Axial needle roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of axial needle roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial needle roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ **1100**
Load carrying capacity	radial		–	➤ *1103|1.2*
	axial, one direction		++	➤ *1103|1.2*
	axial, both directions		–	
	moments		–	
Compensation of angular misalignments	static		–	➤ *1103|1.3*
	dynamic		–	➤ *1103|1.3*
Bearing design	cylindrical bore		✓	➤ *1100|1.1*
	tapered bore		–	
	separable		✓	➤ *1100|1.1*
Lubrication	greased		–	➤ *1103|1.4*
Sealing	open		✓	➤ *1103|1.5*
	non-contact		–	
	contact		–	
Operating temperature in °C	from to		–20 +120	➤ *1104|1.8*
Suitability for	high speeds		++	➤ *1103|1.6*
	high running accuracy		–	➤ *1105|1.11* ➤ *114*
	low-noise running		+	➤ *1104|1.7* ➤ *27*
	high rigidity		+++	➤ *54*
	reduced friction		+++	➤ *56*
	length compensation within bearing		(+)	
	non-locating bearing arrangement		–	
	locating bearing arrangement		–	
X-life bearings		X-life	–	
Inner cage diameter D_{c1} in mm	from to		4 160	➤ *1110* ➤ *1112*
Product tables	from page ➤		**1110**	

1 Axial needle roller bearings

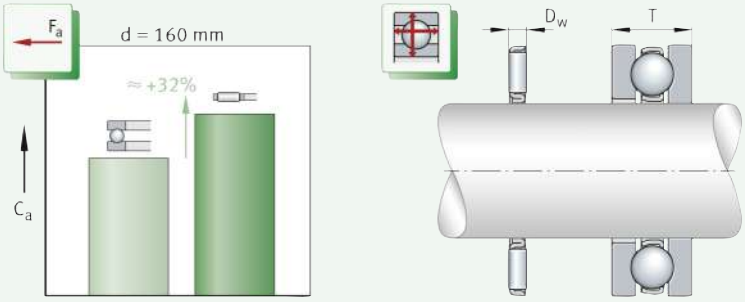
Axial needle roller bearings are particularly suitable where:

- high axial forces occur in one direction but no radial loads are present (the bearings may only be subjected to axial load ➤*1103*|*1.2*)
- the load carrying capacity of comparable axial deep groove ball bearings is no longer adequate and the very high axial load carrying capacity of axial cylindrical roller bearings is not yet necessary ➤*1100*|🗀 *1*
- higher speeds occur in addition to high axial loads
- the bearing arrangement must have very high axial rigidity
- the axial space available is extremely small ➤*1100*|🗀 *1*
- the bearing parts can or must be mounted separately
- the bearing arrangement is not configured but, for cost reasons, ready-to-fit standard bearings are to be used.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1099*.

🗀 **1**
Axial needle roller bearing and axial deep groove ball bearing – comparison of load carrying capacity and design envelope

F_a = *axial load*
C_a = *basic dynamic load rating*
D_w = *diameter of needle roller*
T = *axial section height of axial deep groove ball bearing*



1.1 Bearing design

✎ *Design variants*

Axial needle roller bearings are available as:

- complete axial needle roller bearings (comprising a needle roller and cage assembly and axial bearing washers) ➤*1101*|🗀 *2*
- individual bearing parts for combination, comprising:
  - axial needle roller and cage assembly (prefix AXK)
  - axial bearing washers (prefix AS) ➤*1102*|🗀 *3*
- bearings with centring spigot (prefix AXW) ➤*1102*|🗀 *4* and ➤*1102*|🗀 *5*.

Furthermore, Schaeffler supplies axial needle roller bearings by agreement for specific applications, for example with tabs to prevent rotation. Such bearings are used, due to their low axial section height, in applications such as automotive manual gearshift transmissions.

