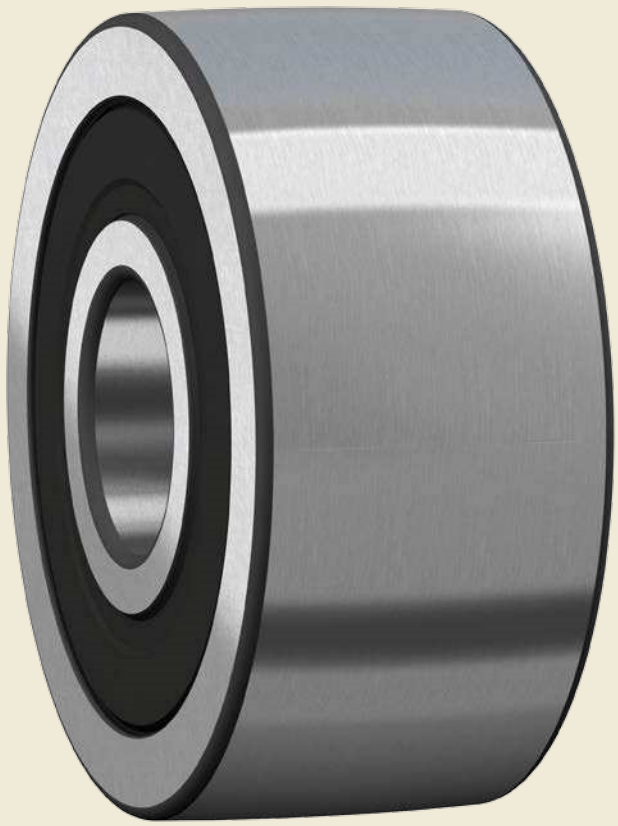


14 Cam rollers

14 Cam rollers

14 Cam rollers

More information

SKF cam rollers (yoke-type track rollers based on ball bearings) are designed to run on all types of tracks and to be used in cam drives, conveyor systems, etc.

The outer ring running surface is crowned as standard. Double row cam rollers are also available with a cylindrical (flat) outer ring running surface.

SKF supplies cam rollers greased, sealed and ready-to-mount. They are available in two main designs and also as variants of these:

- single row cam rollers based on deep groove ball bearings in the 62 series (fig. 1)
- double row cam rollers based on double row angular contact ball bearings in the 32 dimension series (fig. 2)

Cam roller features

- **Accommodate high radial loads**
  The thick-walled outer ring enables high radial loads, while reducing distortion and bending stresses.
- **Accommodate tilting moments**
  Double row cam rollers accommodate higher tilting moments than single row cam rollers.
- **Long service life**
  The crowned outer ring running surface is beneficial for applications where outer ring tilting relative to the track may occur or where edge stresses need to be minimized.
- **Relatively high speed capability**

Fig. 1

Single row cam roller

Fig. 2

Double row cam roller

Designs and variants

Single row cam rollers

- are based on deep groove ball bearings in the 62 series (fig. 1)
- have a thick-walled outer ring with its running surface crowned
- are capped with a sheet steel reinforced NBR contact seal on both sides
- are greased for the life of the bearing and cannot be relubricated (table 1)

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 should be taken.

Double row cam rollers

- are based on double row angular contact ball bearings in the 32 dimension series (fig. 2)
- have a thick-walled outer ring with its running surface available in two designs:
  - crowned as standard (series designation 3058.. C)
  - cylindrical (flat) (series designation 3057.. C)
- have a 30° contact angle, enabling, together with the two ball sets, tilting moments to be accommodated
- are supplied capped in two variants:
  - with a sheet steel shield on both sides that extends into a recess on the inner ring (designation suffix -2Z)
  - with an NBR contact seal on both sides (designation suffix -2RS1)

    These cam rollers are not listed in this catalogue, but can be found online at skf.com/go/17000-14-2.
- are greased for the life of the bearing under normal operating conditions (table 1)
- should be relubricated, if:
  - subjected to moisture or solid contaminants
  - they run for long periods at temperatures above 70 °C *(160 °F)*
- have a lubrication hole in the inner ring
  - Where suitable ducts are provided in the pin, the bearings are easy to relubricate.
  - The grease should be applied slowly to avoid damaging the shields or seals.

When capped bearings must operate under certain conditions, such as very high speeds or high temperatures, grease may appear between the inner ring and capping device. For bearing arrangements where this would be detrimental, appropriate actions should be taken.

Table 1

Technical specifications of SKF greases for track rollers

Bearing type	Specifications for the initial grease fill Temperature range[1] –50 0 50 100 150 200 250 °C –60 30 120 210 300 390 480 °F	Thickener	Base oil type	NLGI grade	Base oil viscosity [mm²/s] at 40 °C *(105 °F)*	Base oil viscosity [mm²/s] at 100 °C *(210 °F)*	Grease for relubrication
Single row cam roller (D ≤ 62 mm)		Lithium soap	Mineral	2	70	7,3	–
Single row cam roller (D > 62 mm), Double row cam roller		Lithuim soap	Mineral	3	100	10	LGMT 3[2]
Support roller, Cam follower		Lithuim complex soap	Mineral	2	160	15,5	LGWA 2

[1] Refer to the SKF traffic light concept (page 117).
[2] Single row cam rollers cannot be relubricated.

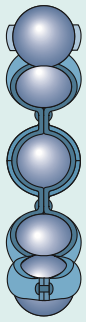
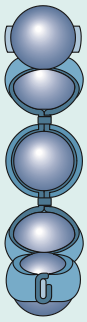
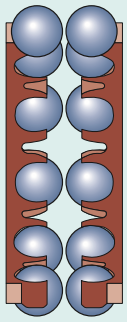
Cages

SKF cam rollers are fitted with one of the cages shown in table 2. Double row cam rollers are equipped with two cages.

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.

Table 2

Cages for cam rollers

	Single row cam rollers		Double row cam rollers
			
Cage type	Riveted, ball centred	Ribbon-type, ball centred	Snap-type, ball centred
Material	Stamped steel	Stamped steel	PA66, glass fibre reinforced
Suffix	–	–	–

Bearing data

	Single row cam rollers	Double row cam rollers
Dimension standards	ISO 15, dimension series 02, except for the outside diameter	ISO 15, dimension series 32, except for the outside diameter
Profile of the outer ring running surface	Radius = 400 mm	• **3058.. C design** Radius = 400 mm • **3057.. C design** Cylindrical (flat)
Tolerances For additional information → page 35	Normal, except: • diameter of the crowned running surface: twice the Normal tolerance Values for Normal tolerance class: ISO 492 (table 2, page 38)	
Internal clearance	C3 Values: ISO 5753-1 (table 6, page 252)	Normal Values 32 A series: (table 8, page 396)
For additional information → page 182	Values are valid for unmounted bearings under zero measuring load.	
Defect frequencies	→ skf.com/bearingcalculator	

Loads

Dynamic loads	As track rollers are not supported in a housing, the outer rings deform, leading to an altered load distribution and bending stresses in the outer ring. The basic load ratings listed in the **product tables**, **page 938**, take into account the altered load distribution, while the maximum radial loads $F_{r\,max}$ (**product tables**) are based on the bending stresses.
Static loads	Permissible static load is the lower value of $F_{0r\,max}$ or C_0 (**product tables**).
Axial loads	Cam rollers are intended for predominantly radial loads. However, axial loads can occur because of skew or tilting or when the outer ring runs against flanges for brief periods. Axial loads acting continuously on the outer ring may reduce the cam roller service life. To evaluate these influences, contact the SKF application engineering service.
Minimum load For additional information → **page 106**	$F_{rm} = 0{,}0167\ C_0$
Equivalent dynamic bearing load For additional information → **page 91**	$P = F_r$
Equivalent static bearing load For additional information → **page 105**	$P_0 = F_r$

Symbols

C_0	basic static load rating [kN] (**product tables**, **page 938**)
F_r	radial load [kN]
$F_{r\,max}$	maximum permissible dynamic radial load [kN] (**product tables**)
$F_{0r\,max}$	maximum permissible static radial load [kN] (**product tables**)
F_{rm}	minimum radial load [kN]
P	equivalent dynamic bearing load [kN]
P_0	equivalent static bearing load [kN]

Temperature limits

The permissible operating temperature for cam rollers can be limited by:

- the dimensional stability of the bearing rings and balls
- the cage
- the seals
- the lubricant

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

Bearing rings and balls

SKF cam rollers are heat stabilized up to at least:

- 120 °C *(250 °F)* for single row cam rollers
- 150 °C *(300 °F)* for double row cam rollers

Cages

Steel cages can be used at the same operating temperatures as the bearing rings and balls. For temperature limits of PA66 cages, refer to *Polymer cages*, **page 188**.

Seals

The permissible operating temperature for NBR seals is –40 to +100 °C *(–40 to +210 °F)*. Temperatures up to 120 °C *(250 °F)* can be tolerated for brief periods.

Typically, temperature peaks are at the seal lip.

Lubricants

Temperature limits for greases used in SKF cam rollers are provided in **table 1**, **page 933**. 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**).

Speed limits

The limiting speed listed in the **product tables** 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 130**.

Design considerations

Pins

Pins or shafts should be machined to tolerance class g6Ⓔ:

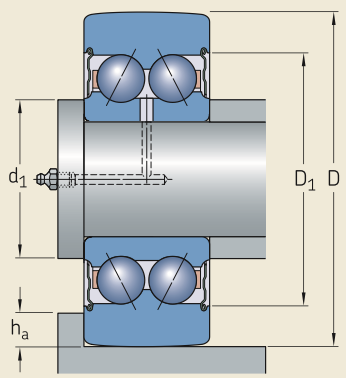
- for normal operating conditions, such as stationary inner ring load
- where easy displacement of the inner ring is required

Support surfaces

Continuously axial loaded cam rollers should be supported over the entire inner ring side face (**fig. 3**) and the support surface should be dimensioned according to diameter d_1 (**product tables**, **page 938**).

Fig. 3

Cam roller with supported inner ring or flange



Guide flanges

For rails or cams with guide flanges, the recommended flange height h_a (**fig. 3**) should be:

$h_a \leq 0{,}5\ (D - D_1)$

The values for the outer ring diameters D and D_1 are listed in the product tables.

Designation system

		Group 1	Group 2	Group 3	/	Group 4					
						4.1	4.2	4.3	4.4	4.5	4.6

Prefixes

Basic designation

3612.. R Single row cam roller with an NBR contact seal on both sides
3057.. C Double row cam roller with a cylindrical (flat) outer ring running surface
3058.. C Double row cam roller with a crowned outer ring running surface

Suffixes

Group 1: Internal design

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

-2RS1 NBR contact seal on both sides
-2Z Sheet steel shield on both sides

Group 3: Cage design

Group 4.1: Materials, heat treatment

Group 4.2: Accuracy, clearance, preload, quiet running

Group 4.3: Bearing sets, matched bearing

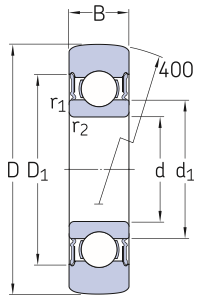
Group 4.4: Stabilization

Group 4.5: Lubrication

Group 4.6: Other variants

14.1 Single row cam rollers

D **32 – 80** mm



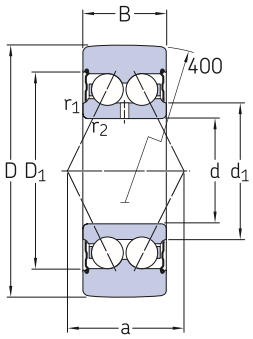
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	B	C	C_0	P_u	F_r max.	F_{0r} max.			
mm			kN		kN	kN		r/min	kg	–
32	10	9	4,68	2,04	0,085	3,45	5	12 000	0,04	▸ **361200 R**
35	12	10	6,24	2,6	0,11	3,35	4,75	11 000	0,051	▸ **361201 R**
40	15	11	7,02	3,2	0,137	5,1	7,35	9 500	0,072	▸ **361202 R**
47	17	12	8,84	4,25	0,18	8,15	11,6	8 500	0,11	▸ **361203 R**
52	20	14	11,4	5,5	0,232	7,5	10,6	7 000	0,15	▸ **361204 R**
62	25	15	13	6,8	0,29	12,9	18,6	6 300	0,24	▸ **361205 R**
72	30	16	17,4	9,5	0,4	14,6	20,8	5 300	0,34	▸ **361206 R**
80	35	17	22,1	11,8	0,5	12,9	18,3	4 500	0,42	▸ **361207 R**

▸ Popular item

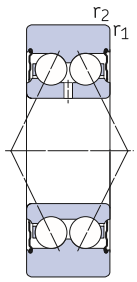
Dimensions				Calculation factor
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min.	f_0
mm				–
32	17	24,8	0,6	13
35	18,4	27,4	0,6	12
40	21,7	30,4	0,6	13
47	24,5	35	0,6	13
52	28,8	40,6	1	13
62	34,3	46,3	1	14
72	40,3	54,1	1	14
80	46,9	62,7	1,1	14

