

# FULL COMPLEMENT NEEDLE BEARINGS

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# Technical features

## Full complement needle bearings



Full complement needle bearings have a through-hardened outer ring which results in high static and dynamic load capacities and an ability to withstand overloading, shocks and vibration.

They are particularly suitable for operations involving oscillating motion but may also accept high speed conditions where good alignment is necessary. This can more easily be achieved using a convex inner ring raceway (inner rings with suffix R6).

The retention of the needles in the outer ring enables the bearing to be installed easily during assembly.

The difference between the needle bearings with integral end flanges series 3000 and the others is explained in the Chapter of the Bearings with cages.

These bearings are available with or without an inner ring from 12 mm bore size. Standard complete bearings type **NA** have an inner ring with convex raceway form. If extra wide inner rings or rings with lubrication hole are required, they should be ordered separately for use with the corresponding **RNA** series.

### Reference standards are:

- **ISO 1206** - Needle roller bearings – Light and medium series – Dimensions and tolerances.

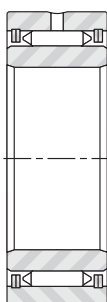
### FULL COMPLEMENT BEARINGS WITHOUT INNER RING

The shaft journal which is used directly as the inner ring raceway of the bearing should have adequate hardness and satisfactory surface finish. A hardness of 58-64 HRC will ensure full load capacity for the bearing. Lower hardness figures will entail a reduction in both static and dynamic capacities as shown in the table of dimensions (see Technical Section).

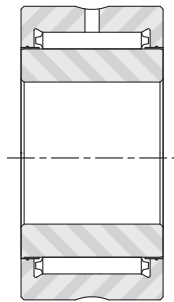
In cases of misalignment, a convex inner ring raceway can be machined directly at the shaft journal position by grinding, using a concave profile and inclining the diamond impregnated grinding wheel. A convex inner ring raceway calculated to permit misalignment of 1 in 1000 does not affect bearing load capacity. A larger convex radius is necessary for a greater degree of misalignment but this will reduce the effective bearing load capacity.

### TYPES OF BEARINGS

#### Needle roller bearings with inner rings



**NA Series 1000, 2000, 22000**



**NA Series 3000**

#### Needle roller bearings without inner rings



**RNA Series 1000, 2000, 22000**



**RNA Series 3000**

# Technical features

## Full complement needle bearings

### INNER RINGS

Inner rings made from high quality bearing steel heat treated and through-hardened avoid any necessity for heat treatment of the shaft and enable the bearings to operate within their full load capacity.

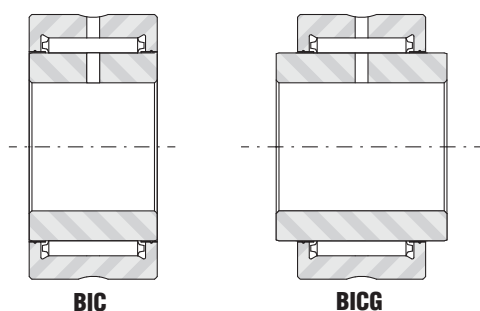
#### Inner rings with convex raceway "R6"

These inner rings without lubrication hole are of the same width as the outer ring and are supplied with series **NA** complete, types **1000**, **2000**, **22000** and **3000**. They can accept a misalignment of 1 in 1000 in continuous operation and up to 2 in 1000 temporarily, as in the case of sudden deflection due to overload conditions. The inner and outer rings may be displaced axially from one to the other by up to 5% of the ring width. The designation of the inner ring separated from the complete needle bearing is **BI** number **R6**. For example **BI 2020 R6**. The designation of the needle bearings complete of inner ring **BI...R6** is **NA** number. For example **NA 2035**.

#### Inner rings with cylindrical raceway

Cylindrical inner rings of the same bore as those with convex raceway may be supplied on request in the following versions:

- with oil hole permitting lubrication through the shaft (**BIC**).
- wider than corresponding outer ring (**BICG**), to enable a displacement in position of one ring relative to the other (e.g. expansion of the shaft) or lateral shaft movement. In the latter case, which can occur with or without simultaneous rotation of the shaft, please consult Nadella Technical Service.



The use of cylindrical inner rings with standard bearings type **RNA** series **1000**, **2000**, **22000** and **3000** requires that the housing and shaft be correctly aligned at assembly with due regard to the application under load. If it is not essential to use these inner rings, it is always preferable to use complete bearings type **NA** with convex inner rings type "**R6**", without oil hole, of the same width as the outer ring. In particular cases where lubrication is provided through the shaft, the inner ring with oil hole may be replaced by a lubrication hole at the face of the inner ring.

