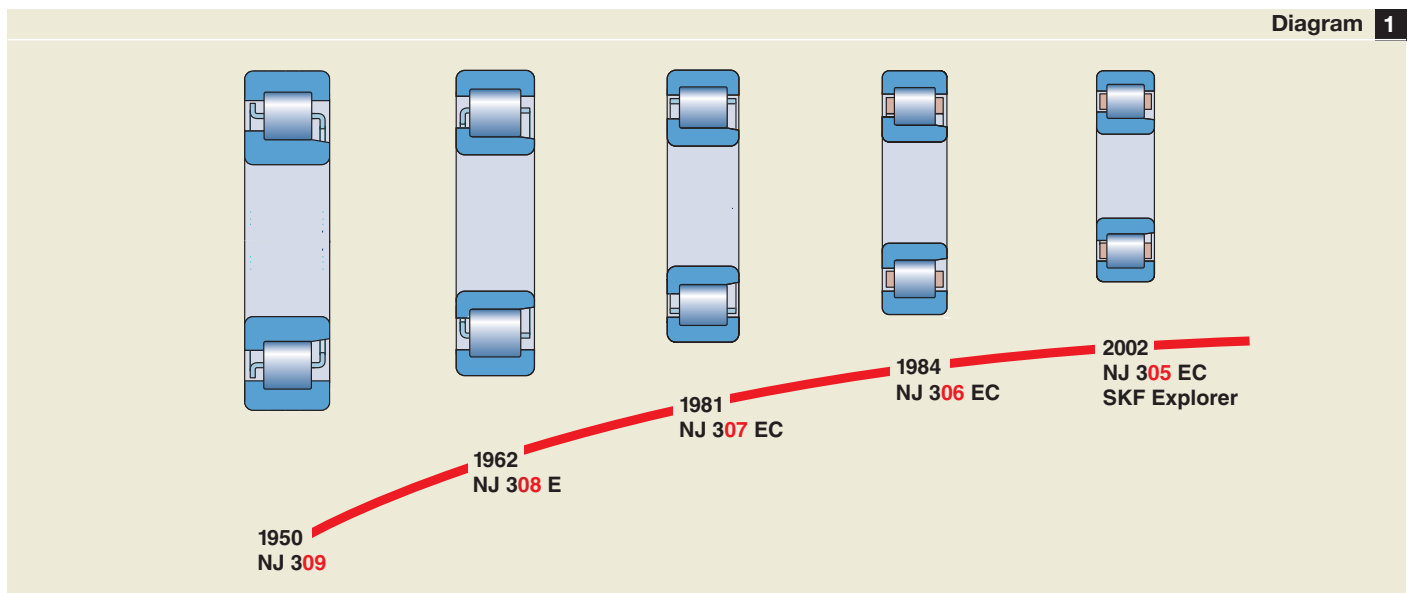
- material
- heat treatment
- material hardness
- manufacturing quality
- logarithmic contact profile
- roller end/flange geometry
- surface finish
- cage design



to form an optimum product. The result is one to be proud of: single row cylindrical roller bearings that set new standards with respect to performance and endurance; single row cylindrical roller bearings with enhanced ability to support dynamic loads; single row

*Performance improvements permit downsizing*

Diagram 1



## New performance class

cylindrical roller bearings with up to three times longer service life than the previous SKF standard, which is superior to all other conventional cylindrical roller bearings. The performance improvements of SKF cylindrical roller bearings over the past 50 years have permitted downsizing, whilst still maintaining the required performance (→ diagram 1).

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**Material**

SKF Explorer bearings feature an extremely clean and homogenous steel with a minimum number of inclusions. This improved steel is so much cleaner than the highest grades covered by present classifications. The reduction in the number of inclusions increases the fatigue strength in the rolling contacts and enables the bearings to operate much longer.

**Heat treatment**

New heat treatment procedures optimize the bearing resistance to operational damage and temperatures without affecting dimensional stability.

**Material hardness**

The hardness of the rings and rollers of SKF Explorer bearings have been selected for optimum performance. This makes them less sensitive to contaminants and contributes to their extremely long service life.

**Manufacturing quality**

Upgraded manufacturing processes have contributed to a significant improvement in product quality. This means that the rings can be produced with an increased roundness and the deviation from true form of the rollers has also been further reduced. The results of the tighter tolerances may be invisible but the bearings run markedly quieter and with less vibration.



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**Logarithmic contact profile**

This important feature of SKF cylindrical roller bearings – for the past twenty-odd years – has been further refined for the rollers used in SKF Explorer bearings. The bearings are thus even less sensitive to small misalignment and can carry heavy loads.

**Roller end/flange geometry**

The optimized roller end/flange contacts of SKF cylindrical roller bearings are also present in SKF Explorer bearings. The resultant advantages include reduced friction, lower operating temperatures and less wear.

**Surface finish**

The surface finish of the raceways on the rings and rollers has been further refined and provides enhanced lubrication conditions in SKF Explorer bearings so that they can operate longer even under poor lubrication conditions.

**Cage design**

The design and material of the cage can have a significant impact on a bearing's ability to withstand given operating conditions. That is the reason for making SKF Explorer bearings available with up to four different cages. The design of the cages used in SKF Explorer bearings contributes to good lubrication of all contact surfaces, even under occasional interruptions in lubricant supply.



**The proof is in the performance ...**

If an SKF Explorer cylindrical roller bearing is compared with any other cylindrical roller bearing, several unique design features will be discovered. These derive from the many improvements described before and make the SKF Explorer performance class bearings superior. The numerous “micro” improvements do not become obvious until the bearing goes into operation. It runs more quietly as well as longer – in fact much, much longer than any cylindrical roller bearing used so far – because it is an SKF Explorer bearing.

**.... as well as the long life**

To take full advantage of the increased load carrying capacity and improved wear resistance, the life of SKF Explorer bearings should always be calculated using the SKF rating life. In this calculation, the life extending improvements to SKF Explorer bearings are taken into account by

- an increased basic dynamic load rating, and
- an increased SKF life modification factor  $a_{SKF}$ , adjusted by multiplying the term  $\eta_c (P_U/P)$  by 1,4 to take into account the improved material and operating behaviour.

All the product improvements described can be exploited, for example,

- to increase service life of existing designs,
- to maintain power output of new designs,
- to increase power output of existing designs or
- to increase power density of new designs.

## Increase service life of existing designs

Don't need to increase power output?  
Use an SKF Explorer bearing of equal size to:

- Increase safety factor
- Reduce vibration
- Reduce heat generation
- Increase service intervals
- Increase machine uptime

## Maintain power output of new designs

Use a smaller SKF Explorer bearing to:

- Reduce overall dimensions to save on material costs and weight
- Achieve a stiffer design
- Reduce heat generation
- Increase speeds

## Increase power output of existing designs

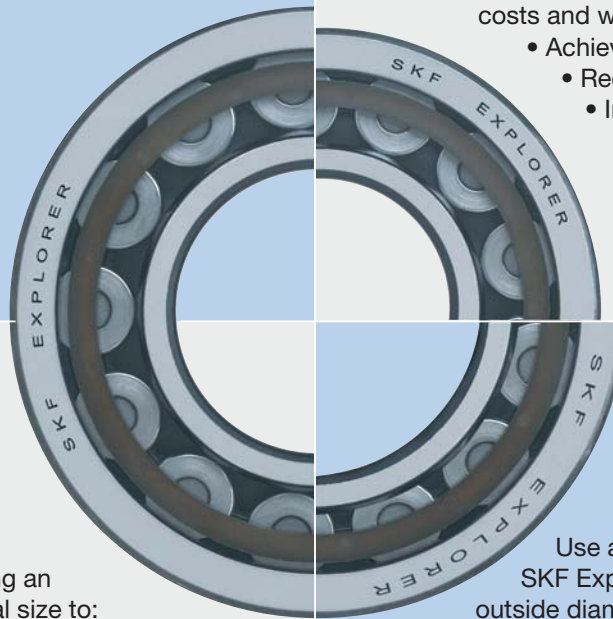
Avoid costly redesign by using an SKF Explorer bearing of equal size to:

- Increase power density
- Increase speeds
- Increase loads

## Increase power density of new designs

Use a lower section height SKF Explorer bearing with the same outside diameter to:

- Increase shaft size
- Achieve a stiffer design
- Operate at the same or higher speeds



## Availability

The most common cylindrical roller bearings of the N, NU, NJ and NUP designs in the 2, 3, 22 and 23 Dimension Series are available as SKF Explorer bearings. They are listed in the product table, printed in blue.

## Product designation

SKF Explorer bearings retain the designation of earlier standard bearings, e.g. NJ 2218 ECP or NU 2330 ECMA. However, each bearing and its box are marked with the name EXPLORER, to avoid confusion.



# High performance in all applications

SKF cylindrical roller bearings – especially SKF Explorer bearings – are state-of-the-art products. Their characteristics make them suitable for use in all types of industrial applications and essential for some.

Here are just a few examples from the extensive range of SKF cylindrical roller bearing applications.

## Commercial vehicle rear axle gear

SKF cylindrical roller bearings contribute significantly to enhanced operational reliability and extended vehicle service life.

## Two-stage bevel gear

High radial load carrying capacity, wide speed range, low friction and easy axial displacement in a non-locating bearing are just some of the characteristics which make SKF cylindrical roller bearings so interesting to gearbox manufacturers.

### Applications

- Stationary gearboxes
- Automotive gearboxes
- Electric motors
- Vibration motors
- Vibration generators for road rollers
- Pumps and compressors
- Ventilators
- Material handling equipment
- Paper machines
- Textile machinery
- Rail vehicles
- Rolling mills
- Wind turbines

### Requirements

- Most modern design
- High load carrying capacity
- Compact bearings
- High speed capability
- High operational reliability
- High running accuracy
- Quiet operation, low vibration
- Low operating temperatures
- Easy mounting
- Little maintenance
- Extremely long service life
- Large choice of variants
- Worldwide availability

### Solution



Proven reliability

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Marine reduction gear

SKF cylindrical roller bearings have made a significant contribution to ship safety and manoeuvrability over many, many sea miles.

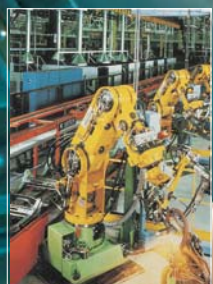
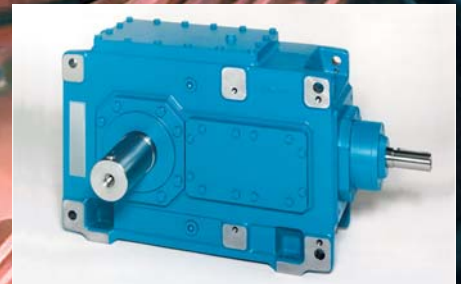
Screw compressor with oil-lubricated screw flanks

Bearings must be able to support heavy dynamic loads and operate at high speeds – good reasons for selecting SKF cylindrical roller bearings with an injection moulded PEEK cage, for example, to support the screws at the non-locating end.

Vibration motors

Depending on their size, SKF cylindrical roller bearings of the NJ design with a polyamide 6,6 cage or a one-piece window-type brass cage can accommodate heavy loads and high speeds in combination with considerable eccentric motion.

These few examples do not do justice to the full range of applications for cylindrical roller bearings and in particular to those of SKF Explorer cylindrical roller bearings in industry.



# Selection of bearing size

## Bearing life

For modern high quality bearings the basic rating life can deviate significantly from the actual service life in a given application. Therefore ISO 281:1990/Amd 2:2000 contains a modified life equation to supplement the basic rating life, which now makes predicting the bearing life of SKF Explorer bearings more precise.

This life calculation makes use of a modification factor to account for the amount of contamination, the viscosity of the lubricant, and the fatigue limit of the material. The SKF life modification factor  $a_{SKF}$  applies to the standardized concept.

The SKF rating life of a roller bearing according to ISO 281:1990/Amd 2:2000 is

$$L_{nm} = a_1 a_{SKF} \left(\frac{C}{P}\right)^{10/3}$$

If the speed is constant, the life can be expressed in operating hours, using the equation

$$L_{nmh} = a_1 a_{SKF} \frac{1\,000\,000}{60 n} \left(\frac{C}{P}\right)^{10/3}$$

where

$L_{nm}$  = SKF rating life (at 100 – n % reliability), millions of revolutions

$L_{nmh}$  = SKF rating life (at 100 – n % reliability), operating hours

$a_1$  = life adjustment factor for reliability according to ISO 281:1990, normally  $a_1 = 1$

$a_{SKF}$  = SKF life modification factor (→ **diagram 1**)

$C$  = basic dynamic load rating, kN

$P$  = equivalent dynamic bearing load, kN

$n$  = rotational speed, r/min

### Life modification factor $a_{SKF}$

This factor represents the relationship between the fatigue load limit ratio ( $P_U/P$ ), the lubrication condition (viscosity ratio  $\kappa$ ) and the contamination level in the bearing ( $\eta_c$ ). Values for the factor  $a_{SKF}$  can be obtained from **diagram 1** as a function of  $\eta_c$  ( $P_U/P$ ) for SKF standard and SKF Explorer cylindrical roller bearings and for different values of the viscosity ratio  $\kappa$ . Guideline values when selecting  $\eta_c$  are given in **table 1**. More detailed information can be found in the SKF General Catalogue or the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

**Diagram 1** has been drawn up for a safety factor commonly used in fatigue life considerations and is valid for lubricants without EP additives. If a lubricant containing such additives is used, reference should be made to the SKF General Catalogue or the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

### Equivalent dynamic bearing load

When dynamically stressed cylindrical roller bearings are used as non-locating bearings

$$P = F_r$$

If cylindrical roller bearings with flanges on both the inner and outer rings are used to locate a shaft in one or both directions, the equivalent dynamic bearing load can be calculated using

$$P = F_r \quad \text{when } F_a/F_r \leq e$$

$$P = 0,92 F_r + YF_a \quad \text{when } F_a/F_r > e$$

| Degree of cleanliness/<br>contamination | Factor $\eta_c$<br>for bearings with<br>mean diameter<br>$d_m$ (mm) |            |
|-----------------------------------------|---------------------------------------------------------------------|------------|
|                                         | $\leq 100$                                                          | $> 100$    |
| <b>Cleanliness</b>                      |                                                                     |            |
| Extreme                                 | 1                                                                   | 1          |
| High                                    | 0,8 .. 0,6                                                          | 0,9 .. 0,8 |
| Normal                                  | 0,6 .. 0,5                                                          | 0,8 .. 0,6 |
| <b>Contamination</b>                    |                                                                     |            |
| Slight                                  | 0,5 .. 0,3                                                          | 0,6 .. 0,4 |
| Typical                                 | 0,3 .. 0,1                                                          | 0,4 .. 0,2 |
| Severe                                  | 0,1 .. 0                                                            | 0,1 .. 0   |

### Guideline values for factor $\eta_c$ for contamination level

where

$e$  = limiting value

= 0,2 for bearings

in the 10, 2, 3 and 4 series

= 0,3 for bearings

in the 22 and 23 series

$Y$  = axial load factor

= 0,6 for bearings

in the 10, 2, 3 and 4 series

= 0,4 for bearings

in the 22 and 23 series

Since axially loaded cylindrical roller bearings only operate satisfactorily when they are subjected to a simultaneously acting radial load, the ratio  $F_a/F_r$  should not exceed 0,5.

### Equivalent static bearing load

For statically stressed cylindrical roller bearings

$$P_0 = F_r$$



## Previous and new – a comparison

The performance enhancements of SKF Explorer cylindrical roller bearings can best be demonstrated by life calculations for the bearing NU 207 ECP. For the same operating conditions the life of

- the previous standard NU 207 ECP with
  - a basic dynamic load rating  $C = 48,4$  kN, and
  - a fatigue load limit  $P_u = 6,1$  kN and
- the SKF Explorer bearing NU 207 ECP with
  - a basic dynamic load rating  $C = 56$  kN, and
  - a fatigue load limit  $P_u = 6,1$  kN

are calculated. The operating conditions are assumed to be

- an equivalent dynamic bearing load  $P = 4,8$  kN,
- a viscosity ratio  $\kappa = 2$ , and
- a contamination level  $\eta_c = 0,4$ .

The  $L_{10m}$  lives of the two bearings are then as follows, since  $a_1 = 1$ .

### Previous standard bearing

For  $\eta_c (P_u/P) = 0,4 (6,1/4,8) = 0,5$  using the black values on the x axis in **diagram 1** and  $\kappa = 2$

$$a_{SKF} \approx 3,2$$

so that the life becomes

$$L_{10m} = a_{SKF} (C/P)^{10/3} = 3,2 (48,4/4,8)^{10/3} = 7\,080 \text{ millions of revolutions}$$

### SKF Explorer bearing

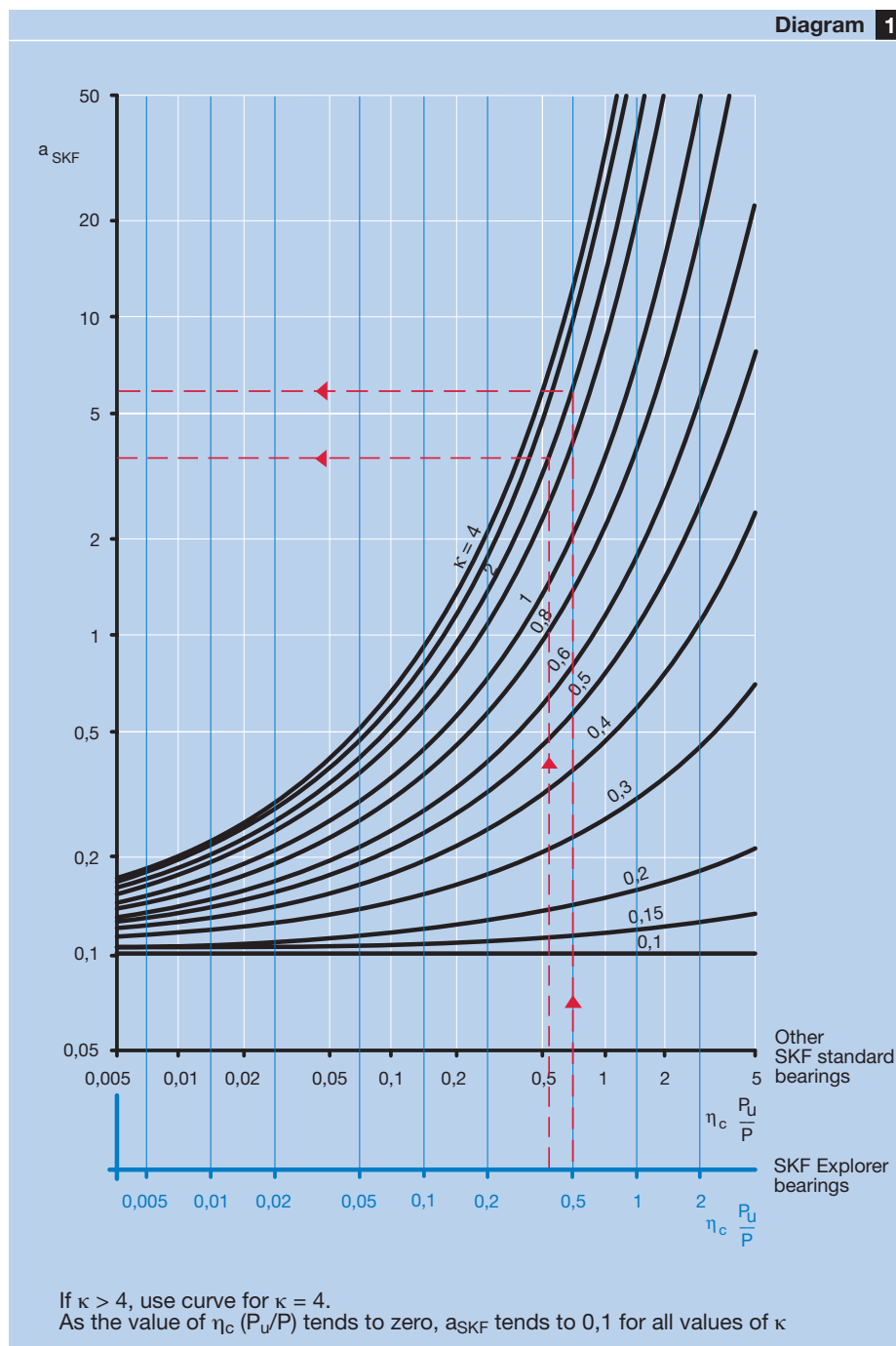
For  $\eta_c (P_u/P) = 0,4 (6,1/4,8) = 0,5$  using the blue values on the x axis in **diagram 1** and  $\kappa = 2$

$$a_{SKF} \approx 6,2$$

so that the life becomes

$$L_{10m} = a_{SKF} (C/P)^{10/3} = 6,2 (56/4,8)^{10/3} = 22\,320 \text{ millions of revolutions}$$

Diagram 1



SKF life modification factor  $a_{SKF}$  for cylindrical roller bearings

In this comparison, the life of the SKF Explorer bearing, when compared to a previous standard bearing, is 22 320 hours versus 7 080 hours – or approximately three times longer life.

# Design of bearing arrangements

When designing a bearing arrangement it is not just a question of selecting a suitable bearing and determining its size – a number of other factors have to be taken into account: type and quantity of lubricant, bearing fits and bearing clearance, design of associated components, selection of seals etc. Each individual decision influences the subsequent performance, reliability and economy of the bearing arrangement.

To design a bearing arrangement thus calls for some considerable experience as well as knowledge of mechanics. If this is available, the information contained in the SKF General Catalogue or the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com), should be adequate. If not, please contact the SKF application engineering service for assistance.

Here, the characteristics of SKF cylindrical roller bearings and their suitability for various application demands are presented.

## Bearing arrangement

Because of their design characteristics, SKF cylindrical roller bearings are particularly suitable for bearing arrangements

- that have to accommodate heavy radial loads and sometimes also axial loads while operating at high speeds, and
- where there is a need to have interference fits on the shaft as well as in the housing.

Bearings with a flangeless inner or outer ring can accommodate axial displacements of the shaft as a result of thermal expansion. As axial displacement takes place within the bearing rather than between the bearing and shaft or housing bore, there is practically no increase in friction as the bearing rotates. Eliminating the axial interaction between the locating and the non-locating bearing means that stresses are low, temperature is minimized and maximum service life

is achieved. A typical arrangement with a cylindrical roller bearing at the non-locating side is shown in **fig 1**.

The choice between the NU and N designs should take arrangement design and mounting procedures into consideration. N design bearings are preferred for high-speed applications or where idling under very light loads is to be expected.

In most applications cylindrical roller bearings with a cylindrical bore are used. Bearings with a tapered bore are required for a limited number of applications.

The **matrix** provides an overview of the suitability of the different cylindrical roller bearing standard designs for given application conditions.

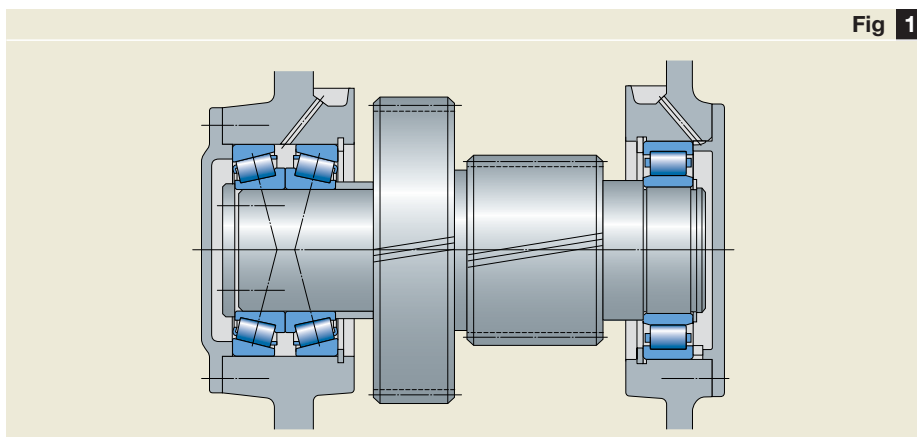
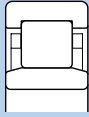
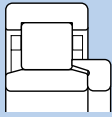
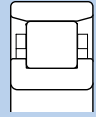
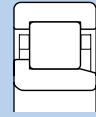
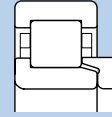
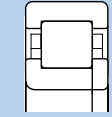
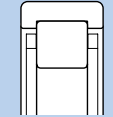
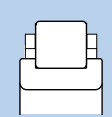


Fig 1

*NU type cylindrical roller bearing as non-locating bearing on a gear shaft*

Overview of the characteristics of the various standard designs of single row cylindrical roller bearings

| Characteristics                        |             | Standard designs                                                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     | Matrix |
|----------------------------------------|-------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                                        |             |  |  |  |  |  |  |  |  |        |
| Suitability of bearing for             | Cage design | NU                                                                                | NU + HJ                                                                           | N                                                                                 | NJ                                                                                | NJ + HJ                                                                            | NUP                                                                                 | RNU                                                                                 | RN                                                                                  |        |
| Radial loads                           | All         | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                                | +++                                                                                 | +++<br>■                                                                            | +++<br>■                                                                            |        |
| Combined loads                         | All         | --                                                                                | +<br>←                                                                            | --                                                                                | +<br>←                                                                            | +<br>↔                                                                             | +<br>↔                                                                              | --                                                                                  | --                                                                                  |        |
| Non-locating positions                 | All         | +++                                                                               | ++<br>←                                                                           | +++                                                                               | ++<br>←                                                                           | --                                                                                 | --                                                                                  | +++                                                                                 | +++                                                                                 |        |
| Locating positions                     | All         | --                                                                                | +<br>←                                                                            | --                                                                                | +<br>←                                                                            | +<br>↔                                                                             | +<br>↔                                                                              | --                                                                                  | --                                                                                  |        |
| High running accuracy                  | All         | +++                                                                               | ++                                                                                | +++                                                                               | ++                                                                                | ++                                                                                 | ++                                                                                  | +++<br>■                                                                            | +++<br>■                                                                            |        |
| Loads smaller than minimum load        | P           | -                                                                                 | -                                                                                 | +                                                                                 | -                                                                                 | -                                                                                  | -                                                                                   | -                                                                                   | +                                                                                   |        |
| High speeds + grease lubrication       | P, M        | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                 | ++                                                                                  | ++                                                                                  | ++                                                                                  |        |
|                                        | J           | +                                                                                 | +                                                                                 | ●                                                                                 | +                                                                                 | +                                                                                  | +                                                                                   | +                                                                                   | ●                                                                                   |        |
|                                        | MA, ML, MP  | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                  | -                                                                                   | -                                                                                   | -                                                                                   |        |
| High speeds + oil lubrication          | P, M        | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                 | ++                                                                                  | ++                                                                                  | ++                                                                                  |        |
|                                        | J           | +                                                                                 | +                                                                                 | ●                                                                                 | +                                                                                 | +                                                                                  | +                                                                                   | +                                                                                   | ●                                                                                   |        |
|                                        | MA, ML, MP  | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                                | +++                                                                                 | +++                                                                                 | +++                                                                                 |        |
| High accelerations                     | P, M        | +                                                                                 | +                                                                                 | +                                                                                 | +                                                                                 | +                                                                                  | +                                                                                   | +                                                                                   | +                                                                                   |        |
|                                        | J           | -                                                                                 | -                                                                                 | ●                                                                                 | -                                                                                 | -                                                                                  | -                                                                                   | -                                                                                   | ●                                                                                   |        |
|                                        | MA, ML, MP  | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                                | +++                                                                                 | +++                                                                                 | +++                                                                                 |        |
| High radial accelerations + vibrations | P, M        | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                  | -                                                                                   | -                                                                                   | -                                                                                   |        |
|                                        | J           | +                                                                                 | +                                                                                 | ●                                                                                 | +                                                                                 | +                                                                                  | +                                                                                   | +                                                                                   | ●                                                                                   |        |
|                                        | MA, ML, MP  | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                               | +++                                                                                | +++                                                                                 | +++                                                                                 | +++                                                                                 |        |
| High operating temperatures            | P           | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                  | -                                                                                   | -                                                                                   | -                                                                                   |        |
|                                        | J           | ++                                                                                | ++                                                                                | ●                                                                                 | ++                                                                                | ++                                                                                 | ++                                                                                  | ++                                                                                  | ●                                                                                   |        |
|                                        | M, ML, MP   | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                | ++                                                                                 | ++                                                                                  | ++                                                                                  | ++                                                                                  |        |

**Symbols:**  
 +++ eminently suitable  
 ++ very suitable  
 + suitable  
 - less suitable  
 -- unsuitable  
 ← in one direction  
 ↔ in both directions  
 ● not applicable  
 ■ presupposes shaft or housing raceway of bearing quality

**Cages:**  
**J** Pressed steel cage, roller centred  
**M** Two-piece machined brass cage, roller centred  
**MA** Two-piece machined brass cage, outer-ring centred  
**ML** One-piece form-turned window-type brass cage, inner or outer ring centred  
**MP** One-piece window-type brass cage with milled, reamed or broached pockets, inner or outer ring centred  
**P** Injection moulded cage of glass fibre reinforced polyamide 6,6, roller centred

# Mounting and dismounting

Cylindrical roller bearings are precision mechanical components that should be handled with care during mounting and dismounting. This includes using the correct methods and the appropriate tools. To realize maximum bearing service life, SKF has a full line of mounting, dismounting and maintenance tools for nearly every purpose. Full information can be found in the catalogue MP3000 "SKF Maintenance and Lubrication Products" or online at [www.skf.com](http://www.skf.com). Additional information about how to mount and dismount single row cylindrical roller bearings can also be found at [www.skf/mount.com](http://www.skf/mount.com).

## Mounting

The inner and outer rings of cylindrical roller bearings are mounted separately. This simplifies mounting as interference fits are generally prescribed for both rings.

If the required interference is not too great, the rings of small cylindrical roller bearings can usually be mounted using a mechanical fitting tool, such as the SKF TMFT bearing fitting tool. Large numbers of bearings are generally mounted using mechanical or hydraulic presses.

The rings of larger bearings are seldom mounted in the cold state. The inner ring and – if possible – the housing must therefore be heated prior to mounting. SKF induction heaters (→ fig 1) are suitable for heating inner rings to some 60 to 80 °C above ambient temperature. Hotplates as well as aluminium heating rings specially

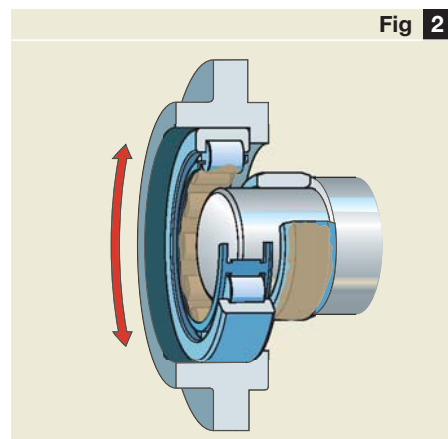
designed for heating the inner ring of cylindrical roller bearings (→ fig 8) can also be used.

When assembling the removable ring and the ring with roller and cage assembly, the shaft or the housing should be turned slowly (→ fig 2). Skewing the rings must be prevented (→ fig 3), as otherwise the rollers and raceways may be damaged. Where series mounting or large bearings are involved, a mounting sleeve is often used (→ fig 4). The sleeve should have the same diameter as the raceway diameter F of the inner ring and machined to tolerance d10.

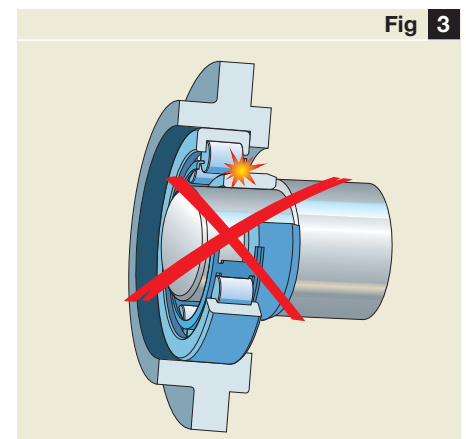
*An induction heater for safely heating inner rings*



*Rotate the shaft or housing during assembly*



*Care must be taken that shaft and housing are correctly aligned to avoid scoring the raceways*



## Dismounting

If the bearings are to be reused after inspection, they must be dismantled as carefully as they were mounted.

Dismounting an outer ring is easier if tapped holes are provided in the housing shoulders to take withdrawal screws (→ fig 5).

The inner ring of a cylindrical roller bearing can be dismantled mechanically or with heat.

The inner ring of small bearings and the inner ring with roller and cage assembly of N-type bearings can be removed using mechanical withdrawal tools. This can be performed with

- a jaw puller, if the shaft is pre-machined (→ fig 6) or
- a strong back puller such as SKF TMBS pullers, when there is enough space behind (→ fig 7).

Special heaters have been developed to dismount the inner rings of cylindrical roller bearings having no flanges or only one flange. They heat the inner ring rapidly without appreciably heating the shaft, so that the expanded inner ring can be removed easily.

If inner rings do not have to be removed frequently, or if larger sizes of inner rings (up to approximately 400 mm bore diameter) have to be dismantled the use of an aluminium heating ring is the preferred method. This tool consists of a slotted ring with

*The use of a mounting sleeve facilitates the assembly of a larger number of bearings*

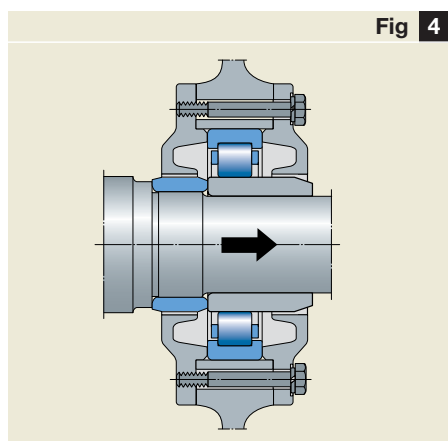


Fig 4

handles (→ fig 8) that is simple and easy-to-use and avoids shaft and inner ring damage.

The use of electric withdrawal tools becomes economic when bearings of the same size are frequently mounted and dismantled. These electrical induction heaters have one or more coils energized by alternating current. It is necessary to demagnetize the inner rings after heating and removal.

Pullers, heaters and heating rings are available from SKF. Additional information can be found in the catalogue MP3000 “SKF Maintenance and Lubrication Products” or online at [www.skf.com](http://www.skf.com).

*Outer rings can be removed more easily if tapped holes are provided in the housing shoulder*

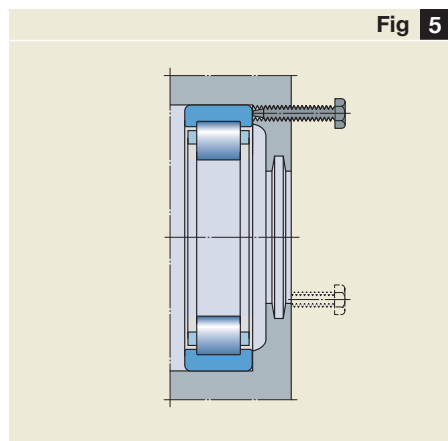


Fig 5

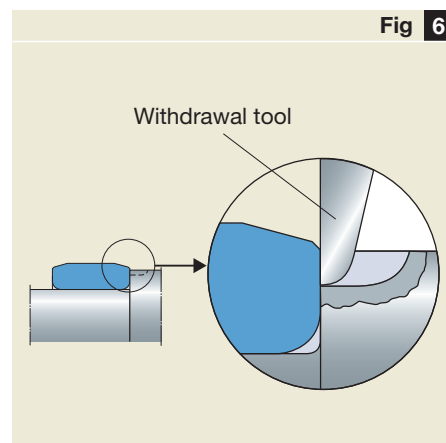


Fig 6

*Notches pre-machined in the shaft shoulder that accommodate puller arms eliminate the risk of damaging the inner ring or seating*

*The SKF TMBS strong back puller is supplied in kit form to cover the most difficult pulling operations*

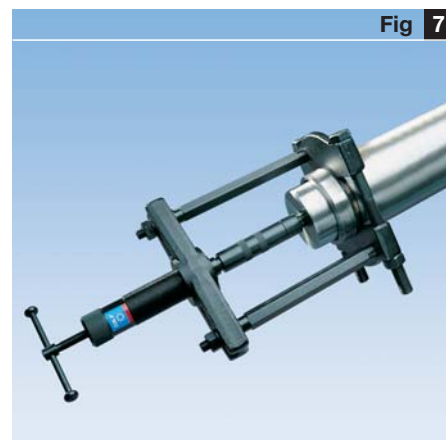


Fig 7

*The SKF TMBR series aluminium heating ring is an economic, easy-to-use tool to mount and dismount inner rings*



Fig 8

# Lubrication and handling

## Lubrication

SKF cylindrical roller bearings can be lubricated with grease or oil. There is no strict boundary where one type of lubricant is more appropriate than the other. The upper temperature limit for greases based on mineral oils is about 120 °C for continuous operation. The limit is much higher for oil lubrication and even higher if synthetic oils are used, provided that the cage and other components of the bearing arrangement can withstand the higher temperatures.

The advantage of grease over oil is that grease is more easily retained in the bearing arrangement. This is particularly important in applications where the bearing axes are vertical or at an angle.

On the other hand, oil lubrication allows operation at higher speeds and temperatures and contributes to the removal of frictional or applied heat from the bearing position.

SKF cylindrical roller bearings with an injection moulded cage of glass fibre reinforced polyamide 6,6 are particularly suited to grease lubrication. The special cage bar design enables the build-up of a grease reservoir by adhesion. This allows maintenance intervals to be extended, good performance under emergency conditions and help to prevent bearing seizure under lubrication starvation.

