# FULL COMPLEMENT NEEDLE BEARINGS

NADELLA

# 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.

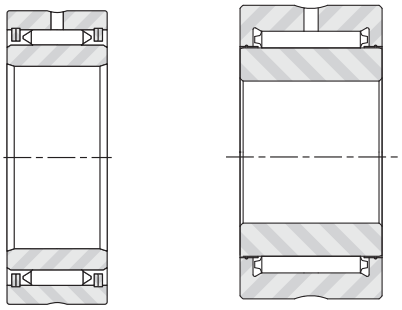
**Reference standards are:**
- **ISO 1206** - Needle roller bearings – Light and medium series – Dimensions and tolerances.

**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**

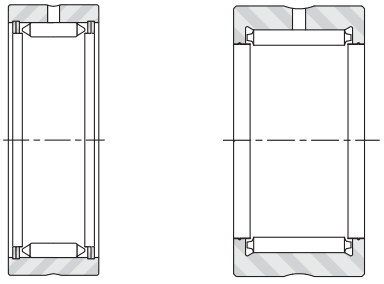
**Needle roller bearings with inner rings**



**NA Series 1000, 2000, 22000**

**NA Series 3000**

**Needle roller bearings without inner rings**



**RNA Series 1000, 2000, 22000**

**RNA Series 3000**

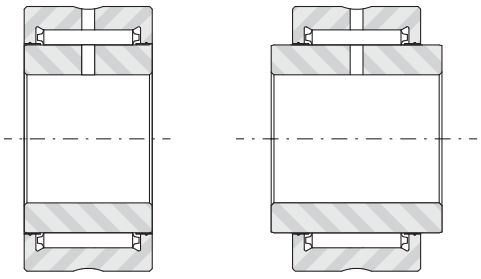
# Technical features

## 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.



BIC BICG

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 radiai play suitable for certain applications.

| Nominal dimension $F_w$ mm | | Tolerance of diameter under needles | | |
|---|---|---|---|---|
| | | normal µm | Selected TB µm | Selected TC µm |
| 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 µm | | Selected TB µm | | Selected TC µm | |
| 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 µm | | Selected TB µm | | Selected TC µm | |
| 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 µm | | Selected TB µm | | Selected TC µm | |
| 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 µm | | Selected TB µm | | Selected TC µm | |
| 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 µm | | Selected TB µm | | Selected TC µm | |
| 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 | | | | |

# 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 |

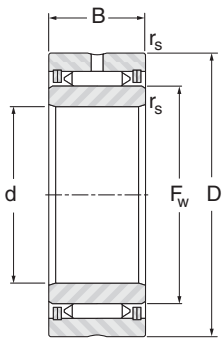
**NOTE:** Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions. Details of shaft and housing quality requirements are given on pages 13 and 14.

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

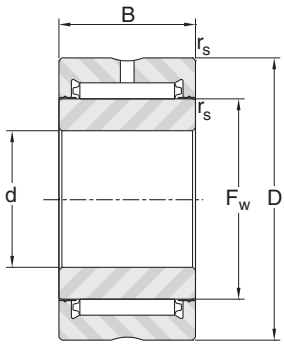
| Rotation conditions | Nominal shaft diameter *d* mm | | ISO tolerance zone for shaft | Nominal housing bore diameter *D* mm | ISO tolerance zone for housing |
|---|---|---|---|---|---|
| Load stationary relative to housing | All diameters | | h5 (h6) | All diameters | J6 |
| Load rotates relative to 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




NA series 1000, 2000, 22000

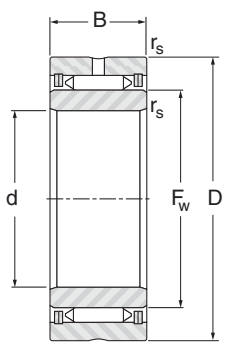



NA series 3000

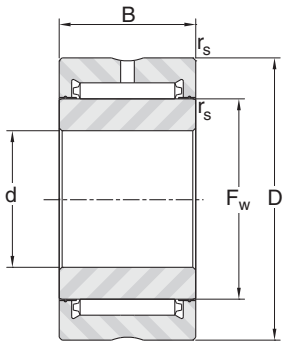
| Shaft ∅ mm | Designation | d mm | D mm | B mm | $F_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| **12** | **NA 1012** (1) | 12 | 28 | 15 | 17.6 | 0.35 | 11.0 | 16.5 | 22000 | 14000 | 0.050 |
| **15** | **NA 1015** (1) | 15 | 32 | 15 | 20.8 | 0.65 | 12.4 | 19.5 | 18000 | 12000 | 0.044 |
| | **NA 2015** (1) | 15 | 35 | 22 | 22.1 | 0.65 | 23.5 | 37.5 | 17000 | 11000 | 0.082 |
| **17** | **NA 1017** (1) | 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 |

