

INNER RINGS



Technical features

Inner rings

When it is impractical to meet the shaft raceway design requirements (hardness, surface finish, case depth, etc.) standard inner rings may be used.

Inner rings are made of rolling bearing steel and after hardening, their bores, raceways and end surfaces are ground.

Inner rings may be used to provide inner raceway surfaces for radial needle roller bearings, needle roller bearings and needle bushes with opened and closed end. For a generic bearing with a given internal diameter, there is a choice of inner rings with the same diameter F but of different widths. Normally, the width of the inner ring should never be less than that of the bearing. Alternatively, a cylindrical inner ring wider than the bearing may be used to permit the fitting of a sealing ring, which would locate on the extended portion at one end of the bearing. In this case, if the inner ring has an oil hole, care should be taken to ensure that the hole does not coincide with the ends of the needles

CONSTRUCTION

Inner rings are available in four basic designs and differ only by the chamfers at the ends of the raceway surfaces, the lubricant access holes and the raceway profile. Inner rings of series **JR** have chamfers to assist in bearing installation but are without lubricating holes.

Inner rings of series **JR.JS1** have bearing installation chamfers and lubricating holes (bore diameters 5 to 50 mm). Inner rings of series **JRZ.JS1** are without installation chamfers, allowing for maximum possible raceway contact.

Inner rings series **BIC** and **BICG** are also represented, to completion of the bearings series **NA**, in addition to the **IM 19000** and **IM 20600** for use with combined bearings RAXN and RAXNPZ.

Inner rings features

Series	Lubrication hole	Chamfer
JR		X
JR.JS1	X	X
JRZ.JS1	X	

Nominal diameter of lubrication hole

Series	Internal diameter of the inner ring mm		Nominal diameter of the lubrication hole mm
	>	≤	
JR.JS1 JRZ.JS1		20	2
	20	40	2,5
	40	80	3
	80		3,5

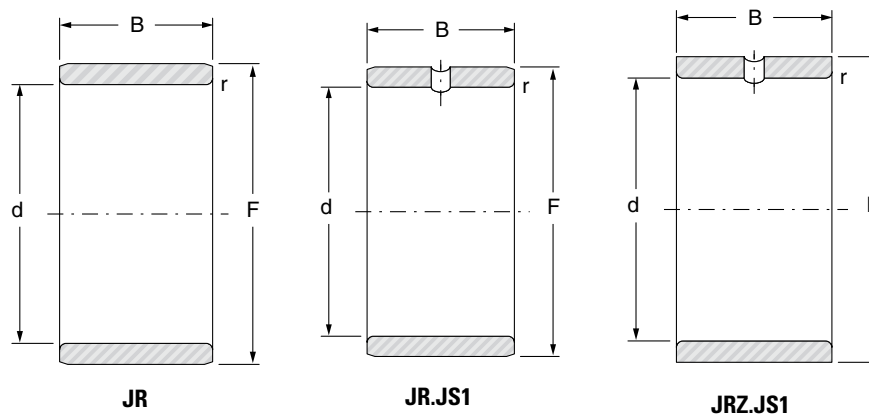
Construction tolerances of inner rings

Series	Tolerance on external diameter F	Other tolerances
JR With suffix P	h5	According ISO 492
IM 19000 and IM 20600	+0.000 /- 0.005 mm	Contact Technical Service

In the following tables are listed all the inner rings for needle bushes, cages, needle bearings with cages, with full complement and combined bearings that are showed in this catalogue.

Inner rings

Summary table

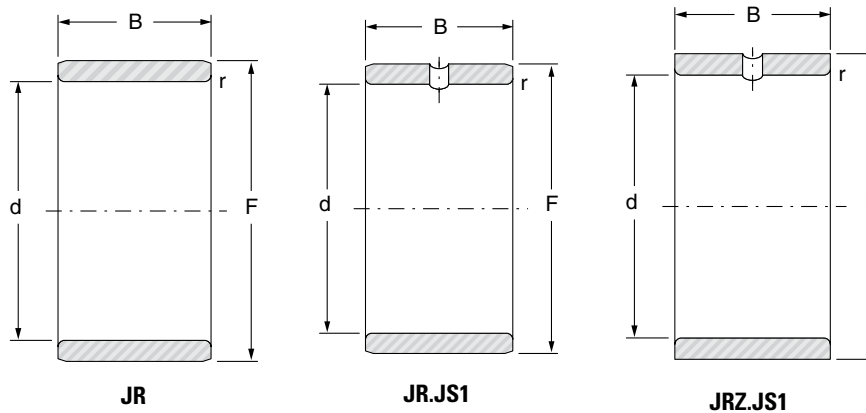


Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
5	JR5x8x8JS1	5	8	8	0.3	0.002
	JR5x8x12	5	8	12	0.3	0.003
	JR5x8x16	5	8	16	0.3	0.004
6	JR6x9x8JS1	6	9	8	0.3	0.002
	JR6x9x12	6	9	12	0.3	0.003
	JR6x9x16	6	9	16	0.3	0.004
	JR6x10x10	6	10	10	0.3	0.004
	JR6x10x10JS1	6	10	10	0.3	0.004
	JRZ6x10x12JS1	6	10	12	0.3	0.005
7	JR7x10x10.5	7	10	10.5	0.3	0.003
	JR7x10x12	7	10	12	0.3	0.004
	JR7x10x16	7	10	16	0.3	0.005
8	JR8x12x10	8	12	10	0.3	0.005
	JR8x12x10JS1	8	12	10	0.3	0.005
	JR8x12x10.5	8	12	10.5	0.3	0.005
	JRZ8x12x12JS1	8	12	12	0.3	0.006
	JR8x12x12.5	8	12	12.5	0.3	0.006
	JR 8x12x16	8	12	16	0.3	0.007
9	JR9x12x12	9	12	12	0.3	0.005
	JR9x12x16	9	12	16	0.3	0.006
10	JR10x13x12.5	10	13	12.5	0.3	0.005
	JR10x14x11JS1	10	14	11	0.3	0.007
	JR10x14x12	10	14	12	0.3	0.007
	JR10x14x12JS1	10	14	12	0.3	0.007
	JR10x14x13	10	14	13	0.3	0.007
	JRZ10x14x14JS1	10	14	14	0.3	0.008
	JR10x14x16	10	14	16	0.3	0.009
	JR10x14x20	10	14	20	0.3	0.012



