2. Cylindrical Roller Bearings



Single-Row Cylindrical Roller Bearings

Standard Series



Ultra High-Speed Single-Row Cylindrical Roller Bearings NSKROBUST™ Series

BASIC Series

Low Heat Generation Series



Double-Row Cylindrical Roller Bearings

High Rigidity Series

Low Heat Generation Series

Part 4

Cylindrical Roller Bearings

Cylindrical Roller Bearings ·····110-127
Features
Numbering System
Bearing Tables
Single-Row Cylindrical Roller Bearings (Standard Series)
Ultra High-Speed Single-Row Cylindrical Roller Bearings (NSKROBUST Series)
Double-Row Cylindrical Roller Bearings

2. Cylindrical Roller Bearings

Features

Cylindrical roller bearings (CRBs) feature higher radial rigidity and can take higher radial loads than ball bearings; this makes them especially suitable for applications that require high rigidity such as lathe spindles and for use as rear end bearings subjected to large belt loads.

The optimized internal design and cage shape of NSK cylindrical roller bearings achieve low heat generation and stable operation in high-speed applications.

Double-row cylindrical roller bearings are also available with the "E44" oil lubrication specification providing lubrication holes and an oil groove in the center of the outer ring.

Type Differences

NN-type cylindrical roller bearings feature ribs on the inner rings, while the ribs of NNU-type bearings are on the outer ring. NN-type bearings are used widely for their versatility; under grease lubrication, they provide a short run-in period, while under oil lubrication, their design prevents oil from overaccumulating within.

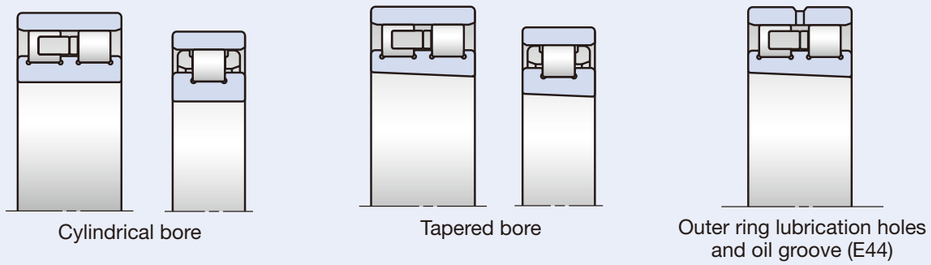
Available NSKHPS, APTSURF Available

Type	Dimension Series	Series	Cage	Bore Diameter 25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	120	130	140	150	160	170	180	190	200	220	240	260	280
N	10	—	MR																															
		RS, RX	TP																															
NN	30		MB																															
			TB																															
	39		MB																															
	49		MB																															
NNU	49		MB																															

For details on NSKHPS and APTSURF bearings, see p. 29

Bore Specifications and Lubrication Holes

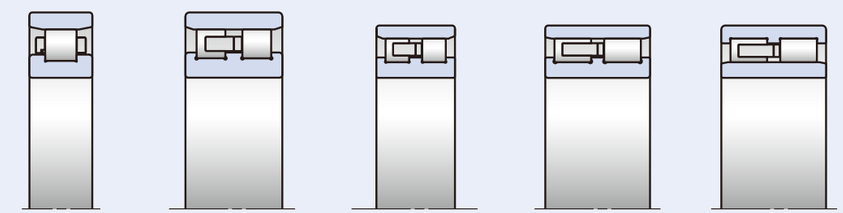
Fig. 2.1



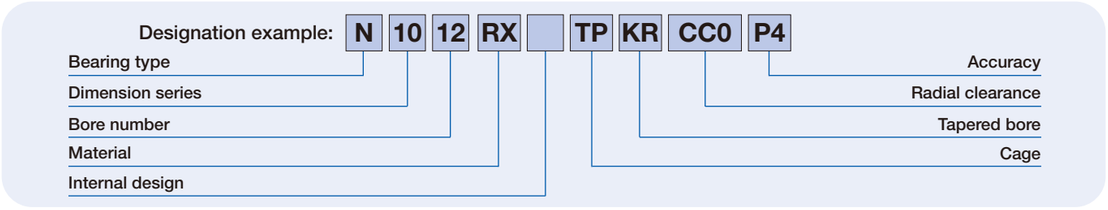
Both cylindrical bore and tapered bores are available. NSK recommends tapered bores as they help to prevent clearance variation by allowing for adjustments of radial internal clearance after mounting.

Bearing Types and Dimension Series

Fig. 2.2



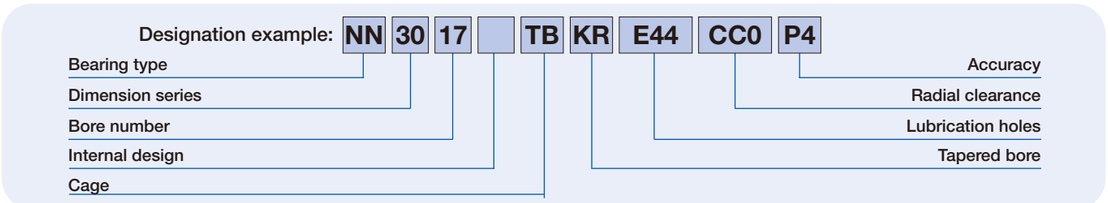
Numbering System for Single-Row Cylindrical Roller Bearings (Standard Series and NSKROBUST Series)



			Reference pages
N	Bearing type	N: Single-row CRB (inner ring rib type)	46-47, 110
10	Dimension series	10: 10 Series	46-47, 110
12	Bore number	Bearing bore = Bore number × 5 (mm)	112-115
RX	Material	No code: Standard CRB (material of inner and outer ring and rollers: SUJ2 bearing steel) RS, RX: Ultra high-speed single-row CRB (NSKROBUST Series)	14-15 28-29
Z	Internal design	No code: Standard type Z: Low heat generation type	112-115
TP	Cage	TP: Outer ring guided PEEK cage No code: Rib guided brass cage MR: Roller guided brass cage	19, 28-29
KR	Tapered bore	No code: Cylindrical bore KR (K): 1/12 Tapered bore	226-227
CC0	Radial clearance	CC1: Standard clearance for cylindrical bore (Non-interchangeable) CC0: Standard clearance for tapered bore (Non-interchangeable) CCG: Special radial clearance	46-47 112-115
P4	Accuracy	P2: ISO Class 2, P4: ISO Class 4, P5: ISO Class 5 P4Y: Special class (bore diameter and outside diameter are exclusive to NSK, all others are ISO Class 4)	222-225

Type	Material: Inner/Outer ring	Material: Rollers
RS	Bearing steel (SUJ2)	Bearing steel (SUJ2)
RX	Heat resistant steel for high-speed operation (SHX)	Heat resistant steel for high-speed operation (SHX)

Numbering System for Double-Row Cylindrical Roller Bearings

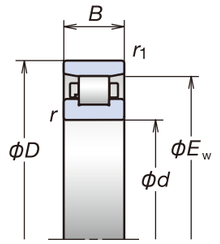


			Reference pages
NN	Bearing type	NN: Double-row CRB (inner ring rib type) NNU: Double-row CRB (outer ring rib type)	46-47, 110
30	Dimension series	30: 30 Series 39: 39 Series 49: 49 Series	46-47, 110
17	Bore number	Bearing bore = Bore number × 5 (mm)	116-127
Z	Internal design	No code: Standard type Z: Low heat generation type	116-127
TB	Cage	TB: Roller guided PPS cage No code: Rib guided brass cage MB: Roller guided brass cage	19, 24-25
KR	Tapered bore	No code: Cylindrical bore KR (K): 1/12 Tapered bore	226-227
E44	Lubrication holes	No code: No lubrication holes E44: Outer ring with oil groove and lubrication holes	116-127
CC0	Radial clearance	CC1: Standard clearance for cylindrical bore (Non-interchangeable) CC0: Standard clearance for tapered bore (Non-interchangeable) CCG: Special radial clearance	46-47 116-127
P4	Accuracy	P2: ISO Class 2, P4: ISO Class 4, P5: ISO Class 5 P4Y: Special class (bore diameter and outside diameter are exclusive to NSK, all others are ISO Class 4)	222-225

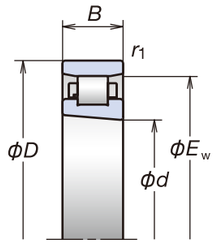
2. Cylindrical Roller Bearings

Bore Diameter 30-70 mm

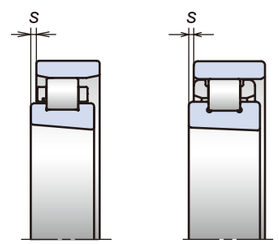
Single-Row Cylindrical Roller Bearings



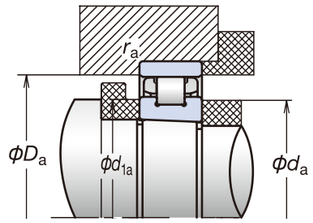
Cylindrical Bore



Tapered Bore



TP Cage



Designation (1)(2)	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (3) (min^{-1})	
	d	D	B	r (min.)	r_1 (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
*N1006MR1KR	30	55	13	1	0.6	24.2	19.6	3.00	48.5	0.135	19 000	31 000
*N1007MRKR	35	62	14	1	0.6	27.8	23.2	3.55	55	0.172	17 000	27 000
*N1008MRKR	40	68	15	1	0.6	33.5	29.0	4.45	61	0.213	15 000	25 000
*N1009MRKR	45	75	16	1	0.6	40.0	35.5	5.50	67.5	0.279	14 000	22 000
*N1009RSTPKR	45	75	16	1	0.6	33.0	29.4	4.50	67.5	0.243	16 000	23 000
*N1009RXTPKR	45	75	16	1	0.6	50.0	29.4	4.50	67.5	0.243	21 000	30 000
*N1009RSZTPKR	45	75	16	1	0.6	19.7	14.7	2.26	67.5	0.224	16 000	23 000
*N1009RXZTPKR	45	75	16	1	0.6	29.9	14.7	2.26	67.5	0.224	21 000	30 000
*N1010MRKR	50	80	16	1	0.6	39.5	36.0	5.55	72.5	0.286	13 000	20 000
*N1010RSTPKR	50	80	16	1	0.6	35.5	33.0	5.05	72.5	0.265	15 000	21 000
*N1010RXTPKR	50	80	16	1	0.6	54.0	33.0	5.05	72.5	0.265	20 000	27 000
*N1010RSZTPKR	50	80	16	1	0.6	21.1	16.5	2.54	72.5	0.244	15 000	21 000
*N1010RXZTPKR	50	80	16	1	0.6	32.0	16.5	2.54	72.5	0.244	20 000	27 000
*N1011BMR1KR	55	90	18	1.1	1	46.5	44.0	6.75	81	0.425	12 000	18 000
*N1011RSTPKR	55	90	18	1.1	1	43.0	39.5	6.05	81	0.383	13 000	19 000
*N1011RXTPKR	55	90	18	1.1	1	65.0	39.5	6.05	81	0.383	18 000	25 000
*N1011RSZTPKR	55	90	18	1.1	1	25.4	19.7	3.05	81	0.355	13 000	19 000
*N1011RXZTPKR	55	90	18	1.1	1	38.5	19.7	3.05	81	0.355	18 000	25 000
*N1012BMR1KR	60	95	18	1.1	1	49.5	48.5	7.50	86.1	0.454	11 000	17 000
*N1012RSTPKR	60	95	18	1.1	1	46.0	44.0	6.80	86.1	0.411	12 000	18 000
*N1012RXTPKR	60	95	18	1.1	1	69.5	44.0	6.80	86.1	0.411	17 000	23 000
*N1012RSZTPKR	60	95	18	1.1	1	27.3	22.1	3.40	86.1	0.380	12 000	18 000
*N1012RXZTPKR	60	95	18	1.1	1	41.5	22.1	3.40	86.1	0.380	17 000	23 000
*N1013BMR1KR	65	100	18	1.1	1	50.5	51.0	7.85	91	0.483	10 000	16 000
*N1013RSTPKR	65	100	18	1.1	1	49.0	49.0	7.55	91	0.440	11 000	17 000
*N1013RXTPKR	65	100	18	1.1	1	74.0	49.0	7.55	91	0.440	16 000	22 000
*N1013RSZTPKR	65	100	18	1.1	1	29.0	24.5	3.75	91	0.406	11 000	17 000
*N1013RXZTPKR	65	100	18	1.1	1	44.0	24.5	3.75	91	0.406	16 000	22 000
*N1014BMR1KR	70	110	20	1.1	1	61.5	63.0	9.65	100	0.668	9 000	15 000
*N1014RSTPKR	70	110	20	1.1	1	57.5	57.0	8.75	100	0.607	10 000	16 000
*N1014RXTPKR	70	110	20	1.1	1	87.0	57.0	8.75	100	0.607	15 000	20 000
*N1014RSZTPKR	70	110	20	1.1	1	34.0	28.5	4.40	100	0.563	10 000	16 000
*N1014RXZTPKR	70	110	20	1.1	1	52.0	28.5	4.40	100	0.563	15 000	20 000

Axial Displacement (4) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)	
						CC9 (5)		CC0		CC1		CC1	
s	d_a (min.)	d_{1a} (min.)	D_a (max.)	D_a (min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.
1.1	35	36	51	49	0.5	5	10	8	15	10	25	5	15
1.5	40	41	58	56	0.5	5	12	8	15	12	25	5	15
1.7	45	46	64	62	0.6	5	12	8	15	12	25	5	15
2.0	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
1.1	50	51	71	68	0.6	5	15	10	20	15	30	5	18
2.0	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
1.1	55	56	76	73	0.6	5	15	10	20	15	30	5	18
2.7	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
1.1	61.5	63	85	82	1	5	15	10	20	15	35	5	20
2.7	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
1.1	66.5	68	90	87	1	5	15	10	20	15	35	5	20
2.7	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
1.1	71.5	73	95	92	1	5	15	10	20	15	35	5	20
3.2	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25
1.3	76.5	78	105	101	1	10	20	15	30	20	40	10	25

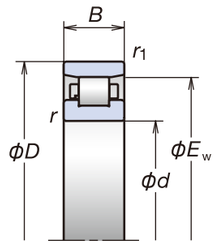
(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). No code is used for cylindrical bores.
(2) GN gauges are available for bearing designations with an asterisk (*). For details, refer to Page 180.
(3) For details on limiting speeds, refer to Page 216.
(4) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(5) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

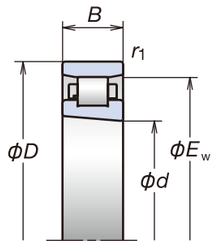
2. Cylindrical Roller Bearings

Bore Diameter **75-400** mm

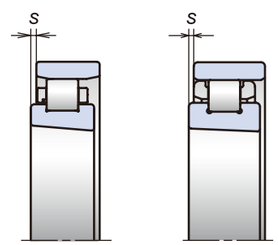
Single-Row Cylindrical Roller Bearings



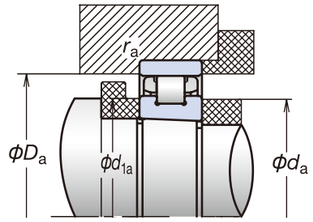
Cylindrical Bore



Tapered Bore



TP Cage



Designation (1)(2)	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (3) (min^{-1})	
	d	*D*	*B*	*r* (min.)	r_1 (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
*N1015MRKR	75	115	20	1.1	1	74.0	74.5	11.4	105	0.700	8 500	13 700
*N1015RSTPKR	75	115	20	1.1	1	61.0	63.0	9.70	105	0.645	9 900	15 000
*N1015RXTPKR	75	115	20	1.1	1	93.0	63.0	9.70	105	0.645	14 000	19 000
*N1015RSZTPKR	75	115	20	1.1	1	36.5	31.5	4.85	105	0.596	9 900	15 000
*N1015RXZTPKR	75	115	20	1.1	1	55.0	31.5	4.85	105	0.596	14 000	19 000
*N1016BMR1KR	80	125	22	1.1	1	78.0	82.0	12.5	113	0.957	7 900	12 700
*N1016RSTPKR	80	125	22	1.1	1	75.5	78.5	12.0	113	0.872	9 200	14 000
*N1016RXTPKR	80	125	22	1.1	1	115	78.5	12.0	113	0.872	13 000	17 000
*N1016RSZTPKR	80	125	22	1.1	1	45.0	39.5	6.00	113	0.805	9 200	14 000
*N1016RXZTPKR	80	125	22	1.1	1	68.0	39.5	6.00	113	0.805	13 000	17 000
*N1017BMR1KR	85	130	22	1.1	1	80.0	86.0	12.9	118	1.07	7 500	10 300
*N1017RSTPKR	85	130	22	1.1	1	80.0	86.0	12.9	118	0.933	8 800	13 000
*N1017RXTPKR	85	130	22	1.1	1	121	86.0	12.9	118	0.933	12 000	17 000
*N1017RSZTPKR	85	130	22	1.1	1	47.5	43.0	6.45	118	0.859	8 800	13 000
*N1017RXZTPKR	85	130	22	1.1	1	72.0	43.0	6.45	118	0.859	12 000	17 000
*N1018MRKR	90	140	24	1.5	1.1	108	114	16.9	127	1.27	7 000	9 600
*N1019BMR1KR	95	145	24	1.5	1.1	102	114	16.6	132	1.37	6 700	9 200
*N1020MRKR	100	150	24	1.5	1.1	114	126	18.1	137	1.46	6 400	8 800
*N1021BMR1KR	105	160	26	2	1.1	138	155	21.8	146	1.79	6 100	8 300
*N1022BMR1KR	110	170	28	2	1.1	154	173	24.0	155	2.22	5 800	7 900
*N1024MRKR	120	180	28	2	1.1	171	191	26.0	165	2.34	5 400	7 300
*N1026MRKR	130	200	33	2	1.1	211	238	31.5	182	3.55	4 900	6 700
*N1028BMR1KR	140	210	33	2	1.1	202	240	31.0	192	3.78	4 600	6 300
*N1030BMRKR	150	225	35	2.1	1.5	249	294	37.5	206	4.56	4 300	5 100
*N1032BMRKR	160	240	38	2.1	1.5	292	340	42.5	219	5.59	4 000	4 800
N1034MRKR	170	260	42	2.1	2.1	355	415	51.0	237	7.85	3 600	4 400
N1036MRKR	180	280	46	2.1	2.1	435	510	61.0	255	9.76	3 400	4 100
N1038KR	190	290	46	2.1	2.1	445	535	63.0	265	10.4	3 200	4 000
N1040MRKR	200	310	51	2.1	2.1	480	580	67.5	281	13.5	3 000	3 700
N1044MRKR	220	340	56	3	3	615	750	84.5	310	17.4	2 500	3 000
N1048KR	240	360	56	3	3	650	820	90.5	330	18.6	2 300	2 800
N1052KR	260	400	65	4	4	790	1 000	107	364	27.6	2 100	2 600
N1060KR	300	460	74	4	4	1 090	1 400	144	420	42.2	1 800	2 200
N1064KR	320	480	74	4	4	1 110	1 470	149	440	43.8	1 800	2 100
N1068KR	340	520	82	5	5	1 330	1 740	173	475	59.8	1 600	2 000
N1072KR	360	540	82	5	5	1 370	1 830	179	495	61.6	1 600	1 900
N1080KR	400	600	90	5	5	1 670	2 280	216	550	84.1	1 400	1 700

Axial Displacement (4) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)	
						CC9 (5)		CC0		CC1		CC1	
s	d_a (min.)	d_{1a} (min.)	D_a (max.)	D_a (min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.
2.7	81.5	83	110	106	1	10	20	15	30	20	40	10	25
1.3	81.5	83	110	106	1	10	20	15	30	20	40	10	25
1.3	81.5	83	110	106	1	10	20	15	30	20	40	10	25
1.3	81.5	83	110	106	1	10	20	15	30	20	40	10	25
1.3	81.5	83	110	106	1	10	20	15	30	20	40	10	25
2.2	86.5	88	120	115	1	10	20	15	30	20	40	10	25
1.8	86.5	88	120	115	1	10	20	15	30	20	40	10	25
1.8	86.5	88	120	115	1	10	20	15	30	20	40	10	25
1.8	86.5	88	120	115	1	10	20	15	30	20	40	10	25
1.8	86.5	88	120	115	1	10	20	15	30	20	40	10	25
3.7	91.5	93	125	120	1	10	25	20	35	25	45	10	30
1.8	91.5	93	125	120	1	10	25	20	35	25	45	10	30
1.8	91.5	93	125	120	1	10	25	20	35	25	45	10	30
1.8	91.5	93	125	120	1	10	25	20	35	25	45	10	30
1.8	91.5	93	125	120	1	10	25	20	35	25	45	10	30
1.1	98	100	133.5	129	1	10	25	20	35	25	45	10	30
1.6	103	105	138.5	134	1	10	25	20	35	25	45	10	30
1.1	108	110	143.5	139	1	10	25	20	35	25	45	10	30
1.6	114	116	153.5	148	1	10	25	20	35	25	50	10	30
2.1	119	121	163.5	157	1	10	25	20	35	25	50	10	30
1.8	129	131	173.5	167	1	10	25	20	35	25	50	10	30
3.3	139	142	193.5	184	1	15	30	25	40	30	60	10	35
3.8	149	152	203.5	194	1	15	30	25	40	30	60	10	35
3.8	161	164	217	208	1.5	15	35	30	50	35	65	10	35
1.9	171	174	232	221	1.5	15	35	30	50	35	65	10	35
2.9	181	185	249	239	2	15	35	30	50	35	75	10	40
1.5	191	195	269	258	2	15	35	30	50	35	75	10	40
1.5	201	205	279	268	2	20	40	30	50	40	80	15	45
3.0	211	215	299	284	2	20	40	30	50	40	80	15	45
3.5	233	238	327	313	2.5	20	45	35	60	45	90	15	50
3.5	253	258	347	333	2.5	25	50	40	65	50	100	15	50
3.8	276	281	384	367	3	25	55	40	70	55	110	20	55
5.3	316	322	444	424	3	30	60	45	75	60	120	20	60
5.3	336	342	464	444	3	30	65	45	80	65	135	20	65
4.3	360	367	500	479	4	30	65	45	80	65	135	20	65
4.3	380	387	520	499	4	35	75	50	90	75	150	25	75
5.8	420	428	580	554.5	4	35	75	50	90	75	150	25	75

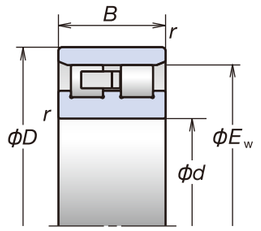
(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). No code is used for cylindrical bores.
(2) GN gauges are available for bearing designations with an asterisk (*). For details, refer to Page 180.
(3) For details on limiting speeds, refer to Page 216.
(4) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(5) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

