

FLT Polska Sp. z o.o.

(Previously Impex-Łożyska Sp. z o.o.)

The change of the company's name came into effect in January 2007.

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All F&T factories conform to quality control and quality assurance systems in accordance with ISO 9001 standards.

This catalog contains basic information on F&T bearings.

Our F&T specialists would help you regarding our product whenever the need would arise.

GENERAL INFORMATION

Materials: Bearing rings and rolling elements are produced of through hardened bearing high chrome carbon steel. Bearing cages are produced of pressed steel, brass or polyamid/nylon. However, in standard executions, pressed steel cage is used.

Dimensions: Boundary dimensions of standard bearings conform to ISO 15, ISO 355 and ISO 104 standards.

Dimensions of special bearings are not standardized.

Tolerances: Dimensional and running accuracy conform to ISO 492, ISO 578, ISO 199 and ISO 582 standards.

FLT bearings are produced mainly in tolerance class 0 (P0).

Internal clearance: Clearance of standard bearings conforms to ISO 5753 standard. Bearings of different clearances can be supplied upon request.

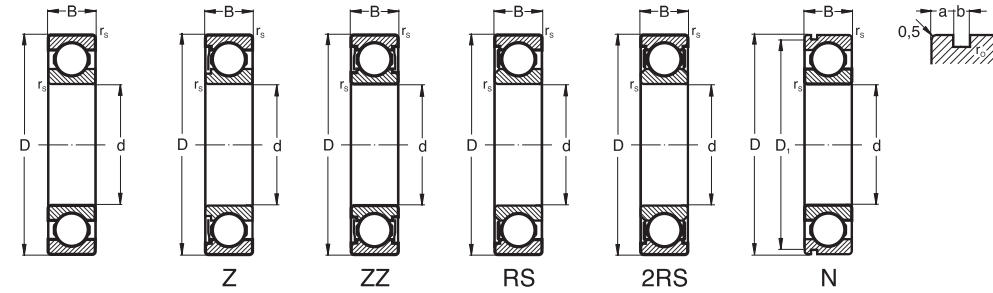
Basic load rating: C and Co ratings in the catalogue are calculated in accordance with ISO 281 and ISO 76 standards.

Basic rating life: can be calculated in accordance with ISO 281 and ISO 76 standards. This also applies to adjusted rating life with the use of factors a1, a2 and a3. Tests have confirmed that factors a2 and a3 can be used for calculating adjusted rating life.

DEEP GROOVE BALL BEARINGS



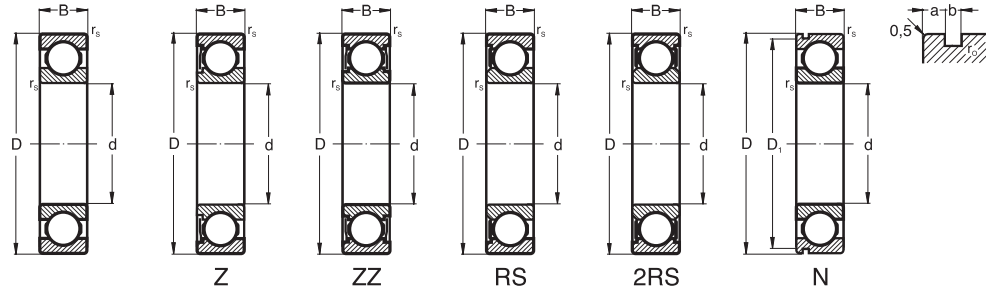
Single row



SUFFIX	Deep groove ball bearings (single row)
Z	metal shield at one side of the bearing
ZZ	metal shields at both sides of the bearing
RS	rubber seal at one side of the bearing
2RS	rubber seals at both sides of the bearing
N	snap ring groove in outer ring
ZN	shield at one side of the bearing and snap ring groove at the other side
M	machined brass cage
MA	machined brass cage centred on the outer ring
TN	polyamid cage
P6	accuracy to ISO tolerance class 6
P5	accuracy to ISO tolerance class 5
C0	standard clearance (not mentioned/marked on bearing)
C2	radial clearance less the normal
C3	radial clearance greater than normal
C4	radial clearance greater than C3
P63	accuracy to ISO class P6 and clearance C3

FLT Deep groove ball bearings

Single row

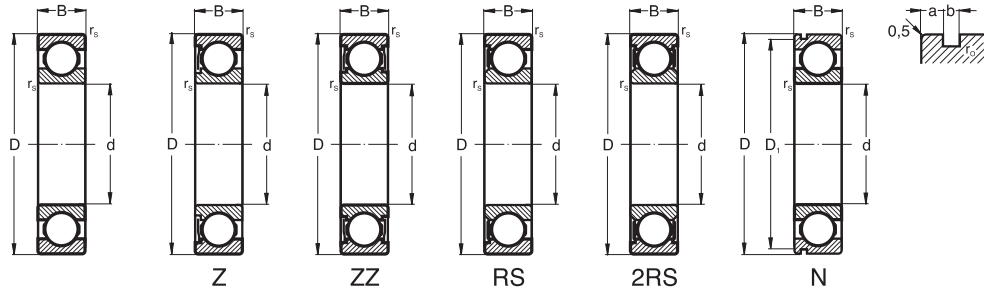


DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATION	MODIFICATION					
d	D	B	rs min	D ₁	a ~	b	r ₀ max	dynamic C	static C ₀	grease*	oil	~		Z	ZZ	RS	2RS	N	ZN
mm								kN		min ⁻¹									
4	13	5	0.2					0.98	0.30	48 000	56 000	0.003	624	•	•	•	•		
5	16	5	0.3					1.10	0.38	43 000	50 000	0.005	625	•	•	•	•		
6	19	6	0.3					2.24	0.92	36 000	43 000	0.009	626	•	•	•	•		
7	19	6	0.3					2.88	1.08	28 000	36 000	0.008	607	•	•	•	•		
	22	7	0.3					3.28	1.35	32 000	38 000	0.010	627	•	•	•	•		
8	22	7	0.3					3.30	1.40	32 000	38 000	0.012	608	•	•	•	•		
	24	8	0.3					3.35	1.40	28 000	34 000	0.017	628	•	•	•	•		
9	24	7	0.3					3.35	1.45	30 000	36 000	0.014	609	•	•	•	•		
	26	8	0.6					4.58	2.02	26 000	32 000	0.020	629	•	•	•	•		
10	26	8	0.3					4.58	2.02	28 000	34 000	0.019	6000	•	•	•	•		
	30	9	0.6	28.17	2.06	1.35	0.4	5.05	2.28	24 000	30 000	0.032	6200	•	•	•	•	•	
	35	11	0.6					7.65	3.49	20 000	26 000	0.058	6300	•	•	•	•		
12	28	8	0.3					5.10	2.40	26 000	32 000	0.022	6001	•	•	•	•		
	32	10	0.6	30.15	2.06	1.35	0.4	6.90	3.20	22 000	28 000	0.037	6201	•	•	•	•	•	•
	32	14	0.6	34.77	2.06	1.35	0.4	6.90	3.20	19 000	24 000	0.052	62201	•	•	•	•		•
	37	12	1.0					9.71	4.36	19 000	24 000	0.060	6301	•	•	•	•		
15	32	9	0.3	30.15	2.06	1.35	0.4	5.60	2.85	22 000	28 000	0.030	6002	•	•	•	•		
	35	11	0.6	33.17	2.06	1.35	0.4	7.74	3.83	19 000	24 000	0.045	6202	•	•	•	•	•	•
	35	14	0.6					7.65	3.60	20 000	24 000	0.053	62202	•	•	•	•		
	42	13	1.0	39.75	2.06	1.35	0.4	11.37	5.50	17 000	20 000	0.082	6302	•	•	•	•		
17	35	10	0.3	33.17	2.06	1.35	0.4	6.00	3.25	19 000	24 000	0.039	6003	•	•	•	•		
	40	12	0.6	38.10	2.06	1.35	0.4	9.57	4.86	17 000	20 000	0.065	6203	•	•	•	•	•	•
	47	14	1.0	44.60	2.46	1.35	0.4	12.80	6.68	16 000	19 000	0.115	6303	•	•	•	•		•
	62	17	1.1	59.61	3.28	1.90	0.6	23.00	11.90	12 000	15 000	0.270	6403	•	•	•	•		
20	32	7	0.3					3.45	2.24	17 000	22 000	0.018	61804	•	•	•	•		
	37	9	0.3					6.37	3.65	17 000	22 000	0.038	61904	•	•	•	•		
	42	8	0.3					7.93	4.46	18 000	22 000	0.050	16004	•	•	•	•		
	42	12	0.6	39.75	2.06	1.35	0.4	9.40	5.05	17 000	20 000	0.069	6004	•	•	•	•		
	47	14	1.0	44.60	2.46	1.35	0.4	12.80	6.68	15 000	18 000	0.106	6204	•	•	•	•	•	•
	47	18	1.0					12.70	6.55	10 000		0.131	62204	•	•	•	•		
	52	15	1.1	49.73	2.46	1.35	0.4	15.94	8.07	13 000	16 000	0.144	6304	•	•	•	•	•	•
	72	19	1.1	68.81	3.28	1.90	0.6	30.05	15.00	10 000	13 000	0.400	6404	•	•	•	•	•	•
25	37	7	0.3					3.8	2.8		24 000	0.021	61805						
	42	9	0.3					7.02	4.3		22 000	0.045	61905						
	47	8	0.3					9.07	5.28	14 000	17 000	0.060	16005	•	•	•	•		
	47	12	0.6	44.60	2.06	1.35	0.4	11.25	6.49	15 000	18 000	0.080	6005	•	•	•	•		
	52	15	1.0	49.73	2.46	1.35	0.4	14.04	7.90	12 000	15 000	0.129	6205	•	•	•	•	•	•
	52	18	1.0					14.04	7.90	12 000	15 000	0.153	62205	•	•	•	•		
	62	17	1.1	59.61	3.28	1.90	0.6	22.41	11.78	11 000	14 000	0.232	6305	•	•	•	•	•	•
	80	21	1.5	76.81	3.88	1.90	0.6	36.00	19.30	9 000	11 000	0.530	6405	•	•	•	•	•	•
30	42	7	0.3					4.15	3.35		19 000	0.025	61806						
	47	9	0.3					7.28	4.55		19 000	0.051	61906						
	55	9	0.3					11.20	7.35	12 000	15 000	0.085	16006						
	55	13	1.0	52.60	2.06	1.35	0.4	13.24	8.22	12 000	15 000	0.116	6006	•	•	•	•	•	•
	62	16	1.0	59.61	3.28	1.90	0.6	19.49	11.35	10 000	13 000	0.200	6206	•	•	•	•	•	•
	62	20	1.0					19.46	11.31	7 500		0.236	62206	•	•	•	•		
	62	20	1.0	68.81	3.28	1.90	0.6	28.70	15.80	9 000	11 000	0.346	6306	•	•	•	•	•	•
	90	23	1.5	86.79	3.88	2.70	0.6	43.30	24.00	8 500	10 000	0.375	6406	•	•	•	•	•	•

*Limiting speeds for bearings in RS and 2RS amount to only two-thirds of the values given in the Table

FLT Deep groove ball bearings

Single row

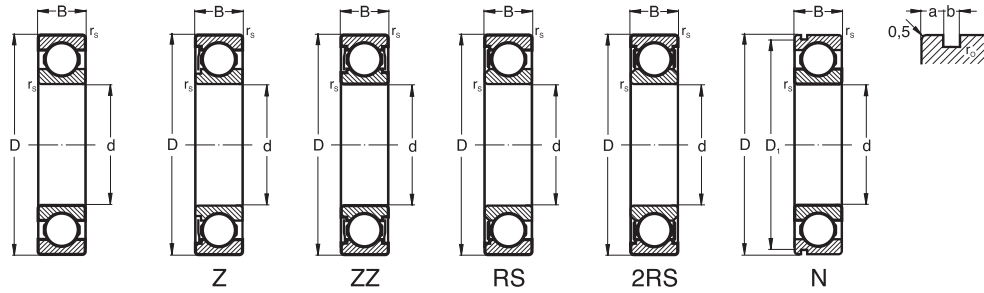


DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATION	MODIFICATION					
d	D	B	rs min	D _i	a ~	b	r ₀ max	dynamic C	static C ₀	grease*	oil	~		Z	ZZ	RS	2RS	N	ZN
mm								kN		min ⁻¹		kg							
35	62	9	0.3					12.20	8.80	10 000	13 000	0.110	16007	•	•				
	62	14	1.0	59.61	2.06	1.35	0.6	15.90	10.30	10 000	13 000	0.155	6007	•	•				
	72	17	1.1	68.81	3.28	1.90	0.6	25.70	15.30	9 000	11 000	0.288	6207	•	•	•	•	•	•
	80	21	1.5	76.81	3.28	1.90	0.6	33.60	21.00	8 500	10 000	0.457	6307	•	•	•	•	•	•
	100	25	1.5	96.80	3.88	2.70	0.6	54.60	30.60	7 000	8 500	0.952	6407	•	•	•	•	•	•
40	68	9	0.3					13.2	10.2	9 500	12 000	0.125	16008	•					
	68	15	1.0	64.82	2.49	1.90	0.6	16.8	11.5	9 500	12 000	0.192	6008	•	•				
	80	18	1.1	76.81	3.28	1.90	0.6	29.1	17.9	8 500	10 000	0.366	6208	•	•	•	•	•	•
	90	23	1.5	86.79	3.28	2.70	0.6	40.7	24.0	7 500	9 000	0.633	6308	•	•	•	•	•	•
	110	27	2.0	106.81	3.88	2.70	0.6	64.1	34.6	6 700	8 000	1.230	6408	•	•	•	•	•	•
45	75	10	0.6					15.6	12.2	9 000	11 000	0.170	16009						
	75	16	1.0	71.83	2.49	1.90	0.6	21.2	15.2	9 000	11 000	0.250	6009	•	•	•	•	•	•
	85	19	1.1	81.81	3.28	1.90	0.6	32.7	20.5	7 500	9 000	0.407	6209	•	•	•	•	•	•
	100	25	1.5	96.80	3.28	2.70	0.6	53.0	32.1	6 700	8 000	0.833	6309	•	•	•	•	•	•
	120	29	2.0	115.21	4.06	3.10	0.6	76.9	45.0	6 000	7 000	1.530	6409	•	•	•	•	•	•
50	72	12	0.6					14.6	11.8		12 000	0.14	61910	•					
	80	10	0.6					16.2	13.2	8 500	10 000	0.180	16010						
	80	16	1.0	76.81	2.49	1.90	0.6	21.8	16.6	8 500	10 000	0.261	6010	•	•	•	•	•	•
	90	20	1.1	86.79	3.28	1.90	0.6	35.1	23.2	7 000	8 500	0.463	6210	•	•	•	•	•	•
	110	27	2.0	106.81	3.28	2.70	0.6	61.8	37.9	6 300	7 500	1.070	6310	•	•	•	•	•	•
55	130	31	2.1	125.22	4.06	3.10	0.6	91.6	54.3	5 300	6 300	1.880	6410	•	•	•	•	•	•
	90	11	0.6					16.4	14.2	7 500	9 000	0.260	16011						
	90	18	1.1	86.79	2.87	2.70	0.6	28.3	21.3	7 500	9 000	0.385	6011	•	•	•	•	•	•
	100	21	1.5	96.80	3.28	2.70	0.6	43.4	29.2	6 300	7 500	0.607	6211	•	•	•	•	•	•
	120	29	2.0	115.21	4.06	3.10	0.6	71.5	44.6	5 600	6 700	1.370	6311	•	•	•	•	•	•
60	140	33	2.1	135.23	4.90	3.10	0.6	100.0	62.0	5 000	6 000	2.300	6411	•	•	•	•	•	•
	95	11	0.6					20.0	17.6	6 700	8 000	0.280	16012						
	95	18	1.1	91.82	2.87	2.70	0.6	29.4	23.2	6 700	8 000	0.415	6012	•	•	•	•	•	•
	110	22	1.5	106.81	3.28	2.70	0.6	46.1	33.1	6 000	7 000	0.783	6212	•	•	•	•	•	•
	130	31	2.1	125.22	4.06	3.10	0.6	81.8	51.8	5 000	6 000	1.790	6312	•	•	•	•	•	•
65	150	35	2.1	145.25	4.90	3.10	0.6	109.0	70.0	4 800	5 600	2.770	6412	•	•	•	•	•	•
	100	11	0.6					21.2	19.6		8 000	0.30	16013						
	100	18	1.1	96.80	2.87	2.70	0.6	30.5	25.2	6 300	7 500	0.435	6013	•	•	•	•	•	•
	120	23	1.5	115.21	4.06	2.70	0.6	57.2	40.0	5 300	6 300	0.99	6213	•	•	•	•	•	•
	140	33	2.1	135.23	4.90	3.10	0.6	93.0	56.0	4 800	5 600	2.08	6313	•	•	•	•	•	•
70	160	37	2.1	155.22	4.90	3.10	0.6	118.0	78.6	4 500	5 300	3.30	6413	•	•	•	•	•	•
	110	20	1.1	106.81	2.87	3.10	0.6	38.0	30.9	6 000	7 000	0.60	6014	•	•	•	•	•	•
	125	24	1.5	120.22	4.06	3.10	0.6	62.2	44.0	5 000	6 000	1.07	6214	•	•	•	•	•	•
	150	35	2.1	145.24	4.90	3.10	0.6	104.0	63.0	4 500	5 300	2.52	6314	•	•	•	•	•	•
	180	42	3.0	173.66	5.69	3.50	0.6	143.0	104.0	3 800	4 500	4.83	6414	•	•	•	•	•	•
75	115	13	0.6					28.5	27.0		6 700	0.46	16015						
	115	20	1.1	111.81	2.87	3.10	0.6	39.5	33.6	5 600	6 700	0.63	6015	•	•			•	
	130	25	1.5	125.22	4.06	3.10	0.6	66.2	49.3	4 800	5 600	1.18	6215	•	•			•	
	160	37	2.1	155.22	4.90	3.10	0.6	113.4	77.0	4 300	5 000	3.00	6315	•	•	•	•	•	•
	190	45	3.0	183.64	5.69	3.50	0.6	153.0	114.0	3 600	4 300	6.80	6415	•	•	•	•	•	•

*Limiting speeds for bearings in RS and 2RS amount to only two-thirds of the values given in the Table

F&T Deep groove ball bearings

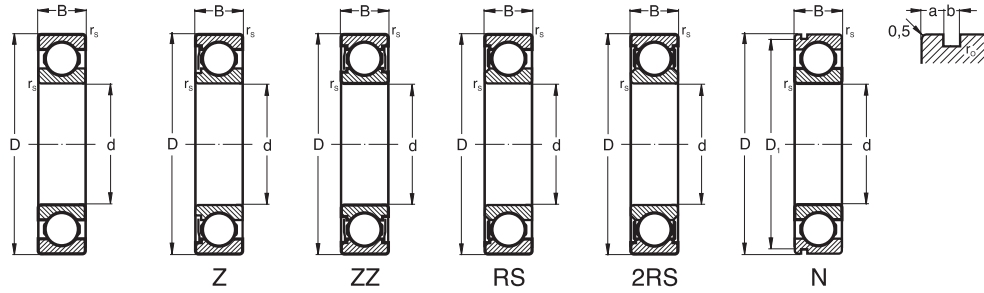
Single row



DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATION	MODIFICATION					
d	D	B	rs min	D ₁	a ~	b	r ₀ max	dynamic C	static C ₀	grease*	oil	~		Z	ZZ	RS	2RS	N	ZN
mm								kN		min ⁻¹		kg							
80	125	22	1.1	120.22	2.87	3.10	0.6	47.6	39.7	5 300	6 300	0.85	6016						
	140	26	2.0	135.23	4.90	3.10	0.6	72.7	53.0	4 500	5 300	1.40	6216	•				•	
	170	39	2.1	163.65	5.69	3.50	0.6	124.0	80.0	3 800	4 500	3.60	6316		•			•	
	200	48	3.0	193.65	5.69	3.50	0.6	163.0	125.0	2 500	3 200	8.00	6416					•	
85	120	18	1.1					32	29	5 300	6 300	0.55	61917						
	130	22	1.1	125.22	2.87	3.10	0.6	49.5	43	5 000	6 000	0.89	6017					•	
	150	28	2.0	145.24	4.90	3.10	0.6	77.0	59	4 300	5 000	1.79	6217					•	
	180	41	3.0	173.66	5.69	3.50	0.6	133	90	3 600	4 300	4.23	6317					•	
90	140	16	1.0					41.5	39		5 300	0.86	16018						
	140	24	1.5	135.23	3.71	3.10	0.6	58.2	46.6	4 800	5 600	1.16	6018					•	
	160	30	2.0	155.22	4.90	3.10	0.6	102.4	75.9	3 800	4 500	2.15	6218					•	
	190	43	3.0	183.64	5.69	3.50	0.6	143	98	3 400	4 000	4.90	6318					•	
95	130	18	1.0					33.8	33.5		6 300	0.61	61919						
	145	24	1.5	140.23	3.71	3.10	0.6	60.5	53.7	4 500	5 300	1.21	6019					•	
	170	32	2.1	163.65	5.69	3.50	0.6	108.7	81.7	3 600	4 300	2.62	6219					•	
	200	45	3.0	193.65	5.69	3.50	0.6	153	110	3 200	3 800	5.62	6319			•		•	
100	150	24	1.5	145.24	3.71	3.10	0.6	60.1	54.2	4 300	5 000	1.25	6020					•	
	180	34	2.1	173.66	5.69	3.50	0.6	122.1	92.7	3 400	4 000	3.14	6220					•	
	215	47	3.0					175	131	3 000	3 600	7.00	6320					•	
105	130	13	1.1					16.3	19		6 300	0.32	61821						
	160	26	2.0	155.22	3.71	3.10	0.6	72.5	65.5	4 000	4 800	1.54	6021					•	
	190	36	2.1	183.64	5.69	3.50	0.6	133	104.5	3 200	3 800	3.70	6221					•	
	225	49	3.0					173	146	2 800	3 400	8.05	6321					•	
110	140	16	1.0					28.1	26		5 600		61822						
	170	28	2.0	163.65	3.71	3.50	0.6	82	72.8	3 800	4 500	1.96	6022					•	
	200	38	2.1	193.65	5.69	3.50	0.6	144.1	117	3 000	3 600	4.36	6222					•	
	240	50	3.0					207	167	2 600	3 200	9.54	6322					•	
120	165	22	1.1					55.3	57		5 000	1.2	61924						
	180	19	1.0					63.7	64		4 800	1.6	16024						
	180	28	2.0	173.66	3.71	3.50	0.6	84	61	3 400	4 000	1.42	6024					•	
	215	40	2.1					153	112	2 800	3 400	5.15	6224					•	
	260	55	3.0					217	180	2 400	3 000	14.60	6324					•	
130	200	22	1.1					78	81.5		3 800	2.42	16026						
	200	33	2.0	193.65	5.69	3.50	0.6	106	78	3 200	3 800	3.70	6026					•	
	230	40	3.0					168	125	2 600	3 200	5.82	6226					•	
	280	58	4.0					230	193	2 200	2 800	18.20	6326					•	
140	210	33	2.0					110	83	3 000	3 600	3.90	6028					•	
	250	42	3.0					177	137	2 400	3 000	7.47	6228					•	
	300	62	4.0					255	224	2 000	2 600	21.80	6328					•	
150	225	35	2.1					124	98	2 600	3 200	4.80	6030					•	
	270	45	3.0					190	149	2 000	2 600	10.10	6230					•	
	320	65	4.0					291	255	1 900	2 400	26.20	6330					•	
160	200	20	1.1					52	62		3 600	1.19	61832						
	240	38	2.1					138	105	2 400	3 000	5.89	6032					•	
	290	48	3.0					203	164	1 900	2 400	14.30	6232					•	