The greases generally recommended for cylindrical roller bearings have a consistency of 2 and may contain EP additives. Where the bearings are subjected to axial loads, the grease should have an oil bleed to DIN 51817:1998 (IP 121/75:1992) of approximately 3 %. For this reason, high-temperature greases should only be used when the operating temperature is always above +80 °C. Similarly, greases with a consistency of 3 should only be used if, for example, strong vibrations favour distribution of the grease.

To enhance the operational reliability of axially loaded cylindrical roller bearings SKF recommends using a grease or oil with a viscosity that is at least 1,5 times the requisite viscosity for the operating temperature (viscosity ratio  $\kappa = \nu/\nu_1 \geq 1,5$ ). If an axial load is applied for long periods (> 1 h), the relubrication intervals should be shortened.

## Bearing handling

Before packaging, SKF cylindrical roller bearings are treated with a rust-inhibiting medium and can be stored for several years in their original packages. The bearings should be stored lying down, preferably in rooms that are free from vibration, have a relative humidity that does not exceed 60 % and where the temperature is reasonably constant.

When purchasing, make sure that the SKF cylindrical roller bearings are in their original packages (→ **page 13**). A single bearing package cannot be opened without breaking the seal, this proves that the bearing is in "mint" condition and has not been exposed to undesirable environmental conditions.

# Comprehensive support for long-term success

2

Why not profit from SKF competence? Decades of experience in almost all branches of industry have enabled SKF to establish expertise in improving machine performance and productivity that can be shared with customers and bearing users. SKF Total Shaft Solutions™ can provide

- failure analysis and root cause elimination,
- engineering consultancy for all rotating components,
- products, services and systems, and
- machine condition diagnoses.

Another SKF concept that takes an even wider view of customer-related technologies and competencies is known as Asset Efficiency Optimization™ (AEO) and focuses, as the name suggests, on considering machines and plants as assets and optimizing their efficiency.

The AEO concept from SKF picks up where most plant asset management programmes typically stop. Using this concept enables a plant to produce the same amount for less cost, or to produce more for the same costs. It is a system for organizing and applying

assets – from personnel to machinery – bringing together knowledge and technology to achieve the greatest return on investment. It covers

- condition-dependent maintenance,
- proactive maintenance for reliability enhancement,
- maintenance service and
- integrated maintenance concepts.

More information on the SKF competencies and services can be obtained from the local SKF representative.



# Bearing data – general

## Designs

SKF single row cylindrical roller bearings with a cage guided roller complement are produced in many different designs. The most popular ones (→ fig 1)

- NU design (a)
- N design (b)
- NJ design (c)
- NUP design (d)

are described on **page 7** and listed in the product table.

## Angle rings

Angle rings, series designation HJ (→ fig 2), are designed to fit

- NU-design bearings (a)
- NJ-design bearings (b).

The HJ angle rings, where available, are listed in the product table with their designation and dimensions together with the relevant bearing. Detailed information on angle rings can be found on **page 9**.

## SKF Explorer class bearings

Cylindrical roller bearings in the SKF Explorer performance class are listed in blue in the product table. SKF Explorer bearings retain the designation of earlier standard bearings, e.g. NU 216 ECP. However, each bearing and its box are marked with the name “EXPLORER”, to avoid confusion.

## Dimensions

The dimensions of SKF single row cylindrical roller bearings are in accordance with ISO 15:1998.

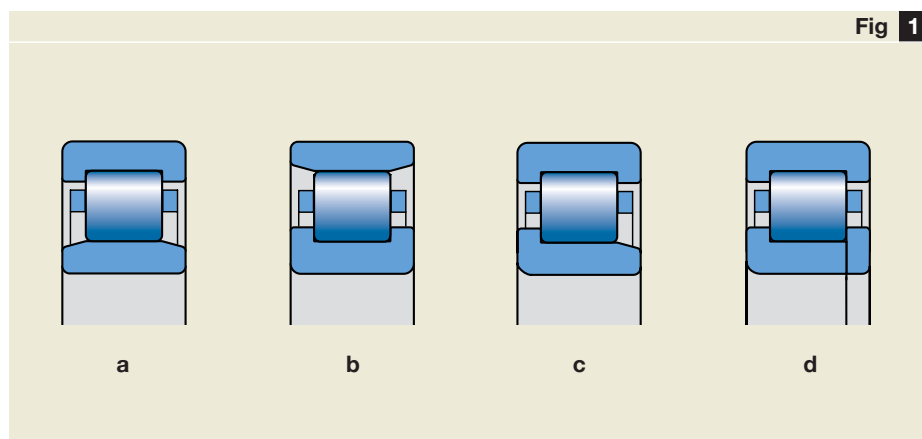
The dimensions of the HJ angle rings correspond to those specified in ISO 246:1995.

## Tolerances

SKF single row cylindrical roller bearings are manufactured to Normal tolerances for dimensional accuracy and to P6 for running accuracy as standard.

The tolerances correspond to those specified in ISO 492:2002 and can be found in the SKF General Catalogue or the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

### Standard bearing designs



### Bearings with an angle ring

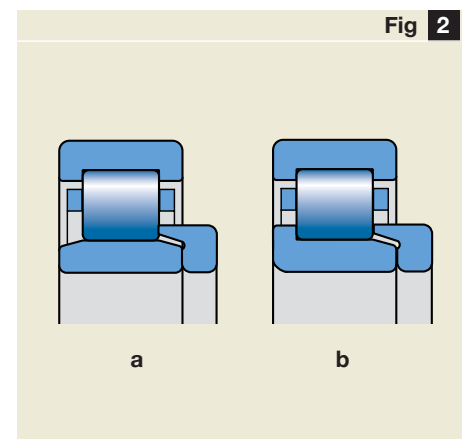
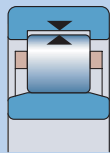




Table 1

**Radial internal clearance**

SKF single row cylindrical roller bearings are manufactured with Normal radial internal clearance as standard. Most of the bearings are also available with C3 radial internal clearance. Some of the bearings can even be supplied with the smaller C2 or the appreciably greater C4 clearance. In addition some bearings are produced with special reduced clearances. This special clearance corresponds to a section of a standard clearance range or to sections of two adjacent clearance ranges.

Bearings with non-standard clearance or with the special reduced clearances can be supplied to special order.

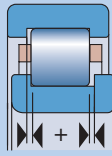
The actual clearance limits for bearings with a cylindrical bore are provided in **table 1** and are in accordance with ISO 5753:1991. They are valid for unmounted bearings under zero measuring load.

The separable components of all SKF bearings with standard clearance as well as those with reduced clearance are interchangeable.

| Bore diameter |            | Radial internal clearance |     |        |     |     |     |     |     |       |       |
|---------------|------------|---------------------------|-----|--------|-----|-----|-----|-----|-----|-------|-------|
| d             | over incl. | C2                        |     | Normal |     | C3  |     | C4  |     | C5    |       |
| mm            | µm         | min                       | max | min    | max | min | max | min | max | min   | max   |
| -             | 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 | 690   | 810   |
| 560           | 630        | 140                       | 260 | 260    | 380 | 380 | 500 | 500 | 620 | 780   | 900   |
| 630           | 710        | 145                       | 285 | 285    | 425 | 425 | 565 | 565 | 705 | 865   | 1 005 |
| 710           | 800        | 150                       | 310 | 310    | 470 | 470 | 630 | 630 | 790 | 975   | 1 135 |
| 800           | 900        | 180                       | 350 | 350    | 520 | 520 | 690 | 690 | 860 | 1 095 | 1 265 |

*Radial internal clearance of cylindrical roller bearings with a cylindrical bore*

Table 2



| Bearing<br>Bore<br>diameter | Size<br>code | Axial internal clearance of bearings in the series |     |       |     |        |     |        |     |
|-----------------------------|--------------|----------------------------------------------------|-----|-------|-----|--------|-----|--------|-----|
|                             |              | NUP 2                                              |     | NUP 3 |     | NUP 22 |     | NUP 23 |     |
| mm                          | –            | µm                                                 |     |       |     |        |     |        |     |
|                             |              | min                                                | max | min   | max | min    | max | min    | max |
| 15                          | 02           | –                                                  | –   | –     | –   | –      | –   | –      | –   |
| 17                          | 03           | 37                                                 | 140 | 37    | 140 | 37     | 140 | 47     | 155 |
| 20                          | 04           | 37                                                 | 140 | 37    | 140 | 47     | 155 | 47     | 155 |
| 25                          | 05           | 37                                                 | 140 | 47    | 155 | 47     | 155 | 47     | 155 |
| 30                          | 06           | 37                                                 | 140 | 47    | 155 | 47     | 155 | 47     | 155 |
| 35                          | 07           | 47                                                 | 155 | 47    | 155 | 47     | 155 | 62     | 180 |
| 40                          | 08           | 47                                                 | 155 | 47    | 155 | 47     | 155 | 62     | 180 |
| 45                          | 09           | 47                                                 | 155 | 47    | 155 | 47     | 155 | 62     | 180 |
| 50                          | 10           | 47                                                 | 155 | 47    | 155 | 47     | 155 | 62     | 180 |
| 55                          | 11           | 47                                                 | 155 | 62    | 180 | 47     | 155 | 62     | 180 |
| 60                          | 12           | 47                                                 | 155 | 62    | 180 | 62     | 180 | 87     | 230 |
| 65                          | 13           | 47                                                 | 155 | 62    | 180 | 62     | 180 | 87     | 230 |
| 70                          | 14           | 47                                                 | 155 | 62    | 180 | 62     | 180 | 87     | 230 |
| 75                          | 15           | 47                                                 | 155 | 62    | 180 | 62     | 180 | 87     | 230 |
| 80                          | 16           | 47                                                 | 155 | 62    | 180 | 62     | 180 | 87     | 230 |
| 85                          | 17           | 62                                                 | 180 | 62    | 180 | 62     | 180 | 87     | 230 |
| 90                          | 18           | 62                                                 | 180 | 62    | 180 | 62     | 180 | 87     | 230 |
| 95                          | 19           | 62                                                 | 180 | 62    | 180 | 62     | 180 | 87     | 230 |
| 100                         | 20           | 62                                                 | 180 | 87    | 230 | 87     | 230 | 120    | 315 |
| 105                         | 21           | 62                                                 | 180 | –     | –   | –      | –   | –      | –   |
| 110                         | 22           | 62                                                 | 180 | 87    | 230 | 87     | 230 | 120    | 315 |
| 120                         | 24           | 62                                                 | 180 | 87    | 230 | 87     | 230 | 120    | 315 |
| 130                         | 26           | 62                                                 | 180 | 87    | 230 | 87     | 230 | 120    | 315 |
| 140                         | 28           | 62                                                 | 180 | 87    | 230 | 87     | 230 | 120    | 315 |
| 150                         | 30           | 62                                                 | 180 | –     | –   | 87     | 230 | 120    | 315 |
| 160                         | 32           | 87                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 170                         | 34           | 87                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 180                         | 36           | 87                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 190                         | 38           | 87                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 200                         | 40           | 87                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 220                         | 44           | 95                                                 | 230 | –     | –   | –      | –   | –      | –   |
| 240                         | 48           | 95                                                 | 250 | –     | –   | –      | –   | –      | –   |
| 260                         | 52           | 95                                                 | 250 | –     | –   | –      | –   | –      | –   |

**Axial internal clearance**

NUP-design cylindrical roller bearings, which can locate a shaft axially in both directions, are manufactured with an axial internal clearance as shown in **table 2**. The axial internal clearance of NJ-design bearings when combined with an HJ angle ring is specified in **table 3**.

The clearance limits quoted in **tables 2** and **3** should be considered as guideline values. When axial internal clearance is measured, the rollers may tilt, causing an enlargement of the axial clearance, which may be as much as

- the radial internal clearance of bearings in the 2, 3 and 4 series or
- 2/3 of the radial internal clearance for bearings in the 22 and 23 series.

*Axial internal clearance of NUP cylindrical roller bearings*

**Axial displacement**

Cylindrical roller bearings with flangeless inner or outer rings, NU- and N-designs, and NJ-design bearings with one integral flange at the inner ring, can accommodate axial displacement of the shaft with respect to the housing as a result of thermal expansion within certain limits (→ fig 3). As axial displacement takes place within the bearing and not between the ring and shaft or housing bore, there is practically no increase in friction as the bearing rotates. Values for the permissible axial displacement “s” from the normal position of one bearing ring relative to the other are listed in the product table.

**Influence of operating temperature on bearing material**

SKF cylindrical roller bearings undergo a special heat treatment. When fitted with a steel or brass cage, they can be used at temperatures of up to +150 °C.

**Misalignment**

The ability of single row cylindrical roller bearings to accommodate angular misalignment of the inner ring with respect to the outer ring is limited to a few minutes of arc. The actual values are

- 4 minutes of arc for bearings in the narrow 2, 3, 4, 10 and 12 series and
- 3 minutes of arc for bearings in the 20, 22 and 23 series.

These guideline values apply to non-locating bearings, provided the positions of the shaft and housing axes remain constant. Larger misalignments may be possible but may result in shorter bearing service life. In these

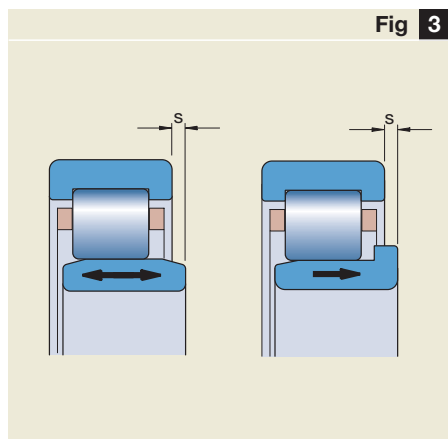


Fig 3

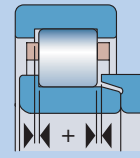


Table 3

| Bearing Bore diameter | Size code | Axial internal clearance of bearings in the series |     |         |     |         |     |          |     |          |     |
|-----------------------|-----------|----------------------------------------------------|-----|---------|-----|---------|-----|----------|-----|----------|-----|
|                       |           | NJ 2+HJ                                            |     | NJ 3+HJ |     | NJ 4+HJ |     | NJ 22+HJ |     | NJ 23+HJ |     |
| mm                    | -         | µm                                                 |     |         |     |         |     |          |     |          |     |
|                       |           | min                                                | max | min     | max | min     | max | min      | max | min      | max |
| 15                    | 02        | 42                                                 | 165 | 42      | 165 | -       | -   | -        | -   | -        | -   |
| 17                    | 03        | 42                                                 | 165 | 42      | 165 | -       | -   | 42       | 165 | 52       | 183 |
| 20                    | 04        | 42                                                 | 165 | 42      | 165 | -       | -   | 52       | 185 | 52       | 183 |
| 25                    | 05        | 42                                                 | 165 | 52      | 185 | -       | -   | 52       | 185 | 52       | 183 |
| 30                    | 06        | 42                                                 | 165 | 52      | 185 | 60      | 200 | 52       | 185 | 52       | 183 |
| 35                    | 07        | 52                                                 | 185 | 52      | 185 | 60      | 200 | 52       | 185 | 72       | 215 |
| 40                    | 08        | 52                                                 | 185 | 52      | 185 | 60      | 200 | 52       | 185 | 72       | 215 |
| 45                    | 09        | 52                                                 | 185 | 52      | 185 | 60      | 200 | 52       | 185 | 72       | 215 |
| 50                    | 10        | 52                                                 | 185 | 52      | 185 | 80      | 235 | 52       | 185 | 72       | 215 |
| 55                    | 11        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 52       | 185 | 72       | 215 |
| 60                    | 12        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 72       | 215 | 102      | 275 |
| 65                    | 13        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 72       | 215 | 102      | 275 |
| 70                    | 14        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 72       | 215 | 102      | 275 |
| 75                    | 15        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 72       | 215 | 102      | 275 |
| 80                    | 16        | 52                                                 | 185 | 72      | 215 | 80      | 235 | 72       | 215 | 102      | 275 |
| 85                    | 17        | 72                                                 | 215 | 72      | 215 | 110     | 290 | 72       | 215 | 102      | 275 |
| 90                    | 18        | 72                                                 | 215 | 72      | 215 | 110     | 290 | 72       | 215 | 102      | 275 |
| 95                    | 19        | 72                                                 | 215 | 72      | 215 | 110     | 290 | 72       | 215 | 102      | 275 |
| 100                   | 20        | 72                                                 | 215 | 102     | 275 | 110     | 290 | 102      | 275 | 140      | 375 |
| 105                   | 21        | 72                                                 | 215 | 102     | 275 | 110     | 290 | 102      | 275 | 140      | 375 |
| 110                   | 22        | 72                                                 | 215 | 102     | 275 | 110     | 290 | 102      | 275 | 140      | 375 |
| 120                   | 24        | 72                                                 | 215 | 102     | 275 | 110     | 310 | 102      | 275 | 140      | 375 |
| 130                   | 26        | 72                                                 | 215 | 102     | 275 | 110     | 310 | 102      | 275 | 140      | 375 |
| 140                   | 28        | 72                                                 | 215 | 102     | 275 | 140     | 385 | 102      | 275 | 140      | 375 |
| 150                   | 30        | 72                                                 | 215 | 102     | 275 | 140     | 385 | 102      | 275 | 140      | 375 |
| 160                   | 32        | 102                                                | 275 | 102     | 275 | -       | -   | 140      | 375 | 140      | 375 |
| 170                   | 34        | 102                                                | 275 | -       | -   | -       | -   | 140      | 375 | -        | -   |
| 180                   | 36        | 102                                                | 275 | -       | -   | -       | -   | 140      | 375 | -        | -   |
| 190                   | 38        | 102                                                | 275 | -       | -   | -       | -   | -        | -   | -        | -   |
| 200                   | 40        | 102                                                | 275 | -       | -   | -       | -   | -        | -   | -        | -   |
| 220                   | 44        | 110                                                | 290 | -       | -   | -       | -   | -        | -   | -        | -   |
| 240                   | 48        | 110                                                | 310 | -       | -   | -       | -   | -        | -   | -        | -   |
| 260                   | 52        | 110                                                | 310 | -       | -   | -       | -   | -        | -   | -        | -   |
| 280                   | 56        | 110                                                | 310 | -       | -   | -       | -   | -        | -   | -        | -   |

Axial internal clearance of NJ cylindrical roller bearings + HJ angle ring

Axial displacement

cases, it is advisable to contact the SKF application engineering service.

When the bearings are used to locate the shaft axially, the guideline values must be reduced, as uneven flange loading can lead to increased wear and possibly even to flange fracture.

The maximum values for misalignment do not apply to NUP bearings or NJ bearings with an HJ angle ring. Because these bearings have two inner and two outer ring flanges and the axial internal clearance is relatively small, axial stresses may be induced in the bearing. In case of doubt, please contact the SKF application engineering service.

### Cages

Depending on their size and design, SKF single row cylindrical roller bearings are equipped as standard with one of the cages described below and shown in **fig 4**. Bearings included in the SKF standard programme are also available with a choice of up to four different cages (**→ product table**).

The various cages used for single row cylindrical roller bearings are

- injection moulded cage of glass fibre reinforced polyamide 6,6, roller centred, designation suffix P (**a**),
- unhardened pressed steel cage, roller centred, designation suffix J or no suffix (**b**),
- one-piece window-type brass cage, inner or outer ring centred, designation suffixes ML and MP (**c**),
- two-piece machined brass cage, roller centred, designation suffix M, or outer ring centred, designation suffix MA, or inner ring centred, designation suffix MB (**d**).

### Note

Bearings with a polyamide cage can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception for a few synthetic oils and greases with synthetic base oil as well as some lubricants containing a high proportion of EP additives when used at elevated temperatures.

For bearing arrangements, which are to operate at continuously high temperatures or under difficult conditions, the use of bearings with metallic cages is recommended. For applications using refrigerants such as ammonia or freon replacements, bearings with a polyamide cage can be used for operating temperatures up to 70 °C. At higher operating temperatures bearings incorporating a machined brass or steel cage should be used.

For demanding applications, like compressors, the use of glass fibre reinforced PEEK cages is common. The exceptional properties of PEEK are a superior combination of strength and flexibility, high operating temperature range, high chemical and wear resistance and good processability.

### Standard cages

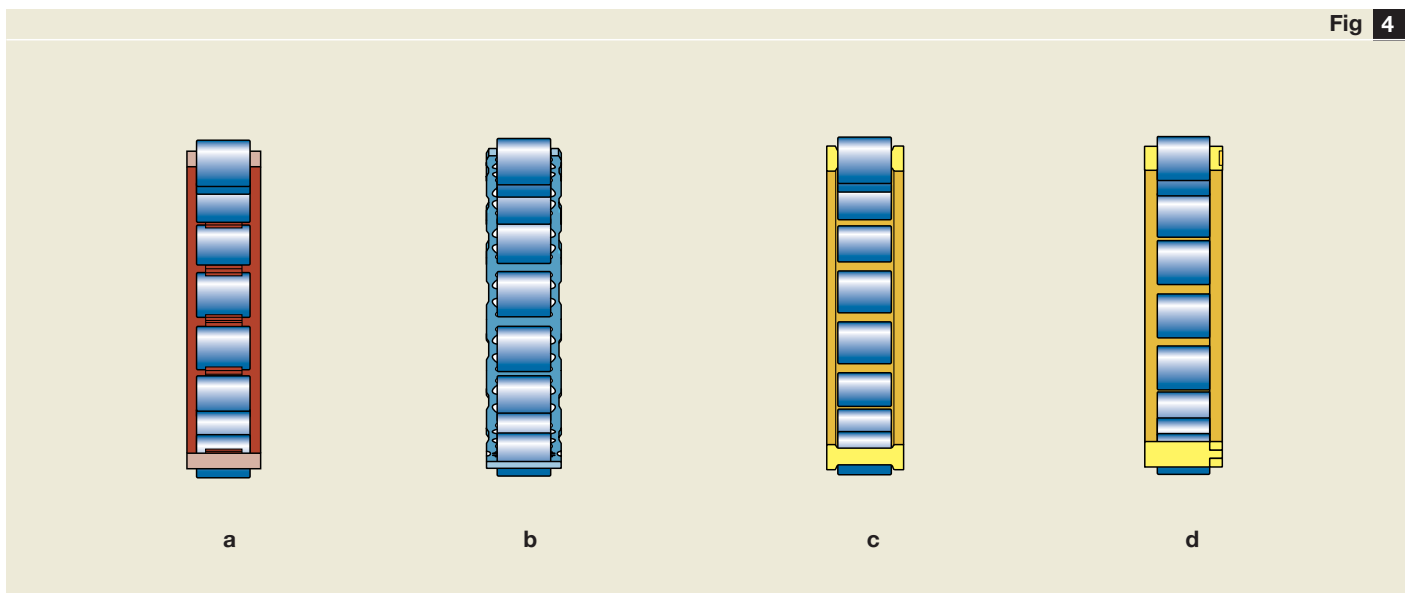


Fig 4

### Speed ratings

The limiting speed is determined by criteria that include the form stability and strength of the cage, lubrication of the cage guiding surfaces, centrifugal and gyratory forces acting on the rolling elements, precision etc.

The values listed in the product table are valid for the appropriate standard cage. To estimate the limiting speed for bearings with an alternative cage, **table 4** provides the appropriate conversion factors.

Bearings with an outer ring centred brass cage are not particularly suited for grease lubrication. If grease lubricated, they should not be used at speeds higher than  $n \times d_m = 250\,000$  mm/min and the relubrication intervals should be shortened.

Detailed information on reference and limiting speeds can be found in the SKF General Catalogue or the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

### Minimum load

In order to provide satisfactory operation, single row cylindrical roller bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions, the inertia forces of the rollers and cage, and the friction in the lubricant, can have a detrimental

influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

The requisite minimum load to be applied to single row cylindrical roller bearings can be estimated using

$$F_{rm} = k_r \left( 6 + \frac{4n}{n_r} \right) \left( \frac{d_m}{100} \right)^2$$

where

$F_{rm}$  = minimum radial load, kN

$k_r$  = minimum load factor  
(→ product table)

$n$  = rotational speed, r/min

$n_r$  = reference speed, r/min  
(→ product table)

$d_m$  = bearing mean diameter  
=  $0,5 (d + D)$ , mm

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the single row cylindrical roller bearing must be subjected to an additional radial load.

**Table 4**

| Bearing with standard cage | alternative standard cage |        |        |
|----------------------------|---------------------------|--------|--------|
|                            | P, J, M, MR               | MA, MB | ML, MP |
| <b>P, J, M, MR</b>         | 1                         | 1,3    | 1,5    |
| <b>MA, MB</b>              | 0,75                      | 1      | 1,2    |
| <b>ML, MP</b>              | 0,65                      | 0,85   | 1      |

*Conversion factors for limiting speeds*

**Dynamic axial load carrying capacity**

Bearings with flanges on both the inner and outer ring can support axial loads in addition to radial loads. Their axial load carrying capacity is primarily determined by the ability of the sliding surfaces of the roller end/flange contact to support loads. Factors having the greatest effect on this ability are the lubrication conditions, operating temperature and heat dissipation from the bearing.

Assuming the conditions cited below, the permissible axial load can be calculated with sufficient accuracy from

$$F_{ap} = \frac{k_1 C_0 10^4}{n (d + D)} - k_2 F_r$$

where

$F_{ap}$  = maximum permissible axial load, kN

$C_0$  = basic static load rating, kN

$F_r$  = actual radial bearing load, kN

$n$  = rotational speed, r/min

$d$  = bearing bore diameter, mm

$D$  = bearing outside diameter, mm

$k_1$  = a factor

= 1,5 for oil lubrication

= 1 for grease lubrication

$k_2$  = a factor

= 0,15 for oil lubrication

= 0,1 for grease lubrication

**Bearings subjected to axial loads should be supported to a height corresponding to half of the flange height**

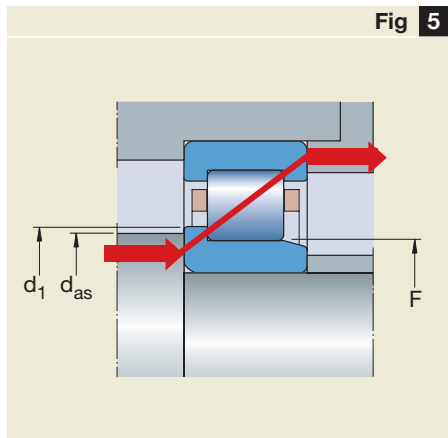


Fig 5

The above equation is based on conditions that are considered typical for normal bearing operation:

- a difference of 60 °C between the bearing operating temperature and the ambient temperature;
- a specific heat loss from the bearing of 0,5 mW/mm<sup>2</sup> °C; with reference to the bearing outside diameter surface ( $\pi D B$ );
- a viscosity ratio  $\kappa \geq 2$ .

For grease lubrication the viscosity of the base oil in the grease may be used. If  $\kappa$  is less than 2, the friction will increase and there will be more wear. These effects can be reduced at low speeds, for example, by using oils with AW (anti-wear) and EP (extreme pressure) additives.

Where axial loads act for longer periods and the bearings are grease lubricated, it is advisable to use grease that has good oil bleeding properties at the operating temperatures (> 3 % according to DIN 51 817 or IP 12175/1992). Frequent relubrication is also recommended.

The values of the permissible load  $F_{ap}$  obtained from the heat balance equation are valid for a continuously acting constant axial load and adequate lubricant supply to the roller end/flange contacts. Where axial loads act only for short periods, the values may be multiplied by 2, or for axially acting shock loads by 3.

To avoid any risk of flange breakage, the constantly acting axial load  $F_a$  applied to the bearing should never exceed the numerical value of

- 0,0045  $D^{1,5}$  for bearings of series 2 and
- 0,0023  $D^{1,7}$  for bearings of other series.

Where the axial load acts only occasionally and for brief periods,  $F_a$  should never be greater than the numerical value of

- 0,013  $D^{1,5}$  for bearings of series 2 and
- 0,007  $D^{1,7}$  for bearings of other series

where

$F_a$  = the occasionally acting axial load, kN

$D$  = bearing outside diameter, mm

To obtain an even flange load and provide sufficient running accuracy of the shaft when cylindrical roller bearings are subjected to heavy axial loads, axial runout and the size of the abutment surfaces of adjacent components become particularly important. As to the diameter of the abutment surfaces, SKF recommends supporting the inner ring at a height corresponding to half of the flange height (→ fig 5). For the inner ring flange, for example, the abutment diameter can be obtained using

$$d_{as} = 0,5 (d_1 + F)$$

where

$d_{as}$  = shaft abutment diameter, mm

$d_1$  = inner ring flange diameter, mm

$F$  = inner ring raceway diameter, mm

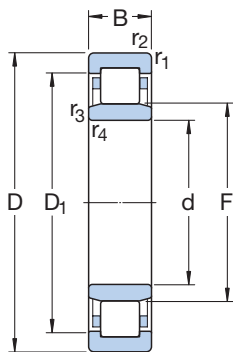
Where misalignment between the inner and outer rings exceeds 1 minute of arc, the action of the load on the flange changes so considerably that the safety factors included in the guideline values may be inadequate. In these cases, please contact the SKF application engineering service.

**Supplementary designations**

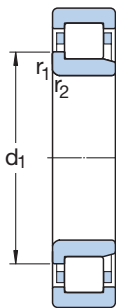
The designation suffixes used to identify certain features of SKF single row cylindrical roller bearings are explained in the following.

|            |                                                                                                                                                   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CN</b>  | Normal radial internal clearance; generally only appears in connection with one of the following letters for reduced or displaced clearance range |
| <b>H</b>   | Reduced clearance range corresponding to the upper half of the actual range                                                                       |
| <b>L</b>   | Reduced clearance range corresponding to the lower half of the actual range                                                                       |
|            | The above letters are also used together with the clearance class suffixes C2, C3 and C4                                                          |
| <b>C2</b>  | Radial internal clearance smaller than Normal                                                                                                     |
| <b>C3</b>  | Radial internal clearance greater than Normal                                                                                                     |
| <b>C4</b>  | Radial internal clearance greater than C3                                                                                                         |
| <b>C5</b>  | Radial internal clearance greater than C4                                                                                                         |
| <b>EC</b>  | Optimized internal design incorporating more and/or larger rollers and with modified roller end/flange contact                                    |
| <b>HA3</b> | Inner ring of case-hardening steel                                                                                                                |
| <b>HB1</b> | Bainite hardened inner and outer ring                                                                                                             |
| <b>HN1</b> | Inner and outer ring with special surface "enriched" heat treatment                                                                               |
| <b>J</b>   | Pressed steel cage, roller centred, unhardened                                                                                                    |
| <b>K</b>   | Tapered bore, taper 1:12                                                                                                                          |
| <b>M</b>   | Two-piece machined brass cage, roller centred                                                                                                     |
| <b>MA</b>  | Two-piece machined brass cage, outer ring centred                                                                                                 |
| <b>MB</b>  | Two-piece machined brass cage, inner ring centred                                                                                                 |
| <b>ML</b>  | One-piece form-turned window-type brass cage, inner or outer ring centred                                                                         |
| <b>MP</b>  | One-piece window-type brass cage with milled, reamed or broached pockets, inner or outer ring centred                                             |
| <b>MR</b>  | One-piece form-turned window-type brass cage, roller centred                                                                                      |

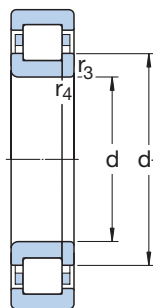
|               |                                                                                                      |
|---------------|------------------------------------------------------------------------------------------------------|
| <b>N</b>      | Snap ring groove in the outer ring outside diameter                                                  |
| <b>NR</b>     | Snap ring groove in the outer ring, with snap ring                                                   |
| <b>N1</b>     | One locating slot in one outer ring side face                                                        |
| <b>N2</b>     | Two locating slots 180° apart in one outer ring side face                                            |
| <b>P</b>      | Injection moulded cage of glass fibre reinforced polyamide 6,6, roller centred                       |
| <b>PH</b>     | Injection moulded PEEK cage, roller centred                                                          |
| <b>PHA</b>    | Injection moulded PEEK cage, outer ring centred                                                      |
| <b>S1</b>     | Rings dimensionally stabilized for operating temperatures up to +200 °C                              |
| <b>S2</b>     | Rings dimensionally stabilized for operating temperatures up to +250 °C                              |
| <b>VA301</b>  | Bearing for railway vehicle traction motors                                                          |
| <b>VA305</b>  | VA301 + special inspection routines                                                                  |
| <b>VA3091</b> | VA301 + VL0241                                                                                       |
| <b>VA350</b>  | Bearing for railway axleboxes                                                                        |
| <b>VA820</b>  | Bearing for railway axleboxes according to EN 12080:1998, class 1                                    |
| <b>VC025</b>  | Bearing with specially wear-resistant raceways for applications in heavily contaminated environments |
| <b>VL0241</b> | Aluminium-oxide coated outside surface of the outer ring for electrical resistance up to 1 000 V DC  |
| <b>VL2071</b> | Aluminium-oxide coated outside surface of the inner ring for electrical resistance up to 1 000 V DC  |
| <b>VQ015</b>  | Inner ring with crowned raceway for increased permissible misalignment                               |



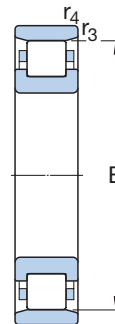
Type NU



Type NJ



Type NUP



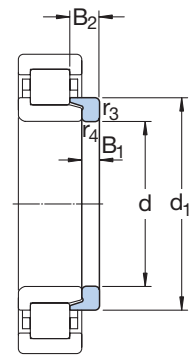
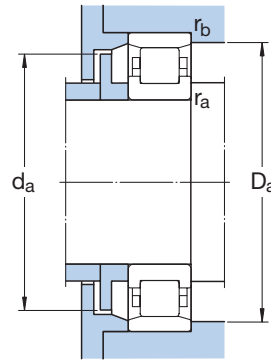
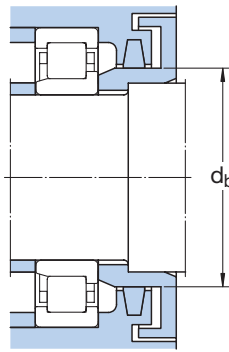
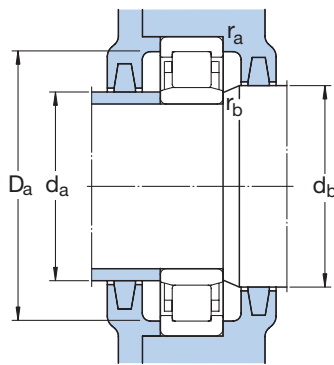
Type N

| Principal dimensions |    |      | Basic load ratings |                | Fatigue load limit<br>P <sub>u</sub> | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|----|------|--------------------|----------------|--------------------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D  | B    | C                  | C <sub>0</sub> |                                      | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |    |      | kN                 |                | kN                                   | r/min           |                | kg                                 | -                                          |                                                 |
| 15                   | 35 | 11   | 12,5               | 10,2           | 1,22                                 | 22 000          | 26 000         | 0,047                              | <b>NU 202 ECP</b>                          | -                                               |
|                      | 35 | 11   | 12,5               | 10,2           | 1,22                                 | 22 000          | 26 000         | 0,049                              | <b>NJ 202 ECP</b>                          | -                                               |
| 17                   | 40 | 12   | 17,2               | 14,3           | 1,73                                 | 19 000          | 22 000         | 0,068                              | <b>NU 203 ECP</b>                          | <b>ML</b>                                       |
|                      | 40 | 12   | 17,2               | 14,3           | 1,73                                 | 19 000          | 22 000         | 0,070                              | <b>NJ 203 ECP</b>                          | <b>ML</b>                                       |
|                      | 40 | 12   | 17,2               | 14,3           | 1,73                                 | 19 000          | 22 000         | 0,073                              | <b>NUP 203 ECP</b>                         | <b>ML</b>                                       |
|                      | 40 | 12   | 17,2               | 14,3           | 1,73                                 | 19 000          | 22 000         | 0,066                              | <b>N 203 ECP</b>                           | -                                               |
| 40                   | 16 | 23,8 | 21,6               | 2,65           | 19 000                               | 22 000          | 0,092          | <b>NU 2203 ECP</b>                 | -                                          |                                                 |
|                      | 16 | 23,8 | 21,6               | 2,65           | 19 000                               | 22 000          | 0,095          | <b>NJ 2203 ECP</b>                 | -                                          |                                                 |
|                      | 16 | 23,8 | 21,6               | 2,65           | 19 000                               | 22 000          | 0,097          | <b>NUP 2203 ECP</b>                | -                                          |                                                 |
| 47                   | 14 | 24,6 | 20,4               | 2,55           | 15 000                               | 20 000          | 0,12           | <b>NU 303 ECP</b>                  | -                                          |                                                 |
|                      | 14 | 24,6 | 20,4               | 2,55           | 15 000                               | 20 000          | 0,12           | <b>NJ 303 ECP</b>                  | -                                          |                                                 |
|                      | 14 | 24,6 | 20,4               | 2,55           | 15 000                               | 20 000          | 0,12           | <b>N 303 ECP</b>                   | -                                          |                                                 |
| 20                   | 47 | 14   | 25,1               | 25,2           | 2,75                                 | 16 000          | 19 000         | 0,11                               | <b>NU 204 ECP</b>                          | <b>ML</b>                                       |
|                      | 47 | 14   | 25,1               | 25,2           | 2,75                                 | 16 000          | 19 000         | 0,11                               | <b>NJ 204 ECP</b>                          | <b>ML</b>                                       |
|                      | 47 | 14   | 25,1               | 25,2           | 2,75                                 | 16 000          | 19 000         | 0,12                               | <b>NUP 204 ECP</b>                         | <b>ML</b>                                       |
|                      | 47 | 14   | 25,1               | 25,2           | 2,75                                 | 16 000          | 19 000         | 0,11                               | <b>N 204 ECP</b>                           | -                                               |
| 47                   | 18 | 29,7 | 27,5               | 3,45           | 16 000                               | 19 000          | 0,14           | <b>NU 2204 ECP</b>                 | -                                          |                                                 |
|                      | 18 | 29,7 | 27,5               | 3,45           | 16 000                               | 19 000          | 0,14           | <b>NJ 2204 ECP</b>                 | -                                          |                                                 |
| 52                   | 15 | 35,5 | 26                 | 3,25           | 15 000                               | 18 000          | 0,17           | <b>NU 304 ECP</b>                  | -                                          |                                                 |
|                      | 15 | 35,5 | 26                 | 3,25           | 15 000                               | 18 000          | 0,17           | <b>NJ 304 ECP</b>                  | -                                          |                                                 |
|                      | 15 | 35,5 | 26                 | 3,25           | 15 000                               | 18 000          | 0,16           | <b>NUP 304 ECP</b>                 | -                                          |                                                 |
|                      | 15 | 35,5 | 26                 | 3,25           | 15 000                               | 18 000          | 0,15           | <b>N 304 ECP</b>                   | -                                          |                                                 |
| 52                   | 21 | 47,5 | 38                 | 4,8            | 14 000                               | 18 000          | 0,21           | <b>NU 2304 ECP</b>                 | -                                          |                                                 |
|                      | 21 | 47,5 | 38                 | 4,8            | 14 000                               | 18 000          | 0,22           | <b>NJ 2304 ECP</b>                 | -                                          |                                                 |
|                      | 21 | 47,5 | 38                 | 4,8            | 14 000                               | 18 000          | 0,22           | <b>NUP 2304 ECP</b>                | -                                          |                                                 |
| 25                   | 47 | 12   | 14,2               | 13,2           | 1,4                                  | 18 000          | 18 000         | 0,084                              | <b>NU 1005</b>                             | -                                               |
|                      | 52 | 15   | 28,6               | 27             | 3,35                                 | 14 000          | 16 000         | 0,14                               | <b>NU 205 ECP</b>                          | <b>J, ML</b>                                    |
|                      | 52 | 15   | 28,6               | 27             | 3,35                                 | 14 000          | 16 000         | 0,15                               | <b>NJ 205 ECP</b>                          | <b>J, ML</b>                                    |
|                      | 52 | 15   | 28,6               | 27             | 3,35                                 | 14 000          | 16 000         | 0,14                               | <b>NUP 205 ECP</b>                         | <b>ML</b>                                       |
|                      | 52 | 15   | 28,6               | 27             | 3,35                                 | 14 000          | 16 000         | 0,13                               | <b>N 205 ECP</b>                           | -                                               |
| 52                   | 18 | 34,1 | 34                 | 4,25           | 14 000                               | 16 000          | 0,17           | <b>NU 2205 ECP</b>                 | <b>ML</b>                                  |                                                 |
|                      | 18 | 34,1 | 34                 | 4,25           | 14 000                               | 16 000          | 0,18           | <b>NJ 2205 ECP</b>                 | <b>ML</b>                                  |                                                 |
|                      | 18 | 34,1 | 34                 | 4,25           | 14 000                               | 16 000          | 0,17           | <b>NUP 2205 ECP</b>                | <b>ML</b>                                  |                                                 |