Axial needle roller bearings

Ready-to-fit bearing units with very small axial space

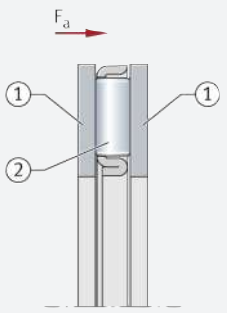
Axial needle roller bearings are part of the group of axial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single row, ready-to-fit bearings comprise flat, ribless axial bearing washers between which axial needle roller and cage assemblies are arranged ➤*1101*|*2*. Their axial section height corresponds only to the diameter of the needle rollers plus the thickness of the washers. Due to this design, the bearings are extremely small in axial height ➤*1112*|. The rolling elements are retained and guided by axial cages. The needle rollers are made from through hardened rolling bearing steel 100Cr6. They have a hardness of at least 670 HV and profiled ends, i.e. they have a slight lateral curvature towards the ends. The modified line contact between the needle rollers and raceways prevents damaging edge stresses. This in turn has a positive effect on the operating life of the bearings.

Due to the extensive possible combinations, the bearing parts for axial needle roller bearings are always supplied individually, i.e. the corresponding axial needle roller and cage assemblies and axial bearing washers in the product tables must always be ordered together ➤*1101*|*2*, ➤*1102*|*3*, ➤*1106*|*1.13* and ➤*1112*|.

2
Axial needle roller bearing

F_a = *axial load*

① *Axial bearing washers*
② *Axial needle roller and cage assembly*



Axial needle roller and cage assemblies

The axial section height corresponds to the needle roller diameter

Axial needle roller and cage assemblies AXK comprise geometrically stable plastic or metal cages fitted with a large number of needle rollers ➤*1101*|*2*. Due to the high uniformity of diameter (the needle rollers are sorted to very small diameter tolerances) of the needle rollers with each other, this gives very uniform loading of the rolling elements ➤*1105*|*3*. Since the axial section height of the cage assemblies is determined purely by the needle roller diameter, the bearings require only an extremely small axial design space.

Suitable as a direct bearing arrangement or in conjunction with axial bearing washers

The axial needle roller and cage assemblies are generally combined with axial bearing washers ➤*1101*|*2* and ➤*1102*|*3*. If they are to be used directly – i.e. without these washers – in the adjacent construction, the raceway for the needle rollers must be produced as a rolling bearing raceway ➤*1107*|*1.16*.

Axial bearing washers

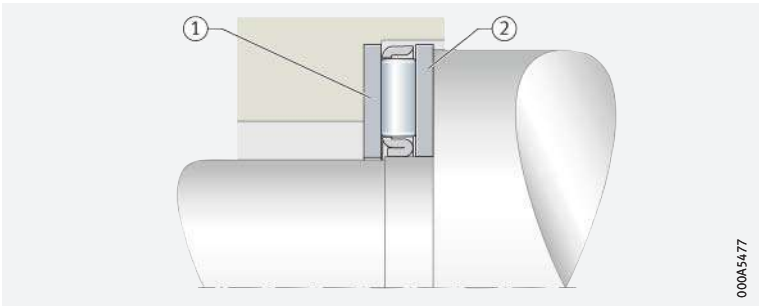
Suitable as shaft or housing locating washers

Axial bearing washers AS are suitable for axial needle roller and cage assemblies AXK. They are punched, through hardened, polished and suitable for use as shaft or housing locating washers. Housing locating washers are externally centred, shaft locating washers are internally centred ➤*1102*|*3* and ➤*1107*|*1.16*. They are used if the adjacent machine parts cannot be used as a raceway for the rolling elements but are sufficiently rigid and geometrically precise.

The use of complete axial needle roller bearings (axial cylindrical roller and cage assembly AXK with axial bearing washers AS) is only appropriate, for example, if high speeds occur and the bearing washers must therefore be precisely centred or the running surfaces for the rolling elements cannot be configured as a rolling bearing raceway.

3
Axial bearing washers

① *Axial needle roller bearing, housing locating washer externally centred*
② *Axial needle roller bearing, shaft locating washer internally centred*



Axial bearings with centring spigot

The centring spigot gives simplified mounting of the bearings

Axial needle roller bearings AXW comprise a housing locating washer with a centring spigot into which an axial needle roller and cage assembly AXK is inserted. With the aid of the centring spigot, the housing locating washer can be precisely centred in the housing bore. This gives easier mounting of the bearings. The running surface for the needle roller and cage assembly must be produced as a rolling bearing raceway, i. e. it must be hardened and ground.