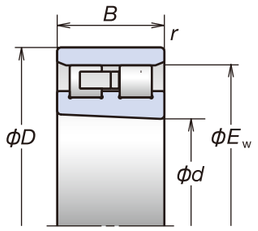
2. Cylindrical Roller Bearings

Bore Diameter **25-65** mm

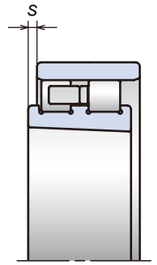
Double-Row Cylindrical Roller Bearings

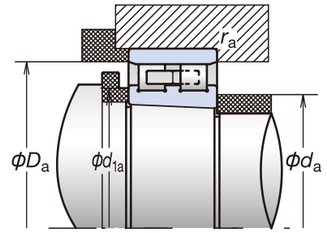


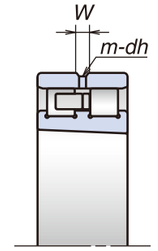
Cylindrical Bore



Tapered Bore







E44 Specification

Designation (1)(2)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (3) (min^{-1})	
	d	*D*	*B*	*r* (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
* **NN3005MBKR**	**25**	**47**	**16**	0.6	31.5	30.0	4.60	41.3	0.121	20 900	25 000
* **NN3006MBKR**	**30**	**55**	**19**	1	38.0	37.0	5.70	48.5	0.186	17 700	21 200
* **NN3006TBKR**	**30**	**55**	**19**	1	38.0	37.0	5.70	48.5	0.171	20 000	23 600
* **NN3006ZTBKR**	**30**	**55**	**19**	1	22.5	18.6	2.86	48.5	0.152	21 000	27 900
* **NN3007MBKR**	**35**	**62**	**20**	1	48.5	50.0	7.70	55	0.297	15 500	18 600
* **NN3007TBKR**	**35**	**62**	**20**	1	48.5	50.0	7.70	55	0.227	17 600	20 700
* **NN3007ZTBKR**	**35**	**62**	**20**	1	28.7	25.0	3.85	55	0.198	18 400	24 500
* **NN3008MBKR**	**40**	**68**	**21**	1	53.0	55.5	8.50	61	0.356	13 900	16 700
* **NN3008TBKR**	**40**	**68**	**21**	1	53.0	55.5	8.50	61	0.269	15 800	18 600
* **NN3008ZTBKR**	**40**	**68**	**21**	1	31.5	27.7	4.25	61	0.234	16 600	22 000
* **NN3009MBKR**	**45**	**75**	**23**	1	63.5	68.5	10.5	67.5	0.471	12 500	15 000
* **NN3009TBKR**	**45**	**75**	**23**	1	61.5	65.5	10.0	67.5	0.348	14 200	16 700
* **NN3009ZTBKR**	**45**	**75**	**23**	1	36.5	32.5	5.00	67.5	0.302	14 900	19 800
* **NN3010MBKR**	**50**	**80**	**23**	1	65.5	72.5	11.2	72.5	0.502	11 600	13 900
* **NN3010TBKR**	**50**	**80**	**23**	1	65.5	72.5	11.2	72.5	0.378	13 100	15 400
* **NN3010ZTBKR**	**50**	**80**	**23**	1	39.0	36.5	5.60	72.5	0.328	13 800	18 300
* **NN3011MBKR**	**55**	**90**	**26**	1.1	85.5	96.5	14.8	81	0.748	10 400	12 500
* **NN3011TBKR**	**55**	**90**	**26**	1.1	85.5	96.5	14.8	81	0.562	11 800	13 800
* **NN3011ZTBKR**	**55**	**90**	**26**	1.1	50.5	48.5	7.40	81	0.488	12 400	16 400
* **NN3012MBKR**	**60**	**95**	**26**	1.1	90.0	106	16.3	86.1	0.804	9 700	11 700
* **NN3012TBKR**	**60**	**95**	**26**	1.1	90.0	106	16.3	86.1	0.602	11 000	13 000
* **NN3012ZTBKR**	**60**	**95**	**26**	1.1	53.5	53.0	8.15	86.1	0.522	11 600	15 400
* **NN3013MBKR**	**65**	**100**	**26**	1.1	95.0	116	17.8	91	0.862	9 100	11 000
* **NN3013TBKR**	**65**	**100**	**26**	1.1	95.0	116	17.8	91	0.644	10 400	12 200
* **NN3013ZTBKR**	**65**	**100**	**26**	1.1	56.5	58.0	8.90	91	0.557	10 900	14 500

Axial Displacement (4) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
			D_a			CC9 (5)		CC0		CC1		CC1		Hole Dia.	Oil Groove Width	Number of Holes
s	d_a (min.)	d_{1a} (min.)	(max.)	(min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.	d_h (mm)	*W* (mm)	*m*
0.8	29	29	43	42	0.6	5	10	8	15	10	25	5	15	2	3.5	4
1.3	35	36	50	50	1	5	10	8	15	10	25	5	15	2	3.5	4
1.3	35	36	50	50	1	5	10	8	15	10	25	5	15	2	3.5	4
1.3	35	36	50	50	1	5	10	8	15	10	25	5	15	2	3.5	4
1.3	40	41	57	56	1	5	12	8	15	12	25	5	15	2	3.5	4
1.3	40	41	57	56	1	5	12	8	15	12	25	5	15	2	3.5	4
1.3	40	41	57	56	1	5	12	8	15	12	25	5	15	2	3.5	4
1.4	45	46	63	62	1	5	12	8	15	12	25	5	15	2	3.5	4
1.4	45	46	63	62	1	5	12	8	15	12	25	5	15	2	3.5	4
1.4	45	46	63	62	1	5	12	8	15	12	25	5	15	2	3.5	4
1.2	50	51	70	69	1	5	15	10	20	15	30	5	18	2	3.5	4
1.2	50	51	70	69	1	5	15	10	20	15	30	5	18	2	3.5	4
1.2	50	51	70	69	1	5	15	10	20	15	30	5	18	2	3.5	4
1.2	55	56	75	74	1	5	15	10	20	15	30	5	18	2	3.5	4
1.2	55	56	75	74	1	5	15	10	20	15	30	5	18	2	3.5	4
1.2	55	56	75	74	1	5	15	10	20	15	30	5	18	2	3.5	4
1.4	61.5	62	83.5	83	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	61.5	62	83.5	83	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	61.5	62	83.5	83	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	66.5	67	88.5	88	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	66.5	67	88.5	88	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	66.5	67	88.5	88	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	71.5	72	93.5	93	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	71.5	72	93.5	93	1	5	15	10	20	15	35	5	20	2	3.5	4
1.4	71.5	72	93.5	93	1	5	15	10	20	15	35	5	20	2	3.5	4

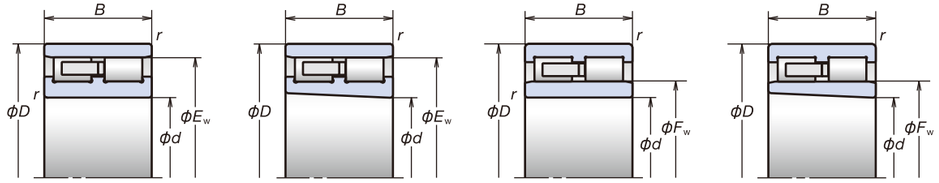
(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). No code is used for cylindrical bores.
(2) GN gauges are available for bearing designations with an asterisk (*). For details, refer to Page 180.
(3) For details on limiting speeds, refer to Page 216.
(4) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(5) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

2. Cylindrical Roller Bearings

Bore Diameter 70-105 mm

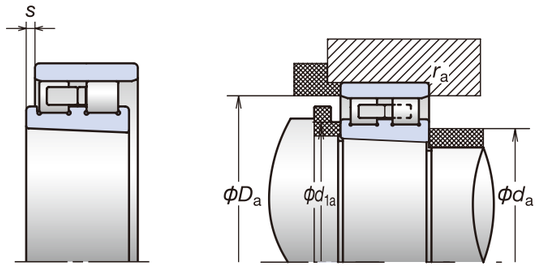
Double-Row Cylindrical Roller Bearings

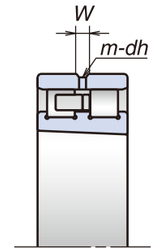


NN Cylindrical Bore | NN Tapered Bore | NNU Cylindrical Bore | NNU Tapered Bore

Designation (1)(2)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (F_w in case of NNU type) (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (3) (min^{-1})	
	d	D	B	r (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
*NN3014MBKR	70	110	30	1.1	120	148	22.8	100	1.23	8 000	10 000
*NN3014TBKR	70	110	30	1.1	120	148	22.8	100	0.925	9 500	11 200
*NN3014ZTBKR	70	110	30	1.1	71.5	74.0	11.4	100	0.809	9 900	13 200
*NN3015MBKR	75	115	30	1.1	119	149	22.9	105	1.28	7 900	9 500
*NN3015TBKR	75	115	30	1.1	119	149	22.9	105	0.964	9 000	10 600
*NN3015ZTBKR	75	115	30	1.1	70.5	74.5	11.5	105	0.848	9 400	12 500
*NN3016MBKR	80	125	34	1.1	147	186	28.3	113	1.77	7 400	8 800
*NN3016TBKR	80	125	34	1.1	147	186	28.3	113	1.35	8 300	9 800
*NN3016ZTBKR	80	125	34	1.1	87.0	93.0	14.2	113	1.19	8 800	11 700
*NN3017MBKR	85	130	34	1.1	154	201	30.0	118	1.87	7 000	8 400
*NN3017TBKR	85	130	34	1.1	154	201	30.0	118	1.42	8 000	9 400
*NN3017ZTBKR	85	130	34	1.1	91.5	101	15.1	118	1.25	8 400	11 100
*NN3018MBKR	90	140	37	1.5	176	228	33.5	127	2.38	6 600	7 900
*NN3018TBKR	90	140	37	1.5	176	228	33.5	127	1.82	7 400	8 700
*NN3018ZTBKR	90	140	37	1.5	104	114	16.7	127	1.61	7 800	10 300
*NN3019MBKR	95	145	37	1.5	185	246	36.0	132	2.51	6 300	7 500
*NN3019TBKR	95	145	37	1.5	185	246	36.0	132	1.91	7 100	8 400
*NN3019ZTBKR	95	145	37	1.5	110	123	17.9	132	1.68	7 500	9 900
NN3920MBKR	100	140	30	1.1	130	182	26.4	130	1.32	6 300	7 500
NN4920MBKR	100	140	40	1.1	190	295	43.0	130	1.76	6 300	7 500
NNU4920MBKR	100	140	40	1.1	190	295	43.0	112	1.75	6 300	7 500
*NN3020MBKR	100	150	37	1.5	193	265	38.0	137	2.63	6 000	7 200
*NN3020TBKR	100	150	37	1.5	193	265	38.0	137	2.00	6 800	8 000
*NN3020ZTBKR	100	150	37	1.5	115	133	19.0	137	1.76	7 200	9 500
NN4921MBKR	105	145	40	1.1	198	315	45.0	135	1.91	6 000	7 200
NNU4921MBKR	105	145	40	1.1	198	315	45.0	117	1.83	6 000	7 200
*NN3021MBKR	105	160	41	2	243	320	45.5	146	3.40	5 700	6 800
*NN3021TBKR	105	160	41	2	243	320	45.5	146	2.52	6 500	7 600
*NN3021ZTBKR	105	160	41	2	145	161	22.7	146	2.17	6 800	9 000

(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). No code is used for cylindrical bores.
(2) GN gauges are available for bearing designations with an asterisk (*). For details, refer to Page 180.
(3) For details on limiting speeds, refer to Page 216.
(4) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(5) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.





E44 Specification

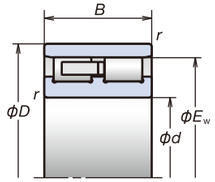
Axial Displacement (4) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
			D_a			CC9 (5)		CC0		CC1		CC1		Hole Dia.	Oil Groove Width	Number of Holes
s	d_a (min.)	d_{1a} (min.)	(max.)	(min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.	d_h (mm)	W (mm)	m
1.2	76.5	77	103.5	102	1	10	20	15	30	20	40	10	25	2	3.5	4
1.2	76.5	77	103.5	102	1	10	20	15	30	20	40	10	25	2	3.5	4
1.2	76.5	77	103.5	102	1	10	20	15	30	20	40	10	25	2	3.5	4
1.2	81.5	82	108.5	107	1	10	20	15	30	20	40	10	25	2	3.5	4
1.2	81.5	82	108.5	107	1	10	20	15	30	20	40	10	25	2	3.5	4
1.2	81.5	82	108.5	107	1	10	20	15	30	20	40	10	25	2	3.5	4
1.7	86.5	87	118.5	115	1	10	20	15	30	20	40	10	25	2.5	5	4
1.7	86.5	87	118.5	115	1	10	20	15	30	20	40	10	25	2.5	5	4
1.7	86.5	87	118.5	115	1	10	20	15	30	20	40	10	25	2.5	5	4
2.2	91.5	92	123.5	120	1	10	25	20	35	25	45	10	30	2.5	5	4
2.2	91.5	92	123.5	120	1	10	25	20	35	25	45	10	30	2.5	5	4
2.2	91.5	92	123.5	120	1	10	25	20	35	25	45	10	30	2.5	5	4
1.4	98	99	132	129	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	98	99	132	129	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	98	99	132	129	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	103	104	137	134	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	103	104	137	134	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	103	104	137	134	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.2	106.5	108	133.5	132	1	10	25	20	35	25	45	10	30	2	3.5	4
1.2	106.5	108	133.5	132	1	10	25	20	35	25	45	10	30	2.5	5	4
1.2	106.5	108	133.5	–	1	10	25	20	35	25	45	10	30	2.5	5	4
1.4	108	109	142	139	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	108	109	142	139	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.4	108	109	142	139	1.5	10	25	20	35	25	45	10	30	2.5	5	4
1.2	111.5	113	138.5	137	1	10	25	20	35	25	50	10	30	2.5	5	4
1.2	111.5	113	138.5	–	1	10	25	20	35	25	50	10	30	2.5	5	4
2.7	114	115	151	148	2	10	25	20	35	25	50	10	30	3	6	4
2.7	114	115	151	148	2	10	25	20	35	25	50	10	30	3	6	4
2.7	114	115	151	148	2	10	25	20	35	25	50	10	30	3	6	4

For additional information:
● Dynamic Equivalent Load ·····P191
● Static Equivalent Load ·····P198
● Nozzle Position ·····P240
● Recommended Grease Quantities··P257

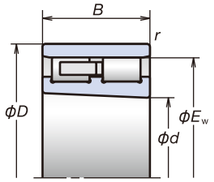
2. Cylindrical Roller Bearings

Bore Diameter **110-160** mm

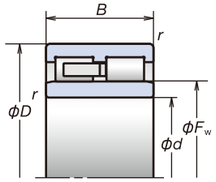
Double-Row Cylindrical Roller Bearings



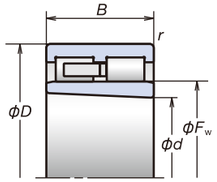
NN Cylindrical Bore



NN Tapered Bore



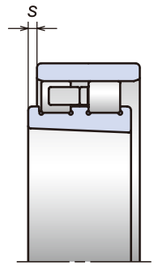
NNU Cylindrical Bore

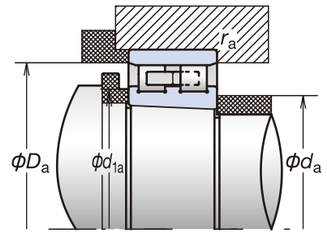


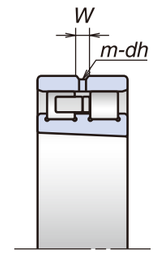
NNU Tapered Bore

Designation (1)(2)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (F_w in case of NNU type) (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (3) (min^{-1})	
	d	*D*	*B*	*r* (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
NN3922MBKR	**110**	**150**	**30**	1.1	141	207	29.3	140	1.44	5 800	7 000
NN4922MBKR	**110**	**150**	**40**	1.1	205	335	47.5	140	1.92	5 800	7 000
NNU4922MBKR	**110**	**150**	**40**	1.1	205	335	47.5	122	1.90	5 800	7 000
***NN3022MBKR**	**110**	**170**	**45**	2	281	375	52.0	155	4.35	5 400	6 500
***NN3022TBKR**	**110**	**170**	**45**	2	281	375	52.0	155	3.21	6 100	7 200
***NN3022ZTBKR**	**110**	**170**	**45**	2	167	188	26.0	155	2.78	6 400	8 500
NN3924MBKR	**120**	**165**	**34**	1.1	169	251	34.5	153.5	2.02	5 300	6 400
NN4924MBKR	**120**	**165**	**45**	1.1	225	360	50.0	153.5	2.62	5 300	6 400
NNU4924MBKR	**120**	**165**	**45**	1.1	225	360	50.0	133.5	2.59	5 300	6 400
***NN3024MBKR**	**120**	**180**	**46**	2	294	405	55.0	165	4.72	5 000	6 000
***NN3024TBKR**	**120**	**180**	**46**	2	294	405	55.0	165	3.50	5 700	6 700
***NN3024ZTBKR**	**120**	**180**	**46**	2	175	203	27.6	165	3.03	6 000	7 900
NN3926MBKR	**130**	**180**	**37**	1.5	213	325	43.5	167	2.64	4 900	5 900
NN4926MBKR	**130**	**180**	**50**	1.5	335	545	73.5	168	3.51	4 900	5 900
NNU4926MBKR	**130**	**180**	**50**	1.5	335	545	73.5	144	3.48	4 900	5 900
***NN3026MBKR**	**130**	**200**	**52**	2	350	475	63.0	182	5.53	4 600	5 500
***NN3026TBKR**	**130**	**200**	**52**	2	350	475	63.0	182	5.10	5 200	6 100
***NN3026ZTBKR**	**130**	**200**	**52**	2	208	238	31.5	182	4.46	5 500	7 200
NN3928MBKR	**140**	**190**	**37**	1.5	248	375	50.0	178	2.79	4 600	5 500
NN4928MBKR	**140**	**190**	**50**	1.5	350	585	77.0	178	3.73	4 600	5 500
NNU4928MBKR	**140**	**190**	**50**	1.5	350	585	77.0	154	3.70	4 600	5 500
***NN3028MBKR**	**140**	**210**	**53**	2	365	515	67.0	192	5.95	4 300	5 200
***NN3028TBKR**	**140**	**210**	**53**	2	365	515	67.0	192	5.51	4 900	5 700
***NN3028ZTBKR**	**140**	**210**	**53**	2	218	258	33.5	192	4.81	5 200	6 800
NN3930MBKR	**150**	**210**	**45**	2	325	490	62.5	195	4.47	4 200	5 000
NN4930MBKR	**150**	**210**	**60**	2	435	715	91.5	195	5.79	4 200	5 000
NNU4930MBKR	**150**	**210**	**60**	2	435	715	91.5	167	5.85	4 200	5 000
***NN3030MBKR**	**150**	**225**	**56**	2.1	410	585	74.5	206	7.29	4 000	4 800
***NN3030TBKR**	**150**	**225**	**56**	2.1	410	585	74.5	206	6.70	4 500	5 300
***NN3030ZTBKR**	**150**	**225**	**56**	2.1	245	294	37.5	206	5.87	4 800	6 300
NN3932MBKR	**160**	**220**	**45**	2	335	520	65.5	205	4.72	4 000	4 800
NN4932MBKR	**160**	**220**	**60**	2	450	760	96.0	205	6.19	4 000	4 800
NNU4932MBKR	**160**	**220**	**60**	2	450	760	96.0	177	6.18	4 000	4 800
***NN3032MBKR**	**160**	**240**	**60**	2.1	460	660	82.5	219	8.83	3 800	4 500
***NN3032TBKR**	**160**	**240**	**60**	2.1	460	660	82.5	219	8.18	4 300	5 000
***NN3032ZTBKR**	**160**	**240**	**60**	2.1	273	330	41.5	219	7.20	4 500	6 000

(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). No code is used for cylindrical bores.
(2) GN gauges are available for bearing designations with an asterisk (*). For details, refer to Page 180.
(3) For details on limiting speeds, refer to Page 216.
(4) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(5) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.







E44 Specification

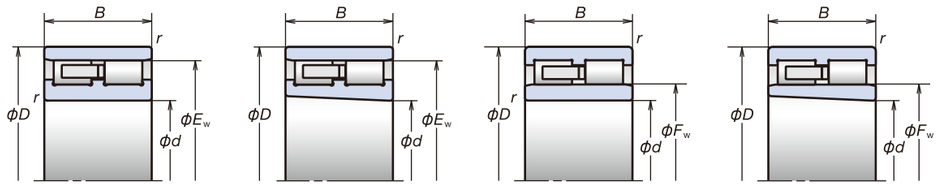
Axial Displacement (4) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
						CC9 (5)		CC0		CC1		CC1		Hole Dia.	Oil Groove Width	Number of Holes
s	d_a (min.)	d_{1a} (min.)	D_a (max.)	D_a (min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.	d_h (mm)	*W* (mm)	*m*
1.2	116.5	118	143.5	142	1	10	25	20	35	25	50	10	30	2	3.5	4
1.2	116.5	118	143.5	142	1	10	25	20	35	25	50	10	30	2.5	5	4
1.2	116.5	118	143.5	—	1	10	25	20	35	25	50	10	30	2.5	5	4
1.4	119	121	161	157	2	10	25	20	35	25	50	10	30	3	6	4
1.4	119	121	161	157	2	10	25	20	35	25	50	10	30	3	6	4
1.4	119	121	161	157	2	10	25	20	35	25	50	10	30	3	6	4
1.7	126.5	128	158.5	156	1	10	25	20	35	25	50	10	30	2.5	5	4
2.7	126.5	128	158.5	156	1	10	25	20	35	25	50	10	30	3	6	4
2.1	126.5	128	158.5	—	1	10	25	20	35	25	50	10	30	3	6	4
1.4	129	131	171	167	2	10	25	20	35	25	50	10	30	3	6	4
1.4	129	131	171	167	2	10	25	20	35	25	50	10	30	3	6	4
1.4	129	131	171	167	2	10	25	20	35	25	50	10	30	3	6	4
1.4	138	140	172	169	1.5	15	30	25	40	30	60	10	35	2.5	5	4
1.2	138	140	172	170	1.5	15	30	25	40	30	60	10	35	3	6	4
1.2	138	140	172	—	1.5	15	30	25	40	30	60	10	35	3	6	4
2.4	139	141	191	185	2	15	30	25	40	30	60	10	35	4	8	4
2.4	139	141	191	185	2	15	30	25	40	30	60	10	35	4	8	4
2.4	139	141	191	185	2	15	30	25	40	30	60	10	35	4	8	4
1.2	148	150	182	180	1.5	15	30	25	40	30	60	10	35	2.5	5	4
1.7	148	150	182	180	1.5	15	30	25	40	30	60	10	35	3	6	4
1.7	148	150	182	—	1.5	15	30	25	40	30	60	10	35	3	6	4
1.3	149	151	201	195	2	15	30	25	40	30	60	10	35	4	8	4
1.3	149	151	201	195	2	15	30	25	40	30	60	10	35	4	8	4
1.3	149	151	201	195	2	15	30	25	40	30	60	10	35	4	8	4
1.4	159	162	201	197	2	15	35	30	50	35	65	10	35	3	6	4
1.3	159	162	201	197	2	15	35	30	50	35	65	10	35	4	8	4
1.3	159	162	201	—	2	15	35	30	50	35	65	10	35	4	8	4
2.4	161	162	214	209	2	15	35	30	50	35	65	10	35	4	8	4
2.4	161	162	214	209	2	15	35	30	50	35	65	10	35	4	8	4
2.4	161	162	214	209	2	15	35	30	50	35	65	10	35	4	8	4
1.4	169	172	211	207	2	15	35	30	50	35	65	10	35	3	6	4
1.3	169	172	211	207	2	15	35	30	50	35	65	10	35	4	8	4
1.3	169	172	211	—	2	15	35	30	50	35	65	10	35	4	8	4
2.3	171	172	229	222	2	15	35	30	50	35	65	10	35	4	8	4
2.3	171	172	229	222	2	15	35	30	50	35	65	10	35	4	8	4
2.3	171	172	229	222	2	15	35	30	50	35	65	10	35	4	8	4

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

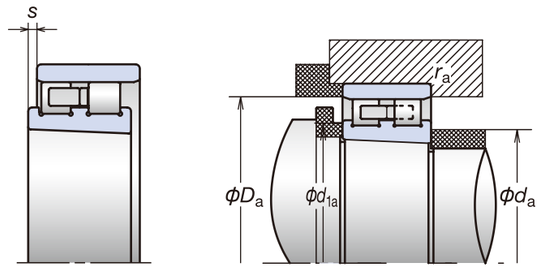
2. Cylindrical Roller Bearings

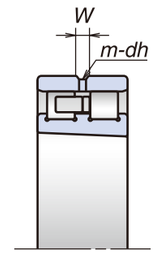
Bore Diameter **170-260** mm

Double-Row Cylindrical Roller Bearings



NN Cylindrical Bore | NN Tapered Bore | NNU Cylindrical Bore | NNU Tapered Bore





E44 Specification

Designation (1)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (F_w in case of NNU type) (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (2) (min^{-1})	
	d	D	B	r (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
NN3934MBKR	**170**	**230**	**45**	2	345	550	68.5	215	5.01	3 800	4 500
NN4934MBKR	**170**	**230**	**60**	2	465	805	100	215	6.42	3 800	4 500
NNU4934MBKR	**170**	**230**	**60**	2	465	805	100	187	6.50	3 800	4 500
NN3034MBKR	**170**	**260**	**67**	2.1	555	805	98.0	236	12.1	3 500	4 200
NN3936MBKR	**180**	**250**	**52**	2	420	655	80.0	232	7.20	3 500	4 200
NN4936MBKR	**180**	**250**	**69**	2	590	1 020	125	232	9.47	3 500	4 200
NNU4936MBKR	**180**	**250**	**69**	2	590	1 020	125	200	9.55	3 500	4 200
NN3036MBKR	**180**	**280**	**74**	2.1	695	995	119	255	15.7	3 300	4 000
NN3938MBKR	**190**	**260**	**52**	2	425	680	81.5	243.5	7.57	3 400	4 000
NN4938MBKR	**190**	**260**	**69**	2	595	1 060	127	243.5	9.72	3 400	4 000
NNU4938MBKR	**190**	**260**	**69**	2	595	1 060	127	211.5	9.91	3 400	4 000
NN3038MBKR	**190**	**290**	**75**	2.1	730	1 080	127	265	16.7	3 200	3 800
NN3940MBKR	**200**	**280**	**60**	2.1	515	815	96.5	259	10.6	3 200	3 800
NN4940MBKR	**200**	**280**	**80**	2.1	700	1 220	144	259	14.0	3 200	3 800
NNU4940MBKR	**200**	**280**	**80**	2.1	700	1 220	144	223	14.0	3 200	3 800
NN3040MBKR	**200**	**310**	**82**	2.1	805	1 170	135	282	21.3	3 000	3 600
NN3944MBKR	**220**	**300**	**60**	2.1	540	895	103	279	11.5	2 500	3 100
NN4944MBKR	**220**	**300**	**80**	2.1	735	1 330	153	279	15.1	2 500	3 100
NNU4944MBKR	**220**	**300**	**80**	2.1	735	1 330	153	243	15.2	2 500	3 100
NN3044MBKR	**220**	**340**	**90**	3	1 000	1 480	166	310	27.7	2 400	2 900
NN3948MBKR	**240**	**320**	**60**	2.1	565	975	110	300	12.3	2 400	2 900
NN4948MBKR	**240**	**320**	**80**	2.1	770	1 450	163	300	17.8	2 400	2 900
NNU4948MBKR	**240**	**320**	**80**	2.1	770	1 450	163	263	16.2	2 400	2 900
NN3048MBKR	**240**	**360**	**92**	3	1 050	1 600	177	330	30.4	2 200	2 700
NN3952MBKR	**260**	**360**	**75**	2.1	825	1 380	151	335	21.4	2 100	2 600
NN4952MBKR	**260**	**360**	**100**	2.1	1 150	2 100	229	335	28.4	2 100	2 600
NNU4952MBKR	**260**	**360**	**100**	2.1	1 150	2 100	229	289	28.3	2 100	2 600
NN3052KR	**260**	**400**	**104**	4	1 270	1 920	206	364	44.7	2 000	2 500