Inner rings

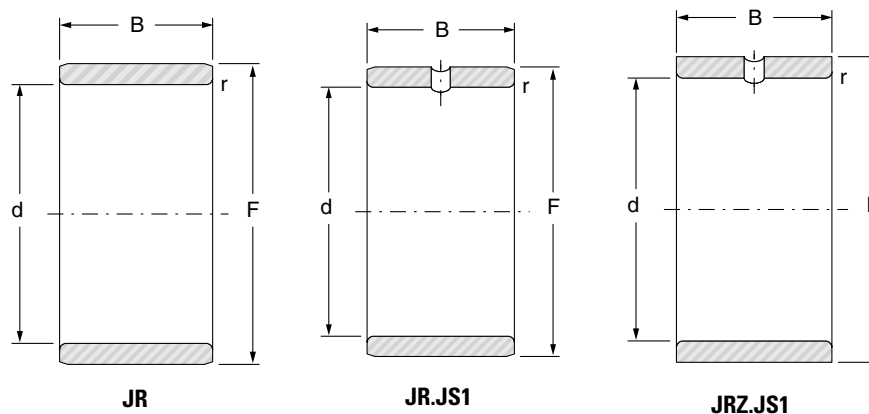
Summary table



Shaft ∅ mm	Designation	d mm	F mm	B mm	r's min mm	Weight kg
12	JR12x15x12.5	12	15	12.5	0.3	0.006
	JR12x15x16	12	15	16	0.3	0.008
	JR12x15x16.5	12	15	16.5	0.3	0.008
	JR12x15x18.5	12	15	18.5	0.3	0.009
	JR12x15x22.5	12	15	22.5	0.3	0.011
	JR12x16x12	12	16	12	0.3	0.008
	JR12x16x12JS1	12	16	12	0.3	0.008
	JR12x16x13	12	16	13	0.3	0.008
	JRZ12x16x14JS1	12	16	14	0.3	0.010
	JR12x16x16	12	16	16	0.3	0.011
	JR12x16x20	12	16	20	0.3	0.014
JR12x16x22	12	16	22	0.3	0.015	
14	JR14x17x17	14	17	17	0.3	0.009
15	JR15x18x16.5	15	18	16.5	0.3	0.010
	JR15x19x16	15	19	16	0.3	0.013
	JR15x19x20	15	19	20	0.3	0.017
	JR15x20x12	15	20	12	0.3	0.012
	JR15x20x12JS1	15	20	12	0.3	0.012
	JR15x20x13	15	20	13	0.3	0.014
	JRZ15x20x14JS1	15	20	14	0.3	0.015
	JR15x20x16	15	20	16	0.3	0.017
	JR 15x20x20	15	20	20	0.35	0.021
	JR15x20x23	15	20	23	0.3	0.025
	JR15x20x26	15	20	26	0.3	0.028

Inner rings

Summary table

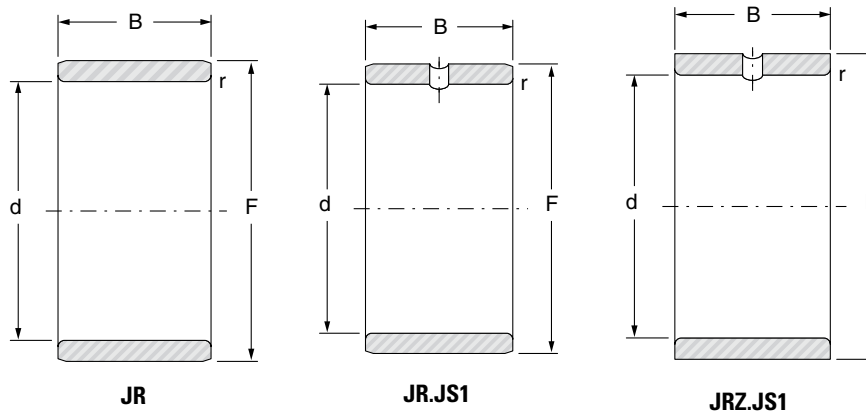


Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
17	JR17x20x16.5	17	20	16.5	0.3	0.011
	JR17x20x20	17	20	20	0.3	0.014
	JR17x20x20.5	17	20	20.5	0.3	0.014
	JR17x20x30.5	17	20	30.5	0.3	0.021
	JR17x21x16	17	21	16	0.3	0.015
	JR17x21x20	17	21	20	0.3	0.019
	JR17x22x13	17	22	13	0.3	0.015
	JR17x22x16	17	22	16	0.3	0.019
	JR17x22x16JS1	17	22	16	0.3	0.019
	JRZ17x22x16JS1	17	22	16	0.3	0.019
	JR17x22x20	17	22	20	0.35	0.023
	JR17x22x23	17	22	23	0.3	0.028
	JR17x22x26	17	22	26	0.3	0.031
	JR17x22x32	17	22	32	0.3	0.038
20	JR20x24x16	20	24	16	0.3	0.018
	JR20x24x20	20	24	20	0.3	0.022
	JR20x25x16	20	25	16	0.3	0.022
	JR20x25x16JS1	20	25	16	0.3	0.022
	JR20x25x17	20	25	17	0.3	0.023
	JRZ20x25x18JS1	20	25	18	0.3	0.025
	JR20x25x20	20	25	20	0.3	0.028
	JR20x25x20.5	20	25	20.5	0.3	0.029
	JR20x25x26	20	25	26	0.3	0.036
	JR20x25x26.5	20	25	26.5	0.3	0.037
	JR20x25x30	20	25	30	0.3	0.042
	JR20x25x32	20	25	32	0.3	0.044
	JR20x25x38.5	20	25	38.5	0.3	0.054



