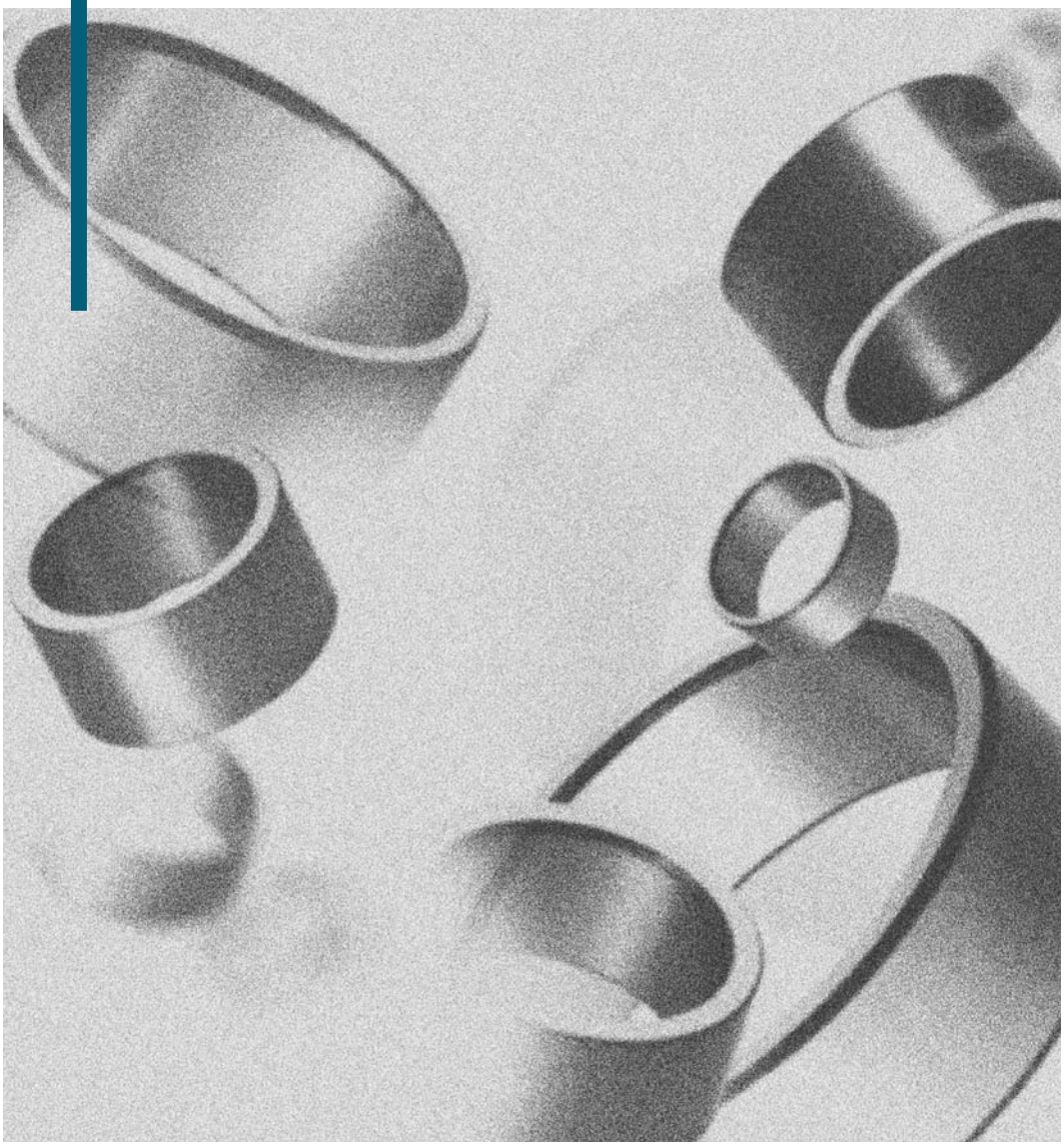
# Inner Rings



# Inner Rings

## Inner Rings

Many of the needle roller bearings use a shaft as the direct raceway surface without using inner ring. However, it is recommended to use any of the inner rings described hereunder, together with needle roller bearing, where applicable shaft can not be surface-hardened and surface-finished by grinding. Any inner rings are made of high carbon chrome bearing steel and finished by grinding after heat-treated.

It is desirable to use an inner ring of wide width, where the axial displacement of a shaft is great and also a seal is used at the outer side of bearing.

## Types and Designs

**NTN** inner rings are available in both of **IR type** with boundary dimensions of metric system and **MI type** with boundary dimensions of inch system. Both edges of inner ring raceway are chamfered to form gentle tapers in order to facilitate fitting of the inner ring. In contrast, inner rings whose inner ring number is headed by an asterisk (*) are provided with slight-chamfering so that they will offer a greater axial travel. In addition to these inner rings, manufacture of special inner ring type (suffix D) with oil hole on its center is also available.

For applications that need particularly high running accuracy, certain bearing users install the inner ring onto the shaft and then grind the raceway surface to targeted accuracy. To fulfill this type of request, **NTN** will supply a special inner ring whose raceway surface includes a grinding allowance. For details, contact **NTN** Engineering.

## Composition of inner ring number

Inner ring number consists of type code (**IR** or **MI**)), dimension code [bore dia. ($d$)× raceway dia. ($F$)×width ($B$)] and a suffix. Note that the dimensions of Type **MI** (inch series) inner rings measure in 1/16 increments.

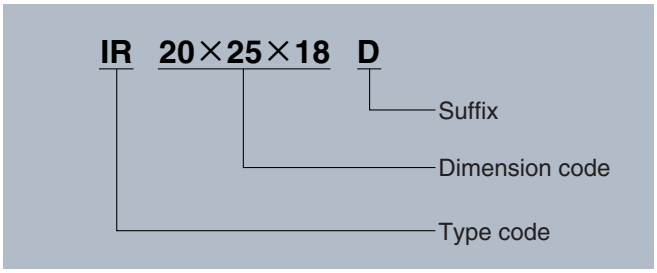


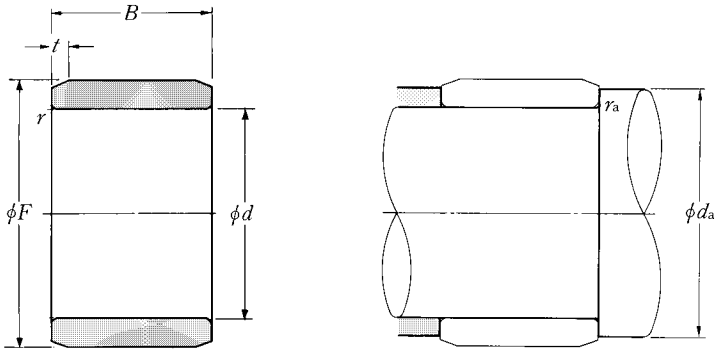

**Fig. 1**

## Dimensional accuracy for inner ring

The dimensional accuracy (bore diameter "$d$", width "$B$" and chamfer dimension "$r_s$ min"), profile accuracy and running accuracy of the inner rings are as shown in **Tables 4.3** and **4.5** of Section 4 "**Bearing accuracy**" (page A-26). And the standard accuracy class of these items conforms to JIS Class-0, but other inner rings conforming to JIS Class-5 and -4 are also offerable on request.

Each inner ring has been finished to the dimensional tolerance of its raceway diameter ($F$) in the relevant dimension table so that when the inner ring is combined with a needle roller bearing, the resultant radial internal clearance falls in a range of ordinary clearance (refer to **Table 5.1** in Sec. **5.2 "Running clearance"**.)