14.2 Double row cam rollers

D **32 – 80** mm



3058.. C-2Z



3057.. C-2Z

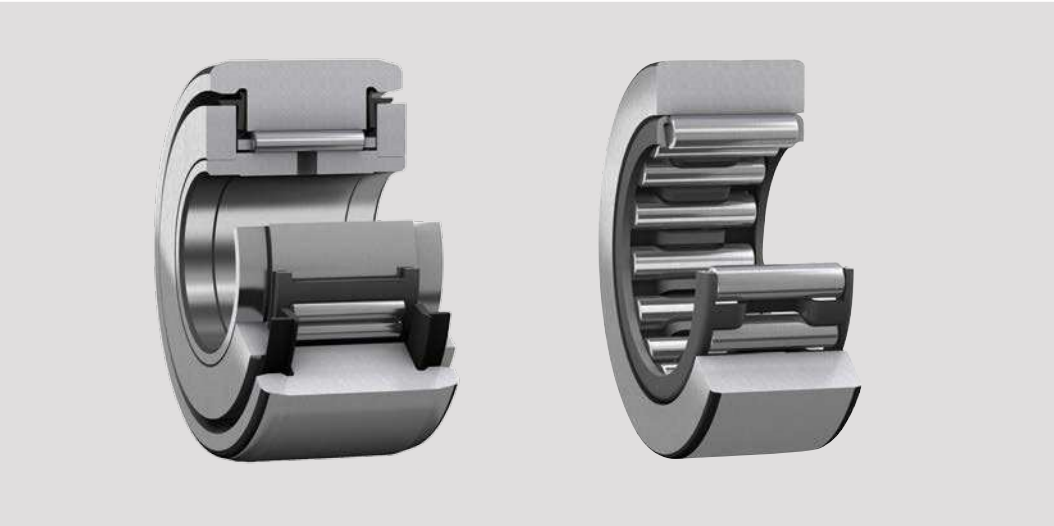
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designations Cam roller with crowned running surface	cylindrical running surface
D	d	B	C	C_0	P_u	F_r max.	F_{0r} max.				
mm			kN		kN	kN		r/min	kg	–	
32	10	14	6,76	3,6	0,153	4,4	6,3	11 000	0,062	▸ **305800 C-2Z**	
35	12	15,9	9,04	4,555	0,193	3,8	5,4	9 500	0,078	▸ **305801 C-2Z**	▸ **305701 C-2Z**
40	15	15,9	10,1	5,5	0,263	5,85	8,5	9 000	0,1	▸ **305802 C-2Z**	▸ **305702 C-2Z**
47	17	17,5	13	7,35	0,315	9,3	13,4	8 000	0,16	▸ **305803 C-2Z**	▸ **305703 C-2Z**
52	20	20,6	16,5	9,5	0,4	8,3	12	7 000	0,22	▸ **305804 C-2Z**	▸ **305704 C-2Z**
62	25	20,6	18,6	11,8	0,5	15,3	21,6	6 000	0,32	▸ **305805 C-2Z**	▸ **305705 C-2Z**
72	30	23,8	25,1	16,3	0,695	17	24	5 000	0,49	▸ **305806 C-2Z**	▸ **305706 C-2Z**
80	35	27	31,9	20,4	0,865	15,6	22,4	4 300	0,65	▸ **305807 C-2Z**	▸ **305707 C-2Z**

▸ Popular item

Dimensions

d	d_1 ≈	D_1 ≈	$r_{1,2}$ min.	a
mm				
32	15,8	25	0,6	16,5
35	17,7	27,7	0,6	19
40	20,2	30,7	0,6	21
47	23,3	35	0,6	23
52	27,7	40,9	1	28
62	32,7	45,9	1	30
72	38,7	55,2	1	36
80	45,4	63,9	1,1	42

15 Support rollers



15 Support rollers

15 Support rollers

More information

SKF support rollers (yoke-type track rollers based on roller bearings) are designed to run on all types of tracks and to be used in cam drives, conveyor systems, etc.

SKF support rollers are based on needle or cylindrical roller bearings.

SKF supplies them ready-to-mount. To meet the requirements of different applications, they are available in several designs and variants (fig. 1):

- with or without a cage
- with or without flange rings
- with or without an inner ring
- with or without seals (sealed or open)
- with the outer ring running surface profile:
  - crowned as standard
  - cylindrical (flat)

Support roller features

- **Accommodate high radial loads**
  The thick-walled outer ring enables high radial loads, while reducing distortion and bending stresses.

- **Long service life**
  The crowned outer ring running surface is beneficial for applications where outer ring tilting relative to the track may occur or where edge stresses need to be minimized.

Fig. 1

Support rollers

- based on needle roller bearings
- with a cage
- with flange rings
- with an inner ring

- based on cylindrical roller bearings
- without a cage
- with flange rings
- with an inner ring

- based on needle roller bearings
- with a cage
- without flange rings
- without an inner ring

Designs and variants

SKF support rollers are available without or with flange rings (fig. 2). They have a thick-walled outer ring with its running surface crowned as standard. However, support rollers with a cylindrical (flat) running surface are also available (designation suffix X).

Support rollers without flange rings require adjacent components to guide the outer ring and cage axially.

Support rollers with flange rings do not need adjacent components to guide the outer ring and cage axially (fig. 3). Axial loads, which are induced when shafts are not horizontal or aligned properly, are accommodated by the flange rings.

Support rollers without flange rings

- require adjacent components to guide the outer ring and cage axially
- are based on needle roller bearings
- are available:
  - with an inner ring, which is slightly wider than the outer ring to avoid axial clamping of the outer ring
  - without an inner ring (designation prefix R), intended for arrangements where the pin or shaft is hardened and ground

  These support rollers are not listed in this catalogue, but can be found online at skf.com/go/17000-15-3.

(R)STO design support rollers

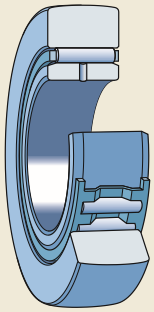
- are available (fig. 4):
  - with an inner ring that can be mounted separately from the outer ring and roller and cage assembly, which must always be kept together as supplied
  - without an inner ring (prefix R)
  - only open (without seals)

(R)NA 22...2RS design support rollers

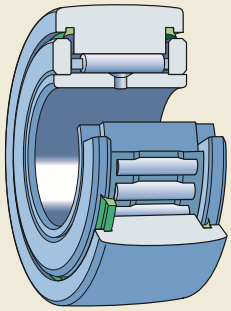
- are available (fig. 5):
  - with an inner ring that can be mounted separately from the outer ring and roller and cage assembly
  - without an inner ring (prefix R)
  - greased and capped with a sheet steel reinforced NBR contact seal on both sides
- have the needle roller and cage assembly axially guided between two integral flanges in the outer ring to form a non-separable unit

Fig. 2

Support rollers



without flange rings



with flange rings

Fig. 3

Application of support roller with flange rings

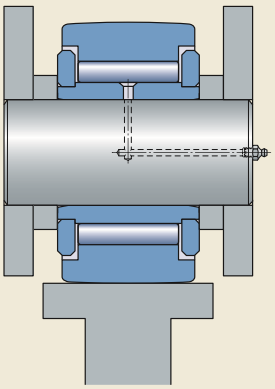
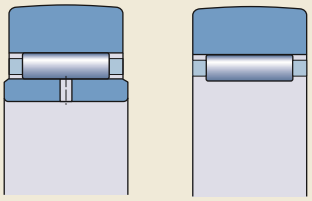
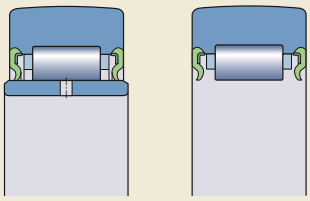


Fig. 4



STO RSTO

Fig. 5



NA 22...2RS RNA 22...2RS

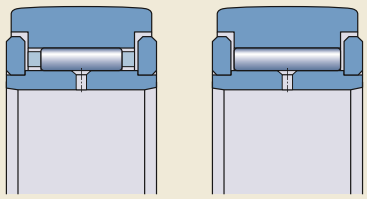
Support rollers with flange rings

- do not need adjacent components to guide the outer ring and cage axially (fig. 3, page 945)
- are non-separable units
- have different flange designs:
  - pressed-on flange rings (NATR and NATV designs)
  - loose flange rings (NUTR, PWTR and NNTR designs)
- accommode axial loads that can occur because of skew or tilting

NATR and NATV design support rollers

- are based on (fig. 6):
  - a needle roller and cage assembly (NATR design)
  - a full complement of needle rollers (NATV design)
- have the outer ring axially guided by pressed-on flange rings, forming a gap-type seal

Fig. 6



NATR NATV

- are also available with an axial sliding ring on both sides (designation suffixes PPA, fig. 7, and PPXA):
  - made of PA66
  - forming narrow labyrinth seals with the outer ring in a radial direction, to protect against coarse contaminants
  - serving as contact seals in an axial direction to retain grease reliably in the bearing
  - improving lubrication conditions in the bearing, keeping friction and frictional heat low, and extending grease life

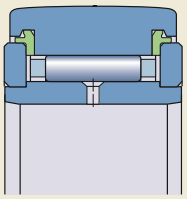
NUTR .. A design support rollers

- are based on double row full complement cylindrical roller bearings without an integral flange between the two roller sets (fig. 8)
- have an outer ring with two integral flanges, which guide the roller sets axially
- have an inner ring with two loose flange rings, which guide the outer ring axially via the roller sets
- have a sheet metal angle ring pressed into the outer ring shoulder on both sides:
  - forming an effective labyrinth seal
  - extending over the flange rings, making the bearing non-separable
- accommodate relatively heavy axial loads that can occur because of skew or tilting
- can be supplied with a reinforced (thicker) outer ring to accommodate heavy peak loads (e.g. NUTR 50 A → NUTR 50110 A)

PWTR ...2RS design support rollers

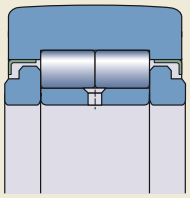
- are based on double row full complement cylindrical roller bearings (fig. 9)
- have an outer ring with three integral flanges, which guide the roller sets axially
- have an inner ring with two loose flange rings, which guide the outer ring axially via the roller sets
- have a relatively large grease quantity between the two roller sets
- are fitted on both sides with an NBR contact seal, being integral with a sheet metal angle ring that is pressed into the outer ring shoulder:
  - to press against the flange rings
  - extending over the flange rings, making the bearing non-separable
- accommodate relatively heavy axial loads that can occur because of skew or tilting
- can be supplied with a reinforced (thicker) outer ring to accommodate heavy peak loads (e.g. PWTR 50.2RS → PWTR 50110.2RS)

Fig. 7



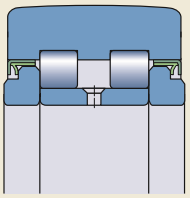
NATR .. PPA

Fig. 8



NUTR .. A

Fig. 9



PWTR ...2RS

NNTR ...2ZL design support rollers

- are based on double row full complement cylindrical roller bearings (fig. 10)
- have an outer ring with three integral flanges, which guide the roller sets axially
- have an inner ring with two loose flange rings, which guide the outer ring axially via the roller sets
- have a relatively large grease quantity between the two roller sets
- are fitted with a lamellar seal on both sides, inserted into recesses in the shoulders of the flange rings and the outer ring, making the bearing non-separable
- accommodate very heavy radial loads and relatively heavy axial loads that can occur because of skew or tilting

Cages

SKF support rollers, if not a full complement of rollers, are fitted with one of the cages shown in table 1. The standard cage is not identified in the bearing designation.

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.

Lubrication

SKF support rollers are supplied greased (table 1, page 933).

(R)STO design support rollers can be oil or grease lubricated. In applications where oil is used, SKF recommends thoroughly washing the initial grease fill from the bearing prior to operation.

For general information, refer to *Lubrication*, page 109.

Relubrication requirements

Support rollers:

- should be relubricated regularly to achieve their full service life, even if the initial grease fill still has its full lubricating properties
- used in applications where there are light loads, relatively low speeds and clean surroundings can operate for long periods before relubrication is required
- that operate under contaminated and damp conditions at high speeds or at temperatures > 70 °C *(160 °F)* require more frequent relubrication
- without a cage (full complement of rollers) require more frequent relubrication

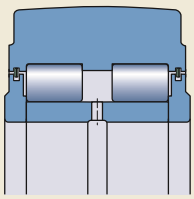
Relubrication features

The inner rings of SKF support rollers have one lubrication hole, except:

- NNTR designs with d ≤ 90 mm → three lubrication holes
- NNTR designs with d ≥ 100 mm → six lubrication holes

If suitable ducts are provided in the pin, the bearings are easy to relubricate.

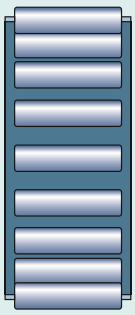
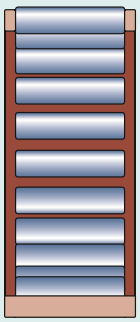
Fig. 10



NNTR ...2ZL

Table 1

Cages for support rollers

		
Cage type	Window-type, centring depends on size and design	Window-type, outer raceway centred
Material	Sheet steel	PA66, glass fibre reinforced
Suffix	–	TN

Bearing data

Dimension standards	• **(R)NA 22 designs** ISO 15, dimension series 22, except for the outer ring width • **NATR, NATV, NUTR .. A, PWTR designs** ISO 7063 and ANSI/ABMA Standard 18.1 (where standardized) • **(R)STO designs** Not standardized
Profile of the outer ring running surface	• **(R)STO, (R)NA 22, NATR, NATV designs** Radius = 500 mm • **NNTR design** D ≤ 260 mm → Radius = 10 000 mm D ≥ 290 mm → Radius = 15 000 mm • **NATR .. PPA, NATV .. PPA, NUTR .. A, PWTR designs** Improved crowned profile for better load distribution, higher stiffness and reduced wear
Tolerances For additional information → **page 35**	Normal, except: • diameter of the crowned running surface: – NNTR design → h10 – other designs → 0/–0,05 mm • width B: – NNTR design → 0/–0,5 mm – NATR, NATV, NUTR .. A, PWTR designs → h12 • inside diameter F_w: – RSTO, RNA 22 designs → F6 Values for Normal tolerance class: ISO 492 (**table 2**, **page 38**) Values for ISO tolerance classes: h10, h12 and F6 (**table 2**, **page 950**)
Internal clearance For additional information → **page 182**	• **STO and NA 22 designs** Normal • **Other designs** Between C2 and Normal Values: ISO 5753-1 (**table 11**, **page 603**) Values are valid for unmounted bearings under zero measuring load.
Defect frequencies	→ skf.com/bearingcalculator

Loads

Dynamic loads	As track rollers are not supported in a housing, the outer rings deform, leading to an altered load distribution and bending stresses in the outer ring. The basic load ratings listed in the **product tables**, **page 954** , take into account the altered load distribution, while the maximum radial loads $F_{r\,max}$ (**product tables**) are based on the bending stresses.
Static loads	Permissible static load is the lower value of $F_{0r\,max}$ or C_0 (**product tables**). Where requirements for smooth running are below normal, the static load may exceed C_0, but should never exceed the maximum permissible static radial load $F_{0r\,max}$.
Axial loads	Support rollers are intended for radial loads. However, support rollers with flange rings can generally accommodate axial loads that can occur because of skew or tilting. The magnitude of permissible load depends on the internal design.
Minimum load For additional information → **page 106**	$F_{rm} = 0{,}0167\ C_0$
Equivalent dynamic bearing load For additional information → **page 91**	$P = F_r$
Equivalent static bearing load For additional information → **page 105**	$P_0 = F_r$

Symbols

C_0	basic static load rating [kN] (**product tables**, **page 954**)
F_r	radial load [kN]
$F_{r\,max}$	maximum permissible dynamic radial load [kN] (**product tables**)
$F_{0r\,max}$	maximum permissible static radial load [kN] (**product tables**)
F_{rm}	minimum radial load [kN]
P	equivalent dynamic bearing load [kN]
P_0	equivalent static bearing load [kN]

Temperature limits

The permissible operating temperature for support rollers can be limited by:

- the dimensional stability of the bearing rings and rollers
- the cage
- the seals
- the lubricant

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

Bearing rings and rollers

SKF support rollers are heat stabilized up to at least 140 °C *(280 °F)*.

