

7

Needle roller bearings



# 7 Needle roller bearings

<b>Designs and variants</b> .....	<b>583</b>	<b>Designation system</b> .....	<b>612</b>
Needle roller and cage assemblies .....	583	<b>Product tables</b>	
Basic design bearings .....	583	<b>7.1</b> Needle roller and cage assemblies .....	614
Other needle roller and cage assemblies .....	584	<b>7.2</b> Drawn cup needle roller bearings .....	618
Drawn cup needle roller bearings .....	584	<b>7.3</b> Needle roller bearings with machined rings with flanges, without an inner ring .....	624
Basic design bearings .....	585	<b>7.4</b> Needle roller bearings with machined rings with flanges, with an inner ring .....	636
Arrangements with components and other bearings ..	586	<b>7.5</b> Alignment needle roller bearings, without an inner ring .....	648
Needle roller bearings with machined rings .....	586	<b>7.6</b> Alignment needle roller bearings, with an inner ring .....	650
Basic design bearings .....	587	<b>7.7</b> Needle roller / angular contact ball bearings .....	652
Arrangements with other bearings .....	587	<b>7.8</b> Needle roller / thrust ball bearings, full complement thrust bearing .....	654
Alignment needle roller bearings .....	588	<b>7.9</b> Needle roller / thrust ball bearings, thrust bearing with a cage .....	656
Combined needle roller bearings .....	588	<b>7.10</b> Needle roller / cylindrical roller thrust bearings ...	658
Needle roller / angular contact ball bearings .....	588	<b>7.11</b> Needle roller bearing inner rings .....	660
Needle roller / thrust ball bearings .....	590		
Needle roller / cylindrical roller thrust bearings .....	592		
Needle roller bearing components .....	593		
Needle roller bearing inner rings .....	593		
Needle rollers .....	593		
Sealing solutions .....	594		
Associated external seals .....	594		
Capped bearings .....	594		
Greases for capped bearings .....	595		
Relubrication features .....	595		
Cages .....	596		
<b>Bearing data</b> .....	<b>598</b>		
(Dimension standards, tolerances, operating clearance, internal clearance, permissible misalignment)			
<b>Loads</b> .....	<b>606</b>		
(Minimum load, equivalent dynamic bearing load, equivalent static bearing load)			
<b>Temperature limits</b> .....	<b>608</b>		
<b>Permissible speed</b> .....	<b>608</b>	<b>Other needle roller bearings</b>	
 		Support rollers .....	943
<b>Design considerations</b> .....	<b>609</b>	Cam followers .....	963
Abutment dimensions .....	609	Needle roller thrust bearings .....	895
Shaft and housing tolerances .....	610	Bearings with Solid Oil .....	1023
	610	NoWear coated bearings .....	1059
 		Inner rings as wear sleeves	→ <a href="http://skf.com/seals">skf.com/seals</a>
<b>Mounting</b> .....	<b>611</b>	Universal joint bearings	→ <a href="http://skf.com/bearings">skf.com/bearings</a>
Paired mounting .....	611		



# 7 Needle roller bearings

## More information

General bearing knowledge . . . .	17
<b>Bearing selection process . . . . .</b>	<b>59</b>
Lubrication . . . . .	109
Bearing interfaces . . . . .	139
Selecting internal clearance . . . . .	182
Sealing, mounting and dismounting . . . . .	193

SKF needle roller bearings are bearings with cylindrical rollers that are small in diameter relative to their length. The modified roller/raceway profile prevents stress peaks to extend bearing service life.

SKF supplies needle roller bearings in many different designs, series and in a wide range of sizes, which make them appropriate for a wide variety of operating conditions and applications.

### Bearing features

- **Low cross section**  
In applications where less space is available, needle roller bearings offer a very compact solution (fig. 1), and drawn cup needle roller bearings enable downsizing.
- **High load carrying capacity**  
Owing to their large number of rollers, needle roller bearings have a high load carrying capacity.
- **High stiffness**  
Because of their large number of small-diameter rollers, needle roller bearings have high stiffness.

- **Separable design**

The possibility of assembling inner and outer rings separately permits interference fits for shaft and housing and also enables easy maintenance inspections (fig. 2).

- **Accommodate axial displacement**

Except for bearings with flanges on both the inner and outer rings, needle roller bearings with machined rings can accommodate axial displacement (fig. 3).

- **Accommodate static misalignment**

Alignment needle roller bearings are self-aligning up to 3° of static misalignment.

- **Locating bearing arrangement**

Combined needle roller bearings accommodate combined radial and axial loads in one or both directions.

Fig. 1

#### Low cross section

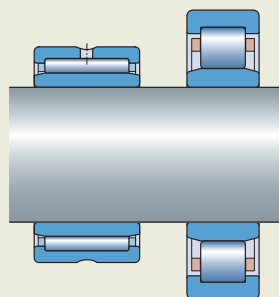
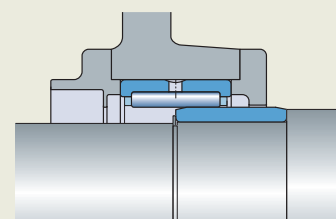


Fig. 2

#### Separable design



# Designs and variants

## Needle roller and cage assemblies

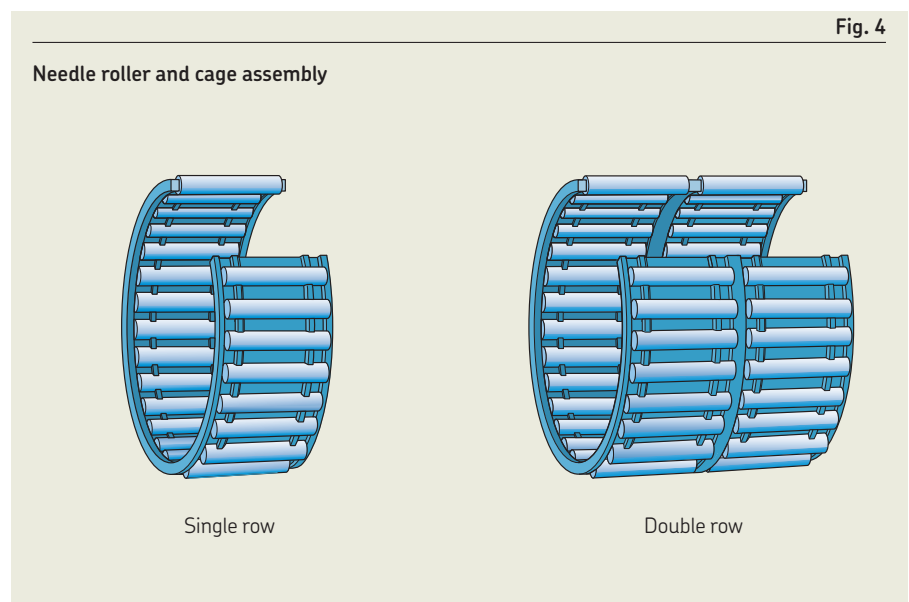
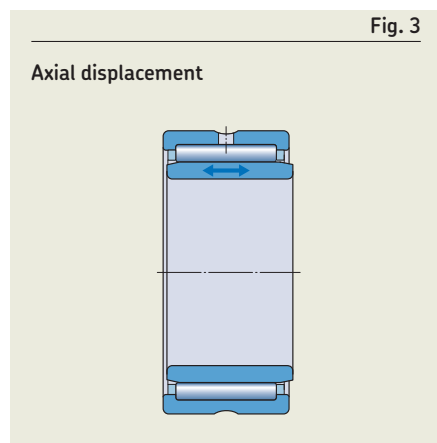
SKF needle roller and cage assemblies are self-contained, ready-to-mount bearings. In applications where the shaft and housing bore can serve as raceways, the assemblies can be used to create bearing arrangements that require minimal radial space.

### Basic design bearings

- are identified by the series designation K
- are available as (fig. 4):
  - single row design (no designation suffix)
  - double row design (designation suffix ZW)

They are characterized by the following properties:

- simple to mount and robust
- accurate roller guidance in the cage pockets
- good running performance



## Other needle roller and cage assemblies

Needle roller and cage assemblies with a split cage can be used where raceways are recessed in the shaft (fig. 5).

Special needle roller and cage assemblies are used for the gudgeon (wrist) pin (fig. 6) and crankpin (crankshaft journal) (fig. 7) for connecting rods of internal combustion engines and compressors. They provide excellent service in spite of rapid accelerations, elevated temperatures, unfavourable load, and poor lubrication conditions.

For additional information about special sizes and designs, which are available on request, contact SKF.

## Drawn cup needle roller bearings

SKF drawn cup needle roller bearings have a deep drawn, thin-walled outer ring. Drawn cup needle roller bearings are typically used in applications where the housing bore cannot be used as a raceway for a needle roller and cage assembly, but where a very compact and economical bearing arrangement is required. These bearings are mounted with a tight interference fit in the housing. This enables a simple and economic design of the housing bore, as shoulders or snap rings are not required to locate the bearing axially.

The drawn cup of hardened steel and the needle roller and cage assembly of these bearings form a non-separable unit.

## SKF standard assortment

SKF supplies a wide assortment of drawn cup needle roller bearings. This includes:

- bearings with open ends (fig. 8)
- bearings with a closed end (fig. 9)
- full complement bearings with open ends (fig. 10)

SKF drawn cup needle roller bearings:

- are supplied without an inner ring
- are generally designed with one needle roller and cage assembly – except wide sizes, which incorporate two needle roller and cage assemblies immediately adjacent to each other, with a lubrication hole in the outer ring (fig. 11).

Fig. 5

Needle roller and cage assemblies with a split cage

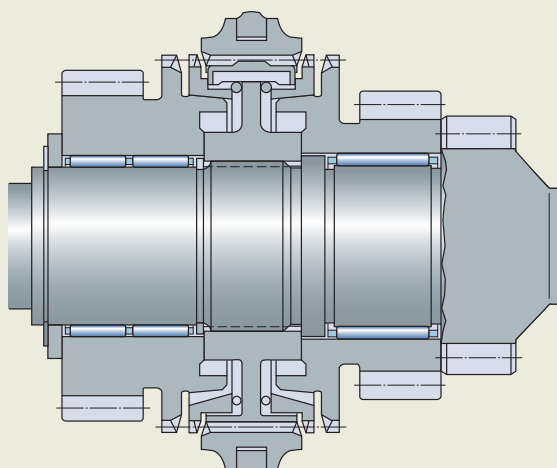


Fig. 6

Special needle roller and cage assembly for the gudgeon (wrist) pin

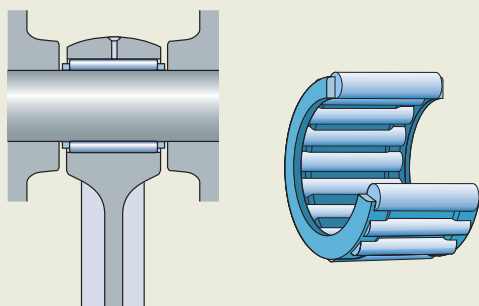
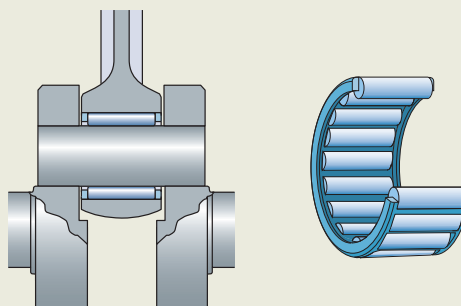


Fig. 7

Special needle roller and cage assembly for the crankpin (crankshaft journal)



## Basic design bearings

- Drawn cup needle roller bearings with open ends** (series designation HK, [fig. 8](#))
  - are available open (without seals) or sealed on one or both sides (*Sealing solutions*, [page 594](#))
- Drawn cup needle roller bearings with a closed end** (series designation BK, [fig. 9](#))
  - are available open or sealed (*Sealing solutions*)
  - are suitable for bearing arrangements where they are situated at the end of a shaft
  - accommodate small axial guidance forces, because of the profiled design of their closed end
- Full complement bearings with open ends** (series designation HN, [fig. 10](#))
  - are suitable for very heavy radial loads at moderate speeds
  - are available with open ends and without seals only

Full complement drawn cup needle roller bearings are supplied with a special grease to secure the rollers during transport. However, SKF recommends relubricating after mounting. Depending on the required grade, SKF recommends SKF LGEP 2 or SKF LGWM 1 grease for relubrication. The technical specifications of the initial grease fill and the relubrication greases are listed in [table 1](#).

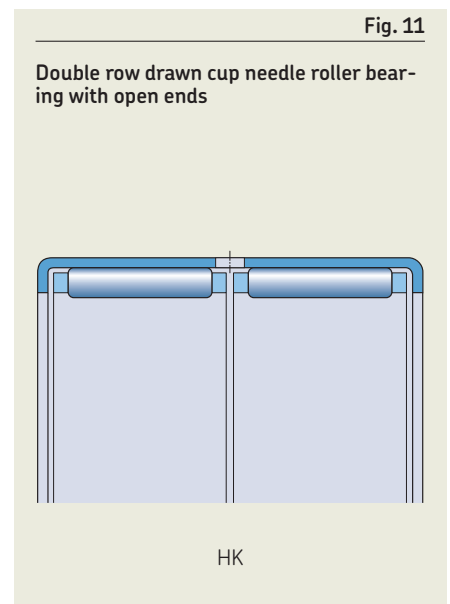
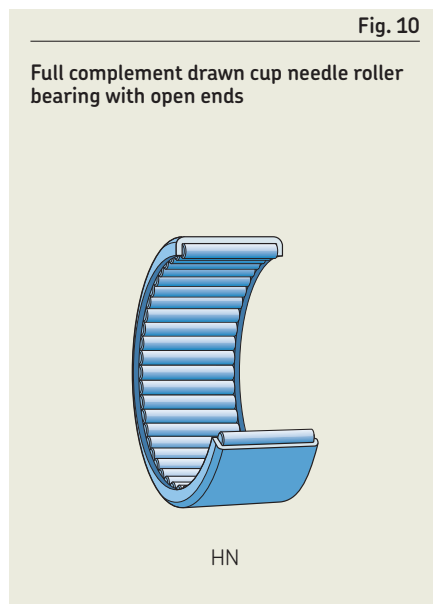
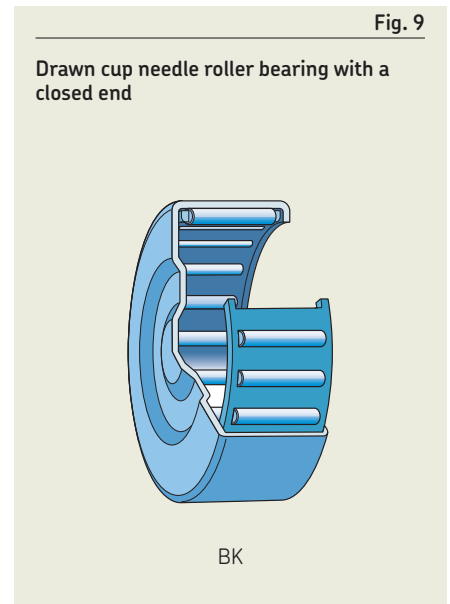
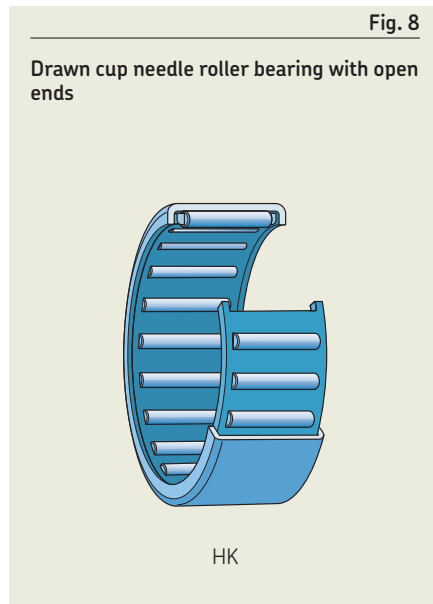


Table 1

### Technical specifications of SKF standard greases for full complement drawn cup needle roller bearings

Grease	Temperature range <sup>1)</sup>							Thickener	Base oil type	NLGI grade	Base oil viscosity [mm <sup>2</sup> /s]	
	-50	0	50	100	150	200	250				at 40 °C (105 °F)	at 100 °C (210 °F)
Initial grease fill								Lithium soap	Mineral	1-2	200	18,7
LGEP 2								Lithium soap	Mineral	2	200	16
LGMW 1								Lithium soap	Mineral	1	200	16

-60 30 120 210 300 390 480 °F

<sup>1)</sup> Refer to the SKF traffic light concept ([page 117](#)).

## Arrangements with components and other bearings

- Generally, drawn cup needle roller bearings run directly on a shaft. However, in applications where the shaft cannot be hardened and ground, bearings should be combined with an inner ring (**fig. 12**, and *Needle roller bearing inner rings*, **page 593**).
- Drawn cup needle roller bearings with wide inner rings (**fig. 12** and *Needle roller bearing inner rings*) provide an excellent counterface for the lips of external G or SD design seals ([skf.com/seals](http://skf.com/seals)).
- Certain sizes of drawn cup needle roller bearings can be combined with a needle roller thrust bearing with a centring flange, AXW series (**fig. 13** and *Needle roller thrust bearings*, **page 895**), to accommodate combined radial and axial loads.

## Needle roller bearings with machined rings

SKF needle roller bearings with machined rings are made of carbon chromium bearing steel. SKF supplies these bearings with or without flanges on the outer ring, in a wide range of series and sizes. SKF also supplies them with or without an inner ring.

### Needle roller bearings with machined inner and outer rings

- are used for applications where the shaft cannot be hardened and ground (**fig. 14**)
- have limited permissible axial displacement of the shaft relative to the housing (**fig. 3**, **page 583** and **product table**, **page 636**), which can be extended, if needed, by using a wide inner ring (*Needle roller bearing inner rings*, **page 593**)

### Needle roller bearings with a machined outer ring, without an inner ring

- are an excellent choice for compact bearing arrangements if the shaft can be hardened and ground (**fig. 15**)
- enable a larger shaft diameter and a stiffer bearing arrangement compared to arrangements with bearings with inner rings

Axial displacement of the shaft relative to the housing is only limited by the width of the raceway on the shaft. By machining the shaft raceways to the appropriate dimensional and geometrical tolerances, it is possible to obtain bearing arrangements with tighter geometrical tolerances. For additional information, refer to *Raceways on shafts and in housings*, **page 179**.

Fig. 12

Drawn cup needle roller bearing

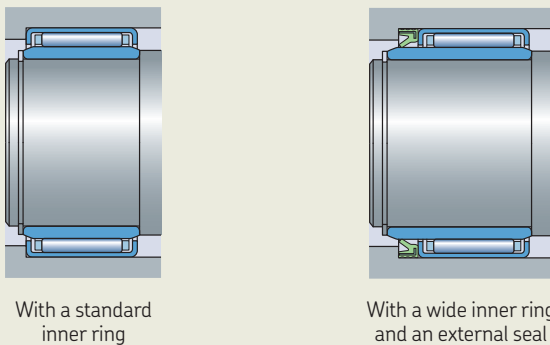


Fig. 13

Drawn cup needle roller bearing combined with a needle roller thrust bearing

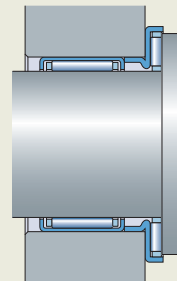


Fig. 14

Needle roller bearing with machined rings

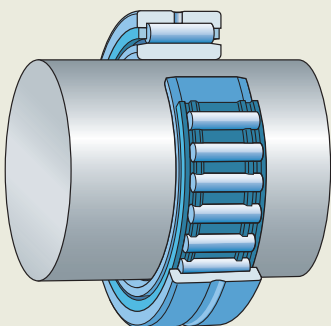


Fig. 15

Needle roller bearing with a machined outer ring

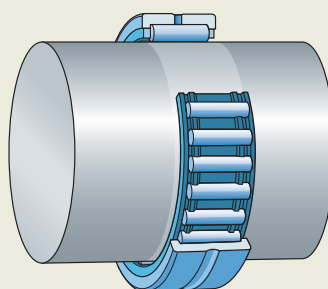
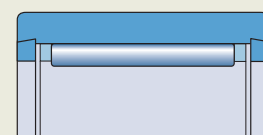


Fig. 16

Needle roller bearing with non-separable closure rings



NK ( $F_w \leq 10 \text{ mm}$ )

## Basic design bearings

### Needle roller bearings with machined rings, with flanges

- are available open (without seals) or sealed on one or both sides
- are available with or without an inner ring
- with  $D \leq 17$  mm ( $F_w \leq 10$  mm), are available with non-separable closure rings that act as flanges (fig. 16)

The flanges on larger bearings are an integral part of the outer ring, and the bearings have an annular groove and one or more lubrication holes in the outer ring (fig. 17).

- are generally designed as single row bearings, with the exception of RNA 69 (fig. 18) and NA 69 series double row bearings with  $D \geq 52$  mm ( $F_w \geq 40$  mm)

The roller and cage assembly and outer ring of a needle roller bearing with flanges form a non-separable unit.

### Needle roller bearings with machined rings, without flanges

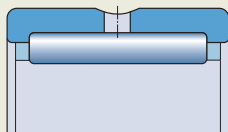
- are separable, i.e. the outer ring, needle roller and cage assembly, and inner ring, can all be mounted separately (fig. 19)
  - Needle roller and cage assemblies can, depending on the arrangement design, either be mounted:
    - together with the outer ring
    - together with the shaft
    - together with the inner ring
    - between the outer ring and shaft or inner ring as the final step
  - However, needle roller and cage assemblies and bearing outer rings must always be kept together as supplied.
- are generally designed with one needle roller and cage assembly
  - However, wide sizes incorporate two needle roller and cage assemblies immediately adjacent to each other and have an annular groove and a lubrication hole in the outer ring (fig. 20).

### Arrangements with other bearings

To accommodate combined radial and axial loads, needle roller bearings with machined rings can be combined with a needle roller thrust bearing with a centring flange, AXW series, if the outside diameter  $D$  of the radial bearing is equal to the flange diameter  $D_1$  of the thrust bearing (fig. 21, and *Needle roller thrust bearings*, page 895).

Fig. 17

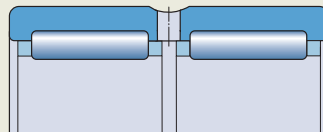
Needle roller bearing with integral flanges in the outer ring



NK ( $F_w \geq 12$  mm)  
NKS  
RNA 48, RNA 49  
RNA 69 ( $F_w \leq 35$  mm)

Fig. 18

Double row needle roller bearing with flanges



RNA 69 ( $F_w \geq 40$  mm)

Fig. 19

Separable design

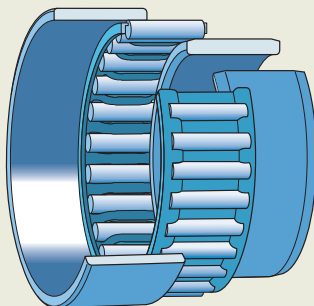


Fig. 20

Double row needle roller bearing without flanges

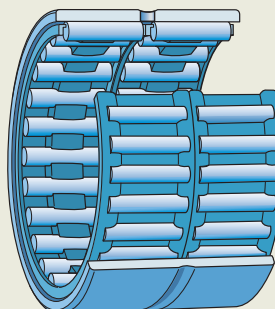
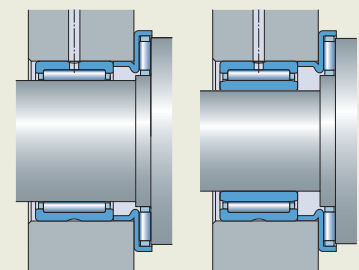


Fig. 21

Needle roller bearing with a needle roller thrust bearing



Without an inner ring

With an inner ring





## Alignment needle roller bearings

SKF alignment needle roller bearings have an outer ring with a sphered (convex) outside surface. Two polymer seating rings with a sphered (concave) inside surface are encased in a drawn sheet steel sleeve and fitted over the outer ring.

SKF supplies alignment needle roller bearings with or without an inner ring (fig. 22).

### Bearings with an inner ring

- should be used in applications where the shaft cannot be hardened and ground
- have limited permissible axial displacement of the shaft relative to the housing (product table, page 650), which can be extended, if needed, by using a wide inner ring (Needle roller bearing inner rings, page 593)

### Bearings without an inner ring

- are an excellent choice for compact bearing arrangements, if the shaft can be hardened and ground.

## Combined needle roller bearings

SKF combined needle roller bearings consist of a radial needle roller bearing combined with a thrust bearing. They can accommodate both radial and axial loads. They are particularly suitable for applications where other types of locating bearing arrangements occupy too much space, or where the axial loads are too heavy, the speeds are too high, or the lubricant is inadequate for arrangements with simple thrust washers. SKF supplies combined needle roller bearings in the following basic designs:

- needle roller / angular contact ball bearing
- needle roller / thrust ball bearing
- needle roller / cylindrical roller thrust bearing

Relubrication intervals for the radial and thrust part of the bearing must be calculated separately. The shorter of the two intervals should be used. For additional information about lubrication, refer to *Lubrication*, page 110.

## Needle roller / angular contact ball bearings

SKF supplies needle roller / angular contact ball bearings without seals in two series (fig. 23):

- NKIA 59 series bearings can accommodate axial loads in one direction
- NKIB 59 series bearings can accommodate axial loads in both directions

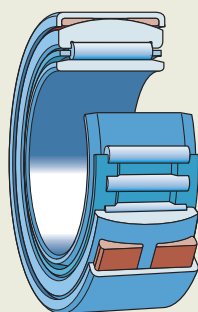
These combined bearings:

- consist of a radial needle roller bearing and an angular contact ball bearing
- accommodate heavy radial loads, carried exclusively by the needle roller bearing
- accommodate light axial loads, carried exclusively by the angular contact ball bearing
- are low cross section bearings
- can operate at high speeds
- are separable, i.e. the inner ring can be mounted separately from the outer ring and rolling element and cage assemblies
- can be grease or oil lubricated, depending on the application

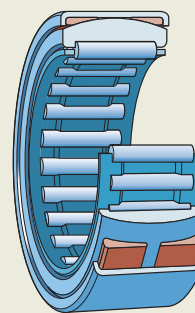
In the case of grease lubrication, both the needle roller and angular contact ball bearings should be filled with the same lubricant prior to mounting.

Fig. 22

Alignment needle roller bearing



With an inner ring, PNA



Without an inner ring, RPNA

### NKIA series bearings

- can accommodate axial loads in one direction and, therefore, locate the shaft in one direction only
- can be mounted back-to-back (fig. 24), for short shafts and where changes in length due to thermal expansion are relatively minor

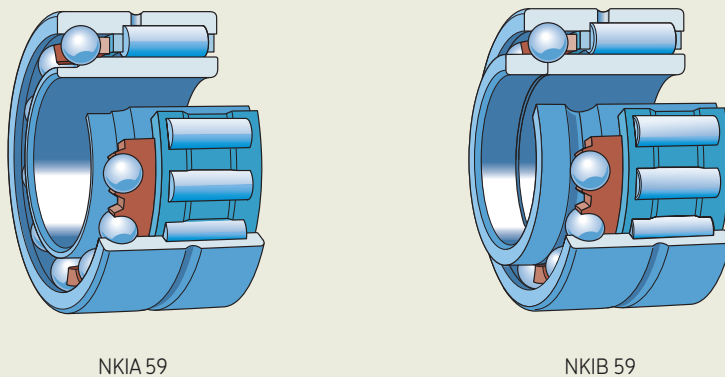
### NKIB series bearings

- can locate the shaft in both directions
- have axial clearance, between 0,08 and 0,25 mm
- have a two-piece inner ring to facilitate mounting
 

When mounting the inner ring, it is important that the two pieces are axially clamped to one another.
- have inner rings, which are not interchangeable with those from another seemingly identical bearing (keep together as supplied)

Fig. 23

Needle roller / angular contact ball bearing

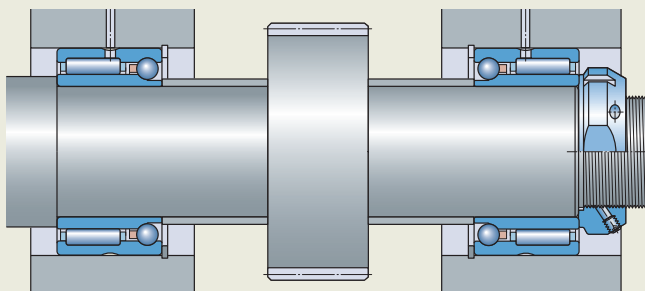


NKIA 59

NKIB 59

Fig. 24

NKIA series bearings arranged back-to-back



## Needle roller / thrust ball bearings

SKF supplies needle roller / thrust ball bearings in two series (fig. 25):

- NX series with a full complement thrust ball bearing
- NKX series with a thrust ball bearing with a cage

These combined bearings:

- consist of a radial needle roller bearing and a thrust ball bearing
- are supplied without an inner ring
- can be combined with an inner ring (fig. 26), where the shaft cannot be hardened and ground (product tables, page 654 and page 656, must be ordered separately)
- can accommodate axial loads in one direction and, therefore, locate the shaft in one direction only

- can be mounted back-to-back (fig. 27), for short shafts and where changes in length due to thermal expansion are relatively minor

For these types of arrangements, SKF recommends preloading the thrust ball bearings with Belleville washers (cup springs). This preload helps to prevent the balls from skidding if one of the thrust bearings becomes unloaded. Preload also improves performance of the thrust ball bearings while reducing noise levels.

