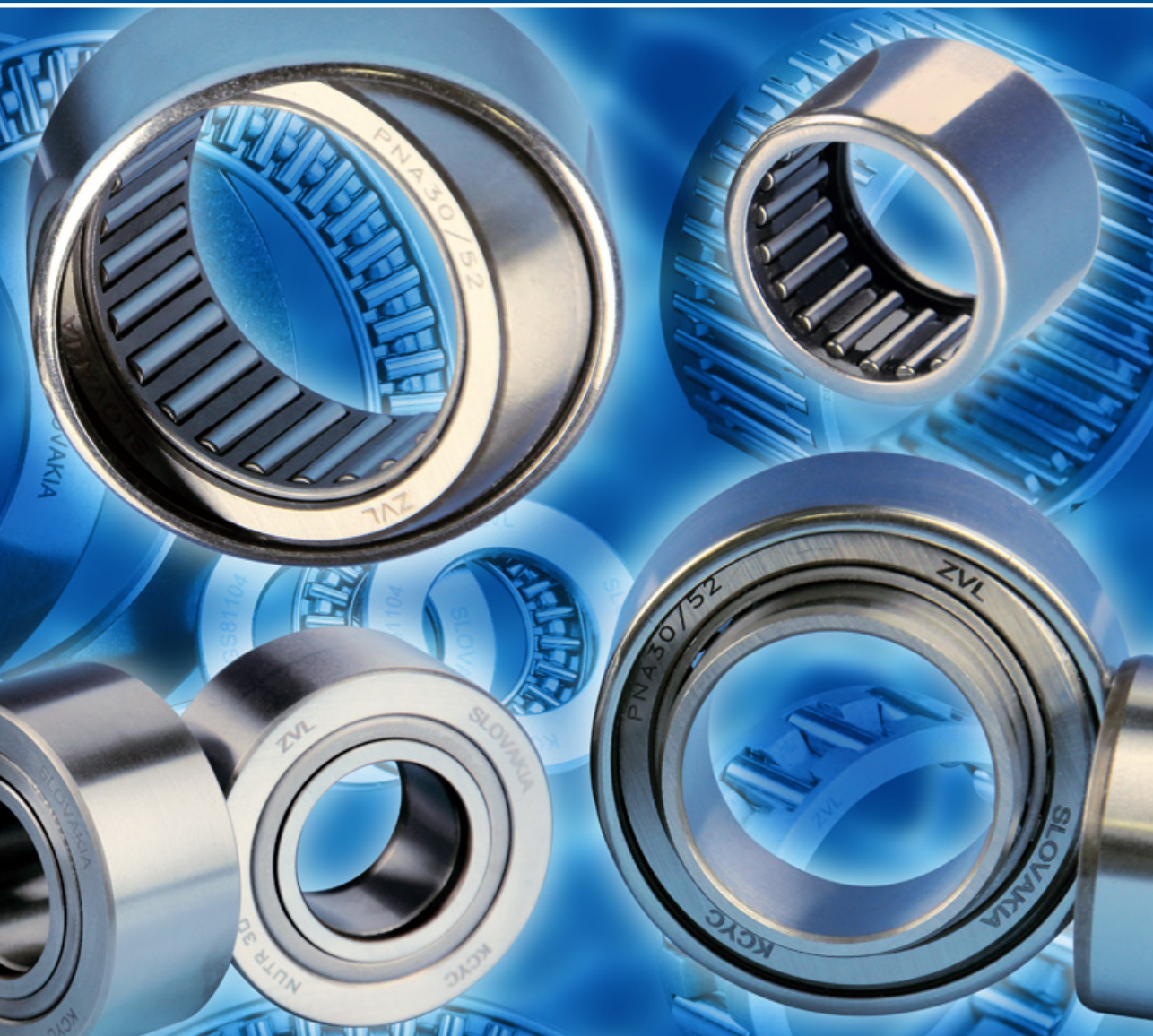




NEEDLE ROLLER BEARING CATALOGUE



INTRODUCTION

Purpose of the catalogue is to inform our customers about the range of offered bearings and accessories from the production of ZVL SLOVAKIA.

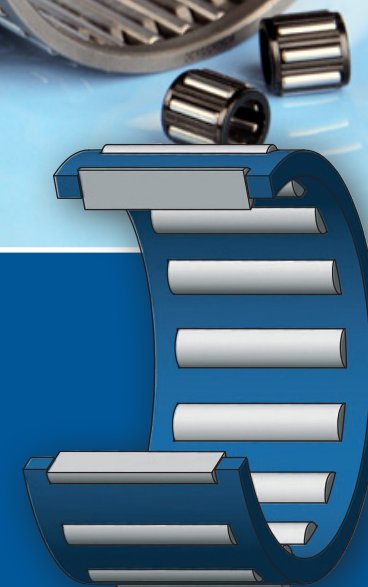
The catalogue comprises all produced types and sizes of standardized needle roller bearings, cam followers and accessories. In the first part – tables, there are presented technical data of products, dimensions, load bearing capacities and other data necessary for the bearing proper selection for a particular seating. In the second part of the catalogue, there is provided information concerning the radial clearances and the accuracy of the bearings.

We believe that the catalogue will be a good tool for you for the proper selection and usage of bearings, and at the same time, we would like to ask you that if you have any question, please contact our staff who are ready to offer solutions at all times.



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NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



NEEDLE CAGES – SINGLE ROW / DOUBLE ROW

Single and double row needle roller cages are bearings with little spatial demands. Their cross-sectional profile is very small and therefore they are used in structures with a lack of space. Nevertheless, they assure heavy load transfer. The needle roller cages are manufactured with the diameter of a hole from 5 mm to 110 mm.

DESIGN DATA

MAIN DIMENSIONS

The main dimensions of needle roller cages with single and double row are set forth in the dimensional tables at pages below, and they conform to the standard DIN 5405-1.

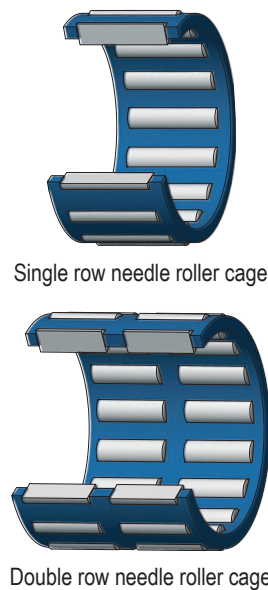
DESIGN

These are bearings with steel needles seated in one or two rows in a sheet metal or plastic cage. Needle rollers are made of bearing steel of the 100Cr6 grade. Example of designation K9x12x10. Cages are manufactured of quality steels (15CrMo, 20CrMo) or plastic material (PA66). The plastic cage can be used from the temperature of 120°C. It is possible that the temperature may rise, in the short term, up to 180 °C. Note: cages of the K...ZW design are to be negotiated with the representatives of ZVL SLOVAKIA in advance.

PRECISENESS OF BEARINGS

Needles in bearings are sorted by deviation from the nominal diameter, while the maximum deviation is from 2 to 3 µm.

Sorting groups are designated by inscription on the cage, pairs of sorting groups with colour of the adhesive tape on the packing.



Single row needle roller cage

Double row needle roller cage

Sorting group	Pair of the sorting group	Sorting groups in µm	
standard	red	0 až -2	-1 až -3
	blue	-2 až -4	-3 až -5
	white (grey)	-4 až -6	-5 až -7
as demanded	green	-6 až -8	-7 až -9
as demanded	yellow	-8 až -10	-9 až -11

PRECISENESS OF THE RELATED PARTS

Execution of the related parts – diameter of the shaft and housing – designates the input radial clearance. Tolerance zone is designated by the following table:

Nominal diameter of the shaft in mm		from 3 to 80		from 80 to 250	
Tolerance band of the shaft	lesser than standard	j5	h5	h5	h5
	standard	h5	g5	g5	f5
	bigger than standard	g6	f6	f6	e6
Tolerance zone of the hole		G6	H6	G6	H6

Deviation of circularity must be in all cases adhered at the level of 25% size of the tolerance zone. Distance of the side guiding surfaces shall be in the tolerance zone H11.

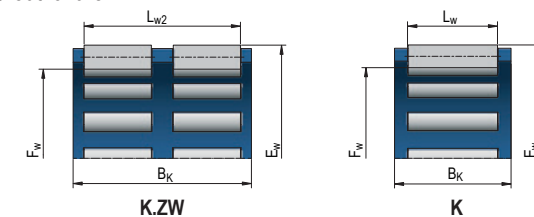
NEEDLE CAGES – SINGLE ROW / DOUBLE ROW

EXECUTION OF CONNECTING PARTS

In order to reach the required load bearing capacity of the needle roller cage, hardness of the hardened surface layer must be minimally 58-64HRC and thickness of the hardened layer must be minimally 0.6 - 1 mm. Surface roughness must be within Ra = 0.2 µm.

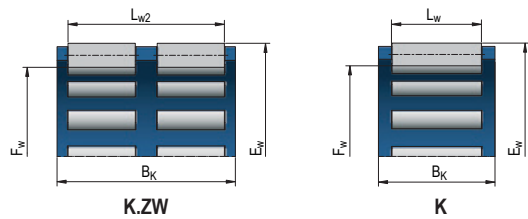
MARGINAL ROTATIONAL FREQUENCY

Marginal rotational frequency shown in the catalogue represents maximal rotational speed, at which the bearing works with certain safety margin without failure.



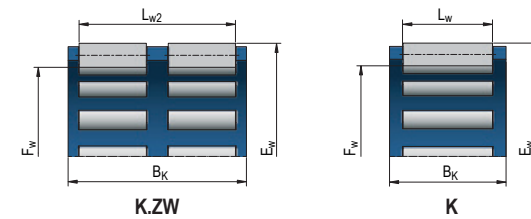
Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K	C	Co			
5	5	8	8	2,3	1,88	37000	K5x8x8TN	0,7
	5	8	10	2,8	2,45	37000	K5x8x10TN	0,9
6	6	9	8	2,56	2,24	35000	K6x9x8TN	0,8
	6	9	10	3,3	3,1	35000	K6x9x10TN	1
	6	10	13	3,5	2,8	33000	K6x10x13TN	1,3
7	7	10	8	2,75	2,55	32000	K7x10x8TN	0,9
	7	10	10	3,35	3,4	32000	K7x10x10TN	1,1
8	8	11	8	3	2,9	30000	K8x11x8TN	1,1
	8	11	10	3,83	3,95	30000	K8x11x10TN	1,7
	8	11	13	5	5,7	30000	K8x11x13TN	1,8
	8	12	10	4,9	4,6	30000	K8x12x10TN	1,3
9	9	12	10	4,2	4,7	30000	K9x12x10TN	1,5
	9	12	13	5,5	6,7	30000	K9x12x13TN	1,9
10	10	13	10	4,5	5,25	27000	K10x13x10TN	1,6
	10	13	13	6	7,6	27000	K10x13x13TN	2,1
	10	13	16	6,3	7,8	27000	K10x13x16TN	2,2
	10	14	10	7	7,9	27000	K10x14x10TN	2,9
	10	14	13	8	9,1	26000	K10x14x13TN	4,3
	10	16	12	7	9,3	27000	K10x16x12TN	3,7
	12	15	9	4,12	5,21	25000	K12x15x9TN	2,7
12	12	15	10	4,32	5,73	25000	K12x15x10TN	1,9
	12	15	13	6	8,1	25000	K12x15x13TN	2,4
	12	16	8	4,2	4,7	25000	K12x16x8TN	2,9
	12	16	10	6	6,9	25000	K12x16x10TN	3,8
	12	16	13	7,9	9,2	25000	K12x16x13TN	3,4
	12	17	13	9,3	10	24000	K12x17x13TN	4,4
	12	18	12	9,8	8	24000	K12x18x12TN	5
	12	15	20	8,2	12	25000	K12x15x20TN	3,8
	14	17	10	5,1	6,8	23000	K14x17x10	4
	14	17	17	9,3	14	23000	K14x17x17	6,8
	14	18	10	6,8	8,3	23000	K14x18x10	4,8
	14	18	17	10,5	14,5	23000	K14x18x17	10,5

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



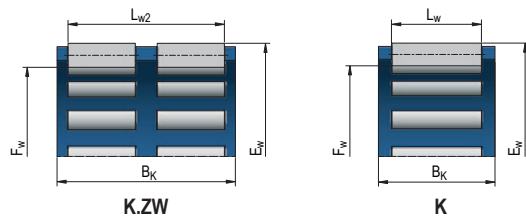
Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K					
14	14	18	13	8,1	9,8	23000	K14x18x13	6,3
	14	18	14	9,2	12	23000	K14x18x14	5,8
	14	18	15	10	13	23000	K14x18x15	7,3
	14	18	17	10,5	13,9	23000	K14x18x17	8
	14	20	12	9,9	10,5	22000	K14x20x12	18,6
15	15	18	14	7,5	11	23000	K15x18x14	5,3
	15	18	17	9,6	15,9	23000	K15x18x17	5,4
	15	19	10	7,2	9	22000	K15x19x10	5,1
15	15	19	13	9	9,8	22000	K15x19x13	7
	15	19	17	10,3	15	22000	K15x19x17	8,8
	15	19	24	12,8	20,1	22000	K15x19x24	10,5
	15	20	13	9,7	11	22000	K15x20x13	8,9
	15	21	12	10	13	22000	K15x21x12	10
	15	21	15	13,8	16	22000	K15x21x15	13
	15	21	21	18	24	22000	K15x21x21	18,2
16	16	20	10	7,6	9,7	22000	K16x20x10	5,7
	16	20	13	8,7	11,3	22000	K16x20x13	7,1
	16	20	17	11,2	16,3	22000	K16x20x17	9,2
	16	21	10	9	12	22000	K16x21x10	6,7
	16	22	12	11	12	21000	K16x22x12	10,4
	16	22	13	12	13,4	21000	K16x22x13	11,9
	16	22	16	14,3	17	21000	K16x22x16	13,7
	16	22	20	18	22,3	21000	K16x22x20	16,7
	16	23	14	19	21	19000	K16x23x14	20
	16	24	20	21,1	23	20000	K16x24x20	24,9
17	17	21	10	7,9	10,1	21000	K17x21x10	5,6
	17	21	13	10	14,1	21000	K17x21x13	7,5
	17	21	17	12	17,4	21000	K17x21x17	9,5
	17	23	14	11	15	21000	K17x23x14	11,5
18	18	22	10	8,2	9,9	20000	K18x22x10	6,1
	18	22	13	9	12,1	20000	K18x22x13	7,7
	18	22	17	11,9	17,6	20000	K18x22x17	10,8
	18	24	12	11,2	12,9	20000	K18x24x12	11,6
	18	24	13	12,9	14,9	20000	K18x24x13	12,6
	18	24	13,5	12,9	14,9	20000	K18x24x13,5	13
	18	24	20	20	26,5	20000	K18x24x20	19
	18	25	14	16,5	18,8	20000	K18x25x14	14,9
18	18	25	22	22,9	28,4	20000	K18x25x22	24,3
18	18	26	14	18	20	18000	K18x26x14	19

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



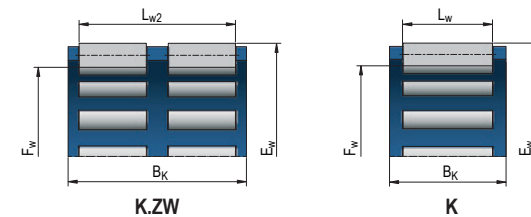
Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K					
18	18	28	16	19	18,4	19000	K18x28x16	24
19	19	23	13	9,3	13	20000	K19x23x13	8,2
	19	23	17	12	18,6	20000	K19x23x17	11,1
20	20	24	10	8,7	12,1	19000	K20x24x10	6,5
	20	24	12	9,6	13,8	19000	K20x24x12	8
	20	24	13	9,6	13,8	19000	K20x24x13	8,9
	20	24	17	12,4	20	19000	K20x24x17	11,2
	20	26	12	13,1	15,7	19000	K20x26x12	13,2
20	20	26	16	18	25	18500	K20x26x16	17,5
	20	26	17	18,7	25,5	19000	K20x26x17	18,2
	20	26	20	20,6	28,5	18000	K20x26x20	22
	20	28	20	23,4	28	18000	K20x28x20	26,8
	20	28	25	30	28,5	18000	K20x28x25	36,2
	20	30	30	35	41	19000	K20x30x30	56
	21	25	13	9,6	14,5	19000	K21x25x13	9
22	21	25	17	12,8	21	18000	K21x25x17	12
	22	26	10	8,7	12,8	18000	K22x26x10	7,1
	22	26	13	10	15,4	18000	K22x26x13	9,4
	22	26	17	13,1	22,1	18000	K22x26x17	12,1
	22	27	13	14	23	18000	K22x27x13	10,8
	22	28	17	19	26,5	19000	K22x28x17	19,7
	22	28	23	20	27	17000	K22x28x23	26
	22	29	16	19,5	25	17000	K22x29x16	22,2
	22	30	15	19,6	22,9	18900	K22x30x15TN	14,4
	22	30	20	21	23,5	18900	K22x30x20	28
	22	32	24	33,5	39,5	16000	K22x32x24	43,4
	23	35	16	24	23,4	15000	K23x35x16TN	30
	24	28	10	9,4	14,3	17000	K24x28x10	8,1
	24	28	13	10,5	17	17000	K24x28x13	10,1
24	24	28	17	14	24,5	17000	K24x28x17	13,2
	24	29	13	13,1	19,1	16000	K24x29x13	13,5
	24	30	17	19	27	16000	K24x30x17	21,5
	24	30	31	27	43	16000	K24x30x31	39,1
	25	29	10	9,7	14,9	16000	K25x29x10	8,3
25	25	29	13	10,8	17,9	16000	K25x29x13	10,4
	25	29	17	14,5	25,5	16000	K25x29x17	13,7
	25	30	13	14,1	21,3	16000	K25x30x13	12,9
	25	30	20	21,1	28	16000	K25x30x20	20,5
	25	30	25	21,7	40,4	15000	K25x30x25	21

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



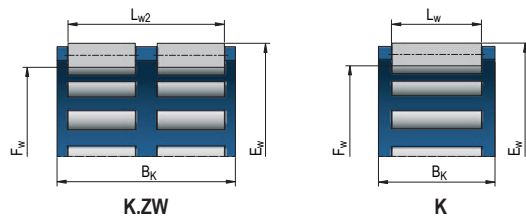
Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K	 C	 Co			
25	25	30	26	20,1	26,5	15000	K25x30x26	21,6
	25	31	17	19	28	16000	K25x31x17	21,8
	25	31	21	24,1	37,5	16000	K25x31x21	26,2
	25	32	16	20,5	27,5	15000	K25x32x16	24,5
	25	33	20	28	37,5	15000	K25x33x20	32
	25	33	24	33,9	46,5	15000	K25x33x24	38,7
	25	34	18	48	67	15000	K25x34x18	32
	25	35	30	46,5	61,5	14000	K25x35x30	65,5
26	26	30	26	21	35	14000	K25x30x26	27
	26	30	10	9,5	15,5	16000	K26x30x10	9
26	26	30	13	11,1	18,7	16000	K26x30x13	11,4
	26	30	17	14,7	27	16000	K26x30x17	15
26	26	31	13	12,4	18,4	15000	K26x31x13	9,9
	26	30	22	15,2	28	16000	K26x30x22	12,3
27	27	32	17	16	34	17000	K27x32x17	29
28	28	32	16,5	15	32,4	14000	K28x32x16,5	18
	28	32	17	15	32,4	14000	K28x32x17	18,2
	28	33	13	14,8	23,6	14000	K28x33x13	15,2
	28	33	17	19,1	33	14000	K28x33x17	19,5
	28	33	27	22,8	40,5	14000	K28x33x27TN	19
	28	34	17	21,3	35	14000	K28x34x17	24,2
	28	35	16	21	29	14000	K28x35x16	29
	28	35	18	23,5	33,5	14000	K28x35x18	31
	28	35	20	24	34	14000	K28x35x20	35
	28	35	27	34,5	54,5	14000	K28x35x27	47
	28	36	16	34	47	11000	K28x36x16	40
	28	40	18	33	36,5	12000	K28x40x18	50
30	30	40	25	45	54,5	12000	K28x40X25	71
	30	34	13	11,8	21,2	13000	K30x34x13	14,6
	30	35	13	11,5	25	13000	K30x35x13	16,3
	30	35	17	19,1	33,5	13000	K30x35x17	21,3
	30	35	27	30	58,5	13000	K30x35x27	33,3
	30	37	16	22,5	33	13000	K30x37x16	26,4
	30	38	25	16	39	13000	K30x38x25	43
	30	40	18	31,5	39,5	12000	K30x40x18	44
32	30	40	30	48,5	68,5	13000	K30x40x30	78
	30	35	26	23,5	43,5	12000	K30x35x26	32
	32	37	13	15	25	12000	K32x37x13	18,3
	32	37	17	19,4	35	12000	K32x37x17	22,4