Cages

Steel cages can be used at the same operating temperatures as the bearing rings and rollers. For temperature limits of PA66 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.
- PA66 sliding rings: –30 to +100 °C *(–20 to +210 °F)*

Typically, temperature peaks are at the seal lip.

Lubricants

Temperature limits for greases used in SKF support rollers are provided in table 1, page 947. 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).

Speed limits

The limiting speed listed in the product tables 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 130.

Design considerations

Pins

For general information, refer to *Bearing interfaces*, page 139.

For support rollers with an inner ring, the pin/shaft should be machined to tolerance class g6Ⓔ under the following conditions:

- stationary inner ring load
- where easy displacement of the inner ring is required

Table 2

ISO tolerance classes

Nominal dimension		**h7Ⓔ** Deviations		**h9Ⓔ** Deviations		**h10Ⓔ** Deviations		**h12Ⓔ** Deviations		**F6Ⓔ** Deviations	
>	≤	U	L	U	L	U	L	U	L	U	L
mm		µm		µm		µm		µm		µm	
3	**6**	0	–12	–	–	–	–	–	–	–	–
6	**10**	0	–15	0	–36	–	–	–	–	+22	+13
10	**18**	0	–18	0	–43	–	–	0	–180	+27	+16
18	**30**	0	–21	0	–52	–	–	0	–210	+33	+20
30	**50**	–	–	0	–62	–	–	0	–250	+41	+25
50	**80**	–	–	–	–	–	–	–	–	+49	+30
120	**180**	–	–	–	–	0	–160	–	–	–	–
180	**250**	–	–	–	–	0	–185	–	–	–	–
250	**315**	–	–	–	–	0	–210	–	–	–	–

To exploit the full load carrying capacity of support rollers without an inner ring, the pin/shaft should:

- be machined to tolerance class k5Ⓔ
- be machined to a surface finish similar to a bearing raceway
- have the same hardness as a bearing raceway

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

Support surfaces

For support rollers without flange rings, the outer ring support surfaces:

- guide the outer ring and cage during operation
- must be fine turned
- must be free of burrs and clean
- should extend to at least half the outer ring side face (fig. 11), if unhardened – hardened surfaces may be smaller

Heavily loaded support rollers with flange rings should be axially supported:

- over the entire flange ring side faces (fig. 12)
- according to diameter d_1 (product table, page 956)

Axial gap

The following support rollers must be located without any axial gap:

- support rollers without flange rings, with an inner ring (fig. 11)
- support rollers with flange rings (fig. 12)

Support rollers without an inner ring must have an axial gap ≥ 0,2 mm between the outer ring and the support surfaces (fig. 13).

Mounting

SKF recommends positioning the lubrication hole in the unloaded zone of the inner ring. Positioning is not needed for PWTR and NNTR design support rollers, which have the lubrication holes in the empty space between the two roller sets.

Where mounting the outer ring assembly and inner ring separately, care must be taken not to damage the seal lips.

Fig. 11

Support roller without flange rings – guiding surface design

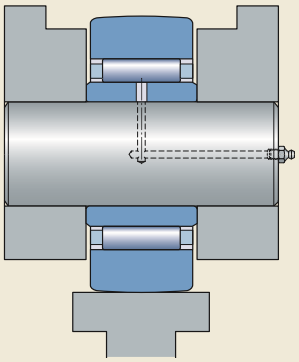


Fig. 12

Support roller with flange rings – support surface design

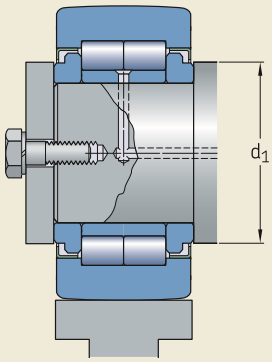
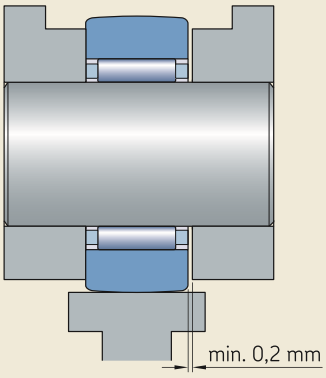


Fig. 13

Support roller without an inner ring – axial gap



Designation system

		Group 1	Group 2	Group 3	/

Prefixes

R	Support roller without an inner ring

Basic designation

NA 22	Support roller without a flange ring, fitted with a needle roller and cage assembly
STO	Support roller without a flange ring, fitted with a needle roller and cage assembly
NATR	Support roller with two pressed-on flange rings, fitted with a needle roller and cage assembly
NATV	Support roller with two pressed-on flange rings, fitted with a full complement of needle rollers
NUTR	Support roller based on a double row full complement cylindrical roller bearing with two integral outer ring flanges and a loose flange ring on both sides of the inner ring
NNTR	Support roller based on a double row full complement cylindrical roller bearing with three integral outer ring flanges and a loose flange ring on both sides of the inner ring
PWTR	Support roller based on a double row full complement cylindrical roller bearing with three integral outer ring flanges and a loose flange ring on both sides of the inner ring

Suffixes

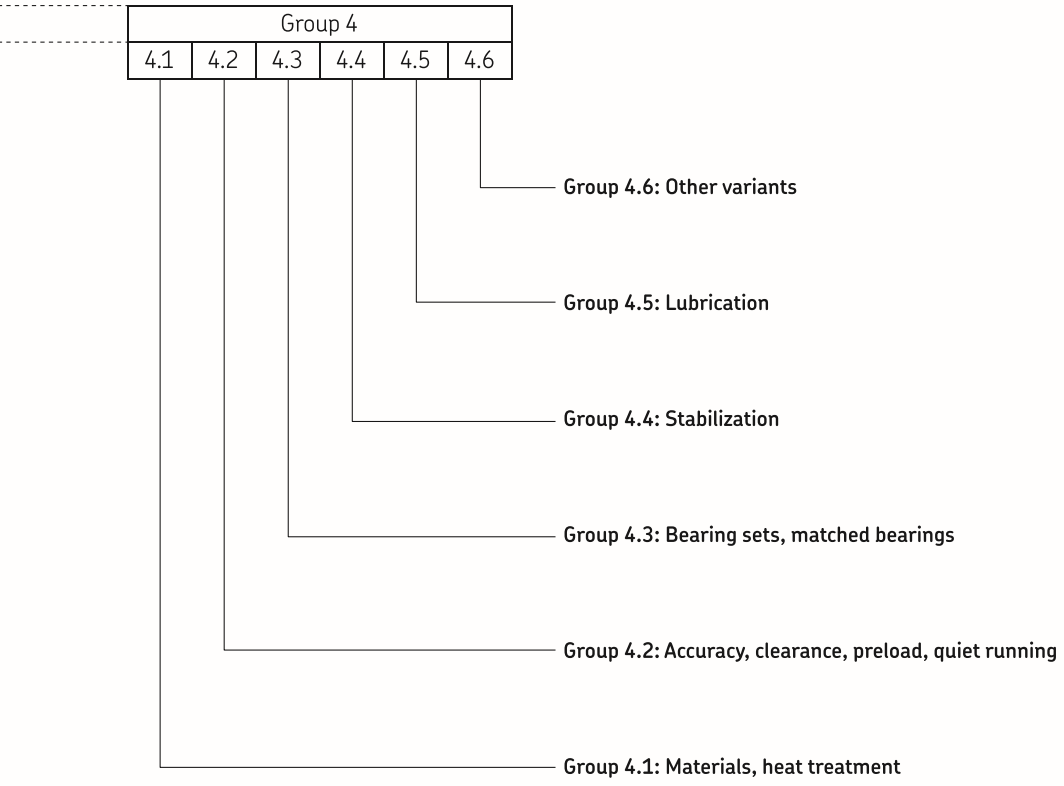
Group 1: Internal design

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

.2RS	NBR contact seal on both sides
.2ZL	Lamellar seal on both sides
A	Improved crowned profile of the outer ring running surface (NUTR design)
PPA	PA66 axial sliding and sealing ring on both sides. Improved crowned profile of the outer ring running surface
PPXA	PA66 axial sliding and sealing ring on both sides. Cylindrical (flat) profile of the outer ring running surface
X	Cylindrical (flat) profile of the outer ring running surface

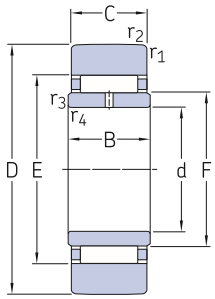
Group 3: Cage design

TN	Glass fibre reinforced PA66 cage

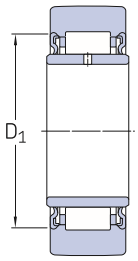

Group 4
4.1
4.2
4.3
4.4
4.5
4.6
Group 4.6: Other variants
Group 4.5: Lubrication
Group 4.4: Stabilization
Group 4.3: Bearing sets, matched bearings
Group 4.2: Accuracy, clearance, preload, quiet running
Group 4.1: Materials, heat treatment

15.1 Support rollers without flange rings, with an inner ring

D **19 – 90** mm



STO



NA 22...2RS

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	C	B	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
19	6	9,8	10	3,74	4,5	0,5	4,25	6,1	7 000	0,017	▸ **STO 6 TN**
	6	11,8	12	4,02	3,65	0,425	2,55	3,6	7 000	0,022	**NA 22/6.2RS**
24	8	9,8	10	4,13	5,4	0,6	7,5	10,8	7 000	0,026	**STO 8 TN**
	8	11,8	12	4,68	4,55	0,54	5,3	7,5	6 700	0,034	▸ **NA 22/8.2RS**
30	10	11,8	12	8,25	8,8	1,04	8,5	12,2	6 000	0,049	▸ **STO 10**
	10	13,8	14	6,6	7,5	0,88	12	17,3	6 300	0,06	▸ **NA 2200.2RS**
32	12	11,8	12	8,8	9,8	1,18	8,3	12	5 600	0,057	▸ **STO 12**
	12	13,8	14	7,04	8,5	1	11,6	16,6	6 000	0,067	▸ **NA 2201.2RS**
35	15	11,8	12	9,13	10,6	1,27	7,1	10	5 000	0,063	**STO 15**
	15	13,8	14	7,48	9,3	1,12	9,5	13,7	5 000	0,075	▸ **NA 2202.2RS**
40	17	15,8	16	9,52	13,2	1,6	15,3	22	4 500	0,11	▸ **NA 2203.2RS**
	17	15,8	16	14,2	17,6	2,08	12	17,3	4 500	0,11	**STO 17**
47	20	15,8	16	16,1	21,2	2,5	18,6	26,5	4 000	0,15	**STO 20**
	20	17,8	18	16,1	18	2,16	17,6	25,5	4 000	0,18	▸ **NA 2204.2RS**
52	25	15,8	16	16,5	22,8	2,7	18	26	3 400	0,18	**STO 25**
	25	17,8	18	16,8	20	2,4	17,3	24,5	3 400	0,21	▸ **NA 2205.2RS**
62	30	19,8	20	17,9	25,5	3,05	28,5	40,5	2 800	0,32	**NA 2206.2RS**
	30	19,8	20	22,9	34,5	4,25	23,6	33,5	2 600	0,31	**STO 30**
72	35	19,8	20	24,6	39	4,8	36	51	2 200	0,44	**STO 35**
	35	22,7	23	22,4	35,5	4,3	38	54	2 200	0,51	**NA 2207.2RS**
80	40	19,8	20	23,8	39	4,75	34,5	49	1 900	0,53	**STO 40**
	40	22,7	23	27,5	40,5	5	35,5	51	1 900	0,63	▸ **NA 2208.2RS**
90	50	22,7	23	28,1	43	5,3	34,5	50	1 600	0,69	**NA 2210.2RS**

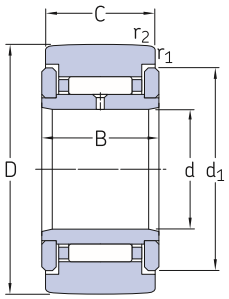
▸ Popular item

Dimensions

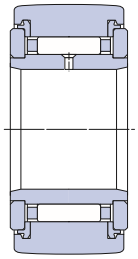
D	D_1	E	F	$r_{1,2}$ min.	$r_{3,4}$ min.
mm					
19	–	13	10	0,3	0,3
	16	–	10	0,3	0,3
24	–	15	12	0,3	0,3
	18	–	12	0,3	0,3
30	–	20	14	0,3	0,3
	20	–	14	0,6	0,3
32	–	22	16	0,3	0,3
	22	–	16	0,6	0,3
35	–	26	20	0,3	0,3
	26	–	20	0,6	0,3
40	28	–	22	1	0,3
	–	29	22	0,3	0,3
47	–	32	25	0,3	0,3
	33	–	25	1	0,3
52	–	37	30	0,3	0,3
	38	–	30	1	0,3
62	43	–	35	1	0,3
	–	46	38	0,6	0,6
72	–	50	42	0,6	0,6
	50	–	42	1,1	0,6
80	–	58	50	1	1
	57	–	48	1,1	0,6
90	68	–	58	1,1	0,6

