

**Drawn cup needle roller bearings  
with open ends**  
**Drawn cup needle roller bearings  
with closed end**

# Drawn cup needle roller bearings

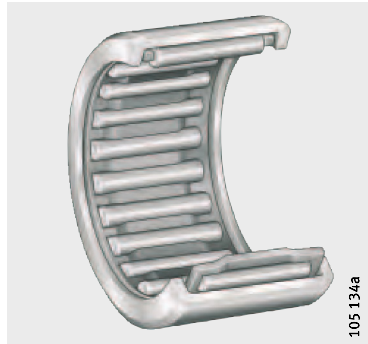
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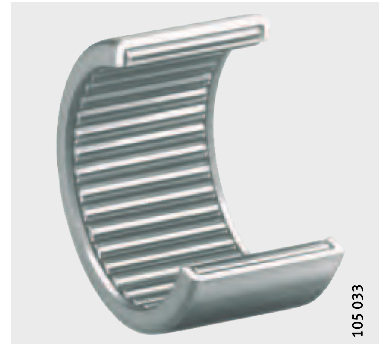
# Product overview Drawn cup needle roller bearings

**Drawn cup  
needle roller bearings  
with open ends**  
With cage or  
full complement

HK

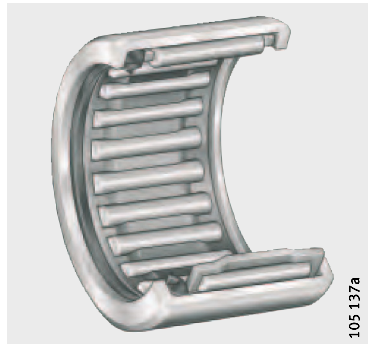


HN

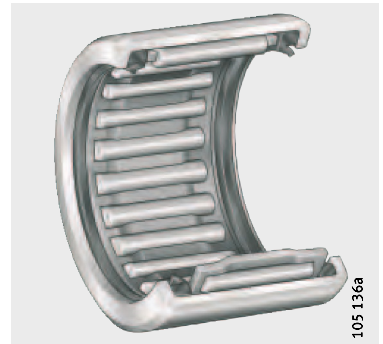


Lip seals

HK..-RS

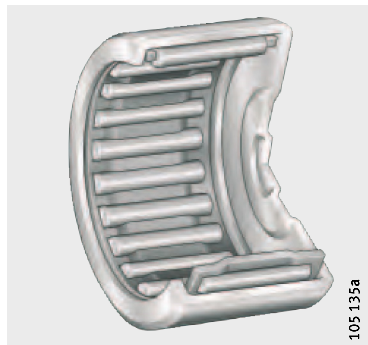


HK..-2RS



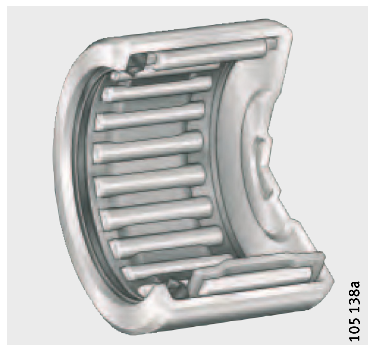
**Drawn cup  
needle roller bearings  
with closed end**

BK



Lip seal

BK..-RS



# Drawn cup needle roller bearings

## Features

Drawn cup needle roller bearings with open ends and with closed end are needle roller bearings with a very small radial section height. They comprise thin-walled, drawn cup outer rings and needle roller and cage assemblies which together form a complete unit.

These bearings allow the design of particularly compact and easy-to-fit bearing arrangements with high radial load carrying capacity. In order to support axial forces, they can also be combined with axial needle roller bearings AXW, series AXW, see dimension table, page 880.

The majority of the bearings are of a single row design and do not have a lubrication hole. Double row designs have a lubrication hole and the suffix ZW.

For particular applications, drawn cup needle roller bearings with open ends are also available in a full complement design.

Drawn cup needle roller bearings require a hardened and ground bearing raceway on the shaft. If the shaft cannot be used as a raceway, the bearings can be combined with inner rings IR or LR. Suitable inner rings: see page 776.

If axial locating elements such as shoulders, snap rings etc. are not used, the housing bore can be produced easily and particularly economically. As a result, fitting of the bearings is simplified.

## Drawn cup needle roller bearings with open ends

Drawn cup needle roller bearings with open ends are supplied with a needle roller and cage assembly or a full complement needle roller set. Bearings with needle roller and cage assemblies allow higher speeds than the full complement designs.

## Full complement drawn cup needle roller bearings with open ends

Full complement drawn cup needle roller bearings have the maximum number of needle rollers and therefore offer extremely high load carrying capacity within a very small design envelope. However, their use at high speeds is restricted.

Since the needle rollers are not retained by mechanical means, they are secured for transport and fitting by means of a special grease (DIN 51825-K1/2K-30). However, this does not have adequate long term lubrication capacity. Relubrication is therefore recommended after fitting.

## Drawn cup needle roller bearings with closed end

Some designs of drawn cup needle roller bearings are closed at one end. They are thus suitable for closing off the shaft ends of bearing arrangements. This gives protection against injury by rotating shafts and protects the bearing against contamination and moisture.

Depending on the size, the base is either smooth or lock-beaded (stiffened). Due to the profiled base, small axial guidance forces are possible.



# Drawn cup needle roller bearings

**Sealing** Drawn cup needle roller bearings with open ends and drawn cup needle roller bearings with closed end are available in an unsealed design in accordance with DIN 618-1/ISO 3 245 and a sealed design in accordance with DIN 618-2.

Under normal operating conditions, the lip seals give protection against contamination, spray water and the loss of lubricant.

**Lubrication** Sealed bearings are greased with a lithium complex soap grease to GA08.

**Operating temperature** Unsealed bearings can be used at temperatures up to +140 °C.



Sealed drawn cup needle roller bearings with open ends and with closed end are suitable for temperatures from -30 °C to +100 °C, restricted by the lubricant and seal material.

Bearings with a plastic cage are suitable for operating temperatures from -20 °C to +120 °C.

**Cages** With only a few exceptions, the cages are made from sheet steel. Bearings with a plastic cage have the suffix TV.

**Special designs** The following special designs are available by agreement:

- unsealed bearings, greased with lithium complex soap grease to GA08 (suffix GA08)
- bearings with a lubrication hole for sizes from HK0609 (suffix AS1).

**Special bearings** In addition to the catalogue designs, special designs are available by agreement:

- with an enveloping circle diameter  $F_w$  from 2 mm to 100 mm
- for special noise requirements (bearings with special noise testing).

**Universal joint bearings** For universal joints, universal joint bearings of series BU and BBU are available by agreement.