## NX series bearings

- consist of a radial needle roller bearing and a full complement thrust ball bearing (fig. 28)
- are suitable for applications where there are moderate radial loads and lighter, single direction axial loads
- have low cross-sectional height, which enables shaft centrelines to be positioned close together like for multi-spindle drills
- can be mounted with a snap ring, or against a shoulder in the housing bore, for axial support

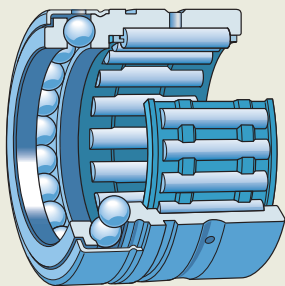
The snap ring groove in the outer ring provides a cost-effective and axially space-saving solution (fig. 29 and product tables, 7.8, page 654).

- are most often oil lubricated and therefore supplied without grease
- have a stamped steel cover that
  - extends over the shaft washer of the full complement thrust ball bearing
  - is firmly attached to the radial needle roller bearing
  - makes these bearings non-separable
  - has lubrication holes as standard
  - has no lubrication holes for bearings with designation suffix Z (fig. 28)

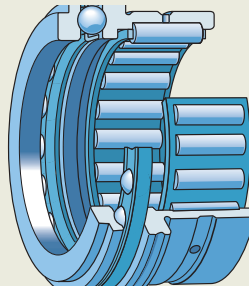
These bearings can be grease lubricated.

Fig. 25

Needle roller / thrust ball bearing



Full complement thrust bearing, NX



Thrust bearing with a cage, NKX

Fig. 26

NX series bearing with an inner ring

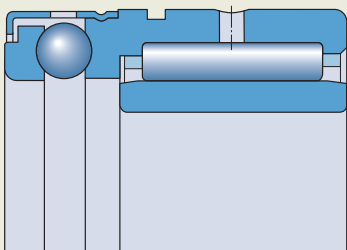
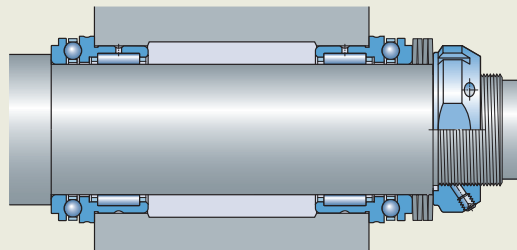


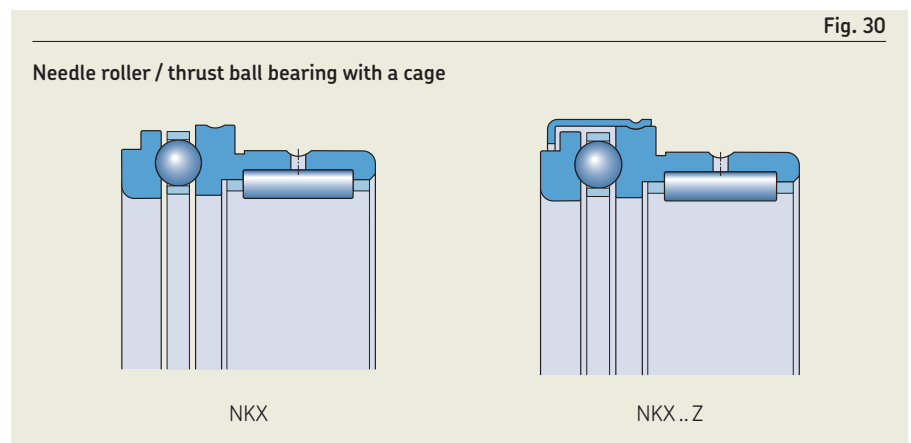
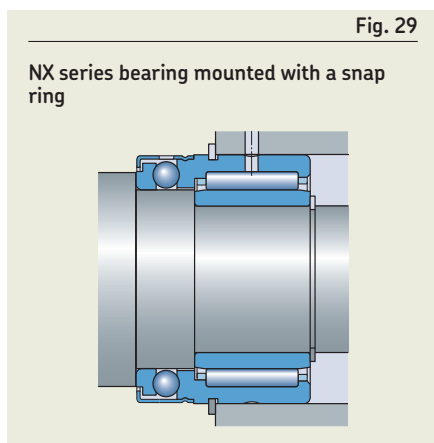
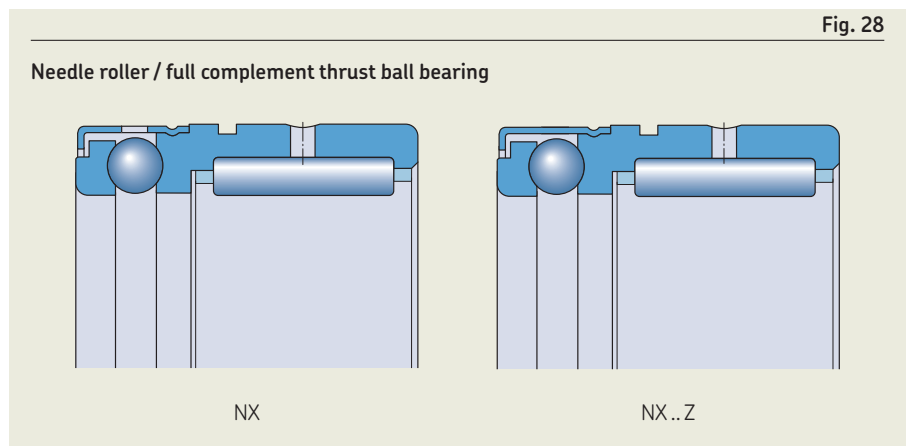
Fig. 27

NKX series bearings arranged back-to-back, incorporating Belleville washers



### NKX series bearings with a cage

- consist of a radial needle roller bearing and a thrust ball bearing with a ball and cage thrust assembly identical to the 511 series (fig. 30)
- permit relatively high-speed operation
- are located axially in one direction by the outer ring flange
- can be mounted separately from both the ball and cage assembly and shaft washer
- should be oil lubricated, as there is no cover that retains the grease in the bearing
- have no stamped steel cover, as standard
- have a stamped steel cover for bearings with designation Z (fig. 30) that
  - has no lubrication holes
  - extends over the shaft washer of the thrust ball bearing
  - is firmly attached to the housing washer that is integral to the needle roller bearing outer ring
  - makes these bearings non-separable



## Needle roller / cylindrical roller thrust bearings

SKF supplies needle roller / cylindrical roller thrust bearings in the NKXR series (fig. 31).

These combined bearings:

- consist of a radial needle roller bearing and a cylindrical roller thrust bearing
- The cylindrical roller and cage thrust assembly is identical to the 811 series.
- are supplied without an inner ring
- can be combined with an inner ring (fig. 32), where the shaft cannot be hardened and ground (product table, page 658, must be ordered separately)
- can accommodate axial loads in one direction
- can locate the shaft in one direction only
- can be mounted back-to-back (fig. 33) for short shafts and where changes in length due to thermal expansion are relatively minor

For these types of arrangements, SKF recommends preloading the thrust ball bearings with Belleville washers (cup springs). This elastic preload helps to prevent the balls from skidding if one of the thrust bearings becomes unloaded. Preload also improves performance of the thrust ball bearings while reducing noise levels.

### NKXR series bearings

- are separable
  - can be mounted separately from both the cylindrical roller and cage thrust assembly and the shaft washer
  - should be oil lubricated, as oil facilitates an adequate supply of lubricant to the bearing
  - have no stamped steel cover, as standard
- have a stamped steel cover for bearings with designation suffix Z (fig. 34) that
    - has no lubrication holes
    - extends over the shaft washer of the cylindrical roller thrust bearing
    - is firmly attached to the housing washer that is integral to the needle roller bearing outer ring
    - makes these bearings non-separable

Fig. 31

Needle roller / cylindrical roller thrust bearing

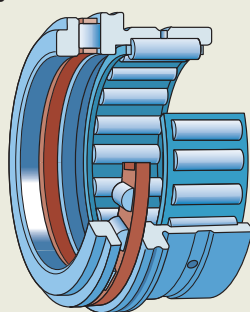


Fig. 32

NKXR .. Z bearing with an inner ring

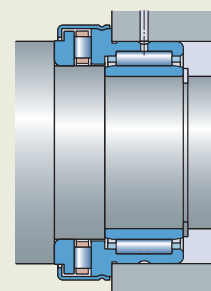


Fig. 33

NKXR series bearings arranged back-to-back, incorporating Belleville washers

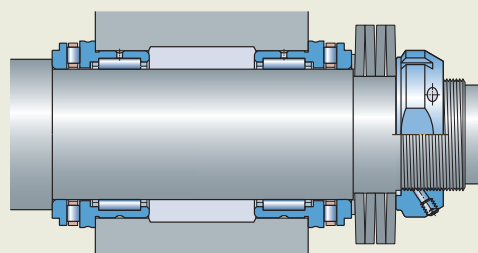
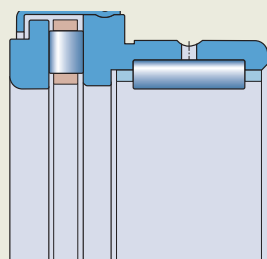


Fig. 34

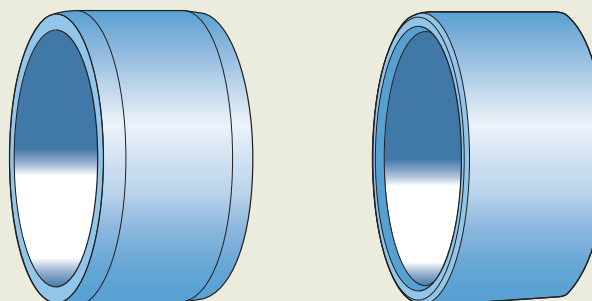
Needle roller / cylindrical roller thrust bearing



NKXR .. Z

Fig. 35

Inner rings



IR

LR

# Needle roller bearing components

## Needle roller bearing inner rings

SKF supplies inner rings for needle roller bearings separately. They are typically combined with needle roller and cage assemblies (page 583) or drawn cup needle roller bearings (page 584) in applications where the shaft cannot be hardened and ground.

Inner rings are available in two series (fig. 35):

- IR series
  - with or without a lubrication hole
  - with or without a machining allowance
- LR series

Both inner ring series:

- are also available in different widths
- permit greater axial displacement of the shaft, relative to the housing, when they are wider than standard
  - provide an excellent counterface for the lips of contact seals (fig. 12, page 586)
- should be located on both sides to prevent axial movement (regardless of whether the ring has an interference or loose fit)
  - one side can be located against a shoulder
  - the other side can be located by either a snap ring, a distance ring or a nut

## IR series inner rings

- are the standard SKF inner rings for needle roller bearings
- are hardened and ground
- have a precision ground raceway surface with a lead-in chamfer on both sides

The chamfers facilitate assembly and protect the seal lips from damage during the mounting process.

- are available in some sizes with a lubrication hole (designation suffix IS1, fig. 36)

Inner rings with additional lubrication holes are available on request.

- are available on request with a pre-ground raceway and a machining allowance (designation suffix VGS, table 2)

They can be finish ground after mounting on a shaft in applications where extremely tight geometrical tolerances are required.

## LR series inner rings

- are hardened, and the bore and raceway diameter are ground
- side faces are turned and the edges are smoothed
- can be used to provide a cost-effective bearing arrangement for applications where the larger run-out and width tolerances are less important

## Needle rollers

Needle rollers can be used to design full complement bearing arrangements for low-speed or oscillating applications. These compact bearing arrangements have a very high load carrying capacity when compared to bearings with a cage and are economical, provided the shaft and housing bore can serve as raceways (*Raceways on shafts and in housings*, page 179).

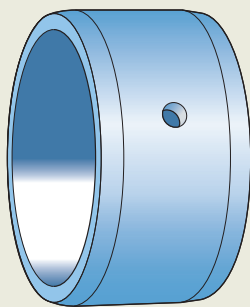
Needle rollers:

- are not listed in this catalogue, but can be found online at [skf.com/go/17000-7-12](http://skf.com/go/17000-7-12)
- are made of carbon chromium steel
- have a hardness of 58 to 65 HRC
- have a precision ground surface

For assistance in designing full complement bearing arrangements or to calculate performance data for these bearing arrangements, contact the SKF application engineering service.

Fig. 36

Inner ring with a lubrication hole



IR .. IS1

Table 2

Machining allowance of inner ring raceway diameter

Raceway diameter F	Machining allowance z	Pre-ground raceway diameter F <sub>VGS</sub>
>      ≤		
mm	mm	mm
–	50	0,10
50	80	0,15
80	180	0,20
180	250	0,25
250	315	0,30
315	400	0,35
400	500	0,40

F<sub>VGS</sub> = F + z  
(tolerance class h7(ⓔ))

## Sealing solutions

### Associated external seals

- can be used for needle roller bearing arrangements (fig. 12, page 586)
- can be supplied in various sizes, as listed in the product tables:
  - Needle roller and cage assemblies, page 614
  - Drawn cup needle roller bearings, page 618
  - Needle roller bearings with machined rings with flanges, without an inner ring, page 624

For information about associated power transmission seals, refer to [skf.com/seals](http://skf.com/seals).

### Capped bearings

SKF supplies certain needle roller bearings capped with a seal or steel cover. The assortment of capped bearings includes:

- drawn cup needle roller bearings, sealed on one or both sides
- needle roller bearings with machined rings in the (R)NA 49 series, sealed on one or both sides
- combined needle roller bearings, capped with a steel cover over the thrust part of the bearing

When capped bearings must operate under certain conditions, such as very high speeds or high temperatures, some grease may leak. For bearing arrangements where this would be detrimental, appropriate actions could be taken.

### Sealed drawn cup needle roller bearings

For applications where a sufficiently effective seal is not available, or cannot be used for space reasons, SKF supplies certain drawn cup needle roller bearings as sealed bearings. The assortment includes:

- drawn cup needle roller bearings with open ends (fig. 37)
  - available for  $8 \leq F_w \leq 50$  mm
  - sealed on one side (designation suffix RS)
  - sealed on both sides (designation suffix .2RS)
- sealed drawn cup needle roller bearings with a closed end (designation suffix RS, fig. 38)
  - available for  $10 \leq F_w \leq 25$  mm

These integral contact seals are made of PUR, FKM or NBR. Sealed drawn cup needle roller bearings are, under normal conditions and with appropriate counterface, an extremely cost-effective solution to exclude solid contaminants and moisture, and retain the lubricant in the bearing.

#### ⚠ WARNING

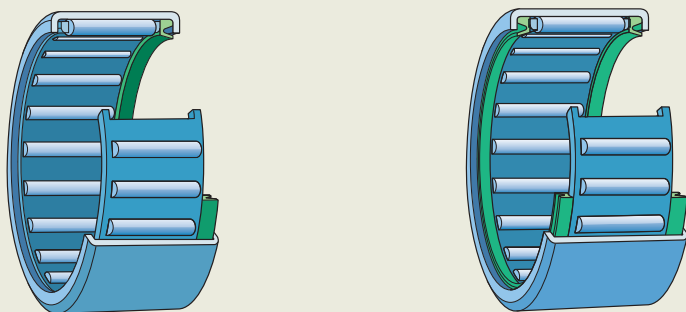
Seals made of FKM (fluoro rubber) exposed to an open flame or temperatures above 300 °C (570 °F) are a health and environmental hazard! They remain dangerous even after they have cooled.

Read and follow the safety precautions on page 197.



Fig. 37

Sealed drawn cup needle roller bearing with open ends

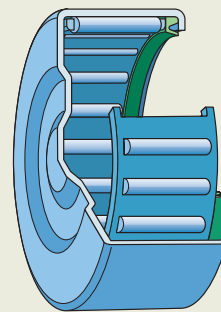


HK..RS

HK...2RS

Fig. 38

Sealed drawn cup needle roller bearing with a closed end



BK..RS

### Sealed needle roller bearings with machined rings

- are available in the (R)NA 49 series with a contact seal made of NBR (effective at keeping the lubricant in and contaminants out of the bearing) on one (designation suffix RS) or both sides (designation suffix .2RS) (fig. 39)
- have an inner ring that is 1 mm wider than the outer ring, which maintains the effectiveness of the seals and simplifies the bearing arrangements even when small axial displacements occur

### Capped combined needle roller bearings

SKF supplies certain combined needle roller bearings capped with a stamped steel cover over the thrust part of the bearing (designation suffix Z). The cover, which has no lubrication holes, forms a gap-type seal to retain

the grease in the bearing. The assortment includes:

- needle roller / full complement thrust ball bearings (fig. 28, page 591)
- needle roller / thrust ball bearings (fig. 30, page 591)
- needle roller / cylindrical roller thrust bearings (fig. 34, page 592)

### Greases for capped bearings

Needle roller bearings with one or two seals are supplied greased. The thrust part of combined needle roller bearings with the designation suffix Z is also supplied greased. They are filled with high-quality grease (table 3) under clean conditions.

The relatively large quantity of grease in the bearings means they can be operated for long periods before relubrication is required. SKF recommends SKF LGWA 2 grease (table 3), if relubrication is required.

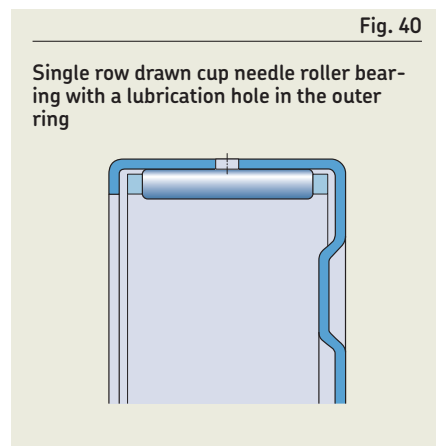
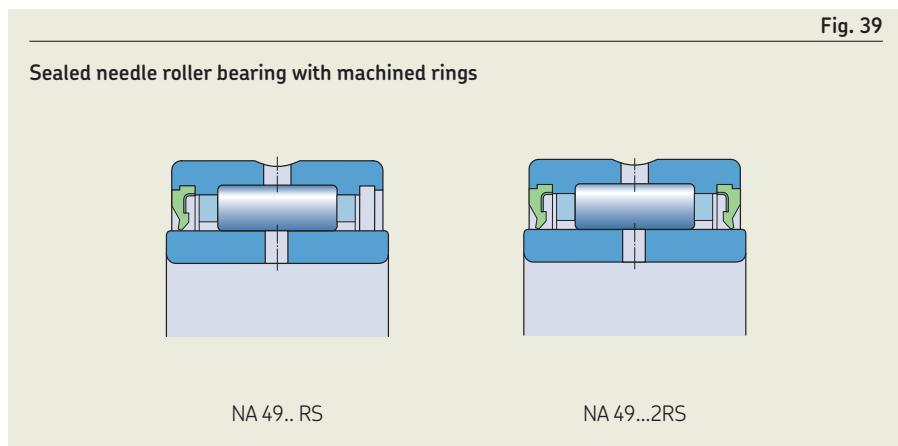
## Relubrication features

SKF supplies needle roller bearings with different features to facilitate effective lubrication and relubrication.

### Drawn cup needle roller bearings

All double row drawn cup needle roller bearings have one lubrication hole in the outer ring (fig. 11, page 585), as standard.

On request, SKF can supply any single row drawn cup needle roller bearing for inside diameters under the rollers  $F_w \geq 7$  mm with a lubrication hole in the outer ring (fig. 40).



**Table 3**

**Technical specifications of greases for capped needle roller bearings**

Grease	Temperature range <sup>1)</sup>								Thickener	Base oil type	NLGI grade	Base oil viscosity [mm <sup>2</sup> /s]	
	-50	0	50	100	150	200	250	°C				at 40 °C (105 °F)	at 100 °C (210 °F)
Initial grease fill									Lithium complex soap	Mineral	2	160	15,5
LGWA 2									Lithium complex soap	Mineral	2	185	15

<sup>1)</sup> Refer to the SKF traffic light concept (page 117).



## 7 Needle roller bearings

### Needle roller bearings with machined rings

- with flanges and  $D \geq 19$  mm ( $F, F_w \geq 12$  mm) have an annular groove and, depending on the bearing size, one or more lubrication holes in the outer ring (fig. 17, page 587)
- with seal(s) have an additional lubrication hole in the inner ring (fig. 39, page 595)
- double row and without flanges have an annular groove with one lubrication hole in the outer ring (fig. 20, page 587)
- without flanges and with an inner ring have one lubrication hole in the inner ring for certain sizes (product table, page 636)

### Combined needle roller bearings

The needle roller bearing used in combined bearings has an annular groove with one lubrication hole in the outer ring.

Needle roller / full complement thrust ball bearings in the NX series without the designation suffix Z have a cover with lubrication holes over the thrust part of the bearing (fig. 28, page 591). Most often they are oil lubricated and, therefore, SKF supplies these bearings without grease.

## Cages

SKF needle roller bearings are fitted with one of the cage designs shown in table 4.

When used at high temperatures, some lubricants can have a detrimental effect on polyamide cages. For additional information about the suitability of cages, refer to *Cages*, page 187.

### Double row needle roller bearings

Double row needle roller and cage assemblies have a double row cage in the same design as a single row cage (fig. 4, page 583).

Other double row needle roller bearings are fitted with two cage assemblies (fig. 11, page 585, and fig. 18, page 587).

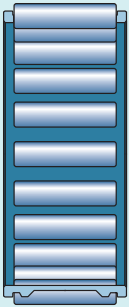
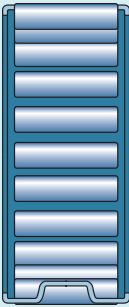
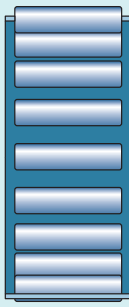

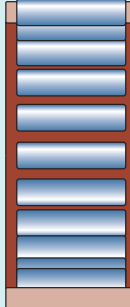



### Cages for needle roller bearings

#### Cages for radial bearings



Cage type	Window-type
Material	Sheet steel or machined steel
Suffix	–
Bearing types	
Needle roller and cage assemblies	Standard
Drawn cup needle roller bearings	–
Needle roller bearings with machined rings	–
Alignment needle roller bearings	–
Needle roller / angular contact ball bearings	–
Needle roller / thrust ball bearings	–
Needle roller / cylindrical roller thrust bearings	–

Table 4

					Cages for thrust bearings		
							
Window-type	Window-type	Window-type	Window-type	Window-type	Window-type	Snap-type	Window-type
Sheet steel or machined steel	Sheet steel	Sheet steel	Sheet steel or machined steel	Glass fibre reinforced PA66	Sheet steel	Glass fibre reinforced PA66	Glass fibre reinforced PA66
-	-	-	-	TN	-	-	-
-	Standard	-	-	Standard	-	-	-
-	-	Standard	-	Standard	-	-	-
Standard	-	-	Standard	Standard	-	-	-
Standard	-	-	Standard	-	-	-	-
Standard	-	-	Standard	-	-	Standard	-
Standard	-	-	Standard	Standard	Standard	-	-
Standard	-	-	Standard	-	-	-	Standard

# Bearing data

	Needle roller and cage assemblies	Drawn cup needle roller bearings
<b>Dimension standards</b>	ISO 3030 when $F_w \leq 100$ mm, as far as standardized	Boundary dimensions: ISO 3245, as far as standardized
<b>Tolerances</b>	<ul style="list-style-type: none"> <li>• rollers: ISO 3096 Grade 2 (grade G2)               <ul style="list-style-type: none"> <li>– tolerance of each gauge 2 <math>\mu\text{m}</math></li> <li>– standard gauges (<a href="#">table 5, page 601</a>)</li> <li>– specific gauge to be stated when ordering</li> </ul> </li> <li>• U: ISO 3030, as far as standardized (<math>-0,2/-0,8</math> mm)</li> </ul>	ISO 3245, as far as standardized <ul style="list-style-type: none"> <li>• <math>F_w \approx</math> within F8 (<a href="#">table 8, page 602</a>) Measuring of <math>F_w</math>:               <ul style="list-style-type: none"> <li>– bearing must be pressed into a thick-walled ring gauge, bore diameter listed in <a href="#">table 8</a></li> <li>– check deviation of <math>F_w</math> with measuring mandrel</li> </ul> </li> <li>• C: <math>0/-0,3</math> mm</li> </ul>
For additional information → <b>page ##</b>		Dimensional tolerances can be checked only if bearings are mounted.
<b>Operating clearance</b>	Range of C2 to Normal if: <ul style="list-style-type: none"> <li>• fitted with standard gauge rollers (<a href="#">table 5, page 601</a>)</li> <li>• recommended raceway tolerances (<a href="#">table 6, page 601</a>) applied</li> <li>• normal operating conditions</li> </ul>	Range of C2 to C3 if recommended tolerances ( <a href="#">table 17, page 610</a> ) applied
<b>Internal clearance</b>	Specific ranges: <a href="#">table 7, page 602</a>	–
<b>Permissible misalignment</b>	$\approx 1$ minute of arc  Misalignment increases bearing noise and reduces bearing service life, ...	$\approx 1$ minute of arc

Needle roller bearings with machined rings	Alignment needle roller bearings
Boundary dimensions: ISO 1206 for bearings in the (R)NA 48, (R)NA 49 and (R)NA 69 series	d, D: ISO 15 D ≤ 47 mm → diameter series 0 D ≥ 55 mm → diameter series 9
Normal P6 or P5 on request <ul style="list-style-type: none"> <li>F<sub>w</sub>: F6 (table 9, page 603) Values are valid for unmounted bearings when rollers are in contact with the outer ring raceway.</li> </ul> Tighter tolerance for inside diameter under the rollers on request (designation suffix H followed by two numbers that identify the tolerance limit, e.g. H+24+20).  Values: ISO 492 (table 2, page 38, to table 4, page 40)	<ul style="list-style-type: none"> <li>Normal for the inner ring and the outer ring with sphered outside surface</li> <li>C of the external drawn sheet steel sleeve: ± 0,5 mm</li> <li>F<sub>w</sub>: F6 (table 9, page 603) Values are valid for unmounted bearings and when rollers are in contact with the outer ring raceway.</li> </ul> Values: ISO 492 (table 2, page 38)
<b>Bearings without an inner ring</b> Suitable ranges (table 10, page 603) where: <ul style="list-style-type: none"> <li>recommended shaft tolerance classes applied</li> <li>housing bore tolerance not tighter than K7<sup>Ⓔ</sup></li> </ul>	<b>Bearings without an inner ring</b> Range of C2 to C3 if recommended tolerances (table 17, page 610) applied
Normal (bearings with an inner ring) Check availability of C2, C3 or C4 clearance classes  Values: ISO 5753-1 (table 11, page 603) Values are valid for unmounted bearings under zero measuring load.	
≈ 1 minute of arc	≤ 3° static misalignment No dynamic misalignment

... and when it exceeds the guideline value these effects become particularly noticeable.

Bearing data, continued			
	Needle roller / angular contact ball bearings	Needle roller / thrust ball bearings	Needle roller / cylindrical roller thrust bearings
<b>Dimension standards</b>	Boundary dimensions: ISO 15 – dimension series 59, except for following inner ring parameters in the NKIB 59 series: <ul style="list-style-type: none"> <li>extended width on one side</li> <li>slightly larger bore diameter of the narrow part</li> </ul>	Boundary dimensions: DIN 5429-1, except for NX and NX..Z series bearings (not standardized)	Boundary dimensions: DIN 5429-1
<b>Tolerances</b>	Normal, except for width of the complete inner ring in the NKIB 59 series: 0/−0,3 mm  Values: ISO 492 (table 2, page 38)	D: Normal F <sub>w</sub> : F6 (table 9, page 603) d: E8 (table 9) C: 0/−0,25 mm C <sub>1</sub> (applicable to NKX(R) series only): 0/−0,2 mm  Values: Radial bearings → ISO 492 (table 2, page 38) Thrust bearings → ISO 199 (table 10, page 46)	
For additional information → page ##			
<b>Operating clearance</b>	–	<b>Bearings without an inner ring</b> Range slightly less than Normal if recommended tolerances (table 17, page 610) applied	
<b>Internal clearance</b>	Normal (bearings with an inner ring) Check availability of C2, C3 or C4 clearance classes  Values: ISO 5753-1 (table 11, page 603) Values are valid for unmounted bearings under zero measuring load.	–	
<b>Permissible misalignment</b>	Misalignment increases bearing noise and reduces bearing service life.	Cannot tolerate any misalignment.	