15.2 Support rollers with flange rings, with an inner ring

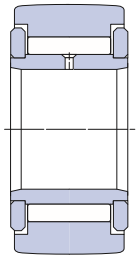
D **16 – 40** mm



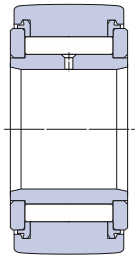
NATR



NATR .. PPA



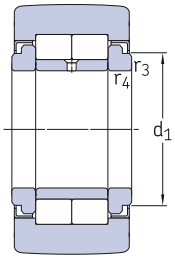
NATV



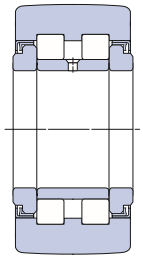
NATV .. PPA

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	C	B	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
16	5	11	12	3,14	3,2	0,345	2,9	4,15	6 000	0,014	**NATR 5**
	5	11	12	3,14	3,2	0,345	2,9	4,15	6 000	0,014	▸ **NATR 5 PPA**
	5	11	12	4,73	6,55	0,72	4,05	5,7	4 300	0,015	**NATV 5**
	5	11	12	4,73	6,55	0,72	4,05	5,7	4 300	0,015	▸ **NATV 5 PPA**
19	6	11	12	3,47	3,8	0,415	3,8	5,5	5 600	0,02	▸ **NATR 6**
	6	11	12	3,47	3,8	0,415	3,8	5,5	5 600	0,019	▸ **NATR 6 PPA**
	6	11	12	5,28	8	0,88	5,1	7,35	4 000	0,021	**NATV 6**
	6	11	12	5,28	8	0,88	5,1	7,35	4 000	0,021	▸ **NATV 6 PPA**
24	8	14	15	5,28	6,1	0,695	5,2	7,35	5 000	0,038	▸ **NATR 8 PPA**
	8	14	15	7,48	11,4	1,32	7,35	10,4	3 600	0,042	**NATV 8**
	8	14	15	7,48	11,4	1,32	7,35	10,4	3 600	0,041	▸ **NATV 8 PPA**
30	10	14	15	6,44	8	0,88	7,8	11,2	4 800	0,064	▸ **NATR 10**
	10	14	15	6,44	8	0,88	7,8	11,2	4 800	0,061	▸ **NATR 10 PPA**
	10	14	15	8,97	14,6	1,66	11	15,6	3 200	0,065	**NATV 10**
	10	14	15	8,97	14,6	1,66	11	15,6	3 200	0,064	▸ **NATV 10 PPA**
32	12	14	15	6,6	8,5	0,95	7,65	10,8	4 500	0,071	**NATR 12**
	12	14	15	6,6	8,5	0,95	7,65	10,8	4 500	0,066	▸ **NATR 12 PPA**
	12	14	15	9,35	15,3	1,76	10,6	15	3 000	0,072	▸ **NATV 12**
	12	14	15	9,35	15,3	1,76	10,6	15	3 000	0,069	▸ **NATV 12 PPA**
35	15	18	19	9,52	13,7	1,56	11,4	16,3	4 000	0,1	▸ **NATR 15**
	15	18	19	9,52	13,7	1,56	11,4	16,3	4 000	0,095	▸ **NATR 15 PPA**
	15	18	19	12,3	23,2	2,7	14,6	20,8	2 600	0,11	**NATV 15**
	15	18	19	12,3	23,2	2,7	14,6	20,8	2 600	0,1	▸ **NATV 15 PPA**
	15	18	19	16,8	17,6	2	8,65	12,2	5 000	0,099	▸ **NUTR 15 A**
	15	18	19	11,9	11,4	1,2	8,65	12,5	5 000	0,099	▸ **PWTR 15.2RS**
40	17	20	21	10,5	14,6	1,73	12,5	18	3 400	0,14	▸ **NATR 17**
	17	20	21	10,5	14,6	1,73	12,5	18	3 400	0,14	▸ **NATR 17 PPA**
	17	20	21	14,2	26,5	3,1	17	24,5	2 200	0,15	**NATV 17**
	17	20	21	14,2	26,5	3,1	17	24,5	2 200	0,15	▸ **NATV 17 PPA**
	17	20	21	19	22	2,5	14	20	4 500	0,15	▸ **NUTR 17 A**
	17	20	21	13,8	14,3	1,5	13,7	19,6	4 500	0,15	▸ **PWTR 17.2RS**

▸ Popular item



NUTR .. A



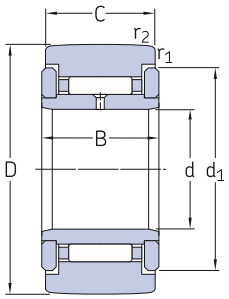
PWTR ...2RS

Dimensions

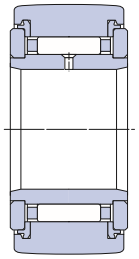
D	d_1	$r_{1,2}$ min.	$r_{3,4}$ min.
mm			
16	12,5	0,15	–
	12,5	0,15	–
	12,5	0,15	–
	12,5	0,15	–
19	15	0,15	–
	15	0,15	–
	15	0,15	–
	15	0,15	–
24	19	0,3	–
	19	0,3	–
	19	0,3	–
30	23	0,6	–
	23	0,6	–
	23	0,6	–
	23	0,6	–
32	25	0,6	–
	25	0,6	–
	25	0,6	–
	25	0,6	–
35	27,6	0,6	–
	27,6	0,6	–
	27,6	0,6	–
	27,6	0,6	–
	20	0,6	0,3
	20	0,6	0,3
40	31,5	1	–
	31,5	1	–
	31,5	1	–
	31,5	1	–
	22	1	0,5
	22	1	0,5

15.2 Support rollers with flange rings, with an inner ring

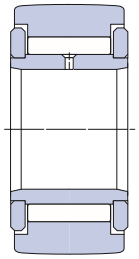
D **42 – 72** mm



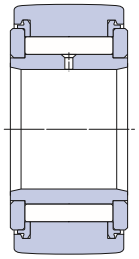
NATR



NATR .. PPA



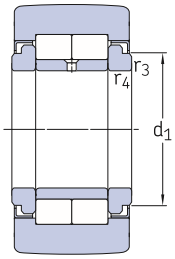
NATV



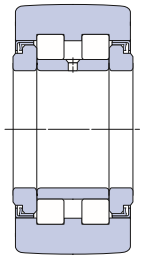
NATV .. PPA

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	C	B	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
42	15	18	19	20,1	23,2	2,65	21,6	31	5 000	0,16	▸ **NUTR 1542 A**
	15	18	19	14,2	15	1,6	22	31,5	5 000	0,16	**PWTR 1542.2RS**
47	17	20	21	22	27	3,05	30	43	4 500	0,22	▸ **NUTR 1747 A**
	17	20	21	15,7	17,6	1,86	30	42,5	4 500	0,22	**PWTR 1747.2RS**
	20	24	25	14,7	24,5	2,9	23,6	33,5	3 000	0,25	▸ **NATR 20**
	20	24	25	14,7	24,5	2,9	23,6	33,5	3 000	0,24	▸ **NATR 20 PPA**
	20	24	25	19,4	41,5	5	30,5	43	1 900	0,25	**NATV 20**
	20	24	25	19,4	41,5	5	30,5	43	1 900	0,25	▸ **NATV 20 PPA**
	20	24	25	28,6	33,5	3,9	17,6	25	3 800	0,25	▸ **NUTR 20 A**
	20	24	25	22,9	24,5	2,8	18,3	26	3 800	0,25	**PWTR 20.2RS**
52	20	24	25	31,9	39	4,55	30	42,5	3 800	0,32	▸ **NUTR 2052 A**
	20	24	25	25,5	29	3,35	30,5	44	3 800	0,32	▸ **PWTR 2052.2RS**
	25	24	25	14,7	25,5	3,1	21,6	31	2 400	0,28	▸ **NATR 25**
	25	24	25	14,7	25,5	3,1	21,6	31	2 400	0,27	▸ **NATR 25 PPA**
	25	24	25	19,8	44	5,3	28,5	40,5	1 600	0,29	**NATV 25**
	25	24	25	19,8	44	5,3	28,5	40,5	1 600	0,28	▸ **NATV 25 PPA**
	25	24	25	29,7	36	4,25	18	25,5	3 200	0,28	▸ **NUTR 25 A**
	25	24	25	23,8	26,5	3,05	18,6	26,5	3 200	0,28	▸ **PWTR 25.2RS**
62	25	24	25	35,8	48	5,6	44	63	3 200	0,45	▸ **NUTR 2562 A**
	25	24	25	29,2	36	4,05	45	64	3 200	0,45	**PWTR 2562.2RS**
	30	28	29	22,9	37,5	4,55	26,5	38	1 800	0,47	▸ **NATR 30**
	30	28	29	22,9	37,5	4,55	26,5	38	1 800	0,44	▸ **NATR 30 PPA**
	30	28	29	29,2	62	7,65	34,5	49	1 400	0,48	**NATV 30**
	30	28	29	29,2	62	7,65	34,5	49	1 400	0,47	▸ **NATV 30 PPA**
	30	28	29	41,3	47,5	5,85	24	34,5	2 600	0,47	▸ **NUTR 30 A**
	30	28	29	31,9	32,5	4,05	20,4	29	2 600	0,47	**PWTR 30.2RS**
72	30	28	29	48,4	61	7,5	53	76,5	2 600	0,7	▸ **NUTR 3072 A**
	30	28	29	39,6	45	5,6	47,5	68	2 000	0,7	**PWTR 3072.2RS**
	35	28	29	24,6	43	5,3	33,5	48	1 600	0,55	▸ **NATR 35 PPA**
	35	28	29	31,9	72	8,8	43	62	1 100	0,63	▸ **NATV 35 PPA**
	35	28	29	45,7	57	6,95	33,5	47,5	2 000	0,63	▸ **NUTR 35 A**
	35	28	29	35,8	40,5	5	28	40	2 000	0,63	**PWTR 35.2RS**

▸ Popular item



NUTR .. A



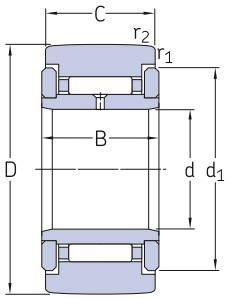
PWTR ...2RS

Dimensions

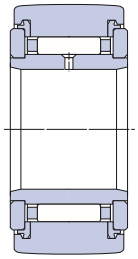
D	d_1	$r_{1,2}$ min.	$r_{3,4}$ min.
mm			
42	20	0,6	0,3
	20	0,6	0,3
47	22	1	0,5
	22	1	0,5
	36,5	1	–
	36,5	1	–
	36,5	1	–
	36,5	1	–
	27	1	0,5
	27	1	0,5
52	27	1	0,5
	27	1	0,5
	41,5	1	–
	41,5	1	–
	41,5	1	–
	41,5	1	–
	31	1	0,5
	31	1	0,5
62	31	1	0,5
	31	1	0,5
	51	1	–
	51	1	–
	51	1	–
	51	1	–
	38	1	0,5
	38	1	0,5
72	38	1	0,5
	38	1	0,5
	58	1,1	–
	58	1,1	–
	44	1,1	0,6
	44	1,1	0,6

15.2 Support rollers with flange rings, with an inner ring

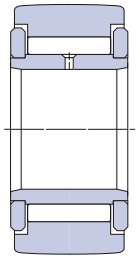
D **80 – 110** mm



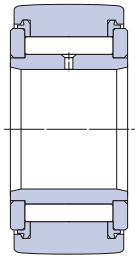
NATR



NATR .. PPA



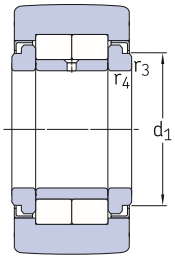
NATV



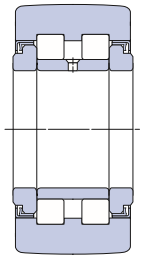
NATV .. PPA

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	C	B	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
80	35	28	29	51,2	68	8,3	57	81,5	2 000	0,84	▸ **NUTR 3580 A**
	35	28	29	41,8	50	6,3	51	72	2 000	0,84	▸ **PWTR 3580.2RS**
	40	30	32	31,9	57	7,1	41,5	58,5	1 500	0,8	▸ **NATR 40 PPA**
	40	30	32	39,1	88	11	51	73,5	950	0,83	▸ **NATV 40 PPA**
	40	30	32	57,2	72	9	32	45,5	1 800	0,82	▸ **NUTR 40 A**
	40	30	32	41,8	49	6	33,5	48	1 800	0,82	▸ **PWTR 40.2RS**
85	45	30	32	58,3	75	9,3	32,5	46,5	1 700	0,88	▸ **NUTR 45 A**
	45	30	32	42,9	50	6,2	34	48	1 700	0,88	**PWTR 45.2RS**
90	40	30	32	68,2	91,5	11,4	63	90	1 800	1,15	▸ **NUTR 4090 A**
	40	30	32	49,5	62	7,65	64	91,5	1 800	1,15	▸ **PWTR 4090.2RS**
	50	30	32	30,8	58,5	7,2	40	57	1 200	0,87	▸ **NATR 50 PPA**
	50	30	32	39,1	93	11,6	50	72	850	0,97	▸ **NATV 50 PPA**
	50	30	32	58,3	78	9,65	32,5	47,5	1 600	0,95	▸ **NUTR 50 A**
	50	30	32	42,9	52	6,55	34,5	49	1 600	0,95	**PWTR 50.2RS**
100	45	30	32	73,7	104	12,7	80	114	1 700	1,4	▸ **NUTR 45100 A**
	45	30	32	53,9	69,5	8,65	81,5	116	1 700	1,4	**PWTR 45100.2RS**
110	50	30	32	78,1	116	14,3	98	140	1 600	1,7	▸ **NUTR 50110 A**
	50	30	32	57,2	78	9,65	100	143	1 600	1,7	▸ **PWTR 50110.2RS**

▸ Popular item



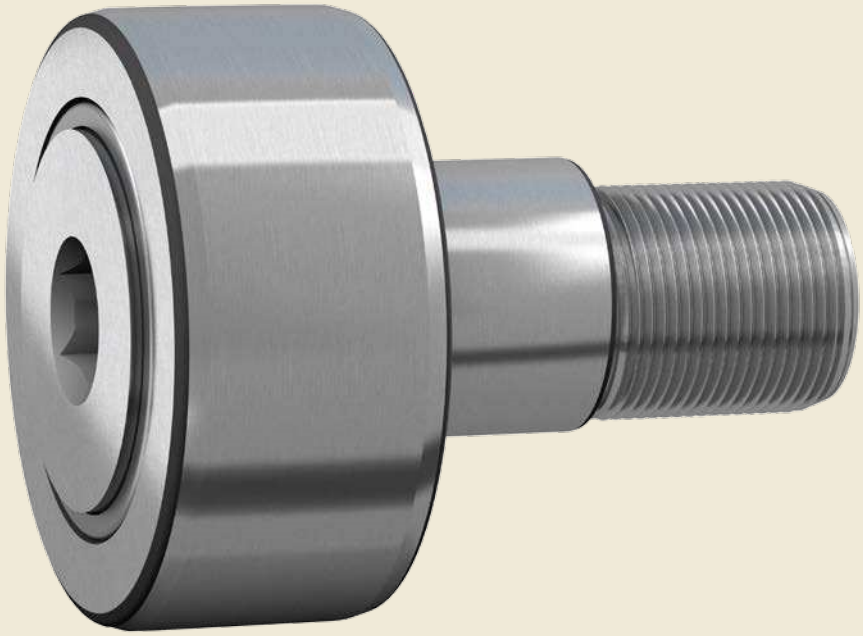
NUTR .. A



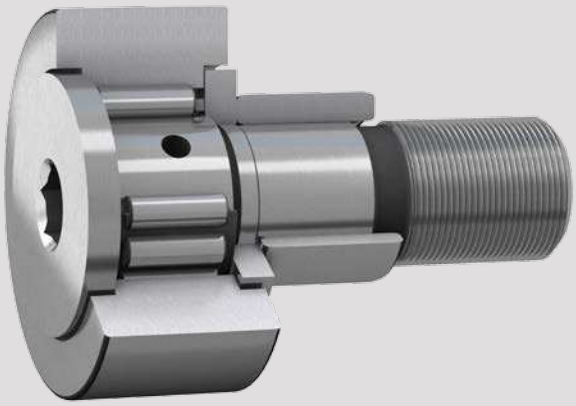
PWTR ...2RS

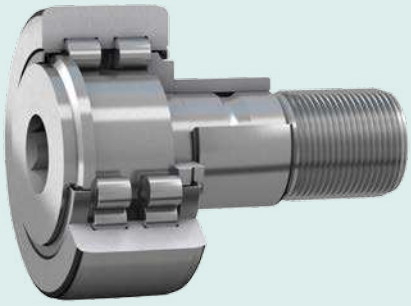
Dimensions

D	d_1	$r_{1,2}$ min.	$r_{3,4}$ min.
mm			
80	44	1,1	0,6
	44	1,1	0,6
	66	1,1	–
	66	1,1	–
	50,5	1,1	0,6
	50,5	1,1	0,6
85	55,2	1,1	0,6
	55,2	1,1	0,6
90	50,5	1,1	0,6
	50,5	1,1	0,6
	76	1,1	–
	76	1,1	–
	59,8	1,1	0,6
	59,8	1,1	0,6
100	55,2	1,1	0,6
	55,2	1,1	0,6
110	59,8	1,1	0,6
	59,8	1,1	0,6



16 Cam followers





16 Cam followers

16 Cam followers

More information

SKF cam followers (stud-type track rollers) are designed to run on all types of tracks and to be used in cam drives, conveyor systems, etc.