Axial Displacement (3) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
						CC9 (4)		CC0		CC1		CC1				
s	d_a (min.)	d_{1a} (min.)	D_a (max.)	D_a (min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.	Hole Dia. d_h (mm)	Oil Groove Width W (mm)	Number of Holes m
1.4	179	182	221	217	2	15	35	30	50	35	75	10	40	3	6	4
1.3	179	182	221	217	2	15	35	30	50	35	75	10	40	4	8	4
1.3	179	182	221	–	2	15	35	30	50	35	75	10	40	4	8	4
2.4	181	183	249	239	2	15	35	30	50	35	75	10	40	5	9	4
1.5	189	193	241	234	2	15	35	30	50	35	75	10	40	4	8	4
1.3	189	193	241	234	2	15	35	30	50	35	75	10	40	5	9	4
1.3	189	193	241	–	2	15	35	30	50	35	75	10	40	5	9	4
2.9	191	193	269	258	2	15	35	30	50	35	75	10	40	5	9	4
2.4	199	203	251	246	2	20	40	30	50	40	80	15	45	4	8	4
1.3	199	203	251	246	2	20	40	30	50	40	80	15	45	5	9	4
1.3	199	203	251	–	2	20	40	30	50	40	80	15	45	5	9	4
1.1	201	203	279	268	2	20	40	30	50	40	80	15	45	5	9	4
2.3	211	214	269	261	2	20	40	30	50	40	80	15	45	4	8	4
3.3	211	214	269	261	2	20	40	30	50	40	80	15	45	5	9	4
3.3	211	214	269	–	2	20	40	30	50	40	80	15	45	5	9	4
2.5	211	214	299	285	2	20	40	30	50	40	80	15	45	6	12	4
2.3	231	234	289	281	2	20	45	35	60	45	90	15	50	4	8	4
3.3	231	234	289	281	2	20	45	35	60	45	90	15	50	5	9	4
3.3	231	234	289	–	2	20	45	35	60	45	90	15	50	5	9	4
3.2	233	236	327	313	2.5	20	45	35	60	45	90	15	50	6	12	4
2.3	251	254	309	302	2	25	50	40	65	50	100	15	50	4	8	4
1.8	251	254	309	302	2	25	50	40	65	50	100	15	50	5	9	4
3.3	251	254	309	–	2	25	50	40	65	50	100	15	50	5	9	4
3.5	253	256	347	334	2.5	25	50	40	65	50	100	15	50	6	12	4
1.1	271	275	349	338	2	25	55	40	70	55	110	20	55	5	9	4
2.4	271	275	349	338	2	25	55	40	70	55	110	20	55	6	12	4
2.4	271	275	349	–	2	25	55	40	70	55	110	20	55	6	12	4
3.8	276	278	384	368	3	25	55	40	70	55	110	20	55	6	12	4

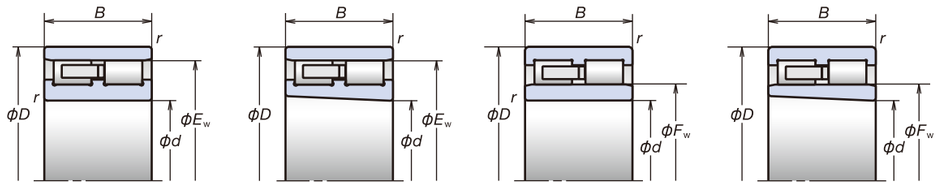
(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). For cylindrical bores, omit this code.
(2) For details on limiting speeds, refer to Page 216.
(3) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(4) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

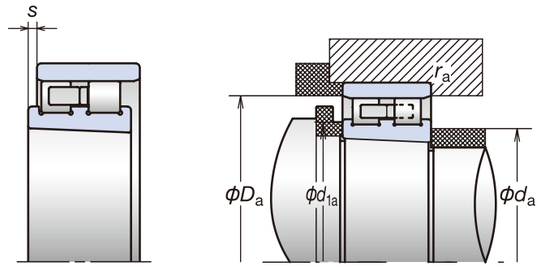
2. Cylindrical Roller Bearings

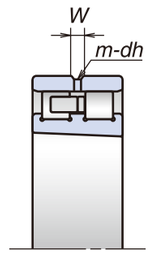
Bore Diameter **280-420** mm

Double-Row Cylindrical Roller Bearings



NN Cylindrical Bore | NN Tapered Bore | NNU Cylindrical Bore | NNU Tapered Bore





E44 Specification

Designation (1)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (F_w in case of NNU type) (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (2) (min^{-1})	
	d	*D*	*B*	*r* (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
NN3956MBKR	**280**	**380**	**75**	2.1	850	1 460	157	355	22.8	2 000	2 500
NN4956KR	**280**	**380**	**100**	2.1	1 180	2 230	239	355	30.1	2 000	2 500
NNU4956KR	**280**	**380**	**100**	2.1	1 180	2 230	239	309	33.1	2 000	2 500
NN3056KR	**280**	**420**	**106**	4	1 330	2 080	219	384	47.7	1 900	2 300
NN3960KR	**300**	**420**	**90**	3	1 050	1 800	188	388	36.2	1 800	2 300
NN4960KR	**300**	**420**	**118**	3	1 510	2 870	300	388	47.6	1 800	2 300
NNU4960KR	**300**	**420**	**118**	3	1 510	2 870	300	336	47.6	1 800	2 300
NN3060KR	**300**	**460**	**118**	4	1 590	2 460	253	418	66.5	1 800	2 100
NN3964KR	**320**	**440**	**90**	3	1 080	1 910	197	408	38.2	1 800	2 100
NN4964KR	**320**	**440**	**118**	3	1 560	3 050	315	408	50.3	1 800	2 100
NNU4964KR	**320**	**440**	**118**	3	1 560	3 050	315	356	50.3	1 800	2 100
NN3064KR	**320**	**480**	**121**	4	1 660	2 670	270	438	71.8	1 700	2 000
NN4968KR	**340**	**460**	**118**	3	1 670	3 400	345	428	52.6	1 700	2 000
NNU4968KR	**340**	**460**	**118**	3	1 670	3 400	345	376	52.9	1 700	2 000
NN3068KR	**340**	**520**	**133**	5	2 050	3 300	330	473	95.6	1 600	1 900
NN3972KR	**360**	**480**	**90**	3	1 140	2 130	212	448	42.1	1 600	1 900
NN4972KR	**360**	**480**	**118**	3	1 710	3 550	355	448	55.1	1 600	1 900
NNU4972KR	**360**	**480**	**118**	3	1 710	3 550	355	396	55.2	1 600	1 900
NN3072KR	**360**	**540**	**134**	5	2 090	3 450	335	493	99.7	1 500	1 800
NN3976KR	**380**	**520**	**106**	4	1 540	2 730	267	484	63.5	1 500	1 800
NN4976KR	**380**	**520**	**140**	4	2 310	4 600	450	485	81.3	1 500	1 800
NNU4976KR	**380**	**520**	**140**	4	2 310	4 600	450	421	88.8	1 500	1 800
NN3076KR	**380**	**560**	**135**	5	2 180	3 700	355	513	113	1 400	1 700
NN4980KR	**400**	**540**	**140**	4	2 390	4 900	470	505	84.1	1 400	1 700
NNU4980KR	**400**	**540**	**140**	4	2 390	4 900	470	441	85.1	1 400	1 700
NN3080KR	**400**	**600**	**148**	5	2 570	4 300	405	548	138	1 300	1 600
NN4984K	**420**	**560**	**140**	4	2 460	5 150	490	525	87.9	1 200	1 500
NNU4984K	**420**	**560**	**140**	4	2 460	5 150	490	461	88.4	1 200	1 500
NN3084K	**420**	**620**	**150**	5	2 620	4 450	415	568	145	1 100	1 400

Axial Displacement (3) (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
						CC9 (4)		CC0		CC1		CC1		Hole Dia.	Oil Groove Width	Number of Holes
s	d_a (min.)	d_{1a} (min.)	D_a (max.)	D_a (min.)	r_a (max.)	min.	max.	min.	max.	min.	max.	min.	max.	d_h (mm)	*W* (mm)	*m*
1.1	291	295	369	358	2	25	55	40	70	55	110	20	55	5	9	4
2.4	291	295	369	358	2	25	55	40	70	55	110	20	55	6	12	4
2.4	291	295	369	–	2	25	55	40	70	55	110	20	55	6	12	4
3.5	296	298	404	388	3	25	55	40	70	55	110	20	55	6	12	4
2.2	313	318	407	391	2.5	30	60	45	75	60	120	20	60	6	12	4
2.5	313	318	407	391	2.5	30	60	45	75	60	120	20	60	6	12	4
2.5	313	318	407	–	2.5	30	60	45	75	60	120	20	60	6	12	4
4.8	316	319	444	422	3	30	60	45	75	60	120	20	60	6	12	4
2.2	333	338	427	411	2.5	30	65	45	80	65	135	20	65	6	12	4
3.5	333	338	427	411	2.5	30	65	45	80	65	135	20	65	6	12	4
2.5	333	338	427	–	2.5	30	65	45	80	65	135	20	65	6	12	4
5.3	336	340	464	442	3	30	65	45	80	65	135	20	65	8	15	4
3.0	353	363	447	431	2.5	30	65	45	80	65	135	20	65	6	12	4
3.0	353	363	447	–	2.5	30	65	45	80	65	135	20	65	6	12	4
6.8	360	365	500	477	4	30	65	45	80	65	135	20	65	8	15	4
2.2	373	381	467	451	2.5	35	75	50	90	75	150	25	75	6	12	4
3.0	373	383	467	451	2.5	35	75	50	90	75	150	25	75	6	12	4
3.0	373	383	467	–	2.5	35	75	50	90	75	150	25	75	6	12	4
7.0	380	385	520	497	4	35	75	50	90	75	150	25	75	8	15	4
3.5	396	405	504	487	3	35	75	50	90	75	150	25	75	6	12	4
3.8	396	408	504	488	3	35	75	50	90	75	150	25	75	8	15	4
3.8	396	408	504	–	3	35	75	50	90	75	150	25	75	8	15	4
7.3	400	411	540	518	4	35	75	50	90	75	150	25	75	8	15	4
3.5	416	428	524	508	3	35	75	50	90	75	150	25	75	8	15	4
3.5	416	428	524	–	3	35	75	50	90	75	150	25	75	8	15	4
2.3	420	432	580	553	4	35	75	50	90	75	150	25	75	8	15	4
4.0	436	448	544	528	3	40	85	60	105	85	170	25	85	8	15	4
3.5	436	448	544	–	3	40	85	60	105	85	170	25	85	8	15	4
2.8	440	453	600	573	4	40	85	60	105	85	170	25	85	8	15	4

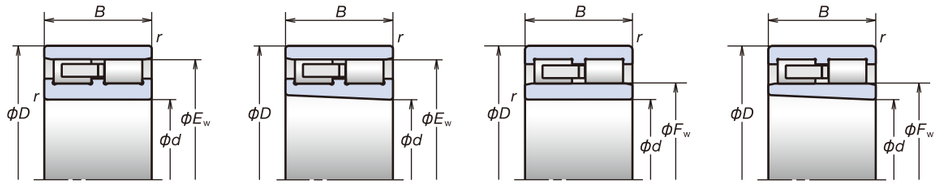
(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). For cylindrical bores, omit this code.
(2) For details on limiting speeds, refer to Page 216.
(3) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(4) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

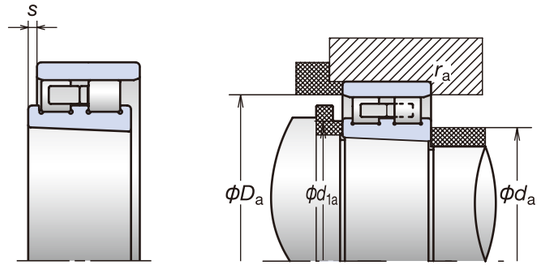
2. Cylindrical Roller Bearings

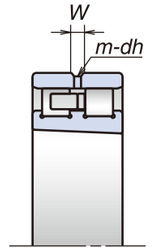
Bore Diameter **440-800** mm

Double-Row Cylindrical Roller Bearings



NN Cylindrical Bore | NN Tapered Bore | NNU Cylindrical Bore | NNU Tapered Bore





E44 Specification

Designation (1)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	E_w (F_w in case of NNU type) (mm) (reference)	Mass (kg) (approx.)	Limiting Speeds (2) (min^{-1})	
	d	*D*	*B*	*r* (min.)	C_r (Dynamic)	C_{or} (Static)				Grease	Oil
NN4988K	**440**	**600**	**160**	4	2 910	6 000	560	559	123	1 100	1 400
NNU4988K	**440**	**600**	**160**	4	2 910	6 000	560	487	123	1 100	1 400
NN3088K	**440**	**650**	**157**	6	2 900	4 900	455	596	166	1 100	1 300
NN3992K	**460**	**620**	**118**	4	1 980	3 700	345	578	94.5	1 100	1 300
NN4992K	**460**	**620**	**160**	4	2 950	6 200	570	579	127	1 100	1 300
NNU4992K	**460**	**620**	**160**	4	2 950	6 200	570	507	128	1 100	1 300
NN3092K	**460**	**680**	**163**	6	3 150	5 350	490	623	189	1 000	1 300
NN4996K	**480**	**650**	**170**	5	3 300	7 000	640	607	151	1 000	1 300
NNU4996K	**480**	**650**	**170**	5	3 300	7 000	640	531	150	1 000	1 300
NN3096K	**480**	**700**	**165**	6	3 200	5 550	500	643	211	1 000	1 200
NN49/500K	**500**	**670**	**170**	5	3 350	7 200	650	627	155	1 000	1 200
NNU49/500K	**500**	**670**	**170**	5	3 350	7 200	650	551	157	1 000	1 200
NN30/500K	**500**	**720**	**167**	6	3 200	5 600	495	663	205	900	1 200
NN39/530K	**530**	**710**	**136**	5	2 510	4 900	435	663	139	900	1 200
NN49/530K	**530**	**710**	**180**	5	3 750	8 150	725	664	185	900	1 200
NNU49/530K	**530**	**710**	**180**	5	3 750	8 150	725	584	186	900	1 200
NN30/530K	**530**	**780**	**185**	6	3 900	6 900	600	715	280	900	1 100
NN49/560K	**560**	**750**	**190**	5	4 000	8 700	760	701	218	900	1 100
NNU49/560K	**560**	**750**	**190**	5	4 000	8 700	760	617	230	900	1 100
NN49/600K	**600**	**800**	**200**	5	4 700	10 500	900	749	273	800	1 000
NNU49/600K	**600**	**800**	**200**	5	4 700	10 500	900	659	284	800	1 000
NN49/630K	**630**	**850**	**218**	6	5 150	11 400	960	793	328	800	1 000
NNU49/630K	**630**	**850**	**218**	6	5 150	11 400	960	697	328	800	1 000
NN49/670K	**670**	**900**	**230**	6	5 100	11 500	945	838	419	700	900
NNU49/670K	**670**	**900**	**230**	6	5 100	11 500	945	742	381	700	900
NNU49/710BK	**710**	**950**	**243**	6	5 500	12 600	1 020	775	472	700	900
NNU49/750K	**750**	**1 000**	**250**	6	6 800	15 900	1 270	826	530	700	800
NNU49/800K	**800**	**1 060**	**258**	6	7 050	16 500	1 300	879	573	600	800

(3) Axial Displacement (mm)	Abutment and Fillet Dimensions (mm)					Clearances in Bearings with Tapered Bores (μm)						Clearances in Bearings with Cylindrical Bores (μm)		E44 Specification Lubrication Holes		
	d_a	d_{1a}	D_a		r_a	CC9 (4)		CC0		CC1		CC1		Hole Dia. d_h	Oil Groove Width *W*	Number of Holes
s	(min.)	(min.)	(max.)	(min.)	(max.)	min.	max.	min.	max.	min.	max.	min.	max.	(mm)	(mm)	*m*
3.3	456	469	584	562	3	40	85	60	105	85	170	25	85	8	15	4
3.3	456	469	584	–	3	40	85	60	105	85	170	25	85	8	15	4
3.0	466	479	624	601	5	40	85	60	105	85	170	25	85	8	15	4
3.8	476	486	604	581	3	45	95	70	120	95	190	25	95	6	12	4
3.3	476	489	604	582	3	45	95	70	120	95	190	25	95	8	15	4
3.3	476	489	604	–	3	45	95	70	120	95	190	25	95	8	15	4
3.5	486	500	654	628	5	45	95	70	120	95	190	25	95	10	18	4
2.0	500	514	630	610	4	45	95	70	120	95	190	25	95	10	18	4
2.0	500	514	630	–	4	45	95	70	120	95	190	25	95	10	18	4
4.3	506	520	674	648	5	45	95	70	120	95	190	25	95	10	18	4
3.8	520	534	650	630	4	45	95	70	120	95	190	25	95	10	18	4
3.8	520	534	650	–	4	45	95	70	120	95	190	25	95	10	18	4
5.5	526	540	694	668	5	45	95	70	120	95	190	25	95	10	18	4
4.0	550	561	690	668	4	50	105	80	135	105	210	30	105	8	15	4
3.0	550	565	690	667	4	50	105	80	135	105	210	30	105	10	18	4
3.0	550	565	690	–	4	50	105	80	135	105	210	30	105	10	18	4
4.2	556	571	754	720	5	50	105	80	135	105	210	30	105	10	18	4
2.3	580	596	730	704	4	50	105	80	135	105	210	30	105	10	18	4
2.2	580	596	730	–	4	50	105	80	135	105	210	30	105	10	18	4
3.3	620	637	780	752	4	55	115	85	145	115	230	30	115	10	18	4
3.3	620	637	780	–	4	55	115	85	145	115	230	30	115	10	18	4
2.8	656	674	824	796	5	55	115	85	145	115	230	30	115	12	20	4
2.7	656	674	824	–	5	55	115	85	145	115	230	30	115	12	20	4
6.3	696	715	874	841	5	60	130	90	160	130	260	30	130	12	20	4
6.2	696	715	874	–	5	60	130	90	160	130	260	30	130	12	20	4
11.4	736	756	924	–	5	60	130	90	160	130	260	30	130	12	20	4
7.1	776	797	974	–	5	70	150	110	190	145	290	35	145	12	20	4
8.9	826	848	1 034	–	5	70	150	110	190	145	290	35	145	12	20	4

(1) Designations listed here are suffixed with "K" or "KR" to indicate tapered bores (1:12). For cylindrical bores, omit this code.
(2) For details on limiting speeds, refer to Page 216.
(3) Axial displacement refers to the allowable amount that the outer and inner rings may move from their normal positions in the axial direction.
(4) Clearance CC9 is applicable to cylindrical roller bearings with tapered bores in ISO Tolerance Classes 5 and 4.

For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Nozzle Position ····· P240
- Recommended Grease Quantities ·· P257

3. Angular Contact Thrust Ball Bearings



High-Speed Angular Contact Thrust Ball Bearings NSKROBUST™ Series

BASIC Series



Angular Contact Thrust Ball Bearings

NSKTAC F Series



Double-Direction Angular Contact Thrust Ball Bearings

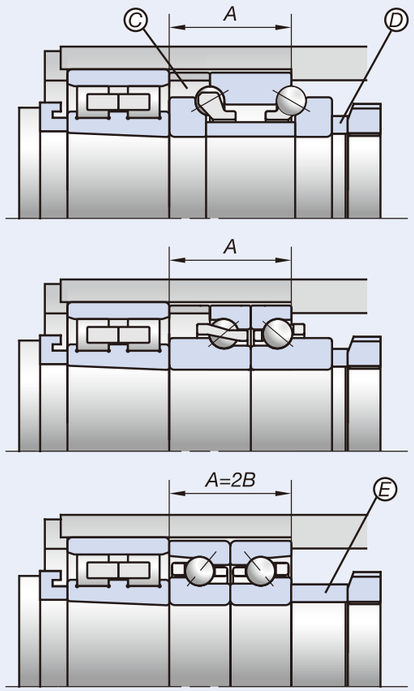
NSKTAC D Series

Angular Contact Thrust Ball Bearings

Angular Contact Thrust Ball Bearings ·····130-141

- Features
- Numbering System
- Bearing Tables
  - High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)
  - Angular Contact Thrust Ball Bearings (NSKTAC F Series)
  - Double-Direction Angular Contact Thrust Ball Bearings (NSKTAC D Series)

3. Angular Contact Thrust Ball Bearings



Features

Superior high-speed capability and high rigidity are required of ball bearings used for sustaining axial loads in machine tool spindles. For such requirements, NSK offers three types of bearings to choose from, depending on the structure and characteristics of the machine.

All of these bearings are designed for use in combination with cylindrical roller bearings. They are manufactured with special outer ring outside diameter tolerances to provide clearance between the outside diameter of the bearing and the inner diameter of the housing when mounted so that any radial load is supported by the cylindrical roller bearings only.

Angular contact thrust ball bearings in the NSKROBUST Series support high speeds while maintaining high rigidity. Contact angles of 40° (BTR) and 30° (BAR) result in superior high-speed performance and low heat generation.

Interchangeability

BAR and BTR Series bearings have special widths to allow easily replacement of 20 Series bearings without the need to redesign the shaft or housing—just a simple modification to the spacer configuration is all that's required (spacer C is removed and spacer D is replaced with spacer E as shown).

For the replacement of 29 Series bearings with BAR and BTR type bearings, please contact NSK.