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



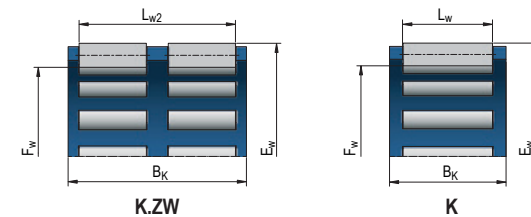
Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K	 C	 Co			
32	32	37	27	29,5	59,5	12000	K32x37x27	36,7
	32	37	28	23,1	43	12000	K32x37x28TN	22,3
	32	38	16	21	34	12000	K32x38x16	25
	32	38	20	26	44,5	12000	K32x38x20	31
	32	38	26	27	46,5	12000	K32x38x26TN	25,2
	32	39	16	23,5	35	12000	K32x39x16	36,7
	32	39	18	26	40,5	12000	K32x39x18	37,2
	32	40	20	37	40,5	12000	K32x40x20	48
	32	40	36	53,5	91,5	12000	K32x40x36	73
	32	46	32	65,5	82,5	11000	K32x46x32	119
	32	40	42	49,5	83,5	12000	K32x40x42TN	77,1
	35	40	13	15,8	27,5	11000	K35x40x13	18,8
35	35	40	17	20,3	38	11000	K35x40x17	25,3
	35	40	25	29	59,5	11000	K35x40x25	31
	35	40	27	24,5	48	11000	K35x40x27TN	23,4
	35	40	27	27,8	62,1	11000	K35x40x27	28
	35	40	30	25	49,5	11000	K35x40x30	43
	35	42	16	23,9	37	11000	K35x42x16	34
	35	42	18	27	42,5	11000	K35x42x18	39,2
	35	42	30	38,5	67,5	11000	K35x42x30	62,4
	35	43	18	28	41,5	11000	K35x43x18	38
	35	45	20	36,5	49,5	10000	K35x45x20	55,5
	35	45	30	52,5	78,5	10000	K35x45x30	80
	35	45	49	81,5	134	10000	K35x45x49	120
36	35	40	30	31,5	65,5	11000	K35x40x30	48
	35	42	20	29,5	48,5	11000	K35x42x20	41
37	36	41	30	23	43	11000	K36x41x30	52
	36	42	16	24	42	11000	K36x42x16	50
38	37	42	17	21,9	42,5	10000	K37x42x17	25,8
	37	42	27	31,5	67,5	10000	K37x42x27	40,7
39	37	45	26	43,5	73,5	10000	K37x45x26	60,5
	38	43	17	20	38	10000	K38x43x17	26
	38	43	27	31	67,5	10000	K38x43x27	43,2
	38	46	20	35	56,5	10000	K38x46x20	46
40	38	46	32	54,5	98,5	10000	K38x46x32	72,7
	39	44	24	28	58,5	10000	K39x44x24	38
40	39	44	26	27	55,5	10000	K39x44x26	29,5
	40	44	13	13,5	28	10000	K40x44x13	20
	40	45	13	17,1	32	10000	K40x45x13	21,5

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW

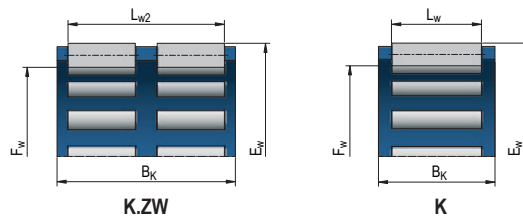


Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K					
40	40	45	17	20,9	41	10000	K40x45x17	27,4
	40	45	21	24,4	49,5	10000	K40x45x21	36,5
	40	45	27	32,5	72,5	10000	K40x45x27	46
	40	46	17	24,5	44,5	9000	K40x46x17	30
	40	47	18	29	49,5	9000	K40x47x18	45,2
	40	47	20	32	56,5	9000	K40x47x20	42
	40	48	20	35,5	58,5	9000	K40x48x20	57,7
	40	45	30	26	53,5	9000	K40x45x30	48
42	42	47	13	17,3	33	9000	K42x47x13	22,5
	42	47	17	21,1	42,5	9000	K42x47x17	31,1
	42	47	25	27	57,5	9000	K42x47x25TN	25,7
	42	47	27	33	74,5	9000	K42x47x27	46,6
	42	48	35	35	76	9000	K42x48x35	60
	42	50	18	31	49,5	9000	K42x50x18	53
	42	50	20	34,5	56,5	9000	K42x50x20	54
	42	47	30	31	75,5	9000	K42x47x30	54
43	43	48	17	21	42,5	9000	K43x48x17	29,3
	43	48	27	33	74,5	9000	K43x48x27	45,7
	43	50	18	30,5	53,5	9000	K43x50x18	48,5
45	45	49	19	17,5	40	8000	K45x49x19	27
	45	50	17	22	45	8000	K45x50x17	25,5
	45	50	27	34	79,5	8000	K45x50x27	50
	45	50	32	38	90,5	8000	K45x50x32TN	45
	45	52	18	31	56,5	8000	K45x52x18	51
	45	52	21	39,5	57,5	8000	K45x52x21TN	32,9
	45	53	20	38,5	66,5	8000	K45x53x20	62,2
	45	53	21	38	66,5	8000	K45x53x21	65
	45	53	22	42	66,5	8000	K45x53x22	68,4
	45	53	28	51,5	97,5	8000	K45x53x28	78
	45	59	18	43,5	53,5	7000	K45x59x18TN	60,5
	45	59	32	72,5	101,5	7000	K45x59x32	145,5
	45	59	36	75,5	108,5	7000	K45x59x36	195
	45	51	36	44,5	98,5	7000	K45x51x36	85
47	47	52	17	22,8	48,5	8000	K47x52x17	32
	47	52	27	34,5	82,5	8000	K47x52x27	50,7
	47	53	25	38	81,5	8000	K47x53x25	53
	47	55	28	52,5	99,5	7500	K47x55x28	62,4
48	48	54	19	30	60,5	7500	K48x54x19	44
	48	54	25	31	91	7500	K48x54x25	55

NEEDLE CAGES – SINGLE ROW / DOUBLE ROW



Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	E _w	B _K					
50	50	55	13,5	17,5	36	7500	K50x55x13,5	31
	50	55	17	21,4	46,5	7500	K50x55x17	35
	50	55	20	26	59,5	7500	K50x55x20	39,4
	50	55	30	38,5	96,5	7500	K50x55x30	59,4
	50	57	18	33	62,5	7000	K50x57x18	53,4
	50	58	20	35	61,5	7000	K50x58x20	64,9
	50	58	25	43,5	80,5	7000	K50x58x25	81
	50	58	25	43,5	80,5	7000	K50x58x25	81
52	52	57	12	17,5	36	7000	K52x57x12	24
55	55	60	20	28	65,5	6500	K55x60x20	43,4
	55	60	27	37,5	96,5	6500	K55x60x27	60,5
	55	60	30	40,5	103	6500	K55x60x30	68,6
	55	61	20	41	69,5	6500	K55x61x20	56
	55	62	18	35	68,5	6500	K55x62x18	58,4
	55	63	15	24,5	40,5	6500	K55x63x15	53
	55	63	20	39,5	79,5	6500	K55x63x20	73,3
	55	63	25	49,5	99,5	6500	K55x63x25	88
	55	63	32	61,5	129,5	6500	K55x63x32	117
	55	60	40	48	132	6500	K55x60x40	96,5
56	56	61	20	27	64,5	6500	K56x61x20	45
58	58	63	17	21,5	63,5	6000	K58x63x17	42
	58	64	19	24,5	77,5	6000	K58x64x19	53
	58	65	18	34,5	69,5	6000	K58x65x18	52
	58	65	38	48,5	106,5	6000	K58x65x38	106
60	60	65	20	29	71,5	6000	K60x65x20	50,5
	60	65	30	42	115,5	6000	K60x65x30	71,2
	60	68	20	43	84,5	5500	K60x68x20	79
	60	68	23	49	100,5	5500	K60x68x23	94
	60	68	25	52,5	110,5	5500	K60x68x25	97
	60	68	27	59	120,5	6000	K60x68x27	98
	60	75	42	113	192	5500	K60x75x42	24
	60	66	33	45,5	111,5	6000	K60x66x33	104
	60	66	40	57,5	150,5	5500	K60x66x40	116
	60	68	30	44	87,5	5500	K60x68x30	136
	60	68	34	47,5	95,5	5500	K60x68x34	140
62	62	70	40	65,5	145,5	5500	K62x70x40	147,5
63	63	70	21	45	100,5	5500	K63x70x21	75
64	64	70	16	27,5	59,5	5500	K64x70x16	53
65	65	70	20	30	76,5	5500	K65x70x20	49
	65	70	30	43,5	123,5	5500	K65x70x30	83



Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ¹	Bearing designation	Weight g
d	F _w	E _w	B _K	C	Co			
65	65	73	23	45,5	93,5	5000	K65x73x23	100
	65	73	30	56,5	122,5	5000	K65x73x30	126
68	68	74	20	35	83,5	5000	K68x74x20	65
	68	74	30	46	117,5	5000	K68x74x30	97
	68	74	35	48	124,5	5000	K68x74x35	116
	68	75	32	53,5	127,5	4500	K68x75x32	120
70	70	76	20	35,5	85,5	4500	K70x76x20	70
	70	76	30	51,5	138,5	4500	K70x76x30	100
70	70	78	25	51,5	111,5	4500	K70x78x25	115
	70	78	30	59,5	134,5	4500	K70x78x30	136
	70	80	30	72,5	147,5	4500	K70x80x30	150
	70	78	46	77,5	206	4500	K70x78x46	230
72	72	80	20	41	84,5	4500	K72x80x20	94
75	73	79	20	36,5	99,5	4500	K73x79x20	69
	75	81	20	37	93,5	4500	K75x81x20	72
	75	81	30	51,5	142	4500	K75x81x30	106
	75	83	23	49,5	108	4000	K75x83x23	113
	75	83	30	61,5	142	4000	K75x83x30	174
	75	83	35	62,5	146,5	4000	K75x83x35	165
80	75	83	40	72,5	176,5	4000	K75x83x40	190
	80	86	20	38	97,5	4000	K80x86x20	76
	80	86	30	55,5	158,5	4000	K80x86x30	114
	80	88	30	71,5	178,5	4000	K80x88x30	141
	80	88	40	75,5	191,5	4000	K80x88x40	204
	80	88	46	87,5	220	4000	K80x88x46	235
85	85	92	20	44	107,5	3500	K85x92x20	96
	90	97	20	44,5	112,5	3000	K90x97x20	103
	90	98	27	60,5	149,5	3000	K90x98x27	150
90	90	98	30	67,5	171,5	3000	K90x98x30	172
	95	102	20	45,5	122,5	2900	K95x102x20	110
	95	103	30	68,5	179,5	2900	K95x103x30	177
95	95	103	40	82,5	227,5	2900	K95x103x40	250
	100	107	21	47,5	126,5	2700	K100x107x21	120
100	100	108	27	56,5	142,5	2700	K100x108x27	176
	100	108	30	70,5	187,5	2700	K100x108x30	190
105	105	112	21	47	126,5	2500	K105x112x21	123
	105	113	30	71,5	196,5	2500	K105x113x30	198
110	110	117	24	55,5	157,5	2300	K110x117x24	146
	110	118	30	77,5	218,5	2300	K110x118x30	217

NEEDLE ROLLER BEARINGS



NEEDLE ROLLER BEARINGS

These are bearings with or also without inner ring, may or may not have a sealing. These bearings have a lubricating groove and possibly also a hole on the outer ring.

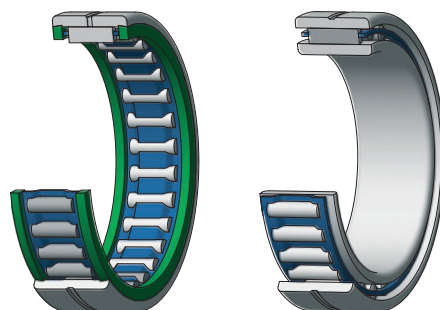
DESIGN DATA

MAIN DIMENSIONS

Main dimensions of the needle roller bearings are set forth in the dimensional tables below.

DESIGN

These are bearings with high bearing capacity at low height. They can be supplied with or without inner ring. Needle rollers are guided by the cage between the outer ring collars. The outer ring, needle rollers and cage compose one assembly unit. Needle rollers and rings are made of bearing steel of 100Cr6 grade. The cages are manufactured of quality steels (15CrMo, 20CrMo) or plastic material (PA66).



The needle roller bearings are supplied in the following versions:

Designation	Description	Shaft diameter mm	
		from	to
NK	Needle roller bearing without inner ring (light series)	5	110
NKI	Needle roller bearing (light series)	5	100
NKS	Needle roller bearing without inner ring (heavy duty series)	20	75
NKIS	Needle roller bearing (heavy duty series)	17	100
PNA	Alignment needle roller bearings with inner ring	12	40
RPNA	Alignment needle roller bearings without inner ring	15	45
RNA48, RNA49	Needle roller bearing without inner ring with lubrication at the outer ring, single row (series 48, 49)	14	125
NA48, NA49	Needle roller bearing, single row (series 48, 49)	10	180
RNA69	Needle roller bearing without inner ring with lubrication at the outer ring, double row (series 69)	16	110
NA69	Needle roller bearing without inner ring, double row (series 69)	12	95
NAO	Single and double row needle roller bearings without rings - cage and rings are mounted separately	6	90

PRECISENESS OF BEARINGS

Elements (needles) in bearings are manufactured in the G2 class of preciseness. Difference of diameter in individual elements in the bearing is max. 2 µm. The needle roller bearings are supplied as standard in the standard preciseness degree - P0. Supplies in higher preciseness degree are to be negotiated in advance. Geometrical deviations, as well as deviations of shape and position are set forth in tables in the annexes. Bearings are manufactured with the basic radial clearance sometimes designated as "0", as well as in other classes C2, C3, and C4. The radial clearance ranges are presented in the annexes. Enveloping circle of the needle roller bearings without inner ring lies in the tolerance zone F6. This value applies for bearings in not assembled status.

NEEDLE ROLLER BEARINGS

PRECISENESS OF THE RELATED PARTS

Extent of the tolerance zone for the shaft and body production is conditional to the application method of the needle roller bearings. For the openings of bodies for seating the outer ring applies the value K6, for manufacturing the shafts applies the following table:

Basic dimension of the shaft mm		≤80	>80
Internal radial clearance	small	k5	
	standard	h5	g5
	big	g6	f6

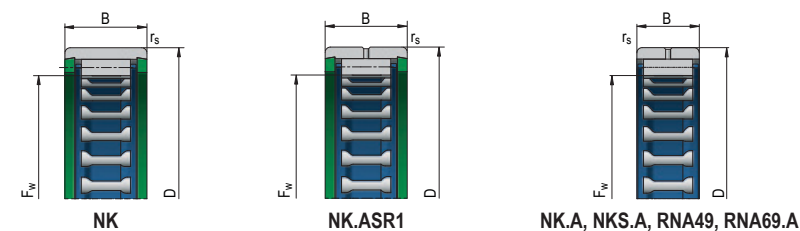
Bearings are normally used in the temperature range from -20 to +120°C.

Alignment needle roller bearings must be pressed to the body hole with interference. Outer bushing a bearing ring are mutually combined so that the tilting is possible at meeting the body hole tolerance according to the table.

Body	Hole tolerance	Shaft tolerance	
		without inner ring	with inner ring
Steel or cast iron	N6 (N7)	h5 (h6)	k5 (j6)
Light metal	R6 (R7)		

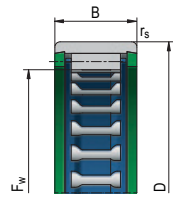
MARGINAL ROTATIONAL FREQUENCY

Marginal rotational frequency presented in the catalogue presents the maximal rotational speed at which the bearing works with certain safety margin without failure.

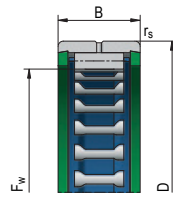


Shaft diameter mm	Dimensions mm				Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
	D	B	F _w	r _s	C	C ₀				
5	10	10	5	0,15	2,35	1,92	24000	39000	NK5/10TN	3,1
	10	12	5	0,15	3	2,65	24000	39000	NK5/12TN	3,7
6	12	10	6	0,15	2,6	2,28	22000	36000	NK6/10	4,7
	12	12	6	0,15	2,9	2,8	22000	36000	NK6/12TN	5,7
7	14	10	7	0,3	2,65	2,5	20000	34000	NK7/10TN	6,9
	14	12	7	0,3	3,25	3,25	20000	34000	NK7/12TN	8,2
8	15	12	8	0,3	3,95	4,1	19000	32000	NK8/12	8,7
	15	16	8	0,3	5,1	5,8	19000	32000	NK8/16	12
9	16	12	9	0,3	4,05	4,75	18000	30000	NK9/12	10,3
	16	16	9	0,3	5,9	7,1	18000	30000	NK9/16	12,8
10	17	12	10	0,3	4,75	5,5	17000	28000	NK10/12	10,1
	17	16	10	0,3	5,6	7,35	17000	28000	NK10/16	13,3

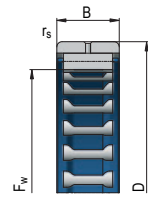
NEEDLE ROLLER BEARINGS



NK



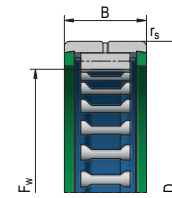
NK.ASR1



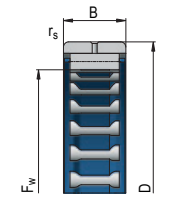
NK.A, NKS.A, RNA49, RNA69.A

Shaft diameter mm	Dimensions mm				Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	F _w	r _s						
12	19	12	12	0,3	5,7	6,55	16000	26000	NK12/12A	12,1
	19	16	12	0,3	6,4	9,15	16000	26000	NK12/16	15,9
14	22	13	14	0,3	8,5	9,2	15000	25000	RNA4900	16,5
	22	16	14	0,3	10,1	11,5	15000	25000	NK14/16A	20,7
	22	20	14	0,3	12,8	15,6	15000	25000	NK14/20A	25,5
15	23	16	15	0,3	10,7	12,7	14400	24000	NK15/16A	21,8
	23	20	15	0,3	13,6	17,2	14400	24000	NK15/20A	26,6
16	24	13	16	0,3	9,4	10,9	14000	23000	RNA4901	17,4
	24	16	16	0,3	11,3	13,9	14000	23000	NK16/16A	22,4
	24	20	16	0,3	14,4	18,8	14000	23000	NK16/20A	28,4
17	25	16	17	0,3	11,9	15	14000	23000	NK17/16A	23,7
	25	20	17	0,3	13,7	19	14000	23000	NK17/20A	29,8
18	26	16	18	0,3	12,5	16,2	14000	22000	NK18/16A	24,9
	26	20	18	0,3	14,3	20,4	14000	22000	NK18/20A	31,4
19	27	16	19	0,3	13	17,4	14000	22000	NK19/16A	26,1
	27	20	19	0,3	15	22	14000	22000	NK19/20A	32,2
20	28	13	20	0,3	10,6	13,6	13000	20000	RNA4902	21,7
	28	16	20	0,3	13	17,5	13000	20000	NK20/16A	27
	28	20	20	0,3	16,4	20,8	13000	20000	NK20/20A	33,9
	28	23	20	0,3	17,3	25,5	13000	20000	RNA6902A	39,7
21	32	20	20	0,3	23	25	13000	20000	NKS20A	48,7
	29	16	21	0,3	13,5	18,7	13000	20000	NK21/16A	28,1
22	29	20	21	0,3	17,1	25,5	13000	20000	NK21/20A	35,2
	30	13	22	0,3	11	14,6	12000	19000	RNA4903	22,2
24	30	16	22	0,3	14	19,9	12000	19000	NK22/16A	30
	30	20	22	0,3	16	25	12000	19000	NK22/20A	37
	30	23	22	0,3	18	29	12000	19000	RNA6903A	42,4
	35	20	22	0,3	20,8	25,5	12000	19000	NKS22A	61,5
25	32	16	24	0,3	15	22,3	10000	17000	NK24/16A	31,9
	32	20	24	0,3	17,3	28,5	10000	17000	NK24/20A	40
	37	20	24	0,3	26	31	10000	17000	NKS24A	65,5
26	33	16	25	0,3	14,9	22,4	10000	17000	NK25/16A	32,6
	33	20	25	0,3	17	28,5	10000	17000	NK25/20A	42
	37	17	25	0,3	19	23,6	10000	17000	RNA4904	52,3
	37	30	25	0,3	33,5	49	10000	17000	RNA6904A	100
26	38	20	25	0,3	27,5	33,5	10000	17000	NKS25A	68,1
	34	16	26	0,3	14,6	23,6	9500	16000	NK26/16A	34
	34	20	26	0,3	17,6	30	9500	16000	NK26/20A	42