**Suffixes** Suffixes for available designs: see table.

## Available designs

| Suffix | Description  | Design                                      |
|--------|--|---|
| AS1    | With lubrication hole from HK0609  | Special design, available by agreement only |
| GA08   | Unsealed, greased bearings for operating temperatures from -30 °C to +140 °C |   |
| RS     | Contact seal on one side   | Standard                                    |
| TV     | Cage made from glass fibre reinforced polyamide 66                           |   |
| ZW     | Double row design, with lubrication hole                                     |   |
| 2RS    | Contact seals on both sides  |   |

## Design and safety guidelines

### Static load safety factor

The static load safety factor  $S_0$  is the security against permanent deformation at the rolling contact and is determined as follows:

$$S_0 = \frac{C_{0r}}{P_0}$$

$S_0$  Static load safety factor –  
 $C_{0r}$  Basic radial static load rating according to dimension tables N  
 $P_0$  Equivalent static bearing load. N



The static load safety factor  $S_0$  must be  $\geq 3$ .

### Minimum radial load

In order to ensure operation without slippage, the bearings must be subjected to a minimum load  $F_{r\ min}$  in a radial direction. This applies in particular to high speed bearings since, if the radial load is insufficient or not present, damaging sliding motion may occur between the rolling elements and raceways. In continuous operation, a minimum radial load of the order of  $P \geq 0,02 \cdot C_r$  is necessary.

### Speeds



The speeds  $n_G$  in the dimension tables are valid for oil lubrication. If grease lubrication is used, the permissible value is 60% of the stated value.



# Drawn cup needle roller bearings

## Design of bearing arrangements

### Raceway for bearings without inner ring

For drawn cup needle roller bearings without an inner ring, the rolling element raceway must be hardened and ground, see table. The surface hardness must be 670 HV, the hardening depth CHD or SHD must be sufficiently large.



In order to fully utilise the load carrying capacity of the bearings, sufficient rigid support must be provided for the thin-walled outer rings.

### Design of housing bore

The bore tolerance is dependent on the housing material. The recommended tolerances are listed in the table.

### Tolerances for shaft raceway and housing bore

| Housing material   | Tolerance                             |              |
|--------------------|---------------------------------------|--------------|
|                    | Shaft for bearings without inner ring | Housing bore |
| Steel or cast iron | h6                                    | N6           |
| Light metal Al     |                                       | R6           |
| Mg                 |                                       | S6           |

### Surface for shaft raceway and housing bore

| Surface quality | Shaft raceway for bearings without inner ring | Housing bore                          |
|-----------------|---|---------------------------------------|
| Roughness max.  | R <sub>a</sub> 0,2 (R <sub>z</sub> 1)         | R <sub>a</sub> 0,8 (R <sub>z</sub> 4) |
| Roundness       | IT 3  | IT 5/2                                |
| Parallelism     | IT 3  | IT 5/2                                |

### Lead chamfer

The shaft and housing bore must have a lead chamfer of 10° to 15°.

## Location

### Radial and axial location

Drawn cup needle roller bearings are located in the housing bore by means of a press fit. They are pressed into the bore and require no further axial locating elements.

### Installation with fitting mandrel

The bearings should be installed using a special fitting mandrel, *Figure 1*. The shoulder of the fitting mandrel must rest against the end face of the bearing. This is indicated by the designation. A toroidal ring should be used to retain the bearing. The length and oversize of the ring must be matched by the customer to the dimensions and mass of the bearing.

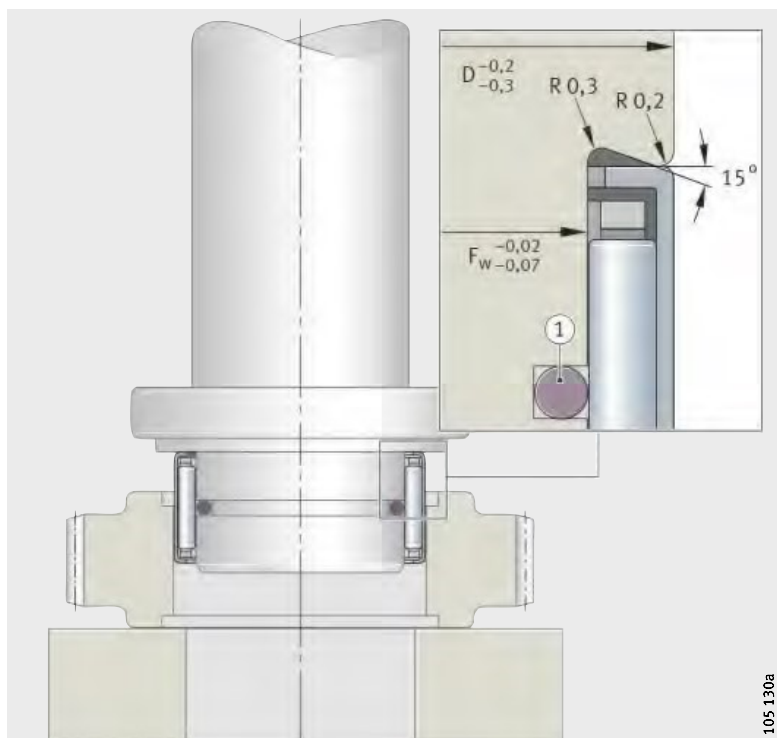
If grease lubrication is to be used, the bearings should be lubricated with grease before fitting.



Drawn cup bearings must not be tilted while they are being pressed in.

The forces occurring during pressing-in are dependent on several factors. The fitting situation should be arranged so that the bearing rib on the end face is not deformed.

If the application requires a fitting procedure different from the one described, fitting trials must be carried out in order to ensure that the bearings can be fitted correctly and without causing damage.



① Toroidal ring

*Figure 1*  
Installation using a fitting mandrel





# Drawn cup needle roller bearings

**Accuracy** The main dimensions of the bearings conform to DIN 618/ISO 3 245. The thin-walled outer rings adopt the dimensional and geometrical accuracy of the housing bore.

**Enveloping circle** In the case of bearings without an inner ring, the dimension for the enveloping circle  $F_w$  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. Once the bearings are fitted, the enveloping circle  $F_w$  is approximately in tolerance zone F8; for bore tolerances to table, page 686. Deviations for the tolerance zone F8, see table, page 168.

**Inspection dimensions** The enveloping circle is determined on the basis of the inspection dimensions in the table according to DIN 620-1.



Bearings used for enveloping circle measurement should not be repeatedly pushed in and out of the gauge. Bearings that have been checked in the ring gauge should not be used again.

