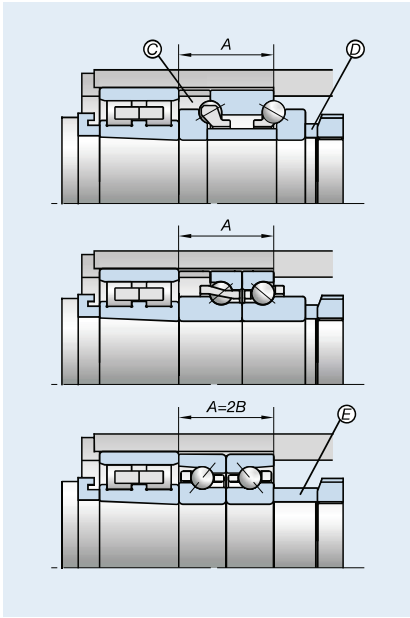


# 3. Angular Contact Thrust Ball Bearings



## Features

Superior high-speed capability and high rigidity are required of ball bearings used for sustaining axial loads in machine tool spindles. For such application requirements, NSK offers three types of bearings for customers to choose from depending on the structure and the 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 outer diameter tolerances in order to provide clearance between the outer 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.

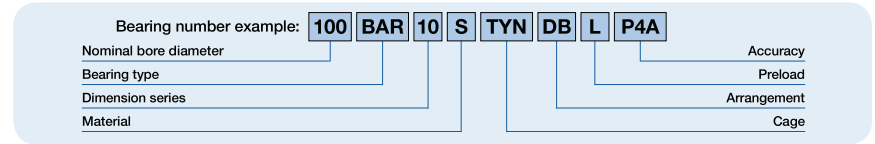
The high-speed angular contact thrust ball bearings of the NSKROBUST series are capable of high-speed performance while maintaining high rigidity. Contact angles of 40° (BTR) and 30° (BAR) result in superior high-speed performance and low heat generation.

## Interchangeability

The BAR and BTR Series have special width dimensions to enable customers to easily replace their angular contact thrust ball bearings of the 20 Series with the BAR and BTR type without having to modify the shaft or housing. As shown in the figure on the left, remove spacer (C) and replace spacer (D) with spacer (E).

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

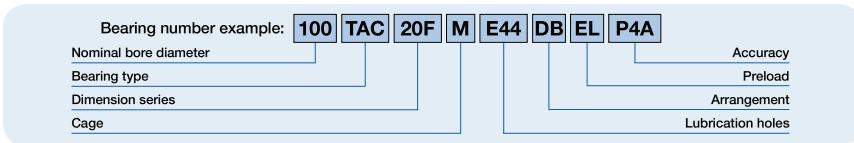
## Numbering System of High-Speed Angular Contact Thrust Ball Bearings (NSKROBUST Series)



			Reference pages														
<b>100</b>	Nominal bore diameter	Bore diameter (mm)	132-137														
<b>BAR</b>	Bearing type	BAR: 30° contact angle BTR: 40° contact angle	26, 44-45														
<b>10</b>	Dimension series	10: 10 Series bore and outer diameter, special width	132-137														
<b>S</b>	Material	<table border="1"> <thead> <tr> <th>Type</th> <th colspan="2">Material</th> </tr> </thead> <tbody> <tr> <td rowspan="2">S</td> <td>Inner/Outer ring</td> <td>Rolling elements</td> </tr> <tr> <td>Bearing steel (SUJ2)</td> <td>Bearing steel (SUJ2)</td> </tr> <tr> <td>E</td> <td>Bearing steel (SUJ2)</td> <td>Ultra long life bearing rolling elements (EOTF)</td> </tr> <tr> <td>H</td> <td>Bearing steel (SUJ2)</td> <td>Ceramics (Si<sub>3</sub>N<sub>4</sub>)</td> </tr> </tbody> </table>	Type	Material		S	Inner/Outer ring	Rolling elements	Bearing steel (SUJ2)	Bearing steel (SUJ2)	E	Bearing steel (SUJ2)	Ultra long life bearing rolling elements (EOTF)	H	Bearing steel (SUJ2)	Ceramics (Si <sub>3</sub> N <sub>4</sub> )	14-17, 26
		Type	Material														
		S	Inner/Outer ring	Rolling elements													
			Bearing steel (SUJ2)	Bearing steel (SUJ2)													
E	Bearing steel (SUJ2)	Ultra long life bearing rolling elements (EOTF)															
H	Bearing steel (SUJ2)	Ceramics (Si <sub>3</sub> N <sub>4</sub> )															
<b>TYN</b>	Cage	TYN: Rolling element guided polyamide cage; limiting speed $d_m n = 1.2$ million (grease), 1.4 million (oil) MY: Rolling element guided machined brass cage No symbol: Outer ring guided machined brass cage TYN cage is available up to 160mm bore diameter bearings	18														
<b>DB</b>	Arrangement	DB: Back-to-back arrangement	200-205														
<b>L</b>	Preload	L: Light preload (standard for this series) EL: Extra light preload	132-137, 210														
<b>P4A</b>	Accuracy	P2A: Outer diameter tolerances are NSK-specific, all others are ISO Class 2	228														
		P4A: Outer diameter tolerances are NSK-specific, all others are ISO Class 4															

