

Needle roller bearings



Matrix for bearing preselection 912

1 Needle roller bearings, aligning needle roller bearings 914

1.1	Bearing design	914
1.2	Load carrying capacity	921
1.3	Compensation of angular misalignments	921
1.4	Lubrication	922
1.5	Sealing	922
1.6	Speeds	923
1.7	Noise	923
1.8	Temperature range	924
1.9	Cages	924
1.10	Internal clearance	924
1.11	Dimensions, tolerances	926
1.12	Suffixes	926
1.13	Structure of bearing designation	927
1.14	Dimensioning	928



1.15	Minimum load	928
1.16	Design of bearing arrangements	928
1.17	Mounting and dismounting	933
1.18	Legal notice regarding data freshness	934
1.19	Further information	934
Product tables		936
	Needle roller bearings with ribs	936
	Needle roller bearings without ribs	956
	Aligning needle roller bearings	962

2 Combined needle roller bearings 964

2.1	Bearing design	964
2.2	Load carrying capacity	968
2.3	Compensation of angular misalignments	970
2.4	Lubrication	971
2.5	Sealing	972
2.6	Speeds	972
2.7	Noise	973
2.8	Temperature range	973
2.9	Cages	973
2.10	Internal clearance	973
2.11	Dimensions, tolerances	974
2.12	Suffixes	975
2.13	Structure of bearing designation	975
2.14	Dimensioning	976
2.15	Minimum load	977

2.16	Design of bearing arrangements	977
2.17	Mounting and dismounting	981
2.18	Legal notice regarding data freshness	982
2.19	Further information	982
Product tables		984
	Needle roller/axial deep groove ball bearings	984
	Needle roller/axial cylindrical roller bearings	988
	Needle roller/angular contact ball bearings	990

3 Inner rings 992

3.1	Product design	992
3.2	Temperature range	994
3.3	Internal clearance	994
3.4	Tolerances	995
3.5	Suffixes	995
3.6	Structure of bearing designation	996
3.7	Design of bearing arrangements	996
3.8	Mounting and dismounting	997
3.9	Legal notice regarding data freshness	997
Product tables		998
	Inner rings without lubrication hole	998
	Inner rings with lubrication hole	1004



Matrix for bearing preselection

The matrix gives an overview of the types and design features of 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			Machined needle roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			with ribs, with or without inner ring 	without ribs, with or without inner ring 	detailed information 914
Load carrying capacity	radial		+++	+++	➤ 921 1.2
	axial, one direction		–	–	➤ 921 1.2
	axial, both directions		–	–	➤ 921 1.2
	moments		–	–	
Compensation of angular misalignments	static		–	–	➤ 921 1.3
	dynamic		–	–	➤ 921 1.3
Bearing design	cylindrical bore		✓	✓	➤ 914 1.1
	tapered bore		–	–	
	separable		✓ ¹⁾	✓	➤ 914 1.1
Lubrication	greased		✓ ³⁾	–	➤ 922 1.4
Sealing	open		✓	✓	➤ 922 1.5
	non-contact		–	–	➤ 922 1.5
	contact		✓	–	➤ 922 1.5
Operating temperature in °C		from to	–30 ⁶⁾ +120	–30 ⁶⁾ +120	➤ 924 1.8
Suitability for	high speeds		+++	+++	➤ 923 1.6
	high running accuracy		++	++	➤ 926 1.11 ➤ 114
	low-noise running		+	+	➤ 923 1.7 ➤ 27
	high rigidity		+++	+++	➤ 54
	reduced friction		++	++	➤ 56
	length compensation within bearing		+++	+++	➤ 914 1.1 ➤ 25
	non-locating bearing arrangement		+++	+++	➤ 139
	locating bearing arrangement		–	–	➤ 139
X-life bearings			✓	✓	➤ 920
Inside diameter d and F _w in mm		from to	5 415	5 100	➤ 936
Product tables		from page	936	956	

- Only the inner rings can be mounted separately
- Valid for axial component only in bearings without an end cap
- Sealed bearings only
- NKX...-Z is greased
- NKXR...-Z is greased
- Valid for bearings with sheet steel cage. With plastic cage: – 20 °C to +120 °C
- For mounting in pairs
- Valid for NKIB only

	Aligning needle roller bearings		Combined needle roller bearings				
	with or without inner ring 	detailed information  914	needle roller/ axial deep groove ball bearings 	needle roller/ axial cylindrical roller bearings 	needle roller/ angular contact ball bearings 	detailed information  964	
	+++	➤ 921 1.2	+++	+++	+++	➤ 968 2.2	
	-	➤ 921 1.2	++	+++	+	➤ 968 2.2	
	-	➤ 921 1.2	-	-	++ ⁸⁾	➤ 968 2.2	
	-		-	-	-		
	++	➤ 921 1.3	-	-	-	➤ 970 2.3	
	-	➤ 921 1.3	-	-	-	➤ 970 2.3	
	✓	➤ 914 1.1	✓	✓	✓	➤ 964 2.1	
	-		-	-	-		
	✓ ¹⁾	➤ 914 1.1	✓ ²⁾	✓ ²⁾	✓ ¹⁾	➤ 964 2.1	
	-	➤ 922 1.4	- ⁴⁾	- ⁵⁾	-	➤ 971 2.4	
	✓	➤ 922 1.5	✓	✓	✓	➤ 972 2.5	
	-	➤ 922 1.5	-	-	-	➤ 972 2.5	
	-	➤ 922 1.5	-	-	-	➤ 972 2.5	
	-20 +100	➤ 924 1.8	-30 +120	-30 +120	-30 +120	➤ 973 2.8	
	++	➤ 923 1.6	+++	++	+++	➤ 972 2.6	
	+	➤ 926 1.11 ➤ 114	++	++	++	➤ 974 2.11 ➤ 114	
	(+)	➤ 923 1.7 ➤ 27	(+)	(+)	(+)	➤ 973 2.7 ➤ 27	
	+	➤ 54	+++	+++	+++	➤ 54	
	++	➤ 56	++	++	++	➤ 56	
	+++	➤ 914 1.1 ➤ 25	(+)	(+)	(+)	➤ 25	
	+++	➤ 139	-	-	-	➤ 139	
	-	➤ 139	(+) ⁷⁾	(+) ⁷⁾	+	➤ 139	
	✓	➤ 920	✓	✓	✓	➤ 968	
	12 45	➤ 962	7 70	15 50	12 70	➤ 984	
	962		984	988	990		

1 Needle roller bearings, aligning needle roller bearings



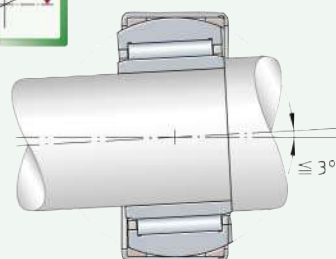
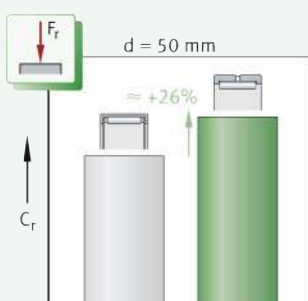
The bearings:

- can support high to very high radial forces
- are used when the load carrying capacity or accuracy of drawn cup needle roller bearings with open ends is no longer sufficient and the high load capacity of cylindrical roller bearings is not yet required
- can only support radial loads and, as a result, are highly suitable for use as non-locating bearings (they permit axial displacement of the shaft relative to the housing in the bearing)
- permit high speeds in spite of line contact
- compensate misalignments between the shaft and housing (aligning needle roller bearings)
- require only a very small radial design envelope, particularly if the bearing arrangement is designed without an inner ring
- are available in numerous sizes and designs
- result in particularly compact, cost-effective and economical bearing arrangements.

For an overview of other product-specific features, see the Matrix for bearing preselection ►912.

1
Needle roller bearing in X-life quality: comparison of load carrying capacity with drawn cup needle roller bearing (open ends) of almost identical dimensions; angular adjustment facility of aligning needle roller bearings (permissible adjustment angle)

C_r = basic dynamic load rating



1.1 Bearing design

Design variants

Needle roller bearings are available as:

- needle roller bearings with ribs on the outer ring ►915| 2 to ►917| 5
- needle roller bearings without ribs on the outer ring ►918| 6 and ►918| 7
- aligning needle roller bearings ►919| 8 and ►919| 9
- combined needle roller bearings ►964.

Needle roller bearings are X-life bearings ►920.



In addition to the bearings described in this chapter, needle roller bearings are also available in other series, designs and sizes, as well as for specific applications, by agreement.

Needle roller bearings are non-locating bearings

Needle roller bearings

Needle roller bearings are rolling bearings with a low radial section height and high load carrying capacity, which are used as non-locating bearings and are part of the group of radial needle roller bearings. These bearings comprise machined outer rings, needle roller and cage assemblies and removable inner rings, i.e. they can be supplied with or without an inner ring in accordance with the application ▶915| 2 to ▶919| 8. In contrast to the outer cups of drawn cup needle roller bearings, which are produced by forming methods, the bearing rings are machined. Due to their non-locating bearing function, the bearings cannot guide the shaft axially in any direction.

The needle roller and cage assembly is guided by the ribs

Needle roller bearings with ribs on the outer ring

Needle roller bearings with ribs are ready-to-fit units. The outer ring and needle roller and cage assembly form a self-retaining unit. The needle roller and cage assembly is guided by the ribs on the outer ring. The outer ring has a lubrication groove and at least one lubrication hole. There is no relubrication facility in types NK with $F_w \leq 10$ mm and NKI with $d \leq 7$ mm. The bearings are predominantly of a single row design, type RNA69 is of a double row design above an enveloping circle diameter $F_w = 40$ mm and is therefore fitted with two needle roller and cage assemblies. The bearings are available:

- with or without an inner ring ▶915| 2 and ▶916| 4
- in a single or double row design ▶915| 2 and ▶916| 4
- as open or sealed versions ▶916| 3, ▶916| 4, ▶922| 1.5.

Available types

Needle roller bearings with ribs on the outer ring, without inner ring

Needle roller bearings with ribs on the outer ring and without an inner ring are available in the following types and dimension series:

- NK, NKS, RNA48, RNA49, RNA69 (single row) ▶915| 2
- RNA69..-ZW (double row) ▶915| 2
- RNA49..-RSR, RNA49..-2RSR (sealed on one or both sides) ▶916| 3 and ▶922| 1.5.

For bearing arrangements with particularly compact radial dimensions

Bearings without an inner ring are highly suitable for bearing arrangements with particularly compact radial dimensions, if the shaft raceway can be hardened and ground ▶928| 1.16. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity.

Length compensation (axial displacement facility)

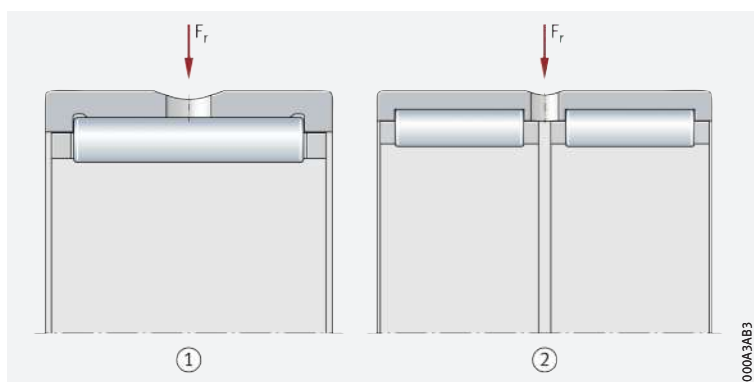
Radial needle roller bearings are used as non-locating bearings, i.e. when the shaft must allow axial length compensation relative to the housing. For bearings without an inner ring, the axial displacement facility of the shaft is dependent on the width of the shaft raceway.



Needle roller bearings with ribs on the outer ring, without inner ring, open

F_r = radial load

- ① Single row needle roller bearing
- ② Double row needle roller bearing



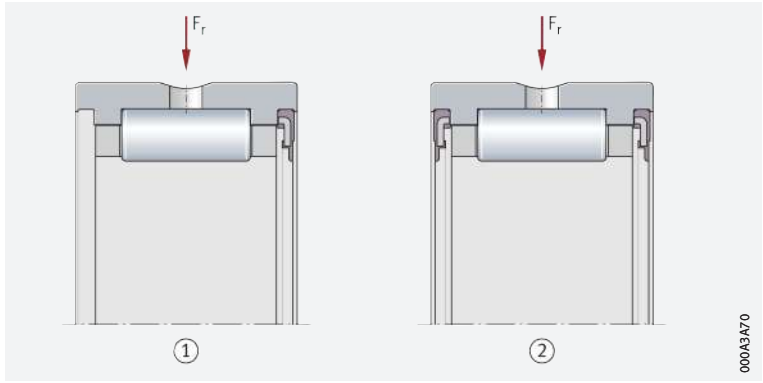
000A3AB3

3

Needle roller bearings
with ribs on the outer ring,
without inner ring,
sealed on one or both sides

F_r = radial load

- ① Single row needle roller bearing,
contact seal on one side
- ② Single row needle roller bearing,
contact seal on both sides



000A3A70

Available types

Needle roller bearings with ribs on the outer ring, with inner ring

Needle roller bearings with ribs on the outer ring and with an inner ring are available in the following types and dimension series:

- NKI, NKIS, NA48, NA49, NA69 (single row) ➤ 916 | 4
- NA69...ZW (double row) ➤ 916 | 4
- NA49...RSR, NA49...2RSR (sealed on one or both sides)
➤ 917 | 5 and ➤ 922 | 1.5.

Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway. The bearings are of a single row design, NA69 is of a double row design from $d \geq 32$ mm.

Axial displacement of the inner ring

For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables. Where larger displacements occur, the standard ring can be replaced by a wider inner ring IR. Inner rings ➤ 992.

Replacement of inner rings



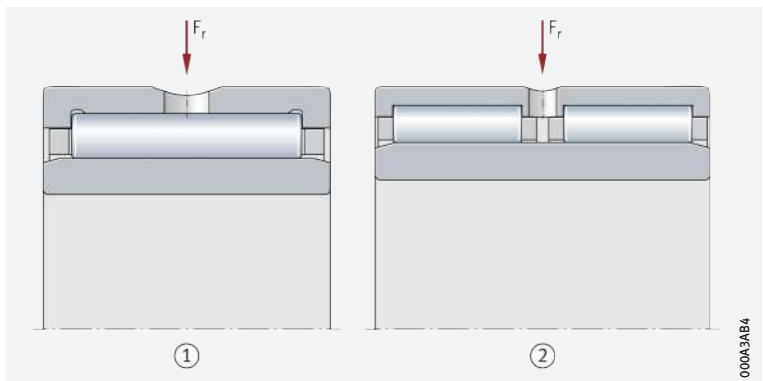
In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

4

Needle roller bearings
with ribs on the outer ring,
with inner ring, open

F_r = radial load

- ① Single row
needle roller bearing
- ② Double row
needle roller bearing

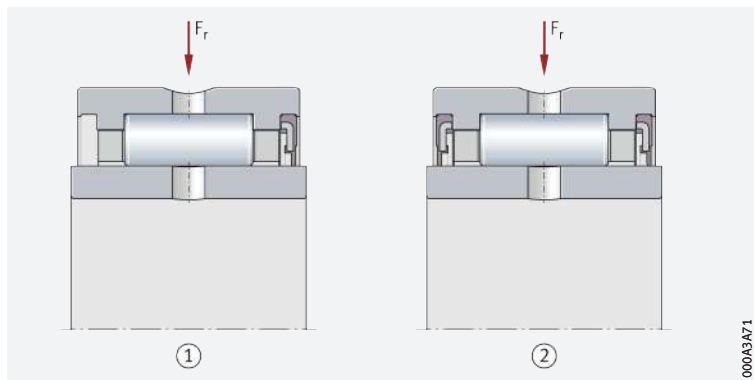


000A3AB4

 **5**
 Needle roller bearings
 with ribs on the outer ring,
 with inner ring,
 sealed on one or both sides

F_r = radial load

- ① Single row needle roller bearing,
contact seal on one side
- ② Single row needle roller bearing,
contact seal on both sides



000A3A71

Needle roller bearings without ribs on the outer ring

 The bearing components
 can be mounted
 independently of each other

Needle roller bearings without ribs on the outer ring are ready-to-fit units. The bearings are not self-retaining. This means that the outer ring, needle roller and cage assembly and inner ring can be fitted independently of each other. The needle roller and cage assembly can be mounted in different ways: it can be fitted together with the shaft, the outer ring or the inner ring, or it can be subsequently inserted between the outer ring and shaft or inner ring. The needle roller and cage assembly and outer ring must not, however, be interchanged with identical components from other bearings during mounting, but should always be fitted as supplied. The majority of the bearings are of a single row design. Double row bearings comprise two single row needle roller and cage assemblies arranged adjacent to each other. They have a lubrication groove in the circumference of the outer ring, at least one lubrication hole in the outer ring and the suffix ZW-ASR1 ➤926|1.12. Bearings are also available with a lubrication hole in the inner ring; these have the suffix IS1 ➤926|1.12.