**Inspection dimensions for drawn cup needle roller bearings**

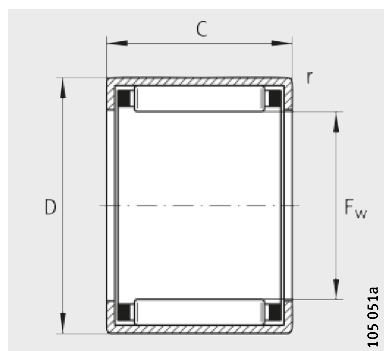
| Enveloping circle<br>$F_w$<br>mm | Outside diameter<br>D<br>mm | Ring gauge bore<br>Actual dimension<br>mm | Enveloping circle                |                                  |
|----------------------------------|-----------------------------|---|----------------------------------|----------------------------------|
|                                  |                             |   | Upper deviation<br>$\mu\text{m}$ | Lower deviation<br>$\mu\text{m}$ |
| 2                                | 4,6                         | 4,587                                     | +24                              | +6                               |
| 3                                | 6,5                         | 6,484                                     | +24                              | +6                               |
| 4                                | 8                           | 7,984                                     | +28                              | +10                              |
| 5                                | 9                           | 8,984                                     | +28                              | +10                              |
| 6                                | 10                          | 9,984                                     | +28                              | +10                              |
| 7                                | 11                          | 10,980                                    | +31                              | +13                              |
| 8                                | 12                          | 11,980                                    | +31                              | +13                              |
| 9                                | 13                          | 12,980                                    | +31                              | +13                              |
| 10                               | 14                          | 13,980                                    | +31                              | +13                              |
| 12                               | 16                          | 15,980                                    | +34                              | +16                              |
| 12                               | 18                          | 17,980                                    | +34                              | +16                              |
| 13                               | 19                          | 18,976                                    | +34                              | +16                              |
| 14                               | 20                          | 19,976                                    | +34                              | +16                              |
| 15                               | 21                          | 20,976                                    | +34                              | +16                              |
| 16                               | 22                          | 21,976                                    | +34                              | +16                              |
| 17                               | 23                          | 22,976                                    | +34                              | +16                              |
| 18                               | 24                          | 23,976                                    | +34                              | +16                              |
| 20                               | 26                          | 25,976                                    | +41                              | +20                              |
| 22                               | 28                          | 27,976                                    | +41                              | +20                              |
| 25                               | 32                          | 31,972                                    | +41                              | +20                              |
| 28                               | 35                          | 34,972                                    | +41                              | +20                              |
| 30                               | 37                          | 36,972                                    | +41                              | +20                              |
| 32                               | 39                          | 38,972                                    | +50                              | +25                              |
| 35                               | 42                          | 41,972                                    | +50                              | +25                              |
| 40                               | 47                          | 46,972                                    | +50                              | +25                              |
| 45                               | 52                          | 51,967                                    | +50                              | +25                              |
| 50                               | 58                          | 57,967                                    | +50                              | +25                              |
| 55                               | 63                          | 62,967                                    | +60                              | +30                              |
| 60                               | 68                          | 67,967                                    | +60                              | +30                              |



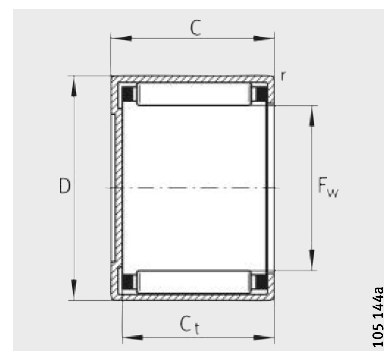
# Drawn cup needle roller bearings with open ends

# Drawn cup needle roller bearings with closed end

Unsealed



HK



BK

**Dimension table** · Dimensions in mm

| Drawn cup needle roller bearings with open ends |              | Drawn cup needle roller bearings with closed end |              | Dimensions     |     |           |                        |           |
|---|--------------|--|--------------|----------------|-----|-----------|------------------------|-----------|
| Designation                                     | Mass m<br>≈g | Designation                                      | Mass m<br>≈g | F <sub>w</sub> | D   | C<br>-0,3 | C <sub>t</sub><br>min. | r<br>min. |
| + HK0205-TV                                     | 0,3          | -  | -            | 2              | 4,6 | 5         | -                      | 0,3       |
| + HK0306-TV                                     | 1            | + BK0306-TV                                      | 1            | 3              | 6,5 | 6         | 5,2                    | 0,3       |
| + HK0408  | 2            | + BK0408   | 2,1          | 4              | 8   | 8         | 6,4                    | 0,3       |
| + HK0509  | 2            | + BK0509   | 2,1          | 5              | 9   | 9         | 7,4                    | 0,4       |
| + HK0606  | 1,5          | -  | -            | 6              | 10  | 6         | -                      | 0,4       |
| + HK0608  | 2,1          | -  | -            | 6              | 10  | 8         | -                      | 0,4       |
| HK0609  | 2,5          | BK0609   | 2,6          | 6              | 10  | 9         | 7,4                    | 0,4       |
| HK0709  | 2,6          | BK0709   | 2,9          | 7              | 11  | 9         | 7,4                    | 0,4       |
| HK0808  | 2,7          | BK0808   | 3            | 8              | 12  | 8         | 6,4                    | 0,4       |
| HK0810  | 3            | BK0810   | 3,4          | 8              | 12  | 10        | 8,4                    | 0,4       |
| HK0908  | 3            | -  | -            | 9              | 13  | 8         | -                      | 0,4       |
| HK0910  | 4            | BK0910   | 4,3          | 9              | 13  | 10        | 8,4                    | 0,4       |
| HK0912  | 4,6          | BK0912   | 4,9          | 9              | 13  | 12        | 10,4                   | 0,4       |
| HK1010  | 4,1          | BK1010   | 4,3          | 10             | 14  | 10        | 8,4                    | 0,4       |
| HK1012  | 4,8          | BK1012   | 5            | 10             | 14  | 12        | 10,4                   | 0,4       |
| HK1015  | 6            | BK1015   | 6,2          | 10             | 14  | 15        | 13,4                   | 0,4       |
| HK1210  | 4,6          | BK1210   | 5,2          | 12             | 16  | 10        | 8,4                    | 0,4       |
| HK1212  | 9            | BK1212   | 10           | 12             | 18  | 12        | 9,3                    | 0,8       |
| HK1312  | 10           | BK1312   | 11           | 13             | 19  | 12        | 9,3                    | 0,8       |
| HK1412  | 10,5         | BK1412   | 12           | 14             | 20  | 12        | 9,3                    | 0,8       |
| HK1512  | 11           | BK1512   | 13           | 15             | 21  | 12        | 9,3                    | 0,8       |
| HK1516  | 15           | BK1516   | 17           | 15             | 21  | 16        | 13,3                   | 0,8       |
| HK1522-ZW                                       | 20           | -  | -            | 15             | 21  | 22        | -                      | 0,8       |
| HK1612  | 12           | BK1612   | 14           | 16             | 22  | 12        | 9,3                    | 0,8       |
| HK1616  | 16           | BK1616   | 18           | 16             | 22  | 16        | 13,3                   | 0,8       |
| HK1622-ZW                                       | 22           | BK1622-ZW  | 24           | 16             | 22  | 22        | 19,3                   | 0,8       |
| HK1712  | 12           | -  | -            | 17             | 23  | 12        | -                      | 0,8       |
| HK1812  | 13           | BK1812   | 15           | 18             | 24  | 12        | 9,3                    | 0,8       |
| HK1816  | 18           | BK1816   | 20           | 18             | 24  | 16        | 13,3                   | 0,8       |
| HK2010  | 12           | -  | -            | 20             | 26  | 10        | -                      | 0,8       |
| HK2012  | 14           | -  | -            | 20             | 26  | 12        | -                      | 0,8       |
| HK2016  | 19           | BK2016   | 22           | 20             | 26  | 16        | 13,3                   | 0,8       |
| HK2020  | 24           | BK2020   | 27           | 20             | 26  | 20        | 17,3                   | 0,8       |
| HK2030-ZW                                       | 35           | -  | -            | 20             | 26  | 30        | -                      | 0,8       |