F&T Deep groove ball bearings

Single row



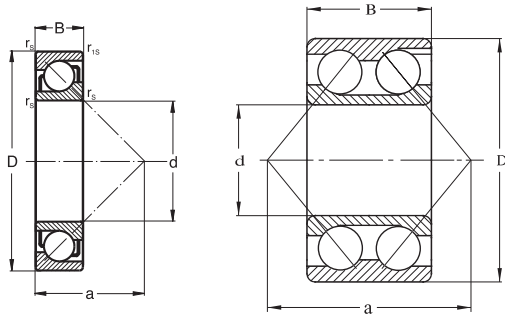
DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATION	MODIFICATION					
d	D	B	r _s min	D ₁	a ~	b	r _o max	dynamic C	static C ₀	grease*	oil	~		Z	ZZ	RS	2RS	N	ZN
mm								kN		min ⁻¹		kg							
170	215	22	1.1					62	73.5		3 400	1.56							
	260	42	2.1					168	133	2 200	2 800	7.92							
	310	52	4.0					228	196	1 900	2 400	17.50							
180	280	46	2.1					189	156	2 000	2 600	10.30							
	320	52	4.0					256	230	1 800	2 200	18.30							
190	290	31	2.0					150	166		2 600	7.1							
	290	46	2.1					196	167	2 000	2 600	10.80							
	340	55	4.0					269	248	1 800	2 000	23.00							
200	250	24	1.5					68	85		3 000	2.8							
	310	51	2.1					219	190	1 900	2 400	13.90							
	360	58	4.0					280	267	1 700	2 000	28.20							
220	270	24	1.5					73.5	96.5		2 800	2.88							
240	300	28	2.0					96.4	126.1		2 400	4.8							
280	350	33	2.0					142.7	182.9		1 900	7.63							
300	380	38	2.1					150	196		1 800	10.7							
320	400	38	2.1					153	212		1 700	11.3							
340	420	38	2.1					156	220		1 600	11.9							
380	480	46	2.0					237.5	351.5		1 500	20.7							
480	600	56	3.0					300	500		1 100	38							
560	680	56	3.0					310	570		950	43.5							
600	730	60	3.0					355	670		900	50.5							

ANGULAR CONTACT BALL BEARINGS

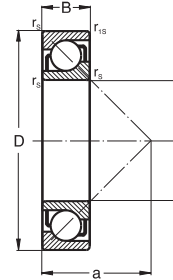


F&T Angular contact ball bearings

Single and double row



Single row



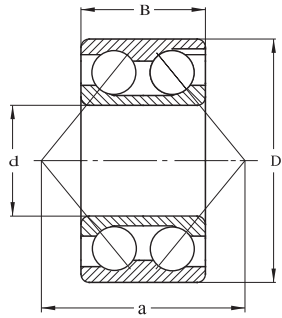
SUFFIX Angular contact ball bearings (single and double row)

A	modified internal desing – contact angle 30°
B	modified internal desing – contact angle 40°
2RS	rubber seals at both sides of the bearing
P6	accuracy to ISO tolerance class 6
P5	accuracy to ISO tolerance class 5
X1	dimensions non conformity with the international standard
MA	solid brass cage centred in the outer ring
FA	solid steel cage centred in the outer ring
V	bearing without cage with full quantity of rolling elements
N2M	bearing with two retaining slots and brass cage

DIMENSIONS						BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS
d	D	B	r _s min	r _{fs} min	a ~	dynamic C	static C ₀	grease	oil	~ kg	
mm						kN		min ⁻¹		kg	
17	40	12	0.6	0.3	16	10.8	5.3	14 000	19 000	0.07	7203B
	47	14	1	0.6	20.5	14.8	7.15	12 000	17 000	0.12	7303B
20	47	14	1	0.6	21	13.3	6.55	11 000	16 000	0.112	7204B
	52	15	1.1	0.6	17	18	9.3	10 000	15 000	0.15	7304B
25	52	15	1	0.6	23.5	14.7	7.65	9 500	14 000	0.135	7205B
	62	17	1.1	0.6	26.5	24.6	12.8	8 500	12 000	0.243	7305B
30	62	17	1	0.6	27	20.4	13.5	8 500	12 000	0.208	7206X1B
	72	19	1.1	0.6	31	34.4	21.2	7 500	10 000	0.362	7306B
35	72	17	1.1	0.6	31	27	18.3	7 500	10 000	0.295	7207B
	80	21	1.5	1	34.5	36.3	24.1	7 000	9 500	0.475	7307B
40	80	18	1.1	0.6	34	35.7	25.7	6 700	9 000	0.382	7208B
	90	23	1.5	1	39	49.7	30.2	6 300	8 500	0.657	7308B
45	85	19	1.1	0.6	37	35.7	27.0	6 300	8 500	0.43	7209B
	100	25	1.5	1	43	58	40.1	5 600	7 500	0.875	7309B
50	90	20	1.1	0.6	39	37	24.8	5 600	7 500	0.485	7210B
	110	27	2	1	47	67.5	47.8	5 000	6 700	1.14	7310B
55	100	21	1.5	1	43	46.5	29.4	5 300	7 000	0.635	7211B
	120	29	2	1	52	79	47.5	4 500	6 000	1.45	7311B
60	110	22	1.5	1	47	56	35.8	4 800	6 300	0.82	7212B
	130	31	2.1	1.1	55	90.5	54	4 300	5 600	1.81	7312B
65	120	23	1.5	1	50	64	42.2	4 300	5 600	1.02	7213B
	140	33	2.1	1.1	60	106	75.4	4 000	5 300	2.22	7313B
70	125	24	1.5	1	53	69	46.6	4 300	5 600	1.12	7214B
	150	35	2.1	1.1	64	120	86	3 600	4 800	2.7	7314B
75	130	25	1.5	1	56	71	49	4 000	5 300	1.23	7215B
	160	37	2.1	1.1	68	125	80	3 400	4 500	3.15	7315B
80	140	26	2	1	59	80	56	3 600	4 800	1.5	7216B
	170	39	2.1	1.1	72	135	90	3 200	4 300	4.18	7316B
85	150	28	2	1	64	90.5	64	3 400	4 500	1.8	7217B
	180	41	3	1.1	76	145	100	3 000	4 000	4.9	7317B
90	160	30	2	1	67	106	75	3 200	4 300	2.3	7218B
	190	43	3	1.1	80	155	112	2 900	3 800	5.76	7318B
95	170	32	2.1	1.1	71	121	86.5	3 000	4 000	3	7219B
	200	45	3	1.1	84	171	129	2 500	3 400	6.68	7319B
100	180	34	2.1	1.1	76	130	91	2 800	3 800	3.32	7220B
	215	47	3	1.1	90	191	150	2 400	3 200	7.18	7320B

F&T Angular contact ball bearings

Double row with filling slots



Four-point contact ball bearings

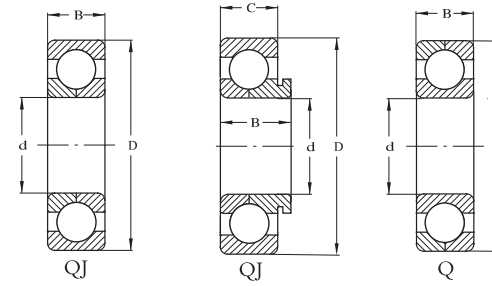


Fig. 1

Fig. 2

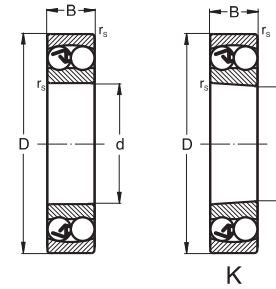
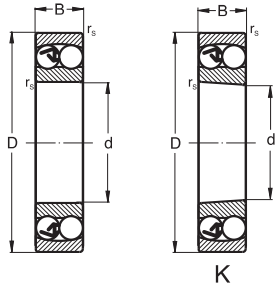
Fig. 3

DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS	DIMENSIONS			BASIC LOAD RATING		MODIFICATION			BASIC DESIGNATIONS	MASS	FIG No		
d	D	B	r _s min	a ~	dynamic C	static C ₀	grease	oil	~		d	D	B/C	dynamic C	static C ₀	V	MA	FA		~			
mm					kN		min ⁻¹		kg	mm			kN					kg					
25	52	20.6	1.0	35	22.0	13.4	8 000	11 000	0.19	3205	40	80	22/18	59	50					QJ 208 X	0.45	2	
	52	20.7	1.1	36	22.1	13.5	8 000	11 000	0.20		3205 2RS	45	85	19	61.5	55					QJ 209	0.52	1
	62	25.4	1.1	41	28.9	26.4	7 500	10 000	0.37		3305		100	25	93.5	77					QJ 309	1.04	1
30	62	23.8	1.0	41	27.2	27.0	7 000	9 500	0.32	3206	55	120	29	139	119					QJ 311X	0.74	1	
	72	30.2	1.1	47	44.5	27.0	6 300	8 500	0.59	3306		120	29	139	119					QBJ 55	1.58	1	
35	72	27.0	1.1	47	34.5	35.3	6 000	8 000	0.48	3207	65	100	18	55	61.5					QJ 1013X	0.51	1	
	80	34.9	1.5	54	57.0	35.5	5 600	7 500	0.82	3307	130	280	58	444	580					QJ 326	19.50	1	
40	80	30.2	1.1	52	49.0	32.0	5 600	7 500	0.65	3208	140	300	62	486	661					QJ 328	24.00	1	
	90	36.5	1.5	58	53.6	56.6	5 000	6 700	0.95	3308	170	260	42	315	453					QJ 1034	9.50	1	
45	85	30.2	1.1	56	52.5	36.5	5 000	6 700	0.71	3209	180	380	75	638	1030					QJ 336	47.50	1	
	100	39.7	1.5	65	73.1	79.4	4 500	6 000	1.40	3309	220	340	56	431	724					QJ 1044	22.80	1	
50	90	30.2	1.1	59	60.0	42.5	4 800	6 300	0.76	3210		460	88	845	1530					QJ 344	73.00	1	
	110	44.4	2.0	73	104.0	72.0	4 000	5 300	1.95	3310	320	580	92	984	2139					QJ 264 N2M	121.00	1	
70	150	63.5	2.1	109	143	166	3 000	4 000	4.87	3314	360	540	82	680	1490					QJ 1072	70.00	1	
	80	170	68.3	2.1	113	176.0	212.0	3 600	4 000	6.95	3316	530	710	82	903	2390					QJ 19/530	105.48	1
630												850	100	1150	3400					QJ 19/630	162.00	1	
670												820	69	821	2460					Q 18/670	82.40	3	
900												1180	122	1610	5690					QJ 19/900	379.40	1	

SELF-ALIGNING BALL BEARINGS



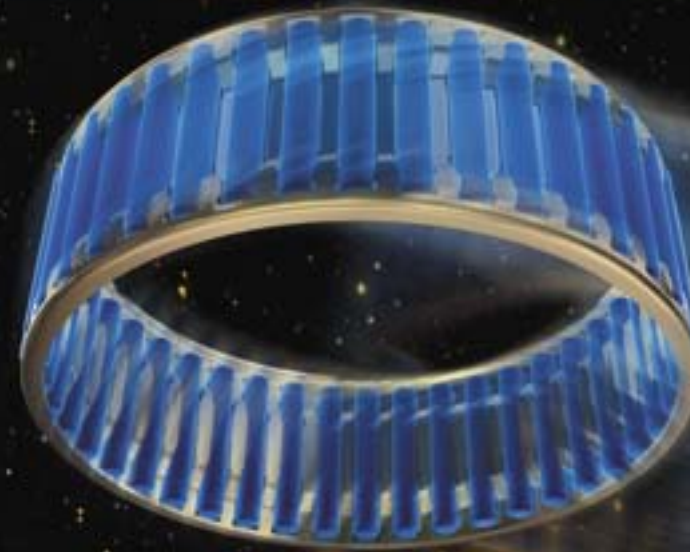
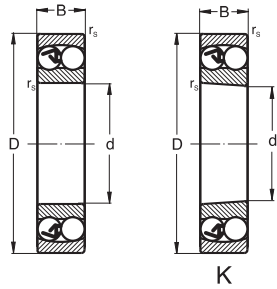
FLT Self-aligning ball bearings



SUFFIX Self-aligning ball bearings

K	tapered bored (1:12 on diameter)
P6	accuracy to ISO tolerance class 6
C3	radial clearance greater than normal
C4	radial clearance greater than C3

d	DIMENSIONS			BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	BASIC DESIGNATIONS	MODIFICATION K
	D	B	r _s	dynamic C	static C ₀	grease	oil			
mm				kN		min ⁻¹				
25	52	15	1	12	3.3	13 000	16 000	0.14	1205	●
	52	18	1	12.5	3.45	13 000	16 000	0.18	2205	●
30	62	17	1	17.8	5.05	9 500	12 000	0.26	1305	●
	62	16	1	15.67	4.7	10 000	13 000	0.22	1206	●
35	62	20	1	15.30	4.55	9 500	12 000	0.26	2206	●
	72	19	1.1	21.35	6.34	9 000	11 000	0.39	1306	●
	72	27	1.1	31.4	8.67	8 500	10 000	0.5	2306	●
	72	17	1.1	15.8	5.15	9 000	11 000	0.32	1207	●
40	72	23	1.1	21.65	6.68	8 500	10 000	0.4	2207	●
	80	21	1.5	25.1	7.94	7 500	9 000	0.51	1307	●
	80	31	1.5	39.4	11.1	7 000	8 500	0.68	2307	●
	80	18	1.1	19.22	6.5	8 500	10 000	0.42	1208	●
45	80	23	1.1	22.26	7.37	7 500	9 000	0.51	2208	●
	90	23	1.5	29.51	9.76	6 700	8 000	0.72	1308	●
	90	33	1.5	44.85	13.38	6 300	7 500	0.93	2308	●
	85	19	1.1	21.82	7.37	7 500	9 000	0.47	1209	●
50	85	23	1.1	23.29	8.15	7 000	8 500	0.55	2209	●
	100	25	1.5	38.1	12.9	6 300	7 500	0.96	1309	●
	100	36	1.5	54.11	16.47	5 600	6 700	1.25	2309	●
	90	20	1.1	22.72	8.09	7 000	8 500	0.53	1210	●
55	90	23	1.1	23.26	8.47	6 300	7 500	0.59	2210	●
	110	27	2	43.34	14.16	5 600	6 700	1.2	1310	●
	110	40	2	64.38	20.0	5 300	6 300	1.65	2310	●
	100	21	1.5	26.75	10.03	6 300	7 500	0.71	1211	●
60	100	25	1.5	26.35	9.93	6 000	7 000	0.81	2211	●
	120	29	2	51.32	18.05	5 000	6 000	1.6	1311	●
	120	43	2	75.27	23.78	4 800	5 600	2.1	2311	●
	110	22	1.5	30.16	11.56	5 600	6 700	0.9	1212	●
65	110	28	1.5	33.94	12.55	5 300	6 300	1.1	2212	●
	130	31	2.1	57.12	20.74	4 500	5 300	1.95	1312	●
	130	46	2.1	86.80	27.84	4 500	5 300	2.6	2312	●
	120	23	1.5	31.0	12.37	5 300	6 300	1.15	1213	●
70	130	31	1.5	43.53	16.35	5 000	6 000	1.45	2213	●
	140	33	2.1	61.97	22.86	4 300	5 000	2.45	1313	●
	140	48	2.1	96.23	32.38	4 000	4 900	3.25	2313	●
	125	24	1.5	34.64	13.68	5 000	6 000	1.25	1214	●
75	125	31	1.5	40	17	4 800	5 600	1.5	2214	●
	150	35	2.1	74.29	27.68	4 000	4 800	3	1314	●
	150	51	2.1	110	37.5	3 800	4 500	3.9	2314	●



DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	BASIC DESIGNATIONS	MODIFICATION K
d	D	B	r _s	dynamic C	static C ₀	grease	oil			
mm				kN		min ⁻¹				
75	130	25	1.5	38.85	15.55	4 800	5 600	1.35	1215	●
	130	31	1.5	44	18	4 500	5 300	1.6	2215	●
	160	37	2.1	79.16	29.87	3 900	4 500	3.55	1315	●
	160	55	2.1	122	42.5	3 400	4 000	4.7	2315	●
80	140	26	2	39.82	16.94	4 500	5 300	1.65	1216	●
	140	33	2	71	28.5	4 000	4 800	2.0	2216	●
	170	39	2.1	88.35	33.01	3 600	4 300	4.2	1316	●
	170	58	2.1	145	51.67	3 200	3 800	6.1	2316	●
85	150	28	2	49.22	20.48	4 200	4 800	2.1	1217	●
	150	36	2	57.94	23.61	3 800	4 500	2.5	2217	●
	180	41	3	97.59	37.82	3 400	4 000	5.0	1317	●
	180	60	3	140	51	3 000	3 600	7.1	2317	●
90	160	30	2	54.94	22.22	3 800	4 500	2.5	1218	●
	160	40	2	71	28.5	3 600	4 300	3.4	2218	●
	190	43	3	116.27	44.8	2 800	3 400	8.45	1318	●
95	170	32	2.1	64	27	3 600	4 300	3.1	1219	●
	170	43	2.1	83	34	3 200	3 800	4.1	2219	●
	200	67	3	163	64	2 600	3 200	8.8	2319	●
100	180	34	2.1	69.12	29.48	3 400	4 000	3.7	1220	●

FLT Needle roller and cage assemblies

Drawn cup needle roller bearings, Needle roller bearings

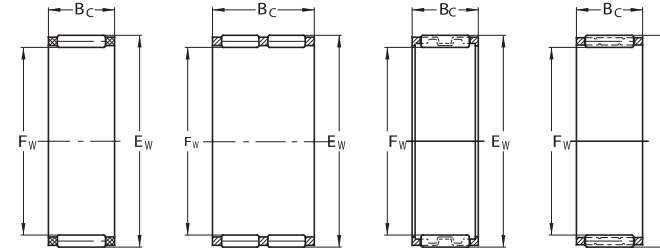
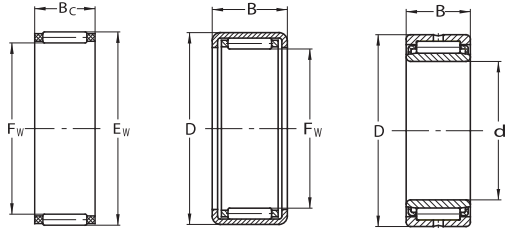


Fig. 1

Fig. 2

Fig. 3

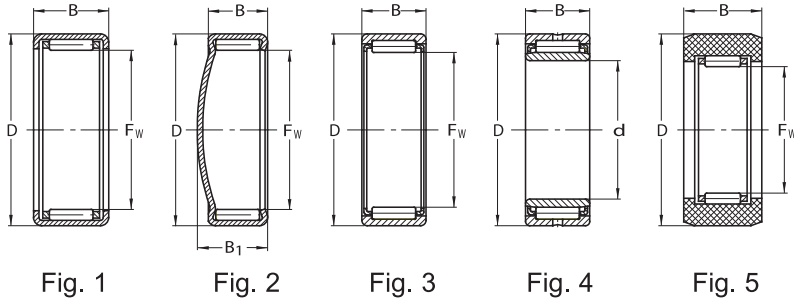
Fig. 4

PREFIX	SUFFIX	Needle roller bearings
KBK		special cage for gudgeon pin bearing
KZK		special cage for crank pin bearing
	TNG	polyamid cage
	V	bearing without cage with full quantity of rolling elements

DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~ kg	FIG No
Fw	Ew	Bc	dynamic C	static C ₀			
mm			kN				
12	18	12	9.25	8.75	K 12x18x12 TNG	0.0060	1
15	25	37	34.6	37.5	612-735 TN	0.0420	1
16	20	23	13.4	19.5	KK 16x20x23 TNG	0.0080	2
	22	12	10.6	11.1	KZK 16x22x12	0.0095	3
18	22	17	9.6	13.1	KBK 18x22x17	0.0108	4
19.05	28.575	36.5	40.4	48.8	612-695 TNG	0.0460	1
	28.575	43	46.0	57.5	612-696 TNG	0.0560	1
19.3	25.3	19.8	18.4	23.7	F-52590	0.0172	1
20	26	17	19.9	24.8	K 20x26x17	0.0182	1
22	29	16	17.8	21.2	KZK 22x29x16	0.0156	3
25.4	33.336	25.4	36.2	51.0	C 162116	0.0726	1
28	33	13	14.9	22.8	K 28x33x13	0.0152	1
30	34	32.5	24.2	51.0	KK 30x34x32.5 TNG	0.0194	2
35	40	30	24.7	47.0	KK 35x40x30	0.0430	2
40	45	17	23.5	46.0	K 40x45x17	0.0254	1
45	53	21	38.9	66.0	K 45x53x21	0.0580	1

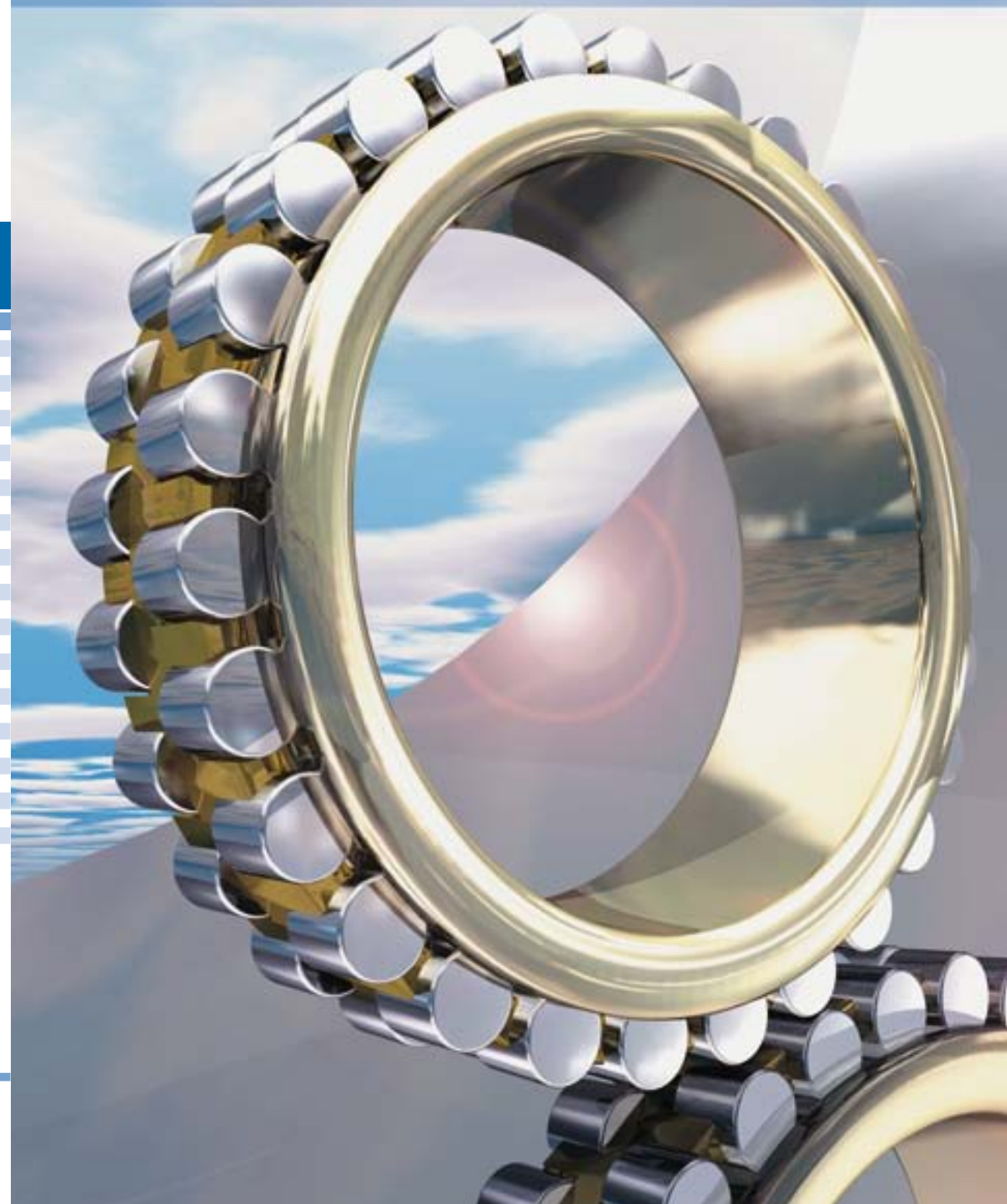
F&T Drawn cup needle roller bearings (with open and closed ends)

CYLINDRICAL ROLLER BEARINGS

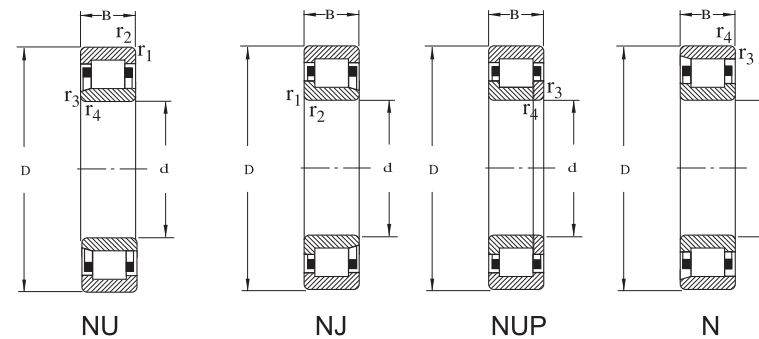
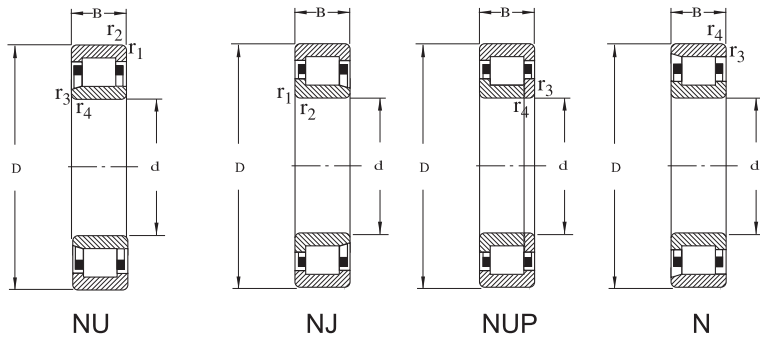


DIMENSIONS				BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~ kg	FIG No
Fw	D	B	B ₁	dynamic C	static C ₀			
mm				kN				
5	9	9		2.01	1.75	HK 0509	0.0020	1
6	10	9		2.22	2.04	RHNA 061009	0.0026	1
10	15	9.6		5.9	8.3	311-687V	0.0066	2
10	16	8.95	10.15	6.5	7.3	F-43088	0.0070	2
10	16	12		5.3	5.55	RHNA 101612	0.0080	1
10	14	10		4.55	5.7	HK1010	0.0040	1
12	18	9.95	10.70	8.25	10.4	F-82868	0.0090	2
12	18	9.95		8.25	10.4	311-748 V	0.0090	2
14	20	12		6.1	7.75	HK 1412	0.0105	1
15.875	20.638	12.7		7.0	10.9	SCE 108	0.0109	1
17	23	22		12.5	20.6	RHNA 172322 A	0.0217	1
18	24	16		10.3	16.3	HK 1816	0.0175	1
19	36.1	19		10.6	13.2	373-692 X1	0.0280	5*
19	37.7	19		10.6	13.2	373-692	0.0280	5*
19	38.0	19		10.6	13.2	373-692 X2	0.0280	5*
19.05	25.4	19.05		13.7	21.2	SCE 1212	0.0226	1
22.248	34.925	25.4		29.4	37.4	313-641	0.0870	3
25	32	20		17.8	31.5	HK 2520	0.0341	1
25	42	17		23.5	30.5	NA 4905	0.0913	4
25.4	38.1	25.4		31.9	43.1	F-92090	0.0900	3
30	42	17		23.5	30.5	RNA 4905	0.0610	3
30	37	26		25.8	53.5	HK 3026	0.0594	1
30	38	20		21.5	37.3	RHNA 303820 X1	0.0460	1
31.75	44.45	25.4		35.8	53.0	F-92091	0.1088	3
31.75	47.625	31.75		56.0	77.0	313-644	0.1850	3
34.925	14.275	12.7		11.8	21.9	SCE 228	0.0280	1
35	41	12		11.3	19.4	HK 3512	0.0277	1
41.161	49.327	16.1		21.1	39.0	F-47905	0.0516	1
50.8	60.325	25.4		37.7	78.0	SCE 3216	0.1080	1

*Fig. no. 5 – Needle roller bearing with rubber sleeve.



FLT Cylindrical roller bearings

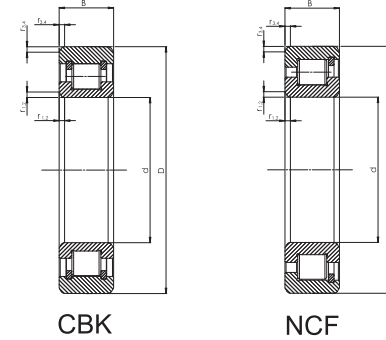
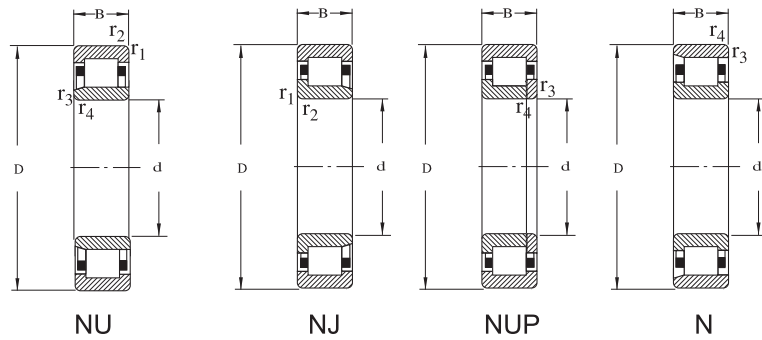


PREFIX	SUFFIX	Cylindrical roller bearings
R		separable bearing without removable inner (RNU) or outer ring (RN)
	E	modified internal design - increased capacity
	M	machined brass cage
	MA	machined brass cage centred on the outer ring
	MB	machined brass cage centred on the inner ring
	TN	polyamid cage
	P6	accuracy to ISO tolerance class 6
	C2	radial clearance less than normal
	C3	radial clearance greater than normal
	C4	radial clearance greater than C3
	P63	accuracy to ISO class 6 and clearance greater than normal
	P64	accuracy to ISO class 6 and clearance greater than C3
	V	bearing without cage with full quantity of rolling elements

DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS	MASS
d	D	B	r _{1,2} min	r _{3,4} min	dynamic C	static C ₀	grease	oil		~
mm					kN		r/min			kg
35	72	17	1.1	0.6	46.5	48.0	7 500	9 500	N207E NU207E	0.34
	72	17	1.1	0.6	46.5	48.0	7 500	9 500	NJ207E NUP207E	0.34
	72	23	1.1	1.1	49.0	51.2	7 500	9 500	NJ2207E	0.45
	80	21	1.5	1.1	62.0	63.2	7 000	9 000	N307E NU307E	0.50
40	80	21	1.5	1.1	62.0	63.2	7 000	9 000	NJ307E NUP307E	0.50
	80	18	1.5	1.1	51.5	53.0	7 000	9 000	N208E	0.39
	80	18	1.5	1.1	51.5	53.0	7 000	8 000	NJ208E NUP208E	0.39
	90	23	1.5	1.5	76.8	77.8	6 300	8 000	N308E NU308E	0.67
	90	23	1.5	1.5	76.8	77.8	6 300	8 000	NJ308E NUP308E	0.67
45	110	27	2	2	90.5	89.8	5 600	6 700	NUP408E	1.15
	85	19	1.1	1.1	58.5	63.8	6 300	8 000	N209E NU209E	0.45
	85	19	1.1	1.1	58.5	63.8	6 300	8 000	NJ209E NUP209E	0.45
	85	23	1.1	1.1	61.4	67.8	6 300	8 000	NJ2209E	0.54
	100	25	1.5	1.5	93.0	98.0	5 600	7 000	N309E NU309E	0.95
	100	25	1.5	1.5	93.0	98.0	5 600	7 000	NJ309E NUP309E	0.95
50	100	25	1.5	1.5	93.0	98.0	5 600	7 000	NF309E	0.95
	80	16	1	0.6	31.0	34.0	8 000	9 500	NU1010M	0.32
	90	20	1.1	1.1	61.2	69.2	6 000	7 500	N210E NU210E	0.51
	90	20	1.1	1.1	61.2	69.2	6 000	7 500	NJ210E NUP210E	0.51
	90	23	1.1	1.1	64.2	73.6	6 000	7 500	NJ2210EM	0.65
	110	27	2	2	105	112	5 300	6 700	N310E NU310E	1.2
55	110	27	2	2	105	112	5 300	6 700	NJ310E NUP310E	1.2
	100	21	1.5	1.1	80.2	95.5	5 300	6 700	N211E NU211E	0.68
	100	21	1.5	1.1	80.2	95.5	5 300	6 700	NJ211E NUP211E	0.68
	100	25	1.5	1.1	75.3	87.2	5 300	6 700	NJ2211EM	0.77
	120	29	2	2	128	138	4 800	6 000	N311E NU311E	1.53
	120	29	2	2	128	138	4 800	6 000	NJ311E NUP311E	1.53
60	110	22	1.5	1.5	89.8	102	5 000	6 300	N212E NU212E	0.84
	110	22	1.5	1.5	89.8	102	5 000	6 300	NJ212E NUP212E	0.84
	110	28	1.5	1.5	101	123	5 000	6 300	NJ2212E	1.09
	130	31	2.1	2.1	142	155	4 500	5 600	N312E NU312E	1.94
65	130	31	2.1	2.1	142	155	4 500	5 600	NJ312E NUP312E	1.94
	120	23	1.5	1.5	102	118	4 500	5 600	N213E NU213E	1.05
	120	23	1.5	1.5	102	118	4 500	5 600	NJ213E NUP213E	1.05
	140	33	2.1	2.1	170	188	4 000	5 000	N313E NU313E	2.42
	140	33	2.1	2.1	170	188	4 000	5 000	NJ313E NUP313E	2.42
70	125	24	1.5	1.5	112	135	4 300	5 300	N214E NU214E	1.29
	125	24	1.5	1.5	112	135	4 300	5 300	NJ214E NUP214E	1.29
	125	31	1.5	1.5	119	151	4 300	5 300	NJ2214E	1.7
	150	35	2.1	2.1	195	220	3 800	4 800	N314E NU314E	2.90
	150	35	2.1	2.1	195	220	3 800	4 800	NJ314E NUP314E	2.90
75	130	25	1.5	1.5	125	155	4 000	5 000	N215E NU215E	1.45
	130	25	1.5	1.5	125	155	4 000	5 000	NJ215E NUP215E	1.45
	160	37	2.1	2.1	228	260	3 600	4 500	N315E NU315E	3.59
	160	37	2.1	2.1	228	260	3 600	4 500	NJ315E NUP315E	3.59

DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS	MASS
d	D	B	r _{1,2} min	r _{3,4} min	dynamic C	static C ₀	grease	oil		~
mm					kN		r/min			kg
15	35	11	0.6	0.3	12.5	10.2	18 000	22 000	N202E NU202E	0.048
	35	11	0.6	0.3	12.5	10.2	18 000	22 000	NJ202E NUP202E	0.048
	35	11	0.6	0.3	12.5	10.2	18 000	22 000	NJ202ETNT	0.047
17	40	12	0.6	0.3	19.7	17.0	15 000	18 000	NJ203E	0.09
	40	12	0.6	0.3	19.8	17.1	15 000	18 000	NJ203E TNT	0.07
	47	14	1	0.6	25.1	22.0	13 000	16 000	N204E NU204E	0.11
20	47	14	1	0.6	25.1	22.0	13 000	16 000	NJ204E NUP204E	0.11
	52	15	1	0.6	28.6	27.0	11 000	14 000	N205E NU205E	0.13
25	52	15	1	0.6	28.6	27.0	11 000	14 000	NJ205E NUP205E	0.13
	52	18	1	0.6	27.5	26.8	11 000	14 000	NJ2205M NUP2205	0.16
	62	17	1.1	1.1	40.2	36.5	9 500	12 000	N305E NU305E	0.24
30	62	17	1.1	1.1	40.2	36.5	9 500	12 000	NJ305E NUP305E	0.24
	62	24	1.1	1.1	42.7	40.9	9 500	12 000	NU2305EM	0.4
	62	16	1	0.6	36.0	35.5	8 500	11 000	N206E NU206E	0.22
	62	16	1	0.6	36.0	35.5	8 500	11 000	NJ206E NUP206E	0.22
	62	20	1	0.6	48.9	49.8	8 500	11 000	NUP2206EM	
72	72	19	1.1	1.1	49.2	48.2	8 000	10 000	N306E NU306E	0.38
	72	19	1.1	1.1	49.2	48.2	8 000	10 000	NJ306E NUP306E	0.38

FtT Cylindrical roller bearings

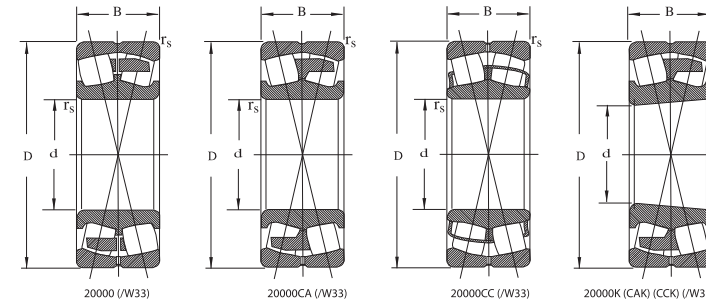
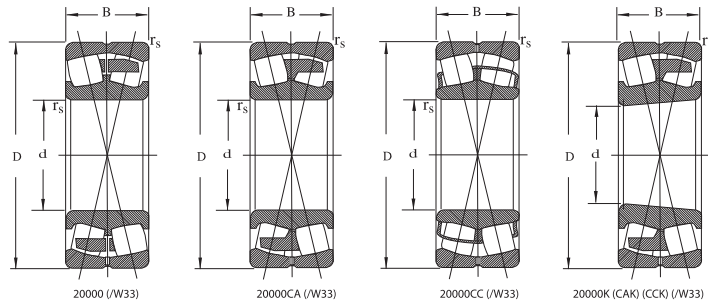


DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS ~ kg	DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS ~ kg
d	D	B	r _{1,2} min	r _{3,4} min	dynamic C	static C ₀	grease	oil				d	D	B	r _{1,2} min	r _{3,4} min	dynamic C	static C ₀	grease	oil			
mm					kN		r/min				mm					kN		r/min					
80	140	26	2	2	132	165	3 800	4 800	N216E	NU216E	1.74	170	310	52	4	4	425	650	1 500	1 900	N234	18.70	
	140	26	2	2	132	165	3 800	4 800	NJ216E	NUP216E	1.74		360	72	4	4	715	952	1 300	1 700	N334	37.20	
	170	39	2.1	2.1	245	282	3 400	4 300	N316E	NU316E	4.05		180	320	52	4	4	425	650	1 400	1 800	N236	20.00
170	39	2.1	2.1	245	282	3 400	4 300	NJ316E	NUP316E	4.05	380	75		4	4	835	1100	1 200	1 600	N336	42.50		
170	39	2.1	2.1	245	282	3 400	4 300	N218E	NU218E	2.44	250	42		2	2	39.3	70.1	1 300		NCF2936V	6.2		
90	160	30	2	2	172	215	3 400	4 300	NJ218E	NUP218E	2.44	220	270	24	1.5	1.5	181	385		1 100	NCF1844V	2.8	
	160	30	2	2	172	215	3 400	4 300	N318E	NU318E	6.07		240	300	28	2	2	240	490		1 000	NCF1848V	4.4
	190	43	3	3	298	348	3 000	3 800	NJ318E	NUP318E	6.07		270	360	60	2.1	1.5	790	1460		900	NCF2952V	18.5
95	170	32	2.1	2.1	208	262	3 200	4 000	N219E	NU219E	2.90	380	480	46	2.1	1.5	627	1290		600	NCF1876V	19.2	
	170	32	2.1	2.1	208	262	3 200	4 000	NJ219E	NUP219E	2.90		22	47	18	2	1	35	26		-	CBK-497*	0.14
	200	45	3	3	315	380	2 800	3 600	N319E	NU319E	6.62		30	61.935	19.05	2.7	1	37	44		-	CBK-239*	0.27
100	200	45	3	3	315	380	2 800	3 600	NJ319E	NUP319E	6.62	49.930	80	15	0.3	0.3	28	33		-	CBK-238*	0.27	
	180	34	2.1	2.1	235	302	3 000	3 800	N220E	NU220E	3.34	* - bearing without cage with full quantity of rollers											
	180	34	2.1	2.1	235	302	3 000	3 800	NJ220E	NUP220E	3.34												
215	47	3	3	365	425	2 600	3 200	N320E	NU320E	8.04													
215	47	3	3	365	425	2 600	3 200	NJ320E	NUP320E	8.04													
105	190	36	2.1	2.1	185	235	2 800	3 600	N221E	NU221E	4.00												
	190	36	2.1	2.1	185	235	2 800	3 600	NJ221E	NUP221E	4.00												
	190	36	2.1	2.1	224	238	2 800	3 600	NJ221E	NUP221E	4.00												
110	225	49	3	3	322	392	2 200	3 000	N321E	NU321E	9.90												
	225	49	3	3	322	392	2 200	3 000	NJ321E	NUP321E	9.90												
	200	38	2.1	2.1	278	360	2 600	3 400	N222E	NU222E	5.08												
120	200	38	2.1	2.1	278	360	2 600	3 400	NJ222E	NUP222E	5.08												
	240	50	3	3	352	428	2 000	2 800	N322E	NU322E	11.10												
	240	50	3	3	352	428	2 000	2 800	NJ322E	NUP322E	11.10												
130	215	40	2.1	2.1	322	422	2 200	3 000	N224E	NU224E	6.22												
	215	40	2.1	2.1	322	422	2 200	3 000	NJ224E	NUP224E	6.22												
	215	40	2.1	2.1	247	249	2 200	3 000	N324E	NU324E	6.32												
140	260	55	3	3	440	522	1 900	2 600	N226E	NU226E	7.15												
	260	55	3	3	440	522	1 900	2 600	NJ226E	NUP226E	7.15												
	280	58	4	4	492	620	1 700	2 200	N326E	NU326E	18.50												
150	280	58	4	4	492	620	1 700	2 200	NJ326E	NUP326E	18.50												
	250	42	3	3	302	415	1 800	2 400	N228E	NU228E	9.00												
	250	42	3	3	302	415	1 800	2 400	NJ228E	NUP228E	9.00												
160	250	68	3	3	553	799	1 800	2 400	NJ2228EM		15.9												
	300	62	4	4	545	690	1 600	2 000	N328E	NU328E	22.80												
	300	62	4	4	545	690	1 600	2 000	NJ328E	NUP328E	22.80												
150	225	35	2.1	1.5	208	310	2 600	3 200	NU1030EM		4.99												
	270	45	3	3	360	490	1 700	2 200	N230E		11.60												
	320	65	4	4	595	765	1 500	1 900	N330E		26.40												
160	240	38	2.1	1.5	245	255	2 400	3 000	NU1032M		6.2												
	290	48	3	3	405	552	1 600	2 000	N232E		14.70												
	340	68	4	4	628	825	1 400	1 800	N332E		32.20												