Inner rings

Summary table

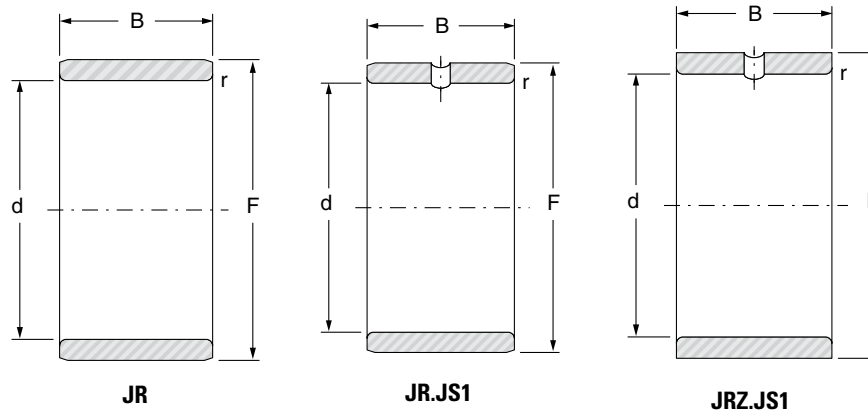


Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
22	JR22x26x16	22	26	16	0.3	0.019
	JR22x26x20	22	26	20	0.3	0.023
	JR22x28x17	22	28	17	0.3	0.030
	JR22x28x20.5	22	28	20.5	0.3	0.038
	JR22x28x30	22	28	30	0.3	0.056
23	JR23x28x20	23	28	20	0.35	0.030
25	JR25x29x20	25	29	20	0.3	0.027
	JR25x29x30	25	29	30	0.3	0.040
	JR25x30x16	25	30	16	0.3	0.027
	JR25x30x16JS1	25	30	16	0.3	0.027
	JR25x30x17	25	30	17	0.3	0.028
	JRZ25x30x18JS1	25	30	18	0.3	0.031
	JR25x30x20	25	30	20	0.3	0.034
	JR25x30x20.5	25	30	20.5	0.3	0.035
	JR25x30x26	25	30	26	0.3	0.044
	JR25x30x26.5	25	30	26.5	0.3	0.045
	JR25x30x30	25	30	30	0.3	0.051
	JR25x30x32	25	30	32	0.3	0.054
JR25x30x38.5	25	30	38.5	0.3	0.066	
28	JR28x32x17	28	32	17	0.3	0.028
	JR28x32x20	28	32	20	0.3	0.030
	JR28x32x30	28	32	30	0.3	0.044
30	JR30x35x16	30	35	16	0.3	0.031
	JR30x35x17	30	35	17	0.3	0.033
	JRZ30x35x18JS1	30	35	18	0.3	0.036
	JR30x35x20	30	35	20	0.3	0.039
	JRZ30x35x20JS1	30	35	20	0.3	0.039



Inner rings

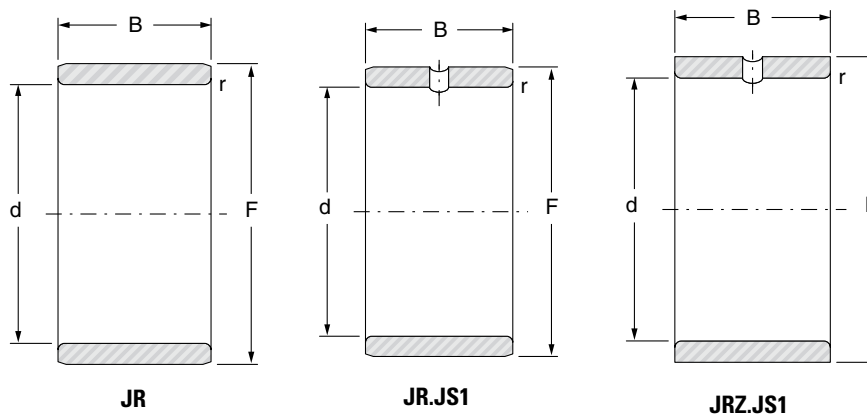
Summary table



Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
30	JR30x35x20.5	30	35	20.5	0.3	0.040
	JR30x35x26	30	35	26	0.3	0.054
	JR30x35x30	30	35	30	0.3	0.057
	JR30x35x32	30	35	32	0.3	0.062
	JR30x38x20JS1	30	38	20	0.6	0.067
32	JR32x37x20	32	37	20	0.3	0.043
	JR32x37x30	32	37	30	0.3	0.064
	JR32x40x20	32	40	20	0.6	0.069
	JR32x40x36	32	40	36	0.6	0.128
35	JR35x40x17	35	40	17	0.3	0.040
	JR35x40x20	35	40	20	0.3	0.046
	JR35x40x20.5	35	40	20.5	0.3	0.049
	JR35x40x22	35	40	22	0.3	0.052
	JR35x40x30	35	40	30	0.3	0.071
	JR35x40x34	35	40	34	0.3	0.080
	JR35x40x40	35	40	40	0.3	0.094
	JR35x42x20	35	42	20	0.6	0.065
	JR35x42x20JS1	35	42	20	0.6	0.065
	JRZ35x42x23JS1	35	42	23	0.6	0.074
	JR35x42x36	35	42	36	0.6	0.122
JR35x44x22	35	44	22	0.6	0.097	
37	JR37x42x20	37	42	20	0.35	0.046
38	JR38x43x20	38	43	20	0.3	0.050
	JR38x43x30	38	43	30	0.3	0.075

