

Thrust ball bearing

Thrust ball bearing are separate type bearings, contact angle is 90° , can only take axial load, and limit rotation speed is low.

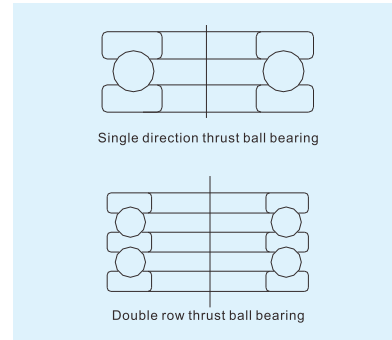
1. Main structure

1. Single direction thrust ball bearing 51000 type

This type of bearings can only take the axial load from one direction, and can limit the movement of shaft and housing in single direction.

2. Double direction thrust ball bearing 52000 type

This type of bearings can take the axial load from two directions, and can limit the axial movement of shaft and housing in two directions.



2. Cage material

When outer diameter is not greater than 250mm, generally adopt steel sheet (or metal strip) pressed cage; when outer diameter is greater than 250mm, adopt solid cage. See the following table for details.

Bearing series	Molded cage	Pressed cage	Machined cage
511	51100~51106	51107~51152	51156~511/530
512	—	51200~51224	51226~51260
513	—	51305~51320	51322~51340
514	—	51405~51415	51416~51420
522	—	52202~52224	52226, 52228
523	—	52305~52320	52322, 52324
524	—	52405~52415	52416~52426

3. Minimum axial load

For thrust ball bearings in operation, if external axial load is too small, therefore the bearing is not compressed. Steel ball will generate slippage and damage the normal running of the bearing due to the effect of inertial force. Therefore, certain axial load must be applied to the bearing during operation.

4. Allowable misalignment angle

The two bearing surfaces of thrust ball bearings must be parallel and no deviation is allowed. The shaft axis must be vertical to the housing bearing surface. If this cannot be guaranteed, spherical seat washer and aligning washer may be adopted to compensate. In case of any question, please contact the technical center of C&U Group.

5. Tolerance

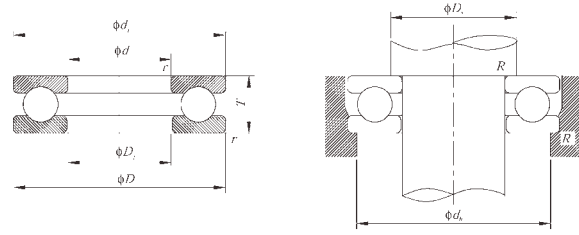
See the explanation part A45 for the tolerances of thrust ball bearings.

6. Dynamic equivalent axial load

Thrust ball bearing can only take axial load and its axial direction dynamic equivalent load is:
 $P_a = F_a$

7. Static equivalent axial load

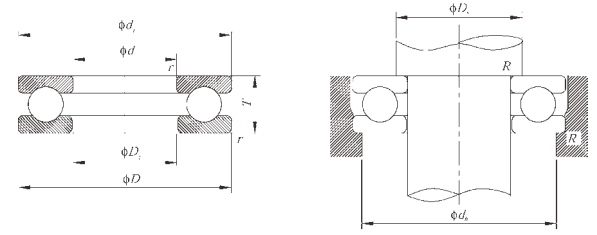
The static equivalent axial load of thrust ball bearing is:
 $P_{0a} = F_a$