(1) without holes and lubrication groove

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



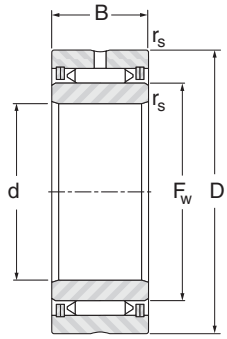

NA series 1000, 2000, 22000



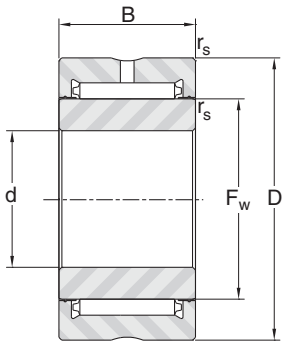

NA series 3000

| Shaft ∅ mm | Designation | d mm | D mm | B mm | $F_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| 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



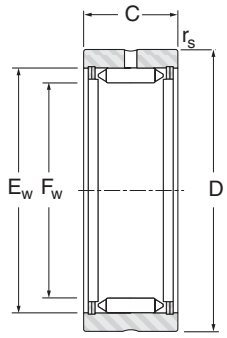

NA series 1000, 2000, 22000



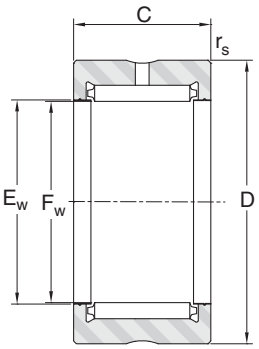

NA series 3000

| Shaft ∅ mm | Designation | d mm | D mm | B mm | $F_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| **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




RNA series 1000, 2000, 22000

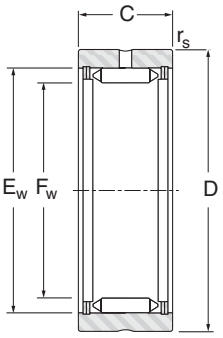



RNA series 3000

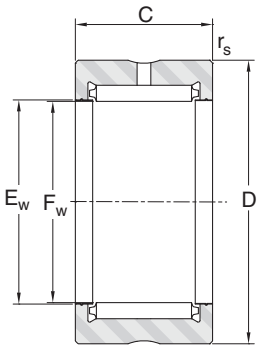
| Shaft ∅ mm | Designation | $F_w$ mm | D mm | C mm | $E_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| **7.3** | **RNA 1005** (1) | 7.3 | 16 | 12 | 12.3 | 0.35 | 3.95 | 4.45 | 52000 | 34000 | 0.010 |
| **9.7** | **RNA 1007** (1) | 9.7 | 19 | 12 | 14.7 | 0.35 | 4.80 | 5.90 | 39000 | 25000 | 0.013 |
| **12.1** | **RNA 1009** (1) | 12.1 | 22 | 12 | 17.1 | 0.35 | 5.60 | 7.40 | 31000 | 20000 | 0.018 |
| **14.4** | **RNA 1010** (1) | 14.4 | 24 | 12 | 19.4 | 0.35 | 6.35 | 8.90 | 26000 | 17000 | 0.020 |
| **17.6** | **RNA 1012** (1) | 17.6 | 28 | 15 | 22.6 | 0.35 | 11.0 | 16.5 | 22000 | 14000 | 0.034 |
| **20.8** | **RNA 1015** (1) | 20.8 | 32 | 15 | 25.8 | 0.65 | 12.4 | 19.5 | 18000 | 12000 | 0.044 |
| **22.1** | **RNA 2015** (1) | 22.1 | 35 | 22 | 28.1 | 0.65 | 23.5 | 37.5 | 17000 | 11000 | 0.082 |
| **23.9** | **RNA 1017** (1) | 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 |

(1) without holes and lubrication groove

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



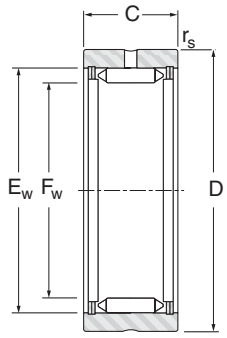

**RNA series 1000, 2000, 22000**



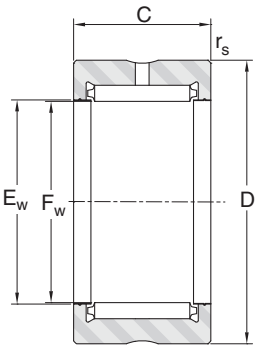

**RNA series 3000**

| Shaft ∅ mm | Designation | $F_w$ mm | D mm | C mm | $E_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| 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




**RNA series 1000, 2000, 22000**




**RNA series 3000**

| Shaft ∅ mm | Designation | $F_w$ mm | D mm | C mm | $E_w$ mm | $r_{s\ min.}$ mm | Load Ratings kN | | Speed rating $min^{-1}$ | | Weight kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dynamic | Static | | | |
| | | | | | | | C | $C_0$ | Oil | Grease | |
| **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 |