+ Not available with lubrication hole.

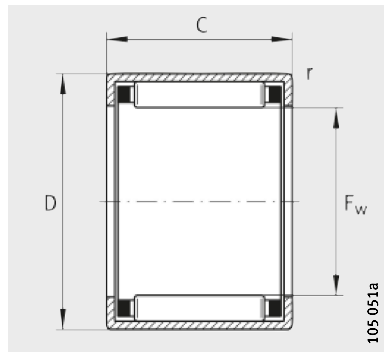
| Basic load ratings |                        | Fatigue limit load<br>$C_{ur}$<br>N | Limiting speed<br>$n_G$<br>$\text{min}^{-1}$ | Reference speed<br>$n_B$<br>$\text{min}^{-1}$ | Suitable inner rings<br>(to be ordered separately) |                     |
|--------------------|------------------------|-------------------------------------|--|---|--|---------------------|
| dyn.<br>$C_r$<br>N | stat.<br>$C_{0r}$<br>N |                                     |  |   | LR Designation                                     | IR Designation      |
| 465                | 265                    | 28,5                                | 58 000                                       | 93 000  | –  | –                   |
| 1 230              | 840                    | 113                                 | 48 000                                       | 57 000  | –  | –                   |
| 1 780              | 1 310                  | 144                                 | 42 500                                       | 44 500  | –  | –                   |
| 2 400              | 1 990                  | 239                                 | 39 000                                       | 36 500  | –  | –                   |
| 1 610              | 1 220                  | 167                                 | 36 500                                       | 31 500  | –  | –                   |
| 2 030              | 1 650                  | 184                                 | 36 500                                       | 31 500  | –  | –                   |
| 2 850              | 2 600                  | 310                                 | 36 500                                       | 30 500  | –  | –                   |
| 3 100              | 2 950                  | 355                                 | 33 000                                       | 26 500  | –  | –                   |
| 2 750              | 2 600                  | 290                                 | 29 500                                       | 23 800  | –  | –                   |
| 3 800              | 3 950                  | 500                                 | 29 500                                       | 23 200  | –  | <b>IR5X8X12</b>     |
| 3 550              | 3 750                  | 440                                 | 26 500                                       | 20 600  | –  | –                   |
| 4 250              | 4 650                  | 600                                 | 26 500                                       | 20 600  | –  | –                   |
| 5 300              | 6 300                  | 860                                 | 26 500                                       | 20 200  | –  | <b>IR6X9X12</b>     |
| 4 400              | 5 100                  | 650                                 | 24 300                                       | 18 700  | <b>LR7X10X10,5</b>                                 | <b>IR7X10X10,5</b>  |
| 5 500              | 6 800                  | 930                                 | 24 300                                       | 18 400  | –  | <b>IR7X10X12</b>    |
| 6 800              | 8 800                  | 1 210                               | 24 300                                       | 18 200  | –  | <b>IR7X10X16</b>    |
| 4 950              | 6 200                  | 800                                 | 20 700                                       | 15 700  | <b>LR8X12X10,5</b>                                 | <b>IR8X12X10,5</b>  |
| 6 500              | 7 300                  | 860                                 | 20 000                                       | 15 500  | <b>LR8X12X12,5</b>                                 | <b>IR8X12X12,5</b>  |
| 6 800              | 7 900                  | 940                                 | 18 700                                       | 14 400  | <b>LR10X13X12,5</b>                                | <b>IR10X13X12,5</b> |
| 7 100              | 8 500                  | 1 010                               | 17 500                                       | 13 500  | –  | <b>IR10X14X13</b>   |
| 7 900              | 9 400                  | 1 150                               | 16 300                                       | 12 300  | <b>LR12X15X12,5</b>                                | <b>IR12X15X12,5</b> |
| 10 500             | 14 400                 | 1 780                               | 16 500                                       | 12 300  | <b>LR12X15X16,5</b>                                | <b>IR12X15X16,5</b> |
| 13 400             | 19 500                 | 2 380                               | 16 500                                       | 12 300  | <b>LR12X15X22,5</b>                                | <b>IR12X15X22,5</b> |
| 7 600              | 9 700                  | 1 160                               | 15 600                                       | 11 900  | –  | <b>IR12X16X13</b>   |
| 10 900             | 15 300                 | 1 900                               | 15 600                                       | 11 600  | –  | <b>IR12X16X16</b>   |
| 13 100             | 19 400                 | 2 310                               | 15 600                                       | 11 700  | –  | <b>IR12X16X22</b>   |
| 7 900              | 10 300                 | 1 230                               | 14 700                                       | 11 200  | –  | –                   |
| 8 100              | 10 900                 | 1 300                               | 14 000                                       | 10 700  | <b>LR15X18X12,5</b>                                | –                   |
| 11 600             | 17 300                 | 2 140                               | 14 000                                       | 10 400  | <b>LR15X18X16,5</b>                                | <b>IR15X18X16,5</b> |
| 6 400              | 8 200                  | 1 040                               | 12 700                                       | 10 000  | –  | –                   |
| 8 600              | 12 100                 | 1 450                               | 12 700                                       | 9 700   | –  | <b>IR15X20X13</b>   |
| 12 700             | 20 100                 | 2 500                               | 12 700                                       | 9 300   | <b>LR17X20X16,5</b>                                | <b>IR17X20X16,5</b> |
| 15 700             | 26 000                 | 3 500                               | 12 700                                       | 9 300   | <b>LR17X20X20,5</b>                                | <b>IR17X20X20,5</b> |
| 21 800             | 40 000                 | 5 000                               | 12 700                                       | 9 200   | <b>LR17X20X30,5</b>                                | <b>IR17X20X30,5</b> |