## Type IR

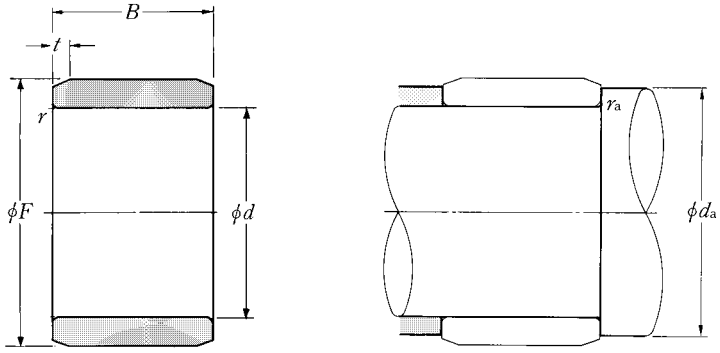



$d$ 5～10mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 5 | 7 | 10 | 0.15 | 1 | IR 5× 7×10 | 6.2 | 0.15 | 0.0014 |
| | 8 $^{0}_{-0.006}$ | 12 | 0.3 | 1 | IR 5× 8×12 | 7 | 0.3 | 0.0028 |
| | 8 | 16 | 0.3 | — | ※IR 5× 8×16 | 7 | 0.3 | 0.0038 |
| 6 | 8 | 10 | 0.15 | 1 | IR 6× 8×10 | 7.2 | 0.15 | 0.0017 |
| | 9 | 12 | 0.3 | 1 | IR 6× 9×12 | 8 | 0.3 | 0.0032 |
| | 9 $^{0}_{-0.006}$ | 16 | 0.3 | 1 | IR 6× 9×16 | 8 | 0.3 | 0.0043 |
| | 10 | 10 | 0.3 | 1 | IR 6×10×10 | 8 | 0.3 | 0.0037 |
| | 10 | 12 | 0.3 | — | ※IR 6×10×12D | 8 | 0.3 | 0.0046 |
| | 10 | 13 | 0.3 | 1 | IR 6×10×13 | 8 | 0.3 | 0.0050 |
| 7 | 9 | 10 | 0.15 | 1 | IR 7× 9×10 | 8.2 | 0.15 | 0.0019 |
| | 10 | 10.5 | 0.3 | 1 | IR 7×10×10.5 | 9 | 0.3 | 0.0031 |
| | 10 $^{0}_{-0.006}$ | 12 | 0.3 | 1 | IR 7×10×12 | 9 | 0.3 | 0.0036 |
| | 10 | 16 | 0.3 | 1 | IR 7×10×16 | 9 | 0.3 | 0.0049 |
| | 12 $^{0}_{-0.008}$ | 16 | 0.3 | 1 | IR 7×12×16 | 9 | 0.3 | 0.0093 |
| 8 | 10 $^{0}_{-0.006}$ | 11 | 0.15 | 1 | IR 8×10×11 | 9.2 | 0.15 | 0.0024 |
| | 12 | 10 | 0.3 | 1 | IR 8×12×10 | 10 | 0.3 | 0.0048 |
| | 12 | 10.5 | 0.3 | 1 | IR 8×12×10.5 | 10 | 0.3 | 0.0050 |
| | 12 $^{0}_{-0.008}$ | 12 | 0.3 | — | ※IR 8×12×12D | 10 | 0.3 | 0.0057 |
| | 12 | 12.5 | 0.3 | 1 | IR 8×12×12.5 | 10 | 0.3 | 0.0059 |
| | 14 | 16 | 0.3 | 1 | IR 8×14×16 | 10 | 0.3 | 0.013 |
| 9 | 12 | 11 | 0.3 | 1 | IR 9×12×11 | 11 | 0.3 | 0.0041 |
| | 12 $^{0}_{-0.008}$ | 12 | 0.3 | 1 | IR 9×12×12 | 11 | 0.3 | 0.0045 |
| | 12 | 16 | 0.3 | 1 | IR 9×12×16 | 11 | 0.3 | 0.0061 |
| | 15 | 16 | 0.3 | 1 | IR 9×15×16 | 11 | 0.3 | 0.014 |
| 10 | 13 | 12.5 | 0.3 | 1 | IR10×13×12.5 | 12 | 0.3 | 0.0052 |
| | 14 | 12 | 0.3 | 1 | IR10×14×12 | 12 | 0.3 | 0.0073 |
| | 14 $^{0}_{-0.008}$ | 13 | 0.3 | 1 | IR10×14×13 | 12 | 0.3 | 0.0074 |
| | 14 | 14 | 0.3 | — | ※IR10×14×14D | 12 | 0.3 | 0.0080 |
| | 14 | 16 | 0.3 | — | ※IR10×14×16 | 12 | 0.3 | 0.0092 |
| | 14 | 20 | 0.3 | 1 | IR10×14×20 | 12 | 0.3 | 0.012 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## Type IR




### $d$ 10～15mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| | 15 | 15.5 | 0.3 | 1 | **IR10×15×15.5** | 12 | 0.3 | 0.012 |
| **10** | 15 $^{0}_{-0.008}$ | 20.5 | 0.3 | 1 | **IR10×15×20.5** | 12 | 0.3 | 0.015 |
| | 16 | 16 | 0.3 | 1 | **IR10×16×16** | 12 | 0.3 | 0.015 |
| | 15 | 12 | 0.3 | 1 | **IR12×15×12** | 14 | 0.3 | 0.0058 |
| | 15 | 12.5 | 0.3 | 1 | **IR12×15×12.5** | 14 | 0.3 | 0.0061 |
| | 15 | 16 | 0.3 | 1 | **IR12×15×16** | 14 | 0.3 | 0.0078 |
| | 15 | 16.5 | 0.3 | — | **※IR12×15×16.5** | 14 | 0.3 | 0.0080 |
| | 15 | 22.5 | 0.3 | — | **※IR12×15×22.5** | 14 | 0.3 | 0.011 |
| | 16 | 12 | 0.3 | 1.5 | **IR12×16×12** | 14 | 0.3 | 0.0079 |
| | 16 | 13 | 0.3 | 1.5 | **IR12×16×13** | 14 | 0.3 | 0.0087 |
| **12** | 16 $^{0}_{-0.008}$ | 14 | 0.3 | — | **※IR12×16×14D** | 14 | 0.3 | 0.0095 |
| | 16 | 16 | 0.3 | 1.5 | **IR12×16×16** | 14 | 0.3 | 0.011 |
| | 16 | 20 | 0.3 | 1.5 | **IR12×16×20** | 14 | 0.3 | 0.014 |
| | 16 | 22 | 0.3 | 1.5 | **IR12×16×22** | 14 | 0.3 | 0.015 |
| | 17 | 20.5 | 0.3 | 1.5 | **IR12×17×20.5** | 14 | 0.3 | 0.019 |
| | 17 | 25.5 | 0.3 | 1.5 | **IR12×17×25.5** | 14 | 0.3 | 0.024 |
| | 18 | 16 | 0.3 | 1.5 | **IR12×18×16** | 14 | 0.3 | 0.018 |
| **14** | 17 $^{0}_{-0.008}$ | 17 | 0.3 | 1.5 | **IR14×17×17** | 16 | 0.3 | 0.0095 |
| | 18 | 12.5 | 0.3 | 1.5 | **IR15×18×12.5** | 17 | 0.3 | 0.0072 |
| | 18 | 16 | 0.3 | 1.5 | **IR15×18×16** | 17 | 0.3 | 0.0093 |
| | 18 | 16.5 | 0.3 | 1.5 | **IR15×18×16.5** | 17 | 0.3 | 0.0096 |
| | 18 $^{0}_{-0.008}$ | 17.5 | 0.3 | 1.5 | **IR15×18×17.5** | 17 | 0.3 | 0.010 |
| | 18 | 20.5 | 0.3 | 1.5 | **IR15×18×20.5** | 17 | 0.3 | 0.012 |
| | 18 | 25.5 | 0.3 | 1.5 | **IR15×18×25.5** | 17 | 0.3 | 0.015 |
| **15** | 19 | 16 | 0.3 | 1.5 | **IR15×19×16** | 17 | 0.3 | 0.013 |
| | 19 | 20 | 0.3 | 1.5 | **IR15×19×20** | 17 | 0.3 | 0.016 |
| | 20 | 12 | 0.3 | 1.5 | **IR15×20×12** | 17 | 0.3 | 0.012 |
| | 20 $^{0}_{-0.009}$ | 13 | 0.3 | 1.5 | **IR15×20×13** | 17 | 0.3 | 0.014 |
| | 20 | 14 | 0.3 | — | **※IR15×20×14D** | 17 | 0.3 | 0.015 |
| | 20 | 18 | 0.3 | 1.5 | **IR15×20×18** | 17 | 0.3 | 0.019 |
| | 20 | 20.5 | 0.3 | 1.5 | **IR15×20×20.5** | 17 | 0.3 | 0.021 |