Inner rings

Summary table

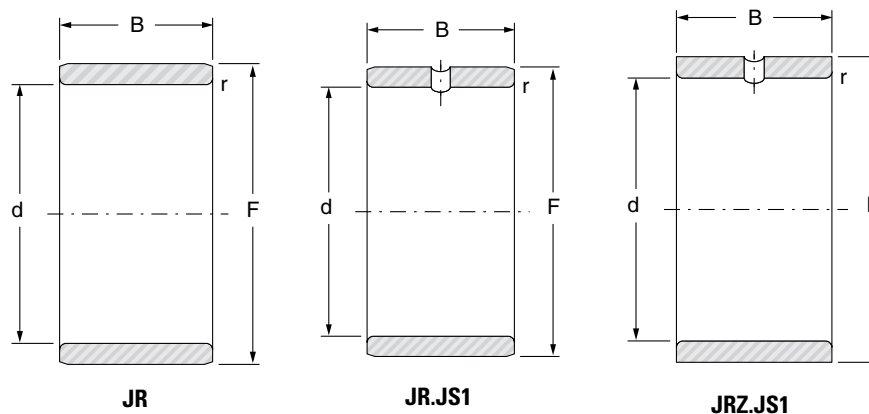


Shaft ∅ mm	Designation	d mm	F mm	B mm	r's min mm	Weight kg
40	JR40x45x17	40	45	17	0.3	0.044
	JR40x45x20	40	45	20	0.3	0.052
	JR40x45x20.5	40	45	20.5	0.3	0.054
	JR40x45x25	40	45	25	0.35	0.062
	JR40x45x30	40	45	30	0.3	0.078
	JR40x45x34	40	45	34	0.3	0.089
	JR40x45x40	40	45	40	0.3	0.115
	JR40x48x22	40	48	22	0.6	0.094
	JRZ40x48x23JS1	40	48	23	0.6	0.100
	JR40x48x40	40	48	40	0.6	0.173
	JR40x50x20	40	50	20	1	0.110
42	JR42x47x20	42	47	20	0.3	0.055
	JR42x47x30	42	47	30	0.3	0.083
45	JR45x50x20	45	50	20	0.3	0.058
	JR45x50x25	45	50	25	0.6	0.073
	JR45x50x25.5	45	50	25.5	0.3	0.075
	JR45x50x35	45	50	35	0.6	0.103
	JR45x50x40	45	50	40	0.3	0.117
	JR45x52x22	45	52	22	0.6	0.090
	JR45x52x23	45	52	23	0.6	0.096
	JRZ45x52x23JS1	45	52	23	0.6	0.096
	JR45x52x40	45	52	40	0.6	0.167
	JR45x55x20	45	55	20	1	0.133
	JR45x55x20JS1	45	55	20	1	0.133
	JR45x55x22	45	55	22	1	0.135
	JR45x55x40	45	55	40	1	0.247



Inner rings

Summary table

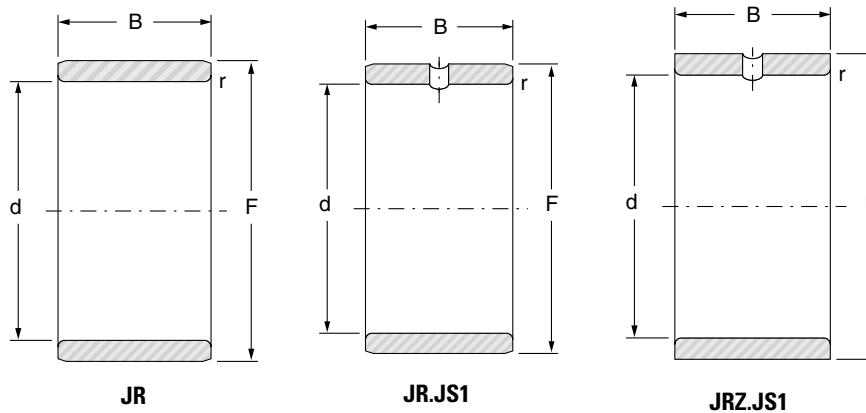


Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
50	JR50x55x20	50	55	20	0.3	0.065
	JR50x55x25	50	55	25	0.6	0.081
	JR50x55x35	50	55	35	0.6	0.113
	JR50x55x40	50	55	40	0.3	0.130
	JR50x58x22	50	58	22	0.6	0.117
	JRZ50x58x23JS1	50	58	23	0.6	0.122
	JR50x58x40	50	58	40	0.6	0.213
	JR50x60x20	50	60	20	1	0.155
	JR50x60x20JS1	50	60	20	1	0.155
	JR50x60x25	50	60	25	1	0.170
	JR50x60x40	50	60	40	1	0.310
55	JR55x60x25	55	60	25	0.6	0.088
	JR55x60x35	55	60	35	0.6	0.124
	JR55x63x25	55	63	25	1	0.141
	JR55x63x45	55	63	45	1	0.286
	JR55x65x30	55	65	30	1	0.222
	JR55x65x60	55	65	60	1	0.444
60	JR60x68x25	60	68	25	0.6	0.153
	JR60x68x35	60	68	35	0.6	0.220
	JR60x68x45	60	68	45	1	0.284
	JR60x70x25	60	70	25	1	0.200
	JR60x70x30	60	70	30	1	0.240
	JR60x70x60	60	70	60	1	0.480