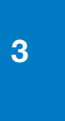
The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 203 ECP becomes NU 203 ECML





Angle ring



Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

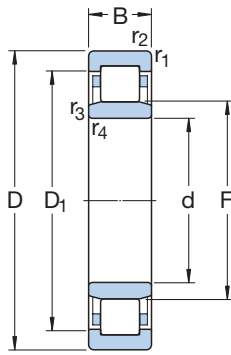
Angle ring Designation

Mass

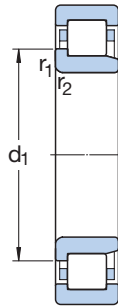
Dimensions

| d    | d <sub>1</sub><br>~ | D <sub>1</sub><br>~ | F, E | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub> , D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass  | B <sub>1</sub> | B <sub>2</sub> |
|------|---------------------|---------------------|------|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|-------|----------------|----------------|
| mm   |                     |                     |      |                         |                         |                 | mm                    |                       |                                        |                       |                       |                       | -              | -                      | kg    | mm             |                |
| 15   | -                   | 27,9                | 19,3 | 0,6                     | 0,3                     | 1               | 17,4                  | 18,5                  | 21                                     | 30,8                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
|      | 21,9                | 27,9                | 19,3 | 0,6                     | 0,3                     | 1               | 18,5                  | 18,5                  | 23                                     | 30,8                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
| 17   | -                   | 32,4                | 22,1 | 0,6                     | 0,3                     | 1               | 19,4                  | 21                    | 24                                     | 35,8                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
|      | 25                  | 32,4                | 22,1 | 0,6                     | 0,3                     | 1               | 21                    | 21                    | 27                                     | 35,8                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
|      | 25                  | 32,4                | 22,1 | 0,6                     | 0,3                     | -               | 21,2                  | -                     | 27                                     | 35,8                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
|      | 25                  | -                   | 35,1 | 0,6                     | 0,3                     | 1               | 21,2                  | 33                    | 37                                     | 37,6                  | 0,6                   | 0,3                   | 0,15           | -                      |       |                |                |
|      | -                   | 32,4                | 22,1 | 0,6                     | 0,3                     | 1,5             | 19,4                  | 21                    | 24                                     | 35,8                  | 0,6                   | 0,3                   | 0,2            | -                      |       |                |                |
|      | 25                  | 32,4                | 22,1 | 0,6                     | 0,3                     | 1,5             | 21                    | 21                    | 27                                     | 35,8                  | 0,6                   | 0,3                   | 0,2            | -                      |       |                |                |
|      | 25                  | 32,4                | 22,1 | 0,6                     | 0,3                     | -               | 21,2                  | -                     | 27                                     | 35,8                  | 0,6                   | 0,3                   | 0,2            | -                      |       |                |                |
|      | -                   | 37                  | 24,2 | 1                       | 0,6                     | 1               | 21,2                  | 23                    | 26                                     | 41,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 27,7                | 37                  | 24,2 | 1                       | 0,6                     | 1               | 22,6                  | 23                    | 29                                     | 41,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 27,7                | -                   | 40,2 | 1                       | 0,6                     | 1               | 22,6                  | 38                    | 42                                     | 42,8                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
| 20   | -                   | 38,8                | 26,5 | 1                       | 0,6                     | 1               | 24,2                  | 25                    | 28                                     | 41,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 29,7                | 38,8                | 26,5 | 1                       | 0,6                     | 1               | 25                    | 25                    | 31                                     | 41,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 29,7                | 38,8                | 26,5 | 1                       | 0,6                     | -               | 25,6                  | -                     | 31                                     | 41,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 29,7                | -                   | 41,5 | 1                       | 0,6                     | 1               | 25,6                  | 40                    | 43                                     | 42,8                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | -                   | 38,8                | 26,5 | 1                       | 0,6                     | 2               | 24,2                  | 25                    | 28                                     | 41,4                  | 1                     | 0,6                   | 0,2            | -                      |       |                |                |
|      | 29,7                | 38,8                | 26,5 | 1                       | 0,6                     | 2               | 25                    | 25                    | 31                                     | 41,4                  | 1                     | 0,6                   | 0,2            | -                      |       |                |                |
|      | 31,2                | 42,4                | 27,5 | 1,1                     | 0,6                     | 0,9             | 24,2                  | 26                    | 29                                     | 45                    | 1                     | 0,6                   | 0,15           | HJ 304 EC              | 0,017 | 4              | 6,5            |
|      | 31,2                | 42,4                | 27,5 | 1,1                     | 0,6                     | 0,9             | 27                    | 29                    | 33                                     | 45                    | 1                     | 0,6                   | 0,15           | HJ 304 EC              | 0,017 | 4              | 6,5            |
|      | 31,2                | 42,4                | 27,5 | 1,1                     | 0,6                     | -               | 27                    | -                     | 33                                     | 45                    | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | 31,2                | -                   | 45,5 | 1,1                     | 0,6                     | 0,9             | 27                    | 44                    | 47                                     | 47,8                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
|      | -                   | 42,4                | 27,5 | 1,1                     | 0,6                     | 1,9             | 24,2                  | 26                    | 29                                     | 45                    | 1                     | 0,6                   | 0,2            | -                      |       |                |                |
|      | 31,2                | 42,4                | 27,5 | 1,1                     | 0,6                     | 1,9             | 26                    | 26                    | 33                                     | 45                    | 1                     | 0,6                   | 0,2            | -                      |       |                |                |
|      | 31,2                | 42,4                | 27,5 | 1,1                     | 0,6                     | -               | 27                    | -                     | 33                                     | 45                    | 1                     | 0,6                   | 0,2            | -                      |       |                |                |
|      | 25                  | -                   | 38,8 | 30,5                    | 0,6                     | 0,3             | 2                     | 27                    | 29                                     | 32                    | 43,8                  | 0,6                   | 0,3            | 0,1                    | -     |                |                |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | 1,3             | 29,2                  | 30                    | 33                                     | 46,4                  | 1                     | 0,6                   | 0,15           | HJ 205 EC              | 0,014 | 3              | 6              |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | 1,3             | 30                    | 30                    | 36                                     | 46,4                  | 1                     | 0,6                   | 0,15           | HJ 205 EC              | 0,014 | 3              | 6              |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | -               | 30,6                  | -                     | 36                                     | 46,4                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
| 34,7 |                     | -                   | 46,5 | 1                       | 0,6                     | 1,3             | 30,6                  | 45                    | 48                                     | 47,8                  | 1                     | 0,6                   | 0,15           | -                      |       |                |                |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | 1,8             | 29,2                  | 30                    | 33                                     | 46,4                  | 1                     | 0,6                   | 0,2            | HJ 2205 EC             | 0,014 | 3              | 6,5            |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | 1,8             | 30                    | 30                    | 36                                     | 46,4                  | 1                     | 0,6                   | 0,2            | HJ 2205 EC             | 0,014 | 3              | 6,5            |
| 34,7 |                     | 43,8                | 31,5 | 1                       | 0,6                     | -               | 30,6                  | -                     | 36                                     | 46,4                  | 1                     | 0,6                   | 0,2            | -                      |       |                |                |

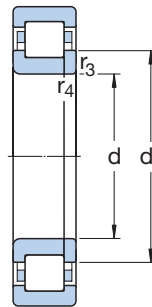
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



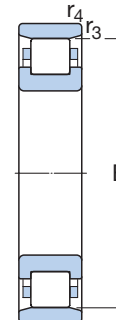
Type NU



Type NJ



Type NUP

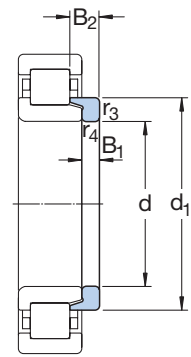
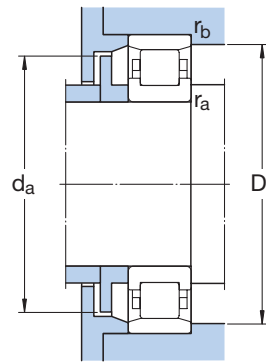
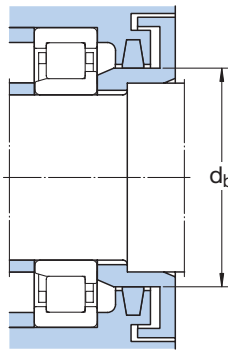
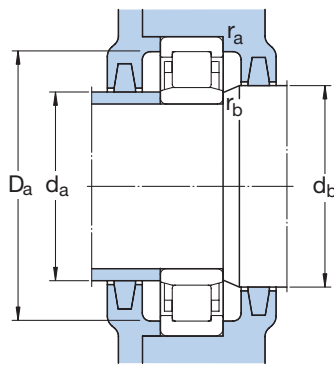


Type N

| Principal dimensions |    |    | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |       |
|----------------------|----|----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|-------|
| d                    | D  | B  | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |       |
| mm                   |    |    | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |       |
| 25<br>cont.          | 62 | 17 | 46,5               | 36,5  | 4,55                        | 12 000          | 15 000         | 0,28                               | NU 305 ECP                                 | J, ML                                           |       |
|                      | 62 | 17 | 46,5               | 36,5  | 4,55                        | 12 000          | 15 000         | 0,29                               | NJ 305 ECP                                 | J, ML                                           |       |
|                      | 62 | 17 | 46,5               | 36,5  | 4,55                        | 12 000          | 15 000         | 0,25                               | NUP 305 ECP                                | J, ML                                           |       |
|                      | 62 | 17 | 46,5               | 36,5  | 4,55                        | 12 000          | 15 000         | 0,24                               | N 305 ECP                                  | –                                               |       |
|                      | 62 | 24 | 64                 | 55    | 6,95                        | 12 000          | 15 000         | 0,38                               | NU 2305 ECP                                | J, ML                                           |       |
|                      | 62 | 24 | 64                 | 55    | 6,95                        | 12 000          | 15 000         | 0,39                               | NJ 2305 ECP                                | ML                                              |       |
|                      | 62 | 24 | 64                 | 55    | 6,95                        | 12 000          | 15 000         | 0,38                               | NUP 2305 ECP                               | ML                                              |       |
|                      | 30 | 55 | 13                 | 17,9  | 17,3                        | 1,86            | 14 000         | 15 000                             | 0,12                                       | NU 1006                                         | –     |
|                      |    | 62 | 16                 | 44    | 36,5                        | 4,55            | 13 000         | 14 000                             | 0,23                                       | NU 206 ECP                                      | J, ML |
|                      |    | 62 | 16                 | 44    | 36,5                        | 4,55            | 13 000         | 14 000                             | 0,24                                       | NJ 206 ECP                                      | J, ML |
|                      |    | 62 | 16                 | 44    | 36,5                        | 4,55            | 13 000         | 14 000                             | 0,22                                       | NUP 206 ECP                                     | ML    |
|                      |    | 62 | 16                 | 44    | 36,5                        | 4,55            | 13 000         | 14 000                             | 0,20                                       | N 206 ECP                                       | –     |
| 62                   |    | 20 | 55                 | 49    | 6,1                         | 13 000          | 14 000         | 0,26                               | NU 2206 ECP                                | J, ML                                           |       |
| 62                   |    | 20 | 55                 | 49    | 6,1                         | 13 000          | 14 000         | 0,27                               | NJ 2206 ECP                                | J, ML                                           |       |
| 62                   |    | 20 | 55                 | 49    | 6,1                         | 13 000          | 14 000         | 0,27                               | NUP 2206 ECP                               | ML                                              |       |
| 72                   |    | 19 | 58,5               | 48    | 6,2                         | 11 000          | 12 000         | 0,40                               | NU 306 ECP                                 | J, M, ML                                        |       |
| 72                   |    | 19 | 58,5               | 48    | 6,2                         | 11 000          | 12 000         | 0,41                               | NJ 306 ECP                                 | J, M, ML                                        |       |
| 72                   |    | 19 | 58,5               | 48    | 6,2                         | 11 000          | 12 000         | 0,38                               | NUP 306 ECP                                | J, M, ML                                        |       |
| 72                   |    | 19 | 58,5               | 48    | 6,2                         | 11 000          | 12 000         | 0,36                               | N 306 ECP                                  | –                                               |       |
| 72                   |    | 27 | 83                 | 75    | 9,65                        | 11 000          | 12 000         | 0,53                               | NU 2306 ECP                                | ML                                              |       |
| 72                   |    | 27 | 83                 | 75    | 9,65                        | 11 000          | 12 000         | 0,54                               | NJ 2306 ECP                                | ML                                              |       |
| 72                   |    | 27 | 83                 | 75    | 9,65                        | 11 000          | 12 000         | 0,55                               | NUP 2306 ECP                               | ML                                              |       |
| 90                   |    | 23 | 60,5               | 53    | 6,8                         | 9 000           | 11 000         | 0,75                               | NU 406                                     | –                                               |       |
| 90                   |    | 23 | 60,5               | 53    | 6,8                         | 9 000           | 11 000         | 0,77                               | NJ 406                                     | –                                               |       |
| 35                   |    | 62 | 14                 | 35,8  | 38                          | 4,55            | 12 000         | 13 000                             | 0,16                                       | NU 1007 ECP                                     | –     |
|                      | 72 | 17 | 56                 | 48    | 6,1                         | 11 000          | 12 000         | 0,33                               | NU 207 ECP                                 | J, M, ML                                        |       |
|                      | 72 | 17 | 56                 | 48    | 6,1                         | 11 000          | 12 000         | 0,33                               | NJ 207 ECP                                 | J, M, ML                                        |       |
|                      | 72 | 17 | 56                 | 48    | 6,1                         | 11 000          | 12 000         | 0,31                               | NUP 207 ECP                                | J, M, ML                                        |       |
|                      | 72 | 17 | 56                 | 48    | 6,1                         | 11 000          | 12 000         | 0,30                               | N 207 ECP                                  | –                                               |       |
|                      | 72 | 23 | 69,5               | 63    | 8,15                        | 11 000          | 12 000         | 0,40                               | NU 2207 ECP                                | J, ML                                           |       |
|                      | 72 | 23 | 69,5               | 63    | 8,15                        | 11 000          | 12 000         | 0,41                               | NJ 2207 ECP                                | J, ML                                           |       |
|                      | 72 | 23 | 69,5               | 63    | 8,15                        | 11 000          | 12 000         | 0,42                               | NUP 2207 ECP                               | ML                                              |       |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 305 ECP becomes NU 305 ECML



Angle ring

3

Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

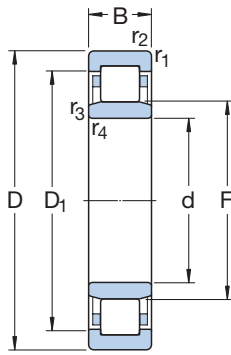
Angle ring Designation

Mass

Dimensions

| d           | d <sub>1</sub> | D <sub>1</sub> | F, E | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub> , D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass  | B <sub>1</sub> | B <sub>2</sub> |   |
|-------------|----------------|----------------|------|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|-------|----------------|----------------|---|
| mm          |                |                |      |                         |                         |                 | mm                    |                       |                                        |                       |                       |                       | -              | -                      | kg    | mm             |                |   |
| 25<br>cont. | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | 1,3             | 32                    | 32                    | 36                                     | 55                    | 1                     | 1                     | 0,15           | HJ 305 EC              | 0,023 | 4              | 7              |   |
|             | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | 1,3             | 32                    | 32                    | 40                                     | 55                    | 1                     | 1                     | 0,15           | HJ 305 EC              | 0,023 | 4              | 7              |   |
|             | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | -               | 32                    | -                     | 40                                     | 55                    | 1                     | 1                     | 0,15           | -                      | -     | -              | -              |   |
|             | 38,1           | -              | 54   | 1,1                     | 1,1                     | 1,3             | 32                    | 52                    | 56                                     | 55                    | 1                     | 1                     | 0,15           | -                      | -     | -              | -              |   |
|             | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | 2,3             | 32                    | 32                    | 36                                     | 55                    | 1                     | 1                     | 0,25           | HJ 2305 EC             | 0,025 | 4              | 8              |   |
|             | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | 2,3             | 32                    | 32                    | 40                                     | 55                    | 1                     | 1                     | 0,25           | HJ 2305 EC             | 0,025 | 4              | 8              |   |
|             | 38,1           | 50,7           | 34   | 1,1                     | 1,1                     | -               | 32                    | -                     | 40                                     | 55                    | 1                     | 1                     | 0,25           | -                      | -     | -              | -              |   |
|             | 30             | -              | 45,6 | 36,5                    | 1                       | 0,6             | 2,1                   | 33,2                  | 35                                     | 38                    | 50,4                  | 1                     | 0,6            | 0,1                    | -     | -              | -              | - |
|             | 41,2           | 52,5           | 37,5 | 1                       | 0,6                     | 1,3             | 34,2                  | 36                    | 39                                     | 56,4                  | 1                     | 0,6                   | 0,15           | HJ 206 EC              | 0,025 | 4              | 7              |   |
|             | 41,2           | 52,5           | 37,5 | 1                       | 0,6                     | 1,3             | 35,6                  | 36                    | 43                                     | 56,4                  | 1                     | 0,6                   | 0,15           | HJ 206 EC              | 0,025 | 4              | 7              |   |
|             | 41,2           | 52,5           | 37,5 | 1                       | 0,6                     | -               | 35,6                  | -                     | 43                                     | 56,4                  | 1                     | 0,6                   | 0,15           | -                      | -     | -              | -              |   |
|             | 41,2           | -              | 55,5 | 1                       | 0,6                     | 1,3             | 35,6                  | 54                    | 57                                     | 57,8                  | 1                     | 0,6                   | 0,15           | -                      | -     | -              | -              |   |
| -           | 52,5           | 37,5           | 1    | 0,6                     | 1,8                     | 34              | 36                    | 39                    | 57                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |
| 41,2        | 52,5           | 37,5           | 1    | 0,6                     | 1,8                     | 34              | 36                    | 43                    | 57                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |
| 41,2        | 52,5           | 37,5           | 1    | 0,6                     | -                       | 34              | -                     | 43                    | 57                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |
| -           | 58,9           | 40,5           | 1,1  | 1,1                     | 1,4                     | 37              | 39                    | 42                    | 65                                     | 1                     | 1                     | 0,15                  | -              | -                      | -     | -              |                |   |
| 45          | 58,9           | 40,5           | 1,1  | 1,1                     | 1,4                     | 37              | 39                    | 47                    | 65                                     | 1                     | 1                     | 0,15                  | -              | -                      | -     | -              |                |   |
| 45          | 58,9           | 40,5           | 1,1  | 1,1                     | -                       | 37              | -                     | 47                    | 65                                     | 1                     | 1                     | 0,15                  | -              | -                      | -     | -              |                |   |
| 45          | -              | 62,5           | 1,1  | 1,1                     | 1,4                     | 37              | 60                    | 64                    | 65                                     | 1                     | 1                     | 0,15                  | -              | -                      | -     | -              |                |   |
| -           | 58,9           | 40,5           | 1,1  | 1,1                     | 2,4                     | 37              | 39                    | 42                    | 65                                     | 1                     | 1                     | 0,25                  | -              | -                      | -     | -              |                |   |
| 45          | 58,9           | 40,5           | 1,1  | 1,1                     | 2,4                     | 37              | 39                    | 47                    | 65                                     | 1                     | 1                     | 0,25                  | -              | -                      | -     | -              |                |   |
| 45          | 58,9           | 40,5           | 1,1  | 1,1                     | -                       | 37              | -                     | 47                    | 65                                     | 1                     | 1                     | 0,25                  | -              | -                      | -     | -              |                |   |
| 50,5        | 66,6           | 45             | 1,5  | 1,5                     | 1,6                     | 41              | 43                    | 47                    | 79                                     | 1,5                   | 1,5                   | 0,15                  | HJ 406         | 0,080                  | 7     | 11,5           |                |   |
| 50,5        | 66,6           | 45             | 1,5  | 1,5                     | 1,6                     | 41              | 43                    | 47                    | 79                                     | 1,5                   | 1,5                   | 0,15                  | HJ 406         | 0,080                  | 7     | 11,5           |                |   |
| 35          | -              | 54,5           | 42   | 1                       | 0,6                     | 1               | 38,2                  | 41                    | 44                                     | 56                    | 1                     | 0,6                   | 0,1            | -                      | -     | -              | -              |   |
| 48,1        | 60,7           | 44             | 1,1  | 0,6                     | 1,3                     | 39,2            | 42                    | 46                    | 65                                     | 1                     | 0,6                   | 0,15                  | HJ 207 EC      | 0,033                  | 4     | 7              |                |   |
| 48,1        | 60,7           | 44             | 1,1  | 0,6                     | 1,3                     | 42              | 42                    | 50                    | 65                                     | 1                     | 0,6                   | 0,15                  | HJ 207 EC      | 0,033                  | 4     | 7              |                |   |
| 48,1        | 60,7           | 44             | 1,1  | 0,6                     | -                       | 42              | -                     | 50                    | 65                                     | 1                     | 0,6                   | 0,15                  | -              | -                      | -     | -              |                |   |
| 48,1        | -              | 64             | 1,1  | 0,6                     | 1,3                     | 42              | 62                    | 66                    | 67,8                                   | 1                     | 0,6                   | 0,15                  | -              | -                      | -     | -              |                |   |
| -           | 60,7           | 44             | 1,1  | 0,6                     | 2,8                     | 39,2            | 42                    | 46                    | 65                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |
| 48,1        | 60,7           | 44             | 1,1  | 0,6                     | 2,8                     | 42              | 42                    | 50                    | 65                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |
| 48,1        | 60,7           | 44             | 1,1  | 0,6                     | -                       | 42              | -                     | 48                    | 65                                     | 1                     | 0,6                   | 0,2                   | -              | -                      | -     | -              |                |   |

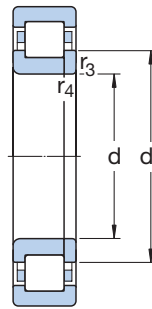
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP

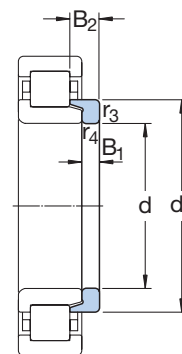
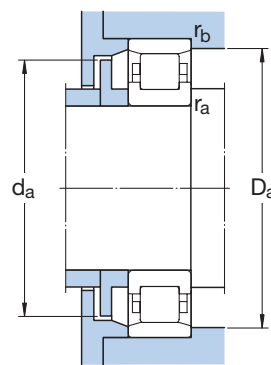
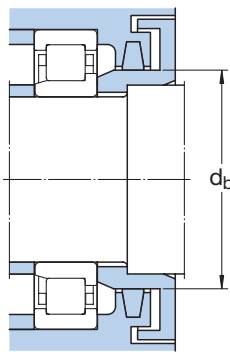
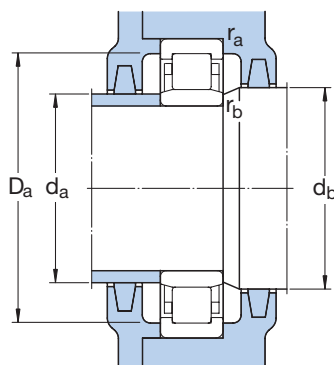


Type N

| Principal dimensions |     |    | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |          |
|----------------------|-----|----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|----------|
| d                    | D   | B  | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |          |
| mm                   |     |    | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |          |
| 35<br>cont.          | 80  | 21 | 75                 | 63    | 8,15                        | 9 500           | 11 000         | 0,54                               | NU 307 ECP                                 | J, M, ML                                        |          |
|                      | 80  | 21 | 75                 | 63    | 8,15                        | 9 500           | 11 000         | 0,55                               | NJ 307 ECP                                 | J, M, ML                                        |          |
|                      | 80  | 21 | 75                 | 63    | 8,15                        | 9 500           | 11 000         | 0,51                               | NUP 307 ECP                                | J, M, ML                                        |          |
|                      | 80  | 21 | 75                 | 63    | 8,15                        | 9 500           | 11 000         | 0,48                               | N 307 ECP                                  | –                                               |          |
|                      | 80  | 31 | 106                | 98    | 12,7                        | 9 500           | 11 000         | 0,72                               | NU 2307 ECP                                | J                                               |          |
|                      | 80  | 31 | 106                | 98    | 12,7                        | 9 500           | 11 000         | 0,73                               | NJ 2307 ECP                                | –                                               |          |
|                      | 80  | 31 | 106                | 98    | 12,7                        | 9 500           | 11 000         | 0,75                               | NUP 2307 ECP                               | –                                               |          |
|                      | 100 | 25 | 76,5               | 69,5  | 9                           | 8 000           | 9 500          | 1,00                               | NU 407                                     | –                                               |          |
|                      | 100 | 25 | 76,5               | 69,5  | 9                           | 8 000           | 9 500          | 1,05                               | NJ 407                                     | –                                               |          |
|                      | 40  | 68 | 15                 | 25,1  | 26                          | 3               | 11 000         | 18 000                             | 0,22                                       | NU 1008 ML                                      | –        |
|                      |     | 80 | 18                 | 62    | 53                          | 6,7             | 9 500          | 11 000                             | 0,42                                       | NU 208 ECP                                      | J, M, ML |
|                      |     | 80 | 18                 | 62    | 53                          | 6,7             | 9 500          | 11 000                             | 0,43                                       | NJ 208 ECP                                      | J, M, ML |
| 80                   |     | 18 | 62                 | 53    | 6,7                         | 9 500           | 11 000         | 0,40                               | NUP 208 ECP                                | J, M, ML                                        |          |
| 80                   |     | 18 | 62                 | 53    | 6,7                         | 9 500           | 11 000         | 0,37                               | N 208 ECP                                  | –                                               |          |
| 80                   |     | 23 | 81,5               | 75    | 9,65                        | 9 500           | 11 000         | 0,54                               | NU 2208 ECP                                | J, ML                                           |          |
| 80                   |     | 23 | 81,5               | 75    | 9,65                        | 9 500           | 11 000         | 0,55                               | NJ 2208 ECP                                | J, ML                                           |          |
| 80                   |     | 23 | 81,5               | 75    | 9,65                        | 9 500           | 11 000         | 0,56                               | NUP 2208 ECP                               | J, ML                                           |          |
| 90                   |     | 23 | 93                 | 78    | 10,2                        | 8 000           | 9 500          | 0,73                               | NU 308 ECP                                 | J, M, ML                                        |          |
| 90                   |     | 23 | 93                 | 78    | 10,2                        | 8 000           | 9 500          | 0,75                               | NJ 308 ECP                                 | J, M, ML                                        |          |
| 90                   |     | 23 | 93                 | 78    | 10,2                        | 8 000           | 9 500          | 0,68                               | NUP 308 ECP                                | M, ML                                           |          |
| 90                   |     | 23 | 93                 | 78    | 10,2                        | 8 000           | 9 500          | 0,64                               | N 308 ECP                                  | –                                               |          |
| 90                   |     | 33 | 129                | 120   | 15,3                        | 8 000           | 9 500          | 0,94                               | NU 2308 ECP                                | J, M, ML                                        |          |
| 90                   |     | 33 | 129                | 120   | 15,3                        | 8 000           | 9 500          | 0,96                               | NJ 2308 ECP                                | J, M, ML                                        |          |
| 90                   |     | 33 | 129                | 120   | 15,3                        | 8 000           | 9 500          | 0,98                               | NUP 2308 ECP                               | M, ML                                           |          |
| 110                  |     | 27 | 96,8               | 90    | 11,6                        | 7 000           | 8 500          | 1,40                               | NU 408                                     | –                                               |          |
| 110                  |     | 27 | 96,8               | 90    | 11,6                        | 7 000           | 8 500          | 1,35                               | NJ 408                                     | –                                               |          |
| 45                   |     | 75 | 16                 | 44,6  | 52                          | 6,3             | 9 500          | 11 000                             | 0,26                                       | NU 1009 ECP                                     | –        |
|                      |     | 85 | 19                 | 69,5  | 64                          | 8,15            | 9 000          | 9 500                              | 0,48                                       | NU 209 ECP                                      | J, M, ML |
|                      |     | 85 | 19                 | 69,5  | 64                          | 8,15            | 9 000          | 9 500                              | 0,49                                       | NJ 209 ECP                                      | J, M, ML |
|                      |     | 85 | 19                 | 69,5  | 64                          | 8,15            | 9 000          | 9 500                              | 0,45                                       | NUP 209 ECP                                     | J, M, ML |
|                      | 85  | 19 | 69,5               | 64    | 8,15                        | 9 000           | 9 500          | 0,43                               | N 209 ECP                                  | –                                               |          |
|                      | 85  | 23 | 85                 | 81,5  | 10,6                        | 9 000           | 9 500          | 0,52                               | NU 2209 ECP                                | J                                               |          |
|                      | 85  | 23 | 85                 | 81,5  | 10,6                        | 9 000           | 9 500          | 0,54                               | NJ 2209 ECP                                | J                                               |          |
|                      | 85  | 23 | 85                 | 81,5  | 10,6                        | 9 000           | 9 500          | 0,55                               | NUP 2209 ECP                               | –                                               |          |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 307 ECP becomes NU 307 ECML

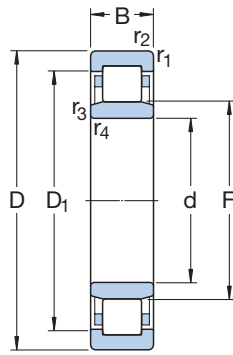


Angle ring

3

| Dimensions         |                |                |      |                         |                         |                 | Abutment and fillet dimensions |                       |                                        |                       |                       |                       | Calculation factor<br>$k_r$ | Angle ring Designation | Mass  | Dimensions     |                |
|--------------------|----------------|----------------|------|-------------------------|-------------------------|-----------------|--------------------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------------|------------------------|-------|----------------|----------------|
| d                  | d <sub>1</sub> | D <sub>1</sub> | F, E | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min          | d <sub>a</sub><br>max | d <sub>b</sub> , D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max |                             |                        |       | B <sub>1</sub> | B <sub>2</sub> |
| mm                 |                |                |      |                         |                         |                 | mm                             |                       |                                        |                       |                       |                       | -                           | -                      | kg    | mm             |                |
| <b>35</b><br>cont. | 51             | 66,3           | 46,2 | 1,5                     | 1,1                     | 1,2             | 42                             | 44                    | 48                                     | 71                    | 1,5                   | 1                     | 0,15                        | <b>HJ 307 EC</b>       | 0,058 | 6              | 9,5            |
|                    | 51             | 66,3           | 46,2 | 1,5                     | 1,1                     | 1,2             | 44                             | 44                    | 53                                     | 71                    | 1,5                   | 1                     | 0,15                        | <b>HJ 307 EC</b>       | 0,058 | 6              | 9,5            |
|                    | 51             | 66,3           | 46,2 | 1,5                     | 1,1                     | -               | 44                             | -                     | 53                                     | 71                    | 1,5                   | 1                     | 0,15                        | -                      | -     | -              | -              |
|                    | 51             | -              | 70,2 | 1,5                     | 1,1                     | 1,2             | 44                             | 68                    | 72                                     | 73                    | 1,5                   | 1                     | 0,15                        | -                      | -     | -              | -              |
|                    | -              | 66,3           | 46,2 | 1,5                     | 1,1                     | 2,7             | 42                             | 44                    | 48                                     | 71                    | 1,5                   | 1                     | 0,25                        | -                      | -     | -              | -              |
|                    | 51             | 66,3           | 46,2 | 1,5                     | 1,1                     | 2,7             | 44                             | 44                    | 53                                     | 71                    | 1,5                   | 1                     | 0,25                        | -                      | -     | -              | -              |
|                    | 51             | 66,3           | 46,2 | 1,5                     | 1,1                     | -               | 44                             | -                     | 53                                     | 71                    | 1,5                   | 1                     | 0,25                        | -                      | -     | -              | -              |
|                    | -              | 76,1           | 53   | 1,5                     | 1,5                     | 1,7             | 46                             | 50                    | 55                                     | 89                    | 1,5                   | 1,5                   | 0,15                        | -                      | -     | -              | -              |
|                    | 59             | 76,1           | 53   | 1,5                     | 1,5                     | 1,7             | 46                             | 50                    | 61                                     | 89                    | 1,5                   | 1,5                   | 0,15                        | -                      | -     | -              | -              |
|                    | <b>40</b>      | -              | 57,6 | 47                      | 1                       | 0,6             | 2,4                            | 43,2                  | 45                                     | 49                    | 63,4                  | 1                     | 0,6                         | 0,1                    | -     | -              | -              |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | 1,4             | 47                             | 48                    | 51                                     | 73                    | 1                     | 1                     | 0,15                        | <b>HJ 208 EC</b>       | 0,047 | 5              | 8,5            |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | 1,4             | 47                             | 48                    | 56                                     | 73                    | 1                     | 1                     | 0,15                        | <b>HJ 208 EC</b>       | 0,047 | 5              | 8,5            |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | -               | 47                             | -                     | 56                                     | 73                    | 1                     | 1                     | 0,15                        | -                      | -     | -              | -              |
| 54                 |                | -              | 71,5 | 1,1                     | 1,1                     | 1,4             | 47                             | 69                    | 73                                     | 73                    | 1                     | 1                     | 0,15                        | -                      | -     | -              | -              |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | 1,9             | 47                             | 48                    | 51                                     | 73                    | 1                     | 1                     | 0,2                         | <b>HJ 2208 EC</b>      | 0,048 | 5              | 9              |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | 1,9             | 47                             | 48                    | 56                                     | 73                    | 1                     | 1                     | 0,2                         | <b>HJ 2208 EC</b>      | 0,048 | 5              | 9              |
| 54                 |                | 67,9           | 49,5 | 1,1                     | 1,1                     | -               | 47                             | -                     | 56                                     | 73                    | 1                     | 1                     | 0,2                         | -                      | -     | -              | -              |
| 57,5               |                | 75,6           | 52   | 1,5                     | 1,5                     | 1,4             | 49                             | 50                    | 54                                     | 81                    | 1,5                   | 1,5                   | 0,15                        | <b>HJ 308 EC</b>       | 0,084 | 7              | 11             |
| 57,5               |                | 75,6           | 52   | 1,5                     | 1,5                     | 1,4             | 49                             | 50                    | 60                                     | 81                    | 1,5                   | 1,5                   | 0,15                        | <b>HJ 308 EC</b>       | 0,084 | 7              | 11             |
| 57,5               |                | 75,6           | 52   | 1,5                     | 1,5                     | -               | 49                             | -                     | 60                                     | 81                    | 1,5                   | 1,5                   | 0,15                        | -                      | -     | -              | -              |
| 57,5               |                | -              | 80   | 1,5                     | 1,5                     | 1,4             | 49                             | 78                    | 82                                     | 81                    | 1,5                   | 1,5                   | 0,15                        | -                      | -     | -              | -              |
| -                  |                | 75,6           | 52   | 1,5                     | 1,5                     | 2,9             | 49                             | 50                    | 54                                     | 81                    | 1,5                   | 1,5                   | 0,25                        | -                      | -     | -              | -              |
| 57,5               |                | 75,6           | 52   | 1,5                     | 1,5                     | 2,9             | 49                             | 50                    | 60                                     | 81                    | 1,5                   | 1,5                   | 0,25                        | -                      | -     | -              | -              |
| 57,5               |                | 75,6           | 52   | 1,5                     | 1,5                     | -               | 49                             | -                     | 60                                     | 81                    | 1,5                   | 1,5                   | 0,25                        | -                      | -     | -              | -              |
| -                  |                | 84,2           | 58   | 2                       | 2                       | 2,5             | 53                             | 56                    | 60                                     | 97                    | 2                     | 2                     | 0,15                        | -                      | -     | -              | -              |
| 64,8               |                | 84,2           | 58   | 2                       | 2                       | 2,5             | 53                             | 56                    | 67                                     | 97                    | 2                     | 2                     | 0,15                        | -                      | -     | -              | -              |
| <b>45</b>          |                | -              | 65,3 | 52,5                    | 1                       | 0,6             | 0,9                            | 48,2                  | 51                                     | 54                    | 70,4                  | 1                     | 0,6                         | 0,1                    | -     | -              | -              |
|                    | 59             | 73             | 54,5 | 1,1                     | 1,1                     | 1,2             | 52                             | 53                    | 56                                     | 78                    | 1                     | 1                     | 0,15                        | <b>HJ 209 EC</b>       | 0,052 | 5              | 8,5            |
|                    | 59             | 73             | 54,5 | 1,1                     | 1,1                     | 1,2             | 52                             | 53                    | 61                                     | 78                    | 1                     | 1                     | 0,15                        | <b>HJ 209 EC</b>       | 0,052 | 5              | 8,5            |
|                    | 59             | 73             | 54,5 | 1,1                     | 1,1                     | -               | 52                             | -                     | 61                                     | 78                    | 1                     | 1                     | 0,15                        | -                      | -     | -              | -              |
|                    | 59             | -              | 76,5 | 1,1                     | 1,1                     | 1,2             | 52                             | 74                    | 78                                     | 78                    | 1                     | 1                     | 0,15                        | -                      | -     | -              | -              |
|                    | -              | 73             | 54,5 | 1,1                     | 1,1                     | 1,7             | 52                             | 53                    | 56                                     | 78                    | 1                     | 1                     | 0,2                         | -                      | -     | -              | -              |
|                    | 59             | 73             | 54,5 | 1,1                     | 1,1                     | 1,7             | 52                             | 53                    | 56                                     | 78                    | 1                     | 1                     | 0,2                         | -                      | -     | -              | -              |
|                    | 59             | 73             | 54,5 | 1,1                     | 1,1                     | -               | 52                             | -                     | 61                                     | 78                    | 1                     | 1                     | 0,2                         | -                      | -     | -              | -              |