Needle roller bearings without ribs on the outer ring are available:

- with and without an inner ring ➤918|6 and ➤918|7
- in a single or double row design ➤916|3 and ➤917|5.

Needle roller bearings without ribs on the outer ring, without inner ring

 Available types

Needle roller bearings without ribs on the outer ring and without an inner ring are available in the following types:

- RNAO (single row) ➤918|6
- RNAO..-ZW-ASR1 (double row) ➤918|6.

 For bearing arrangements
 with particularly compact
 radial dimensions

Bearings without an inner ring are highly suitable for bearing arrangements with particularly compact radial dimensions, if the shaft raceway can be hardened and ground ➤928|1.16. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity. If the shaft raceway is produced to the appropriate dimensional and geometrical accuracy, bearing arrangements with increased running accuracy can be achieved.

 Length compensation
 (axial displacement facility)

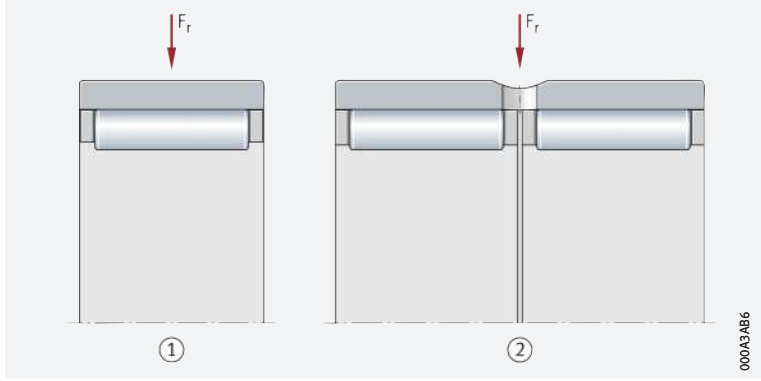
Radial needle roller bearings are used as non-locating bearings, i.e. when the shaft must allow axial length compensation relative to the housing. For bearings without an inner ring, the axial displacement facility of the shaft is dependent on the width of the shaft raceway.



6
Needle roller bearings
without ribs on the outer ring,
without inner ring, open

F_r = radial load

- ① Single row
needle roller bearing
- ② Double row
needle roller bearing



000A3AB6

Available types

Needle roller bearings without ribs on the outer ring, with inner ring

Needle roller bearings without ribs on the outer ring and with an inner ring are available in the following types:

- NAO (single row) ➤ 918 | ⑦
- NAO..ZW-ASR1 (double row) ➤ 918 | ⑦.

Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway.

Axial displacement of the inner ring

For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables ➤ 960 | ⑧. Where larger displacements occur, the standard ring can be replaced by a wider inner ring IR. Inner rings ➤ 992.

Replacement of inner rings



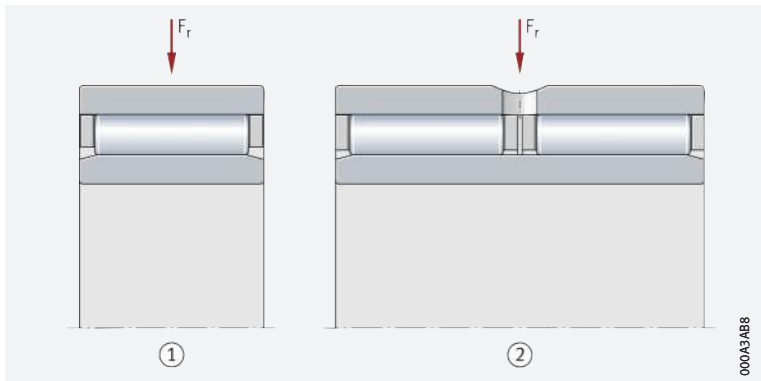
The outer ring and the needle roller and cage assembly are matched to each other and must not be interchanged during mounting with components from other bearings of the same size. In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.



7
Needle roller bearings
without ribs on the outer ring,
with inner ring, open

F_r = radial load

- ① Single row
needle roller bearing
- ② Double row
needle roller bearing



000A3AB8

Suitable for the compensation of angular misalignments

Aligning needle roller bearings

Aligning needle roller bearings comprise drawn outer cups, plastic support rings with a concave inner profile, outer rings with a spherical outside surface, needle roller and cage assemblies and removable inner rings ➤ 919 | ⑧. As a result of their design, these bearings can compensate misalignments, since the outer ring, with its spherical outside surface, is able to move in the concave plastic support ring ➤ 921 | 1.3. Due to their non-locating bearing function, the bearings cannot guide the shaft axially in any direction.

Available types

For bearing arrangements with particularly compact radial dimensions

Aligning needle roller bearing without inner ring

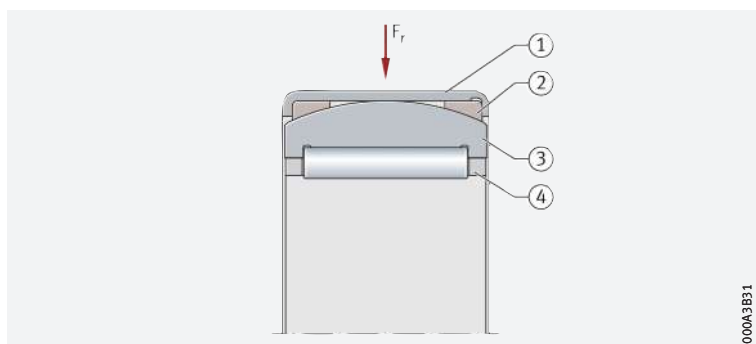
F_r = radial load

- ① Drawn outer cup
- ② Plastic support rings with concave inner profile
- ③ Outer ring with spherical outside surface
- ④ Needle roller and cage assembly

Aligning needle roller bearings without inner ring

Aligning needle roller bearings are available in type RPNA ▶ 919 | 8.

Bearings without an inner ring are highly suitable for bearing arrangements with low section height and particularly compact dimensions, if the shaft raceway can be hardened and ground ▶ 928 | 1. 16. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity.



Aligning needle roller bearings with inner ring

Available types

Axial displacement of the inner ring

Aligning needle roller bearings are available in type PNA ▶ 919 | 9.

Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway.

For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables ▶ 962 | . Where larger displacements occur, the standard ring can be replaced by a wider inner ring of series IR. Inner rings ▶ 992.

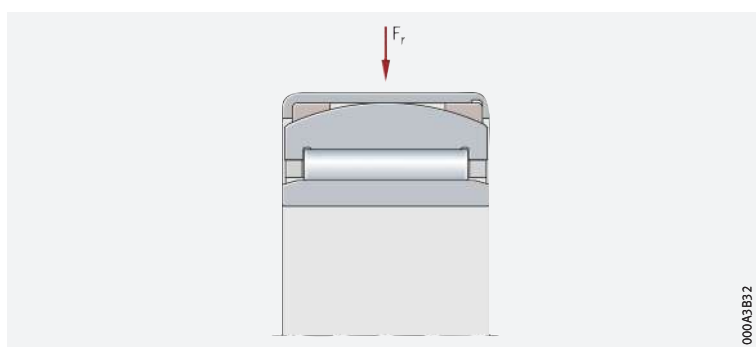
Replacement of inner rings



In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

Aligning needle roller bearing with inner ring

F_r = radial load



X-life

X-life premium quality

The radial needle roller bearings described here are X-life bearings. These bearings are characterised by a very high load carrying capacity and long rating life. This is achieved, for example, through the modified internal construction and optimised contact geometry between the needle rollers and raceways, as well as through the higher quality of the steel and rolling elements, higher surface quality and appropriate heat treatment and/or coating.

Advantages

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life
- high operational security
- compact, environmentally-friendly bearing arrangements.

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

X-life radial needle roller bearings include the suffix XL in the designation ► 920 | 10, ► 927 | 14 and ► 936 | 10.

Increased customer benefits due to X-life

Lower operating costs, higher machine availability

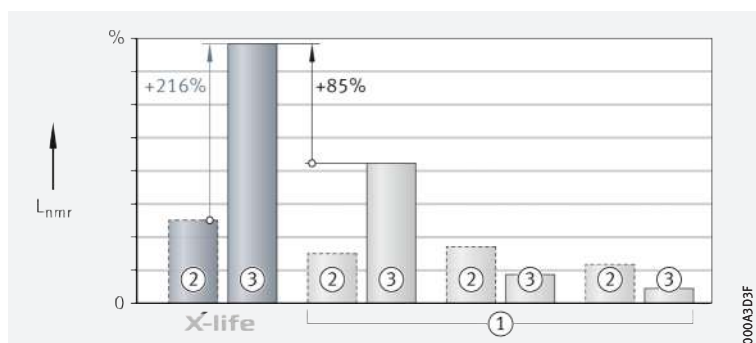
Suffix XL

10

Calculated rating life and rating life verified in tests – comparison between X-life needle roller bearing and bearings without X-life quality

L_{nmr} = adjusted reference rating life

- ① Bearing without X-life quality
- ② Calculated rating life
- ③ Rating life verified in tests



Areas of application

Due to their special technical features, X-life needle roller bearings are highly suitable for bearing arrangements in:

- printing machinery
- the food and packaging industry
- compressors
- fluid and hydraulic pumps
- automotive chassis and gearboxes
- gearboxes for industrial, rail and wind turbine applications
- agricultural vehicles and equipment.



X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ► 10.

1.2 Load carrying capacity

The bearings are pure radial bearings

Radial needle roller bearings support very high radial forces due to the presence of line contact, but may only be subjected to purely radial load. If the bearing position is also required to support axial forces, the needle roller bearings can, for example, be combined with axial needle roller bearings AXW ►921| 11. An extensive range of combined needle roller bearings is also available for combined loads ►964.



If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15%.



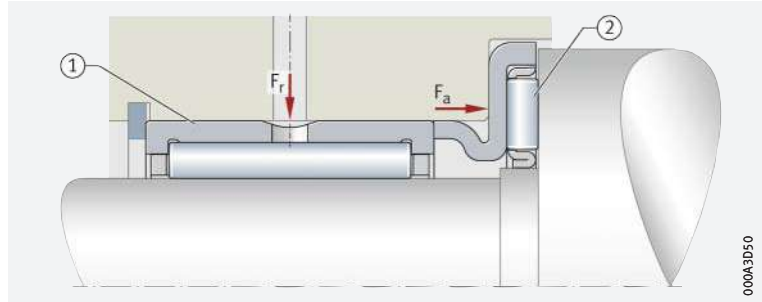
11
Radial needle roller bearing
combined with
axial needle roller bearing

F_r = radial load

F_a = axial load

① Needle roller bearing NK

② Axial needle roller bearing AXW



1.3 Compensation of angular misalignments

The bearings are not suitable for the compensation of shaft misalignments relative to the housing.

Needle roller bearings with or without ribs on the outer ring are not suitable for the compensation of angular misalignments. The extent to which a misalignment of the shaft can be tolerated relative to the housing bore is dependent on factors such as the design of the bearing arrangement, the size of the bearing, the operating clearance and the load. As a result, no guide value can be specified here for a possible misalignment. If angular misalignments occur, aligning needle roller bearings can be used ►921| 12.



In all cases, misalignments cause increased running noise, place increased strain on the cages and have a harmful influence on the operating life of the bearings.

Aligning needle roller bearings

Aligning needle roller bearings can compensate static misalignment

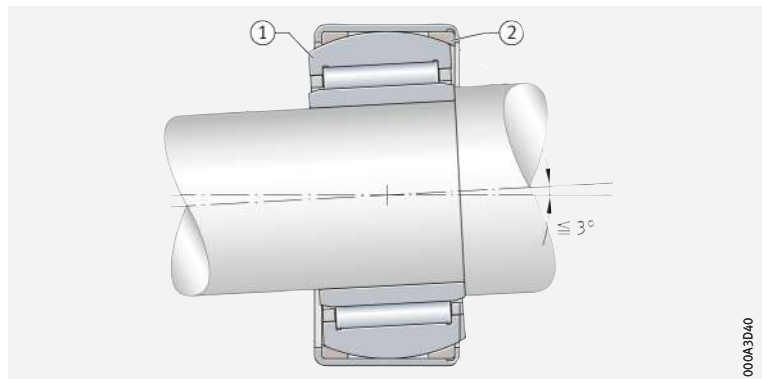
Due to the spherical outer ring and the concave support ring, aligning bearings can compensate static misalignments between the shaft and housing of up to 3° ►921| 12 and ►914| 1.1. The bearings must not, however, be used to support swivel or tumbling motion. During adjustment motion between the outer cup and the ring, a breakaway torque occurs. In order that adjustment motion can take place, the tolerances for the housing bore must be observed ►930| 5.



12
Compensation of misalignments

① Spherical outer ring

② Concave support ring



1.4 Lubrication

Greased bearings

Needle roller bearings with or without ribs on the outer ring

The sealed bearings are greased with a high quality lithium complex soap grease to GA08. Arcanol LOAD150 is suitable for relubrication. For this purpose, the outer ring has a lubrication groove and a lubrication hole ➤ 914 | 1.1.



Do not wash greased bearings out prior to mounting. If mounting is carried out using thermal tools, the bearings should not be heated to a temperature in excess of +80 °C, taking account of the grease filling and seal material. If higher heating temperatures are required, it must be ensured that the permissible upper temperature limits for grease and seals are not exceeded. Schaeffler recommends the use of induction heating devices for heating purposes ➤ 231.

Ungreased bearings

Open bearings are not greased. They 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.

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.



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

1.5 Sealing

The bearings are open or sealed

Needle roller bearings are available in an unsealed design in accordance with DIN 617:2008 and ISO 3245:2015 and a sealed design in accordance with DIN 617:2008.

Integrated seals are particularly space-saving

Sealed bearings

Under normal operating conditions, contact seals give protection against contamination, spray water and the loss of lubricant. The integration of such seals into the bearing provides a compact, reliable, proven and economical sealing solution ➤ 916 | 3 and ➤ 917 | 5.

The sealing material used is the oil-resistant and wear-resistant elastomer material NBR. The seal lips are in contact with a defined contact pressure against the sliding surface.

Provide seals in the adjacent construction

Unsealed bearings

In the case of unsealed bearings, 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.



Sealing rings must not be used as running surfaces for the cage, as these will be damaged as a result and no longer able to fulfil their sealing function.

Effective sealing elements for use in sealing open bearings

13

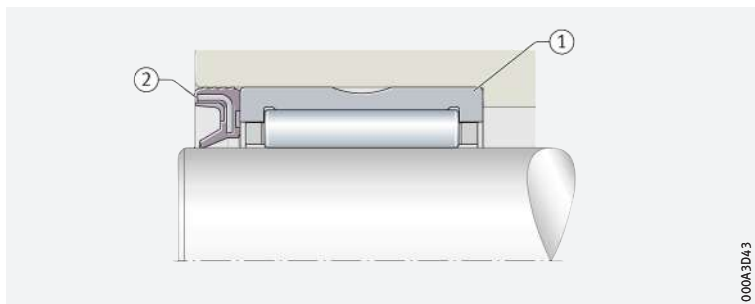
Sealing of the bearing position with a sealing ring G

- ① Needle roller bearing with ribs on the outer ring, open
- ② Sealing ring G

Sealing of the bearing position with a sealing ring G

Bearing positions with open needle roller bearings can be sealed cost-effectively with sealing rings G. The sealing rings are designed as contact seals and are arranged in front of the bearing ►923|13.