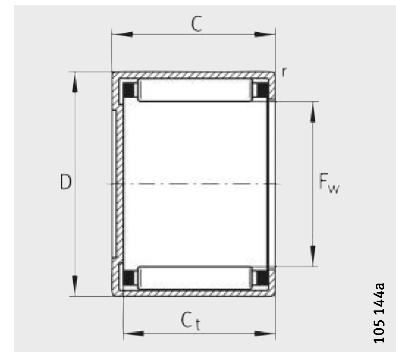
# Drawn cup needle roller bearings with open ends

# Drawn cup needle roller bearings with closed end

Unsealed



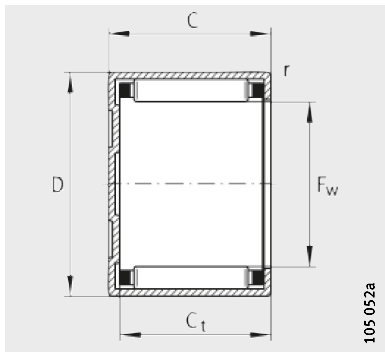
HK



BK with  $F_w < 25$  mm

Dimension table (continued) · Dimensions in mm

| Drawn cup needle roller bearings with open ends |                 | Drawn cup needle roller bearings with closed end |                 | Dimensions |    |           |               |           |
|---|-----------------|--|-----------------|------------|----|-----------|---------------|-----------|
| Designation                                     | Mass<br>m<br>≈g | Designation                                      | Mass<br>m<br>≈g | $F_w$      | D  | C<br>-0,3 | $C_t$<br>min. | r<br>min. |
| HK2210  | 13              | -  | -               | 22         | 28 | 10        | -             | 0,8       |
| HK2212  | 15              | BK2212   | 18              | 22         | 28 | 12        | 9,3           | 0,8       |
| HK2216  | 21              | BK2216   | 24              | 22         | 28 | 16        | 13,3          | 0,8       |
| HK2220  | 26              | -  | -               | 22         | 28 | 20        | -             | 0,8       |
| HK2512  | 20              | -  | -               | 25         | 32 | 12        | -             | 0,8       |
| HK2516  | 27              | BK2516   | 32              | 25         | 32 | 16        | 13,3          | 0,8       |
| HK2520  | 33              | BK2520   | 38              | 25         | 32 | 20        | 17,3          | 0,8       |
| HK2526  | 44              | BK2526   | 48              | 25         | 32 | 26        | 23,3          | 0,8       |
| HK2538-ZW                                       | 64              | BK2538-ZW  | 68              | 25         | 32 | 38        | 35,3          | 0,8       |
| HK2816  | 29              | -  | -               | 28         | 35 | 16        | -             | 0,8       |
| HK2820  | 36              | -  | -               | 28         | 35 | 20        | -             | 0,8       |
| HK3012  | 23              | BK3012   | 28              | 30         | 37 | 12        | 9,3           | 0,8       |
| HK3016  | 31              | BK3016   | 38              | 30         | 37 | 16        | 13,3          | 0,8       |
| HK3020  | 39              | BK3020   | 47              | 30         | 37 | 20        | 17,3          | 0,8       |
| HK3022  | 42              | -  | -               | 30         | 37 | 22        | -             | 0,8       |
| HK3026  | 51              | BK3026   | 58              | 30         | 37 | 26        | 23,3          | 0,8       |
| HK3038-ZW                                       | 76              | BK3038-ZW  | 84              | 30         | 37 | 38        | 35,3          | 0,8       |
| HK3220  | 40,6            | -  | -               | 32         | 39 | 20        | -             | 0,8       |
| HK3224  | 49              | -  | -               | 32         | 39 | 24        | -             | 0,8       |
| HK3512  | 27              | -  | -               | 35         | 42 | 12        | -             | 0,8       |
| HK3516  | 36              | -  | -               | 35         | 42 | 16        | -             | 0,8       |
| HK3520  | 44              | BK3520   | 53              | 35         | 42 | 20        | 17,3          | 0,8       |
| HK4012  | 30              | -  | -               | 40         | 47 | 12        | -             | 0,8       |
| HK4016  | 39              | -  | -               | 40         | 47 | 16        | -             | 0,8       |
| HK4020  | 54              | BK4020   | 62              | 40         | 47 | 20        | 17,3          | 0,8       |
| HK4512  | 33              | -  | -               | 45         | 52 | 12        | -             | 0,8       |
| HK4516  | 46              | -  | -               | 45         | 52 | 16        | -             | 0,8       |
| HK4520  | 56              | BK4520   | 72              | 45         | 52 | 20        | 17,3          | 0,8       |
| HK5020  | 70              | -  | -               | 50         | 58 | 20        | -             | 0,8       |
| HK5025  | 90              | -  | -               | 50         | 58 | 25        | -             | 0,8       |
| HK5520  | 74              | -  | -               | 55         | 63 | 20        | -             | 0,8       |
| HK5528  | 105             | -  | -               | 55         | 63 | 28        | -             | 0,8       |
| HK6012  | 49              | -  | -               | 60         | 68 | 12        | -             | 0,8       |
| HK6020  | 81              | -  | -               | 60         | 68 | 20        | -             | 0,8       |
| HK6032  | 136             | -  | -               | 60         | 68 | 32        | -             | 0,8       |