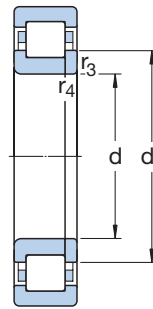
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP

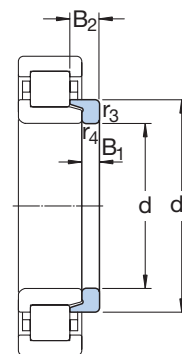
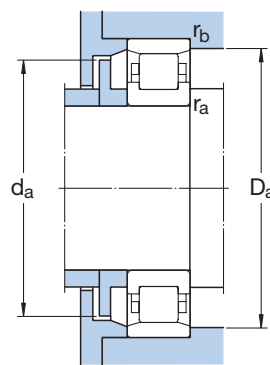
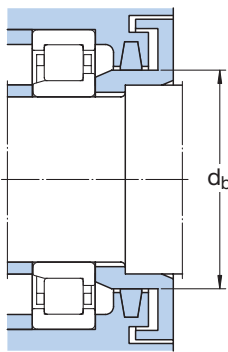
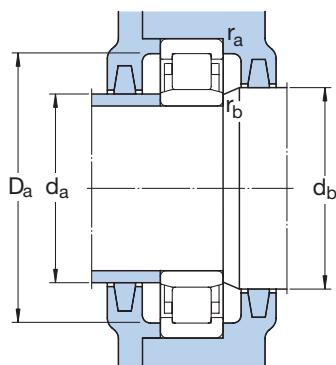


Type N

| Principal dimensions |     |     | Basic load ratings |        | Fatigue load limit<br>P <sub>u</sub> | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |          |
|----------------------|-----|-----|--------------------|--------|--------------------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|----------|
| d                    | D   | B   | dynamic            | static |                                      | Reference speed | Limiting speed |                                    |                                            |                                                 |          |
| mm                   |     |     | kN                 |        | kN                                   | r/min           |                | kg                                 | –                                          |                                                 |          |
| 45<br>cont.          | 100 | 25  | 112                | 100    | 12,9                                 | 7 500           | 8 500          | 1,00                               | NU 309 ECP                                 | J, M, ML                                        |          |
|                      | 100 | 25  | 112                | 100    | 12,9                                 | 7 500           | 8 500          | 1,05                               | NJ 309 ECP                                 | J, M, ML                                        |          |
|                      | 100 | 25  | 112                | 100    | 12,9                                 | 7 500           | 8 500          | 0,95                               | NUP 309 ECP                                | J, ML                                           |          |
|                      | 100 | 25  | 112                | 100    | 12,9                                 | 7 500           | 8 500          | 0,88                               | N 309 ECP                                  | –                                               |          |
|                      | 100 | 36  | 160                | 153    | 20                                   | 7 500           | 8 500          | 1,30                               | NU 2309 ECP                                | ML                                              |          |
|                      | 100 | 36  | 160                | 153    | 20                                   | 7 500           | 8 500          | 1,35                               | NJ 2309 ECP                                | ML                                              |          |
|                      | 100 | 36  | 160                | 153    | 20                                   | 7 500           | 8 500          | 1,35                               | NUP 2309 ECP                               | ML                                              |          |
|                      | 120 | 29  | 106                | 102    | 13,4                                 | 6 700           | 7 500          | 1,78                               | NU 409                                     | –                                               |          |
|                      | 120 | 29  | 106                | 102    | 13,4                                 | 6 700           | 7 500          | 1,70                               | NJ 409                                     | –                                               |          |
|                      | 50  | 80  | 16                 | 46,8   | 56                                   | 6,7             | 9 000          | 9 500                              | 0,27                                       | NU 1010 ECP                                     | –        |
|                      |     | 90  | 20                 | 73,5   | 69,5                                 | 8,8             | 8 500          | 9 000                              | 0,49                                       | NU 210 ECP                                      | J, M, ML |
|                      |     | 90  | 20                 | 73,5   | 69,5                                 | 8,8             | 8 500          | 9 000                              | 0,50                                       | NJ 210 ECP                                      | J, M, ML |
| 90                   |     | 20  | 73,5               | 69,5   | 8,8                                  | 8 500           | 9 000          | 0,51                               | NUP 210 ECP                                | J, ML                                           |          |
| 90                   |     | 20  | 73,5               | 69,5   | 8,8                                  | 8 500           | 9 000          | 0,48                               | N 210 ECP                                  | –                                               |          |
| 90                   |     | 23  | 90                 | 88     | 11,4                                 | 8 500           | 9 000          | 0,56                               | NU 2210 ECP                                | J, M, ML                                        |          |
| 90                   |     | 23  | 90                 | 88     | 11,4                                 | 8 500           | 9 000          | 0,59                               | NJ 2210 ECP                                | J, M, ML                                        |          |
| 90                   |     | 23  | 90                 | 88     | 11,4                                 | 8 500           | 9 000          | 0,59                               | NUP 2210 ECP                               | J, ML                                           |          |
| 110                  |     | 27  | 127                | 112    | 15                                   | 6 700           | 8 000          | 1,15                               | NU 310 ECP                                 | J, M, ML                                        |          |
| 110                  |     | 27  | 127                | 112    | 15                                   | 6 700           | 8 000          | 1,15                               | NJ 310 ECP                                 | J, M, ML                                        |          |
| 110                  |     | 27  | 127                | 112    | 15                                   | 6 700           | 8 000          | 1,20                               | NUP 310 ECP                                | J, M, ML                                        |          |
| 110                  |     | 27  | 127                | 112    | 15                                   | 6 700           | 8 000          | 1,15                               | N 310 ECP                                  | M                                               |          |
| 110                  |     | 40  | 186                | 186    | 24,5                                 | 6 700           | 8 000          | 2,00                               | NU 2310 ECP                                | ML                                              |          |
| 110                  |     | 40  | 186                | 186    | 24,5                                 | 6 700           | 8 000          | 1,75                               | NJ 2310 ECP                                | ML                                              |          |
| 110                  |     | 40  | 186                | 186    | 24,5                                 | 6 700           | 8 000          | 1,80                               | NUP 2310 ECP                               | ML                                              |          |
| 130                  |     | 31  | 130                | 127    | 16,6                                 | 6 000           | 7 000          | 2,00                               | NU 410                                     | –                                               |          |
| 130                  |     | 31  | 130                | 127    | 16,6                                 | 6 000           | 7 000          | 2,05                               | NJ 410                                     | –                                               |          |
| 55                   |     | 90  | 18                 | 57,2   | 69,5                                 | 8,3             | 8 000          | 8 500                              | 0,40                                       | NU 1011 ECP                                     | –        |
|                      |     | 100 | 21                 | 96,5   | 95                                   | 12,2            | 7 500          | 8 000                              | 0,67                                       | NU 211 ECP                                      | J, M, ML |
|                      |     | 100 | 21                 | 96,5   | 95                                   | 12,2            | 7 500          | 8 000                              | 0,67                                       | NJ 211 ECP                                      | J, M, ML |
|                      |     | 100 | 21                 | 96,5   | 95                                   | 12,2            | 7 500          | 8 000                              | 0,69                                       | NUP 211 ECP                                     | J, M, ML |
|                      | 100 | 21  | 96,5               | 95     | 12,2                                 | 7 500           | 8 000          | 0,66                               | N 211 ECP                                  | M                                               |          |
|                      | 100 | 25  | 114                | 118    | 15,3                                 | 7 500           | 8 000          | 0,79                               | NU 2211 ECP                                | J, M, ML                                        |          |
|                      | 100 | 25  | 114                | 118    | 15,3                                 | 7 500           | 8 000          | 0,81                               | NJ 2211 ECP                                | J, M, ML                                        |          |
|                      | 100 | 25  | 114                | 118    | 15,3                                 | 7 500           | 8 000          | 0,82                               | NUP 2211 ECP                               | J, ML                                           |          |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 309 ECP becomes NU 309 ECML.

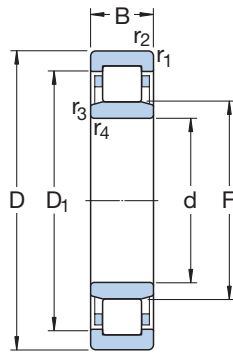


Angle ring

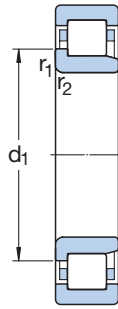
3

| Dimensions  |       |       |      |                  |                  |        | Abutment and fillet dimensions |              |                   |              |              |              | Calculation factor<br>$k_r$ | Angle ring Designation | Mass  | Dimensions     |                |
|-------------|-------|-------|------|------------------|------------------|--------|--------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------------------|------------------------|-------|----------------|----------------|
| d           | $d_1$ | $D_1$ | F, E | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min                   | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                        |       | B <sub>1</sub> | B <sub>2</sub> |
| mm          |       |       |      |                  |                  |        | mm                             |              |                   |              |              |              | -                           | -                      | kg    | mm             |                |
| 45<br>cont. | 64,4  | 83,8  | 58,5 | 1,5              | 1,5              | 1,7    | 54                             | 56           | 61                | 91           | 1,5          | 1,5          | 0,15                        | HJ 309 EC              | 0,11  | 7              | 11,5           |
|             | 64,4  | 83,8  | 58,5 | 1,5              | 1,5              | 1,7    | 54                             | 56           | 67                | 91           | 1,5          | 1,5          | 0,15                        | HJ 309 EC              | 0,11  | 7              | 11,5           |
|             | 64,4  | 83,8  | 58,5 | 1,5              | 1,5              | -      | 54                             | -            | 67                | 91           | 1,5          | 1,5          | 0,15                        | -                      | -     | -              | -              |
|             | 64,4  | -     | 88,5 | 1,5              | 1,5              | 1,7    | 54                             | 86           | 91                | 91           | 1,5          | 1,5          | 0,15                        | -                      | -     | -              | -              |
|             | -     | 83,8  | 58,5 | 1,5              | 1,5              | 3,2    | 54                             | 56           | 61                | 91           | 1,5          | 1,5          | 0,25                        | -                      | -     | -              | -              |
|             | 64,4  | 83,8  | 58,5 | 1,5              | 1,5              | 3,2    | 54                             | 56           | 67                | 91           | 1,5          | 1,5          | 0,25                        | -                      | -     | -              | -              |
|             | 64,4  | 83,8  | 58,5 | 1,5              | 1,5              | -      | 54                             | -            | 67                | 91           | 1,5          | 1,5          | 0,25                        | -                      | -     | -              | -              |
|             | 71,8  | 92,2  | 64,5 | 2                | 2                | 2,5    | 58                             | 62           | 67                | 107          | 2            | 2            | 0,15                        | HJ 409                 | 0,18  | 8              | 13,5           |
|             | 71,8  | 92,2  | 64,5 | 2                | 2                | 2,5    | 58                             | 62           | 74                | 107          | 2            | 2            | 0,15                        | HJ 409                 | 0,18  | 8              | 13,5           |
|             | 50    | -     | 70   | 57,5             | 1                | 0,6    | 1                              | 53,2         | 56                | 60           | 75,4         | 1            | 0,6                         | 0,1                    | -     | -              | -              |
| 64          |       | 78    | 59,5 | 1,1              | 1,1              | 1,5    | 57                             | 57           | 62                | 83           | 1            | 1            | 0,15                        | HJ 210 EC              | 0,058 | 5              | 9              |
| 64          |       | 78    | 59,5 | 1,1              | 1,1              | 1,5    | 57                             | 57           | 66                | 83           | 1            | 1            | 0,15                        | HJ 210 EC              | 0,058 | 5              | 9              |
| 64          |       | 78    | 59,5 | 1,1              | 1,1              | -      | 57                             | -            | 66                | 83           | 1            | 1            | 0,15                        | -                      | -     | -              | -              |
| 64          |       | -     | 81,5 | 1,1              | 1,1              | 1,5    | 57                             | 79           | 83                | 83           | 1            | 1            | 0,15                        | -                      | -     | -              | -              |
| -           |       | 78    | 59,5 | 1,1              | 1,1              | 1,5    | 57                             | 57           | 62                | 83           | 1            | 1            | 0,2                         | -                      | -     | -              | -              |
| 64          |       | 78    | 59,5 | 1,1              | 1,1              | 1,5    | 57                             | 57           | 66                | 83           | 1            | 1            | 0,2                         | -                      | -     | -              | -              |
| 64          |       | 78    | 59,5 | 1,1              | 1,1              | -      | 57                             | -            | 66                | 83           | 1            | 1            | 0,2                         | -                      | -     | -              | -              |
| 71,2        |       | 92,1  | 65   | 2                | 2                | 1,9    | 61                             | 63           | 67                | 99           | 2            | 2            | 0,15                        | HJ 310 EC              | 0,14  | 8              | 13             |
| 71,2        |       | 92,1  | 65   | 2                | 2                | 1,9    | 61                             | 63           | 73                | 99           | 2            | 2            | 0,15                        | HJ 310 EC              | 0,14  | 8              | 13             |
| 71,2        |       | 92,1  | 65   | 2                | 2                | -      | 61                             | -            | 73                | 99           | 2            | 2            | 0,15                        | -                      | -     | -              | -              |
| 71,2        |       | -     | 97   | 2                | 2                | 1,9    | 61                             | 95           | 99                | 99           | 2            | 2            | 0,15                        | -                      | -     | -              | -              |
| -           |       | 92,1  | 65   | 2                | 2                | 3,4    | 61                             | 63           | 67                | 99           | 2            | 2            | 0,25                        | -                      | -     | -              | -              |
| 71,2        |       | 92,1  | 65   | 2                | 2                | 3,4    | 61                             | 63           | 73                | 99           | 2            | 2            | 0,25                        | -                      | -     | -              | -              |
| 71,2        |       | 92,1  | 65   | 2                | 2                | -      | 61                             | -            | 73                | 99           | 2            | 2            | 0,25                        | -                      | -     | -              | -              |
| -           |       | 102   | 70,8 | 2,1              | 2,1              | 2,6    | 64                             | 68           | 73                | 116          | 2            | 2            | 0,15                        | -                      | -     | -              | -              |
| 78,8        | 102   | 70,8  | 2,1  | 2,1              | 2,6              | 64     | 68                             | 81           | 116               | 2            | 2            | 0,15         | -                           | -                      | -     | -              |                |
| 55          | -     | 79    | 64,5 | 1,1              | 1                | 0,5    | 59,6                           | 63           | 67                | 84           | 1            | 1            | 0,1                         | -                      | -     | -              | -              |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | 1      | 62                             | 64           | 68                | 91           | 1,5          | 1            | 0,15                        | HJ 211 EC              | 0,083 | 6              | 9,5            |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | 1      | 64                             | 64           | 73                | 91           | 1,5          | 1            | 0,15                        | HJ 211 EC              | 0,083 | 6              | 9,5            |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | -      | 64                             | -            | 73                | 91           | 1,5          | 1            | 0,15                        | -                      | -     | -              | -              |
|             | 70,8  | -     | 90   | 1,5              | 1,1              | 1      | 64                             | 88           | 92                | 93           | 1,5          | 1            | 0,15                        | -                      | -     | -              | -              |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | 1,5    | 62                             | 64           | 68                | 91           | 1,5          | 1            | 0,2                         | HJ 2211 EC             | 0,085 | 6              | 10             |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | 1,5    | 64                             | 64           | 73                | 91           | 1,5          | 1            | 0,2                         | HJ 2211 EC             | 0,085 | 6              | 10             |
|             | 70,8  | 86,3  | 66   | 1,5              | 1,1              | -      | 64                             | -            | 73                | 91           | 1,5          | 1            | 0,2                         | -                      | -     | -              | -              |

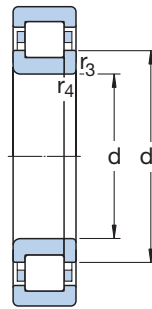
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP



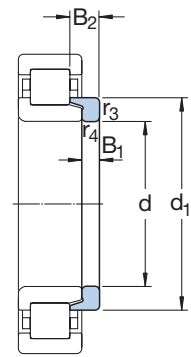
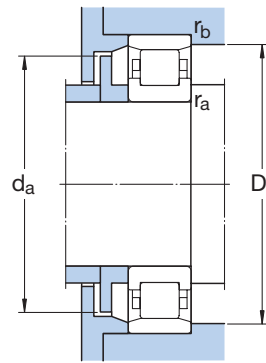
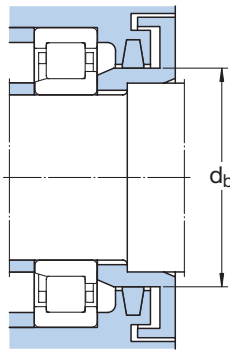
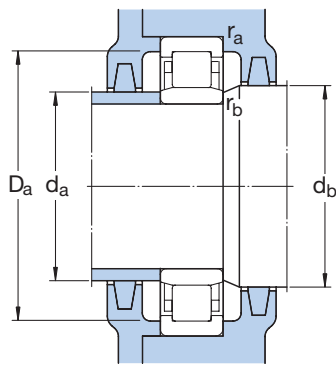
Type N

| Principal dimensions |     |     | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |          |
|----------------------|-----|-----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|----------|
| d                    | D   | B   | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |          |
| mm                   |     |     | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |          |
| 55<br>cont.          | 120 | 29  | 156                | 143   | 18,6                        | 6 000           | 7 000          | 1,45                               | NU 311 ECP                                 | J, M, ML                                        |          |
|                      | 120 | 29  | 156                | 143   | 18,6                        | 6 000           | 7 000          | 1,50                               | NJ 311 ECP                                 | J, M, ML                                        |          |
|                      | 120 | 29  | 156                | 143   | 18,6                        | 6 000           | 7 000          | 1,55                               | NUP 311 ECP                                | J, M, ML                                        |          |
|                      | 120 | 29  | 156                | 143   | 18,6                        | 6 000           | 7 000          | 1,45                               | N 311 ECP                                  | M                                               |          |
|                      | 120 | 43  | 232                | 232   | 30,5                        | 6 000           | 7 000          | 2,25                               | NU 2311 ECP                                | ML                                              |          |
|                      | 120 | 43  | 232                | 232   | 30,5                        | 6 000           | 7 000          | 2,30                               | NJ 2311 ECP                                | ML                                              |          |
|                      | 120 | 43  | 232                | 232   | 30,5                        | 6 000           | 7 000          | 2,35                               | NUP 2311 ECP                               | ML                                              |          |
|                      | 140 | 33  | 142                | 140   | 18,6                        | 5 600           | 6 300          | 2,50                               | NU 411                                     | –                                               |          |
|                      | 140 | 33  | 142                | 140   | 18,6                        | 5 600           | 6 300          | 2,55                               | NJ 411                                     | –                                               |          |
|                      | 60  | 95  | 18                 | 37,4  | 44                          | 5,3             | 8 000          | 11 000                             | 0,48                                       | NU 1012 ML                                      | –        |
|                      |     | 110 | 22                 | 108   | 102                         | 13,4            | 6 700          | 7 500                              | 0,81                                       | NU 212 ECP                                      | J, M, ML |
|                      |     | 110 | 22                 | 108   | 102                         | 13,4            | 6 700          | 7 500                              | 0,83                                       | NJ 212 ECP                                      | J, M, ML |
| 110                  |     | 22  | 108                | 102   | 13,4                        | 6 700           | 7 500          | 0,86                               | NUP 212 ECP                                | J, ML                                           |          |
| 110                  |     | 22  | 108                | 102   | 13,4                        | 6 700           | 7 500          | 0,81                               | N 212 ECP                                  | M                                               |          |
| 110                  |     | 28  | 146                | 153   | 20                          | 6 700           | 7 500          | 1,10                               | NU 2212 ECP                                | J, M, ML                                        |          |
| 110                  |     | 28  | 146                | 153   | 20                          | 6 700           | 7 500          | 1,15                               | NJ 2212 ECP                                | J, M, ML                                        |          |
| 110                  |     | 28  | 146                | 153   | 20                          | 6 700           | 7 500          | 1,15                               | NUP 2212 ECP                               | J, ML                                           |          |
| 130                  |     | 31  | 173                | 160   | 20,8                        | 5 600           | 6 700          | 1,80                               | NU 312 ECP                                 | J, M, ML                                        |          |
| 130                  |     | 31  | 173                | 160   | 20,8                        | 5 600           | 6 700          | 1,90                               | NJ 312 ECP                                 | J, M, ML                                        |          |
| 130                  |     | 31  | 173                | 160   | 20,8                        | 5 600           | 6 700          | 1,95                               | NUP 312 ECP                                | J, M, ML                                        |          |
| 130                  |     | 31  | 173                | 160   | 20,8                        | 5 600           | 6 700          | 1,80                               | N 312 ECP                                  | M                                               |          |
| 130                  |     | 46  | 260                | 265   | 34,5                        | 5 600           | 6 700          | 2,75                               | NU 2312 ECP                                | ML                                              |          |
| 130                  |     | 46  | 260                | 265   | 34,5                        | 5 600           | 6 700          | 2,80                               | NJ 2312 ECP                                | ML                                              |          |
| 130                  |     | 46  | 260                | 265   | 34,5                        | 5 600           | 6 700          | 2,85                               | NUP 2312 ECP                               | ML                                              |          |
| 150                  |     | 35  | 168                | 173   | 22                          | 5 000           | 6 000          | 3,00                               | NU 412                                     | –                                               |          |
| 150                  |     | 35  | 168                | 173   | 22                          | 5 000           | 6 000          | 3,10                               | NJ 412                                     | –                                               |          |
| 65                   |     | 100 | 18                 | 62,7  | 81,5                        | 9,8             | 7 000          | 7 500                              | 0,45                                       | NU 1013 ECP                                     | –        |
|                      |     | 120 | 23                 | 122   | 118                         | 15,6            | 6 300          | 6 700                              | 1,05                                       | NU 213 ECP                                      | J, M, ML |
|                      |     | 120 | 23                 | 122   | 118                         | 15,6            | 6 300          | 6 700                              | 1,07                                       | NJ 213 ECP                                      | J, M, ML |
|                      |     | 120 | 23                 | 122   | 118                         | 15,6            | 6 300          | 6 700                              | 1,10                                       | NUP 213 ECP                                     | J, ML    |
|                      |     | 120 | 23                 | 122   | 118                         | 15,6            | 6 300          | 6 700                              | 1,05                                       | N 213 ECP                                       | –        |
|                      |     | 120 | 31                 | 170   | 180                         | 24              | 6 300          | 6 700                              | 1,40                                       | NU 2213 ECP                                     | J        |
|                      |     | 120 | 31                 | 170   | 180                         | 24              | 6 300          | 6 700                              | 1,45                                       | NJ 2213 ECP                                     | J        |
|                      | 120 | 31  | 170                | 180   | 24                          | 6 300           | 6 700          | 1,50                               | NUP 2213 ECP                               | –                                               |          |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 311 ECP becomes NU 311 ECML



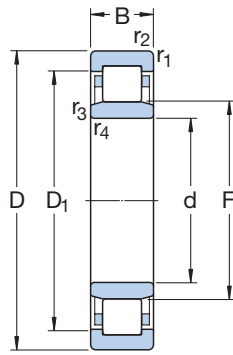


Angle ring

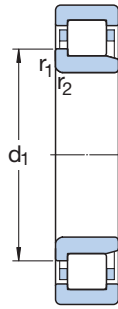


| Dimensions  |       |       |       |                  |                  |        | Abutment and fillet dimensions |              |                   |              |              |              | Calculation factor<br>$k_r$ | Angle ring Designation | Mass      | Dimensions |       |    |
|-------------|-------|-------|-------|------------------|------------------|--------|--------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------------------|------------------------|-----------|------------|-------|----|
| d           | $d_1$ | $D_1$ | F, E  | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min                   | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                        |           | $B_1$      | $B_2$ |    |
| mm          |       |       |       |                  |                  |        | mm                             |              |                   |              |              |              | -                           | -                      | kg        | mm         |       |    |
| 55<br>cont. | 77,5  | 101   | 70,5  | 2                | 2                | 2      | 66                             | 68           | 73                | 109          | 2            | 2            | 0,15                        | HJ 311 EC              | 0,19      | 9          | 14    |    |
|             | 77,5  | 101   | 70,5  | 2                | 2                | 2      | 66                             | 68           | 80                | 109          | 2            | 2            | 0,15                        | HJ 311 EC              | 0,19      | 9          | 14    |    |
|             | 77,5  | 101   | 70,5  | 2                | 2                | -      | 66                             | -            | 80                | 109          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 77,5  | -     | 106,5 | 2                | 2                | 2      | 66                             | 104          | 109               | 109          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 77,5  | 101   | 70,5  | 2                | 2                | 3,5    | 66                             | 68           | 73                | 109          | 2            | 2            | 0,25                        | HJ 2311 EC             | 0,19      | 9          | 15,5  |    |
|             | 77,5  | 101   | 70,5  | 2                | 2                | 3,5    | 66                             | 68           | 80                | 109          | 2            | 2            | 0,25                        | HJ 2311 EC             | 0,19      | 9          | 15,5  |    |
|             | 77,5  | 101   | 70,5  | 2                | 2                | -      | 66                             | -            | 80                | 109          | 2            | 2            | 0,25                        | -                      | -         | -          | -     |    |
|             | 85,2  | 108   | 77,2  | 2,1              | 2,1              | 2,6    | 69                             | 74           | 79                | 126          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 85,2  | 108   | 77,2  | 2,1              | 2,1              | 2,6    | 69                             | 74           | 88                | 126          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 60    | -     | 81,6  | 69,5             | 1,1              | 1      | 2,9                            | 64,6         | 68                | 72           | 89           | 1            | 1                           | 0,1                    | -         | -          | -     | -  |
| 77,5        | 95,7  | 72    | 1,5   | 1,5              | 1,4              | 69     | 70                             | 74           | 101               | 1,5          | 1,5          | 0,15         | HJ 212 EC                   | 0,10                   | 6         | 10         |       |    |
|             | 77,5  | 95,7  | 72    | 1,5              | 1,5              | 1,4    | 69                             | 70           | 80                | 101          | 1,5          | 1,5          | 0,15                        | HJ 212 EC              | 0,10      | 6          | 10    |    |
|             | 77,5  | 95,7  | 72    | 1,5              | 1,5              | -      | 69                             | -            | 80                | 101          | 1,5          | 1,5          | 0,15                        | -                      | -         | -          | -     |    |
|             | 77,5  | -     | 100   | 1,5              | 1,5              | 1,4    | 69                             | 98           | 101               | 101          | 1,5          | 1,5          | 0,15                        | -                      | -         | -          | -     |    |
|             | 77,5  | 95,7  | 72    | 1,5              | 1,5              | 1,4    | 69                             | 70           | 74                | 101          | 1,5          | 1,5          | 0,2                         | HJ 212 EC              | 0,10      | 6          | 10    |    |
|             | 77,5  | 95,7  | 72    | 1,5              | 1,5              | 1,4    | 69                             | 70           | 80                | 101          | 1,5          | 1,5          | 0,2                         | HJ 212 EC              | 0,10      | 6          | 10    |    |
|             | 77,5  | 95,7  | 72    | 1,5              | 1,5              | -      | 69                             | -            | 80                | 101          | 1,5          | 1,5          | 0,2                         | -                      | -         | -          | -     |    |
|             | 84,3  | 110   | 77    | 2,1              | 2,1              | 2,1    | 72                             | 74           | 79                | 118          | 2            | 2            | 0,15                        | HJ 312 EC              | 0,22      | 9          | 14,5  |    |
|             | 84,3  | 110   | 77    | 2,1              | 2,1              | 2,1    | 72                             | 74           | 87                | 118          | 2            | 2            | 0,15                        | HJ 312 EC              | 0,22      | 9          | 14,5  |    |
|             | 84,3  | 110   | 77    | 2,1              | 2,1              | -      | 72                             | -            | 87                | 118          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
| 84,3        | -     | 115   | 2,1   | 2,1              | 2,1              | 72     | 112                            | 118          | 118               | 2            | 2            | 0,15         | -                           | -                      | -         | -          |       |    |
|             | -     | 110   | 77    | 2,1              | 2,1              | 3,6    | 72                             | 74           | 79                | 118          | 2            | 2            | 0,25                        | -                      | -         | -          | -     |    |
|             | 84,3  | 110   | 77    | 2,1              | 2,1              | 3,6    | 72                             | 74           | 87                | 118          | 2            | 2            | 0,25                        | -                      | -         | -          | -     |    |
|             | 84,3  | 110   | 77    | 2,1              | 2,1              | -      | 72                             | -            | 87                | 118          | 2            | 2            | 0,25                        | -                      | -         | -          | -     |    |
|             | -     | 117   | 83    | 2,1              | 2,1              | 2,5    | 74                             | 80           | 85                | 136          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 91,8  | 117   | 83    | 2,1              | 2,1              | 2,5    | 74                             | 80           | 94                | 136          | 2            | 2            | 0,15                        | -                      | -         | -          | -     |    |
|             | 65    | -     | 88,5  | 74               | 1,1              | 1      | 1                              | 69,6         | 72                | 77           | 94           | 1            | 1                           | 0,1                    | -         | -          | -     | -  |
|             | 84,4  | 104   | 78,5  | 1,5              | 1,5              | 1,4    | 74                             | 76           | 81                | 111          | 1,5          | 1,5          | 0,15                        | HJ 213 EC              | 0,12      | 6          | 10    |    |
|             |       | 84,4  | 104   | 78,5             | 1,5              | 1,5    | 1,4                            | 74           | 76                | 87           | 111          | 1,5          | 1,5                         | 0,15                   | HJ 213 EC | 0,12       | 6     | 10 |
|             |       | 84,4  | 104   | 78,5             | 1,5              | 1,5    | -                              | 74           | -                 | 87           | 111          | 1,5          | 1,5                         | 0,15                   | -         | -          | -     | -  |
| 84,4        |       | -     | 108,5 | 1,5              | 1,5              | 1,4    | 74                             | 106          | 111               | 111          | 1,5          | 1,5          | 0,15                        | -                      | -         | -          | -     |    |
| -           |       | 104   | 78,5  | 1,5              | 1,5              | 1,9    | 74                             | 76           | 81                | 111          | 1,5          | 1,5          | 0,2                         | -                      | -         | -          | -     |    |
| 84,4        |       | 104   | 78,5  | 1,5              | 1,5              | 1,9    | 74                             | 76           | 87                | 111          | 1,5          | 1,5          | 0,2                         | -                      | -         | -          | -     |    |
| 84,4        |       | 104   | 78,5  | 1,5              | 1,5              | -      | 74                             | -            | 87                | 111          | 1,5          | 1,5          | 0,2                         | -                      | -         | -          | -     |    |

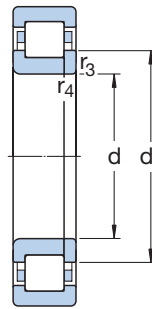
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



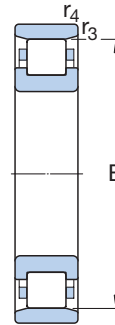
Type NU



Type NJ



Type NUP

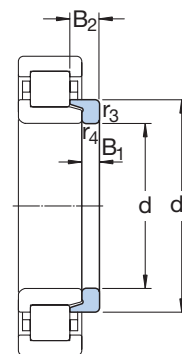
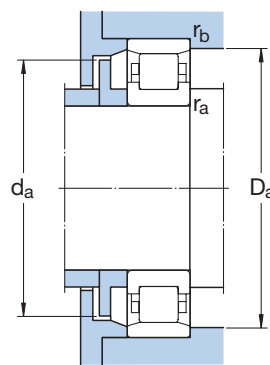
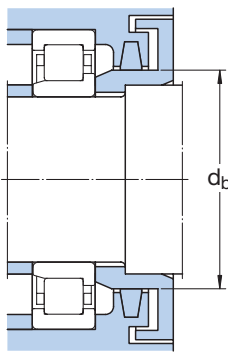
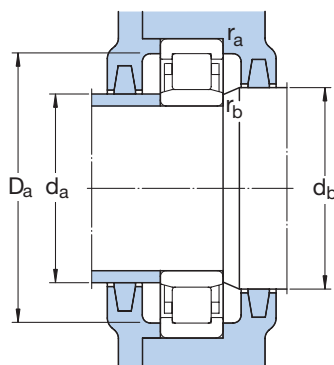