d 10~45 mm

Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (r/min)		Nominal numbers	Dimensions (mm)		Mounting dimensions (mm)			Reference mass (kg)			
						$d_{i1, max}^{2)}$	$D_{i1, min}^{3)}$	D_s Max	d_b Max	R Max				
10	24	9	0.3	10.0	14.0	6,700	9,500	51100	24	11	18	16	0.3	0.022
	26	11	0.6	12.7	17.1	5,800	8,300	51200	26	12	20	16	0.6	0.030
12	26	9	0.3	10.3	15.4	6,400	9,200	51101	26	13	20	18	0.3	0.023
	28	11	0.6	13.2	19.0	5,600	8,000	51201	28	14	22	18	0.6	0.035
15	28	9	0.3	10.5	16.8	6,200	8,800	51102	28	16	23	20	0.3	0.024
	32	12	0.6	16.6	24.8	5,000	7,100	51202	32	17	25	22	0.6	0.046
17	30	9	0.3	10.8	18.2	6,000	8,500	51103	30	18	25	22	0.3	0.026
	35	12	0.6	17.2	27.3	4,800	6,800	51203	35	19	28	24	0.6	0.053
20	35	10	0.3	14.2	24.7	5,200	7,500	51104	35	21	29	26	0.3	0.040
	40	14	0.6	22.3	37.5	4,100	5,900	51204	40	22	32	28	0.6	0.080
25	42	11	0.6	19.6	37.0	4,600	6,500	51105	42	26	35	32	0.6	0.060
	47	15	0.6	27.8	50.5	3,700	5,300	51205	47	27	38	34	0.6	0.112
	52	18	1.0	35.5	61.5	3,200	4,600	51305	52	27	41	36	1.0	0.177
	60	24	1.0	55.5	89.5	2,600	3,700	51405	60	27	46	39	1.0	0.330
30	47	11	0.6	20.4	42.0	4,300	6,200	51106	47	32	40	37	0.6	0.070
	52	16	0.6	29.3	58.0	3,400	4,900	51206	52	32	43	39	0.6	0.140
	60	21	1.0	43.0	78.5	2,800	3,900	51306	60	32	48	42	1.0	0.270
	70	28	1.0	72.5	126.0	2,200	3,200	51406	70	32	54	46	1.0	0.516
35	52	12	0.6	20.4	44.5	3,900	5,600	51107	52	37	45	42	0.6	0.084
	62	18	1.0	39.0	78.0	2,900	4,200	51207	62	37	51	46	1.0	0.216
	68	24	1.0	55.5	105.0	2,400	3,500	51307	68	37	55	48	1.0	0.383
	80	32	1.1	87.0	155.0	1,900	2,800	51407	80	37	62	53	1.0	0.759
40	60	13	0.6	26.9	63.0	3,500	5,000	51108	60	42	52	48	0.6	0.124
	68	19	1.0	47.0	98.5	2,700	3,900	51208	68	42	57	51	1.0	0.277
	78	26	1.0	69.0	135.0	2,200	3,100	51308	78	42	63	55	1.0	0.549
	90	36	1.1	112.0	205.0	1,700	2,500	51408	90	42	70	60	1.0	1.082
45	65	14	0.6	27.9	69.0	3,200	4,600	51109	65	47	57	53	0.6	0.150
	73	20	1.0	48.0	105.0	2,600	3,700	51209	73	47	62	56	1.0	0.318
	85	28	1.0	80.0	163.0	2,000	2,900	51309	85	47	69	61	1.0	0.683
	100	39	1.1	130.0	242.0	1,600	2,200	51409	100	47	78	67	1.0	1.432

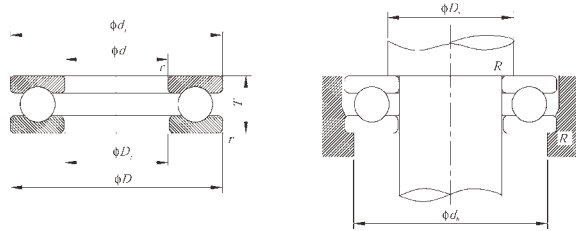
Note: 1) is the minimal permitted dimension of chamfer r
 2) Is the maximal permitted dimension of inner ring outer diameter d1
 3) Is the minimal permitted dimension of outer ring internal bore dimension D1