Numbering System for Angular Contact Thrust Ball Bearings (NSKTAC F Series)

Designation example: **100 TAC 20F M E44 DB EL P4A**

- 100 — Nominal bore diameter
- TAC — Bearing type
- 20F — Dimension series
- M — Cage
- E44 — Lubrication holes
- DB — Arrangement
- EL — Preload
- P4A — Accuracy

			Reference pages
100	Nominal bore diameter	Bore diameter (mm) (50-130 mm)	138-139
TAC	Bearing type	TAC: Angular contact thrust ball bearing	26
20F	Dimension series	20F: For combination with NN30 series 29F: For combination with NN39 and NN49 series	138-139
M	Cage	M: Machined brass cage	—
E44	Lubrication holes	No code: No lubrication holes E44: Lubrication groove and lubrication holes on outer ring	138-139
DB	Arrangement	DB: Back-to-back arrangement	200-205
EL	Preload	L: Light preload (standard for this series) EL: Extra light preload	210
P4A	Preload	P4A: Outside diameter tolerances are NSK-specific, all others are ISO Class 4 P5A: Outside diameter tolerances are NSK-specific, all others are ISO Class 5	228

Numbering System for High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)

Designation example: **100 BAR 10 S TYN DB L P4A**

- 100 — Nominal bore diameter
- BAR — Bearing type
- 10 — Dimension series
- S — Material
- TYN — Cage
- DB — Arrangement
- L — Preload
- P4A — Accuracy

			Reference pages
100	Nominal bore diameter	Bore diameter (mm)	132-137
BAR	Bearing type	BAR: 30° contact angle BTR: 40° contact angle	26, 44-45
10	Dimension series	10: 10 Series bore and outside diameter, special width	132-137
S	Material	Type S: Inner/Outer ring: Bearing steel (SUJ2); Rolling elements: Bearing steel (SUJ2) Type E: Inner/Outer ring: Bearing steel (SUJ2); Rolling elements: Ultra long life bearing rolling elements (EQTF) Type H: Inner/Outer ring: Bearing steel (SUJ2); Rolling elements: Ceramics (Si_3N_4)	14-17, 26
TYN	Cage	TYN: Rolling element guided polyamide cage; limiting speed d_mn =1.2 million (grease), 1.4 million (oil) MY: Rolling element guided machined brass cage No code: Outer ring guided machined brass cage TYN cage is available up to 160mm bore diameter bearings	18
DB	Arrangement	DB: Back-to-back arrangement	200-205
L	Preload	L: Light preload (standard for this series) EL: Extra light preload	132-137, 210
P4A	Accuracy	P2A: Outside diameter tolerances are NSK-specific, all others are ISO Class 2 P4A: Outside diameter tolerances are NSK-specific, all others are ISO Class 4	228

Numbering System for Double-Direction Angular Contact Thrust Ball Bearings (NSKTAC D Series)

Designation example: **150 TAC 20D MY PN7 +L C6**

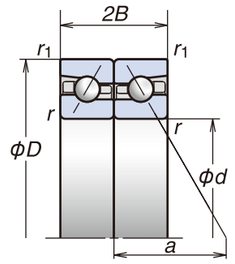
- 150 — Nominal bore diameter
- TAC — Bearing type
- 20D — Dimension series
- MY — Cage
- PN7 — Accuracy
- +L — Spacer
- C6 — Preload

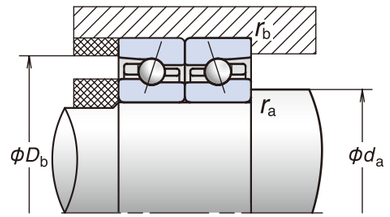
			Reference pages
150	Nominal bore diameter	Bore diameter (mm) (140-320 mm)	140-141
TAC	Bearing type	TAC: Angular contact thrust ball bearing	26
20D	Dimension series	20D, 20X: For combination with NN30 series 29D: For combination with NN39 and NN49 series	140-141
MY	Cage	MY: Machined brass cage	—
PN7	Accuracy	PN7: Special precision accuracy	228
+L	Spacer	Inner ring spacer	—
C6	Preload	C6: Extra light preload C7: Light preload (standard for this series) C8: Medium preload	140-141

3. Angular Contact Thrust Ball Bearings

Bore Diameter **50-85** mm

High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)





Designation	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (1) (kN)	Fatigue Load Limit C_u (kN)	Contact Angle (°)	Effective Load Center (mm)	Mass (kg/row) (Reference)	Limiting Speeds (2) (min^{-1})	
	d	*D*	*2B*	*r* (min.)	r_1 (min.)	C_a (Dynamic)	C_{oa} (Static)				*a*		Grease	Oil
50BAR10E	**50**	**80**	**28.5**	1	0.6	18.5	27.7	18.4	1.83	30	25.6	0.272	12 400	15 700
50BAR10H	**50**	**80**	**28.5**	1	0.6	18.5	26.5	12.6	1.83	30	25.6	0.257	13 100	16 200
50BTR10E	**50**	**80**	**28.5**	1	0.6	22.0	31.5	19.3	2.30	40	34.1	0.272	10 800	14 000
50BTR10H	**50**	**80**	**28.5**	1	0.6	22.0	30.0	15.5	2.30	40	34.1	0.257	11 600	14 700
55BAR10E	**55**	**90**	**33**	1.1	0.6	22.9	35.0	23.4	2.31	30	28.9	0.390	11 100	14 100
55BAR10H	**55**	**90**	**33**	1.1	0.6	22.9	33.5	16.0	2.31	30	28.9	0.369	11 800	14 500
55BTR10E	**55**	**90**	**33**	1.1	0.6	27.2	40.0	23.6	2.91	40	38.3	0.390	9 700	12 600
55BTR10H	**55**	**90**	**33**	1.1	0.6	27.2	38.0	19.7	2.91	40	38.3	0.369	10 400	13 200
60BAR10E	**60**	**95**	**33**	1.1	0.6	23.8	38.0	25.5	2.51	30	30.4	0.420	10 400	13 200
60BAR10H	**60**	**95**	**33**	1.1	0.6	23.8	36.5	17.5	2.51	30	30.4	0.397	11 000	13 600
60BTR10E	**60**	**95**	**33**	1.1	0.6	28.2	43.5	25.8	3.15	40	40.4	0.420	9 100	11 800
60BTR10H	**60**	**95**	**33**	1.1	0.6	28.2	41.5	21.5	3.15	40	40.4	0.397	9 700	12 300
65BAR10E	**65**	**100**	**33**	1.1	0.6	24.6	41.5	27.7	2.71	30	31.8	0.450	9 700	12 400
65BAR10H	**65**	**100**	**33**	1.1	0.6	24.6	39.5	19.0	2.71	30	31.8	0.425	10 400	12 800
65BTR10E	**65**	**100**	**33**	1.1	0.6	29.2	47.0	27.3	3.45	40	42.5	0.450	8 500	11 100
65BTR10H	**65**	**100**	**33**	1.1	0.6	29.2	45.0	23.3	3.45	40	42.5	0.425	9 100	11 600
70BAR10E	**70**	**110**	**36**	1.1	0.6	34.0	55.0	37.5	3.65	30	34.7	0.601	8 900	11 400
70BAR10H	**70**	**110**	**36**	1.1	0.6	34.0	53.0	25.5	3.65	30	34.7	0.561	9 500	11 700
70BTR10E	**70**	**110**	**36**	1.1	0.6	40.5	63.0	35.0	4.60	40	46.3	0.601	7 800	10 200
70BTR10H	**70**	**110**	**36**	1.1	0.6	40.5	60.0	31.5	4.60	40	46.3	0.561	8 400	10 600
75BAR10E	**75**	**115**	**36**	1.1	0.6	34.5	57.5	39.0	3.80	30	36.1	0.634	8 500	10 800
75BAR10H	**75**	**115**	**36**	1.1	0.6	34.5	55.5	26.7	3.80	30	36.1	0.592	9 000	11 100
75BTR10E	**75**	**115**	**36**	1.1	0.6	41.0	65.5	36.5	4.80	40	48.4	0.634	7 400	9 600
75BTR10H	**75**	**115**	**36**	1.1	0.6	41.0	63.0	33.0	4.80	40	48.4	0.592	7 900	10 000
80BAR10E	**80**	**125**	**40.5**	1.1	0.6	40.0	68.5	46.5	4.50	30	39.4	0.830	7 900	10 000
80BAR10H	**80**	**125**	**40.5**	1.1	0.6	40.0	65.5	32.0	4.50	30	39.4	0.776	8 300	10 300
80BTR10E	**80**	**125**	**40.5**	1.1	0.6	48.0	78.0	43.0	5.65	40	52.7	0.830	6 900	8 900
80BTR10H	**80**	**125**	**40.5**	1.1	0.6	48.0	74.5	39.0	5.65	40	52.7	0.776	7 400	9 300
85BAR10E	**85**	**130**	**40.5**	1.1	0.6	40.5	71.5	48.5	4.55	30	41.1	0.983	7 500	9 500
85BAR10H	**85**	**130**	**40.5**	1.1	0.6	40.5	68.5	33.0	4.55	30	41.1	0.926	8 000	9 800
85BTR10E	**85**	**130**	**40.5**	1.1	0.6	48.5	81.5	43.5	5.70	40	55.2	0.983	6 600	8 500
85BTR10H	**85**	**130**	**40.5**	1.1	0.6	48.5	78.0	41.0	5.70	40	55.2	0.926	7 000	8 900

Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangements) (N)		Axial Rigidity (DB and DF Arrangements) (N/μm)		Measured Axial Clearance (μm)	
d_a (min.)	D_b (max.)	r_a (max.)	r_b (max.)	EL	L	EL	L	EL	L
56	75	1	0.6	221	464	169	220	− 5	− 10
56	75	1	0.6	246	531	196	257	− 5	− 10
56	75	1	0.6	335	761	292	387	− 5	− 10
56	75	1	0.6	379	879	341	455	− 5	− 10
62	85	1	0.6	229	606	177	250	− 5	− 12
62	85	1	0.6	256	696	206	293	− 5	− 12
62	85	1	0.6	349	800	307	409	− 5	− 10
62	85	1	0.6	396	924	359	480	− 5	− 10
67	90	1	0.6	241	646	190	270	− 5	− 12
67	90	1	0.6	270	743	221	316	− 5	− 12
67	90	1	0.6	371	855	331	441	− 5	− 10
67	90	1	0.6	421	990	387	518	− 5	− 10
72	95	1	0.6	253	687	203	289	− 5	− 12
72	95	1	0.6	284	791	236	339	− 5	− 12
72	95	1	0.6	392	912	354	473	− 5	− 10
72	95	1	0.6	446	1 056	414	556	− 5	− 10
77	105	1	0.6	252	908	202	317	− 5	− 15
77	105	1	0.6	282	1 051	235	373	− 5	− 15
77	105	1	0.6	390	1 556	352	566	− 5	− 15
77	105	1	0.6	444	1 815	412	668	− 5	− 15
82	110	1	0.6	258	939	209	329	− 5	− 15
82	110	1	0.6	290	1 088	243	387	− 5	− 15
82	110	1	0.6	402	1 612	365	588	− 5	− 15
82	110	1	0.6	458	1 881	427	694	− 5	− 15
87	120	1	0.6	346	1 095	237	356	− 5	− 15
87	120	1	0.6	382	1 256	275	417	− 5	− 15
87	120	1	0.6	507	1 819	406	630	− 5	− 15
87	120	1	0.6	569	2 107	473	741	− 5	− 15
92	125	1	0.6	354	1 129	245	369	− 5	− 15
92	125	1	0.6	391	1 295	284	432	− 5	− 15
92	125	1	0.6	520	1 879	420	653	− 5	− 15
92	125	1	0.6	584	2 177	489	768	− 5	− 15

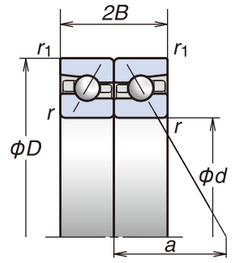
(1) For details on permissible axial load, refer to Page 199.
(2) For details on limiting speeds, refer to Page 216. Limiting speeds listed on this page are based on a DB arrangement with extra light preload (EL). Adjust the limiting speed to 85% of the figure shown when a light preload (L) has been selected.

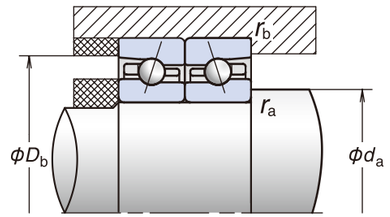
For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Spacer Dimensions and Nozzle Position ·· P237
- Recommended Grease Quantities ·· P257

3. Angular Contact Thrust Ball Bearings

Bore Diameter **90-140** mm

High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)





Designation	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (1) (kN)	Fatigue Load Limit C_u (kN)	Contact Angle (°)	Effective Load Center (mm) a	Mass (kg/row) (Reference)	Limiting Speeds (2) (min^{-1})	
	d	D	$2B$	r (min.)	r_1 (min.)	C_a (Dynamic)	C_{oa} (Static)						Grease	Oil
90BAR10E	**90**	**140**	**45**	1.5	1	53.0	92.5	62.5	5.70	30	44.4	1.21	7 000	8 900
90BAR10H	**90**	**140**	**45**	1.5	1	53.0	88.5	43.0	5.70	30	44.4	1.12	7 400	9 200
90BTR10E	**90**	**140**	**45**	1.5	1	63.0	105	58.0	7.15	40	59.5	1.21	6 100	8 000
90BTR10H	**90**	**140**	**45**	1.5	1	63.0	101	52.5	7.15	40	59.5	1.12	6 600	8 300
95BAR10E	**95**	**145**	**45**	1.5	1	54.0	96.5	65.0	5.80	30	45.5	1.25	6 700	8 500
95BAR10H	**95**	**145**	**45**	1.5	1	54.0	92.0	44.5	5.80	30	45.5	1.16	7 100	8 800
95BTR10E	**95**	**145**	**45**	1.5	1	64.5	110	61.0	7.35	40	61.0	1.25	5 900	7 600
95BTR10H	**95**	**145**	**45**	1.5	1	64.5	105	55.0	7.35	40	61.0	1.16	6 300	8 000
100BAR10E	**100**	**150**	**45**	1.5	1	55.0	100	68.0	5.90	30	47.3	1.31	6 400	8 200
100BAR10H	**100**	**150**	**45**	1.5	1	55.0	96.0	46.5	5.90	30	47.3	1.22	6 800	8 400
100BTR10E	**100**	**150**	**45**	1.5	1	65.0	114	73.0	7.45	40	63.7	1.31	5 600	7 300
100BTR10H	**100**	**150**	**45**	1.5	1	65.0	109	57.0	7.45	40	63.7	1.22	6 000	7 600
105BAR10E	**105**	**160**	**49.5**	2	1	62.0	115	78.0	6.55	30	50.6	1.74	6 100	7 700
105BAR10H	**105**	**160**	**49.5**	2	1	62.0	110	53.5	6.55	30	50.6	1.62	6 500	8 000
105BTR10E	**105**	**160**	**49.5**	2	1	74.0	131	74.5	8.30	40	68.0	1.74	5 300	6 900
105BTR10H	**105**	**160**	**49.5**	2	1	74.0	125	65.5	8.30	40	68.0	1.62	5 700	7 200
110BAR10E	**110**	**170**	**54**	2	1	70.0	131	89.0	7.25	30	53.9	1.97	5 800	7 300
110BAR10H	**110**	**170**	**54**	2	1	70.0	125	60.5	7.25	30	53.9	1.83	6 100	7 500
110BTR10E	**110**	**170**	**54**	2	1	83.0	148	82.5	9.15	40	72.2	1.97	5 000	6 500
110BTR10H	**110**	**170**	**54**	2	1	83.0	142	74.5	9.15	40	72.2	1.83	5 400	6 800
120BAR10E	**120**	**180**	**54**	2	1	72.0	141	96.0	7.55	30	56.8	2.29	5 400	6 800
120BAR10H	**120**	**180**	**54**	2	1	72.0	135	65.5	7.55	30	56.8	2.14	5 700	7 000
120BTR10E	**120**	**180**	**54**	2	1	85.5	160	88.5	9.50	40	76.4	2.29	4 700	6 100
120BTR10H	**120**	**180**	**54**	2	1	85.5	153	80.5	9.50	40	76.4	2.14	5 000	6 400
130BAR10E	**130**	**200**	**63**	2	1	91.0	172	117	8.80	30	63.3	3.20	4 900	6 200
130BAR10H	**130**	**200**	**63**	2	1	91.0	164	79.5	8.80	30	63.3	2.98	5 200	6 400
130BTR10E	**130**	**200**	**63**	2	1	108	195	106	11.1	40	85.0	3.20	4 300	5 600
130BTR10H	**130**	**200**	**63**	2	1	108	187	98.0	11.1	40	85.0	2.98	4 600	5 800
140BAR10E	**140**	**210**	**63**	2	1	99.0	200	135	9.90	30	66.2	3.56	4 600	5 900
140BAR10H	**140**	**210**	**63**	2	1	99.0	191	92.5	9.90	30	66.2	3.30	4 900	6 000
140BTR10E	**140**	**210**	**63**	2	1	117	227	84.0	12.5	40	89.2	3.56	4 000	5 200
140BTR10H	**140**	**210**	**63**	2	1	117	217	100	12.5	40	89.2	3.30	4 300	5 500

Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangements) (N)		Axial Rigidity (DB and DF Arrangements) (N/μm)		Measured Axial Clearance (μm)	
d_a (min.)	D_b (max.)	r_a (max.)	r_b (max.)	EL	L	EL	L	EL	L
99	134	1.5	0.8	360	1 662	252	431	− 5	− 20
99	134	1.5	0.8	398	1 922	292	506	− 5	− 20
99	134	1.5	0.8	532	2 834	433	768	− 5	− 20
99	134	1.5	0.8	598	3 303	504	906	− 5	− 20
104	139	1.5	0.8	368	1 717	260	447	− 5	− 20
104	139	1.5	0.8	408	1 986	301	525	− 5	− 20
104	139	1.5	0.8	546	2 931	448	797	− 5	− 20
104	139	1.5	0.8	614	3 417	521	940	− 5	− 20
109	144	1.5	0.8	376	1 770	268	462	− 5	− 20
109	144	1.5	0.8	417	2 049	311	543	− 5	− 20
109	144	1.5	0.8	559	3 029	462	825	− 5	− 20
109	144	1.5	0.8	630	3 531	539	973	− 5	− 20
115	154	2	1	384	1 820	276	476	− 5	− 20
115	154	2	1	426	2 107	320	560	− 5	− 20
115	154	2	1	573	3 121	477	852	− 5	− 20
115	154	2	1	645	3 640	556	1 005	− 5	− 20
120	164	2	1	391	1 868	284	489	− 5	− 20
120	164	2	1	434	2 164	329	576	− 5	− 20
120	164	2	1	586	3 210	490	877	− 5	− 20
120	164	2	1	661	3 746	572	1 035	− 5	− 20
130	174	2	1	408	1 982	301	523	− 5	− 20
130	174	2	1	454	2 298	350	615	− 5	− 20
130	174	2	1	615	3 417	522	938	− 5	− 20
130	174	2	1	694	3 989	609	1 107	− 5	− 20
140	194	2	1	394	2 532	286	547	− 5	− 25
140	194	2	1	437	2 945	332	644	− 5	− 25
140	194	2	1	591	4 411	496	985	− 5	− 25
140	194	2	1	667	5 163	578	1 163	− 5	− 25
150	204	2	1	580	3 154	359	649	− 5	− 25
150	204	2	1	634	3 642	414	762	− 5	− 25
150	204	2	1	823	5 365	610	1 157	− 5	− 25
150	204	2	1	916	6 248	708	1 364	− 5	− 25

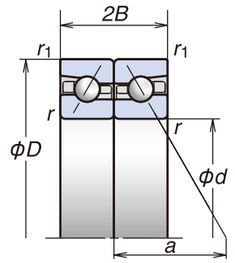
(1) For details on permissible axial load, refer to Page 199.
(2) For details on limiting speeds, refer to Page 216. Limiting speeds listed on this page are based on a DB arrangement with extra light preload (EL). Adjust the limiting speed to 85% of the figure shown when a light preload (L) has been selected.

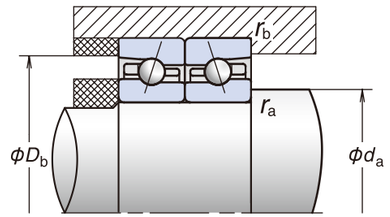
For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Spacer Dimensions and Nozzle Position ·· P237
- Recommended Grease Quantities ·· P257

3. Angular Contact Thrust Ball Bearings

Bore Diameter **150-380** mm

High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)





Designation	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (1) (kN)	Fatigue Load Limit C_u (kN)	Contact Angle (°)	Effective Load Center (mm) a	Mass (kg/row) (Reference)	Limiting Speeds (2) (min^{-1})	
	d	D	$2B$	r (min.)	r_1 (min.)	C_a (Dynamic)	C_{oa} (Static)						Grease	Oil
150BAR10S	**150**	**225**	**67.5**	2.1	1.1	117	234	160	11.2	30	71.0	4.35	4 000	5 100
150BAR10H	**150**	**225**	**67.5**	2.1	1.1	117	224	109	11.2	30	71.0	4.03	4 600	5 600
150BTR10S	**150**	**225**	**67.5**	2.1	1.1	138	267	104	14.2	40	95.5	4.35	3 500	4 600
150BTR10H	**150**	**225**	**67.5**	2.1	1.1	138	255	123	14.2	40	95.5	4.03	4 000	5 100
160BAR10S	**160**	**240**	**72**	2.1	1.1	126	257	175	11.9	30	75.7	5.33	3 800	4 800
160BAR10H	**160**	**240**	**72**	2.1	1.1	126	246	120	11.9	30	75.7	4.95	4 300	5 300
160BTR10S	**160**	**240**	**72**	2.1	1.1	150	293	184	15.1	40	101.9	5.33	3 300	4 300
160BTR10H	**160**	**240**	**72**	2.1	1.1	150	280	147	15.1	40	101.9	4.95	3 800	4 800
170BAR10S	**170**	**260**	**81**	2.1	1.1	148	305	207	13.7	30	82.3	7.95	3 500	4 500
170BTR10S	**170**	**260**	**81**	2.1	1.1	175	345	204	17.2	40	110.5	7.95	3 100	4 000
180BAR10S	**180**	**280**	**90**	2.1	1.1	190	385	262	16.7	30	88.8	10.2	3 300	4 200
180BTR10S	**180**	**280**	**90**	2.1	1.1	226	440	271	21.0	40	118.9	10.2	2 900	3 700
190BAR10S	**190**	**290**	**90**	2.1	1.1	188	385	263	16.4	30	91.8	11.0	3 200	4 000
190BTR10S	**190**	**290**	**90**	2.1	1.1	224	440	255	20.7	40	123.2	11.0	2 800	3 600
200BAR10S	**200**	**310**	**99**	2.1	1.1	213	440	300	18.2	30	98.3	14.2	3 000	3 800
200BTR10S	**200**	**310**	**99**	2.1	1.1	253	505	292	23.0	40	131.7	14.2	2 600	3 400
220BAR10S	**220**	**340**	**108**	3	1.1	238	505	340	19.8	30	107.8	18.5	2 400	3 100
220BTR10S	**220**	**340**	**108**	3	1.1	282	575	305	25.0	40	144.5	18.5	2 000	2 700
240BAR10S	**240**	**360**	**108**	3	1.1	245	545	370	20.6	30	113.5	19.9	2 200	2 900
240BTR10S	**240**	**360**	**108**	3	1.1	291	620	362	26.0	40	152.9	19.9	1 900	2 500
260BAR10S	**260**	**400**	**123**	4	1.5	320	765	520	27.6	30	125.9	29.0	2 000	2 600
260BTR10S	**260**	**400**	**123**	4	1.5	375	870	463	35.0	40	169.2	29.0	1 700	2 300
300BAR10S	**300**	**460**	**142.5**	4	1.5	390	1 020	696	34.5	30	145.3	44.9	1 800	2 300
300BTR10S	**300**	**460**	**142.5**	4	1.5	465	1 160	675	43.5	40	195.1	44.9	1 500	2 000
360BAR10S	**360**	**540**	**159**	5	2	455	1 320	815	40.5	30	169.7	67.6	1 500	1 900
360BTR10S	**360**	**540**	**159**	5	2	540	1 500	870	51.5	40	228.5	67.6	1 300	1 700
380BAR10S	**380**	**560**	**159**	5	2	470	1 410	965	42.5	30	175.4	69.8	1 400	1 900
380BTR10S	**380**	**560**	**159**	5	2	555	1 600	930	53.5	40	236.9	69.8	1 200	1 600

Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangements) (N)		Axial Rigidity (DB and DF Arrangements) (N/μm)		Measured Axial Clearance (μm)	
d_a (min.)	D_b (max.)	r_a (max.)	r_b (max.)	EL	L	EL	L	EL	L
162	218	2	1	584	3 694	364	691	− 5	− 28
162	218	2	1	639	4 278	419	813	− 5	− 28
162	218	2	1	831	5 435	618	1 172	− 5	− 25
162	218	2	1	925	6 330	717	1 382	− 5	− 25
172	233	2	1	591	4 121	370	728	− 5	− 30
172	233	2	1	647	4 780	427	857	− 5	− 30
172	233	2	1	843	5 545	630	1 198	− 5	− 25
172	233	2	1	939	6 458	732	1 412	− 5	− 25
182	253	2	1	604	4 258	383	754	− 5	− 30
182	253	2	1	865	7 366	653	1 355	− 5	− 30
192	273	2	1	606	5 259	385	814	− 5	− 35
192	273	2	1	869	9 183	658	1 467	− 5	− 35
202	283	2	1	606	5 259	385	814	− 5	− 35
202	283	2	1	869	9 184	658	1 467	− 5	− 35
212	303	2	1	617	6 055	396	873	− 5	− 38
212	303	2	1	888	10 629	678	1 577	− 5	− 38
234	333	2.5	1	626	7 839	406	973	− 5	− 45
234	333	2.5	1	905	8 208	695	1 468	− 5	− 31
254	353	2.5	1	651	9 162	431	1 077	− 5	− 48
254	353	2.5	1	947	12 542	740	1 781	− 5	− 40
278	391	3	1.5	1 076	2 325	540	702	−	−
278	391	3	1.5	2 012	10 091	1 008	1 742	−	−
318	451	3	1.5	2 505	5 838	756	1 011	−	−
318	451	3	1.5	4 678	10 874	1 408	1 876	−	−
382	530	4	2	2 801	6 524	845	1 129	−	−
382	530	4	2	5 231	12 157	1 575	2 096	−	−
402	550	4	2	2 982	6 945	899	1 201	−	−
402	550	4	2	5 569	12 942	1 676	2 231	−	−

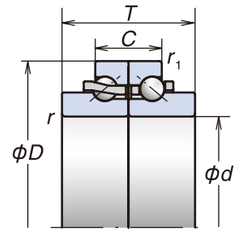
(1) For details on permissible axial load, refer to Page 199.
(2) For details on limiting speeds, refer to Page 216. Limiting speeds listed on this page are based on a DB arrangement with extra light preload (EL). Adjust the limiting speed to 85% of the figure shown when a light preload (L) has been selected.