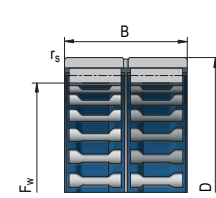
NEEDLE ROLLER BEARINGS



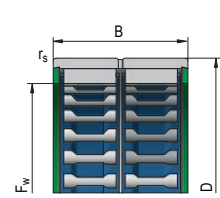
NK.ASR1



NK.A, NKS.A, RNA49, RNA69.A, F < 35 mm



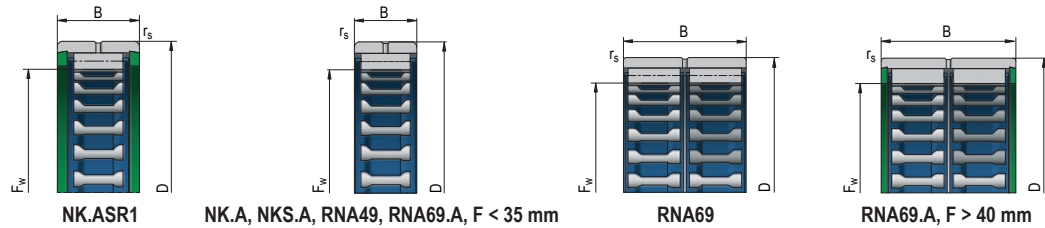
RNA69



RNA69.A, F > 40 mm

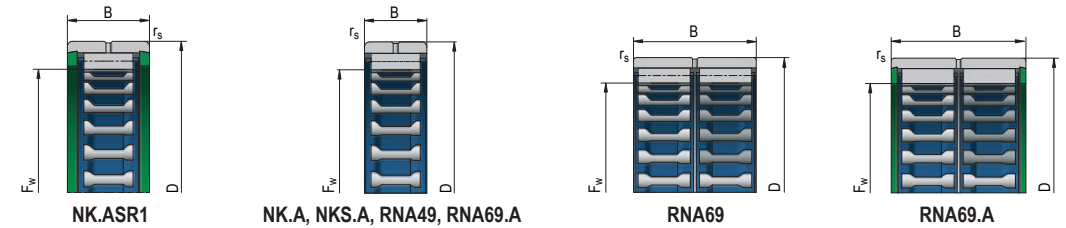
Shaft diameter mm	Dimensions mm				Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	F _w	r _s						
28	37	20	28	0,3	20	32	9000	15000	NK28/20A	52,2
	37	30	28	0,3	26,5	52	9000	15000	NK28/30ASR1	82
	39	17	28	0,3	20,8	27,5	9000	15000	RNA49/22	50,2
	39	30	28	0,3	36	51	9000	15000	RNA69/22A	98
	42	20	28	0,3	28,5	36,5	9000	15000	NKS28A	83,6
29	38	20	29	0,3	21,9	34	8500	14000	NK29/20A	53,7
	38	30	29	0,3	32,5	57	8500	14000	NK29/30A	84,3
30	40	20	30	0,3	22,6	36	8500	14000	NK30/20A	65
	40	30	30	0,3	33,5	60	8500	14000	NK30/30A	97,9
	42	17	30	0,3	23,6	31,5	8500	14000	RNA4905	61
	42	30	30	0,3	39	59	8500	14000	RNA6905A	112
	45	22	30	0,3	32	40	8500	14000	NKS30A	104
32	42	20	32	0,3	23,1	37,5	8000	13000	NK32/20A	68
	42	30	32	0,3	32,5	62	8000	13000	NK32/30A	102
	45	17	32	0,3	22,4	31,5	8000	13000	RNA49/28	73,2
	45	30	32	0,3	40	60	8000	13000	RNA69/28A	135
	47	22	32	0,6	33,5	43,5	8000	13000	NKS32A	110
35	45	20	35	0,3	24,3	41,5	7500	12000	NK35/20A	73,8
	45	30	35	0,3	34	68	7500	12000	NK35/30A	122
	47	17	35	0,3	23,2	33,5	7500	12000	RNA4906	69,4
	47	30	35	0,3	39	65,5	7500	12000	RNA6906A	126
	50	22	35	0,6	34	47,5	7500	12000	NKS35A	118
37	47	20	37	0,3	23,6	43	7000	11000	NK37/20A	77
	47	30	37	0,3	34,5	71	7000	11000	NK37/30A	113
	52	22	37	0,6	35,5	50	7000	11000	NKS37A	123
38	48	20	38	0,3	20,8	41,5	7000	11000	NK38/20ASR1	79,4
	48	30	38	0,3	30,5	68	7000	11000	NK38/30ASR1	116
40	50	20	40	0,3	25	47	6700	10000	NK40/20A	82,7
	50	30	40	0,3	36,5	76,5	6700	10000	NK40/30A	125
	52	20	40	0,6	28,5	46,5	6700	10000	RNA49/32	89,1
	52	36	40	0,6	43	78	6700	10000	RNA69/32A	162
	55	22	40	0,6	36,5	54	6700	10000	NKS40A	129
42	52	20	42	0,3	26,5	49	6700	10000	NK42/20A	85,8
	52	30	42	0,3	37,5	80	6700	10000	NK42/30A	130
	55	20	42	0,6	29	49	6700	10000	RNA4907	107
43	55	36	42	0,6	44	83	6700	10000	RNA6907A	193
	53	20	43	0,3	26	51	6300	9500	NK43/20A	86
	53	30	43	0,3	38	83	6300	9500	NK43/30A	133
	58	22	43	0,6	37,5	57	6300	9500	NKS43A	139

NEEDLE ROLLER BEARINGS



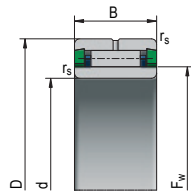
Shaft diameter mm	Dimensions mm				Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	F _w	r _s						
45	55	20	45	0,3	26,5	53	6300	9500	NK45/20A	91,5
	55	30	45	0,3	39	86	6300	9500	NK45/30A	139
	60	22	45	0,6	40,5	60	6000	9000	NKS45A	145
47	57	20	47	0,3	27	55	6000	9000	NK47/20A	94,5
	57	30	47	0,3	39	90	6000	9000	NK47/30A	142
48	62	22	48	0,6	40	64	5600	8500	RNA4908	140
	62	40	48	0,6	64	116	5600	8500	RNA6908A	256
50	62	25	50	0,6	38	74	5600	8500	NK50/25A	158
	62	35	50	0,6	50	106	5600	8500	NK50/35A	221
	65	22	50	1	42,5	67	5600	8500	NKS50A	157
52	68	22	52	0,6	41,5	69,5	5300	8000	RNA4909	182
	68	40	52	0,6	65,5	125	5300	8000	RNA6909A	338
55	68	25	55	0,6	40	82	5000	7500	NK55/25A	180
	68	35	55	0,6	53	118	5000	7500	NK55/35A	250
	72	22	55	1	42,5	72	5000	7500	NKS55A	221
58	72	22	58	0,6	43	76,5	4800	7000	RNA4910	163
	72	40	58	0,6	67	132	4800	7000	RNA6910A	310
60	72	25	60	0,6	40	88	4800	7000	NK60/25A	185
	72	35	60	0,6	55	130	4800	7000	NK60/35A	258
63	80	28	60	1,1	60	98	4800	7000	NKS60A	335
	80	25	63	1	58	100	4500	6700	RNA4911	255
65	80	45	63	1	83	160	4500	6700	RNA6911A	470
	78	25	65	0,6	43	91,5	4300	6300	NK65/25A	221
68	78	35	65	0,6	60	137	4300	6300	NK65/35A	310
	85	28	65	1,1	64	108	4300	6000	NKS65A	365
70	82	25	68	0,6	43,5	89	4000	6000	NK68/25A	241
	82	35	68	0,6	62	139	4000	6000	NK68/35A	338
	85	25	68	1	60	108	4000	6000	RNA4912	275
72	85	45	68	1	71	176	4000	6000	RNA6912A	488
	85	25	70	0,6	41,5	90	4000	6000	NK70/25ASR1	260
73	85	35	70	0,6	58,5	140	4000	6000	NK70/35ASR1	370
	90	28	70	1,1	68	113	4000	6000	NKS70A	380
75	90	25	72	1	61	112	4000	6000	RNA4913	312
	90	45	72	1	95	196	4000	6000	RNA4913A	580
77	90	25	73	0,6	53	100	3800	5600	NK73/25A	302
	90	35	73	0,6	75	156	3800	5600	NK73/35A	428
79	92	25	75	0,6	41,5	91,5	3800	5600	NK75/25ASR1	315
	92	35	75	0,6	58,5	143	3800	5600	NK75/35ASR1	445
	95	28	75	1,1	71	123	3800	5600	NKS75A	402

NEEDLE ROLLER BEARINGS

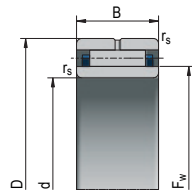


Shaft diameter mm	Dimensions mm				Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	F _w	r _s						
80	95	25	80	1	56	119	3800	5600	NK80/25A	301
	95	35	80	1	74	176	3800	5600	NK80/35A	425
	100	30	80	1	78	150	3800	5600	RNA4914	460
	100	54	80	1	128	265	3800	5600	RNA6914A	875
85	105	25	85	1	69	123	3400	5000	NK85/25A	425
	105	30	85	1	80	156	3400	5000	RNA4915	489
	105	35	85	1	98	193	3400	5000	NK85/35A	600
	105	54	85	1	130	275	3400	5000	RNA6915A	935
90	110	25	90	1	72	132	3000	4500	NK90/25A	450
	110	30	90	1	83	170	3000	4500	RNA4916	516
	110	35	90	1	103	208	3000	4500	NK90/35A	630
95	110	54	90	1	135	300	3000	4500	RNA6916A	987
	115	26	95	1	47	116	3000	4500	NK95/26ASR1	490
100	115	36	95	1	107	223	3000	4500	NK95/36A	680
	120	26	100	1	76	146	2800	4300	NK100/26A	515
	120	35	100	1,1	100	220	2800	4300	RNA4917	715
	120	36	100	1	111	237	2800	4300	NK100/36A	657
105	120	63	100	1,1	166	400	2800	4300	RNA6917A	1200
	125	26	105	1	50	129	2600	4000	NK105/26ASR1	540
	125	35	105	1,1	104	236	2600	4000	RNA4918	745
	125	36	105	1	114	250	2600	4000	NK105/36ASR1	713
110	125	63	105	1,1	160	405	2600	4000	RNA6918A	1330
	130	30	110	1,1	90	208	2400	3800	NK110/30A	650
	130	35	110	1,1	160	245	2400	3800	RNA4919	719
	130	40	110	1,1	122	290	2400	3800	NK110/40A	830
115	130	63	110	1,1	154	440	2400	3800	RNA6919A	1460
	140	40	115	1,1	127	270	2200	3600	RNA4920	1150
120	140	30	120	1	81,5	216	2000	3400	RNA4921	670
125	150	40	125	1,1	132	290	2000	3400	RNA4922	1240

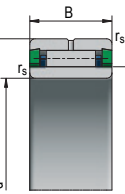
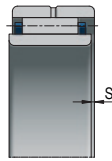
NEEDLE ROLLER BEARINGS



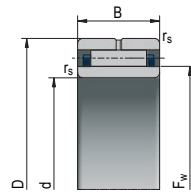
NKI



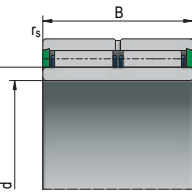
NKI.A, NKIS.A, NA49, NA69.A



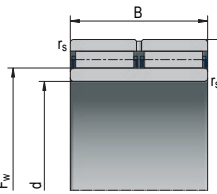
NKI.ASR1, NAK



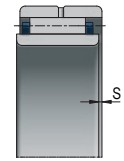
NKI.A, NKIS.A, NA49, NA69.A, d ≤ 30 mm



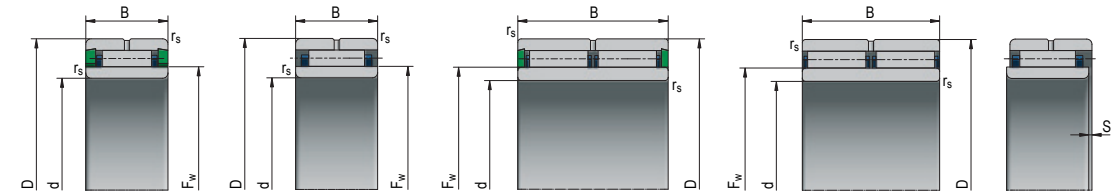
NA69



NA69.A, d > 32 mm

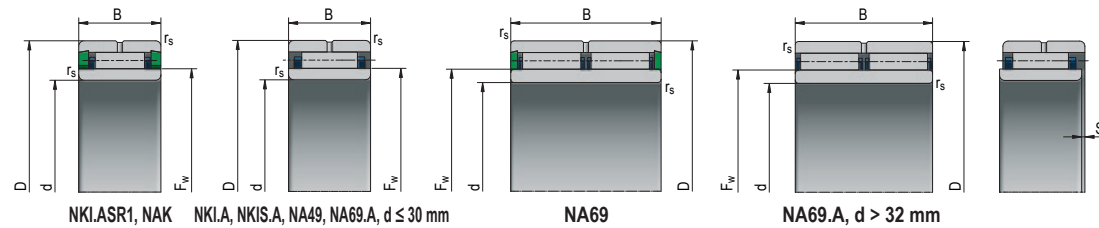


Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	r _s	F _w	S	C	Co				
5	15	12	0,3	8	1,5	4,1	3,95	19000	32000	NKI 5/12A	11,5
	15	16	0,3	8	1,5	5,8	5,1	19000	32000	NKI 5/16A	15,3
6	16	12	0,3	9	1,5	5	4,5	18000	30000	NKI 6/12A	13,5
	16	16	0,3	9	1,5	7,1	5,9	18000	30000	NKI 6/16A	17,4
7	17	12	0,3	10	1,5	5,5	4,75	17000	28000	NKI 7/12A	13,7
	17	16	0,3	10	1,5	7,8	6,2	17000	28000	NKI 7/16A	18,2
9	19	12	0,3	12	1,5	7,1	6,4	16000	26000	NKI 9/12A	16,6
	19	16	0,3	12	1,5	11	9	16000	26000	NKI 9/16A	21,9
10	22	13	0,3	14	1	9,2	8,5	16000	26000	NA4900	23
	22	16	0,3	14	1,5	11,5	10,1	16000	26000	NKI 10/16A	29,4
	22	20	0,3	14	1,5	15,6	12,8	16000	26000	NKI 10/20A	37,1
12	24	13	0,3	16	1	10,9	9,4	15000	24000	NA4901	26
	24	16	0,3	16	1,5	13,9	11,3	15000	24000	NKI 12/16A	33,3
	24	20	0,3	16	1,5	18,8	14,4	15000	24000	NKI 12/20A	41,9
15	24	22	0,3	16	1	20	14,3	15000	24000	NA6901A	46
	27	16	0,3	19	1,5	17,4	13	14000	22000	NKI 15/16A	38,8
	27	20	0,3	19	1,5	22	15	14000	22000	NKI 15/20A	48,7
	28	13	0,3	20	1	13,6	10,6	13000	20000	NA4902	34
17	28	23	0,3	20	1,5	25,5	17,3	13000	20000	NA6902A	63,6
	29	16	0,3	21	2	18,7	13,5	13000	20000	NKI 17/16A	42,4
	29	20	0,3	21	1,5	25,5	17,1	13000	20000	NKI 17/20A	53,4
	30	13	0,3	22	1	14,6	11	12000	19000	NA4903	37
	30	23	0,3	22	1,5	29	18,6	12000	19000	NA6903A	72
20	37	20	0,3	24	1	31	26	10000	17000	NKIS17A	98
	32	16	0,3	24	1,5	22,3	15	10000	17000	NKI 20/16A	49
	32	20	0,3	24	1,5	28,5	17,3	10000	17000	NKI 20/20A	61
	37	17	0,3	25	1,5	23,6	19	10000	17000	NA4904	75,2
	37	30	0,3	25	1,5	49	33,5	10000	17000	NA6904A	141
22	42	20	0,3	28	1	36,5	28,5	9000	15000	NKIS20A	129
	34	16	0,3	26	1,5	23,6	15,3	9500	16000	NKI 22/16A	52
	34	20	0,3	26	2	30	17,6	9500	16000	NKI 22/20A	65,4
	39	17	0,3	28	1,5	27,5	20,8	9000	15000	NA49/22	52
	39	30	0,3	28	1	51	29	9000	15000	NA69/22A	150
25	38	20	0,3	29	2	21,9	34	8500	14000	NKI 25/20A	79,4
	38	30	0,3	29	2	27	54	8500	14000	NKI 25/30A	124
	42	17	0,3	30	1,5	21,6	30	8500	14000	NA4905	88
	42	30	0,3	30	1,5	36,5	57	8500	14000	NA6905A	161
	47	22	0,6	32	1,5	33,5	43,5	8000	13000	NKIS25A	162
28	42	20	0,3	32	2	23,1	37,5	8000	13000	NKI 28/20A	96,5



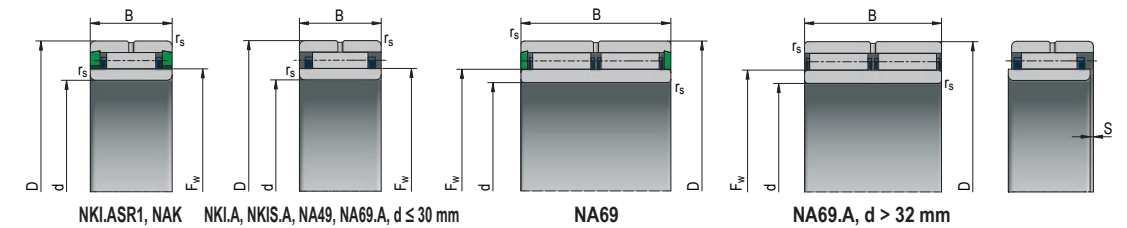
Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	r _s	F _w	S	C	Co				
28	42	30	0,3	32	2	32,5	62	8000	13000	NKI 28/30A	146
	45	17	0,3	32	1,5	22,4	31,5	8000	13000	NA49/28	97,7
	45	30	0,3	32	1,5	40	60	8000	13000	NA69/28A	182
30	45	20	0,3	35	1,5	24,3	41,5	7500	12000	NKI 30/20A	112
	45	30	0,3	35	1,5	34	68	7500	12000	NKI 30/30A	170
	47	17	0,3	35	1,5	23,2	33,5	7500	12000	NA4906	101
	47	30	0,3	35	1	39	65,5	7500	12000	NA6906A	192
	52	22	0,6	37	1,5	36,5	50	7000	11000	NKIS30A	184
32	47	20	0,3	37	2	24	43,5	7000	11000	NKI 32/20A	118
	47	30	0,3	37	1,5	34,5	71	7000	11000	NKI 32/30A	180
	52	20	0,6	40	1,5	28,5	46,5	6700	10000	NA49/32	158
35	52	36	0,6	40	1	43	78	6700	10000	NA69/32A	288
	50	20	0,3	40	2	26	47	6700	10000	NKI 35/20A	127
	50	30	0,3	40	1,5	36,5	76,5	6700	10000	NKI 35/30A	193
	55	20	0,6	42	1,5	29	49	6700	10000	NA4907	170
	55	36	0,6	42	1	44	83	6700	10000	NA6907A	310
38	58	22	0,6	43	1	39	57	6300	9500	NKIS35A	220
	53	20	0,3	43	2	27	51	6300	9500	NKI 38/20A	136
	53	30	0,3	43	1,5	38	83	6300	9500	NKI 38/30A	207
40	55	20	0,3	45	2	27,5	53	6300	9500	NKI 40/20A	142
	55	20	0,3	45	1,5	41	88	6300	9500	NKI 40/30A	216
	62	22	0,6	48	2	40	64	5600	8500	NA4908	230
	62	40	0,6	48	1,5	66	116	5600	8500	NA6908A	430
	65	22	1	50	1	42,5	67	5600	8500	NKIS40A	281
42	57	20	0,3	47	2	28,5	56	6000	9000	NKI 42/20A	148
	57	30	0,3	47	1,5	39	90	6000	9000	NKI 42/30A	222
	62	25	0,6	50	3	38	74	5600	8500	NKI 45/25A	229
45	62	35	0,6	50	3	50	16	5600	8500	NKI 45/35A	322
	68	22	0,6	52	2	41,5	69,5	5300	8000	NA4909	271
	68	40	0,6	52	1,5	65,5	125	5300	8000	NA6909A	495
	72	22	1	55	1	42,5	72	5300	7500	NKIS45A	336
	68	25	0,6	55	3	41,5	81,5	5000	7500	NKI 50/25A	270
50	68	35	0,6	55	3	53	118	5000	7000	NKI 50/35A	379
	72	22	0,6	58	2	43	76,5	4800	7000	NA4910	274
	72	40	0,6	58	1,5	67	132	4800	7000	NA6910A	515
	80	28	1,1	60	1,5	60	98	4800	7000	NKIS50A	518
	72	25	0,6	60	3	40	88	4800	7000	NKI 55/25A	272
55	72	35	0,6	60	3	56	130	4800	7000	NKI 55/35A	379
	80	25	1	63	2,5	58	100	4500	6700	NA4911	393