d 50~85 mm

Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (r/min)		Nominal numbers	Dimensions (mm)		Mounting dimensions (mm)			Reference mass (kg)			
						$d_{i1, max}^{2)}$	$D_{i1, min}^{3)}$	D_s Max	d_b Max	R Max				
50	70	14	0.6	28.8	75.5	3,100	4,500	51110	70	52	62	58	0.6	0.160
	78	22	1.0	48.5	111.0	2,400	3,400	51210	78	52	67	61	1.0	0.378
	95	31	1.1	96.5	202.0	1,800	2,600	51310	95	52	77	68	1.0	0.952
	110	43	1.5	158.0	310.0	1,400	2,000	51410	110	52	86	74	1.5	1.901
55	78	16	0.6	35.0	93.0	2,800	4,000	51111	78	57	69	64	0.6	0.225
	90	25	1.0	69.5	159.0	2,100	3,000	51211	90	57	76	69	1.0	0.608
	105	35	1.1	119.0	246.0	1,600	2,300	51311	105	57	85	75	1.0	1.293
	120	48	1.5	178.0	360.0	1,300	1,800	51411	120	57	94	81	1.5	2.530
60	85	17	1.0	41.5	113.0	2,600	3,700	51112	85	62	75	70	1.0	0.299
	95	26	1.0	73.5	179.0	2,000	2,800	51212	95	62	81	74	1.0	0.671
	110	35	1.1	123.0	267.0	1,600	2,300	51312	110	62	90	80	1.0	1.375
	130	51	1.5	214.0	435.0	1,200	1,700	51412	130	62	102	88	1.5	3.125
65	90	18	1.0	41.5	117.0	2,400	3,500	51113	90	67	80	75	1.0	0.340
	100	27	1.0	75.0	189.0	1,900	2,700	51213	100	67	86	79	1.0	0.770
	115	36	1.1	128.0	287.0	1,500	2,200	51313	115	67	95	85	1.0	1.521
	140	56	2.0	232.0	495.0	1,100	1,600	51413	140	68	110	95	2.0	3.955
70	95	18	1.0	43.0	127.0	2,400	3,400	51114	95	72	85	80	1.0	0.360
	105	27	1.0	76.0	199.0	1,800	2,600	51214	105	72	91	84	1.0	0.798
	125	40	1.1	148.0	340.0	1,400	2,000	51314	125	72	103	92	1.0	2.015
	150	60	2.0	250.0	555.0	1,000	1,500	51414	150	73	118	102	2.0	4.865
75	100	19	1.0	44.5	136.0	2,200	3,200	51115	100	77	90	85	1.0	0.405
	110	27	1.0	77.5	209.0	1,800	2,600	51215	110	77	96	89	1.0	0.873
	135	44	1.5	171.0	395.0	1,300	1,800	51315	135	77	111	99	1.5	2.616
	160	65	2.0	269.0	615.0	940	1,400	51415	160	78	125	110	2.0	5.981
80	105	19	1.0	44.5	141.0	2,200	3,100	51116	105	82	95	90	1.0	0.425
	115	28	1.0	78.5	218.0	1,700	2,400	51216	115	82	101	94	1.0	0.918
	140	44	1.5	176.0	425.0	1,200	1,800	51316	140	82	116	104	1.5	2.715
	170	68	2.1	270.0	620.0	890	1,300	51416	170	83	133	117	2.0	7.768
85	110	19	1.0	46.0	150.0	2,100	3,000	51117	110	87	100	95	1.0	0.443
	125	31	1.0	95.5	264.0	1,600	2,200	51217	125	88	109	101	1.0	1.248
	150	49	1.5	201.0	490.0	1,100	1,600	51317	150	88	124	111	1.5	3.517
	180	72	2.1	288.0	685.0	840	1,200	*51417	177	88	141	124	2.0	9.166

Note: 1) is the minimal permitted dimension of chamfer r
 2) Is the maximal permitted dimension of inner ring outer diameter d1
 3) Is the minimal permitted dimension of outer ring internal bore dimension D1
 Remarks: 1. Model number starting with the sign "*" represents its inner ring outside dimension is smaller than outer ring outside dimension.
 Therefore, when using this type of bearings, the shape of the housing bore does not need to be the same as that shown in the figure, a groove at the outer diameter of the inner ring, can be made into cylindrical shape directly.