SKF cam followers are based on either needle or cylindrical roller bearings. Instead of an inner ring, they have a threaded solid stud (pin).

SKF supplies them ready-to-mount. To meet the requirements of different applications, they are available in several designs and variants (fig. 1):

- with or without a cage
- with different stud designs:
  - a concentric seat
  - an eccentric collar
- with several sealing solutions
- with the outer ring running surface profile:
  - crowned as standard
  - cylindrical (flat)

In contrast to ball and roller bearings, where the bearing size refers to the bore diameter d, for cam followers the size refers to their outside diameter D.

Fig. 1

Cam followers

- based on needle roller bearings
- with a cage
- with an eccentric collar

- based on cylindrical roller bearings
- without a cage
- with an eccentric collar

Cam follower features

- **Accommodate high radial loads**
  The thick-walled outer ring enables high radial loads, while reducing distortion and bending stresses.

- **Accommodate axial loads**
  The flange rings enable cam followers to accommodate axial loads that can occur because of skew or tilting.

- **Long service life**
  The crowned outer ring running surface is beneficial for applications where outer ring tilting relative to the track may occur or where edge stresses need to be minimized.

- **Easy to mount**
  The threaded solid stud (pin) of cam followers can be quickly and easily attached to appropriate machine components by means of a hexagonal nut.

Designs and variants

SKF cam followers have a thick-walled outer ring with its running surface crowned as standard. However, cam followers with a cylindrical (flat) running surface are also available (designation suffix X).

SKF cam followers are available in three basic designs (fig. 2):

- KR design
- NUKR design
- PWKR design

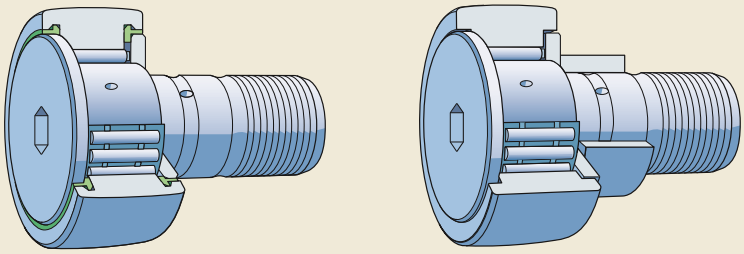
All three designs have the same main dimensions. They are available in different stud designs (fig. 3):

- a concentric seat
- an eccentric collar (E at the end of the basic designation) on the stud

The eccentric collar has a shrink-fit onto the stud, enabling less stringent positioning tolerances to be specified for associated components. The values of the adjustable eccentricity are listed in the product table, page 978.

Fig. 3

Stud designs

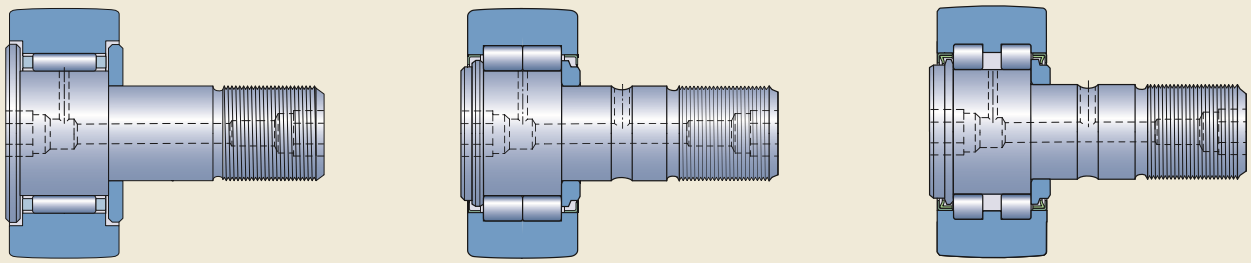


Concentric seat

Eccentric collar

Fig. 2

Basic designs



KR

NUKR .. A

PWKR ...2RS

KR design cam followers

- are available based on:
  - a needle roller and cage assembly (fig. 4)
  - a full complement needle roller set (fig. 5, V in the basic designation)

    Cam followers based on a full complement of needle rollers accommodate higher loads than same-sized cam followers with a cage.
- have the outer ring axially guided by the pressed-on flange ring and the stud head (integral flange), forming a gap-type seal
- are also available with an axial sliding ring on both sides (designation suffixes PPA, fig. 6, or PPSKA, fig. 7, or PPXA):
  - made of PA66
  - forming narrow labyrinth seals with the outer ring in a radial direction, to protect against coarse contaminants
  - serving as contact seals in an axial direction to retain grease reliably in the bearing
  - improving lubrication conditions in the cam follower, keeping friction and frictional heat low, and extending grease life

KR design cam followers, sizes 16 and 19

- without a designation suffix or with the designation suffix PPA (fig. 6)
  - have one slot in the head of the stud that enables the stud to be held in place by a screwdriver during mounting
  - have a relubrication hole for a press-in grease fitting or a plug if relubrication is not required in the centre of the slot (*Accessories*, page 968)
- with the designation suffix PPSKA (fig. 7)
  - have a hexagonal recess in the head of the stud that enables the stud to be held in place by a hexagonal key (Allen wrench) during mounting
  - have no relubrication features

KR design cam followers, designation suffix B, sizes ≥ 22

- have a hexagonal recess at each end of the stud (fig. 4), enabling the cam follower to be held in place by a hexagonal key (Allen wrench) during mounting
- have a relubrication hole for a press-in grease fitting in the centre of each hexagonal recess
- can accommodate adapters from a centralized lubrication system for sizes ≥ 35 (*Accessories*, page 968)

Fig. 4

KR .. B design, sizes 22 and 26

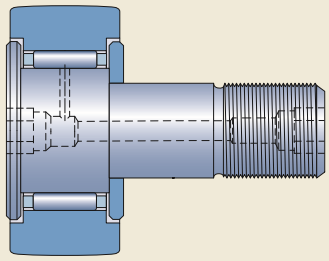


Fig. 5

KRV .. PPA design, sizes ≥ 30

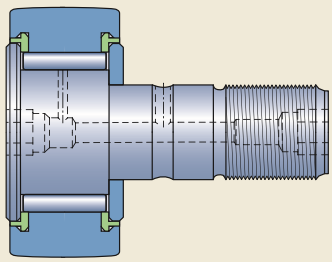
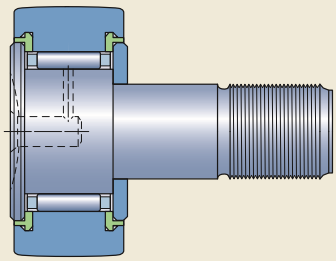
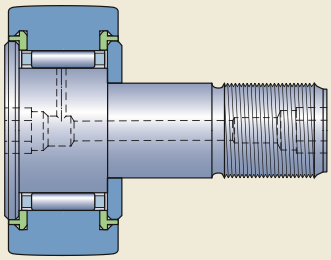


Fig. 6

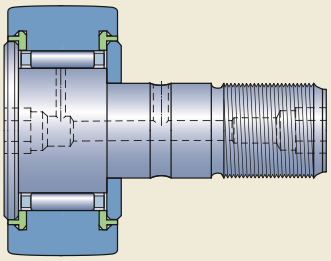
KR .. PPA designs



Sizes 16 and 19



Sizes 22 and 26



Sizes ≥ 30

NUKR .. A design cam followers

- are based on double row full complement cylindrical roller bearings without an integral flange between the two roller sets (fig. 8)
- have the outer ring axially guided by the stud head and pressed-on flange ring via the roller sets
- have a sheet metal angle ring pressed into the outer ring shoulder on both sides, forming an effective labyrinth seal
- have a hexagonal recess at each end of the stud, enabling the cam follower to be held in place by a hexagonal key (Allen wrench) during mounting
- have a relubrication hole for a press-in grease fitting or an adapter from a centralized lubrication system in the centre of each hexagonal recess (*Accessories*, page 968)
- accommodate relatively heavy axial loads that can occur because of skew or tilting

PWKR ...2RS design cam followers

- are based on double row full complement cylindrical roller bearings (fig. 9)
- have the outer ring axially guided by the stud head and pressed-on flange ring via the roller sets
- are fitted on both sides with an NBR contact seal, being integral with a sheet metal angle ring that is pressed into the outer ring shoulder, to press against the flange ring and the stud head
- have a hexagonal recess at each end of the stud, enabling the cam follower to be held in place by a hexagonal key (Allen wrench) during mounting
- have a relubrication hole for a press-in grease fitting or an adapter from a centralized lubrication system in the centre of each hexagonal recess (*Accessories*, page 968)
- accommodate relatively heavy axial loads that can occur because of skew or tilting

Fig. 7

KR .. PPSKA design

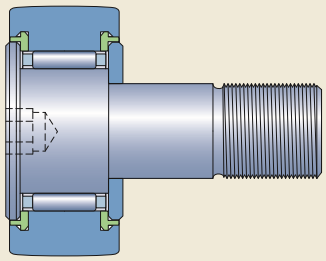


Fig. 8

NUKR .. A design

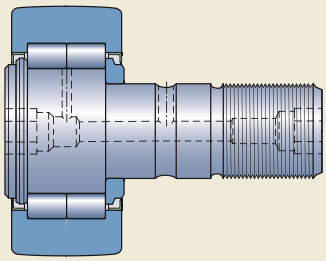
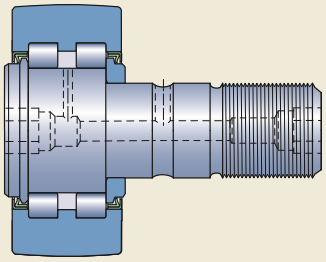


Fig. 9

PWKR ...2RS design



Cages

Cam followers, if not a full complement of rollers, are fitted with a sheet steel window-type cage that is roller centred (fig. 10).

For information about the suitability of cages, refer to *Cages*, page 187.

Accessories

SKF supplies accessories to enable reliable lubrication and location of SKF cam followers (table 1). Accessories, other than grease fittings and hexagonal nuts, must be ordered separately.

Grease fittings

- are supplied with each cam follower as standard (table 1) and are the only ones to be used
- can be pressed into position
- are listed in table 2, page 970 with their dimensions
- have heads that protrude from the stud head end by 1,5 mm for KR design cam followers of sizes 16 and 19

Hexagonal nuts

- are supplied with each cam follower as standard (table 1)
- are in accordance with ISO 4032 or ISO 8673
- are manufactured to strength class 8.8
- are zinc galvanized in accordance with ISO 4042
- are listed in table 3, page 970 with their dimensions and recommended tightening torques

VD1 plugs

- are used to plug the relubrication hole end in the stud of KR design cam followers of sizes 16 and 19 without designation suffix PPSKA, where:
  - relubrication is not required
  - there is no space for the head of the grease fitting
- must be ordered separately (table 1)

AP design adapters

- enable cam followers to be relubricated via a centralized lubrication system
- have a connection that accommodates, for example, 4 × 0,75 polyamide tubing in accordance with DIN 73378, as shown in fig. 11, in which:
  1 Connection
  2 O-ring
  3 Adapter connection
  4 Female thread M 10x1
  5 Polyamide tube
- must be ordered separately (table 1)
- are listed in table 4, page 970 with their dimensions

Fig. 10

Cage for cam follower

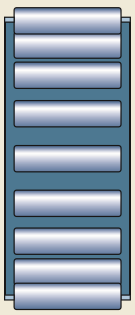


Fig. 11

Adapter for connection to centralized lubrication system

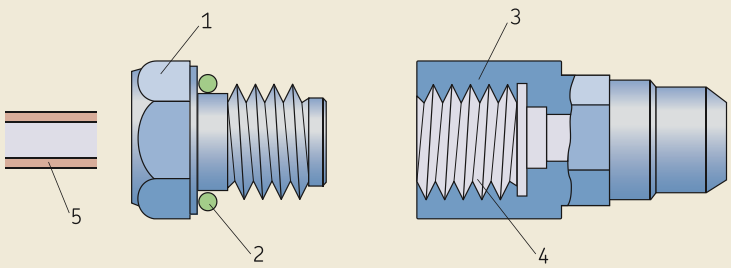
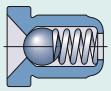