### RING TOLERANCES

Inner and outer rings for full complement standard needle bearings are manufactured in accordance with the tolerance class of ISO Standard 492 (class zero according to DIN 620). Closer tolerances, corresponding to classes 6, 5 and 4 may be necessary for special high precision applications (symbols P6, P5, P4). See table at the end of the catalogue.

### RADIALPLAY

#### Bearings without inner ring

The radial play of a bearing without inner ring results from the difference in diameter beneath the needles and the size of the shaft. The standard diameter beneath the needles for RNA bearings with the recommended shaft tolerances should provide suitable radial play for most normal applications.

For special applications (high precision, close fits, etc.), we can offer the diameter beneath the needles selected as follows:

- in the bottom half of the normal tolerance (**RNA ... TB**)
- in the upper half of the normal tolerance (**RNA...TC**).

Bearings without inner ring tolerance Class **TB** mounted on a shaft with k5 tolerance will have a reduced radial play suitable for certain applications.

Nominal dimension $F_w$ mm		Tolerance of diameter under needles		
		normal $\mu\text{m}$	Selected TB $\mu\text{m}$	Selected TC $\mu\text{m}$
above	to			
5	15	+20 + 40	+20 + 31	+ 29 + 40
15	25	+20 + 43	+20 + 33	+ 30 + 43
25	30	+25 + 48	+25 + 38	+ 35 + 48
30	35	+30 + 53	+30 + 43	+ 40 + 53
35	60	+35 + 58	+35 + 48	+ 45 + 58
60	80	+45 + 73	+45 + 60	+ 58 + 73
80	115	+50 + 78	+50 + 65	+ 63 + 78
115	180	+60 + 88	+60 + 75	+ 73 + 88
180	220	+70 +103	+70 + 88	+ 85 +103
220	270	+80 +113	+80 + 98	+ 95 +113
270	350	+90 +128	+90 +110	+108 +128
Examples of bearing		RNA 1020	RNA 1020 TB	RNA 1020 TC

A nominal diameter under the needles further reduced may be required for certain precision.

Should a larger clearance than normal be necessary, the shaft diameter must be controlled nearer to the nominal size than the tolerances h5 or g5 would normally provide.

# Technical features

## Full complement needle bearings

### Standard complete bearings with inner ring

Complete bearings type **NA** are offered with a radial play that is suitable for the majority of applications. They can be supplied if necessary:

- with the radial play selected from the bottom half of the normal tolerance (**NA...TB**)
- with the radial play selected from the upper half of the normal tolerance (**NA...TC**).

For bore dimensions  $d > 130$  mm, bearings **NA...TB** or **NA...TC** are supplied only on special request.

### Radial play of full complement bearings with convex inner ring "R6".

Series 1 000, 2 000, 22 000							
Inner ring dimension d mm		Standard play $\mu\text{m}$		Selected TB $\mu\text{m}$		Selected TC $\mu\text{m}$	
above	to	min.	max.	min.	max.	min.	max.
12	20	20	50	20	35	35	50
20	25	25	60	25	43	42	60
25	30	30	65	30	48	47	65
30	50	35	70	35	53	52	70
50	55	45	85	45	65	65	85
55	65	45	90	45	68	67	90
65	70	45	95	45	70	70	95
70	105	50	100	50	75	75	100
105	125	60	115	60	88	87	115
120	140	80	145	80	113	112	145
140	170	100	165				
170	190	120	185				
190	210	130	200				
210	230	130	205				
230	260	160	235				
260	290	180	260				
290	310	180	265				

Series 3 000							
Inner ring dimension d mm		Standard play $\mu\text{m}$		Selected TB $\mu\text{m}$		Selected TC $\mu\text{m}$	
above	to	min.	max.	min.	max.	min.	max.
30	45	35	70	35	53	52	70
45	55	45	85	45	65	65	85
55	65	45	90	45	68	67	90
65	70	50	95	50	73	72	95
70	100	50	100	50	75	75	100
100	105	60	110	60	85	85	110
105	130	60	115	60	88	87	115
130	140	80	145	80	113	112	145
140	170	100	165				
170	190	120	185				
190	210	130	200				
210	230	130	200				
230	260	160	235				
260	290	180	260				
290	310	180	265				