SPHERICAL ROLLER BEARINGS



FLT Spherical roller bearings

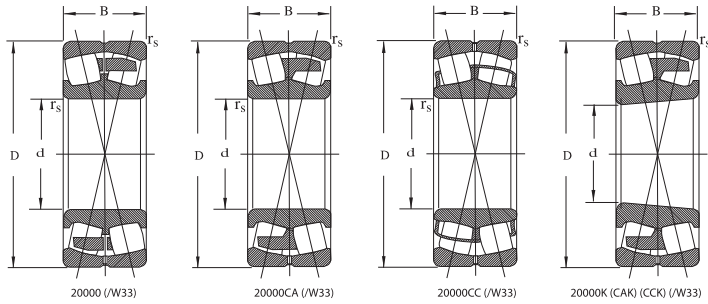


SUFFIX Spherical roller bearings

CA	no middle flange on inner ring, machined brass cage
CC	flangeless inner ring, pressed steel cage
MB	flanges on inner ring, machined brass cage
K	tapered bore (1:12 on diameter)
W33	lubrication groove and three holes in outer ring
C3	radial clearance greater than normal
C4	radial clearance greater than C3

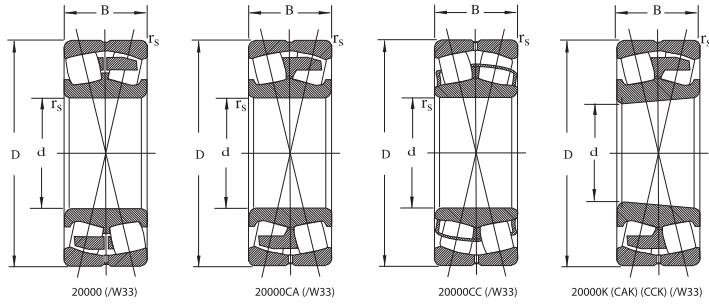
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d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore	tapered bore	~
mm				kN		r/min				kg
20	52	15	1,1	30.80	31.20	6 000	7 500	21304CA		0.17
	25	52	18	1	38.90	40.80	8 000	10 000	22205CC	0.19
30	52	18	1	38.90	40.80	8 000	10 000	22205CA		0.19
	52	18	1	41.00	43.70	8 000	10 000	22205CTNI		0.18
	62	17	1	41.50	44.20	5 300	6 700	21305CA		0.28
	62	20	1	33.50	38.20	5 300	6 700	22206	22206K	0.29
35	62	20	1	51.80	56.80	6 300	8 000	22206CC	22206CCK	0.30
	62	20	1	51.80	56.80	6 700	8 500	22206CA	22206CAK	0.33
	72	19	1,1	55.80	62.00	4 500	6 000	21306CA	21306CAK	0.41
	72	23	1,1	45.20	59.50	4 800	6 000	22207	22207K	0.43
	72	23	1,1	68.50	78.90	5 300	6 700	22207CC	22207CCK	0.47
	72	23	1,1	68.50	78.90	5 600	7 000	22207CA	22207CAK	0.44
40	80	21	1,5	63.50	73.20	5 600	7 000	21307CA		0.54
	80	23	1,1	49.80	68.50	4 500	5 600	22208	22208K	0.56
	80	23	1,1	80.70	90.60	5 000	6 000	22208CC	22208CCK	0.53
	80	23	1,1	78.50	90.80	5 000	6 300	22208CA	22208CAK	0.52
	90	23	1,5	86.20	90.40	3 600	4 500	21308CA	21308CAK	0.74
	90	33	1,5	73.50	90.50	4 000	5 000	22308	22308K	1.04
45	90	33	1,5	116.00	129.00	4 300	5 300	22308CC	22308CCK	1.04
	90	33	1,5	115.30	126.60	4 500	6 000	22308CA	22308CAK	1.04
	85	23	1,1	52.20	73.20	4 000	5 000	22209	22209K	0.59
	85	23	1,1	82.00	97.60	4 500	5 600	22209CC	22209CCK	0.59
	85	23	1,1	80.50	95.20	4 500	6 000	22209CA	22209CAK	0.58
	100	25	1,5	102.60	110.40	3 200	4 000	21309CA	21309CAK	1.02
	100	36	1,5	108.00	140.00	3 600	4 500	22309	22309K	1.39
	100	36	1,5	142.00	170.00	3 800	4 800	22309CC	22309CCK	1.38
50	100	36	1,5	142.00	170.00	4 000	5 300	22309CA	22309CAK	1.38
	90	23	1,1	52.20	73.20	3 800	4 800	22210	22210K	0.69
	90	23	1,1	89.00	111.00	4 000	5 000	22210CC	22210CCK	0.63
	90	23	1,1	83.80	102.00	4 300	5 300	22210CA	22210CAK	0.63
	110	27	2	120.00	140.00	2 800	3 800	21310CA	21310CAK	1.30
	110	40	2	128.00	170.00	3 400	4 300	22310	22310K	1.83
55	110	40	2	178.00	212.00	3 400	4 300	22310CC	22310CCK	1.85
	110	40	2	178.00	212.00	3 800	4 800	22310CA	22310CAK	1.79
	100	25	1,5	60.00	87.20	3 400	4 300	22211	22211K	0.86
	100	25	1,5	106.00	126.00	3 600	4 500	22211CC	22211CCK	0.86
	100	25	1,5	106.00	126.00	3 800	5 000	22211CA	22211CAK	0.85
	120	29	2	142.00	170.00	2 600	3 400	21311CA	21311CAK	1.65
	120	43	2	155.00	198.00	3 000	3 800	22311	22311K	2.30
	120	43	2	210.00	252.00	3 000	3 800	22311CC	22311CCK	2.35
120	43	2	210.00	252.00	3 400	4 300	22311CA	22311CAK	2.31	

FLT Spherical roller bearings



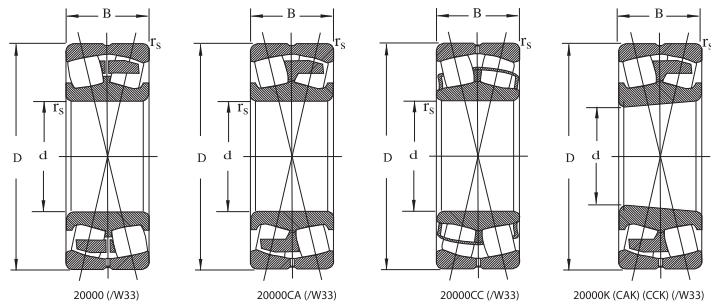
DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS	DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS
d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore	tapered bore		~	d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore	
mm				kN		r/min				kg	mm				kN		r/min				kg
60	110	28	1,5	81.80	122.00	3 200	4 000	22212	22212K	1.20	90	160	40	2	168.00	272.00	1 900	2 600	22218	22218K	4.00
	110	28	1,5	123.50	154.00	3 200	4 000	22212CC	22212CCK	1.12		160	40	2	248.00	337.00	1 900	2 600	22218CC	22218CCK	3.28
	110	28	1,5	118.30	145.80	3 600	4 500	22212CA	22212CAK	1.20		160	40	2	248.00	337.00	2 400	3 000	22218CA	22218CAK	3.67
	130	31	2,1	162.00	195.00	2 400	3 200	21312CA	21312CAK	2.08		160	52.4	2	451.00	576.00	1 900	2 600	23218CA		4.55
	130	46	2,1	168.00	225.00	2 800	3 600	22312	22312K	2.88		190	43	3	320.00	420.00	1 600	2 200	21318CA	21318CAK	6.17
	130	46	2,1	244.20	295.60	2 800	3 600	22312CC	22312CCK	2.95		190	64	3	365.00	542.00	1 700	2 200	22318	22318K	8.88
65	120	31	1,5	88.50	128.00	2 800	3 600	22213	22213K	1.55	95	170	43	2,1	212.00	322.00	1 800	2 400	22219	22219K	4.55
	120	31	1,5	151.00	193.50	2 800	3 600	22213CC	22213CCK	1.52		170	43	2,1	282.70	390.30	2 200	2 800	22219CC	22219CCK	4.57
	120	31	1,5	151.00	193.50	3 200	4 000	22213CA	22213CAK	1.51		200	45	3	355.00	485.00	1 700	2 200	21319CA	21319CAK	7.15
	140	33	2,1	182.00	228.00	2 200	3 000	21313CA	21313CAK	2.57		200	67	3	385.00	570.00	1 600	2 000	22319	22319K	10.38
	140	48	2,1	188.00	252.00	2 400	3 200	22313	22313K	3.49		200	67	3	530.00	705.00	2 000	2 600	22319CA	22319CAK	9.97
	140	48	2,1	265.00	320.00	2 400	3 200	22313CC	22313CCK	3.55		100	165	52	2,1	326.00	494.00	1 700	2 200	23120CA	23120CAK
140	48	2,1	265.00	320.00	3 000	3 800	22313CA	22313CAK	3.51	180	46		2,1	222.00	358.00	1 700	2 200	22220	22220K	5.12	
70	125	31	1,5	95.00	142.00	2 600	3 400	22214	22214K	1.66	180	46	2,1	316.00	435.00	2 200	2 600	22220CA	22220CAK	5.01	
	125	31	1,5	151.00	195.00	3 000	3 800	22214CC	22214CCK	1.60	180	60.3	2,1	420.00	630.00	1 600	2 200	23220CA	23220CAK	6.52	
	125	31	1,5	151.00	195.00	3 000	3 800	22214CA	22214CAK	1.63	215	47	3	385.00	530.00	1 600	2 000	21320CA	21320CAK	8.81	
	150	35	2,1	212.00	268.00	2 000	2 800	21314CA	21314CAK	3.11	215	73	3	450.00	668.00	1 400	1 800	22320	22320K	13.00	
	150	51	2,1	230.00	315.00	2 200	3 000	22314	22314K	4.21	215	73	3	618.00	832.00	1 900	2 400	22320CA	22320CAK	12.80	
	150	51	2,1	300.00	362.00	2 200	3 000	22314CC	22314CCK	4.35	110	170	45	2	288.00	456.00	2 200	3 000	23022	23022K	3.95
150	51	2,1	300.00	362.00	2 800	3 400	21314CA	21314CAK	4.32	170		45	2	288.00	456.00	2 200	3 000	23022CA		3.80	
75	130	31	1,5	95.00	142.00	2 400	3 200	22215	22215K	1.73		180	56	2	376.00	578.50	1 600	2 000	23122CA	23122CAK	5.58
	130	31	1,5	162.70	214.50	2 400	3 200	22215CC	22215CCK	1.82		180	69	2	458.00	775.00	1 600	2 000	24122CA		6.63
	130	31	1,5	162.70	214.50	3 000	3 800	22215CA	22215CAK	1.69		200	53	2,1	288.00	465.00	1 500	1 900	22222	22222K	7.00
	160	37	2,1	238.00	302.00	1 900	2 600	21315CA	21315CAK	3.76		200	53	2,1	410.00	588.00	1 900	2 400	22222CA	22222CAK	7.32
	160	55	2,1	262.00	388.00	2 000	2 800	22315	22315K	5.23	200	69.8	2,1	520.00	800.00	1 500	1 900	23222CA	23222CAK	9.46	
	160	55	2,1	348.00	446.70	2 000	2 800	22315CC	22315CCK	5.28	240	50	3	460.00	635.00	1 400	1 800	21322CA	21322CAK	11.80	
80	160	55	2,1	348.00	446.70	2 600	3 200	22315CA	22315CAK	5.89	240	80	3	545.00	832.00	1 200	1 600	22322	22322K	17.85	
	140	33	2	115.00	180.00	2 200	3 000	22216	22216K	2.28	240	80	3	715.00	968.00	1 700	2 200	22322CA	22322CAK	17.50	
	140	33	2	174.40	233.80	2 200	3 000	22216CC	22216CCK	2.13	120	180	46	2	304.00	501.00	2 000	2 800	23024	23024K	4.30
	140	33	2	174.40	233.80	2 800	3 400	22216CA	22216CAK	2.26		180	46	2	304.00	501.00	2 000	2 800	23024CA		4.17
	170	39	2,1	260.00	332.00	1 800	2 400	21316CA	21316CAK	4.47		180	60	2	380.00	675.00	1 500	2 000	24024CA		5.05
	170	58	2,1	288.00	405.00	1 900	2 600	22316	22316K	6.30		200	62	2	457.00	725.00	1 400	1 800	23124CA	23124CAK	7.85
170	58	2,1	391.00	507.00	2 400	3 000	22316CA	22316CAK	6.32	200		80	2	575.00	998.00	1 400	1 800	24124CA		9.65	
85	150	36	2	145.00	228.00	2 000	2 800	22217	22217K	2.83		215	58	2,1	342.00	565.00	1 300	1 700	22224	22224K	9.07
	150	36	2	212.80	282.30	2 000	2 800	22217CC	22217CCK	2.67	215	58	2,1	395.70	690.00	1 700	2 200	22224CA	22224CAK	9.14	
	150	36	2	212.80	282.30	2 600	3 200	22217CA	22217CAK	2.87	215	76	2,1	610.00	955.00	1 300	1 700	23224CA	23224CAK	11.70	
	180	41	3	298.00	385.00	1 700	2 200	21317CA	21317CAK	5.23	260	86	3	645.00	992.00	1 100	1 500	22324	22324K	22.38	
	180	60	3	308.00	440.00	1 800	2 400	22317	22317K	7.36	260	86	3	845.00	1160.00	1 500	1 900	22324CA	22324CAK	22.20	
	180	60	3	432.00	560.00	2 200	2 800	22317CA	22317CAK	7.27											