NEEDLE ROLLER BEARINGS

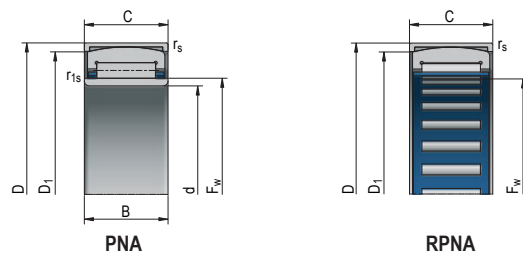


Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	r _s	F _w	S	C	Co				
55	80	45	1	63	2,5	83	160	4500	6700	NA6911A	780
	85	28	1,1	65	1,5	64	108	4300	6300	NKIS55A	558
60	82	25	0,6	68	2	43,5	89	4000	6000	NKI 60/25A	394
	82	35	0,6	68	2,5	62	139	4000	6000	NKI 60/35A	553
	85	25	1	68	1,5	60	108	4000	6000	NA4912	426
	85	45	1	68	2	71	176	4000	6000	NA6912A	808
	90	28	1,1	70	1,5	68	113	4000	6000	NKIS60A	560
65	90	25	0,6	73	2	53	100	3800	5600	NKI 65/25A	467
	90	25	1	72	1,5	61	112	4000	6000	NA4913	456
	90	35	0,6	73	2	75	156	3800	5600	NKI 65/35A	659
	90	45	1	72	2	95	196	4000	6000	NA6913A	833
	95	28	1,1	75	1,5	71	123	3800	5600	NKIS65A	641
70	95	25	1	80	2	56	119	3600	5300	NKI 70/25A	521
	95	35	1	80	3,5	72	176	3600	5300	NKI 70/35A	737
	100	28	1,1	80	1,5	75	133	3400	5000	NKIS70A	680
	100	30	1	80	2,5	78	150	3600	5300	NA4914	728
	100	54	1	80	2	128	265	3600	5300	NA6914A	1340
75	105	25	1	85	2	69	123	3400	5000	NKI 75/25A	641
	105	30	1	85	2,5	80	156	3400	5000	NA4915	775
	105	35	1	85	2	98	193	3400	5000	NKI 75/35A	908
	105	54	1	85	2	130	275	3400	5000	NA6915A	1450
	110	32	1,1	90,8	3	61	160	4000	4500	NAK75	1090
80	110	25	1	90	2	72	132	3000	4500	NKI 80/25A	677
	110	30	1	90	2,5	83	170	3000	4500	NA4916	878
	110	35	1	90	2	103	208	3000	4500	NKI 80/35A	959
	110	54	1	90	2	135	300	3000	4500	NA6916	1522
	115	32	1,1	95,5	3	63	170	2800	4300	NAK80	1150
85	115	26	1	95	3	46,5	116	3000	4500	NKI 85/26ASR1	743
	115	36	1	95	2	107	223	3000	4500	NKI 85/36A	1040
	120	32	1,1	101,2	3	64	176	2600	4000	NAK85	1200
	120	35	1,1	100	2,5	100	200	2800	4300	NA4917	1250
	120	63	1,1	100	2	160	400	2800	4300	NA6917	2200
90	120	26	1	100	3	76	146	2800	4300	NKI 90/26A	778
	120	36	1	100	2,5	111	237	2800	4300	NKI 90/36A	1090
	125	32	1,1	105	3	64	180	2600	4000	NAK90	1260
	125	35	1,1	105	2,5	104	236	2600	4000	NA4918	1312
	125	63	1,1	105	2	160	405	2600	4000	NA6918A	2310
95	125	26	1	105	2,5	50	129	2600	4000	NKI 95/26ASR1	816
	125	36	1	105	3,5	69,5	196	2600	4000	NKI 95/36ASR1	1145

NEEDLE ROLLER BEARINGS

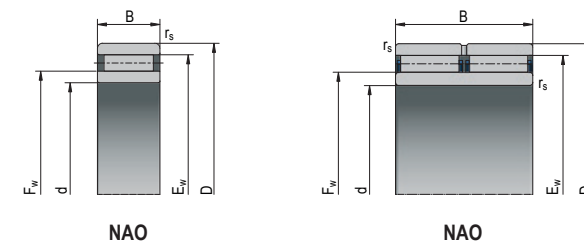


Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Weight g
d	D	B	r _s	F _w	S	C	Co				
95	130	32	1,1	110,8	3	67	193	2400	3800	NAK95	1350
	130	35	1,1	110	2,5	106	245	2400	3800	NA4919	1371
	130	63	1,1	110	2	174	440	2400	3800	NA6919	2500
100	130	30	1,1	110	2	93	208	2400	3800	NKI 100/30A	990
	130	40	1,1	110	3	127	290	2400	3800	NKI 100/40A	1330
	135	32	1,1	115	2	91	204	2200	3600	NKIS100A	1340
	140	40	1,1	115	3,5	127	185	2200	3600	NA4920	1900
110	140	30	1	120	0,5	94	216	2000	3400	NA4822	1080
	150	40	1,1	125	3,5	132	290	2000	3400	NA4922	2070
120	150	30	1	130	0,5	85	236	1900	3200	NA4824	1170
	165	45	1,1	135	3,5	160	380	1800	3000	NA4924	2860
130	165	35	1,1	145	1	98	300	1700	2800	NA4826	1810
	180	50	1,5	150	3	203	470	1700	2800	NA4926	3900
140	175	35	1,1	155	1	102	315	1600	2600	NA4828	1920
	190	50	1,5	160	3	209	500	1600	2600	NA4928	4150
150	190	40	1,1	165	2	125	375	1600	2600	NA4830	2720
160	200	40	1,1	175	2	139	390	1500	2400	NA4832	3150
170	215	45	1,1	185	2	163	480	1400	2200	NA4834	4250
180	225	45	1,1	195	2	166	510	1400	2200	NA4836	4480



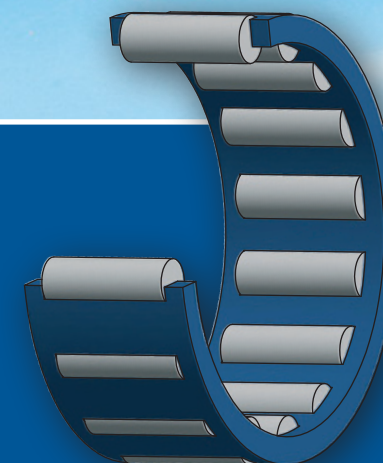
Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	D	C	D ₁	r _s min	C	C ₀			
15	15	28	12	24,5	1	6,9	7,9	24000	RPNA 15/28	32
18	18	32	16	27	1	12,5	16,2	22000	RPNA 18/32	52
20	20	35	16	30,5	1	13	17,5	21000	RPNA 20/35	62
25	25	42	20	36,5	1	18,8	30,5	18000	RPNA 25/42	109
28	28	44	20	38,5	1	22	34	16000	RPNA 28/44	112
30	30	47	20	42	1	22,6	36	15000	RPNA 30/47	125
35	35	52	20	47,5	1	24,3	41,5	13000	RPNA 35/52	131
40	40	55	20	50,5	1	26	47	11000	RPNA 40/55	141
45	45	62	20	58	1	27,5	53	10000	RPNA 45/62	176

Shaft diameter mm	Dimensions mm							Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	F _w	D	C	D ₁ min	r _s min	r _{1s} min	s ¹	C	C ₀			
12	15	28	12	24,5	1	0,3	0,5	6,9	7,9	24000	PNA 12/28	37
15	18	32	16	27	1	0,3	0,5	12,5	16,2	22000	PNA 15/32	62
17	20	35	16	30,5	1	0,3	0,5	13	17,5	21000	PNA 17/35	73
20	25	42	20	36,5	1	0,3	0,5	18,8	30,5	18000	PNA 20/42	136
22	28	44	20	38,5	1	0,3	0,5	22	34	16000	PNA 22/44	145
25	30	47	20	42	1	0,3	0,5	22,6	36	15000	PNA 25/47	157
30	35	52	20	47,5	1	0,3	0,5	24,3	41,5	13000	PNA 30/52	181
35	40	55	20	50,5	1	0,3	0,5	26	47	11000	PNA 35/55	177
40	45	62	20	58	1	0,3	0,5	27,5	53	10000	PNA 40/62	227



Shaft diameter mm	Dimensions mm											Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
d	D	B	F _w	E _w	r _s min	s	d ₁	D ₁	d ₂	D ₂	r _a max	C	C ₀			
6	17	10	10	13	0,3	0,5	9,7	10,3	12,7	13,3	0,3	4,75	5,5	29000	NAO 6x17x10TN	14
9	22	12	12	18	0,3	0,5	11,7	12,3	17,6	18,3	0,3	10	9,9	26000	NAO 9x22x12TN	23,5
12	24	13	16	20	0,3	0,5	15,7	16,4	19,6	20,3	0,3	8,9	11,8	24000	NAO 12x24x13	30
	24	20	16	20	0,3	0,5	15,7	16,4	19,6	20,3	0,3	13,3	19,8	24000	NAO 12x24x20	44
	28	12	16	22	0,3	0,5	15,7	16,4	21,6	22,3	0,3	11,5	12,5	23000	NAO 12x28x12	40
15	28	13	20	24	0,3	0,5	19,7	20,4	23,6	24,3	0,3	9,8	14,3	21000	NAO 15x28x13	29
	32	12	20	26	0,3	0,5	19,7	20,4	25,6	26,5	0,3	13,4	16,2	21000	NAO 15x32x12	50
17	30	13	22	26	0,3	0,5	21,5	22,4	25,6	26,3	0,3	10,4	15,9	20000	NAO 17x30x13	42
	35	16	22	29	0,3	0,5	21,5	22,4	28,4	29,5	0,3	20	25,5	19000	NAO 17x35x16	78
20	35	17	25	29	0,3	0,5	24,5	25,6	28,4	29,5	0,3	14,9	26	18000	NAO 20x35x17	76
	37	16	25	32	0,3	0,5	24,5	25,6	31,4	32,5	0,3	21	28	17000	NAO 20x37x16	82
25	40	17	30	35	0,3	0,8	29,5	30,6	34,4	35,5	0,3	19,6	34	15000	NAO 25x40x17	88
	42	16	30	37	0,3	0,8	29,5	30,6	36,4	37,5	0,3	23,1	33,5	15000	NAO 25x42x16	86
	42	32	30	37	0,3	0,8	29,5	30,6	36,4	37,5	0,3	39,5	67	15000	NAO 25x42x32	190
30	45	13	35	40	0,3	0,8	34,5	35,6	39,4	40,5	0,3	16,2	28	13000	NAO 30x45x13	77
	45	17	35	40	0,3	0,8	34,5	35,6	39,4	40,5	0,3	20,8	38	13000	NAO 30x45x17	102
	45	26	35	40	0,3	0,8	34,5	35,6	39,4	40,5	0,3	27,5	56	13000	NAO 30x45x26	157
	47	16	35	42	0,3	0,8	34,5	35,6	41,4	42,5	0,3	24,4	37,5	13000	NAO 30x47x16	109
	47	18	35	42	0,3	0,8	34,5	35,6	41,4	42,5	0,3	27,5	43	13000	NAO 30x47x18	119
	52	18	37	44	0,3	0,8	36,5	37,6	43,4	44,5	0,3	28	45,5	12000	NAO 30x52x18	117
35	50	17	40	45	0,3	0,8	39,5	40,6	44,4	45,5	0,3	21,4	41,5	12000	NAO 35x50x17	113
	55	20	40	47	0,3	0,8	39,5	40,6	46,2	47,5	0,3	32,5	57	11000	NAO 35x55x20	190
	57	20,5	42	50	0,3	0,8	41,5	42,6	49,2	50,5	0,3	36	59	11000	NAO 35x57x20,5	216
40	55	17	45	50	0,3	0,8	44,5	45,6	49,2	50,5	0,3	22,5	46	10000	NAO 40x55x17	127
	65	20	50	58	0,3	0,8	49,5	50,6	57,2	58,5	0,3	35,5	62	9000	NAO 40x65x20	279
50	68	20	55	60	0,6	1	54,5	55,8	59,2	60,8	0,6	28,5	66	8500	NAO 50x68x20	230
	78	20	60	68	1	1	59,3	60,8	67,2	68,8	1	43,5	85	7500	NAO 50x78x20	410
70	100	30	80	88	1	1	79,3	81	87,2	89	1	72	179	6000	NAO 70x100x30	850
75	105	25	85	93	1	1	84,3	96	92,2	94	1	57	136	5500	NAO 75x105x25	696
80	110	30	90	98	1	1	89,3	91	97,2	99	1	68	172	5000	NAO 80x110x30	920
90	120	30	100	108	1	1	99,3	101	107,2	109	1	71	188	4700	NAO 90x120x30	1044

NEEDLE ROLLER CAGES FOR THE CONNECTING ROD SEATING



NEEDLE ROLLER CAGES FOR THE CONNECTING ROD SEATING

These are special cages with needles, which are designed for assembly of crank shafts and connecting-rod journals. Basic types: **KZK** – are cages with needles to seat the crankshafts, **KBK** – are cages with needles to seat the connecting-rod journals.

DESIGN DATA

MAIN DIMENSIONS

The main dimensions of the needle roller cages for the connecting rod seating are set forth in the dimensional tables below.

DESIGN

KZK

The cages with needles to seat the crankshafts are guided at the outer diameter. The cages are of very high strength and guide the needle rollers well. Execution of guiding surfaced at the outer diameter assures optimal lubrication, and in regard to low weight it enables usage at high speed, as well. In case of special requirements it is possible to produce also the sectional cages, eventually also cages with special surface treatment.

KBK

The cages with needles to seat connecting rod journals are guided at the inner diameter. Different cage width enables adaptation to the width of the connecting rod eye, as well as to the piston.

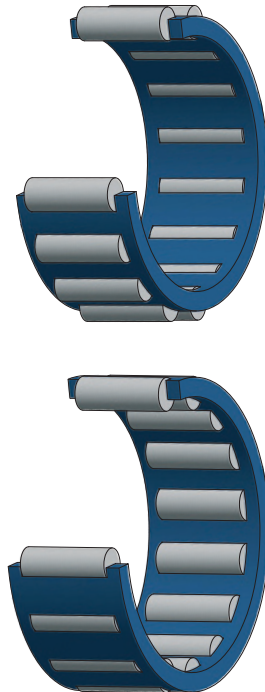
EXECUTION OF THE RELATED PARTS

Race ways of holes or journals must be grinded to the surface roughness of 0.2 µm, recommended materials for the crankshaft journals and piston connecting rods are 16MnCr5 or 15CrNi6. Deviation of circularity for individual surfaces is determined in the following table:

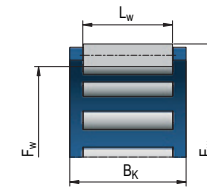
Nominal dimension		Seating the crankshaft journal µm				Seating the connecting rod journal µm			
		F		E		F		E	
from	to	parallelism	circularity	parallelism	circularity	parallelism	circularity	parallelism	circularity
9	14	1	1	2	1	1	1	2	1
14	18	1	1	2	1	1	1	2	1
18	22	1	2	3	2	2	2	3	2
22	25	2	2	3	2	-	-	-	-
25	30	2	2	4	2	-	-	-	-
30	-	2	2	4	3	-	-	-	-

MARGINAL ROTATIONAL FREQUENCY

Marginal rotational frequency presented in the catalogue presents maximal rotational speed at which the bearing works with certain safety margin without failure.

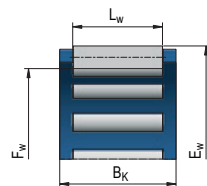


NEEDLE ROLLER CAGES FOR THE CONNECTING ROD SEATING



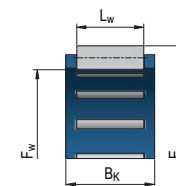
KZK

Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Bearing designation	Weight g
d	F _w	E _w	B _k	C	C ₀		
8	8	12	8	4,58	4,7	KZK8x12x8	1,9
10	10	14	10	5,16	5	KZK10x14x10	3,3
12	12	15	13	7,4	5,3	KZK12x15x13	3,6
	12	16	10	6,9	6,1	KZK12x16x10	3,5
	12	16	11	7,1	6,2	KZK12x16x11	3,7
	12	17	10	7,02	7,02	KZK12x17x10	5
	12	18	10	7,2	7,4	KZK12x18x10	7,8
14	14	18	10	8,5	7,1	KZK14x18x10	4
	14	19	10	7,6	7,3	KZK14x19x10	5,5
	14	19	12	7,95	7,46	KZK14x19x12	7,5
14,4	14,4	20,4	10	7,8	8,1	KZK14,4x20,4x10	6,5
15	15	19	9	7,1	6,8	KZK15x19x9	5
	15	19	10	8,4	7,2	KZK15x19x10	6
	15	19	10	9,1	7,8	KZK15x20x10	7,5
	15	20	10	10,5	8,4	KZK15x21x10	8,5
	15	21	11	10,7	8,5	KZK15x21x11	9,5
15,2	15,2	22,2	12	11,1	8,6	KZK15,2x22,2x12	11,5
16	16	20	10	9,2	8,2	KZK16x20x10	5,8
	16	20	24	9,4	8,7	KZK16x20x24	6,3
	16	21	10	9,8	8,8	KZK16x21x10	5,8
	16	22	12	11,9	11	KZK16x22x12	9,5
	16	22	14	13,93	13,2	KZK16x22x14	11
17	17	21	10	9	7,6	KZK17x21x10	6,7
	17	23	11	11,3	8,1	KZK17x23x11	9,5
18	18	22	10	9,8	7,6	KZK18x22x10	6,9
	18	22	24	17,2	10,1	KZK18x22x24	7,2
	18	24	11,6	13,1	11,6	KZK18x24x11,6	10
	18	24	12	13,1	11,6	KZK18x24x12	10
	18	24	13,3	10,7	9	KZK18x24x13,3	12,4
	18	24	13,5	10,7	9	KZK18x24x13,5	12,4
	18	24	15	15,5	13,2	KZK18x24x15	14
19	19	25	16	15,5	12,1	KZK19x25x16	13,9
	19	28	14	15	12,1	KZK19x28x14	20
20	20	25	16	12,3	9,9	KZK20x25x16	12
	20	26	12	12,5	10,1	KZK20x26x12	9,6
	20	26	14	16,7	12,6	KZK20x26x14	12
	20	26	17	17,6	12,7	KZK20x26x17	17
22	22	28	13	16,5	11,9	KZK22x28x13	15
	22	28	14	16,8	12,6	KZK22x28x14	16