Suitable for the support of axial loads only

Axial bearings with a centring spigot can only support axial loads in one direction. In order to support combined radial/axial loads, however, these bearings can be combined with the following radial needle roller bearings:

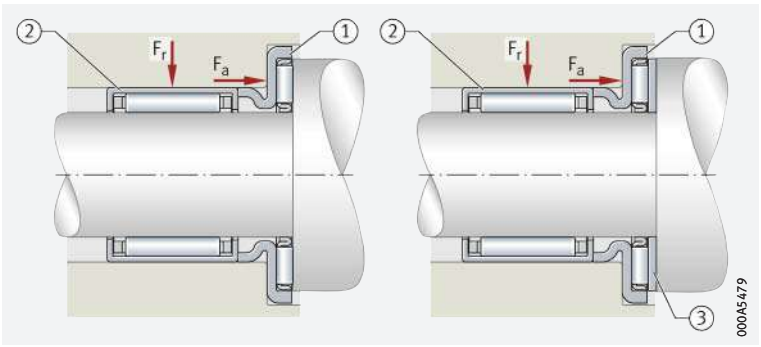
- drawn cup needle roller bearings with open ends and with closed end (direct bearing arrangement) ➤ *1102* | *4*
- needle roller bearings with or without inner ring ➤ *1102* | *5*.

Such combinations give very compact and economical bearing arrangements.

4
Needle roller axial bearings with centring spigot, combined with drawn cup needle roller bearings with open ends

F_a = *axial load*
F_r = *radial load*

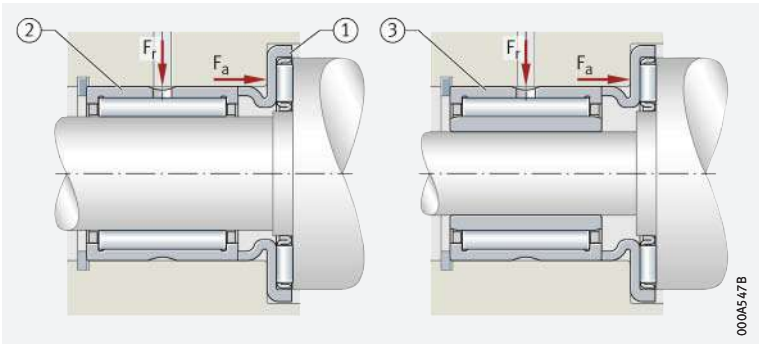
① *Needle roller axial bearing AXW*
② *Drawn cup needle roller bearing with open ends HK (radial bearing)*
③ *Axial bearing washer AS*



5
Needle roller axial bearings with centring spigot, combined with needle roller bearings

F_a = *axial load*
F_r = *radial load*

① *Needle roller axial bearing AXW*
② *Needle roller bearing without inner ring (radial bearing)*
③ *Needle roller bearing with inner ring (radial bearing)*



1.2 Load carrying capacity

For high axial loads acting in one direction

Single row axial needle roller bearings can support high axial loads as well as axial shock loads in one direction, but must not be subjected to radial load ➤1106|1.14. Radial loads must be supported by means of an additional bearing ➤1102|4 and ➤1102|5.

1.3 Compensation of angular misalignments

The bearings do not permit any skewing between the shaft and housing. If angular misalignments occur between the locating surfaces on the shaft and in the housing, this will cause damage to the bearing and a reduction in its operating life.

1.4 Lubrication

Oil or grease lubrication is possible

Axial needle roller bearings and axial needle roller and cage assemblies are not greased. The bearings must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables give two speeds for the bearings ➤1110|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speed

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64. The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 25% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤64.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and needle rollers
- the cage
- the lubricant.

Possible operating temperatures of axial needle roller bearings ➤*1104*|▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Corrosion-resistant design (with Corrotect coating) or polyamide PA66	Bearings with sheet steel cage
	–20 °C to +120 °C	–20 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *The standard cages are made from sheet steel*

Standard cages ➤*1104*|▦ *2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with sheet metal cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦ **2**
Cage, cage suffix, inner cage diameter

Bearing series	Solid cage made from polyamide PA66 TV	Sheet steel cage	Corrosion-resistant design (with Corrotect coating) RR
	Inner cage diameter		
AXK	up to 8	from 10	Available by agreement
AXW	–	from 10	Available by agreement

1.10 Internal clearance

✎ *Axial clearance and preload are determined by the application*

In the case of axial needle roller bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. If axial needle roller bearings are subjected to vibrations while under predominantly static load, for example, they must be lightly preloaded. Preload can be applied, for example, using calibrated sheets (shims). Other suitable means include shaft nuts, disc springs etc. ➤*1107*|*1.15*. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1107*|*1.15*.