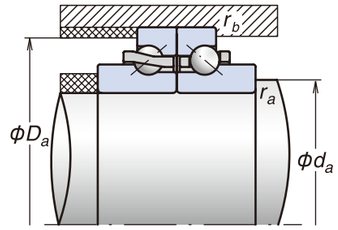
For additional information:
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Spacer Dimensions and Nozzle Position ·· P237
- Recommended Grease Quantities ·· P257

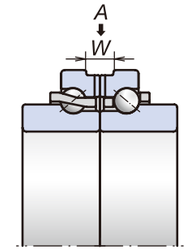
3. Angular Contact Thrust Ball Bearings

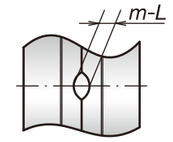
Bore Diameter **80-130** mm

Angular Contact Thrust Ball Bearings (NSKTAC F Series)









Notch Detail (Arrow View A)

E44 Specification

Designation	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Permissible Axial Load (1) (kN)	Fatigue Load Limit C_u (kN)	Contact Angle (°)	Mass (kg/row) (Reference)	Limiting Speeds (2) (min^{-1})	
	d	*D*	*T*	*C*	*r* (min.)	r_1 (min.)	C_a (Dynamic)	C_{oa} (Static)					Grease	Oil
50TAC20F	**50**	**80**	**38**	19	1	0.6	32.0	64.0	10.5	4.20	50	0.285	6 900	7 700
55TAC20F	**55**	**90**	**44**	22	1.1	0.6	39.5	81.0	13.3	5.35	50	0.442	6 200	6 900
60TAC20F	**60**	**95**	**44**	22	1.1	0.6	41.0	88.5	14.4	5.85	50	0.474	5 800	6 500
65TAC20F	**65**	**100**	**44**	22	1.1	0.6	42.5	96.0	15.5	6.35	50	0.506	5 500	6 100
70TAC20F	**70**	**110**	**48**	24	1.1	0.6	58.0	127	20.2	8.20	50	0.678	5 000	5 600
75TAC20F	**75**	**115**	**48**	24	1.1	0.6	59.0	132	21.0	8.55	50	0.717	4 700	5 300
80TAC20F	**80**	**125**	**54**	27	1.1	0.6	69.0	157	25.1	10.1	50	1.01	4 400	4 900
85TAC20F	**85**	**130**	**54**	27	1.1	0.6	70.0	164	26.0	10.3	50	1.04	4 200	4 700
90TAC20F	**90**	**140**	**60**	30	1.5	1	92.0	213	34.5	12.8	50	1.39	3 900	4 300
95TAC20F	**95**	**145**	**60**	30	1.5	1	93.0	222	36.0	13.1	50	1.45	3 800	4 200
100TAC29F	**100**	**140**	**48**	24	1.1	0.6	64.5	171	26.8	10.1	50	0.917	3 800	4 200
100TAC20F	**100**	**150**	**60**	30	1.5	1	94.5	231	37.0	13.3	50	1.47	3 600	4 000
105TAC20F	**105**	**160**	**66**	33	2	1	107	265	42.5	15.0	50	1.96	3 400	3 800
110TAC29F	**110**	**150**	**48**	24	1.1	0.6	67.0	187	29.2	10.7	50	0.996	3 500	3 800
110TAC20F	**110**	**170**	**72**	36	2	1	121	300	46.0	16.7	50	2.45	3 200	3 600
120TAC29F	**120**	**165**	**54**	27	2	1	78.5	223	35.0	12.3	50	1.39	3 200	3 500
120TAC20F	**120**	**180**	**72**	36	2	1	124	325	49.0	17.4	50	2.63	3 000	3 300
130TAC29F	**130**	**180**	**60**	30	1.5	1	93.5	276	43.5	14.3	50	1.89	2 900	3 200
130TAC20F	**130**	**200**	**84**	42	2	1	157	395	61.5	20.0	50	3.96	2 700	3 000

Abutment and Fillet Dimensions (mm)				Preload (N)		Axial Rigidity (N/μm)		Measured Axial Clearance (μm)		E44 Specification Lubrication Holes		
d_a	D_a	r_a (max.)	r_b (max.)	EL	L	EL	L	EL	L	Oil Groove Width *W* (mm)	Notch Width *L* (mm)	Number of Holes *m*
62	75	1	0.6	549	2 335	530	876	− 5	− 15	8	3	4
69	84	1	0.6	580	2 485	565	934	− 5	− 15	8	3	4
74	89	1	0.6	619	2 677	609	1 010	− 5	− 15	8	3	4
79	94	1	0.6	658	2 868	652	1 086	− 5	− 15	8	3	4
87	104	1	0.6	648	2 814	641	1 062	− 5	− 15	10	4	4
92	109	1	0.6	670	2 920	665	1 104	− 5	− 15	10	4	4
99	117	1	0.6	806	3 236	733	1 181	− 5	− 15	12	5	4
104	122	1	0.6	829	3 348	758	1 225	− 5	− 15	12	5	4
110	131	1.5	1	847	3 428	778	1 254	− 5	− 15	12	5	4
115	136	1.5	1	872	3 548	805	1 301	− 5	− 15	12	5	4
117	134	1	0.6	931	3 839	871	1 418	− 5	− 15	10	4	4
120	141	1.5	1	897	3 667	833	1 348	− 5	− 15	12	5	4
127	150	2	1	925	3 802	864	1 400	− 5	− 15	12	6	4
127	144	1	0.6	996	4 157	944	1 543	− 5	− 15	10	4	4
134	158	2	1	952	3 933	894	1 451	− 5	− 15	14	6	4
139	157	2	1	1 036	4 351	989	1 619	− 5	− 15	10	5	4
144	168	2	1	1 005	4 189	954	1 551	− 5	− 15	14	6	4
150	170	1.5	1	1 102	4 666	1 062	1 741	− 5	− 15	10	5	4
160	187	2	1	956	3 946	898	1 453	− 5	− 15	14	6	4

(1) For details on permissible axial load, refer to Page 199.
(2) For details on limiting speeds, refer to Page 216. Limiting speeds listed on this page are based on a DB arrangement with extra light preload (EL). Adjust the limiting speed to 85% of the figure shown when a light preload (L) has been selected.

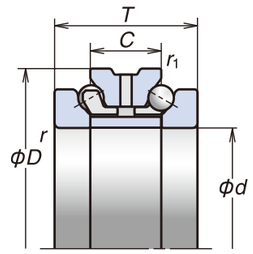
For additional information:

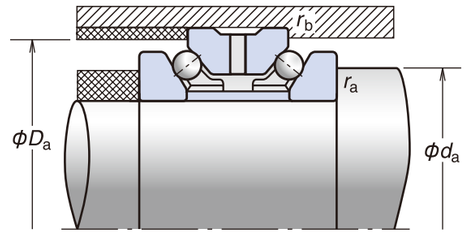
- Dynamic Equivalent Load ····· P191
- Static Equivalent Load ····· P198
- Recommended Grease Quantities ·· P257

3. Angular Contact Thrust Ball Bearings

Bore Diameter **140-320** mm

Double-Direction Angular Contact Thrust Ball Bearings (NSKTAC D Series)





Designation	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Permissible Axial Load (2) (kN)	Fatigue Load Limit C_u (kN)	Contact Angle (°)	Mass (kg) (Reference)	Limiting Speeds (3) (min^{-1})	
	d	*D* (1)	*T*	*C*	*r* (min.)	r_1 (min.)	C_a (Dynamic)	C_{oa} (Static)					Grease	Oil
140TAC20X+L	**140**	**210**	**84**	42	2	1	183	525	325	25.0	60	8.67	2 600	2 900
150TAC29D+L	**150**	**210**	**72**	36	2	1	146	465	290	22.2	60	6.18	2 500	2 800
150TAC20X+L	**150**	**225**	**90**	45	2.1	1.1	216	620	382	28.2	60	10.6	2 400	2 700
160TAC29D+L	**160**	**220**	**72**	36	2	1	149	490	307	22.9	60	6.45	2 400	2 700
160TAC20X+L	**160**	**240**	**96**	48	2.1	1.1	233	685	424	30.0	60	12.9	2 300	2 500
170TAC29D+L	**170**	**230**	**72**	36	2	1	152	520	324	23.6	60	7.35	2 300	2 500
170TAC20X+L	**170**	**260**	**108**	54	2.1	1.1	274	810	497	34.5	60	17.6	2 100	2 400
180TAC29D+L	**180**	**250**	**84**	42	2	1	199	655	405	28.5	60	9.99	2 100	2 400
180TAC20X+L	**180**	**280**	**120**	60	2.1	1.1	355	1 020	634	41.5	60	23.1	2 000	2 200
190TAC29D+L	**190**	**260**	**84**	42	2	1	203	695	428	29.5	60	11.0	2 000	2 300
190TAC20D+L	**190**	**290**	**120**	60	2.1	1.1	360	1 060	659	43.0	60	24.4	1 900	2 100
200TAC29D+L	**200**	**280**	**96**	48	2.1	1.1	257	855	531	35.0	60	15.7	1 900	2 100
200TAC20D+L	**200**	**310**	**132**	66	2.1	1.1	395	1 180	736	46.0	60	29.6	1 800	2 000
220TAC29D+L	**220**	**300**	**96**	48	2.1	1.1	265	930	577	36.5	60	17.0	1 800	2 000
220TAC20D+L	**220**	**340**	**144**	72	2.1	1.1	455	1 390	856	52.0	60	39.1	1 600	1 800
240TAC29D+L	**240**	**320**	**96**	48	2.1	1.1	268	980	608	37.5	60	17.0	1 700	1 800
240TAC20D+L	**240**	**360**	**144**	72	3	1.1	455	1 450	893	52.0	60	42.2	1 500	1 700
260TAC29D+L	**260**	**360**	**120**	60	2.1	1.1	395	1 390	858	49.5	60	30.3	1 500	1 700
260TAC20D+L	**260**	**400**	**164**	82	4	1.5	550	1 890	1 170	65.0	60	64.5	1 400	1 600
280TAC29D+L	**280**	**380**	**120**	60	2.1	1.1	400	1 470	909	51.0	60	31.3	1 400	1 600
300TAC29D+L	**300**	**420**	**144**	72	3	1.1	500	1 810	1 120	60.5	60	50.4	1 200	1 400
320TAC29D+L	**320**	**440**	**144**	72	3	1.1	510	1 920	1 180	62.5	60	53.2	1 100	1 300

Abutment and Fillet Dimensions (mm)				Preload (N)			Axial Rigidity (N/μm)			Measured Axial Clearance (μm)		
d_a	D_a	r_a (max.)	r_b (max.)	C6	C7	C8	C6	C7	C8	C6	C7	C8
167	198	2	1	925	3 675	9 343	1 194	1 898	2 603	− 3	− 10	− 20
172	200	2	1	196	4 116	7 085	775	2 152	2 587	0	− 10	− 15
178	213	2	1	934	4 725	9 467	1 210	2 086	2 639	− 3	− 12	− 20
182	210	2	1	196	4 309	7 432	803	2 263	2 722	0	− 10	− 15
191	228	2	1	1 277	4 837	11 088	1 368	2 140	2 833	− 4	− 12	− 22
192	219	2	1	196	4 502	7 780	830	2 374	2 857	0	− 10	− 15
206	245	2	1	2 078	6 745	13 736	1 650	2 451	3 119	− 6	− 15	− 25
207	238	2	1	1 063	4 409	9 795	1 439	2 319	3 038	− 3	− 10	− 18
220	264	2	1	2 982	6 811	15 473	1 876	2 476	3 268	− 8	− 15	− 27
217	247	2	1	1 102	4 617	10 284	1 508	2 439	3 198	− 3	− 10	− 18
230	274	2	1	3 074	7 039	18 620	1 941	2 565	3 564	− 8	− 15	− 30
230	267	2	1	1 098	4 597	11 866	1 502	2 427	3 344	− 3	− 10	− 20
245	291	2	1	3 083	7 714	18 677	1 947	2 650	3 575	− 8	− 16	− 30
250	287	2	1	1 160	4 933	12 790	1 613	2 621	3 616	− 3	− 10	− 20
272	320	2	1	3 247	4 331	19 791	2 063	2 273	3 794	− 8	− 10	− 30
270	307	2	1	1 202	5 156	13 405	1 688	2 750	3 798	− 3	− 10	− 20
290	341	2.5	1	3 345	9 161	20 465	2 133	2 993	3 927	− 8	− 17	− 30
300	344	2	1	1 193	8 859	13 254	1 671	3 274	3 750	− 3	− 15	− 20
316	375	3	1.5	4 232	8 420	22 437	2 461	3 101	4 315	—	—	—
320	364	2	1	1 239	9 313	13 947	1 754	3 451	3 954	− 3	− 15	− 20
348	399	2.5	1	1 717	9 403	16 124	1 970	3 485	4 179	—	—	—
368	419	2.5	1	1 789	9 885	20 384	2 071	3 673	46 89	—	—	—

(1) Outside diameter tolerance is f6.
(2) For details on permissible axial load, refer to Page 199.
(3) For details on limiting speeds, refer to Page 216. Limiting speeds listed on this page are based on an extra light preload (C6).
Adjust the limiting speed to 85% of the figure shown when a light preload (C7) has been selected and 70% when a medium preload (C8) has been selected.

For additional information:
- Dynamic Equivalent Load ·····P191
- Static Equivalent Load ·····P198
- Recommended Grease Quantities··P257

4. Ball Screw Support Bearings



High-Rigidity Bearings

NSKTAC C Series



High Load Capacity Bearings

NSKTAC 03 Series



Double-Row Bearings

BSBD Series



Units

Units for Ball Screw Support

Ball Screw Support Bearings

NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support ···144-149

- Features
- Numbering System
- Bearing Tables
- High-Rigidity Angular Contact Thrust Ball Bearings
  - NSKTAC C Series
- High Load Capacity Angular Contact Thrust Ball Bearings
  - NSKTAC 03 Series

NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support (Double-Row) ···150-153

- Features
- Numbering System
- Bearing Tables
- Double-Row Bearings
  - BSBD Series

Units for Ball Screw Support ···154-155

- Features
- Numbering System
- Support Unit Tables

4. Ball Screw Support Bearings

NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support

Features

NSKHPS bearings improve reliability by focusing on material cleanliness—the single-most important factor for bearing life—through the use of our proprietary material evaluation technologies improve dynamic load ratings by 5% compared with conventional bearings.

The NSKTAC C Series features high axial rigidity suitable for machine tool feed mechanisms, while the NSKTAC 03 Series with its high axial load capacity is well-suited for the support of large ball screws in high-load drive applications such as electric injection molding machines. With these series, users can achieve much lower torque and higher accuracy than with roller bearings.

NSKTAC C High-Rigidity Bearings

A larger number of balls and a 60° contact angle provide high axial rigidity that makes NSKTAC C bearings ideally suited for machine tool feeding mechanisms.

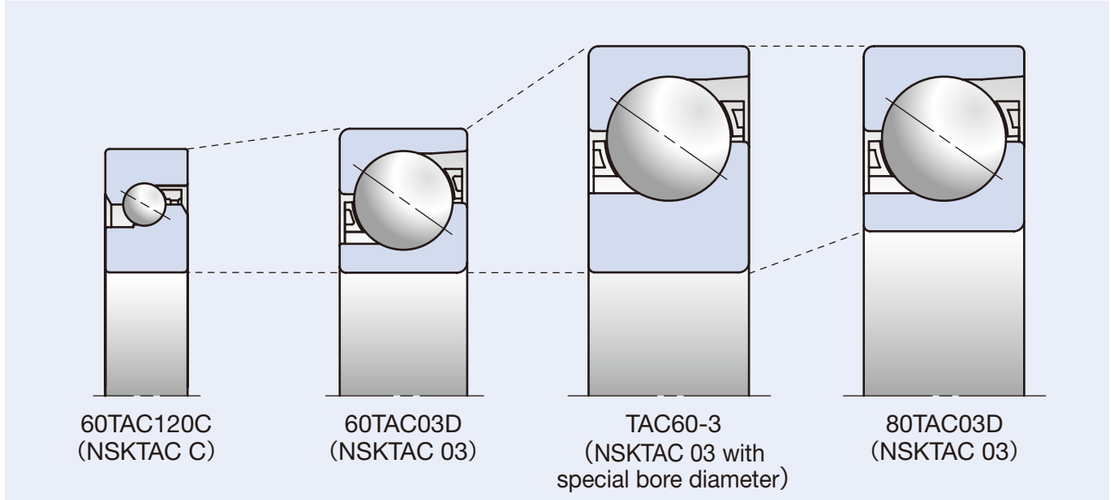
The DDG seals used for the sealed bearings of this series are light-contact seals for high speeds; a strong sealing effect is achieved by a labyrinth between the seal lip and the seal groove of the inner ring. This ensures that no foreign particles can get into the bearing and no grease can leak out, thus helping to keep the surrounding area clean. Some bearings from this series are also available as non-contact sealed bearings for even lower torque and lower heat generation.

For ease of handling and increased efficiency, NSKTAC C bearings come prepacked with WPH grease that resists high temperatures and is less likely to soften and leak.

NSKTAC 03 High Load Capacity Bearings

An optimized internal design provides NSKTAC 03 bearings with higher limiting axial loads, allowing for fewer bearing rows and smaller equipment. We also offer bearings with special bore diameters. That way, bearings with higher load capacity may be employed without any need to modify the shaft diameter, allowing for more compact screw shaft ends.

Please consult with NSK to confirm the suitability of NSKTAC 03 bearings for applications outside of injection molding machines and machine tools.



Numbering System for NSKTAC C High-Rigidity Angular Contact Thrust Ball Bearings

Designation example: 30 | TAC | 62 | C | | SU | H | PN7C

- 30 — Nominal bore diameter
- TAC — Bearing type
- 62 — Nominal outside diameter
- C — Internal design
- (blank) — Seal
- SU — Arrangement
- H — Preload
- PN7C — Accuracy

			Reference pages
30	Nominal bore diameter	Bore diameter (mm)	146-147
TAC	Bearing type	Angular contact thrust ball bearing	30, 144
62	Nominal outside diameter	Outside diameter (mm)	146-147
C	Internal design	Contact angle 60°	—
	Seal	No code: Open type DDG: Contact rubber seal V1V: Non-contact rubber seal	144
SU	Arrangement	SU: Universal arrangement (single-row)	200-205
H	Preload	H: Heavy preload (standard in the NSKHPS Series)	146-147
PN7C	Accuracy	PN7C: NSKTAC C standard accuracy (NES Class 7C, axial runout equivalent to P2)	229

Numbering System for NSKTAC 03 High Load Capacity Angular Contact Thrust Ball Bearings

Designation example: 60 | TAC | 03 | D | T85 | SU | M | PN5D

- 60 — Nominal bore diameter
- TAC — Bearing type
- 03 — Dimension series
- D — Internal design
- T85 — Cage
- SU — Arrangement
- M — Preload
- PN5D — Accuracy

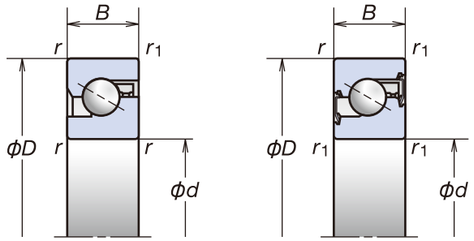
			Reference pages
60	Nominal bore diameter	Bore diameter (mm)	148-149
TAC	Bearing type	Angular contact thrust ball bearing	30, 144
03	Dimension series	02: 02 Series 03: 03 Series	144
D	Internal design	Contact angle 55°	—
T85	Cage	T85: Polyamide cage M: Brass Cage	—
SU	Arrangement	SU: Universal arrangement (single-row)	200-205
M	Preload	M: Medium preload EL: Extra light preload	148-149
PN5D	Accuracy	PN5D: NSKTAC 03 standard accuracy (NES Class 5D)	229

NSKHPS is not applicable for TAC100-3 to 180TAC03DM.

4. Ball Screw Support Bearings

Bore Diameter **15-60** mm

High-Rigidity Angular Contact Thrust Ball Bearings



Open type　　Sealed type DDG

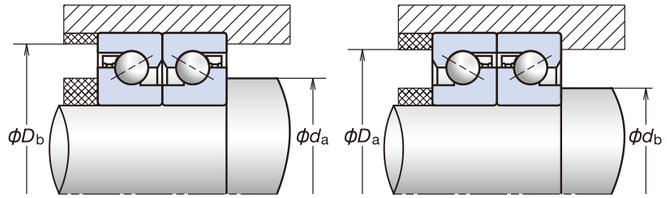
(Open type)

Designation	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (mm)				Recommended Grease Quantity (g/brg)	Contact Angle (°)	Limiting Speeds (2) (min⁻¹)		Mass (kg) (approx.)
	d	*D*	*B*	*r* (min.)	r_1 (min.)	D_b (max.)	d_a (min.)	D_a (max.)	d_b (min.)			Grease	Oil	
15TAC47C	**15**	**47**	**15**	1	0.6	42	19.5	41	19.5	2.0	60	6 900	9 200	0.146
17TAC47C	**17**	**47**	**15**	1	0.6	42	23	41	23	2.0	60	6 900	9 200	0.140
20TAC47C	**20**	**47**	**15**	1	0.6	42	25	41	25	2.0	60	6 900	9 200	0.135
25TAC62C	**25**	**62**	**15**	1	0.6	57	31	56	31	2.8	60	5 200	6 900	0.252
30TAC62C	**30**	**62**	**15**	1	0.6	57	36	56	36	3.0	60	4 900	6 400	0.224
30TAC72C	**30**	**72**	**19**	1	0.6	67	36	66	36	4.6	60	4 100	5 800	0.427
35TAC72C	**35**	**72**	**15**	1	0.6	67	42	66	42	3.5	60	4 100	5 800	0.310
40TAC72C	**40**	**72**	**15**	1	0.6	67	47	66	47	3.6	60	4 100	5 500	0.275
40TAC90C	**40**	**90**	**20**	1	0.6	85	48	84	48	8.2	60	3 500	4 600	0.674
45TAC75C	**45**	**75**	**15**	1	0.6	68	54	67	54	3.9	60	3 700	4 900	0.270
45TAC100C	**45**	**100**	**20**	1	0.6	93	55	92	55	9.0	60	3 000	4 100	0.842
50TAC100C	**50**	**100**	**20**	1	0.6	92	60	91	60	9.5	60	3 000	3 900	0.778
55TAC100C	**55**	**100**	**20**	1	0.6	92	63	91	63	9.5	60	3 000	3 900	0.714
55TAC120C	**55**	**120**	**20**	1	0.6	112	63	111	63	11	60	2 500	3 500	1.23
60TAC120C	**60**	**120**	**20**	1	0.6	112	70	111	70	11	60	2 500	3 500	1.16

(Sealed type)

Designation (1)	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (mm)				Contact Angle (°)	Limiting Speeds (2) (min⁻¹)	Mass (kg) (approx.)
	d	*D*	*B*	*r* (min.)	r_1 (min.)	D_b (max.)	d_a (min.)	D_a (max.)	d_b (min.)		Grease	
***15TAC47CDDG**	**15**	**47**	**15**	1	0.6	42	19.5	41	19.5	60	6 900	0.146
***17TAC47CDDG**	**17**	**47**	**15**	1	0.6	42	22	41	22	60	6 900	0.140
***20TAC47CDDG**	**20**	**47**	**15**	1	0.6	42	25	41	25	60	6 900	0.135
***25TAC62CDDG**	**25**	**62**	**15**	1	0.6	57	30	56	30	60	5 200	0.252
30TAC62CDDG	**30**	**62**	**15**	1	0.6	57	36	56	36	60	4 900	0.224
35TAC72CDDG	**35**	**72**	**15**	1	0.6	67	41	66	41	60	4 100	0.310
40TAC72CDDG	**40**	**72**	**15**	1	0.6	67	46	66	46	60	4 100	0.275
40TAC90CDDG	**40**	**90**	**20**	1	0.6	85	47	84	47	60	3 500	0.674
45TAC100CDDG	**45**	**100**	**20**	1	0.6	93	54	92	54	60	3 000	0.842
50TAC100CDDG	**50**	**100**	**20**	1	0.6	92	59	91	59	60	3 000	0.778
55TAC100CDDG	**55**	**100**	**20**	1	0.6	92	63	91	63	60	3 000	0.714

(1) An asterisk (*) indicates bearings that are also available as non-contact sealed bearings.
(2) Limiting speeds are based on high preload (H). The values shown are valid for all types of bearing arrangements.
(3) To calculate permissible axial load, multiply limiting axial load by 0.7.
(4) The starting torque values in the table apply to grease-lubricated bearings. Contact seal torque is not included. For oil-lubricated bearings, multiply by 1.4.
(5) Abutment and fillet dimensions shown are recommended values for general machine tool applications. For heavy loads, please contact NSK.