Bearing data, continued

	Needle roller bearing inner rings		Needle rollers
	IR series	LR series	
<b>Dimension standards</b>	–		ISO 3096, except for RN-2x6.3 BF/G2 that is not standardized
<b>Tolerances</b> For additional information → page ##	Normal Values: ISO 492 (table 2, page 38), except for raceway tolerances (table 12, page 604)	F: h6 B: h12 d: K6 Values: table 13, page 604	ISO 3096 Grade 2 for flat end needle rollers Available tolerances (table 14, page 604)
<b>Operating clearance</b>	Depends on the bearing type with which the inner ring is combined.		–
<b>Internal clearance</b>	Depends on the bearing type with which the inner ring is combined.		–

**Table 5**

Needle roller gauges	
Gauge type	Gauge
–	µm
Standard gauges	0/-2 -1/-3 -2/-4 -3/-5 -4/-6 -5/-7

For additional gauges available on request, contact SKF.

**Table 6**

Raceway tolerance classes for needle roller and cage assemblies				
Shaft Nominal diameter		Housing/shaft tolerance classes for operating clearance <sup>1)</sup>		
>	≤	lower side	medium	higher side
mm		–		
–	<b>80</b>	G6/f5 H6/h5	G6/h5 H6/g5	G6/g6 H6/f6
<b>80</b>	<b>120</b>	G6/h5	G6/g5	G6/f6
<b>120</b>	–	G6/h5 –	G6/g5 H6/f5	G6/f6 H6/e6

<sup>1)</sup> The envelope requirement (symbol  $\text{E}$  from ISO 14405-1) is not shown but applies to all tolerance classes.

Table 7

## Mounting scheme – example

Needle roller and cage assembly: K 16x22x12  
 Housing bore diameter: 22H6 (E) [mm], deviation 0/+13 µm  
 Shaft diameter: 16h5 (E) [mm], deviation 0/-8 µm

Shaft diameter Deviation group	Housing bore diameter							
	0 to +3		+3 to +6		+6 to +9		+9 to +13	
	Needle roller gauge limits	Radial internal clearance	Needle roller gauge limits	Radial internal clearance	Needle roller gauge limits	Radial internal clearance	Needle roller gauge limits	Radial internal clearance
µm	µm							
<b>0 to -3</b>					-5/-7	18-24	-3/-5	17-24
<b>-3 to -6</b>			-5/-7	18-24	-3/-5 -4/-6	17-25	-2/-4	18-25
<b>-6 to -8</b>	-5/-7 -6/-8	18-25	-3/-5 -4/-6	17-24	-2/-4 -3/-5	18-25	0/-2 -1/-3	17-25

The mean value of the needle roller gauge should be used to calculate the internal clearance, e.g. -6 µm for the gauge -5 to -7 µm.

Table 8

## Tolerances for drawn cup needle roller bearings

Bearing Inside diameter $F_w$	Outside diameter D	Ring gauge Bore diameter (measured)	Deviations from nominal inside diameter		Bearing Inside diameter $F_w$	Outside diameter D	Ring gauge Bore diameter (measured)	Deviations from nominal inside diameter	
			U	L				U	L
mm	mm	mm	µm		mm	mm	mm	µm	
<b>3</b>	6,5	6,484	+24	+6	<b>18</b>	24	23,976	+34	+16
<b>4</b>	8	7,984	+28	+10	<b>20</b>	26	25,976	+41	+20
<b>5</b>	9	8,984	+28	+10	<b>22</b>	28	27,976	+41	+20
<b>6</b>	10	9,984	+28	+10	<b>25</b>	32	31,972	+41	+20
<b>7</b>	11	10,980	+31	+13	<b>28</b>	35	34,972	+41	+20
<b>8</b>	12	11,980	+31	+13	<b>30</b>	37	36,972	+41	+20
<b>9</b>	13	12,980	+31	+13	<b>32</b>	39	38,972	+50	+25
<b>10</b>	14	13,980	+31	+13	<b>35</b>	42	41,972	+50	+25
<b>12</b>	16	15,980	+34	+16	<b>40</b>	47	46,972	+50	+25
<b>12</b>	18	17,980	+34	+16	<b>45</b>	52	51,967	+50	+25
<b>13</b>	19	18,976	+34	+16	<b>50</b>	58	57,967	+50	+25
<b>14</b>	20	19,976	+34	+16	<b>55</b>	63	62,967	+60	+30
<b>15</b>	21	20,976	+34	+16	<b>60</b>	68	67,967	+60	+30
<b>16</b>	22	21,976	+34	+16					
<b>17</b>	23	22,976	+34	+16					

Table 9

ISO tolerance classes					
Nominal diameter		E8 <sup>Ⓔ</sup> Deviation		F6 <sup>Ⓔ</sup> Deviation	
>	≤	U	L	U	L
mm		μm		μm	
–	3	–	–	+12	+6
3	6	–	–	+27	+10
6	10	+47	+25	+33	+13
10	18	+59	+32	+27	+16
18	30	+73	+40	+33	+20
30	50	+89	+50	+41	+25
50	80	+106	+60	+49	+30
80	120	–	–	+58	+36
120	180	–	–	+68	+43
180	250	–	–	+79	+50
250	315	–	–	+88	+56
315	400	–	–	+98	+62
400	500	–	–	+108	+68

Table 10

Shaft tolerance classes for machined needle roller bearings without an inner ring

Nominal inside diameter F <sub>w</sub>		Shaft tolerance classes <sup>1)</sup> for shaft raceways to give operating clearance		
>	≤	lower side	medium	higher side
mm		–		
–	65	k5	h5	g6
65	80	k5	h5	f6
80	160	k5	g5	f6
160	180	k5	g5	e6
180	200	j5	g5	e6
200	250	j5	f6	e6
250	315	h5	f6	d6
315	400	g5	f6	d6

<sup>1)</sup> The envelope requirement (symbol <sup>Ⓔ</sup> from ISO 14405-1) is not shown but applies to all tolerance classes.

Table 11

Radial internal clearance for needle roller bearings

Bore diameter d		Radial internal clearance							
>	≤	C2		Normal		C3		C4	
		min.	max.	min.	max.	min.	max.	min.	max.
mm		μm							
–	30	0	25	20	45	35	60	50	75
30	40	5	30	25	50	45	70	60	85
40	50	5	35	30	60	50	80	70	100
50	65	10	40	40	70	60	90	80	100
65	80	10	45	40	75	65	100	90	125
80	100	15	50	50	85	75	110	105	140
100	120	15	55	50	90	85	125	125	165
120	140	15	60	60	105	100	145	145	190
140	160	20	70	70	120	115	165	165	215
160	180	25	75	75	125	120	170	170	220
180	200	35	90	90	145	140	195	195	250
200	225	45	105	105	165	160	220	220	280
225	250	45	110	110	175	170	235	235	300
250	280	55	125	125	195	190	260	260	330
280	315	55	130	130	205	200	275	275	350
315	355	65	145	145	225	225	305	305	385
355	400	100	190	190	280	280	370	370	460





Table 12

Inner ring raceway tolerances

Nominal diameter		F		$t_{\Delta F_{mp}}$ for CN and EGS	
>	≤	>	≤	U	L
mm		mm		μm	
–	3	3	6	–10	–27
3	6	6	10	–7	–23
6	10	6	10	–7	–23
6	18	10	18	–4	–18
10	24	18	30	0	–12
18	24	30	50	5	–4
24	30	24	30	0	–12
24	30	30	50	5	–4
30	40	30	50	0	–9
40	50	40	50	–5	–19
40	50	50	80	0	–11
50	65	50	80	–10	–21
65	80	65	80	–10	–26
65	80	80	120	–4	–17
80	100	80	120	–14	–27
100	120	100	120	–14	–32
100	120	120	180	–7	–22
120	140	120	180	–17	–37
140	160	140	180	–27	–52
160	180	160	180	–32	–57
160	180	180	250	–25	–46
180	200	180	250	–40	–66
200	225	200	250	–55	–86
225	250	250	315	–54	–87
250	280	250	315	–69	–107
280	315	315	400	–68	–107
315	335	315	400	–83	–127
355	400	355	400	–128	–182
355	400	400	500	–122	–172

Table 13

ISO tolerance classes for LR series inner rings

Nominal diameter		h6 <sup>Ⓔ</sup>		h12 <sup>Ⓔ</sup>		K6 <sup>Ⓔ</sup>	
>	≤	U	L	U	L	U	L
mm		μm		μm		μm	
6	10	0	–9	–	–	+2	–7
10	18	0	–11	0	–180	+2	–9
18	30	0	–13	0	–210	+2	–11
30	50	0	–16	0	–250	+3	–13
50	80	0	–19	–	–	–	–

Table 14

Dimensional and geometrical tolerances of SKF needle rollers, grade G2

Diameter $D_w$		Gauge tolerance	Gauge limits	Roundness (max. circularity deviation in accordance with ISO 3096)	Length $L_w$ Tolerance class
Deviation	$^w$				
U	L				
μm					–
0	–10	2	0/–2 –1/–3 –2/–4 –3/–5 –4/–6 –5/–7 –6/–8 –7/–9 –8/–10	1	h13 <sup>Ⓔ</sup>

Preferred diameter deviations range from 0 to –7 μm.  
Each gauge is packed separately and marked with the gauge limits, e.g. N/M2 or M2/M4, where M signifies minus and N zero. For a needle roller with a 2 mm nominal diameter and gauge limits M2/M4, the actual diameter is between 1,998 mm and 1,996 mm.





# Loads

	Needle rollers and cage assemblies	Drawn cup needle roller bearings	Needle roller bearings with machined rings	Alignment needle roller bearings
<b>Minimum load</b> For additional information → <a href="#">page 106</a>	$F_{rm} = 0,02 C$			
<b>Equivalent dynamic bearing load</b> For additional information → <a href="#">page 91</a>	$P = F_r$			
<b>Equivalent static bearing load</b> For additional information → <a href="#">page 105</a>	$P_0 = F_r$ For drawn cup needle roller bearings, SKF recommends applying a static safety factor $s_0 \geq 3$ , i.e. $s_0 = C_0/P_0 \geq 3$ .			

## Symbols

A	minimum load factor ( <a href="#">product tables</a> )
C	basic dynamic load rating [kN] ( <a href="#">product tables</a> )
$C_0$	basic static load rating [kN] ( <a href="#">product tables</a> )
$d_m$	bearing mean diameter [mm] = 0,5 (d + D)
$F_a$	axial load [kN]
$F_{am}$	minimum axial load [kN]
$F_r$	radial load [kN]
$F_{rm}$	minimum radial load [kN]
n	rotational speed [r/min]
P	equivalent dynamic bearing load [kN]
$P_0$	equivalent static bearing load [kN]
$s_0$	static safety factor

<b>Combined needle roller bearings</b>		
Thrust part		
Angular contact ball bearing	Thrust ball bearing	Cylindrical roller thrust bearing
$F_{am} = 0,25 \frac{C_0}{1\ 000} \left( \frac{n\ d_m}{100\ 000} \right)^2$	$F_{am} = A \left( \frac{n}{1\ 000} \right)^2$	$F_{am} = 0,0005\ C_0 + A \left( \frac{n}{1\ 000} \right)^2$
<p><math>P = F_a</math></p> <p><math>F_a</math> must not exceed <math>0,25\ F_r</math>.</p>	$P = F_a$	$P = F_a$
<p><math>P_0 = F_a</math></p> <p><math>F_a</math> must not exceed <math>0,25\ F_r</math>.</p>	$P_0 = F_a$	$P_0 = F_a$

# Temperature limits

The permissible operating temperature for needle roller bearings can be limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cages
- the seals
- the seating rings
- the lubricant

Where temperatures outside the permissible range are expected, contact SKF.

## Bearing rings and rolling elements

SKF needle roller bearings, and roller and cage assemblies are heat stabilized up to 120 °C (250 °F).

Drawn cup needle roller bearings are heat stabilized up to 140 °C (285 °F).

## Cages

Steel cages can be used at the same operating temperatures as the bearing rings and rolling elements. For temperature limits of polymer cages, refer to *Polymer cages*, [page 188](#).

## Seals

The permissible operating temperature for seals depends on the seal material:

- NBR: -40 to +100 °C (-40 to +210 °F)  
Temperatures up to 120 °C (250 °F) can be tolerated for brief periods.
- PUR: -30 to +100 °C (-20 to +210 °F)
- FKM: -30 to +200 °C (-20 to +390 °F)  
Temperatures up to 230 °C (445 °F) can be tolerated for brief periods.

Typically, temperature peaks are at the seal lip.

## Seating rings

The permissible operating temperature for seating rings is -30 to +100 °C (-20 to +210 °F).

## Lubricants

Temperature limits for greases used in capped needle roller bearings are provided in [table 3, page 595](#), and for full complement drawn cup needle roller bearings in [table 1, page 585](#). For temperature limits of other SKF greases, refer to *Selecting a suitable SKF grease*, [page 116](#).

When using lubricants not supplied by SKF, temperature limits should be evaluated according to the SKF traffic light concept ([page 117](#)).

# Permissible speed

The speed ratings in the **product tables** indicate:

- the **reference speed**, which enables a quick assessment of the speed capabilities from a thermal frame of reference
- the **limiting speed**, which is a mechanical limit that should not be exceeded unless the bearing design and the application are adapted for higher speeds

For additional information, refer to *Operating temperature and speed*, [page 129](#).

# Design considerations

For general information, refer to *Bearing interfaces*, page 140.

## Abutment dimensions

### Needle roller and cage assemblies

Appropriate abutment diameters are provided in [table 15](#).

Recommendations for surfaces of adjacent machine components that guide needle roller and cage assemblies axially:

- fine turned and polished
- hardened and ground for high-speed operations
- no interruptions

For less demanding applications, snap rings can be used. Otherwise, use an intermediate ring, e.g. a spring steel washer, between the snap ring and the cage assembly.

### Needle roller bearings with machined rings, without flanges

Appropriate abutment diameters are listed in the [product tables](#).

Recommendations for surfaces of adjacent machine components that guide the cage of needle roller bearings without flanges axially:

- fine turned and polished
- hardened and ground for high-speed operations
- no interruptions

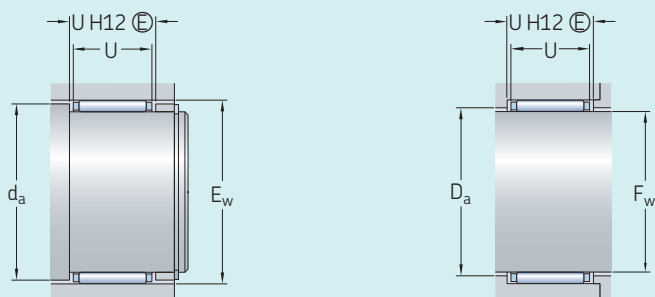
For less demanding applications, snap rings can be used. Otherwise, use an intermediate ring, e.g. a spring steel washer, between the snap ring and the cage assembly.

### Combined needle roller bearings

The diameter of the thrust bearing support surface in the housing should be at least 0,5 mm larger than the dimension  $D_1$  or  $D_2$  ([fig. 41](#) and product tables of *Needle roller / thrust ball bearings*, page 656, and *Needle roller / cylindrical roller thrust bearings*, page 658).

Table 15

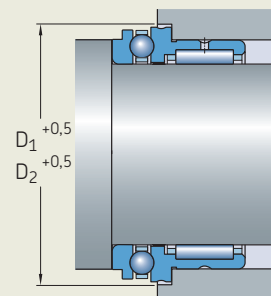
Abutment dimensions for needle roller and cage assemblies



Needle roller and cage assembly Inside diameter $F_w$		Shaft abutment $d_a$	Housing abutment $D_a$
>	≤		
mm		mm	mm
–	25	$E_w - 0,3$	$F_w + 0,4$
25	65	$E_w - 0,5$	$F_w + 0,5$
65	–	$E_w - 1$	$F_w + 1$

Fig. 41

Abutment dimensions, combined needle roller bearing



# Shaft and housing tolerances

The following tables provide tolerance classes to obtain suitable fits and an appropriate operating clearance (page 598) for the following bearings:

- drawn cup needle roller bearings
- needle roller bearings with machined rings
- alignment needle roller bearings
- combined needle roller bearings

Shaft and housing raceway tolerances significantly influence the operating clearance of needle roller and cage assemblies and needle roller bearings with a machined outer ring (without an inner ring) and, therefore, are provided under *Operating clearance*, page 598.

For additional information about raceways, refer to *Raceways on shafts and in housings*, page 179.

## Drawn cup needle roller bearings

Suitable tolerance classes for the housing bore and shaft for bearings with or without an inner ring are provided in table 16.

## Needle roller bearings with machined rings

- Suitable tolerance classes for the shaft for bearings with machined inner and outer rings are provided in table 18.
- Housing seat tolerances for standard conditions are provided in table 8, page 151.

## Alignment needle roller bearings

Suitable tolerance classes for the housing bore and shaft for bearings with or without an inner ring are provided in table 16.

## Combined needle roller bearings

Suitable tolerance classes for the housing bore and shaft for bearings with or without an inner ring are provided in table 17.

Table 16

### Shaft and housing tolerance classes for drawn cup and alignment needle roller bearings

Housing material <sup>1)</sup>	Tolerance classes <sup>2)</sup>		Raceway on the shaft	Shaft inner ring seat
	Housing bore seat <sup>3)</sup>			
Steel, cast iron	N6		h5	k5
Light alloy	R6		h5	k5

<sup>1)</sup> For housings that are not rigid, determine the shaft tolerance by trial and error.

<sup>2)</sup> The envelope requirement (symbol  $\text{E}$  from ISO 14405-1) is not shown but applies to all tolerance classes.

<sup>3)</sup> The geometrical tolerance in accordance with ISO 1101 for the housing bore of drawn cup needle roller bearings must correspond to IT5/2 tolerance grade.

Table 17

### Shaft and housing tolerance classes for combined needle roller bearings

Thrust part	Tolerance class <sup>1)</sup>	
	Housing bore seat	Shaft (raceway and inner ring seat)
Angular contact ball bearing	M6	k5
Thrust ball bearing	K6 <sup>2)</sup>	k5
Cylindrical roller thrust bearing	K6 <sup>2)</sup>	k5

<sup>1)</sup> The envelope requirement (symbol  $\text{E}$  from ISO 14405-1) is not shown but applies to all tolerance classes.

<sup>2)</sup> For stiff bearing arrangements, SKF recommends an M6  $\text{E}$  housing bore tolerance class.

# Mounting

Drawn cup and alignment needle roller bearings should be pressed into the housing bore using a mounting dolly (fig. 42). An O-ring provides a simple means of retaining the bearing on the mounting dolly. The stamped side (side face with the designation) should abut the flange of the mounting dolly.

Special care should be taken to prevent the bearing from skewing or tilting when it is being pressed into the housing. Otherwise the rollers and raceways could easily be damaged.

For grease lubricated bearings, the bearing should be lubricated prior to mounting.

## Paired mounting

If bearings are to be mounted immediately adjacent to each other, the load should be shared equally by both bearings. Therefore, the following need to be considered:

- Full complement needle roller arrangements should incorporate rollers of the same gauge.
- Needle roller and cage assemblies should incorporate rollers of the same gauge
- Drawn cup needle roller bearings should have the same deviations from the nominal inside diameter  $F_w$ .

A delivery of needle rollers of the same nominal diameter may contain packages of one or more gauges. The gauge limits are also printed on the package.

For needle roller and cage assemblies, the deviation from the nominal dimensions of the fitted needle rollers is printed on the package.

For additional information about gauges and inside diameter, refer to *Tolerances*, page 598.

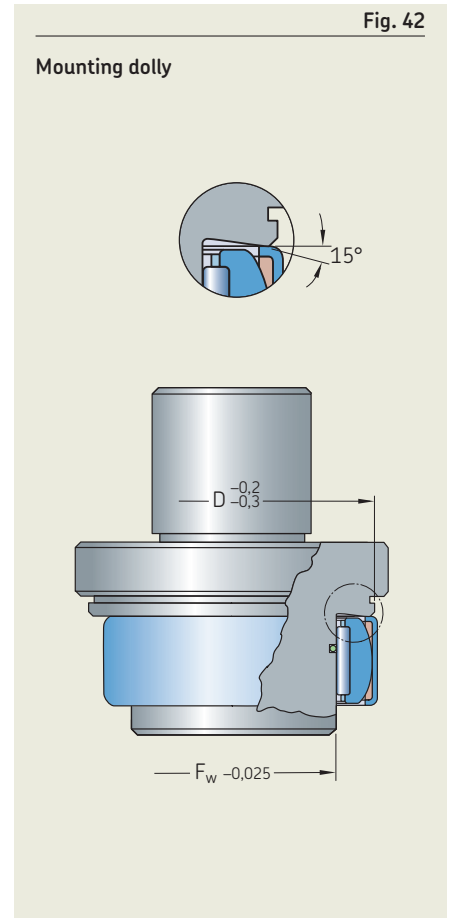


Table 18

### Shaft tolerance classes for needle roller bearings with machined inner and outer rings on solid steel shafts

Conditions	Shaft diameter	Dimensional tolerance <sup>1)</sup>	Total radial run-out Ra tolerance <sup>2)</sup>	Ra
–	mm	–	–	µm
<b>Rotating inner ring load or direction of load indeterminate</b>				
<b>Light and variable loads</b> ( $P \leq 0,05 C$ )				
	$\leq 10$	k5	IT5/2	0,4
	$> 10$ to 25	k6	IT5/2	0,8
	$> 25$ to 100	m6	IT5/2	0,8
<b>Normal to heavy loads</b> ( $0,05 C < P \leq 0,1 C$ )				
	$\leq 25$	k5	IT5/2	0,4
	$> 25$ to 60	m6	IT5/2	0,8
	$> 60$ to 100	n6	IT5/2	0,8
	$> 100$ to 400	p6 <sup>3)</sup>	IT5/2	1,6
<b>Heavy to very heavy loads</b> ( $P > 0,1 C$ )				
	$> 50$ to 100	n6 <sup>3)</sup>	IT5/2	0,8
	$> 100$ to 200	p6 <sup>3)</sup>	IT5/2	1,6
	$> 200$	r6 <sup>3)</sup>	IT5/2	1,6
<b>Stationary inner ring load</b>				
Easy axial displacement of the inner ring on the shaft desirable		g6	IT5/2	1,6
Easy axial displacement of the inner ring on the shaft unnecessary		h6	IT5/2	1,6

<sup>1)</sup> The envelope requirement (symbol  $\oplus$  from ISO 14405-1) is not shown but applies to all tolerance classes.

<sup>2)</sup> Values listed are for bearings to Normal tolerances.

<sup>3)</sup> Bearings with radial internal clearance greater than Normal may be necessary.



# Designation system



## Prefixes

R Bearing without an inner ring

## Basic designation

**BK** Drawn cup needle roller bearing with a closed end  
**HK** Drawn cup needle roller bearing with open ends  
**HN** Drawn cup needle roller bearing with open ends, full complement  
**IR** Needle roller bearing inner ring  
**K** Needle roller and cage assembly  
**LR** Needle roller bearing inner ring  
**NA 48,**  
**NA 49,**  
**NA 69** Needle roller bearing with machined rings, with flanges, with an inner ring  
**NAO** Needle roller bearing with machined rings, without flanges, with an inner ring  
**NK, NKS** Needle roller bearing with machined rings, with flanges, without an inner ring  
**NKI, NKIS** Needle roller bearing with machined rings, with flanges, with an inner ring  
**NKIA 59,**  
**NKIB 59** Needle roller / angular contact ball bearing  
**NKX** Needle roller / thrust ball bearing  
**NKXR** Needle roller / cylindrical roller thrust bearing  
**NX** Needle roller / full complement thrust ball bearing  
**PNA** Alignment needle roller bearing  
**RN** Needle roller

## Suffixes

### Group 1: Internal design

**BF** Needle roller with flat ends  
**D** Deviating or modified internal design with the same boundary dimensions.  
 Example: K 40x45x17 D (Needle roller and cage assembly with a double split cage)  
**DS** Single split needle roller and cage assembly  
**EGS** Inner ring with a non-directionally ground raceway  
**VGS** Inner ring with a pre-ground raceway and a machining allowance  
**ZW** Double row needle roller and cage assembly (double row cage)

### Group 2: External design (seals, snap ring groove, etc.)

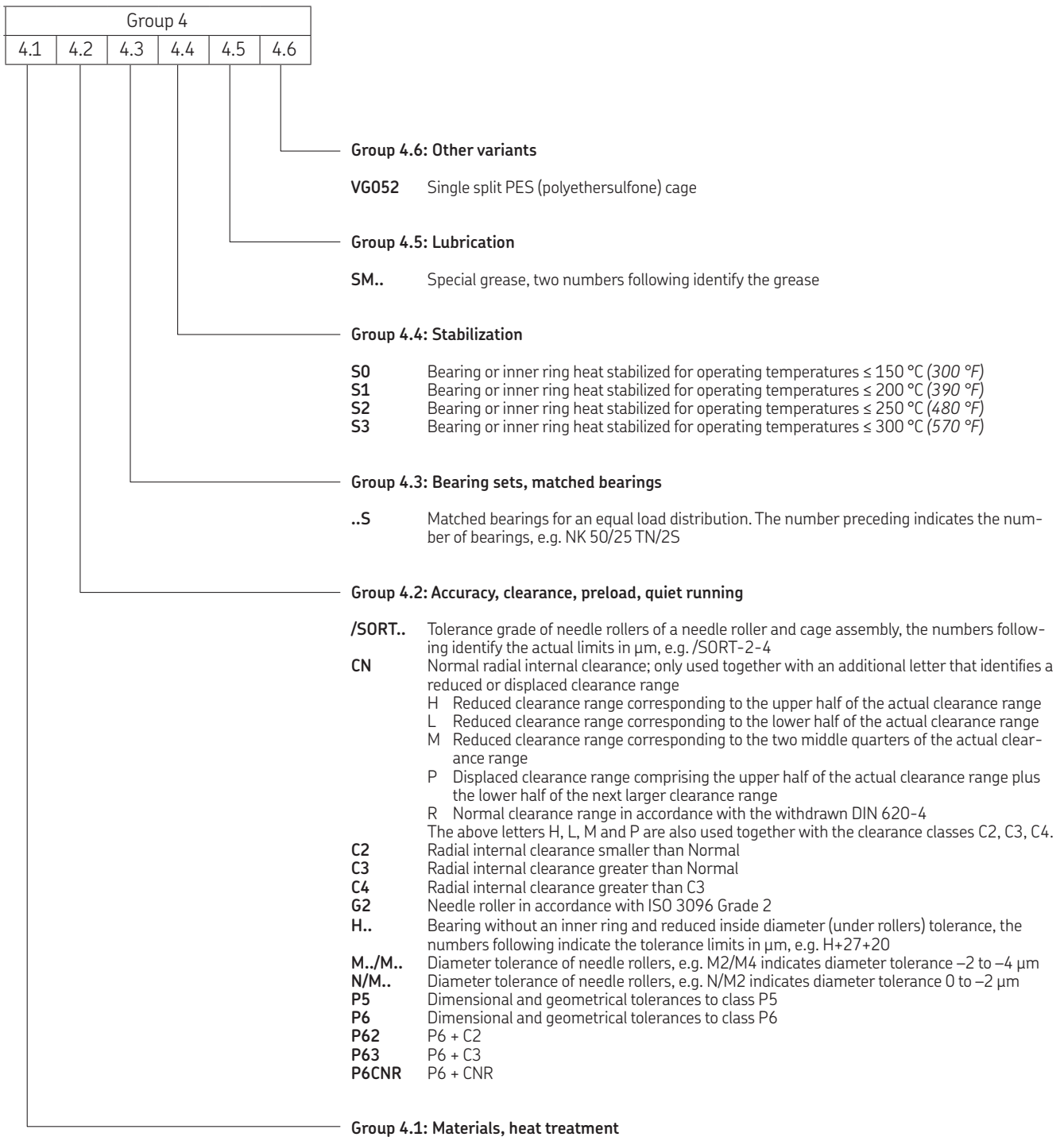
**AS..** Outer ring with lubrication hole(s), the number following indicates the number of holes  
**ASR..** Outer ring with annular groove and lubrication hole(s), the number following indicates the number of holes  
**IS..** Inner ring with lubrication hole(s), the number following indicates the number of holes  
**ISR..** Inner ring with annular groove and lubrication hole(s), the number following indicates the number of holes  
**RS, .2RS** Contact seal on one or both sides, respectively
 