BK with  $F_w \geq 25$  mm

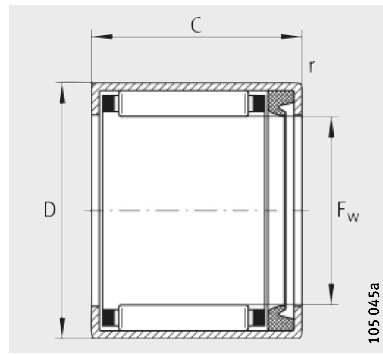
105 052a

| Basic load ratings |                        | Fatigue limit load<br>$C_{ur}$<br>N | Limiting speed<br>$n_G$<br>$\text{min}^{-1}$ | Reference speed<br>$n_B$<br>$\text{min}^{-1}$ | Suitable inner rings<br>(to be ordered separately) |                |
|--------------------|------------------------|-------------------------------------|--|---|--|----------------|
| dyn.<br>$C_r$<br>N | stat.<br>$C_{0r}$<br>N |                                     |  |   | LR Designation                                     | IR Designation |
| 7 500              | 10 500                 | 1 360                               | 11 700                                       | 9 000   | –  | –              |
| 9 100              | 13 400                 | 1 600                               | 11 700                                       | 8 900   | –  | IR17X22X13     |
| 13 400             | 22 100                 | 2 800                               | 11 700                                       | 8 500   | –  | IR17X22X16     |
| 16 500             | 29 000                 | 3 850                               | 11 700                                       | 8 500   | –  | IR17X22X23     |
| 11 000             | 15 200                 | 1 990                               | 10 200                                       | 7 800   | LR20X25X12,5                                       | –              |
| 15 600             | 24 000                 | 3 150                               | 10 200                                       | 7 500   | LR20X25X16,5                                       | IR20X25X17     |
| 19 900             | 33 000                 | 4 200                               | 10 200                                       | 7 400   | LR20X25X20,5                                       | IR20X25X20,5   |
| 25 500             | 45 000                 | 6 200                               | 10 200                                       | 7 300   | LR20X25X26,5                                       | IR20X25X26,5   |
| 34 000             | 66 000                 | 8 400                               | 10 200                                       | 7 300   | LR20X25X38,5                                       | IR20X25X38,5   |
| 16 400             | 26 500                 | 3 450                               | 9 200  | 6 800   | –  | IR22X28X17     |
| 20 900             | 36 000                 | 4 650                               | 9 200  | 6 700   | LR22X28X20,5                                       | IR22X28X20,5   |
| 12 100             | 18 200                 | 2 390                               | 8 600  | 6 600   | LR25X30X12,5                                       | –              |
| 17 200             | 29 000                 | 3 750                               | 8 600  | 6 400   | LR25X30X16,5                                       | IR25X30X17     |
| 22 000             | 39 500                 | 5 100                               | 8 600  | 6 300   | LR25X30X20,5                                       | IR25X30X20,5   |
| 24 800             | 46 000                 | 6 100                               | 8 600  | 6 200   | –  | –              |
| 28 000             | 54 000                 | 7 400                               | 8 600  | 6 200   | LR25X30X26,5                                       | IR25X30X26,5   |
| 37 500             | 79 000                 | 10 100                              | 8 600  | 6 200   | LR25X30X38,5                                       | IR25X30X38,5   |
| 23 000             | 42 500                 | 5 500                               | 8 100  | 5 900   | LR28X32X20   | –              |
| 27 500             | 54 000                 | 7 300                               | 8 100  | 5 800   | –  | –              |
| 13 100             | 21 300                 | 2 800                               | 7 500  | 5 800   | LR30X35X12,5                                       | –              |
| 18 700             | 33 500                 | 4 400                               | 7 500  | 5 600   | LR30X35X16,5                                       | IR30X35X17     |
| 23 800             | 46 000                 | 5 900                               | 7 500  | 5 500   | LR30X35X20,5                                       | IR30X35X20,5   |
| 14 000             | 24 300                 | 3 200                               | 6 600  | 5 200   | LR35X40X12,5                                       | –              |
| 20 000             | 38 500                 | 5 000                               | 6 600  | 5 000   | LR35X40X16,5                                       | IR35X40X17     |
| 25 500             | 52 000                 | 6 800                               | 6 600  | 4 900   | LR35X40X20,5                                       | IR35X40X20,5   |
| 14 900             | 27 500                 | 3 600                               | 5 900  | 4 650   | –  | –              |
| 21 300             | 43 000                 | 5 700                               | 5 900  | 4 550   | LR40X45X16,5                                       | IR40X45X17     |
| 27 000             | 59 000                 | 7 600                               | 5 900  | 4 450   | LR40X45X20,5                                       | IR40X45X20,5   |
| 31 000             | 63 000                 | 8 200                               | 5 300  | 4 050   | LR45X50X20,5                                       | –              |
| 38 500             | 84 000                 | 11 700                              | 5 300  | 4 000   | LR45X50X25,5                                       | IR45X50X25,5   |
| 31 500             | 67 000                 | 8 700                               | 4 850  | 3 800   | LR50X55X20,5                                       | –              |
| 44 000             | 103 000                | 14 700                              | 4 850  | 3 700   | –  | –              |
| 17 400             | 32 000                 | 4 250                               | 4 450  | 3 750   | –  | –              |
| 33 500             | 75 000                 | 9 800                               | 4 450  | 3 500   | –  | –              |
| 53 000             | 135 000                | 19 700                              | 4 450  | 3 400   | –  | –              |