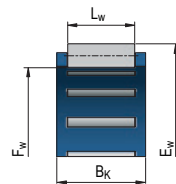
KZK

Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Bearing designation	Weight g
d	F _w	E _w	B _K	C	Co		
22	22	28	15	18,5	13,5	KZK22x28x15	16,7
	22	28	16	20,1	14,4	KZK22x28x16	18
	22	29	15	21,8	17,8	KZK22x29x15	15,2
	22	29	16	21,8	17,8	KZK22x29x16	19
	22	30	16	22,3	18,7	KZK22x30x16	25,7
23	23	29	13	11,3	10	KZK23x29x13	12
	23	30	14	10,1	9,35	KZK23x30x14	19,4
	23	30	16	11,8	9,78	KZK23x30x16	22
23,1	23,1	28,1	14	15,8	10,6	KZK23,1x28,1x14	12,9
24	24	30	15	13,7	11,2	KZK24x30x15	17
	24	30	16	13,7	11,2	KZK24x30x16	18
25	25	30	28	15,2	13,3	KZK25x30x28	24
	25	31	12	8,8	8,7	KZK25x31x12	16
	25	31	17	9,75	9,2	KZK25x31x17	23
	25	31	20	10,6	9,7	KZK25x31x20	26
	25	32	16	23,1	18,2	KZK25x32x16	22,7
25,1	25,1	30,1	14	19	13,7	KZK25,1x30,1x14	14,1
26	26	34	16	17,5	11,7	KZK26x34x16	25
28	28	33	14	21,9	13,2	KZK28x33x14	15,7
	28	34	14	20,7	16,5	KZK28x34x14	20
	28	35	15	22	18	KZK28x35x15	25
	28	35	16	23	18,9	KZK28x35x16	27
	28	36	16	27	19,5	KZK28x36x16	29,1
	28	38	13,6	20,3	17,3	KZK28x38x13,6	40
30	30	36	16	22,8	18,9	KZK30x36x16	28,5
	30	37	16	30,5	21,5	KZK30x37x16	29
	30	38	16	32,6	22,7	KZK30x38x16	34,4
	30	38	18	39,6	26,2	KZK30x38x18	38,8
32	32	40	22	39,3	27,8	KZK32x40x22	50
	32	42	20	41	29	KZK32x42x20	54
35	35	42	20	40,2	26	KZK35x42x20	40
38	38	46	20	43	31,1	KZK38x46x20	50
40	40	48	17	39	29	KZK40x48x17	50
	40	48	20	51	32,5	KZK40x48x20	54



KBK

Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Bearing designation	Weight g
d	F _w	E _w	B _K	C	Co		
8	8	11	10	4	3,5	KBK8x11x10	1,85
	8	12	10	4,1	3,7	KBK8x12x10	2
9	9	12	11,5	4,8	4,2	KBK9x12x11,5	2,4
	9	12	13	5,8	4,6	KBK9x12x13	2,75
	9	12	14	5,9	4,7	KBK9x12x14	3,5
	9	13	12	5,7	5,3	KBK9x13x12	4,1
	9	13	12,5	5,7	5,3	KBK9x13x12,5	4,9
10	9	13	13	5,6	5,35	KBK9x13x13	5,1
	10	13	8	5	4	KBK10x13x8	2
	10	13	10	5,2	4,2	KBK10x13x10	2,4
	10	13	14,5	6,6	5,4	KBK10x13x14,5	5,1
	10	13	16	7,7	6,8	KBK10x13x16	5,7
	10	14	10	4,6	4,4	KBK10x14x10	3,4
	10	14	11	5,7	5,2	KBK10x14x11	4
	10	14	12	6	5,4	KBK10x14x12	4,5
	10	14	12,5	6,2	5,6	KBK10x14x12,5	4,85
	10	14	13	6,2	5,6	KBK10x14x13	5,4
11	11	15	17	7	5,2	KBK11x15x17	5
12	12	15	13	7,3	5,5	KBK12x15x13	4,6
	12	15	14,3	7,7	5,8	KBK12x15x14,3	5,4
	12	15	15	7,8	5,9	KBK12x15x15	5,6
	12	15	16,5	9,9	6,8	KBK12x15x16,5	6,2
	12	15	17	10	7	KBK12x15x17	6,3
	12	15	17,5	10	7	KBK12x15x17,5	6,5
	12	16	13	7,6	6,3	KBK12x16x13	6,7
	12	16	15	9	7,5	KBK12x16x15	7,9
	12	16	15,5	10	7,6	KBK12x16x15,5	8,3
	12	16	16	9,3	7,8	KBK12x16x16	8,5
	12	16	17	9,4	7,9	KBK12x16x17	9,2
	12	17	14	9,5	8	KBK12x17x14	8
	12	17	14,3	9,5	8	KBK12x17x14,3	8,4
	12	17	14,8	9,8	8,3	KBK12x17x14,8	8,8
13	13	17	14,5	10,2	8,3	KBK13x17x14,5	7,1
	13	17	17,5	12,1	9,5	KBK13x17x17,5	8,6
14	14	18	10	7,4	6,26	KBK14x18x10	4,6
	14	18	12	7,57	6,38	KBK14x18x12	6,6
	14	18	13	8,7	7,3	KBK14x18x13	7,6
	14	18	14	8,8	7,4	KBK14x18x14	6,33
	14	18	14,5	8,8	7,4	KBK14x18x14,5	8



KBK

Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Bearing designation	Weight g
d	F _w	E _w	B _K	 C	 Co		
14	14	18	15	8,99	7,6	KBK14x18x15	8,3
	14	18	16,5	9,7	8,8	KBK14x18x16,5	9,6
	14	18	17	9,8	8,9	KBK14x18x17	10,1
	14	18	20	10,1	9	KBK14x18x20	12
	14	18	21	12,4	10,5	KBK14x18x21	13
	14	18	22	13,1	11,1	KBK14x18x22	14
15	14	19	17	13,1	11,1	KBK14x19x17	10,3
	15	19	10	8,6	6,5	KBK15x19x10	5
	15	19	18	11,3	9,9	KBK15x19x18	11
	15	19	19	12,8	10,1	KBK15x19x19	12
	15	19	20	15,5	11,3	KBK15x19x20	12,9
16	15	20	24	20	14,1	KBK15x20x24	18,6
	16	20	19	16,8	11,7	KBK16x20x19	12
	16	20	20	17,6	12,9	KBK16x20x20	13,4
	16	20	21	17,6	12,9	KBK16x20x21	14
	16	20	22	18,7	13	KBK16x20x22	15
17,5	16	21	19	18,7	13	KBK16x21x19	16
	17,5	22	16	16,3	11	KBK17,5x22x16	9,3
	18	22	22	17,7	11,5	KBK18x22x22	16,9
	18	22	23,5	19	11,9	KBK18x22x23,5	18
	18	22	24	20	12	KBK18x22x24	18,4
	18	22	25	20,1	12,7	KBK18x22x25	19,1
18	18	23	21	10,1	9,9	KBK18x23x21	18
	18	23	23	12	10,5	KBK18x23x23	20
	18	24	20	25	20	KBK18x24x20	20
	20	24	30	25,5	14,9	KBK20x24x30	22,1
20	20	25	22	22,3	15,2	KBK20x25x22	19,5
	20	25	25	24	17,1	KBK20x25x25	23

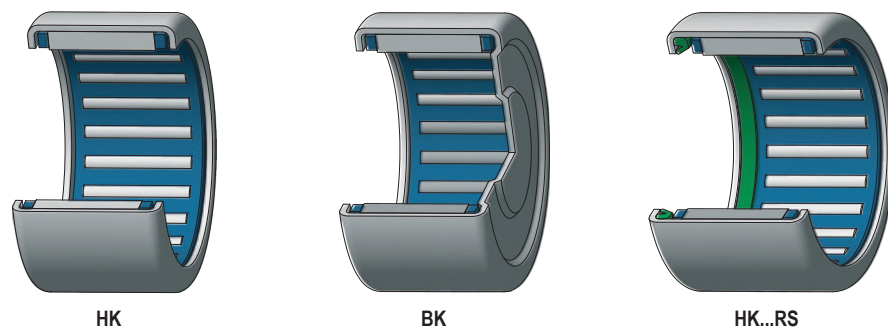
THE DRAWN CUP NEEDLE ROLLER BEARINGS



DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING

The open drawn cup needle roller bearings and the open and closed drawn cup needle roller bearings are the needle roller bearings with the lowest construction height in radial direction. They enable the extra cost effective rolling bearing solutions with high load capacity. Bearings are pressed in the hole tight, so they do not need another axial securing.

DESIGN DATA



DESIGN

Basic types and their dimensional series are defined in the table:

Designation	Description	Shaft dimension mm	
		from	to
HK	Open needle roller bearing with cage	3	50
BK	Drawn cup needle roller bearing with cage	3	45
HK.RS	Open needle roller bearings with cage, sealed on one side	12	50
HK...2RS	Open needle roller bearings with cage, sealed on both sides	12	50
MF, MFH, MFY F, FH, FY	Drawn cup needle roller bearing with cage open needle roller bearing with cage	6	60

PRECISENESS OF BEARINGS

Tolerances of seating needed for the particular bearings are set forth in the table:

	Housing hole tolerance	Shaft tolerance
Steel or alloy	N6	h5
Light metals	R6	

Meeting the tolerances presented above, the resulting value of the enveloping circle of the pressed-in drawn cup needle roller bearing is F8, and with recommended shaft tolerance it achieves the resulting radial clearance of the C0 level.

CHECKING THE DRAWN CUP NEEDLE ROLLER BEARINGS

Dimensional inspection of the drawn cup needle roller bearings without pressing in is not possible. Thin-walled ring is not strength enough, so it could be non-circular. It needs to be pressed into the body hole with recommended tolerances, so that it gains the geometrical preciseness. Dimensional inspection is carried out as follows:

- 1) The bearing is pressed into a ring gauge with a wall thickness of 20 mm, with the hole tolerated according to the attached table
- 2) Using the hole gauge it is verified, whether the hole lies in the tolerance required.

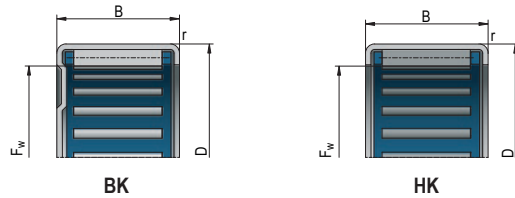
DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING

Diameter of the enveloping circle D_{wp}	Bearing outer diameter D	Hole of the ring gauge, nominal dimension	Hole gauge diameter	
			upper deviation	low deviation
mm	mm	mm	μm	μm
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
11	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
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

MARGINAL ROTATIONAL FREQUENCY

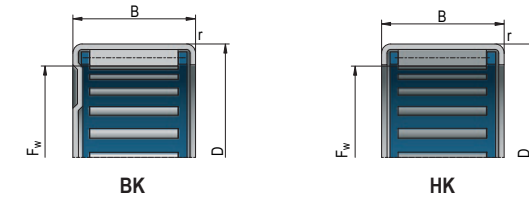
The marginal rotational frequency presented in the catalogue represents maximal rotational speed, at which the bearing works with certain safety margin without failure.

DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING



Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Inner ring	Weight g
	F _w	D	B	t _{min}	r _{min}	C	Co					
3	3	6,5	6	-	0,3	1,23	0,84	32000	48000	HK0306TN	-	1
	3	6,5	6	5,2	0,3	1,23	0,84	32000	48000	BK0306TN	-	1
4	4	8	8	-	0,4	1,74	1,27	32000	48000	HK0408TN	-	1,6
	4	8	8	6,4	0,4	1,74	1,27	32000	48000	BK0408TN	-	1,8
5	5	9	9	-	0,4	2,4	1,99	24000	38000	HK0509	-	2
	5	9	9	7,4	0,4	2,4	1,99	24000	38000	BK0509	-	2,1
6	6	10	8	-	0,4	2,03	1,65	20000	34000	HK0608	-	2,1
	6	10	9	-	0,4	2,85	2,6	20000	34000	HK0609	-	2,5
	6	10	9	7,4	0,4	2,85	2,6	20000	34000	BK0609	-	2,6
7	7	11	9	-	0,4	3,1	2,95	18000	30000	HK0709	-	2,6
	7	11	9	7,4	0,4	3,1	2,95	18000	30000	BK0709	-	2,9
8	8	12	8	-	0,4	2,75	2,6	16000	26000	HK0808	-	2,7
	8	12	10	-	0,4	3,8	3,95	16000	26000	HK0810	IR 5x8x12	3
	8	12	10	8,4	0,4	3,8	3,95	16000	26000	BK0810	IR 5x8x12	3,4
9	9	13	10	-	0,4	4,25	4,65	15000	24000	HK0910	IR 6X9X12	4
	9	13	10	8,4	0,4	4,25	4,65	15000	24000	BK0910	IR 6X9X12	4,3
	9	13	12	-	0,4	5,3	6,3	15000	24000	HK0912	IR 6X9X12	4,6
	9	13	12	10,4	0,4	5,3	6,3	15000	24000	BK0912	IR 6X9X12	4,9
10	10	14	10	-	0,4	4,4	5,1	14000	22000	HK1010	IR 7X10X10,5	4,1
	10	14	10	8,4	0,4	4,4	5,1	14000	22000	BK1010	IR 7X10X10,5	4,3
	10	14	12	-	0,4	5,5	6,8	14000	22000	HK1012	IR 7X10X12	4,8
	10	14	12	10,4	0,4	5,5	6,8	14000	22000	BK1012	IR 7X10X12	5
	10	14	15	-	0,4	6,8	8,8	14000	22000	HK1015	IR 7X10X16	6
12	12	16	10	-	0,4	6,8	8,8	14000	22000	BK1015	IR 7X10X16	6,2
	12	16	10	-	0,4	4,95	6,2	12000	19000	HK1210	IR 8X12X10,5	4,6
	12	16	10	8,4	0,4	4,95	6,2	12000	19000	BK1210	IR 8X12X10,5	5,2
	12	18	12	-	1,0	6,5	7,3	12000	19000	HK1212	IR 8X12X12,5	9,1
13	12	18	12	9,3	1,0	6,5	7,3	12000	19000	BK1212	IR 8X12X12,5	10,3
	13	19	12	-	1,0	6,8	7,9	11000	18000	HK1312	IR 10X13X12,5	9,5
	13	19	12	9,3	1,0	6,8	7,9	11000	18000	BK1312	IR 10X13X12,5	11,2
14	14	20	12	-	1	7,1	8,8	10000	17000	HK1412	IR 10x14x12	10,5
	14	20	12	9,3	1	7,1	8,8	10000	17000	BK1412	IR 10x14x12	12,1
15	15	21	12	-	1	7,9	9,4	9500	16000	HK1512	IR 12x15x12,5	11,1
	15	21	12	9,3	1	7,9	9,4	9500	16000	BK1512	IR 12x15x12,5	12,7
	15	21	16	-	1	10,5	14,4	9500	16000	HK1516	IR 12x15x16,5	15
	15	21	16	13,3	1	10,5	14,4	9500	16000	BK1516	IR 12x15x16,5	16,5
	15	21	22	-	1	13,4	19,5	9500	16000	HK1522	IR 12x15x22,5	20,4
	15	21	22	19,3	1	13,4	19,5	9500	16000	BK1522	IR 12x15x22,5	22
16	16	22	12	-	1	7,6	9,7	9500	16000	HK1612	IR 12x16x12	11,7

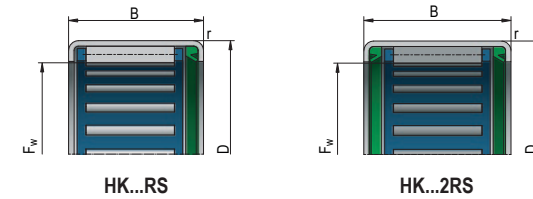
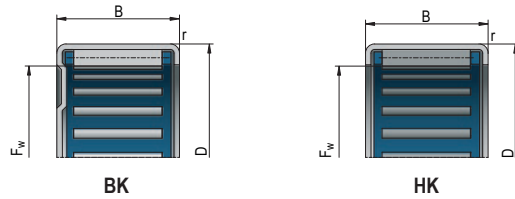
DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING



Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Inner ring	Weight g
	F _w	D	B	t _{min}	r _{min}	C	Co					
16	16	22	12	9,3	1	7,6	9,7	9500	16000	BK1612	IR 12x16x12	13,8
	16	22	16	-	1	10,2	15	9500	16000	HK1616	IR 12x16x16	15,8
	16	22	16	13,3	1	10,2	15	9500	16000	BK1616	IR 12x16x16	17,6
	16	22	22	-	1	13,1	19,4	9500	15000	HK1622	IR 12x16x22	21,7
	16	22	22	19,3	1	13,1	19,4	9500	15000	BK1622	IR 12x16x22	23,4
17	17	23	12	-	1	7,6	10,3	9000	15000	HK1712	-	12,2
	17	23	12	9,3	1	7,6	10,3	9000	15000	BK1712	-	14,5
18	18	24	12	-	1	8,1	10,9	9000	15000	HK1812	-	13,1
	18	24	12	9,3	1	8,1	10,9	9000	15000	BK1812	-	14,9
	18	24	16	-	1	11	17	9000	15000	HK1816	IR 15x18x16,5	17,5
20	20	26	12	-	1	8,6	12,1	8000	13000	HK2012	IR 15x20x12	14,1
	20	26	12	9,3	1	8,6	12,1	8000	13000	BK2012	IR 15x20x12	16,7
	20	26	16	-	1	11,8	19	8000	13000	HK2016	IR 17x20x16,5	19,3
	20	26	16	13,3	1	11,8	19	8000	13000	BK2016	IR 17x20x16,5	22,3
	20	26	20	-	1	14,6	25,5	8000	13000	HK2020	IR 17x20x20,5	24,1
	20	26	20	17,3	1	14,6	25,5	8000	13000	BK2020	IR 17x20x20,5	27,1
	20	26	30	-	1	20	38	8000	13000	HK2030	IR 17x20x30,5	34,7
	20	26	30	27,3	1	20	38	8000	13000	BK2030	IR 17x20x30,5	37,4
	22	28	12	-	1	8,65	13,4	7500	12000	HK2212	IR 17x22x13	15
22	22	28	12	9,3	1	8,65	13,4	7500	12000	BK2212	IR 17x22x13	18,1
	22	28	16	-	1	12,5	21,2	7500	12000	HK2216	IR 17x22x16	20,9
	22	28	16	13,3	1	12,5	21,2	7500	12000	BK2216	IR 17x22x16	24,3
	22	28	20	-	1	14,6	25,5	7500	12000	HK2220	IR 17x22x23	26,2
	22	28	20	17,3	1	14,6	25,5	7500	12000	BK2220	IR 17x22x23	29,9
	25	32	12	-	1	11	15,2	6700	10000	HK2512	-	20
25	25	32	12	9,3	1	11	15,2	6700	10000	BK2512	-	23,2
	25	32	16	-	1	15,6	24	6700	10000	HK2516	IR 20x25x17	27,3
	25	32	16	13,3	1	15,6	24	6700	10000	BK2516	IR 20x25x17	31
	25	32	20	-	1	19,9	33	6700	10000	HK2520	IR 20x25x20,5	34,1
	25	32	20	17,3	1	19,9	33	6700	10000	BK2520	IR 20x25x20,5	38,7
	25	32	26	-	1	23,6	43	6700	10000	HK2526	IR 20x25x26,5	44,8
	25	32	26	23,3	1	23,6	43	6700	10000	BK2526	IR 20x25x26,5	49
	25	32	38	-	1	33,5	66	6700	10000	HK2538	IR 20x25x38,5	64,7
	25	32	38	35,3	1	33,5	66	6700	10000	BK2538	IR 20x25x38,5	69
28	28	35	16	-	1	15,3	25,5	5400	9000	HK2816	IR 22x28x17	30,1
	28	35	16	13,3	1	15,3	25,5	5400	9000	BK2816	IR 22x28x17	34,1
	28	35	20	-	1	20	36	5400	9000	HK2820	IR 22x28x20,5	37,6
	28	35	20	17,3	1	20	36	5400	9000	BK2820	IR 22x28x20,5	43

DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING

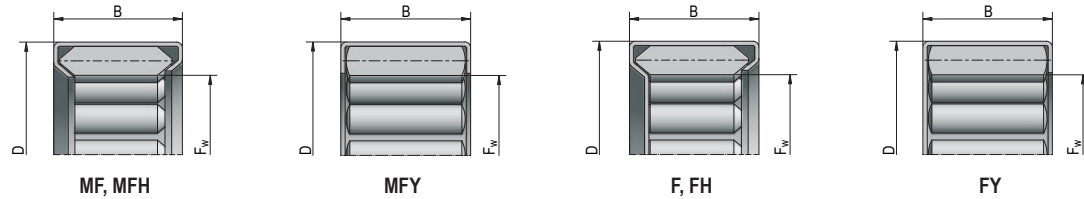
DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING



Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Inner ring	Weight g
d	F _w	D	B	t _{min}	r _{min}	C	Co					
30	30	37	12	-	1	11,2	17,3	5600	8500	HK3012	-	24
	30	37	12	9,3	1	11,2	17,3	5600	8500	BK3012	-	27,9
	30	37	16	-	1	16	28	5600	8500	HK3016	IR 25x30x17	32
	30	37	16	13,3	1	16	28	5600	8500	BK3016	IR 25x30x17	37,1
	30	37	20	-	1	22	39,5	5600	8500	HK3020	IR 25x30x20,5	40,1
	30	37	20	17,3	1	22	39,5	5600	8500	BK3020	IR 25x30x20,5	46,5
	30	37	26	-	1	28	54	5600	8500	HK3026	IR 25x30x26,5	52,9
	30	37	26	23,3	1	28	54	5600	8500	BK3026	IR 25x30x26,5	59,4
	30	37	38	-	1	37,5	79	5600	8500	HK3038	IR 25x30x38,5	76,1
35	30	37	38	35,3	1	37,5	79	5600	8500	BK3038	IR 25x30x38,5	82,5
	35	42	12	-	1	13,1	21,3	5000	7500	HK3512	-	27,7
	35	42	16	-	1	16,6	30,5	5000	7500	HK3516	IR 30x35x17	36,9
40	35	42	20	-	1	23,8	46	5000	7500	HK3520	IR 30x35x20,5	46,1
	40	47	12	-	1	14	24,3	3900	6500	HK4012	-	31,1
	40	47	16	-	1	20	38,5	3900	6500	HK4016	IR 35x40x17	41,4
45	40	47	20	-	1	25,5	52	3900	6500	HK4020	IR 35x40x20,5	51,8
	45	52	16	-	1	19	39	4000	6000	HK4516	IR 40x45x17	34,8
	45	52	20	-	1	25	56	4000	6000	HK4520	IR 40x45x20,5	57,8
50	45	52	20	17,3	1	25	56	4000	6000	BK4520	IR 40x45x20,5	70,9
	50	58	20	-	1	27,5	57	3600	5300	HK5020	IR 45x50x20	72
	50	58	25	-	1	33,5	75	3600	5300	HK5025	IR 45x50x25,5	90,1

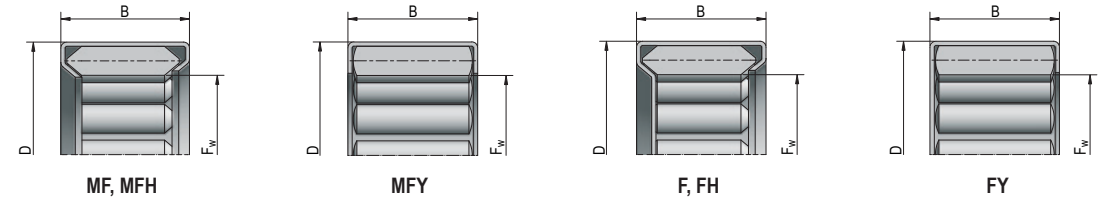
Shaft diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Bearing designation	Inner ring	Weight g
d	F _w	D	B	r _{min}		C	Co					
12	12	18	14	1		6,5	7,3	12000		HK1214RS	-	10,7
	12	18	16	1		6,5	7,3	12000		HK1216-2RS	-	11,5
14	14	20	14	1		7,1	8,5	11000		HK1414RS	IR 10x14x16	12
	14	20	16	1		7,1	8,5	11000		HK1416-2RS	IR 10x14x20	14
15	15	21	14	1		7,8	9,8	11000		HK1514RS	IR 12x15x16,5	12,6
	15	21	16	1		7,8	9,8	11000		HK1516-2RS	IR 12x15x16,5	17
16	16	22	14	1		7,6	9,7	10000		HK1614RS	IR 12x16x16	13,3
	16	22	16	1		7,6	9,7	10000		HK1616-2RS	IR 12x16x20	15,1
18	18	24	14	1		8,1	10,9	9500		HK1814RS	IR 15x18x16,5	15,1
	18	24	16	1		8,1	10,9	9500		HK1816-2RS	IR 15x18x16,5	17
20	20	26	16	1		8,6	12,1	8500		HK2016-2RS	IR 17x20x16,5	18,8
	20	26	18	1		11,8	19	8500		HK2018RS	IR 17x20x20,5	21,4
	20	26	20	1		11,8	19	8500		HK2020-2RS	IR 17x20x20,5	23,5
22	22	28	16	1		8,6	13,4	7500		HK2216-2RS	-	20,3
	22	28	18	1		12,5	21,2	7500		HK2218RS	IR 17x22x23	23,5
	22	28	20	1		12,5	21,2	7500		HK2220-2RS	IR 17x22x23	25,5
	25	32	14	1		10,8	15,2	6700		HK2514RS	IR 20x25x17	27
	25	32	16	1		10,8	15,2	6700		HK2516-2RS	IR 20x25x17	27,3
	25	32	18	1		15,6	24	6700		HK2518RS	IR 20x25x20,5	31
25	25	32	20	1		15,6	24	6700		HK2520-2RS	IR 20x25x20,5	33,1
	25	32	22	1		19,6	33	6700		HK2522RS	IR 20x25x26	42
	25	35	24	1		19,6	33	6700		HK2524-2RS	IR 20x25x26	39,7
	28	35	20	1		15,3	25,5	6000		HK2820-2RS	IR 22x28x20,5	36,9
	30	37	16	1		11,2	17,3	5600		HK3016-2RS	IR 25x30x17	28,5
30	30	37	18	1		16	28	5600		HK3018RS	IR 25x30x20,5	36,6
	30	37	20	1		16	28	5600		HK3020-2RS	IR 25x30x20,5	39,1
	30	37	22	1		21,6	39,5	5600		HK3022RS	IR 25x30x26	49
	30	37	24	1		21,6	39,5	5600		HK3024-2RS	IR 25x30x26	49,7
35	35	42	16	1		12,9	22	4800		HK3516-2RS	IR 30x35x17	36,4
	35	42	18	1		16,6	30,5	4800		HK3518RS	IR 30x35x20,5	37,4
	35	42	20	1		16,6	30,5	4800		HK3520-2RS	IR 30x35x20,5	41,1
40	40	47	16	1		12,9	23,2	4300		HK4016-2RS	IR 35x40x17	41,2
	40	47	18	1		18	35,5	4300		HK4018RS	IR 35x40x20,5	47,3
	40	47	20	1		18	35,5	4300		HK4020-2RS	IR 35x40x20,5	50,2
45	45	52	18	1		19	39	3800		HK4518RS	IR 40x45x20,5	54,2
	45	52	20	1		19	39	3800		HK4520-2RS	IR 40x45x20,5	57,4
50	50	58	22	1		27,5	57	3400		HK5022RS	IR 45x50x25,5	77,2
	50	58	24	1		27,5	57	3400		HK5024-2RS	IR 45x50x25,5	84

DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING



Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
	F _w	D	B	c	Co			
6	6	10	8	3,08	5,8	12000	F-0608	2,5
6,35	6,35	11,11	11,13	3,5	6,05	12000	F6.35x11.11x11.13	3,2
	6,35	11,11	11,13	3,5	6,05	12000	MF6.35x11.11x11.13	4,1
8	8	12	10	4,05	7,15	13000	F-0810	3,7
	8	14	10	5,2	7,15	7400	FH-0810	7
	8	14	12	4,55	7,15	7400	FH-0812	9
9	9	13	10	4,9	8,05	12000	F-0910	4
	9	15	10	8	11,5	7100	FH-0910	6
	9	15	13	856	12,8	7100	FH9x15x13	8
9,52	9,52	14,29	12,7	9	13,3	7100	F9.52x14.29x12.7	7,5
10	10	14	10	5,7	9,35	11000	F-1010	4,2
	10	16	10	6,35	10,8	11000	FH-1010	6,5
	10	16	15	6,89	11,5	7100	F10x16x15	12
	10	16	17	6,5	11	7000	F10x16x17	-
12	12	16	12	6,38	10,9	7100	F-1212	6
	12	17	12	8,4	11,9	7100	F12x17x12	8
	12	17	15	9	12,5	7100	F12x17x15	10,5
	12	17	18	9,8	13,5	7100	F12x17x18	13
15	15	20	12	8,4	11,9	7100	F15x20x12	10
	15	20	16	9,5	12,8	7100	F15x20x16	13,6
	15	20	20	10,5	16	7100	F15x20x20	17,2
	15	20	20	10,5	16	7100	FY15x20x20	20
	15	21	12	9,7	15,9	8100	F-1512	12
16	16	22	16	14,1	25,9	7700	F-1616	17
17	17	23	12	10,6	21,6	7300	F-1712	13
	17	23	14	12,5	22,5	7300	F-1714	15
	17	23	18	13,8	24,8	7300	F-1718	21
	17	23	22	13,5	24	7100	F-1722	-
18	18	24	16	15	29,1	6900	F-1816	18
20	20	26	14	15,8	40,5	6900	F-2014	17
	20	26	20	18,8	42,5	6900	F-2020	26
	20	26	25	20,5	35	6300	F20x26x25	33
25	25	32	16	18,7	37,9	5100	F-2516	28
	25	32	22	11	16,5	5100	F-2522	40
	25	32	25	11,5	18,5	5100	F 25x32x25	43
	25	33	8	12,2	16,8	4300	F 25x33x08	16,7
28	28	35	20	25,7	58,3	4600	F-2820	118
30	30	37	20	26,8	62,5	4300	F-3020	42
	30	37	20	26,8	62,5	4300	MF-3020	48

DRAWN CUP NEEDLE ROLLER BEARINGS, CLOSED AND OPEN WITH AND W/O SEALING



Shaft diameter mm	Dimensions mm			Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g
	F _w	D	B	c	Co			
30	30	38	16	25,5	57,5	4600	F 30x38x16	37,5
	30	38	24	28,8	64,5	4300	F 30x38x24	37,5
	30	38	32	34,5	78,9	4300	F 30x38x32	81,5
32	32	40	32	37,5	84	4300	F 32x40x32	86
	32	39	16	25,8	61,5	4300	F-3216	35
35	35	42	20	24	69,1	3700	F-3520	49
	35	43	16	23,5	68	3700	F 35x43x16	41
	35	43	25	38,7	86,2	3200	F 35x43x25	72
	35	43	32	40,5	98,7	3200	F 35x43x32	90
40	40	47	20	30,3	82,6	3300	F-4020	56
	40	50	32	42,5	10,8	2600	FH-4032	68
	40	50	32	42,5	10,8	2600	MFH-4032	95
	40	50	38	44,8	108,5	2600	FH 40x50x38	105
45	45	52	20	30,4	90,1	2900	F-4520	62
	45	55	38	45,8	128	2900	FH 45x55x38	140
50	50	58	20	35,8	98	2600	F-5020	78
	50	60	38	50,5	145,8	2600	FH 50x60x38	145
60	60	68	40	50,2	145	2600	F 60x68x40	185

AXIAL CAGES WITH NEEDLES / AXIAL BEARING RINGS



AXIAL CAGES WITH NEEDLES / AXIAL BEARING RINGS

The axial needle roller cages with needles are a basic component of the axial needle roller bearings. The cages are made of steel plate, eventually of plastic material. High preciseness of needle rollers G2 assures uniform distribution of load.

DESIGN DATA

MAIN DIMENSIONS

The main dimensions of the axial needle roller cages with needles are set forth in the table. They conform to the standard DIN 5405-3.

DESIGN

The cages are manufactured of quality steels (15CrMo, 20CrMo) or plastic material (PA66), and assure uniform guiding of the needle rollers in the seating.

The needle rollers, body rings GS, and shaft rings WS are made of steels for roller bearings 100Cr6.



Component of the bearing	Design series	Hole		Outer diameter		Height	
		Designation	Tolerance	Designation	Tolerance	Designation	Tolerance
Axial cage with needles	AXK	D _w	E10	D _g	c12	d _r	DIN 5402 G 2
Body rings	GS	D ₁	-	D _g	according to DIN 620	h	h11
Shaft rings	WS	D _w	according to DIN 620	d ₁	-	h	h11
Race	LS	D _w	E 12	D _g	a12	h	h11
Axial ring	AS	D _w	E 12	D _g	a12	s	±0,05

Axial bearings are manufactured in the preciseness level P0. For the raised demands they can be manufactured in the preciseness level P6 and P5.

Body ring				Shaft ring				Axial run-out				
Scope of the outer diameter nominal dimension D mm		Outer diameter deviation μm		Scope of the hole nominal dimension d mm		Deviation μm		Scope of the diameter nominal dimension D, d mm		Axial run-out Maximally for the degree of preciseness μm		
from	to	low	upper	from	to	low	upper	from	to	P0	P6	P5
-	18	0	-11	-	18	-8	0	-	18	10	5	3
18	30	0	-13	18	30	-10	0	18	30	10	5	3
30	50	0	-16	30	50	-12	0	30	50	10	6	3
50	80	0	-19	50	80	-15	0	50	80	10	7	4
80	120	0	-22	80	120	-20	0	80	120	15	8	4
120	180	0	-25	120	180	-25	0	120	180	15	9	5
180	250	0	-30	180	250	-30	0	180	250	20	10	5
250	315	0	-35	250	315	-35	0	250	315	25	13	7
315	400	0	-40	315	400	-40	0	315	400	30	15	7
400	500	0	-45	400	500	-45	0	400	500	30	18	9
500	630	0	-50	500	630	-50	0	500	630	35	21	11
630	800	0	-75	630	800	-75	0	630	800	40	25	13

AXIAL CAGES WITH NEEDLES / AXIAL BEARING RINGS

Recommended tolerance values for shafts and holes are presented in the table below.

Axial cage with needles AXK	Inner guiding	h8	-
	Outer guiding	-	H9
Body rings GS			H7 (H9)
Shaft rings WS		h6 (h8)	
Race LS	As the body ring	Free shaft	H11
Axial ring AS	As the shaft ring	h10	Free hole

The axial needle roller cages can be supplied independently with one or two rings GS, WS, LS, AS. Due to the large number of combinations, it is necessary to order each component separately.

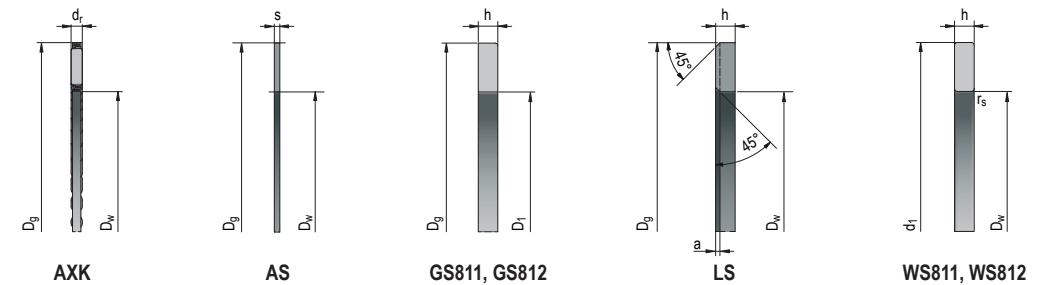
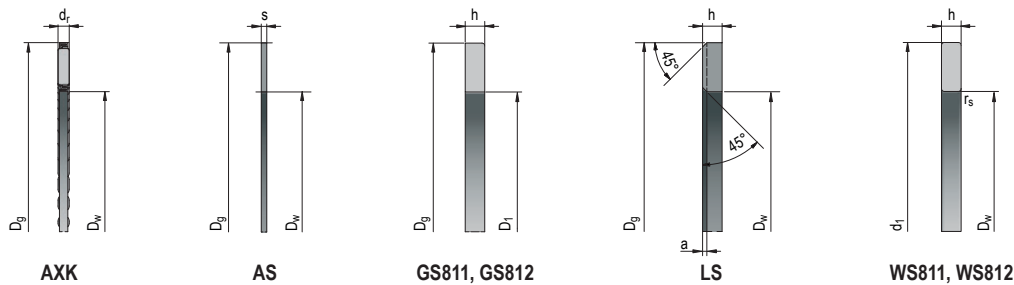
In the case of ordering separate AXK ... cages, it is necessary to do race ways on the connecting parts in the Dw, Dg dimensions presented in the dimension tables. Their axial run-out must not exceed values referred to in the table above and roughness must be less than Ra=0.2mm.

MARGINAL ROTATIONAL FREQUENCY

The marginal rotational frequency presented in the catalogue presents maximal rotational speed, at which the bearing works with certain safety margin without failure.

AXIAL CAGES WITH NEEDLES / AXIAL BEARING RINGS

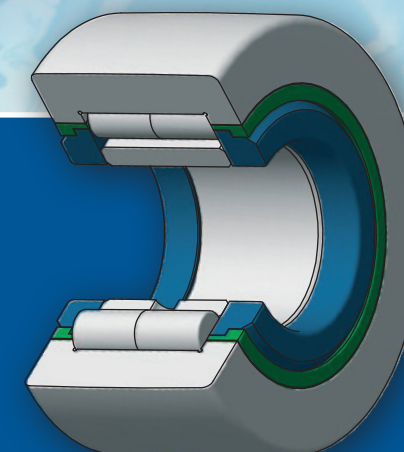
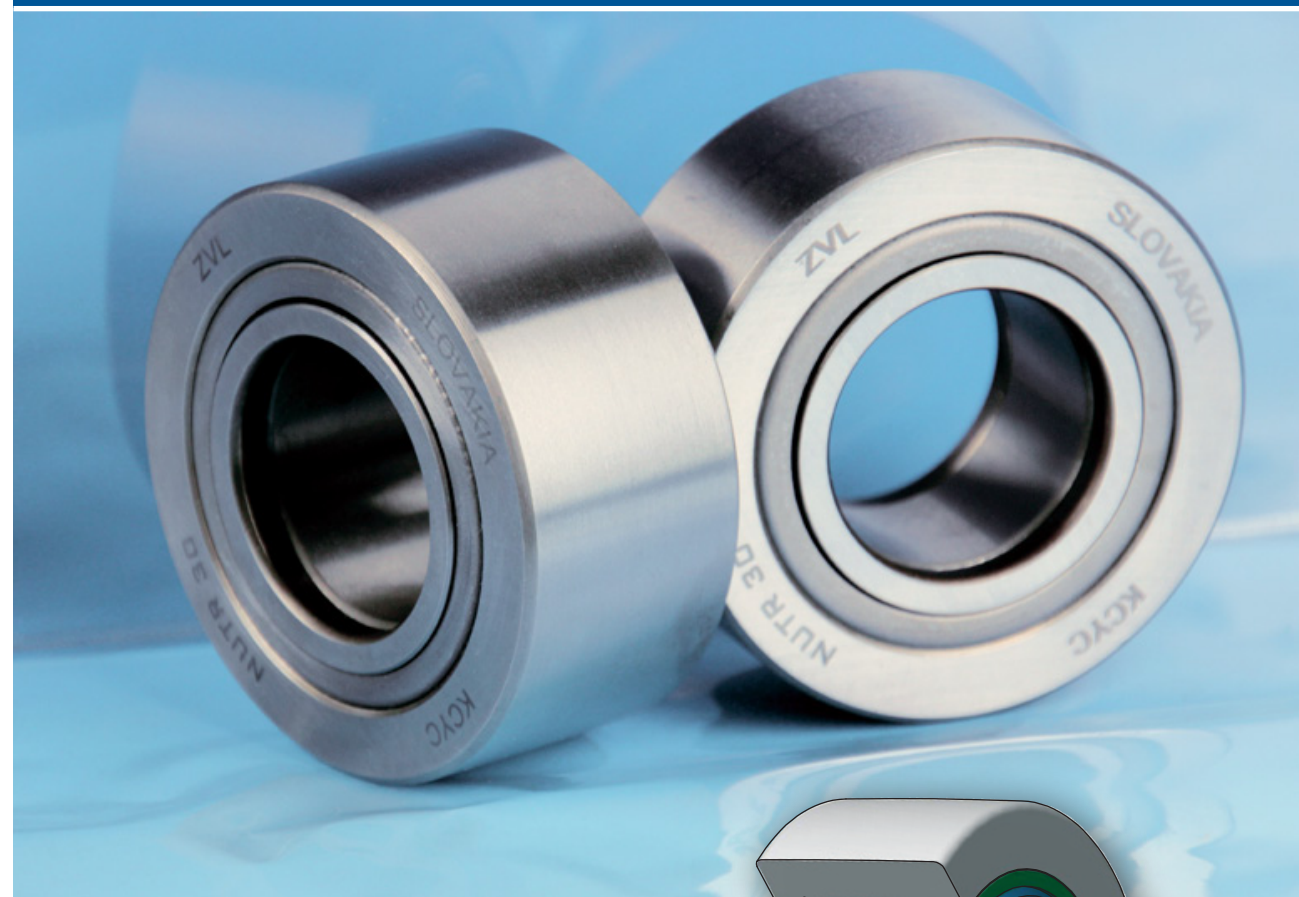
AXIAL CAGES WITH NEEDLES / AXIAL BEARING RINGS