- NBR or FKM or PUR for a drawn cup needle roller bearing
- NBR for a machined needle roller bearing

**Z** Combined needle roller bearing, factory greased thrust bearing with a cover without lubrication holes over the outside diameter

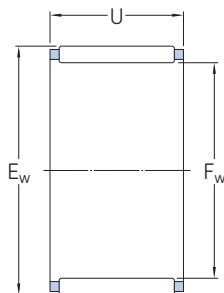
### Group 3: Cage design

**TN** Glass fibre reinforced PA66 cage



## 7.1 Needle roller and cage assemblies

$F_w$  3 – 30 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Associated radial shaft seals <sup>1)</sup>	
$F_w$	$E_w$	U	C	$C_0$	$P_u$	Reference speed	Limiting speed			Single lip	Double lip
mm			kN		kN	r/min		g	–	–	
3	5	7	1,51	1,34	0,134	40 000	45 000	0,3	K 3x5x7 TN	–	–
	5	9	1,68	1,53	0,153	40 000	45 000	0,4	► K 3x5x9 TN	–	–
4	7	7	1,72	1,32	0,137	36 000	43 000	0,5	K 4x7x7 TN	–	–
	7	10	2,29	1,9	0,204	36 000	43 000	0,7	K 4x7x10 TN	–	–
5	8	8	2,29	2	0,212	36 000	40 000	0,7	K 5x8x8 TN	–	–
	8	10	2,92	2,7	0,29	36 000	40 000	0,9	► K 5x8x10 TN	–	–
6	9	8	2,55	2,36	0,25	34 000	38 000	0,8	K 6x9x8 TN	–	–
	9	10	3,3	3,2	0,345	34 000	38 000	1,1	K 6x9x10 TN	–	–
7	10	8	2,81	2,75	0,29	32 000	36 000	0,9	K 7x10x8 TN	–	–
	10	10	3,58	3,75	0,415	32 000	36 000	1	K 7x10x10 TN	–	–
8	11	10	3,8	4,25	0,465	32 000	36 000	1,2	K 8x11x10 TN	–	–
	11	13	5,01	5,85	0,67	32 000	36 000	1,7	K 8x11x13 TN	–	–
	12	10	4,84	4,75	0,54	30 000	34 000	2	K 8x12x10 TN	G 8x12x3	–
9	12	10	4,4	5,2	0,57	30 000	34 000	1,5	K 9x12x10 TN	–	–
10	13	10	4,57	5,7	0,63	28 000	32 000	1,6	► K 10x13x10 TN	–	–
	13	13	5,94	8	0,9	28 000	32 000	2,3	K 10x13x13 TN	–	–
	14	10	5,61	6,1	0,695	28 000	32 000	2,5	K 10x14x10 TN	G 10x14x3	–
	14	13	7,21	8,5	0,98	28 000	32 000	4,6	K 10x14x13 TN	G 10x14x3	–
12	15	10	4,73	6,2	0,695	26 000	30 000	2,9	K 12x15x10 TN	–	–
	15	13	6,16	8,65	0,98	26 000	30 000	2,3	K 12x15x13 TN	–	–
14	17	13	9,13	10,4	1,22	26 000	30 000	4,9	K 12x17x13 TN	–	–
	18	12	9,52	10	1,18	26 000	30 000	6	K 12x18x12 TN	G 12x18x3	SD 12x18x3
14	18	10	6,93	8,65	1	24 000	28 000	4	K 14x18x10	–	–
	18	13	7,92	10,2	1,18	24 000	28 000	6,5	K 14x18x13	–	–
	18	15	9,13	12,5	1,46	24 000	28 000	5	K 14x18x15 TN	–	–
	18	17	10,5	14,6	1,7	24 000	28 000	8	K 14x18x17	–	–
15	19	13	8,25	11,2	1,29	24 000	28 000	7	► K 15x19x13	–	–
	19	17	10,8	15,6	1,86	24 000	28 000	9,5	► K 15x19x17	–	–
	21	15	13,8	16,3	2	24 000	26 000	11	K 15x21x15	G 15x21x3	SD 15x21x3
	21	21	18,7	24,5	3	24 000	26 000	17	K 15x21x21	G 15x21x3	SD 15x21x3

► Popular item

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

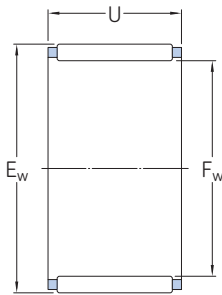
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Associated radial shaft seals <sup>1)</sup>		
F <sub>w</sub>	E <sub>w</sub>	U	dynamic	static		Reference speed	Limiting speed			Single lip	Double lip	
mm			kN		kN	r/min		g	–	–		
16	20	10	7,48	10	1,16	24 000	26 000	5,5	K 16x20x10	–	–	
	20	13	8,58	12	1,37	24 000	26 000	7,5	K 16x20x13	–	–	
	20	17	11,2	17	2	24 000	26 000	10	K 16x20x17	–	–	
	22	12	11	12,5	1,5	22 000	26 000	10	K 16x22x12	G 16x22x3	SD 16x22x3	
	22	16	14,2	17,6	2,12	22 000	26 000	12	K 16x22x16	G 16x22x3	SD 16x22x3	
	22	20	17,6	22,8	2,8	22 000	26 000	17	K 16x22x20	G 16x22x3	SD 16x22x3	
	24	20	20,5	23,6	2,9	22 000	24 000	22	K 16x24x20	G 16x24x3	SD 16x24x3	
	17	21	10	7,81	10,8	1,22	22 000	26 000	5,5	K 17x21x10	–	–
	18	24	12	12,1	15	1,8	20 000	24 000	12	K 18x24x12	G 18x24x3	SD 18x24x3
19	23	13	9,13	13,7	1,6	20 000	24 000	8	K 19x23x13	–	–	
20	24	10	8,58	12,9	1,46	20 000	22 000	6,5	K 20x24x10	–	–	
	24	13	9,52	14,6	1,66	20 000	22 000	9	K 20x24x13	–	–	
	24	17	12,5	20,8	2,4	20 000	22 000	12	K 20x24x17	–	–	
26	17	18,3	26	3,2	19 000	22 000	16	K 20x26x17	G 20x26x4	SD 20x26x4		
	26	20	20,1	29	3,6	19 000	22 000	19	▶ K 20x26x20	G 20x26x4	SD 20x26x4	
	28	20	22,9	28,5	3,45	18 000	20 000	27	K 20x28x20	G 20x28x4	SD 20x28x4	
28	25	29,2	39	4,9	18 000	20 000	32	▶ K 20x28x25	G 20x28x4	SD 20x28x4		
	30	30	34,1	41,5	5,2	17 000	20 000	49	K 20x30x30	–	–	
21	25	13	9,68	15,3	1,76	19 000	22 000	9	K 21x25x13	–	–	
22	26	10	8,8	13,7	1,56	18 000	20 000	7,5	▶ K 22x26x10	–	–	
	26	13	10,1	16,3	1,86	18 000	20 000	9,5	K 22x26x13	–	–	
	26	17	13,2	22,8	2,7	18 000	20 000	12	K 22x26x17	–	–	
28	17	18,3	27	3,25	17 000	20 000	18	K 22x28x17	G 22x28x4	SD 22x28x4		
	29	16	19,4	25,5	3,05	17 000	19 000	16	K 22x29x16	–	–	
	30	15	19	23,6	2,8	17 000	19 000	18	K 22x30x15 TN	G 22x30x4	SD 22x30x4	
23	35	16	24,2	23,2	2,9	15 000	17 000	29	K 23x35x16 TN	–	–	
24	28	10	9,35	15	1,73	17 000	19 000	8,5	K 24x28x10	–	–	
	28	13	10,6	18	2,08	17 000	19 000	10	K 24x28x13	–	–	
	30	17	18,7	27,5	3,4	16 000	18 000	19	K 24x30x17	–	–	
25	29	10	9,52	15,6	1,8	16 000	18 000	8,5	K 25x29x10	–	–	
	29	13	10,8	18,6	2,16	16 000	18 000	11	K 25x29x13	–	–	
	30	17	17,9	30,5	3,6	16 000	18 000	16	K 25x30x17	–	–	
30	20	20,9	36,5	4,4	16 000	18 000	18	K 25x30x20	–	–		
	32	16	19,8	27,5	3,35	15 000	17 000	21	K 25x32x16	G 25x32x4	–	
	33	20	27,5	38	4,65	15 000	17 000	33	K 25x33x20	G 25x33x4	SD 25x33x4	
35	30	44,6	62	7,8	15 000	17 000	65	▶ K 25x35x30	G 25x35x4	SD 25x35x4		
26	30	13	11,2	19,6	2,28	16 000	18 000	11	K 26x30x13	–	–	
28	33	13	14,7	24,5	2,85	14 000	16 000	13	K 28x33x13	–	–	
	33	17	19	33,5	4,05	14 000	16 000	17	K 28x33x17	–	–	
30	35	13	15,1	25,5	3	13 000	15 000	14	K 30x35x13	–	–	
	35	17	18,7	34	4,05	13 000	15 000	19	K 30x35x17	–	–	
	35	27	29,2	60	7,35	13 000	15 000	30	K 30x35x27	–	–	
37	18	25,1	39	4,65	13 000	15 000	30	K 30x37x18	G 30x37x4	SD 30x37x4		
	40	30	46,8	69,5	8,65	12 000	14 000	73	K 30x40x30	G 30x40x4	SD 30x40x4	

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<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

## 7.1 Needle roller and cage assemblies

$F_w$  32 – 100 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Associated radial shaft seals <sup>1)</sup>	
$F_w$	$E_w$	U	C	$C_0$	$P_u$	Reference speed	Limiting speed			Single lip	Double lip
mm			kN		kN	r/min		g	–	–	
32	37	13	14,7	25,5	3	13 000	14 000	18	K 32x37x13	–	–
	37	17	19	35,5	4,25	13 000	14 000	19	K 32x37x17	–	–
	38	20	25,1	45	5,6	12 000	14 000	30	K 32x38x20	–	–
	40	25	35,8	58,5	7,2	12 000	14 000	49	K 32x40x25	–	–
35	40	13	15,4	28	3,25	12 000	13 000	19	K 35x40x13	–	–
	40	17	19,8	39	4,65	12 000	13 000	21	K 35x40x17	–	–
	40	27	23,8	49	6	12 000	13 000	39	K 35x40x27 TN	–	–
	42	16	23,3	37,5	4,5	11 000	13 000	34	K 35x42x16	G 35x42x4	SD 35x42x4
	42	18	26,4	44	5,3	11 000	13 000	34	K 35x42x18	G 35x42x4	SD 35x42x4
	45	20	35,2	50	6,2	11 000	12 000	56	K 35x45x20	G 35x45x4	SD 35x45x4
37	42	17	21,6	43	5,2	11 000	13 000	22	K 37x42x17	–	–
38	43	17	19,8	39	4,65	11 000	12 000	29	K 38x43x17	–	–
	46	32	52,3	100	12,5	10 000	12 000	76	K 38x46x32	–	–
40	45	17	20,5	41,5	5	10 000	12 000	31	K 40x45x17	–	–
	45	27	31,4	73,5	9	10 000	12 000	46	K 40x45x27	–	–
	48	20	34,7	58,5	7,35	10 000	11 000	49	► K 40x48x20	–	–
42	47	17	20,9	43	5,2	10 000	11 000	32	K 42x47x17	–	–
	50	20	33,6	57	7,1	9 500	11 000	53	K 42x50x20	–	–
43	48	17	20,9	43	5,2	9 500	11 000	30	K 43x48x17	–	–
45	50	17	21,6	46,5	5,6	9 000	10 000	34	K 45x50x17	–	–
	50	27	33	81,5	10	9 000	10 000	52	K 45x50x27	–	–
	53	28	49,5	98	12,2	9 000	10 000	81	K 45x53x28	–	–
47	52	17	22,4	49	6	9 000	10 000	35	K 47x52x17	–	–
50	55	20	25,5	60	7,2	8 500	9 500	43	► K 50x55x20	–	–
	55	30	37,4	98	12	8 500	9 500	65	K 50x55x30	–	–
	57	18	31,9	64	7,8	8 000	9 000	47	K 50x57x18	–	–
	58	25	41,8	81,5	10,2	8 000	9 000	90	K 50x58x25	G 50x58x4	SD 50x58x4
55	60	20	27	67	8,15	7 500	8 500	40	K 55x60x20	–	–
	60	30	39,6	108	13,4	7 500	8 500	71	K 55x60x30	–	–
	62	18	34,1	71	8,5	7 500	8 500	52	K 55x62x18	–	–
	63	32	59,4	129	16,3	7 500	8 500	102	K 55x63x32	G 55x63x5	–

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<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

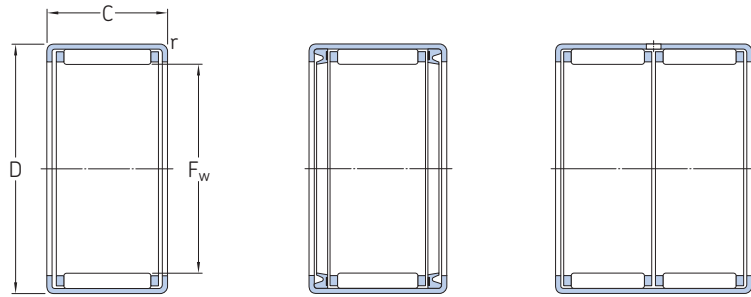
Principal dimensions			Basic load ratings		Fatigue load limit P <sub>u</sub>	Speed ratings		Mass	Designation	Associated radial shaft seals <sup>1)</sup>	
F <sub>w</sub>	E <sub>w</sub>	U	dynamic C	static C <sub>0</sub>		Reference speed	Limiting speed			Single lip	Double lip
mm			kN		kN	r/min		g	–	–	–
<b>60</b>	65	20	28,1	72	8,8	7 000	8 000	52	<b>K 60x65x20</b>	–	–
	68	25	51,2	112	14	6 700	7 500	89	<b>K 60x68x25</b>	–	–
<b>65</b>	73	30	53,9	125	15,6	6 300	7 000	141	▶ <b>K 65x73x30</b>	–	–
<b>70</b>	76	20	34,1	86,5	10,6	6 000	6 700	71	<b>K 70x76x20</b>	–	–
	78	30	57,2	137	17	6 000	6 700	148	<b>K 70x78x30</b>	G 70x78x5	–
<b>75</b>	83	23	47,3	110	13,7	5 300	6 300	124	<b>K 75x83x23</b>	–	–
<b>80</b>	88	30	68,2	176	22	5 000	6 000	138	<b>K 80x88x30</b>	–	–
<b>85</b>	92	20	42,9	108	13,2	4 800	5 600	102	<b>K 85x92x20</b>	–	–
<b>90</b>	97	20	42,9	114	13,7	4 500	5 300	109	<b>K 90x97x20</b>	–	–
	98	30	64,4	173	21,6	4 500	5 300	172	<b>K 90x98x30</b>	–	–
<b>95</b>	103	30	66	180	22,8	4 300	5 000	165	<b>K 95x103x30</b>	–	–
<b>100</b>	108	27	55	143	17,6	4 000	4 800	185	<b>K 100x108x27</b>	–	–

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<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

## 7.2 Drawn cup needle roller bearings

$F_w$  3–17 mm



HK

HK ...2RS

HK (double row)

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$	$P_u$	Reference speed	Limiting speed		
mm			kN		kN	r/min		g	–
3	6,5	6	1,23	0,88	0,088	24 000	26 000	1	▶ HK 0306 TN
4	8	8	1,76	1,37	0,14	22 000	26 000	2	▶ HK 0408
5	9	9	2,38	2,08	0,22	22 000	24 000	2	▶ HK 0509
6	10	8	2,01	1,73	0,18	20 000	22 000	2,1	▶ HK 0608
	10	9	2,81	2,7	0,285	20 000	22 000	2,5	HK 0609
7	11	9	3,03	3,05	0,325	20 000	22 000	2,6	HK 0709
8	12	8	2,7	2,75	0,285	19 000	22 000	2,7	▶ HK 0808
	12	10	3,69	4,05	0,44	19 000	22 000	3	▶ HK 0810
	12	12	2,7	2,75	0,285	–	13 000	3,3	▶ HK 0812.2RS
9	13	8	3,52	3,9	0,415	18 000	20 000	3	▶ HK 0908
	13	10	4,13	4,8	0,53	18 000	20 000	4	▶ HK 0910
	13	12	5,12	6,4	0,72	18 000	20 000	4,6	HK 0912
10	14	10	4,29	5,3	0,57	18 000	20 000	4,1	HK 1010
	14	12	5,39	6,95	0,78	18 000	20 000	4,8	▶ HK 1012
	14	14	4,29	5,3	0,57	–	12 000	4,6	▶ HK 1014.2RS
	14	15	6,6	9	1,02	18 000	20 000	6	▶ HK 1015
12	16	10	4,84	6,4	0,71	16 000	18 000	4,6	▶ HK 1210
	18	12	6,27	7,35	0,85	16 000	18 000	9,5	▶ HK 1212
	18	16	6,27	7,35	0,85	–	10 000	11	▶ HK 1216.2RS
13	19	12	6,6	8	0,915	16 000	17 000	10,5	▶ HK 1312
14	20	12	6,82	8,65	0,98	15 000	17 000	10,5	▶ HK 1412
15	21	12	7,65	9,5	1,08	15 000	16 000	11	▶ HK 1512
	21	16	10,1	14,6	1,7	15 000	16 000	15	▶ HK 1516
	21	22	13	20	2,28	15 000	16 000	20	▶ HK 1522 <sup>1)</sup>
16	22	12	7,37	9,8	1,12	14 000	16 000	12	▶ HK 1612
	22	16	10,5	15,6	1,8	14 000	16 000	16	▶ HK 1616
	22	20	10,5	15,6	1,8	–	9 000	18	HK 1620.2RS
	22	22	12,8	19,6	2,24	14 000	16 000	24	▶ HK 1622 <sup>1)</sup>
17	23	12	7,65	10,6	1,2	14 000	15 000	13	▶ HK 1712

▶ Popular item

<sup>1)</sup> Double row, outer ring with a lubrication hole.

Dimensions		Associated inner rings <sup>1)</sup>		Associated radial shaft seals <sup>2)</sup>	
$F_w$	r min.	IR series	LR series	Single lip	Double lip
mm		–		–	
3	0,3	–	–	–	–
4	0,3	–	–	G 4x8x2 S	–
5	0,4	–	–	G 5x9x2 S	–
6	0,4	–	–	G 6x10x2 S	–
	0,4	–	–	G 6x10x2 S	–
7	0,4	–	–	G 7x11x2 S	–
8	0,4	–	–	G 8x12x3	–
	0,4	IR 5x8x12	–	G 8x12x3	–
	0,4	–	–	–	–
9	0,4	–	–	G 9x13x3	–
	0,4	–	–	G 9x13x3	–
	0,4	IR 6x9x12	–	G 9x13x3	–
10	0,4	IR 7x10x10.5	LR 7x10x10.5	G 10x14x3	–
	0,4	IR 7x10x12	–	G 10x14x3	–
	0,4	–	–	–	–
	0,4	IR 7x10x16	–	G 10x14x3	–
12	0,4	IR 8x12x10.5	LR 8x12x10.5	G 12x16x3	–
	0,8	IR 8x12x12.5	LR 8x12x12.5	G 12x18x3	SD 12x18x3
	0,8	–	–	–	–
13	0,8	IR 10x13x12.5	LR 10x13x12.5	G 13x19x3	–
14	0,8	IR 10x14x13	–	G 14x20x3	SD 14x20x3
15	0,8	IR 12x15x12.5	LR 12x15x12.5	G 15x21x3	SD 15x21x3
	0,8	IR 12x15x16.5	LR 12x15x16.5	G 15x21x3	SD 15x21x3
	0,8	IR 12x15x22.5	LR 12x15x22.5	G 15x21x3	SD 15x21x3
16	0,8	IR 12x16x13	–	G 16x22x3	SD 16x22x3
	0,8	IR 12x16x16	–	G 16x22x3	SD 16x22x3
	0,8	–	–	–	–
	0,8	IR 12x16x22	–	G 16x22x3	SD 16x22x3
17	0,8	–	–	G 17x23x3	SD 17x23x3

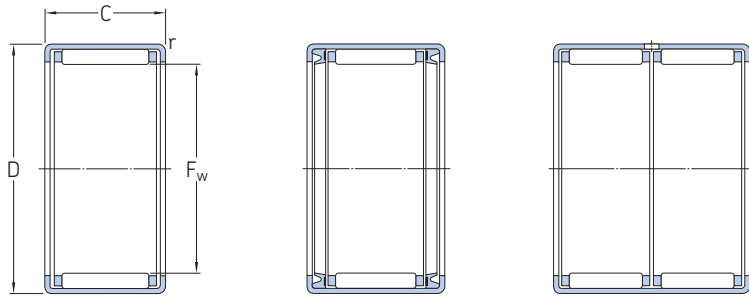
<sup>1)</sup> For additional information → Needle roller bearing inner rings, page 593

<sup>2)</sup> For additional information → [skf.com/seals](http://skf.com/seals)



## 7.2 Drawn cup needle roller bearings

$F_w$  18 – 30 mm



HK

HK ...2RS

HK (double row)

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	dynamic	static		Reference speed	Limiting speed		
mm			C	$C_0$	$P_u$	r/min		g	–
18	24	12	7,92	11,2	1,27	13 000	15 000	13	▶ HK 1812
	24	16	7,92	11,2	1,27	–	8 500	15	▶ HK 1816.2RS
	24	16	11,2	17,6	2,04	13 000	15 000	18	▶ HK 1816
20	26	10	6,16	8,5	0,93	12 000	14 000	12	▶ HK 2010
	26	12	8,42	12,5	1,4	12 000	14 000	14	▶ HK 2012
	26	16	8,42	12,5	1,4	–	8 000	18	▶ HK 2016.2RS
22	26	16	12,3	20,4	2,36	12 000	14 000	19	▶ HK 2016
	26	20	12,3	20,4	2,36	–	8 000	23	▶ HK 2020.2RS
	26	20	15,1	26,5	3,15	12 000	14 000	24	▶ HK 2020
	26	30	20,9	40,5	4,75	12 000	14 000	35	▶ HK 2030 <sup>1)</sup>
25	28	10	7,21	10,6	1,2	11 000	12 000	13	▶ HK 2210
	28	12	8,8	13,7	1,56	11 000	12 000	15	▶ HK 2212
	28	16	8,8	13,7	1,56	–	7 500	18	▶ HK 2216.2RS
	28	16	13	22,4	2,6	11 000	12 000	21	▶ HK 2216
	28	20	13	22,4	2,6	–	7 500	23	▶ HK 2220.2RS
	28	20	15,7	29	3,45	11 000	12 000	26	▶ HK 2220
28	32	12	10,5	15,3	1,76	9 500	11 000	20	▶ HK 2512
	32	16	10,5	15,3	1,76	–	6 700	27	▶ HK 2516.2RS
	32	16	15,1	24	2,85	9 500	11 000	25	▶ HK 2516
	32	20	15,1	24	2,85	–	6 700	31	▶ HK 2520.2RS
	32	20	19	32,5	4	9 500	11 000	33	▶ HK 2520
	32	26	24,2	45	5,5	9 500	11 000	44	▶ HK 2526
	32	30	24,2	45	5,5	–	6 700	47	▶ HK 2530.2RS
	32	38	33	65,5	8	9 500	11 000	64	▶ HK 2538 <sup>1)</sup>
	35	16	15,7	26,5	3,15	9 000	9 500	26,5	▶ HK 2816
30	35	20	15,7	26,5	3,15	–	6 300	34	▶ HK 2820.2RS
	35	20	20,1	36,5	4,4	9 000	9 500	36	▶ HK 2820
	37	12	11,7	18,3	2,12	8 000	9 000	23	▶ HK 3012
30	37	16	11,7	18,3	2,12	–	5 600	31	▶ HK 3016.2RS
	37	16	16,5	29	3,4	8 000	9 000	31	▶ HK 3016
	37	20	20,9	40	4,75	8 000	9 000	38	▶ HK 3020
	37	26	27	54	6,55	8 000	9 000	51	▶ HK 3026
	37	38	35,8	80	9,5	8 000	9 000	76	▶ HK 3038 <sup>1)</sup>

▶ Popular item

<sup>1)</sup> Double row, outer ring with a lubrication hole.

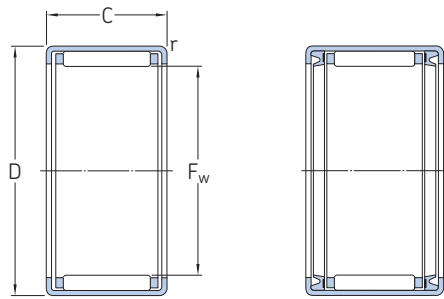
Dimensions		Associated inner rings <sup>1)</sup>		Associated radial shaft seals <sup>2)</sup>	
F <sub>w</sub>	r min.	IR series	LR series	Single lip	Double lip
mm		-		-	
18	0,8	-	LR 15x18x12.5	G 18x24x3	SD 18x24x3
	0,8	IR 15x18x16.5	LR 15x18x16.5	-	-
	0,8	IR 15x18x16.5	LR 15x18x16.5	G 18x24x3	SD 18x24x3
20	0,8	-	-	G 20x26x4	SD 20x26x4
	0,8	IR 15x20x13	-	G 20x26x4	SD 20x26x4
	0,8	IR 17x20x16.5	LR 17x20x16.5	-	-
	0,8	IR 17x20x16.5	LR 17x20x16.5	G 20x26x4	SD 20x26x4
	0,8	IR 17x20x20.5	LR 17x20x20.5	-	-
	0,8	IR 17x20x20.5	LR 17x20x20.5	G 20x26x4	SD 20x26x4
	0,8	IR 17x20x30.5	LR 17x20x30.5	G 20x26x4	SD 20x26x4
22	0,8	-	-	G 22x28x4	SD 22x28x4
	0,8	IR 17x22x13	-	G 22x28x4	SD 22x28x4
	0,8	IR 17x22x23	-	-	-
	0,8	IR 17x22x23	-	G 22x28x4	SD 22x28x4
	0,8	IR 17x22x23	-	-	-
	0,8	IR 17x22x23	-	G 22x28x4	SD 22x28x4
25	0,8	-	LR 20x25x12.5	G 25x32x4	-
	0,8	IR 20x25x17	LR 20x25x16.5	-	-
	0,8	IR 20x25x17	LR 20x25x16.5	G 25x32x4	-
	0,8	IR 20x25x20.5	LR 20x25x20.5	-	-
	0,8	IR 20x25x20.5	LR 20x25x20.5	G 25x32x4	-
	0,8	IR 20x25x26.5	LR 20x25x26.5	G 25x32x4	-
	0,8	IR 20x25x30	-	-	-
	0,8	IR 20x25x38.5	LR 20x25x38.5	G 25x32x4	-
28	0,8	IR 22x28x17	-	G 28x35x4	SD 28x35x4
	0,8	IR 22x28x20.5	LR 22x28x20.5	-	-
	0,8	IR 22x28x20.5	LR 22x28x20.5	G 28x35x4	SD 28x35x4
30	0,8	-	LR 25x30x12.5	G 30x37x4	SD 30x37x4
	0,8	IR 25x30x17	LR 25x30x16.5	-	-
	0,8	IR 25x30x17	LR 25x30x16.5	G 30x37x4	SD 30x37x4
	0,8	IR 25x30x20.5	LR 25x30x20.5	G 30x37x4	SD 30x37x4
	0,8	IR 25x30x26.5	LR 25x30x26.5	G 30x37x4	SD 30x37x4
	0,8	IR 25x30x38.5	LR 25x30x38.5	G 30x37x4	SD 30x37x4

<sup>1)</sup> For additional information → Needle roller bearing inner rings, page 593