### Radial play of full complement bearings with cylindrical inner ring (not R6).

Series 1 000, 22 000							
Inner ring dimension d mm		Standard play $\mu\text{m}$		Selected TB $\mu\text{m}$		Selected TC $\mu\text{m}$	
above	to	min.	max.	min.	max.	mini.	max.
12	17	20	50	20	35	35	50
17	20	30	60	30	45	45	60
20	25	35	70	35	53	52	70
25	30	40	75	40	58	57	75
30	35	45	80	45	63	62	80
35	50	50	85	50	68	67	85
50	55	60	100	60	80	80	100
55	65	60	105	60	83	82	105
65	70	60	110	60	85	85	110
70	90	65	115	65	90	90	115

Series 2 000							
Inner ring dimension d mm		Standard play $\mu\text{m}$		Selected TB $\mu\text{m}$		Selected TC $\mu\text{m}$	
above	to	mini.	maxi.	min.	max.	min.	max.
15	20	30	60	30	45	45	60
20	25	35	70	35	53	52	70
25	30	40	75	40	58	57	75
30	35	45	80	45	63	62	80
35	50	50	85	50	68	67	85
50	55	60	100	60	80	80	100
55	65	60	105	60	83	82	105
65	70	60	110	60	85	85	110
70	105	65	115	65	90	90	115
105	125	75	130	75	103	102	130
125	140	95	160	95	128	127	160
140	170	125	190				
170	190	145	210				
190	210	160	230				
210	230	160	235				

Series 3 000							
Inner ring dimension d mm		Standard play $\mu\text{m}$		Selected TB $\mu\text{m}$		Selected TC $\mu\text{m}$	
above	to	min.	max.	min.	max.	min.	max.
30	45	50	85	50	68	67	85
45	55	60	100	60	80	80	100
55	65	60	105	60	83	82	105
65	70	65	110	65	88	87	110
70	100	65	115	65	90	90	115
100	105	75	125	75	100	100	125
105	130	75	130	75	103	102	130
130	140	95	160	95	128	127	160
140	170	125	190				
170	190	145	210				
190	210	160	230				
210	230	160	235				
230	260	190	265				
260	290	210	290				
290	310	210	295				



# Technical features

## Full complement needle bearings

### BEARING MOUNTING

#### General requirements

In general, the mounting of needle roller bearings with or without inner rings, of normal precision, requires the shaft seat or raceway to be machined to quality IT5 or IT6. The housing bore should meet quality IT6 or IT7. Other quality requirements for shaft and housings are given on page 13.

#### MOUNTING DIMENSIONS

It is recommended that needle roller bearings are mounted in their housings with a clearance fit if the load is stationary relative to the housing, and with a tight transition fit if the load rotates relative to the housing.

Table 2 lists the recommended tolerances for the housing bore and the shaft raceway for bearings without inner rings. Table 3 lists the recommended shaft tolerances for the above two mounting conditions when the bearings are used with inner rings.

Other mounting dimensions may be required for special operating conditions such as:

1. Extremely heavy radial loads
2. Shock loads
3. Temperature gradient across bearing
4. Housing material with heat expansion coefficient different to that of the bearing
5. Oscillating movements

**Table 2- Mounting tolerances for bearings without inner ring**

Rotation conditions	Nominal housing bore diameter $D$ mm	ISO tolerance zone for housing	Nominal shaft diameter $F$ mm	ISO tolerance zone for shaft
Load stationary relative to housing	All diameters	J6	All diameters	h5
Load rotates relative to housing	All diameters	M6	All diameters	g5

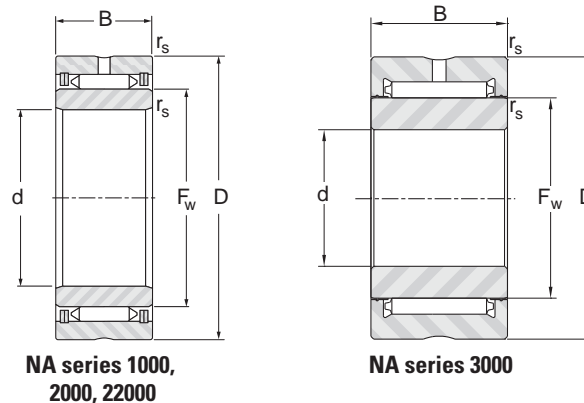
**NOTE:** Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions. Details of shaft and housing quality requirements are given on pages 13 and 14.