If there is any uncertainty regarding correct setting, please consult Schaeffler.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial needle roller bearings correspond to ISO 104:2015. The main dimensions of axial needle roller and cage assemblies correspond to DIN 5405-2:2016, while those of axial bearing washers correspond to DIN 5405-3:2016. Axial needle roller bearings with centring spigot are not standardised.

Tolerances

Axial bearing washers adapt to the accuracy of the abutment surface. They are flat under a minimum concentric load of 200 N.

Tolerances for the bore and outside diameter as well as for the width of the bearing parts ➤*1105*|▦*3* and ➤*1105*|⧉*6*.

The sort tolerances and sort intervals of the needle roller diameters correspond to ISO 3096:1996 or DIN 5402-3:2012, grade G2.

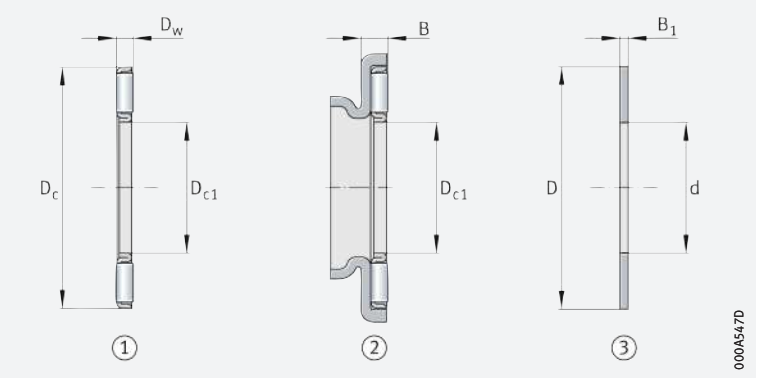
The diameter sort tolerance of the needle rollers in the axial needle roller and cage assemblies AXW is 2 µm.

▦*3*
Tolerances of bearing parts

Series	Bore		Outside diameter		Height	
		Tolerance class		Tolerance class		Deviations mm
AXK	D_{c1}	E11	D_c	c12	D_w	0 −0,01
AXW	D_{c1}	E12	–	–	B	0 −0,2
AS	d	E12	D	e12	B_1	±0,05

⧉*6*
Bearing parts

① *Axial needle roller and cage assembly AXK*
② *Axial needle roller bearing AXW*
③ *Axial bearing washer AS*



1.12 Suffixes

For a description of the suffixes used in this chapter ➤*1105*|▦*4* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦*4*
Suffixes and corresponding descriptions

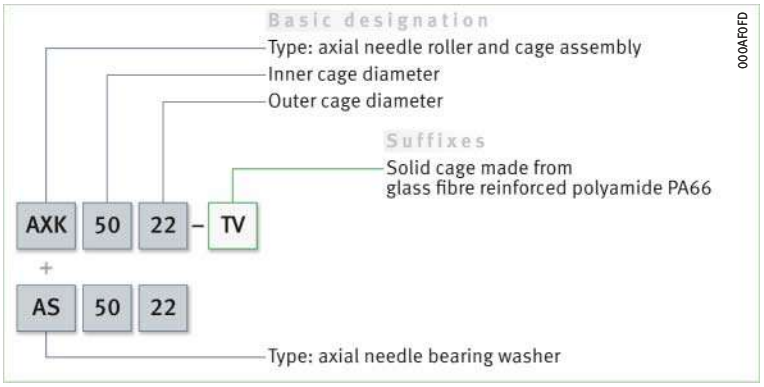
Suffix	Description of suffix	
RR	Corrosion-resistant design, with Corrotect coating	Special design, available by agreement
TV	Plastic cage made from glass fibre reinforced polyamide PA66	Standard