<sup>2)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

## 7.2 Drawn cup needle roller bearings

$F_w$  35 – 60 mm



HK

HK...2RS

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	dynamic	static		Reference speed	Limiting speed		
mm			C	$C_0$	$P_u$	r/min		g	–
35	42	12	12,5	21,6	2,45	7 000	8 000	27	▶ HK 3512
	42	16	17,9	34	4	7 000	8 000	36	▶ HK 3516
	42	20	17,9	34	4	–	5 000	41	HK 3520.2RS
	42	20	22,9	46,5	5,6	7 000	8 000	44	▶ HK 3520
40	47	12	13,4	24,5	2,8	6 300	7 000	30	▶ HK 4012
	47	16	14,5	27,5	3,15	–	4 500	37	HK 4016.2RS
	47	16	19	39	4,55	6 300	7 000	39	▶ HK 4016
	47	20	19	39	4,55	–	4 500	48	HK 4020.2RS
	47	20	24,2	53	6,4	6 300	7 000	54	▶ HK 4020
45	52	12	14,2	27,5	3,2	5 600	6 300	33	HK 4512
	52	16	20,5	43	5,1	5 600	6 300	47	▶ HK 4516
	52	20	20,5	43	5,1	–	4 000	54	HK 4520.2RS
	52	20	26	60	7,2	5 600	6 300	56	▶ HK 4520
50	58	20	29,2	63	7,8	5 000	5 600	70	▶ HK 5020
	58	24	29,2	63	7,8	–	3 600	81	HK 5024.2RS
	58	25	36,9	85	10,6	5 000	5 600	85	▶ HK 5025
55	63	20	30,3	67	8,3	4 500	5 000	74	▶ HK 5520
	63	28	41,8	104	12,9	4 500	5 000	105	HK 5528
60	68	12	17,6	32	3,8	4 300	4 800	49	HK 6012
	68	20	31,9	75	9,3	4 300	4 800	81	HK 6020
	68	32	51,2	137	17	4 300	4 800	136	HK 6032

▶ Popular item

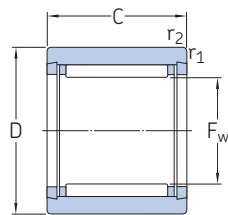
Dimensions		Associated inner rings <sup>1)</sup>		Associated radial shaft seals <sup>2)</sup>	
F <sub>w</sub>	r min.	IR series	LR series	Single lip	Double lip
mm					
35	0,8	–	LR 30x35x12.5	G 35x42x4	SD 35x42x4
	0,8	IR 30x35x17	LR 30x35x16.5	G 35x42x4	SD 35x42x4
	0,8	IR 30x35x20.5	LR 30x35x20.5	–	–
	0,8	IR 30x35x20.5	LR 30x35x20.5	G 35x42x4	SD 35x42x4
40	0,8	–	LR 35x40x12.5	G 40x47x4	SD 40x47x4
	0,8	IR 35x40x20	LR 35x40x16.5	–	–
	0,8	IR 35x40x20	LR 35x40x16.5	G 40x47x4	SD 40x47x4
	0,8	IR 35x40x20.5	LR 35x40x20.5	–	–
	0,8	IR 35x40x20.5	LR 35x40x20.5	G 40x47x4	SD 40x47x4
45	0,8	–	–	G 45x52x4	SD 45x52x4
	0,8	IR 40x45x17	LR 40x45x16.5	G 45x52x4	SD 45x52x4
	0,8	IR 40x45x20.5	LR 40x45x20.5	–	–
	0,8	IR 40x45x20.5	–	G 45x52x4	SD 45x52x4
50	0,8	–	LR 45x50x20.5	G 50x58x4	SD 50x58x4
	0,8	IR 45x50x25.5	LR 45x50x25.5	–	–
	0,8	IR 45x50x25.5	LR 45x50x25.5	G 50x58x4	SD 50x58x4
55	0,8	–	LR 50x55x20.5	G 55x63x5	–
	0,8	–	–	G 55x63x5	–
60	0,8	–	–	–	–
	0,8	–	–	–	–
	0,8	–	–	–	–

<sup>1)</sup> For additional information → [Needle roller bearing inner rings, page 593](#)

<sup>2)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

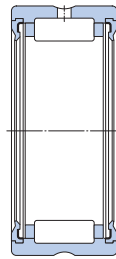
$F_w$  5–19 mm



NK ( $F_w \leq 10$  mm)



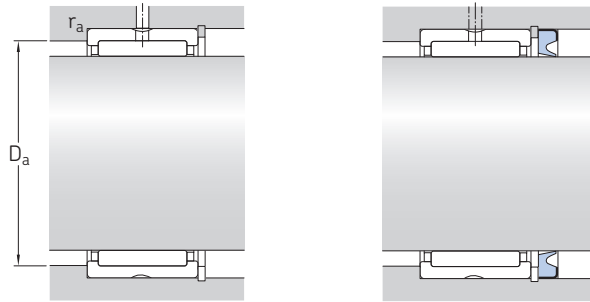
NK ( $F_w \geq 12$  mm)  
RNA 49  
RNA 69



RNA 49...2RS

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$	$P_u$	Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
5	10	10	2,29	2	0,212	36 000	40 000	0,0031	▶ NK 5/10 TN
	10	12	2,92	2,7	0,29	36 000	40 000	0,0037	▶ NK 5/12 TN
6	12	10	2,55	2,36	0,25	34 000	38 000	0,0047	▶ NK 6/10 TN
	12	12	3,3	3,2	0,345	34 000	38 000	0,0057	▶ NK 6/12 TN
7	14	10	2,81	2,75	0,29	32 000	36 000	0,0069	NK 7/10 TN
	14	12	3,58	3,75	0,415	32 000	36 000	0,0082	NK 7/12 TN
8	15	12	3,8	4,25	0,465	32 000	36 000	0,0087	▶ NK 8/12 TN
	15	16	5,01	5,85	0,67	32 000	36 000	0,012	▶ NK 8/16 TN
9	16	12	4,4	5,2	0,57	30 000	34 000	0,01	▶ NK 9/12 TN
	16	16	5,72	7,2	0,815	30 000	34 000	0,013	NK 9/16 TN
10	17	12	4,57	5,7	0,63	28 000	32 000	0,01	▶ NK 10/12 TN
	17	16	5,94	8	0,9	28 000	32 000	0,013	▶ NK 10/16 TN
12	19	12	6,71	8,15	0,965	26 000	30 000	0,012	▶ NK 12/12
	19	16	9,13	12	1,43	26 000	30 000	0,016	▶ NK 12/16
14	22	13	7,37	8,15	0,965	–	12 000	0,016	▶ RNA 4900.2RS
	22	13	8,8	10,4	1,22	24 000	28 000	0,017	▶ RNA 4900
	22	16	10,2	12,5	1,5	24 000	28 000	0,021	▶ NK 14/16
	22	20	12,8	16,6	2	24 000	28 000	0,026	▶ NK 14/20
15	23	16	11	14	1,66	24 000	26 000	0,022	▶ NK 15/16
	23	20	13,8	18,3	2,2	24 000	26 000	0,027	▶ NK 15/20
16	24	13	8,09	9,65	1,14	–	11 000	0,018	▶ RNA 4901.2RS
	24	13	9,9	12,2	1,46	22 000	26 000	0,017	▶ RNA 4901
	24	16	11,7	15,3	1,8	22 000	26 000	0,022	▶ NK 16/16
	24	20	14,5	20	2,4	22 000	26 000	0,028	▶ NK 16/20
17	24	22	16,1	23,2	2,75	22 000	26 000	0,031	▶ RNA 6901
	25	16	12,1	16,6	1,96	22 000	26 000	0,024	▶ NK 17/16
18	25	20	15,1	22	2,65	22 000	26 000	0,03	▶ NK 17/20
	26	16	12,8	17,6	2,12	22 000	24 000	0,025	▶ NK 18/16
19	26	20	16,1	23,6	2,85	22 000	24 000	0,031	▶ NK 18/20
	27	16	13,4	19	2,28	20 000	24 000	0,026	▶ NK 19/16
19	27	20	16,5	25,5	3,05	20 000	24 000	0,032	NK 19/20

▶ Popular item

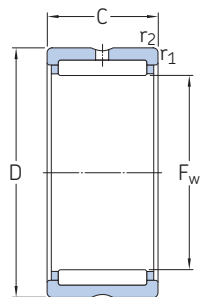


Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		
$F_w$	$r_{1,2}$ min.	$D_a$ max.	$r_a$ max.	Single lip	Double lip	Spring loaded lip
mm		mm		-		
5	0,15	8,8	0,1	G 5x10x2 S	-	-
	0,15	8,8	0,1	G 5x10x2 S	-	-
6	0,15	10,8	0,1	G 6x12x2 S	-	-
	0,15	10,8	0,1	G 6x12x2 S	-	-
7	0,3	12	0,3	G 7x14x2	-	-
	0,3	12	0,3	G 7x14x2	-	-
8	0,3	13	0,3	G 8x15x3	SD 8x15x3	-
	0,3	13	0,3	G 8x15x3	SD 8x15x3	-
9	0,3	14	0,3	G 9x16x3	-	-
	0,3	14	0,3	G 9x16x3	-	-
10	0,3	15	0,3	G 10x17x3	SD 10x17x3	-
	0,3	15	0,3	G 10x17x3	SD 10x17x3	-
12	0,3	17	0,3	G 12x19x3	SD 12x19x3	-
	0,3	17	0,3	G 12x19x3	SD 12x19x3	-
14	0,3	20	0,3	-	-	-
	0,3	20	0,3	G 14x22x3	SD 14x22x3	-
	0,3	20	0,3	G 14x22x3	SD 14x22x3	-
	0,3	20	0,3	G 14x22x3	SD 14x22x3	-
15	0,3	21	0,3	G 15x23x3	SD 15x23x3	-
	0,3	21	0,3	G 15x23x3	SD 15x23x3	-
16	0,3	22	0,3	-	-	-
	0,3	22	0,3	G 16x24x3	SD 16x24x3	-
	0,3	22	0,3	G 16x24x3	SD 16x24x3	-
	0,3	22	0,3	G 16x24x3	SD 16x24x3	-
17	0,3	23	0,3	G 17x25x3	SD 17x25x3	-
	0,3	23	0,3	G 17x25x3	SD 17x25x3	-
18	0,3	24	0,3	G 18x26x4	SD 18x26x4	-
	0,3	24	0,3	G 18x26x4	SD 18x26x4	-
19	0,3	25	0,3	G 19x27x4	SD 19x27x4	-
	0,3	25	0,3	G 19x27x4	SD 19x27x4	-

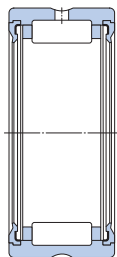
<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

$F_w$  20 – 29 mm



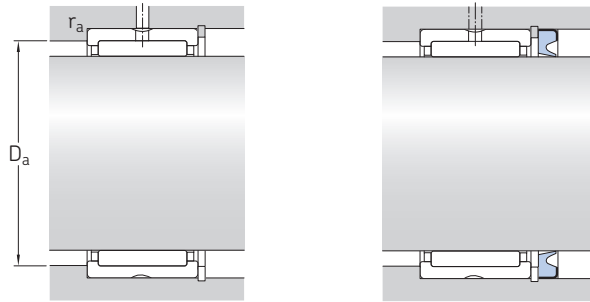
NK(S)  
RNA 49  
RNA 69



RNA 49 ...2RS

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$	$P_u$	Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
20	28	13	9,13	12	1,43	–	9 500	0,022	▶ RNA 4902.2RS ▶ RNA 4902 ▶ NK 20/16
	28	13	11,2	15,3	1,83	19 000	22 000	0,022	
	28	16	13,2	19,3	2,28	19 000	22 000	0,027	
	28	20	16,5	25,5	3,05	19 000	22 000	0,034	▶ NK 20/20 ▶ RNA 6902 ▶ NKS 20
	28	23	17,2	27	3,35	19 000	22 000	0,04	
	32	20	23,3	27	3,25	18 000	20 000	0,049	
21	29	16	13,8	20,4	2,45	19 000	22 000	0,028	NK 21/16 NK 21/20
	29	20	17,2	27	3,35	19 000	22 000	0,035	
22	30	13	9,52	12,9	1,53	–	9 000	0,023	RNA 4903.2RS ▶ RNA 4903 ▶ NK 22/16  ▶ NK 22/20 ▶ RNA 6903
	30	13	11,4	16,3	1,96	18 000	20 000	0,022	
	30	16	14,2	21,6	2,6	18 000	20 000	0,03	
	30	20	17,9	29	3,55	18 000	20 000	0,037	
30	23	18,7	30,5	3,75	18 000	20 000	0,042		
24	32	16	15,4	24,5	2,9	16 000	19 000	0,032	▶ NK 24/16 ▶ NK 24/20 NKS 24
	32	20	19	32,5	4	16 000	19 000	0,04	
	37	20	26	33,5	4	15 000	17 000	0,066	
25	33	16	15,1	24,5	2,9	16 000	18 000	0,033	▶ NK 25/16 ▶ NK 25/20 ▶ RNA 4904.2RS  ▶ RNA 4904 ▶ RNA 6904 ▶ NKS 25
	33	20	19	32,5	4	16 000	18 000	0,042	
	37	17	19,4	22,4	2,65	–	7 500	0,056	
	37	17	21,6	28	3,35	15 000	17 000	0,052	
	37	30	35,2	53	6,55	15 000	17 000	0,1	
	38	20	27,5	36	4,4	15 000	17 000	0,068	
26	34	16	15,7	26	3,1	15 000	17 000	0,034	▶ NK 26/16 ▶ NK 26/20
	34	20	19,4	34,5	4,25	15 000	17 000	0,042	
28	37	20	22	36,5	4,55	14 000	16 000	0,052	▶ NK 28/20 ▶ NK 28/30 RNA 49/22  RNA 69/22 NKS 28
	37	30	31,9	60	7,5	14 000	16 000	0,082	
	39	17	23,3	32	3,9	14 000	15 000	0,05	
	39	30	36,9	57	7,2	14 000	15 000	0,098	
42	20	28,6	39	4,75	13 000	15 000	0,084		
29	38	20	24,6	42,5	5,2	14 000	15 000	0,05	NK 29/20 TN NK 29/30
	38	30	31,9	60	7,5	14 000	15 000	0,084	

▶ Popular item



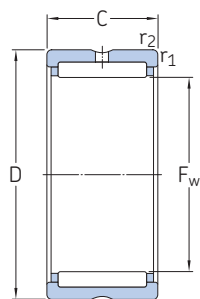
Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		
$F_w$	$r_{1,2}$ min.	$D_a$ max.	$r_a$ max.	Single lip	Double lip	Spring loaded lip
mm		mm				
20	0,3	26	0,3	–	–	–
	0,3	26	0,3	G 20x28x4	SD 20x28x4	–
	0,3	26	0,3	G 20x28x4	SD 20x28x4	–
	0,3	26	0,3	G 20x28x4	SD 20x28x4	–
	0,6	28	0,6	–	–	20x32x7 HMS5 RG
21	0,3	27	0,3	G 21x29x4	–	–
	0,3	27	0,3	G 21x29x4	–	–
22	0,3	28	0,3	–	–	–
	0,3	28	0,3	G 22x30x4	SD 22x30x4	–
	0,3	28	0,3	G 22x30x4	SD 22x30x4	–
	0,3	28	0,3	G 22x30x4	SD 22x30x4	–
	0,3	28	0,3	G 22x30x4	SD 22x30x4	–
24	0,3	30	0,3	G 24x32x4	SD 24x32x4	–
	0,3	30	0,3	G 24x32x4	SD 24x32x4	–
	0,6	33	0,6	–	–	24x37x7 HMS5 RG
25	0,3	31	0,3	G 25x33x4	SD 25x33x4	–
	0,3	31	0,3	G 25x33x4	SD 25x33x4	–
	0,3	35	0,3	–	–	–
	0,3	35	0,3	–	–	25x37x5 HMS5 RG
	0,6	34	0,6	–	–	25x38x7 HMS5 RG
26	0,3	32	0,3	G 26x34x4	SD 26x34x4	–
	0,3	32	0,3	G 26x34x4	SD 26x34x4	–
28	0,3	35	0,3	G 28x37x4	–	–
	0,3	35	0,3	G 28x37x4	–	–
	0,3	37	0,3	–	–	–
	0,3	37	0,3	–	–	–
	0,6	38	0,6	–	–	28x42x7 HMS5 RG
29	0,3	36	0,3	G 29x38x4	–	–
	0,3	36	0,3	G 29x38x4	–	–

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)



### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

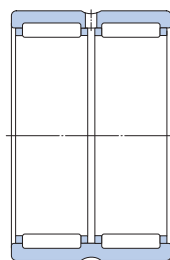
$F_w$  30 – 43 mm



NK(S)  
RNA 49  
RNA 69 ( $F_w \leq 38$  mm)



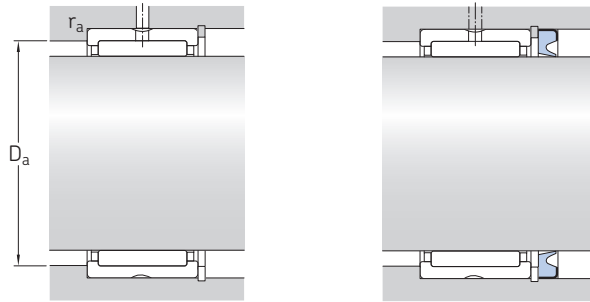
RNA 49 ...2RS



RNA 69 ( $F_w \geq 40$  mm)

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$	$P_u$	Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
30	40	20	25,1	44	5,5	13 000	15 000	0,061	▶ NK 30/20 TN ▶ NK 30/30 TN ▶ RNA 4905.2RS
	40	30	36,9	72	9	13 000	15 000	0,092	
	42	17	21,6	27,5	3,25	–	6 300	0,06	
	42	17	24,2	34,5	4,15	13 000	15 000	0,061	▶ RNA 4905 ▶ RNA 6905 ▶ NKS 30
	42	30	38	62	7,65	13 000	15 000	0,11	
	45	22	31,9	43	5,3	12 000	14 000	0,1	
32	42	20	26,4	48	6	12 000	14 000	0,064	▶ NK 32/20 TN NK 32/30 RNA 49/28
	42	30	34,1	65,5	8,3	12 000	14 000	0,1	
	45	17	25,1	36,5	4,4	12 000	14 000	0,073	
	45	30	39,6	65,5	8,3	12 000	14 000	0,14	▶ RNA 69/28 NKS 32
	47	22	34,1	46,5	5,7	12 000	13 000	0,11	
	47	22	34,1	46,5	5,7	12 000	13 000	0,11	
35	45	20	27,5	52	6,55	11 000	13 000	0,069	▶ NK 35/20 TN ▶ NK 35/30 TN ▶ RNA 4906.2RS
	45	30	40,2	85	10,6	11 000	13 000	0,11	
	47	17	23,3	32	3,8	–	5 600	0,069	
	47	17	25,5	39	4,65	11 000	13 000	0,069	▶ RNA 4906 ▶ RNA 6906 ▶ NKS 35
	47	30	42,9	75	9,3	11 000	13 000	0,13	
	50	22	35,2	50	6,2	11 000	12 000	0,12	
37	47	20	25,1	46,5	5,85	11 000	12 000	0,077	NK 37/20 NK 37/30 NKS 37
	47	30	36,9	76,5	9,5	11 000	12 000	0,11	
	52	22	36,9	54	6,55	10 000	12 000	0,12	
38	48	20	25,5	49	6,1	11 000	12 000	0,079	▶ NK 38/20 NK 38/30
	48	30	37,4	80	10	11 000	12 000	0,12	
40	50	20	29,7	60	7,5	10 000	11 000	0,078	▶ NK 40/20 TN ▶ NK 40/30 ▶ RNA 49/32
	50	30	38	83	10,4	10 000	11 000	0,13	
	52	20	30,8	51	6,3	10 000	11 000	0,089	
	52	36	47,3	90	10,8	10 000	11 000	0,16	▶ RNA 69/32 ▶ NKS 40
	55	22	38	57	7,1	9 500	11 000	0,13	
	55	22	38	57	7,1	9 500	11 000	0,13	
42	52	20	27	53	6,55	9 500	11 000	0,086	▶ NK 42/20 NK 42/30 RNA 4907.2RS
	52	30	39,1	86,5	10,8	9 500	11 000	0,13	
	55	20	27	43	5,3	–	4 800	0,11	
	55	20	31,9	54	6,7	9 500	11 000	0,11	RNA 4907 RNA 6907
55	36	48,4	93	11,4	9 500	11 000	0,19		
43	53	20	27,5	55	6,8	9 500	11 000	0,086	NK 43/20 NK 43/30 NKS 43
	53	30	40,2	90	11,2	9 500	11 000	0,13	
	58	22	39,1	61	7,5	9 000	10 000	0,14	

▶ Popular item

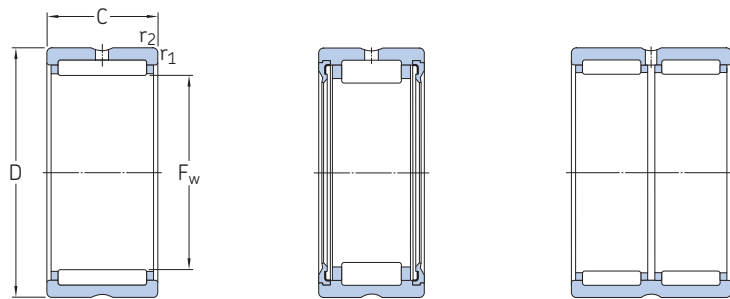


Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		
$F_w$	$r_{1,2}$ min.	$D_a$ max.	$r_a$ max.	Single lip	Double lip	Spring loaded lip
mm		mm		-		
30	0,3	38	0,3	G 30x40x4	SD 30x40x4	-
	0,3	38	0,3	G 30x40x4	SD 30x40x4	-
	0,3	40	0,3	-	-	-
	0,3	40	0,3	-	-	30x42x6 HMS5 RG
	0,3	40	0,3	-	-	30x42x6 HMS5 RG
	0,6	41	0,6	-	-	30x45x7 HMS5 RG
32	0,3	40	0,3	G 32x42x4	SD 32x42x4	-
	0,3	40	0,3	G 32x42x4	SD 32x42x4	-
	0,3	43	0,3	G 32x45x4	-	-
	0,3	43	0,3	G 32x45x4	-	-
	0,6	43	0,6	-	-	32x47x6 HMS5 RG
35	0,3	43	0,3	G 35x45x4	SD 35x45x4	-
	0,3	43	0,3	G 35x45x4	SD 35x45x4	-
	0,3	45	0,3	-	-	-
	0,3	45	0,3	-	-	35x47x6 HMS5 RG
	0,3	45	0,3	-	-	35x47x6 HMS5 RG
	0,6	46	0,6	-	-	35x50x7 HMS5 RG
37	0,3	45	0,3	G 37x47x4	SD 37x47x4	-
	0,3	45	0,3	G 37x47x4	SD 37x47x4	-
	0,6	48	0,6	-	-	37x52x8 HMS4 R
38	0,3	46	0,3	G 38x48x4	SD 38x48x4	-
	0,3	46	0,3	G 38x48x4	SD 38x48x4	-
40	0,3	48	0,3	G 40x50x4	SD 40x50x4	-
	0,3	48	0,3	G 40x50x4	SD 40x50x4	-
	0,6	48	0,6	G 40x52x5	SD 40x52x5	-
	0,6	48	0,6	G 40x52x5	SD 40x52x5	-
	0,6	51	0,6	-	-	40x55x7 HMS5 RG
42	0,3	50	0,3	G 42x52x4	SD 42x52x4	-
	0,3	50	0,3	G 42x52x4	SD 42x52x4	-
	0,6	51	0,6	-	-	-
	0,6	51	0,6	-	-	42x55x7 HMS5 RG
	0,6	51	0,6	-	-	42x55x7 HMS5 RG
	0,6	51	0,6	-	-	42x55x7 HMS5 RG
43	0,3	51	0,3	G 43x53x4	-	-
	0,3	51	0,3	G 43x53x4	-	-
	0,6	53	0,6	-	-	-

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

$F_w$  45 – 70 mm



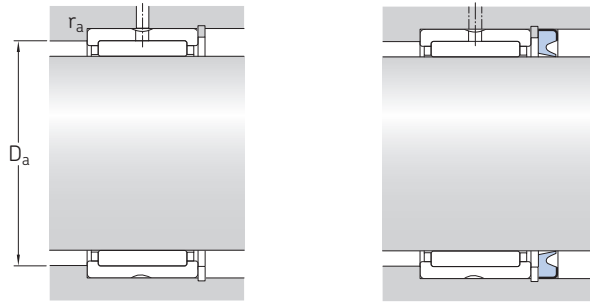
NK(S)  
RNA 49

RNA 49 ...2RS

RNA 69

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$		Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
45	55	20	31,4	65,5	8,3	9 000	10 000	0,085	▶ NK 45/20 TN ▶ NK 45/30 TN ▶ NKS 45
	55	30	45,7	108	13,7	9 000	10 000	0,13	
	60	22	40,2	64	8	8 500	10 000	0,15	
47	57	20	29,2	61	7,65	8 500	10 000	0,095	NK 47/20 ▶ NK 47/30
	57	30	41,8	98	12,5	8 500	10 000	0,14	
48	62	22	36,9	58,5	7,1	–	4 000	0,15	RNA 4908.2RS ▶ RNA 4908 ▶ RNA 6908
	62	22	42,9	71	8,8	8 000	9 500	0,14	
	62	40	67,1	125	15,3	8 000	9 500	0,26	
50	62	25	42,9	91,5	11,2	8 000	9 000	0,15	▶ NK 50/25 TN ▶ NK 50/35 TN NKS 50
	62	35	58,3	137	17	8 000	9 000	0,21	
	65	22	42,9	72	8,8	8 000	9 000	0,16	
52	68	22	39,1	64	7,8	–	3 800	0,16	RNA 4909.2RS RNA 4909 ▶ RNA 6909
	68	22	45,7	78	9,65	7 500	8 500	0,18	
	68	40	70,4	137	17	7 500	8 500	0,34	
55	68	25	40,2	88	10,8	7 500	8 500	0,18	▶ NK 55/25 NK 55/35 ▶ NKS 55
	68	35	52,3	122	15,3	7 500	8 500	0,25	
	72	22	44,6	78	9,8	7 000	8 000	0,22	
58	72	22	40,2	69,5	8,5	–	3 400	0,16	▶ RNA 4910.2RS ▶ RNA 4910 ▶ RNA 6910
	72	22	47,3	85	10,6	7 000	8 000	0,16	
	72	40	73,7	150	18,6	7 000	8 000	0,31	
60	72	25	46,8	110	13,4	6 700	7 500	0,17	NK 60/25 TN ▶ NK 60/35 ▶ NKS 60
	72	35	55	134	17	6 700	7 500	0,26	
	80	28	62,7	104	13,2	6 300	7 500	0,34	
63	80	25	57,2	106	13,2	6 300	7 000	0,26	▶ RNA 4911 ▶ RNA 6911
	80	45	89,7	190	23,2	6 300	7 000	0,47	
65	78	25	44	104	12,7	6 300	7 000	0,22	▶ NK 65/25 ▶ NK 65/35 NKS 65
	78	35	58,3	146	18,3	6 300	7 000	0,31	
	85	28	66	114	14,6	6 000	6 700	0,36	
68	82	25	44	95	11,8	6 000	6 700	0,24	NK 68/25 NK 68/35 ▶ RNA 4912
	82	35	60,5	146	18,3	6 000	6 700	0,34	
	85	25	60,5	114	14,3	6 000	6 700	0,28	
	85	45	93,5	204	25	6 000	6 700	0,49	▶ RNA 6912
70	85	25	44,6	98	12,2	6 000	6 700	0,26	▶ NK 70/25 ▶ NK 70/35 ▶ NKS 70
	85	35	61,6	150	19	6 000	6 700	0,37	
	90	28	68,2	120	15,3	5 600	6 300	0,38	

▶ Popular item

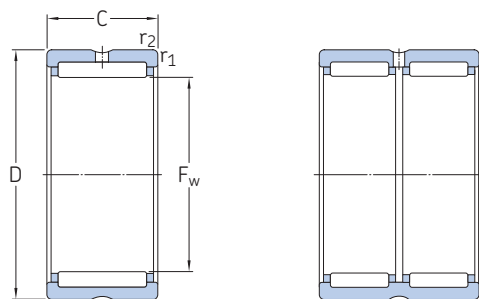


Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		
$F_w$	$r_{1,2}$ min.	$D_a$ max.	$r_a$ max.	Single lip	Double lip	Spring loaded lip
mm		mm		-		
45	0,3	53	0,3	G 45x55x4	SD 45x55x4	-
	0,3	53	0,3	G 45x55x4	SD 45x55x4	-
	0,6	56	0,6	-	-	45x60x7 HMS5 RG
47	0,3	55	0,3	-	-	-
	0,3	55	0,3	-	-	-
48	0,6	58	0,6	-	-	-
	0,6	58	0,6	-	-	48x62x8 HMS5 RG
	0,6	58	0,6	-	-	48x62x8 HMS5 RG
50	0,6	58	0,6	G 50x62x5	SD 50x62x5	-
	0,6	58	0,6	G 50x62x5	SD 50x62x5	-
	1	60	1	-	-	50x65x8 HMS5 RG
52	0,6	64	0,6	-	-	-
	0,6	64	0,6	-	-	52x68x8 HMS5 RG
	0,6	64	0,6	-	-	52x68x8 HMS5 RG
55	0,6	64	0,6	-	-	55x68x8 HMS5 RG
	0,6	64	0,6	-	-	55x68x8 HMS5 RG
	1	67	1	-	-	55x72x8 HMS5 RG
58	0,6	68	0,6	-	-	-
	0,6	68	0,6	-	-	58x72x8 HMS5 RG
	0,6	68	0,6	-	-	58x72x8 HMS5 RG
60	0,6	68	0,6	-	-	60x72x8 HMS5 RG
	0,6	68	0,6	-	-	60x72x8 HMS5 RG
	1,1	73,5	1	-	-	60x80x8 HMS5 RG
63	1	75	1	-	-	63x80x8 CRW1 R
	1	75	1	-	-	63x80x8 CRW1 R
65	0,6	74	0,6	-	-	-
	0,6	74	0,6	-	-	-
	1,1	78,5	1	-	-	65x85x8 HMS5 RG
68	0,6	78	0,6	-	-	-
	0,6	78	0,6	-	-	-
	1	80	1	-	-	-
70	1	80	1	-	-	68x85x8 CRW1 R
	0,6	81	0,6	-	-	70x85x8 HMS5 RG
	0,6	81	0,6	-	-	70x85x8 HMS5 RG
	1,1	83,5	1	-	-	70x90x10 HMS5 RG