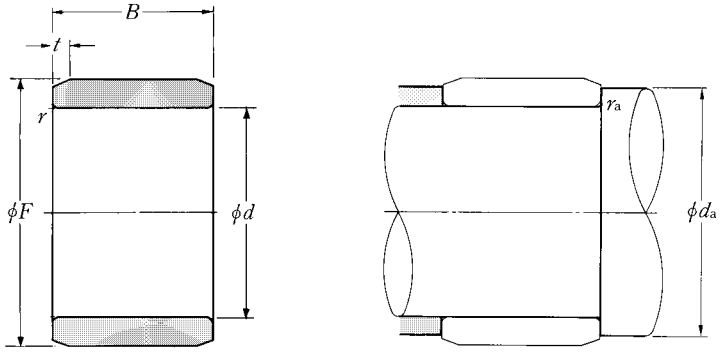
Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## $d$ 15～20mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 15 | 20 | 23 | 0.3 | — | ※IR15×20×23 | 17 | 0.3 | 0.024 |
| | 20 $^{0}_{-0.009}$ | 26 | 0.3 | 1.5 | IR15×20×26 | 17 | 0.3 | 0.027 |
| | 20 | 30.5 | 0.3 | 1.5 | IR15×20×30.5 | 17 | 0.3 | 0.032 |
| | 22 | 20 | 0.6 | 1.5 | IR15×22×20 | 19 | 0.6 | 0.032 |
| 17 | 20 | 16 | 0.3 | 1.5 | IR17×20×16 | 19 | 0.3 | 0.011 |
| | 20 | 16.5 | 0.3 | 1.5 | IR17×20×16.5 | 19 | 0.3 | 0.011 |
| | 20 | 20 | 0.3 | 1.5 | IR17×20×20 | 19 | 0.3 | 0.014 |
| | 20 | 20.5 | 0.3 | — | ※IR17×20×20.5 | 19 | 0.3 | 0.014 |
| | 20 | 30.5 | 0.3 | — | ※IR17×20×30.5 | 19 | 0.3 | 0.021 |
| | 21 | 16 | 0.3 | 1.5 | IR17×21×16 | 19 | 0.3 | 0.014 |
| | 21 | 20 | 0.3 | — | ※IR17×21×20 | 19 | 0.3 | 0.018 |
| | 22 $^{0}_{-0.009}$ | 13 | 0.3 | 1.5 | IR17×22×13 | 19 | 0.3 | 0.015 |
| | 22 | 14 | 0.3 | — | ※IR17×22×14D | 19 | 0.3 | 0.016 |
| | 22 | 16 | 0.3 | — | ※IR17×22×16 | 19 | 0.3 | 0.019 |
| | 22 | 18 | 0.3 | 1.5 | IR17×22×18 | 19 | 0.3 | 0.021 |
| | 22 | 20.5 | 0.3 | 1.5 | IR17×22×20.5 | 19 | 0.3 | 0.024 |
| | 22 | 23 | 0.3 | — | ※IR17×22×23 | 19 | 0.3 | 0.027 |
| | 22 | 26 | 0.3 | 1.5 | IR17×22×26 | 19 | 0.3 | 0.030 |
| | 22 | 32 | 0.3 | 1.5 | IR17×22×32 | 19 | 0.3 | 0.036 |
| | 24 | 20 | 0.6 | 1.5 | IR17×24×20 | 21 | 0.6 | 0.034 |
| 20 | 24 | 16 | 0.3 | 1.8 | IR20×24×16 | 22 | 0.3 | 0.017 |
| | 24 | 20 | 0.3 | — | ※IR20×24×20 | 22 | 0.3 | 0.021 |
| | 24 | 28.5 | 0.3 | — | ※IR20×24×28.5 | 22 | 0.3 | 0.030 |
| | 25 | 12.5 | 0.3 | 1.8 | IR20×25×12.5 | 22 | 0.3 | 0.016 |
| | 25 | 16 | 0.3 | — | ※IR20×25×16 | 22 | 0.3 | 0.021 |
| | 25 $^{0}_{-0.009}$ | 16.5 | 0.3 | 1.8 | IR20×25×16.5 | 22 | 0.3 | 0.022 |
| | 25 | 17 | 0.3 | 1.8 | IR20×25×17 | 22 | 0.3 | 0.022 |
| | 25 | 18 | 0.3 | — | ※IR20×25×18D | 22 | 0.3 | 0.024 |
| | 25 | 20 | 0.3 | — | ※IR20×25×20 | 22 | 0.3 | 0.027 |
| | 25 | 20.5 | 0.3 | 1.8 | IR20×25×20.5 | 22 | 0.3 | 0.028 |
| | 25 | 23 | 0.3 | 1.8 | IR20×25×23 | 22 | 0.3 | 0.031 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## Type IR




### $d$ 20～28mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 20 | 25 | 26 | 0.3 | 1.8 | IR20×25×26 | 22 | 0.3 | 0.034 |
| | 25 | 26.5 | 0.3 | — | ※IR20×25×26.5 | 22 | 0.3 | 0.036 |
| | 25 $^{0}_{-0.009}$ | 30 | 0.3 | 1.8 | IR20×25×30 | 22 | 0.3 | 0.041 |
| | 25 | 32 | 0.3 | 1.8 | IR20×25×32 | 22 | 0.3 | 0.041 |
| | 25 | 38.5 | 0.3 | — | ※IR20×25×38.5 | 22 | 0.3 | 0.053 |
| | 28 | 20 | 0.6 | 1.8 | IR20×28×20 | 24 | 0.6 | 0.045 |
| 22 | 26 | 16 | 0.3 | 1.8 | IR22×26×16 | 24 | 0.3 | 0.017 |
| | 26 | 20 | 0.3 | — | ※IR22×26×20 | 24 | 0.3 | 0.022 |
| | 28 | 17 | 0.3 | 1.8 | IR22×28×17 | 24 | 0.3 | 0.030 |
| | 28 $^{0}_{-0.009}$ | 20 | 0.3 | 1.8 | IR22×28×20 | 24 | 0.3 | 0.035 |
| | 28 | 20.5 | 0.3 | 1.8 | IR22×28×20.5 | 24 | 0.3 | 0.036 |
| | 28 | 23 | 0.3 | 1.8 | IR22×28×23 | 24 | 0.3 | 0.042 |
| | 28 | 30 | 0.3 | — | ※IR22×28×30 | 24 | 0.3 | 0.054 |
| 25 | 29 | 20 | 0.3 | — | ※IR25×29×20 | 27 | 0.3 | 0.026 |
| | 29 | 30 | 0.3 | 1.8 | IR25×29×30 | 27 | 0.3 | 0.039 |
| | 30 | 12.5 | 0.3 | 1.8 | IR25×30×12.5 | 27 | 0.3 | 0.020 |
| | 30 | 16 | 0.3 | 1 | IR25×30×16 | 27 | 0.3 | 0.024 |
| | 30 | 16.5 | 0.3 | 1.8 | IR25×30×16.5 | 27 | 0.3 | 0.026 |
| | 30 | 17 | 0.3 | 1.8 | IR25×30×17 | 27 | 0.3 | 0.027 |
| | 30 | 18 | 0.3 | — | ※IR25×30×18 | 27 | 0.3 | 0.030 |
| | 30 $^{0}_{-0.009}$ | 20 | 0.3 | 1.8 | IR25×30×20 | 27 | 0.3 | 0.033 |
| | 30 | 20.5 | 0.3 | 1.8 | IR25×30×20.5 | 27 | 0.3 | 0.034 |
| | 30 | 23 | 0.3 | 1.8 | IR25×30×23 | 27 | 0.3 | 0.038 |
| | 30 | 26 | 0.3 | 1.8 | IR25×30×26 | 27 | 0.3 | 0.041 |
| | 30 | 26.5 | 0.3 | — | ※IR25×30×26.5 | 27 | 0.3 | 0.043 |
| | 30 | 30 | 0.3 | 1.8 | IR25×30×30 | 27 | 0.3 | 0.050 |
| | 30 | 32 | 0.3 | 1 | IR25×30×32 | 27 | 0.3 | 0.054 |
| | 30 | 38.5 | 0.3 | — | ※IR25×30×38.5 | 27 | 0.3 | 0.064 |
| | 32 $^{+0.008}_{-0.002}$ | 22 | 0.6 | 1.8 | IR25×32×22 | 29 | 0.6 | 0.052 |
| | 32 | 30.5 | 0.6 | 1.8 | IR25×32×30.5 | 29 | 0.6 | 0.072 |
| 28 | 32 $^{-0.008}_{-0.002}$ | 17 | 0.3 | 1.8 | IR28×32×17 | 30 | 0.3 | 0.025 |