Inner rings

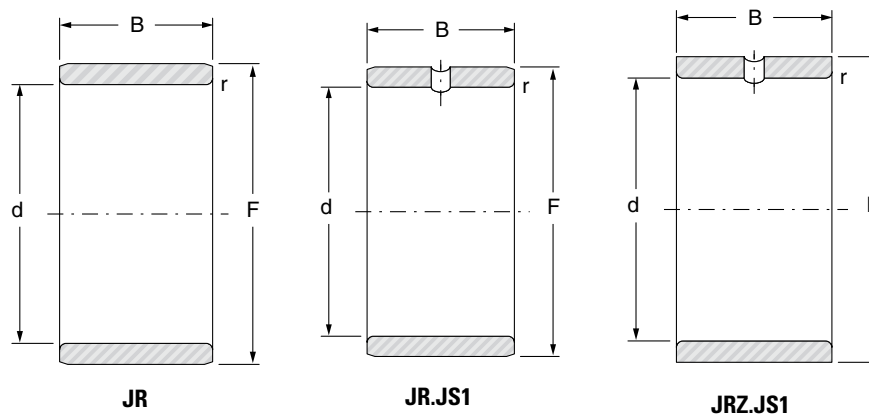
Summary table



Shaft ∅ mm	Designation	d mm	F mm	B mm	r's min mm	Weight kg
65	JR65x72x25	65	72	25	1	0.143
	JR65x72x45	65	72	45	1	0.266
	JR65x73x25	65	73	25	0.6	0.170
	JR65x73x35	65	73	35	0.6	0.240
	JR65x75x28	65	75	28	1	0.240
	JR65x75x30	65	75	30	1	0.260
	JR65x75x60	65	75	60	1	0.520
70	JR70x80x25	70	80	25	1	0.230
	JR70x80x30	70	80	30	1	0.270
	JR70x80x35	70	80	35	1	0.320
	JR70x80x54	70	80	54	1	0.500
	JR70x80x60	70	80	60	1	0.556
75	JR75x85x25	75	85	25	1	0.240
	JR75x85x30	75	85	30	1	0.289
	JR75x85x35	75	85	35	1	0.338
	JR75x85x54	75	85	54	1	0.530
80	JR80x90x25	80	90	25	1	0.260
	JR80x90x30	80	90	30	1	0.306
	JR80x90x35	80	90	35	1	0.355
	JR80x90x54	80	90	54	1	0.565
85	JR85x95x26	85	95	26	1	0.290
	JR85x95x30	85	95	30	1	0.334
	JR85x95x36	85	95	36	1	0.397
	JR85x100x35	85	100	35	1.1	0.595
	JR85x100x63	85	100	63	1.1	1.080

Inner rings

Summary table

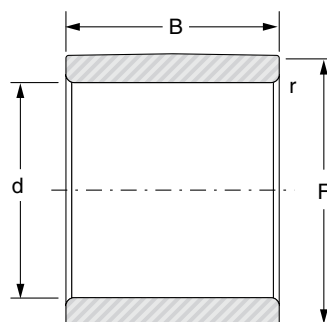


Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
90	JR90x100x26	90	100	26	1	0.300
	JR90x100x30	90	100	30	1	0.350
	JR90x100x36	90	100	36	1	0.422
	JR90x105x32	90	105	32	1.1	0.580
	JR90x105x35	90	105	35	1.1	0.624
	JR90x105x63	90	105	63	1.1	1.140
95	JR95x105x26	95	105	26	1	0.310
	JR95x105x36	95	105	36	1	0.430
	JR95x110x35	95	110	35	1.1	0.653
	JR95x110x63	95	110	63	1.1	1.200
100	JR100x110x30	100	110	30	1.1	0.384
	JR100x110x40	100	110	40	1.1	0.510
	JR100x115x40	100	115	40	1.1	0.790
110	JR110x120x30	110	120	30	1	0.425
	JR110x125x40	110	125	40	1.1	0.870
120	JR120x130x30	120	130	30	1	0.460
	JR120x135x45	120	135	45	1.1	1.060
130	JR130x145x35	130	145	35	1.1	0.890
	JR130x150x50	130	150	50	1.5	1.730
140	JR140x155x35	140	155	35	1.1	0.955
	JR140x160x50	140	160	50	1.5	1.860
150	JR150x165x40	150	165	40	1.1	1.170
160	JR160x175x40	160	175	40	1.1	1.240
170	JR170x185x45	170	185	45	1.1	1.480
180	JR180x195x45	180	195	45	1.1	1.560



Inner rings for machine-tool quality combined bearings - Summary table

IM 19000 B
and IM 20600 series

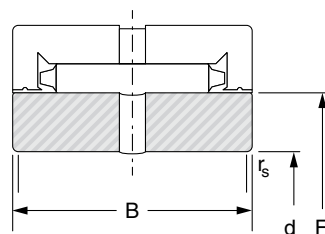


IM

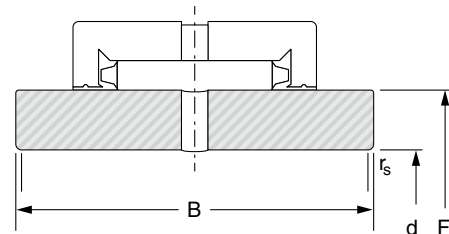
Shaft ∅ mm	Designation	d mm	F mm	B mm	r mm	Weight kg
17	IM 19017	17	20	27.5	0.2	0.019
	IM 20617	17	20	32	0.2	0.021
20	IM 19020	20	25	27.5	0.35	0.038
	IM 20620	20	25	32	0.35	0.044
25	IM 19025	25	30	27.5	0.35	0.042
	IM 20625	25	30	32	0.35	0.052
30	IM 19030	30	35	27.5	0.35	0.053
	IM 20630	30	35	32	0.35	0.061
35	IM 19035	35	40	27.5	0.35	0.063
	IM 20635	35	40	32	0.35	0.072
40	IM 19040	40	45	27.5	0.35	0.069
	IM 20640	40	45	32	0.35	0.080
45	IM 19045	45	50	30.5	0.65	0.085
	IM 20645	45	50	35	0.65	0.096