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

$F_w$  72 – 105 mm

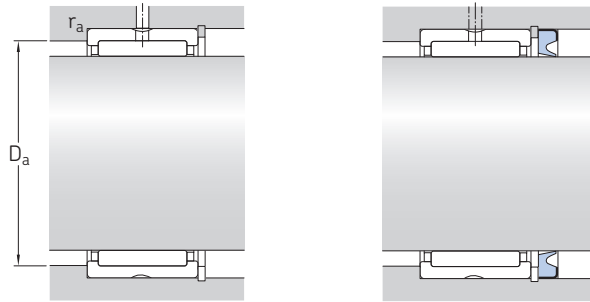


NK(S)  
RNA 49

RNA 69

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$		Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
<b>72</b>	90	25	61,6	120	14,6	5 600	6 300	0,31	RNA 4913
	90	45	95,2	212	26	5 600	6 300	0,58	▶ RNA 6913
<b>73</b>	90	25	52,8	106	13,2	5 600	6 300	0,3	NK 73/25
	90	35	73,7	163	20,4	5 600	6 300	0,43	NK 73/35
<b>75</b>	92	25	53,9	110	13,7	5 300	6 000	0,32	NK 75/25
	92	35	74,8	170	21,2	5 300	6 000	0,45	▶ NK 75/35
	95	28	70,4	132	16,6	5 300	6 000	0,4	NKS 75
<b>80</b>	95	25	56,1	127	15,6	5 000	5 600	0,3	▶ NK 80/25
	95	35	76,5	190	24	5 000	5 600	0,43	▶ NK 80/35
	100	30	84,2	163	20,8	5 000	5 600	0,46	▶ RNA 4914
	100	54	128	285	36	5 000	5 600	0,86	▶ RNA 6914
<b>85</b>	105	25	69,3	132	16,6	4 800	5 300	0,43	▶ NK 85/25
	105	30	84,2	170	21,6	4 800	5 300	0,49	RNA 4915
	105	35	96,8	200	26	4 800	5 300	0,6	▶ NK 85/35
	105	54	130	290	37,5	4 800	5 300	0,94	RNA 6915
<b>90</b>	110	25	72,1	140	18	4 500	5 000	0,45	▶ NK 90/25
	110	30	88	183	23,2	4 500	5 000	0,52	▶ RNA 4916
	110	35	101	216	28	4 500	5 000	0,63	▶ NK 90/35
	110	54	134	315	40	4 500	5 000	0,99	▶ RNA 6916
<b>95</b>	115	26	73,7	146	18,6	4 300	4 800	0,49	NK 95/26
	115	36	105	232	30	4 300	4 800	0,68	NK 95/36
<b>100</b>	120	26	76,5	156	19,6	4 000	4 500	0,52	▶ NK 100/26
	120	35	108	250	31	4 000	4 500	0,66	RNA 4917
	120	36	108	250	31	4 000	4 500	0,72	▶ NK 100/36
	120	63	165	425	53	4 000	4 500	1,2	▶ RNA 6917
<b>105</b>	125	26	78,1	166	20,4	3 800	4 300	0,54	NK 105/26
	125	35	112	265	32,5	3 800	4 300	0,75	RNA 4918
	125	36	112	265	32,5	3 800	4 300	0,71	NK 105/36
	125	63	172	450	55	3 800	4 300	1,35	RNA 6918

▶ Popular item

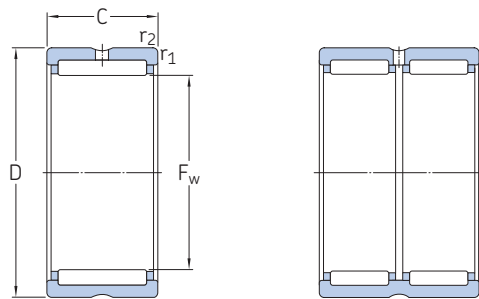


Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		
$F_w$	$r_{1,2}$ min.	$D_a$ max.	$r_a$ max.	Single lip	Double lip	Spring loaded lip
mm		mm		-		
72	1	85	1	-	-	72x90x10 HMS5 RG
	1	85	1	-	-	72x90x10 HMS5 RG
73	1	85	1	-	-	-
	1	85	1	-	-	-
75	1	87	1	-	-	73x92x11.1 CRWH1 R
	1	87	1	-	-	73x92x11.1 CRWH1 R
	1,1	88,5	1	-	-	75x95x10 HMS5 RG
80	1	90	1	-	-	80x95x10 HMS5 RG
	1	90	1	-	-	80x95x10 HMS5 RG
	1	95	1	-	-	80x100x10 HMS5 RG
	1	95	1	-	-	80x100x10 HMS5 RG
85	1	100	1	-	-	85x105x12 HMS5 RG
	1	100	1	-	-	85x105x12 HMS5 RG
	1	100	1	-	-	85x105x12 HMS5 RG
	1	100	1	-	-	85x105x12 HMS5 RG
90	1	105	1	-	-	90x110x10 HMS5 RG
	1	105	1	-	-	90x110x10 HMS5 RG
	1	105	1	-	-	90x110x10 HMS5 RG
	1	105	1	-	-	90x110x10 HMS5 RG
95	1	110	1	-	-	95x115x12 HMS5 RG
	1	110	1	-	-	95x115x12 HMS5 RG
100	1	115	1	-	-	100x120x10 HMS5 RG
	1,1	113,5	1	-	-	100x120x10 HMS5 RG
	1	115	1	-	-	100x120x10 HMS5 RG
	1,1	113,5	1	-	-	100x120x10 HMS5 RG
105	1	120	1	-	-	105x125x13 HMS4 R
	1,1	118,5	1	-	-	105x125x13 HMS4 R
	1	120	1	-	-	105x125x13 HMS4 R
	1,1	118,5	1	-	-	105x125x13 HMS4 R

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

### 7.3 Needle roller bearings with machined rings with flanges, without an inner ring

$F_w$  110 – 330 mm

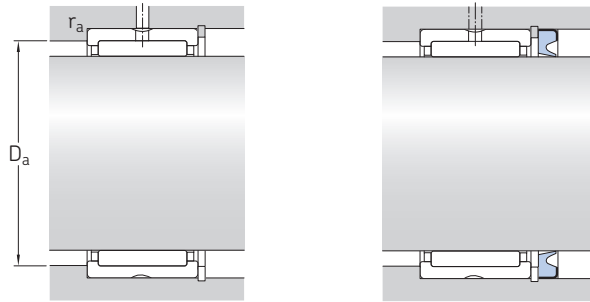


NK  
RNA 48  
RNA 49

RNA 69

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	C	$C_0$	$P_u$	Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
<b>110</b>	130	30	96,8	220	27	3 600	4 000	0,65	▶ NK 110/30
	130	35	114	270	33,5	3 600	4 000	0,72	RNA 4919
	130	40	123	305	37,5	3 600	4 000	0,83	▶ NK 110/40
	130	63	172	465	56	3 600	4 000	1,45	▶ RNA 6919
<b>115</b>	140	40	125	280	34	3 400	4 000	1,15	RNA 4920
<b>120</b>	140	30	93,5	232	27	3 400	3 800	0,66	▶ RNA 4822
<b>125</b>	150	40	130	300	35,5	3 200	3 600	1,25	RNA 4922
<b>130</b>	150	30	99	255	29	3 200	3 600	0,73	▶ RNA 4824
<b>135</b>	165	45	176	405	49	3 000	3 400	1,85	▶ RNA 4924
<b>145</b>	165	35	119	325	36,5	2 800	3 200	0,99	RNA 4826
<b>150</b>	180	50	198	480	57	2 600	3 000	2,2	RNA 4926
<b>155</b>	175	35	121	345	37,5	2 600	3 000	0,97	▶ RNA 4828
<b>160</b>	190	50	205	510	60	2 400	2 800	2,35	RNA 4928
<b>165</b>	190	40	147	415	46,5	2 400	2 800	1,6	RNA 4830
<b>175</b>	200	40	157	450	49	2 200	2 600	1,7	▶ RNA 4832
<b>185</b>	215	45	179	520	56	2 200	2 400	2,55	RNA 4834
<b>195</b>	225	45	190	570	60	2 000	2 400	2,7	RNA 4836
<b>210</b>	240	50	220	710	73,5	1 900	2 200	3,2	▶ RNA 4838
<b>220</b>	250	50	224	735	75	1 800	2 000	3,35	RNA 4840
<b>240</b>	270	50	238	815	81,5	1 700	1 900	3,6	▶ RNA 4844
<b>265</b>	300	60	347	1 120	112	1 500	1 700	5,4	RNA 4848
<b>285</b>	320	60	358	1 200	118	1 400	1 500	5,8	RNA 4852
<b>305</b>	350	69	429	1 320	129	1 300	1 400	9,3	RNA 4856
<b>330</b>	380	80	594	1 800	173	1 100	1 300	12,5	RNA 4860

▶ Popular item



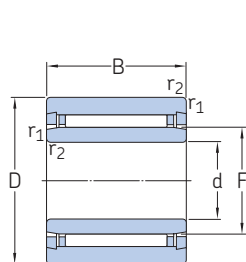
Dimensions		Abutment and fillet dimensions		Associated radial shaft seals <sup>1)</sup>		Spring loaded lip
F <sub>w</sub>	r <sub>1,2</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.	Single lip	Double lip	
mm		mm		-		
110	1,1	123,5	1	-	-	110x130x12 HMS5 RG
	1,1	123,5	1	-	-	110x130x12 HMS5 RG
	1,1	123,5	1	-	-	110x130x12 HMS5 RG
	1,1	123,5	1	-	-	110x130x12 HMS5 RG
115	1,1	133,5	1	-	-	115x140x12 HMS5 RG
120	1	135	1	-	-	120x140x12 HMS5 RG
125	1,1	143,5	1	-	-	125x150x12 HMS5 RG
130	1	145	1	-	-	130x150x10 CRSA1 R
135	1,1	158,5	1	-	-	135x165x14 HMSA7 R
145	1,1	158,5	1	-	-	-
150	1,5	172	1,5	-	-	150x180x12 HMS5 RG
155	1,1	168,5	1	-	-	-
160	1,5	182	1,5	-	-	160x190x15 HMS5 RG
165	1,1	183,5	1	-	-	165x190x15 HMS5 RG
175	1,1	193,5	1	-	-	175x200x15 HMS5 RG
185	1,1	208,5	1	-	-	185x215x15 HMS42 R
195	1,1	218,5	1	-	-	-
210	1,5	232	1,5	-	-	210x240x15 HMS5 RG
220	1,5	242	1,5	-	-	220x250x15 HMS5 RG
240	1,5	262	1,5	-	-	240x270x15 HMS5 RG
265	2	291	2	-	-	Available on request
285	2	311	2	-	-	285x320x16 HDS2 R
305	2	341	2	-	-	Available on request
330	2,1	369	2	-	-	Available on request

<sup>1)</sup> For additional information → [skf.com/seals](http://skf.com/seals)

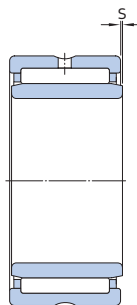


## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring

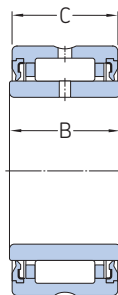
d 5 – 17 mm



NKI (d ≤ 7 mm)



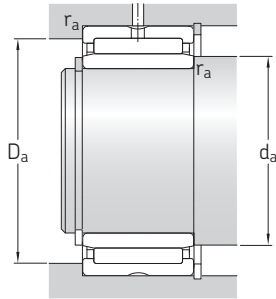
NKI(S) (d ≥ 9 mm)  
NA 49  
NA 69



NA 49 ...2RS

Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min		kg	–
5	15	12	–	3,8	4,25	0,465	32 000	36 000	0,012	▶ NKI 5/12 TN NKI 5/16 TN
	15	16	–	5,01	5,85	0,67	32 000	36 000	0,015	
6	16	12	–	4,4	5,2	0,57	30 000	34 000	0,014	▶ NKI 6/12 TN ▶ NKI 6/16 TN
	16	16	–	5,72	7,2	0,815	30 000	34 000	0,017	
7	17	12	–	4,57	5,7	0,63	28 000	32 000	0,014	NKI 7/12 TN NKI 7/16 TN
	17	16	–	5,94	8	0,9	28 000	32 000	0,018	
9	19	12	–	6,71	8,15	0,965	26 000	30 000	0,017	▶ NKI 9/12 ▶ NKI 9/16
	19	16	–	9,13	12	1,43	26 000	30 000	0,022	
10	22	13	–	8,8	10,4	1,22	24 000	28 000	0,024	▶ NA 4900 ▶ NA 4900.2RS ▶ NKI 10/16 ▶ NKI 10/20
	22	14	13	7,37	8,15	0,965	–	12 000	0,025	
	22	16	–	10,2	12,5	1,5	24 000	28 000	0,029	
	22	20	–	12,8	16,6	2	24 000	28 000	0,037	
12	24	13	–	9,9	12,2	1,46	22 000	26 000	0,026	▶ NA 4901 ▶ NA 4901.2RS ▶ NKI 12/16 ▶ NKI 12/20 ▶ NA 6901
	24	14	13	8,09	9,65	1,14	–	11 000	0,028	
	24	16	–	11,7	15,3	1,8	22 000	26 000	0,033	
	24	20	–	14,5	20	2,4	22 000	26 000	0,042	
15	27	16	–	13,4	19	2,28	20 000	24 000	0,039	▶ NKI 15/16 ▶ NKI 15/20 ▶ NA 4902 ▶ NA 4902.2RS ▶ NA 6902 NKIS 15
	27	20	–	16,5	25,5	3,05	20 000	24 000	0,049	
	28	13	–	11,2	15,3	1,83	19 000	22 000	0,034	
	28	14	13	9,13	12	1,43	–	9 500	0,037	
17	28	23	–	17,2	27	3,35	19 000	22 000	0,064	▶ NKI 17/16 ▶ NKI 17/20 ▶ NA 4903 ▶ NA 4903.2RS ▶ NA 6903 ▶ NKIS 17
	35	20	–	24,6	30	3,65	16 000	19 000	0,092	
	29	16	–	13,8	20,4	2,45	19 000	22 000	0,042	
	29	20	–	17,2	27	3,35	19 000	22 000	0,053	
	30	13	–	11,4	16,3	1,96	18 000	20 000	0,038	
	30	14	13	9,52	12,9	1,53	–	9 000	0,04	
30	23	–	18,7	30,5	3,75	18 000	20 000	0,072		
37	20	–	26	33,5	4	15 000	17 000	0,098		

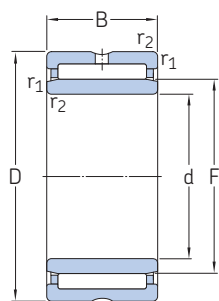
▶ Popular item



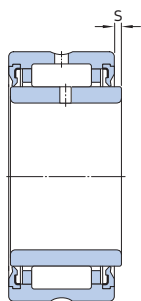
Dimensions			Abutment and fillet dimensions			
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm			mm			
5	8	0,3	1,5	7	13	0,3
	8	0,3	2	7	13	0,3
6	9	0,3	1,5	8	14	0,3
	9	0,3	2	8	14	0,3
7	10	0,3	1,5	9	15	0,3
	10	0,3	2	9	15	0,3
9	12	0,3	1,5	11	17	0,3
	12	0,3	2	11	17	0,3
10	14	0,3	0,5	12	20	0,3
	14	0,3	0,5	12	20	0,3
	14	0,3	0,5	12	20	0,3
	14	0,3	0,5	12	20	0,3
12	16	0,3	0,5	14	22	0,3
	16	0,3	0,5	14	22	0,3
	16	0,3	0,5	14	22	0,3
	16	0,3	0,5	14	22	0,3
15	19	0,3	0,5	17	25	0,3
	19	0,3	0,5	17	25	0,3
	20	0,3	0,5	17	26	0,3
	20	0,3	0,5	17	26	0,3
17	21	0,3	0,5	19	27	0,3
	21	0,3	0,5	19	27	0,3
	22	0,3	0,5	19	28	0,3
	22	0,3	0,5	19	28	0,3
17	22	0,3	0,5	19	28	0,3
	22	0,3	1	19	28	0,3
	24	0,6	0,5	21	33	0,6
	24	0,6	0,5	21	33	0,6

## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring

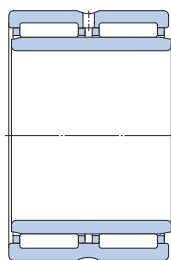
d 20 – 32 mm



NKI(S)  
NA 49  
NA 69 (d ≤ 30 mm)



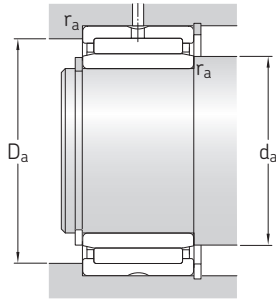
NA 49 ...2RS



NA 69 (d ≥ 32 mm)

Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min	kg	–	
20	32	16	–	15,4	24,5	2,9	16 000	19 000	0,048	▶ NKI 20/16
	32	20	–	19	32,5	4	16 000	19 000	0,06	▶ NKI 20/20
	37	17	–	21,6	28	3,35	15 000	17 000	0,075	▶ NA 4904
22	37	18	17	19,4	22,4	2,65	–	7 500	0,08	▶ NA 4904.2RS
	37	30	–	35,2	53	6,55	15 000	17 000	0,14	▶ NA 6904
	42	20	–	28,6	39	4,75	13 000	15 000	0,13	▶ NKIS 20
25	34	16	–	15,7	26	3,1	15 000	17 000	0,052	▶ NKI 22/16
	34	20	–	19,4	34,5	4,25	15 000	17 000	0,065	▶ NKI 22/20
	39	17	–	23,3	32	3,9	14 000	15 000	0,08	▶ NA 49/22
28	39	30	–	36,9	57	7,2	14 000	15 000	0,15	▶ NA 69/22
	38	20	–	24,6	42,5	5,2	14 000	15 000	0,08	▶ NKI 25/20 TN
	38	30	–	31,9	60	7,5	14 000	15 000	0,12	▶ NKI 25/30
30	42	17	–	24,2	34,5	4,15	13 000	15 000	0,088	▶ NA 4905
	42	18	17	21,6	27,5	3,25	–	6 300	0,09	▶ NA 4905.2RS
	42	30	–	38	62	7,65	13 000	15 000	0,16	▶ NA 6905
32	47	22	–	34,1	46,5	5,7	12 000	13 000	0,16	▶ NKIS 25
	42	20	–	26,4	48	6	12 000	14 000	0,092	▶ NKI 28/20 TN
	42	30	–	34,1	65,5	8,3	12 000	14 000	0,14	▶ NKI 28/30
30	45	17	–	25,1	36,5	4,4	12 000	14 000	0,098	▶ NA 49/28
	45	30	–	39,6	65,5	8,3	12 000	14 000	0,18	▶ NA 69/28
	45	20	–	27,5	52	6,55	11 000	13 000	0,11	▶ NKI 30/20 TN
28	45	30	–	40,2	85	10,6	11 000	13 000	0,17	▶ NKI 30/30 TN
	47	17	–	25,5	39	4,65	11 000	13 000	0,1	▶ NA 4906
	47	18	17	23,3	32	3,8	–	5 600	0,1	▶ NA 4906.2RS
32	47	30	–	42,9	75	9,3	11 000	13 000	0,19	▶ NA 6906
	52	22	–	36,9	54	6,55	10 000	12 000	0,18	▶ NKIS 30
	47	20	–	25,1	46,5	5,85	11 000	12 000	0,11	▶ NKI 32/20
30	47	30	–	36,9	76,5	9,5	11 000	12 000	0,17	▶ NKI 32/30
	52	20	–	30,8	51	6,3	10 000	11 000	0,16	▶ NA 49/32
	52	36	–	47,3	90	10,8	10 000	11 000	0,29	▶ NA 69/32

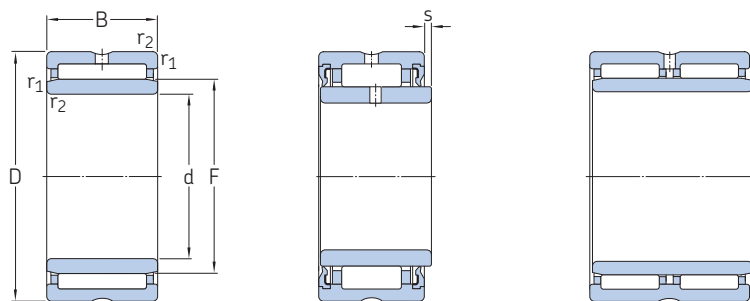
▶ Popular item



Dimensions			Abutment and fillet dimensions				
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.	
mm			mm				
20	24	0,3	0,5	22	30	0,3	
	24	0,3	0,5	22	30	0,3	
	25	0,3	0,8	22	35	0,3	
25	25	0,3	0,5	22	35	0,3	
	25	0,3	1	22	35	0,3	
	28	0,6	0,5	24	38	0,6	
22	26	0,3	0,5	24	32	0,3	
	26	0,3	0,5	24	32	0,3	
	28	0,3	0,8	24	37	0,3	
28	28	0,3	0,5	24	37	0,3	
	25	29	0,3	1	27	36	0,3
		29	0,3	1,5	27	36	0,3
30		0,3	0,8	27	40	0,3	
30	30	0,3	0,5	27	40	0,3	
	30	0,3	1	27	40	0,3	
	32	0,6	1	29	43	0,6	
28	32	0,3	1	30	40	0,3	
	32	0,3	1,5	30	40	0,3	
	32	0,3	0,8	30	43	0,3	
32	32	0,3	1	30	43	0,3	
	30	35	0,3	0,5	32	43	0,3
		35	0,3	1	32	43	0,3
35		0,3	0,8	32	45	0,3	
35	35	0,3	0,5	32	45	0,3	
	35	0,3	1	32	45	0,3	
	37	0,6	1	34	48	0,6	
32	37	0,3	0,5	34	45	0,3	
	37	0,3	1	34	45	0,3	
	40	0,6	0,8	36	48	0,6	
40	40	0,6	0,5	36	48	0,6	

## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring

d 35 – 55 mm



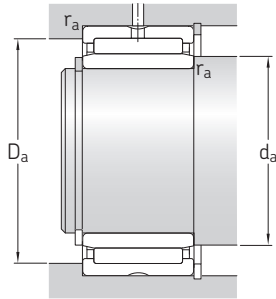
NKI(S)  
NA 49

NA 49 ...2RS

NA 69

Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min		kg	–
35	50	20	–	29,7	60	7,5	10 000	11 000	0,12	▶ NKI 35/20 TN
	50	30	–	38	83	10,4	10 000	11 000	0,19	▶ NKI 35/30
	55	20	–	31,9	54	6,7	9 500	11 000	0,17	▶ NA 4907
	55	21	20	27	43	5,3	–	4 800	0,18	▶ NA 4907.2RS
	55	36	–	48,4	93	11,4	9 500	11 000	0,31	▶ NA 6907
	58	22	–	39,1	61	7,5	9 000	10 000	0,22	NKIS 35
38	53	20	–	27,5	55	6,8	9 500	11 000	0,13	NKI 38/20
	53	30	–	40,2	90	11,2	9 500	11 000	0,21	▶ NKI 38/30
40	55	20	–	31,4	65,5	8,3	9 000	10 000	0,14	▶ NKI 40/20 TN
	55	30	–	45,7	108	13,7	9 000	10 000	0,22	▶ NKI 40/30 TN
	62	22	–	42,9	71	8,8	8 000	9 500	0,23	▶ NA 4908
	62	23	22	36,9	58,5	7,1	–	4 000	0,25	▶ NA 4908.2RS
	62	40	–	67,1	125	15,3	8 000	9 500	0,43	▶ NA 6908
	65	22	–	42,9	72	8,8	8 000	9 000	0,28	NKIS 40
42	57	20	–	29,2	61	7,65	8 500	10 000	0,14	NKI 42/20
	57	30	–	41,8	98	12,5	8 500	10 000	0,22	NKI 42/30
45	62	25	–	42,9	91,5	11,2	8 000	9 000	0,22	▶ NKI 45/25 TN
	62	35	–	58,3	137	17	8 000	9 000	0,31	▶ NKI 45/35 TN
	68	22	–	45,7	78	9,65	7 500	8 500	0,27	▶ NA 4909
	68	23	22	39,1	64	7,8	–	3 800	0,29	▶ NA 4909.2RS
	68	40	–	70,4	137	17	7 500	8 500	0,5	▶ NA 6909
	72	22	–	44,6	78	9,8	7 000	8 000	0,34	▶ NKIS 45
50	68	25	–	40,2	88	10,8	7 500	8 500	0,26	▶ NKI 50/25
	68	35	–	52,3	122	15,3	7 500	8 500	0,36	▶ NKI 50/35
	72	22	–	47,3	85	10,6	7 000	8 000	0,27	▶ NA 4910
	72	23	22	40,2	69,5	8,5	–	3 400	0,3	▶ NA 4910.2RS
	72	40	–	73,7	150	18,6	7 000	8 000	0,52	▶ NA 6910
	80	28	–	62,7	104	13,2	6 300	7 500	0,52	▶ NKIS 50
55	72	25	–	46,8	110	13,4	6 700	7 500	0,26	▶ NKI 55/25 TN
	72	35	–	55	134	17	6 700	7 500	0,36	▶ NKI 55/35
	80	25	–	57,2	106	13,2	6 300	7 000	0,39	▶ NA 4911
	80	45	–	89,7	190	23,2	6 300	7 000	0,78	▶ NA 6911
	85	28	–	66	114	14,6	6 000	6 700	0,56	NKIS 55

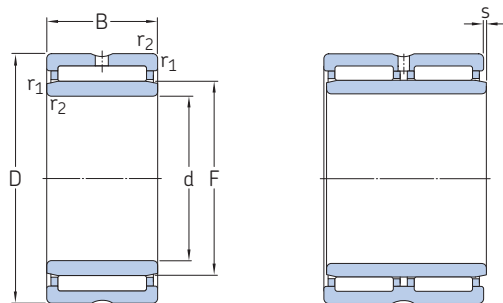
▶ Popular item



Dimensions			Abutment and fillet dimensions			
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm			mm			
35	40	0,3	0,5	37	48	0,3
	40	0,3	1	37	48	0,3
	42	0,6	0,8	39	51	0,6
	42	0,6	0,5	39	51	0,6
	43	0,6	0,5	39	53	0,6
38	43	0,3	0,5	40	51	0,3
	43	0,3	1	40	51	0,3
40	45	0,3	0,5	42	53	0,3
	45	0,3	1	42	53	0,3
	48	0,6	1	44	58	0,6
	48	0,6	0,5	44	58	0,6
	50	1	0,5	45	60	1
42	47	0,3	0,5	44	55	0,3
	47	0,3	1	44	55	0,3
45	50	0,6	1,5	49	58	0,6
	50	0,6	2	49	58	0,6
	52	0,6	1	49	64	0,6
	52	0,6	0,5	49	64	0,6
	55	1	0,5	50	67	1
50	55	0,6	1,5	54	64	0,6
	55	0,6	2	54	64	0,6
	58	0,6	1	54	68	0,6
	58	0,6	0,5	54	68	0,6
	60	1,1	2	56,5	73,5	1
55	60	0,6	1,5	59	68	0,6
	60	0,6	2	59	68	0,6
	63	1	1,5	60	75	1
	63	1	1,5	60	75	1
	65	1,1	2	61,5	78,5	1

## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring

d 60 – 90 mm

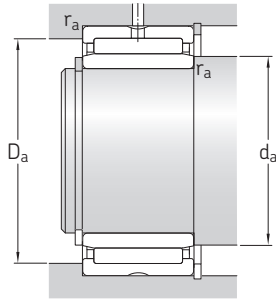


NKI(S)  
NA 49

NA 69

Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min		kg	–
60	82	25	–	44	95	11,8	6 000	6 700	0,39	▶ NKI 60/25
	82	35	–	60,5	146	18,3	6 000	6 700	0,55	▶ NKI 60/35
	85	25	–	60,5	114	14,3	6 000	6 700	0,43	▶ NA 4912
	85	45	–	93,5	204	25	6 000	6 700	0,81	▶ NA 6912
	90	28	–	68,2	120	15,3	5 600	6 300	0,56	▶ NKIS 60
	90	35	–	73,7	163	20,4	5 600	6 300	0,66	▶ NKI 65/35
65	90	25	–	52,8	106	13,2	5 600	6 300	0,46	▶ NKI 65/25
	90	25	–	61,6	120	14,6	5 600	6 300	0,46	▶ NA 4913
	90	35	–	73,7	163	20,4	5 600	6 300	0,66	▶ NKI 65/35
	90	45	–	95,2	212	26	5 600	6 300	0,83	▶ NA 6913
	95	28	–	70,4	132	16,6	5 300	6 000	0,64	▶ NKIS 65
	95	35	–	84,2	163	20,8	5 000	5 600	0,73	▶ NA 4914
70	95	25	–	56,1	127	15,6	5 000	5 600	0,51	▶ NKI 70/25
	95	35	–	76,5	190	24	5 000	5 600	0,72	▶ NKI 70/35
	100	30	–	84,2	163	20,8	5 000	5 600	0,73	▶ NA 4914
	100	54	–	128	285	36	5 000	5 600	1,35	▶ NA 6914
	105	25	–	69,3	132	16,6	4 800	5 300	0,64	▶ NKI 75/25
	105	30	–	84,2	170	21,6	4 800	5 300	0,78	▶ NA 4915
75	105	35	–	96,8	200	26	4 800	5 300	0,91	▶ NKI 75/35
	105	54	–	130	290	37,5	4 800	5 300	1,45	▶ NA 6915
	110	25	–	72,1	140	18	4 500	5 000	0,68	▶ NKI 80/25
	110	30	–	88	183	23,2	4 500	5 000	0,88	▶ NA 4916
	110	35	–	101	216	28	4 500	5 000	0,96	▶ NKI 80/35
	110	54	–	134	315	40	4 500	5 000	1,5	▶ NA 6916
85	115	26	–	73,7	146	18,6	4 300	4 800	0,74	▶ NKI 85/26
	115	36	–	105	232	30	4 300	4 800	1,05	▶ NKI 85/36
	120	35	–	108	250	31	4 000	4 500	1,25	▶ NA 4917
	120	63	–	165	425	53	4 000	4 500	2,2	▶ NA 6917
	120	26	–	76,5	156	19,6	4 000	4 500	0,78	▶ NKI 90/26
	120	36	–	108	250	31	4 000	4 500	1,1	▶ NKI 90/36
90	125	35	–	112	265	32,5	3 800	4 300	1,3	▶ NA 4918
	125	63	–	172	450	55	3 800	4 300	2,3	▶ NA 6918

▶ Popular item



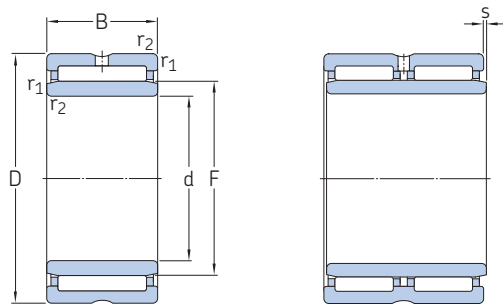
Dimensions				Abutment and fillet dimensions		
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm				mm		
60	68	0,6	1	64	78	0,6
	68	0,6	1	64	78	0,6
	68	1	1,5	65	80	1
	68	1	1,5	65	80	1
	70	1,1	2	66,5	83,5	1
	70	1,1	2	66,5	83,5	1
65	73	1	1	70	85	1
	72	1	1,5	70	85	1
	73	1	1	70	85	1
	72	1	1,5	70	85	1
	75	1,1	2	71,5	88,5	1
	75	1,1	2	71,5	88,5	1
70	80	1	0,8	75	90	1
	80	1	0,8	75	90	1
	80	1	1,5	75	95	1
	80	1	1	75	95	1
	80	1	1	75	95	1
	80	1	1	75	95	1
75	85	1	1	80	100	1
	85	1	1,5	80	100	1
	85	1	1	80	100	1
	85	1	1	80	100	1
	85	1	1	80	100	1
	85	1	1	80	100	1
80	90	1	1	85	105	1
	90	1	1,5	85	105	1
	90	1	1	85	105	1
	90	1	1	85	105	1
	90	1	1	85	105	1
	90	1	1	85	105	1
85	95	1	1,5	90	110	1
	95	1	1,5	90	110	1
	100	1,1	1	91,5	113,5	1
	100	1,1	1	91,5	113,5	1
	100	1,1	1	91,5	113,5	1
	100	1,1	1	91,5	113,5	1
90	100	1	1,5	95	115	1
	100	1	1,5	95	115	1
	105	1,1	1	96,5	118,5	1
	105	1,1	1	96,5	118,5	1
	105	1,1	1	96,5	118,5	1
	105	1,1	1	96,5	118,5	1





## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring

d 95 – 320 mm

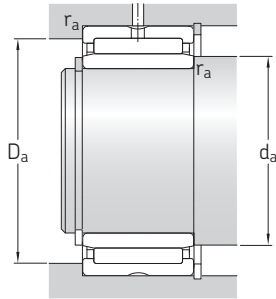


NKI  
NA 48  
NA 49

NA 69

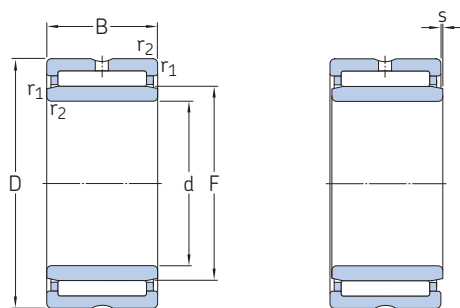
Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min		kg	–
95	125	26	–	78,1	166	20,4	3 800	4 300	0,82	▶ NKI 95/26
	125	36	–	112	265	32,5	3 800	4 300	1,15	▶ NKI 95/36
	130	35	–	114	270	33,5	3 600	4 000	1,35	▶ NA 4919
	130	63	–	172	465	56	3 600	4 000	2,5	▶ NA 6919
100	130	30	–	96,8	220	27	3 600	4 000	0,99	▶ NKI 100/30
	130	40	–	123	305	37,5	3 600	4 000	1,35	▶ NKI 100/40
	140	40	–	125	280	34	3 400	4 000	1,9	▶ NA 4920
110	140	30	–	93,5	232	27	3 400	3 800	1,1	▶ NA 4822
	150	40	–	130	300	35,5	3 200	3 600	2,05	▶ NA 4922
120	150	30	–	99	255	29	3 200	3 600	1,15	▶ NA 4824
	165	45	–	176	405	49	3 000	3 400	2,85	▶ NA 4924
130	165	35	–	119	325	36,5	2 800	3 200	1,8	▶ NA 4826
	180	50	–	198	480	57	2 600	3 000	3,9	▶ NA 4926
140	175	35	–	121	345	37,5	2 600	3 000	1,9	▶ NA 4828
	190	50	–	205	510	60	2 400	2 800	4,15	▶ NA 4928
150	190	40	–	147	415	46,5	2 400	2 800	2,7	▶ NA 4830
160	200	40	–	157	450	49	2 200	2 600	2,85	▶ NA 4832
170	215	45	–	179	520	56	2 200	2 400	3,95	▶ NA 4834
180	225	45	–	190	570	60	2 000	2 400	4,2	▶ NA 4836
190	240	50	–	220	710	73,5	1 900	2 200	5,55	▶ NA 4838
200	250	50	–	224	735	75	1 800	2 000	5,8	▶ NA 4840
220	270	50	–	238	815	81,5	1 700	1 900	6,35	▶ NA 4844
240	300	60	–	347	1 120	112	1 500	1 700	9,9	▶ NA 4848
260	320	60	–	358	1 200	118	1 400	1 500	10,5	▶ NA 4852
280	350	69	–	429	1 320	129	1 300	1 400	15,5	▶ NA 4856
300	380	80	–	594	1 800	173	1 100	1 300	22	▶ NA 4860
320	400	80	–	605	1 900	176	1 100	1 200	23	▶ NA 4864

▶ Popular item



Dimensions				Abutment and fillet dimensions		
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm				mm		
<b>95</b>	105	1	1,5	100	120	1
	105	1	1,5	100	120	1
	110	1,1	1	101,5	123,5	1
	110	1,1	1	101,5	123,5	1
<b>100</b>	110	1,1	1,5	106,5	123,5	1
	110	1,1	2	106,5	123,5	1
	115	1,1	2	106,5	133,5	1
<b>110</b>	120	1	0,8	115	135	1
	125	1,1	2	116,5	143,5	1
<b>120</b>	130	1	0,8	125	145	1
	135	1,1	2	126,5	158,5	1
<b>130</b>	145	1,1	1	136,5	158,5	1
	150	1,5	1,5	138	172	1,5
<b>140</b>	155	1,1	1	146,5	168,5	1
	160	1,5	1,5	148	182	1,5
<b>150</b>	165	1,1	1,5	156,5	183,5	1
<b>160</b>	175	1,1	1,5	166,5	193,5	1
<b>170</b>	185	1,1	1,5	176,5	208,5	1
<b>180</b>	195	1,1	1,5	186,5	218,5	1
<b>190</b>	210	1,5	1,5	198	232	1,5
<b>200</b>	220	1,5	1,5	208	242	1,5
<b>220</b>	240	1,5	1,5	228	262	1,5
<b>240</b>	265	2	2	249	291	2
<b>260</b>	285	2	2	269	311	2
<b>280</b>	305	2	2,5	289	341	2
<b>300</b>	330	2,1	2	311	369	2
<b>320</b>	350	2,1	2	331	389	2

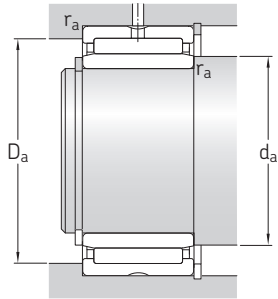
## 7.4 Needle roller bearings with machined rings with flanges, with an inner ring d 340 – 380 mm



Principal dimensions				Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	C	dynamic	static		Reference speed	Limiting speed		
mm				C	C <sub>0</sub>	P <sub>u</sub>	r/min		kg	–
340	420	80	–	616	1 960	183	1 000	1 200	24	NA 4868
360	440	80	–	627	2 040	186	950	1 100	25,5	NA 4872
380	480	100	–	968	3 000	270	900	1 000	42,5	NA 4876

7.4

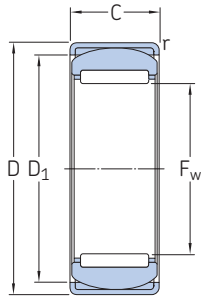




Dimensions				Abutment and fillet dimensions		
d	F	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm				mm		
340	370	2,1	2	351	409	2
360	390	2,1	2	371	429	2
380	415	2,1	2	391	469	2

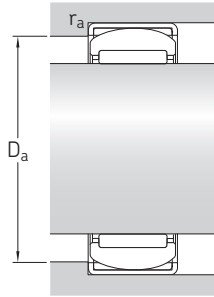
## 7.5 Alignment needle roller bearings, without an inner ring

$F_w$  15 – 45 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
$F_w$	D	C	dynamic	static		Reference speed	Limiting speed		
			C	$C_0$	$P_u$				
mm			kN		kN	r/min		kg	–
15	28	12	7,37	9,15	1,08	24 000	28 000	0,032	RPNA 15/28
18	32	16	12,8	17,6	2,12	22 000	24 000	0,052	RPNA 18/32
20	35	16	13,2	19,3	2,28	19 000	22 000	0,062	▶ RPNA 20/35
25	42	20	19	32,5	4	16 000	18 000	0,11	▶ RPNA 25/42
30	47	20	22,9	38	4,8	13 000	15 000	0,13	▶ RPNA 30/47
35	52	20	24,6	45	5,6	11 000	13 000	0,13	▶ RPNA 35/52
40	55	20	26,4	51	6,3	10 000	11 000	0,14	RPNA 40/55
45	62	20	27,5	57	7,1	9 000	10 000	0,18	▶ RPNA 45/62

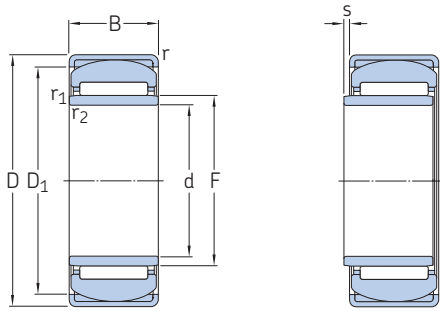
7.5



Dimensions			Abutment and fillet dimensions		
$F_w$	$D_1$	$r_{\text{min.}}$	$D_a_{\text{min.}}$	$D_a_{\text{max.}}$	$r_a_{\text{max.}}$
mm			mm		
15	24,5	0,8	23,5	24,5	0,8
18	27	0,8	26	27	0,8
20	30,5	0,8	29,5	30,5	0,8
25	36,5	0,8	35	37	0,8
30	42	0,8	41	42	0,8
35	47,5	0,8	46,5	47,5	0,8
40	50,5	0,8	49,5	50,5	0,8
45	58	0,8	57	58	0,8

## 7.6 Alignment needle roller bearings, with an inner ring

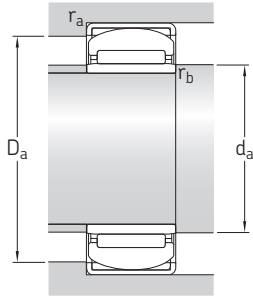
d 12 – 40 mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
d	D	B	dynamic	static		Reference speed	Limiting speed		
mm			kN		kN	r/min		kg	–
12	28	12	7,37	9,15	1,08	24 000	28 000	0,037	PNA 12/28
15	32	16	12,8	17,6	2,12	22 000	24 000	0,062	► PNA 15/32
17	35	16	13,2	19,3	2,28	19 000	22 000	0,073	► PNA 17/35
20	42	20	19	32,5	4	16 000	18 000	0,14	► PNA 20/42
22	44	20	22	36,5	4,55	14 000	16 000	0,15	PNA 22/44
25	47	20	22,9	38	4,8	13 000	15 000	0,16	PNA 25/47
30	52	20	24,6	45	5,6	11 000	13 000	0,18	► PNA 30/52
35	55	20	26,4	51	6,3	10 000	11 000	0,18	► PNA 35/55
40	62	20	27,5	57	7,1	9 000	10 000	0,23	► PNA 40/62

7.6

► Popular item

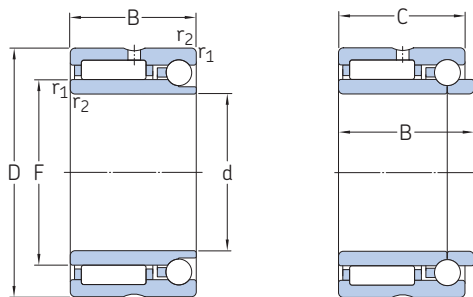


Dimensions						Abutment and fillet dimensions				
d	F	D <sub>1</sub>	r min.	r <sub>1,2</sub> min.	s max.	d <sub>a</sub> min.	D <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.	r <sub>b</sub> max.
mm						mm				
12	15	24,5	0,8	0,3	0,5	14	23,5	24,5	0,8	0,3
15	18	27	0,8	0,3	0,5	17	26	27	0,8	0,3
17	20	30,5	0,8	0,3	0,5	19	29,5	30,5	0,8	0,3
20	25	36,5	0,8	0,3	0,5	22	35	37	0,8	0,3
22	28	38,5	0,8	0,3	0,5	24	37,5	39	0,8	0,3
25	30	42	0,8	0,3	0,5	25	41	42	0,8	0,3
30	35	47,5	0,8	0,3	0,5	32	46,5	47,5	0,8	0,3
35	40	50,5	0,8	0,3	0,5	37	49,5	50,5	0,8	0,3
40	45	58	0,8	0,3	0,5	42	57	58	0,8	0,3



## 7.7 Needle roller / angular contact ball bearings

d 12 – 70 mm

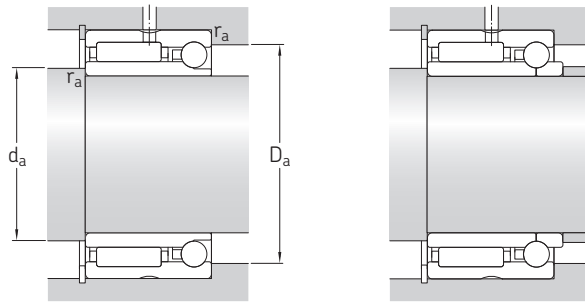


NKIA

NKIB

Principal dimensions				Basic load ratings				Fatigue load limit		Speed ratings		Mass	Designation
d	D	B	C	radial dynamic C	static C <sub>0</sub>	axial dynamic C	static C <sub>0</sub>	radial P <sub>u</sub>	axial P <sub>u</sub>	Reference speed	Limiting speed	kg	
mm				kN				kN		r/min		kg	–
12	24	16	–	8,09	9,65	2,07	1,92	1,14	0,083	22 000	26 000	0,04	▶ NKIA 5901
	24	17,5	16	8,09	9,65	2,07	1,92	1,14	0,083	22 000	26 000	0,043	▶ NKIB 5901
15	28	18	–	11,2	15,3	2,27	2,37	1,83	0,099	19 000	22 000	0,05	▶ NKIA 5902
	28	20	18	11,2	15,3	2,27	2,37	1,83	0,099	19 000	22 000	0,052	▶ NKIB 5902
17	30	18	–	11,4	16,3	2,24	2,74	1,96	0,116	18 000	20 000	0,056	▶ NKIA 5903
	30	20	18	11,4	16,3	2,24	2,74	1,96	0,116	18 000	20 000	0,058	▶ NKIB 5903
20	37	23	–	21,6	28	3,79	4,21	3,35	0,176	15 000	17 000	0,1	▶ NKIA 5904
	37	25	23	21,6	28	3,79	4,21	3,35	0,176	15 000	17 000	0,11	▶ NKIB 5904
22	39	23	–	23,3	32	4,14	4,93	3,9	0,205	14 000	15 000	0,12	NKIA 59/22
	39	25	23	23,3	32	4,14	4,93	3,9	0,205	14 000	15 000	0,12	▶ NKIB 59/22
25	42	23	–	24,2	34,5	4,24	5,26	4,15	0,224	13 000	15 000	0,13	▶ NKIA 5905
	42	25	23	24,2	34,5	4,24	5,26	4,15	0,224	13 000	15 000	0,13	▶ NKIB 5905
30	47	23	–	25,5	39	4,54	6,32	4,65	0,268	11 000	13 000	0,15	▶ NKIA 5906
	47	25	23	25,5	39	4,54	6,32	4,65	0,268	11 000	13 000	0,15	▶ NKIB 5906
35	55	27	–	31,9	54	5,83	8,42	6,7	0,355	9 500	11 000	0,24	▶ NKIA 5907
	55	30	27	31,9	54	5,83	8,42	6,7	0,355	9 500	11 000	0,25	▶ NKIB 5907
40	62	30	–	42,9	71	7,17	10,9	8,8	0,467	8 000	9 500	0,32	▶ NKIA 5908
	62	34	30	42,9	71	7,17	10,9	8,8	0,467	8 000	9 500	0,32	▶ NKIB 5908
45	68	30	–	45,7	78	7,47	12	9,65	0,513	7 500	8 500	0,38	NKIA 5909
	68	34	30	45,7	78	7,47	12	9,65	0,513	7 500	8 500	0,38	▶ NKIB 5909
50	72	30	–	47,3	85	7,74	13,7	10,6	0,579	7 000	8 000	0,38	▶ NKIA 5910
	72	34	30	47,3	85	7,74	13,7	10,6	0,579	7 000	8 000	0,39	▶ NKIB 5910
55	80	34	–	57,2	106	9,27	16,7	13,2	0,697	6 300	7 000	0,55	NKIA 5911
	80	38	34	57,2	106	9,27	16,7	13,2	0,697	6 300	7 000	0,56	▶ NKIB 5911
60	85	34	–	60,5	114	9,58	18	14,3	0,77	6 000	6 700	0,59	▶ NKIA 5912
	85	38	34	60,5	114	9,58	18	14,3	0,77	6 000	6 700	0,6	▶ NKIB 5912
65	90	34	–	61,6	120	9,96	19,2	14,6	0,816	5 600	6 300	0,64	NKIA 5913
	90	38	34	61,6	120	9,96	19,2	14,6	0,816	5 600	6 300	0,64	▶ NKIB 5913
70	100	40	–	84,2	163	13,2	25	20,8	1,05	5 000	5 600	0,98	NKIA 5914
	100	45	40	84,2	163	13,2	25	20,8	1,05	5 000	5 600	0,99	▶ NKIB 5914

▶ Popular item



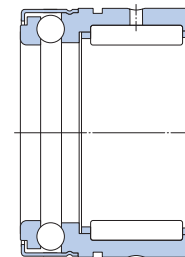
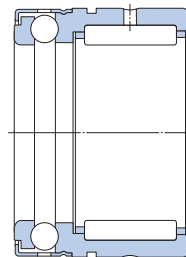
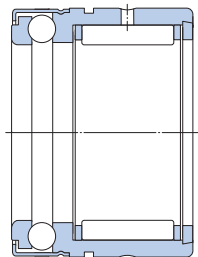
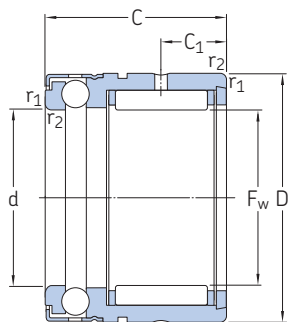
**Dimensions**

**Abutment and fillet dimensions**

d	F	r <sub>1,2</sub> min.	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.
mm			mm		
12	16	0,3	14	22	0,3
	16	0,3	14	22	0,3
15	20	0,3	17	26	0,3
	20	0,3	17	26	0,3
17	22	0,3	19	28	0,3
	22	0,3	19	28	0,3
20	25	0,3	22	35	0,3
	25	0,3	22	35	0,3
22	28	0,3	24	37	0,3
	28	0,3	24	37	0,3
25	30	0,3	27	40	0,3
	30	0,3	27	40	0,3
30	35	0,3	32	45	0,3
	35	0,3	32	45	0,3
35	42	0,6	39	51	0,6
	42	0,6	39	51	0,6
40	48	0,6	44	58	0,6
	48	0,6	44	58	0,6
45	52	0,6	49	64	0,6
	52	0,6	49	64	0,6
50	58	0,6	54	68	0,6
	58	0,6	54	68	0,6
55	63	1	60	75	1
	63	1	60	75	1
60	68	1	65	80	1
	68	1	65	80	1
65	72	1	70	85	1
	72	1	70	85	1
70	80	1	75	95	1
	80	1	75	95	1

## 7.8 Needle roller / thrust ball bearings, full complement thrust bearing

$F_w$  7 – 35 mm



NX  
( $F_w = 7$  mm)

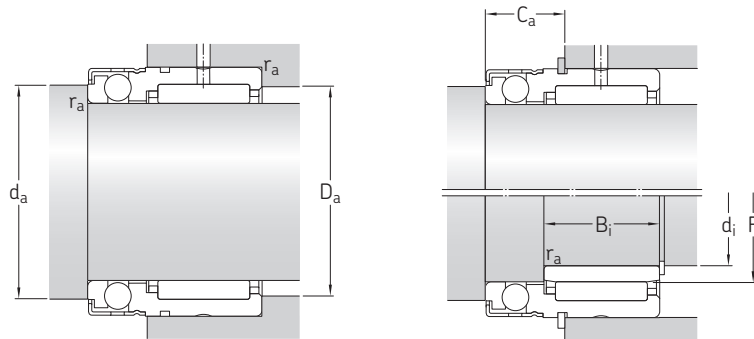
NX..Z  
( $F_w = 7$  mm)

NX  
( $F_w \geq 10$  mm)

NX..Z  
( $F_w \geq 10$  mm)

Principal dimensions			Basic load ratings				Fatigue load limit		Minimum load factor	Speed ratings		Mass	Designation
$F_w$	D	C	radial dynamic C	static $C_0$	axial dynamic C	static $C_0$	radial $P_u$	axial $P_u$	A	Reference speed	Limiting speed	kg	
mm			kN				kN		–	r/min		kg	–
7	14	18	2,81	2,75	3,45	5	0,29	0,186	0,00013	10 000	6 000	0,014	► NX 7 ZTN
	14	18	2,81	2,75	3,45	5	0,29	0,186	0,00013	10 000	11 000	0,014	NX 7 TN
10	19	18	4,95	4,55	5,07	8,5	0,53	0,31	0,00038	8 500	5 600	0,025	► NX 10 Z
	19	18	4,95	4,55	5,07	8,5	0,53	0,31	0,00038	8 500	9 500	0,025	NX 10
12	21	18	5,39	5,2	5,27	9,65	0,61	0,355	0,00048	8 000	5 300	0,028	► NX 12 Z
	21	18	5,39	5,2	5,27	9,65	0,61	0,355	0,00048	8 000	9 000	0,028	NX 12
15	24	28	11	14	6,18	12,2	1,66	0,45	0,00077	7 500	5 300	0,048	NX 15 Z
	24	28	11	14	6,18	12,2	1,66	0,45	0,00077	7 500	8 500	0,048	NX 15
17	26	28	12,1	16,6	6,37	13,4	1,96	0,5	0,00093	7 000	5 000	0,053	NX 17 Z
	26	28	12,1	16,6	6,37	13,4	1,96	0,5	0,00093	7 000	8 500	0,053	NX 17
20	30	28	13,2	19,3	7,8	17,3	2,28	0,64	0,0016	6 300	4 500	0,068	► NX 20 Z
	30	28	13,2	19,3	7,8	17,3	2,28	0,64	0,0016	6 300	7 500	0,068	NX 20
25	37	30	15,1	24,5	12,4	28,5	2,9	1,06	0,0042	5 600	3 800	0,12	NX 25 Z
	37	30	15,1	24,5	12,4	28,5	2,9	1,06	0,0042	5 600	6 300	0,12	NX 25
30	42	30	22,9	38	12,7	32,5	4,8	1,2	0,0055	5 300	3 600	0,13	► NX 30 Z
	42	30	22,9	38	12,7	32,5	4,8	1,2	0,0055	5 300	6 000	0,13	NX 30
35	47	30	24,6	45	13,5	38	5,6	1,4	0,0075	5 000	3 400	0,16	NX 35 Z
	47	30	24,6	45	13,5	38	5,6	1,4	0,0075	5 000	5 600	0,16	NX 35

► Popular item



Dimensions				Abutment and fillet dimensions				Associated inner ring <sup>1)</sup> Dimensions			Designation	Associated snap ring <sup>2)</sup> Designation
F <sub>w</sub>	C <sub>1</sub>	d	r <sub>1,2</sub> min.	d <sub>a</sub> min.	D <sub>a</sub> max.	C <sub>a</sub>	r <sub>a</sub> max.	d <sub>i</sub>	F	B <sub>i</sub>		
mm				mm				mm			-	-
7	4,7	7	0,3	9,6	12	10	0,3	-	-	-	-	SW 14
	4,7	7	0,3	9,6	12	10	0,3	-	-	-	-	SW 14
10	4,7	10	0,3	14,6	17	10	0,3	6	10	10	IR 6x10x10 IS1	SW 19
	4,7	10	0,3	14,6	17	10	0,3	6	10	10	IR 6x10x10 IS1	SW 19
12	4,7	12	0,3	16,6	19	10	0,3	8	12	10	IR 8x12x10 IS1	SW 21
	4,7	12	0,3	16,6	19	10	0,3	8	12	10	IR 8x12x10 IS1	SW 21
15	8	15	0,3	19	22	12,2	0,3	12	15	16	IR 12x15x16	SW 24
	8	15	0,3	19	22	12,2	0,3	12	15	16	IR 12x15x16	SW 24
17	8	17	0,3	21	24	12,2	0,3	14	17	17	IR 14x17x17	SW 26
	8	17	0,3	21	24	12,2	0,3	14	17	17	IR 14x17x17	SW 26
20	8	20	0,3	25	28	12,2	0,3	17	20	16	IR 17x20x16	SW 30
	8	20	0,3	25	28	12,2	0,3	17	20	16	IR 17x20x16	SW 30
25	8	25	0,3	31,6	35	14,2	0,3	20	25	16	IR 20x25x16 IS1	SW 37
	8	25	0,3	31,6	35	14,2	0,3	20	25	16	IR 20x25x16 IS1	SW 37
30	10	30	0,3	36,5	40	14,2	0,3	25	30	20	IR 25x30x20	SW 42
	10	30	0,3	36,5	40	14,2	0,3	25	30	20	IR 25x30x20	SW 42
35	10	35	0,3	40,5	45	14,2	0,3	30	35	20	IR 30x35x20	SW 47
	10	35	0,3	40,5	45	14,2	0,3	30	35	20	IR 30x35x20	SW 47

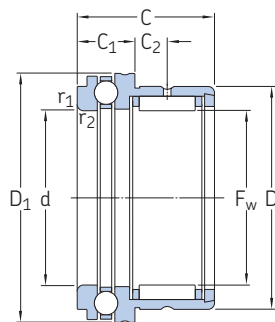
<sup>1)</sup> For additional information → Needle roller bearing inner rings, page 593

<sup>2)</sup> In accordance with DIN 471, not supplied by SKF.