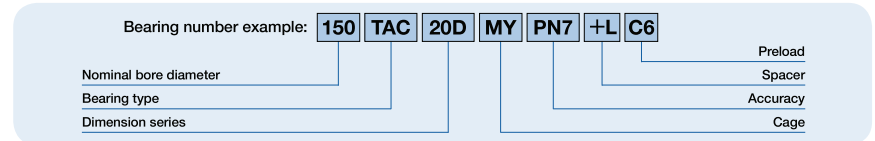
Angular Contact Thrust Ball Bearings

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



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

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

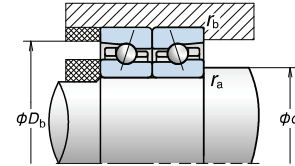
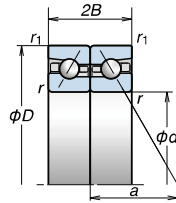


			Reference pages
<b>150</b>	Nominal bore diameter	Bore diameter (mm) (140-320mm)	140-141
<b>TAC</b>	Bearing type	TAC: Angular contact thrust ball bearing	26
<b>20D</b>	Dimension series	20D, 20X: For combination with NN30 series 29D: For combination with NN39 and NN49 series	140-141
<b>MY</b>	Cage	MY: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

# 3. Angular Contact Thrust Ball Bearings

Bore Diameter **50-85 mm**

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



Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Contact angle (Degree)	Effective Load Center (mm) a	Mass (kg/row) (Reference)	Limiting Speeds (min <sup>-1</sup> )	
	d	D	2B	r (min.)	r1 (min.)	Ca (Dynamic)	Coa (Static)					Grease	Oil
50BAR10E	50	80	28.5	1	0.6	14.7	27.7	18.4	30	25.6	0.272	12 400	15 700
50BAR10H	50	80	28.5	1	0.6	(14.7)	(27.7)	12.6	30	25.6	0.257	13 100	16 200
50BTR10E	50	80	28.5	1	0.6	17.4	31.5	19.3	40	34.1	0.272	10 800	14 000
50BTR10H	50	80	28.5	1	0.6	(17.4)	(31.5)	15.5	40	34.1	0.257	11 600	14 700
55BAR10E	55	90	33	1.1	0.6	18.2	35.0	23.4	30	28.9	0.390	11 100	14 100
55BAR10H	55	90	33	1.1	0.6	(18.2)	(35.0)	16.0	30	28.9	0.369	11 800	14 500
55BTR10E	55	90	33	1.1	0.6	21.6	40.0	23.6	40	38.3	0.390	9 700	12 600
55BTR10H	55	90	33	1.1	0.6	(21.6)	(40.0)	19.7	40	38.3	0.369	10 400	13 200
60BAR10E	60	95	33	1.1	0.6	18.9	38.0	25.5	30	30.4	0.420	10 400	13 200
60BAR10H	60	95	33	1.1	0.6	(18.9)	(38.0)	17.5	30	30.4	0.397	11 000	13 600
60BTR10E	60	95	33	1.1	0.6	22.4	43.5	25.8	40	40.4	0.420	9 100	11 800
60BTR10H	60	95	33	1.1	0.6	(22.4)	(43.5)	21.5	40	40.4	0.397	9 700	12 300
65BAR10E	65	100	33	1.1	0.6	19.5	41.5	27.7	30	31.8	0.450	9 700	12 400
65BAR10H	65	100	33	1.1	0.6	(19.5)	(41.5)	19.0	30	31.8	0.425	10 400	12 800