They are suitable for circumferential velocities at the running surface of up to 10 m/s and protect the bearing position reliably against contamination, spray water and the excessive loss of lubricant. The sealing rings are matched to the low radial dimensions of needle roller bearings. They are very easy to fit, since they are simply pressed into the housing bore.



1.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables generally give two speeds for the bearings ►936|

- the kinematic limiting speed n_G
- the thermal speed rating n_{Gr} .

Limiting speeds



The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ►64.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals and for grease lubrication where bearings are supplied greased and with seals.

Values for grease lubrication

For grease lubrication, 60% of the value stated in the product tables is permissible in the case of aligning needle roller bearings.

Reference speeds

n_{Gr} is used to calculate n_g

The thermal speed rating n_{Gr} is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_g ►64.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

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 rings and rolling elements
 - the cage
 - the lubricant
 - the seals.

Possible operating temperatures of needle roller bearings with ribs
➤ 924 |  1.

 1
Permissible temperature ranges

Operating temperature	Needle roller bearings with or without ribs, aligning needle roller bearings		
	open bearings	sealed bearings, aligning needle roller bearings	with plastic cage
	-30 °C to +120 °C	-20 °C to +100 °C limited by the lubricant, seal material and the plastic support ring	-20 °C to +120 °C



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

1.9 Cages

 Solid cages made from polyamide PA66 and sheet steel are used as standard

The standard cages are made from sheet steel or plastic (polyamide PA66). Bearings with a plastic cage have the suffix TV. Aligning needle roller bearings are fitted with sheet steel cages.

1.10 Internal clearance

 The standard is CN

Radial internal clearance

Needle roller bearings with an inner ring are manufactured as standard with radial internal clearance CN (normal) ➤ 924 |  2. CN is not stated in the designation.



For bearings with ribs on the outer ring, certain sizes are also available by agreement with the larger internal clearance C3.



The values for radial internal clearance in bearings with an inner ring correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤ 924 |  2. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

Bearings with inner ring

 2
Radial internal clearance of needle roller bearings with inner ring

Nominal bore diameter		Radial internal clearance			
d		CN (Group N)		C3 (Group 3)	
mm		µm		µm	
over	incl.	min.	max.	min.	max.
–	24	20	45	35	60
24	30	20	45	35	60
30	40	25	50	45	70
40	50	30	60	50	80
50	65	40	70	60	90
65	80	40	75	65	100
80	100	50	85	75	110
100	120	50	90	85	125
120	140	60	105	100	145
continued ▼					

 **2**
Radial internal clearance
of needle roller bearings
with inner ring

Nominal bore diameter		Radial internal clearance			
d		CN (Group N)		C3 (Group 3)	
mm		μm		μm	
over	incl.	min.	max.	min.	max.
140	160	70	120	115	165
160	180	75	125	120	170
180	200	90	145	140	195
200	225	105	165	160	220
225	250	110	175	170	235
250	280	125	195	190	260
280	315	130	205	200	275
315	355	145	225	225	305
355	400	190	280	280	370
400	450	210	310	310	410
450	500	220	330	330	440
continued ▲					

 In the case of bearings
without an inner ring,
the enveloping circle
diameter is used

Enveloping circle diameter F_w for bearings without an inner ring

In the case of bearings without inner ring, the dimension for the enveloping circle diameter F_w is used instead of the radial internal clearance. The enveloping circle is the inner inscribed circle of the needle rollers in clearance-free contact with the outer raceway. For bearings before fitting, the enveloping circle F_w is in the tolerance class F6. Deviations ▶ 925 |  3.

 **3**
Deviations for the enveloping
circle diameter

Enveloping circle diameter F _w mm		Tolerance class F6		Tolerance class F8	
		Tolerance for enveloping circle diameter F _w			
		upper deviation	lower deviation	upper deviation	lower deviation
over	incl.	μm	μm	μm	μm
3	6	+18	+10	+28	+10
6	10	+22	+13	+35	+13
10	18	+27	+16	+43	+16
18	30	+33	+20	+53	+20
30	50	+41	+25	+64	+25
50	80	+49	+30	+76	+30
80	120	+58	+36	+90	+36
120	180	+68	+43	+106	+43
180	250	+79	+50	+122	+50
250	315	+88	+56	+137	+56
315	400	+98	+62	+151	+62
400	500	+108	+68	+165	+68

Bearings without ribs on the outer ring



If the enveloping circle is to be in tolerance class F6, the outer ring/ needle roller cage assembly as a matched pair (as delivered) must not be interchanged with parts from other matched pairs during mounting of the bearings.



1.11 Dimensions, tolerances

Dimension standards



The main dimensions of needle roller bearings correspond to ISO 15:2017. The main dimensions of types RNA48, NA48, RNA49, NA49, RNA69, NA69 correspond to DIN 617:2008 and ISO 1206:2001. Nominal dimensions of needle roller bearings with ribs ➤ 936 |

Chamfer dimensions



The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. The maximum chamfer dimensions for the inner rings to DIN 620-6:2004 must be taken into consideration. Overview and limiting values ➤ 135 | 7.11. Nominal value of chamfer dimension ➤ 936 |

Tolerances



The tolerances for the dimensional and running accuracy of needle roller bearings correspond to ISO 492:2014. This excludes the types RNA48, NA48, RNA49, NA49, RNA69, NA69 and aligning needle roller bearings; the dimensional and running tolerances of these bearings correspond to ISO 1206:2001. Needle roller bearings with ribs are available by agreement with increased dimensional, geometrical and running accuracy (suffix P5). This excludes the outside diameter and the width of the outer cup in aligning needle roller bearings. The width has a tolerance of $\pm 0,5$ mm.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤ 926 | 4 and **medias** interchange ➤ <https://www.schaeffler.de/std/1D52>.

4
Suffixes and
corresponding descriptions

Suffix	Description of suffix	
ASR1	Lubrication hole and lubrication groove in the outer ring, dependent on the size	Standard
C3	Radial internal clearance C3 (larger than normal)	Special design, available by agreement
D	Bearing with improved steel cage for downsizing option	Standard
IS1	Lubrication hole in the inner ring, dependent on the size	
P5	Bearing with high dimensional, geometrical and running accuracy	Special design, available by agreement
RSR	Contact seal on one side (lip seal)	Standard
TV	Bearing with cage made from glass fibre reinforced polyamide PA66	
TW	Bearing with cage made from glass fibre reinforced polyamide PA66 and two short needle rollers per cage pocket	Available by agreement
XL	X-life bearing	Standard
ZW	Double row design, dependent on the size	
2RSR	Contact seal on both sides (lip seal)	

1.13

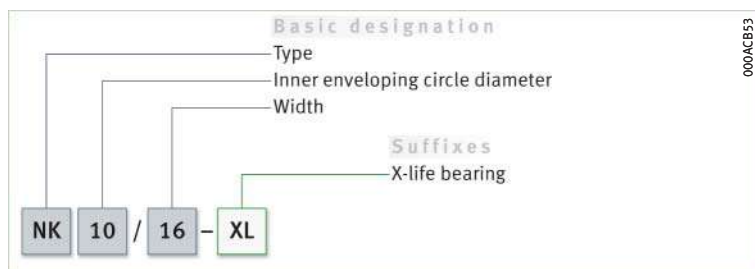
Structure of bearing designation

Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ▶ 927 | 14 to ▶ 927 | 17. The composition of designations is subject in part to DIN 623-1 ▶ 102 | 10.

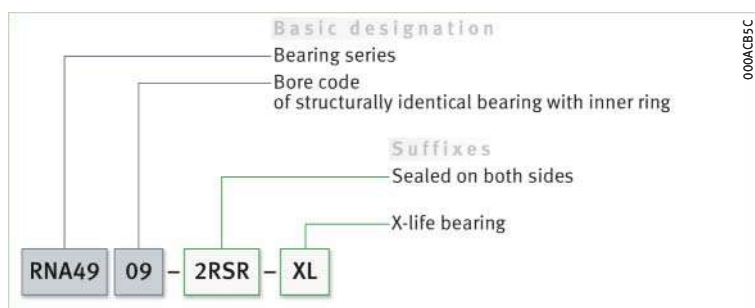
14

Single row needle roller bearing with ribs on the outer ring, without inner ring, open: designation structure



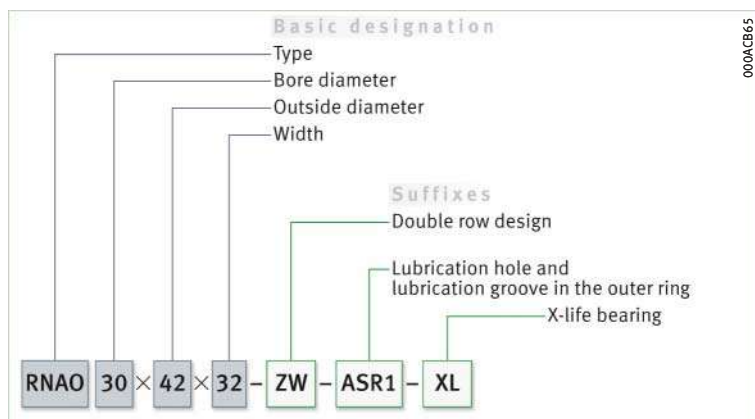
15

Single row needle roller bearing with ribs on the outer ring, without inner ring, sealed on both sides: designation structure



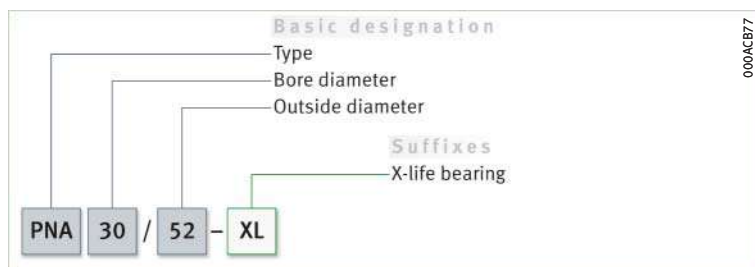
16

Double row needle roller bearing without ribs on the outer ring, without inner ring, open: designation structure



17

Aligning needle roller bearing with inner ring: designation structure



1.14 Dimensioning

 $P = F_r$ under purely radial load of constant magnitude and direction



Equivalent dynamic bearing load

The basic rating life equation $L = (C_r/P)^P$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r . If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$)  928 |  1.

Needle roller bearings and aligning needle roller bearings are non-locating bearings and may only be subjected to radial load.

 1
Equivalent dynamic load

Legend

$$P = F_r$$

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Equivalent static bearing load

For needle roller bearings subjected to static load  928 |  2.

 2
Equivalent static load

Legend

$$P_0 = F_{0r}$$

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial 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  928 |  3.

 3
Static load safety factor

Legend

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

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

1.15 Minimum load

 In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required

In order that no slippage occurs between the contact partners, the needle roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.



If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

 Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements  930 |  6 and  931 |  7.

☞ *For secure radial location, tight fits are necessary*

Radial location

Needle roller bearings with an inner ring are radially located by means of fits on the shaft and in the housing. In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts, mounting and dismounting options etc., must be taken into consideration in the selection of fits.



If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ▶ 150 | 6 and ▶ 158 | 7.



The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ▶ 145
- tolerance classes for cylindrical shaft seats (radial bearings) ▶ 147 | 2
- shaft fits ▶ 150 | 6
- tolerance classes for bearing seats in housings (radial bearings) ▶ 148 | 4
- housing fits ▶ 158 | 7.

Axial location – location methods

☞ *The bearings must also be securely located in an axial direction*

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ▶ 929 | 18 and ▶ 929 | 19.



18
Axial location
of the bearing rings in bearings
with ribs on the outer ring

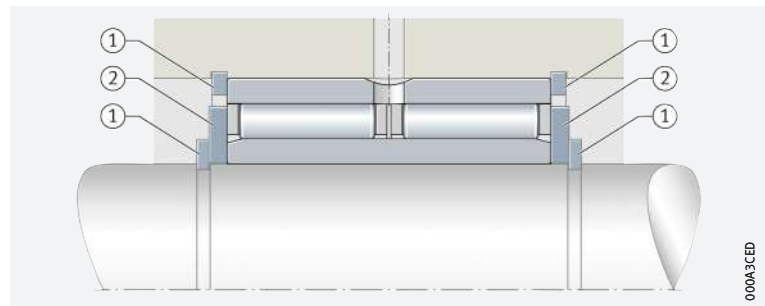
① Retaining ring



19
Axial location
of the bearing rings in bearings
without ribs on the outer ring

① Retaining ring

② Axial washer



Axial guidance of the needle roller and cage assemblies in bearings without ribs on the outer ring



The needle roller and cage assemblies must be axially guided on lateral, burr-free running surfaces. The running surfaces for the cage must be precision machined (Ra 2) and resistant to wear. The product tables give the maximum value of the radius ra, the diameters of the abutment shoulders da, Da and the dimension db, Db for axial guidance of the needle roller and cage assembly. Mounting dimensions >956|

Tolerances of the housing bore for aligning needle roller bearings

5
Tolerance classes and surface design for housings, as a function of the material – for aligning needle roller bearings

Table with 5 columns: Housing material, Bore tolerance to ISO 286-2, Roundness tolerance, Parallelism tolerance, Recommended mean roughness value. Rows include Steel or cast iron and Light metal.

Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For needle roller bearings with ribs with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of the bearing seating surfaces >930| 6, tolerances t1 to t3 in accordance with >168| 11. Numerical values for IT grades >931| 7.

6
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Table with 7 columns: Bearing tolerance class (to ISO 492, to DIN 620), Bearing seating surface, Standard tolerance grades to ISO 286-1 (IT grades), Diameter tolerance, Roundness tolerance, Parallelism tolerance, Total axial runout tolerance of abutment shoulder. Rows include Normal, - and various seating surfaces (Shaft, Housing).

 **7**
Numerical values
for ISO standard tolerances
(IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm												
	over	3	6	10	18	30	50	80	120	180	250	315	400
	incl.	6	10	18	30	50	80	120	180	250	315	400	500
	Values in μm												
IT2		1,5	1,5	2	2,5	2,5	3	4	5	7	8	9	10
IT3		2,5	2,5	3	4	4	5	6	8	10	12	13	15
IT4		4	4	5	6	7	8	10	12	14	16	18	20
IT5		5	6	8	9	11	13	15	18	20	23	25	27
IT6		8	9	11	13	16	19	22	25	29	32	36	40
IT7		12	15	18	21	25	30	35	40	46	52	57	63

Roughness of cylindrical bearing seating surfaces

 *Ra must not be too high*

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value R_a must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ► 931 |  8.

 **8**
Roughness values
for cylindrical bearing seating
surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax μm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions

 *The contact surfaces
for the rings must be
of sufficient height*

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. The abutment shoulders (shaft, housing) should be perpendicular to the bearing axis.



The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418 or an undercut to DIN 509.

 *Chamfer dimensions*

The chamfer dimensions r are given in the product tables. These dimensions are limiting dimensions (minimum dimensions); the actual values should not be lower than specified. The overlap between the snap rings and the end faces of the bearing rings must be sufficiently large.

Raceway for bearings without an inner ring (direct bearing arrangement)

 *The raceway must be
suitable as a rolling
bearing raceway*

In the case of needle roller bearings without an inner ring, the rolling element raceway on the shaft must be hardened and ground. Tolerances and surface designs are shown in ► 932 |  9. The surface hardness of the raceway must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large.



The values in the tables are valid for housing tolerances up to K7 . For tighter bores, the operating clearance should be checked by either calculation or measurement.

9
Tolerance classes and
surface design of raceways
for needle roller bearings
without an inner ring

Table with 8 columns: Shaft diameter, Shaft tolerance, Design of raceway (Roundness tolerance, Parallelism tolerance, Recommended mean roughness value), and Nominal dimension mm. It includes tolerance classes (k5, h5, g6, f6, e6, j5, h5, g5, f6, d6) and roughness values (0,1, 0,15, 0,2).

1) The envelope requirement applies.

Shaft raceway to DIN 617

If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15%.

Steels for the raceway
Through hardening steels

Through hardening steels in accordance with ISO 683-17 (e.g. 100Cr6) are suitable as materials for rolling bearing raceways in direct bearing arrangements. These steels can also be surface layer hardened.