FLT Spherical roller bearings

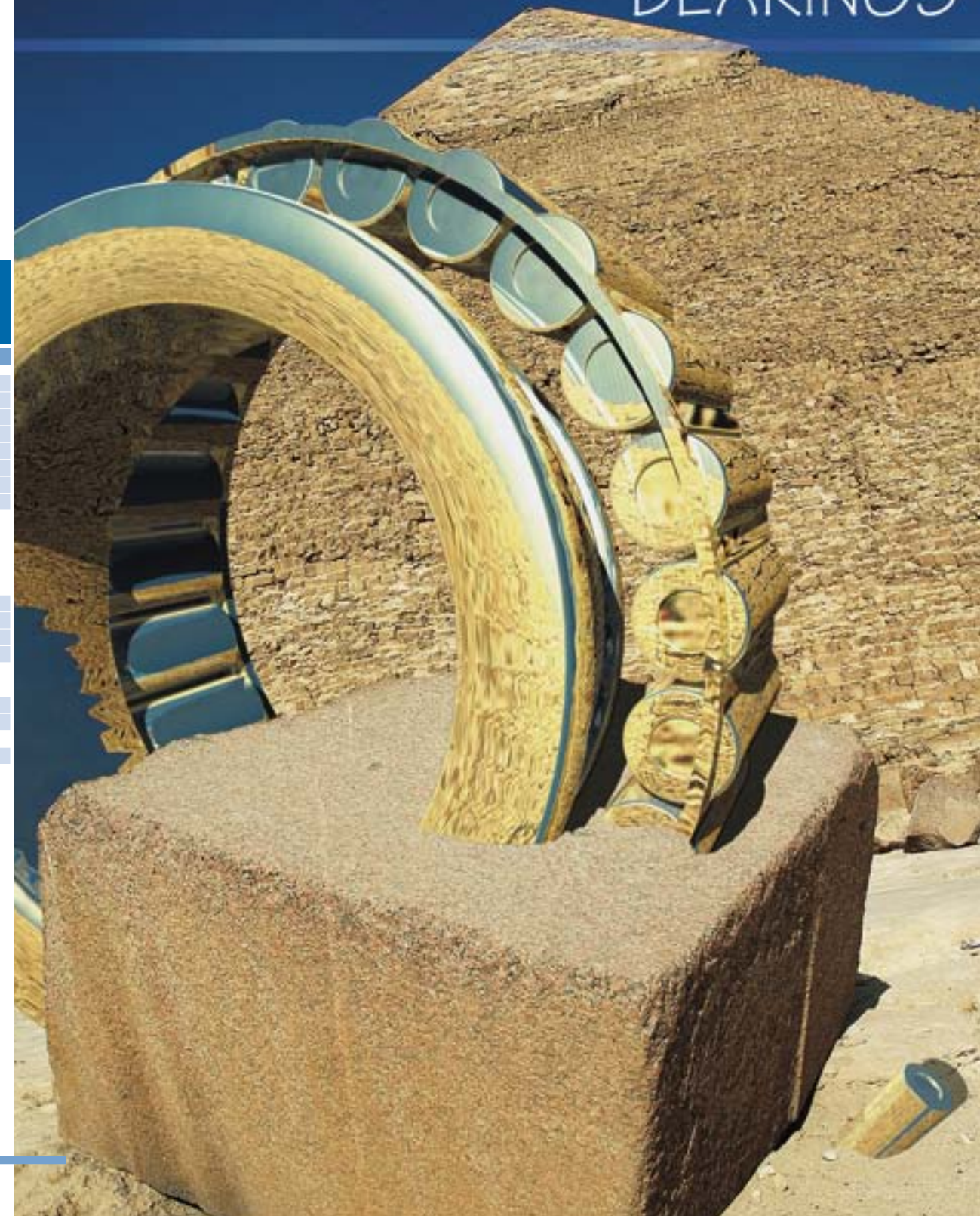


DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS	DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS		
d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore	tapered bore		~	d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore		tapered bore	~
mm				kN		r/min				kg	mm				kN		r/min				kg		
130	200	52	2	386.00	630.00	1 900	2 600	23026	23026K	6.12	170	260	67	2.1	445.00	1010.00	800	1 000	23034	23034K	13.00		
	200	52	2	386.00	630.00	1 900	2 600	23026CA	23026CAK	5.99		260	67	2.1	620.00	1070.00	1 600	2 000	23034CA	23034CAK	12.9		
	200	69	2	472.00	852.00	1 400	1 800	24026CA		7.55		260	90	2.1	792.00	1520.00	1 000	1 300	24034CA		16.70		
	210	64	2	482.00	802.00	1 300	1 700	23126CA	23126CAK	8.49		280	88	2.1	900.00	1550.00	1 000	1 300	23134CA	23134CAK	21.10		
	210	80	2	585.00	1030.00	1 300	1 700	24126CA		10.30		280	109	2.1	1070.00	1930.00	1 000	1 300	24134CA		25.50		
	230	64	3	408.00	708.00	1 200	1 600	22226	22226K	11.38		310	86	4	720.00	1300.00	850	1 100	22234	22234K	29.00		
	230	64	3	562.00	832.00	1 600	2 000	22226CA	22226CAK	11.20		310	86	4	975.00	1500.00	1 100	1 400	22234CA	22234CAK	28.10		
	230	80	3	678.00	1080.00	1 200	1 600	23226CA	23226CAK	13.80		310	110	4	1200.00	2030.00	900	1 200	23234CA	23234CAK	35.70		
	280	93	4	722.00	1140.00	950	1 300	22326	22326K	28.17		360	120	4	1150.00	2060.00	750	950	22334	22334K	60.00		
	280	93	4	965.00	1340.00	1 400	1 800	22326CA	22326CAK	27.50		360	120	4	1490.00	2130.00	950	1 300	22334CA	22334CAK	59.3		
	140	210	53	2	285.00	635.00	950	1 300	23028	23028K		6.30	180	280	74	2.1	540.00	1230.00	750	950	23036	23036K	17.60
		210	53	2	403.00	679.00	1 800	2 400	23028CA			6.4		280	74	2.1	794.00	1390.00	1 400	1 800	23036CA	23036CAK	17
210		53	2	403.00	679.00	1 800	2 400	23028CC		6.4	280	100		2.1	928.00	1820.00	950	1 200	24036CA		22.10		
210		69	2	488.00	895.00	1 300	1 700	24028CA		8.01	300	96		3	1050.00	1830.00	900	1 200	23136CA	23136CAK	26.90		
225		68	2.1	538.00	905.00	1 200	1 600	23128CA	23128CAK	10.20	300	118		3	1210.00	2200.00	900	1 200	24136CA		32.00		
225		85	2.1	670.00	1200.00	1 200	1 600	24128CA		12.50	320	86		4	735.00	1370.00	800	1 000	22236	22236K	30.00		
250		68	3	478.00	805.00	1 000	1 400	22228	22228K	14.20	320	86		4	1010.00	1590.00	1 100	1 300	22236CA	22236CAK	29.40		
250		68	3	640.00	955.00	1 400	1 700	22228CA	22228CAK	14.48	320	112		4	1280.00	2170.00	850	1 100	23236CA	23236CAK	37.90		
250		88	3	812.00	1300.00	1 100	1 500	23228CA	23228CAK	18.10	380	126		4	1260.00	2270.00	700	900	22336	22336K	70.00		
300		102	4	925.00	1340.00	900	1 200	22328	22328K	34.84	380	126		4	1610.00	2370.00	900	1 200	22336CA		70.4		
300		102	4	1130.00	1610.00	1 300	1 700	22328CA	22328CAK	34.60	190	290		75	2.1	555.00	1230.00	700	900	23038	23038K	20.00	
150		225	56	2.1	328.00	768.00	900	1 200	23030	23030K		8.19		290	75	2.1	762.00	1350.00	1 300	1 700	23038CA		18.0
	225	56	2.1	432.00	744.00	1 700	2 200	23030CA		8.12		290	100	2.1	975.00	1910.00	900	1 200	24038		23.0		
	225	75	2.1	570.00	1070.00	1 200	1 500	24030CA		10.10		290	100	2.1	975.00	1910.00	900	1 200	24038CA		23.00		
	250	80	2.1	738.00	1250.00	1 100	1 400	23130CA	23130CAK	15.70		320	104	3	1200.00	2120.00	850	1 100	23138CA	23138CAK	33.60		
	250	100	2.1	890.00	1600.00	1 100	1 400	24130CA		19.00		320	128	3	1410.00	2590.00	850	1 100	24138CA		40.20		
	270	73	3	508.00	875.00	950	1 300	22230	22230K	18.42		340	92	4	818.00	1510.00	750	950	22238	22238K	37.41		
	270	73	3	750.00	1130.00	1 300	1 600	22230CA	22230CAK	18.00		340	92	4	1595.00	2490.00	800	1 100	22238CA	22238CAK	36.20		
	270	96	3	948.00	1540.00	1 100	1 400	23230CA	23230CAK	23.20		340	120	4	1450.00	2490.00	800	1 100	23238CA	23238CAK	46.10		
	320	108	4	1020.00	1740.00	850	1 100	22330	22330K	42.34		400	132	5	1390.00	2530.00	670	850	22338	22338K	81.00		
	320	108	4	1270.00	1850.00	1 200	1 500	22330CA	22330CAK	42.00		340	92	4	1773.00	2592.00	850	1 100	22338CA		78.8		
	160	240	60	2.1	368.00	825.00	850	1 100	23032	23032K		9.60	200	310	82	2.1	580.00	1310.00	670	850	23040	23040K	24.00
		240	60	2.1	518.00	890.00	1 700	2 200	23032CA		9.48	310		82	2.1	580.00	1310.00	670	850	23040CA		23.00	
240		80	2.1	652.00	1230.00	1 100	1 400	24032CA		12.20	310	109		2.1	1120.00	2220.00	850	1 100	24040CA		29.30		
270		86	2.1	845.00	1440.00	1 000	1 300	23132CA	23132CAK	19.80	340	112		3	1380.00	2460.00	800	1 000	23140CA	23140CAK	41.60		
270		109	2.1	1040.00	1880.00	1 000	1 300	24132CA		24.40	340	140		3	1580.00	2950.00	800	1 000	24140CA		49.90		
290		80	3	642.00	1140.00	900	1 200	22232	22232K	22.20	360	98		4	920.00	1740.00	700	900	22240	22240K	47.70		
290		80	3	920.80	1290.00	1 200	1 500	22232CA	22232CAK	22.95	360	98		4	1771.00	2810.00	750	1 000	22240CA	22240CAK	43.90		
290		104	3	1090.00	1780.00	1 100	1 400	23232CA	23232CAK	29.40	360	128		4	1610.00	2790.00	750	1 000	23240CA	23240CAK	55.40		
340		114	4	1040.00	1700.00	800	1 000	22332	23034K	51.00	420	138		5	1490.00	2720.00	630	800	22340	22340K	94.00		
340		114	4	1330.00	1840.00	950	1 300	22332CA		51.9	420	138		5	1930.00	2730.00	850	1 100	22340CA		94.0		
												280		60	5	495.00	1150.00	1 000	1 400	23940CA		11.9	

F&T Spherical roller bearings

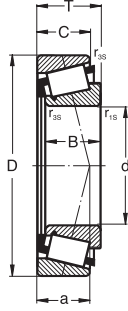


TAPERED ROLLER BEARINGS



DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		BASIC DESIGNATIONS		MASS
d	D	B	r _{1,2} min	dynamic C	static C ₀	grease	oil	cylindrical bore	tapered bore	~
mm				kN		r/min				kg
220	340	90	3	760.00	1810.00	600	750	23044	23044K	28.80
	340	118	3	1330.00	2680.00	750	1 000	24044CA		38.10
	370	120	4	1570.00	2820.00	700	950	23144CA	23144CAK	51.50
	400	108	4	1170.00	2220.00	630	800	22244	22244K	61.50
	400	108	4	2287.00	3220.00	630	800	22244CA	22244CAK	58.40
	400	144	4	2070.00	3620.00	670	900	23244CA	23244CAK	78.50
	460	145	5	1690.00	3200.00	560	700	22344	22344K	120.00
	460	145	5	2410.00	3560.00	750	950	22344CA		119
240	360	92	3	792.00	2060.00	530	670	23048	23048K	35.50
	360	118	3	1400.00	2850.00	700	950	24048CA		40.80
	400	128	4	1790.00	3220.00	670	850	23148CA	23148CAK	63.70
	440	120	4	1990.00	3192.00	700	900	22248CA		82.4
	500	155	5	2680.00	4010.00	670	850	22348CA		150
260	400	104	4	1000.00	2450.00	500	630	23052	23052K	51.50
	400	140	4	1790.00	3740.00	630	850	24052CA		62.40
	440	144	4	2210.00	4070.00	600	800	23152CA	23152CAK	88.20
	480	174	5	2800.00	4750.00	630	800	23252CA		142
280	420	106	4	1080.00	2680.00	450	560	23056	23056K	62.00
	420	106	4	1080.00	2680.00	450	560	23056CA		57.00
300	460	118	4	1800.00	3400.00	800	1 000	23060CA	23060CAK	71.50
	460	160	4	2380.00	4780.00	560	700	24060CA		97.6
480	870	310	7.5	6750.00	15200.00	340	430	23296CA		835
560	750	140	5	3050.00	7350.00	340	430	239/560CA		183
850	1030	136	5	3340.00	10000.00	260	530	238/850CA		240

FtT Tapered roller bearings



SUFFIX Single row Tapered roller bearings

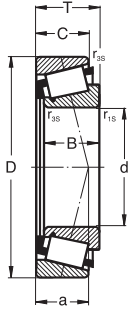
A	modified internal design-increased capacity
P6	accuracy to ISO tolerance class 6
X	boundary dimensions altered to conform to ISO standards
FD	solid collapsible steel cage
B	Increased contact angle

d	D	B	C	T	DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		MASS ~	BASIC DESIGNATIONS	
					r _{1s} min	r _{2s} min	r _{3s} min	a ~	dynamic C	static C ₀	grease	oil			
mm										kN		min ⁻¹		kg	
15	35	11	10	11.75	0.6	0.6	0.3	10	15	14.3	12 000	16 000	0.057	30202A	
	42	13	11	14.25	1	1	0.3	10	22.9	21.6	10 000	15 000	0.094		30302A
17	40	12	11	13.25	1	1	0.3	10	19.3	18.8	9 000	13 000	0.07	30203A	
	47	14	12	15.25	1	1	0.3	10	26	25.7	8 500	12 000	0.13	30303A	
20	47	19	16	20.25	1	1	0.3	12	35.3	36.3	8 000	11 000	0.17	32303A	
	42	15	12	15	0.6	0.6	0.3	10	25.1	28.2	9 000	13 000	0.1	32004X	
25	47	14	12	15.25	1	1	0.3	11	27.5	28	8 000	11 000	0.12	30204A	
	52	15	13	16.25	1.5	1.5	0.6	11	31.6	32	8 000	11 000	0.17	30304A	
30	52	21	18	22.25	1.5	1.5	0.6	11	44	45.5	7 500	11 000	0.23	32304A	
	47	15	11.5	15	0.6	0.6	0.3	12	28	34.1	8 000	11 000	0.12	32005X	
35	52	15	13	16.25	1	1	0.3	12	32.6	35.5	7 500	10 000	0.16	30205A	
	62	17	15	18.25	1.5	1.5	0.6	13	44.6	43	6 700	9 000	0.26	30305A	
40	62	17	13	18.25	1.5	1.5	0.6	20	38	40	5 600	7 500	0.22	31305A	
	52	18	15	19.25	1	1	0.3	18	41.3	49.2	7 000	9 500	0.19	32205A	
45	52	22	18	22	1	1	0.3	14	47.1	55.8	6 700	9 000	0.23	33205A	
	62	24	20	25.25	1.5	1.5	0.6	15	65	69.3	6 000	8 000	0.36	32305A	
50	55	17	13	17	1	1	0.3	14	35.7	46.8	6 700	9 000	0.17	32006XA	
	62	16	14	17.25	1	1	0.3	14	40.2	44	6 300	8 500	0.23	30206A	
55	62	16	14	17.25	1	1	0.3	14	45.5	50.5	6 300	8 500	0.23	30206XA	
	62	20	17	21.25	1	1	0.3	15	50.1	57	6 300	8 500	0.29	32206A	
60	62	25	19.5	25	1	1	0.3	16	63.8	75.4	5 600	7 500	0.37	33206A	
	72	19	16	20.75	1.5	1.5	0.6	15	56.1	56	5 600	7 500	0.39	30306A	
65	72	27	23	28.75	1.5	1.5	0.6	18	76.5	85	5 300	7 000	0.54	32306A	
	72	19	14	20.75	1.5	1.5	0.6	22	47.3	50	5 000	6 700	0.37	31306A	
70	62	18	14	18	1	1	0.3	15	36.4	47.1	6 000	8 000	0.22	32007XA	
	72	17	15	18.25	1.5	1.5	0.6	15	51.2	56	5 300	7 000	0.33	30207A	
75	72	23	19	24.25	1.5	1.5	0.6	17	66	78	5 300	7 000	0.49	32207A	
	72	28	22	28	1.55	1.5	0.6	18	82.6	101.7	5 500	7 400	0.52	33207A	
80	80	21	18	22.75	2	1.5	0.6	16	72.1	73.5	5 000	6 700	0.52	30307A	
	80	31	25	32.75	2	1.5	0.6	20	95.2	106	4 800	6 300	0.72	32307A	
85	80	21	15	22.75	2	1.5	0.6	25	59.7	63.9	4 500	6 000	0.50	31307A	

d	D	B	C	T	DIMENSIONS				BASIC LOAD RATING		LIMITING SPEEDS		MASS ~	BASIC DESIGNATIONS	
					r _{1s} min	r _{2s} min	r _{3s} min	a ~	dynamic C	static C ₀	grease	oil			
mm										kN		min ⁻¹		kg	
40	68	19	14.5	19	1	1	0.3	15	54	71	5 300	7 000	0.27	32008X	
	68	19	14.5	19	1	1	0.3	15	54	71	5 300	7 000	0.27	32008XA	
	80	18	16	19.75	1.5	1.5	0.6	16	63.4	70.2	4 800	6 300	0.42	30208A	
	80	23	19	24.75	1.5	1.5	0.6	19	74.8	86.5	4 800	6 300	0.53	32208A	
	80	32	25	32	1.5	1.5	0.6	21	105.8	135.5	4 500	6 000	0.72	33208A	
	90	23	20	25.25	2	1.5	0.6	19	85.8	95	4 500	6 000	0.74	30308A	
	90	33	27	35.25	2	1.5	0.6	23	117.9	142.7	4 000	5 300	0.99	32308A	
	90	33	27	35.25	2	1.5	0.6	23	115.7	147.8	4 300	5 600	1.04	32308B	
45	90	23	17	25.25	2	1.5	0.6	28	73.7	81.5	4 000	5 300	0.68	31308A	
	75	20	15.5	20	1	1	0.3	17	61	86.5	4 800	6 300	0.34	32009A	
	75	20	15.5	20	1	1	0.3	17	58.4	81.4	4 800	6 300	0.34	32009XA	
	85	19	16	20.75	1.5	1.5	0.6	18	66	76.5	4 500	6 000	0.47	30209A	
	85	19	16	20.75	1.5	1.5	0.6	18	67.9	83.6	4 300	6 000	0.47	30209XA	
	85	23	19	24.75	1.5	1.5	0.6	20	80.9	98	4 500	6 000	0.59	32209A	
	85	32	25	32	1.5	2	0.5	22	99.5	124	4 000	5 300	0.82	33209X	
	85	32	25	32	1.5	1.5	0.6	22	109.5	145.1	4 300	5 600	0.77	33209A	
50	100	25	22	27.25	2	1.5	0.6	21	108	120	4 000	5 300	0.99	30309A	
	100	36	30	38.25	2	1.5	0.6	25	140	170	3 600	4 800	1.33	32309A	
	100	25	18	27.25	2	1.5	0.6	31	87.6	101.1	3 400	4 500	0.91	31309A	
	100	36	30	38.25	2	1.5	0.6	30	145.3	189.4	3 600	4 800	1.4	32309B	
	80	20	15.5	20	1	1	0.3	18	61.1	89	4 500	6 000	0.37	32010X	
	80	24	19	24	1	1	0.3	17	76.8	110.9	4 300	5 600	0.43	33010A	
	85	26	20	26	1.5	1.5	0.6	20	89.3	124.1	4 300	5 600	0.59	33110A	
	90	20	17	21.75	1.5	1.5	0.6	19	76.5	91.5	4 300	5 600	0.54	30210A	
55	90	23	19	24.75	1.5	1.5	0.6	21	82.5	100	4 300	5 600	0.63	32210A	
	90	32	24.5	32	1.5	1.5	0.6	23	112.9	154.6	4 000	5 300	0.83	33210A	
	110	27	23	29.25	2.5	2	0.6	23	131.4	150	3 600	4 800	1.20	30310A	
	110	40	33	42.25	2.5	2	0.6	27	174	244	3 200	4 300	1.74	32310AX1	
	110	40	33	42.25	2.5	2	0.6	33	177.5	236.1	3 400	4 500	1.89	32310B	
	110	27	19	29.25	2.5	2	0.6	34	105	138	3 200	4 300	1.16	31310A	
	90	23	17.5	23	1.5	1.5	0.6	20	80.2	117.2	4 000	5 300	0.56	32011A	
	90	23	17.5	23	1.5	1.5	0.6	20	80.2	117.2	3 800	5 000	0.55	32011X	
60	100	21	18	22.75	2	1.5	0.6	20	90.3	106.3	3 800	5 000	0.72	30211A	
	100	25	21	26.75	2	1.5	0.6	22	106	129	3 800	5 000	0.84	32211A	
	100	35	27	35	2	1.5	0.6	25	138	190	3 400	4 500	1.20	33211A	
	120	29	25	31.5	2.5	2	0.6	24	135	179	3 200	4 300	1.53	30311A	
	120	43	35	45.5	2.5	2	0.6	29	200	275	3 000	4 000	2.20	32311A	
	120	43	35	45.5	2.5	2	0.6	36	203	271.4	3 000	4 000	2.37	32311B	
	120	29	21	31.5	2.5	2	0.6	37	118.3	131.8	2 800	3 800	1.50	31311A	

FtT Tapered roller bearings

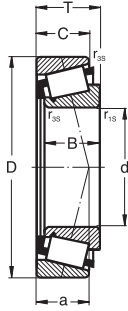
Single row



DIMENSIONS										BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS	DIMENSIONS										BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS			
d	D	B	C	T	r _{1s}	r _{2s}	r _{3s}	a	dynamic	static	grease	oil	~	d		D	B	C	T	r _{1s}	r _{2s}	r _{3s}	a	dynamic	static	grease	oil	~	dynamic	static		grease	oil	~
mm										kN		min ⁻¹		kg		mm										kN		min ⁻¹		kg				
60	95	23	17.5	23	1.5	1.5	0.6	21	81.7	122.2	3 800	5 000	0.59	32012X	90	140	32	24	32	2	1.5	0.6	30	168	270	2 200	3 600	1.75	32018X					
	100	30	23	30	1.5	1.5	0.6	23	117.1	173.2	3 400	4 500	0.89	33112A		150	45	35	45	2.5	2	0.6	35	262	419	2 000	3 200	3.18	33118A					
	110	22	19	23.75	2	1.5	0.6	22	98	125	3 400	4 500	0.86	30212A		160	30	26	32.5	2.5	2	0.6	31	194	273	2 000	3 000	2.49	30218A					
	110	28	24	29.75	2	1.5	0.6	24	126	174	3 400	4 500	1.10	32212A		160	40	34	42.5	2.5	2	0.6	36	248	377	2 000	3 000	3.30	32218A					
	110	38	29	38	2	1.5	0.5	28	165.8	231.4	3 200	4 300	1.51	33212A		190	43	36	46.5	4	3	1	36	327	439	1 800	2 600	5.50	30318A					
	130	31	26	33.5	3	2.5	1	26	167	210	3 000	4 000	1.90	30312A		190	64	53	67.5	4	3	1	44	429	639	1 800	2 400	8.23	32318A					
	130	46	37	48.5	3	2.5	1	31	229	323	2 600	3 600	2.80	32312A	95	145	32	24	32	2	1.5	0.5	32	174	281	2 200	3 200	1.79	32019X					
	130	31	22	33.5	3	2.5	1	39	134	172	2 600	3 600	1.83	31312A		145	39	32.5	39	2	1.5	0.5	29	231	390	2 200	3 200	2.26	33019A					
65	100	23	17.5	23	1.5	1.5	0.6	22	84.2	127	3 400	4 500	0.63	32013X		170	32	27	34.5	3	2.5	1	33	217	305	1 900	2 800	2.96	30219A					
	110	34	26.5	34	1.5	1.5	0.5	26	142.8	220.4	3 200	4 300	1.30	33113A		170	43	37	45.5	3	2.5	1	39	282	431	1 900	2 800	4.00	32219A					
	120	23	20	24.75	2	1.5	0.6	23	115	150	3 000	4 000	1.10	30213A		200	45	38	49.5	4	3	1	39	372	472	1 800	2 600	6.50	30319A					
	120	31	27	32.75	2	1.5	0.6	27	160.9	221.7	3 000	4 000	1.50	32213A		200	67	55	71.5	4	3	1	47	485	721	1 700	2 400	9.55	32319A					
	120	41	32	41	2	1.5	0.6	29	202.2	281.6	2 800	3 800	2.05	33213A	100	150	32	24	32	2	1.5	0.5	33	173.1	291.7	2 200	3 000	1.85	32020X					
	140	33	28	36	3	2.5	1	28	194	249	2 600	3 600	2.30	30313A		150	39	32.5	39	2	1.5	0.5	29	229.5	391.2	2 200	3 200	2.33	33020A					
	140	48	39	51	3	2.5	1	33	260	360	2 400	3 400	3.40	32313A		145	22.5	17.5	24	3	3	0.6	30	125	190	2 200	3 200	1.15	T4CB100					
	140	33	23	36	3	2.5	1	42	156	197	2 200	3 200	2.25	31313A		180	34	29	37	3	2.5	1	35	245	346	1 900	2 800	3.54	30220A					
70	110	25	19	25	1.5	1.5	0.6	23	101	153	3 200	4 300	0.84	32014X		180	46	39	49	3	2.5	1	41	337	476	1 800	2 600	4.76	32220A					
	110	31	25.5	31	1.5	1.5	0.5	22	134.4	220.4	3 000	4 000	1.07	33014A		215	47	39	51.5	4	3	1	40	412	527	1 700	2 400	4.90	30320A					
	125	24	21	26.25	2	1.5	0.6	25	125	166	3 000	4 000	1.22	30214A		215	73	60	77.5	4	3	1	51	553	847	1 600	2 200	12.10	32320A					
	125	31	27	33.25	2	1.5	0.6	28	155	228	2 800	3 800	1.56	32214A	105	160	35	26	35	2.5	2	0.6	34	196	316	1 900	2 800	2.40	32021X					
	150	35	30	38	3	2.5	1	29	220	282	2 400	3 400	2.90	30314A		160	43	34	43	2.5	2.5	0.6	35	264.7	453.5	2 000	3 000	3.0	33021X					
	150	51	42	54	3	2.5	1	36	296	429	2 200	3 400	4.10	32314A		190	36	30	39	3	2.5	1	37	268	383	1 800	2 600	4.25	30221A					
	150	35	25	38	3	2.5	0.8	47	187	231	2 000	3 000	2.85	31314A		190	50	43	53	3	2.5	1	44	367	575	1 800	2 600	5.90	32221A					
75	115	25	19	25	1.5	1.5	0.6	25	103.1	160.2	3 000	4 000	0.90	32015X		225	49	41	53.5	4	3	1	41	440	535	1 600	2 200	9.15	30321A					
	130	25	22	27.25	2	1.5	0.6	27	135	182	2 800	3 800	1.33	30215A		225	77	63	81.5	4	3	1	54	598	934	1 400	1 900	16.00	32321A					
	130	31	27	33.25	2	1.5	0.6	29	160	234	2 600	3 600	1.62	32215A	110	170	38	29	38	2.5	2	0.6	37	245.7	403.4	1 900	2 800	3.02	32022X					
	160	37	31	40	3	2.5	1	31	242	318	2 200	3 200	3.40	30315A		170	47	37	47	2.5	2	0.6	34	303	536	1 800	2 600	3.85	33022A					
	160	55	45	58	3	2.5	1	38	344	494	2 000	3 000	5.00	32315A		180	56	43	56	2.5	2	0.6	44	373	639	1 800	2 600	5.55	33122A					
	160	37	26	40	3	2.5	1	50	194	250	1 800	2 600	3.50	31315A		200	38	32	41	3	2.5	1	39	301	434	1 700	2 400	5.00	30222A					
	130	41	31	41	2	1.5	0.6	32	192	302	2 400	3 400	2.25	33215A		200	53	46	56	3	2.5	1	46	390	631	1 700	2 400	6.90	32222A					
80	125	29	22	29	1.5	1.5	0.6	27	138	216	2 600	3 600	1.30	32016X		240	50	42	54.5	4	3	1	43	480	635	1 600	2 200	10.70	30322A					
	130	37	29	37	2	2	0.6	30	181	317	2 600	3 600	1.60	33116A		240	80	65	84.5	4	3	1	56	674	1030	1 400	1 900	19.30	32322A					
	140	26	22	28.25	2.5	2	0.6	28	147	203	2 400	3 400	1.59	30216A	120	180	38	29	38	2.5	2	0.6	40	242	404	1 800	2 600	3.18	32024X					
	140	33	29	35.25	2.5	2	0.6	30	184	263	2 400	3 400	2.00	32216A		215	40	34	43.5	3	2.5	1	43	334	491	1 600	2 200	6.01	30224A					
	140	46	35	46	2.5	2	0.6	35	245.7	361.8	2 400	3 400	2.83	33216A		215	58	50	61.5	3	2.5	1	51	440	727	1 600	2 200	8.75	32224A					
	170	39	33	42.5	3	2.5	1	33	271	377	2 000	3 000	4.00	30316A		260	55	46	59.5	4	3	1	47	537	705	1 500	2 000	13.80	30324A					
	170	58	48	61.5	3	2.5	1	41	378	545	1 900	2 800	5.90	32316A		260	86	69	90.5	4	3	1	60	773	1115	1 200	1 600	24.00	32324A					
85	130	29	22	29	1.5	1.5	0.6	28	139.8	220.3	2 600	3 600	1.32	32017X		230	45	34	45	2.5	2	0.6	42	314	540	1 600	2 200	4.95	32026A					
	140	41	32	41	2.5	2	0.6	32	215.7	354.2	2 400	3 400	2.45	33117A		230	40	34	43.75	4	3	1	45	369	490	1 500	2 000	7.60	30226A					
	150	28	24	30.5	2.5	2	0.6	30	171	239	2 200	3 200	2.00	30217A		230	64	54	67.75	4	3	1	56	576	884	1 400	1 800	11.4	32226A					
	150	36	30	38.5	2.5	2	0.6	33	212	309	2 200	3 200	2.50	32217A	140	250	42	36	45.75	4	3	1	47	418	570	1 400	1 900	8.65	30228A					
	180	41	34	44.5	4	3	1	35	305	399	1 900	2 800	4.70	30317A		250	68	58	71.75	4	3	1	60	675	1050	1 200	1 600	14.4	32228A					
	180	60	49	63.5	4	3	1	42	406	597	1 800	2 600	6.95	32317A		300	102	85	107.75	5	4	1	71	1220	1650	1 300	1 700	34.70	32328FD					