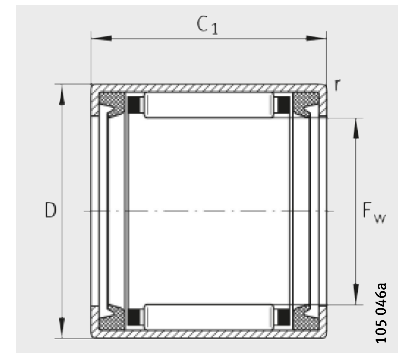


**Drawn cup needle roller bearings with open ends**  
**Drawn cup needle roller bearings with closed end**

Sealed



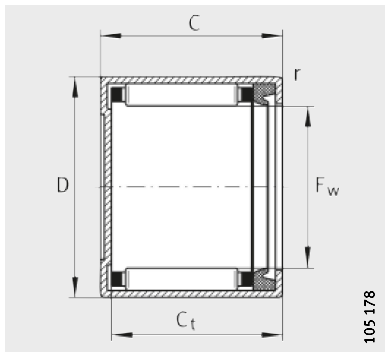
HK..-RS



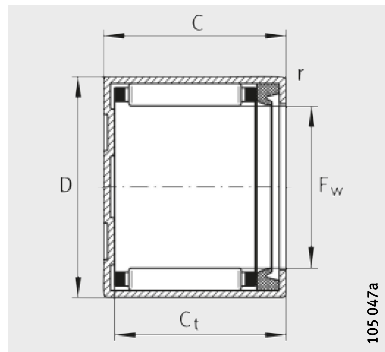
HK..-2RS

Dimension table · Dimensions in mm

| Drawn cup needle roller bearings with open ends |              |                      |              | Drawn cup needle roller bearings with closed end |              | Dimensions     |    |    |                |
|---|--------------|----------------------|--------------|--|--------------|----------------|----|----|----------------|
| Sealed on one side                              |              | Sealed on both sides |              | Sealed   |              | F <sub>w</sub> | D  | C  | C <sub>1</sub> |
| Designation                                     | Mass m<br>≈g | Designation          | Mass m<br>≈g | Designation                                      | Mass m<br>≈g |                |    |    |                |
| -   | -            | <b>HK0810-2RS</b>    | 3,2          | -  | -            | <b>8</b>       | 12 | -  | 10             |
| <b>HK0810-RS</b>                                | 3            | <b>HK0812-2RS</b>    | 3,3          | -  | -            | <b>8</b>       | 12 | 10 | 12             |
| <b>HK0812-RS</b>                                | 3,1          | -                    | -            | -  | -            | <b>8</b>       | 12 | 12 | -              |
| -   | -            | <b>HK1012-2RS</b>    | 4,3          | -  | -            | <b>10</b>      | 14 | -  | 12             |
| <b>HK1012-RS</b>                                | 4,2          | <b>HK1014-2RS</b>    | 4,6          | <b>BK1012-RS</b>                                 | 4,3          | <b>10</b>      | 14 | 12 | 14             |
| -   | -            | <b>HK1214-2RS</b>    | 8            | -  | -            | <b>12</b>      | 16 | -  | 14             |
| <b>HK1214-RS</b>                                | 10           | <b>HK1216-2RS</b>    | 11           | -  | -            | <b>12</b>      | 18 | 14 | 16             |
| <b>HK1414-RS</b>                                | 12           | <b>HK1416-2RS</b>    | 13           | <b>BK1414-RS</b>                                 | 13           | <b>14</b>      | 20 | 14 | 16             |
| <b>HK1514-RS</b>                                | 12           | <b>HK1516-2RS</b>    | 15           | -  | -            | <b>15</b>      | 21 | 14 | 16             |
| <b>HK1518-RS</b>                                | 16           | <b>HK1520-2RS</b>    | 18           | -  | -            | <b>15</b>      | 21 | 18 | 20             |
| <b>HK1614-RS</b>                                | 13           | <b>HK1616-2RS</b>    | 14           | <b>BK1614-RS</b>                                 | 15           | <b>16</b>      | 22 | 14 | 16             |
| -   | -            | <b>HK1620-2RS</b>    | 18           | -  | -            | <b>16</b>      | 22 | -  | 20             |
| <b>HK1814-RS</b>                                | 14           | <b>HK1816-2RS</b>    | 15           | -  | -            | <b>18</b>      | 24 | 14 | 16             |
| -   | -            | <b>HK2016-2RS</b>    | 18           | -  | -            | <b>20</b>      | 26 | -  | 16             |
| <b>HK2018-RS</b>                                | 21           | <b>HK2020-2RS</b>    | 23           | <b>BK2018-RS</b>                                 | 24           | <b>20</b>      | 26 | 18 | 20             |
| <b>HK2214-RS</b>                                | 16           | <b>HK2216-2RS</b>    | 18           | -  | -            | <b>22</b>      | 28 | 14 | 16             |
| <b>HK2218-RS</b>                                | 24           | <b>HK2220-2RS</b>    | 26           | -  | -            | <b>22</b>      | 28 | 18 | 20             |
| -   | -            | <b>HK2516-2RS</b>    | 27           | -  | -            | <b>25</b>      | 32 | -  | 16             |
| <b>HK2518-RS</b>                                | 29           | <b>HK2520-2RS</b>    | 31           | <b>BK2518-RS</b>                                 | 34           | <b>25</b>      | 32 | 18 | 20             |
| -   | -            | <b>HK2524-2RS</b>    | 40           | -  | -            | <b>25</b>      | 32 | -  | 24             |
| -   | -            | <b>HK2530-2RS</b>    | 47           | -  | -            | <b>25</b>      | 32 | -  | 30             |
| <b>HK2818-RS</b>                                | 31           | <b>HK2820-2RS</b>    | 34           | -  | -            | <b>28</b>      | 35 | 18 | 20             |
| -   | -            | <b>HK3016-2RS</b>    | 31           | -  | -            | <b>30</b>      | 37 | -  | 16             |
| <b>HK3018-RS</b>                                | 37           | <b>HK3020-2RS</b>    | 36           | -  | -            | <b>30</b>      | 37 | 18 | 20             |
| -   | -            | <b>HK3024-2RS</b>    | 44           | -  | -            | <b>30</b>      | 37 | -  | 24             |
| -   | -            | <b>HK3516-2RS</b>    | 32           | -  | -            | <b>35</b>      | 42 | -  | 16             |
| <b>HK3518-RS</b>                                | 39           | <b>HK3520-2RS</b>    | 41           | -  | -            | <b>35</b>      | 42 | 18 | 20             |
| -   | -            | <b>HK4016-2RS</b>    | 37           | -  | -            | <b>40</b>      | 47 | -  | 16             |
| <b>HK4018-RS</b>                                | 45           | <b>HK4020-2RS</b>    | 48           | -  | -            | <b>40</b>      | 47 | 18 | 20             |
| <b>HK4518-RS</b>                                | 50           | <b>HK4520-2RS</b>    | 54           | -  | -            | <b>45</b>      | 52 | 18 | 20             |
| <b>HK5022-RS</b>                                | 76           | <b>HK5024-2RS</b>    | 81           | -  | -            | <b>50</b>      | 58 | 22 | 24             |