Type N

| Principal dimensions |     |     | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |          |
|----------------------|-----|-----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|----------|
| d                    | D   | B   | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |          |
| mm                   |     |     | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |          |
| 65<br>cont.          | 140 | 33  | 212                | 196   | 25,5                        | 5 300           | 5 600          | 2,28                               | NU 313 ECP                                 | J, M, ML                                        |          |
|                      | 140 | 33  | 212                | 196   | 25,5                        | 5 300           | 5 600          | 2,30                               | NJ 313 ECP                                 | J, M, ML                                        |          |
|                      | 140 | 33  | 212                | 196   | 25,5                        | 5 300           | 5 600          | 2,35                               | NUP 313 ECP                                | J, ML                                           |          |
|                      | 140 | 33  | 212                | 196   | 25,5                        | 5 300           | 5 600          | 2,25                               | N 313 ECP                                  | M                                               |          |
|                      | 140 | 48  | 285                | 290   | 38                          | 5 300           | 5 600          | 3,30                               | NU 2313 ECP                                | ML                                              |          |
|                      | 140 | 48  | 285                | 290   | 38                          | 5 300           | 5 600          | 3,35                               | NJ 2313 ECP                                | ML                                              |          |
|                      | 140 | 48  | 285                | 290   | 38                          | 5 300           | 5 600          | 3,45                               | NUP 2313 ECP                               | ML                                              |          |
|                      | 160 | 37  | 183                | 190   | 24                          | 4 800           | 5 600          | 3,60                               | NU 413                                     | –                                               |          |
|                      | 160 | 37  | 183                | 190   | 24                          | 4 800           | 5 600          | 3,65                               | NJ 413                                     | –                                               |          |
|                      | 70  | 110 | 20                 | 76,5  | 93                          | 12              | 6 300          | 7 000                              | 0,62                                       | NU 1014 ECP                                     | –        |
|                      |     | 125 | 24                 | 137   | 137                         | 18              | 6 000          | 6 300                              | 1,15                                       | NU 214 ECP                                      | J, M, ML |
|                      |     | 125 | 24                 | 137   | 137                         | 18              | 6 000          | 6 300                              | 1,15                                       | NJ 214 ECP                                      | J, M, ML |
| 125                  |     | 24  | 137                | 137   | 18                          | 6 000           | 6 300          | 1,20                               | NUP 214 ECP                                | M, ML                                           |          |
| 125                  |     | 24  | 137                | 137   | 18                          | 6 000           | 6 300          | 1,15                               | N 214 ECP                                  | –                                               |          |
| 125                  |     | 31  | 180                | 193   | 25,5                        | 6 000           | 6 300          | 1,55                               | NU 2214 ECP                                | J, M, ML                                        |          |
| 125                  |     | 31  | 180                | 193   | 25,5                        | 6 000           | 6 300          | 1,55                               | NJ 2214 ECP                                | M, ML                                           |          |
| 125                  |     | 31  | 180                | 193   | 25,5                        | 6 000           | 6 300          | 1,55                               | NUP 2214 ECP                               | M, ML                                           |          |
| 150                  |     | 35  | 236                | 228   | 29                          | 4 800           | 5 600          | 2,75                               | NU 314 ECP                                 | J, M, ML                                        |          |
| 150                  |     | 35  | 236                | 228   | 29                          | 4 800           | 5 600          | 2,80                               | NJ 314 ECP                                 | J, M, ML                                        |          |
| 150                  |     | 35  | 236                | 228   | 29                          | 4 800           | 5 600          | 2,85                               | NUP 314 ECP                                | M, ML                                           |          |
| 150                  |     | 35  | 236                | 228   | 29                          | 4 800           | 5 600          | 2,75                               | N 314 ECP                                  | M                                               |          |
| 150                  |     | 51  | 315                | 325   | 41,5                        | 4 800           | 5 600          | 4,00                               | NU 2314 ECP                                | ML                                              |          |
| 150                  |     | 51  | 315                | 325   | 41,5                        | 4 800           | 5 600          | 4,05                               | NJ 2314 ECP                                | ML                                              |          |
| 150                  |     | 51  | 315                | 325   | 41,5                        | 4 800           | 5 600          | 4,15                               | NUP 2314 ECP                               | ML                                              |          |
| 180                  |     | 42  | 229                | 240   | 30                          | 4 300           | 5 000          | 5,25                               | NU 414                                     | –                                               |          |
| 180                  |     | 42  | 229                | 240   | 30                          | 4 300           | 5 000          | 5,35                               | NJ 414                                     | –                                               |          |
| 75                   |     | 115 | 20                 | 58,3  | 71                          | 8,5             | 6 700          | 10 000                             | 0,74                                       | NU 1015 ML                                      | –        |
|                      |     | 130 | 25                 | 150   | 156                         | 20,4            | 5 600          | 6 000                              | 1,25                                       | NU 215 ECP                                      | J, M, ML |
|                      |     | 130 | 25                 | 150   | 156                         | 20,4            | 5 600          | 6 000                              | 1,30                                       | NJ 215 ECP                                      | J, M, ML |
|                      |     | 130 | 25                 | 150   | 156                         | 20,4            | 5 600          | 6 000                              | 1,30                                       | NUP 215 ECP                                     | M, ML    |
|                      |     | 130 | 25                 | 150   | 156                         | 20,4            | 5 600          | 6 000                              | 1,25                                       | N 215 ECP                                       | –        |
|                      |     | 130 | 31                 | 186   | 208                         | 27              | 5 600          | 6 000                              | 1,60                                       | NU 2215 ECP                                     | J, ML    |
|                      |     | 130 | 31                 | 186   | 208                         | 27              | 5 600          | 6 000                              | 1,60                                       | NJ 2215 ECP                                     | J, ML    |
|                      | 130 | 31  | 186                | 208   | 27                          | 5 600           | 6 000          | 1,65                               | NUP 2215 ECP                               | J, ML                                           |          |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 313 ECP becomes NU 313 ECML

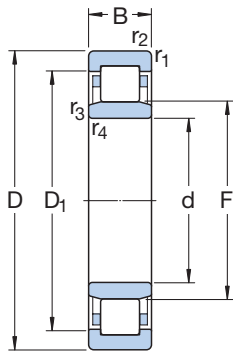


Angle ring

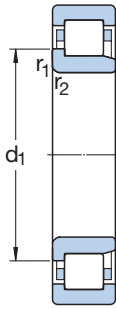
3

| Dimensions  |            |            |       |                  |                  |        | Abutment and fillet dimensions |              |                   |              |              |              | Calculation factor<br>$k_r$ | Angle ring<br>Designation | Mass       | Dimensions |       |
|-------------|------------|------------|-------|------------------|------------------|--------|--------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------------------|---------------------------|------------|------------|-------|
| d           | $d_1$<br>~ | $D_1$<br>~ | F, E  | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min                   | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                           |            | $B_1$      | $B_2$ |
| mm          |            |            |       |                  |                  |        | mm                             |              |                   |              |              |              | -                           | -                         | kg         | mm         |       |
| 65<br>cont. | 90,5       | 119        | 82,5  | 2,1              | 2,1              | 2,2    | 77                             | 80           | 85                | 128          | 2            | 2            | 0,15                        | HJ 313 EC                 | 0,27       | 10         | 15,5  |
|             | 90,5       | 119        | 82,5  | 2,1              | 2,1              | 2,2    | 77                             | 80           | 93                | 128          | 2            | 2            | 0,15                        | HJ 313 EC                 | 0,27       | 10         | 15,5  |
|             | 90,5       | 119        | 82,5  | 2,1              | 2,1              | -      | 77                             | -            | 93                | 128          | 2            | 2            | 0,15                        | -                         | -          | -          | -     |
|             | 90,5       | -          | 124,5 | 2,1              | 2,1              | 2,2    | 77                             | 122          | 127               | 128          | 2            | 2            | 0,15                        | -                         | -          | -          | -     |
|             | -          | 119        | 82,5  | 2,1              | 2,1              | 4,7    | 77                             | 80           | 85                | 128          | 2            | 2            | 0,25                        | -                         | -          | -          | -     |
|             | 90,5       | 119        | 82,5  | 2,1              | 2,1              | 4,7    | 77                             | 80           | 93                | 128          | 2            | 2            | 0,25                        | -                         | -          | -          | -     |
|             | 90,5       | 119        | 82,5  | 2,1              | 2,1              | -      | 77                             | -            | 93                | 128          | 2            | 2            | 0,25                        | -                         | -          | -          | -     |
|             | 98,5       | 125        | 89,3  | 2,1              | 2,1              | 2,6    | 79                             | 86           | 92                | 146          | 2            | 2            | 0,15                        | HJ 413                    | 0,42       | 11         | 18    |
|             | 98,5       | 125        | 89,3  | 2,1              | 2,1              | 2,6    | 79                             | 86           | 92                | 146          | 2            | 2            | 0,15                        | HJ 413                    | 0,42       | 11         | 18    |
|             | 70         | 84         | 97,5  | 79,5             | 1,1              | 1      | 1,3                            | 74,6         | 78                | 82           | 104          | 1            | 1                           | 0,1                       | HJ 1014 EC | 0,082      | 5     |
| 89,4        |            | 109        | 83,5  | 1,5              | 1,5              | 1,2    | 79                             | 81           | 86                | 116          | 1,5          | 1,5          | 0,15                        | HJ 214 EC                 | 0,15       | 7          | 11    |
| 89,4        |            | 109        | 83,5  | 1,5              | 1,5              | 1,2    | 79                             | 81           | 92                | 116          | 1,5          | 1,5          | 0,15                        | HJ 214 EC                 | 0,15       | 7          | 11    |
| 89,4        |            | 109        | 83,5  | 1,5              | 1,5              | -      | 79                             | -            | 92                | 116          | 1,5          | 1,5          | 0,15                        | -                         | -          | -          | -     |
| 89,4        |            | -          | 113,5 | 1,5              | 1,5              | 1,2    | 79                             | 111          | 116               | 116          | 1,5          | 1,5          | 0,15                        | -                         | -          | -          | -     |
| -           |            | 109        | 83,5  | 1,5              | 1,5              | 1,7    | 79                             | 81           | 86                | 116          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |
| 89,4        |            | 109        | 83,5  | 1,5              | 1,5              | 1,7    | 79                             | 81           | 92                | 116          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |
| 89,4        |            | 109        | 83,5  | 1,5              | 1,5              | -      | 79                             | -            | 92                | 116          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | 1,8    | 82                             | 86           | 91                | 138          | 2            | 2            | 0,15                        | HJ 314 EC                 | 0,32       | 10         | 15,5  |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | 1,8    | 82                             | 86           | 100               | 138          | 2            | 2            | 0,15                        | HJ 314 EC                 | 0,32       | 10         | 15,5  |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | -      | 82                             | -            | 100               | 138          | 2            | 2            | 0,15                        | -                         | -          | -          | -     |
| 97,3        |            | -          | 133   | 2,1              | 2,1              | 1,8    | 82                             | 130          | 136               | 138          | 2            | 2            | 0,15                        | -                         | -          | -          | -     |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | 4,8    | 82                             | 86           | 91                | 138          | 2            | 2            | 0,25                        | HJ 2314 EC                | 0,34       | 10         | 18,5  |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | 4,8    | 82                             | 86           | 100               | 138          | 2            | 2            | 0,25                        | HJ 2314 EC                | 0,34       | 10         | 18,5  |
| 97,3        |            | 127        | 89    | 2,1              | 2,1              | -      | 82                             | -            | 100               | 138          | 2            | 2            | 0,25                        | -                         | -          | -          | -     |
| -           | 140        | 100        | 3     | 3                | 3,5              | 86     | 97                             | 102          | 164               | 2,5          | 2,5          | 0,15         | -                           | -                         | -          | -          |       |
| 110         | 140        | 100        | 3     | 3                | 3,5              | 86     | 97                             | 113          | 164               | 2,5          | 2,5          | 0,15         | -                           | -                         | -          | -          |       |
| 75          | -          | 101        | 85    | 1,1              | 1                | 3      | 79,6                           | 83           | 87                | 109          | 1            | 1            | 0,1                         | -                         | -          | -          | -     |
|             | 94,3       | 114        | 88,5  | 1,5              | 1,5              | 1,2    | 84                             | 86           | 91                | 121          | 1,5          | 1,5          | 0,15                        | HJ 215 EC                 | 0,16       | 7          | 11    |
|             | 94,3       | 114        | 88,5  | 1,5              | 1,5              | 1,2    | 84                             | 86           | 97                | 121          | 1,5          | 1,5          | 0,15                        | HJ 215 EC                 | 0,16       | 7          | 11    |
|             | 94,3       | 114        | 88,5  | 1,5              | 1,5              | -      | 84                             | -            | 97                | 121          | 1,5          | 1,5          | 0,15                        | -                         | -          | -          | -     |
|             | 94,3       | -          | 118,5 | 1,5              | 1,5              | 1,2    | 84                             | 116          | 121               | 121          | 1,5          | 1,5          | 0,15                        | -                         | -          | -          | -     |
|             | -          | 114        | 88,5  | 1,5              | 1,5              | 1,7    | 84                             | 86           | 91                | 121          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |
|             | 94,3       | 114        | 88,5  | 1,5              | 1,5              | 1,7    | 84                             | 86           | 97                | 121          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |
|             | 94,3       | 114        | 88,5  | 1,5              | 1,5              | -      | 84                             | -            | 97                | 121          | 1,5          | 1,5          | 0,2                         | -                         | -          | -          | -     |

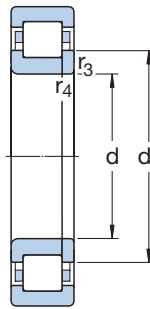
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP

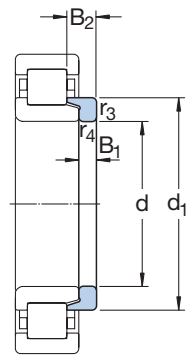
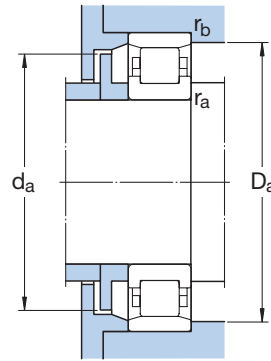
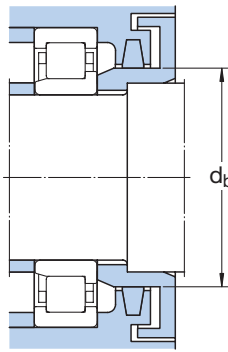
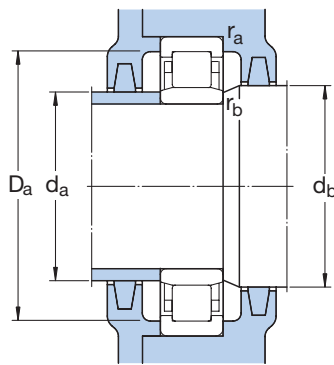


Type N

| Principal dimensions |     |    | Basic load ratings |        | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|-----|----|--------------------|--------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D   | B  | dynamic            | static |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |     |    | kN                 |        | kN                          | r/min           |                | kg                                 | –                                          |                                                 |
| 75<br>cont.          | 160 | 37 | 280                | 265    | 33,5                        | 4 500           | 5 300          | 3,30                               | NU 315 ECP                                 | J, M, ML                                        |
|                      | 160 | 37 | 280                | 265    | 33,5                        | 4 500           | 5 300          | 3,35                               | NJ 315 ECP                                 | J, M, ML                                        |
|                      | 160 | 37 | 280                | 265    | 33,5                        | 4 500           | 5 300          | 3,45                               | NUP 315 ECP                                | M, ML                                           |
|                      | 160 | 37 | 280                | 265    | 33,5                        | 4 500           | 5 300          | 3,30                               | N 315 ECP                                  | M                                               |
|                      | 160 | 55 | 380                | 400    | 50                          | 4 500           | 5 300          | 4,90                               | NU 2315 ECP                                | J, ML                                           |
|                      | 160 | 55 | 380                | 400    | 50                          | 4 500           | 5 300          | 5,00                               | NJ 2315 ECP                                | ML                                              |
|                      | 160 | 55 | 380                | 400    | 50                          | 4 500           | 5 300          | 5,10                               | NUP 2315 ECP                               | ML                                              |
|                      | 190 | 45 | 264                | 280    | 34                          | 4 000           | 4 800          | 6,75                               | NU 415                                     | –                                               |
|                      | 190 | 45 | 264                | 280    | 34                          | 4 000           | 4 800          | 6,90                               | NJ 415                                     | –                                               |
| 80                   | 125 | 22 | 66                 | 81,5   | 10,4                        | 6 300           | 6 300          | 1,00                               | NU 1016                                    | –                                               |
|                      | 125 | 22 | 99                 | 127    | 16,3                        | 5 600           | 9 500          | 1,10                               | NJ 1016 ECML                               | –                                               |
|                      | 140 | 26 | 160                | 166    | 21,2                        | 5 300           | 5 600          | 1,50                               | NU 216 ECP                                 | J, M, ML                                        |
|                      | 140 | 26 | 160                | 166    | 21,2                        | 5 300           | 5 600          | 1,60                               | NJ 216 ECP                                 | J, M, ML                                        |
|                      | 140 | 26 | 160                | 166    | 21,2                        | 5 300           | 5 600          | 1,65                               | NUP 216 ECP                                | ML                                              |
|                      | 140 | 26 | 160                | 166    | 21,2                        | 5 300           | 5 600          | 1,50                               | N 216 ECP                                  | –                                               |
|                      | 140 | 33 | 212                | 245    | 31                          | 5 300           | 5 600          | 2,00                               | NU 2216 ECP                                | J, M, ML                                        |
|                      | 140 | 33 | 212                | 245    | 31                          | 5 300           | 5 600          | 2,05                               | NJ 2216 ECP                                | J, M, ML                                        |
|                      | 140 | 33 | 212                | 245    | 31                          | 5 300           | 5 600          | 2,10                               | NUP 2216 ECP                               | M, ML                                           |
|                      | 170 | 39 | 300                | 290    | 36                          | 4 300           | 5 000          | 3,95                               | NU 316 ECP                                 | J, M, ML                                        |
|                      | 170 | 39 | 300                | 290    | 36                          | 4 300           | 5 000          | 4,00                               | NJ 316 ECP                                 | J, M, ML                                        |
|                      | 170 | 39 | 300                | 290    | 36                          | 4 300           | 5 000          | 4,10                               | NUP 316 ECP                                | M, ML                                           |
|                      | 170 | 39 | 300                | 290    | 36                          | 4 300           | 5 000          | 3,90                               | N 316 ECP                                  | M                                               |
|                      | 170 | 58 | 415                | 440    | 55                          | 4 300           | 5 000          | 5,95                               | NU 2316 ECP                                | M, ML                                           |
|                      | 170 | 58 | 415                | 440    | 55                          | 4 300           | 5 000          | 6,00                               | NJ 2316 ECP                                | M, ML                                           |
|                      | 170 | 58 | 415                | 440    | 55                          | 4 300           | 5 000          | 6,00                               | NUP 2316 ECP                               | M, ML                                           |
|                      | 200 | 48 | 303                | 320    | 39                          | 3 800           | 4 500          | 7,30                               | NU 416                                     | –                                               |
|                      | 200 | 48 | 303                | 320    | 39                          | 3 800           | 4 500          | 8,05                               | NJ 416                                     | –                                               |
| 85                   | 130 | 22 | 68,2               | 86,5   | 10,8                        | 6 000           | 9 000          | 1,05                               | NU 1017 ML                                 | –                                               |
|                      | 150 | 28 | 190                | 200    | 24,5                        | 4 800           | 5 300          | 1,90                               | NU 217 ECP                                 | J, M, ML                                        |
|                      | 150 | 28 | 190                | 200    | 24,5                        | 4 800           | 5 300          | 1,95                               | NJ 217 ECP                                 | J, M, ML                                        |
|                      | 150 | 28 | 190                | 200    | 24,5                        | 4 800           | 5 300          | 2,00                               | NUP 217 ECP                                | J, ML                                           |
|                      | 150 | 28 | 190                | 200    | 24,5                        | 4 800           | 5 300          | 1,90                               | N 217 ECP                                  | M                                               |
|                      | 150 | 36 | 250                | 280    | 34,5                        | 4 800           | 5 300          | 2,45                               | NU 2217 ECP                                | J, M, ML                                        |
|                      | 150 | 36 | 250                | 280    | 34,5                        | 4 800           | 5 300          | 2,55                               | NJ 2217 ECP                                | J, M, ML                                        |
|                      | 150 | 36 | 250                | 280    | 34,5                        | 4 800           | 5 300          | 2,65                               | NUP 2217 ECP                               | ML                                              |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 315 ECP becomes NU 315 ECML



Angle ring

Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

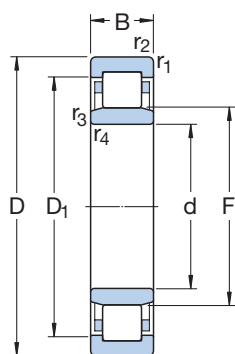
Angle ring Designation

Mass

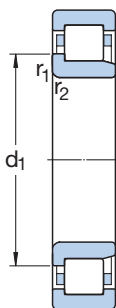
Dimensions

| d           | d <sub>1</sub> | D <sub>1</sub> | F, E  | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub> , D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass      | B <sub>1</sub> | B <sub>2</sub> |      |
|-------------|----------------|----------------|-------|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|-----------|----------------|----------------|------|
| mm          |                |                |       |                         |                         |                 | mm                    |                       |                                        |                       |                       |                       | -              | -                      | kg        | mm             |                |      |
| 75<br>cont. | 104            | 136            | 95    | 2,1                     | 2,1                     | 1,8             | 87                    | 92                    | 97                                     | 148                   | 2                     | 2                     | 0,15           | HJ 315 EC              | 0,39      | 11             | 16,5           |      |
|             | 104            | 136            | 95    | 2,1                     | 2,1                     | 1,8             | 87                    | 92                    | 107                                    | 148                   | 2                     | 2                     | 0,15           | HJ 315 EC              | 0,39      | 11             | 16,5           |      |
|             | 104            | 136            | 95    | 2,1                     | 2,1                     | -               | 87                    | -                     | 107                                    | 148                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
|             | 104            | -              | 143   | 2,1                     | 2,1                     | 1,8             | 87                    | 140                   | 146                                    | 148                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
|             | 104            | 136            | 95    | 2,1                     | 2,1                     | 4,8             | 87                    | 92                    | 97                                     | 148                   | 2                     | 2                     | 0,25           | HJ 2315 EC             | 0,42      | 11             | 19,5           |      |
|             | 104            | 136            | 95    | 2,1                     | 2,1                     | 4,8             | 87                    | 92                    | 107                                    | 148                   | 2                     | 2                     | 0,25           | HJ 2315 EC             | 0,42      | 11             | 19,5           |      |
|             | 104            | 136            | 95    | 2,1                     | 2,1                     | -               | 87                    | -                     | 107                                    | 148                   | 2                     | 2                     | 0,25           | -                      | -         | -              | -              |      |
|             | -              | 148            | 104,5 | 3                       | 3                       | 3,8             | 91                    | 101                   | 107                                    | 174                   | 2,5                   | 2,5                   | 0,15           | -                      | -         | -              | -              |      |
|             | 116            | 148            | 104,5 | 3                       | 3                       | 3,8             | 91                    | 101                   | 119                                    | 174                   | 2,5                   | 2,5                   | 0,15           | -                      | -         | -              | -              |      |
|             | 80             | -              | 109   | 91,5                    | 1,1                     | 1               | 3,3                   | 86                    | 90                                     | 94                    | 119                   | 1                     | 1              | 0,1                    | -         | -              | -              | -    |
|             |                | 96,2           | 111   | 91,5                    | 1,1                     | 1               | 1,5                   | 86                    | 90                                     | 94                    | 119                   | 1                     | 1              | 0,1                    | -         | -              | -              | -    |
|             |                | 101            | 123   | 95,3                    | 2                       | 2               | 1,4                   | 91                    | 93                                     | 98                    | 129                   | 2                     | 2              | 0,15                   | HJ 216 EC | 0,21           | 8              | 12,5 |
| 101         |                | 123            | 95,3  | 2                       | 2                       | 1,4             | 91                    | 93                    | 104                                    | 129                   | 2                     | 2                     | 0,15           | HJ 216 EC              | 0,21      | 8              | 12,5           |      |
| 101         |                | 123            | 95,3  | 2                       | 2                       | -               | 91                    | -                     | 104                                    | 129                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
| 101         |                | -              | 127,3 | 2                       | 2                       | 1,4             | 91                    | 125                   | 129                                    | 129                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
| 101         |                | 123            | 95,3  | 2                       | 2                       | 1,4             | 91                    | 93                    | 98                                     | 129                   | 2                     | 2                     | 0,2            | HJ 216 EC              | 0,21      | 8              | 12,5           |      |
| 101         |                | 123            | 95,3  | 2                       | 2                       | 1,4             | 91                    | 93                    | 104                                    | 129                   | 2                     | 2                     | 0,2            | HJ 216 EC              | 0,21      | 8              | 12,5           |      |
| 101         |                | 123            | 95,3  | 2                       | 2                       | -               | 91                    | -                     | 104                                    | 129                   | 2                     | 2                     | 0,2            | -                      | -         | -              | -              |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | 2,1             | 92                    | 98                    | 104                                    | 158                   | 2                     | 2                     | 0,15           | HJ 316 EC              | 0,44      | 11             | 17             |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | 2,1             | 92                    | 98                    | 113                                    | 158                   | 2                     | 2                     | 0,15           | HJ 316 EC              | 0,44      | 11             | 17             |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | -               | 92                    | -                     | 113                                    | 158                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
| 110         |                | -              | 151   | 2,1                     | 2,1                     | 2,1             | 92                    | 148                   | 154                                    | 158                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | 5,1             | 92                    | 98                    | 104                                    | 158                   | 2                     | 2                     | 0,25           | HJ 2316 EC             | 0,48      | 11             | 20             |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | 5,1             | 92                    | 98                    | 113                                    | 158                   | 2                     | 2                     | 0,25           | HJ 2316 EC             | 0,48      | 11             | 20             |      |
| 110         |                | 144            | 101   | 2,1                     | 2,1                     | -               | 92                    | -                     | 113                                    | 158                   | 2                     | 2                     | 0,25           | -                      | -         | -              | -              |      |
| 122         |                | 157            | 110   | 3                       | 3                       | 3,7             | 96                    | 106                   | 113                                    | 184                   | 2,5                   | 2,5                   | 0,15           | HJ 416                 | 0,78      | 13             | 22             |      |
| 122         |                | 157            | 110   | 3                       | 3                       | 3,7             | 96                    | 106                   | 125                                    | 184                   | 2,5                   | 2,5                   | 0,15           | HJ 416                 | 0,78      | 13             | 22             |      |
| 85          | -              | 114            | 96,5  | 1,1                     | 1                       | 3,3             | 89,6                  | 95                    | 99                                     | 124                   | 1                     | 1                     | 0,1            | -                      | -         | -              | -              |      |
|             | 107            | 131            | 100,5 | 2                       | 2                       | 1,5             | 96                    | 98                    | 103                                    | 139                   | 2                     | 2                     | 0,15           | HJ 217 EC              | 0,24      | 8              | 12,5           |      |
|             | 107            | 131            | 100,5 | 2                       | 2                       | 1,5             | 96                    | 98                    | 110                                    | 139                   | 2                     | 2                     | 0,15           | HJ 217 EC              | 0,24      | 8              | 12,5           |      |
|             | 107            | 131            | 100,5 | 2                       | 2                       | -               | 96                    | -                     | 110                                    | 139                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
|             | 107            | -              | 136,5 | 2                       | 2                       | 1,5             | 96                    | 134                   | 139                                    | 139                   | 2                     | 2                     | 0,15           | -                      | -         | -              | -              |      |
|             | -              | 131            | 100,5 | 2                       | 2                       | 2               | 96                    | 98                    | 103                                    | 139                   | 2                     | 2                     | 0,2            | -                      | -         | -              | -              |      |
|             | 107            | 131            | 100,5 | 2                       | 2                       | 2               | 96                    | 98                    | 110                                    | 139                   | 2                     | 2                     | 0,2            | -                      | -         | -              | -              |      |
|             | 107            | 131            | 100,5 | 2                       | 2                       | -               | 96                    | -                     | 110                                    | 139                   | 2                     | 2                     | 0,2            | -                      | -         | -              | -              |      |

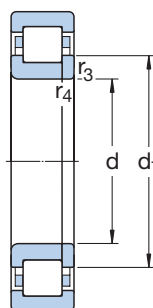
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP

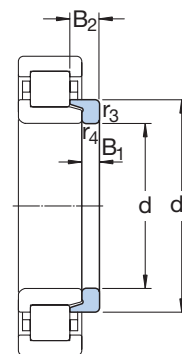
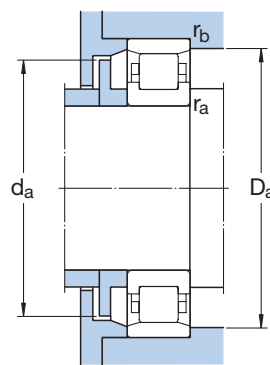
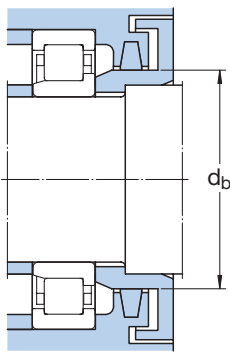
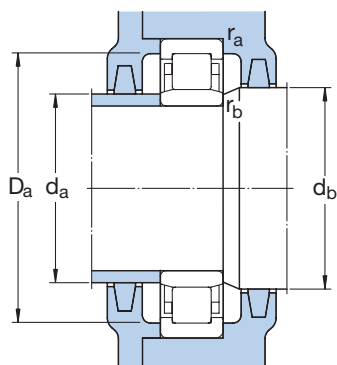


Type N

| Principal dimensions |           |     | Basic load ratings |                | Fatigue load limit<br>P <sub>u</sub> | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |                 |
|----------------------|-----------|-----|--------------------|----------------|--------------------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|-----------------|
| d                    | D         | B   | C                  | C <sub>0</sub> |                                      | Reference speed | Limiting speed |                                    |                                            |                                                 |                 |
| mm                   |           |     | kN                 |                | kN                                   | r/min           |                | kg                                 | –                                          |                                                 |                 |
| <b>85</b><br>cont.   | 180       | 41  | 340                | 335            | 41,5                                 | 4 000           | 4 800          | 4,70                               | <b>NU 317 ECP</b>                          | <b>J, M</b>                                     |                 |
|                      | 180       | 41  | 340                | 335            | 41,5                                 | 4 000           | 4 800          | 4,80                               | <b>NJ 317 ECP</b>                          | <b>J, M</b>                                     |                 |
|                      | 180       | 41  | 340                | 335            | 41,5                                 | 4 000           | 4 800          | 4,90                               | <b>NUP 317 ECP</b>                         | <b>J, M</b>                                     |                 |
|                      | 180       | 41  | 340                | 335            | 41,5                                 | 4 000           | 4 800          | 4,70                               | <b>N 317 ECP</b>                           | <b>M</b>                                        |                 |
|                      | 180       | 60  | 455                | 490            | 60                                   | 4 000           | 4 800          | 6,85                               | <b>NU 2317 ECP</b>                         | <b>J, ML</b>                                    |                 |
|                      | 180       | 60  | 455                | 490            | 60                                   | 4 000           | 4 800          | 7,00                               | <b>NJ 2317 ECP</b>                         | <b>ML</b>                                       |                 |
|                      | 180       | 60  | 455                | 490            | 60                                   | 4 000           | 4 800          | 7,00                               | <b>NUP 2317 ECP</b>                        | <b>ML</b>                                       |                 |
|                      | 210       | 52  | 319                | 335            | 39                                   | 3 600           | 4 300          | 9,70                               | <b>NU 417</b>                              | –                                               |                 |
|                      | 210       | 52  | 319                | 335            | 39                                   | 3 800           | 4 300          | 8,90                               | <b>NJ 417</b>                              | –                                               |                 |
| <b>90</b>            | 140       | 24  | 80,9               | 104            | 12,7                                 | 5 600           | 8 500          | 1,35                               | <b>NU 1018 ML</b>                          | –                                               |                 |
|                      | 160       | 30  | 208                | 220            | 27                                   | 4 500           | 5 000          | 2,35                               | <b>NU 218 ECP</b>                          | <b>J, M, ML</b>                                 |                 |
|                      | 160       | 30  | 208                | 220            | 27                                   | 4 500           | 5 000          | 2,40                               | <b>NJ 218 ECP</b>                          | <b>J, M, ML</b>                                 |                 |
|                      | 160       | 30  | 208                | 220            | 27                                   | 4 500           | 5 000          | 2,45                               | <b>NUP 218 ECP</b>                         | <b>M, ML</b>                                    |                 |
|                      | 160       | 30  | 208                | 220            | 27                                   | 4 500           | 5 000          | 2,35                               | <b>N 218 ECP</b>                           | <b>M</b>                                        |                 |
|                      | 160       | 40  | 280                | 315            | 39                                   | 4 500           | 5 000          | 3,15                               | <b>NU 2218 ECP</b>                         | <b>J, M, ML</b>                                 |                 |
|                      | 160       | 40  | 280                | 315            | 39                                   | 4 500           | 5 000          | 3,20                               | <b>NJ 2218 ECP</b>                         | <b>M, ML</b>                                    |                 |
|                      | 160       | 40  | 280                | 315            | 39                                   | 4 500           | 5 000          | 3,30                               | <b>NUP 2218 ECP</b>                        | –                                               |                 |
|                      | 190       | 43  | 365                | 360            | 43                                   | 3 800           | 4 500          | 5,45                               | <b>NU 318 ECP</b>                          | <b>J, M, ML</b>                                 |                 |
|                      | 190       | 43  | 365                | 360            | 43                                   | 3 800           | 4 500          | 5,55                               | <b>NJ 318 ECP</b>                          | <b>J, M, ML</b>                                 |                 |
|                      | 190       | 43  | 365                | 360            | 43                                   | 3 800           | 4 500          | 5,65                               | <b>NUP 318 ECP</b>                         | <b>M, ML</b>                                    |                 |
|                      | 190       | 43  | 365                | 360            | 43                                   | 3 800           | 4 500          | 5,40                               | <b>N 318 ECP</b>                           | <b>M</b>                                        |                 |
|                      | 190       | 64  | 500                | 540            | 65,5                                 | 3 800           | 4 500          | 8,00                               | <b>NU 2318 ECP</b>                         | <b>J, ML</b>                                    |                 |
|                      | 190       | 64  | 500                | 540            | 65,5                                 | 3 800           | 4 500          | 8,15                               | <b>NJ 2318 ECP</b>                         | <b>J, ML, M</b>                                 |                 |
|                      | 190       | 64  | 500                | 540            | 65,5                                 | 3 800           | 4 500          | 8,30                               | <b>NUP 2318 ECP</b>                        | <b>ML</b>                                       |                 |
|                      |           | 225 | 54                 | 380            | 415                                  | 48              | 3 400          | 4 000                              | 11,5                                       | <b>NU 418</b>                                   | –               |
|                      | <b>95</b> | 145 | 24                 | 84,2           | 110                                  | 13,2            | 5 300          | 8 000                              | 1,40                                       | <b>NU 1019 ML</b>                               | –               |
|                      |           | 170 | 32                 | 255            | 265                                  | 32,5            | 4 300          | 4 800                              | 2,85                                       | <b>NU 219 ECP</b>                               | <b>J, M, ML</b> |
| 170                  |           | 32  | 255                | 265            | 32,5                                 | 4 300           | 4 800          | 2,90                               | <b>NJ 219 ECP</b>                          | <b>J, M, ML</b>                                 |                 |
| 170                  |           | 32  | 255                | 265            | 32,5                                 | 4 300           | 4 800          | 3,00                               | <b>NUP 219 ECP</b>                         | <b>ML</b>                                       |                 |
| 170                  |           | 32  | 255                | 265            | 32,5                                 | 4 300           | 4 800          | 2,85                               | <b>N 219 ECP</b>                           | –                                               |                 |
| 170                  |           | 43  | 325                | 375            | 45,5                                 | 4 300           | 4 800          | 3,85                               | <b>NU 2219 ECP</b>                         | <b>J, M</b>                                     |                 |
| 170                  |           | 43  | 325                | 375            | 45,5                                 | 4 300           | 4 800          | 3,95                               | <b>NJ 2219 ECP</b>                         | <b>J, M</b>                                     |                 |
| 170                  |           | 43  | 325                | 375            | 45,5                                 | 4 300           | 4 800          | 4,00                               | <b>NUP 2219 ECP</b>                        | –                                               |                 |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 317 ECP becomes NU 317 ECM