65BTR10E	65	100	33	1.1	0.6	23.1	47.0	27.3	40	42.5	0.450	8 500	11 100
65BTR10H	65	100	33	1.1	0.6	(23.1)	(47.0)	23.3	40	42.5	0.425	9 100	11 600
70BAR10E	70	110	36	1.1	0.6	26.9	55.0	37.5	30	34.7	0.601	8 900	11 400
70BAR10H	70	110	36	1.1	0.6	(26.9)	(55.0)	25.5	30	34.7	0.561	9 500	11 700
70BTR10E	70	110	36	1.1	0.6	32.0	63.0	35.0	40	46.3	0.601	7 800	10 200
70BTR10H	70	110	36	1.1	0.6	(32.0)	(63.0)	31.5	40	46.3	0.561	8 400	10 600
75BAR10E	75	115	36	1.1	0.6	27.3	57.5	39.0	30	36.1	0.634	8 500	10 800
75BAR10H	75	115	36	1.1	0.6	(27.3)	(57.5)	26.7	30	36.1	0.592	9 000	11 100
75BTR10E	75	115	36	1.1	0.6	32.5	65.5	36.5	40	48.4	0.634	7 400	9 600
75BTR10H	75	115	36	1.1	0.6	(32.5)	(65.5)	33.0	40	48.4	0.592	7 900	10 000
80BAR10E	80	125	40.5	1.1	0.6	32.0	68.5	46.5	30	39.4	0.830	7 900	10 000
80BAR10H	80	125	40.5	1.1	0.6	(32.0)	(68.5)	32.0	30	39.4	0.776	8 300	10 300
80BTR10E	80	125	40.5	1.1	0.6	38.0	78.0	43.0	40	52.7	0.830	6 900	8 900
80BTR10H	80	125	40.5	1.1	0.6	(38.0)	(78.0)	39.0	40	52.7	0.776	7 400	9 300
85BAR10E	85	130	40.5	1.1	0.6	32.5	71.5	48.5	30	41.1	0.983	7 500	9 500
85BAR10H	85	130	40.5	1.1	0.6	(32.5)	(71.5)	33.0	30	41.1	0.926	8 000	9 800
85BTR10E	85	130	40.5	1.1	0.6	38.5	81.5	43.5	40	55.2	0.983	6 600	8 500
85BTR10H	85	130	40.5	1.1	0.6	(38.5)	(81.5)	41.0	40	55.2	0.926	7 000	8 900

(\*) Basic load rating values are reference values for ceramic ball bearings.  
 (†) For permissible axial load, please refer to Page 199.  
 (‡) For application of limiting speeds, please 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.

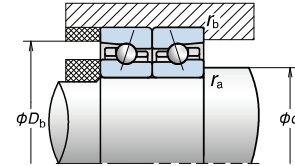
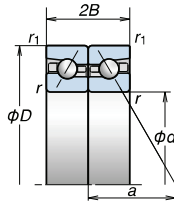
Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangement) (N)		Axial Rigidity (DB and DF Arrangement) (N/μm)		Measured Axial Clearance (μm)	
da (min.)	D0 (max.)	ra (max.)	rb (max.)	EL	L	EL	L	EL	L
56	75	1	0.6	221	464	169	220	- 5	- 10
56	75	1	0.6	246	531	196	257	- 5	- 10
56	75	1	0.6	335	761	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

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  
(NSK ROBUST Series)



Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Contact angle (Degree)	Effective Load Center (mm)	Mass (kg/row)	Limiting Speeds (min <sup>-1</sup> )	
	d	D	2B	r (min.)	r <sub>1</sub> (min.)	C <sub>a</sub> (Dynamic)	C <sub>0a</sub> (Static)					Grease	Oil
90BAR10E	90	140	45	1.5	1	42.5	92.5	62.5	30	44.4	1.21	7 000	8 900
90BAR10H	90	140	45	1.5	1	(42.5)	(92.5)	43.0	30	44.4	1.12	7 400	9 200
90BTR10E	90	140	45	1.5	1	50.0	105	58.0	40	59.5	1.21	6 100	8 000
90BTR10H	90	140	45	1.5	1	(50.0)	(105)	52.5	40	59.5	1.12	6 600	8 300
95BAR10E	95	145	45	1.5	1	43.0	96.5	65.0	30	45.5	1.25	6 700	8 500
95BAR10H	95	145	45	1.5	1	(43.0)	(96.5)	44.5	30	45.5	1.16	7 100	8 800
95BTR10E	95	145	45	1.5	1	51.0	110	61.0	40	61.0	1.25	5 900	7 600
95BTR10H	95	145	45	1.5	1	(51.0)	(110)	55.0	40	61.0	1.16	6 300	8 000
100BAR10E	100	150	45	1.5	1	43.5	100	68.0	30	47.3	1.31	6 400	8 200
100BAR10H	100	150	45	1.5	1	(43.5)	(100)	46.5	30	47.3	1.22	6 800	8 400
100BTR10E	100	150	45	1.5	1	51.5	114	73.0	40	63.7	1.31	5 600	7 300
100BTR10H	100	150	45	1.5	1	(51.5)	(114)	57.0	40	63.7	1.22	6 000	7 600
105BAR10E	105	160	49.5	2	1	49.5	115	78.0	30	50.6	1.74	6 100	7 700
105BAR10H	105	160	49.5	2	1	(49.5)	(115)	53.5	30	50.6	1.62	6 500	8 000
105BTR10E	105	160	49.5	2	1	58.5	131	74.5	40	68.0	1.74	5 300	6 900
105BTR10H	105	160	49.5	2	1	(58.5)	(131)	65.5	40	68.0	1.62	5 700	7 200
110BAR10E	110	170	54	2	1	55.5	131	89.0	30	53.9	1.97	5 800	7 300
110BAR10H	110	170	54	2	1	(55.5)	(131)	60.5	30	53.9	1.83	6 100	7 500
110BTR10E	110	170	54	2	1	66.0	148	82.5	40	72.2	1.97	5 000	6 500
110BTR10H	110	170	54	2	1	(66.0)	(148)	74.5	40	72.2	1.83	5 400	6 800
120BAR10E	120	180	54	2	1	57.0	141	96.0	30	56.8	2.29	5 400	6 800
120BAR10H	120	180	54	2	1	(57.0)	(141)	65.5	30	56.8	2.14	5 700	7 000
120BTR10E	120	180	54	2	1	68.0	160	88.5	40	76.4	2.29	4 700	6 100
120BTR10H	120	180	54	2	1	(68.0)	(160)	80.5	40	76.4	2.14	5 000	6 400
130BAR10E	130	200	63	2	1	72.5	172	117	30	63.3	3.20	4 900	6 200
130BAR10H	130	200	63	2	1	(72.5)	(172)	79.5	30	63.3	2.98	5 200	6 400
130BTR10E	130	200	63	2	1	86.0	195	106	40	85.0	3.20	4 300	5 600
130BTR10H	130	200	63	2	1	(86.0)	(195)	98.0	40	85.0	2.98	4 600	5 800
140BAR10E	140	210	63	2	1	78.5	200	135	30	66.2	3.56	4 600	5 900
140BAR10H	140	210	63	2	1	(78.5)	(200)	92.5	30	66.2	3.30	4 900	6 000
140BTR10E	140	210	63	2	1	93.0	227	84.0	40	89.2	3.56	4 000	5 200
140BTR10H	140	210	63	2	1	(93.0)	(227)	100	40	89.2	3.30	4 300	5 500

Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangement) (N)		Axial Rigidity (DB and DF Arrangement) (N/μm)		Measured Axial Clearance (μm)	
d <sub>a</sub> (min.)	D <sub>0</sub> (max.)	r <sub>a</sub> (max.)	r <sub>b</sub> (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

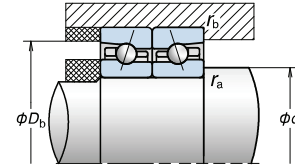
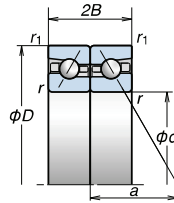
(\*) Basic load rating values are reference values for ceramic ball bearings.  
 (†) For permissible axial load, please refer to Page 199.  
 (‡) For application of limiting speeds, please refer to Page 216. Limiting speeds listed on this page are based on a DB arrangement with extra light preload (EL). 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 **150-380mm**