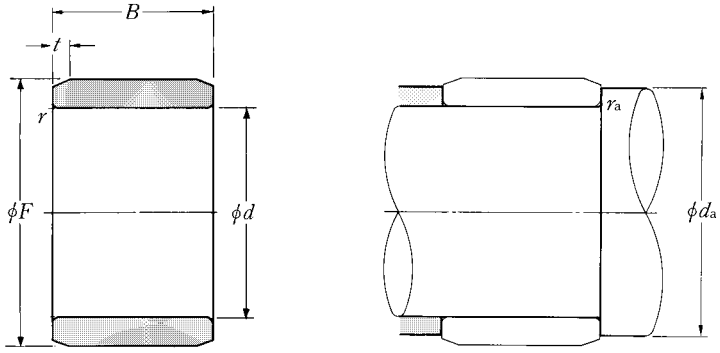
Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## $d$ 28～35mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| | 32 | 20 | 0.3 | 1.8 | **IR28×32×20** | 30 | 0.3 | 0.028 |
| **28** | 32 $^{+0.008}_{-0.002}$ | 23 | 0.3 | 1.8 | **IR28×32×23** | 30 | 0.3 | 0.034 |
| | 32 | 30 | 0.3 | — | **※IR28×32×30** | 30 | 0.3 | 0.044 |
| **29** | 32 $^{+0.008}_{-0.002}$ | 13 | 0.3 | 1.8 | **IR29×32×13** | 31 | 0.3 | 0.015 |
| | 35 | 12.5 | 0.3 | 1.8 | **IR30×35×12.5** | 32 | 0.3 | 0.024 |
| | 35 | 13 | 0.3 | 1.3 | **IR30×35×13** | 32 | 0.3 | 0.025 |
| | 35 | 16 | 0.3 | — | **※IR30×35×16** | 32 | 0.3 | 0.031 |
| | 35 | 16.5 | 0.3 | 1.8 | **IR30×35×16.5** | 32 | 0.3 | 0.032 |
| | 35 | 17 | 0.3 | 1.8 | **IR30×35×17** | 32 | 0.3 | 0.032 |
| | 35 | 18 | 0.3 | — | **※IR30×35×18D** | 32 | 0.3 | 0.035 |
| | 35 | 20 | 0.3 | — | **※IR30×35×20** | 32 | 0.3 | 0.038 |
| **30** | 35 $^{+0.008}_{-0.002}$ | 20.5 | 0.3 | 1.8 | **IR30×35×20.5** | 32 | 0.3 | 0.039 |
| | 35 | 23 | 0.3 | 1.8 | **IR30×35×23** | 32 | 0.3 | 0.044 |
| | 35 | 26 | 0.3 | 1.8 | **IR30×35×26** | 32 | 0.3 | 0.050 |
| | 35 | 30 | 0.3 | — | **※IR30×35×30** | 32 | 0.3 | 0.059 |
| | 35 | 32 | 0.3 | 1.8 | **IR30×35×32** | 32 | 0.3 | 0.063 |
| | 37 | 18 | 0.3 | 1.8 | **IR30×37×18** | 32 | 0.3 | 0.050 |
| | 37 | 22 | 0.6 | 1.8 | **IR30×37×22** | 34 | 0.6 | 0.061 |
| | 38 | 20 | 0.6 | — | **※IR30×38×20** | 34 | 0.6 | 0.065 |
| | 37 | 20 | 0.3 | 2 | **IR32×37×20** | 34 | 0.3 | 0.040 |
| | 37 | 30 | 0.3 | — | **※IR32×37×30** | 34 | 0.3 | 0.063 |
| **32** | 38 $^{0}_{-0.011}$ | 32 | 0.3 | 2 | **IR32×38×32** | 34 | 0.3 | 0.082 |
| | 40 | 20 | 0.6 | 2 | **IR32×40×20** | 36 | 0.6 | 0.068 |
| | 40 | 27 | 0.6 | 2 | **IR32×40×27** | 36 | 0.6 | 0.092 |
| | 40 | 36 | 0.6 | 2 | **IR32×40×36** | 36 | 0.6 | 0.124 |
| **33** | 37 $^{0}_{-0.011}$ | 13 | 0.3 | 2 | **IR33×37×13** | 35 | 0.3 | 0.022 |
| | 40 | 12.5 | 0.3 | 2 | **IR35×40×12.5** | 37 | 0.3 | 0.027 |
| **35** | 40 $^{0}_{-0.011}$ | 16.5 | 0.3 | 2 | **IR35×40×16.5** | 37 | 0.3 | 0.037 |
| | 40 | 17 | 0.3 | 2 | **IR35×40×17** | 37 | 0.3 | 0.038 |
| | 40 | 20 | 0.3 | 2 | **IR35×40×20** | 37 | 0.3 | 0.044 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## Type IR




$d$ 35～45mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 35 | 40 | 20.5 | 0.3 | 2 | **IR35×40×20.5** | 37 | 0.3 | 0.046 |
| | 40 | 30 | 0.3 | — | **※IR35×40×30** | 37 | 0.3 | 0.068 |
| | 40 | 34 | 0.3 | 1.8 | **IR35×40×34** | 37 | 0.3 | 0.079 |
| | 40 | 40 | 0.3 | 2 | **IR35×40×40** | 37 | 0.3 | 0.091 |
| | 42 $^{0}_{-0.011}$ | 20 | 0.6 | 1.8 | **IR35×42×20** | 39 | 0.6 | 0.064 |
| | 42 | 21 | 0.6 | — | **※IR35×42×21** | 39 | 0.6 | 0.068 |
| | 42 | 23 | 0.6 | — | **※IR35×42×23D** | 39 | 0.6 | 0.074 |
| | 42 | 27 | 0.6 | 2 | **IR35×42×27** | 39 | 0.6 | 0.080 |
| | 42 | 36 | 0.6 | 2 | **IR35×42×36** | 39 | 0.6 | 0.117 |
| | 43 | 22 | 0.6 | 2 | **IR35×43×22** | 39 | 0.6 | 0.081 |
| 38 | 43 $^{0}_{-0.011}$ | 20 | 0.3 | 1.8 | **IR38×43×20** | 40 | 0.3 | 0.048 |
| | 43 | 30 | 0.3 | — | **※IR38×43×30** | 40 | 0.3 | 0.074 |
| 40 | 45 | 16.5 | 0.3 | 2 | **IR40×45×16.5** | 42 | 0.3 | 0.042 |
| | 45 | 17 | 0.3 | 2 | **IR40×45×17** | 42 | 0.3 | 0.043 |
| | 45 | 20 | 0.3 | 2 | **IR40×45×20** | 42 | 0.3 | 0.051 |
| | 45 | 20.5 | 0.3 | 2 | **IR40×45×20.5** | 42 | 0.3 | 0.053 |
| | 45 | 26.5 | 0.3 | — | **※IR40×45×26.5** | 42 | 0.3 | 0.068 |
| | 45 | 30 | 0.3 | 2 | **IR40×45×30** | 42 | 0.3 | 0.077 |
| | 45 $^{0}_{-0.011}$ | 34 | 0.3 | 2 | **IR40×45×34** | 42 | 0.3 | 0.088 |
| | 45 | 40 | 0.3 | 2 | **IR40×45×40** | 42 | 0.3 | 0.106 |
| | 48 | 22 | 0.6 | 2 | **IR40×48×22** | 44 | 0.6 | 0.092 |
| | 48 | 23 | 0.6 | — | **※IR40×48×23** | 44 | 0.6 | 0.097 |
| | 48 | 30 | 0.6 | 2 | **IR40×48×30** | 44 | 0.6 | 0.123 |
| | 48 | 40 | 0.6 | 2 | **IR40×48×40** | 44 | 0.6 | 0.170 |
| | 50 | 20 | 0.3 | 0.8 | **IR40×50×20** | 44 | 0.3 | 0.106 |
| | 50 | 22 | 1 | 2 | **IR40×50×22** | 45 | 1 | 0.118 |
| 42 | 47 $^{0}_{-0.011}$ | 20 | 0.3 | 2 | **IR42×47×20** | 44 | 0.3 | 0.053 |
| | 47 | 30 | 0.3 | 2 | **IR42×47×30** | 44 | 0.3 | 0.080 |
| 45 | 50 $^{0}_{-0.011}$ | 20 | 0.3 | 2 | **IR45×50×20** | 47 | 0.3 | 0.057 |
| | 50 | 25 | 0.6 | 2 | **IR45×50×25** | 49 | 0.6 | 0.071 |