d 90~170 mm

Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (r/min)		Nominal numbers	Dimensions (mm)		Mounting dimensions (mm)			Reference mass (kg)			
						$d_{i1, max}^{2)}$	$D_{i1, min}^{3)}$	D_s Max	d_a Max	R Max				
90	120	22	1.0	59.5	190.0	1,900	2,700	51118	120	92	108	102	1.0	0.680
	135	35	1.1	117.0	325.0	1,400	2,000	51218	135	93	117	108	1.0	1.702
	155	50	1.5	198.0	490.0	1,100	1,600	51318	155	93	129	116	1.5	3.732
	190	77	2.1	305.0	750.0	790	1,100	*51418	187	93	149	131	2.0	11.01
100	135	25	1.0	85.0	268.0	1,700	2,400	51120	135	102	121	114	1.0	0.986
	150	38	1.1	147.0	410.0	1,300	1,800	51220	150	103	130	120	1.0	2.288
	170	55	1.5	237.0	595.0	990	1,400	51320	170	103	142	128	1.5	4.870
	210	85	3.0	370.0	970.0	710	1,000	*51420	205	103	165	145	2.5	14.66
110	145	25	1.0	87.0	288.0	1,600	2,300	51122	145	112	131	124	1.0	1.074
	160	38	1.1	153.0	450.0	1,200	1,800	51222	160	113	140	130	1.0	2.458
	190	63	2.0	267.0	750.0	870	1,200	*51322	187	113	158	142	2.0	7.670
120	155	25	1.0	89.0	310.0	1,500	2,200	51124	155	122	141	134	1.0	1.108
	170	39	1.1	154.0	470.0	1,200	1,700	51224	170	123	150	140	1.0	2.703
	210	70	2.1	296.0	805.0	780	1,100	*51324	205	123	173	157	2.0	10.80
130	170	30	1.0	104.0	350.0	1,300	1,900	51126	170	132	154	146	1.0	1.733
	190	45	1.5	191.0	565.0	1,000	1,500	*51226	187	133	166	154	1.5	4.200
	225	75	2.1	330.0	960.0	720	1,000	*51326	220	134	186	169	2.0	12.70
140	180	31	1.0	107.0	375.0	1,300	1,800	*51128	178	142	164	156	1.0	1.910
	200	46	1.5	193.0	595.0	980	1,400	*51228	197	143	176	164	1.5	4.765
	240	80	2.1	350.0	1050.0	670	960	*51328	235	144	199	181	2.0	15.30
150	190	31	1.0	109.0	400.0	1,200	1,800	*51130	188	152	174	166	1.0	2.011
	215	50	1.5	220.0	685.0	900	1,300	*51230	212	153	189	176	1.5	5.800
	250	80	2.1	360.0	1130.0	660	940	*51330	245	154	209	191	2.0	16.10
160	200	31	1.0	112.0	425.0	1,200	1,700	*51132	198	162	184	176	1.0	2.100
	225	51	1.5	223.0	720.0	870	1,200	*51232	222	163	199	186	1.5	6.320
	270	87	3.0	450.0	1470.0	600	860	*51332	265	164	225	205	2.5	20.71
170	215	34	1.1	134.0	510.0	1,100	1,600	*51134	213	172	197	188	1.0	2.770
	240	55	1.5	261.0	835.0	810	1,200	*51234	237	173	212	198	1.5	7.802
	280	87	3.0	465.0	1570.0	590	840	*51334	275	174	235	215	2.5	21.59

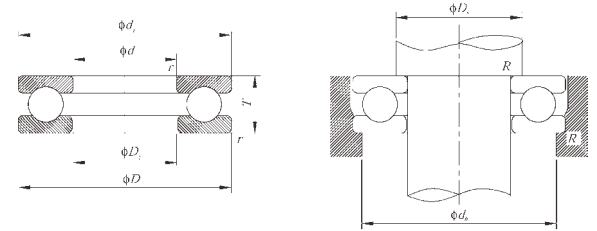
Note: 1) is the minimal permitted dimension of chamfer r

2) Is the maximal permitted dimension of inner ring outer diameter d1

3) Is the minimal permitted dimension of outer ring internal bore dimension D1

Remarks: 1. Model number starting with the sign "*" represents its inner ring outside dimension is smaller than outer ring outside dimension.