Calculation of preload, axial rigidity, starting torque and Fatigue Load Limit for bearing arrangements
Multiply by factors in table B.

Table B

	DFD ⦰⦰⦰	DFF ⦰⦰⦰⦰	DFT ⦰⦰⦰⦰
	DBD ⦰⦰⦰	DBB ⦰⦰⦰⦰	DBT ⦰⦰⦰⦰
Preload factor	1.36	2.00	1.57
Axial rigidity	1.49	2.00	1.89
Starting torque	1.35	2.00	1.55
Fatiigue Load Limit	2.00		3.00

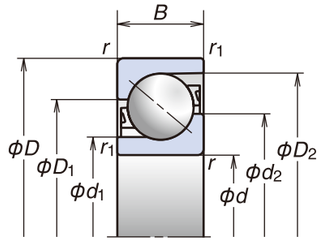
DB/DF Arrangement—H Preload				Basic Dynamic Load Rating C_a (by Number of Rows Sustaining F_a)			Limiting Static Axial Load (3) (by Number of Rows Sustaining F_a)			Fatigue Load Limit C_u (kN)
Preload (N)	Axial Rigidity (N/μm)	Starting Torque (4) (N·m)	Measured Axial Clearance (μm)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
2 280	850	0.15	− 15	36.0	58.5	77.5	40.5	81.5	122	3.35
2 400	890	0.16	− 15	37.0	59.5	79.5	43.0	86.0	129	3.55
2 750	1 030	0.18	− 15	39.0	63.5	84.5	50.0	100	150	4.25
2 750	1 030	0.18	− 15	39.0	63.5	84.5	50.0	100	150	4.25
2 860	1 080	0.19	− 15	40.0	65.0	86.5	52.0	104	157	4.45
3 450	1 150	0.29	− 17	74.5	121	160	89.5	179	269	7.80
3 100	1 170	0.20	− 15	41.5	67.0	89.5	57.0	114	170	4.90
4 440	1 340	0.40	− 19	77.5	126	167	99.0	198	298	8.80
4 650	1 410	0.42	− 19	79.0	129	171	104	208	310	9.30
4 650	1 410	0.42	− 19	79.0	129	171	104	208	310	9.30
5 450	1 660	0.49	− 19	85.0	138	183	123	246	370	11.3
5 450	1 660	0.49	− 19	85.0	138	183	123	246	370	11.3

DB and DF Arrangement—H Preload				Basic Dynamic Load Rating C_a (by Number of Rows Sustaining F_a)			Limiting Static Axial Load (3) (by Number of Rows Sustaining F_a)			Fatigue Load Limit C_u (kN)
Preload (N)	Axial Rigidity (N/μm)	Starting Torque (4) (N·m)	Measured Axial Clearance (μm)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
1 450	630	0.09	− 13	27.6	45.0	59.5	26.6	53.0	79.5	2.27
2 280	850	0.15	− 15	36.0	58.5	77.5	40.5	81.5	122	3.35
2 400	890	0.16	− 15	37.0	59.5	79.5	43.0	86.0	129	3.55
2 750	1 030	0.18	− 15	39.0	63.5	84.5	50.0	100	150	4.25
2 860	1 080	0.19	− 15	40.0	65.0	86.5	52.0	104	157	4.45
3 450	1 150	0.29	− 17	74.5	121	160	89.5	179	269	7.80
4 440	1 340	0.40	− 19	77.5	126	167	99.0	198	298	8.80
4 650	1 410	0.42	− 19	79.0	129	171	104	208	310	9.30
4 650	1 410	0.42	− 19	79.0	129	171	104	208	310	9.30

4. Ball Screw Support Bearings

Bore Diameter **15-180** mm

High Load Capacity Angular Contact Thrust Ball Bearings



Designation (1)	Boundary Dimensions (mm)					Reference Dimensions (mm)				Recommended Grease Quantity (g/brg)	Contact Angle (°)	Limiting Speeds (2) (min⁻¹)		Mass (kg) (approx.)
	d	*D*	*B*	*r* (min.)	r_1 (min.)	d_1	d_2	D_1	D_2			Grease	Oil	
15TAC02D	**15**	**35**	**11**	0.6	0.3	19.1	24.5	26	31.9	1.0	55	12 000	14 800	0.047
20TAC03D	**20**	**52**	**15**	1.1	0.6	27.2	35.3	37.5	46.1	2.7	55	8 300	10 300	0.155
25TAC02D	**25**	**52**	**15**	1	0.6	30.8	38.1	39.6	47.3	3.0	55	7 700	9 700	0.137
TAC35-3	**35**	**90**	**23**	1.5	1	50.4	64.2	67.1	81.7	13	55	4 600	5 700	0.712
40TAC03D	**40**	**90**	**23**	1.5	1	50.4	64.2	67.1	81.7	13	55	4 600	5 700	0.659
TAC40-3	**40**	**110**	**27**	2	1	62	79.1	82.4	100.6	24	55	3 700	4 700	1.28
45TAC03D	**45**	**100**	**25**	1.5	1	56.5	71.7	74.7	90.8	17	55	4 100	5 200	0.877
TAC45-3	**45**	**110**	**27**	2	1	62	79.1	82.4	100.6	24	55	3 700	4 700	1.21
50TAC03D	**50**	**110**	**27**	2	1	62	79.1	82.4	100.6	24	55	3 700	4 700	1.14
TAC50-3	**50**	**130**	**31**	2.1	1.1	73.9	93.8	98	119	37	55	3 100	3 900	2.00
55TAC03D	**55**	**120**	**29**	2	1	68	86.4	90.2	109.7	30	55	3 400	4 300	1.44
60TAC03D	**60**	**130**	**31**	2.1	1.1	73.9	93.8	98	119	37	55	3 100	3 900	1.80
TAC60-3	**60**	**170**	**39**	2.1	1.1	98.5	123.6	128.7	157.5	79	55	2 400	3 000	4.47
70TAC03D	**70**	**150**	**35**	2.1	1.1	86.3	108.6	113.4	137.8	55	55	2 700	3 400	2.67
75TAC03D	**75**	**160**	**37**	2.1	1.1	92.4	116.2	121	146.2	67	55	2 500	3 200	3.20
80TAC03D	**80**	**170**	**39**	2.1	1.1	98.5	123.6	128.7	157.5	79	55	2 400	3 000	3.80
TAC80-3	**80**	**215**	**47**	3	1.1	124	154.9	160.4	194.5	148	55	1 900	2 400	8.66
100TAC03D	**100**	**215**	**47**	3	1.1	124	154.9	160.4	194.5	148	55	1 900	2 400	7.54
TAC100-3	**100**	**260**	**55**	3	1.1	150.5	186.9	193.4	231.7	237	55	1 500	2 000	14.8
120TAC03D	**120**	**260**	**55**	3	1.1	150.5	186.9	193.4	231.7	237	55	1 500	2 000	13.3
***TAC120-3M**	**120**	**300**	**62**	4	1.5	174.3	216.4	223.6	268.3	299	55	1 300	1 700	24.4
***140TAC03DM**	**140**	**300**	**62**	4	1.5	174.3	216.4	223.6	268.3	299	55	1 300	1 700	22.4
***TAC140-3M**	**140**	**340**	**68**	4	1.5	201.2	246.2	254.3	301.6	395	55	1 200	1 500	34.1
***160TAC03DM**	**160**	**340**	**68**	4	1.5	201.2	246.2	254.3	301.6	395	55	1 200	1 500	31.6
***TAC160-3M**	**160**	**380**	**75**	4	1.5	227.0	275.6	284.9	338.8	538	55	1 000	1 400	47.0
***180TAC03DM**	**180**	**380**	**75**	4	1.5	227.0	275.6	284.9	338.8	538	55	1 000	1 400	43.8

(1) An asterisk (*) indicates bearings that are also available equipped with screw holes for mounting bolts.
(2) Limiting speeds are based on the standard preload of each bearing. The values shown are valid for all types of bearing arrangements.
(3) The starting torque values in the table apply to grease lubrication.
(4) To calculate permissible axial load, multiply limiting axial load by 0.7.

Calculation of preload, axial rigidity, starting torque and Fatigue Load Limit for bearing arrangements
Multiply by factors in table B.

Table B

Number of load-sustaining rows	2 rows		3 rows			4 rows		5 rows
	DFD ØØØ	DFF ØØØØ	DFT ØØØØ	DFFD ØØØØØ	DFFF ØØØØØ	DFTD ØØØØØ	DFFT ØØØØØ	DFTT ØØØØØ
	DBD ØØØ	DBB ØØØØ	DBT ØØØØ	DBBD ØØØØØ	DBBB ØØØØØØ	DBTD ØØØØØ	DBBT ØØØØØØ	DBTT ØØØØØØ
Preload factor	1.36	2.00	1.57	2.42	3.00	1.72	2.72	1.83
Axial rigidity	1.49	2.00	1.89	2.51	3.00	2.24	2.97	2.57
Starting torque	1.35	2.00	1.55	2.41	3.00	1.68	2.71	1.77
Fatigue Load Limit	2.00		3.00			4.00		5.00

Preload	DB and DF Arrangements				Basic Dynamic Load Rating C_a (by Number of Rows Sustaining F_a)					Limiting Static Axial Load (4) (by Number of Rows Sustaining F_a)					Fatigue Load Limit C_u (kN)
	Preload (N)	Axial Rigidity (N/μm)	Starting Torque (3) (N·m)	Measured Axial Clearance (μm)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	4 Rows (kN)	5 Rows (kN)	1 Row (kN)	2 Rows (kN)	3 Rows (kN)	4 Rows (kN)	5 Rows (kN)	
M	400	290	0.017	− 7	25.1	41.0	54.0	66.5	77.5	18.6	37.5	56.0	74.5	93.0	1.64
M	830	430	0.026	− 10	51.0	83.0	110	135	158	38.5	77.0	116	154	193	3.60
M	690	430	0.036	− 8	44.5	72.0	95.5	117	137	36.0	72.5	109	145	181	3.50
M	2 500	780	0.26	− 18	136	221	293	360	420	118	235	355	470	590	11.2
M	2 500	780	0.26	− 18	136	221	293	360	420	118	235	355	470	590	11.2
M	3 900	970	0.50	− 23	200	325	430	525	615	181	360	540	720	905	17.3
M	2 800	830	0.31	− 20	160	259	345	420	495	142	283	425	565	710	13.7
M	3 900	970	0.50	− 23	200	325	430	525	615	181	360	540	720	905	17.3
M	3 900	970	0.50	− 23	200	325	430	525	615	181	360	540	720	905	17.3
M	5 200	1 120	0.78	− 26	261	425	565	690	805	242	485	725	965	1 210	23.5
M	5 200	1 120	0.78	− 26	261	425	565	690	805	242	485	725	965	1 210	23.5
M	4 280	1 060	0.68	− 24	228	370	490	600	705	210	420	630	840	1 050	20.1
M	5 200	1 120	0.78	− 26	261	425	565	690	805	242	485	725	965	1 210	23.5
M	8 050	1 400	1.5	− 33	365	595	790	965	1 130	390	775	1 170	1 550	1 940	34.0
M	6 400	1 250	1.1	− 29	315	510	680	830	970	305	615	920	1 230	1 530	28.8
M	7 230	1 330	1.3	− 31	340	550	735	895	1 050	345	690	1 040	1 380	1 730	31.0
M	8 050	1 400	1.5	− 33	365	595	790	965	1 130	390	775	1 170	1 550	1 940	34.0
EL	1 230	880	0.15	− 6	505	820	1 090	1 330	1 560	510	1 020	1 530	2 040	2 550	48.5
EL	1 230	880	0.15	− 6	505	820	1 090	1 330	1 560	510	1 020	1 530	2 040	2 550	48.5
EL	1 620	1 050	0.21	− 7	625	1 020	1 350	1 650	1 930	680	1 360	2 040	2 720	3 400	63.0
EL	1 620	1 050	0.21	− 7	625	1 020	1 350	1 650	1 930	680	1 360	2 040	2 720	3 400	63.0
EL	1 710	1 130	0.24	− 7	765	1 240	1 650	2 020	2 360	794	1 590	2 380	3 200	3 950	77.5
EL	1 710	1 130	0.24	− 7	765	1 240	1 650	2 020	2 360	794	1 590	2 380	3 200	3 950	77.5
EL	1 850	1 240	0.27	− 7	870	1 420	1 880	2 300	2 690	1 040	2 080	3 100	4 150	5 200	90.5
EL	1 850	1 240	0.27	− 7	870	1 420	1 880	2 300	2 690	1 040	2 080	3 100	4 150	5 200	90.5
EL	1 940	1 310	0.30	− 7	1 030	1 670	2 220	2 710	3 150	1 360	2 720	4 100	5 450	6 800	108
EL	1 940	1 310	0.30	− 7	1 030	1 670	2 220	2 710	3 150	1 360	2 720	4 100	5 450	6 800	108

4. Ball Screw Support Bearings

NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support (Double-Row)

BSBD Series double-row nearing units support the quick and accurate positioning of workpieces and spindles.

Features

The bearings of this series are double-row angular contact thrust ball bearings with a 60° contact angle and a single outer ring. The specifications are the same as those of NSKTAC bearings, both series being optimized for the support of ball screws in machine tools. All BSBD Series bearings are equipped with a rubber contact seal and prepacked with high-performance grease.

Angular Contact Thrust Ball Bearings for Ball Screw Support (Double-Row) (BSBD Series)

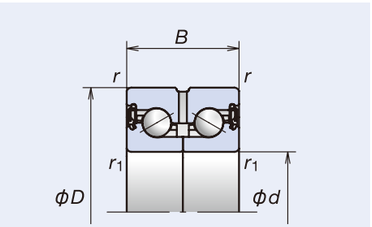
Designation example: **BS F 30 80 DDU H P2B DT**

- BS — Bearing type
- F — F: Flange type, N: No flange
- 30 — Bore diameter
- 80 — Outside diameter
- DDU — Seal type
- H — Preload
- P2B — Accuracy
- DT — Arrangement

Note:
P2B is an accuracy class specific to the BSBD Series, indicating the following:
Running accuracy: ISO Class 2
Other tolerances: NSK-specific

■ BSN Type

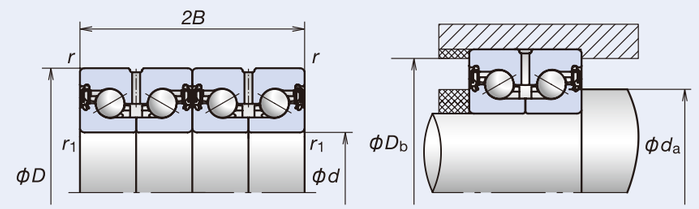
BSN bearings are double-row angular contact thrust ball bearings in a back-to-back arrangement with a single outer ring. The bearings are prepacked with high performance grease. Lubrication holes allow for relubrication during operation if necessary. The contact seal offers minimized friction and temperature rise while providing excellent sealing performance.



Single product

■ Matched DT pairs

BSBD bearings are available in matched DT pairs for applications with large external loads or where high rigidity and long life are required. The mating surfaces of the 2-row bearing set are controlled for offset so as to have no impact on the preload of each individual bearing.



Matched DT pairs

BSN Type Single product

Designation	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (1) (mm)		Contact Angle (°)	Basic Load Ratings (kN)		Limiting Static Axial Load (2) (kN)	Fatigue Load Limit C_u (kN)	Preload (N)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (min^{-1})	Starting Torque (3) (N·m)	Recommended Clamping Force (N)
	d	*D*	*B*	*r* (min.)	r_1 (min.)	d_a (min.)	D_b (max.)		C_a (Dynamic)	C_{oa} (Static)						Grease	H	
BSN1242	**12**	**42**	**25**	0.6	0.3	15	33	60	22.2	24.0	17.6	1.37	720	375	0.20	8 000	0.038	4 030
BSN1545	**15**	**45**	**25**	0.6	0.3	19	35	60	23.3	26.9	19.4	1.57	675	400	0.22	7 100	0.034	4 050
BSN1747	**17**	**47**	**25**	0.6	0.6	21	37	60	24.4	29.7	21.2	1.75	880	450	0.23	6 700	0.05	4 400
BSN2052	**20**	**52**	**28**	0.6	0.6	24	43	60	31.5	41.0	29.3	2.39	1 885	650	0.31	5 800	0.13	7 600
BSN2557	**25**	**57**	**28**	0.6	0.6	29	48	60	34.0	48.0	34.0	2.86	2 245	750	0.36	5 100	0.16	8 100
BSN3062	**30**	**62**	**28**	0.6	0.6	34	53	60	36.0	55.5	38.5	3.35	2 625	850	0.40	4 500	0.19	8 600
BSN3072	**30**	**72**	**38**	0.6	0.6	35	64	60	72.5	94.0	66.5	5.40	4 855	950	0.74	3 900	0.59	11 100
BSN3572	**35**	**72**	**34**	0.6	0.6	40	62	60	50.0	77.5	52.0	4.70	2 630	900	0.66	3 800	0.21	13 500
BSN4075	**40**	**75**	**34**	0.6	0.6	46	67	60	53.0	88.0	58.5	5.35	3 065	1 000	0.65	3 500	0.24	14 100
BSN4090	**40**	**90**	**46**	0.6	0.6	46	80	60	94.5	135	91.0	7.90	7 220	1 200	1.38	3 100	1.02	18 700
BSN5090	**50**	**90**	**34**	0.6	0.6	56	82	60	57.5	110	71.5	6.85	4 020	1 250	0.93	2 800	0.33	15 400
BSN50110	**50**	**110**	**54**	0.6	0.6	57	98	60	139	219	149	12.9	7 435	1 400	2.46	2 500	1.06	19 100
BSN60110	**60**	**110**	**45**	0.6	0.6	68	100	60	104	187	126	11.2	4 780	1 300	1.82	2 400	0.50	20 900

BSN Type Matched DT pairs

Designation	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (1) (mm)		Contact Angle (°)	Basic Load Ratings (kN)		Limiting Static Axial Load (2) (kN)	Fatigue Load Limit C_u (kN)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (min^{-1})	Starting Torque (3) (N·m)	Recommended Clamping Force (N)
	d	*D*	*2B*	*r* (min.)	r_1 (min.)	d_a (min.)	D_b (max.)		C_a (Dynamic)	C_{oa} (Static)					Grease	H	
BSN1747-DT	**17**	**47**	**50**	0.6	0.6	21	37	60	39.5	59.5	42.5	3.50	790	0.46	6 700	0.10	4 400
BSN2052-DT	**20**	**52**	**56**	0.6	0.6	24	43	60	51.5	82.0	58.5	4.80	1 180	0.62	5 800	0.26	7 600
BSN2557-DT	**25**	**57**	**56**	0.6	0.6	29	48	60	55.0	96.0	68.0	5.70	1 370	0.71	5 100	0.32	8 100
BSN3062-DT	**30**	**62**	**56**	0.6	0.6	34	53	60	58.5	111	77.0	6.65	1 580	0.80	4 500	0.37	8 600
BSN3072-DT	**30**	**72**	**76**	0.6	0.6	35	64	60	118	188	133	10.8	1 800	1.47	3 900	1.17	11 100
BSN3572-DT	**35**	**72**	**68**	0.6	0.6	40	62	60	81.5	155	104	9.35	1 630	1.32	3 800	0.41	13 500
BSN4075-DT	**40**	**75**	**68**	0.6	0.6	46	67	60	86.5	176	117	10.7	1 850	1.30	3 500	0.49	14 100
BSN4090-DT	**40**	**90**	**92**	0.6	0.6	46	80	60	153	269	182	15.8	2 300	2.76	3 100	2.03	18 700
BSN5090-DT	**50**	**90**	**68**	0.6	0.6	56	82	60	93.5	220	143	13.7	2 330	1.86	2 800	0.66	15 400
BSN50110-DT	**50**	**110**	**108**	0.6	0.6	57	98	60	226	440	299	25.8	2 690	4.92	2 500	2.11	19 100

(1) Abutment and fillet dimensions shown are recommended values for general machine tool applications. For heavy loads, please contact NSK.
(2) To calculate permissible axial load, multiply limiting axial load by 0.7.
(3) Values shown indicate starting torque in preloaded bearings and do not include seal torque.
Note: Be sure to secure inner rings during dismounting, as they are designed to separate easily.

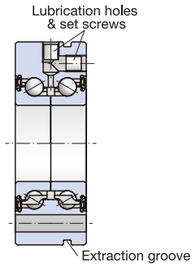
4. Ball Screw Support Bearings

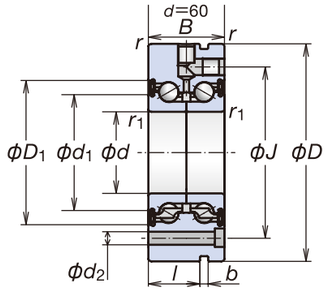
Double-Row (BSBD Series)

■ BSF Type

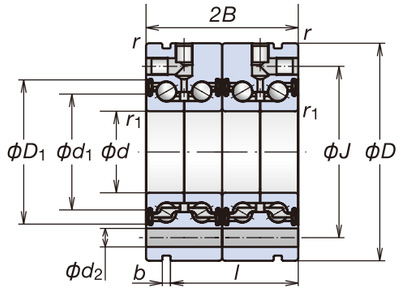
Like the BSN range, BSF bearings offer bolt holes on the outer ring for easy mounting directly to the side of a housing. With a lubrication hole on the outside diameter surface and another on the side surface, relubrication is easy. If not used, these holes can be blocked with set screws to prevent foreign matter entry. Additionally, an extraction groove on the outside diameter surface makes for easy removal.

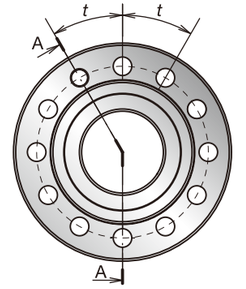
Note: BSF bearings are supplied with seals and set screws
Mounting bolts are not included.