Case hardening steels

Case hardening steels must correspond to DIN EN ISO 683-17 (e.g. 17MnCr5, 18CrNiMo7-6) or EN 10084 (e.g. 16MnCr5).

Steels for inductive surface layer hardening

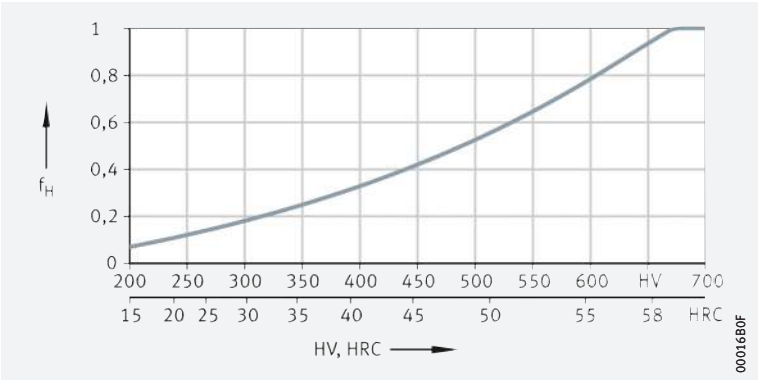
For flame and induction hardening, steels in accordance with DIN EN ISO 683-17 (e.g. C56E2, 43CrMo4) or DIN 17212 (e.g. Cf53) should be used.

Raceway hardness of less than 670 HV

If the raceway fulfils the requirements for rolling bearing materials but the raceway hardness is less than 670 HV, the load on the bearing arrangement cannot be as high as the full load carrying capacity of the bearing. In order to determine the dynamic and static load carrying capacity of the bearing arrangement, the basic dynamic load rating C of the bearings must be multiplied by the reduction factor f_H (dynamic hardness factor) and the basic static load rating C_0r by the reduction factor f_H0 (static hardness factor).

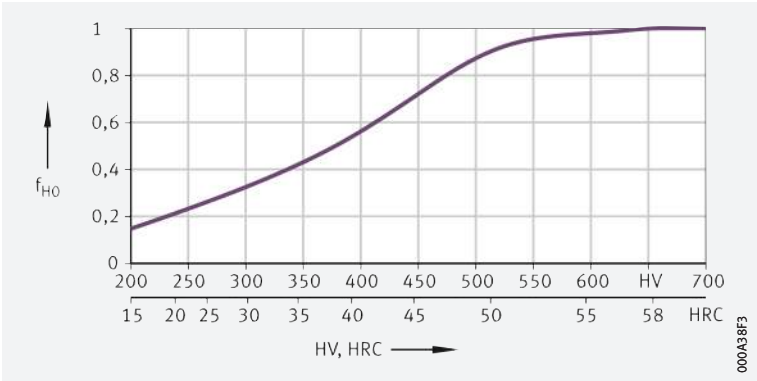
20
Dynamic hardness factor
at reduced hardness
of raceways/rolling elements

f_H = dynamic hardness factor
HV, HRC = surface hardness



21
Static hardness factor
at reduced hardness
of raceways/rolling elements

f_{H0} = static hardness factor
HV, HRC = surface hardness



Approximation value
for case hardening depth

Determining the case hardening depth

An approximation value for determining the minimum hardness depth is given in ▶868| 4. The reference value for the load present is the equivalent stress in accordance with the distortion energy hypothesis (DEH) as a function of the rolling element diameter D_w and the magnitude of the load.

4
Case hardening depth

$$CHD \geq 0,052 \cdot D_w$$

Legend

CHD	mm	Case hardening depth
D_w	mm	Rolling element diameter.



The local hardness must always be above the local requisite hardness, which can be calculated from the equivalent stress.

Determining the surface hardening depth



In these surface hardening methods, the load and contact geometry must be taken into consideration when determining the requisite hardening depth.

For calculation of the surface hardening depth SHD ▶869| 5:

5
Surface hardening depth

$$SHD \geq 140 \cdot D_w / R_{p0,2}$$

Legend

SHD	mm	Surface hardening depth
D_w	mm	Rolling element diameter
$R_{p0,2}$	N/mm ²	Yield point of base material.

1.17

Mounting and dismounting



The mounting and dismounting options for needle roller bearings with ribs, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Aligning needle roller bearings

Mounting using
pressing mandrel

Due to the drawn outer cup, the bearings must be mounted using a special pressing mandrel ▶898. The marked side of the bearing should be in contact with the flange of the mandrel. A toroidal ring on the mandrel holds the bearing securely on the mandrel.

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.



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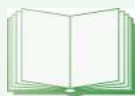
Link to electronic product catalogue



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:

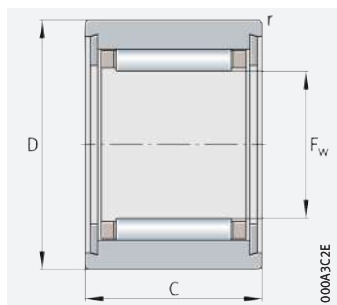
- Determining the bearing size ► 34
- Rigidity ► 54
- Friction and increases in temperature ► 56
- Speeds ► 64
- Bearing data ► 97
- Lubrication ► 70
- Sealing ► 182
- Design of bearing arrangements ► 139
- Mounting and dismounting ► 191.



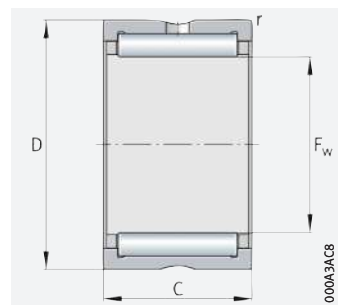
Needle roller bearings with ribs

Without inner ring

Open



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



NK ($F_w \geq 12 \text{ mm}$), RNA49, RNA69

$F_w = 5 - 19 \text{ mm}$

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ g	
5	10	10	2 650	1 920	295	39 000	55 000	3,1	NK5/10-TV-XL ²⁾
	10	12	3 400	2 650	435	39 000	54 000	3,7	NK5/12-TV-XL ²⁾
6	12	10	2 950	2 280	355	36 500	48 500	4,7	NK6/10-TV-XL ²⁾
	12	12	3 800	3 150	520	36 500	47 500	5,7	NK6/12-TV-XL ²⁾
7	14	10	3 250	2 650	410	34 500	43 000	6,9	NK7/10-TV-XL ²⁾
	14	12	4 150	3 600	600	34 500	42 000	8,2	NK7/12-TV-XL ²⁾
8	15	12	4 450	4 100	690	32 500	37 000	8,7	NK8/12-TV-XL ²⁾
	15	16	5 800	5 800	970	32 500	36 500	12	NK8/16-TV-XL ²⁾
9	16	12	5 100	5 000	840	31 000	32 000	10,3	NK9/12-TV-XL ²⁾
	16	16	6 600	7 100	1 190	31 000	32 000	12,8	NK9/16-TV-XL ²⁾
10	17	12	5 300	5 500	930	29 500	29 000	10,1	NK10/12-TV-XL ²⁾
	17	16	7 000	7 800	1 310	29 500	28 500	13,3	NK10/16-TV-XL ²⁾
12	19	12	7 200	7 100	1 280	26 500	22 400	12,1	NK12/12-XL
	19	16	10 100	11 000	1 920	26 500	21 600	15,9	NK12/16-XL
14	22	16	15 400	17 100	2 850	24 600	16 800	21,4	NK14/16-D-XL
	22	16	11 400	11 500	2 100	24 600	18 600	20,7	NK14/16-XL
	22	20	14 500	15 600	2 700	24 600	18 300	25,5	NK14/20-XL
	22	13	9 600	9 200	1 630	24 600	17 800	16,5	RNA4900-XL
15	23	16	12 100	12 700	2 320	23 900	17 300	21,8	NK15/16-XL
	23	20	15 400	17 200	3 000	23 900	17 000	26,6	NK15/20-XL
16	24	16	12 800	13 900	2 550	23 200	16 200	22,4	NK16/16-XL
	24	20	16 300	18 800	3 250	23 200	15 900	28,4	NK16/20-XL
	24	13	10 600	10 900	1 940	23 200	15 300	17,4	RNA4901-XL
	24	22	18 100	21 600	3 800	23 200	14 300	31	RNA6901-XL
17	25	16	13 500	15 000	2 750	22 600	15 300	23,7	NK17/16-XL
	25	20	17 100	20 400	3 550	22 600	15 000	29,8	NK17/20-XL
18	26	16	14 100	16 200	3 000	22 100	14 400	24,9	NK18/16-XL
	26	20	17 900	22 000	3 850	22 100	14 100	31,4	NK18/20-XL
19	27	16	14 700	17 400	3 200	21 600	13 700	26,1	NK19/16-XL
	27	20	18 700	23 600	4 150	21 600	13 400	32,2	NK19/20-XL

medias ➤ <https://www.schaeffler.de/std/1E00>

¹⁾ For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

²⁾ With closing rings, without lubrication hole and groove.



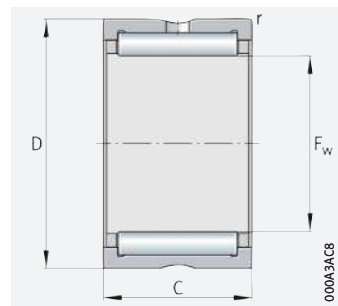
Dimensions		Suitable sealing rings ¹⁾	
F _w	r min.	► 1026	
5	0,15	GR5×10×2	–
	0,15	GR5×10×2	–
6	0,15	GR6×12×2	–
	0,15	GR6×12×2	–
7	0,3	GR7×14×2	–
	0,3	GR7×14×2	–
8	0,3	G8×15×3	SD8×15×3
	0,3	G5×15×3	SD8×15×3
9	0,3	G9×16×3	–
	0,3	G9×16×3	–
10	0,3	G10×17×3	SD10×17×3
	0,3	G10×17×3	SD10×17×3
12	0,3	G12×19×3	SD12×19×3
	0,3	G12×19×3	SD12×19×3
14	0,3	G14×22×3	SD14×22×3
	0,3	G14×22×3	SD14×22×3
	0,3	G14×22×3	SD14×22×3
	0,3	G14×22×3	SD14×22×3
15	0,3	G15×23×3	SD15×23×3
	0,3	G15×23×3	SD15×23×3
16	0,3	G16×24×3	SD16×24×3
	0,3	G16×24×3	SD16×24×3
	0,3	G16×24×3	SD16×24×3
	0,3	G16×24×3	SD16×24×3
17	0,3	G17×25×3	SD17×25×3
	0,3	G17×25×3	SD17×25×3
18	0,3	G18×26×4	SD18×26×4
	0,3	G18×26×4	SD18×26×4
19	0,3	G19×27×4	SD19×27×4
	0,3	G19×27×4	SD19×27×4





Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA49, RNA69

$F_w = 20 - 29 \text{ mm}$

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	$\approx \text{g}$	
20	28	16	18 500	23 900	4 050	21 100	12 100	28,4	NK20/16-D-XL
	28	16	14 600	17 500	3 200	21 100	13 200	27	NK20/16-XL
	28	20	18 600	23 800	4 150	21 100	12 900	33,9	NK20/20-XL
	28	13	12 000	13 600	2 430	21 100	12 000	21,7	RNA4902-XL
	28	23	19 500	25 500	4 450	21 100	11 700	39,7	RNA6902-XL
	32	20	26 000	25 000	4 400	20 000	11 800	48,7	NKS20-XL
21	29	16	15 200	18 700	3 450	20 600	12 600	28,1	NK21/16-XL
	29	20	19 300	25 500	4 450	20 600	12 300	35,2	NK21/20-XL
22	30	16	15 800	19 900	3 650	20 000	12 000	30	NK22/16-XL
	30	20	20 000	27 000	4 700	20 000	11 700	37	NK22/20-XL
	30	13	12 400	14 600	2 600	20 000	10 900	22,2	RNA4903-XL
	30	23	21 100	29 000	5 100	20 000	10 500	42,4	RNA6903-XL
	35	20	27 500	28 000	4 900	18 500	10 900	61,5	NKS22-XL
24	32	16	16 900	22 300	4 100	18 500	11 000	31,9	NK24/16-XL
	32	20	21 400	30 500	5 300	18 500	10 700	40	NK24/20-XL
	37	20	29 500	31 000	5 400	17 200	10 100	65,5	NKS24-XL
25	33	16	16 800	22 400	4 150	17 800	10 700	32,6	NK25/16-XL
	33	20	21 300	30 500	5 300	17 800	10 400	42	NK25/20-XL
	37	17	23 700	25 500	4 600	16 900	9 900	52,3	RNA4904-XL
	37	30	40 500	51 000	9 100	16 900	9 500	100	RNA6904-XL
	38	20	31 000	33 500	5 800	16 600	9 700	68,1	NKS25-XL
26	34	16	17 300	23 600	4 350	17 200	10 300	34	NK26/16-XL
	34	20	22 000	32 000	5 600	17 200	10 100	42	NK26/20-XL
28	37	20	29 000	41 500	7 400	15 800	8 800	58	NK28/20-D-XL
	37	20	24 800	34 000	5 900	15 800	9 300	52,2	NK28/20-XL
	37	30	37 000	57 000	10 500	15 800	9 000	82	NK28/30-XL
	39	17	26 000	29 500	5 300	15 300	8 600	50,2	RNA49/22-XL
	39	30	42 000	55 000	9 900	15 300	8 400	98	RNA69/22-XL
	42	20	32 500	36 500	6 400	15 100	8 900	83,6	NKS28-XL
29	38	20	27 500	39 000	6 900	15 300	8 700	50	NK29/20-TV-XL
	38	30	37 000	57 000	10 600	15 300	8 800	84,3	NK29/30-XL

medias ► <https://www.schaeffler.de/std/1E01>

1) For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.