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



Bearing Numbers	Boundary Dimensions (mm)					基本定格荷重 <sup>(1)</sup> (kN)		Permissible Axial Load (kN)	Contact angle (Degree)	Effective Load Center (mm) a	Mass (kg/row) (Reference)	Limiting Speeds (r/min)	
	d	D	2B	r (min.)	r1 (min.)	Ca (Dynamic)	Coa (Static)					Grease	Oil
150BAR10S	150	225	67.5	2.1	1.1	92.5	234	160	30	71.0	4.35	4 000	5 100
150BAR10H	150	225	67.5	2.1	1.1	(92.5)	(234)	109	30	71.0	4.03	4 600	5 600
150BTR10S	150	225	67.5	2.1	1.1	110	267	104	40	95.5	4.35	3 500	4 600
150BTR10H	150	225	67.5	2.1	1.1	(110)	(267)	123	40	95.5	4.03	4 000	5 100
160BAR10S	160	240	72	2.1	1.1	100	257	175	30	75.7	5.33	3 800	4 800
160BAR10H	160	240	72	2.1	1.1	(100)	(257)	120	30	75.7	4.95	4 300	5 300
160BTR10S	160	240	72	2.1	1.1	119	293	184	40	101.9	5.33	3 300	4 300
160BTR10H	160	240	72	2.1	1.1	(119)	(293)	147	40	101.9	4.95	3 800	4 800
170BAR10S	170	260	81	2.1	1.1	117	305	207	30	82.3	7.95	3 500	4 500
170BTR10S	170	260	81	2.1	1.1	139	345	204	40	110.5	7.95	3 100	4 000
180BAR10S	180	280	90	2.1	1.1	151	385	262	30	88.8	10.2	3 300	4 200
180BTR10S	180	280	90	2.1	1.1	179	440	271	40	118.9	10.2	2 900	3 700
190BAR10S	190	290	90	2.1	1.1	150	385	263	30	91.8	11.0	3 200	4 000
190BTR10S	190	290	90	2.1	1.1	177	440	255	40	123.2	11.0	2 800	3 600
200BAR10S	200	310	99	2.1	1.1	169	444	300	30	98.3	14.2	3 000	3 800
200BTR10S	200	310	99	2.1	1.1	201	505	292	40	131.7	14.2	2 600	3 400
220BAR10S	220	340	108	3	1.1	189	505	340	30	107.8	18.5	2 400	3 100
220BTR10S	220	340	108	3	1.1	224	575	305	40	144.5	18.5	2 000	2 700
240BAR10S	240	360	108	3	1.1	195	545	370	30	113.5	19.9	2 200	2 900
240BTR10S	240	360	108	3	1.1	231	620	362	40	152.9	19.9	1 900	2 500
260BAR10S	260	400	123	4	1.5	253	765	520	30	125.9	29.0	2 000	2 600
260BTR10S	260	400	123	4	1.5	300	870	463	40	169.2	29.0	1 700	2 300
300BAR10S	300	460	142.5	4	1.5	310	1 020	696	30	145.3	44.9	1 800	2 300
300BTR10S	300	460	142.5	4	1.5	370	1 160	675	40	195.1	44.9	1 500	2 000
360BAR10S	360	540	159	5	2	360	1 320	815	30	169.7	67.6	1 500	1 900
360BTR10S	360	540	159	5	2	425	1 500	870	40	228.5	67.6	1 300	1 700
380BAR10S	380	560	159	5	2	370	1 410	965	30	175.4	69.8	1 400	1 900
380BTR10S	380	560	159	5	2	440	1 600	930	40	236.9	69.8	1 200	1 600

(1) Basic load rating values are reference values for ceramic ball bearings.

(2) For permissible axial load, please refer to Page 199.

(3) For application of limiting speeds, please 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.