1.13 Structure of bearing designation

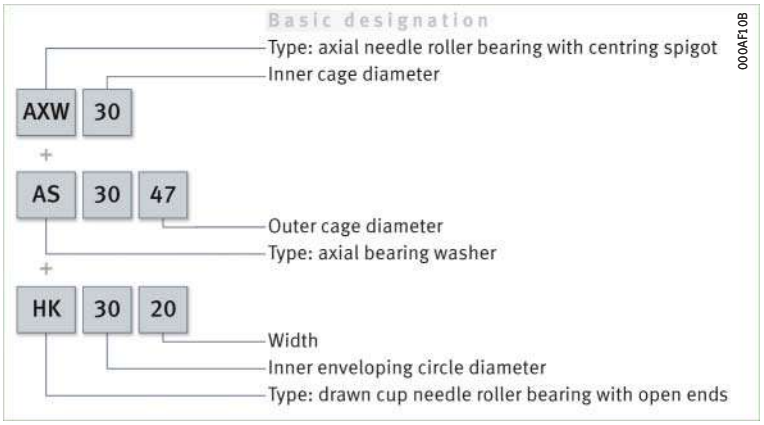
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*1106*|🗀*7* and ➤*1106*|🗀*8*. The composition of designations for axial needle roller and cage assemblies and axial bearing washers is subject to DIN 623-1 ➤*102*|🗀*10*.

🗀**7**
Axial needle roller bearing, comprising axial needle roller and cage assembly and axial bearing washers



🗀**8**
Axial needle roller bearing with centring spigot, combined with axial bearing washer and drawn cup needle roller bearing with open ends



1.14 Dimensioning

Equivalent dynamic bearing load

Axial cylindrical roller bearings can only support axial forces ➤*1103*|*1.2*. In the rating life equation, P is therefore substituted by the value for F_a ➤*1106*|*f1*.

f1
Equivalent dynamic load

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

✎ *Combined loads are not possible*

In relation to the direction of load, the same conditions apply as for the equivalent dynamic bearing load, i. e. combined loads are not permissible. In the rating life equation, P_0 is therefore substituted by the value for F_{0a} ➤*1106*|*f2*.

f2
Equivalent static load

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

$S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤1107|f3.

f3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

Rolling bearings under low loads are particularly prone to slippage

In order to prevent slippage damage, the bearing must be subjected to a minimum axial load $F_{a\,min}$ ➤1107|f4. In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally achieved, however, simply by the weight of the bearing parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a shaft nut ➤1104|1.10.

f4
Minimum axial load

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating, axial
k_a	–	Factor for determining the minimum load; $k_a = 3$
n	min^{-1}	Speed.

1.16 Design of bearing arrangements

Design of adjacent parts

Axial needle roller bearings cannot tolerate angular misalignments ➤1103|1.3. The locating surfaces for the bearing parts on the shaft and in the housing must therefore be vertical to the shaft axis, while the adjacent parts must be rigid and flat. They must be configured such that the bearing washers are supported as far as possible over the whole circumference and over the whole raceway width.

Running surfaces of rolling elements in direct bearing arrangements with needle roller and cage assemblies

Produce the running surfaces as a rolling bearing raceway

For the very smallest axial design space, axial needle roller and cage assemblies can also run directly (i.e. without axial bearing washers) on the adjacent construction. In this case – and if the load carrying capacity of the axial needle roller and cage assemblies is to be fully utilised – the raceways on the shaft and in the housing must be produced as a rolling bearing raceway or must correspond to the quality and hardness of axial bearing washers. When designing the raceway on the shaft and in the housing, the raceway dimensions E_a and E_b of axial needle roller and cage assemblies must be observed ➤1110|▦. If the values observed, this will ensure that the raceways for the needle rollers – taking account of any possible axial offset of the needle roller and cage assembly – are adequately dimensioned.

Raceway design

Design of running surfaces:

- raceway hardness 670 HV to 840 HV
- radial cage guidance surfaces Ramax 0,8 (Rzmax 4)
- surface hardening depth SHD ≧ 140 · $D_w/R_{p0,2}$
  - SHD = surface hardening depth in mm
  - D_w = rolling element diameter in mm
  - $R_{p0,2}$ = proof stress in N/mm²
- roughness Ramax 0,2 (Rzmax 1)
- raceway dimensions E_a and E_b according to the product tables must be observed
- total axial runout tolerances to ISO tolerance grade IT5 (for special requirements IT4) relative to the inside diameter of the axial needle roller and cage assemblies D_{c1} must be observed.