Cylindrical inner rings with hole for RNA bearings - Summary table

BIC and BICG series



BIC



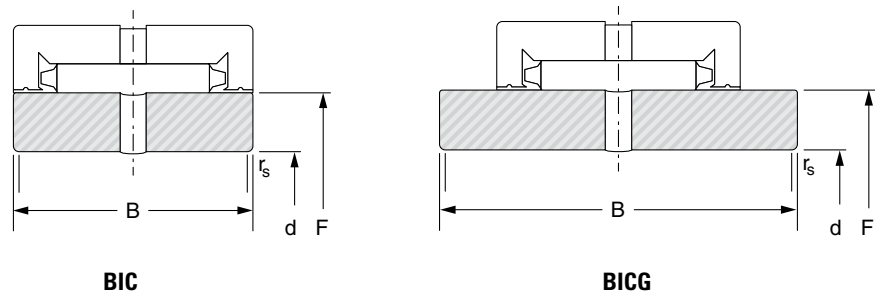
BICG

Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
12	BIC 1012	12	17.6	15	1	0.016
15	BIC 1015	15	20.8	15	1	0.018
	BIC 2015	15	22.1	22	1	0.035
17	BIC 1017	17	23.9	15	1	0.026
20	BIC 1020	20	28.7	18	1	0.046
	BIC 2020	20	28.7	22	1	0.056
25	BIC 1025	25	33.5	18	1	0.054
	BIC 2025	25	33.5	22	1	0.065
	BIC 22025	25	33.5	30	1	0.500
30	BIC 1030	30	38.2	18	1	0.060
	BIC 2030	30	38.2	22	1	0.074
	BIC 3030	30	44.0	30	1	0.188
35	BIC 1035	35	44.0	18	1	0.077
	BIC 2035	35	44.0	22	1	0.093
40	BIC 1040	40	49.7	18	1.5	0.094
	BIC 2040	40	49.7	22	1.5	0.115
	BIC 3040	40	55.4	36	1.5	0.321
45	BIC 1045	45	55.4	18	1.5	0.113
	BIC 2045	45	55.4	22	1.5	0.139
	BIC 3045	45	62.1	38	1.5	0.422



Cylindrical inner rings with hole for RNA bearings - Summary table

BIC and BICG series



Shaft ∅ mm	Designation	d mm	F mm	B mm	r _s min mm	Weight kg
50	BIC 1050	50	62.1	20	2	0.163
	BIC 11050	50	62.1	24	2	0.196
	BIC 2050	50	62.1	28	2	0.228
	BIC 3050	50	68.8	38	2	0.515
55	BIC 1055	55	68.8	20	2	0.205
	BIC 3055	55	72.6	38	2	0.525
	BICG 3055	55	72.6	48	2	0.660
60	BIC 2060	60	72.6	28	2	0.282
	BIC 3060	60	78.3	38	2	0.583
	BICG 2060	60	72.6	38	2	0.385
65	BIC 3065	65	83.1	38	2	0.623
70	BIC 3070	70	88.0	38	2	0.662
75	BIC 2075	75	88.0	32	2	0.410
80	BIC 1080	80	96.0	24	2	0.410
	BIC 2080	80	96.0	32	2	0.545
	BIC 3080	80	99.5	38	2	0.805
90	BIC 2090	90	104.7	32	2	0.531
	BIC 3090	90	109.1	43	2	0.990
95	BIC 2095	95	109.1	32	2	0.548
	BIC 3095	95	114.7	43	2	1.075
100	BIC 3100	100	119.2	43	2	1.090
105	BIC 2105	105	119.2	32	2	0.615
110	BIC 2110	110	124.7	34	2	0.705
125	BICG 2125	125	142.5	44	2	1.340
130	BIC 3130	130	158.0	52	2	2.530



MANUFACTURING TOLERANCES OF BEARING RINGS

Standard tolerance class P0⁽¹⁾

Inner ring

∅ bore nominal d mm		d _m ($\frac{d \text{ min.} + d \text{ max.}}{2}$) μm		Out of round μm max.	Width		
					tolerance μm		Max variation on a ring μm
from	to	max.	min.	max.	min.		
2,5	10	0	-8	10	0	-120	15
10	18	0	-8	10	0	-120	20
18	30	0	-10	13	0	-120	20
30	50	0	-12	15	0	-120	20
50	80	0	-15	20	0	-150	25
80	120	0	-20	25	0	-200	25
120	180	0	-25	30	0	-250	30
180	250	0	-30	40	0	-300	30
250	315	0	-35	50	0	-350	35
315	400	0	-40	60	0	-400	40

Outer ring

∅ external diameter nominal D mm		D _m ($\frac{D \text{ min.} + D \text{ max.}}{2}$) μm		Out of round μm max.	Width
from	to	max.	min.		
6	18	0	-8	15	Tolerance variations on a ring are identical to those of the inner ring for the corresponding bearing
18	30	0	-9	15	
30	50	0	-11	20	
50	80	0	-13	25	
80	120	0	-15	35	
120	150	0	-18	40	
150	180	0	-25	45	
180	250	0	-30	50	
250	315	0	-35	60	
315	400	0	-40	70	

(1) According to ISO 1206 (DIN 620 Class 0).

Tolerance class P6⁽²⁾

Inner ring

∅ bore nominal d mm		d _m ($\frac{d \text{ min.} + d \text{ max.}}{2}$) μm		Out of round μm max.	Width		
					tolerance μm		Max variation on a ring μm
from	to	max.	min.	max.	min.		
2,5	10	0	-7	6	0	-120	15
10	18	0	-7	7	0	-120	20
18	30	0	-8	8	0	-120	20
30	50	0	-10	10	0	-120	20
50	80	0	-12	10	0	-150	25
80	120	0	-15	13	0	-200	25
120	180	0	-18	18	0	-250	30
180	250	0	-22	20	0	-300	30
250	315	0	-25	25	0	-350	35
315	400	0	-30	30	0	-400	40

Outer ring

∅ external diameter nominal D mm		D _m ($\frac{D \text{ min.} + D \text{ max.}}{2}$) μm		Out of round μm max.	Width
from	to	max.	min.		
6	18	0	-7	9	Tolerance variations on a ring are identical to those of the inner ring for the corresponding bearing
18	30	0	-8	9	
30	50	0	-9	10	
50	80	0	-11	13	
80	120	0	-13	18	
120	150	0	-15	20	
150	180	0	-18	23	
180	250	0	-20	25	
250	315	0	-25	30	
315	400	0	-28	35	