**Table 3- Shaft tolerances for bearings with inner rings**

Rotation conditions	Nominal shaft diameter $d$ mm		ISO tolerance zone for shaft	Nominal housing bore diameter $D$ mm	ISO tolerance zone for housing
Load stationary relative to housing	All diameters		h5 (h6)	All diameters	J6
Load rotates relative to housing	>	≤		All diameters	M6
		40	k5		
	40	100	m5		
	100	140	m5		
	140	-	n6		

**NOTE:** Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions. Details of shaft and housing quality requirements are given on pages 13 and 14.

# Full complement needle bearings with inner ring - NA 1 000, 2 000, 22 000, 3 000 series

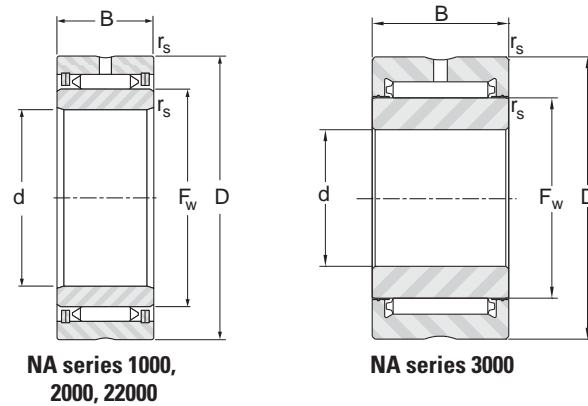


Shaft ∅ mm	Designation	d mm	D mm	B mm	F <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
12	NA 1012 <sup>(1)</sup>	12	28	15	17.6	0.35	11.0	16.5	22000	14000	0.050
15	NA 1015 <sup>(1)</sup>	15	32	15	20.8	0.65	12.4	19.5	18000	12000	0.044
	NA 2015 <sup>(1)</sup>	15	35	22	22.1	0.65	23.5	37.5	17000	11000	0.082
17	NA 1017 <sup>(1)</sup>	17	35	15	23.9	0.65	13.7	22.5	16000	10000	0.047
20	NA 1020	20	42	18	28.7	0.65	19.3	33.5	13000	8600	0.084
	NA 2020	20	42	22	28.7	0.65	28.5	49.0	13000	8600	0.104
25	NA 1025	25	47	18	33.5	0.65	21.5	39.0	11000	7200	0.097
	NA 2025	25	47	22	33.5	0.65	33.0	60.0	11000	7200	0.122
	NA 22025	25	47	30	33.5	0.65	52.0	94.0	11000	7200	0.170
30	NA 1030	30	52	18	38.2	0.65	23.5	44.5	10000	6500	0.107
	NA 2030	30	52	22	38.2	0.65	34.5	66.0	10000	6500	0.139
	NA 22030	30	52	30	38.2	0.65	57.0	108	10000	6500	0.193
	NA 3030	30	62	30	44.0	0.65	64.0	125	8600	5600	0.309
35	NA 1035	35	58	18	44.0	0.65	26.0	51.0	8600	5600	0.127
	NA 2035	35	58	22	44.0	0.65	38.0	75.0	8600	5600	0.160
	NA 22035	35	58	30	44.0	0.65	63.0	124	8600	5600	0.225
	NA 3035	35	72	36	49.7	0.65	90.0	183	7600	4900	0.545
40	NA 1040	40	65	18	49.7	0.85	28.5	58.0	7600	4900	0.160
	NA 2040	40	65	22	49.7	0.85	41.5	85.0	7600	4900	0.200
	NA 22040	40	65	30	49.7	0.85	68.0	140	7600	4900	0.278
	NA 3040	40	80	36	55.4	0.85	97.0	204	6900	4500	0.672
45	NA 1045	45	72	18	55.4	0.85	30.5	65.0	6900	4500	0.193
	NA 2045	45	72	22	55.4	0.85	45.0	95.0	6900	4500	0.242
	NA 3045	45	85	38	62.1	0.85	105.0	230	6100	4000	0.710
50	NA 1050	50	80	20	62.1	0.85	33.0	73.0	6100	4000	0.418
	NA 2050	50	80	28	62.1	0.85	64.0	142	6100	4000	0.603
	NA 3050	50	90	38	68.8	0.85	113.0	255	5500	3600	1.22