Abutment and Fillet Dimensions (mm)				Preload (DB and DF Arrangement) (N)		Axial Rigidity (DB and DF Arrangement) (N/μm)		Measured Axial Clearance (μm)	
da (min.)	D0 (max.)	ra (max.)	rb (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	-	-

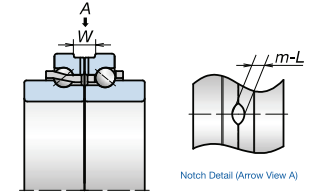
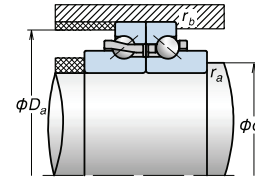
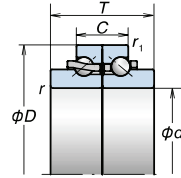
For additional information:

- 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 **80-130mm**

Angular Contact Thrust Ball Bearings  
(NSKTAC F Series)



E44 Specification

Bearing Numbers	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Permissible Axial Load (1) (kN)	Contact angle (Degree)	Mass (kg/row) (Reference)	Limiting Speeds (2) (min <sup>-1</sup> )	
	d	D	T	C	r (min.)	r <sub>1</sub> (min.)	C <sub>a</sub> (Dynamic)	C <sub>0a</sub> (Static)				Grease	Oil
50TAC20F	50	80	38	19	1	0.6	25.3	64.0	10.5	50	0.285	6 900	7 700
55TAC20F	55	90	44	22	1.1	0.6	31.5	81.0	13.3	50	0.442	6 200	6 900
60TAC20F	60	95	44	22	1.1	0.6	32.5	88.5	14.4	50	0.474	5 800	6 500
65TAC20F	65	100	44	22	1.1	0.6	33.5	96.0	15.5	50	0.506	5 500	6 100
70TAC20F	70	110	48	24	1.1	0.6	46.0	127	20.2	50	0.678	5 000	5 600
75TAC20F	75	115	48	24	1.1	0.6	46.5	132	21.0	50	0.717	4 700	5 300
80TAC20F	80	125	54	27	1.1	0.6	54.5	157	25.1	50	1.01	4 400	4 900
85TAC20F	85	130	54	27	1.1	0.6	55.5	164	26.0	50	1.04	4 200	4 700
90TAC20F	90	140	60	30	1.5	1	73.0	213	34.5	50	1.39	3 900	4 300
95TAC20F	95	145	60	30	1.5	1	74.0	222	36.0	50	1.45	3 800	4 200
100TAC29F	100	140	48	24	1.1	0.6	51.5	171	26.8	50	0.917	3 800	4 200
100TAC20F	100	150	60	30	1.5	1	75.0	231	37.0	50	1.47	3 600	4 000
105TAC20F	105	160	66	33	2	1	85.0	265	42.5	50	1.96	3 400	3 800
110TAC29F	110	150	48	24	1.1	0.6	53.0	187	29.2	50	0.996	3 500	3 800
110TAC20F	110	170	72	36	2	1	96.0	300	46.0	50	2.45	3 200	3 600
120TAC29F	120	165	54	27	2	1	62.0	223	35.0	50	1.39	3 200	3 500
120TAC20F	120	180	72	36	2	1	98.5	325	49.0	50	2.63	3 000	3 300
130TAC29F	130	180	60	30	1.5	1	74.5	276	43.5	50	1.89	2 900	3 200
130TAC20F	130	200	84	42	2	1	125	395	61.5	50	3.96	2 700	3 000

(1) For permissible axial load, please refer to Page 199.

(2) For application of limiting speeds, please 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.

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

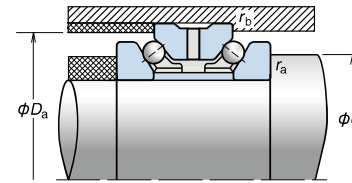
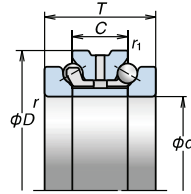
For additional information:

- Dynamic equivalent load ..... P191
- Static equivalent load ..... P198
- Recommended Grease Quantities .. P257