FtT Tapered roller bearings

Single row



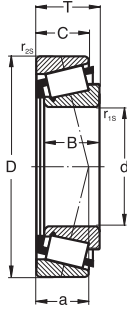
d	DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	BASIC DESIGNATIONS
	D	B	C	T	r _{1s} min	r _{2s} min	r _{3s} min	a ~	dynamic C	static C ₀	grease	oil		
mm									kN		min ⁻¹			
150	270	45	38	49	4	3	1	50	429	560	1 300	1 800	11	30230A
	270	73	60	77	4	3	1	64	756	1180	1 100	1 500	18.2	32230A
160	290	80	67	84	4	3	1	69	856.5	1435	1 000	1 400	23.1	32232P6X
170	310	86	71	91	5	4	1	74	1020	1640	1 000	1 300	28.5	32234A
	310	86	70	91	5	4	1	72	1060	1610	1 000	1 500	27.20	32234FD
	230	30	23	32	1.5	2	0.6	42	221	395	1 400	1 900	4.17	32934
180	320	86	70	91	5	4	1	78	803	1200	950	1 400	26.66	32236
190	290	64	48	64	3	2.5	0.8	63	653	1180	1 100	1 600	14.8	32038XP6X
	340	92	75	97	5	4	1	83	1120	1780	900	1 300	35.40	32238A
200	310	70	53	70	3	2.5	0.8	67	720	1400	900	1 200	19.1	32040X
220	300	51	39	51	3	2.5	1.3	59	448	911	1 000	1 500	10.1	32944
	340	76	57	76	4	3	1	73	850	1660	950	1 400	24.7	32044X
	340	76	57	76	4	3	1	73	869	1570	900	1 300	24.50	32044XP5
	400	65	54	72	4	4	1	68	951	1330	850	1 200	34.50	30244
	400	108	90	114	4	4	1	98	1510	2470	800	1 100	59.00	32244
240	360	76	57	76	4	3	1	79	671	1610	850	1 200	26.2	32048X
260	400	87	65	87	5	4	1.3	86	1120	2070	800	1 100	38.7	32052X
	540	102	80	112	6	6	2	98	1910	2580	630	850	110.96	30352FD
280	380	63.5	48	63.5	3	2.5	1.3		672	1370	800	1 100	19.9	32956
320	480	100	74	100	5	4	1	104	1500	3150	630	850	61.9	32064X

TAPERED ROLLER BEARINGS

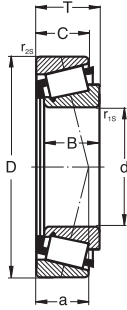
SPECIAL AND-INCH SIZES TAPERED ROLLER BEARINGS



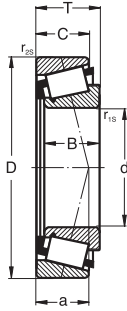
FLT Special and inch size tapered roller bearings



SHAFT mm	DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	DESIGNATION		CALCULATION FACTORS		
	d	D	T	B	C	r _{s1} min	r _{s2} max	a ~	dynamic C	static C ₀	grease min ⁻¹	oil min ⁻¹		FLT	Equivalent	e	y ₁	y ₀
15	15	35	11	10.75	8.50	0.70	1.25	8	15.3	13.8	11 000	16 000	0.047	CBK 170B	639209 (SKF)	0.45	1.30	0.70
	15	42	13	13.50	10	1.00	1.00	9	21.4	22.0	11 000	16 000	0.054	CBK 257	336658 (SKF) 639213(SKF)	0.40	1.50	0.83
17.462	17.462	39.878	13.483	14.605	10.668	1.30	1.30	9	20.7	20.2	9 000	13 000	0.081	LM 11749/LM 11710	K-LM 11749/K-LM 11710	0.28	2.10	1.10
	0.6875	1.5700	0.5450	0.5750	0.4200	0.05	0.05											
19.050	19.050	45.237	15.494	16.637	12.065	1.30	1.30	10	27.5	27.5	8 500	12 000	0.120	LM 11949/LM11910	K-LM 11949/K-LM 11910	0.30	2.00	1.10
	0.7500	1.7810	0.6100	0.6550	0.4750	0.05	0.05											
20	20	43	13.25	12	11	3.00	1.50	10	21.4	21.7	8 500	12 000	0.084	CBK 173B	639329 (SKF)	0.38	1.60	0.90
21.430	21.430	50.005	17.526	18.288	13.970	1.30	1.30	11	35.0	36.5	8 000	11 000	0.170	M 12649/M 12610	K-M 12649/K-M 12610	0.28	2.10	1.10
	0.8437	1.9687	0.6900	0.720	0.55	0.05	0.05											
21.987	21.987	45.237	15.494	16.637	12.065	1.30	1.30	10	27.0	30.0	8 000	11 000	0.120	LM 12749/LM 12710	K-LM 12749/K-LM 12710	0.31	1.90	1.10
	0.8656	1.7810	0.6100	0.6550	0.4750	0.05	0.05											
22	22	41	14.4	14.6	11.4	1.00	1.00	10	18.4	21.2	8 000	11 000	0.096	CBK 323B	442327N (SKF)	0.26	0.27	1.25
23	23	52	15	14.26	12.7	3.00	1.50	11	27.1	29.3	7 500	10 000	0.126	CBK 258	639175 (SKF)	0.40	1.51	0.83
25.4	25.40	50.292	14.224	14.732	10.668	1.30	1.30	11	25.5	29.0	7 500	10 000	0.130	L 44643/L 44610	K-L44643/K-L 44610	0.37	1.60	0.90
	1.0000	1.9800	0.5600	0.5800	0.4200	0.05	0.05											
25.4	25.40	59.530	23.368	23.114	18.288	0.80	1.50	11	50.0	58.0	6 300	9 000	0.320	M 84249/M 84210	K-M 84249/K-M 84210	0.55	1.10	0.60
	1.0000	2.3437	0.8200	0.8100	0.5625	0.03	0.06											
26	26	52	15	14.26	12.7	2.80	1.50	11	27.1	29.3	7 500	10 000	0.138	CBK 171	639174 (SKF)	0.40	1.51	0.83
26.988	26.988	50.292	14.224	14.732	10.668	3.50	1.30	11	25.5	29.0	7 500	10 000	0.110	L 44649/L 44610	K-L 44649/K-L 44610	0.37	1.60	0.90
	1.0625	1.9800	0.5600	0.5800	0.4200	0.14	0.05											
29	29	50.292	14.224	14.732	10.668	3.50	1.30	11	25.4	31.8	7 000	9 500	0.110	L 45449/L 45410	331274 (SKF)	0.37	1.60	0.90
	1.1417	1.9800	0.5600	0.5800	0.4200	0.14	0.05											
30.162	30.162	64.292	21.433	21.433	16.670	1.50	1.50	18	49.0	60.0	6 300	8 000	0.350	CBK 248	K-M 86649/K-M 86610	0.55	1.10	0.50
	1.1875	2.5312	0.8438	0.8438	0.6563	0.14	0.14											
31.750	31.750	59.131	15.875	16.764	11.811	3.50	1.30	13	33.0	44.0	6 300	8 000	0.180	LM 67048/LM 67010	K-LM 67048/L-LM 67010	0.41	1.50	0.80
	1.2500	2.3280	0.6250	0.6600	0.4650	0.14	0.05											
31.750	31.750	62	18.161	19.050	14.288	4.00	1.30	13	48.5	57.0	6 000	8 000	0.240	15123/15245	K-15123/K-15245	0.35	1.70	0.90
	1.2500	2.4409	0.7150	6.7500	0.5625	0.16	0.05											
31.750	31.750	69.012	19.845	19.583	15.875	3.50	1.30	15	53.9	67.0	5 600	7 500	0.350	14125A/14276	K-14125A/K-14276	0.37	1.60	0.80
	1.2500	2.4170	0.7813	0.7710	0.6250	0.14	0.05											
31.750	31.750	69.85	23.812	25.357	19.05	0.8	1.3	17	70.1	83.2	5 600	7 500	0.440		2580/2523	0.27	2.19	1.21
	1.2500	2.7500	0.9375	0.9983	0.7500	0.0315	0.0512											
33.338	33.338	76.2	29.370	28.575	23.020	0.80	2.00	23	78.1	106.0	4 800	6 300	0.680	CBK 093	K-HM 99443/K-HM 89410	0.54	1.10	0.60
	1.3125	3.0000	1.1563	1.1250	0.9063	0.03	0.08											
34.925	34.925	65.088	18.034	18.288	13.970	3.60	1.30	14	43.2	50.9	5 600	7 500	0.300	CBK 333	K-LM 48548/K-LM 48510	0.37	1.60	0.90
	1.3750	2.5625	0.7100	0.7200	0.5500	0.14	0.05											
34.925	34.925	69.012	19.945	19.583	15.875	1.50	1.30	15	53.0	59.6	5 600	7 500	0.340	14137A/14276	K-14137A/K-14276	0.38	1.60	0.90
	1.3750	2.7170	0.7813	0.7710	0.6250	0.06	0.05											
34.925	34.925	73.025	23.812	24.609	19.050	1.50	2.30	15	64.8	78.1	5 300	7 000	0.470	CBK 350	K-25877/K-25820	0.29	2.00	1.10
	1.3750	2.8750	0.9375	0.9688	0.7500	0.06	0.09											
34.925	34.925	76.2	29.370	28.575	23.02	3.50	3.30	23	79.0	106.5	4 800	6 300	0.660	HM 89446/HM 89410	K-HM 89446/K-HM 89410	0.54	1.10	0.60
	1.3750	3.0000	1.1563	1.2500	0.9063	0.14	0.13											
34.988	34.988	59.974	15.875	16.764	11.938	3.50	1.30	13	33	44	6 000	8 000	0.172	L-68149/L 68111	K-L-68149/K-L 68111	0.43	1.40	0.80
	1.3775	2.3612	0.6250	0.6600	0.4700	0.14	0.05											
35	35	60	15.875	18.460	11.938	2.00	1.30	13	33	44	5 000	6 700	0.170	JL 68145/JL 68111 Z	K-JL 68145/K-JL 68111	0.43	1.40	0.80
35	35	80	32	32	25	1.50	0.30	13	99	134	5 000	6 700	0.810	514-747		0.36	1.48	0.92
36	36	68	16.5	16.5	13.75	1.50	1.50	15	36.4	40.6	5 000	6 700	0.280	CBK 091	639180 (SKF)	0.44	1.40	0.75



SHAFT mm	DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	DESIGNATION		CALCULATION FACTORS		
	d	D	T	B	C	r _{s1} min	r _{s2} max	a ~	dynamic C	static C ₀	grease min ⁻¹	oil min ⁻¹		FLT	Equivalent	e	y ₁	y ₀
38	38	63	17	17	13.50	1.30	1.30	15	40.5	56.5	5 300	7 000	0.200	JL 69349/JL 69399		0.42	1.40	0.80
	38	63	17.1	17	13.50	2.00	1.50	14	44	59	5 300	7 000	0.200	513-716A	K-JL69349A/K-JL69399	0.43	1.40	0.80
38.1	38.1	65.088	18.034	18.288	13.970	2.30	1.30	13	42.9	57	5 600	7 500	0.240	LM 29749/LM 29710		0.33	1.80	1.00
	1.5000	2.5625	0.7100	0.7200	0.5500	0.09	0.05											
	38.1	79.375	29.370	29.771	23.812	4.0	4.0	21	90.5	120	5 000	6 700	0.690	514-809	3490/3420	0.37	1.60	0.88
39	39	72.015	21.5	20.64	16.74	2.00	0.50	15	48.7	60.6	4 800	6 300	0.370	CBK 187	639330 (SKF)	0.40	1.50	0.82
40	40	70	17	16.5	14.25	1.80	1.30	15	38.8	48.7	4 800	6 300	0.310	CBK 172	639163 (SKF)	0.44	1.35	0.74
41.275	41.275	72.11	19.558	19.812	14.732	2.20	1.50	16	55.2	68.6	4 800	6 300	0.320	514-873		0.40	1.50	0.83
	1.6250	2.8390	0.7700	0.7800	0.5800	0.0866	0.0591											
41.275	41.275	73.431	19.558	19.812	14.732	3.50	1.30	16	55.5	69.5	4 800	6 300	0.330	LM 501349/LM 501310	K-LM 501349/K-LM 501310	0.40	1.50	0.80
	1.6250	2.8910	0.7700	0.7800	0.5800	0.14	0.05											
41.275	41.275	82.550	26.543	25.654	20.193	3.50	3.30	22	73.1	92.3	4 500	6 000	0.620	CBK 387	K-M 802048/K-M 802011	0.54	1.10	0.60
	1.6250	3.2500	1.0450	1.0900	0.7900	0.14	0.13											
44.450	44.450	82.931	23.813	25.4	19.050	3.50	0.80	17	81.5	107.0	4 500	6 000	0.570	25580/25520	K-25580/K-25520	0.33	1.80	1.00
	1.7500	3.2650	0.9375	1.0000	0.7500	0.74	0.03											
44.450	44.450	95.250	27.783	28.575	22.225	0.80	0.80	20	105.0	137.0	4 000	5 300	0.990	CBK 327	K-33885/K-33822	0.33	1.80	1.00
	1.7500	3.7500	1.0938	1.1250	0.8750	0.03	0.03											
44.450	44.450	95.250	30.958	28.575	22.225	3.60	0.80	30	97.9	119.0	4 300	5 600	1.110	CBK 334	K-HM 903249/K-HM 903210	0.75	0.80	0.45
	1.7500	3.7500	1.2188	1.1250	0.8750	0.14	0.03											
45.618	45.618	82.931	23.812	25.4	19.050	3.60	0.80	17	74.2	96	4 500	6 000	0.55	CBK 349	K-25590/K-25520	0.33	1.80	1.00
	1.7900	3.2650	0.9375	1.0000	0.7500	0.14	0.03											
45.987	45.987	74.976	18.0	18.0	14.0	1.50	1.50	16	47.3	63.2	4 800	6 300	0.31	CBK 331A	K-LM 503349/K-LM 503310	0.40	1.50	0.80
	1.8105	2.9518	0.7087	0.7087	0.5512	0.06	0.06											
47.625	47.625	96.838	21.0	21.946	15.875	0.80	0.80	18	74.5	76	3 800	5 500	0.73	CBK 351	K-386A/K-382A	0.35	1.70	0.90
	1.8750	3.8125	0.8268	0.8640	0.6250	0.03	0.03											
50	50.0	110.0	22.0	21.996	18.825	1.5	1.0		91.6	125			1.05		396A/394A	0.40	1.49	0.80
	1.9685	4.3307	0.8661	0.8600	0.7411	0.06												
50.8	50.8	93.264	30.162	30.302	23.812	3.50	3.30	22	99.6	138.5	4 000	5 300	0.84		3780/3720	0.34	1.77	0.97
	2.0000	3.6718	1.1875	1.1930	0.9375	0.1378	0.1299											
50.8	50.8	95.250	27.783	28.575	22.225	3.50	0.80	20	105	134	4 000	5 300	0.88	CBK 322	K-33889/K33822	0.33	1.80	1.00
	2.0000	3.7500	1.0938	1.1250	0.8750	0.14	0.03											
50.8	50.8	100	35.0	35.0	27.0	2.00	2.00	29	135.7	178.2	4 000	5 300	0.92	CBK 393	331305 (SKF)	0.40	1.5	0.83
50.8	50.8	104.775	36.512	36.512	28.575	3.50	3.30	29	130	192	3 400	4 500	1.50	CBK 347	K-HM 807046/K-HM 807010	0.47	1.27	0.70
	2.0000	4.1250	1.4375	1.4375	1.1250	0.14	0.13											
55	55	93	50.8		39.8	3.3	0.3		134	227	3 000	4 000	1.407	CBK-260				
57	57	85	18.5	19.0	14.0	1.50	1.50	20	53	52	3 400	4 500	0.33	CBK 494	639352 (SKF)	0.32	1.80	1.00
57.150	57.150	104.775	27.783	29.317	24.605	2.40	3.30	24	114	148	3 200	4 300	1.05	CBK 335		0.32	1.88	1.00
	2.2500	4.1250	1.0938	1.1543	0.9688	0.10	0.13											
57.150	57.150	112.712	30.162	30.162	23.812	3.50	3.30	23	127	159	3 200	4 300	1.40	514-765	K-39581/K-39520	0.33	1.80	1.00
	2.2500	4.4375	1.1875	1.1875	0.9375	0.4	0.13											
60	60	127	36.513	36.513	26.988	3.50	1.50	32	165	228	3 000	4 000	2.05	CBK 261	K-HM 813839/K-HM 813810	0.52	1.15	0.63
60	60	135	33.550	30.95	22.0	3.00	2.50	41	143	176	2 600	3 600	2.50	400371	400371 (CBF)	0.83	0.73	0.40
63.5	63.5	95	17	15.5	11.55	2.00	2.00	19	37.5	55	3 400	4 500	0.30	CBK 200	431629 (SKF)	0.78	1.77	0.42
65	65	95	17	16	13	1.00	1.00	21	42.2	64.5	3 400	4 500	0.38	514-683		0.49	1.23	0.68
	65	120	39	38.5	32	1.5	1.5		197	261	2 800	3 900	2.063	CBK-278A				
	65	110	28	28	22.5	3.0	2.8	24.5	136	191	3 400	4 600	1.071		JM511946/JM511910	0.40	1.49	0.82
	2.5591	4.3307	1.1024	1.1024	0.8858													