Dimensions		Suitable sealing rings ¹⁾	
F _w	r min.	► 1026	
20	0,3	G20×28×4	SD20×28×4
	0,3	G20×28×4	SD20×28×4
	0,3	G20×28×4	SD20×28×4
	0,3	G20×28×4	SD20×28×4
	0,3	G20×28×4	SD20×28×4
	0,6	–	–
21	0,3	G21×29×4	–
	0,3	G21×29×4	–
22	0,3	G22×30×4	SD22×30×4
	0,3	G22×30×4	SD22×30×4
	0,3	G22×30×4	SD22×30×4
	0,3	G22×30×4	SD22×30×4
	0,6	–	–
24	0,3	G24×32×4	–
	0,3	G24×32×4	–
	0,6	–	–
25	0,3	G25×33×4	SD25×33×4
	0,3	G25×33×4	SD25×33×4
	0,3	–	–
	0,3	–	–
	0,6	–	–
26	0,3	G26×34×4	SD26×34×4
	0,3	G26×34×4	SD26×34×4
28	0,3	G28×37×4	–
	0,3	G28×37×4	–
	0,3	G28×37×4	–
	0,3	–	–
	0,3	–	–
	0,6	–	–
29	0,3	G29×38×4	–
	0,3	G29×38×4	–

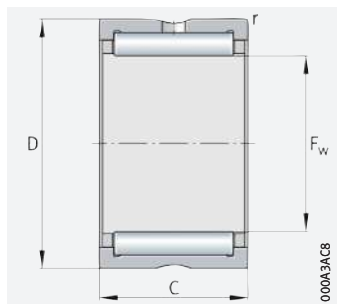




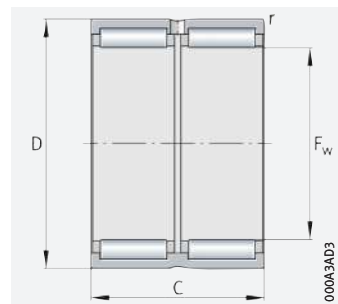
Needle roller bearings with ribs

Without inner ring

Open



NK, NKS, RNA49, RNA69



RNA69..-ZW

$F_w = 30 - 42 \text{ mm}$

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_{gr}	m	
			N	N	N	min^{-1}	min^{-1}	≈ g	
30	40	20	27 500	35 500	7 300	14 800	9 600	61	NK30/20-TW-XL
	40	20	28 000	41 000	7 200	14 800	8 500	61	NK30/20-TV-XL
	40	30	42 000	69 000	12 700	14 800	8 200	92,4	NK30/30-TV-XL
	42	17	26 500	31 500	5 700	14 400	8 100	61	RNA4905-XL
	42	30	44 000	59 000	10 600	14 400	7 900	112	RNA6905-XL
	45	22	36 500	40 000	6 900	14 000	8 500	104	NKS30-XL
32	42	20	29 500	44 500	7 800	14 000	8 000	64	NK32/20-TV-XL
	42	30	39 000	63 000	11 700	14 000	8 200	102	NK32/30-XL
	45	17	27 500	33 500	6 100	13 600	7 600	73,2	RNA49/28-XL
	45	30	45 500	63 000	11 400	13 600	7 400	135	RNA69/28-XL
	47	22	38 000	43 500	7 400	13 200	8 000	110	NKS32-XL
35	45	20	31 000	48 500	8 500	12 900	7 400	69,4	NK35/20-TV-XL
	45	30	46 000	81 000	15 000	12 900	7 100	106	NK35/30-TV-XL
	47	17	28 500	35 500	6 400	12 600	6 900	69,4	RNA4906-XL
	47	30	49 000	71 000	12 800	12 600	6 600	126	RNA6906-XL
	50	22	39 500	47 000	8 000	12 300	7 400	118	NKS35-XL
37	47	20	34 000	56 000	9 900	12 300	6 800	83	NK37/20-D-XL
	47	20	28 000	43 500	7 600	12 300	7 400	77	NK37/20-XL
	47	30	42 000	73 000	13 500	12 300	7 200	113	NK37/30-XL
	52	22	41 500	50 000	8 600	11 700	7 100	123	NKS37-XL
38	48	20	29 000	45 000	7 900	12 000	7 200	79,4	NK38/20-XL
	48	30	43 000	76 000	14 000	12 000	7 000	116	NK38/30-XL
40	50	20	33 500	56 000	9 800	11 400	6 500	78	NK40/20-TV-XL
	50	30	44 000	79 000	14 600	11 400	6 700	125	NK40/30-XL
	52	20	34 500	47 500	8 900	11 100	6 400	89,1	RNA49/32-XL
	52	36	53 000	82 000	15 100	11 100	6 500	162	RNA69/32-ZW-XL
	55	22	42 500	54 000	9 200	10 900	6 600	129	NKS40-XL
42	52	20	30 000	49 000	8 600	10 900	6 600	85,8	NK42/20-XL
	52	30	44 500	82 000	15 200	10 900	6 400	130	NK42/30-XL
	55	20	35 500	50 000	9 400	10 700	6 100	107	RNA4907-XL
	55	36	54 000	86 000	15 900	10 700	6 200	193	RNA6907-ZW-XL

medias ► <https://www.schaeffler.de/std/1E02>

- ¹⁾ For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

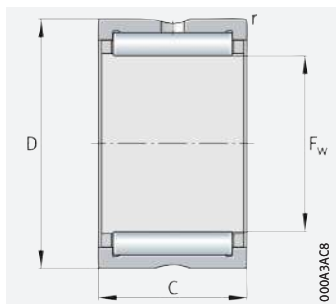


Dimensions		Suitable sealing rings ¹⁾	
F_w	r	► 1026	
	min.		
30	0,3	G30×40×4	SD30×40×4
	0,3	G30×40×4	SD30×40×4
	0,3	G30×40×4	SD30×40×4
	0,3	–	–
	0,3	–	–
	0,6	–	–
32	0,3	G32×42×4	SD32×42×4
	0,3	G32×42×4	SD32×42×4
	0,3	G32×45×4	–
	0,3	G32×45×4	–
	0,6	–	–
35	0,3	G35×45×4	SD35×45×4
	0,3	G35×45×4	SD35×45×4
	0,3	–	–
	0,3	–	–
	0,6	–	–
37	0,3	G37×47×4	SD37×47×4
	0,3	G37×47×4	SD37×47×4
	0,3	G37×47×4	SD37×47×4
	0,6	–	–
38	0,3	G38×48×4	SD38×48×4
	0,3	G38×48×4	SD38×48×4
40	0,3	G40×50×4	SD40×50×4
	0,3	G40×50×4	SD40×50×4
	0,6	G40×52×5	SD40×52×5
	0,6	G40×52×5	SD40×52×5
	0,6	–	–
42	0,3	G42×52×4	SD42×52×4
	0,3	G42×52×4	SD42×52×4
	0,6	–	–
	0,6	–	–

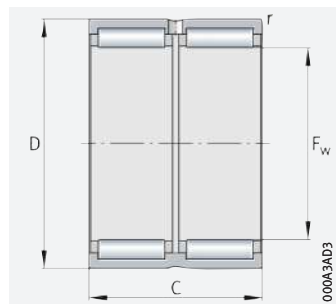


Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA49



RNA69...ZW

F_w = 43 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F _w	D	C	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	n _{gr}	m	➤ 926 1.12 ➤ 927 1.13 x-life ➤ 920
			N	N	N	min ⁻¹	min ⁻¹	≈ g	
43	53	20	30 500	51 000	8 900	10 700	6 500	86	NK43/20-XL
	53	30	45 500	85 000	15 800	10 700	6 300	133	NK43/30-XL
	58	22	44 000	57 000	9 800	10 200	6 200	139	NKS43-XL
45	55	20	35 000	62 000	10 800	10 200	5 900	85,3	NK45/20-TV-XL
	55	30	52 000	103 000	19 100	10 200	5 700	132	NK45/30-TV-XL
	60	22	45 500	60 000	10 400	9 800	6 000	145	NKS45-XL
47	57	20	32 500	56 000	9 900	9 800	6 000	94,5	NK47/20-XL
	57	30	48 500	94 000	17 500	9 800	5 800	142	NK47/30-XL
48	62	22	48 500	67 000	11 500	9 200	5 300	140	RNA4908-XL
	62	40	74 000	116 000	19 400	9 200	5 400	256	RNA6908-ZW-XL
50	62	25	48 500	87 000	14 800	9 200	5 400	146	NK50/25-TV-XL
	62	35	67 000	132 000	23 900	9 200	5 200	207	NK50/35-TV-XL
	65	22	48 000	67 000	11 500	8 900	5 500	157	NKS50-XL
52	68	22	51 000	73 000	12 600	8 600	4 900	182	RNA4909-XL
	68	40	79 000	127 000	21 400	8 600	4 950	338	RNA6909-ZW-XL
55	68	25	57 000	111 000	19 400	8 400	4 700	195	NK55/25-D-XL
	68	25	45 500	82 000	14 000	8 400	5 200	180	NK55/25-XL
	68	35	60 000	118 000	21 300	8 400	5 200	250	NK55/35-XL
	72	22	51 000	74 000	12 700	8 200	5 100	221	NKS55-XL
58	72	22	53 000	80 000	13 800	7 800	4 350	163	RNA4910-XL
	72	40	82 000	139 000	23 400	7 800	4 400	310	RNA6910-ZW-XL
60	72	25	53 000	103 000	17 500	7 700	4 600	170	NK60/25-TV-XL
	72	35	63 000	130 000	23 500	7 700	4 800	258	NK60/35-XL
	80	28	71 000	98 000	17 300	7 400	4 750	335	NKS60-XL
63	80	25	65 000	100 000	17 300	7 200	4 150	255	RNA4911-XL
	80	45	102 000	176 000	30 000	7 200	4 200	470	RNA6911-ZW-XL
65	78	25	50 000	98 000	16 700	7 200	4 500	221	NK65/25-XL
	78	35	66 000	142 000	25 500	7 200	4 450	310	NK65/35-XL
	85	28	75 000	108 000	19 100	6 900	4 400	356	NKS65-XL

medias ➤ <https://www.schaeffler.de/std/1E03>

¹⁾ For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.



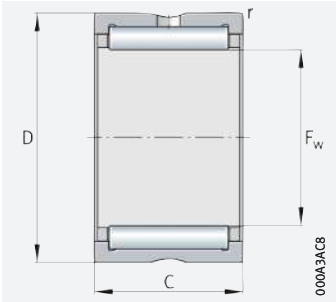
Dimensions		Suitable sealing rings ¹⁾	
F_w	r	► 1026	
	min.		
43	0,3	G43×53×4	–
	0,3	G43×53×4	–
	0,6	–	–
45	0,3	G45×55×4	SD45×55×4
	0,3	G45×55×4	SD45×55×4
	0,6	–	–
47	0,3	–	–
	0,3	–	–
48	0,6	–	–
	0,6	–	–
50	0,6	G50×62×5	SD50×62×5
	0,6	G50×62×5	SD50×62×5
	1	–	–
52	0,6	–	–
	0,6	–	–
55	0,6	–	–
	0,6	–	–
	0,6	–	–
	1	–	–
58	0,6	–	–
	0,6	–	–
60	0,6	–	–
	0,6	–	–
	1,1	–	–
63	1	–	–
	1	–	–
65	0,6	–	–
	0,6	–	–
	1,1	–	–



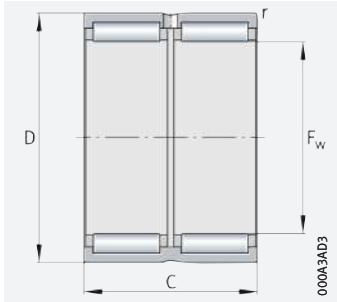


Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA48, RNA49



RNA69..-ZW

F_w = 68 – 240 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions
F _w	D	C	dyn. C _r N	stat. C _{0r} N	C _{ur} N	n _G min ⁻¹	n _{gr} min ⁻¹	m ≈ g	➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920	r min.
68	82	25	49 500	89 000	15 200	6 800	4 500	241	NK68/25-XL	0,6
	82	35	70 000	139 000	25 500	6 800	4 350	338	NK68/35-XL	0,6
	85	25	68 000	108 000	18 800	6 700	3 850	275	RNA4912-XL	1
	85	45	106 000	191 000	32 500	6 700	3 850	488	RNA6912-ZW-XL	1
70	85	25	50 000	92 000	15 700	6 600	4 450	260	NK70/25-XL	0,6
	85	35	71 000	144 000	26 500	6 600	4 300	370	NK70/35-XL	0,6
	90	28	77 000	113 000	20 000	6 400	4 200	380	NKS70-XL	1,1
72	90	25	69 000	112 000	19 500	6 300	3 650	312	RNA4913-XL	1
	90	45	108 000	198 000	33 500	6 300	3 650	580	RNA6913-ZW-XL	1
73	90	25	60 000	100 000	17 500	6 300	4 150	302	NK73/25-XL	1
	90	35	85 000	156 000	27 000	6 300	4 050	428	NK73/35-XL	1
75	92	25	61 000	104 000	18 200	6 100	4 050	315	NK75/25-XL	1
	92	35	87 000	162 000	28 000	6 100	3 950	445	NK75/35-XL	1
	95	28	81 000	123 000	21 900	6 000	3 950	402	NKS75-XL	1,1
80	95	25	63 000	119 000	19 700	5 800	3 750	301	NK80/25-XL	1
	95	35	89 000	184 000	32 500	5 800	3 650	425	NK80/35-XL	1
	100	30	95 000	156 000	27 500	5 700	3 400	460	RNA4914-XL	1
	100	54	145 000	265 000	47 500	5 700	3 450	857	RNA6914-ZW-XL	1
85	105	25	78 000	123 000	21 700	5 400	3 550	425	NK85/25-XL	1
	105	35	111 000	193 000	34 500	5 400	3 450	600	NK85/35-XL	1
	105	30	97 000	162 000	28 500	5 400	3 200	489	RNA4915-XL	1
	105	54	147 000	275 000	49 500	5 400	3 250	935	RNA6915-ZW-XL	1
90	110	25	81 000	132 000	23 300	5 100	3 400	450	NK90/25-XL	1
	110	35	116 000	208 000	37 000	5 100	3 250	630	NK90/35-XL	1
	110	30	101 000	174 000	30 500	5 100	3 000	516	RNA4916-XL	1
	110	54	153 000	300 000	53 000	5 100	3 050	987	RNA6916-ZW-XL	1
95	115	26	83 000	137 000	24 000	4 850	3 300	490	NK95/26-XL	1
	115	36	121 000	223 000	39 500	4 850	3 150	680	NK95/36-XL	1

medias ➤ <https://www.schaeffler.de/std/1E04>



Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions
F _w	D	C	dyn. C _r N	stat. C _{0r} N	C _{ur} N	n _G min ⁻¹	n _{gr} min ⁻¹	m ≈ g	▶ 926 1.12 ▶ 927 1.13 X-life ▶ 920	r min.
100	120	26	86 000	146 000	25 000	4 600	3 150	515	NK100/26-XL	1
	120	36	125 000	237 000	41 500	4 600	3 000	715	NK100/36-XL	1
	120	35	125 000	237 000	41 500	4 600	2 800	657	RNA4917-XL	1,1
	120	63	188 000	400 000	71 000	4 600	2 850	1 200	RNA6917-ZW-XL	1,1
105	125	26	89 000	155 000	26 500	4 400	3 050	540	NK105/26-XL	1
	125	36	129 000	250 000	43 500	4 400	2 850	713	NK105/36-XL	1
	125	35	129 000	250 000	43 500	4 400	2 650	745	RNA4918-XL	1,1
	125	63	195 000	425 000	74 000	4 400	2 700	1 330	RNA6918-ZW-XL	1,1
110	130	30	111 000	210 000	35 500	4 200	2 800	650	NK110/30-XL	1,1
	130	40	143 000	290 000	50 000	4 200	2 750	830	NK110/40-XL	1,1
	130	35	131 000	260 000	44 500	4 200	2 500	719	RNA4919-XL	1,1
	130	63	197 000	440 000	76 000	4 200	2 550	1 460	RNA6919-ZW-XL	1,1
115	140	40	144 000	270 000	45 500	4 000	2 650	1 150	RNA4920-XL	1,1
120	140	30	106 000	216 000	36 000	3 900	2 340	670	RNA4822-XL	1
125	150	40	149 000	290 000	47 500	3 700	2 430	1 240	RNA4922-XL	1,1
130	150	30	112 000	239 000	39 000	3 600	2 120	730	RNA4824-XL	1
135	165	45	205 000	390 000	64 000	3 400	2 250	1 860	RNA4924-XL	1,1
145	165	35	134 000	310 000	48 500	3 250	2 000	990	RNA4826-XL	1,1
150	180	50	229 000	470 000	74 000	3 100	2 080	2 210	RNA4926-XL	1,5
155	175	35	136 000	325 000	50 000	3 050	1 870	1 050	RNA4828-XL	1,1
160	190	50	237 000	500 000	78 000	2 900	1 910	2 350	RNA4928-XL	1,5
165	190	40	172 000	400 000	62 000	2 850	1 830	1 600	RNA4830-XL	1,1
175	200	40	181 000	435 000	66 000	2 700	1 700	1 700	RNA4832-XL	1,1
185	215	45	209 000	510 000	75 000	2 550	1 640	2 540	RNA4834-XL	1,1
195	225	45	219 000	550 000	80 000	2 420	1 510	2 680	RNA4836-XL	1,1
210	240	50	255 000	690 000	100 000	2 250	1 360	3 210	RNA4838-XL	1,5
220	250	50	260 000	720 000	102 000	2 150	1 280	3 350	RNA4840-XL	1,5
240	270	50	275 000	790 000	110 000	1 980	1 130	3 620	RNA4844-XL	1,5

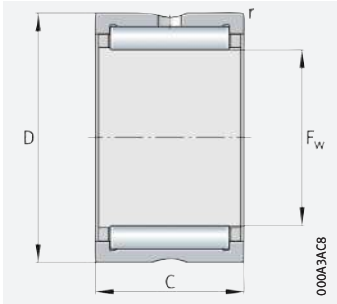
medias ▶ <https://www.schaeffler.de/std/1E05>