Tolerances for shaft and housing bore

Proven tolerances are given in ➤*1108*|▦*5*. If the data are observed, this will give correct radial guidance of the bearing elements.

▦ **5**
Tolerances for shafts and housing bores

Bearing component		Tolerance class[1] for	
		Shaft	Bore
AXK	Shaft guided	h8	–
AS	Externally centred as housing locating washer	Shaft released	H9
	Internally centred as shaft locating washer	h8	Bore released

[1] *The envelope requirement Ⓔ applies.*

Tolerances for the centring spigot in the housing bore

Where axial needle roller bearings AXW are to be combined with drawn cup needle roller bearings with open ends or closed end, or with needle roller bearings, the bore tolerances selected for the bore of the centring spigot in the housing must be the same as for the radial bearings ➤*1100*|*1.1*, ➤*1102*|⧉*4* and ➤*1102*|⧉*5*.

Release and guidance of bearing parts

Release of shaft and housing locating washers

If the bearing washers are centred on the shaft, they must have radial clearance in the housing bore while, if they are centred in the housing, there must be radial clearance between the washer bore and the shaft ➤*1108*|▦*5*.

Guidance of axial needle roller and cage assemblies

In order to achieve the lowest possible sliding speeds on the guidance surfaces, the axial needle roller and cage assemblies are generally guided on the shaft. This is particularly important in the case of high speeds.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial needle roller bearings are not self-retaining. As a result, the bearing parts can be mounted separately from each other. This gives simplified mounting of the bearings.

Mounting position of bearing washers

The axial bearing washers AS must be suitable as a raceway on both sides, i.e. either side of the washer can face towards the needle rollers.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

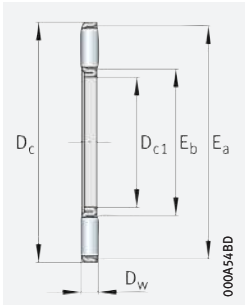
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

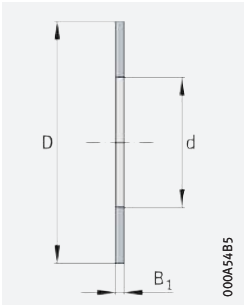
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Axial needle roller and cage assemblies
Axial bearing washers



AXK

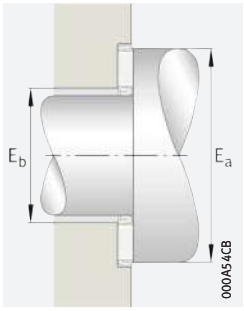


AS

D_{c1} = 4 – 160 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating
D_{c1} d	D_c D	D_w	B_1	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}
4	14	2	1	4 400	8 000	940	21 500	15 100
5	15	2	1	4 750	9 200	1 070	20 600	13 100
6	19	2	1	6 800	15 500	1 580	18 900	11 000
8	21	2	1	7 800	19 400	1 970	17 800	8 900
10	24	2	1	9 200	25 500	2 500	16 900	7 400
12	26	2	1	9 900	29 000	2 850	15 200	6 500
15	28	2	1	11 300	36 000	3 600	13 200	4 950
17	30	2	1	11 900	39 500	3 950	12 100	4 500
20	35	2	1	13 100	46 500	4 750	10 500	4 350
25	42	2	1	14 700	58 000	5 900	8 400	3 700
30	47	2	1	16 300	70 000	7 100	7 300	3 100
35	52	2	1	17 800	81 000	8 300	6 500	2 700
40	60	3	1	28 000	114 000	11 800	5 600	2 340
45	65	3	1	30 000	128 000	13 300	5 100	2 100
50	70	3	1	32 000	143 000	14 800	4 700	1 890
55	78	3	1	38 000	186 000	20 300	4 250	1 730
60	85	3	1	44 500	234 000	26 500	3 900	1 550
65	90	3	1	46 500	255 000	28 500	3 650	1 430
70	95	4	1	54 000	255 000	26 500	3 450	1 400
75	100	4	1	55 000	265 000	28 000	3 250	1 340
80	105	4	1	56 000	280 000	29 500	3 100	1 260
85	110	4	1	58 000	290 000	30 500	2 950	1 200
90	120	4	1	73 000	405 000	44 500	2 700	1 100
100	135	4	1	91 000	560 000	58 000	2 420	970
110	145	4	1	97 000	620 000	63 000	2 230	880
120	155	4	1	102 000	680 000	68 000	2 070	800
130	170	5	1	133 000	840 000	75 000	1 900	750
140	180	5	1	138 000	900 000	79 000	1 780	700
150	190	5	1	143 000	960 000	82 000	1 680	660
160	200	5	1	148 000	1 020 000	86 000	1 590	620