# 3. Angular Contact Thrust Ball Bearings

Bore Diameter 140-320mm

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



Bearing Numbers	Boundary Dimensions (mm)						Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact angle (Degree)	Mass (kg) (Reference)	Limiting Speeds (°) (min <sup>-1</sup> )	
	d	D (1)	T	C	r (min.)	r1 (min.)	Ca (Dynamic)	Coa (Static)				Grease	Oil
140TAC20X+L	140	210	84	42	2	1	145	525	325	60	8.67	2 600	2 900
150TAC29D+L	150	210	72	36	2	1	116	465	290	60	6.18	2 500	2 800
150TAC20X+L	150	225	90	45	2.1	1.1	171	620	382	60	10.6	2 400	2 700
160TAC29D+L	160	220	72	36	2	1	118	490	307	60	6.45	2 400	2 700
160TAC20X+L	160	240	96	48	2.1	1.1	185	685	424	60	12.9	2 300	2 500
170TAC29D+L	170	230	72	36	2	1	120	520	324	60	7.35	2 300	2 500
170TAC20X+L	170	260	108	54	2.1	1.1	217	810	497	60	17.6	2 100	2 400
180TAC29D+L	180	250	84	42	2	1	158	655	405	60	9.99	2 100	2 400
180TAC20X+L	180	280	120	60	2.1	1.1	280	1 020	634	60	23.1	2 000	2 200
190TAC29D+L	190	260	84	42	2	1	161	695	428	60	11.0	2 000	2 300
190TAC20D+L	190	290	120	60	2.1	1.1	285	1 060	659	60	24.4	1 900	2 100
200TAC29D+L	200	280	96	48	2.1	1.1	204	855	531	60	15.7	1 900	2 100
200TAC20D+L	200	310	132	66	2.1	1.1	315	1 180	736	60	29.6	1 800	2 000
220TAC29D+L	220	300	96	48	2.1	1.1	210	930	577	60	17.0	1 800	2 000
220TAC20D+L	220	340	144	72	2.1	1.1	360	1 390	856	60	39.1	1 600	1 800
240TAC29D+L	240	320	96	48	2.1	1.1	213	980	608	60	17.0	1 700	1 800
240TAC20D+L	240	360	144	72	3	1.1	360	1 450	893	60	42.2	1 500	1 700
260TAC29D+L	260	360	120	60	2.1	1.1	315	1 390	858	60	30.3	1 500	1 700
260TAC20D+L	260	400	164	82	4	1.5	440	1 890	1 170	60	64.5	1 400	1 600
280TAC29D+L	280	380	120	60	2.1	1.1	320	1 470	909	60	31.3	1 400	1 600
300TAC29D+L	300	420	144	72	3	1.1	395	1 810	1 120	60	50.4	1 200	1 400
320TAC29D+L	320	440	144	72	3	1.1	405	1 920	1 180	60	53.2	1 100	1 300

Abutment and Fillet Dimensions (mm)				Preload (N)			Axial rigidity (N/μm)		
da	Da	ra (max.)	rb (max.)	C6	C7	C8	C6	C7	C8
167	198	2	1	925	3 675	9 343	1 194	1 898	2 603
172	200	2	1	196	4 116	7 085	775	2 152	2 587
178	213	2	1	934	4 725	9 467	1 210	2 086	2 639
182	210	2	1	196	4 309	7 432	803	2 263	2 722
191	228	2	1	1 277	4 837	11 088	1 368	2 140	2 833
192	219	2	1	196	4 502	7 780	830	2 374	2 857
206	245	2	1	2 078	6 745	13 736	1 650	2 451	3 119
207	238	2	1	1 063	4 409	9 795	1 439	2 319	3 038
220	264	2	1	2 982	6 811	15 473	1 876	2 476	3 268
217	247	2	1	1 102	4 617	10 284	1 508	2 439	3 198
230	274	2	1	3 074	7 039	18 620	1 941	2 565	3 564
230	267	2	1	1 098	4 597	11 866	1 502	2 427	3 344
245	291	2	1	3 083	7 714	18 677	1 947	2 650	3 575
250	287	2	1	1 160	4 933	12 790	1 613	2 621	3 616
272	320	2	1	3 247	4 331	19 791	2 063	2 273	3 794
270	307	2	1	1 202	5 156	13 405	1 688	2 750	3 798
290	341	2.5	1	3 345	9 161	20 465	2 133	2 993	3 927
300	344	2	1	1 193	8 859	13 254	1 671	3 274	3 750
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
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	4 689

(1) Outer diameter tolerance is f6.  
 (2) For permissible axial load, please refer to Page 199.  
 (3) For application of limiting speeds, please 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.

For additional information:  
 ● Dynamic equivalent load ..... P191  
 ● Static equivalent load ..... P198  
 ● Recommended Grease Quantities .. P257

Double-Direction Angular Thrust Ball Bearing