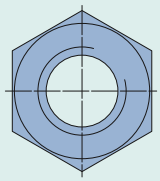
Table 1

Accessories for cam followers

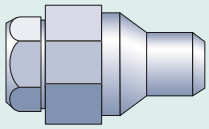


Grease fitting

Plug



Hexagonal nut

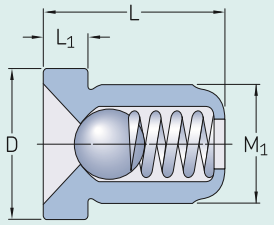


Adapter

Cam follower Design	Size without seals	with seals	**Supplied with the cam follower** Grease fitting	Hexagonal nut	**To be ordered separately** Plug	Adapter
KR						
KRE						
KRV						
	16	**16 PPA**	NIP A1	M 6x1	VD1	–
	–	**16 PPSKA**	–	M 6x1	–	–
	19	**19 PPA**	NIP A1	M 8x1,25	VD1	–
	–	**19 PPSKA**	–	M 8x1,25	–	–
	22 B	**22 PPA**	2 x NIP A1x4,5	M 10x1	–	–
	26 B	**26 PPA**	2 x NIP A1x4,5	M 10x1	–	–
	30 B	**30 PPA**	2 x NIP A1x4,5	M 12x1,5	–	–
	32 B	**32 PPA**	2 x NIP A1x4,5	M 12x1,5	–	–
	35 B	**35 PPA**	2 x NIP A2x7,5	M 16x1,5	–	AP 8
	40 B	**40 PPA**	2 x NIP A2x7,5	M 18x1,5	–	AP 8
	–	**47 PPA**	2 x NIP A2x7,5	M 20x1,5	–	AP 10
	–	**52 PPA**	2 x NIP A2x7,5	M 20x1,5	–	AP 10
	–	**62 PPA**	2 x NIP A3x9,5	M 24x1,5	–	AP 14
	–	**72 PPA**	2 x NIP A3x9,5	M 24x1,5	–	AP 14
	–	**80 PPA**	2 x NIP A3x9,5	M 30x1,5	–	AP 14
	–	**90 PPA**	2 x NIP A3x9,5	M 30x1,5	–	AP 14
NUKR .. A						
NUKRE .. A						
PWKR ...2RS						
PWKRE ...2RS						
	–	**35**	2 x NIP A2x7,5	M 16x1,5	–	AP 8
	–	**40**	2 x NIP A2x7,5	M 18x1,5	–	AP 8
	–	**47**	2 x NIP A2x7,5	M 20x1,5	–	AP 10
	–	**52**	2 x NIP A2x7,5	M 20x1,5	–	AP 10
	–	**62**	2 x NIP A3x9,5	M 24x1,5	–	AP 14
	–	**72**	2 x NIP A3x9,5	M 24x1,5	–	AP 14
	–	**80**	2 x NIP A3x9,5	M 30x1,5	–	AP 14
	–	**90**	2 x NIP A3x9,5	M 30x1,5	–	AP 14

Table 2

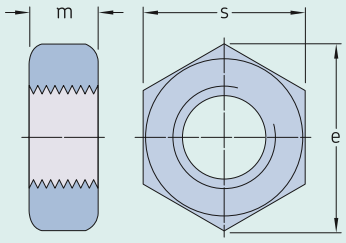
Grease fittings



Designation	Dimensions M_1	D	L	L_1
–	mm			
NIP A1	4	6	6	1,5
NIP A1x4,5	4	4,7	4,5	1
NIP A2x7,5	6	7,5	7,5	2
NIP A3x9,5	8	10	9,5	3

Table 3

Hexagonal nuts

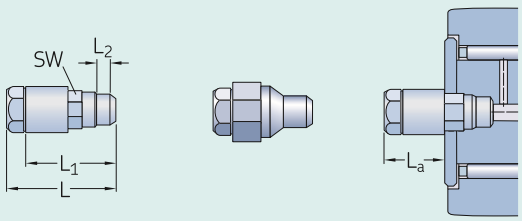


Size	Dimensions m	e	s	Tightening torque	Standard[1)]
–	mm			Nm	–
M 6x1	5,2	11	10	3	1
M 8x1,25	6,8	14,4	13	8	1
M 10x1	8,4	17,8	16	15	2
M 12x1,5	10,8	20	18	22	2
M 16x1,5	14,8	26,8	24	58	2
M 18x1,5	15,8	29,6	27	87	2
M 20x1,5	18	33	30	120	2
M 24x1,5	21,5	39,5	36	220	2
M 30x1,5	25,6	50,9	46	450	2

1) 1 = EN ISO 4032, ISO 4032
2 = EN ISO 8673, ISO 8673

Table 4

Dimensions of adapters for connecting to a centralized lubrication system



AP 8 and AP 10 AP 14

Designation	Dimensions L	L_1	L_2	L_a	SW
–	mm				
AP 8	27	22	4	16	8
AP 10	27	22	5	15	10
AP 14	25	20	6	8	14

Lubrication

SKF cam followers are supplied greased (**table 1**, **page 933**).

For general information, refer to *Lubrication*, **page 109**.

Relubrication requirements

Cam followers:

- should be relubricated regularly to achieve their full service life, even if the initial grease fill still has its full lubricating properties
- used in applications where there are light loads, relatively low speeds and clean surroundings can operate for long periods before relubrication is required
- that operate under contaminated and damp conditions at high speeds or at temperatures > 70 °C *(160 °F)* require more frequent relubrication
- without a cage (full complement of rollers) require more frequent relubrication

KR design cam followers of sizes 16 and 19 with designation suffix PPSKA cannot be relubricated.

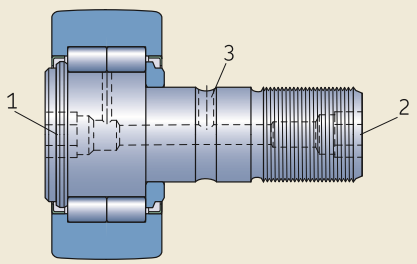
Relubrication features

Cam followers can be relubricated via ducts inside the stud. Depending on series and size, there are up to three positions for relubrication (**fig. 12**):

- Positions 1 and 2 can be fitted with the grease fitting supplied with the cam follower.
- Position 3 should be used when relubricating via ducts in the adjacent components.
- For detailed information about the positions, refer to **product tables**, **page 978**.
- For cam followers, sizes ≥ 35, positions 1 and 2 can be connected to a centralized lubrication system (*Accessories*, **page 968**).
- Positions not used for relubrication should be closed by a grease fitting or a plug (*Accessories*).

Fig. 12

Cam follower relubrication points



Bearing data

Dimension standards	ISO 7063 and ANSI/ABMA Standard 18.1 (where standardized)
Profile of the outer ring running surface	• **KR .. (B) designs** Radius = 500 mm • **Other designs** Improved crowned profile for better load distribution, higher stiffness and reduced wear
Tolerances For additional information → **page 35**	Normal, except: • KR, KRE, KRV designs: ISO 7063 • diameter of the crowned running surface: 0/–0,05 mm • stud shank diameter: h7 • eccentric collar diameter: h9 Values for Normal tolerance class: ISO 492 (**table 2**, **page 38**) Values for ISO tolerance classes: h7 and h9 (**table 2**, **page 970**)
Internal clearance For additional information → **page 182**	Between C2 and Normal Values: ISO 5753-1 (**table 11**, **page 603**) Values are valid for unmounted bearings under zero measuring load.
Defect frequencies	→ skf.com/bearingcalculator

Loads

Dynamic loads	As track rollers are not supported in a housing, the outer rings deform, leading to an altered load distribution and bending stresses in the outer ring. The basic load ratings listed in the **product table**, **page 978**, take into account the altered load distribution, while the maximum radial loads $F_{r\,max}$ (**product table**) are based on the bending stresses.
Static loads	Permissible static load is the lower value of $F_{0r\,max}$ or C_0 (**product table**). Where requirements for smooth running are below normal, the static load may exceed C_0, but should never exceed the maximum permissible static radial load $F_{0r\,max}$.
Axial loads	Cam followers are intended for radial loads. However, their flange rings enable cam followers to accommodate axial loads that can occur because of skew or tilting. The magnitude of permissible load depends on the internal design.
Minimum load For additional information → **page 106**	$F_{rm} = 0{,}0167\ C_0$
Equivalent dynamic bearing load For additional information → **page 91**	$P = F_r$
Equivalent static bearing load For additional information → **page 105**	$P_0 = F_r$

Symbols

C_0	basic static load rating [kN] (**product table**, **page 978**)
F_r	radial load [kN]
$F_{r\,max}$	maximum permissible dynamic radial load [kN] (**product table**)
$F_{0r\,max}$	maximum permissible static radial load [kN] (**product table**)
F_{rm}	minimum radial load [kN]
P	equivalent dynamic bearing load [kN]
P_0	equivalent static bearing load [kN]

Temperature limits

The permissible operating temperature for cam followers can be limited by:

- the dimensional stability of the bearing rings and rollers
- the cage
- the seals
- the lubricant

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

Bearing rings and rollers

SKF cam followers are heat stabilized up to at least 140 °C *(280 °F)*.

Cages

Steel cages can be used at the same operating temperatures as the bearing rings and rollers.

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.
- PA66 sliding rings: –30 to +100 °C *(–20 to +210 °F)*

Typically, temperature peaks are at the seal lip.

Lubricants

Temperature limits for greases used in SKF cam rollers are provided in **table 1**, **page 933**. 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**).

Speed limits

The limiting speed listed in the **product table** 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 130**.

Design considerations

Attachment holes for studs

The holes in the adjacent part of machinery that will accommodate the stud or eccentric collar of a cam follower should be machined to tolerance class H7Ⓔ.

If the requisite tightening torque for the hexagonal nut (**table 3**, **page 970**) cannot be achieved or the cam followers are subjected to peak loads, the stud or eccentric collar should be mounted with an interference fit. The lead-in chamfer of the holes should be ≤ 0,5 × 45°.

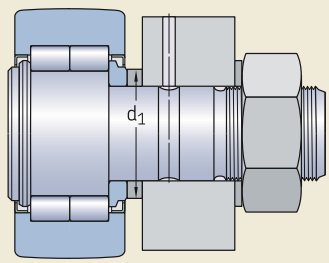
Support surfaces

The flange ring that is pressed onto the stud shank should be axially supported:

- over its entire side face (**fig. 13**)
- according to diameter d_1 (**product table**, **page 978**)
- with material that has a sufficiently high strength to accommodate the tightening torque (**table 3**, **page 970**)

Fig. 13

Supported flange ring



Mounting

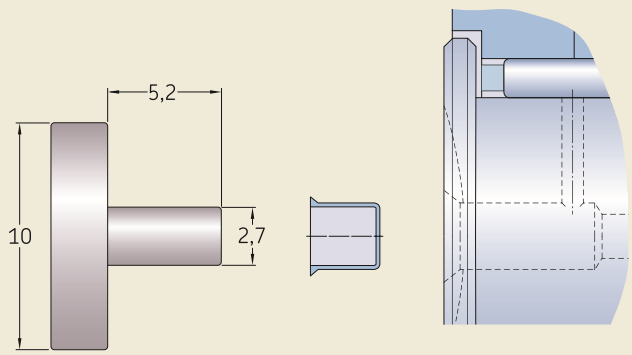
Cam followers can be attached to associated components (fig. 13) using the hexagonal nut (table 3, page 970) supplied with the cam follower. Spring washers, which are not supplied by SKF, serve to secure the nuts.

- To exploit the full load carrying capacity of cam followers, the nuts should be tightened to the recommended torque values (table 3).
- Where heavy vibrations occur, cam followers can be located using:
  - self-locking nuts in accordance with ISO 10511
  - special lock washers

  For self-locking nuts, a higher tightening torque must be applied. Follow the recommendations of the nut manufacturer.
- Cam followers, sizes ≥ 22, have a hexagonal recess in the stud head and can be held in place by a hexagonal key (Allen wrench) while the nut is being tightened.
- Some small cam follower designs (sizes 16 and 19) have a slot in the stud head instead and can be held in place by a screwdriver. For additional information, refer to the illustrations in the product table, page 978.
- Depending on the mounting conditions, cam followers with an eccentric collar can be adjusted to the required eccentricity via the slot or the hexagonal recess.
- Do not hit the head of the stud as damage to the cam follower may result.
- SKF recommends positioning the lubrication hole in the stud head in the unloaded zone of the cam follower. The position of this hole corresponds to the SKF trademark on the head end of the stud.
- The lubrication hole in position 3 that is parallel and in line with the lubrication hole in the stud head (fig. 12, page 971) may be used to incorporate a locking device to prevent the stud from turning.
- When inserting a plug, it should be pressed into place using a mandrel (fig. 14).

Fig. 14

Inserting the VD1 plug with a mandrel



Designation system

		Group 1	Group 2	Group 3	/

Prefixes

Basic designation

KR Cam follower fitted with a needle roller and cage assembly
KRE Cam follower fitted with a needle roller and cage assembly, with an eccentric collar pressed onto the stud
KRV Cam follower fitted with a full complement of needle rollers
KRVE Cam follower fitted with a full complement of needle rollers, with an eccentric collar pressed onto the stud
NUKR Cam follower based on a double row full complement cylindrical roller bearing with two integral outer ring flanges
NUKRE Cam follower based on a double row full complement cylindrical roller bearing with two integral outer ring flanges, with an eccentric collar pressed onto the stud
PWKR Cam follower based on a double row full complement cylindrical roller bearing with three integral outer ring flanges
PWKRE Cam follower based on a double row full complement cylindrical roller bearing with three integral outer ring flanges, with an eccentric collar pressed onto the stud

Suffixes

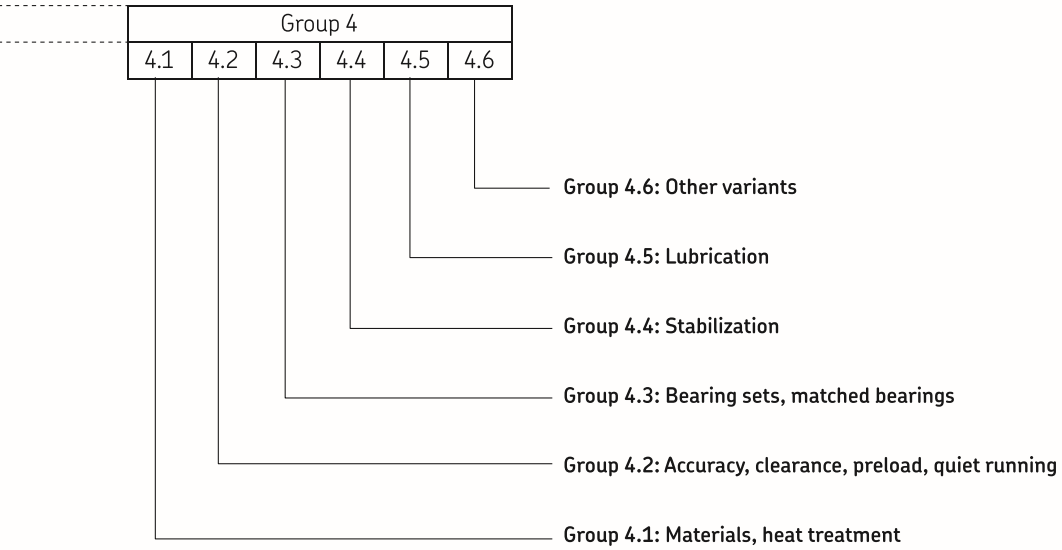
Group 1: Internal design

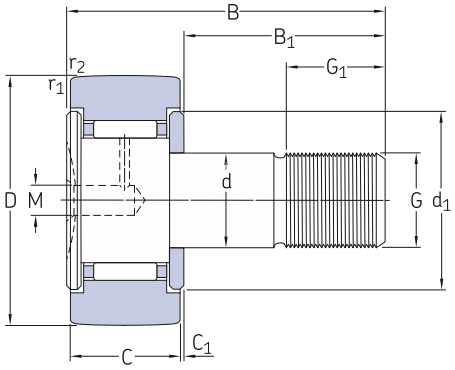
Group 2: External design (seals, snap ring groove, etc.)