Therefore, when using this type of bearings, the shape of the housing bore does not need to be the same as that shown in the figure, a groove at the outer diameter of the inner ring, can be made into cylindrical shape directly.



d 180~200 mm

Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (r/min)		Nominal numbers	Dimensions (mm)		Mounting dimensions (mm)			Reference mass (kg)			
						$d_{i1, max}^{2)}$	$D_{i1, min}^{3)}$	D_s Max	d_a Max	R Max				
180	225	34	1.1	135.0	525.0	1,100	1,500	*51136	222	183	207	198	1.0	2.920
	250	56	1.5	266.0	875.0	780	1,100	*51236	247	183	222	208	1.5	8.338
	300	95	3.0	490.0	1700.0	540	780	*51336	295	184	251	229	2.5	27.46
190	240	37	1.1	170.0	655.0	980	1,400	*51138	237	193	220	210	1.0	3.750
	270	62	2.0	310.0	1060.0	710	1,000	*51238	267	194	238	222	2.0	11.31
	320	105	4.0	545.0	1950.0	500	710	*51338	315	195	266	244	3.0	34.89
200	250	37	1.1	172.0	675.0	960	1,400	*51140	247	203	230	220	1.0	3.922
	280	62	2.0	315.0	1110.0	700	990	*51240	277	204	248	232	2.0	11.78
	340	110	4.0	595.0	2220.0	470	670	*51340	335	205	282	258	3.0	41.79

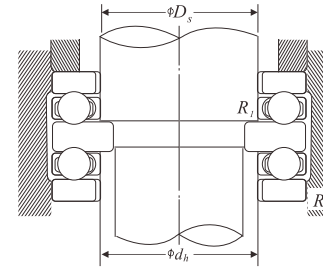
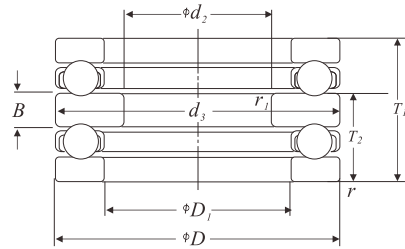
Note: 1) is the minimal permitted dimension of chamfer r

2) Is the maximal permitted dimension of inner ring outer diameter d1

3) Is the minimal permitted dimension of outer ring internal bore dimension D1

Remarks: 1. Model number starting with the sign "*" represents its inner ring outside dimension is smaller than outer ring outside dimension.

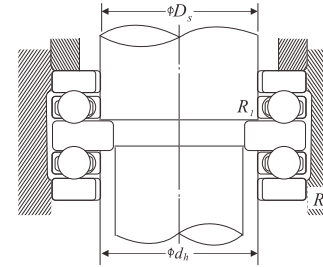
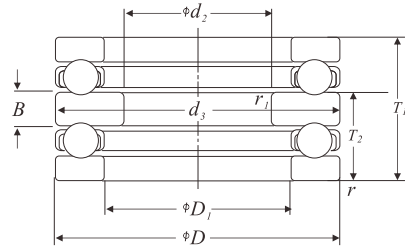
Therefore, when using this type of bearings, the shape of the housing bore does not need to be the same as that shown in the figure, a groove at the outer diameter of the inner ring, can be made into cylindrical shape directly.