Shaft diameter mm		Dimensions mm							Bearing designation		
D _w	D _g	d _r	D ₁	d ₁	s	h	a	r _s min	Axial needle roller bearings and cages with needles	Shaft washer of the axial bearing	Bearing washer
10	24	2	-	-	1	2,75	0,5	-	AXK1024	LS1024	AS1024
12	26	2	-	-	1	2,75	0,5	-	AXK1226	LS1226	AS1226
15	28	2	16	28	1	2,75	0,5	0,3	AXK1528	LS1528	AS1528
17	30	2	18	30	1	2,75	0,5	0,3	AXK1730	LS1730	AS1730
20	35	2	21	35	1	2,75	0,5	0,3	AXK2035	LS2035	AS2035
25	42	2	26	42	1	3	1	0,6	AXK2542	LS2542	AS2542
30	47	2	32	47	1	3	1	0,6	AXK3047	LS3047	AS3047
35	52	2	37	52	1	3,5	1	0,6	AXK3552	LS3552	AS3552
40	60	3	42	60	1	3,5	1	0,6	AXK4060	LS4060	AS4060
45	65	3	47	65	1	4	1	0,6	AXK4565	LS4565	AS4565
50	70	3	52	70	1	4	1	0,6	AXK5070	LS5070	AS5070
55	78	3	57	78	1	5	1	0,6	AXK5578	LS5578	AS5578
60	85	3	62	85	1	4,75	1,5	1	AXK6085	LS6085	AS6085
65	90	3	67	90	1	5,25	1,5	1	AXK6590	LS6590	AS6590
70	95	4	72	95	1	5,25	1,5	1	AXK7095	LS7095	AS7095
75	100	4	77	100	1	5,75	1,5	1	AXK75100	LS75100	AS75100
80	105	4	82	105	1	5,75	1,5	1	AXK80105	LS80105	AS80105
85	110	4	87	110	1	5,75	1,5	1	AXK85110	LS85110	AS85110
90	120	4	92	120	1	6,5	1,5	1	AXK90120	LS90120	AS90120
100	135	4	102	135	1	7	1,5	1	AXK100135	LS100135	AS100135
110	145	4	112	145	1	7	1,5	1	AXK110145	LS110145	AS110145
120	155	4	122	155	1	7	1,5	1	AXK120155	LS120155	AS120155
130	170	4	132	170	1	9	1,5	1	AXK130170	LS130170	AS130170
140	180	5	142	178	1	9,5	1,5	1	AXK140180	LS140180	AS140180
150	190	5	152	188	1	9,5	1,5	1	AXK150190	LS150190	AS150190
160	200	5	162	198	1	9,5	1,5	1	AXK160200	LS160200	AS160200

Bearing designation		Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹		Weight g			
Bearing washer	Shaft washer of the axial bearing	C	Co			Axial needle roller bearings and cages with needles	Shaft washer of the axial bearing	Bearing washer	
-	-	7,8	23,6	5000	14000	2	8	3	-
-	-	8,5	27	4800	13000	3	9	3	-
WS81102	GS81102	9,65	33,5	4500	12000	3	10	3	10
WS81103	GS81103	10,2	36,5	4300	11000	3	11	3	11
WS81104	GS81104	11,2	43	3600	9000	5	14	5	14
WS81105	GS81105	12,5	54	2800	7000	6	21	7	21
WS81106	GS81106	14	65,5	2400	6300	7	23	8	23
WS81107	GS81107	15,3	76,5	2000	5600	8	30	9	32
WS81108	GS81108	24,5	110	1800	5000	16	41	12	43
WS81109	GS81109	26,5	125	1600	4500	18	52	13	54
WS81110	GS81110	28	137	1400	4000	20	56	14	59
WS81111	GS81111	36	196	1200	3600	26	91	18	94
WS81112	GS81112	39	240	1100	3400	35	102	22	106
WS81113	GS81113	40,5	260	1000	3200	36	121	23	125
WS81114	GS81114	50	260	950	3000	55	128	25	133
WS81115	GS81115	51	275	900	2800	58	150	27	155
WS81116	GS81116	52	285	850	2600	60	158	28	165
WS81117	GS81117	54	300	850	2600	63	166	28	173
WS81118	GS81118	67	415	800	2400	81	245	38	253
WS81120	GS81120	78	560	700	2000	106	345	50	355
WS81122	GS81122	81,5	600	670	1900	117	373	55	385
WS81124	GS81124	85	655	630	1800	126	405	59	415
WS81126	GS81126	112	830	560	1600	198	650	74	666
WS81128	GS81128	116	900	530	1500	212	710	78	716
WS81130	GS81130	120	950	500	1400	225	756	83	761
WS81132	GS81132	125	1000	480	1300	238	802	88	805

SUPPORT ROLLERS AND CAM FOLLOWERS



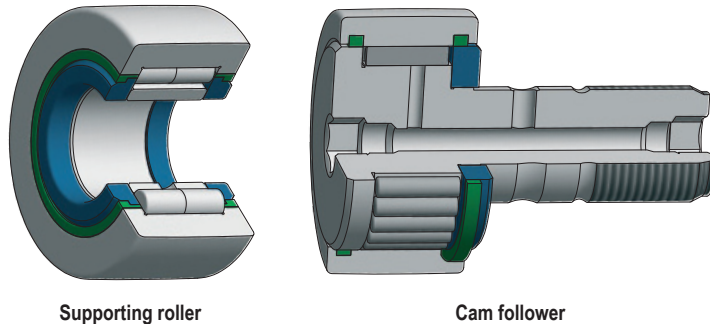
SUPPORT ROLLERS AND CAM FOLLOWERS

The cam followers KR..KRV.. are composed of robust stud with collar that is hardened in the area of the race way. Outer ring is robust, what supports removing of edge tensions. Supporting rollers NATR.., NATV.., NUTR are composed of standard inner ring and robust outer ring, similarly as at cam followers KRV.., removing of edge tensions during operation.

DESIGN DATA

MAIN DIMENSIONS

Main dimensions of the NATR, NUTR and KRV bearings are set forth in tables.



DESIGN

Supporting rollers

The supporting rollers are composed of the robust outer ring with collars, between which are inserted the needle rollers. These can be guided by cages or without them. The inner ring is executed with an axial guiding using a pair of flange rings or without flange rings. Outer surface of the outer ring is composed of radius that enables removing of edge tensions during operation.

The supporting rollers can be supplied with or without sealing. On demand they can be supplied also without inner ring. In this case the tolerance of the enveloping circle of the needle rollers is in the F6 level. Rings and needle rollers are made of roller bearing steel of the 100Cr6 grade.

Offered types are shown in the following table:

Designation	Description	Shaft dimension mm	
		from	to
NATR	The supporting roller with axially guided flange rings, slot seal	16	90
NATR...PP	The supporting roller with additional sealing rings	16	90
NATV	The supporting roller with axially guided flange rings, with full needle roller count, slot seal	16	90
NATV...PP	The supporting roller with additional sealing rings	16	90
NUTR	The supporting roller with axially guided roller elements, full elements count, slot seal	35	110
NUTR...X	The supporting roller with cylindrical surface	35	110

Cam followers

Similarly as the supporting rollers, the cam followers are composed of robust outer rings, between which are inserted the needle rollers. These can be guided by cages or without them. The inner ring is composed of the shaft with collar enabling axial guiding of the cam follower in one direction, race way, clamping stem for seating into the body, and end thread for fixing the cam follower. Axial guiding from the opposite side is assured by the flange ring.

SUPPORT ROLLERS AND CAM FOLLOWERS

Outer surface of the outer ring is composed of radius that enables removing of edge tensions during operation. The cam followers can be supplied with or without sealing. Outer rings, needle rollers and the supporting collar are made of roller bearing steel of the 100Cr6 grade. Shafts are made of cementation steel. During the heat treatment, the thread is protected against cementation and subsequent hardening.

Offered types are shown in the following table:

Designation	Description	Shaft dimension mm	
		from	to
KR	Cam follower with axially guided collar or guiding ring, slot seal with eccentric	16	40
KR...PP	with additional sealing rings	16	40
KRV	Cam follower with axially guided collar or guiding ring, full needle roller count, slot seal	16	40
KRV...PP	with additional sealing rings	16	40
NUKR	Cam follower with axially guided rolling elements, full roller count, slot seal	16	40

PRECISENESS OF BEARINGS AND RELATED PARTS

Supporting rollers

Accuracy of dimensions, shape and running of the supporting rings corresponds to the preciseness degree 0, besides the tolerance of the convex surface (0 to -0.05 mm) and the B type bearing width at the NATR.., NATV...., NUTR bearings, where the tolerance is in value h12.

Suitable tolerances for the shaft are shown in the following table.

Shaft tolerance	Supporting roller without inner ring	Supporting roller with inner ring
	k5 (k6)	g6 (h6)

Cam followers

Running accuracy of the outer rings corresponds to the preciseness degree 0, besides the tolerance of the convex surface (0 to -0.05 mm). Tolerance of clamping stem is of the level h7, and the outer diameter of the eccentric of the level h12. Suitable size for clamping of the shaft seating part is in the tolerance zone H7.

Enclosing lid

Prior to assembly, the unnecessary lubrication holes must be closed by the provided enclosing lid. The lid is installed by pressing plug with dimensions pursuant to the following table:

Enclosing lid	Nominal diameter mm	Dimensions of the pressing plug in mm			Used for all design series
		D (to)	d -0,1	L -0,1	
VD 1	4	10	2,7	5,2	16 až 26
VD 2	6	12	4,7	7,3	30 až 40
VD 3	8	15	6,7	10	47 až 90

Roller pulleys is also possible to supply in eccentric ring design on the cylindrical part of the shaft. Marking of such pulleys is KRE.....KRVE.

SUPPORT ROLLERS AND CAM FOLLOWERS

Lubrication head

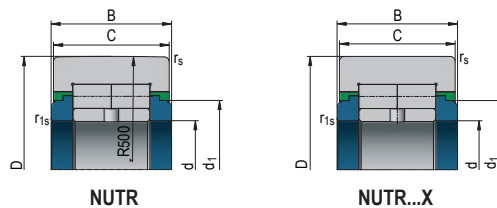
For the cam followers, it is possible to use the space-saving lubrication heads, which are thrust into the shaft hole.

Dimensions are set forth in the following table:

Enclosing lid	Dimensions in mm				Used for all design series
	D	d	L	h	
NIP A 1	6	4	6	1,5	16 to 26
NIP A 2	8	6	9	2	30 to 40
NIP A 3	10	8	12	3	47 to 90

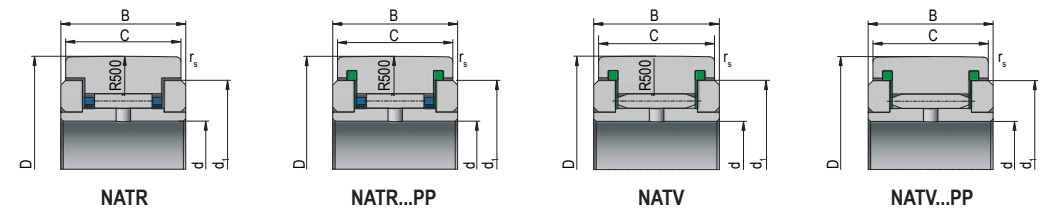
MARGINAL ROTATIONAL FREQUENCY

Marginal rotational frequency shown in the catalogue presents the maximal rotational speed, at which the bearing works with certain safety margin without failure.



Cam follower outer diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation		Weight g
	D	d	B	C	r _s	C	C ₀				
35	15	19	18	0,6	20	23	27	6500	NUTR15	NUTR15-X	99
40	17	21	20	1	22	24,8	31	5500	NUTR17	NUTR17-X	147
42	15	19	18	0,6	20	23	27	6500	NUTR1542	NUTR1542-X	158
47	17	21	20	1	22	24,8	31	5500	NUTR1747	NUTR1747-X	220
	20	25	24	1	27	39	50	4200	NUTR20	NUTR20-X	245
52	20	25	24	1	27	39	50	4200	NUTR2052	NUTR2052-X	321
	25	25	24	1	31	43,5	60	3400	NUTR25	NUTR25-X	281
62	25	25	24	1	31	43,5	60	3400	NUTR2562	NUTR2562-X	450
	30	29	28	1	38	59	79	2600	NUTR30	NUTR30-X	465
72	30	29	28	1	38	59	79	2600	NUTR3072	NUTR3072-X	697
	35	29	28	1,1	44	65	93	2100	NUTR35	NUTR35-X	630
80	35	29	28	1,1	44	65	93	2100	NUTR3580	NUTR3580-X	836
	40	32	30	1,1	51	90	134	1600	NUTR40	NUTR40-X	816
85	45	32	30	1,1	55	95	147	1400	NUTR45	NUTR45-X	883
90	40	32	30	1,1	51	90	134	1600	NUTR4090	NUTR4090-X	1129
	50	32	30	1,1	60	100	161	1300	NUTR50	NUTR50-X	950
100	45	32	30	1,1	55	95	147	1400	NUTR45100	NUTR45100-X	1396
110	50	32	30	1,1	60	100	161	1300	NUTR50110	NUTR50110-X	1690

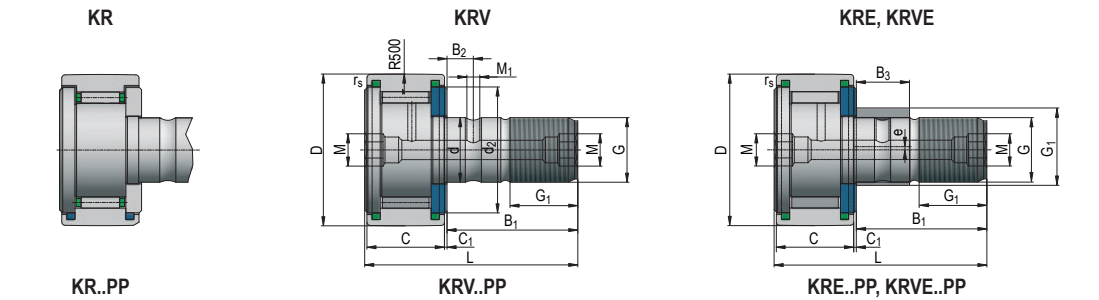
SUPPORT ROLLERS AND CAM FOLLOWERS



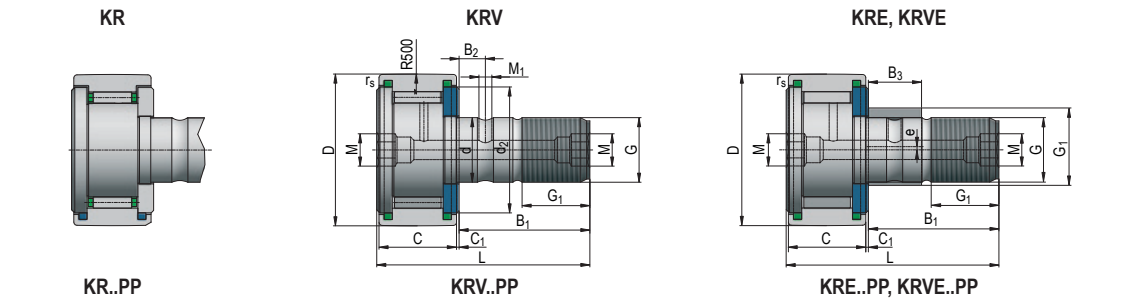
Cam follower outer diameter mm	Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g	Bearing designation	Weight g
	D	d	B	C	r _s	C	C ₀					
16	5	12	11	0,15	12	3,8	3,75	22000	NATR5	14	NATR5-PP	14
	5	12	11	0,15	12	6,4	8,5	8500	NATV5	15	NATV5-PP	15
19	6	12	11	0,15	14	4,25	4,6	20000	NATR6	20	NATR6-PP	20
	6	12	11	0,15	14	7,3	10,8	7000	NATV6	21	NATV6-PP	21
24	8	15	14	0,3	19	6,8	7,7	15000	NATR8	41	NATR8-PP	41
	8	15	14	0,3	19	10,4	15,6	5500	NATV8	42	NATV8-PP	42
30	10	15	14	0,6	23	8,1	9,7	11000	NATR10	64	NATR10-PP	64
	10	15	14	0,6	23	12,2	19	4500	NATV10	65	NATV10-PP	65
32	12	15	14	0,6	25	8,7	11	9000	NATR12	71	NATR12-PP	71
	12	15	14	0,6	25	13,2	21,7	3900	NATV12	72	NATV12-PP	72
35	15	19	18	0,6	27	12,9	19	7000	NATR15	103	NATR15-PP	103
	15	19	18	0,6	27	18,3	35	3400	NATV15	105	NATV15-PP	105
40	17	21	20	1	32	14,2	20,4	6000	NATR17	144	NATR17-PP	144
	17	21	20	1	32	21	39,5	2900	NATV17	152	NATV17-PP	152
47	20	25	24	1	37	19,5	32	4900	NATR20	246	NATR20-PP	246
	20	25	24	1	37	28	59	2600	NATV20	254	NATV20-PP	254
52	25	25	24	1	42	21,2	38	3600	NATR25	275	NATR25-PP	275
	25	25	24	1	42	31	72	2100	NATV25	285	NATV25-PP	285
62	30	29	28	1	51	34	59	2600	NATR30	470	NATR30-PP	470
	30	29	28	1	51	48,5	108	1700	NATV30	481	NATV30-PP	481
72	35	29	28	1,1	58	37	69	2000	NATR35	635	NATR35-PP	635
	35	29	28	1,1	58	53	127	1400	NATV35	647	NATV35-PP	647
80	40	32	30	1,1	66	49	94	1700	NATR40	805	NATR40-PP	805
	40	32	30	1,1	66	66	159	1300	NATV40	890	NATV40-PP	890
85	45	32	30	1,1	72	51	101	1500	NATR45	910	NATR45-PP	910
90	50	32	30	1,1	76	52	108	1300	NATR50	960	NATR50-PP	960
	50	32	30	1,1	76	72	191	1000	NATV50	990	NATV50-PP	990

SUPPORT ROLLERS AND CAM FOLLOWERS

SUPPORT ROLLERS AND CAM FOLLOWERS

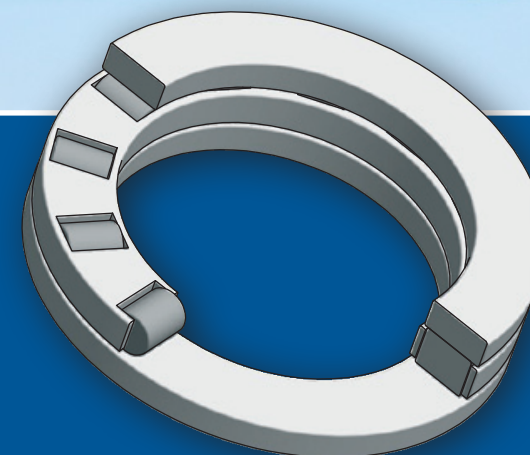


Shaft diameter mm	Dimensions mm												
D	d	C	r _{s min}	B	B ₁	B ₂	G	G ₁	M	M ₁	C ₁	d ₂	d _{1 h9}
16	6	11	0,15	28	16	-	M6	8	4	-	0,6	12	9
	6	11	0,15	28	16	-	M6	8	4	-	0,6	12	9
	6	11	0,15	28	16	-	M6	8	4	-	0,6	12	9
	6	11	0,15	28	16	-	M6	8	4	-	0,6	12	9
19	8	11	0,15	32	20	-	M8	10	4	-	0,6	14	11
	8	11	0,15	32	20	-	M8	10	4	-	0,6	14	11
	8	11	0,15	32	20	-	M8	10	4	-	0,6	14	11
	8	11	0,15	32	20	-	M8	10	4	-	0,6	14	11
22	10	12	0,3	36	23	-	M10x1	12	4	-	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	-	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	-	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	-	0,6	17	13
26	10	12	0,3	36	23	-	M10x1	12	4	3	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	3	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	3	0,6	17	13
	10	12	0,3	36	23	-	M10x1	12	4	3	0,6	17	13
30	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,6	23	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,6	23	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,6	23	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,6	23	15
32	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,6	27	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,8	27	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,8	27	15
	12	14	0,6	40	25	6	M12x1,5	13	6	3	0,8	27	15
35	16	18	0,6	52	32,5	8	M16x1,5	17	6	3	0,8	27	20
	16	18	0,6	52	32,5	8	M16x1,5	17	6	3	0,8	27	20
	16	18	0,6	52	32,5	8	M16x1,5	17	6	3	0,8	27	20
	16	18	0,6	52	32,5	8	M16x1,5	17	6	3	0,8	21	20
40	18	20	1	58	36,5	8	M18x1,5	19	6	3	0,8	32	22
	18	20	1	58	36,5	8	M18x1,5	19	6	3	0,8	32	22
	18	20	1	58	36,5	8	M18x1,5	19	6	3	0,8	32	22
	18	20	1	58	36,5	8	M18x1,5	19	6	3	0,8	23	22