<sup>(1)</sup> without holes and lubrication groove

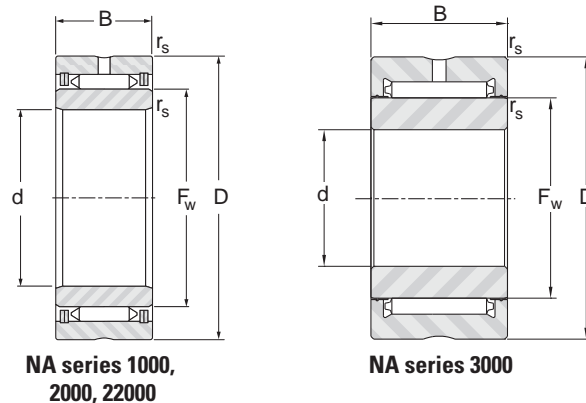


# Full complement needle bearings with inner ring - NA 1 000, 2 000, 22 000, 3 000 series



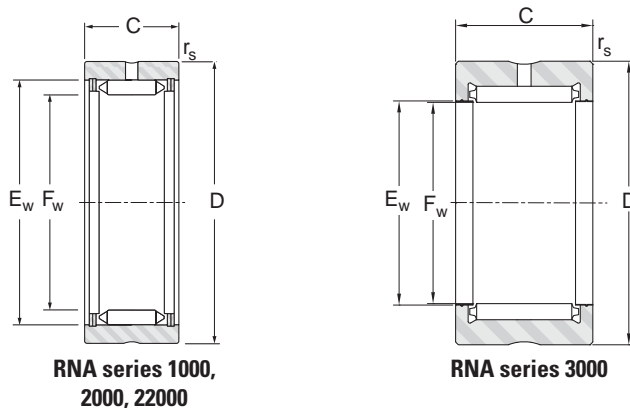
Shaft ∅ mm	Designation	d mm	D mm	B mm	F <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
55	NA 1055	55	85	20	68.8	0.85	35.5	80.0	5500	3600	0.258
	NA 2055	55	85	28	68.8	0.85	69.0	157	5500	3600	0.361
	NA 3055	55	95	38	72.6	0.85	117.0	268	5200	3400	0.782
60	NA 1060	60	90	20	72.6	0.85	37.0	85.0	5200	3400	0.283
	NA 2060	60	90	28	72.6	0.85	72.0	165	5200	3400	0.413
	NA 3060	60	100	38	78.3	0.85	123.0	290	4900	3200	0.810
65	NA 2065	65	95	28	78.3	0.85	78.0	184	4900	3200	0.433
	NA 3065	65	105	38	83.1	0.85	129.0	308	4500	2900	0.865
70	NA 1070	70	100	20	83.1	0.85	43.0	103	4500	2900	0.322
	NA 2070	70	100	28	83.1	0.85	81.0	195	4500	2900	0.470
	NA 3070	70	110	38	88.0	0.85	134.0	325	4300	2800	0.906
75	NA 2075	75	110	32	88.0	0.85	104.0	253	4300	2800	0.767
	NA 3075	75	120	38	96.0	0.85	142.0	355	4000	2600	1.098
80	NA 1080	80	115	24	96.0	0.85	68.0	170	4000	2600	0.510
	NA 2080	80	115	32	96.0	0.85	110.0	275	4000	2600	0.694
	NA 3080	80	125	38	99.5	0.85	145.0	365	3800	2500	1.220
85	NA 2085	85	120	32	99.5	1.35	113.0	285	3800	2500	0.787
	NA 3085	85	130	38	104.7	1.35	150.0	390	3600	2300	1.252
90	NA 2090	90	125	32	104.7	1.35	117.0	300	3600	2300	0.837
	NA 3090	90	135	43	109.7	1.35	185.0	480	3500	2300	1.522
95	NA 2095	95	130	32	109.1	1.35	120.0	315	3500	2300	0.882
	NA 3095	95	140	43	114.7	1.35	190.0	505	3300	2100	1.551
100	NA 2100	100	135	32	114.7	1.35	125.0	330	3300	2100	0.677
	NA 3100	100	145	43	119.2	1.35	195.0	520	3200	2100	1.645
105	NA 2105	105	140	32	119.2	1.35	129.0	340	3200	2100	0.941
	NA 3105	105	150	45	124.7	1.35	203.0	550	3000	2000	1.762