Needle roller bearings with ribs

Without inner ring
Open



RNA48

F_w = 265 – 415 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimen- sions
F _w	D	C	dyn. C _r N	stat. C _{0r} N	C _{ur} N	n _G min ⁻¹	n _{dr} min ⁻¹	m ≈ g	➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920	r min.
265	300	60	400 000	1 080 000	150 000	1 780	980	5 400	RNA4848-XL	2
285	320	60	415 000	1 160 000	158 000	1 660	890	5 800	RNA4852-XL	2
305	350	69	510 000	1 300 000	175 000	1 540	850	9 300	RNA4856-XL	2
330	380	80	700 000	1 770 000	235 000	1 420	740	12 700	RNA4860-XL	2,1
350	400	80	710 000	1 850 000	242 000	1 340	680	13 400	RNA4864-XL	2,1
370	420	80	730 000	1 940 000	249 000	1 270	640	14 000	RNA4868-XL	2,1
390	440	80	740 000	2 020 000	255 000	1 210	600	14 800	RNA4872-XL	2,1
415	480	100	1 130 000	2 900 000	370 000	1 130	520	26 000	RNA4876-XL	2,1

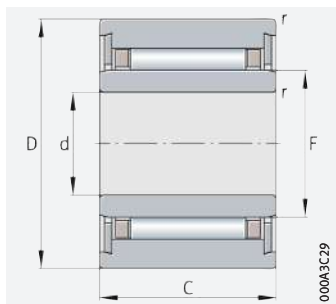
medias ➤ <https://www.schaeffler.de/std/1E06>



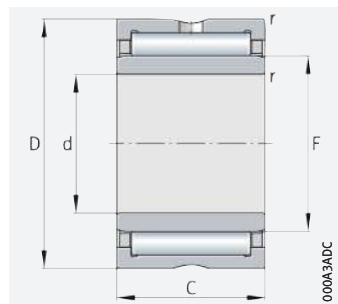


Needle roller bearings with ribs

With inner ring
Open



NKI ($d \leq 7 \text{ mm}$)



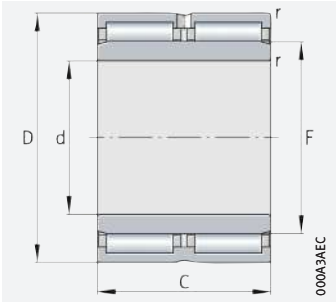
NKI ($d \geq 9 \text{ mm}$), NKIS, NA49, NA69 ($d \leq 30 \text{ mm}$)

d = 5 – 35 mm

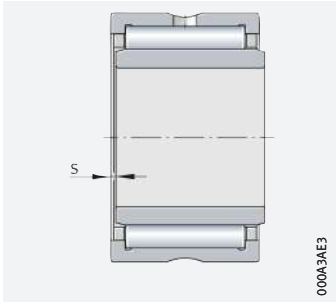
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\theta r}$	m		F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
5	15	12	4 450	4 100	690	32 500	32 500	11,5	NKI5/12-TV-XL ¹⁾	8	0,3	1,5
	15	16	5 800	5 800	970	32 500	32 000	15,3	NKI5/16-TV-XL ¹⁾	8	0,3	2
6	16	12	5 100	5 000	840	31 000	28 500	13,5	NKI6/12-TV-XL ¹⁾	9	0,3	1,5
	16	16	6 600	7 100	1 190	31 000	28 000	17,4	NKI6/16-TV-XL ¹⁾	9	0,3	2
7	17	12	5 300	5 500	930	29 500	26 000	13,7	NKI7/12-TV-XL ¹⁾	10	0,3	1,5
	17	16	7 000	7 800	1 310	29 500	25 500	18,2	NKI7/16-TV-XL ¹⁾	10	0,3	2
9	19	12	7 200	7 100	1 280	26 500	20 200	16,6	NKI9/12-XL	12	0,3	1,5
	19	16	10 100	11 000	1 920	26 500	19 500	21,9	NKI9/16-XL	12	0,3	2
10	22	16	11 400	11 500	2 100	24 600	16 400	29,4	NKI10/16-XL	14	0,3	0,5
	22	20	14 500	15 600	2 700	24 600	16 100	37,1	NKI10/20-XL	14	0,3	0,5
	22	13	9 600	9 200	1 630	24 600	16 400	23	NA4900-XL	14	0,3	0,5
12	24	16	12 800	13 900	2 550	23 200	14 500	33,3	NKI12/16-XL	16	0,3	0,5
	24	20	16 300	18 800	3 250	23 200	14 200	41,9	NKI12/20-XL	16	0,3	0,5
	24	13	10 600	10 900	1 940	23 200	14 200	26	NA4901-XL	16	0,3	0,5
	24	22	18 100	21 600	3 800	23 200	13 300	46	NA6901-XL	16	0,3	1
15	27	16	14 700	17 400	3 200	21 600	12 400	38,8	NKI15/16-XL	19	0,3	0,5
	27	20	18 700	23 600	4 150	21 600	12 100	48,7	NKI15/20-XL	19	0,3	0,5
	28	13	12 000	13 600	2 430	21 100	11 200	34	NA4902-XL	20	0,3	0,5
	28	23	19 500	25 500	4 450	21 100	10 900	63,6	NA6902-XL	20	0,3	1
	35	20	27 500	28 000	4 900	18 500	9 400	92	NKIS15-XL	22	0,6	0,5
17	29	16	15 200	18 700	3 450	20 600	11 400	42,4	NKI17/16-XL	21	0,3	0,5
	29	20	19 300	25 500	4 450	20 600	11 200	53,4	NKI17/20-XL	21	0,3	0,5
	30	13	12 400	14 600	2 600	20 000	10 200	37	NA4903-XL	22	0,3	0,5
	30	23	21 100	29 000	5 100	20 000	9 800	72	NA6903-XL	22	0,3	1
	37	20	29 500	31 000	5 400	17 200	8 800	98	NKIS17-XL	24	0,6	0,5
20	32	16	16 900	22 300	4 100	18 500	10 100	49	NKI20/16-XL	24	0,3	0,5
	32	20	21 400	30 500	5 300	18 500	9 900	61	NKI20/20-XL	24	0,3	0,5
	37	17	23 700	25 500	4 600	16 900	9 400	75,2	NA4904-XL	25	0,3	0,8
	37	30	40 500	51 000	9 100	16 900	8 900	141	NA6904-XL	25	0,3	1
	42	20	32 500	36 500	6 400	15 100	7 700	129	NKIS20-XL	28	0,6	0,5

medias ➤ <https://www.schaeffler.de/std/1E07>

¹⁾ With closing rings, without lubrication hole and groove.



NA69...ZW



Axial displacement "s"

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920	Dimensions		
d	D	B	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	n _{∅r}	m		F	r	s
			N	N	N	min ⁻¹	min ⁻¹	≈ g			min.	
22	34	16	17 300	23 600	4 350	17 200	9 500	52	NKI22/16-XL	26	0,3	0,5
	34	20	22 000	32 000	5 600	17 200	9 300	65,4	NKI22/20-XL	26	0,3	0,5
	39	17	26 000	29 500	5 300	15 300	8 100	80	NA49/22-XL	28	0,3	0,8
	39	30	42 000	55 000	9 900	15 300	7 900	150	NA69/22-XL	28	0,3	0,5
25	38	20	27 500	39 000	6 900	15 300	8 100	75,8	NKI25/20-TV-XL	29	0,3	1
	38	30	37 000	57 000	10 600	15 300	8 200	124	NKI25/30-XL	29	0,3	1,5
	42	17	26 500	31 500	5 700	14 400	7 700	88	NA4905-XL	30	0,3	0,8
	42	30	44 000	59 000	10 600	14 400	7 500	161	NA6905-XL	30	0,3	1
	47	22	38 000	43 500	7 400	13 200	7 100	162	NKIS25-XL	32	0,6	1
28	42	20	29 500	44 500	7 800	14 000	7 500	92,4	NKI28/20-TV-XL	32	0,3	1
	42	30	39 000	63 000	11 700	14 000	7 600	146	NKI28/30-XL	32	0,3	1,5
	45	17	27 500	33 500	6 100	13 600	7 400	97,7	NA49/28-XL	32	0,3	0,8
	45	30	45 500	63 000	11 400	13 600	7 100	182	NA69/28-XL	32	0,3	1
30	45	20	31 000	48 500	8 500	12 900	6 800	108	NKI30/20-TV-XL	35	0,3	0,5
	45	30	46 000	81 000	15 000	12 900	6 600	165	NKI30/30-TV-XL	35	0,3	1
	47	17	28 500	35 500	6 400	12 600	6 600	101	NA4906-XL	35	0,3	0,8
	47	30	49 000	71 000	12 800	12 600	6 300	192	NA6906-XL	35	0,3	1
	52	22	41 500	50 000	8 600	11 700	6 400	184	NKIS30-XL	37	0,6	1
32	47	20	28 000	43 500	7 600	12 300	6 900	118	NKI32/20-XL	37	0,3	0,5
	47	30	42 000	73 000	13 500	12 300	6 600	180	NKI32/30-XL	37	0,3	1
	52	20	34 500	47 500	8 900	11 100	6 000	158	NA49/32-XL	40	0,6	0,8
	52	36	53 000	82 000	15 100	11 100	6 100	288	NA69/32-ZW-XL	40	0,6	0,5
35	50	20	32 500	48 500	9 900	11 400	6 900	122	NKI35/20-TW-XL	40	0,3	0,5
	50	20	33 500	56 000	9 800	11 400	6 100	122	NKI35/20-TV-XL	40	0,3	0,5
	50	30	44 000	79 000	14 600	11 400	6 200	193	NKI35/30-XL	40	0,3	1
	55	20	35 500	50 000	9 400	10 700	5 800	170	NA4907-XL	42	0,6	0,8
	55	36	54 000	86 000	15 900	10 700	5 900	310	NA6907-ZW-XL	42	0,6	0,5
	58	22	44 000	57 000	9 800	10 200	5 600	220	NKIS35-XL	43	0,6	0,5

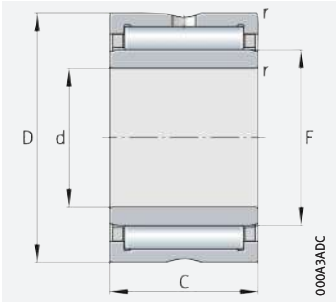
medias ➤ <https://www.schaeffler.de/std/1E08>



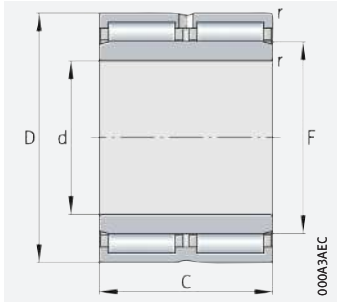


Needle roller bearings with ribs

With inner ring
Open



NKI, NKIS, NA49

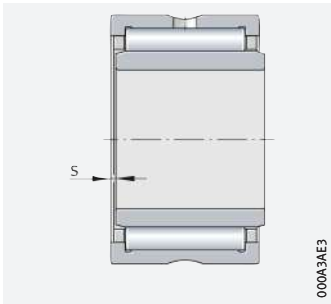


NA69...-ZW

d = 38 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C _r N	stat. C _{0r} N	C _{ur} N	n _G min ⁻¹	n _{thr} min ⁻¹	m ≈ g	➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920	F	r	s
											min.	
38	53	20	30 500	51 000	8 900	10 700	6 000	136	NKI38/20-XL	43	0,3	0,5
	53	30	45 500	85 000	15 800	10 700	5 900	207	NKI38/30-XL	43	0,3	1
40	55	20	35 000	62 000	10 800	10 200	5 600	136	NKI40/20-TV-XL	45	0,3	0,5
	55	30	54 000	97 000	18 200	10 200	5 900	216	NKI40/30-TW-XL	45	0,3	1
	55	30	52 000	103 000	19 100	10 200	5 400	216	NKI40/30-TV-XL	45	0,3	1
	62	22	48 500	67 000	11 500	9 200	5 000	230	NA4908-XL	48	0,6	1
	62	40	74 000	116 000	19 400	9 200	5 100	430	NA6908-ZW-XL	48	0,6	0,5
	65	22	48 000	67 000	11 500	8 900	4 850	281	NKIS40-XL	50	1	0,5
42	57	20	32 500	56 000	9 900	9 800	5 600	148	NKI42/20-XL	47	0,3	0,5
	57	30	48 500	94 000	17 500	9 800	5 400	222	NKI42/30-XL	47	0,3	1
45	62	25	48 500	87 000	14 800	9 200	5 100	217	NKI45/25-TV-XL	50	0,6	1,5
	62	35	67 000	132 000	23 900	9 200	4 950	308	NKI45/35-TV-XL	50	0,6	2
	68	22	51 000	73 000	12 600	8 600	4 700	271	NA4909-XL	52	0,6	1
	68	40	79 000	127 000	21 400	8 600	4 750	495	NA6909-ZW-XL	52	0,6	0,5
	72	22	51 000	74 000	12 700	8 200	4 600	336	NKIS45-XL	55	1	0,5
50	68	25	45 500	82 000	14 000	8 400	4 950	270	NKI50/25-XL	55	0,6	1,5
	68	35	60 000	118 000	21 300	8 400	4 900	379	NKI50/35-XL	55	0,6	2
	72	22	53 000	80 000	13 800	7 800	4 150	274	NA4910-XL	58	0,6	1
	72	40	82 000	139 000	23 400	7 800	4 200	515	NA6910-ZW-XL	58	0,6	0,5
	80	28	71 000	98 000	17 300	7 400	4 250	518	NKIS50-XL	60	1,1	2
55	72	25	52 000	92 000	17 000	7 700	4 900	255	NKI55/25-TW-XL	60	0,6	1,5
	72	25	53 000	103 000	17 500	7 700	4 400	255	NKI55/25-TV-XL	60	0,6	1,5
	72	35	63 000	130 000	23 500	7 700	4 550	379	NKI55/35-XL	60	0,6	2
	80	25	65 000	100 000	17 300	7 200	4 000	393	NA4911-XL	63	1	1,5
	80	45	102 000	176 000	30 000	7 200	4 000	780	NA6911-ZW-XL	63	1	1,5
	85	28	75 000	108 000	19 100	6 900	4 000	558	NKIS55-XL	65	1,1	2
60	82	25	49 500	89 000	15 200	6 800	4 200	394	NKI60/25-XL	68	0,6	1
	82	35	70 000	139 000	25 500	6 800	4 050	553	NKI60/35-XL	68	0,6	1
	85	25	68 000	108 000	18 800	6 700	3 700	426	NA4912-XL	68	1	1,5
	85	45	106 000	191 000	32 500	6 700	3 700	808	NA6912-ZW-XL	68	1	1,5
	90	28	77 000	113 000	20 000	6 400	3 800	560	NKIS60-XL	70	1,1	2

medias ➤ <https://www.schaeffler.de/std/1E09>



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Axial displacement "s"