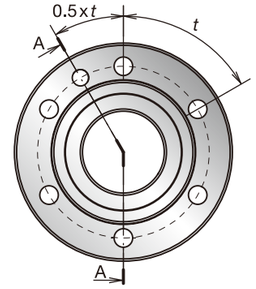


(BSF60145 features countersunk bolt holes)





Type Ⅰ



Type Ⅱ

BSF Type Single product

Designation	Boundary Dimensions (mm)					Contact Angle (°)	Basic Load Ratings (kN)		Limiting Static Axial Load (1) (kN)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (min⁻¹)
	d	*D*	*B*	*r* (min.)	r_1 (min.)		C_a (Dynamic)	C_{oa} (Static)				Grease
BSF1255	**12**	**55**	**25**	0.6	0.3	60	22.2	24.0	17.6	375	0.37	8 000
BSF1560	**15**	**60**	**25**	0.6	0.3	60	23.3	26.9	19.4	400	0.44	7 100
BSF1762	**17**	**62**	**25**	0.6	0.6	60	24.4	29.7	21.2	450	0.46	6 700
BSF2068	**20**	**68**	**28**	0.6	0.6	60	31.5	41.0	29.3	650	0.61	5 800
BSF2575	**25**	**75**	**28**	0.6	0.6	60	34.0	48.0	34.0	750	0.73	5 100
BSF3080	**30**	**80**	**28**	0.6	0.6	60	36.0	55.5	38.5	850	0.79	4 500
BSF30100	**30**	**100**	**38**	0.6	0.6	60	72.5	94.0	66.5	950	1.71	3 900
BSF3590	**35**	**90**	**34**	0.6	0.6	60	50.0	77.5	52.0	900	1.20	3 800
BSF40100	**40**	**100**	**34**	0.6	0.6	60	53.0	88.0	58.5	1 000	1.49	3 500
BSF40115	**40**	**115**	**46**	0.6	0.6	60	94.5	135	91.0	1 200	2.56	3 100
BSF50115	**50**	**115**	**34**	0.6	0.6	60	57.5	110	71.5	1 250	1.89	2 800
BSF50140	**50**	**140**	**54**	0.6	0.6	60	139	219	149	1 400	4.46	2 500
BSF60145	**60**	**145**	**45**	0.6	0.6	60	104	187	126	1 300	4.06	2 400

Reference Dimensions (mm)							Type	Mounting Bolts		Preload (N)	Starting Torque (2) (N·m)	Recommended Clamping Force (N)
d_1	D_1	*J*	d_2	*l*	*b*	*t*		Bolt Dia.	Number of Bolts		H	
23.7	32.7	42	6.8	17	3	3 x 120°	Ⅱ	M6	3	720	0.038	4 030
26.7	35.7	46	6.8	17	3	3 x 120°	Ⅱ	M6	3	675	0.034	4 050
28.1	37.7	48	6.8	17	3	3 x 120°	Ⅱ	M6	3	890	0.05	4 400
32.6	43	53	6.8	19	3	4 x 90°	Ⅱ	M6	4	1 885	0.13	7 600
37.6	48	58	6.8	19	3	4 x 90°	Ⅱ	M6	4	2 245	0.16	8 100
42.6	53	63	6.8	19	3	6 x 60°	Ⅱ	M6	6	2 625	0.19	8 600
49.1	64.4	80	8.8	30	3	8 x 45°	Ⅱ	M8	8	4 855	0.59	11 100
53.1	62.2	75	8.8	25	3	4 x 90°	Ⅱ	M8	4	2 630	0.21	13 500
55.1	67.2	80	8.8	25	3	4 x 90°	Ⅱ	M8	4	3 065	0.24	14 100
63.1	80.1	94	8.8	36	3	12 x 30°	Ⅱ	M8	12	7 220	1.02	18 700
70.1	82.2	94	8.8	25	3	6 x 60°	Ⅱ	M8	6	4 020	0.33	15 400
78.1	97.5	113	11	45	3	12 x 30°	Ⅱ	M10	12	7 435	1.06	19 100
83.1	99.3	120	8.8	35	3	8 x 45°	Ⅱ	M8	8	4 780	0.50	20 900

BSF Type Matched DT pairs

Designation	Boundary Dimensions (mm)					Contact Angle (°)	Basic Load Ratings (kN)		Limiting Static Axial Load (1) (kN)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (min⁻¹)
	d	*D*	*2B*	*r* (min.)	r_1 (min.)		C_a (Dynamic)	C_{oa} (Static)				Grease
BSF1762-DT	**17**	**62**	**50**	0.6	0.6	60	39.5	59.5	42.5	790	0.890	6 700
BSF2068-DT	**20**	**68**	**56**	0.6	0.6	60	51.5	82.0	58.5	1 180	1.17	5 800
BSF2575-DT	**25**	**75**	**56**	0.6	0.6	60	55.0	96.0	68.0	1 370	1.46	5 100
BSF3080-DT	**30**	**80**	**56**	0.6	0.6	60	58.5	111	77.0	1 580	1.58	4 500
BSF30100-DT	**30**	**100**	**76**	0.6	0.6	60	118	188	133	1 800	3.41	3 900
BSF3590-DT	**35**	**90**	**68**	0.6	0.6	60	81.5	155	104	1 630	2.30	3 800
BSF40100-DT	**40**	**100**	**68**	0.6	0.6	60	86.5	176	117	1 850	2.88	3 500
BSF40115-DT	**40**	**115**	**92**	0.6	0.6	60	153	269	182	2 300	5.12	3 100
BSF50115-DT	**50**	**115**	**68**	0.6	0.6	60	93.5	220	143	2 330	3.78	2 800
BSF50140-DT	**50**	**140**	**108**	0.6	0.6	60	226	440	299	2 690	8.92	2 500

Reference Dimensions (mm)							Type	Mounting Bolts		Starting Torque (2) (N·m)	Recommended Clamping Force (N)
d_1	D_1	*J*	d_2	*l*	*b*	*t*		Bolt Dia.	Number of Bolts	H	
28.1	37.7	48	6.8	42	3	6 x 60°	Ⅰ	M6	5	0.10	4 400
32.6	43	53	6.8	47	3	8 x 45°	Ⅰ	M6	7	0.26	7 600
37.6	48	58	6.8	47	3	8 x 45°	Ⅰ	M6	7	0.32	8 100
42.6	53	63	6.8	47	3	12 x 30°	Ⅰ	M6	11	0.37	8 600
49.1	64.4	80	8.8	68	3	8 x 45°	Ⅱ	M8	8	1.17	11 100
53.1	62.2	75	8.8	59	3	8 x 45°	Ⅰ	M8	7	0.41	13 500
55.1	67.2	80	8.8	59	3	8 x 45°	Ⅰ	M8	7	0.49	14 100
63.1	80.1	94	8.8	82	3	12 x 30°	Ⅱ	M8	12	2.03	18 700
70.1	82.2	94	8.8	59	3	12 x 30°	Ⅰ	M8	11	0.66	15 400
78.1	97.5	113	11	99	3	12 x 30°	Ⅱ	M10	12	2.11	19 100

(1) To calculate permissible axial load, multiply limiting axial load by 0.7.
(2) Values shown indicate starting torque in preloaded bearings and do not include seal torque.
(3) Be sure to secure inner rings during dismounting, as they are designed to separate easily.

4. Ball Screw Support Bearings

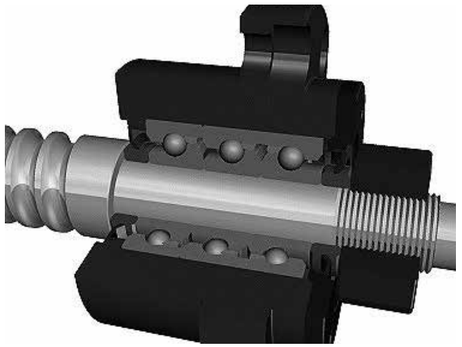
Ball Screw Support Units

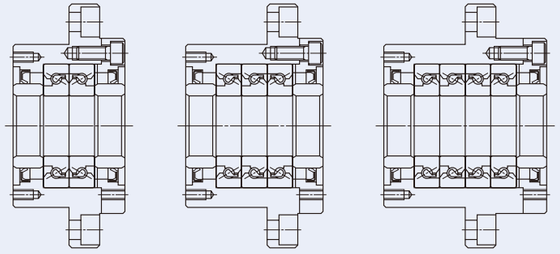


Ball screw support units for machine tools and heavy loads feature NSKTAC C Series high-accuracy, high-rigidity angular contact thrust ball bearings. Three types of arrangements are available, as shown below.

Features

- Dust-resistant design allows for simpler support structures
- With bearings pre-assembled and proper preload already applied, on-site mounting procedures are simple





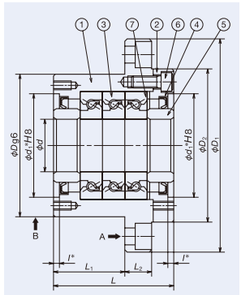
Designation	Support Unit Component Dimensions (1) (mm)																
	d	*D*	D_1	D_2	*L*	L_1	L_2	*A*	*W*	*X*	*Y*	*Z*	d_1*	*l**	*V**	*P**	*Q**
WBK17DF-31H	17	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK20DF-31H	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK25DF-31H	25	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK25DFD-31H	25	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DF-31H	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DFD-31H	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK35DF-31H	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK35DFD-31H	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK35DFF-31H	35	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DF-31H	40	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DFD-31H	40	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DFF-31H	40	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12

(1) Component dimensions with an asterisk (*) are used for mounting seal units to standard NSK hollow ball screw shafts but can also be used for dust covers, dampers, and other accessories.
(2) To calculate permissible axial load, multiply limiting axial load by 0.7.
(3) Rigidity values shown are theoretical values calculated from elastic displacement between the grooves and steel balls.

Numbering System for Support Units

Designation example: **WBK 30 DFD - 31H**

- WBK: Support unit code
- 30: Nominal bearing bore
- DFD: Bearing arrangement code (DF: Two-row arrangement; DFD: Three-row arrangement; DFF: Four-row arrangement)
- 31H: Serial number



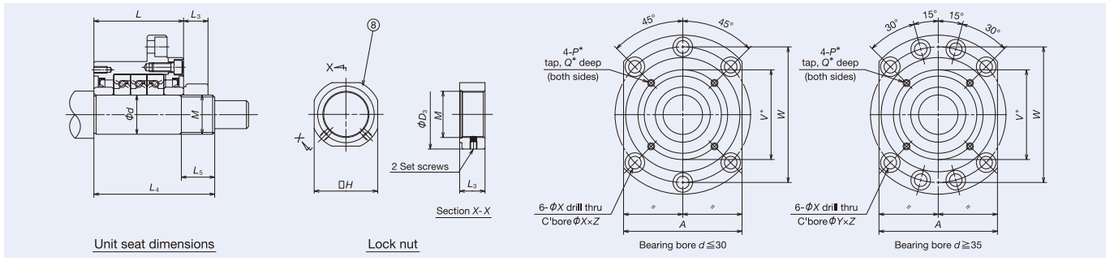
Components of Support Unit

Part No.	Name of Part	Quantity
①	Housing	1
②	Retaining cover	1
③	Angular contact thrust ball bearings for ball screw support	1 set
④	Dust seal	2
⑤	Collar	2
⑥	Preload securing bolt	6 or 8
⑦	Shim	1 set
⑧	Locknut	1

Mounting Notes/Additional Information

- Use datum faces A and B to mount the support unit to a machine base.
- Do not try to disassemble the NSK Support Unit as it is preloaded to high precision with all components excluding the locknut integrated into a single piece.
- The bearings are prepacked with grease.
- Locknut ⑧ is designed specifically for ball screws with its perpendicularity strictly controlled against the triangular thread of the screw. Tighten the set screws to prevent loosening of the locknut.

  The locknut is also available separately. For further information on angular contact thrust ball bearings for ball screw support (NSKTAC C Series), refer to Page 144.



Basic Dynamic Load Rating C_a [kN]	Limiting Axial Load (2) [kN]	Preload [N]	Axial Rigidity (3) [N/μm]	Starting Torque (4) [N·cm]	Locknut Reference Dimensions [mm]				Unit Seat Dimensions (5) [mm]			Limiting Speeds [min⁻¹]	Mass [kg]
					M	*H*	D_3	L_3	*d*	L_4	L_5		
27.6	26.6	1 450	630	14	M17×1.0	32	37	18	17	81	23	6 900	1.9
27.6	26.6	1 450	630	14	M20×1.0	36	40	18	20	81	23	6 900	1.9
36.0	40.5	2 280	850	21	M25×1.5	41	45	20	25	89	26	5 200	3.1
58.5	81.5	3 100	1 250	28	M25×1.5	41	45	20	25	104	26	5 200	3.4
37.0	43.0	2 400	890	23	M30×1.5	46	50	20	30	89	26	4 900	3.0
59.5	86.0	3 260	1 310	30	M30×1.5	46	50	20	30	104	26	4 900	3.3
39.0	50.0	2 750	1 030	27	M35×1.5	50	55	22	35	92	30	4 100	3.4
63.5	100	3 740	1 500	34	M35×1.5	50	55	22	35	107	30	4 100	4.3
63.5	100	5 490	2 060	43	M35×1.5	50	55	22	35	122	30	4 100	5.0
40.0	52.0	2 860	1 080	28	M40×1.5	55	60	22	40	92	30	4 100	3.6
65.0	104	3 900	1 590	36	M40×1.5	55	60	22	40	107	30	4 100	4.2
65.0	104	5 730	2 150	46	M40×1.5	55	60	22	40	122	30	4 100	4.7

(4) Torque values shown indicate starting torque in preloaded bearings and do not include seal torque.
(5) h5 tolerance is recommended for the shaft outside diameter at the unit seat.

Note: As bearing units are prepacked with grease, they can be used immediately as is.

6. Thrust Bearings



Single-Direction Thrust Ball Bearings

Thrust Cylindrical Roller Bearings



ROBUSTSLIM™

Thrust Bearings

Thrust Bearings ····· 164-175

- Features
- Numbering System
- Bearing Tables
  - Single-Direction Thrust Ball Bearings
  - Thrust Cylindrical Roller Bearings
  - ROBUSTSLIM™ Angular Contact Ball Bearings

6. Thrust Bearings

Types and Features

Single-Direction Thrust Ball Bearings

Thrust ball bearings can sustain axial loads but no radial loads.

Standard cages for single-direction thrust ball bearings are shown in Table 6.1. Pressed steel and machined brass cages are usually used, and the basic load ratings listed in the bearing tables assume the standard cage type shown here.

Note that if a different cage type is used for a given designation, the number of balls used may vary, causing the load rating to differ from that listed in the bearing tables.

Table 6.1 Standard Cages for Thrust Ball Bearings

	Flat seat	Pressed steel cage	Machined brass cage
Single-direction	511	51106-51152X	51156X-51180X
	512	51206-51236X	51238X-51280X
	513	51306-51336X	51338X-51340X
	514	51406-51418X	51420X-51436X

Thrust Cylindrical Roller Bearings

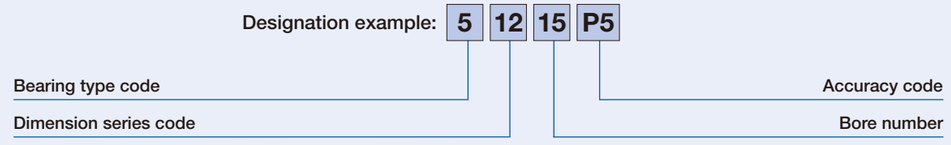
Thrust cylindrical roller bearings use cylindrical rollers arranged in a machined brass cage. Though they can sustain only axial loads, they can support heavy loads and offer high axial rigidly.

Minimum Axial Load

It is necessary to apply some axial load to thrust bearings to prevent slippage between the rolling elements and the raceways.

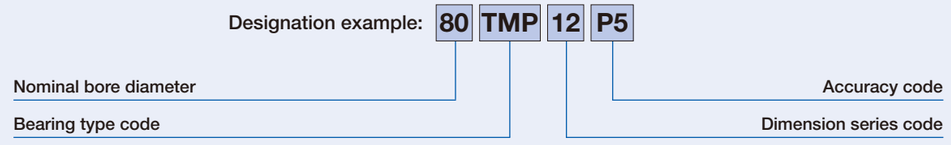
For more details, please refer to page 215.

Numbering System for Single-Direction Thrust Ball Bearings



5	Bearing type	5: Thrust ball bearing
12	Dimension series	11: 11 Series 12: 12 Series 13: 13 Series 14: 14 Series
15	Bore number	Bearing bore = Bore number ×5 (mm)
P5	Accuracy	P5: ISO Class 5, P4: ISO Class 4

Numbering System for Thrust Cylindrical Roller Bearings

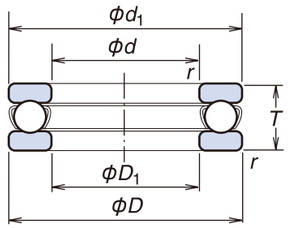


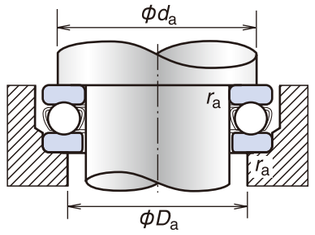
80	Nominal bore diameter	Bore diameter (mm)
TMP	Bearing type	TMP: Thrust cylindrical roller bearing
12	Dimension series	11: 11 Series 12: 12 Series 93: 93 Series
P5	Accuracy	P5: Class 5, P4: Class 4

6. Thrust Bearings

Bore Diameter **30-160** mm

Single-Direction Thrust Ball Bearings





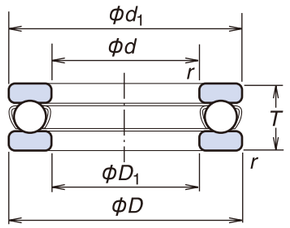
Designation (1)	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Fatigue Load Limit	Mass	Limiting Speeds (min^{-1})		Minimum Load Factor (2)	Abutment and Fillet Dimensions (mm)		
	d	D	T	d_1	D_1	r (min.)	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(kg) (approx.)	Grease	Oil	M ($\times 10^{-6}$)	d_a (min.)	D_a (max.)	r_a (max.)
51106	**30**	**47**	**11**	47	32	0.6	20.6	42	1.92	0.064	4 300	6 700	0.009	40	37	0.6
51206	**30**	**52**	**16**	52	32	0.6	29.5	58	2.65	0.137	3 400	5 300	0.018	43	39	0.6
51306	**30**	**60**	**21**	60	32	1	43	78.5	3.60	0.267	2 800	4 300	0.033	48	42	1
51406	**30**	**70**	**28**	70	32	1	73	126	5.70	0.519	2 200	3 400	0.082	54	46	1
51107	**35**	**52**	**12**	52	37	0.6	22.1	49.5	2.26	0.081	4 000	6 000	0.013	45	42	0.6
51207	**35**	**62**	**18**	62	37	1	39.5	78	3.55	0.210	3 000	4 500	0.033	51	46	1
51307	**35**	**68**	**24**	68	37	1	56	105	4.75	0.386	2 400	3 800	0.059	55	48	1
51407	**35**	**80**	**32**	80	37	1.1	87.5	155	7.05	0.769	2 000	3 000	0.13	62	53	1
51108	**40**	**60**	**13**	60	42	0.6	27.1	63	2.86	0.120	3 600	5 300	0.021	52	48	0.6
51208	**40**	**68**	**19**	68	42	1	47.5	98.5	4.45	0.270	2 800	4 300	0.050	57	51	1
51308	**40**	**78**	**26**	78	42	1	70	135	6.10	0.536	2 200	3 400	0.098	63	55	1
51209	**45**	**73**	**20**	73	47	1	48	105	4.75	0.310	2 600	4 000	0.059	62	56	1
51309	**45**	**85**	**28**	85	47	1	80.5	163	7.45	0.672	2 000	3 000	0.14	69	61	1
51110	**50**	**70**	**14**	70	52	0.6	29	75.5	3.45	0.153	3 200	4 800	0.030	62	58	0.6
51210	**50**	**78**	**22**	78	52	1	49	111	5.05	0.378	2 400	3 600	0.067	67	61	1
51310	**50**	**95**	**31**	95	52	1.1	97.5	202	9.15	0.931	1 800	2 800	0.21	77	68	1
51410	**50**	**110**	**43**	110	52	1.5	147	288	13.1	1.94	1 400	2 200	0.44	86	74	1.5
51111	**55**	**78**	**16**	78	57	0.6	35	93	4.25	0.227	2 800	4 300	0.045	69	64	0.6
51211	**55**	**90**	**25**	90	57	1	70	159	7.20	0.599	2 200	3 200	0.13	76	69	1
51311	**55**	**105**	**35**	105	57	1.1	115	244	11.1	1.31	1 600	2 400	0.31	85	75	1
51112	**60**	**85**	**17**	85	62	1	41.5	113	5.10	0.281	2 600	4 000	0.065	75	70	1
51212	**60**	**95**	**26**	95	62	1	71.5	169	7.65	0.673	2 000	3 000	0.15	81	74	1
51312	**60**	**110**	**35**	110	62	1.1	119	263	11.9	1.40	1 600	2 400	0.36	90	80	1
51113	**65**	**90**	**18**	90	67	1	42	117	5.35	0.324	2 400	3 800	0.073	80	75	1
51213	**65**	**100**	**27**	100	67	1	75.5	189	8.60	0.756	1 900	2 800	0.18	86	79	1
51313	**65**	**115**	**36**	115	67	1.1	123	282	12.8	1.54	1 500	2 400	0.41	95	85	1
51413	**65**	**140**	**56**	140	68	2	234	495	22.1	4.10	1 100	1 700	1.2	110	95	2
51214	**70**	**105**	**27**	105	72	1	74	189	8.60	0.793	1 900	2 800	0.19	91	84	1
51314	**70**	**125**	**40**	125	72	1.1	137	315	14.2	2.00	1 400	2 000	0.53	103	92	1
51115	**75**	**100**	**19**	100	77	1	43.5	131	5.95	0.389	2 200	3 400	0.092	90	85	1
51215	**75**	**110**	**27**	110	77	1	78	209	9.50	0.845	1 800	2 800	0.22	96	89	1
51415	**75**	**160**	**65**	160	78	2	254	560	23.5	6.15	950	1 400	1.8	125	110	2
51116	**80**	**105**	**19**	105	82	1	45	141	6.40	0.417	2 200	3 400	0.10	95	90	1
51216	**80**	**115**	**28**	115	82	1	79	218	9.95	0.931	1 800	2 600	0.25	101	94	1
51316	**80**	**140**	**44**	140	82	1.5	164	395	17.0	2.74	1 300	1 900	0.82	116	104	1.5
51416	**80**	**170**	**68**	170	83	2.1	272	620	25.2	7.21	900	1 300	2.3	133	117	2
51117	**85**	**110**	**19**	110	87	1	46.5	150	6.85	0.440	2 200	3 200	0.12	100	95	1
51217	**85**	**125**	**31**	125	88	1	96	264	11.7	1.22	1 600	2 400	0.36	109	101	1
51118	**90**	**120**	**22**	120	92	1	60	190	8.45	0.646	1 900	3 000	0.19	108	102	1
51218	**90**	**135**	**35**	135	93	1.1	114	310	13.3	1.69	1 400	2 200	0.51	117	108	1
51318	**90**	**155**	**50**	155	93	1.5	214	525	21.5	3.83	1 100	1 700	1.4	129	116	1.5
51120	**100**	**135**	**25**	135	102	1	86	268	11.2	0.960	1 700	2 600	0.37	121	114	1
51220	**100**	**150**	**38**	150	103	1.1	135	375	15.3	2.25	1 300	2 000	0.75	130	120	1
51320	**100**	**170**	**55**	170	103	1.5	239	595	23.3	4.98	1 000	1 500	1.9	142	128	1.5
51420X	**100**	**210**	**85**	205	103	3	370	985	36.0	14.8	710	1 100	5.3	165	145	2.5
51122	**110**	**145**	**25**	145	112	1	88	288	11.6	1.04	1 700	2 400	0.43	131	124	1
51222	**110**	**160**	**38**	160	113	1.1	136	395	15.4	2.42	1 300	1 900	0.85	140	130	1
51322X	**110**	**190**	**63**	187	113	2	282	755	28.0	7.19	900	1 300	3.0	158	142	2
51124	**120**	**155**	**25**	155	122	1	90	310	11.9	1.12	1 600	2 400	0.49	141	134	1
51224	**120**	**170**	**39**	170	123	1.1	141	430	16.3	2.70	1 200	1 800	1.0	150	140	1
51424X	**120**	**250**	**102**	245	123	4	480	1 400	46.5	26.2	600	900	11	196	174	3
51126	**130**	**170**	**30**	170	132	1	105	350	13.1	1.68	1 400	2 000	0.69	154	146	1
51226X	**130**	**190**	**45**	187	133	1.5	183	550	19.8	3.95	1 100	1 600	1.7	166	154	1.5
51326X	**130**	**225**	**75**	220	134	2.1	350	1 030	35.0	12.1	750	1 100	5.6	186	169	2
51128X	**140**	**180**	**31**	178	142	1	107	375	13.6	1.83	1 300	2 000	0.79	164	156	1
51228X	**140**	**200**	**46**	197	143	1.5	186	575	20.1	4.30	1 000	1 500	1.9	176	164	1.5
51328X	**140**	**240**	**80**	235	144	2.1	370	1 130	37.0	14.2	670	1 000	6.8	199	181	2
51130X	**150**	**190**	**31**	188	152	1	110	400	14.0	1.95	1 300	1 900	0.89	174	166	1
51230X	**150**	**215**	**50**	212	153	1.5	238	735	24.7	5.52	950	1 400	2.9	189	176	1.5
51330X	**150**	**250**	**80**	245	154	2.1	380	1 200	38.5	15.0	670	1 000	7.7	209	191	2
51430X	**150**	**300**	**120**	295	154	4	620	2 010	61.0	43.5	480	710	24	238	212	3
51132X	**160**	**200**	**31**	198	162	1	113	425	14.5	2.07	1 200	1 900	1.0	184	176	1
51332X	**160**	**270**	**87**	265	164	3	475	1 570	49.0	19.6	600	900	13	225	205	2.5
51432X	**160**	**320**	**130**	315	164	5	650	2 210	65.0	52.7	450	670	28	254	226	4

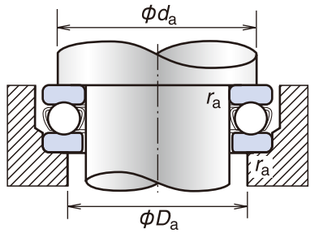
(1) Designations suffixed with X indicate that the outside diameter d_1 of the shaft washer is smaller than the outside diameter D of the housing washer.
(2) For more information on minimum load factors, please refer to page 215.