Tolerance class P5⁽²⁾

Inner ring

∅ bore nominal d mm		d _m ($\frac{d \text{ min.} + d \text{ max.}}{2}$) μm		Out of round μm max.	Width		
					tolerance μm		Max variation on a ring μm
from	to	max.	min.	max.	min.		
2,5	10	0	-5	3,5	0	-40	5
10	18	0	-5	3,5	0	-80	5
18	30	0	-6	4	0	-120	5
30	50	0	-8	5	0	-120	5
50	80	0	-9	5	0	-150	6
80	120	0	-10	6	0	-200	7
120	180	0	-13	8	0	-250	8
180	250	0	-15	10	0	-300	10
250	315	0	-18	13	0	-350	13
315	400	0	-23	15	0	-400	15

Outer ring

∅ external diameter nominal D mm		D _m ($\frac{D \text{ min.} + D \text{ max.}}{2}$) μm		Out of round μm max.	Width
from	to	max.	min.		
6	18	0	-5	5	Tolerance variations on a ring are identical to those of the inner ring for the corresponding bearing
18	30	0	-6	6	
30	50	0	-7	7	
50	80	0	-9	8	
80	120	0	-10	10	
120	150	0	-11	11	
150	180	0	-13	13	
180	250	0	-15	15	
250	315	0	-18	18	
315	400	0	-20	20	

(2) According to ISO/R 492 (DIN 620). For tolerances of class 4 information on request.

NOTE- For the particular tolerances of a bearing type, please consult the corresponding chapter. In view of the relative thinness of inner and outer rings of needle bearings, their circularity (or ovality) is of little significance, because it is influenced by the shape of the appropriate shafts and housings after installation. This characteristic does not figure in the tables above.



ISO HOUSING TOLERANCES, in μm

Nominal diameter mm		F			G	H						J			K	M		N			P	R	
		F6	F7	F8	G6	H6	H7	H8	H10	H11	H12	J6	J7	Js12	K6	M6	M7	N6	N7	N11	P7	R6	R7
from	to																						
6	10	+22 +13	+28 +13	+35 +13	+14 +5	+9 0	+15 0	+22 0	+58 0	+90 +0	+150 +0	+5 -4	+8 -7	±75	+2 -7	-3 -12	0 -15	-7 -16	-4 -19	0 -90	-9 -24	-16 -25	-13 -28
10	18	+27 +16	+34 +16	+43 +16	+17 +6	+11 0	+18 0	+27 0	+70 0	+110 0	+180 0	+6 -5	+10 -8	±90	+2 -9	-4 -15	0 -18	-9 -23	-5 -23	0 -110	-11 -29	-20 -31	-16 -34
18	30	+33 +20	+41 +20	+53 +20	+20 +7	+13 0	+21 0	+33 0	+64 0	+130 0	+210 0	+8 -5	+12 -9	±105	+2 -11	-4 -17	0 -21	-11 -24	-7 -26	0 -130	-14 -35	-24 -37	-20 -41
30	50	+41 +25	+50 +25	+64 +25	+25 +9	+16 0	+25 0	+39 0	+100 0	+160 0	+250 0	+10 -6	+14 -11	±125	+3 -13	-4 -20	0 -25	-12 -28	-8 -33	0 -160	-17 -42	-29 -45	-25 -50
50	65	+49 +30	+60 +30	+76 +30	+29 +10	+19 0	+30 0	+46 0	+120 0	+190 0	+300 0	+13 -6	+18 -12	±150	+4 -15	-5 -24	0 -30	-14 -33	-9 -39	0 -190	-21 -51	-35 -54	-30 -60
65	80	+49 +30	+60 +30	+76 +30	+29 +10	+19 0	+30 0	+46 0	+120 0	+190 0	+300 0	+13 -6	+18 -12	±150	+4 -15	-5 -24	0 -30	-14 -33	-9 -39	0 -190	-21 -51	-37 -56	-32 -62
80	100	+58 +36	+71 +36	+90 +36	+34 +12	+22 0	+35 0	+54 0	+140 0	+220 0	+350 0	+16 -6	+22 -13	±175	+4 -18	-6 -28	0 -35	-16 -38	-10 -45	0 -220	-24 -59	-44 -66	-38 -73
100	120	+58 +36	+71 +36	+90 +36	+34 +12	+22 0	+35 0	+54 0	+140 0	+220 0	+350 0	+16 -6	+22 -13	±175	+4 -18	-6 -28	0 -35	-16 -38	-10 -45	0 -220	-24 -59	-47 -69	-41 -76
120	140	+68 +43	+83 +43	+106 +43	+39 +14	+25 0	+40 0	+63 0	+160 0	+250 0	+400 0	+18 -7	+26 -14	±200	+4 -21	-8 -33	0 -40	-20 -45	-12 -52	0 -250	-28 -68	-56 -81	-48 -88
140	160	+68 +43	+83 +43	+106 +43	+39 +14	+25 0	+40 0	+63 0	+160 0	+250 0	+400 0	+18 -7	+26 -14	±200	+4 -21	-8 -33	0 -40	-20 -45	-12 -52	0 -250	-28 -68	-58 -83	-50 -90
160	80	+68 +43	+83 +43	+106 +43	+39 +14	+25 0	+40 0	+63 0	+160 0	+250 0	+400 0	+18 -7	+26 -14	±200	+4 -21	-8 -33	0 -40	-20 -45	-12 -52	0 -250	-28 -68	-61 -86	-53 -93
180	200	+79 +50	+96 +50	+122 +50	+44 +15	+29 0	+46 0	+72 0	+185 0	+290 0	+460 0	+22 -7	+30 -16	±230	+5 -24	-8 -37	0 -46	-22 -51	-14 -60	0 -290	-33 -79	-68 -97	-60 -106
200	225	+79 +50	+96 +50	+122 +50	+44 +15	+29 0	+46 0	+72 0	+185 0	+290 0	+460 0	+22 -7	+30 -16	±230	+5 -24	-8 -37	0 -46	-22 -51	-14 -60	0 -290	-33 -79	-71 -100	-63 -109
225	250	+79 +50	+96 +50	+122 +50	+44 +15	+28 0	+46 0	+72 0	+185 0	+290 0	+460 0	+22 -7	+30 -16	±230	+5 -24	-8 -37	0 -46	-22 -51	-14 -60	0 -290	-33 -79	-75 -104	-67 -113
250	280	+88 +56	+108 +56	+137 +56	+49 +17	+32 0	+52 0	+81 0	+210 0	+320 0	+520 0	+25 -7	+36 -16	±260	+5 -27	-9 -41	0 -52	-25 -57	-14 -66	0 -320	-36 -88	-85 -117	-74 -126
280	315	+88 +56	+108 +56	+137 +56	+49 +17	+32 0	+52 0	+81 0	+210 0	+320 0	+520 0	+25 -7	+36 -16	±260	+5 -27	-9 -41	0 -52	-25 -57	-14 -66	0 -320	-36 -88	-89 -121	-76 -130
315	355	+98 +62	+119 +62	+151 +62	+54 +18	+36 0	+57 0	+89 0	+230 0	+360 0	+570 0	+29 -7	+39 -18	±285	+7 -29	-10 -46	0 -57	-26 -62	-16 -73	0 -360	-41 -98	-97 -133	-87 -144
355	400	+98 +62	+119 +62	+151 +62	+54 +18	+36 0	+57 0	+89 0	+230 0	+360 0	+570 0	+29 -7	+39 -18	±285	+7 -29	-10 -46	0 -57	-26 -62	-16 -73	0 -360	-41 -98	-103 -139	-93 -150