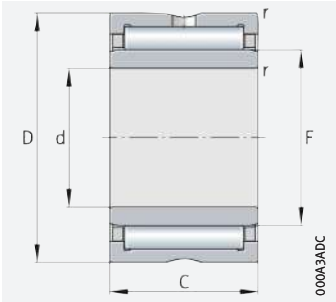
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_{gr} min^{-1}	m $\approx$ g		F	r	s
65	90	25	60 000	100 000	17 500	6 300	3 900	467	NKI65/25-XL	73	1	1
	90	35	85 000	156 000	27 000	6 300	3 750	659	NKI65/35-XL	73	1	1
	90	25	69 000	112 000	19 500	6 300	3 500	456	NA4913-XL	72	1	1,5
	90	45	108 000	198 000	33 500	6 300	3 550	833	NA6913-ZW-XL	72	1	1,5
	95	28	81 000	123 000	21 900	6 000	3 600	641	NKI565-XL	75	1,1	2
70	95	25	63 000	119 000	19 700	5 800	3 500	521	NKI70/25-XL	80	1	0,8
	95	35	89 000	184 000	32 500	5 800	3 350	737	NKI70/35-XL	80	1	0,8
	100	30	95 000	156 000	27 500	5 700	3 250	728	NA4914-XL	80	1	1,5
	100	54	145 000	265 000	47 500	5 700	3 300	1 340	NA6914-ZW-XL	80	1	1
75	105	25	78 000	123 000	21 700	5 400	3 300	641	NKI75/25-XL	85	1	1
	105	35	111 000	193 000	34 500	5 400	3 200	908	NKI75/35-XL	85	1	1
	105	30	97 000	162 000	28 500	5 400	3 100	775	NA4915-XL	85	1	1,5
	105	54	147 000	275 000	49 500	5 400	3 150	1 450	NA6915-ZW-XL	85	1	1
80	110	25	81 000	132 000	23 300	5 100	3 150	677	NKI80/25-XL	90	1	1
	110	35	116 000	208 000	37 000	5 100	3 050	959	NKI80/35-XL	90	1	1
	110	30	101 000	174 000	30 500	5 100	2 900	878	NA4916-XL	90	1	1,5
	110	54	153 000	300 000	53 000	5 100	2 900	1 522	NA6916-ZW-XL	90	1	1
85	115	26	83 000	137 000	24 000	4 850	3 100	743	NKI85/26-XL	95	1	1,5
	115	36	121 000	223 000	39 500	4 850	2 950	1 040	NKI85/36-XL	95	1	1,5
	120	35	125 000	237 000	41 500	4 600	2 650	1 250	NA4917-XL	100	1,1	1
	120	63	188 000	400 000	71 000	4 600	2 700	2 200	NA6917-ZW-XL	100	1,1	1
90	120	26	86 000	146 000	25 000	4 600	2 950	778	NKI90/26-XL	100	1	1,5
	120	36	125 000	237 000	41 500	4 600	2 800	1 090	NKI90/36-XL	100	1	1,5
	125	35	129 000	250 000	43 500	4 400	2 500	1 312	NA4918-XL	105	1,1	1
	125	63	195 000	425 000	74 000	4 400	2 550	2 310	NA6918-ZW-XL	105	1,1	1
95	125	26	89 000	155 000	26 500	4 400	2 850	816	NKI95/26-XL	105	1	1,5
	125	36	129 000	250 000	43 500	4 400	2 700	1 145	NKI95/36-XL	105	1	1,5
	130	35	131 000	260 000	44 500	4 200	2 400	1 371	NA4919-XL	110	1,1	1
	130	63	197 000	440 000	76 000	4 200	2 440	2 500	NA6919-ZW-XL	110	1,1	1

medias ► <https://www.schaeffler.de/std/1E0A>

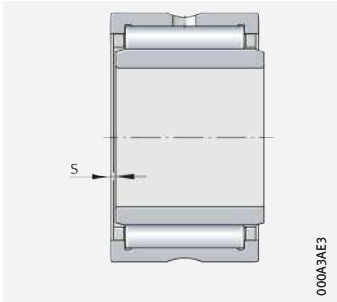


Needle roller bearings with ribs

With inner ring
Open



NKI, NA49, NA48



Axial displacement "s"

d = 100 – 380 mm

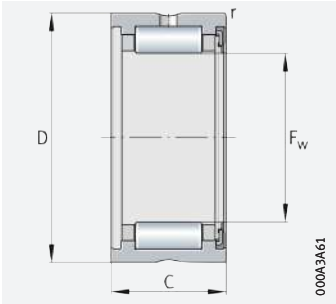
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C _r N	stat. C _{0r} N	C _{ur} N	n _G min ⁻¹	n _{gr} min ⁻¹	m ≈ g	► 926 1.12 ► 927 1.13 X-life ► 920	F	r	s
										min.		
100	130	30	111 000	210 000	35 500	4 200	2 650	990	NKI100/30-XL	110	1,1	1,5
	130	40	143 000	290 000	50 000	4 200	2 600	1 330	NKI100/40-XL	110	1,1	2
	140	40	144 000	270 000	45 500	4 000	2 550	1 900	NA4920-XL	115	1,1	2
110	150	40	149 000	290 000	47 500	3 700	2 330	2 070	NA4922-XL	125	1,1	2
	140	30	106 000	216 000	36 000	3 900	2 270	1 080	NA4822-XL	120	1	0,8
120	165	45	205 000	390 000	64 000	3 400	2 160	2 860	NA4924-XL	135	1,1	2
	150	30	112 000	239 000	39 000	3 600	2 070	1 170	NA4824-XL	130	1	0,8
130	180	50	229 000	470 000	74 000	3 100	2 000	3 900	NA4926-XL	150	1,5	1,5
	165	35	134 000	310 000	48 500	3 250	1 930	1 810	NA4826-XL	145	1,1	1
140	190	50	237 000	500 000	78 000	2 900	1 860	4 150	NA4928-XL	160	1,5	1,5
	175	35	136 000	325 000	50 000	3 050	1 810	1 920	NA4828-XL	155	1,1	1
150	190	40	172 000	400 000	62 000	2 850	1 780	2 720	NA4830-XL	165	1,1	1,5
160	200	40	181 000	435 000	66 000	2 700	1 650	2 890	NA4832-XL	175	1,1	1,5
170	215	45	209 000	510 000	75 000	2 550	1 610	3 960	NA4834-XL	185	1,1	1,5
180	225	45	219 000	550 000	80 000	2 420	1 490	4 200	NA4836-XL	195	1,1	1,5
190	240	50	255 000	690 000	100 000	2 250	1 330	5 610	NA4838-XL	210	1,5	1,5
200	250	50	260 000	720 000	102 000	2 150	1 250	5 840	NA4840-XL	220	1,5	1,5
220	270	50	275 000	790 000	110 000	1 980	1 110	6 380	NA4844-XL	240	1,5	1,5
240	300	60	400 000	1 080 000	150 000	1 780	960	10 000	NA4848-XL	265	2	2
260	320	60	415 000	1 160 000	158 000	1 660	870	10 600	NA4852-XL	285	2	2
280	350	69	510 000	1 300 000	175 000	1 540	840	15 300	NA4856-XL	305	2	2,5
300	380	80	700 000	1 770 000	235 000	1 420	720	21 800	NA4860-XL	330	2,1	2
320	400	80	710 000	1 850 000	242 000	1 340	670	23 000	NA4864-XL	350	2,1	2
340	420	80	730 000	1 940 000	249 000	1 270	620	24 200	NA4868-XL	370	2,1	2
360	440	80	740 000	2 020 000	255 000	1 210	590	25 600	NA4872-XL	390	2,1	2
380	480	100	1 130 000	2 900 000	370 000	1 130	510	42 600	NA4876-XL	415	2,1	2

medias ► <https://www.schaeffler.de/std/1E0B>

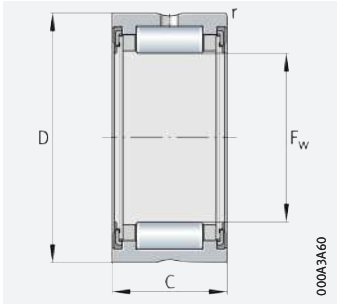




Needle roller bearings with ribs
Without inner ring
Sealed



Sealed on one side (-RSR)



Sealed on both sides (-2RSR)

$F_w = 14 - 58\text{ mm}$

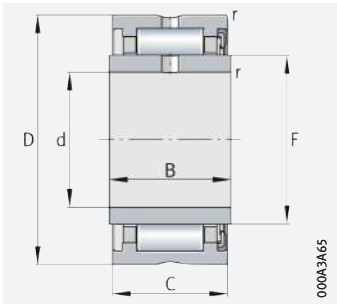
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation		Dimensions
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	m	➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920		r
			N	N	N	min^{-1}	≈ g			min.
14	22	13	7 700	6 900	1 360	14 800	16	RNA4900-RSR-XL	RNA4900-2RSR-XL	0,3
16	24	13	8 600	8 300	1 630	13 900	18	RNA4901-RSR-XL	RNA4901-2RSR-XL	0,3
20	28	13	9 700	10 300	2 040	12 600	21,5	RNA4902-RSR-XL	RNA4902-2RSR-XL	0,3
22	30	13	10 000	11 000	2 180	12 000	23	RNA4903-RSR-XL	RNA4903-2RSR-XL	0,3
25	37	17	19 500	19 900	3 750	10 100	56	RNA4904-RSR-XL	RNA4904-2RSR-XL	0,3
30	42	17	21 800	24 200	4 550	8 600	60	RNA4905-RSR-XL	RNA4905-2RSR-XL	0,3
35	47	17	23 900	28 500	5 400	7 500	69	RNA4906-RSR-XL	RNA4906-2RSR-XL	0,3
42	55	20	29 500	39 500	7 200	6 400	107	RNA4907-RSR-XL	RNA4907-2RSR-XL	0,6
48	62	22	41 000	53 000	8 800	5 500	154	RNA4908-RSR-XL	RNA4908-2RSR-XL	0,6
52	68	22	43 000	59 000	9 700	5 200	157	RNA4909-RSR-XL	RNA4909-2RSR-XL	0,6
58	72	22	45 000	64 000	10 600	4 650	160	RNA4910-RSR-XL	RNA4910-2RSR-XL	0,6

medias ➤ <https://www.schaeffler.de/std/1EOC>

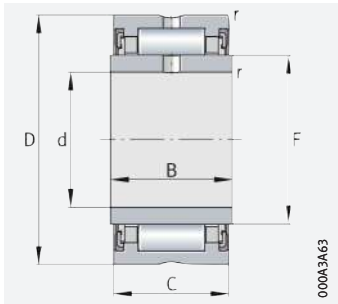


Needle roller bearings
with ribs

With inner ring
Sealed



Sealed on one side (-RSR)



Sealed on both sides (-2RSR)

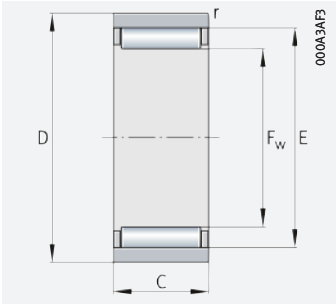
d = 10 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation		Dimensions		
d	D	B	dyn. C _r	stat. C _{0r}	C _{ur}	n _G grease	m	► 926 1.12 ► 927 1.13 X-life ► 920		F	C	r
			N	N	N	min ⁻¹	≈ g					min.
10	22	14	7 700	6 900	1 360	14 800	24,5	NA4900-RSR-XL	NA4900-2RSR-XL	14	13	0,3
12	24	14	8 600	8 300	1 630	13 900	27,5	NA4901-RSR-XL	NA4901-2RSR-XL	16	13	0,3
15	28	14	9 700	10 300	2 040	12 600	37	NA4902-RSR-XL	NA4902-2RSR-XL	20	13	0,3
17	30	14	10 000	11 000	2 180	12 000	40	NA4903-RSR-XL	NA4903-2RSR-XL	22	13	0,3
20	37	18	19 500	19 900	3 750	10 100	80	NA4904-RSR-XL	NA4904-2RSR-XL	25	17	0,3
25	42	18	21 800	24 200	4 550	8 600	89,5	NA4905-RSR-XL	NA4905-2RSR-XL	30	17	0,3
30	47	18	23 900	28 500	5 400	7 500	104	NA4906-RSR-XL	NA4906-2RSR-XL	35	17	0,3
35	55	21	29 500	39 500	7 200	6 400	175	NA4907-RSR-XL	NA4907-2RSR-XL	42	20	0,6
40	62	23	41 000	53 000	8 800	5 500	252	NA4908-RSR-XL	NA4908-2RSR-XL	48	22	0,6
45	68	23	43 000	59 000	9 700	5 200	290	NA4909-RSR-XL	NA4909-2RSR-XL	52	22	0,6
50	72	23	45 000	64 000	10 600	4 650	295	NA4910-RSR-XL	NA4910-2RSR-XL	58	22	0,6

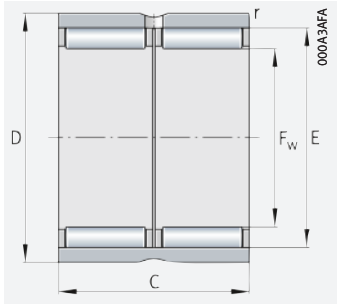
medias ► <https://www.schaeffler.de/std/1E0D>



Needle roller bearings
without ribs
Without inner ring
Open



RNAO

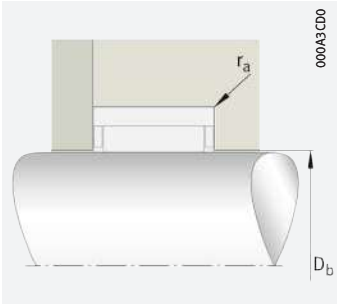


RNAO..-ZW-ASR1

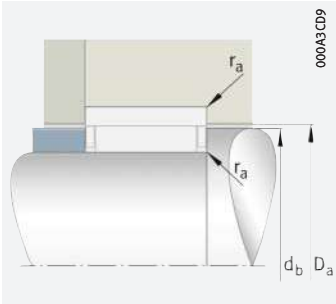
F_w = 5 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F _w	D	C	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	n _{gr}	m	
			N	N	N	min ⁻¹	min ⁻¹	≈ g	
5	10	8	2 650	1 920	295	39 000	53 000	3	RNA05×10×8-TV-XL
6	13	8	2 950	2 280	355	36 500	48 500	6	RNA06×13×8-TV-XL
7	14	8	3 250	2 650	410	34 500	41 500	6	RNA07×14×8-TV-XL
8	15	10	4 450	4 100	690	32 500	35 500	8	RNA08×15×10-TV-XL
10	17	10	5 300	5 500	930	29 500	28 000	10	RNA010×17×10-TV-XL
12	22	12	11 300	9 900	1 740	26 000	19 700	19	RNA012×22×12-TV-XL
15	23	13	9 700	10 900	1 760	24 300	17 900	20	RNA015×23×13-XL
16	24	13	10 100	11 800	1 890	23 600	16 800	21	RNA016×24×13-XL
	28	12	13 000	12 500	2 210	22 900	15 900	32	RNA016×28×12-XL
17	25	13	11 700	14 600	2 240	22 900	15 200	22	RNA017×25×13-XL
18	30	24	24 800	30 000	5 300	21 800	14 000	69	RNA018×30×24-ZW-ASR1-XL
20	28	13	11 100	14 300	2 310	21 300	13 700	25	RNA020×28×13-XL
	28	26	19 000	28 500	4 600	21 300	13 700	50	RNA020×28×26-ZW-ASR1-XL
	32	12	15 100	16 200	2 850	20 900	12 700	38	RNA020×32×12-XL
22	30	13	11 800	15 900	2 550	20 400	12 400	27	RNA022×30×13-XL
	35	16	22 600	25 500	4 200	19 200	11 200	59	RNA022×35×16-XL
25	35	17	16 800	26 000	4 250	18 100	11 000	53	RNA025×35×17-XL
	35	26	21 900	37 000	5 900	18 100	11 200	76	RNA025×35×26-ZW-ASR1-XL
	37	16	23 500	27 500	4 550	17 200	10 000	60	RNA025×37×16-XL
30	40	17	22 100	34 000	5 300	15 100	8 800	60	RNA030×40×17-XL
	42	16	26 000	33 500	5 500	14 600	8 500	59	RNA030×42×16-XL
	42	32	45 000	67 000	11 000	14 600	8 500	137	RNA030×42×32-ZW-ASR1-XL
35	45	13	18 300	28 000	4 450	13 100	7 800	53	RNA035×45×13-XL
	45	17	23 500	38 500	6 100	13 100	7 700	69	RNA035×45×17-XL
	45	26	31 500	56 000	8 900	13 100	7 800	91	RNA035×45×26-ZW-ASR1-XL
	47	16	27 500	37 500	6 200	12 700	7 500	78	RNA035×47×16-XL
	47	18	31 000	43 000	7 400	12 700	7 400	89	RNA035×47×18-XL
	47	32	47 500	75 000	12 400	12 700	7 500	156	RNA035×47×32-ZW-ASR1-XL

medias ► <https://www.schaeffler.de/std/1EOE>



Axial guidance of needle roller and cage assembly in housing



Axial guidance of needle roller and cage assembly on shaft

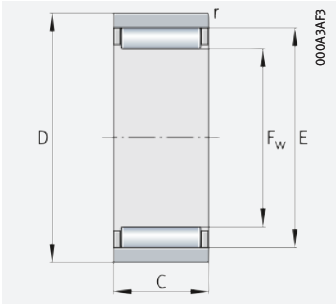
Dimensions			Mounting dimensions			
F _w	E	r min.	D _b	d _b	D _a	r _a max.
5	8	0,15	5,3	7,7	8,3	0,1
6	9	0,3	6,3	8,7	9,3	0,3
7	10	0,3	7,3	9,7	10,3	0,3
8	11	0,3	8,3	10,7	11,3	0,3
10	13	0,3	10,3	12,7	13,3	0,3
12	18	0,3	12,3	17,6	18,3	0,3
15	19	0,3	15,4	18,6	19,3	0,3
16	20	0,3	16,4	19,6	20,3	0,3
	22	0,3	16,4	21,6	22,3	0,3
17	21	0,3	17,4	20,6	21,3	0,3
18	24	0,3	18,4	23,6	24,5	0,3
20	24	0,3	20,4	23,6	24,3	0,3
	24	0,3	20,4	23,6	24,3	0,3
	26	0,3	20,4	25,6	26,5	0,3
22	26	0,3	22,4	25,6	26,3	0,3
	29	0,3	22,4	28,4	29,5	0,3
25	29	0,3	25,6	28,4	29,5	0,3
	29	0,3	25,6	28,4	29,5	0,3
	32	0,3	25,6	31,4	32,5	0,3
30	35	0,3	30,6	34,4	35,5	0,3
	37	0,3	30,6	36,4	37,5	0,3
	37	0,3	30,6	36,4	37,5	0,3
35	40	0,3	35,6	39,4	40,5	0,3
	40	0,3	35,6	39,4	40,5	0,3
	40	0,3	35,6	39,4	40,5	0,3
	42	0,3	35,6	41,4	42,5	0,3
	42	0,3	35,6	41,4	42,5	0,3
	42	0,3	35,6	41,4	42,5	0,3