medias ➤ *https://www.schaeffler.de/std/1D9C*

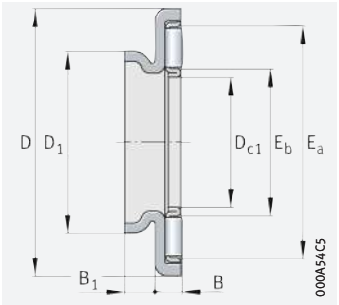


Mounting dimensions/raceway dimensions for direct bearing arrangement

	Axial needle roller and cage assemblies		Axial bearing washers		Raceway dimensions	
	Mass	Designation ➤*1105|1.12* ➤*1106|1.13*	Mass	Designation ➤*1105|1.12* ➤*1106|1.13*		
d D_{c1}	m ≈ g		m ≈ g		E_b	E_a
4	0,7	**AXK0414-TV**	1	**AS0414**	5	13
5	0,8	**AXK0515-TV**	1	**AS0515**	6	14
6	1	**AXK0619-TV**	2	**AS0619**	7	18
8	2	**AXK0821-TV**	2	**AS0821**	9	20
10	3	**AXK1024**	3	**AS1024**	12	23
12	3	**AXK1226**	3	**AS1226**	14	25
15	4	**AXK1528**	3	**AS1528**	17	27
17	4	**AXK1730**	4	**AS1730**	19	29
20	5	**AXK2035**	5	**AS2035**	22	34
25	7	**AXK2542**	7	**AS2542**	29	41
30	8	**AXK3047**	8	**AS3047**	34	46
35	10	**AXK3552**	9	**AS3552**	39	51
40	16	**AXK4060**	12	**AS4060**	45	58
45	18	**AXK4565**	13	**AS4565**	50	63
50	20	**AXK5070**	14	**AS5070**	55	68
55	28	**AXK5578**	18	**AS5578**	60	76
60	33	**AXK6085**	22	**AS6085**	65	83
65	35	**AXK6590**	24	**AS6590**	70	88
70	60	**AXK7095**	25	**AS7095**	74	93
75	61	**AXK75100**	27	**AS75100**	79	98
80	63	**AXK80105**	28	**AS80105**	84	103
85	67	**AXK85110**	29	**AS85110**	89	108
90	86	**AXK90120**	39	**AS90120**	94	118
100	104	**AXK100135**	50	**AS100135**	105	133
110	122	**AXK110145**	55	**AS110145**	115	143
120	131	**AXK120155**	59	**AS120155**	125	153
130	205	**AXK130170**	65	**AS130170**	136	167
140	219	**AXK140180**	79	**AS140180**	146	177
150	232	**AXK150190**	84	**AS150190**	156	187
160	246	**AXK160200**	89	**AS160200**	166	197