# Full complement needle bearings with inner ring - NA 1 000, 2 000, 22 000, 3 000 series



Shaft ∅ mm	Designation	d mm	D mm	B mm	F <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
110	NA 2110	110	145	34	124.7	1.35	133.0	360	3000	2000	1.015
	NA 3110	110	160	45	132.5	1.35	210.0	580	2900	1900	2.037
115	NA 2115	115	155	34	132.5	1.35	139.0	380	2900	1900	1.205
	NA 3115	115	165	45	137.0	1.35	215.0	600	2800	1800	2.140
120	NA 2120	120	160	34	137.0	1.35	142.0	395	2800	1800	1.265
	NA 3120	120	170	45	143.5	1.35	224.0	630	2700	1800	2.107
125	NA 2125	125	165	34	143.5	1.35	145.0	410	2700	1800	1.218
130	NA 2130	130	170	34	148.0	1.35	150.0	425	2600	1700	1.292
140	NA 2140	140	180	36	158.0	1.35	157.0	455	2400	1600	1.478
	NA 3140	140	205	52	170.5	1.35	290.0	860	2200	1400	3.840
150	NA 2150	150	195	36	170.5	1.35	165.0	490	2200	1400	1.790
160	NA 2160	160	205	36	179.3	1.35	170.0	515	2100	1400	1.970
170	NA 2170	170	220	42	193.8	1.35	233.0	720	2000	1300	2.570
180	NA 2180	180	230	42	202.6	1.35	240.0	750	1900	1200	2.835
190	NA 2190	190	245	42	216.0	1.35	250.0	800	1800	1200	3.210
200	NA 2200	200	255	42	224.1	1.35	257.0	830	1700	1100	3.560
190	NA 2190	190	245	42	216.0	1.35	250.0	800	1800	1200	3.210
200	NA 2200	200	255	42	224.1	1.35	257.0	830	1700	1100	3.560
190	NA 2190	190	245	42	216.0	1.35	250.0	800	1800	1200	3.210
200	NA 2200	200	255	42	224.1	1.35	257.0	830	1700	1100	3.560

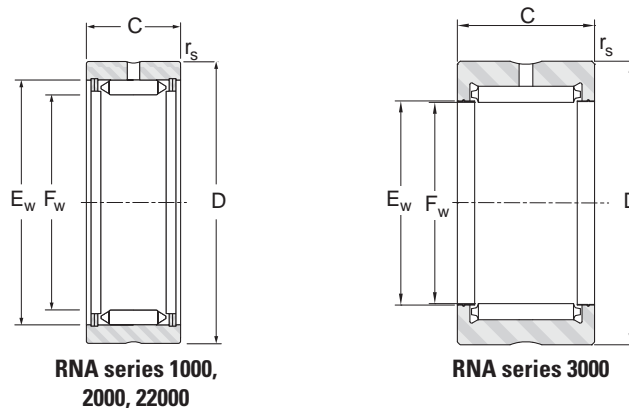
# Full complement needle bearings without inner ring - RNA 1 000, 2 000, 22 000, 3 000 series