d 10~50 mm

Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (r/min)		Nominal number	Dimensions (mm)				Mounting dimensions (mm)				Reference mass (kg)		
d_2	D	T_1	$r_{1min}^{1)}$	$r_{1min}^{2)}$	C_u	C_{0u}	Grease	Oil		$d_{31, max}^{2)}$	$D_{11, min}^{3)}$	B	T_2	D_s Max	d_h Max	R Max	R_1 Max			
10	32	22	0.6	0.3	16.6	24.8	5,000	7,100	52202	32	17	5	13.5	15	22	0.6	0.3	0.085		
	40	26	0.6	0.3	22.3	37.5	4,100	5,900		52204	40	22	6	16.0	20	28	0.6		0.3	0.149
15	60	45	1	0.6	55.5	89.5	2,600	3,700	52405	60	27	11	28.0	25	39	1	0.6	0.630		
	47	28	0.6	0.3	27.8	50.5	3,700	5,300		52205	47	27	7	17.5	25	34	0.6		0.3	0.212
	52	34	1	0.3	35.5	61.5	3,200	4,600			52305	52	27	8	21.0	25	36		1	0.3
20	70	52	1	0.6	72.5	126.0	2,200	3,200	52406	70	32	12	32.0	30	46	1	0.6	1.01		
	52	29	0.6	0.3	29.3	58.0	3,400	4,900		52206	52	32	7	18.0	30	39	0.6		0.3	0.252
	60	38	1	0.3	43	78.5	2,800	3,900			52306	60	32	9	23.5	30	42		1	0.3
25	80	59	1.1	0.6	87	155.0	1,900	2,800	52407	80	37	14	36.5	35	53	1	0.6	1.44		
	62	34	1	0.3	39	78.0	2,900	4,200		52207	62	37	8	21.0	35	46	1		0.3	0.418
	68	36	1	0.6	47	98.5	2,700	3,900			52208	68	42	9	22.5	40	51		1	0.6
30	68	44	1	0.3	55.5	105	2,400	3,500	52307	68	37	10	27.0	35	48	1	0.3	0.678		
	78	49	1	0.6	69.0	135	2,200	3,100		52308	78	42	12	30.5	40	55	1		0.6	1.06
	90	65	1.1	0.6	112	205	1,700	2,500			52408	90	42	15	40.0	40	60		1	0.6
35	73	37	1	0.6	48	105	2,600	3,700	52209	73	47	9	23.0	45	56	1	0.6	0.634		
	85	52	1	0.6	80	163	2,000	2,900		52309	85	47	12	32.0	45	61	1		0.6	1.34
	100	72	1.1	0.6	130	242	1,600	2,200			52409	100	47	17	44.5	45	67		1	0.6
40	78	39	1	0.6	48.5	111	2,400	3,400	52210	78	52	9	24.0	50	61	1	0.6	0.730		
	95	58	1.1	0.6	96.5	202	1,800	2,600		52310	95	52	14	36.0	50	68	1		0.6	1.80
	110	78	1.5	0.6	158	310	1,400	2,000			52410	110	52	18	48.0	50	74		1.5	0.6
45	90	45	1	0.6	69.5	159	2,100	3,000	52211	90	57	10	27.5	55	69	1	0.6	1.14		
	105	64	1.1	0.6	119	246	1,600	2,300		52311	105	57	15	39.5	55	75	1		0.6	2.41
	120	87	1.5	0.6	178	360	1,300	1,800			52411	120	57	20	53.5	55	81		1.5	0.6
50	95	46	1	0.6	73.5	179	2,000	2,800	52212	95	62	10	28.0	60	74	1	0.6	1.25		
	110	64	1.1	0.6	123	267	1,600	2,300		52312	110	62	15	39.5	60	80	1		0.6	2.56
	130	93	1.5	0.6	214	435	1,200	1,700			52412	130	62	21	57.0	60	88		1.5	0.6
	140	101	2	1	232	495	1,100	1,600		52413		140	68	23	62.0	65	95		2	1

Note: 1) is the minimal permitted dimension of chamfer r
 2) is the maximal permitted dimension of inner ring outer diameter d1
 3) is the minimal permitted dimension of outer ring internal bore dimension D1