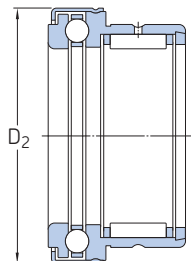


## 7.9 Needle roller / thrust ball bearings, thrust bearing with a cage

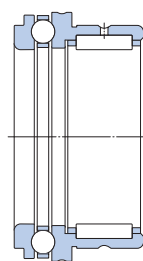
$F_w$  10 – 70 mm



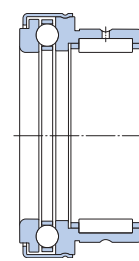
NKX  
( $F_w = 10$  mm)



NKX..Z  
( $F_w = 10$  mm)



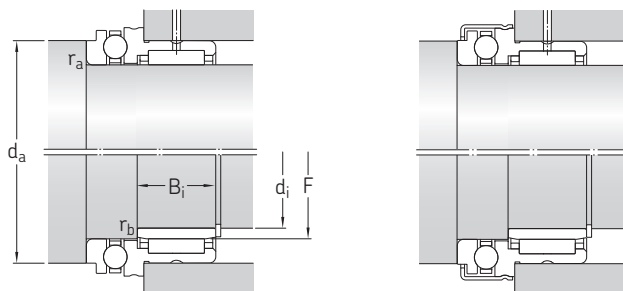
NKX  
( $F_w \geq 12$  mm)



NKX..Z  
( $F_w \geq 12$  mm)

$F_w$	Principal dimensions		Basic load ratings				Fatigue load limit		Minimum load factor	Speed ratings		Mass	Designation
	D	C	radial dynamic C	static $C_0$	axial dynamic C	static $C_0$	radial $P_u$	axial $P_u$		Reference speed	Limiting speed		
mm			kN				kN		–	r/min		kg	–
10	19	23	5,94	8	9,95	15,3	0,9	0,56	0,0012	9 500	8 000	0,036	NKX 10 ZTN
	19	23	5,94	8	9,95	15,3	0,9	0,56	0,0012	9 500	13 000	0,034	▶ NKX 10 TN
12	21	23	9,13	12	10,4	16,6	1,43	0,62	0,0014	9 000	7 500	0,04	▶ NKX 12 Z
	21	23	9,13	12	10,4	16,6	1,43	0,62	0,0014	9 000	13 000	0,038	NKX 12
15	24	23	11	14	10,6	18,3	1,66	0,67	0,0017	8 500	7 000	0,047	▶ NKX 15 Z
	24	23	11	14	10,6	18,3	1,66	0,67	0,0017	8 500	12 000	0,044	▶ NKX 15
17	26	25	12,1	16,6	10,8	19,6	1,96	0,735	0,002	8 500	7 000	0,055	▶ NKX 17 Z
	26	25	12,1	16,6	10,8	19,6	1,96	0,735	0,002	8 500	12 000	0,053	NKX 17
20	30	30	16,5	25,5	14,3	27	3,05	1	0,0038	7 500	6 000	0,09	▶ NKX 20 Z
	30	30	16,5	25,5	14,3	27	3,05	1	0,0038	7 500	10 000	0,083	▶ NKX 20
25	37	30	19	32,5	19,5	40,5	4	1,5	0,0085	6 300	5 500	0,13	▶ NKX 25 Z
	37	30	19	32,5	19,5	40,5	4	1,5	0,0085	6 300	9 000	0,13	NKX 25
30	42	30	22,9	38	20,3	45,5	4,8	1,7	0,01	6 000	5 000	0,14	▶ NKX 30 Z
	42	30	22,9	38	20,3	45,5	4,8	1,7	0,01	6 000	8 500	0,14	▶ NKX 30
35	47	30	24,6	45	21,2	51	5,6	1,9	0,013	5 600	4 500	0,17	▶ NKX 35 Z
	47	30	24,6	45	21,2	51	5,6	1,9	0,013	5 600	7 500	0,16	▶ NKX 35
40	52	32	26,4	51	27	68	6,3	2,55	0,024	5 000	4 000	0,21	▶ NKX 40 Z
	52	32	26,4	51	27	68	6,3	2,55	0,024	5 000	7 000	0,2	NKX 40
45	58	32	27,5	57	28,1	75	7,1	2,8	0,029	4 500	3 800	0,27	▶ NKX 45 Z
	58	32	27,5	57	28,1	75	7,1	2,8	0,029	4 500	6 300	0,25	NKX 45
50	62	35	38	78	28,6	81,5	9,65	3,05	0,034	4 300	3 600	0,3	▶ NKX 50 Z
	62	35	38	78	28,6	81,5	9,65	3,05	0,034	4 300	6 300	0,28	▶ NKX 50
60	72	40	41,8	96,5	41,6	122	11,8	4,55	0,077	3 600	3 000	0,38	▶ NKX 60 Z
	72	40	41,8	96,5	41,6	122	11,8	4,55	0,077	3 600	5 000	0,36	▶ NKX 60
70	85	40	44,6	98	43,6	137	12,2	5,1	0,097	3 400	2 700	0,52	▶ NKX 70 Z
	85	40	44,6	98	43,6	137	12,2	5,1	0,097	3 400	4 500	0,5	▶ NKX 70

▶ Popular item

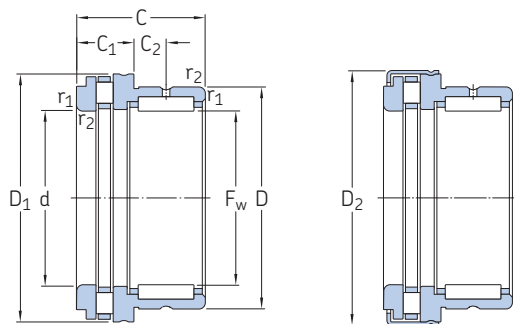


Dimensions			Abutment and fillet dimensions							Associated inner ring <sup>1)</sup> Dimensions			Designation
F <sub>w</sub>	C <sub>1</sub>	C <sub>2</sub>	d	D <sub>1</sub>	D <sub>2</sub>	r <sub>1,2</sub> min.	d <sub>a</sub> min.	r <sub>a</sub> max.	r <sub>b</sub> max.	d <sub>i</sub>	F	B <sub>i</sub>	
mm			mm							mm			-
10	9	6,5	10	-	25,2	0,3	19,7	0,3	0,3	7	10	16	IR 7x10x16
	9	6,5	10	24,1	-	0,3	19,7	0,3	0,3	7	10	16	IR 7x10x16
12	9	6,5	12	-	27,2	0,3	21,7	0,3	0,3	9	12	16	IR 9x12x16
	9	6,5	12	26,1	-	0,3	21,7	0,3	0,3	9	12	16	IR 9x12x16
15	9	6,5	15	-	29,2	0,3	23,7	0,3	0,3	12	15	16	IR 12x15x16
	9	6,5	15	28,1	-	0,3	23,7	0,3	0,3	12	15	16	IR 12x15x16
17	9	8	17	-	31,2	0,3	25,7	0,3	0,3	14	17	17	IR 14x17x17
	9	8	17	30,1	-	0,3	25,7	0,3	0,3	14	17	17	IR 14x17x17
20	10	10,5	20	-	36,2	0,3	30,7	0,3	0,3	17	20	20	IR 17x20x20
	10	10,5	20	35,1	-	0,3	30,7	0,3	0,3	17	20	20	IR 17x20x20
25	11	9,5	25	-	43,2	0,6	37,7	0,6	0,3	20	25	20	IR 20x25x20
	11	9,5	25	42,1	-	0,6	37,7	0,6	0,3	20	25	20	IR 20x25x20
30	11	9,5	30	-	48,2	0,6	42,7	0,6	0,3	25	30	20	IR 25x30x20
	11	9,5	30	47,1	-	0,6	42,7	0,6	0,3	25	30	20	IR 25x30x20
35	12	9	35	-	53,2	0,6	47,7	0,6	0,3	30	35	20	IR 30x35x20
	12	9	35	52,1	-	0,6	47,7	0,6	0,3	30	35	20	IR 30x35x20
40	13	10	40	-	61,2	0,6	55,7	0,6	0,3	35	40	20	IR 35x40x20
	13	10	40	60,1	-	0,6	55,7	0,6	0,3	35	40	20	IR 35x40x20
45	14	9	45	-	66,5	0,6	60,5	0,6	0,3	40	45	20	IR 40x45x20
	14	9	45	65,2	-	0,6	60,5	0,6	0,3	40	45	20	IR 40x45x20
50	14	10	50	-	71,5	0,6	65,5	0,6	0,6	45	50	25	IR 45x50x25
	14	10	50	70,2	-	0,6	65,5	0,6	0,6	45	50	25	IR 45x50x25
60	17	12	60	-	86,5	1	80,5	1	1	50	60	25	IR 50x60x25
	17	12	60	85,2	-	1	80,5	1	1	50	60	25	IR 50x60x25
70	18	11	70	-	96,5	1	90,5	1	1	60	70	25	IR 60x70x25
	18	11	70	95,2	-	1	90,5	1	1	60	70	25	IR 60x70x25

<sup>1)</sup> For additional information → Needle roller bearing inner rings, page 593

## 7.10 Needle roller / cylindrical roller thrust bearings

F<sub>w</sub> 15 – 50 mm

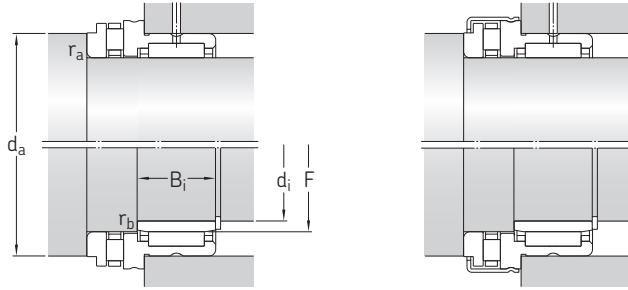


NKXR

NKXR..Z

Principal dimensions			Basic load ratings				Fatigue load limit		Minimum load factor	Speed ratings		Mass	Designation
F <sub>w</sub>	D	C	radial dynamic C	static C <sub>0</sub>	axial dynamic C	static C <sub>0</sub>	radial P <sub>u</sub>	axial P <sub>u</sub>	A	Reference speed	Limiting speed	kg	
mm			kN				kN		–	r/min			–
15	24	23	11	14	11,2	27	1,66	2,45	0,000 058	4 300	8 500	0,042	NKXR 15
	24	23	11	14	11,2	27	1,66	2,45	0,000 058	4 300	8 500	0,045	▶ NKXR 15 Z
17	26	25	12,1	16,6	12,2	31,5	1,96	2,85	0,000 079	4 300	8 500	0,05	▶ NKXR 17
	26	25	12,1	16,6	12,2	31,5	1,96	2,85	0,000 079	4 300	8 500	0,053	▶ NKXR 17 Z
20	30	30	16,5	25,5	18,6	48	3,05	4,65	0,00018	3 800	7 500	0,08	▶ NKXR 20
	30	30	16,5	25,5	18,6	48	3,05	4,65	0,00018	3 800	7 500	0,084	▶ NKXR 20 Z
25	37	30	19	32,5	25	69,5	4	6,8	0,00039	3 200	6 300	0,12	NKXR 25
	37	30	19	32,5	25	69,5	4	6,8	0,00039	3 200	6 300	0,13	▶ NKXR 25 Z
30	42	30	22,9	38	27	78	4,8	7,65	0,00049	3 000	6 000	0,14	NKXR 30
	42	30	22,9	38	27	78	4,8	7,65	0,00049	3 000	6 000	0,14	▶ NKXR 30 Z
35	47	30	24,6	45	29	93	5,6	9,15	0,00069	2 800	5 600	0,16	NKXR 35
	47	30	24,6	45	29	93	5,6	9,15	0,00069	2 800	5 600	0,17	▶ NKXR 35 Z
40	52	32	26,4	51	43	137	6,3	13,7	0,0015	2 400	5 000	0,2	NKXR 40
	52	32	26,4	51	43	137	6,3	13,7	0,0015	2 400	5 000	0,21	▶ NKXR 40 Z
45	58	32	27,5	57	45	153	7,1	15,3	0,0019	2 200	4 500	0,24	NKXR 45
	58	32	27,5	57	45	153	7,1	15,3	0,0019	2 200	4 500	0,26	▶ NKXR 45 Z
50	62	35	38	78	47,5	166	9,65	16,6	0,0022	2 200	4 300	0,27	NKXR 50
	62	35	38	78	47,5	166	9,65	16,6	0,0022	2 200	4 300	0,29	▶ NKXR 50 Z

▶ Popular item



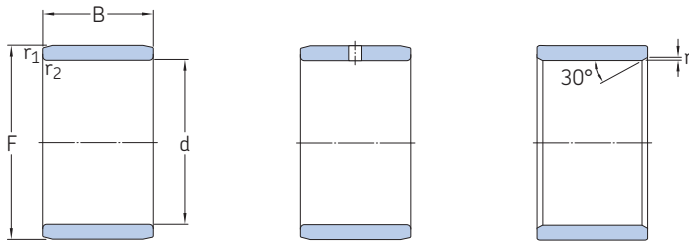
Dimensions							Abutment and fillet dimensions			Associated inner ring <sup>1)</sup> Dimensions			Designation
F <sub>w</sub>	C <sub>1</sub>	C <sub>2</sub>	d	D <sub>1</sub>	D <sub>2</sub>	r <sub>1,2</sub> min.	d <sub>a</sub> min.	r <sub>a</sub> max.	r <sub>b</sub> max.	d <sub>i</sub>	F	B <sub>i</sub>	
mm							mm			mm			-
15	9	6,5	15	28,1	-	0,3	23,7	0,3	0,3	12	15	16	IR 12x15x16
	9	6,5	15	-	29,2	0,3	23,7	0,3	0,3	12	15	16	IR 12x15x16
17	9	8	17	30,1	-	0,3	25,7	0,3	0,3	14	17	17	IR 14x17x17
	9	8	17	-	31,2	0,3	25,7	0,3	0,3	14	17	17	IR 14x17x17
20	10	10,5	20	35,1	-	0,3	30,7	0,3	0,3	17	20	20	IR 17x20x20
	10	10,5	20	-	36,2	0,3	30,7	0,3	0,3	17	20	20	IR 17x20x20
25	11	9,5	25	42,1	-	0,6	37,7	0,6	0,3	20	25	20	IR 20x25x20
	11	9,5	25	-	43,2	0,6	37,7	0,6	0,3	20	25	20	IR 20x25x20
30	11	9,5	30	47,1	-	0,6	42,7	0,6	0,3	25	30	20	IR 25x30x20
	11	9,5	30	-	48,2	0,6	42,7	0,6	0,3	25	30	20	IR 25x30x20
35	12	9	35	52,1	-	0,6	47,7	0,6	0,3	30	35	20	IR 30x35x20
	12	9	35	-	53,2	0,6	47,7	0,6	0,3	30	35	20	IR 30x35x20
40	13	10	40	60,1	-	0,6	55,7	0,6	0,3	35	40	20	IR 35x40x20
	13	10	40	-	61,2	0,6	55,7	0,6	0,3	35	40	20	IR 35x40x20
45	14	9	45	65,2	-	0,6	60,6	0,6	0,3	40	45	20	IR 40x45x20
	14	9	45	-	66,5	0,6	60,6	0,6	0,3	40	45	20	IR 40x45x20
50	14	10	50	70,2	-	0,6	65,5	0,6	0,6	45	50	25	IR 45x50x25
	14	10	50	-	71,5	0,6	65,5	0,6	0,6	45	50	25	IR 45x50x25

<sup>1)</sup> For additional information → Needle roller bearing inner rings, page 593



## 7.11 Needle roller bearing inner rings

d 5 – 75 mm



IR

IR .. IS1

LR

Dimensions					Mass	Designation	Dimensions					Mass	Designation	
d	F	B	r, r <sub>1,2</sub> min.				d	F	B	r, r <sub>1,2</sub> min.				
mm					kg	–	mm					kg	–	
5	8	12	0,3	0,0028		IR 5x8x12	15	18	12,5	0,3	0,0072		LR 15x18x12.5	
	8	16	0,3	0,0037		IR 5x8x16		18	16	0,3	0,0094		IR 15x18x16	
6	9	12	0,3	0,003		▶ IR 6x9x12	19	19	16	0,3	0,013		IR 15x19x16	
	9	16	0,3	0,0043		IR 6x9x16		19	20	0,3	0,016		IR 15x19x20	
7	10	10,5	0,3	0,0031		▶ IR 7x10x10.5	20	20	13	0,3	0,014		IR 15x20x13	
	10	10,5	0,3	0,0031		LR 7x10x10.5		20	23	0,3	0,024		IR 15x20x23	
	10	12	0,3	0,0036		▶ IR 7x10x12			17	20	16	0,3	0,011	
8	10	16	0,3	0,0049		IR 7x10x16	20	16,5		0,3	0,011		▶ IR 17x20x16.5	
	12	10	0,3	0,0048		▶ IR 8x12x10 IS1	20	16,5	0,3	0,011		LR 17x20x16.5		
		10,5	0,3	0,005		IR 8x12x10.5	20	20	0,3	0,014		▶ IR 17x20x20		
		10,5	0,3	0,005		LR 8x12x10.5		20	20,5	0,3	0,014		▶ IR 17x20x20.5	
12	12,5	0,3	0,0059		▶ IR 8x12x12.5	20	20,5	0,3	0,014		LR 17x20x20.5			
9	12	12	0,3	0,0044		IR 9x12x12	20	30,5	0,3	0,021		▶ IR 17x20x30.5		
	12	16	0,3	0,006		IR 9x12x16		20	30,5	0,3	0,021		LR 17x20x30.5	
10	13	12,5	0,3	0,0052		▶ IR 10x13x12.5		22	13	0,3	0,015		▶ IR 17x22x13	
	13	12,5	0,3	0,0052		LR 10x13x12.5	22	16	0,3	0,018		▶ IR 17x22x16		
	14	13	0,3	0,0074		IR 10x14x13		22	23	0,3	0,027		▶ IR 17x22x23	
14	16	0,3	0,0092		▶ IR 10x14x16	24		20	0,6	0,034		▶ IR 17x24x20		
	20	0,3	0,012		IR 10x14x20	20	24	16	0,3	0,015		IR 20x24x16		
12	15	12	0,3	0,0057			IR 12x15x12	24	20	0,3	0,021		▶ IR 20x24x20	
	15	12,5	0,3	0,0061		▶ IR 12x15x12.5	25	12,5	0,3	0,016		LR 20x25x12.5		
	15	12,5	0,3	0,0061		LR 12x15x12.5	25	16,5	0,3	0,022		LR 20x25x16.5		
	15	16	0,3	0,0076		▶ IR 12x15x16		17	0,3	0,025		IR 20x25x17		
		16,5	0,3	0,0081		IR 12x15x16.5	20	0,3	0,028		▶ IR 20x25x20			
	15	22,5	0,3	0,011		IR 12x15x22.5	25	20,5	0,3	0,027		▶ IR 20x25x20.5		
	15	20,5	0,3	0,011		LR 12x15x22.5		20,5	0,3	0,027		LR 20x25x20.5		
		26,5	0,3	0,038				26,5	0,3	0,038		▶ IR 20x25x26.5		
16	13	0,3	0,0085		▶ IR 12x16x13	25	26,5	0,3	0,038		LR 20x25x26.5			
	16	0,3	0,011		IR 12x16x16		25	30	0,3	0,04		▶ IR 20x25x30		
16	20	0,3	0,014		▶ IR 12x16x20	25	38,5	0,3	0,053		▶ IR 20x25x38.5			
	22	0,3	0,015		IR 12x16x22	28	20	0,6	0,045		IR 20x28x20			
14	17	17	0,3	0,0095			▶ IR 14x17x17							

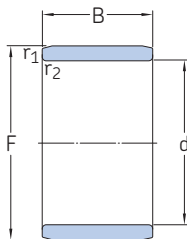
▶ Popular item

Dimensions				Mass	Designation	Dimensions				Mass	Designation	
d	F	B	r, r <sub>1,2</sub> min.			d	F	B	r, r <sub>1,2</sub> min.			
mm				kg	-	mm				kg	-	
22	26	16	0,3	0,018	IR 22x26x16	40	45	16,5	0,3	0,041	LR 40x45x16.5	
	26	20	0,3	0,023	IR 22x26x20		45	17	0,3	0,043	IR 40x45x17	
	28	17	0,3	0,03	▶ IR 22x28x17		45	20	0,3	0,049	▶ IR 40x45x20	
	28	20	0,3	0,035	IR 22x28x20		45	20,5	0,3	0,052	IR 40x45x20.5	
	28	20,5	0,3	0,036	IR 22x28x20.5		45	20,5	0,3	0,052	LR 40x45x20.5	
	28	30	0,3	0,054	IR 22x28x30		45	30	0,3	0,084	▶ IR 40x45x30	
	25	29	20	0,3	0,026		IR 25x29x20	48	22	0,6	0,092	▶ IR 40x48x22
		29	30	0,3	0,039		IR 25x29x30	48	40	0,6	0,17	▶ IR 40x48x40
		30	12,5	0,3	0,02		▶ LR 25x30x12.5	50	22	1	0,12	IR 40x50x22
		30	16,5	0,3	0,027		LR 25x30x16.5	42	47	20	0,3	0,053
30		17	0,3	0,027	▶ IR 25x30x17	47	30		0,3	0,081	IR 42x47x30	
30		20	0,3	0,033	▶ IR 25x30x20	45	50	20,5	0,3	0,059	LR 45x50x20.5	
30		20,5	0,3	0,033	▶ IR 25x30x20.5		50	25	0,6	0,071	▶ IR 45x50x25	
30		20,5	0,3	0,033	LR 25x30x20.5		50	25,5	0,3	0,075	IR 45x50x25.5	
30		26,5	0,3	0,046	▶ IR 25x30x26.5	50	25,5	0,3	0,075	LR 45x50x25.5		
30		26,5	0,3	0,046	LR 25x30x26.5	50	35	0,6	0,1	▶ IR 45x50x35		
30	30	0,3	0,053	▶ IR 25x30x30	52	22	0,6	0,089	▶ IR 45x52x22			
30	32	0,3	0,056	IR 25x30x32	52	40	0,6	0,16	IR 45x52x40			
30	38,5	0,3	0,065	▶ IR 25x30x38.5	55	22	1	0,13	▶ IR 45x55x22			
30	38,5	0,3	0,065	LR 25x30x38.5	50	55	20,5	0,6	0,064	LR 50x55x20.5		
32	22	0,6	0,053	IR 25x32x22		55	25	0,6	0,078	▶ IR 50x55x25		
32	22	0,6	0,053	IR 25x32x22		55	35	0,6	0,11	▶ IR 50x55x35		
28	32	17	0,3	0,025	IR 28x32x17	58	22	0,6	0,12	IR 50x58x22		
	32	20	0,3	0,029	IR 28x32x20		40	0,6	0,21	IR 50x58x40		
	32	30	0,3	0,044	IR 28x32x30		60	25	1	0,16	▶ IR 50x60x25	
30	35	12,5	0,3	0,023	LR 30x35x12.5	60	28	1,1	0,18	IR 50x60x28		
	35	13	0,3	0,025	▶ IR 30x35x13		55	60	25	0,6	0,086	▶ IR 55x60x25
	35	16	0,3	0,034	IR 30x35x16			60	35	0,6	0,12	▶ IR 55x60x35
	35	17	0,3	0,036	▶ IR 30x35x17	63		25	1	0,14	IR 55x63x25	
	35	20	0,3	0,039	▶ IR 30x35x20	63	45	1	0,26	IR 55x63x45		
	35	20,5	0,3	0,04	IR 30x35x20.5		65	28	1,1	0,2	▶ IR 55x65x28	
	35	20,5	0,3	0,04	LR 30x35x20.5		60	68	25	1	0,15	IR 60x68x25
	35	26	0,3	0,05	▶ IR 30x35x26	68		35	0,6	0,21	▶ IR 60x68x35	
	35	30	0,3	0,059	▶ IR 30x35x30	68		45	1	0,28	▶ IR 60x68x45	
	37	22	0,6	0,062	IR 30x37x22	70	25	1	0,2	▶ IR 60x70x25		
32	37	20	0,3	0,042	IR 32x37x20	70	28	1,1	0,22	▶ IR 60x70x28		
	37	30	0,3	0,062	▶ IR 32x37x30	65	72	25	1	0,14	▶ IR 65x72x25	
	40	20	0,6	0,068	IR 32x40x20		72	45	1	0,26	IR 65x72x45	
40	36	0,6	0,12	▶ IR 32x40x36	73		35	1	0,23	IR 65x73x35		
35	40	12,5	0,3	0,027	LR 35x40x12.5	75	28	1,1	0,23	▶ IR 65x75x28		
	40	16,5	0,3	0,037	LR 35x40x16.5		70	80	25	1	0,22	▶ IR 70x80x25
	40	17	0,3	0,038	IR 35x40x17			80	30	1	0,27	IR 70x80x30
	40	20	0,3	0,044	▶ IR 35x40x20	80		35	1	0,31	▶ IR 70x80x35	
	40	20,5	0,3	0,046	▶ IR 35x40x20.5	80	54	1	0,49	▶ IR 70x80x54		
	40	20,5	0,3	0,046	LR 35x40x20.5		75	85	25	1	0,24	IR 75x85x25
	40	30	0,3	0,067	▶ IR 35x40x30			85	35	1	0,34	▶ IR 75x85x35
	42	36	0,6	0,12	▶ IR 35x42x36	85		54	1	0,53	▶ IR 75x85x54	
	43	22	0,6	0,082	IR 35x43x22							
	38	43	20	0,3	0,048	IR 38x43x20						
43		30	0,3	0,074	IR 38x43x30							

▶ Popular item

## 7.11 Needle roller bearing inner rings

d 80 – 240 mm



Dimensions				Mass	Designation
d	F	B	r, r <sub>1,2</sub> min.		
mm				kg	–
80	90	25	1	0,25	▶ IR 80x90x25
	90	30	1	0,3	▶ IR 80x90x30
	90	35	1	0,36	▶ IR 80x90x35
	90	54	1	0,56	▶ IR 80x90x54
85	95	26	1	0,28	▶ IR 85x95x26
	95	36	1	0,39	IR 85x95x36
	100	35	1,1	0,58	▶ IR 85x100x35
	100	63	1,1	1,05	IR 85x100x63
90	100	26	1	0,29	▶ IR 90x100x26
	100	30	1	0,34	IR 90x100x30
	100	36	1	0,41	▶ IR 90x100x36
	105	35	1,1	0,61	▶ IR 90x105x35
95	105	26	1	0,31	IR 95x105x26
100	110	40	1,1	0,51	▶ IR 100x110x40
	115	40	1,1	0,8	▶ IR 100x115x40
110	120	30	1	0,41	▶ IR 110x120x30
	125	40	1,1	0,84	▶ IR 110x125x40
120	130	30	1	0,44	▶ IR 120x130x30
	135	45	1,1	1,05	▶ IR 120x135x45
130	145	35	1,1	0,86	▶ IR 130x145x35
	150	50	1,5	1,7	▶ IR 130x150x50
140	155	35	1,1	0,92	▶ IR 140x155x35
	160	50	1,5	1,8	▶ IR 140x160x50
150	165	40	1,1	1,1	▶ IR 150x165x40
160	175	40	1,1	1,2	▶ IR 160x175x40
170	185	45	1,1	1,45	▶ IR 170x185x45
180	195	45	1,1	1,5	▶ IR 180x195x45
190	210	50	1,5	2,4	▶ IR 190x210x50

Dimensions				Mass	Designation
d	F	B	r, r <sub>1,2</sub> min.		
mm				kg	–
200	220	50	1,5	2,5	▶ IR 200x220x50
220	240	50	1,5	2,75	▶ IR 220x240x50
240	265	60	2	4,6	IR 240x265x60

7.11



▶ Popular item