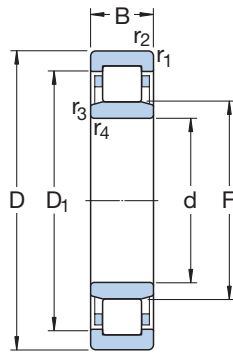


Angle ring

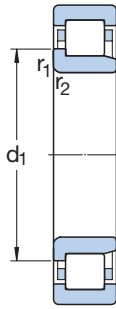
3

| Dimensions         |       |       |       |                  |                  |          | Abutment and fillet dimensions |              |                   |              |              |              | Calculation factor<br>$k_r$ | Angle ring Designation | Mass | Dimensions |      |
|--------------------|-------|-------|-------|------------------|------------------|----------|--------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------------------|------------------------|------|------------|------|
| d                  | $d_1$ | $D_1$ | F, E  | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^{1)}$ | $d_a$<br>min                   | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                        |      |            |      |
| mm                 |       |       |       |                  |                  |          | mm                             |              |                   |              |              |              | -                           | -                      | kg   | mm         |      |
| <b>85</b><br>cont. | 117   | 153   | 108   | 3                | 3                | 2,3      | 99                             | 105          | 111               | 166          | 2,5          | 2,5          | 0,15                        | <b>HJ 317 EC</b>       | 0,55 | 12         | 18,5 |
|                    | 117   | 153   | 108   | 3                | 3                | 2,3      | 99                             | 105          | 120               | 166          | 2,5          | 2,5          | 0,15                        | <b>HJ 317 EC</b>       | 0,55 | 12         | 18,5 |
|                    | 117   | 153   | 108   | 3                | 3                | -        | 99                             | -            | 120               | 166          | 2,5          | 2,5          | 0,15                        | -                      |      |            |      |
|                    | 117   | -     | 160   | 3                | 3                | 2,3      | 99                             | 157          | 163               | 166          | 2,5          | 2,5          | 0,15                        | -                      |      |            |      |
|                    | -     | 153   | 108   | 3                | 3                | 5,8      | 99                             | 105          | 111               | 166          | 2,5          | 2,5          | 0,25                        | -                      |      |            |      |
|                    | 117   | 153   | 108   | 3                | 3                | 5,8      | 99                             | 105          | 120               | 166          | 2,5          | 2,5          | 0,25                        | -                      |      |            |      |
|                    | 117   | 153   | 108   | 3                | 3                | -        | 99                             | -            | 120               | 166          | 2,5          | 2,5          | 0,25                        | -                      |      |            |      |
|                    | -     | 163   | 113   | 4                | 4                | 3,8      | 105                            | 109          | 116               | 190          | 3            | 3            | 0,15                        | -                      |      |            |      |
|                    | 126   | 163   | 113   | 4                | 4                | 3,8      | 105                            | 109          | 129               | 190          | 3            | 3            | 0,15                        | -                      |      |            |      |
|                    | -     | 140   | 107   | 2                | 2                | 2,6      | 101                            | 104          | 110               | 149          | 2            | 2            | 0,2                         | -                      |      |            |      |
| <b>90</b>          | -     | 122   | 103   | 1,5              | 1,1              | 3,5      | 96                             | 101          | 106               | 133          | 1,5          | 1            | 0,1                         | -                      |      |            |      |
|                    | 114   | 140   | 107   | 2                | 2                | 1,8      | 101                            | 104          | 110               | 149          | 2            | 2            | 0,15                        | <b>HJ 218 EC</b>       | 0,31 | 9          | 14   |
|                    | 114   | 140   | 107   | 2                | 2                | 1,8      | 101                            | 104          | 117               | 149          | 2            | 2            | 0,15                        | <b>HJ 218 EC</b>       | 0,31 | 9          | 14   |
|                    | 114   | 140   | 107   | 2                | 2                | -        | 101                            | -            | 117               | 149          | 2            | 2            | 0,15                        | -                      |      |            |      |
|                    | 114   | -     | 145   | 2                | 2                | 1,8      | 101                            | 142          | 148               | 149          | 2            | 2            | 0,15                        | -                      |      |            |      |
|                    | -     | 140   | 107   | 2                | 2                | 2,6      | 101                            | 104          | 110               | 149          | 2            | 2            | 0,2                         | -                      |      |            |      |
|                    | 114   | 140   | 107   | 2                | 2                | 2,6      | 101                            | 104          | 117               | 149          | 2            | 2            | 0,2                         | -                      |      |            |      |
|                    | 114   | 140   | 107   | 2                | 2                | -        | 101                            | -            | 117               | 149          | 2            | 2            | 0,2                         | -                      |      |            |      |
|                    | 124   | 162   | 113,5 | 3                | 3                | 2,5      | 104                            | 110          | 116               | 176          | 2,5          | 2,5          | 0,15                        | <b>HJ 318 EC</b>       | 0,60 | 12         | 18,5 |
|                    | 124   | 162   | 113,5 | 3                | 3                | 2,5      | 104                            | 110          | 127               | 176          | 2,5          | 2,5          | 0,15                        | <b>HJ 318 EC</b>       | 0,60 | 12         | 18,5 |
| 124                | 162   | 113,5 | 3     | 3                | -                | 104      | -                              | 127          | 176               | 2,5          | 2,5          | 0,15         | -                           |                        |      |            |      |
| 124                | -     | 169,5 | 3     | 3                | 2,5              | 104      | 166                            | 173          | 176               | 2,5          | 2,5          | 0,15         | -                           |                        |      |            |      |
| 124                | 162   | 113,5 | 3     | 3                | 6                | 104      | 110                            | 116          | 176               | 2,5          | 2,5          | 0,25         | -                           |                        |      |            |      |
| 124                | 162   | 113,5 | 3     | 3                | 6                | 104      | 110                            | 127          | 176               | 2,5          | 2,5          | 0,25         | -                           |                        |      |            |      |
| 124                | 162   | 113,5 | 3     | 3                | -                | 104      | 110                            | 127          | 176               | 2,5          | 2,5          | 0,25         | -                           |                        |      |            |      |
| -                  | 176   | 123,5 | 4     | 4                | 4,9              | 106      | 120                            | 126          | 209               | 3            | 3            | 0,15         | -                           |                        |      |            |      |
| <b>95</b>          | -     | 127   | 108   | 1,5              | 1,1              | 3,5      | 101                            | 106          | 111               | 138          | 1,5          | 1            | 0,1                         | -                      |      |            |      |
|                    | 120   | 149   | 112,5 | 2,1              | 2,1              | 1,7      | 107                            | 110          | 115               | 158          | 2            | 2            | 0,15                        | <b>HJ 219 EC</b>       | 0,33 | 9          | 14   |
|                    | 120   | 149   | 112,5 | 2,1              | 2,1              | 1,7      | 107                            | 110          | 123               | 158          | 2            | 2            | 0,15                        | <b>HJ 219 EC</b>       | 0,33 | 9          | 14   |
|                    | 120   | 149   | 112,5 | 2,1              | 2,1              | -        | 107                            | -            | 123               | 158          | 2            | 2            | 0,15                        | -                      |      |            |      |
|                    | 120   | -     | 154,5 | 2,1              | 2,1              | 1,7      | 107                            | 152          | 157               | 158          | 2            | 2            | 0,15                        | -                      |      |            |      |
|                    | -     | 149   | 112,5 | 2,1              | 2,1              | 3        | 107                            | 110          | 115               | 158          | 2            | 2            | 0,2                         | -                      |      |            |      |
|                    | 120   | 149   | 112,5 | 2,1              | 2,1              | 3        | 107                            | 110          | 123               | 158          | 2            | 2            | 0,2                         | -                      |      |            |      |
|                    | 120   | 149   | 112,5 | 2,1              | 2,1              | -        | 107                            | -            | 123               | 158          | 2            | 2            | 0,2                         | -                      |      |            |      |

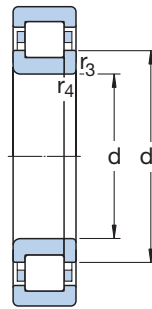
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP



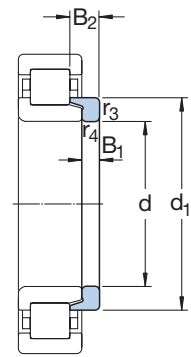
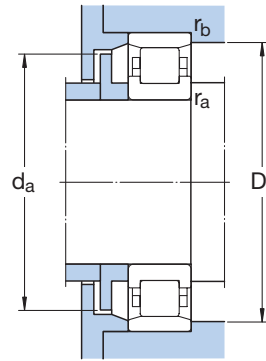
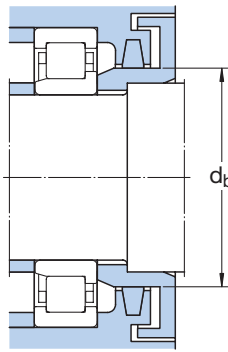
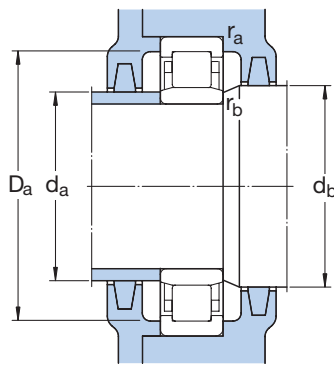
Type N

| Principal dimensions |     |    | Basic load ratings |                | Fatigue load limit<br>P <sub>u</sub> | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|-----|----|--------------------|----------------|--------------------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D   | B  | C                  | C <sub>0</sub> |                                      | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |     |    | kN                 |                | kN                                   | r/min           |                | kg                                 | –                                          |                                                 |
| 95<br>cont.          | 200 | 45 | 390                | 390            | 46,5                                 | 3 600           | 4 300          | 6,25                               | NU 319 ECP                                 | J, M, ML                                        |
|                      | 200 | 45 | 390                | 390            | 46,5                                 | 3 600           | 4 300          | 6,45                               | NJ 319 ECP                                 | J, M, ML                                        |
|                      | 200 | 45 | 390                | 390            | 46,5                                 | 3 600           | 4 300          | 6,25                               | NUP 319 ECP                                | M, ML                                           |
|                      | 200 | 45 | 390                | 390            | 46,5                                 | 3 600           | 4 300          | 6,25                               | N 319 ECP                                  | M                                               |
|                      | 200 | 67 | 530                | 585            | 69,5                                 | 3 600           | 4 300          | 9,65                               | NU 2319 ECP                                | J, ML                                           |
|                      | 200 | 67 | 530                | 585            | 69,5                                 | 3 600           | 4 300          | 9,85                               | NJ 2319 ECP                                | J, ML                                           |
|                      | 200 | 67 | 530                | 585            | 69,5                                 | 3 600           | 4 300          | 9,75                               | NUP 2319 ECP                               | J, ML                                           |
|                      | 240 | 55 | 413                | 455            | 52                                   | 3 200           | 3 600          | 13,5                               | NU 419 M                                   | –                                               |
| 100                  | 150 | 24 | 85,8               | 114            | 13,7                                 | 5 000           | 7 500          | 1,45                               | NU 1020 ML                                 | M                                               |
|                      | 180 | 34 | 285                | 305            | 36,5                                 | 4 000           | 4 500          | 3,45                               | NU 220 ECP                                 | J, M, ML                                        |
|                      | 180 | 34 | 285                | 305            | 36,5                                 | 4 000           | 4 500          | 3,50                               | NJ 220 ECP                                 | J, M, ML                                        |
|                      | 180 | 34 | 285                | 305            | 36,5                                 | 4 000           | 4 500          | 3,60                               | NUP 220 ECP                                | ML                                              |
|                      | 180 | 34 | 285                | 305            | 36,5                                 | 4 000           | 4 500          | 3,45                               | N 220 ECP                                  | –                                               |
|                      | 180 | 46 | 380                | 450            | 54                                   | 4 000           | 4 500          | 4,75                               | NU 2220 ECP                                | J, ML                                           |
|                      | 180 | 46 | 380                | 450            | 54                                   | 4 000           | 4 500          | 4,80                               | NJ 2220 ECP                                | J, ML                                           |
|                      | 180 | 46 | 380                | 450            | 54                                   | 4 000           | 4 500          | 4,90                               | NUP 2220 ECP                               | ML                                              |
|                      | 215 | 47 | 450                | 440            | 51                                   | 3 200           | 3 800          | 7,85                               | NU 320 ECP                                 | J, M, ML                                        |
|                      | 215 | 47 | 450                | 440            | 51                                   | 3 200           | 3 800          | 7,65                               | NJ 320 ECP                                 | J, M, ML                                        |
|                      | 215 | 47 | 450                | 440            | 51                                   | 3 200           | 3 800          | 7,80                               | NUP 320 ECJ                                | ML                                              |
|                      | 215 | 47 | 450                | 440            | 51                                   | 3 200           | 3 800          | 7,55                               | N 320 ECP                                  | M                                               |
|                      | 215 | 73 | 670                | 735            | 85                                   | 3 200           | 3 800          | 12,0                               | NU 2320 ECP                                | J, ML                                           |
|                      | 215 | 73 | 670                | 735            | 85                                   | 3 200           | 3 800          | 12,2                               | NJ 2320 ECP                                | J, ML                                           |
|                      | 215 | 73 | 670                | 735            | 85                                   | 3 200           | 3 800          | 12,5                               | NUP 2320 ECP                               | J, ML                                           |
|                      | 250 | 58 | 429                | 475            | 53                                   | 3 000           | 3 600          | 14,0                               | NU 420 M                                   | –                                               |
| 105                  | 160 | 26 | 101                | 137            | 16                                   | 4 800           | 7 500          | 1,85                               | NU 1021 ML                                 | M                                               |
|                      | 190 | 36 | 300                | 315            | 36,5                                 | 3 800           | 4 300          | 4,00                               | NU 221 ECP                                 | J, ML                                           |
|                      | 190 | 36 | 300                | 315            | 36,5                                 | 3 800           | 4 300          | 4,10                               | NJ 221 ECP                                 | ML                                              |
|                      | 190 | 36 | 300                | 315            | 36,5                                 | 3 800           | 4 300          | 4,20                               | NUP 221 ECP                                | ML                                              |
|                      | 190 | 36 | 300                | 315            | 36,5                                 | 3 800           | 4 300          | 3,95                               | N 221 ECP                                  | –                                               |
|                      | 225 | 49 | 500                | 500            | 57                                   | 3 200           | 3 800          | 8,75                               | NU 321 ECP                                 | J, ML                                           |
|                      | 225 | 49 | 500                | 500            | 57                                   | 3 200           | 3 800          | 9,00                               | NJ 321 ECJ                                 | ML                                              |
|                      | 225 | 49 | 500                | 500            | 57                                   | 3 200           | 3 800          | 8,65                               | N 321 ECP                                  | –                                               |
|                      | 260 | 60 | 501                | 570            | 64                                   | 2 800           | 3 400          | 19,0                               | NU 421 M                                   | –                                               |

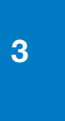
The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 319 ECP becomes NU 319 ECML





Angle ring



Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

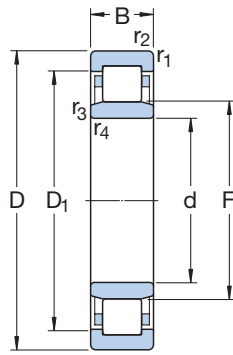
Angle ring Designation

Mass

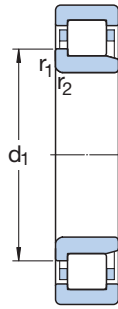
Dimensions

| d          | $d_1$      | $D_1$ | F, E  | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max | $k_r$             | Angle ring Designation | Mass             | $B_1$ | $B_2$ |    |
|------------|------------|-------|-------|------------------|------------------|--------|--------------|--------------|-------------------|--------------|--------------|--------------|-------------------|------------------------|------------------|-------|-------|----|
| mm         |            |       |       |                  |                  |        | mm           |              |                   |              |              |              | -                 | -                      | kg               | mm    |       |    |
| <b>95</b>  | 132        | 170   | 121,5 | 3                | 3                | 2,9    | 109          | 118          | 124               | 186          | 2,5          | 2,5          | 0,15              | <b>HJ 319 EC</b>       | 0,76             | 13    | 20,5  |    |
|            | cont. 132  | 170   | 121,5 | 3                | 3                | 2,9    | 109          | 118          | 135               | 186          | 2,5          | 2,5          | 0,15              | <b>HJ 319 EC</b>       | 0,76             | 13    | 20,5  |    |
|            | 132        | 170   | 121,5 | 3                | 3                | -      | 109          | -            | 135               | 186          | 2,5          | 2,5          | 0,15              | -                      |                  |       |       |    |
|            | 132        | -     | 177,5 | 3                | 3                | 2,9    | 109          | 174          | 181               | 186          | 2,5          | 2,5          | 0,15              | -                      |                  |       |       |    |
|            | 132        | 170   | 121,5 | 3                | 3                | 6,9    | 109          | 118          | 124               | 186          | 2,5          | 2,5          | 0,25              | <b>HJ 2319 EC</b>      | 0,81             | 13    | 24,5  |    |
|            | 132        | 170   | 121,5 | 3                | 3                | 6,9    | 109          | 118          | 135               | 186          | 2,5          | 2,5          | 0,25              | <b>HJ 2319 EC</b>      | 0,81             | 13    | 24,5  |    |
|            | 132        | 170   | 121,5 | 3                | 3                | -      | 109          | -            | 135               | 186          | 2,5          | 2,5          | 0,25              | -                      |                  |       |       |    |
|            | -          | 186   | 133,5 | 4                | 4                | 5      | 115          | 130          | 136               | 220          | 3            | 3            | 0,15              | -                      |                  |       |       |    |
|            | <b>100</b> | -     | 132   | 113              | 1,5              | 1,1    | 3,5          | 106          | 111               | 116          | 143          | 1,5          | 1                 | 0,1                    | -                |       |       |    |
|            |            | 127   | 157   | 119              | 2,1              | 2,1    | 1,7          | 112          | 116               | 122          | 168          | 2            | 2                 | 0,15                   | <b>HJ 220 EC</b> | 0,42  | 10    | 15 |
| 127        |            | 157   | 119   | 2,1              | 2,1              | 1,7    | 112          | 116          | 130               | 168          | 2            | 2            | 0,15              | <b>HJ 220 EC</b>       | 0,42             | 10    | 15    |    |
| 127        |            | 157   | 119   | 2,1              | 2,1              | -      | 112          | -            | 130               | 168          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
| 127        |            | -     | 163   | 2,1              | 2,1              | 1,7    | 112          | 160          | 166               | 168          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
| 127        |            | 157   | 119   | 2,1              | 2,1              | 2,5    | 112          | 116          | 122               | 168          | 2            | 2            | 0,2               | <b>HJ 2220 EC</b>      | 0,43             | 10    | 16    |    |
| 127        |            | 157   | 119   | 2,1              | 2,1              | 2,5    | 112          | 116          | 130               | 168          | 2            | 2            | 0,2               | <b>HJ 2220 EC</b>      | 0,43             | 10    | 16    |    |
| 127        |            | 157   | 119   | 2,1              | 2,1              | -      | 112          | -            | 130               | 168          | 2            | 2            | 0,2               | -                      |                  |       |       |    |
| 139        |            | 182   | 127,5 | 3                | 3                | 2,9    | 114          | 124          | 130               | 201          | 2,5          | 2,5          | 0,15              | <b>HJ 320 EC</b>       | 0,87             | 13    | 20,5  |    |
| 139        |            | 182   | 127,5 | 3                | 3                | 2,9    | 114          | 124          | 142               | 201          | 2,5          | 2,5          | 0,15              | <b>HJ 320 EC</b>       | 0,87             | 13    | 20,5  |    |
| 139        | 182        | 127,5 | 3     | 3                | -                | 114    | -            | 142          | 201               | 2,5          | 2,5          | 0,15         | -                 |                        |                  |       |       |    |
| 139        | -          | 191,5 | 3     | 3                | 2,9              | 114    | 188          | 195          | 201               | 2,5          | 2,5          | 0,15         | -                 |                        |                  |       |       |    |
| 139        | 182        | 127,5 | 3     | 3                | 5,9              | 114    | 124          | 130          | 201               | 2,5          | 2,5          | 0,25         | <b>HJ 2320 EC</b> | 0,93                   | 13               | 23,5  |       |    |
| 139        | 182        | 127,5 | 3     | 3                | 5,9              | 114    | 124          | 142          | 201               | 2,5          | 2,5          | 0,25         | <b>HJ 2320 EC</b> | 0,93                   | 13               | 23,5  |       |    |
| 139        | 182        | 127,5 | 3     | 3                | -                | 114    | -            | 142          | 201               | 2,5          | 2,5          | 0,25         | -                 |                        |                  |       |       |    |
| -          | 195        | 139   | 4     | 4                | 4,9              | 120    | 135          | 142          | 230               | 3            | 3            | 0,15         | -                 |                        |                  |       |       |    |
| <b>105</b> | -          | 140   | 119,5 | 2                | 1,1              | 3,8    | 111          | 117          | 122               | 151          | 2            | 1            | 0,1               | -                      |                  |       |       |    |
|            | -          | 164   | 125   | 2,1              | 2,1              | 2      | 117          | 122          | 128               | 178          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
|            | 134        | 164   | 125   | 2,1              | 2,1              | 2      | 117          | 122          | 137               | 178          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
|            | 134        | 164   | 125   | 2,1              | 2,1              | -      | 117          | -            | 137               | 178          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
|            | 134        | -     | 173   | 2,1              | 2,1              | 2      | 117          | 170          | 176               | 178          | 2            | 2            | 0,15              | -                      |                  |       |       |    |
|            | -          | 190   | 133   | 3                | 3                | 3,4    | 119          | 130          | 136               | 211          | 2,5          | 2,5          | 0,15              | -                      |                  |       |       |    |
|            | 145        | 190   | 133   | 3                | 3                | 3,4    | 119          | 130          | 148               | 211          | 2,5          | 2,5          | 0,15              | -                      |                  |       |       |    |
|            | 145        | -     | 201   | 3                | 3                | 3,4    | 119          | 198          | 203               | 211          | 2,5          | 2,5          | 0,15              | -                      |                  |       |       |    |
|            | -          | 203   | 144,5 | 4                | 4                | 4,9    | 125          | 140          | 147               | 240          | 3            | 3            | 0,15              | -                      |                  |       |       |    |

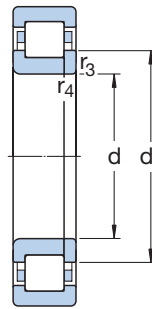
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



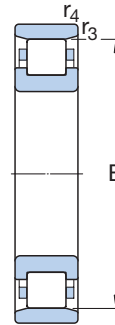
Type NU



Type NJ



Type NUP

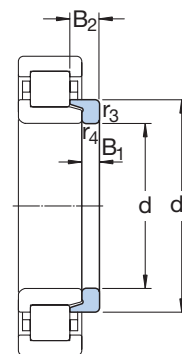
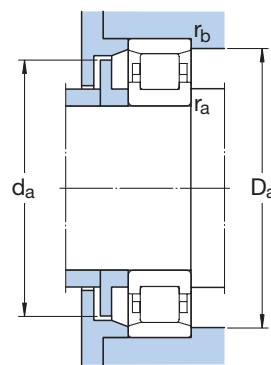
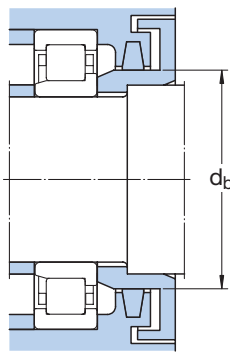
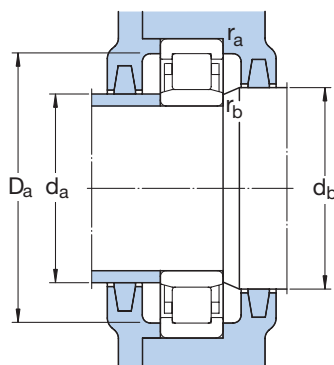


Type N

| Principal dimensions |     |     | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|-----|-----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D   | B   | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |     |     | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |
| <b>110</b>           | 170 | 28  | 128                | 166   | 19,3                        | 4 500           | 7 000          | 2,30                               | <b>NU 1022 ML</b>                          | <b>M</b>                                        |
|                      | 200 | 38  | 335                | 365   | 42,5                        | 3 600           | 4 000          | 4,80                               | <b>NU 222 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 200 | 38  | 335                | 365   | 42,5                        | 3 600           | 4 000          | 4,90                               | <b>NJ 222 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 200 | 38  | 335                | 365   | 42,5                        | 3 600           | 4 000          | 5,00                               | <b>NUP 222 ECP</b>                         | <b>ML</b>                                       |
|                      | 200 | 38  | 335                | 365   | 42,5                        | 3 600           | 4 000          | 4,80                               | <b>N 222 ECP</b>                           | <b>M</b>                                        |
|                      | 200 | 53  | 440                | 520   | 61                          | 3 600           | 4 000          | 6,70                               | <b>NU 2222 ECP</b>                         | <b>J, ML</b>                                    |
|                      | 200 | 53  | 440                | 520   | 61                          | 3 600           | 4 000          | 6,85                               | <b>NJ 2222 ECP</b>                         | <b>J, ML</b>                                    |
|                      | 200 | 53  | 440                | 520   | 61                          | 3 600           | 4 000          | 7,00                               | <b>NUP 2222 ECP</b>                        | <b>ML</b>                                       |
|                      | 240 | 50  | 530                | 540   | 61                          | 3 000           | 3 400          | 10,8                               | <b>NU 322 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 240 | 50  | 530                | 540   | 61                          | 3 000           | 3 400          | 11,1                               | <b>NJ 322 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 240 | 50  | 530                | 540   | 61                          | 3 000           | 3 400          | 11,2                               | <b>NUP 322 ECP</b>                         | <b>J, ML</b>                                    |
|                      | 240 | 50  | 530                | 540   | 61                          | 3 000           | 3 400          | 10,5                               | <b>N 322 ECP</b>                           | <b>M</b>                                        |
|                      | 240 | 80  | 780                | 900   | 102                         | 3 000           | 3 400          | 17,0                               | <b>NU 2322 ECP</b>                         | <b>MA</b>                                       |
|                      | 240 | 80  | 780                | 900   | 102                         | 3 000           | 3 400          | 18,9                               | <b>NJ 2322 ECP</b>                         | <b>MA</b>                                       |
|                      | 240 | 80  | 780                | 900   | 102                         | 3 000           | 3 400          | 18,9                               | <b>NUP 2322 ECP</b>                        | <b>MA</b>                                       |
|                      | 280 | 65  | 532                | 585   | 64                          | 2 600           | 3 200          | 20,0                               | <b>NU 422</b>                              | –                                               |
| 280                  | 65  | 532 | 585                | 64    | 2 600                       | 3 200           | 20,3           | <b>NJ 422</b>                      | –                                          |                                                 |
| <b>120</b>           | 180 | 28  | 134                | 183   | 20,8                        | 4 000           | 6 300          | 2,45                               | <b>NU 1024 ML</b>                          | <b>M</b>                                        |
|                      | 215 | 40  | 390                | 430   | 49                          | 3 400           | 3 600          | 5,75                               | <b>NU 224 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 215 | 40  | 390                | 430   | 49                          | 3 400           | 3 600          | 5,85                               | <b>NJ 224 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 215 | 40  | 390                | 430   | 49                          | 3 400           | 3 600          | 6,00                               | <b>NUP 224 ECJ</b>                         | <b>ML</b>                                       |
|                      | 215 | 40  | 390                | 430   | 49                          | 3 400           | 3 600          | 5,75                               | <b>N 224 ECP</b>                           | <b>M</b>                                        |
|                      | 215 | 58  | 520                | 630   | 72                          | 3 400           | 3 600          | 8,30                               | <b>NU 2224 ECP</b>                         | <b>J, M, ML</b>                                 |
|                      | 215 | 58  | 520                | 630   | 72                          | 3 400           | 3 600          | 8,50                               | <b>NJ 2224 ECP</b>                         | <b>J, M, ML</b>                                 |
|                      | 215 | 58  | 520                | 630   | 72                          | 3 400           | 3 600          | 9,00                               | <b>NUP 2224 ECP</b>                        | <b>ML</b>                                       |
|                      | 260 | 55  | 610                | 620   | 69,5                        | 2 800           | 3 200          | 13,3                               | <b>NU 324 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 260 | 55  | 610                | 620   | 69,5                        | 2 800           | 3 200          | 13,5                               | <b>NJ 324 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 260 | 55  | 610                | 620   | 69,5                        | 2 800           | 3 200          | 13,7                               | <b>NUP 324 ECP</b>                         | <b>ML</b>                                       |
|                      | 260 | 55  | 610                | 620   | 69,5                        | 2 800           | 3 200          | 13,2                               | <b>N 324 ECP</b>                           | <b>M</b>                                        |
|                      | 260 | 86  | 915                | 1 040 | 116                         | 2 800           | 3 200          | 24,0                               | <b>NU 2324 ECMA</b>                        | –                                               |
|                      | 260 | 86  | 915                | 1 040 | 116                         | 2 800           | 3 200          | 24,3                               | <b>NJ 2324 ECMA</b>                        | <b>M</b>                                        |
|                      | 260 | 86  | 915                | 1 040 | 116                         | 2 800           | 3 200          | 24,3                               | <b>NUP 2324 ECMA</b>                       | –                                               |
|                      | 310 | 72  | 644                | 735   | 78                          | 2 400           | 2 800          | 28,0                               | <b>NU 424</b>                              | –                                               |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 222 ECP becomes NU 222 ECML



Angle ring

3

Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

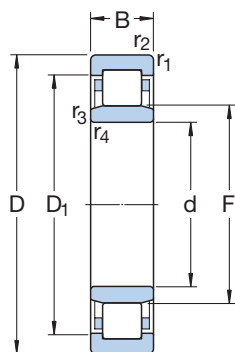
Angle ring Designation

Mass

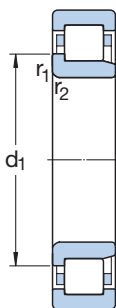
Dimensions

| d          | d <sub>1</sub> | D <sub>1</sub> | F, E  | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub> , D <sub>a</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass | B <sub>1</sub> | B <sub>2</sub> |
|------------|----------------|----------------|-------|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|------|----------------|----------------|
| mm         |                |                |       |                         |                         |                 | mm                    |                       |                                        |                       |                       |                       | -              | -                      | kg   | mm             |                |
| <b>110</b> | -              | 149            | 125   | 2                       | 1,1                     | 3,8             | 116                   | 123                   | 128                                    | 161                   | 2                     | 1                     | 0,1            | -                      |      |                |                |
|            | 141            | 174            | 132,5 | 2,1                     | 2,1                     | 2,1             | 122                   | 130                   | 135                                    | 188                   | 2                     | 2                     | 0,15           | <b>HJ 222 EC</b>       | 0,60 | 11             | 17             |
|            | 141            | 174            | 132,5 | 2,1                     | 2,1                     | 2,1             | 122                   | 130                   | 145                                    | 188                   | 2                     | 2                     | 0,15           | <b>HJ 222 EC</b>       | 0,60 | 11             | 17             |
|            | 141            | 174            | 132,5 | 2,1                     | 2,1                     | -               | 122                   | -                     | 145                                    | 188                   | 2                     | 2                     | 0,15           | -                      |      |                |                |
|            | 141            | -              | 180,5 | 2,1                     | 2,1                     | 2,1             | 122                   | 177                   | 183                                    | 188                   | 2                     | 2                     | 0,15           | -                      |      |                |                |
|            | -              | 174            | 132,5 | 2,1                     | 2,1                     | 3,7             | 122                   | 129                   | 135                                    | 188                   | 2                     | 2                     | 0,2            | -                      |      |                |                |
|            | 141            | 174            | 132,5 | 2,1                     | 2,1                     | 3,7             | 122                   | 129                   | 145                                    | 188                   | 2                     | 2                     | 0,2            | -                      |      |                |                |
|            | 141            | 174            | 132,5 | 2,1                     | 2,1                     | -               | 122                   | -                     | 145                                    | 188                   | 2                     | 2                     | 0,2            | -                      |      |                |                |
|            | 155            | 201            | 143   | 3                       | 3                       | 3               | 124                   | 139                   | 146                                    | 226                   | 2,5                   | 2,5                   | 0,15           | <b>HJ 322 EC</b>       | 1,20 | 14             | 22             |
|            | 155            | 201            | 143   | 3                       | 3                       | 3               | 124                   | 139                   | 159                                    | 226                   | 2,5                   | 2,5                   | 0,15           | <b>HJ 322 EC</b>       | 1,20 | 14             | 22             |
|            | 155            | 201            | 143   | 3                       | 3                       | -               | 124                   | -                     | 159                                    | 226                   | 2,5                   | 2,5                   | 0,15           | -                      |      |                |                |
|            | 155            | -              | 211   | 3                       | 3                       | 3               | 124                   | 208                   | 215                                    | 226                   | 2,5                   | 2,5                   | 0,15           | -                      |      |                |                |
|            | -              | 201            | 143   | 3                       | 3                       | 7,5             | 124                   | 139                   | 146                                    | 226                   | 2,5                   | 2,5                   | 0,25           | -                      |      |                |                |
|            | 155            | 201            | 143   | 3                       | 3                       | 7,5             | 124                   | 139                   | 159                                    | 226                   | 2,5                   | 2,5                   | 0,25           | -                      |      |                |                |
|            | 155            | 201            | 143   | 3                       | 3                       | -               | 124                   | -                     | 159                                    | 226                   | 2,5                   | 2,5                   | 0,25           | -                      |      |                |                |
|            | 171            | 217            | 155   | 4                       | 4                       | 4,8             | 130                   | 150                   | 158                                    | 260                   | 3                     | 3                     | 0,15           | <b>HJ 422</b>          | 2,10 | 17             | 29,5           |
|            | 171            | 217            | 155   | 4                       | 4                       | 4,8             | 130                   | 150                   | 174                                    | 260                   | 3                     | 3                     | 0,15           | <b>HJ 422</b>          | 2,10 | 17             | 29,5           |
| <b>120</b> | -              | 159            | 135   | 2                       | 1,1                     | 3,8             | 126                   | 133                   | 138                                    | 171                   | 2                     | 1                     | 0,1            | -                      |      |                |                |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | 1,9             | 132                   | 140                   | 146                                    | 203                   | 2                     | 2                     | 0,15           | <b>HJ 224 EC</b>       | 0,69 | 11             | 17             |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | 1,9             | 132                   | 140                   | 156                                    | 203                   | 2                     | 2                     | 0,15           | <b>HJ 224 EC</b>       | 0,69 | 11             | 17             |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | -               | 132                   | -                     | 156                                    | 203                   | 2                     | 2                     | 0,15           | -                      |      |                |                |
|            | 153            | -              | 195,5 | 2,1                     | 2,1                     | 1,9             | 132                   | 192                   | 199                                    | 203                   | 2                     | 2                     | 0,15           | -                      |      |                |                |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | 3,8             | 132                   | 140                   | 146                                    | 203                   | 2                     | 2                     | 0,2            | <b>HJ 2224 EC</b>      | 0,74 | 11             | 20             |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | 3,8             | 132                   | 140                   | 156                                    | 203                   | 2                     | 2                     | 0,2            | <b>HJ 2224 EC</b>      | 0,74 | 11             | 20             |
|            | 153            | 188            | 143,5 | 2,1                     | 2,1                     | -               | 132                   | -                     | 156                                    | 203                   | 2                     | 2                     | 0,2            | -                      |      |                |                |
|            | 168            | 219            | 154   | 3                       | 3                       | 3,7             | 134                   | 150                   | 157                                    | 246                   | 2,5                   | 2,5                   | 0,15           | <b>HJ 324 EC</b>       | 1,40 | 14             | 22,5           |
|            | 168            | 219            | 154   | 3                       | 3                       | 3,7             | 134                   | 150                   | 171                                    | 246                   | 2,5                   | 2,5                   | 0,15           | <b>HJ 324 EC</b>       | 1,40 | 14             | 22,5           |
|            | 168            | 219            | 154   | 3                       | 3                       | -               | 134                   | -                     | 171                                    | 246                   | 2,5                   | 2,5                   | 0,15           | -                      |      |                |                |
|            | 168            | -              | 230   | 3                       | 3                       | 3,7             | 134                   | 226                   | 234                                    | 246                   | 2,5                   | 2,5                   | 0,15           | -                      |      |                |                |
|            | 168            | 219            | 154   | 3                       | 3                       | 7,2             | 134                   | 150                   | 157                                    | 246                   | 2,5                   | 2,5                   | 0,25           | <b>HJ 2324 EC</b>      | 1,45 | 14             | 26             |
|            | 168            | 219            | 154   | 3                       | 3                       | 7,2             | 134                   | 150                   | 171                                    | 246                   | 2,5                   | 2,5                   | 0,25           | <b>HJ 2324 EC</b>      | 1,45 | 14             | 26             |
|            | 168            | 219            | 154   | 3                       | 3                       | -               | 134                   | -                     | 171                                    | 246                   | 2,5                   | 2,5                   | 0,25           | -                      |      |                |                |
|            | 188            | 240            | 170   | 5                       | 5                       | 6,3             | 144                   | 165                   | 173                                    | 286                   | 4                     | 4                     | 0,15           | <b>HJ 424</b>          | 2,60 | 17             | 30,5           |

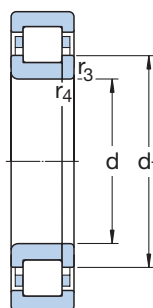
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



Type NUP

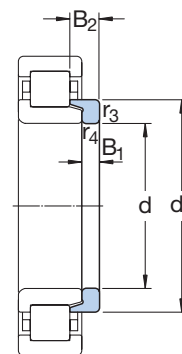
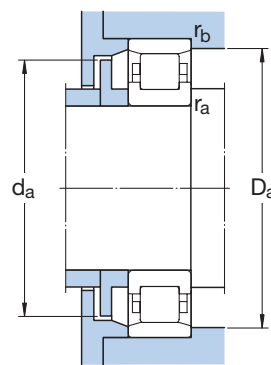
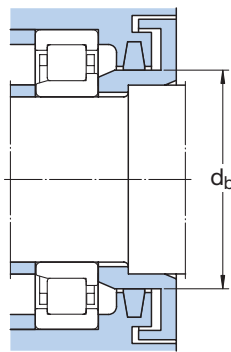
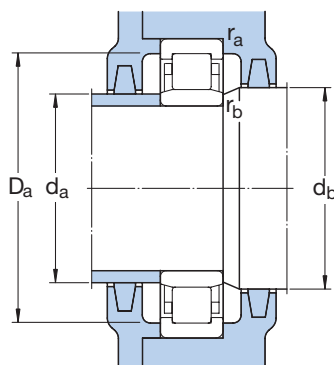


Type N

| Principal dimensions |            |     | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|------------|-----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D          | B   | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |            |     | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |
| <b>130</b>           | 200        | 33  | 165                | 224   | 25                          | 3 800           | 5 600          | 3,80                               | <b>NU 1026 ML</b>                          | <b>M</b>                                        |
|                      | 230        | 40  | 415                | 455   | 51                          | 3 200           | 3 400          | 6,45                               | <b>NU 226 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 230        | 40  | 415                | 455   | 51                          | 3 200           | 3 400          | 6,60                               | <b>NJ 226 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 230        | 40  | 415                | 455   | 51                          | 3 200           | 3 400          | 6,75                               | <b>NUP 226 ECP</b>                         | <b>J, ML</b>                                    |
|                      | 230        | 40  | 415                | 455   | 51                          | 3 200           | 3 400          | 6,30                               | <b>N 226 ECP</b>                           | –                                               |
|                      | 230        | 64  | 610                | 735   | 83                          | 3 200           | 3 400          | 10,5                               | <b>NU 2226 ECP</b>                         | <b>ML</b>                                       |
|                      | 230        | 64  | 610                | 735   | 83                          | 3 200           | 3 400          | 12,2                               | <b>NJ 2226 ECP</b>                         | <b>ML</b>                                       |
|                      | 230        | 64  | 610                | 735   | 83                          | 3 200           | 3 400          | 12,2                               | <b>NUP 2226 ECP</b>                        | <b>ML</b>                                       |
|                      | 280        | 58  | 720                | 750   | 81,5                        | 2 400           | 3 000          | 16,5                               | <b>NU 326 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 280        | 58  | 720                | 750   | 81,5                        | 2 400           | 3 000          | 18,4                               | <b>NJ 326 ECP</b>                          | <b>J, M, ML</b>                                 |
|                      | 280        | 58  | 720                | 750   | 81,5                        | 2 400           | 3 000          | 19,6                               | <b>NUP 326 ECP</b>                         | <b>ML</b>                                       |
|                      | 280        | 58  | 720                | 750   | 81,5                        | 2 400           | 3 000          | 18,5                               | <b>N 326 ECP</b>                           | <b>M</b>                                        |
|                      | 280        | 93  | 1 060              | 1 250 | 137                         | 2 400           | 3 000          | 30,0                               | <b>NU 2326 ECMA</b>                        | –                                               |
|                      | 280        | 93  | 1 060              | 1 250 | 137                         | 2 400           | 3 000          | 30,5                               | <b>NJ 2326 ECMA</b>                        | –                                               |
|                      | 280        | 93  | 1 060              | 1 250 | 137                         | 2 400           | 3 000          | 31,0                               | <b>NUP 2326 ECMA</b>                       | –                                               |
|                      | <b>140</b> | 210 | 33                 | 172   | 245                         | 27              | 3 600          | 5 300                              | 4,05                                       | <b>NU 1028 ML</b>                               |
| 250                  |            | 42  | 450                | 510   | 57                          | 2 800           | 3 200          | 8,50                               | <b>NU 228 ECM</b>                          | <b>J, ML</b>                                    |
| 250                  |            | 42  | 450                | 510   | 57                          | 2 800           | 3 200          | 8,75                               | <b>NJ 228 ECM</b>                          | <b>J, ML</b>                                    |
| 250                  |            | 42  | 450                | 510   | 57                          | 2 800           | 3 200          | 8,90                               | <b>NUP 228 ECM</b>                         | <b>ML</b>                                       |
| 250                  |            | 68  | 655                | 830   | 93                          | 2 800           | 4 800          | 15,0                               | <b>NU 2228 ECML</b>                        | –                                               |
| 250                  |            | 68  | 655                | 830   | 93                          | 2 800           | 4 800          | 15,3                               | <b>NJ 2228 ECML</b>                        | –                                               |
| 250                  |            | 68  | 655                | 830   | 93                          | 2 800           | 4 800          | 15,6                               | <b>NUP 2228 ECML</b>                       | –                                               |
| 300                  |            | 62  | 780                | 830   | 88                          | 2 400           | 2 800          | 22,7                               | <b>NU 328 ECM</b>                          | <b>J, ML</b>                                    |
| 300                  |            | 62  | 780                | 830   | 88                          | 2 400           | 2 800          | 23,0                               | <b>NJ 328 ECM</b>                          | <b>J, ML</b>                                    |
| 300                  |            | 62  | 780                | 830   | 88                          | 2 400           | 2 800          | 23,5                               | <b>NUP 328 ECM</b>                         | <b>ML</b>                                       |
| 300                  |            | 102 | 1 200              | 1 430 | 150                         | 2 400           | 3 600          | 37,0                               | <b>NU 2328 ECMA</b>                        | –                                               |
| 300                  |            | 102 | 1 200              | 1 430 | 150                         | 2 400           | 3 600          | 37,5                               | <b>NJ 2328 ECMA</b>                        | –                                               |
| 300                  |            | 102 | 1 200              | 1 430 | 150                         | 2 400           | 3 600          | 38,0                               | <b>NUP 2328 ECMA</b>                       | –                                               |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 226 ECP becomes NU 226 ECML