Axial needle roller bearings

With centring spigot



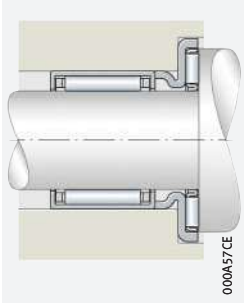
AXW

D_{c1} = 10 – 50 mm

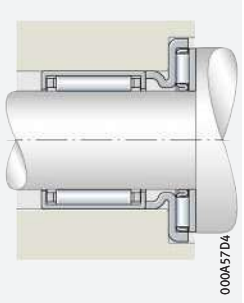
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
D_{c1}	D	B	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1105*|*1.12* ➤*1106*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
10	27	3,2	9 200	25 500	2 500	16 900	9 300	8,3	**AXW10**
12	29	3,2	9 900	29 000	2 850	15 200	8 100	9,1	**AXW12**
15	31	3,2	11 300	36 000	3 600	13 200	6 200	10	**AXW15**
17	33	3,2	11 900	39 500	3 950	12 100	5 600	11	**AXW17**
20	38	3,2	13 100	46 500	4 750	10 500	5 300	14	**AXW20**
25	45	3,2	14 700	58 000	5 900	8 400	4 350	20	**AXW25**
30	50	3,2	16 300	70 000	7 100	7 300	3 650	22	**AXW30**
35	55	3,2	17 800	81 000	8 300	6 500	3 150	27	**AXW35**
40	63	4,2	28 000	114 000	11 800	5 600	2 700	39	**AXW40**
45	68	4,2	30 000	128 000	13 300	5 100	2 400	43	**AXW45**
50	73	4,2	32 000	143 000	14 800	4 700	2 160	49	**AXW50**

medias ➤ *https://www.schaeffler.de/std/1D9D*

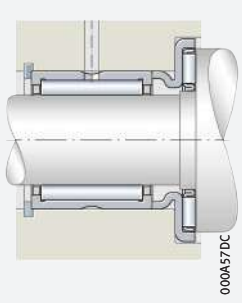
Combination with radial needle roller bearings, drawn cup needle roller bearings with open ends, drawn cup needle roller bearings with closed end



AXW with HK



AXW with AS and HK



AXW with NK, NKS, RNA49, RNA69

Dimensions			Raceway dimensions		Axial bearing washers ➤*1110*	Drawn cup needle roller bearings with open ends ➤*886*		Drawn cup needle roller bearings with closed end ➤*886*	Needle roller bearings ➤*914*	
D_{c1}	D_1	B_1	E_b	E_a	AS	HK	HK..-RS	BK	NK, NKS, RNA49, RNA69	NKI, NKIS, NA49, NA69
10	14	3	12	23	AS1024	HK1010 HK1012 HK1015	–	BK1010 BK1012 BK1015	NK7/10-TV NK7/12-TV	–
12	16	3	14	25	AS1226	HK1210	–	BK1210	NK9/12-TV NK9/16-TV	NKI6/12-TV NKI6/16-TV
15	21	3,5	17	27	AS1528	HK1512 HK1516 HK1522-ZW	HK1514-RS	BK1512 BK1516	–	–
17	23	3,5	19	29	AS1730	HK1712	–	–	NK15/16 NK15/20	–
20	26	3,5	22	34	AS2035	HK2012 HK2016 HK2020 HK2030-ZW	HK2018-RS	BK2016 BK2020	NK18/16 NK18/20	–
25	32	4	29	41	AS2542	HK2512 HK2516 HK2520 HK2526 HK2538-ZW	HK2518-RS	BK2520 BK2526 BK2538-ZW	NK24/16 NK24/20 NKS20	NKI20/16 NKI20/20
30	37	4	34	46	AS3047	HK3012 HK3016 HK3020 HK3026 HK3038-ZW	HK3018-RS	BK3012 BK3016 BK3020 BK3026 BK3038-ZW	NK28/20 NK28/30 NKS24 RNA4904 RNA6904	NA4904 NA6904
35	42	4	39	51	AS3552	HK3512 HK3516 HK3520	HK3518-RS	BK3520	NK32/20-TV NK32/30 NKS28 RNA4905 RNA6905	NKIS20 NA4905 NA6905 NKI28/20-TV NKI28/30
40	47	4	45	58	AS4060	HK4012 HK4016 HK4020	HK4018-RS	BK4020	NK37/20 NK37/30 NKS32 RNA4906 RNA6906	NKIS25 NA4906 NA6906 NKI32/20 NKI32/30
45	52	4	50	63	AS4565	HK4516 HK4520	HK4518-RS	BK4520	NK42/20 NK42/30 NKS37 RNA49/32 RNA69/32-ZW	NKIS30 NA49/32 NA69/32-ZW
50	58	4,5	55	68	AS5070	HK5020 HK5025	HK5022-RS	–	NKS43	NKIS35