BK..-RS with  $F_w < 25 \text{ mm}$



BK..-RS with  $F_w \geq 25 \text{ mm}$

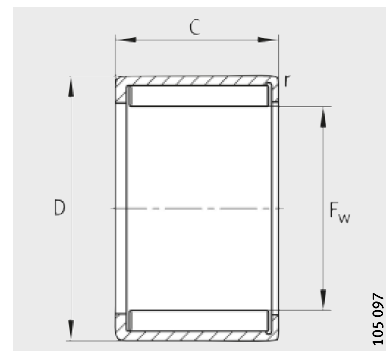
|               |             | Basic load ratings |                        | Fatigue limit load<br>$C_{ur}$<br>N | Limiting speed<br>$n_G$ grease<br>$\text{min}^{-1}$ | Suitable inner rings<br>(to be ordered separately) |                     |                     |
|---------------|-------------|--------------------|------------------------|-------------------------------------|---|--|---------------------|---------------------|
| $C_t$<br>min. | $r$<br>min. | dyn.<br>$C_r$<br>N | stat.<br>$C_{0r}$<br>N |                                     |   | For HK..-RS and HK..-2RS                           |                     | For BK..-RS, LR, IR |
|               |             |                    |                        |                                     |   | LR Designation                                     | IR Designation      | Designation         |
| -             | 0,4         | 2 180              | 1 930                  | 265                                 | 20 000  | -  | -                   | -                   |
| -             | 0,4         | 2 750              | 2 600                  | 290                                 | 20 000  | -  | -                   | -                   |
| -             | 0,4         | 3 800              | 3 950                  | 500                                 | 20 000  | -  | -                   | -                   |
| -             | 0,4         | 3 200              | 3 350                  | 380                                 | 17 000  | -  | -                   | -                   |
| -             | 0,4         | 4 400              | 5 100                  | 650                                 | 17 000  | -  | -                   | -                   |
| -             | 0,4         | 4 950              | 6 200                  | 800                                 | 14 000  | -  | -                   | -                   |
| -             | 0,8         | 6 500              | 7 300                  | 860                                 | 14 000  | -  | -                   | -                   |
| 11,3          | 0,8         | 7 100              | 8 500                  | 1 010                               | 12 000  | -  | -                   | -                   |
| -             | 0,8         | 7 800              | 9 800                  | 1 190                               | 11 000  | <b>LR12X15X16,5</b>                                | <b>IR12X15X16,5</b> | <b>LR12X15X12,5</b> |
| -             | 0,8         | 10 500             | 14 400                 | 1 780                               | 11 000  | -  | -                   | -                   |
| 11,3          | 0,8         | 7 600              | 9 700                  | 1 160                               | 11 000  | -  | <b>IR12X16X20</b>   | <b>IR12X16X13</b>   |
| -             | 0,8         | 10 900             | 15 300                 | 1 900                               | 11 000  | -  | -                   | -                   |
| -             | 0,8         | 8 100              | 10 900                 | 1 300                               | 9 500   | <b>LR15X18X16,5</b>                                | <b>IR15X18X16,5</b> | -                   |
| -             | 0,8         | 8 600              | 12 100                 | 1 450                               | 8 500   | <b>LR17X20X16,5</b>                                | <b>IR17X20X16,5</b> | -                   |
| 15,3          | 0,8         | 12 700             | 20 100                 | 2 500                               | 8 500   | <b>LR17X20X20,5</b>                                | <b>IR17X20X20,5</b> | <b>LR17X20X16,5</b> |
| -             | 0,8         | 9 100              | 13 400                 | 1 600                               | 8 000   | -  | <b>IR17X22X16</b>   | -                   |
| -             | 0,8         | 13 400             | 22 100                 | 2 800                               | 8 000   | -  | <b>IR17X22X23</b>   | -                   |
| -             | 0,8         | 11 000             | 15 200                 | 1 990                               | 7 000   | <b>LR20X25X16,5</b>                                | <b>IR20X25X17</b>   | -                   |
| 15,3          | 0,8         | 15 600             | 24 000                 | 3 150                               | 7 000   | <b>LR20X25X20,5</b>                                | <b>IR20X25X20,5</b> | <b>LR20X25X16,5</b> |
| -             | 0,8         | 19 900             | 33 000                 | 4 200                               | 7 000   | -  | -                   | -                   |
| -             | 0,8         | 25 500             | 45 000                 | 6 200                               | 7 000   | -  | <b>IR20X25X30</b>   | -                   |
| -             | 0,8         | 16 400             | 26 500                 | 3 450                               | 6 000   | <b>LR22X28X20,5</b>                                | <b>IR22X28X20,5</b> | -                   |
| -             | 0,8         | 12 100             | 18 200                 | 2 390                               | 6 000   | <b>LR25X30X16,5</b>                                | <b>IR25X30X17</b>   | -                   |
| -             | 0,8         | 17 200             | 29 000                 | 3 750                               | 6 000   | <b>LR25X30X20,5</b>                                | <b>IR25X30X20,5</b> | -                   |
| -             | 0,8         | 22 000             | 39 500                 | 5 100                               | 6 000   | -  | -                   | -                   |
| -             | 0,8         | 13 100             | 21 300                 | 2 800                               | 5 000   | <b>LR30X35X16,5</b>                                | <b>IR30X35X17</b>   | -                   |
| -             | 0,8         | 18 700             | 33 500                 | 4 400                               | 5 000   | <b>LR30X35X20,5</b>                                | <b>IR30X35X20,5</b> | -                   |
| -             | 0,8         | 14 000             | 24 300                 | 3 200                               | 4 500   | <b>LR35X40X16,5</b>                                | <b>IR35X40X17</b>   | -                   |
| -             | 0,8         | 20 000             | 38 500                 | 5 000                               | 4 500   | <b>LR35X40X20,5</b>                                | <b>IR35X40X20,5</b> | -                   |
| -             | 0,8         | 21 300             | 43 000                 | 5 700                               | 4 000   | <b>LR40X45X20,5</b>                                | <b>IR40X45X20,5</b> | -                   |
| -             | 0,8         | 31 000             | 63 000                 | 8 200                               | 3 600   | <b>LR45X50X25,5</b>                                | <b>IR45X50X25,5</b> | -                   |





# Drawn cup needle roller bearings with open ends

Full complement needle roller set  
Unsealed



HN

Dimension table · Dimensions in mm

| Designation   | Mass<br>m<br>≈g | Dimensions     |    |    |           | Basic load ratings          |                               |
|---------------|-----------------|----------------|----|----|-----------|-----------------------------|-------------------------------|
|               |                 | F <sub>w</sub> | D  | C  | r<br>min. | dyn.<br>C <sub>r</sub><br>N | stat.<br>C <sub>0r</sub><br>N |
| <b>HN0808</b> | 3               | <b>8</b>       | 12 | 8  | 0,4       | 5 000                       | 6 700                         |
| <b>HN1010</b> | 4,6             | <b>10</b>      | 14 | 10 | 0,4       | 7 200                       | 11 100                        |
| <b>HN1210</b> | 5,3             | <b>12</b>      | 16 | 10 | 0,4       | 8 000                       | 13 400                        |
| <b>HN1212</b> | 10,5            | <b>12</b>      | 18 | 12 | 0,8       | 10 200                      | 15 200                        |
| <b>HN1412</b> | 12              | <b>14</b>      | 20 | 12 | 0,8       | 11 000                      | 17 500                        |
| <b>HN1516</b> | 14              | <b>15</b>      | 21 | 16 | 0,8       | 15 400                      | 27 500                        |
| <b>HN1612</b> | 13              | <b>16</b>      | 22 | 12 | 0,8       | 12 000                      | 20 300                        |
| <b>HN1816</b> | 20              | <b>18</b>      | 24 | 16 | 0,8       | 17 000                      | 32 500                        |
| <b>HN2016</b> | 22              | <b>20</b>      | 26 | 16 | 0,8       | 18 100                      | 36 500                        |
| <b>HN2020</b> | 29,5            | <b>20</b>      | 26 | 20 | 0,8       | 22 400                      | 48 000                        |
| <b>HN2520</b> | 39,6            | <b>25</b>      | 32 | 20 | 0,8       | 28 000                      | 59 000                        |
| <b>HN2820</b> | 44              | <b>28</b>      | 35 | 20 | 0,8       | 30 000                      | 67 000                        |
| <b>HN3520</b> | 54              | <b>35</b>      | 42 | 20 | 0,8       | 33 500                      | 83 000                        |
| <b>HN4020</b> | 60,5            | <b>40</b>      | 47 | 20 | 0,8       | 36 000                      | 95 000                        |
| <b>HN4520</b> | 66              | <b>45</b>      | 52 | 20 | 0,8       | 38 500                      | 108 000                       |
| <b>HN4525</b> | 85              | <b>45</b>      | 52 | 25 | 0,8       | 47 000                      | 139 000                       |
| <b>HN5020</b> | 85,3            | <b>50</b>      | 58 | 20 | 0,8       | 44 500                      | 119 000                       |
| <b>HN5025</b> | 107             | <b>50</b>      | 58 | 25 | 0,8       | 54 000                      | 152 000                       |