6. Thrust Bearings

Bore Diameter **170-1 700** mm

Single-Direction Thrust Ball Bearings





Designation (1)	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Fatigue Load Limit	Mass	Limiting Speeds (min^{-1})		Minimum Load Factor (2)	Abutment and Fillet Dimensions (mm)		
	d	D	T	d_1	D_1	r (min.)	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(kg) (approx.)	Grease	Oil	M ($\times 10^{-6}$)	d_a (min.)	D_a (max.)	r_a (max.)
51134X	**170**	**215**	**34**	213	172	1.1	135	510	16.8	2.72	1 100	1 700	1.4	197	188	1
51234X	**170**	**240**	**55**	237	173	1.5	280	915	29.0	7.41	850	1 300	4.4	212	198	1.5
51136X	**180**	**225**	**34**	222	183	1.1	136	530	16.9	2.79	1 100	1 700	1.6	207	198	1
51236X	**180**	**250**	**56**	247	183	1.5	284	955	29.6	7.94	800	1 200	4.8	222	208	1.5
51336X	**180**	**300**	**95**	295	184	3	480	1 680	49.0	25.9	560	850	15	251	229	2.5
51138X	**190**	**240**	**37**	237	193	1.1	172	655	20.4	3.60	1 000	1 600	2.4	220	210	1
51238X	**190**	**270**	**62**	267	194	2	320	1 110	33.0	11.8	750	1 100	6.7	238	222	2
51140X	**200**	**250**	**37**	247	203	1.1	173	675	20.5	3.75	1 000	1 500	2.5	230	220	1
51240X	**200**	**280**	**62**	277	204	2	315	1 110	32.5	12.3	710	1 100	6.9	248	232	2
51144X	**220**	**270**	**37**	267	223	1.1	179	740	21.5	4.09	950	1 500	3.0	250	240	1
51244X	**220**	**300**	**63**	297	224	2	325	1 210	34.0	13.6	670	1 000	8.2	268	252	2
51148X	**240**	**300**	**45**	297	243	1.5	229	935	25.8	6.55	850	1 200	4.9	276	264	1.5
51248X	**240**	**340**	**78**	335	244	2.1	420	1 650	44.0	23.7	560	850	15	299	281	2
51448X	**240**	**440**	**160**	435	245	6	915	3 900	96.5	115	320	500	85	359	321	5
51152X	**260**	**320**	**45**	317	263	1.5	233	990	26.4	7.01	800	1 200	5.6	296	284	1.5
51252X	**260**	**360**	**79**	355	264	2.1	435	1 800	46.5	25.1	560	850	18	319	301	2
51156X	**280**	**350**	**53**	347	283	1.5	315	1 310	33.5	12.0	710	1 000	9.6	322	308	1.5
51256X	**280**	**380**	**80**	375	284	2.1	450	1 950	49.0	27.1	530	800	21	339	321	2
51160X	**300**	**380**	**62**	376	304	2	360	1 560	38.5	17.2	600	900	14	348	332	2
51360	**300**	**480**	**140**	480	305	5	860	3 950	91.5	103	340	500	90	407	375	4
51164X	**320**	**400**	**63**	396	324	2	365	1 660	39.5	18.6	600	900	16	368	352	2
51264X	**320**	**440**	**95**	435	325	3	585	2 680	62.5	45.0	450	670	41	391	369	2.5
51364	**320**	**500**	**140**	500	325	5	880	4 200	94.5	109	340	500	101	427	395	4
51168X	**340**	**420**	**64**	416	344	2	375	1 760	41.0	19.9	560	850	18	388	372	2
51268X	**340**	**460**	**96**	455	345	3	595	2 800	63.5	47.9	430	630	46	411	389	2.5
51172X	**360**	**440**	**65**	436	364	2	385	1 860	42.5	21.5	560	800	19	408	392	2
51272X	**360**	**500**	**110**	495	365	4	705	3 500	76.5	68.8	380	560	70	442	418	3
51176X	**380**	**460**	**65**	456	384	2	385	1 910	42.5	22.4	540	800	21	427	413	2
51276	**380**	**520**	**112**	520	385	4	740	3 800	81.5	74.5	370	550	80	464	438	3
51180X	**400**	**480**	**65**	476	404	2	395	2 010	43.5	23.5	—	790	23	447	433	2
51280X	**400**	**540**	**112**	535	405	4	730	3 800	80.0	76.6	—	540	83	484	458	3

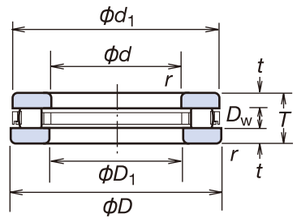
Designation (1)	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Fatigue Load Limit	Mass	Limiting Speeds (min^{-1})		Minimum Load Factor (2)	Abutment and Fillet Dimensions (mm)		
	d	D	T	d_1	D_1	r (min.)	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(kg) (approx.)	Grease	Oil	M ($\times 10^{-6}$)	d_a (min.)	D_a (max.)	r_a (max.)
51184X	**420**	**500**	**65**	495	424	2	400	2 110	44.5	24.4	—	770	25	467	453	2
51284	**420**	**580**	**130**	580	425	5	850	4 650	94.0	109	—	470	121	517	485	4
51188X	**440**	**540**	**80**	535	444	2.1	515	2 850	58.5	40.5	—	650	45	498	482	2
51288	**440**	**600**	**130**	600	445	5	865	4 850	96.0	115	—	460	131	537	505	4
51192X	**460**	**560**	**80**	555	464	2.1	520	2 930	59.0	42.0	—	640	48	518	502	2
51292	**460**	**620**	**130**	620	465	5	880	5 050	98.5	119	—	460	142	557	525	4
51392	**460**	**710**	**195**	710	465	6	1 200	7 150	134	291	—	330	292	606	566	5
51196X	**480**	**580**	**80**	575	484	2.1	530	3 100	61.0	43.7	—	630	52	538	522	2
51296	**480**	**650**	**135**	650	485	5	890	5 250	100	137	—	430	155	582	550	4
511/500X	**500**	**600**	**80**	595	504	2.1	560	3 300	63.5	45.4	—	620	60	554	546	2
511/530X	**530**	**640**	**85**	635	534	3	640	3 900	73.0	56.7	—	570	86	597	575	2.5
512/530	**530**	**710**	**140**	710	535	5	1 010	6 200	113	165	—	400	224	637	605	4
511/560X	**560**	**670**	**85**	665	564	3	655	4 100	75.0	59.6	—	560	95	625	605	2.5
512/560	**560**	**750**	**150**	750	565	5	1 200	7 800	139	200	—	370	328	672	640	4
511/600X	**600**	**710**	**85**	705	605	3	675	4 400	78.0	63.3	—	540	109	665	645	2.5
511/630X	**630**	**750**	**95**	745	634	3	685	4 600	80.0	83.0	—	490	120	700	680	2.5
511/670X	**670**	**800**	**105**	795	675	4	760	5 350	89.5	104	—	440	160	742	728	3
511/750	**750**	**900**	**120**	900	755	4	910	6 850	108	156	—	380	262	834	818	3
F980-1	**980**	**1 120**	**120**	1 115	985	5	1 010	8 900	125	186	—	330	435	1 059	1 041	4
F1250-1	**1 250**	**1 495**	**150**	1 490	1 256	6	1 670	17 200	211	505	—	240	1 645	1 384	1 362	5
F1400-7	**1 400**	**1 570**	**100**	1 570	1 404	4	1 090	11 800	139	246	—	300	813	1 494	1 478	3
F1700-2	**1 700**	**1 960**	**170**	1 950	1 710	6	2 210	27 200	290	783	—	180	4 061	1 838	1 822	5

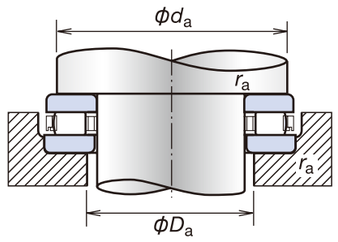
(1) Designations suffixed with X indicate that the outside diameter d_1 of the shaft washer is smaller than the outside diameter D of the housing washer.
(2) For more information on minimum load factors, please refer to page 215.

6. Thrust Bearings

Bore Diameter **40-500** mm

Thrust Cylindrical Roller Bearings





Designation	Boundary Dimensions (mm)				Reference Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit	Mass (kg)	Limiting Speeds (min^{-1})		Minimum Load Factor (1)	Abutment and Fillet Dimensions (mm)		
	d	D	T	r (min.)	d_1	D_1	D_w	t	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(approx.)	Grease	Oil	M ($x10^{-6}$)	d_a (min.)	D_a (max.)	r_a (max.)
40TMP93	**40**	**78**	**22**	1	78	42	8	7	63	194	23.7	0.525	1 200	3 600	0.0026	71	48	1
45TMP93	**45**	**85**	**24**	1	85	47	8	8	71	233	28.4	0.665	1 100	3 400	0.0038	78	53	1
50TMP93	**50**	**95**	**27**	1.1	93	52	11	8	113	350	42.5	0.942	1 000	3 000	0.0086	89	57	1
55TMP93	**55**	**105**	**30**	1.1	105	55.2	11	9.5	134	450	55.0	1.28	900	2 600	0.014	98	63	1
60TMP12	**60**	**95**	**26**	1	95	62	10	8	99	325	39.5	0.735	1 000	3 000	0.0095	88	67	1
60TMP93	**60**	**110**	**30**	1.1	110	62	11	9.5	139	480	58.5	1.36	850	2 600	0.016	103	68	1
65TMP12	**65**	**100**	**27**	1	100	67	12.5	7.25	110	325	39.5	0.805	950	2 800	0.0095	93	71	1
65TMP93	**65**	**115**	**30**	1.1	115	65.2	11	9.5	145	515	63.0	1.44	850	2 600	0.019	108	73	1
70TMP93	**70**	**125**	**34**	1.1	125	72	14	10	191	635	77.5	1.95	750	2 200	0.028	117	78	1
75TMP11	**75**	**100**	**19**	1	100	77	8	5.5	63.5	221	27.0	0.41	1 100	3 400	0.0068	96	79	1
75TMP93	**75**	**135**	**36**	1.5	135	77	14	11	209	735	88.5	2.42	710	2 200	0.038	125	84	1.5
80TMP12	**80**	**115**	**28**	1	115	82	11	8.5	120	420	51.0	1.02	900	2 600	0.016	109	86	1
80TMP93	**80**	**140**	**36**	1.5	138	82	14	11	208	740	87.5	2.54	710	2 000	0.038	130	91	1.5
85TMP11	**85**	**110**	**19**	1	110	87	7.5	5.75	75	298	36.5	0.46	1 100	3 200	0.012	105	89	1
85TMP12	**85**	**125**	**31**	1	125	88	14	8.5	151	485	58.5	1.36	800	2 400	0.021	118	92	1
85TMP93	**85**	**150**	**39**	1.5	148	87	14	12.5	257	995	116	3.2	630	1 900	0.069	140	95	1.5
90TMP11	**90**	**120**	**22**	1	119	91.5	9	6.5	96	370	44.5	0.725	950	3 000	0.019	114	95	1
90TMP93	**90**	**155**	**39**	1.5	155	90.2	16	11.5	250	885	102	3.3	630	1 900	0.055	144	101	1.5
100TMP93	**100**	**170**	**42**	1.5	170	103	16	13	292	1 110	124	4.25	560	1 700	0.086	159	110	1.5
110TMP12	**110**	**160**	**38**	1.1	160	113	15	11.5	228	855	95.5	2.66	630	1 900	0.066	150	119	1
120TMP12	**120**	**170**	**39**	1.1	170	123	15	12	233	895	97.5	2.93	600	1 800	0.072	160	129	1
130TMP12	**130**	**190**	**45**	1.5	187	133	19	13	300	1 090	115	4.5	530	1 600	0.11	177	142	1.5
130TMP93	**130**	**225**	**58**	2.1	225	133	22	18	585	2 370	243	10.4	430	1 300	0.39	214	140	2
140TMP93	**140**	**240**	**60**	2.1	240	143	25	17.5	610	2 360	237	12.2	400	1 200	0.39	226	154	2
150TMP12	**150**	**215**	**50**	2	215	153	19	15.5	375	1 500	153	6.15	480	1 400	0.20	202	163	2
150TMP93	**150**	**250**	**60**	2.1	250	153	25	17.5	635	2 510	249	12.8	400	1 200	0.44	236	165	2

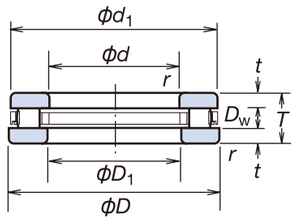
Designation	Boundary Dimensions (mm)				Reference Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit	Mass (kg)	Limiting Speeds (min^{-1})		Minimum Load Factor (1)	Abutment and Fillet Dimensions (mm)		
	d	D	T	r (min.)	d_1	D_1	D_w	t	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(approx.)	Grease	Oil	M ($x10^{-6}$)	d_a (min.)	D_a (max.)	r_a (max.)
160TMP11	**160**	**200**	**31**	1	200	162	11	10	173	815	83.5	2.21	630	1 900	0.093	191	168	1
170TMP12	**170**	**240**	**55**	1.5	237	173	22	16.5	485	1 960	193	8.2	430	1 300	0.35	227	182	1.5
180TMP93	**180**	**300**	**73**	3	300	185	32	20.5	1 000	4 000	375	22.5	320	950	1.1	284	194	2.5
190TMP12	**190**	**270**	**62**	3	266	195	30	16	705	2 630	250	11.8	360	1 100	0.62	255	200	2.5
190TMP93	**190**	**320**	**78**	4	320	195	32	23	1 080	4 500	415	27.6	300	900	1.42	303	205	3
200TMP11	**200**	**250**	**37**	1.1	247	203	17	10	365	1 690	162	4.1	500	1 500	0.40	242	207	1
200TMP93	**200**	**340**	**85**	4	340	205	32	26.5	1 180	5 150	465	34.5	280	800	1.9	322	218	3
220TMP11	**220**	**270**	**37**	1.1	267	223	17	10	385	1 860	173	4.5	480	1 500	0.48	262	227	1
220TMP12	**220**	**300**	**63**	2	297	224	30	16.5	770	3 100	284	13.5	340	1 000	0.86	287	232	2
240TMP11	**240**	**300**	**45**	1.5	297	243	18	13.5	435	2 160	196	7.2	400	1 200	0.65	288	251	1.5
240TMP12	**240**	**340**	**78**	2.1	335	244	32	23	965	4 100	365	23.3	280	850	1.5	322	258	2
240TMP93	**240**	**380**	**85**	4	380	245	32	26.5	1 290	6 100	530	39.4	260	770	2.6	362	258	3
260TMP11	**260**	**320**	**45**	1.5	317	263	18	13.5	460	2 350	208	7.75	400	1 200	0.77	308	272	1.5
260TMP12	**260**	**360**	**79**	2.1	355	264	32	23.5	995	4 350	380	25.2	280	850	1.7	342	276	2
260TMP93	**260**	**420**	**95**	1.1	420	265	38	28.5	1 670	7 700	650	55.2	230	680	4.2	398	282	1
280TMP11	**280**	**350**	**53**	1.5	347	283	20	16.5	545	2 800	242	11.6	340	1 000	1.1	335	294	1.5
280TMP12	**280**	**380**	**80**	2.1	375	284	32	24	1 050	4 750	405	27.2	260	800	2.0	362	296	2
300TMP12	**300**	**420**	**95**	3	415	304	38	28.5	1 390	6 250	520	42	220	670	3.5	398	322	2.5
320TMP11	**320**	**400**	**63**	2	396	324	25	19	820	4 250	355	18	300	900	2.5	385	335	2
320TMP12	**320**	**440**	**95**	3	435	325	38	28.5	1 420	6 550	535	44.5	220	670	3.9	418	340	2.5
340TMP12	**340**	**460**	**96**	3	455	345	38	29	1 450	6 800	545	47.4	220	650	4.2	438	360	2.5
360TMP12	**360**	**500**	**110**	4	495	365	45	32.5	1 870	8 600	675	68.1	190	570	6.7	475	383	3
380TMP12	**380**	**520**	**112**	4	515	385	45	33.5	1 920	8 950	695	82.1	180	550	7.2	495	403	3
400TMP12	**400**	**540**	**112**	4	535	405	45	33.5	1 960	9 350	715	78.0	—	540	7.9	515	423	3
420TMP11	**420**	**500**	**65**	2	495	424	25	20	940	5 450	420	24.6	—	770	4.2	485	434	2
500TMP11	**500**	**600**	**80**	2.1	595	505	32	24	1 420	8 300	605	46.5	—	620	9.6	582	516	2

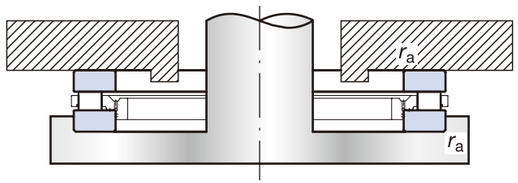
(1) For more information on minimum load factors, please refer to page 215.

6. Thrust Bearings

Bore Diameter **560-2 530** mm

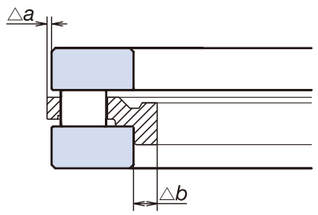
Cylindrical Roller Thrust Bearings for Vertical Lathe Tables





Designation	Boundary Dimensions (mm)				Reference Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit	Mass (kg)	Minimum Load Factor (1)	Limiting Speeds (min^{-1})	Abutment and Fillet Dimensions (2) (mm)
	d	*D*	*T*	*r* (min.)	d_1	D_1	D_w	*t*	C_a (Dynamic)	C_{oa} (Static)	C_u (kN)	(approx.)	*M* ($\times 10^{-6}$)	Oil	r_a (max.)
560TMP7001	**560**	**700**	**95**	4	700	560	35	30	1 690	10 200	715	95.5	14.6	510	3
610TMP7102A	**610**	**710**	**65**	4	710	610	25	20	1 080	7 300	505	46.5	7.5	630	3
860TMP1001	**860**	**1 000**	**96**	4	1 000	860	35	30.5	2 130	15 500	970	145	34	410	3
1240TMP1301A2	**1 240**	**1 380**	**97**	4	1 380	1 240	35	31	2 480	21 000	1 180	204	62	330	3
1400TMP1501B	**1 400**	**1 520**	**90**	3	1 520	1 400	30	30	2 120	19 800	1 080	187	55	330	2.5
1690TMP1801D	**1 690**	**1 800**	**105**	3	1 800	1 690	35	35	2 990	29 300	1 520	239	120	270	2.5
1930TMP2101A	**1 930**	**2 100**	**105**	4	2 100	1 930	35	35	2 700	27 500	1 360	434	135	240	3
2270TMP2401	**2 270**	**2 400**	**120**	4	2 400	2 270	40	40	4 100	44 000	2 090	448	271	200	3
2530TMP2701	**2 530**	**2 750**	**150**	4	2 750	2 530	50	50	5 750	60 500	2 760	1 012	512	150	3

(1) For more information on minimum load factors, please refer to page 215.
(2) Since the cages protrude from the ring faces of thrust cylindrical roller bearings, please use care when designing shafts and housings.
For more details, please contact NSK.



6. Thrust Bearings

ROBUSTSLIM™ High-Accuracy Low-Profile Angular Contact Ball Bearings



Features

ROBUSTSLIM™ angular contact ball bearings are specially designed for the swivel heads of machine tools and suit high-precision machining in equipment with multiple axes.

As high-precision ACBBs with a low profile, ROBUSTSLIM bearings provide a compact solution with high rigidity and low torque.

Low Torque — Lower torque than roller bearings.

High Accuracy — NRRO (Non-repeatable runout) of 0.5 μm or lower with BRSA130.

High Rigidity — High moment stiffness on par with crossed roller bearings.

Space-saving design — Bearing width reduced by 35% or more compared to standard bearings.

Numbering System for ROBUSTSLIM High-Accuracy Low-Profile Angular Contact Ball Bearings

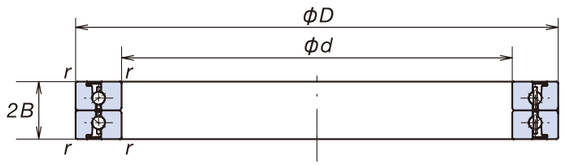
Designation example: **BRSA 130 S T21 V DB CP45 P5**

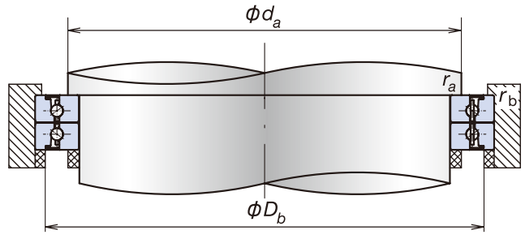
- BRSA — Bearing type code
- 130 — Nominal bore diameter
- S — Material code
- T21 — Cage code
- V — Seal code
- DB — Arrangement code
- CP45 — Preload code
- P5 — Accuracy code

			Reference pages
BRSA	Bearing type	BRSA: contact angle 35°	44-45
130	Nominal bore diameter	Bore dimensions (mm): 130, 170, 220, 340,400	174-175
S	Material	S: Inner/outer ring SUJ2 or SUJ3, balls SUJ2	14-15
T21	Cage	T21: Ring guided resin cage No code: Ring guided machined brass cage	—
V	Seal	V: Non-contact rubber seal on one side	—
DB	Arrangement	DB: Back-to-back arrangement	200-201
CP45	Preload	CP: Special preload	210
P5	Accuracy	P5: Class 5	222-225

Bore Diameter 130-400 mm

ROBUSTSLIM





Designation (1)	Boundary Dimensions (mm)				Basic Load Ratings (kN)		Fatigue Load Limit C_u (kN)	Permissible Axial Load (kN)	Contact Angle α (°)	Mass (kg/row) (reference)
	d	*D*	*2B*	*r* (min.)	C_a (Dynamic)	C_{oa} (Static)				
BRSA130ST21VDBCP45	**130**	**165**	**22**	0.6	25.4	91.0	4.95	28.5	35	0.6
BRSA170ST21VDBCP55	**170**	**215**	**27**	0.6	43.5	166	8.15	47.5	35	1.2
BRSA220ST21VDBCP62	**220**	**270**	**31**	1	57.0	243	10.7	63.5	35	2.0
BRSA340SVDBCP95	**340**	**420**	**50**	1.1	123	560	19.3	150.9	35	8.2
BRSA400SVDBCP100	**400**	**500**	**62**	1.1	176	830	26.1	221.6	35	15.4

Abutment and Fillet Dimensions (mm)				Preload (kN)	Limiting Speeds (min^{-1})	Axial Rigidity (kN/μm)	Radial Rigidity (kN/μm)	Moment Rigidity (kN·m/mrad)
d_a (min.)	D_b (max.)	r_a (max.)	r_b (max.)		Grease			
135	160	0.6	0.6	18	260	2.6	1.8	7.9
175	210	0.6	0.6	29	200	3.4	2.4	17.9
226	264	1	1	43	150	4.4	3.1	37.3
347	413	1	1	95	100	6.5	4.7	134
407	493	1	1	111	80	7.2	5.4	210

(1) Values listed in the table for preload, limiting speeds, and axial/radial/moment rigidity are reference values based on the specified axial clearance for the given designation.