Shaft ∅ mm	Designation	F <sub>w</sub> mm	D mm	C mm	E <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
7.3	RNA 1005 <sup>(1)</sup>	7.3	16	12	12.3	0.35	3.95	4.45	52000	34000	0.010
9.7	RNA 1007 <sup>(1)</sup>	9.7	19	12	14.7	0.35	4.80	5.90	39000	25000	0.013
12.1	RNA 1009 <sup>(1)</sup>	12.1	22	12	17.1	0.35	5.60	7.40	31000	20000	0.018
14.4	RNA 1010 <sup>(1)</sup>	14.4	24	12	19.4	0.35	6.35	8.90	26000	17000	0.020
17.6	RNA 1012 <sup>(1)</sup>	17.6	28	15	22.6	0.35	11.0	16.5	22000	14000	0.034
20.8	RNA 1015 <sup>(1)</sup>	20.8	32	15	25.8	0.65	12.4	19.5	18000	12000	0.044
22.1	RNA 2015 <sup>(1)</sup>	22.1	35	22	28.1	0.65	23.5	37.5	17000	11000	0.082
23.9	RNA 1017 <sup>(1)</sup>	23.9	35	15	28.9	0.65	13.7	22.5	16000	10000	0.047
28.7	RNA 1020	28.7	42	18	34.7	0.65	19.3	33.5	13000	8600	0.084
	RNA 2020	28.7	42	22	34.7	0.65	28.5	49.0	13000	8600	0.104
33.5	RNA 1025	33.5	47	18	39.5	0.65	21.5	39.0	11000	7200	0.097
	RNA 2025	33.5	47	22	39.5	0.65	33.0	60.0	11000	7200	0.122
	RNA 22025	33.5	47	30	39.5	0.65	52.0	94.0	11000	7200	0.170
38.2	RNA 1030	38.2	52	18	44.2	0.65	23.5	44.5	10000	6500	0.107
	RNA 2030	38.2	52	22	44.2	0.65	34.5	66.0	10000	6500	0.139
	RNA 22030	38.2	52	30	44.2	0.65	57.0	108	10000	6500	0.193
44	RNA 1035	44	58	18	50.0	0.65	26.0	51.0	8600	5600	0.127
	RNA 2035	44	58	22	50.0	0.65	38.0	75.0	8600	5600	0.160
	RNA 22035	44	58	30	50.0	0.65	63.0	124	8600	5600	0.225
	RNA 3030	44	62	30	51.0	0.65	64.0	125	8600	5600	0.309
49.7	RNA 1040	49.7	65	18	55.7	0.85	28.5	58.0	7600	4900	0.160
	RNA 2040	49.7	65	22	55.7	0.65	41.5	85.0	7600	4900	0.200
	RNA 22040	49.7	65	30	55.7	0.65	68.0	140	7600	4900	0.278
	RNA 3035	49.7	72	36	56.8	0.65	90.0	183	7600	4900	0.545
55.4	RNA 1045	55.4	72	18	61.4	0.85	30.5	65.0	6900	4500	0.193
	RNA 2045	55.4	72	22	61.4	0.85	45.0	95.0	6900	4500	0.242
	RNA 3040	55.4	80	36	62.5	0.85	97.0	204	6900	4500	0.672

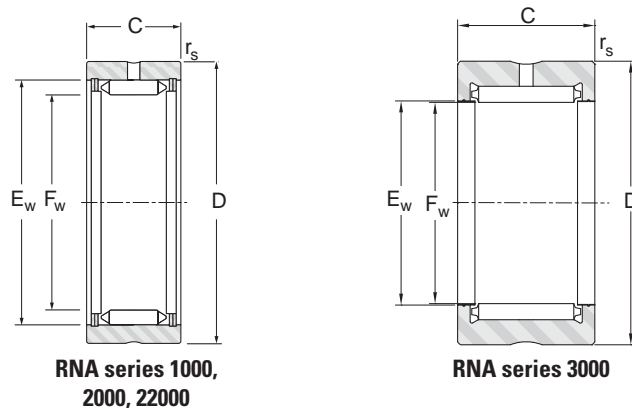
<sup>(1)</sup> without holes and lubrication groove

# Full complement needle bearings without inner ring - RNA 1 000, 2 000, 22 000, 3 000 series



Shaft ∅ mm	Designation	F <sub>w</sub> mm	D mm	C mm	E <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
62.1	RNA 1050	62.1	80	20	68.1	0.85	33.0	73.0	6100	4000	0.255
	RNA 2050	62.1	80	28	68.1	0.85	64.0	142	6100	4000	0.375
	RNA 3045	62.1	85	38	69.2	0.85	105	230	6100	4000	0.710
68.8	RNA 1055	68.8	85	20	74.8	0.85	35.5	80.0	5500	3600	0.258
	RNA 2055	68.8	85	28	74.8	0.85	69.0	157	5500	3600	0.361
	RNA 3050	68.8	90	38	75.9	0.85	113	255	5500	3600	0.705
72.6	RNA 1060	72.6	90	20	78.6	0.85	37.0	85.0	5200	3400	0.283
	RNA 2060	72.6	90	28	78.6	0.85	72.0	165	5200	3400	0.413
	RNA 3055	72.6	95	38	79.6	0.85	117	268	5200	3400	0.782
78.3	RNA 1065	78.3	95	20	84.3	0.85	41.5	97.0	4900	3200	0.306
	RNA 2065	78.3	95	28	84.3	0.85	78.0	184	4900	3200	0.433
	RNA 3060	78.3	100	38	85.3	0.85	123.0	290	4900	3200	0.810
83.1	RNA 1070	83.1	100	20	89.1	0.85	43.0	103	4500	2900	0.322
	RNA 2070	83.1	100	28	89.1	0.85	81.0	195	4500	2900	0.470
	RNA 3065	83.1	105	38	90.2	0.85	129	308	4500	2900	0.865
88	RNA 1075	88	110	24	95.0	0.85	64.0	155	4300	2800	0.577
	RNA 2075	88	110	32	95.0	0.85	104	253	4300	2800	0.767
	RNA 3070	88	110	38	95.0	0.85	134	325	4300	2800	0.906
96	RNA 1080	96	115	24	103.0	0.85	68.0	170	4000	2600	0.510
	RNA 2080	96	115	32	103.0	0.85	110	275	4000	2600	0.694
	RNA 3075	96	120	38	103.0	0.85	142	355	4000	2600	1.098
99.5	RNA 2085	99.5	120	32	106.5	1.35	113	285	3800	2500	0.787
	RNA 3080	99.5	125	38	106.5	0.85	145	365	3800	2500	1.220
104.7	RNA 2090	104.7	125	32	111.7	1.35	117	300	3600	2300	0.837
	RNA 3085	104.7	130	38	111.7	1.35	150	390	3600	2300	1.252
109.1	RNA 2095	109.1	130	32	116.1	1.35	120	315	3500	2300	0.882
	RNA 3090	109.1	135	43	116.1	1.35	185	480	3500	2300	1.522