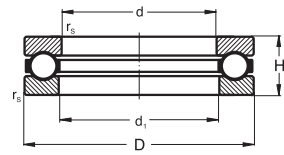
SHAFT mm	DIMENSIONS								BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	DESIGNATION		CALCULATION FACTORS		
	d	D	T	B	C	r _{s1} min	r _{s2} max	a ~	dynamic C	static C ₀	grease	oil		FLT	Equivalent	e	y ₁	y ₀
66.675	66.675	110	22	21.996	18.824	0.80	1.30	21	91.5	114	3 200	4 300	0.79	CBK 336	K-395A/K-394A	0.40	1.50	0.80
	2.6250	4.3307	0.8661	0.8660	0.7411	0.03	0.05											
66.675	66.675	110	22	21.996	22	0.80	1.30	21	88.2	117.9	3 200	4 300	0.84		395A/394A	0.40	1.49	0.82
	2.6250	4.3307	0.8661	0.8660	0.8661	0.0315	0.0512											
66.675	66.675	112.712	30.162	30.048	23.812	3.50	3.30	25	132	183	3 200	4 300	1.15	CBK 337	K-3984/K-3920	0.41	1.47	0.80
70	70	136.525	46.038	46.038	36.513	2.20	2.20	26	229.6	356.3	2 400	3 400	3.15	CBK 262	K-H 715347/K-H 715311	0.48	1.24	0.68
	2.7559	5.3750	1.8125	1.8125	1.4375	0.09	0.09											
72	72	99.24	17	16	13	1	1	19	51	82.5	3 400	4 500	0.36	514-685		0.37	1.62	0.89
73.025	73.025	112.712	25.4	25.4	19.050	3.50	3.30	26	97.4	155.2	3 000	4 000	0.88		29685/29620	0.49	1.23	0.68
	2.8750	4.4375	1.0000	1.0000	0.7500	0.1378	0.7299											
73.025	73.025	112.712	25.4	25.4	19.050	3.60	3.30	26	96	149	3 000	4 000	0.89	CBK 344	K-29685/K-29620	0.48	1.25	0.70
	2.8750	4.4375	1.0000	1.0000	0.7500	0.14	0.73											
73.025	73.025	117.475	30.162	30.162	23.812	3.50	3.30	26	119.8	181.1	3 000	4 000	1.17		33287/33462	0.44	1.38	0.76
	2.8750	4.6250	1.1875	1.1875	0.9375	0.7378	0.7299											
76.2	76.2	136.525	30.163	29.769	22.225	3.60	3.20	29	145	220	2 400	3 400	1.85	CBK 528	K-495A/K-493	0.44	1.35	0.80
	3.0000	5.3750	1.1875	1.1720	0.8750	0.74	0.73											
76.2	76.2	139.992	36.512	36.098	28.575	2.50	2	32	197	262	2 200	3 200	2.39	515-764		0.41	1.43	0.79
	3.0000	5.5115	7.4375	1.4212	1.1250	0.0984	0.0787											
78	78	106	17	17.75	13.125	2	1	19	58.5	97.5	3 200	4 300	0.43	514-874		0.37	1.6	0.88
82.550	82.550	125.412	25.4	25.4	19.845	3.60	1.60	25	113	159	2 600	3 600	1.10	CBK 338	K-27687/K-27620	0.40	1.49	0.82
	3.2500	4.9375	1.0000	1.0000	0.7813	0.74	0.06											
82.550	82.550	133.35	33.338	33.338	26.195	3.50	3.3	29	142.4	219.3	2 400	3 400	1.69		47686/47620	0.40	1.48	0.82
	3.2500	5.2500	1.3125	1.3125	1.0373	0.7378	0.7299											
88.9	88.9	152.400	39.688	36.322	30.162	6.40	3.30	37	234	324.8	2 000	3 000	2.80	515-745	K-593A/K-592	0.40	1.49	0.82
	3.5000	6.0000	1.5625	1.4300	1.1875	0.25	0.73											
90	90	147	40	40	32.5	7.00	3.50	31	226	349	2 200	3 200	2.50	HM 218248/HM 218210	K-HM 218248/K-HM 218210	0.33	1.80	1.00
95	95	135	20	20	14	5.00	2.50		76.5	133	2 500	3 200	0.85	515-838	JL819349/JL819310	0.58	1.03	0.57
95.25	95.25	136.525	122.235	-	-	0.3	1		318	753	1 800	2 600	4.707	CBK-184				
96.838	96.838	148.430	28.575	28.971	21.433	3.50	3.50	31	130	196	2 200	3 200	1.65	CBK-529	K-42381/K-42584	0.49	1.20	0.70
	3.8725	5.8937	1.1250	1.1406	0.8438	0.74	0.74											
100	100	160	41	40	32	2.00	2.00	32	250	396	1 900	2 800	3.05	CBK 263	K-JHM 720249/K-JHM 720210	0.46	1.31	0.72
107.95	107.95	158.75	23.02	21.438	15.875	3.50	3.30	37	97	145	1 900	2 800	1.40	CBK 339	K-37425/K-37625	0.61	0.98	0.54
	4.2500	6.2500	0.9063	0.8440	0.6250	0.74	0.73											
109.539	109.539	158.75	23.02	21.438	15.875	3.50	3.30	37	95.5	142.2	1 900	2 800	1.30	515-761	37431A/37625	0.61	0.98	0.54
		6.2500	0.9063	0.8440	0.6250	0.74	0.73											
110	110	180	41.275	41.275	30.163	3.50	3.30	42	264	432	1 800	2 600	1.65	CBK 264	K-64432/K-64708	0.6	1.20	0.66
120	120	170	27	25	19.5	3.00	3.00	35	178	283	1 800	2 600	1.70		JP12049/JP12010	0.47	1.27	0.70
146.050	146.050	193.675	28.575	28.575	23.02	1.5	1.5	33.5	168	352	1 600	2 200	2.33	515-822	36690/36620	0.37	1.6	0.89
158.75	158.75	205.583	23.812	23.812	18.258	1.5	1.5	33	135	263	1 500	2 000	1.93	516-819	L-432349/L-432310	0.37	1.6	0.89
247.65	247.65	346.075	63.5	63.5	50.8	6.4	6.4		682	1390					M348499/M348410	0.34	1.75	0.97

THRUST BALL BEARINGS

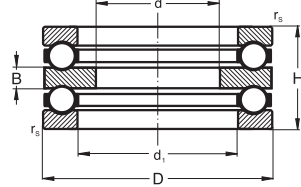


F&T Thrust ball bearings

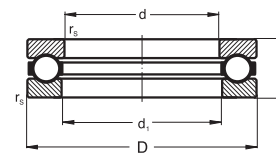
Single direction



double direction



Single direction



SUFFIX Thrust ball bearings

M machined brass cage

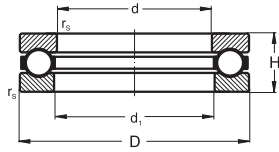
U bearing with sphered housing washer and aligning seating washer

DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS
d	d ₁	D	H	r _s min	dynamic C	static C ₀	grease	oil	~	
mm					kN		min ⁻¹		kg	
10	11	24	9	0.3	10	14	7 000	9 500	0.020	51100
12	13	26	9	0.3	10.4	15.3	6 700	9 000	0.022	51101
15	16	28	9	0.3	9.36	14	6 300	8 500	0.023	51102
17	18	30	9	0.3	9.65	15.3	6 300	8 500	0.025	51103
20	21	35	10	0.3	12.7	20.8	5 600	7 500	0.038	51104
	22	40	14	0.6	22.4	37.5	4 500	6 000	0.083	51204
25	26	42	11	0.6	15.6	29	4 800	6 300	0.061	51105
	27	47	15	0.6	28	50	4 000	5 300	0.110	51205
	27	52	18	1	33.5	55.9	3 900	5 000	0.180	51305
30	32	47	11	0.6	14.93	30.4	4 500	6 000	0.068	51106
	32	52	16	0.6	25.5	46.6	4 500	6 000	0.144	51206
	32	60	21	1	37.8	67.8	3 000	4 000	0.270	51306
35	37	52	12	0.6	17.4	37.5	4 300	5 600	0.085	51107
	37	62	18	1	35.3	67.1	3 800	5 000	0.220	51207
	37	68	24	1	56	85	3 000	4 000	0.390	51307
	38,35	66	16		33.3	77.5	3 500		0.216	CBK-287A
40	42	60	13	0.6	25.1	56.5	3 800	5 000	0.120	51108
	42	68	19	1	40	80.1	3 800	5 000	0.270	51208
	42	78	26	1	57.5	109.3	2 000	3 000	0.550	51308
45	47	65	14	0.6	25.3	59.5	3 800	5 000	0.150	51109
	47	73	26	1	28.9	80.1	3 000	4 000	0.320	51209
	47	85	28	1	71.5	138.3	1 800	2 600	0.690	51309
50	52	70	14	0.6	27.1	69	3 400	4 500	0.160	51110
	52	78	22	1	41.8	92.4	3 000	4 000	0.390	51210
	52	95	31	1.1	86.4	170.8	1 800	2 600	1.000	51310
55	57	78	16	0.6	32.8	85.8	3 000	4 000	0.240	51111
	57	90	25	1	63.5	139.1	2 000	3 000	0.610	51211
	57	105	35	1.1	113	225.8	1 600	2 200	1.340	51311
60	62	85	17	1	39.1	103	2 600	3 600	0.290	51112
	62	95	26	1	62.2	139.1	2 000	3 000	0.690	51212
	62	110	35	1.1	117	246.4	1 600	2 200	1.430	51312
65	67	90	18	1	40.6	113	2 400	3 200	0.340	51113
	67	100	27	1	63.9	149	1 800	2 600	0.770	51213
	67	115	36	1.1	127	231	1 200	1 700	1.570	51313
70	72	95	18	1	40.2	117	2 400	3 200	0.360	51114
	72	105	27	1	65.6	159	1 800	2 620	0.810	51214
	72	125	40	1.1	153	275	1 200	1 700	2.060	51314

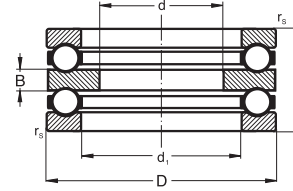
DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS
d	d ₁	D	H	r _s min	dynamic C	static C ₀	grease	oil	~	
mm					kN		min ⁻¹		kg	
75	77	100	19	1	44.3	122.9	2 200	3 200	0.420	51115
	77	110	27	1	67.2	169	1 800	2 600	0.860	51215
	77	135	44	1.5	171	319	1 100	1 600	2.680	51315
80	82	105	19	1	44.9	128.5	2 000	3 000	0.43	51116
	82	115	28	1	68.7	179	1 700	2 400	0.95	51216
	82	140	44	1.5	178	348	1 000	1 500	2.82	51316
85	87	110	19	1	45.5	134.1	2 000	3 000	0.46	51117
	87	125	31	1	97.5	250	1 600	2 200	1.20	51217
	88	150	49	1.5	190	397	950	1 400	3.06	51317
90	92	120	22	1	58	167.3	1 800	2 600	0.68	51118
	93	135	35	1.1	119	300	1 500	2 000	1.70	51218
	93	155	50	1.5	190	400	850	1 200	3.98	51318
100	102	135	25	1	74.3	218.6	1 700	2 400	0.99	51120M
	103	150	38	1.1	138	358	1 300	1 800	2.36	51220
	103	170	55	1.5	215	517	850	1 200	5.11	51320
110	112	145	25	1	76.8	238.4	1 600	2 200	1.08	51122
	113	160	38	1.1	141	380	1 200	1 700	2.57	51222
	113	190	63	1.5	267	704	800	1 100	7.87	51322M
120	122	155	25	1	79.2	258.3	1 600	2 200	1.16	51124
	123	170	39	1.1	153	383	1 200	1 700	2.86	51224
	123	210	70	2	311	869	750	1 000	10.90	51324M
130	132	170	30	1	105	336.2	1 400	1 900	1.87	51126M
	133	190	45	1.5	192	548	950	1 400	4.19	51226M
	134	225	75	2.1	332	705	700	950	13.30	51326
140	142	180	31	1	105.7	350.2	1 300	1 800	2.07	51128M
	143	200	46	1.5	195	578	950	1 400	4.88	51228M
	144	240	80	2.1	370	912	630	900	15.90	51328
150	152	190	31	1	108	328	1 200	1 700	2.33	51130
	153	215	50	1.5	224	589	900	1 300	6.19	51230
	154	250	80	2.1	382	981	500	800	16.70	51330
160	162	200	31	1	120.3	448.3	1 200	1 700	2.33	51132M
	163	225	51	1.5	230	608	850	1 200	6.67	51232
	164	270	87	3	470	1570	630	850	18.6	51332
170	172	215	34	1.1	135	417	1 100	1 600	3.31	51134
	173	240	55	1.5	270	721	800	1 100	8.29	51234
180	183	225	34	1.1	135	431	1 000	1 500	3.48	51136
	183	250	56	1.5	275	750	800	1 100	8.85	51236
190	193	240	37	1.1	171	529	950	1 400	4.06	51138
	194	270	62	2	319	898	750	1 000	11.90	51238
200	203	250	37	1.1	183.7	715	950	1 400	4.24	51140M
	204	280	62	2	334	1175	750	1 000	12.40	51240M
	205	340	110	4	679	2610	480	630	43	51340
220	223	270	37	1.1	175	598	900	1 300	4.62	51144
	224	300	63	2	336	1233	700	950	13.70	51244M

FLT Thrust ball bearings

Single direction



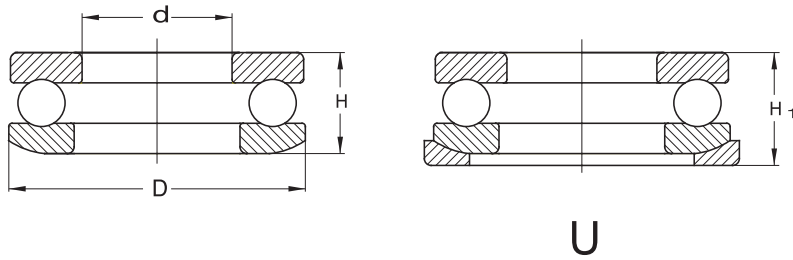
Double direction



DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS	DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS		MASS	BASIC DESIGNATIONS				
d	d ₁	D	H	r _s min	dynamic C	static C ₀	grease	oil	~		d	d ₁	D	H	r _s min	dynamic C	static C ₀	grease	oil	~					
mm					kN		min ⁻¹		kg	mm					kN		min ⁻¹		kg						
240	243	300	45	1.5	240	973.7	800	1 100	7.55	51148M	40	52	78	39	9	1	0.6	41.8	92.4	3 000	4 000	0.71	52210		
	244	340	78	2.1	436	1724	600	800	23.60			51248M	52	95	58	14	1.1	0.6	86.4	170.8	1 800	2 600		1.86	52310
260	263	320	45	1.5	245	1034	800	1 100	8.11	51152M	45	57	90	45	10	1	0.6	63.5	139.1	3 000	4 000	1.12	52211		
	264	360	79	2.1	460	1878	450	630	25.60			51252M	57	105	64	15	1.1	0.6	112.5	225.8	1 600	2 200		2.51	52311
280	283	350	53	1.5	329.9	1391	700	950	12.20	51156M	50	62	95	46	10	1	0.6	62.2	139.1	2 000	3 000	1.25	52212		
	284	380	80	2.1	465	1967	400	560	27.60			51256M	62	110	64	15	1.1	0.6	117	246.4	1 600	2 200		2.86	52312
300	304	380	62	2	406.7	1801	630	850	17.50	51160M	55	67	100	47	10	1	0.6	63.9	149	1 800	2 600	1.36	52213		
	304	420	95	2.1	580	2320	360	500	43.10			51260M	67	115	65	15	1.1	0.6	127	231	1 200	1 700		2.90	52313
	304	420	95	3	580	2680	480	630	42.1			51260	72	105	47	10	1	0.6	65.6	159	1 800	2 600		1.48	52214
320	324	400	63	2	408.8	1863	600	800	18.90	51164M	60	72	125	72	16	1.1	1	153	275	1 200	1 700	3.90	52314		
	325	440	95	3	632	2460	450	600	44.50			51264M	77	110	47	10	1	1	67.2	169	1 800	2 600		1.57	52215
340	344	420	64	2	622	2934	600	800	20.30	51168M	65	77	135	79	18	1.5	1	171	319	1 100	1 600	4.83	52315		
	360	364	440	65	2	430.4	2111	560	750			21.80	51172M	82	115	48	10	1	1	68.7	179	1 700		2 400	1.69
360	364	440	65	2	430.4	2111	560	750	21.80	51172M	70	82	140	79	18	1.5	1	178	348	1 000	1 500	5.06	52316		
												88	124	55	12	1	1	92.8	238	1 600	2 200	2.34	52217		
												88	160	87	19	1.5	1	190	397	950	1 400	6.43	52317		
75	93	135	62	14	1.1	1	101.3	263.9	1 500	2 000	3.22	52218													
	93	155	88	19	1.5	1	190	400	850	1 200	6.60	52318													
85	103	150	67	15	1.1	1	138	358	1 300	1 800	4.29	52220													
	103	170	97	21	1.5	1	215	517	850	1 200	8.90	52320													

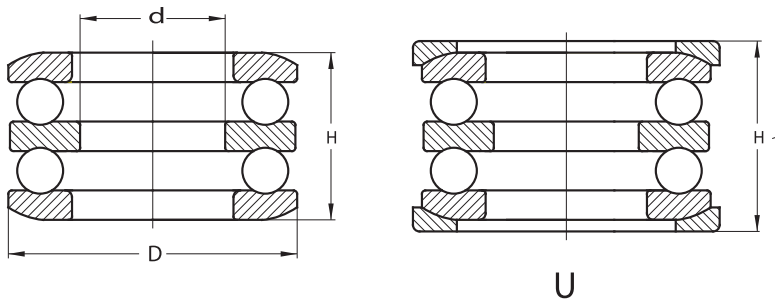
FtT Thrust ball bearings

Single-direction with sphered housing washer and aligning seating



DIMENSIONS			BASIC LOAD RATING		MODIFICATION			BASIC DESIGNATIONS	MASS
d	D	H/H1	dynamic C	static C ₀	M	U	MU		~
mm			kN						kg
200	280	65.3	334.0	1180.0	•			53240	11.4
220	300	65.6/75	336.0	1230.0	•	•		53244	16.8

Double-direction with aligning seat washers



DIMENSIONS			BASIC LOAD RATING		MODIFICATION			BASIC DESIGNATIONS	MASS
d	D	H/H1	dynamic C	static C ₀	M	U	MU		~
mm			kN						kg
45	95	49.6/55	63.5	139.0	•	•		54211	1.4
100	220	131.2/143	311.0	869.0	•	•	•	T-54324	23.3

SPECIAL BALL AND ROLLER BEARINGS



Deep groove ball bearings

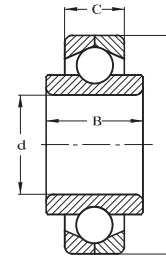


Fig. 1

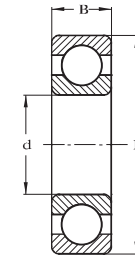


Fig. 2

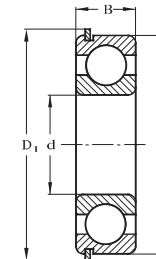


Fig. 3

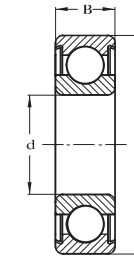


Fig. 4

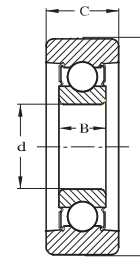


Fig.5

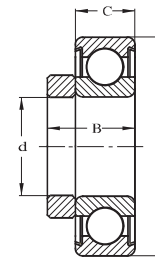


Fig. 6

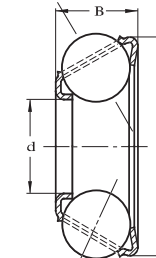


Fig. 7

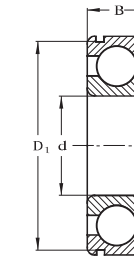
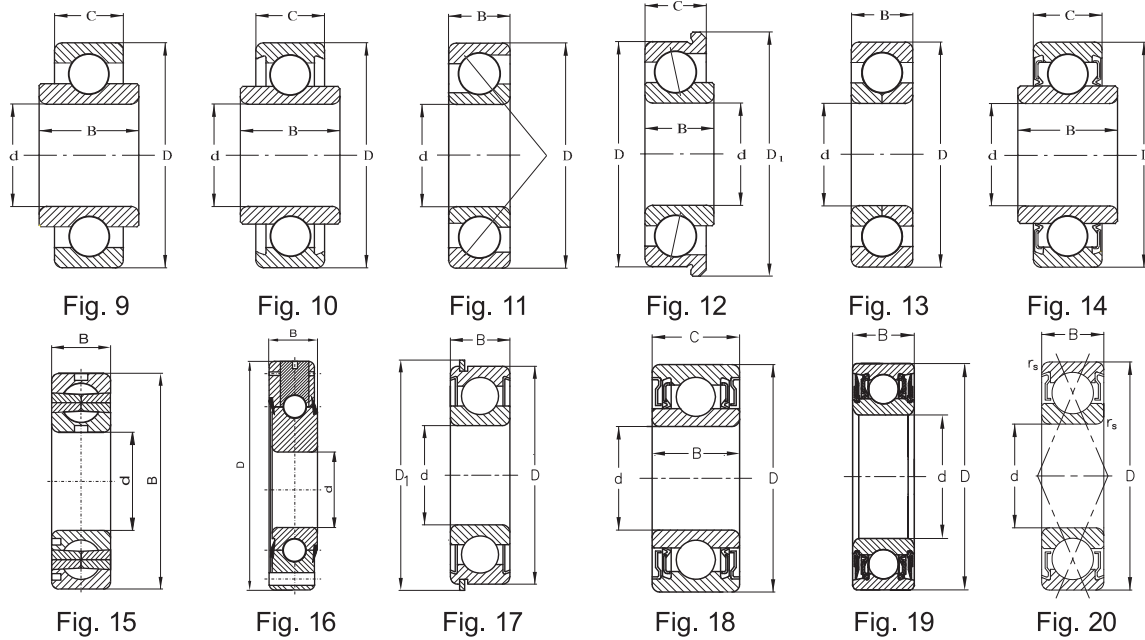