d 55~120 mm

Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (r/min)		Nominal number	Dimensions (mm)				Mounting dimensions (mm)				Reference mass (kg)
d_2	D	T_1	$r_{min}^{2)}$	$r_{1min}^{3)}$	C_u	C_{0u}	Grease	Oil		$d_{31,max}^{2)}$	$D_{11,min}^{3)}$	B	T_2	D_s Max	d_s Max	R Max	R_1 Max	
55	100	47	1	0.6	75.0	189	1,900	2,700	52213 52214 52313	100	67	10	28.5	65	79	1	0.6	1.37
	105	47	1	1	76.0	199	1,800	2,600		105	72	10	28.5	70	84	1	1	1.56
	115	65	1.1	0.6	128	287	1,500	2,200		115	67	15	40.0	65	85	1	0.6	2.76
	125	72	1.1	1	148	340	1,400	2,000	52314	125	72	16	44.0	70	92	1	1	3.75
	150	107	2	1	250	555	1,000	1,500	52414	150	73	24	65.5	70	102	2	1	9.72
60	110	47	1	1	77.5	209	1,800	2,600	52215 52315 52415	110	77	10	28.5	75	89	1	1	1.67
	135	79	1.5	1	171	395	1,300	1,800		135	77	18	48.5	75	99	1.5	1	4.82
	160	115	2	1	269	615	940	1,400		160	78	26	70.5	75	110	2	1	11.80
65	115	48	1	1	78.5	218	1,700	2,400	52216 52316 52416 *52417	115	82	10	29.0	80	94	1	1	1.800
	140	79	1.5	1	176	425	1,200	1,800		140	82	18	48.5	80	104	1.5	1	5.070
	170	120	2.1	1	270	620	890	1,300		170	83	27	73.5	80	117	2	1	14.80
	180	128	2.1	1.1	288	685	840	1,200		179.5	88	29	78.5	85	124	2	1	18.60
70	125	55	1	1	95.5	264	1,600	2,200	52217 52317 *52418	125	88	12	33.5	85	101	1	1	2.470
	150	87	1.5	1	201	490	1,100	1,600		150	88	19	53.0	85	111	1.5	1	6.390
	190	135	2.1	1.1	305	750	790	1,100		189.5	93	30	82.5	90	131	2	1	20.80
75	135	62	1.1	1	117	325	1,400	2,000	52218 52318	135	93	14	38.0	90	108	1	1	3.260
	155	88	1.5	1	198	490	1,100	1,600		155	93	19	53.5	90	116	1.5	1	6.760
80	210	150	3	1.1	370	970	710	1,000	*52420	209.5	103	33	91.5	100	145	2.5	1	28.20
85	150	67	1.1	1	147	410	1,300	1,800	52220 52320	150	103	15	41.0	100	120	1	1	4.270
	170	97	1.5	1	237	595	990	1,400		170	103	21	59.0	100	128	1.5	1	8.800
90	230	166	3	1.1	435	1,240	640	920	*52422	229	113	37	101.5	110	159	2.5	1	37.80
95	160	67	1.1	1	153	450	1,200	1,800	52222 *52322 *52424	160	113	15	41.0	110	130	1	1	4.630
	190	110	2	1	267	705	870	1,200		189.5	113	24	67.0	110	142	2	1	13.10
	250	177	4	1.5	455	1340	590	840		249	123	40	108.5	120	174	3	1.5	14.80
100	170	68	1.1	1.1	154	470	1,200	1,700	52224 *52324 *52426	170	123	15	41.5	120	140	1	1	5.360
	210	123	2.1	1.1	296	805	780	1,100		209.5	123	27	75.0	120	157	2	1	18.40
	270	192	4	2	520	1,590	540	770		269	134	42	117.0	130	188	3	2	60.10
110	190	80	1.5	1.1	191	565	1,000	1,500	*52226	189.5	133	18	49.0	130	154	1.5	1	8.400
120	200	81	1.5	1.1	193	595	980	1,400	*52228	199.5	143	18	49.5	140	164	1.5	1	9.050

Note: 1) is the minimal permitted dimension of chamfer r

2) Is the maximal permitted dimension of inner ring outer diameter d1

3) Is the minimal permitted dimension of outer ring internal bore dimension D1

Remarks: Model number starting with the "*" represents its inner ring outside dimension is less than outer ring outside dimension. Therefore, when using this type of bearings, the shape of the bearing housing bore does not need to be the same as that shown in the figure, leaving escape at the outer diameter of the inner ring, and can be made into cylindrical form directly