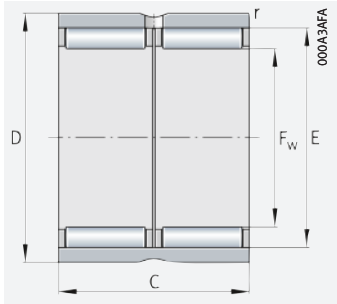


Needle roller bearings without ribs

Without inner ring
Open



RNAO

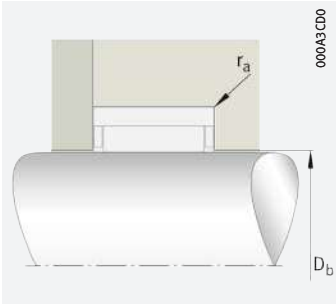


RNAO..-ZW-ASR1

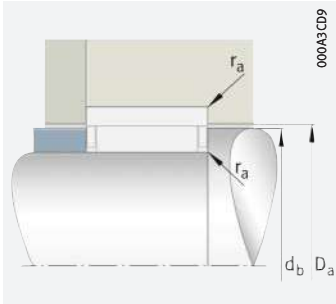
F_w = 40 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F _w	D	C	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	n _{thr}	m	
			N	N	N	min ⁻¹	min ⁻¹	≈ g	
40	50	17	24 200	41 500	6 400	11 500	7 000	74	RNAO40×50×17-XL
	50	34	41 500	83 000	12 900	11 500	7 000	152	RNAO40×50×34-ZW-ASR1-XL
	55	20	37 000	57 000	8 900	11 300	6 600	145	RNAO40×55×20-XL
	55	40	70 000	118 000	18 700	11 100	6 500	275	RNAO40×55×40-ZW-ASR1-XL
45	55	17	25 500	46 000	7 100	10 300	6 300	83	RNAO45×55×17-XL
	62	40	76 000	135 000	21 500	10 000	5 900	377	RNAO45×62×40-ZW-ASR1-XL
50	62	20	30 000	60 000	9 600	9 300	5 800	140	RNAO50×62×20-XL
	65	20	40 500	62 000	10 800	9 100	5 600	168	RNAO50×65×20-XL
	65	40	69 000	124 000	21 700	9 100	5 600	355	RNAO50×65×40-ZW-ASR1-XL
55	68	20	32 000	66 000	10 700	8 500	5 400	166	RNAO55×68×20-XL
60	78	20	49 500	85 000	13 600	7 700	4 650	255	RNAO60×78×20-XL
	78	40	85 000	171 000	27 500	7 700	4 650	435	RNAO60×78×40-ZW-ASR1-XL
65	85	30	64 000	123 000	21 100	7 100	4 550	464	RNAO65×85×30-XL
70	90	30	68 000	135 000	23 200	6 600	4 250	499	RNAO70×90×30-XL
80	100	30	80 000	176 000	31 000	5 800	3 600	580	RNAO80×100×30-XL
90	105	26	69 000	150 000	25 000	5 200	3 350	373	RNAO90×105×26-XL
	110	30	76 000	172 000	29 500	5 200	3 450	610	RNAO90×110×30-XL
100	120	30	80 000	188 000	32 000	4 700	3 150	694	RNAO100×120×30-XL

medias ▶ <https://www.schaeffler.de/std/1EOF>



Axial guidance of needle roller and cage assembly in housing



Axial guidance of needle roller and cage assembly on shaft

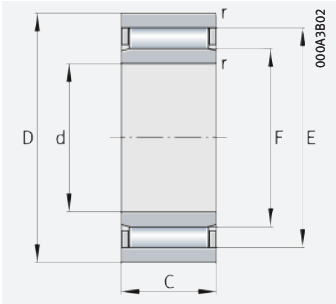
Dimensions			Mounting dimensions			
F _w	E	r min.	D _b	d _b	D _a	r _a max.
40	45	0,3	40,6	44,4	45,5	0,3
	45	0,3	40,6	44,4	45,5	0,3
	47	0,3	40,6	46,2	47,5	0,3
	48	0,3	40,6	47,2	47,5	0,3
45	50	0,3	45,6	49,2	50,5	0,3
	53	0,3	45,6	52,2	53,5	0,3
50	55	0,3	50,6	54,2	55,8	0,3
	58	0,3	50,6	57,2	58,5	0,3
	58	0,6	50,6	57,2	58,5	0,6
55	60	0,6	55,8	59,4	60,8	0,6
60	68	1	60,8	67,2	68,8	1
	68	1	60,8	67,2	68,8	1
65	73	1	66	72,2	73,8	1
70	78	1	71	77,2	78,8	1
80	88	1	81	87,2	89	1
90	98	1	91	97,2	99	1
	98	1	91	97,2	99	1
100	108	1	101	107,2	109	1



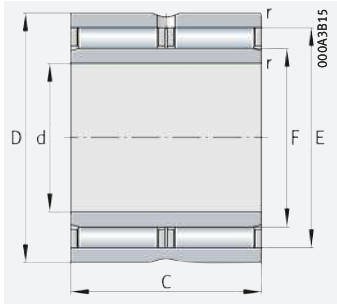


Needle roller bearings without ribs

With inner ring
Open



NAO, NAO..-IS1
(with lubrication hole in inner ring)

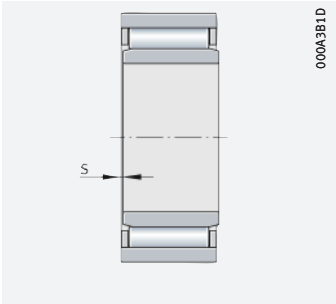


NAO..-ZW-ASR1

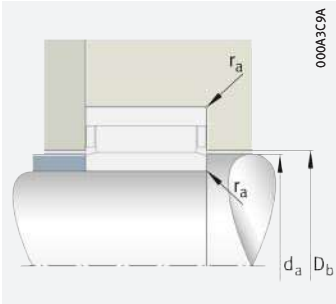
d = 6 – 90 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	n _{thr}	m	
			N	N	N	min ⁻¹	min ⁻¹	≈ g	
6	17	10	5 300	5 500	930	29 500	23 800	14	NAO6×17×10-TV-IS1-XL
9	22	12	11 300	9 900	1 740	26 000	17 900	23,5	NAO9×22×12-TV-XL
12	24	13	10 100	11 800	1 890	23 600	15 000	30	NAO12×24×13-XL
	28	12	13 000	12 500	2 210	22 900	14 300	40	NAO12×28×12-IS1-XL
15	28	13	11 100	14 300	2 310	21 300	12 100	29	NAO15×28×13-XL
	32	12	15 100	16 200	2 850	20 900	11 400	50	NAO15×32×12-IS1-XL
17	30	13	11 800	15 900	2 550	20 400	11 100	42	NAO17×30×13-XL
	35	16	22 600	25 500	4 200	19 200	10 100	78	NAO17×35×16-XL
20	35	17	16 800	26 000	4 250	18 100	10 000	76	NAO20×35×17-XL
	37	16	23 500	27 500	4 550	17 200	9 100	82	NAO20×37×16-XL
25	40	17	22 100	34 000	5 300	15 100	8 100	88	NAO25×40×17-XL
	42	16	26 000	33 500	5 500	14 600	7 800	86	NAO25×42×16-IS1-XL
	42	32	45 000	67 000	11 000	14 600	7 800	190	NAO25×42×32-ZW-ASR1-XL
30	45	17	23 500	38 500	6 100	13 100	7 100	102	NAO30×45×17-XL
	45	26	31 500	56 000	8 900	13 100	7 200	157	NAO30×45×26-ZW-ASR1-XL
	47	16	27 500	37 500	6 200	12 700	6 900	109	NAO30×47×16-XL
	47	18	31 000	43 000	7 400	12 700	6 900	119	NAO30×47×18-XL
35	50	17	24 200	41 500	6 400	11 500	6 500	113	NAO35×50×17-XL
	55	20	37 000	57 000	8 900	11 300	6 200	190	NAO35×55×20-XL
40	55	17	25 500	46 000	7 100	10 300	5 900	127	NAO40×55×17-XL
50	68	20	32 000	66 000	10 700	8 500	5 100	230	NAO50×68×20-IS1-XL
70	100	30	80 000	176 000	31 000	5 800	3 350	850	NAO70×100×30-XL
80	110	30	76 000	172 000	29 500	5 200	3 200	920	NAO80×110×30-XL
90	120	30	80 000	188 000	32 000	4 700	2 950	1 044	NAO90×120×30-XL

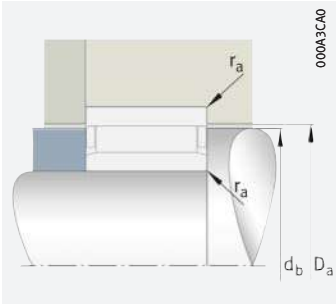
medias ► <https://www.schaeffler.de/std/1E10>



Axial displacement “s”



Axial guidance of needle roller and cage assembly in housing



Axial guidance of needle roller and cage assembly on shaft

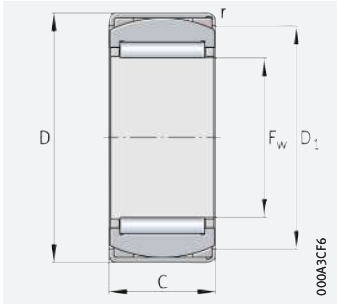
Dimensions						Mounting dimensions				
d	F	E	r	s		da	Db	db	Da	ra
			min.							max.
6	10	13	0,3	0,5		9,7	10,3	12,7	13,3	0,3
9	12	18	0,3	0,5		11,7	12,3	17,6	18,3	0,3
12	16	20	0,3	0,5		15,7	16,4	19,6	20,3	0,3
	16	22	0,3	0,5		15,7	16,4	21,6	22,3	0,3
15	20	24	0,3	0,5		19,7	20,4	23,6	24,3	0,3
	20	26	0,3	0,5		19,7	20,4	25,6	26,5	0,3
17	22	26	0,3	0,5		21,5	22,4	25,6	26,3	0,3
	22	29	0,3	0,5		21,5	22,4	28,4	29,5	0,3
20	25	29	0,3	0,5		24,5	25,6	28,4	29,5	0,3
	25	32	0,3	0,5		24,5	25,6	31,4	32,5	0,3
25	30	35	0,3	0,8		29,5	30,6	34,4	35,5	0,3
	30	37	0,3	0,8		29,5	30,6	36,4	37,5	0,3
	30	37	0,3	0,8		29,5	30,6	36,4	37,5	0,3
30	35	40	0,3	0,8		34,5	35,6	39,4	40,5	0,3
	35	40	0,3	0,8		34,5	35,6	39,4	40,5	0,3
	35	42	0,3	0,8		34,5	35,6	41,4	42,5	0,3
	35	42	0,3	0,8		34,5	35,6	41,4	42,5	0,3
35	40	45	0,3	0,8		39,5	40,6	44,4	45,5	0,3
	40	47	0,3	0,8		39,5	40,6	46,2	47,5	0,3
40	45	50	0,3	0,8		44,5	45,6	49,2	50,5	0,3
50	55	60	0,6	1		54,5	55,8	59,2	60,8	0,6
70	80	88	1	1		79,3	81	87,2	89	1
80	90	98	1	1		89,3	91	97,2	99	1
90	100	108	1	1		99,3	101	107,2	109	1





Aligning needle roller bearings

Without inner ring



RPNA

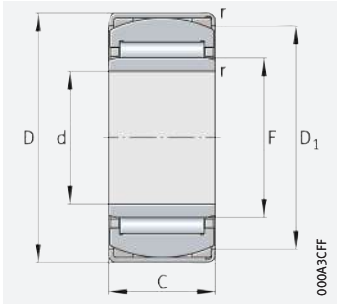
F_w = 15 – 45 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation	Dimensions	
F _w	D	C	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	m		D ₁	r
		±0,5	N	N	N	min ⁻¹	≈ g	➤ 926 1.12 ➤ 927 1.13 X-life ➤ 920		min.
15	28	12	7 800	7 900	1 430	24 100	32	RPNA15/28-XL	24,5	0,8
18	32	16	14 100	16 200	3 000	22 100	52	RPNA18/32-XL	27	0,8
20	35	16	14 600	17 500	3 200	21 100	62	RPNA20/35-XL	30,5	0,8
25	42	20	21 300	30 500	5 300	17 800	109	RPNA25/42-XL	36,5	0,8
28	44	20	24 800	34 000	5 900	15 800	112	RPNA28/44-XL	38,5	0,8
30	47	20	25 500	36 000	6 300	14 800	125	RPNA30/47-XL	42	0,8
35	52	20	27 500	41 500	7 300	12 900	131	RPNA35/52-XL	47,5	0,8
40	55	20	29 500	47 000	8 300	11 400	141	RPNA40/55-XL	50,5	0,8
45	62	20	31 000	53 000	9 300	10 200	176	RPNA45/62-XL	58	0,8

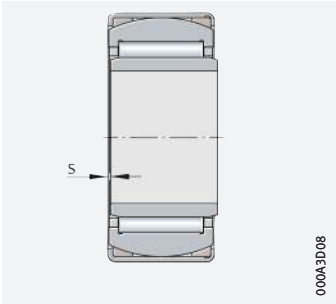
medias ➤ <https://www.schaeffler.de/std/1E11>



Aligning needle roller bearings
With inner ring



PNA



Axial displacement "s"

d = 12 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation	Dimensions					
d	D	C	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	m	► 926 1.12 ► 927 1.13 X-life ► 920	F	B	D ₁	r	r ₁	s
		±0,5	N	N	N	min ⁻¹	≈ g					min.	min.	min.
12	28	12	7 800	7 900	1 430	24 100	37		15	12	24,5	0,8	0,3	0,5
15	32	16	14 100	16 200	3 000	22 100	62	PNA15/32-XL	18	16	27	0,8	0,3	0,5
17	35	16	14 600	17 500	3 200	21 100	73	PNA17/35-XL	20	16	30,5	0,8	0,3	0,5
20	42	20	21 300	30 500	5 300	17 800	136	PNA20/42-XL	25	20	36,5	0,8	0,3	0,5
22	44	20	24 800	34 000	5 900	15 800	145	PNA22/44-XL	28	20	38,5	0,8	0,3	0,5
25	47	20	25 500	36 000	6 300	14 800	157	PNA25/47-XL	30	20	42	0,8	0,3	0,5
30	52	20	27 500	41 500	7 300	12 900	181	PNA30/52-XL	35	20	47,5	0,8	0,3	0,5
35	55	20	29 500	47 000	8 300	11 400	177	PNA35/55-XL	40	20	50,5	0,8	0,3	0,5
40	62	20	31 000	53 000	9 300	10 200	227	PNA40/62-XL	45	20	58	0,8	0,3	0,5

medias ► <https://www.schaeffler.de/std/1E12>