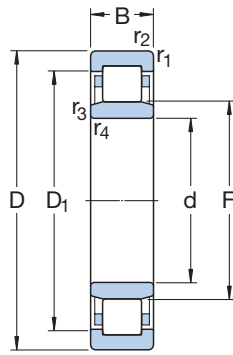


Angle ring

3

| Dimensions |       |       |       |                  |                  |        | Abutment and fillet dimensions |              |                   |              |              |              | Calculation factor<br>$k_r$ | Angle ring Designation | Mass | Dimensions |    |    |
|------------|-------|-------|-------|------------------|------------------|--------|--------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------------------------|------------------------|------|------------|----|----|
| d          | $d_1$ | $D_1$ | F, E  | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min                   | $d_a$<br>max | $d_b, D_a$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                        |      | -          | -  | kg |
| mm         |       |       |       |                  |                  |        | mm                             |              |                   |              |              |              | -                           | -                      | kg   | mm         |    |    |
| <b>130</b> | -     | 175   | 148   | 2                | 1,1              | 4,7    | 136                            | 145          | 151               | 191          | 2            | 1            | 0,1                         | -                      | -    | -          | -  | -  |
|            | 164   | 202   | 153,5 | 3                | 3                | 2,1    | 144                            | 150          | 156               | 216          | 2,5          | 2,5          | 0,15                        | <b>HJ 226 EC</b>       | 0,75 | 11         | 17 |    |
|            | 164   | 202   | 153,5 | 3                | 3                | 2,1    | 144                            | 150          | 167               | 216          | 2,5          | 2,5          | 0,15                        | <b>HJ 226 EC</b>       | 0,75 | 11         | 17 |    |
|            | 164   | 202   | 153,5 | 3                | 3                | -      | 144                            | -            | 167               | 216          | 2,5          | 2,5          | 0,15                        | -                      | -    | -          | -  |    |
|            | 164   | -     | 209,5 | 3                | 3                | 2,1    | 144                            | 206          | 213               | 216          | 2,5          | 2,5          | 0,15                        | -                      | -    | -          | -  |    |
|            | 164   | 202   | 153,5 | 3                | 3                | 4,3    | 144                            | 149          | 156               | 216          | 2,5          | 2,5          | 0,2                         | <b>HJ 2226 EC</b>      | 0,83 | 11         | 21 |    |
|            | 164   | 202   | 153,5 | 3                | 3                | 4,3    | 144                            | 149          | 167               | 216          | 2,5          | 2,5          | 0,2                         | <b>HJ 2226 EC</b>      | 0,83 | 11         | 21 |    |
|            | 164   | 202   | 153,5 | 3                | 3                | -      | 144                            | -            | 167               | 216          | 2,5          | 2,5          | 0,2                         | -                      | -    | -          | -  |    |
|            | 181   | 236   | 167   | 4                | 4                | 3,7    | 147                            | 163          | 170               | 263          | 3            | 3            | 0,15                        | <b>HJ 326 EC</b>       | 1,60 | 14         | 23 |    |
|            | 181   | 236   | 167   | 4                | 4                | 3,7    | 147                            | 163          | 185               | 263          | 3            | 3            | 0,15                        | <b>HJ 326 EC</b>       | 1,60 | 14         | 23 |    |
|            | 181   | 236   | 167   | 4                | 4                | -      | 147                            | -            | 185               | 263          | 3            | 3            | 0,15                        | -                      | -    | -          | -  |    |
|            | 181   | -     | 247   | 4                | 4                | 3,7    | 147                            | 243          | 251               | 263          | 3            | 3            | 0,15                        | -                      | -    | -          | -  |    |
|            | 181   | 236   | 167   | 4                | 4                | 8,7    | 147                            | 163          | 170               | 263          | 3            | 3            | 0,25                        | <b>HJ 2326 EC</b>      | 1,70 | 14         | 28 |    |
|            | 181   | 236   | 167   | 4                | 4                | 8,7    | 147                            | 163          | 185               | 263          | 3            | 3            | 0,25                        | <b>HJ 2326 EC</b>      | 1,70 | 14         | 28 |    |
|            | 181   | 236   | 167   | 4                | 4                | -      | 147                            | -            | 185               | 263          | 3            | 3            | 0,25                        | -                      | -    | -          | -  |    |
| <b>140</b> | -     | 185   | 158   | 2                | 1,1              | 4,4    | 146                            | 155          | 161               | 201          | 2            | 1            | 0,1                         | -                      | -    | -          | -  |    |
|            | -     | 217   | 169   | 3                | 3                | 2,5    | 154                            | 166          | 172               | 236          | 2,5          | 2,5          | 0,15                        | -                      | -    | -          | -  |    |
|            | 179   | 217   | 169   | 3                | 3                | 2,5    | 154                            | 166          | 183               | 236          | 2,5          | 2,5          | 0,15                        | -                      | -    | -          | -  |    |
|            | 179   | 217   | 169   | 3                | 3                | -      | 154                            | -            | 183               | 236          | 2,5          | 2,5          | 0,15                        | -                      | -    | -          | -  |    |
|            | 179   | 217   | 169   | 3                | 3                | 4,4    | 154                            | 164          | 172               | 236          | 2,5          | 2,5          | 0,2                         | <b>HJ 2228 EC</b>      | 1,05 | 11         | 23 |    |
|            | 179   | 217   | 169   | 3                | 3                | 4,4    | 154                            | 164          | 183               | 236          | 2,5          | 2,5          | 0,2                         | <b>HJ 2228 EC</b>      | 1,05 | 11         | 23 |    |
|            | 179   | 217   | 169   | 3                | 3                | -      | 154                            | -            | 183               | 236          | 2,5          | 2,5          | 0,2                         | -                      | -    | -          | -  |    |
|            | 195   | 252   | 180   | 4                | 4                | 3,7    | 157                            | 176          | 183               | 283          | 3            | 3            | 0,15                        | <b>HJ 328 EC</b>       | 2,00 | 15         | 25 |    |
|            | 195   | 252   | 180   | 4                | 4                | 3,7    | 157                            | 176          | 199               | 283          | 3            | 3            | 0,15                        | <b>HJ 328 EC</b>       | 2,00 | 15         | 25 |    |
|            | 195   | 252   | 180   | 4                | 4                | -      | 157                            | -            | 199               | 283          | 3            | 3            | 0,15                        | -                      | -    | -          | -  |    |
|            | 195   | 252   | 180   | 4                | 4                | 9,7    | 157                            | 176          | 183               | 283          | 3            | 3            | 0,25                        | <b>HJ 2328 EC</b>      | 2,15 | 15         | 31 |    |
|            | 195   | 252   | 180   | 4                | 4                | 9,7    | 157                            | 176          | 199               | 283          | 3            | 3            | 0,25                        | <b>HJ 2328 EC</b>      | 2,15 | 15         | 31 |    |
|            | 195   | 252   | 180   | 4                | 4                | -      | 157                            | -            | 199               | 283          | 3            | 3            | 0,25                        | -                      | -    | -          | -  |    |

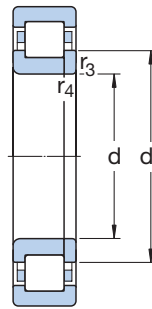
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



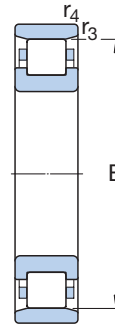
Type NU



Type NJ



Type NUP

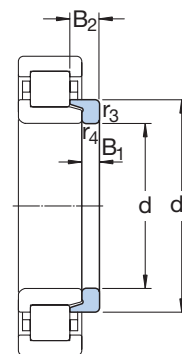
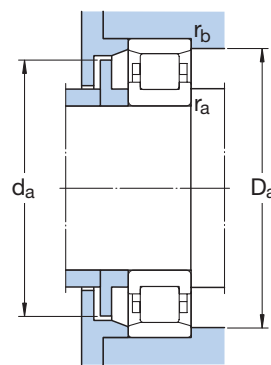
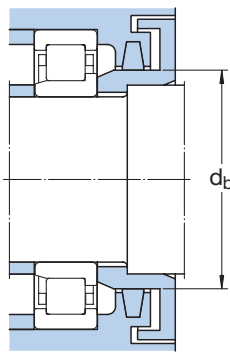
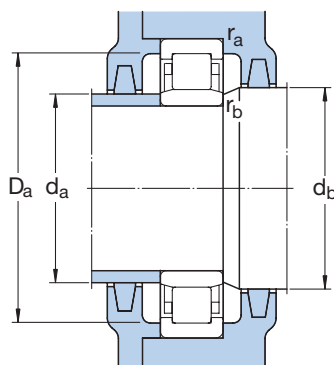


Type N

| Principal dimensions |            |       | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage designs <sup>1)</sup> |
|----------------------|------------|-------|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|-------------------------------------------------|
| d                    | D          | B     | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                 |
| mm                   |            |       | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                 |
| <b>150</b>           | 225        | 35    | 194                | 275   | 30                          | 3 200           | 5 000          | 4,85                               | <b>NU 1030 ML</b>                          | <b>M</b>                                        |
|                      | 270        | 45    | 510                | 600   | 64                          | 2 600           | 2 800          | 11,8                               | <b>NU 230 ECM</b>                          | <b>J, ML</b>                                    |
|                      | 270        | 45    | 510                | 600   | 64                          | 2 600           | 2 800          | 12,0                               | <b>NJ 230 ECM</b>                          | <b>J, ML</b>                                    |
|                      | 270        | 45    | 510                | 600   | 64                          | 2 600           | 2 800          | 12,2                               | <b>NUP 230 ECM</b>                         | <b>ML</b>                                       |
|                      | 270        | 73    | 735                | 930   | 100                         | 2 600           | 2 800          | 20,0                               | <b>NU 2230 ECM</b>                         | –                                               |
|                      | 270        | 73    | 735                | 930   | 100                         | 2 600           | 2 800          | 20,3                               | <b>NJ 2230 ECM</b>                         | –                                               |
|                      | 320        | 65    | 900                | 965   | 100                         | 2 200           | 2 600          | 27,5                               | <b>NU 330 ECM</b>                          | <b>MA</b>                                       |
|                      | 320        | 65    | 900                | 965   | 100                         | 2 200           | 2 600          | 28,0                               | <b>NJ 330 ECM</b>                          | <b>MA</b>                                       |
|                      | 320        | 108   | 1 370              | 1 630 | 166                         | 2 200           | 3 400          | 45,5                               | <b>NU 2330 ECMA</b>                        | –                                               |
|                      | 320        | 108   | 1 370              | 1 630 | 166                         | 2 200           | 3 400          | 46,0                               | <b>NJ 2330 ECMA</b>                        | –                                               |
|                      | 320        | 108   | 1 370              | 1 630 | 166                         | 2 200           | 3 400          | 46,5                               | <b>NUP 2330 ECMA</b>                       | –                                               |
|                      | <b>160</b> | 240   | 38                 | 229   | 325                         | 35,5            | 3 000          | 4 800                              | 5,95                                       | <b>NU 1032 ML</b>                               |
| 290                  |            | 48    | 585                | 680   | 72                          | 2 400           | 2 600          | 14,5                               | <b>NU 232 ECM</b>                          | <b>ML</b>                                       |
| 290                  |            | 48    | 585                | 680   | 72                          | 2 400           | 2 600          | 15,0                               | <b>NJ 232 ECM</b>                          | <b>ML</b>                                       |
| 290                  |            | 48    | 585                | 680   | 72                          | 2 400           | 2 600          | 15,5                               | <b>NUP 232 ECM</b>                         | <b>ML</b>                                       |
| 290                  |            | 48    | 585                | 680   | 72                          | 2 400           | 2 600          | 15,5                               | <b>N 232 ECM</b>                           | –                                               |
| 290                  |            | 80    | 930                | 1 200 | 129                         | 2 400           | 3 600          | 24,0                               | <b>NU 2232 ECMA</b>                        | –                                               |
| 290                  |            | 80    | 930                | 1 200 | 129                         | 2 400           | 3 600          | 24,5                               | <b>NJ 2232 ECMA</b>                        | –                                               |
| 340                  |            | 68    | 1 000              | 1 080 | 112                         | 2 000           | 2 400          | 33,0                               | <b>NU 332 ECM</b>                          | <b>MA</b>                                       |
| 340                  |            | 68    | 1 000              | 1 080 | 112                         | 2 000           | 2 400          | 33,5                               | <b>NJ 332 ECM</b>                          | <b>MA</b>                                       |
| 340                  |            | 114   | 1 250              | 1 730 | 173                         | 1 800           | 2 800          | 53,0                               | <b>NU 2332 ECMA</b>                        | –                                               |
| 340                  |            | 114   | 1 250              | 1 730 | 173                         | 1 800           | 2 800          | 53,5                               | <b>NJ 2332 ECMA</b>                        | –                                               |
| <b>170</b>           |            | 260   | 42                 | 275   | 400                         | 41,5            | 2 800          | 4 300                              | 8,15                                       | <b>NU 1034 ML</b>                               |
|                      | 310        | 52    | 695                | 815   | 85                          | 2 200           | 2 400          | 19,0                               | <b>NU 234 ECM</b>                          | <b>MA</b>                                       |
|                      | 310        | 52    | 695                | 815   | 85                          | 2 200           | 2 400          | 19,5                               | <b>NJ 234 ECM</b>                          | <b>MA</b>                                       |
|                      | 310        | 52    | 695                | 815   | 85                          | 2 200           | 2 400          | 20,0                               | <b>NUP 234 ECM</b>                         | <b>MA</b>                                       |
|                      | 310        | 86    | 1 060              | 1 340 | 140                         | 2 200           | 3 200          | 30,0                               | <b>NU 2234 ECMA</b>                        | –                                               |
|                      | 360        | 72    | 952                | 1 180 | 116                         | 1 700           | 2 200          | 37,5                               | <b>NU 334 ECM</b>                          | <b>MA</b>                                       |
|                      | 360        | 72    | 952                | 1 180 | 116                         | 1 700           | 2 200          | 38,5                               | <b>N 334 ECM</b>                           | –                                               |
|                      | 360        | 120   | 1 450              | 2 040 | 204                         | 1 700           | 3 000          | 62,0                               | <b>NU 2334 ECMA</b>                        | –                                               |
| 360                  | 120        | 1 450 | 2 040              | 204   | 1 700                       | 3 000           | 63,0           | <b>NJ 2334 ECMA</b>                | –                                          |                                                 |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 230 ECM becomes NU 230 ECML

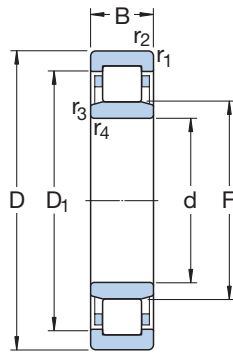


Angle ring

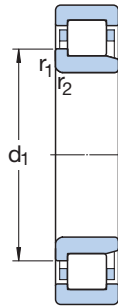
3

| Dimensions |                |                |       |                      |                      |                 | Abutment and fillet dimensions |                    |                                     |                    |                    |                    | Calculation factor $k_r$ | Angle ring Designation | Mass | Dimensions     |                |
|------------|----------------|----------------|-------|----------------------|----------------------|-----------------|--------------------------------|--------------------|-------------------------------------|--------------------|--------------------|--------------------|--------------------------|------------------------|------|----------------|----------------|
| d          | d <sub>1</sub> | D <sub>1</sub> | F, E  | r <sub>1,2</sub> min | r <sub>3,4</sub> min | s <sup>1)</sup> | d <sub>a</sub> min             | d <sub>a</sub> max | d <sub>b</sub> , D <sub>a</sub> min | D <sub>a</sub> max | r <sub>a</sub> max | r <sub>b</sub> max |                          |                        |      | B <sub>1</sub> | B <sub>2</sub> |
| mm         |                |                |       |                      |                      |                 | mm                             |                    |                                     |                    |                    |                    | -                        | -                      | kg   | mm             |                |
| <b>150</b> | -              | 198            | 169,5 | 2,1                  | 1,5                  | 4,9             | 157                            | 167                | 173                                 | 215                | 2                  | 1,5                | 0,1                      | -                      | -    | -              | -              |
|            | 193            | 234            | 182   | 3                    | 3                    | 2,5             | 163                            | 178                | 185                                 | 256                | 2,5                | 2,5                | 0,15                     | <b>HJ 230 EC</b>       | 1,25 | 12             | 19,5           |
|            | 193            | 234            | 182   | 3                    | 3                    | 2,5             | 164                            | 178                | 197                                 | 256                | 2,5                | 2,5                | 0,15                     | <b>HJ 230 EC</b>       | 1,25 | 12             | 19,5           |
|            | 193            | 234            | 182   | 3                    | 3                    | -               | 164                            | -                  | 197                                 | 256                | 2,5                | 2,5                | 0,15                     | -                      | -    | -              | -              |
|            | 194            | 234            | 182   | 3                    | 3                    | 4,9             | 164                            | 179                | 185                                 | 256                | 2,5                | 2,5                | 0,2                      | <b>HJ 2230 EC</b>      | 1,35 | 12             | 24,5           |
|            | 194            | 234            | 182   | 3                    | 3                    | 4,9             | 164                            | 179                | 197                                 | 256                | 2,5                | 2,5                | 0,2                      | <b>HJ 2230 EC</b>      | 1,35 | 12             | 24,5           |
|            | -              | 270            | 193   | 4                    | 4                    | 4               | 167                            | 189                | 196                                 | 303                | 3                  | 3                  | 0,15                     | -                      | -    | -              | -              |
|            | 209            | 270            | 193   | 4                    | 4                    | 4               | 167                            | 189                | 213                                 | 303                | 3                  | 3                  | 0,15                     | -                      | -    | -              | -              |
|            | 209            | 270            | 193   | 4                    | 4                    | 10,5            | 167                            | 189                | 196                                 | 303                | 3                  | 3                  | 0,25                     | -                      | -    | -              | -              |
|            | 209            | 270            | 193   | 4                    | 4                    | 10,5            | 167                            | 189                | 213                                 | 303                | 3                  | 3                  | 0,25                     | -                      | -    | -              | -              |
| 209        | 270            | 193            | 4     | 4                    | -                    | 167             | -                              | 213                | 303                                 | 3                  | 3                  | 0,25               | -                        | -                      | -    | -              |                |
| <b>160</b> | 188            | 211            | 180   | 2,1                  | 1,5                  | 5,2             | 167                            | 177                | 183                                 | 230                | 2                  | 1,5                | 0,1                      | <b>HJ 1032</b>         | 0,65 | 10             | 19             |
|            | -              | 250            | 195   | 3                    | 3                    | 2,7             | 174                            | 191                | 198                                 | 276                | 2,5                | 2,5                | 0,15                     | -                      | -    | -              | -              |
|            | 206            | 250            | 195   | 3                    | 3                    | 2,7             | 174                            | 191                | 210                                 | 276                | 2,5                | 2,5                | 0,15                     | -                      | -    | -              | -              |
|            | 206            | 250            | 195   | 3                    | 3                    | -               | 174                            | -                  | 210                                 | 276                | 2,5                | 2,5                | 0,15                     | -                      | -    | -              | -              |
|            | 206            | -              | 259   | 3                    | 3                    | 2,7             | 174                            | 255                | 263                                 | 276                | 2,5                | 2,5                | 0,15                     | -                      | -    | -              | -              |
|            | 205            | 252            | 193   | 3                    | 3                    | 4,5             | 174                            | 188                | 196                                 | 276                | 2,5                | 2,5                | 0,2                      | <b>HJ 2232 EC</b>      | 1,55 | 12             | 24,5           |
|            | 205            | 252            | 193   | 3                    | 3                    | 4,5             | 174                            | 188                | 209                                 | 276                | 2,5                | 2,5                | 0,2                      | <b>HJ 2232 EC</b>      | 1,55 | 12             | 24,5           |
|            | 221            | 286            | 204   | 4                    | 4                    | 4               | 177                            | 200                | 207                                 | 323                | 3                  | 3                  | 0,15                     | <b>HJ 332 EC</b>       | 2,55 | 15             | 25             |
|            | 221            | 286            | 204   | 4                    | 4                    | 4               | 177                            | 200                | 225                                 | 323                | 3                  | 3                  | 0,15                     | <b>HJ 332 EC</b>       | 2,55 | 15             | 25             |
|            | -              | 286            | 204   | 4                    | 4                    | 11              | 177                            | 200                | 207                                 | 323                | 3                  | 3                  | 0,25                     | -                      | -    | -              | -              |
| 221        | 286            | 204            | 4     | 4                    | 11                   | 177             | 200                            | 225                | 323                                 | 3                  | 3                  | 0,25               | -                        | -                      | -    | -              |                |
| <b>170</b> | 201            | 227            | 193   | 2,1                  | 2,1                  | 5,8             | 180                            | 190                | 196                                 | 250                | 2                  | 2                  | 0,1                      | <b>HJ 1034</b>         | 0,94 | 11             | 21             |
|            | 220            | 268            | 207   | 4                    | 4                    | 2,9             | 187                            | 203                | 210                                 | 293                | 3                  | 3                  | 0,15                     | <b>HJ 234 EC</b>       | 1,65 | 12             | 20             |
|            | 220            | 268            | 207   | 4                    | 4                    | 2,9             | 187                            | 203                | 224                                 | 293                | 3                  | 3                  | 0,15                     | <b>HJ 234 EC</b>       | 1,65 | 12             | 20             |
|            | 220            | 268            | 207   | 4                    | 4                    | -               | 187                            | -                  | 224                                 | 293                | 3                  | 3                  | 0,15                     | -                      | -    | -              | -              |
|            | -              | 270            | 205   | 4                    | 4                    | 4,2             | 187                            | 200                | 208                                 | 293                | 3                  | 3                  | 0,2                      | -                      | -    | -              | -              |
|            | -              | 303            | 218   | 4                    | 4                    | 4,6             | 187                            | 214                | 221                                 | 343                | 3                  | 3                  | 0,15                     | -                      | -    | -              | -              |
|            | 236            | -              | 318   | 4                    | 4                    | 4,6             | 187                            | 313                | 323                                 | 343                | 3                  | 3                  | 0,15                     | -                      | -    | -              | -              |
|            | -              | 299            | 216   | 4                    | 4                    | 10              | 187                            | 211                | 220                                 | 343                | 3                  | 3                  | 0,25                     | -                      | -    | -              | -              |
|            | 238            | 299            | 216   | 4                    | 4                    | 10              | 187                            | 211                | 242                                 | 343                | 3                  | 3                  | 0,25                     | -                      | -    | -              | -              |

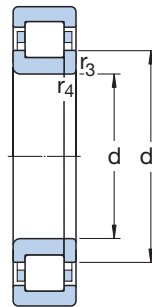
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU



Type NJ



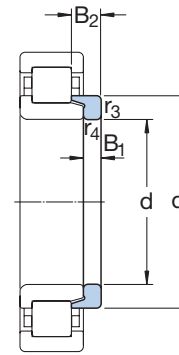
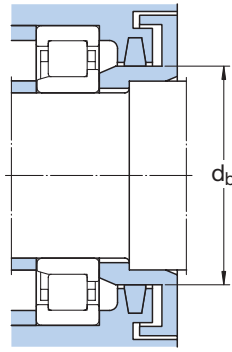
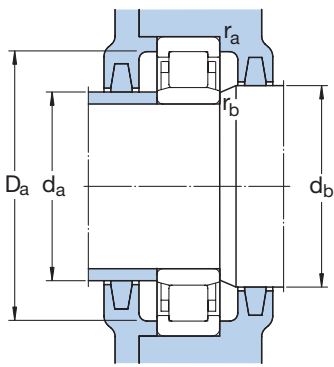
Type NUP

| Principal dimensions |     |     | Basic load ratings |       | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass<br>Bearing with standard cage | Designations<br>Bearing with standard cage | Alternative standard cage design <sup>1)</sup> |          |
|----------------------|-----|-----|--------------------|-------|-----------------------------|-----------------|----------------|------------------------------------|--------------------------------------------|------------------------------------------------|----------|
| d                    | D   | B   | C                  | $C_0$ |                             | Reference speed | Limiting speed |                                    |                                            |                                                |          |
| mm                   |     |     | kN                 |       | kN                          | r/min           |                | kg                                 | –                                          |                                                |          |
| 180                  | 280 | 46  | 336                | 475   | 51                          | 2 600           | 4 000          | 10,5                               | <b>NU 1036 ML</b>                          | <b>M</b>                                       |          |
|                      | 320 | 52  | 720                | 850   | 88                          | 2 200           | 3 200          | 19,5                               | <b>NU 236 ECMA</b>                         | –                                              |          |
|                      | 320 | 52  | 720                | 850   | 88                          | 2 200           | 3 200          | 20,2                               | <b>NJ 236 ECMA</b>                         | –                                              |          |
|                      | 320 | 52  | 720                | 850   | 88                          | 2 200           | 3 200          | 21,0                               | <b>NUP 236 ECMA</b>                        | –                                              |          |
|                      | 320 | 86  | 1 100              | 1 430 | 146                         | 2 200           | 3 200          | 31,5                               | <b>NU 2236 ECMA</b>                        | <b>M</b>                                       |          |
|                      | 320 | 86  | 1 100              | 1 430 | 146                         | 2 200           | 3 200          | 32,0                               | <b>NJ 2236 ECMA</b>                        | <b>M</b>                                       |          |
|                      | 380 | 75  | 1 020              | 1 290 | 125                         | 1 600           | 2 200          | 44,0                               | <b>NU 336 ECM</b>                          | –                                              |          |
|                      | 380 | 126 | 1 610              | 2 240 | 220                         | 1 600           | 2 800          | 71,5                               | <b>NU 2336 ECMA</b>                        | –                                              |          |
|                      | 190 | 290 | 46                 | 347   | 500                         | 53              | 2 600          | 3 800                              | 11,0                                       | <b>NU 1038 ML</b>                              | –        |
|                      |     | 340 | 55                 | 800   | 965                         | 98              | 2 000          | 3 000                              | 24,0                                       | <b>NU 238 ECMA</b>                             | <b>M</b> |
| 340                  |     | 55  | 800                | 965   | 98                          | 2 000           | 3 000          | 24,5                               | <b>NJ 238 ECMA</b>                         | <b>M</b>                                       |          |
| 340                  |     | 55  | 800                | 965   | 98                          | 2 000           | 3 000          | 25,0                               | <b>NUP 238 ECMA</b>                        | <b>M</b>                                       |          |
| 340                  |     | 92  | 1 220              | 1 600 | 160                         | 2 000           | 3 000          | 39,0                               | <b>NU 2238 ECMA</b>                        | –                                              |          |
| 400                  |     | 78  | 1 140              | 1 500 | 143                         | 1 500           | 2 000          | 50,0                               | <b>NU 338 ECM</b>                          | –                                              |          |
| 400                  |     | 132 | 1 830              | 2 550 | 236                         | 1 500           | 2 600          | 82,5                               | <b>NU 2338 ECMA</b>                        | –                                              |          |
| 200                  | 310 | 51  | 380                | 570   | 58,5                        | 2 400           | 3 000          | 14,5                               | <b>NU 1040 MA</b>                          | <b>M</b>                                       |          |
|                      | 360 | 58  | 850                | 1 020 | 100                         | 1 900           | 2 800          | 28,5                               | <b>NU 240 ECMA</b>                         | <b>M</b>                                       |          |
|                      | 360 | 58  | 850                | 1 020 | 100                         | 1 900           | 2 800          | 29,0                               | <b>NJ 240 ECMA</b>                         | <b>M</b>                                       |          |
|                      | 360 | 58  | 850                | 1 020 | 100                         | 1 900           | 2 800          | 29,5                               | <b>NUP 240 ECMA</b>                        | <b>M</b>                                       |          |
|                      | 360 | 98  | 1 370              | 1 800 | 180                         | 1 900           | 2 800          | 46,0                               | <b>NU 2240 ECMA</b>                        | –                                              |          |
|                      | 420 | 80  | 1 230              | 1 630 | 150                         | 1 400           | 2 400          | 56,0                               | <b>NU 340 ECMA</b>                         | –                                              |          |
|                      | 420 | 138 | 1 980              | 2 800 | 255                         | 1 400           | 2 400          | 97,0                               | <b>NU 2340 ECMA</b>                        | –                                              |          |
|                      | 420 | 138 | 1 980              | 2 800 | 255                         | 1 400           | 2 400          | 98,0                               | <b>NJ 2340 ECMA</b>                        | –                                              |          |
|                      | 220 | 340 | 56                 | 495   | 735                         | 73,5            | 2 200          | 2 800                              | 19,0                                       | <b>NU 1044 MA</b>                              | <b>M</b> |
|                      |     | 400 | 65                 | 1 060 | 1 290                       | 125             | 1 600          | 2 400                              | 38,5                                       | <b>NU 244 ECMA</b>                             | <b>M</b> |
| 400                  |     | 65  | 1 060              | 1 290 | 125                         | 1 600           | 2 400          | 39,0                               | <b>NJ 244 ECMA</b>                         | <b>M</b>                                       |          |
| 400                  |     | 65  | 1 060              | 1 290 | 125                         | 1 600           | 2 400          | 39,5                               | <b>NUP 244 ECMA</b>                        | <b>M</b>                                       |          |
| 400                  |     | 108 | 1 570              | 2 280 | 212                         | 1 600           | 2 400          | 62,5                               | <b>NU 2244 ECMA</b>                        | –                                              |          |
| 460                  |     | 88  | 1 210              | 1 630 | 150                         | 1 500           | 1 700          | 72,5                               | <b>NU 344 M</b>                            | –                                              |          |
| 460                  |     | 88  | 1 210              | 1 630 | 150                         | 1 500           | 1 700          | 73,5                               | <b>NJ 344 M</b>                            | –                                              |          |
| 460                  |     | 145 | 2 380              | 3 450 | 310                         | 1 300           | 2 200          | 120                                | <b>NU 2344 ECMA</b>                        | –                                              |          |

The designations of SKF Explorer class bearings are printed in blue

<sup>1)</sup> When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 2236 ECMA becomes NU 2236 ECM





Angle ring

3

Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

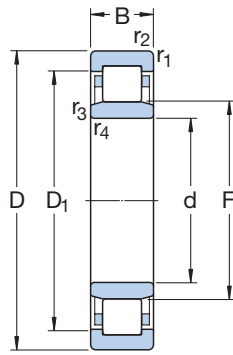
Angle ring Designation

Mass

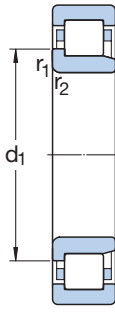
Dimensions

| d   | d <sub>1</sub> | D <sub>1</sub> | F   | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass      | B <sub>1</sub> | B <sub>2</sub> |      |
|-----|----------------|----------------|-----|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|-----------|----------------|----------------|------|
| mm  | ~              | ~              |     |                         |                         |                 | mm                    |                       |                       |                       |                       |                       | -              | -                      | kg        | mm             |                |      |
| 180 | -              | 244            | 205 | 2,1                     | 2,1                     | 6,1             | 190                   | 202                   | 208                   | 270                   | 2                     | 2                     | 0,1            | -                      |           |                |                |      |
|     | 230            | 279            | 217 | 4                       | 4                       | 2,9             | 197                   | 213                   | 220                   | 303                   | 3                     | 3                     | 0,15           | HJ 236 EC              | 1,70      | 12             | 20             |      |
|     | 230            | 279            | 217 | 4                       | 4                       | 2,9             | 197                   | 213                   | 234                   | 303                   | 3                     | 3                     | 0,15           | HJ 236 EC              | 1,70      | 12             | 20             |      |
|     | 230            | 279            | 217 | 4                       | 4                       | -               | 197                   | -                     | 234                   | 303                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | -              | 280            | 215 | 4                       | 4                       | 4,2             | 197                   | 210                   | 218                   | 303                   | 3                     | 3                     | 0,2            | -                      |           |                |                |      |
|     | 229            | 280            | 215 | 4                       | 4                       | 4,2             | 197                   | 210                   | 233                   | 303                   | 3                     | 3                     | 0,2            | -                      |           |                |                |      |
|     | -              | 319            | 227 | 4                       | 4                       | 5               | 197                   | 223                   | 230                   | 363                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | -              | 320            | 227 | 4                       | 4                       | 10,5            | 197                   | 223                   | 230                   | 363                   | 3                     | 3                     | 0,25           | -                      |           |                |                |      |
|     | 190            | -              | 254 | 215                     | 2,1                     | 2,1             | 6,1                   | 200                   | 212                   | 218                   | 280                   | 2                     | 2              | 0,1                    | -         |                |                |      |
|     |                | 244            | 295 | 230                     | 4                       | 4               | 3                     | 207                   | 226                   | 234                   | 323                   | 3                     | 3              | 0,15                   | HJ 238 EC | 2,10           | 13             | 21,5 |
| 244 |                | 295            | 230 | 4                       | 4                       | 3               | 207                   | 226                   | 248                   | 323                   | 3                     | 3                     | 0,15           | HJ 238 EC              | 2,10      | 13             | 21,5           |      |
| 244 |                | 295            | 230 | 4                       | 4                       | -               | 207                   | -                     | 248                   | 323                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
| -   |                | 297            | 228 | 4                       | 4                       | 5               | 207                   | 222                   | 232                   | 323                   | 3                     | 3                     | 0,2            | -                      |           |                |                |      |
| 264 |                | 338            | 245 | 5                       | 5                       | 4,3             | 210                   | 240                   | 249                   | 380                   | 4                     | 4                     | 0,15           | HJ 338 EC              | 4,30      | 18             | 29             |      |
| -   |                | 341            | 240 | 5                       | 5                       | 9,5             | 210                   | 235                   | 244                   | 380                   | 4                     | 4                     | 0,25           | -                      |           |                |                |      |
| 200 | 239            | 269            | 229 | 2,1                     | 2,1                     | 7               | 210                   | 225                   | 233                   | 299                   | 2                     | 2                     | 0,1            | HJ 1040                | 1,65      | 13             | 25,5           |      |
|     | 258            | 312            | 243 | 4                       | 4                       | 2,6             | 217                   | 239                   | 247                   | 343                   | 3                     | 3                     | 0,15           | HJ 240 EC              | 2,55      | 14             | 23             |      |
|     | 258            | 312            | 243 | 4                       | 4                       | 2,6             | 217                   | 239                   | 262                   | 343                   | 3                     | 3                     | 0,15           | HJ 240 EC              | 2,55      | 14             | 23             |      |
|     | 258            | 312            | 243 | 4                       | 4                       | -               | 217                   | -                     | 262                   | 343                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | -              | 313            | 241 | 4                       | 4                       | 5,1             | 217                   | 235                   | 245                   | 343                   | 3                     | 3                     | 0,2            | -                      |           |                |                |      |
|     | -              | 337            | 260 | 5                       | 5                       | 4               | 220                   | 253                   | 264                   | 400                   | 4                     | 4                     | 0,15           | -                      |           |                |                |      |
|     | -              | 350            | 247 | 5                       | 5                       | 9,4             | 220                   | 241                   | 251                   | 400                   | 4                     | 4                     | 0,25           | -                      |           |                |                |      |
| 278 | 350            | 247            | 5   | 5                       | 9,4                     | 220             | 241                   | 280                   | 400                   | 4                     | 4                     | 0,25                  | -              |                        |           |                |                |      |
| 220 | 262            | 297            | 250 | 3                       | 3                       | 7,5             | 233                   | 246                   | 254                   | 327                   | 2,5                   | 2,5                   | 0,1            | HJ 1044                | 2,10      | 14             | 27             |      |
|     | -              | 344            | 268 | 4                       | 4                       | 2,3             | 237                   | 264                   | 270                   | 383                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | 284            | 344            | 268 | 4                       | 4                       | 2,3             | 237                   | 264                   | 288                   | 383                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | 284            | 344            | 268 | 4                       | 4                       | -               | 237                   | -                     | 288                   | 383                   | 3                     | 3                     | 0,15           | -                      |           |                |                |      |
|     | -              | 349            | 259 | 4                       | 4                       | 7,9             | 237                   | 255                   | 264                   | 383                   | 3                     | 3                     | 0,2            | -                      |           |                |                |      |
|     | -              | 371            | 284 | 5                       | 5                       | 5,2             | 240                   | 277                   | 288                   | 440                   | 4                     | 4                     | 0,15           | -                      |           |                |                |      |
|     | 307            | 371            | 284 | 5                       | 5                       | 5,2             | 240                   | 277                   | 311                   | 440                   | 4                     | 4                     | 0,15           | -                      |           |                |                |      |
|     | -              | 384            | 277 | 5                       | 5                       | 10,4            | 240                   | 268                   | 280                   | 440                   | 4                     | 4                     | 0,25           | -                      |           |                |                |      |