ISO SHAFT TOLERANCES, in μm

Nominal diameter mm		f			g		h					j		k		m		n	p
		f6	g5	g6	h5	h6	h7	h8	h10	h13	j5	j6	k5	k6	m5	m6	n6	p6	
from	to																		
3	6	-10 -18	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18	0 -48	0 -180	+3 -2	+6 -2	+8 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	
6	10	-13 -22	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -58	0 -220	+4 -2	+7 -2	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	
10	18	-16 -27	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27	0 -70	0 -270	+5 -3	+8 -3	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +19	
18	30	-20 -33	-7 -16	-7 -20	0 -9	0 -13	0 -21	0 -33	0 -84	0 -330	+5 -4	+9 -4	+11 +2	+15 +2	+17 +9	+21 +9	+29 +15	+35 +22	
30	50	-25 -41	-9 -20	-9 -25	0 -11	0 -18	0 -25	0 -39	0 -100	0 -390	+6 -5	+11 -5	+13 +2	+19 +2	+20 +9	+25 +9	+33 +17	+42 +28	
50	80	-30 -49	-10 -23	-10 -29	0 -13	0 -19	0 -30	0 -46	0 -120	0 -460	+6 -7	+12 -7	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	
80	120	-36 -58	-12 -27	-12 -34	0 -15	0 -22	0 -35	0 -54	0 -140	0 -540	+6 -9	+13 -9	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	
120	180	-43 -99	-14 -32	-14 -39	0 -19	0 -25	0 -40	0 -63	0 -160	0 -630	+7 -11	+14 -11	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	
180	250	-50 -79	-15 -39	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -188	0 -720	+7 -13	+16 -13	+24 +4	+33 +4	+37 +17	+45 +17	+50 +31	+79 +80	
250	315	-56 -88	-17 -40	-17 -49	0 -23	0 -32	0 -52	0 -81	0 -210	0 -610	+7 -18	+15 -15	+27 +4	+35 +4	+43 +20	+52 +20	+66 +34	+88 +55	
315	400	-62 -99	-18 -43	-16 -54	0 -25	0 -38	0 -87	0 -89	0 -230	0 -890	+7 -19	+19 -16	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+99 +92	



INTERNAL RADIAL PLAY OF BEARING ⁽¹⁾

Nominal dimension of the hole mm		Class of play C2 mm		Class of play C0 (standard) mm		Class of play C3 mm		Class of play C4 mm	
>	≥	min	max	min	max	min	max	min	max
–	30.000	–	0.025	0.020	0.045	0.035	0.060	0.050	0.075
30.000	40.000	0.005	0.030	0.025	0.050	0.045	0.070	0.060	0.085
40.000	50.000	0.005	0.035	0.030	0.060	0.050	0.080	0.070	0.100
50.000	65.000	0.010	0.040	0.040	0.070	0.060	0.090	0.080	0.110
65.000	80.000	0.010	0.045	0.040	0.075	0.065	0.100	0.090	0.125
80.000	100.000	0.015	0.050	0.050	0.085	0.075	0.110	0.105	0.140
100.000	120.000	0.015	0.055	0.050	0.090	0.085	0.125	0.125	0.165
120.000	140.000	0.015	0.060	0.060	0.105	0.100	0.145	0.145	0.190
140.000	160.000	0.020	0.070	0.070	0.120	0.115	0.165	0.165	0.215
160.000	180.000	0.025	0.075	0.075	0.125	0.120	0.170	0.170	0.220
180.000	200.000	0.035	0.090	0.090	0.145	0.140	0.195	0.195	0.250
200.000	225.000	0.045	0.105	0.105	0.165	0.160	0.220	0.220	0.280
225.000	250.000	0.045	0.110	0.110	0.175	0.170	0.235	0.235	0.300
250.000	280.000	0.055	0.125	0.125	0.195	0.190	0.260	0.260	0.330
280.000	315.000	0.055	0.130	0.130	0.205	0.200	0.275	0.275	0.350
315.000	355.000	0.065	0.145	0.145	0.225	0.225	0.305	0.305	0.385
355.000	400.000	0.100	0.190	0.190	0.280	0.280	0.370	0.370	0.460
400.000	450.000	0.110	0.210	0.210	0.310	0.310	0.410	0.410	0.510
450.000	500.000	0.110	0.220	0.220	0.330	0.330	0.440	0.440	0.550

(1) According to **ISO 5753** only for needle bearings with cage and precision combined bearings with adjustable preload. For internal radial play of other products see the specific chapters.