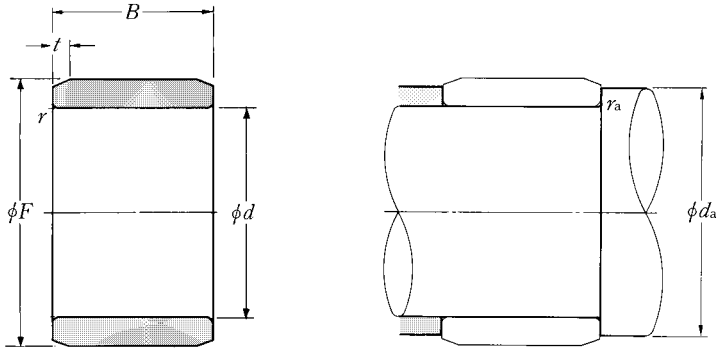
Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## $d$ 45～55mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 45 | 50 | 25.5 | 0.3 | — | ※IR45×50×25.5 | 47 | 0.3 | 0.074 |
| | 50 $^{0}_{-0.011}$ | 32 | 0.6 | — | ※IR45×50×32 | 49 | 0.6 | 0.092 |
| | 50 | 35 | 0.6 | 2 | IR45×50×35 | 49 | 0.6 | 0.101 |
| | 50 | 40 | 0.3 | 1.5 | IR45×50×40 | 47 | 0.3 | 0.115 |
| | 52 | 22 | 0.6 | 2 | IR45×52×22 | 49 | 0.6 | 0.088 |
| | 52 | 23 | 0.6 | — | ※IR45×52×23D | 49 | 0.6 | 0.093 |
| | 52 | 30 | 0.6 | 2 | IR45×52×30 | 49 | 0.6 | 0.123 |
| | 52 $^{+0.008}_{-0.004}$ | 40 | 0.6 | 2 | IR45×52×40 | 49 | 0.6 | 0.164 |
| | 55 | 20 | 0.6 | 2 | IR45×55×20 | 49 | 0.6 | 0.116 |
| | 55 | 22 | 1 | 2 | IR45×55×22 | 50 | 1 | 0.130 |
| | 55 | 40 | 0.6 | 2 | IR45×55×40 | 49 | 0.6 | 0.173 |
| 50 | 55 | 20 | 0.6 | 2 | IR50×55×20 | 54 | 0.6 | 0.063 |
| | 55 | 25 | 0.6 | 2 | IR50×55×25 | 54 | 0.6 | 0.078 |
| | 55 | 35 | 0.6 | 2 | IR50×55×35 | 54 | 0.6 | 0.112 |
| | 55 | 40 | 0.6 | 2 | IR50×55×40 | 54 | 0.6 | 0.128 |
| | 58 | 22 | 0.6 | 2 | IR50×58×22 | 54 | 0.6 | 0.113 |
| | 58 $^{+0.008}_{-0.004}$ | 23 | 0.6 | — | ※IR50×58×23D | 54 | 0.6 | 0.119 |
| | 58 | 30 | 0.6 | 2 | IR50×58×30 | 54 | 0.6 | 0.159 |
| | 58 | 40 | 0.6 | 2 | IR50×58×40 | 54 | 0.6 | 0.209 |
| | 60 | 20 | 1 | 2 | IR50×60×20 | 55 | 1 | 0.129 |
| | 60 | 25 | 1 | 2 | IR50×60×25 | 55 | 1 | 0.163 |
| | 60 | 28 | 1.1 | 2 | IR50×60×28 | 56.5 | 1 | 0.183 |
| | 60 | 40 | 1 | 2 | IR50×60×40 | 55 | 1 | 0.262 |
| 55 | 60 | 25 | 0.6 | 2.2 | IR55×60×25 | 59 | 0.6 | 0.086 |
| | 60 | 35 | 0.6 | 2 | IR55×60×35 | 59 | 0.6 | 0.121 |
| | 63 | 25 | 1 | 2 | IR55×63×25 | 60 | 1 | 0.141 |
| | 63 $^{0}_{-0.013}$ | 34 | 1 | 2.2 | IR55×63×34 | 60 | 1 | 0.192 |
| | 63 | 45 | 1 | 2.2 | IR55×63×45 | 60 | 1 | 0.256 |
| | 65 | 28 | 1.1 | 2.2 | IR55×65×28 | 61.5 | 1 | 0.206 |
| | 65 | 30 | 1 | 2.2 | IR55×65×30 | 60 | 1 | 0.220 |
| | 65 | 60 | 1 | 1.5 | IR55×65×60 | 60 | 1 | 0.440 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus code "**D**" represents inner ring with oil hole.
2. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface.

## Type IR




### $d$ 60～75mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 60 | 68 | 25 | 1 | 2.2 | IR60×68×25 | 65 | 1 | 0.152 |
| | 68 | 34 | 1 | 2.2 | IR60×68×34 | 65 | 1 | 0.206 |
| | 68 | 35 | 0.6 | 2.2 | IR60×68×35 | 64 | 0.6 | 0.213 |
| | 68 $^{0}_{-0.013}$ | 45 | 1 | 2.2 | IR60×68×45 | 65 | 1 | 0.270 |
| | 70 | 25 | 1 | 2.2 | IR60×70×25 | 65 | 1 | 0.195 |
| | 70 | 28 | 1.1 | 2.2 | IR60×70×28 | 66.5 | 1 | 0.216 |
| | 70 | 30 | 1 | 2.2 | IR60×70×30 | 65 | 1 | 0.232 |
| | 70 | 60 | 1 | 2.2 | IR60×70×60 | 65 | 1 | 0.463 |
| 65 | 72 | 25 | 1 | 2.2 | IR65×72×25 | 70 | 1 | 0.142 |
| | 72 | 34 | 1 | 2.2 | IR65×72×34 | 70 | 1 | 0.193 |
| | 72 | 45 | 1 | 2.2 | IR65×72×45 | 70 | 1 | 0.259 |
| | 73 $^{0}_{-0.013}$ | 25 | 0.6 | 2.2 | IR65×73×25 | 69 | 0.6 | 0.164 |
| | 73 | 35 | 0.6 | 2.2 | IR65×73×35 | 69 | 0.6 | 0.232 |
| | 75 | 28 | 1.1 | 2.2 | IR65×75×28 | 71.5 | 1 | 0.240 |
| | 75 | 30 | 1 | 2.2 | IR65×75×30 | 70 | 1 | 0.256 |
| | 75 | 60 | 1 | 2.2 | IR65×75×60 | 70 | 1 | 0.513 |
| 70 | 80 | 25 | 1 | 2.2 | IR70×80×25 | 75 | 1 | 0.224 |
| | 80 | 28 | 1.1 | 2.2 | IR70×80×28 | 76.5 | 1 | 0.250 |
| | 80 | 30 | 1 | 2.2 | IR70×80×30 | 75 | 1 | 0.267 |
| | 80 $^{0}_{-0.013}$ | 35 | 1 | 2.2 | IR70×80×35 | 75 | 1 | 0.313 |
| | 80 | 40 | 1 | 2.2 | IR70×80×40 | 75 | 1 | 0.358 |
| | 80 | 54 | 1 | 2.2 | IR70×80×54 | 75 | 1 | 0.483 |
| | 80 | 56 | 1 | 2.2 | IR70×80×56 | 75 | 1 | 0.502 |
| | 80 | 60 | 1 | 2.2 | IR70×80×60 | 75 | 1 | 0.540 |
| 75 | 85 | 25 | 1 | 2.2 | IR75×85×25 | 80 | 1 | 0.238 |
| | 85 | 30 | 1 | 2.2 | IR75×85×30 | 80 | 1 | 0.287 |
| | 85 $^{0}_{-0.015}$ | 35 | 1 | 2.2 | IR75×85×35 | 80 | 1 | 0.336 |
| | 85 | 40 | 1 | 2.2 | IR75×85×40 | 80 | 1 | 0.385 |
| | 85 | 54 | 1 | 2.2 | IR75×85×54 | 80 | 1 | 0.515 |
| | 90 | 32 | 1.1 | 2.2 | IR75×90×32 | 81.5 | 1 | 0.480 |

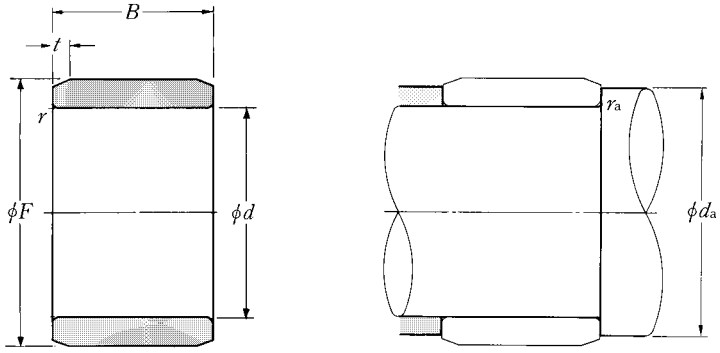
Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