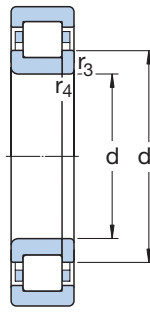
<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



Type NU

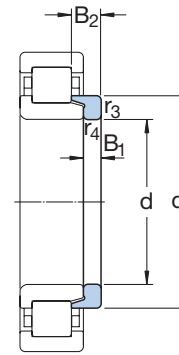
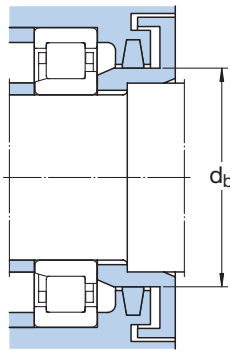
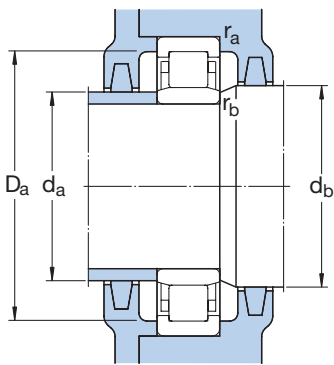


Type NJ



Type NUP

| Principal dimensions |     |     | Basic load ratings |        | Fatigue load limit<br>$P_u$ | Speed ratings   |                | Mass  | Designation  |            |
|----------------------|-----|-----|--------------------|--------|-----------------------------|-----------------|----------------|-------|--------------|------------|
| d                    | D   | B   | dynamic            | static |                             | Reference speed | Limiting speed |       |              |            |
| mm                   |     |     | kN                 |        | kN                          | r/min           |                | kg    | –            |            |
| 240                  | 360 | 56  | 523                | 800    | 78                          | 2 000           | 2 600          | 20,0  | NU 1048 MA   |            |
|                      | 440 | 72  | 952                | 1 370  | 129                         | 1 600           | 2 200          | 51,5  | NU 248 MA    |            |
|                      | 440 | 72  | 952                | 1 370  | 129                         | 1 600           | 2 200          | 52,5  | NJ 248 MA    |            |
| 240                  | 440 | 72  | 952                | 1 370  | 129                         | 1 600           | 2 200          | 53,5  | NUP 248 MA   |            |
|                      | 440 | 120 | 1 450              | 2 360  | 216                         | 1 500           | 2 200          | 84,0  | NU 2248 MA   |            |
|                      | 440 | 120 | 1 450              | 2 360  | 216                         | 1 500           | 2 200          | 85,0  | NJ 2248 MA   |            |
| 240                  | 500 | 95  | 1 450              | 2 000  | 180                         | 1 300           | 1 600          | 94,5  | NU 348 M     |            |
|                      | 500 | 95  | 1 450              | 2 000  | 180                         | 1 300           | 2 000          | 98,5  | NJ 348 MA    |            |
|                      | 500 | 155 | 2 600              | 3 650  | 320                         | 1 200           | 2 000          | 155   | NU 2348 ECMA |            |
| 260                  | 400 | 65  | 627                | 965    | 96,5                        | 1 800           | 2 400          | 29,5  | NU 1052 MA   |            |
|                      | 480 | 80  | 1 170              | 1 700  | 156                         | 1 400           | 2 000          | 68,5  | NU 252 MA    |            |
|                      | 480 | 80  | 1 170              | 1 700  | 156                         | 1 400           | 2 000          | 70,0  | NJ 252 MA    |            |
| 260                  | 480 | 80  | 1 170              | 1 700  | 156                         | 1 400           | 2 000          | 72,0  | NUP 252 MA   |            |
|                      | 480 | 130 | 1 790              | 3 000  | 265                         | 1 300           | 2 000          | 110   | NU 2252 MA   |            |
|                      | 480 | 130 | 1 790              | 3 000  | 265                         | 1 300           | 2 000          | 112   | NJ 2252 MA   |            |
| 260                  | 540 | 102 | 1 940              | 2 700  | 236                         | 1 100           | 1 800          | 125   | NU 352 ECMA  |            |
|                      | 280 | 420 | 65                 | 660    | 1 060                       | 102             | 1 700          | 2 200 | 32,5         | NU 1056 MA |
|                      |     | 500 | 80                 | 1 140  | 1 700                       | 153             | 1 400          | 1 900 | 71,5         | NU 256 MA  |
| 500                  |     | 80  | 1 140              | 1 700  | 153                         | 1 400           | 1 900          | 73,0  | NJ 256 MA    |            |
| 280                  | 500 | 130 | 2 200              | 3 250  | 285                         | 1 200           | 1 900          | 115   | NU 2256 ECMA |            |
|                      | 580 | 175 | 2 700              | 4 300  | 365                         | 1 000           | 1 700          | 230   | NU 2356 MA   |            |
|                      | 300 | 460 | 74                 | 858    | 1 370                       | 129             | 1 500          | 2 000 | 46,5         | NU 1060 MA |
| 460                  |     | 74  | 858                | 1 370  | 129                         | 1 500           | 2 000          | 47,0  | NJ 1060 MA   |            |
| 540                  |     | 85  | 1 420              | 2 120  | 183                         | 1 300           | 1 800          | 89,5  | NU 260 MA    |            |
| 300                  | 540 | 140 | 2 090              | 3 450  | 300                         | 1 200           | 1 800          | 145   | NU 2260 MA   |            |
|                      | 320 | 480 | 74                 | 880    | 1 430                       | 132             | 1 400          | 1 900 | 48,5         | NU 1064 MA |
|                      |     | 480 | 74                 | 880    | 1 430                       | 132             | 1 400          | 1 900 | 49,0         | NJ 1064 MA |
| 580                  |     | 92  | 1 610              | 2 450  | 204                         | 1 200           | 1 600          | 115   | NU 264 MA    |            |
| 320                  | 580 | 150 | 3 190              | 5 000  | 415                         | 1 000           | 1 600          | 180   | NU 2264 ECMA |            |
|                      | 340 | 520 | 82                 | 1 080  | 1 760                       | 156             | 1 300          | 1 700 | 65,0         | NU 1068 MA |
|                      |     | 520 | 82                 | 1 080  | 1 760                       | 156             | 1 300          | 1 700 | 68,0         | NJ 1068 MA |
| 620                  |     | 165 | 2 640              | 4 500  | 365                         | 1 000           | 1 500          | 220   | NU 2268 MA   |            |



Angle ring

3

Dimensions

Abutment and fillet dimensions

Calculation factor  $k_r$

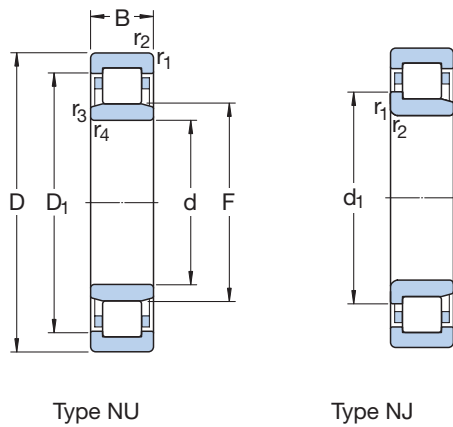
Angle ring Designation

Mass

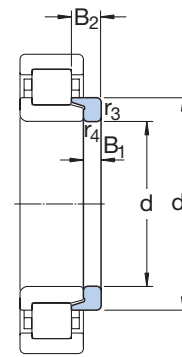
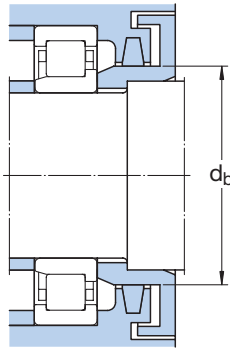
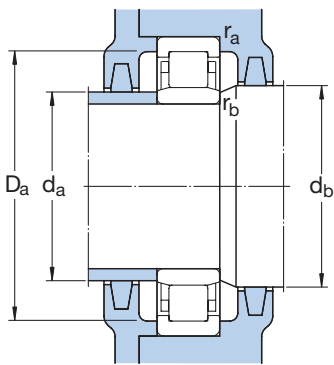
Dimensions

| d          | d <sub>1</sub> | D <sub>1</sub> | F   | r <sub>1,2</sub><br>min | r <sub>3,4</sub><br>min | s <sup>1)</sup> | d <sub>a</sub><br>min | d <sub>a</sub><br>max | d <sub>b</sub><br>min | D <sub>a</sub><br>max | r <sub>a</sub><br>max | r <sub>b</sub><br>max | k <sub>r</sub> | Angle ring Designation | Mass | B <sub>1</sub> | B <sub>2</sub> |
|------------|----------------|----------------|-----|-------------------------|-------------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------|------------------------|------|----------------|----------------|
| mm         | ~              | ~              |     |                         |                         |                 | mm                    |                       |                       |                       |                       |                       | -              | -                      | kg   | mm             |                |
| <b>240</b> | 282            | 317            | 270 | 3                       | 3                       | 7,5             | 253                   | 266                   | 274                   | 347                   | 2,5                   | 2,5                   | 0,1            | <b>HJ 1048</b>         | 2,25 | 14             | 27             |
| -          | 313            | 365            | 295 | 4                       | 4                       | 3,4             | 257                   | 288                   | 299                   | 423                   | 3                     | 3                     | 0,15           | -                      |      |                |                |
| -          | 313            | 365            | 295 | 4                       | 4                       | 3,4             | 257                   | 288                   | 317                   | 423                   | 3                     | 3                     | 0,15           | -                      |      |                |                |
| -          | 313            | 365            | 295 | 4                       | 4                       | -               | 257                   | -                     | 317                   | 423                   | 3                     | 3                     | 0,15           | -                      |      |                |                |
| -          | 313            | 365            | 295 | 4                       | 4                       | 4,3             | 257                   | 284                   | 299                   | 423                   | 3                     | 3                     | 0,2            | -                      |      |                |                |
| -          | 313            | 365            | 295 | 4                       | 4                       | 4,3             | 257                   | 284                   | 317                   | 423                   | 3                     | 3                     | 0,2            | -                      |      |                |                |
| -          | 335            | 401            | 310 | 5                       | 5                       | 5,6             | 260                   | 302                   | 314                   | 480                   | 4                     | 4                     | 0,15           | <b>HJ 348</b>          | 8,90 | 22             | 39,5           |
| -          | 335            | 401            | 310 | 5                       | 5                       | 5,6             | 260                   | 302                   | 339                   | 480                   | 4                     | 4                     | 0,15           | <b>HJ 348</b>          | 8,90 | 22             | 39,5           |
| -          | 335            | 401            | 310 | 5                       | 5                       | 10,3            | 260                   | 295                   | 305                   | 480                   | 4                     | 4                     | 0,25           | -                      |      |                |                |
| <b>260</b> | 309            | 349            | 296 | 4                       | 4                       | 8               | 276                   | 291                   | 300                   | 384                   | 3                     | 3                     | 0,1            | <b>HJ 1052</b>         | 3,30 | 16             | 31,5           |
| -          | 340            | 397            | 320 | 5                       | 5                       | 3,4             | 280                   | 313                   | 324                   | 460                   | 4                     | 4                     | 0,15           | <b>HJ 252</b>          | 6,20 | 18             | 33             |
| -          | 340            | 397            | 320 | 5                       | 5                       | 3,4             | 280                   | 313                   | 344                   | 460                   | 4                     | 4                     | 0,15           | <b>HJ 252</b>          | 6,20 | 18             | 33             |
| -          | 340            | 397            | 320 | 5                       | 5                       | -               | 280                   | -                     | 344                   | 460                   | 4                     | 4                     | 0,15           | -                      |      |                |                |
| -          | 340            | 397            | 320 | 5                       | 5                       | 4,3             | 280                   | 309                   | 324                   | 460                   | 4                     | 4                     | 0,2            | -                      |      |                |                |
| -          | 340            | 397            | 320 | 5                       | 5                       | 4,3             | 280                   | 309                   | 344                   | 460                   | 4                     | 4                     | 0,2            | -                      |      |                |                |
| -          | 455            | 337            | 337 | 6                       | 6                       | 4,2             | 286                   | 330                   | 341                   | 514                   | 5                     | 5                     | 0,15           | -                      |      |                |                |
| <b>280</b> | 329            | 369            | 316 | 4                       | 4                       | 8               | 295                   | 311                   | 320                   | 405                   | 3                     | 3                     | 0,1            | <b>HJ 1056</b>         | 3,55 | 16             | 31,5           |
| -          | 360            | 417            | 340 | 5                       | 5                       | 3,8             | 300                   | 333                   | 344                   | 480                   | 4                     | 4                     | 0,15           | -                      |      |                |                |
| -          | 360            | 417            | 340 | 5                       | 5                       | 3,8             | 300                   | 333                   | 364                   | 480                   | 4                     | 4                     | 0,15           | -                      |      |                |                |
| -          | 350            | 433            | 327 | 5                       | 5                       | 10,2            | 300                   | 320                   | 331                   | 480                   | 4                     | 4                     | 0,2            | <b>HJ 2256 EC</b>      | 6,75 | 18             | 38             |
| -          | 467            | 362            | 362 | 6                       | 6                       | 6,6             | 306                   | 347                   | 366                   | 554                   | 5                     | 5                     | 0,25           | -                      |      |                |                |
| <b>300</b> | 356            | 402            | 340 | 4                       | 4                       | 9,7             | 317                   | 335                   | 344                   | 443                   | 3                     | 3                     | 0,1            | <b>HJ 1060</b>         | 5,30 | 19             | 36             |
| -          | 356            | 402            | 340 | 4                       | 4                       | 9,7             | 317                   | 335                   | 360                   | 443                   | 3                     | 3                     | 0,1            | <b>HJ 1060</b>         | 5,30 | 19             | 36             |
| -          | 451            | 364            | 364 | 5                       | 5                       | 4,8             | 320                   | 358                   | 368                   | 520                   | 4                     | 4                     | 0,15           | -                      |      |                |                |
| -          | 451            | 364            | 364 | 5                       | 5                       | 5,6             | 320                   | 352                   | 368                   | 520                   | 4                     | 4                     | 0,2            | -                      |      |                |                |
| <b>320</b> | 376            | 422            | 360 | 4                       | 4                       | 9,7             | 335                   | 355                   | 364                   | 465                   | 3                     | 3                     | 0,1            | <b>HJ 1064</b>         | 5,65 | 19             | 36             |
| -          | 376            | 422            | 360 | 4                       | 4                       | 9,7             | 335                   | 355                   | 380                   | 465                   | 3                     | 3                     | 0,1            | <b>HJ 1064</b>         | 5,65 | 19             | 36             |
| -          | 507            | 390            | 380 | 5                       | 5                       | 5,3             | 340                   | 383                   | 394                   | 560                   | 4                     | 4                     | 0,15           | -                      |      |                |                |
| -          | 507            | 380            | 380 | 5                       | 5                       | 5,9             | 340                   | 377                   | 384                   | 560                   | 4                     | 4                     | 0,2            | -                      |      |                |                |
| <b>340</b> | 403            | 455            | 385 | 5                       | 5                       | 6,5             | 358                   | 380                   | 389                   | 502                   | 4                     | 4                     | 0,1            | <b>HJ 1068</b>         | 7,40 | 21             | 39,5           |
| -          | 403            | 455            | 385 | 5                       | 5                       | 6,5             | 358                   | 380                   | 408                   | 502                   | 4                     | 4                     | 0,1            | <b>HJ 1068</b>         | 7,40 | 21             | 39,5           |
| -          | 515            | 416            | 416 | 6                       | 6                       | 8               | 366                   | 401                   | 421                   | 594                   | 5                     | 5                     | 0,2            | -                      |      |                |                |

<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other



| Principal dimensions |       |     | Basic load ratings |        | Fatigue load limit<br>P <sub>u</sub> | Speed ratings   |                | Mass  | Designation                                                                |
|----------------------|-------|-----|--------------------|--------|--------------------------------------|-----------------|----------------|-------|----------------------------------------------------------------------------|
| d                    | D     | B   | dynamic            | static |                                      | Reference speed | Limiting speed |       |                                                                            |
| mm                   |       |     | kN                 |        | kN                                   | r/min           |                | kg    | –                                                                          |
| <b>360</b>           | 540   | 82  | 1 100              | 1 830  | 163                                  | 1 300           | 1 600          | 67,5  | <b>NU 1072 MA</b><br><b>NU 2272 MA</b>                                     |
|                      | 650   | 170 | 2 920              | 4 900  | 400                                  | 950             | 1 400          | 250   |                                                                            |
| <b>380</b>           | 560   | 82  | 1 140              | 1 930  | 170                                  | 1 200           | 1 600          | 71,0  | <b>NU 1076 MA</b><br><b>NJ 1076 MA</b><br><b>NU 2276 ECMA</b>              |
|                      | 560   | 82  | 1 140              | 1 930  | 170                                  | 1 200           | 1 600          | 73,0  |                                                                            |
|                      | 680   | 175 | 3 140              | 5 500  | 440                                  | 900             | 1 600          | 275   |                                                                            |
| <b>400</b>           | 600   | 90  | 1 380              | 2 320  | 204                                  | 1 100           | 1 500          | 92,5  | <b>NU 1080 MA</b>                                                          |
| <b>420</b>           | 620   | 90  | 1 420              | 2 450  | 212                                  | 1 100           | 1 400          | 96,0  | <b>NU 1084 MA</b>                                                          |
| <b>440</b>           | 650   | 94  | 1 510              | 2 650  | 212                                  | 1 000           | 1 300          | 105   | <b>NU 1088 MA</b>                                                          |
| <b>460</b>           | 680   | 100 | 1 650              | 2 850  | 224                                  | 950             | 1 200          | 115   | <b>NU 1092 MA</b><br><b>NU 1292 MA</b><br><b>NU 2292 MA</b>                |
|                      | 830   | 165 | 4 180              | 6 800  | 510                                  | 750             | 1 100          | 415   |                                                                            |
|                      | 830   | 212 | 5 120              | 8 650  | 655                                  | 700             | 1 100          | 530   |                                                                            |
| <b>480</b>           | 700   | 100 | 1 680              | 3 000  | 232                                  | 900             | 1 200          | 130   | <b>NU 1096 MA</b>                                                          |
| <b>500</b>           | 720   | 100 | 1 720              | 3 100  | 236                                  | 900             | 1 100          | 135   | <b>NU 10/500 MA</b><br><b>NU 12/500 MA</b>                                 |
|                      | 920   | 185 | 5 280              | 8 500  | 620                                  | 670             | 950            | 585   |                                                                            |
| <b>530</b>           | 780   | 112 | 2 290              | 4 050  | 305                                  | 800             | 1 000          | 190   | <b>NU 10/530 MA</b><br><b>NU 20/530 ECMA</b>                               |
|                      | 780   | 145 | 3 740              | 7 350  | 550                                  | 670             | 1 000          | 255   |                                                                            |
| <b>560</b>           | 820   | 115 | 2 330              | 4 250  | 310                                  | 750             | 1 000          | 210   | <b>NU 10/560 MA</b><br><b>NU 20/560 ECMA</b><br><b>NU 12/560 MA</b>        |
|                      | 820   | 150 | 3 800              | 7 650  | 560                                  | 630             | 1 000          | 290   |                                                                            |
|                      | 1 030 | 206 | 7 210              | 11 200 | 780                                  | 560             | 800            | 805   |                                                                            |
| <b>600</b>           | 870   | 118 | 2 750              | 5 100  | 365                                  | 700             | 900            | 245   | <b>NU 10/600 N2MA</b><br><b>NU 20/600 ECMA</b><br><b>NU 2/600 ECMA/HB1</b> |
|                      | 870   | 155 | 4 180              | 8 000  | 570                                  | 600             | 900            | 325   |                                                                            |
|                      | 1 090 | 155 | 5 610              | 9 800  | 670                                  | 480             | 850            | 710   |                                                                            |
| <b>630</b>           | 920   | 128 | 3 410              | 6 200  | 430                                  | 630             | 1 000          | 285   | <b>NU 10/630 ECN2MA</b><br><b>NU 20/630 ECMA</b><br><b>NU 12/630 ECMA</b>  |
|                      | 920   | 170 | 4 730              | 9 500  | 670                                  | 560             | 850            | 400   |                                                                            |
|                      | 1 150 | 230 | 8 580              | 13 700 | 915                                  | 450             | 700            | 1 100 |                                                                            |
| <b>670</b>           | 980   | 136 | 3 740              | 6 800  | 465                                  | 530             | 800            | 350   | <b>NU 10/670 ECMA</b><br><b>NU 20/670 ECMA</b>                             |
|                      | 980   | 180 | 5 390              | 11 000 | 750                                  | 500             | 800            | 480   |                                                                            |
| <b>710</b>           | 1 030 | 140 | 4 680              | 8 500  | 570                                  | 500             | 750            | 415   | <b>NU 10/710 ECN2MA</b><br><b>NU 20/710 ECMA</b>                           |
|                      | 1 030 | 185 | 5 940              | 12 000 | 815                                  | 480             | 700            | 540   |                                                                            |
| <b>750</b>           | 1 090 | 150 | 4 730              | 8 800  | 585                                  | 430             | 670            | 490   | <b>NU 10/750 ECN2MA</b><br><b>NU 20/750 ECMA</b>                           |
|                      | 1 090 | 195 | 7 040              | 14 600 | 980                                  | 430             | 670            | 635   |                                                                            |
| <b>800</b>           | 1 150 | 200 | 7 040              | 14 600 | 950                                  | 400             | 630            | 715   | <b>NU 20/800 ECMA</b>                                                      |



Angle ring



| Dimensions |       |       |     |                  |                  |        | Abutment and fillet dimensions |              |              |              |              |              | Calculation factor<br>$k_r$ | Angle ring Designation | Mass | Dimensions     |                |         |      |    |      |
|------------|-------|-------|-----|------------------|------------------|--------|--------------------------------|--------------|--------------|--------------|--------------|--------------|-----------------------------|------------------------|------|----------------|----------------|---------|------|----|------|
| d          | $d_1$ | $D_1$ | F   | $r_{1,2}$<br>min | $r_{3,4}$<br>min | $s^1)$ | $d_a$<br>min                   | $d_a$<br>max | $d_b$<br>min | $D_a$<br>max | $r_a$<br>max | $r_b$<br>max |                             |                        |      | B <sub>1</sub> | B <sub>2</sub> |         |      |    |      |
| mm         |       |       |     |                  |                  |        | mm                             |              |              |              |              |              | -                           | -                      | kg   | mm             |                |         |      |    |      |
| 360        | 423   | 475   | 405 | 5                | 5                | 6,5    | 378                            | 400          | 410          | 522          | 4            | 4            | 0,1                         | HJ 1072                | 7,75 | 21             | 39,5           |         |      |    |      |
|            | -     | 542   | 437 | 6                | 6                | 16,7   | 386                            | 428          | 442          | 624          | 5            | 5            |                             |                        |      |                |                | 0,2     | -    |    |      |
| 380        | 443   | 495   | 425 | 5                | 5                | 10,8   | 398                            | 420          | 430          | 542          | 4            | 4            | 0,1                         | HJ 1076                | 8,25 | 21             | 39,5           |         |      |    |      |
|            | 443   | 495   | 425 | 5                | 5                | 10,8   | 398                            | 420          | 448          | 4            | 4            | 0,1          |                             |                        |      |                |                | HJ 1076 | 8,25 | 21 | 39,5 |
|            | -     | 595   | 451 | 6                | 6                | 8,3    | 406                            | 447          | 455          | 654          | 5            | 5            |                             |                        |      |                |                |         |      |    |      |
| 400        | 470   | 527   | 450 | 5                | 5                | 14     | 418                            | 446          | 455          | 582          | 4            | 4            | 0,1                         | HJ 1080                | 9,75 | 23             | 43             |         |      |    |      |
| 420        | 490   | 547   | 470 | 5                | 5                | 14     | 438                            | 466          | 475          | 602          | 4            | 4            | 0,1                         | HJ 1084                | 10,0 | 23             | 43             |         |      |    |      |
| 440        | 512   | 574   | 493 | 6                | 6                | 14,7   | 463                            | 488          | 498          | 627          | 5            | 5            | 0,1                         | HJ 1088                | 11,5 | 24             | 45             |         |      |    |      |
| 460        | 537   | 600   | 516 | 6                | 6                | 15,9   | 483                            | 511          | 521          | 657          | 5            | 5            | 0,1                         | HJ 1092                | 14,0 | 25             | 48             |         |      |    |      |
|            | -     | 715   | 554 | 7,5              | 7,5              | 6,4    | 492                            | 542          | 559          | 798          | 6            | 6            |                             |                        |      |                |                | 0,14    | -    |    |      |
|            | -     | 706   | 554 | 7,5              | 7,5              | 16,5   | 492                            | 542          | 559          | 798          | 6            | 6            |                             |                        |      |                |                | 0,2     | -    |    |      |
| 480        | 557   | 620   | 536 | 6                | 6                | 15,9   | 503                            | 531          | 541          | 677          | 5            | 5            | 0,1                         | HJ 1096                | 14,5 | 25             | 48             |         |      |    |      |
| 500        | 577   | 640   | 556 | 6                | 6                | 11,2   | 523                            | 550          | 561          | 697          | 5            | 5            | 0,1                         | HJ 10/500              | 15,0 | 25             | 48             |         |      |    |      |
|            | -     | 728   | 576 | 7,5              | 7,5              | 14,5   | 532                            | 564          | 581          | 798          | 6            | 6            |                             |                        |      |                |                | 0,21    | -    |    |      |
| 530        | -     | 692   | 593 | 6                | 6                | 10,4   | 553                            | 585          | 598          | 757          | 5            | 5            | 0,1                         | -                      | -    | -              | -              |         |      |    |      |
|            | -     | 704   | 591 | 6                | 6                | 6,8    | 553                            | 587          | 596          | 757          | 5            | 5            |                             |                        |      |                |                | 0,14    |      |    |      |
| 560        | 648   | 726   | 625 | 6                | 6                | 12,3   | 583                            | 617          | 630          | 797          | 5            | 5            | 0,1                         | HJ 10/560              | 21,0 | 27,5           | 53             |         |      |    |      |
|            | -     | 726   | 625 | 6                | 6                | 12,3   | 583                            | 617          | 630          | 797          | 5            | 5            |                             |                        |      |                |                | 0,1     | -    |    |      |
|            | -     | 741   | 626 | 6                | 6                | 6,7    | 583                            | 616          | 631          | 797          | 5            | 5            |                             |                        |      |                |                | 0,14    | -    |    |      |
| 600        | 695   | 779   | 667 | 6                | 6                | 14     | 623                            | 658          | 672          | 847          | 5            | 5            | 0,1                         | HJ 10/600              | 27,5 | 31             | 55             |         |      |    |      |
|            | -     | 793   | 661 | 6                | 6                | 6,1    | 623                            | 652          | 667          | 847          | 5            | 5            |                             |                        |      |                |                | 0,14    | -    |    |      |
|            | -     | 935   | 749 | 9,5              | 9,5              | 3      | 640                            | 743          | 755          | 1 050        | 8            | 8            |                             |                        |      |                |                | 0,17    | -    |    |      |
| 630        | -     | 837   | 702 | 7,5              | 7,5              | 6,2    | 658                            | 691          | 706          | 892          | 6            | 6            | 0,1                         | -                      | -    | -              | -              |         |      |    |      |
|            | -     | 832   | 699 | 7,5              | 7,5              | 8,7    | 658                            | 690          | 705          | 892          | 6            | 6            |                             |                        |      |                |                | 0,14    | -    |    |      |
|            | -     | 1 005 | 751 | 12               | 12               | 13,5   | 678                            | 735          | 757          | 1 102        | 10           | 10           |                             |                        |      |                |                | 0,17    | -    |    |      |
| 670        | -     | 891   | 747 | 7,5              | 7,5              | 7,9    | 698                            | 736          | 753          | 952          | 6            | 6            | 0,1                         | -                      | -    | -              | -              |         |      |    |      |
|            | -     | 890   | 746 | 7,5              | 7,5              | 7      | 698                            | 736          | 752          | 952          | 6            | 6            |                             |                        |      |                |                | 0,14    |      |    |      |
| 710        | -     | 939   | 778 | 7,5              | 7,5              | 8      | 738                            | 769          | 783          | 1 002        | 6            | 6            | 0,1                         | -                      | -    | -              | -              |         |      |    |      |
|            | -     | 939   | 787 | 7,5              | 7,5              | 10     | 738                            | 774          | 793          | 1 002        | 6            | 6            |                             |                        |      |                |                | 0,14    |      |    |      |
| 750        | -     | 993   | 832 | 7,5              | 7,5              | 3      | 778                            | 823          | 838          | 1 062        | 6            | 6            | 0,1                         | -                      | -    | -              | -              |         |      |    |      |
|            | -     | 993   | 832 | 7,5              | 7,5              | 2      | 778                            | 823          | 838          | 1 062        | 6            | 6            |                             |                        |      |                |                | 0,14    |      |    |      |
| 800        | -     | 1 051 | 882 | 7,5              | 7,5              | 2      | 828                            | 868          | 888          | 1 122        | 6            | 6            | 0,14                        | -                      | -    | -              | -              |         |      |    |      |

<sup>1)</sup> Permissible axial displacement from normal position of one ring in relation to the other

# Other SKF cylindrical roller bearings

Single row cylindrical roller bearings with a cage listed in the product table starting on **page 32** constitute the basic SKF assortment and are only part of the total range of SKF cylindrical roller bearings. Other products belonging to the range and which are briefly described in the following are

- precision cylindrical roller bearings,
- full complement cylindrical roller bearings,
- backing bearings for cluster mills,
- bearings for rolling mills, and
- cylindrical roller thrust bearings.

The SKF manufacturing programme also covers electrically insulating cylindrical roller bearings for electric motors and other electrical machines: the INSOCOAT® bearings. Other items include various designs of support rollers and cam followers, indexing rollers for sintering and pelletising plants, bearings for crane wheels and pulleys, special bearings for the automotive industry, cylindrical roller bearing units for traction motors and complete railway axleboxes.

## Precision cylindrical roller bearings

Where characteristics such as high radial load carrying capacity, high stiffness and high speed capability are required at the same time as high running accuracy and compact form, SKF precision cylindrical roller bearings are an obvious choice.

They are available mainly as double row bearings and are primarily used where heavy radial loads have to be accommodated without excessive elastic deformation. In applications where high speed capability is required, but heavy radial load capability is not, single row precision cylindrical roller bearings can be used. These bearings are available as all-steel bearings as well as hybrid bearings with ceramic rollers.

Details of these precision cylindrical roller bearings can be found in the SKF catalogue “High-precision bearings”.



### **Full complement cylindrical roller bearings**

Heavy radial loads, limited space, relatively low speeds and, where possible, oil lubrication are excellent conditions for SKF full complement cylindrical roller bearings and where they have proven their exceptional value. Considerable reliability reserves are derived from the special internal design and the logarithmic roller profile.

The SKF standard range comprises single and double row full complement cylindrical roller bearings in several designs and dimension series.

### **Backing bearings for cluster mills**

The operating conditions in a multi-roll cold rolling mill or cluster mill as they are sometimes called, involve high specific rolling forces and relatively high roll speeds. Additionally, the demands on the finished product with regard to flatness and surface quality are extremely high. To achieve high running accuracy and the ability to accommodate heavy loads are key operational parameters for the back-up rolls. SKF backing bearings meet these demands as they have extremely narrow tolerances for cross-sectional height and radial runout.

Detailed information can be found in the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

### **Bearings for rolling mills**

The operating conditions that are typical for rolling mill bearing applications place special demands on the bearings. As a rule special bearings that differ from standardized bearings in design and execution are required, including multi-row cylindrical roller bearings. These bearings are preferred when rolling speeds are high, because of their low friction, when compared with other roller bearing designs. Their low cross section means that the roll necks can be relatively large with respect to the roll diameter. SKF multi-row cylindrical roller bearings are designed so that they incorporate a large number of rollers and can therefore carry very heavy loads. However, the bearings cannot accommodate any axial loads and as a result, a separate thrust bearing must be used.

Detailed information on SKF cylindrical roller bearings for rolling mills, including the multi-row bearings, can be found in the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).

### **Cylindrical roller thrust bearings**

SKF cylindrical roller thrust bearings are an excellent choice for stiff bearing arrangements that are relatively compact in the axial direction and where heavy axial loads have to be accommodated. The bearings are relatively insensitive to shock loads. Complete bearings comprise a cylindrical roller and cage thrust assembly, a shaft washer and a housing washer. The components are available separately or in various combinations.

The basic SKF range comprises the single direction bearings in the 811 and 812 series as well as the particularly robust bearings in the 874, 893 and 894 series. For applications where axial loads act in both directions, components from bearings in the 811 series together with intermediate washers can be combined to form double direction bearings.

Detailed information on SKF cylindrical roller thrust bearings can be found in the SKF General Catalogue or in the SKF Interactive Engineering Catalogue, available on CD-ROM or online at [www.skf.com](http://www.skf.com).



# SKF - The knowledge engineering company

The business of the SKF Group consists of the design, manufacture and marketing of the world's leading brand of rolling bearings, with a global leadership position in complementary products such as radial seals. SKF also holds an increasingly important position in the market for linear motion products, high precision aerospace bearings, machine tool spindles, as well as plant maintenance services and is an established producer of high-quality bearing steel.

The SKF Group maintains specialized businesses to meet the needs of the global marketplace. SKF supports specific market segments with ongoing research and development efforts that have led to a growing number of innovations, new standards and new products.

SKF Group has global ISO 14001 environmental certification. Individual divisions have been approved for quality certification in accordance with either ISO 9000 or appropriate industry specific standards.

Some 80 manufacturing sites worldwide and sales companies in 70 countries make SKF a truly international corporation. In addition, our 7 000 distributor and dealer partners around the world, e-business marketplace and global distribution system put SKF close to customers for the supply of both products and services. In essence, SKF solutions are available wherever and whenever our customers need them.

Overall, the SKF brand now stands for more than ever before. It stands for the knowledge engineering company ready to serve you with world-class product competences, intellectual resources and the vision to help you succeed.



## **Harnessing wind power**

*The growing industry of wind-generated electric power provides an environmentally compatible source of electricity. SKF is working closely with global industry leaders to develop efficient and trouble-free turbines, using SKF knowledge to provide highly specialized bearings and condition monitoring systems to extend equipment life in the extreme and often remote environments of wind farms.*

## **Developing a cleaner cleaner**

*The electric motor and its bearings are the heart of many household appliances. SKF works closely with appliance manufacturers to improve their product performance, cut costs and reduce weight. A recent*



*example produced a new generation of vacuum cleaners with substantially more suction. SKF's knowledge in small bearing technology is also applied to manufacturers of power tools and office equipment.*



## **Delivering asset efficiency optimization**

*To optimize efficiency and boost productivity, many industrial facilities outsource some or all of their maintenance services to SKF, often with guaranteed performance contracts. Through the specialized capabilities and knowledge available from*

*SKF Reliability Systems, SKF provides a comprehensive range of asset efficiency services, from maintenance strategies and engineering assistance, to operator-driven reliability and machine maintenance programs.*





**Creating a new “cold remedy”**

*In the frigid winters of northern China, sub-zero temperatures can cause rail car wheel assemblies and their bearings to seize due to lubrication starvation. SKF created a new family of synthetic lubricants formulated to retain their lubrication viscosity even at these extreme bearing temperatures. SKF’s knowledge of lubricants and friction are unmatched throughout the world.*



**Planning for sustainable growth**

*By their very nature, bearings make a positive contribution to the natural environment. Reduced friction enables machinery to operate more efficiently, consume less power and require less lubrication. SKF is continually raising the performance bar, enabling new generations of high-efficiency products and equipment. With an eye to the future, SKF’s global policies and manufacturing techniques are planned and implemented to help protect and preserve the earth’s limited natural resources. We remain committed to sustainable, environmentally responsible growth.*

**Evolving by-wire technology**

*SKF has unique expertise and knowledge in fast growing by-wire technology, from fly-by-wire, to drive-by-wire, to work-by-wire. SKF pioneered practical fly-by-wire technology and is a close working partner with all aerospace industry leaders. As an example, virtually all aircraft of the Airbus design use SKF by-wire systems for cockpit flight control. SKF is also a leader in automotive drive-by-wire,*

*having jointly developed the revolutionary Filo and Novanta concept cars which employ SKF mechatronics for steering and braking. Further by-wire development has led SKF to produce an all-electric forklift truck which uses mechatronics rather than hydraulics for all controls.*



**Maintaining a 320 km/h R&D lab**

*In addition to SKF’s renowned research and development facilities in Europe and the United States, Formula One car racing provides a unique environment for SKF to push the limits of bearing technology. For over 50 years, SKF products, engineering and knowledge have helped make*

*Scuderia Ferrari a formidable force in F1 racing. (The average racing Ferrari utilizes more than 150 SKF components.) Lessons learned here are applied to the products we provide to automakers and the after-market worldwide.*



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