# Full complement needle bearings without inner ring - RNA 1 000, 2 000, 22 000, 3 000 series



Shaft ∅ mm	Designation	F <sub>w</sub> mm	D mm	C mm	E <sub>w</sub> mm	r <sub>s</sub> min. mm	Load Ratings kN		Speed rating min <sup>-1</sup>		Weight kg
							Dynamic	Static	Oil	Grease	
							C	C <sub>0</sub>			
114.7	RNA 2100	114.7	135	32	121.7	1.35	125	330	3300	2100	0.677
	RNA 3095	114.7	140	43	121.7	1.35	190	505	3300	2100	1.551
119.2	RNA 2105	119.2	140	32	126.2	1.35	129	340	3200	2100	0.941
	RNA 3100	119.2	145	43	126.2	1.35	195	520	3200	2100	1.645
124.5	RNA 2110	124.5	145	34	131.5	1.35	133	360	3000	2000	1.015
	RNA 3105	124.5	150	45	131.5	1.35	203	550	3000	2000	1.762
132.5	RNA 2115	132.5	155	34	139.5	1.35	139	380	2900	1900	1.205
	RNA 3110	132.5	160	45	139.5	1.35	210	580	2900	1900	2.037
137	RNA 2120	137	160	34	144.0	1.35	142	395	2800	1800	1.265
	RNA 3115	137	165	45	144.0	1.35	215	600	2800	1800	2.140
143.5	RNA 2125	143.5	165	34	150.5	1.35	145	410	2700	1800	1.218
	RNA 3120	143.5	170	45	150.5	1.35	224	630	2700	1800	2.107
148	RNA 2130	148	170	34	155.0	1.35	150	425	2600	1700	1.292
158	RNA 2140	158	180	36	165.0	1.35	157	455	2400	1600	1.478
	RNA 3130	158	190	52	166.0	1.35	275	790	2400	1600	3.285
170.5	RNA 2150	170.5	195	36	177.5	1.35	165	490	2200	1400	1.790
	RNA 3140	170.5	205	52	178.5	1.35	290	860	2200	1400	3.840
179.3	RNA 2160	179.3	205	36	186.3	1.35	170	515	2100	1400	1.970
	RNA 3150	179.3	215	52	187.3	1.35	300	900	2100	1400	4.185
193.8	RNA 2170	193.8	220	42	200.8	1.85	233	720	2000	1300	2.570
	RNA 3160	193.8	230	57	201.9	1.35	360	1110	2000	1300	4.955
202.6	RNA 2180	202.6	230	42	209.6	1.85	240	750	1900	1200	2.835
216	RNA 2190	216	245	42	223.0	1.85	250	800	1800	1200	3.210
	RNA 3180	216	255	57	224.1	1.85	385	1240	1800	1200	6.040
224.1	RNA 2200	224.1	255	42	231.1	1.85	257	830	1700	1100	3.560
236	RNA 2210	236	265	42	243.1	1.85	279	910	1600	1000	3.470
258.4	RNA 3220	258.4	300	64	268.4	1.85	490	1650	1500	980	8.570
269.6	RNA 2240	269.6	300	49	276.6	1.85	345	1190	1400	910	4.985
281.9	RNA 3240	281.9	325	64	291.9	1.85	520	1800	1300	850	9.480
335	RNA 2300	335	375	54	343.0	1.85	460	1690	1100	720	8.600