		Basic Load Rating kN		Limiting Speed for Lubrication min ⁻¹	Bearing designation	Weight g	Bearing designation	Weight g
B ₃	e	C	C ₀					
7	0,5	3,8	3,75	22000	KR16	18	KRE16	20
7	0,5	3,8	3,75	16000	KR16PP	18	KRE16PP	20
7	0,5	6,4	8,5	8500	KRV16	20	KRVE16	22
7	0,5	6,4	8,5	8500	KRV16PP	20	KRVE16PP	22
9	0,5	4,25	4,6	20000	KR19	28	KRE19	31,2
9	0,5	4,25	4,6	14000	KR19PP	28	KRE19PP	31,2
9	0,5	7,3	10,8	7000	KRV19	32	KRVE19	35,2
9	0,5	7,3	10,8	7000	KRV19PP	32	KRVE19PP	35,2
10	0,5	5,7	6,5	16000	KR22	44	KRE22	48,3
10	0,5	5,7	6,5	11000	KR22PP	44	KRE22PP	48,3
10	0,5	8,6	12,9	6000	KRV22	45	KRVE22	49,3
10	0,5	8,6	12,9	6000	KRV22PP	45	KRVE22PP	49,3
10	0,5	5,7	6,5	16000	KR26	58	KRE26	62,3
10	0,5	5,7	6,5	11000	KR26PP	58	KRE26PP	62,3
10	0,5	8,6	12,9	6000	KRV26	61	KRVE26	65,3
10	0,5	8,6	12,9	6000	KRV26PP	61	KRVE26PP	65,3
11	0,5	8,1	9,7	11000	KR30	87	KRE30	92,5
11	0,5	8,1	9,7	8300	KR30PP	87	KRE30PP	92,5
11	0,5	12,2	19	4500	KRV30	89	KRVE30	94,5
11	0,5	12,2	19	4500	KRV30PP	89	KRVE30PP	94,5
11	0,5	8,1	9,7	11000	KR32	98	KRE32	103,5
11	0,5	8,1	9,7	8300	KR30PP	98	KRE30PP	103,5
11	0,5	12,2	19	4500	KRV32	100	KRVE32	105,5
11	0,5	12,2	19	4500	KRV32PP	100	KRVE32PP	105,5
14	1	12,9	19	7000	KR35	169	KRE35	181,5
14	1	12,9	19	7000	KR35PP	169	KRE35PP	181,5
14	1	18,3	35	3400	KRV35	171	KRVE35	183,5
14	1	18,3	35	3400	KRV35PP	171	KRVE35PP	183,5
14	1	23	27	6500	NUKR35	164	NUKRE35	176,5
16	1	14,2	20,4	6000	KR40	274	KRE40	262,8
16	1	14,2	20,4	6000	KR40PP	247	KRE40PP	262,8
16	1	21	39,5	2900	KRV40	249	KRVE40	264,8
16	1	21	39,5	2900	KRV40PP	249	KRVE40PP	264,8
16	1	24,8	31	5500	NUKR40	242	NUKRE40	257,8

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS



RADIAL CLEARANCE OF THE NEEDLE ROLLER BEARINGS

Radial clearance of the needle roller bearings										Tab. 1a
Range of the nominal dimensions d mm		C2				Normálne				
		Exchangeable rings		Non-exchangeable rings		Exchangeable rings		Non-exchangeable rings		
nad	do	min	max	min	max	min	max	min	max	
-	10	0	30	10	20	10	40	20	30	
10	18	0	30	10	20	10	40	20	30	
18	24	0	30	10	20	10	40	20	30	
24	30	0	30	10	25	10	45	25	35	
30	40	0	35	12	25	15	50	25	40	
40	50	5	40	15	30	20	55	30	45	
50	65	5	45	15	35	20	65	35	50	
65	80	5	55	20	40	25	75	40	60	
80	100	10	60	25	45	30	80	45	70	
100	120	10	65	25	50	35	90	50	80	
120	140	10	75	30	60	40	105	60	90	
140	160	15	80	35	65	50	115	65	100	
160	180	20	85	35	75	60	125	75	110	
180	200	25	95	40	80	65	135	80	120	
200	225	30	105	45	90	75	150	90	135	
225	250	40	115	50	100	90	165	100	150	
250	280	45	125	55	110	100	180	110	165	
280	315	50	135	60	120	110	195	120	180	
315	355	55	145	65	135	125	215	135	200	
355	400	65	160	75	150	140	235	150	225	
400	450	70	190	85	170	155	275	170	255	
450	500	85	205	85	190	180	300	190	285	
deviation in μm ($1\mu\text{m} = 0,001\text{ mm}$)										

Tab. 1b											
C3				C4				C5			
Exchangeable rings		Non-exchangeable rings		Exchangeable rings		Non-exchangeable rings		Exchangeable rings		Non-exchangeable rings	
min	max	min	max	min	max	min	max	min	max	min	max
25	55	35	45	35	65	45	55	-	-	-	-
25	55	35	45	35	65	45	55	-	-	-	-
25	55	35	45	35	65	45	55	55	85	65	75
30	65	40	50	40	70	50	60	60	90	70	80
35	70	45	55	45	80	55	70	70	105	80	95
40	75	50	65	55	90	65	80	85	120	95	110
45	90	55	75	65	105	75	90	100	140	110	130
55	105	70	90	75	125	90	110	115	165	130	150
65	115	80	105	90	140	105	125	145	195	155	180
80	135	95	120	105	160	120	145	165	220	180	205
90	155	105	135	115	180	135	160	185	250	200	230
100	165	115	150	130	195	150	180	210	275	225	260
110	175	125	165	150	215	165	200	235	300	250	285
125	195	140	180	165	235	180	220	260	330	275	315
140	215	155	200	180	255	200	240	290	365	305	350
155	230	170	215	205	280	215	265	320	395	330	380
175	255	185	240	230	310	240	295	355	435	370	420
195	280	205	265	255	340	265	325	400	485	410	470
215	305	225	295	280	370	295	360	440	530	455	520
245	340	255	330	320	415	330	405	500	595	510	585
270	390	285	370	355	465	370	455	555	675	565	650
300	420	315	410	395	515	410	505	620	740	625	720
deviation in µm (1µm = 0,001 mm)											

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS

TOLERANCES OF THE AXIAL ROLLER BEARINGS / STANDARD TOLERANCES

Rings of the axial roller bearings preciseness degree P0										Tab. 2
Body ring				Shaft ring				Axial run-out		
Range of the nominal dimensions of the outer diameter D mm		Outer diameter D _m deviation μm		Range of the hole nominal dimensions d mm		Hole d _m deviation μm		Range of the diameter nominal dimensions D or d mm		Axial run-out of rings S _i
from	to	upper	low	from	to	low	upper	from	to	max
-	18	0	-11	-	18	-8	0	-	18	10
18	30	0	-13	18	30	-10	0	18	30	10
30	50	0	-16	30	50	-12	0	30	50	10
50	80	0	-19	50	80	-15	0	50	80	10
80	120	0	-22	80	120	-20	0	80	120	15
120	180	0	-25	120	180	-25	0	120	180	15
180	250	0	-30	180	250	-30	0	180	250	20
250	315	0	-35	250	315	-35	0	250	315	25
315	400	0	-40	315	400	-40	0	315	400	30
400	500	0	-45	400	500	-45	0	400	500	30
500	630	0	-50	500	630	-50	0	500	630	35
630	800	0	-75	630	800	-75	0	630	800	40
deviation in μm (1 μm = 0,001 mm)										

Rings of the axial roller bearings preciseness degree P6, P5										Tab. 3
Body ring				Shaft ring				Axial run-out		
Range of the nominal dimensions of the outer diameter D mm		Outer diameter D _m deviation μm		Range of the hole nominal dimensions d mm		Hole d _m deviation μm		Range of the diameter nominal dimensions D or d mm		Axial run-out of rings S _i max. preciseness degreei
from	to	upper	low	from	to	low	upper	from	to	P6 P5
-	18	0	-11	-	18	-8	0	-	18	5 3
18	30	0	-13	18	30	-10	0	18	30	5 3
30	50	0	-16	30	50	-12	0	30	50	6 3
50	80	0	-19	50	80	-15	0	50	80	7 4
80	120	0	-22	80	120	-20	0	80	120	8 4
120	180	0	-25	120	180	-25	0	120	180	9 5
180	250	0	-30	180	250	-30	0	180	250	10 5
250	315	0	-35	250	315	-35	0	250	315	13 7
315	400	0	-40	315	400	-40	0	315	400	15 7
400	500	0	-45	400	500	-45	0	400	500	18 9
500	630	0	-50	500	630	-50	0	500	630	21 11
630	800	0	-75	630	800	-75	0	630	800	25 13
deviation in μm (1 μm = 0,001 mm)										

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS

TOLERANCES OF THE AXIAL ROLLER BEARINGS / NARROWED TOLERANCES

Rings of the axial roller bearings preciseness degree P4										Tab. 4
Body ring				Shaft ring				Axial run-out		
Range of the nominal dimensions of the outer diameter D mm		Outer diameter D _m deviation μm		Range of the hole nominal dimensions d mm		Hole d _m deviation μm		Range of the diameter nominal dimensions D or d mm		Axial run-out of rings S _i max. preciseness degreei
from	to	upper	low	from	to	low	upper	from	to	max
-	18	0	-7	-	18	-7	0	-	18	2
18	30	0	-8	18	30	-8	0	18	30	2
30	50	0	-9	30	50	-10	0	30	50	2
50	80	0	-11	50	80	-12	0	50	80	3
80	120	0	-13	80	120	-15	0	80	120	3
120	180	0	-15	120	180	-18	0	120	180	4
180	250	0	-20	180	250	-22	0	180	250	4
250	315	0	-25	250	315	-25	0	250	315	5
315	400	0	-28	315	400	-30	0	315	400	5
400	500	0	-33	400	500	-35	0	400	500	6
500	630	0	-38	500	630	-40	0	500	630	7
630	800	0	-45	630	800	-50	0	630	800	8
deviation in μm (1 μm = 0,001 mm)										

TOLERANCES OF THE RADIAL BEARINGS/ STANDARD TOLERANCES

Preciseness class P0											Tab. 5	
Inner rings								Outer rings				
Range of hole nominal dimensions d* mm		Hole d _m deviation		Width B** deviation		Width variation U _p	Radial run-out R _i	Range of the nominal dimensions of the outer diameter D* mm		Outer diameter D _m deviation		Radial run-out R _a
from	to	low	upper	upper	low	max	max	from	to	upper	low	max
0,6	2,5	-8	0	0	-40	12	10	2,5	6	0	-8	15
2,5	10	-8	0	0	-120	15	10	6	18	0	-8	15
10	18	-8	0	0	-120	20	10	18	30	0	-9	15
18	30	-10	0	0	-120	20	13	30	50	0	-11	20
30	50	-12	0	0	-120	20	15	50	80	0	-13	25
50	80	-15	0	0	-150	25	20	80	120	0	-15	35
80	120	-20	0	0	-200	25	25	120	150	0	-18	40
120	180	-25	0	0	-250	30	30	150	180	0	-25	45
180	250	-30	0	0	-300	30	40	180	250	0	-30	50
250	315	-35	0	0	-350	35	50	250	315	0	-35	60
315	400	-40	0	0	-400	40	60	315	400	0	-40	70
400	500	-45	0	0	-450	60	65	400	500	0	-45	80
500	630	-50	0	0	-500	60	70	500	630	0	-50	100
630	800	-75	0	0	-750	80	80	630	800	0	-75	120
800	1000	-100	0	0	-1000	80	90	800	1000	0	-100	120
1000	1250	-125	0	0	-1250	80	100	1000	1250	0	-125	120
1250	1600	-160	0	0	-1600	80	100	1250	1600	0	-160	120
1600	2000	-200	0	0	-2000	100	120	1600	2000	0	-200	120
								2000	2500	0	-250	160
deviation in μm (1μm = 0,001 mm)												

* Including the dimension d = 0.6 mm and D = 2.5 mm.

** Applies to inner and outer rings, values are dedicated to the hole.

TOLERANCES OF THE RADIAL BEARINGS/ STANDARD TOLERANCES

Preciseness class P6											Tab. 6	
Inner rings								Outer rings				
Range of hole nominal dimensions d* mm		Hole d _m deviation		Width B** deviation		Width variation U _p	Radial run-out R _i	Range of the nominal dimensions of the outer diameter D* mm		Outer diameter D _m deviation		Radial run-out R _a
from	to	low	upper	upper	low	max	max	from	to	upper	low	max
0,6	2,5	-7	0	0	-40	12	5	2,5	6	0	-7	8
2,5	10	-7	0	0	-120	15	6	6	18	0	-7	8
10	18	-7	0	0	-120	20	7	18	30	0	-8	9
18	30	-8	0	0	-120	20	8	30	50	0	-9	10
30	50	-10	0	0	-120	20	10	50	80	0	-11	13
50	80	-12	0	0	-150	25	10	80	120	0	-13	18
80	120	-15	0	0	-200	25	13	120	150	0	-15	20
120	180	-18	0	0	-250	30	18	150	180	0	-18	23
180	250	-22	0	0	-300	30	20	180	250	0	-20	25
250	315	-25	0	0	-350	35	25	250	315	0	-25	30
315	400	-30	0	0	-400	40	30	315	400	0	-28	35
400	500	-35	0	0	-450	45	35	400	500	0	-33	40
500	630	-40	0	0	-500	50	40	500	630	0	-38	50
								630	800	0	-45	60
								800	1000	0	-60	75
deviation in μm (1μm = 0,001 mm)												

* Including the dimension d = 0.6 mm and D = 2.5 mm.

** Applies to inner and outer rings, values are dedicated to the hole.

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS

TOLERANCES OF THE RADIAL BEARINGS/ STANDARD TOLERANCES

Preciseness class P5								Tab. 7a
Inner rings								
Range of the hole nominal dimensions d* mm		Hole d _m deviation		Width B** deviation		Width variation U _p	Radial run-out R _i	Side run-out S _i
from	to	low	upper	upper	low	max	max	max
0,6	2,5	-5	0	0	-40	5	3,5	7
2,5	10	-5	0	0	-40	5	3,5	7
10	18	-5	0	0	-80	5	3,5	7
18	30	-6	0	0	-120	5	4	8
30	50	-8	0	0	-120	5	5	8
50	80	-9	0	0	-150	6	5	8
80	120	-10	0	0	-200	7	6	9
120	180	-13	0	0	-250	8	8	10
180	250	-15	0	0	-300	10	10	11
250	315	-18	0	0	-350	13	13	13
315	400	-23	0	0	-400	15	15	15

Outer rings						Tab. 7b	
Range of the nominal dimensions of the outer diameter D* mm		Outer diameter D _m deviation		Width variation U _p	Radial run-out R _i	Side run-out S _i	
from	to	upper	low	max	max	max	
2,5	6	0	-5	5	5	8	
6	18	0	-5	5	5	8	
18	30	0	-6	5	6	8	
30	50	0	-7	5	7	8	
50	80	0	-9	6	8	8	
80	120	0	-10	8	10	9	
120	150	0	-11	8	11	10	
150	180	0	-13	8	13	10	
180	250	0	-15	10	15	11	
250	315	0	-18	11	18	13	
315	400	0	-20	13	20	13	
400	500	0	-23	15	23	15	
500	630	0	-28	18	25	18	
630	800	0	-35	20	30	20	
deviation in µm (1µm = 0,001 mm)							

* Including the dimension d = 0.6 mm and D = 2.5 mm.

** Applies to inner and outer rings, values are dedicated to the hole.

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS

TOLERANCES OF THE BODY HOLE DIAMETERS FOR THE NEEDLE ROLLER BEARINGS
(APPLIES TO THE BODIES OF STEEL, CAST IRON AND CAST STEEL)

Tab. 8				
Operational conditions	Moving ability of the outer ring	Body	Examples of seating	Tolerance
Circumferential loading of the outer ring				
Big surge load Pr > 0,15 Cr Thin-walled bodies	Not movable	one-piece	Wheel centre member with roller bearings, connecting rod bearings	P7
Standard and big load Pr > 0,07 Cr	Not movable		Wheel centre member with ball bearings, crane travelling wheels, bearings of crankshafts	N7
Small and varying load Pr ≤ 0,07 Cr	Not movable		Roller conveyor rollers, tensioning pulleys	M7
Uncertain type of load				
Big surge load Pr > 0,15 Cr	Not movable	one-piece	Traction motors	M7
Standard and big load Pr > 0,07 Cr	Usually not movable		Electric drives, pumps, fans, crankshafts	K7
Small and varying load Pr ≤ 0,07 Cr	Usually movable		Electric drives, pumps, fans, crankshafts	J7
Precise seating				
Small load Pr ≤ 0,07 Cr	Usually not movable	one-piece	Roller bearings for machine tools, ball bearings for machine tools, small electric drives	K6 ¹⁾
	Movable			J6 ²⁾
	Easily movable			H6
Spot load of the outer ring				
Arbitrary load	Easily movable	one-piece or two- part	General engineering, axle bearings of rail vehicles	H7 ³⁾
Small and standard load Pr ≤ 0,15 Cr	Easily movable	one-piece or two- part	General engineering of the rail vehicles, less demanding engineering	H8
			Drying rolls of the paper machines, big electric drives	G7 ⁴⁾

1) There are selected stricter tolerances M6 or N6, for the big loads. There are selected tolerances K5 or M5, for the roller bearings with taper hole.

2) Tolerances for the single row ball bearings in the preciseness P5 a P4 are set forth in the major catalogue of bearings of ZVL SLOVAKIA.

3) There is selected tolerance G7, for the bearings with outer diameter D < 250 mm with temperature difference between the outer ring and body over 0°C.

4) There is selected tolerance F7, for the bearings with outer diameter D > 250 mm with temperature difference between outer ring and body over 10°C.

RADIAL CLEARANCES AND TOLERANCES OF BEARINGS

TOLERANCES OF PIN DIAMETERS FOR THE NEEDLE BEARINGS (APPLICABLE FOR THE SOLID STEEL SHAFTS)

Tab. 9			
Operational conditions	Body	Examples of seating	Tolerance
Spot loading of the outer ring			
Low and standard loading $Pr \leq 0.15 Cr$	Free-running wheels, pulleys	All diameters	g6 ¹⁾
Heavy shock loading $Pr > 0.15 Cr$	Wheels of carriages, tensioning pulleys	All diameters	h6
Circumferential loading of the inner ring or uncertain loading type			
Low and average loading $Pr \leq 0.07 Cr$	Transportation means, fans	≤ 40	i6
		40 až 140	k6
Standard and heavy duty $Pr > 0.07 Cr$	General mechanical engineering, electric drives, turbines, pumps, combustion engines, transmissions, woodworking machines	≤ 40	k5
		40 až 100	m5
		100 až 140	m6
		140 až 200	n6
		> 200	p6
Extra heavy duty, shocks, heavy operational conditions $Pr > 0.15 Cr$	Axle bearings of rail vehicles, traction motors, rolling mills	50 až 140	n6 ²⁾
		140 až 500	n6 ²⁾
		> 500	r6 ²⁾
High precision of seating at low loading $Pr \leq 0.07 Cr$	Machine tools	≤ 40	j5
		40 až 140	k5
		140 až 200	m5

1) For large bearing, there can be selected tolerances f6 to ensure axial shift.

2) It is necessary to use bearings with greater radial clearance than normal.