.2RS NBR contact seal on both sides.
A Improved crowned profile of the outer ring running surface (NUTR design)
B Hexagonal recess on both ends of the stud
PPA KR design with a PA66 axial sliding and sealing ring on both sides; improved crowned profile of the outer ring running surface
- Sizes 16 and 19 have one slot in the head of the stud as standard.
- Sizes ≥ 22 have a hexagonal recess on both ends.

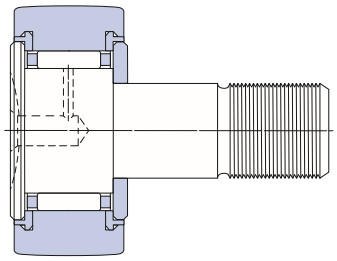
PPSKA KR design, sizes 16 and 19, with a PA66 axial sliding and sealing ring on both sides, improved crowned profile of the outer ring running surface and a hexagonal recess in the head of the stud, no relubrication features
PPXA PPA features except for the outer ring running surface, which has a cylindrical profile
X Cylindrical (flat) profile of the outer ring running surface
XA Cylindrical (flat) profile of the outer ring running surface (NUKR .. A or NUKRE .. A design)
XB Cylindrical (flat) profile of the outer ring running surface and a hexagonal recess on both ends of the stud (NUKR design)

Group 3: Cage design

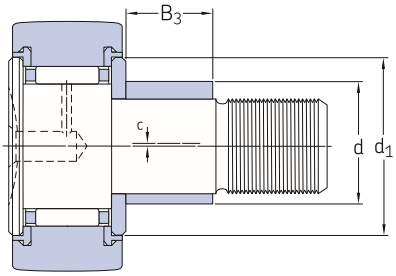

Group 4
4.1
4.2
4.3
4.4
4.5
4.6
Group 4.6: Other variants
Group 4.5: Lubrication
Group 4.4: Stabilization
Group 4.3: Bearing sets, matched bearings
Group 4.2: Accuracy, clearance, preload, quiet running
Group 4.1: Materials, heat treatment



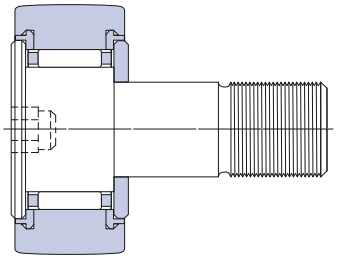
KR
(D ≤ 19 mm)



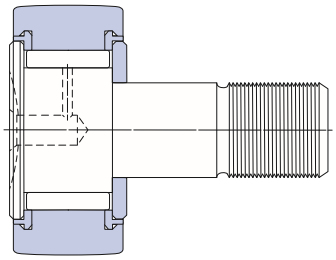
KR .. PPA
(D ≤ 19 mm)



KRE .. PPA
(D ≤ 19 mm)



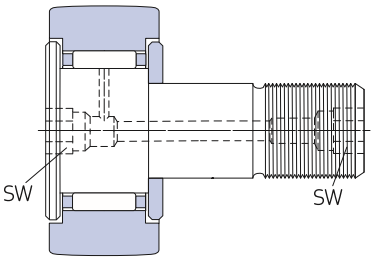
KR .. PPSKA
(D ≤ 19 mm)



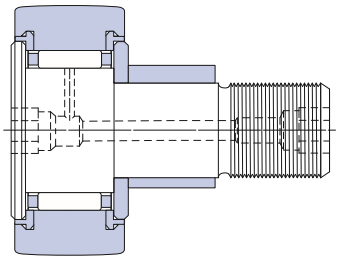
KRV .. PPA
(D ≤ 19 mm)

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	B	C	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
16	6	28	11	3,14	3,2	0,345	2,9	4,15	6 000	0,019	▸ **KR 16**
	6	28	11	3,14	3,2	0,345	2,9	4,15	6 000	0,018	**KR 16 PPA**
	6	28	11	3,14	3,2	0,345	2,9	4,15	6 000	0,019	▸ **KR 16 PPSKA**
	6	28	11	4,73	6,55	0,72	4,05	5,7	4 300	0,019	▸ **KRV 16 PPA**
	9	28	11	3,14	3,2	0,345	2,9	4,15	6 000	0,02	▸ **KRE 16 PPA**
19	8	32	11	3,47	3,8	0,415	3,8	5,5	5 600	0,029	▸ **KR 19**
	8	32	11	3,47	3,8	0,415	3,8	5,5	5 600	0,029	▸ **KR 19 PPA**
	8	32	11	3,47	3,8	0,415	3,8	5,5	5 600	0,029	▸ **KR 19 PPSKA**
	8	32	11	5,28	8	0,88	5,1	7,35	4 000	0,031	▸ **KRV 19 PPA**
	11	32	11	3,47	3,8	0,415	3,8	5,5	5 600	0,032	▸ **KRE 19 PPA**
22	10	36	12	4,4	5	0,56	4,25	6	5 300	0,045	▸ **KR 22 B**
	10	36	12	4,4	5	0,56	4,25	6	5 300	0,043	▸ **KR 22 PPA**
	10	36	12	6,05	9,15	1,04	5,7	8,15	3 600	0,045	▸ **KRV 22 PPA**
	13	36	12	4,4	5	0,56	4,25	6	5 300	0,047	▸ **KRE 22 PPA**
26	10	36	12	4,84	6	0,655	9,3	13,2	5 300	0,059	▸ **KR 26 B**
	10	36	12	4,84	6	0,655	9,3	13,2	5 300	0,057	▸ **KR 26 PPA**
	10	36	12	6,82	11	1,25	11,4	16,3	3 600	0,059	▸ **KRV 26 PPA**
	13	36	12	4,84	6	0,655	9,3	13,2	5 300	0,062	▸ **KRE 26 PPA**

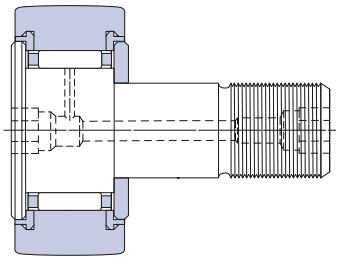
▸ Popular item



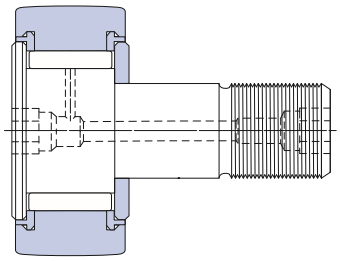
KR .. B
(22 ≤ D ≤ 26 mm)



KRE .. PPA
(22 ≤ D ≤ 26 mm)



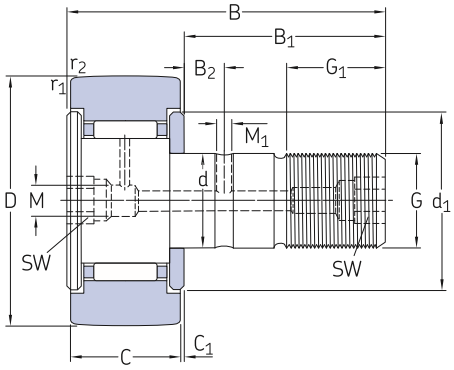
KR .. PPA
(22 ≤ D ≤ 26 mm)



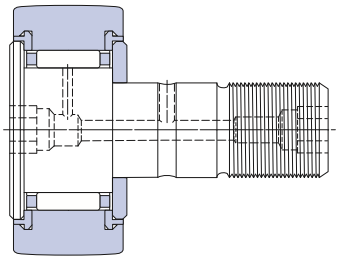
KRV .. PPA
(22 ≤ D ≤ 26 mm)

Dimensions

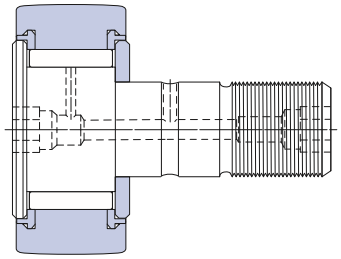
d	B_1	B_2	B_3	C_1	d_1	G	G_1	M	M_1	SW	c	$r_{1,2}$ min.
mm												
16	16	–	–	0,6	12,5	M 6	8	4	–	–	–	0,15
	16	–	–	0,6	12,5	M 6	8	4	–	–	–	0,15
	16	–	–	0,6	12,5	M 6	8	–	–	4	–	0,15
	16	–	–	0,6	12,5	M 6	8	4	–	–	–	0,15
	16	–	7	0,6	12,5	M 6	8	4	–	–	0,5	0,15
19	20	–	–	0,6	15	M 8	10	4	–	–	–	0,15
	20	–	–	0,6	15	M 8	10	4	–	–	–	0,15
	20	–	–	0,6	15	M 8	10	–	–	4	–	0,15
	20	–	–	0,6	15	M 8	10	4	–	–	–	0,15
	20	–	9	0,6	15	M 8	10	4	–	–	0,5	0,15
22	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	10	0,6	17,5	M 10x1	12	4	–	5	0,5	0,3
26	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	–	0,6	17,5	M 10x1	12	4	–	5	–	0,3
	23	–	10	0,6	17,5	M 10x1	12	4	–	5	0,5	0,3



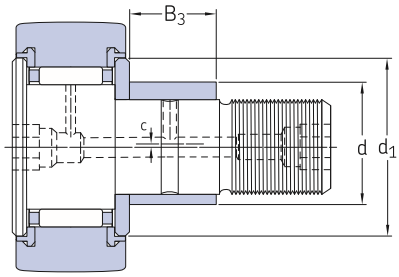
KR .. B



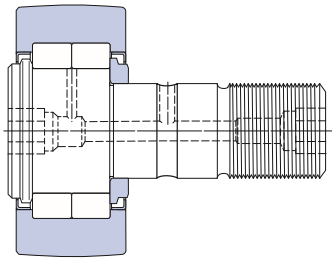
KR .. PPA



KRV .. PPA



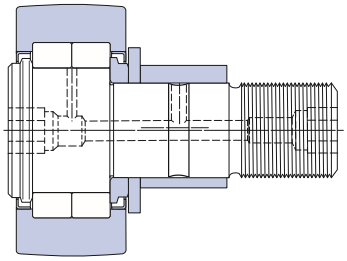
KRE .. PPA



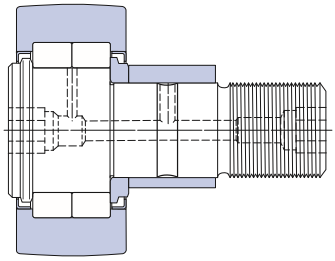
NUKR .. A

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	B	C	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
30	12	40	14	6,44	8	0,88	7,8	11,2	4 800	0,092	▸ **KR 30 B**
	12	40	14	6,44	8	0,88	7,8	11,2	4 800	0,088	▸ **KR 30 PPA**
	12	40	14	8,97	14,6	1,66	11	15,6	3 200	0,091	▸ **KRV 30 PPA**
	15	40	14	6,44	8	0,88	7,8	11,2	4 800	0,093	▸ **KRE 30 PPA**
32	12	40	14	6,71	8,5	0,95	10,6	15	4 800	0,1	▸ **KR 32 B**
	12	40	14	6,71	8,5	0,95	10,6	15	4 800	0,098	▸ **KR 32 PPA**
	12	40	14	9,35	15,3	1,76	14,3	20,4	3 200	0,1	▸ **KRV 32 PPA**
	15	40	14	6,71	8,5	0,95	10,6	15	4 800	0,1	▸ **KRE 32 PPA**
35	16	52	18	9,52	13,7	1,56	11,4	16,3	4 000	0,17	▸ **KR 35 B**
	16	52	18	9,52	13,7	1,56	11,4	16,3	4 000	0,16	▸ **KR 35 PPA**
	16	52	18	12,3	23,2	2,7	14,6	20,8	2 600	0,17	▸ **KRV 35 PPA**
	16	52	18	16,8	17,6	2	8,65	12,2	5 000	0,16	▸ **NUKR 35 A**
	16	52	18	11,9	11,4	1,2	8,65	12,5	5 000	0,16	▸ **PWKR 35.2RS**
	20	52	18	9,52	13,7	1,56	11,4	16,3	4 000	0,18	▸ **KRE 35 PPA**
	20	52	18	16,8	17,6	2	8,65	12,2	5 000	0,18	▸ **NUKRE 35 A**

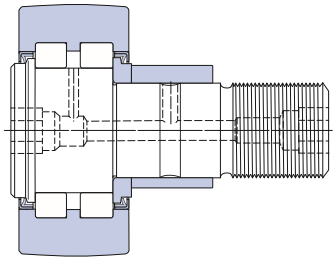
▸ Popular item



NUKRE .. A
(35 ≤ D ≤ 40 mm)



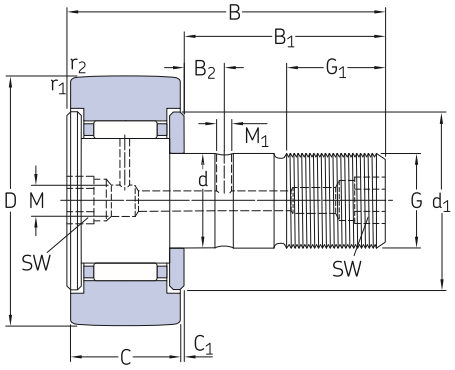
NUKRE .. A
(D ≥ 47 mm)