$d$ 80～100mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| | 90 | 25 | 1 | 2.2 | IR 80× 90×25 | 85 | 1 | 0.254 |
| | 90 | 30 | 1 | 2.2 | IR 80× 90×30 | 85 | 1 | 0.304 |
| 80 | 90 $^{0}_{-0.015}$ | 35 | 1 | 2.2 | IR 80× 90×35 | 85 | 1 | 0.355 |
| | 90 | 40 | 1 | 2.2 | IR 80× 90×40 | 85 | 1 | 0.408 |
| | 90 | 54 | 1 | 2.2 | IR 80× 90×54 | 85 | 1 | 0.543 |
| | 95 | 32 | 1.1 | 2.2 | IR 80× 95×32 | 86.5 | 1 | 0.510 |
| | 95 | 26 | 1 | 2.5 | IR 85× 95×26 | 90 | 1 | 0.280 |
| | 95 | 30 | 1 | 2.5 | IR 85× 95×30 | 90 | 1 | 0.323 |
| | 95 | 36 | 1 | 2.5 | IR 85× 95×36 | 90 | 1 | 0.398 |
| 85 | 100 $^{0}_{-0.015}$ | 32 | 1.1 | 2.5 | IR 85×100×32 | 91.5 | 1 | 0.530 |
| | 100 | 35 | 1.1 | 2.5 | IR 85×100×35 | 91.5 | 1 | 0.580 |
| | 100 | 46 | 1.1 | 2.5 | IR 85×100×46 | 91.5 | 1 | 0.760 |
| | 100 | 63 | 1.1 | 2.5 | IR 85×100×63 | 91.5 | 1 | 1.05 |
| | 100 | 26 | 1 | 2.5 | IR 90×100×26 | 95 | 1 | 0.294 |
| | 100 | 30 | 1 | 2.5 | IR 90×100×30 | 95 | 1 | 0.340 |
| | 100 | 36 | 1 | 2.5 | IR 90×100×36 | 95 | 1 | 0.406 |
| 90 | 105 $^{0}_{-0.015}$ | 32 | 1.1 | 2.5 | IR 90×105×32 | 96.5 | 1 | 0.560 |
| | 105 | 35 | 1.1 | 2.5 | IR 90×105×35 | 96.5 | 1 | 0.610 |
| | 105 | 46 | 1.1 | 2.5 | IR 90×105×46 | 96.5 | 1 | 0.800 |
| | 105 | 63 | 1.1 | 2.5 | IR 90×105×63 | 96.5 | 1 | 1.11 |
| | 105 | 26 | 1 | 2.5 | IR 95×105×26 | 100 | 1 | 0.313 |
| | 105 | 36 | 1 | 2.5 | IR 95×105×36 | 100 | 1 | 0.430 |
| 95 | 110 $^{0}_{-0.015}$ | 32 | 1.1 | 2.5 | IR 95×110×32 | 101.5 | 1 | 0.590 |
| | 110 | 35 | 1.1 | 2.5 | IR 95×110×35 | 101.5 | 1 | 0.640 |
| | 110 | 46 | 1.1 | 2.5 | IR 95×110×46 | 101.5 | 1 | 0.850 |
| | 110 | 63 | 1.1 | 2.5 | IR 95×110×63 | 101.5 | 1 | 1.17 |
| | 110 | 30 | 1.1 | 2.5 | IR100×110×30 | 106.5 | 1 | 0.375 |
| 100 | 110 $^{0}_{-0.015}$ | 40 | 1.1 | 2.5 | IR100×110×40 | 106.5 | 1 | 0.505 |
| | 115 | 32 | 1.1 | 2.5 | IR100×115×32 | 106.5 | 1 | 0.620 |
| | 115 | 40 | 1.1 | 2.5 | IR100×115×40 | 106.5 | 1 | 0.775 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

## Type IR




### $d$ 100～160mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| **100** | 115 $^{0}_{-0.015}$ | 54 | 1.1 | 2.5 | **IR100×115×54** | 106.5 | 1 | 1.09 |
| **110** | 120 $^{0}_{-0.015}$ | 30 | 1 | 2.5 | **IR110×120×30** | 115 | 1 | 0.440 |
| | 120 $^{0}_{-0.015}$ | 40 | 1.1 | 2.5 | **IR110×120×40** | 116.5 | 1 | 0.580 |
| | 125 $^{0}_{-0.018}$ | 40 | 1.1 | 2.5 | **IR110×125×40** | 116.5 | 1 | 0.840 |
| | 125 $^{0}_{-0.018}$ | 54 | 1.1 | 2.5 | **IR110×125×54** | 116.5 | 1 | 1.16 |
| **120** | 130 | 30 | 1 | 2.2 | **IR120×130×30** | 125 | 1 | 0.440 |
| | 130 | 40 | 1.1 | 2.5 | **IR120×130×40** | 126.5 | 1 | 0.590 |
| | 135 $^{0}_{-0.018}$ | 40 | 2 | 2.5 | **IR120×135×40** | 129 | 2 | 0.870 |
| | 135 | 45 | 1.1 | 2.5 | **IR120×135×45** | 126.5 | 1 | 0.980 |
| | 135 | 60 | 1.1 | 2.5 | **IR120×135×60** | 126.5 | 1 | 1.25 |
| **130** | 145 | 32 | 1.5 | 3 | **IR130×145×32** | 138 | 1.5 | 0.780 |
| | 145 | 35 | 1.1 | 3 | **IR130×145×35** | 136.5 | 1 | 0.855 |
| | 145 $^{0}_{-0.018}$ | 42 | 1.5 | 3 | **IR130×145×42** | 138 | 1.5 | 1.05 |
| | 150 $^{0}_{-0.018}$ | 50 | 1.5 | 3 | **IR130×150×50** | 138 | 1.5 | 1.69 |
| | 150 | 52 | 2 | 3 | **IR130×150×52** | 139 | 2 | 1.75 |
| | 150 | 67 | 1.5 | 3 | **IR130×150×67** | 138 | 1.5 | 2.25 |
| **140** | 155 | 32 | 1.5 | 3 | **IR140×155×32** | 148 | 1.5 | 0.840 |
| | 155 | 35 | 1.1 | 3 | **IR140×155×35** | 146.5 | 1 | 0.917 |
| | 155 $^{0}_{-0.018}$ | 42 | 1.5 | 3 | **IR140×155×42** | 148 | 1.5 | 1.10 |
| | 160 $^{0}_{-0.018}$ | 50 | 1.5 | 3 | **IR140×160×50** | 148 | 1.5 | 1.70 |
| | 160 | 52 | 2 | 3 | **IR140×160×52** | 149 | 2 | 1.78 |
| | 160 | 67 | 1.5 | 3 | **IR140×160×67** | 148 | 1.5 | 2.30 |
| **150** | 165 | 32 | 1.5 | 3 | **IR150×165×32** | 158 | 1.5 | 0.900 |
| | 165 | 40 | 1.1 | 3 | **IR150×165×40** | 156.5 | 1 | 1.12 |
| | 165 $^{-0.017}_{-0.035}$ | 42 | 1.5 | 3 | **IR150×165×42** | 158 | 1.5 | 1.18 |
| | 170 | 52 | 2 | 3 | **IR150×170×52** | 159 | 2 | 2.00 |
| | 170 | 60 | 2 | 3 | **IR150×170×60** | 159 | 2 | 2.35 |
| **160** | 175 $^{-0.017}_{-0.035}$ | 40 | 1.1 | 3 | **IR160×175×40** | 166.5 | 1 | 1.20 |
| | 180 $^{-0.017}_{-0.035}$ | 60 | 2 | 3 | **IR160×180×60** | 169 | 2 | 2.50 |

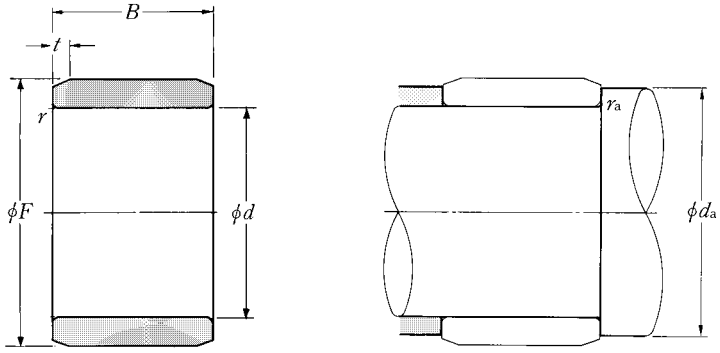
Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

$d$ 170～380mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| **170** | 185 $^{-0.013}_{-0.043}$ | 45 | 1.1 | 3 | **IR170×185× 45** | 176.5 | 1 | 1.45 |
| | 190 | 60 | 2 | 3 | **IR170×190× 60** | 179 | 2 | 2.65 |
| **180** | 195 $^{-0.013}_{-0.043}$ | 45 | 1.1 | 3 | **IR180×195× 45** | 186.5 | 1 | 1.51 |
| | 205 | 69 | 2 | 3 | **IR180×205× 69** | 189 | 2 | 4.10 |
| **190** | 210 $^{-0.020}_{-0.050}$ | 50 | 1.5 | 3.5 | **IR190×210× 50** | 198 | 1.5 | 2.41 |
| | 215 | 69 | 2 | 3.5 | **IR190×215× 69** | 199 | 2 | 4.10 |
| **200** | 220 $^{-0.020}_{-0.050}$ | 50 | 1.5 | 3.5 | **IR200×220× 50** | 208 | 1.5 | 2.49 |
| | 225 | 80 | 2.1 | 3.5 | **IR200×225× 80** | 211 | 2 | 5.10 |
| **220** | 240 $^{-0.033}_{-0.063}$ | 50 | 1.5 | 3.5 | **IR220×240× 50** | 228 | 1.5 | 2.75 |
| | 245 | 80 | 2.1 | 3.5 | **IR220×245× 80** | 231 | 2 | 5.70 |
| **240** | 265 $^{-0.037}_{-0.069}$ | 60 | 2 | 3.5 | **IR240×265× 60** | 249 | 2 | 4.60 |
| | 265 | 80 | 2.1 | 3.5 | **IR240×265× 80** | 251 | 2 | 6.30 |
| **260** | 285 $^{-0.064}_{-0.092}$ | 60 | 2 | 4 | **IR260×285× 60** | 269 | 2 | 4.98 |
| | 290 | 100 | 2.1 | 4 | **IR260×290×100** | 271 | 2 | 10.0 |
| **280** | 305 $^{-0.064}_{-0.092}$ | 69 | 2 | 4 | **IR280×305× 69** | 289 | 2 | 6.20 |
| | 310 | 100 | 2.1 | 4 | **IR280×310×100** | 291 | 2 | 10.8 |
| **300** | 330 $^{-0.062}_{-0.098}$ | 80 | 2.1 | 4 | **IR300×330× 80** | 311 | 2 | 9.30 |
| | 340 | 118 | 3 | 4 | **IR300×340×118** | 313 | 2.5 | 18.5 |
| **320** | 350 $^{-0.062}_{-0.098}$ | 80 | 2.1 | 5 | **IR320×350× 80** | 331 | 2 | 9.80 |
| | 360 | 118 | 3 | 5 | **IR320×360×118** | 333 | 2.5 | 20.0 |
| **340** | 370 $^{-0.062}_{-0.098}$ | 80 | 2.1 | 5 | **IR340×370× 80** | 351 | 2 | 10.1 |
| | 380 | 118 | 3 | 5 | **IR340×380×118** | 353 | 2.5 | 22.0 |
| **360** | 390 $^{-0.090}_{-0.126}$ | 80 | 2.1 | 5 | **IR360×390× 80** | 371 | 2 | 10.9 |
| | 400 | 118 | 3 | 5 | **IR360×400×118** | 373 | 2.5 | 22.0 |
| **380** | 415 $^{-0.080}_{-0.120}$ | 100 | 2.1 | 5 | **IR380×415×100** | 391 | 2 | 18.5 |
| | 430 | 140 | 4 | 5 | **IR380×430×140** | 396 | 3 | 35.0 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

## Type IR



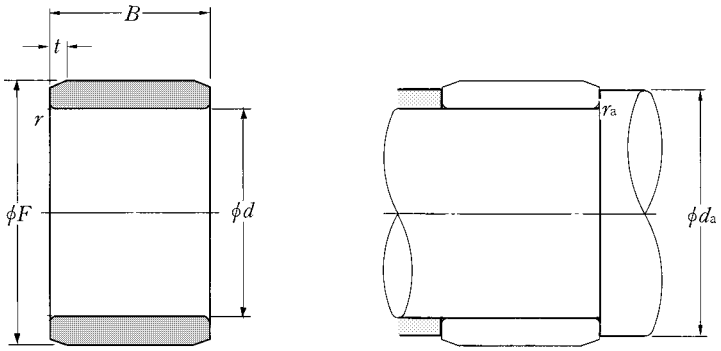

### $d$ 400～440mm

| Boundary dimensions mm | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| **400** | 450 $^{-0.080}_{-0.120}$ | 140 | 4 | 5 | **IR400×450×140** | 416 | 3 | 36.5 |
| **420** | 470 $^{-0.105}_{-0.145}$ | 140 | 4 | 5 | **IR420×470×140** | 436 | 3 | 38.2 |
| **440** | 490 $^{-0.105}_{-0.145}$ | 160 | 4 | 5 | **IR440×490×160** | 456 | 3 | 46.5 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

## Inch series

### Type MI



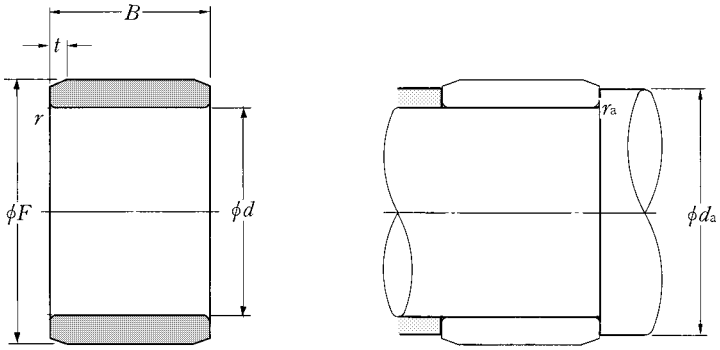

$d$ 9.525～34.925mm

| Boundary dimensions mm (1/25.4mm) | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| **9.525(3/8)** | 14.288(9/16) | 12.95 | 0.6 | — | ※**MI-060908** | 13.5 | 0.6 | 0.013 |
| | 15.875(5/8) $^{0}_{-0.008}$ | 19.30 | 0.6 | 1 | **MI-061012** | 13.5 | 0.6 | 0.019 |
| | 15.875(5/8) | 25.65 | 0.6 | 1 | **MI-061016** | 13.5 | 0.6 | 0.025 |
| **12.700(1/2)** | 19.050(3/4) | 16.13 | 1 | — | ※**MI-081210** | 17.5 | 1 | 0.020 |
| | 19.050(3/4) $^{0}_{-0.009}$ | 19.30 | 1 | — | ※**MI-081212** | 17.5 | 1 | 0.024 |
| | 19.050(3/4) | 25.65 | 1 | — | ※**MI-081216** | 17.5 | 1 | 0.032 |
| **15.875(5/8)** | 22.225(7/8) | 9.78 | 1 | — | ※**MI-101406** | 21 | 1 | 0.014 |
| | 22.225(7/8) | 12.95 | 1 | — | ※**MI-101408** | 21 | 1 | 0.018 |
| | 22.225(7/8) $^{0}_{-0.009}$ | 19.30 | 1 | — | ※**MI-101412** | 21 | 1 | 0.027 |
| | 22.225(7/8) | 25.65 | 1 | — | ※**MI-101416** | 21 | 1 | 0.036 |
| **19.050(3/4)** | 25.400(1) | 19.30 | 1 | — | ※**MI-121612** | 24 | 1 | 0.034 |
| | 25.400(1) $^{0}_{-0.009}$ | 25.65 | 1 | — | ※**MI-121616** | 24 | 1 | 0.045 |
| **22.225(7/8)** | 28.575(1 1/8) | 12.95 | 1 | — | ※**MI-141808** | 27 | 1 | 0.027 |
| | 28.575(1 1/8) | 19.30 | 1 | — | ※**MI-141812** | 27 | 1 | 0.040 |
| | 28.575(1 1/8) $^{0}_{-0.009}$ | 25.65 | 1 | — | ※**MI-141816** | 27 | 1 | 0.052 |
| | 28.575(1 1/8) | 32.00 | 1 | — | ※**MI-141820** | 27 | 1 | 0.066 |
| **25.400(1)** | 31.750(1 1/4) | 19.30 | 1 | — | ※**MI-162012** | 30.5 | 1 | 0.039 |
| | 31.750(1 1/4) $^{+0.008}_{-0.002}$ | 25.65 | 1 | — | ※**MI-162016** | 30.5 | 1 | 0.052 |
| | 31.750(1 1/4) | 32.00 | 1 | — | ※**MI-162020** | 30.5 | 1 | 0.065 |
| **28.575(1 1/8)** | 34.925(1 3/8) | 12.95 | 1 | — | ※**MI-182208** | 33.5 | 1 | 0.032 |
| | 34.925(1 3/8) $^{+0.008}_{-0.002}$ | 25.65 | 1 | — | ※**MI-182216** | 33.5 | 1 | 0.063 |
| | 34.925(1 3/8) | 32.00 | 1 | — | ※**MI-182220** | 33.5 | 1 | 0.079 |
| **31.750(1 1/4)** | 38.100(1 1/2) $^{0}_{-0.011}$ | 25.65 | 1.5 | — | ※**MI-202416** | 37 | 1.5 | 0.075 |
| | 38.100(1 1/2) | 32.00 | 1.5 | — | ※**MI-202420** | 37 | 1.5 | 0.094 |
| **33.338(1 5/16)** | 41.275(1 5/8) $^{0}_{-0.011}$ | 25.65 | 1.5 | 2 | **MI-212616** | 40 | 1.5 | 0.093 |
| | 41.275(1 5/8) | 32.00 | 1.5 | 2 | **MI-212620** | 40 | 1.5 | 0.116 |
| **34.925(1 3/8)** | 41.275(1 5/8) $^{0}_{-0.011}$ | 16.13 | 1.5 | 2 | **MI-222610** | 40 | 1.5 | 0.073 |
| | 44.450(1 3/4) | 25.65 | 1.5 | 2 | **MI-222816** | 41.5 | 1.5 | 0.117 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.
Remarks: 1. Nominal number plus ※-mark represents inner ring with fine-chamfered outer surface. $r$