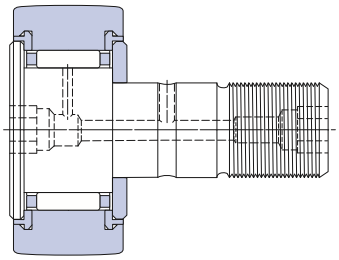
PWKR ...2RS

Dimensions

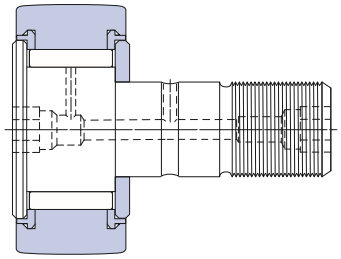
d	B_1	B_2	B_3	C_1	d_1	G	G_1	M	M_1	SW	c	$r_{1,2}$ min.
mm												
30	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	11	0,6	23	M 12x1,5	13	4	3	6	0,5	0,6
32	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	–	0,6	23	M 12x1,5	13	4	3	6	–	0,6
	25	6	11	0,6	23	M 12x1,5	13	4	3	6	0,5	0,6
35	32,5	8	–	0,8	27,6	M 16x1,5	17	6	3	8	–	0,6
	32,5	8	–	0,8	27,6	M 16x1,5	17	6	3	8	–	0,6
	32,5	8	–	0,8	27,6	M 16x1,5	17	6	3	8	–	0,6
	32,5	7,8	–	0,8	20	M 16x1,5	17	6	3	8	–	0,6
	32,5	7,8	–	0,8	20	M 16x1,5	17	6	3	8	–	0,6
	32,5	8	14	0,8	27,6	M 16x1,5	17	6	3	8	1	0,6
	29,5	7,8	12	3,8	27,6	M 16x1,5	17	6	3	8	1	0,6



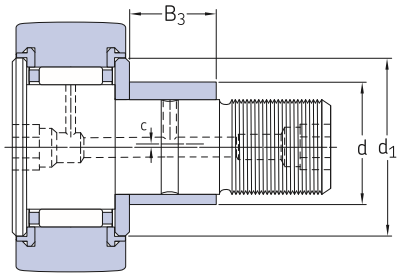
KR .. B



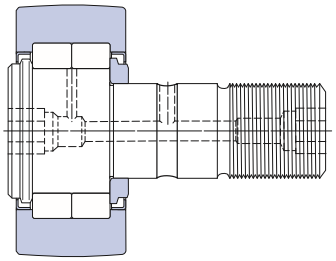
KR .. PPA



KRV .. PPA



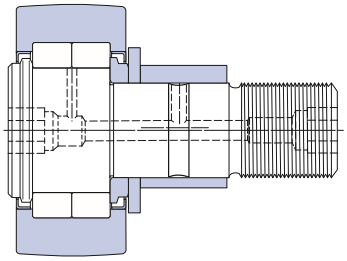
KRE .. PPA



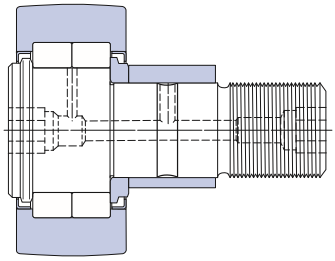
NUKR .. A

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	B	C	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
40	18	58	20	10,5	14,6	1,73	12,5	18	3 400	0,25	▸ **KR 40 B**
	18	58	20	10,5	14,6	1,73	12,5	18	3 400	0,24	▸ **KR 40 PPA**
	18	58	20	14,2	26,5	3,1	17	24,5	2 200	0,25	▸ **KRV 40 PPA**
	18	58	20	19	22	2,5	14	20	4 500	0,24	▸ **NUKR 40 A**
	18	58	20	13,8	14,3	1,5	13,7	19,6	4 500	0,24	**PWKR 40.2RS**
	22	58	20	10,5	14,6	1,73	12,5	18	3 400	0,26	▸ **KRE 40 PPA**
	22	58	20	19	22	2,5	14	20	4 500	0,26	▸ **NUKRE 40 A**
47	20	66	24	14,7	24,5	2,9	23,6	33,5	3 000	0,38	▸ **KR 47 PPA**
	20	66	24	19,4	41,5	5	30,5	43	1 900	0,39	▸ **KRV 47 PPA**
	20	66	24	28,6	33,5	3,9	17,6	25	3 800	0,38	▸ **NUKR 47 A**
	20	66	24	22,9	24,5	2,8	18,3	26	3 800	0,38	**PWKR 47.2RS**
	24	66	24	14,7	24,5	2,9	23,6	33,5	3 000	0,4	▸ **KRE 47 PPA**
	24	66	24	28,6	33,5	3,9	17,6	25	3 800	0,4	▸ **NUKRE 47 A**

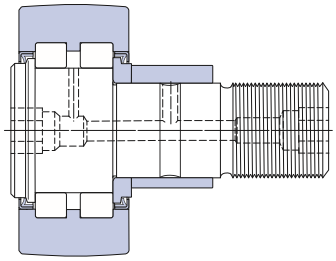
▸ Popular item



NUKRE .. A
(35 ≤ D ≤ 40 mm)



NUKRE .. A
(D ≥ 47 mm)



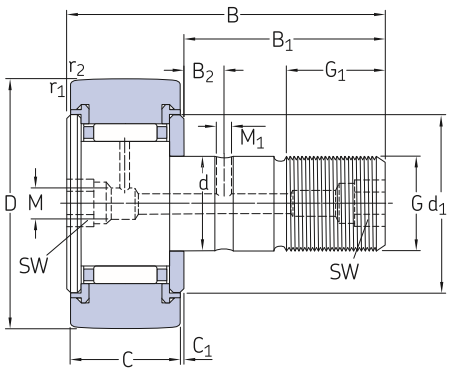
PWKR ...2RS

Dimensions

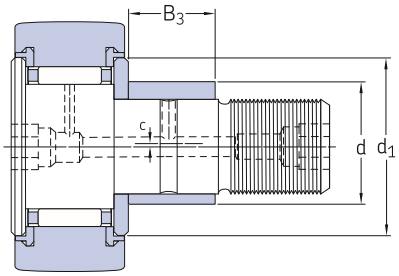
d	B_1	B_2	B_3	C_1	d_1	G	G_1	M	M_1	SW	c	$r_{1,2}$ min.
mm												
40	36,5	8	–	0,8	31,5	M 18x1,5	19	6	3	8	–	1
	36,5	8	–	0,8	31,5	M 18x1,5	19	6	3	8	–	1
	36,5	8	–	0,8	31,5	M 18x1,5	19	6	3	8	–	1
	36,5	8	–	0,8	22	M 18x1,5	19	6	3	8	–	1
	36,5	8	–	0,8	22	M 18x1,5	19	6	3	8	–	1
	36,5	8	16	0,8	31,5	M 18x1,5	19	6	3	8	1	1
	33,5	8	14	3,8	30	M 18x1,5	19	6	3	8	1	1
47	40,5	9	–	0,8	36,5	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	36,5	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	27	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	27	M 20x1,5	21	6	4	10	–	1
	40,5	9	18	0,8	36,5	M 20x1,5	21	6	4	10	1	1
	40,5	9	18	0,8	27	M 20x1,5	21	6	4	10	1	1

16.1 Cam followers

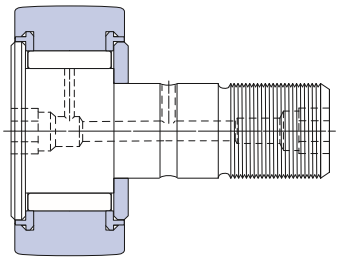
D **52 – 90** mm



KR .. PPA



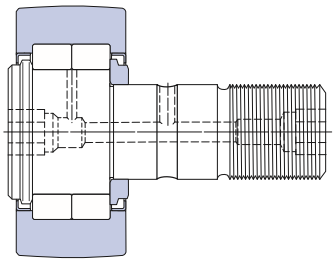
KRE .. PPA



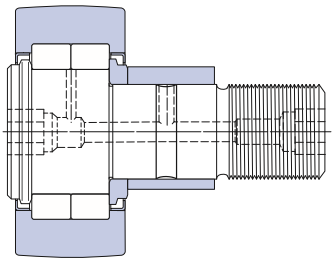
KRV .. PPA

Principal dimensions				Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static	Limiting speed	Mass	Designation
D	d	B	C	C	C_0	P_u	F_r max.	F_{0r} max.			
mm				kN		kN	kN		r/min	kg	–
52	20	66	24	15,7	27	3,2	36	51	3 000	0,45	▸ **KR 52 PPA**
	20	66	24	20,9	46,5	5,6	45	64	1 900	0,46	▸ **KRV 52 PPA**
	20	66	24	29,7	36	4,25	18	25,5	3 200	0,45	▸ **NUKR 52 A**
	20	66	24	23,8	26,5	3,05	18,6	26,5	3 200	0,45	▸ **PWKR 52.2RS**
	24	66	24	15,7	27	3,2	36	51	3 000	0,47	▸ **KRE 52 PPA**
	24	66	24	29,7	36	4,25	18	25,5	3 200	0,47	▸ **NUKRE 52 A**
62	24	80	29	24,6	44	5,5	58,5	85	2 400	0,77	▸ **KR 62 PPA**
	24	80	29	31,4	72	9	72	102	1 700	0,79	▸ **KRV 62 PPA**
	24	80	28	41,3	48	5,85	25	36	2 600	0,8	▸ **NUKR 62 A**
	24	80	28	31,9	32,5	4,05	20,4	29	2 600	0,8	▸ **PWKR 62.2RS**
	28	80	29	24,6	44	5,5	58,5	85	2 400	0,8	▸ **KRE 62 PPA**
	28	80	28	41,3	48	5,85	25	36	2 600	0,82	▸ **NUKRE 62 A**
72	24	80	29	26	48	6	100	143	2 400	1	▸ **KR 72 PPA**
	24	80	29	33	80	9,8	118	170	1 700	1,05	▸ **KRV 72 PPA**
	24	80	28	45,7	58,5	7,1	34,5	50	2 000	1	▸ **NUKR 72 A**
	24	80	28	39,6	45	5,6	47,5	68	2 600	1	▸ **PWKR 72.2RS**
	28	80	29	26	48	6	100	143	2 400	1,05	▸ **KRE 72 PPA**
	28	80	28	45,7	58,5	7,1	34,5	50	2 000	1,05	▸ **NUKRE 72 A**
80	30	100	35	36,9	72	9	106	150	1 800	1,6	▸ **KR 80 PPA**
	30	100	35	45,7	114	14	122	176	1 400	1,65	▸ **KRV 80 PPA**
	30	100	35	69,3	86,5	10,8	48	69,5	1 900	1,6	▸ **NUKR 80 A**
	30	100	35	57,2	73,5	9,3	64	91,5	2 000	1,6	▸ **PWKR 80.2RS**
	35	100	35	36,9	72	9	106	150	1 800	1,65	▸ **KRE 80 PPA**
	35	100	35	69,3	86,5	10,8	48	69,5	1 900	1,65	▸ **NUKRE 80 A**
90	30	100	35	38	76,5	9,5	160	228	1 800	2	▸ **KR 90 PPA**
	30	100	35	47,3	122	15	183	260	1 400	2	▸ **KRV 90 PPA**
	30	100	35	78,1	102	12,7	86,5	125	1 900	1,95	▸ **NUKR 90 A**
	30	100	35	62,7	85	10,8	108	153	2 000	1,95	▸ **PWKR 90.2RS**
	35	100	35	38	76,5	9,5	160	228	1 800	2,05	**KRE 90 PPA**
	35	100	35	78,1	102	12,7	86,5	125	1 900	2	▸ **NUKRE 90 A**

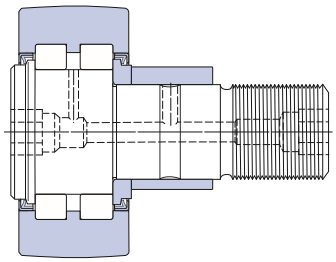
▸ Popular item



NUKR .. A



NUKRE .. A



PWKR ...2RS

Dimensions

d	B_1	B_2	B_3	C_1	d_1	G	G_1	M	M_1	SW	c	$r_{1,2}$ min.
mm												
52	40,5	9	–	0,8	36,5	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	36,5	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	31	M 20x1,5	21	6	4	10	–	1
	40,5	9	–	0,8	31	M 20x1,5	21	6	4	10	–	1
	40,5	9	18	0,8	36,5	M 20x1,5	21	6	4	10	1	1
	40,5	9	18	0,8	31	M 20x1,5	21	6	4	10	1	1
62	49,5	11	–	0,8	44	M 24x1,5	25	8	4	14	–	1
	49,5	11	–	0,8	44	M 24x1,5	25	8	4	14	–	1
	49,5	11	–	1,3	38	M 24x1,5	25	8	4	14	–	1
	49,5	11	–	1,3	38	M 24x1,5	25	8	4	14	–	1
	49,5	11	22	0,8	44	M 24x1,5	25	8	4	14	1	1
	49,5	11	22	1,3	38	M 24x1,5	25	8	4	14	1	1
72	49,5	11	–	0,8	44	M 24x1,5	25	8	4	14	–	1,1
	49,5	11	–	0,8	44	M 24x1,5	25	8	4	14	–	1,1
	49,5	11	–	1,3	44	M 24x1,5	25	8	4	14	–	1,1
	49,5	11	–	1,3	44	M 24x1,5	25	8	4	14	–	1,1
	49,5	11	22	0,8	44	M 24x1,5	25	8	4	14	1	1,1
	49,5	11	22	1,3	44	M 24x1,5	25	8	4	14	1	1,1
80	63	15	–	1	53	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	53	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	47	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	47	M 30x1,5	32	8	4	14	–	1,1
	63	15	29	1	53	M 30x1,5	32	8	4	14	1,5	1,1
	63	15	29	1	47	M 30x1,5	32	8	4	14	1,5	1,1
90	63	15	–	1	53	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	53	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	47	M 30x1,5	32	8	4	14	–	1,1
	63	15	–	1	47	M 30x1,5	32	8	4	14	–	1,1
	63	15	29	1	53	M 30x1,5	32	8	4	14	1,5	1,1
	63	15	29	1	47	M 30x1,5	32	8	4	14	1,5	1,1