## Inch series

### Type MI




$d$ 34.925～98.425mm

| Boundary dimensions mm ($\frac{1}{25.4}$mm) | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| **34.925(1 3/8)** | 44.450(1 3/4) $^{0}_{-0.011}$ | 32.00 | 1.5 | 2 | **MI-222820** | 41.5 | 1.5 | 0.146 |
| **38.100(1 1/2)** | 44.450(1 3/4) $^{0}_{-0.011}$ | 19.30 | 1.5 | 2 | **MI-242812** | 43 | 1.5 | 0.062 |
| | 44.450(1 3/4) | 25.65 | 1.5 | 2 | **MI-242816** | 43 | 1.5 | 0.083 |
| **39.688(1 9/16)** | 47.625(1 7/8) $^{0}_{-0.011}$ | 32.00 | 1.5 | 2 | **MI-253020** | 46 | 1.5 | 0.136 |
| **41.275(1 5/8)** | 50.800(2) $^{+0.008}_{-0.004}$ | 25.65 | 1.5 | 2 | **MI-263216** | 48 | 1.5 | 0.140 |
| | 50.800(2) | 32.00 | 1.5 | 2 | **MI-263220** | 48 | 1.5 | 0.175 |
| **44.450(1 3/4)** | 57.150(2 1/4) $^{+0.008}_{-0.004}$ | 38.35 | 1.5 | 2 | **MI-283624** | 51 | 1.5 | 0.310 |
| | 57.150(2 1/4) | 44.70 | 1.5 | 2 | **MI-283628** | 51 | 1.5 | 0.360 |
| **50.800(2)** | 63.500(2 1/2) $^{0}_{-0.013}$ | 38.35 | 2 | 2 | **MI-324024** | 59 | 2 | 0.340 |
| | 63.500(2 1/2) | 44.70 | 2 | 2 | **MI-324028** | 59 | 2 | 0.420 |
| **57.150(2 1/4)** | 69.850(2 3/4) | 25.65 | 2 | 2.2 | **MI-364416** | 65 | 2 | 0.257 |
| | 69.850(2 3/4) $^{0}_{-0.013}$ | 38.35 | 2 | 2.2 | **MI-364424** | 65 | 2 | 0.384 |
| | 69.850(2 3/4) | 44.70 | 2 | 2.2 | **MI-364428** | 65 | 2 | 0.447 |
| **63.500(2 1/2)** | 76.200(3) $^{0}_{-0.013}$ | 38.35 | 2 | 2.2 | **MI-404824** | 71.5 | 2 | 0.417 |
| | 76.200(3) | 44.70 | 2 | 2.2 | **MI-404828** | 71.5 | 2 | 0.486 |
| **66.675(2 5/8)** | 82.550(3 1/4) $^{0}_{-0.015}$ | 44.70 | 2 | 2.2 | **MI-425228** | 74.5 | 2 | 0.648 |
| | 82.550(3 1/4) | 51.05 | 2 | 2.2 | **MI-425232** | 74.5 | 2 | 0.740 |
| **69.850(2 3/4)** | 82.550(3 1/4) $^{0}_{-0.015}$ | 44.70 | 2 | 2.2 | **MI-445228** | 78 | 2 | 0.530 |
| **76.200(3)** | 88.900(3 1/2) $^{0}_{-0.015}$ | 44.70 | 2 | 2.2 | **MI-485628** | 84 | 2 | 0.574 |
| | 88.900(3 1/2) | 51.05 | 2 | 2.2 | **MI-485632** | 84 | 2 | 0.655 |
| **79.375(3 1/8)** | 95.250(3 3/4) $^{0}_{-0.015}$ | 51.05 | 2.5 | 2.2 | **MI-506032** | 88.5 | 2.5 | 0.862 |
| **85.725(3 3/8)** | 101.600(4) $^{0}_{-0.015}$ | 51.05 | 2.5 | 2.5 | **MI-546432** | 94.5 | 2.5 | 0.930 |
| **92.075(3 5/8)** | 107.950(4 1/4) $^{0}_{-0.015}$ | 51.05 | 2.5 | 2.5 | **MI-586832** | 101 | 2.5 | 1.00 |
| **95.250(3 3/4)** | 114.300(4 1/2) $^{0}_{-0.015}$ | 57.40 | 2.5 | 2.5 | **MI-607236** | 104 | 2.5 | 1.40 |
| **98.425(3 7/8)** | 114.300(4 1/2) $^{0}_{-0.015}$ | 57.40 | 2.5 | 2.5 | **MI-627236** | 107.5 | 2.5 | 1.15 |
| | 114.300(4 1/2) | 63.88 | 2.5 | 2.5 | **MI-627240** | 107.5 | 2.5 | 1.28 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.

$d$ 101.600～203.200mm

| Boundary dimensions mm (1/25.4mm) | | | | | Bearing numbers | Abutment dimensions mm | | Mass kg |
|---|---|---|---|---|---|---|---|---|
| $d$ | $F$ [1] | $B$ | $r_{s\,min}$ [2] | $t$ | | $d_a$ min | $r_{as}$ [3] max | (approx.) |
| 101.600(4) | 127.000(5) | 51.05 | 2.5 | 2.5 | MI-648032 | 110.5 | 2.5 | 1.82 |
| | 127.000(5) $^{0}_{-0.018}$ | 57.40 | 2.5 | 2.5 | MI-648036 | 110.5 | 2.5 | 2.05 |
| | 127.000(5) | 63.88 | 2.5 | 2.5 | MI-648040 | 110.5 | 2.5 | 2.28 |
| 114.300(4 1/2) | 139.700(5 1/2) $^{0}_{-0.018}$ | 63.88 | 2.5 | 2.5 | MI-728840 | 123.5 | 2.5 | 2.58 |
| | 139.700(5 1/2) | 76.58 | 2.5 | 2.5 | MI-728848 | 123.5 | 2.5 | 3.10 |
| 120.650(4 3/4) | 146.050(5 3/4) $^{0}_{-0.018}$ | 76.58 | 3 | 3 | MI-769248 | 132 | 3 | 3.18 |
| 127.000(5) | 152.400(6) $^{0}_{-0.018}$ | 63.88 | 3 | 3 | MI-809640 | 140 | 3 | 2.80 |
| | 152.400(6) | 76.58 | 3 | 3 | MI-809648 | 140 | 3 | 3.35 |
| 139.700(5 1/2) | 165.100(6 1/2) $^{-0.010}_{-0.028}$ | 63.88 | 3 | 3 | MI-8810440 | 152.5 | 3 | 2.84 |
| | 165.100(6 1/2) | 76.58 | 3 | 3 | MI-8810448 | 152.5 | 3 | 3.40 |
| 152.400(6) | 184.150(7 1/4) $^{-0.013}_{-0.033}$ | 76.58 | 3 | 3 | MI-9611648 | 165.5 | 3 | 4.80 |
| 165.100(6 1/2) | 196.850(7 3/4) $^{-0.013}_{-0.043}$ | 76.58 | 3 | 3 | MI-10412448 | 178 | 3 | 5.30 |
| 177.800(7) | 209.550(8 1/4) $^{-0.013}_{-0.043}$ | 76.58 | 3 | 3 | MI-11213248 | 191 | 3 | 5.60 |
| 190.500(7 1/2) | 222.250(8 3/4) $^{-0.020}_{-0.050}$ | 76.58 | 4 | 3 | MI-12014048 | 206.5 | 4 | 6.10 |
| 203.200(8) | 234.950(9 1/4) $^{-0.033}_{-0.063}$ | 76.58 | 4 | 3.5 | MI-12814848 | 219 | 4 | 6.50 |

Note 1) Dimensional tolerance to secure ordinary clearance when any of these inner rings is combined with needle roller bearing with no inner ring.
2) Allowable minimum chamfer dimension $r$. 3) Max. allowable dimension of radius $r_a$ for corner roundness on shaft/housing.