Fig.8

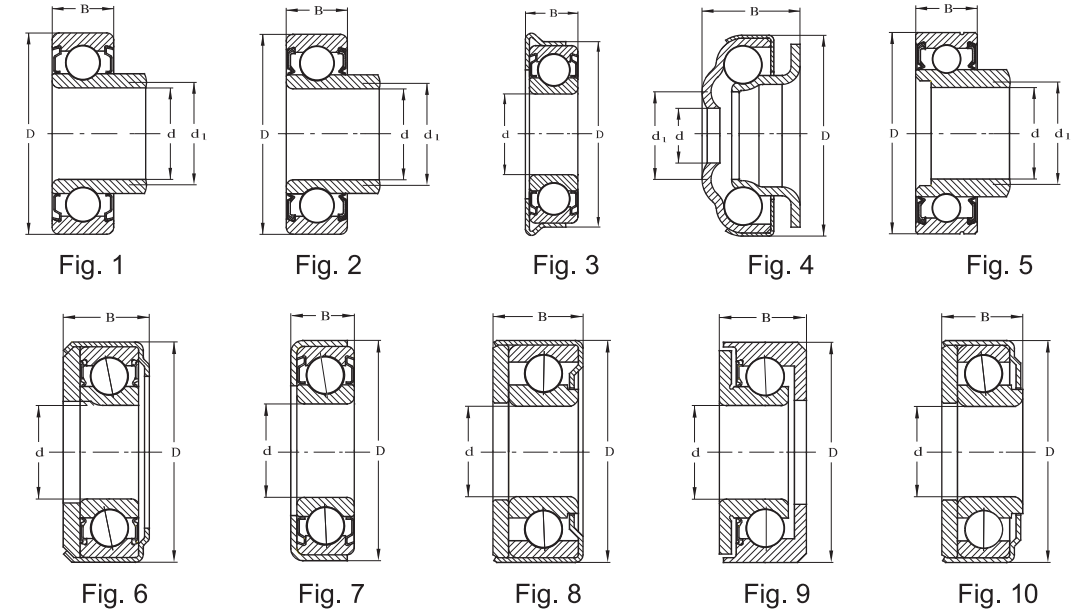
DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~ kg	FIG No
d	D/D1	B/C	dynamic C	static C ₀			
mm			kN				
25	52	25/15	19.7	13.1	113-1048	0.171	1
	62	12	16.6	9.6	68305	0.173	2
	62	14	20.6	11.2	68341	0.190	2
28	67/63.82	18	25.0	13.8	114-618 NR	0.289	3
28.575	71.425	20.638	28.2	15.8	MS-11	0.330	2
28.58	71.425	20.638	29.7	15.7	CBK-296	0.306	2
30	42	7/6	4.1	3.3	113-817	0.250	9
	57	16	13.2	8.3	113-867TNG 2RSRS6	0.177	19
	62	16	22.5	14.7	133-759	0.212	11
	75/80.4	19	30.0	16.1	CBK-083-2RSP66	0.380	4
	65	21	21.2	12.4	CBK-086 B	0.330	4
	84	19/27.3	28.2	15.8	CBK-468	0.623	5
	34.8	72	31.5/21.5	25.7	15.3	114-755-2RS	0.424
35	62	16	16	10.3	113-818-2RS	0.179	4
	72	25	25.7	15.3	114-865-2RSZ C3	0.406	18
	85/91.6	23	33.5	18.3	114-942-2RSNR	0.606	17
	93.5	21/37.25	25.8	18.3	11/6307-2RSA R5-20*	1.020	5
	96.25	21/37.25	25.8	18.3	12/6307-2RS R5-20*	1.240	5
	97	21/37.25	25.8	18.3	12/6307-2RSA R5-20*	1.240	5

*R5-20 – Bearing with radial clearance 5-20 μm
2RSZ– Bearing with seals and shields

Deep groove ball bearings



Clutch's ball bearings for cars, trucks and tractors



DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~	FIG No	DIMENSIONS			PRESSURE DIAMETER d1	BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~	FIG No
d	D/D1	B/C	dynamic C	static C ₀				d	D	B		dynamic C	static C ₀			
mm			kN			kg		mm			mm	kN			kg	
37	55	11.25	22.5	14.8	CBK-361	0.061	7	29.5	52.7	15	34	11.9	8.0	173-722	0.069	4
38.892	80	27.5/21	29.1	17.9	114-743-2RSRC5	0.460	14	30	55	13	34	13.2	8.3	CBK-206-2Z	0.135	1
40	80	27/21	29.1	17.9	114-732-2RSR	0.425	14		55	13	34	13.2	8.3	CBK-206-2RS	0.135	2
45	75	19/16	21.0	15.2	114-751-2RS	0.400	14	30.7	53	15	39.5	11.9	8.0	173-723	0.068	4
	75	19	21	15.2	114-878BTNG2RS	0.29	19	32	58	14.5		13.2	8.3	CBK-182A	0.130	3
	85	50/19	32.7	20.5	114-771	0.630	9	35.9	62	14	39.5	16.0	10.3	CBK-269	0.153	1
	85	27/21	32.7	20.5	88509	0.58	14		62	14	39.5	11.6	10.3	CBK-269ZRS	0.153	1
50	80	16	33	31	134-956-ZZ	0.29	20	37	62	14	39.5	16.0	10.3	CBK-269X1	0.163	1
	80	16	33	31	134-956-2RS	0.30	20		62	14	39.5	16.0	8.2	CBK-302	0.300	5
50.12	79.993	23.97/15.97	21.8	16.6	04-229A	0.306	10	50	81.6	25		21.8	16.6	114-733	0.440	6
52.413	90	18	28.3	21.3	114-741	0.392	2	52.388	84.5	19.25		21.8	16.6	CBK-197	0.260	7
55	90	22	28.3	21.3	114-1015-2RS-2BRS	0.45	19		84.3	27		21.8	16.6	114-791-2Z	0.380	-
	100	21	66.3	55	134-955-2Z	0.604	20	52.413	91.6	22.8		28.3	21.3	114-742	0.560	8
60	110	55/22	46.1	33.1	114-772	1.148	9	55	92	28.5		28.3	21.3	114-744TNRS	0.660	9
	80	12	20.2	19.2	114-940TN	0.109	2	63.505	100	21.971		30.5	25.2	CBK-297	0.560	10
70	110	20	38.0	30.9	URE-6014 MAOW	0.690	2	65	100	21.971		30.5	25.2	CBK-297X1	0.535	10
	110	26	38	30.9	114-980-2RSR2	0.76	19	75	117	27		39.5	33.5	114-740	0.870	6
75	115	26	39.5	33.5	114-1046-2RSR2	0.81	19									
110	175	30	107.0	107.0	926722	2.720	11									
140	215/225	43/38	116.0	139.0	CBK-031	7.450	12									
205	270	28	97.0	132.0	CBK-222A	4.700	13									
275	483	55	295.0	569.0	137-858	60.400	16									
406.4	508	50.8	266.0	478.0	138-862M	25.500	15									
455	662	70	352.0	840.0	138-857	56.200	16									
633	850	57	326.0	972.0	138-868	76.200	16									

A - Changed internal design
 2Z - Bearing with two shields
 2RS - Bearing with two rubber seals
 TNRS - Bearing with plastic cage and rubber seals

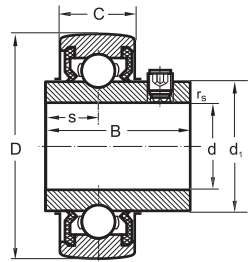


Fig. 1

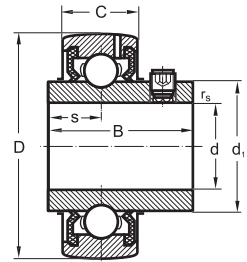


Fig. 2

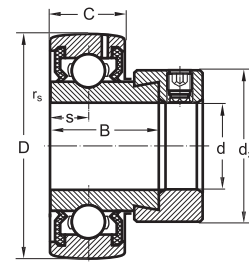


Fig. 3

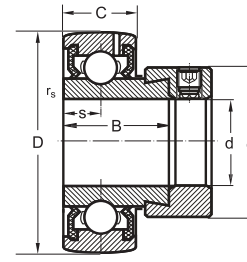


Fig. 4

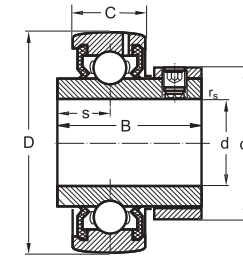


Fig. 5

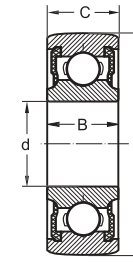


Fig. 6

SHAFT	DIMENSIONS										BASIC LOAD RATING		MASS	FIG No	DESIGNATION		
	d	D	B	B ₁	C	r _o min	S	d ₁	d ₂	dynamic C	static C ₀	~			FLT	SKF	KOYO
	mm										kN		kg				
20	20	47	31		14	0.6					-	6.55	0.14	4	FD204	YAR204	
25	25	52	34.1		15	0.6				-	7.8	0.17	4	FD205	YAR205		
30	30	62	39.1		19	1	15.9	40.7		19.50	11.35	0.32	1	C206			
	30	62	39.1		19	1	15.9	40.7		19.50	11.35	0.32	2	FC206	YAR206	UC206	
	30	62		37.5	18	1	9.0		45.0	19.50	11.35	0.30	3	D206		SA206M	
	30	62		37.5	18	1	9.0		45.0	19.50	11.35	0.30	4	FD206	YET206		
	30	62	16.0		16	1				19.50	11.35	0.18	6	K62062RS	1726206-2RS1		
35	35	72	42.9		20	1.1	17.5	46.9		19.7	15.30	0.57	1	C207			
	35	72	42.9		20	1.1	17.5	46.9		19.7	15.30	0.57	2	FC207	YAR207	UC207	
	35	72		38.9	19	1.1	9.5		56.5	19.7	15.30	0.48	3	D207		SA207M	
	35	72		38.9	19	1.1	9.5		56.5	19.7	15.30	0.48	4	FD207	YET207		
	35	72	42.9		20	1.1	17.5		58.9	19.7	15.30	0.59	5	FB207			
40	35	72	17.0		17	1.1				19.7	15.30	0.25	6	K62072RS	1726207-2RS1		
	40	80	49.2		21	1.1	19.0	52.4		22.4	17.90	0.64	2	FC208	YAR208	UC208	
	40	80		43.7	21	1.1	11.0		60.0	22.4	17.90	0.59	4	FD208	YET208		
	40	80	49.2		19	1.1	19.0		66.5	22.4	17.90	0.72	5	FB208			
	40	80	18.0		18	1.1				22.4	17.90	0.32	6	K62082RS	1726208-2RS1		
45	45	85	49.2		22	1.1	19.0	57.4		25.2	20.5	0.68	2	FC209	YAR209	UC209	
	45	85		43.7	22	1.1	11.0		63.5	25.2	20.5	0.66	4	FD209	YET209		
	45	85	19.0		19	1.1						0.37	6	K62092RS	1726209-2RS1		
50	50	90	51.6		24	1.1	19.0	62.4		35.1	23.2	0.80	2	FC210	YAR210	UC210	
	50	90	51.6		22	1.1	19.0		79.0	35.1	23.2	1.00	5	FB210			
55	55	100	55.6		25	1.5	22.2	68.7		33.4	29.2	1.11	2	FC211	YAR211	UC211	
	55	100	55.6		25	1.5	22.2		88.0	33.4	29.2	1.35	5	FB211			

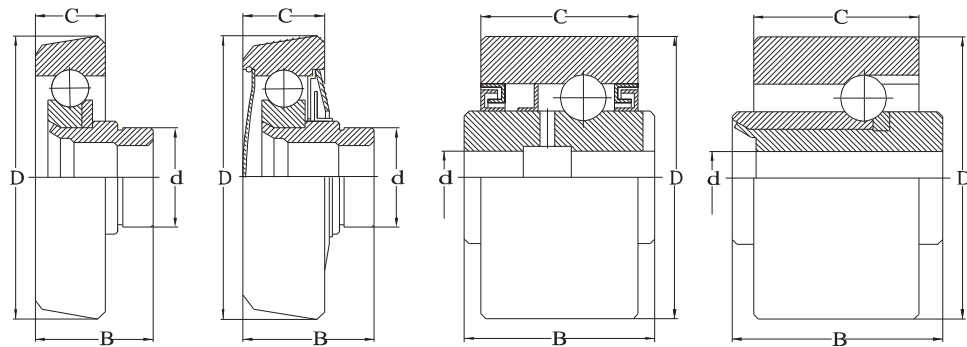


Fig. 1

Fig. 2

Fig. 3

Fig. 4

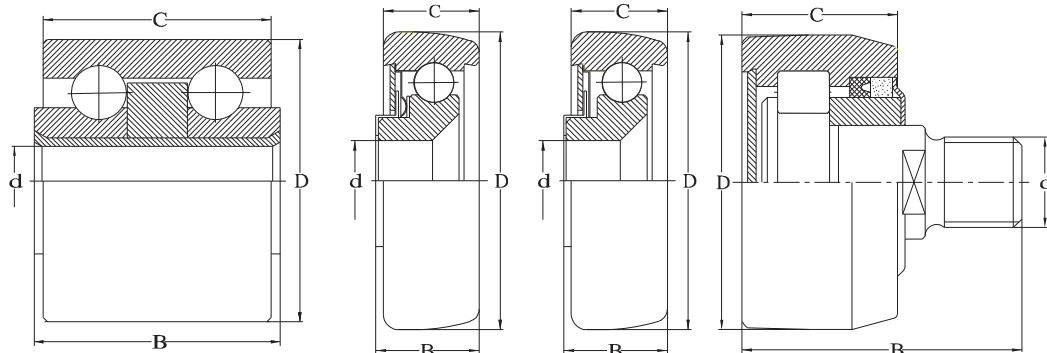


Fig. 5

Fig. 6

Fig. 7

Fig. 8

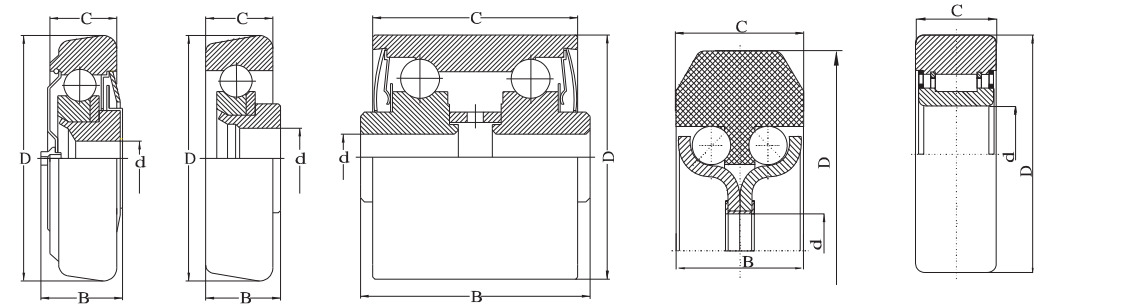


Fig. 9

Fig. 10

Fig. 11

Fig. 12

Fig. 13

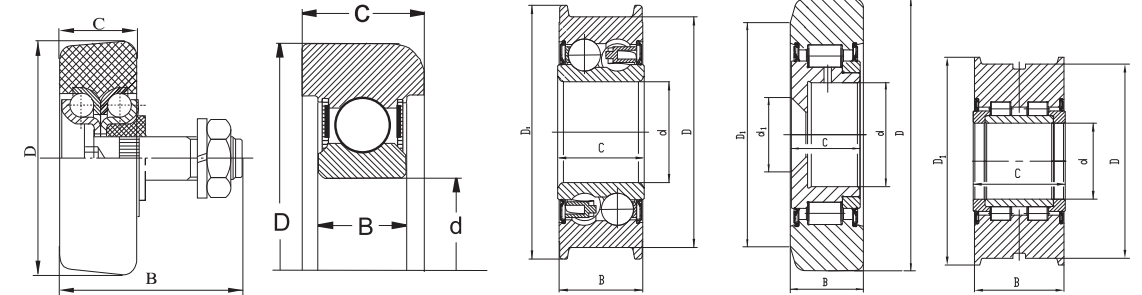


Fig. 14

Fig. 15

Fig. 16

Fig. 17

Fig. 18

DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~	FIG No	DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~	FIG No	
d	D/D1	B/C	dynamic C	static C ₀				d	D/D1	B/C	dynamic C	static C ₀				
mm			kN			kg	mm			kN			kg			
9.55	50.5	15.3/16			NG-2WHEEL	0.051	12	40	89.6	25.65	47.3	35.8	114-1128-2RSR	0.74	15	
12	75.00	62/59	50.0	37.0	CBK-192V	1.803	5		91	25.65	47.3	35.8	114-1127-2RSR	0.75	15	
12.2	71.40	55.5/52	50.0	37.0	124-659DV-2Z	1.151	11		97.4	25/28.5	48.5	37.5	114-1051-2RS	0.947	15	
	71.40	71/65.1	50.0	37.0	124-662DV-2Z	1.440	11		97.9	25/28.5	48.5	37.5	114-1052-2RS	0.965	15	
14.05	63.00	44/34.5	23.0	13.7	CBK-191V	0.675	4		98.3	25/28.5	48.5	37.5	114-1053-2RS	0.980	15	
	63.00	44/34.5	16.0	7.9	CBK-191	0.669	3		99	23/27	40.7	23.9	114-841-2RS	1.125	15	
16	59.00	20.5/19	14.0	7.9	CBK-274B	0.227	6		100	23/27	40.7	23.9	114-842-2RS	1.125	15	
	59.00	20.5/19	14.0	7.9	CBK-274C	0.227	7		101	23/27	40.7	23.9	114-869-2RS	1.004	15	
16.05	76.00	50/39	28.2	15.8	CBK-196	1.046	3		102	23/27	40.7	23.9	114-870-2RS	1.036	15	
	60.325	46.8/19.3			FW-100-2-3/8	0.163	14		102.8	25.65	47.3	35.8	114-1126-2RSR	1.17	15	
20	52	59/30.6	25.0	21.7	CBK-320	0.512	8		109.9	29.5	73.0	92.0	274-1078-2RS	1.65	17	
	80	52/27	21.2	10.9	CBK-188	0.780	2		110.2	29.5	73.0	92.0	274-1085-2RS	1.66	17	
	80	52/27	30.3	18.7	CBK-188 VA*	0.840	1		45	80/90	38	33.0	29.6	174-1129 TNG-2RS	0.81	16
23	82	26.5/24	23.7	13.4	CBK-189	0.566	9		105	41/38	52.0	39.9	174-1057 TNG-2RS	1.27	16	
	82	26.5/24	34.4	23.4	CBK-189 V*	0.620	10		105	41/40	52.0	39.9	174-1058 TNG-2RS	1.265	16	
24	70.5	24	22.8	15.7	114-1132-2RSR	0.52	15		114	25/30	53.0	31.7	114-851-2RS	1.41	15	
25.4	82	29.5/27	28.2	15.8	CBK-243 B	0.620	6		115	25/30	53.0	31.7	114-850-2RS	1.46	15	
	82	29.5/27	28.2	15.8	CBK-243 C	0.620	7		116	25/30	53.0	31.7	114-886-2RS	1.5	15	
28	75.9	26	47.2	29.9	114-1131-2RSR	0.52	15		117	25/32	53.0	31.7	114-902-2RS	1.63	15	
	79.6	21/24.5	35.8	23.2	114-1066-2RS	0.567	15		118	25/32	53.0	31.7	114-903-2RS	1.67	15	
	80.1	21/24.5	35.8	23.2	114-1067-2RS	0.579	15		119	25/32	53.0	31.7	114-947-2RS	1.71	15	
	80.5	21/24.5	35.8	23.2	114-1068-2RS	0.588	15		120	25/32	53.0	31.7	114-948-2RS	1.76	15	
	134	33.5/30	43.4	29.2	CBK-195 A	2.330	9		45.05	115/123	53	107	162	225-1130V-2RS	3.5	18
35	88	30/29	40.7	30	174-1056-2RS	0.74	16									

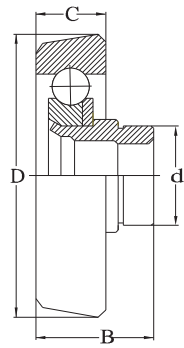


Fig. 1

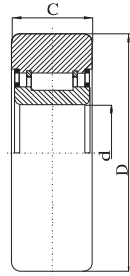


Fig. 13

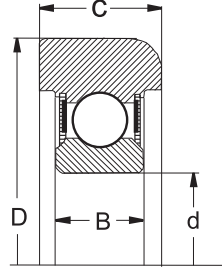


Fig. 15

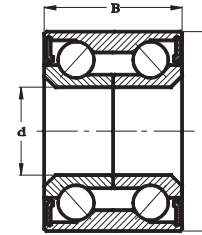


Fig. 1

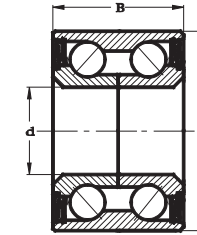


Fig. 2

DIMENSIONS			BASIC LOAD RATING		BEARING DESIGNATIONS	MASS ~	FIG No
d	D/D1	B/C	dynamic C	static C ₀			
mm			kN			kg	
50	129	27/34	62.0	37.9	115-914-2RS	2.09	15
	130	27/34	62.0	37.9	115-915-2RS	2.14	15
	131	27/34	62.0	37.9	115-916-2RS	2.19	15
	132	27/34	62.0	37.9	115-946-2RS	2.25	15
55	136.652	46.304	144.0	231.0	675-815-2RS	3.860	13
60	149	31/36	82.0	52.0	115-933	2.987	15
	150	31/36	82.0	52.0	115-934	3.051	15
	151	31/36	82.0	52.0	115-935	3.115	15
70	140	26	72.5	53.0	115-968-2RS	1.45	1
72.7	174.625	61.925	279.0	424.0	675-846-2RS	8.300	13

SHAFT	DIMENSIONS					BASIC LOAD RATING		LIMITING SPEEDS	DESIGNATION FLT	MASS ~	FIG No
	d	D	B	C	r _{1s} min	dynamic C	static C ₀	grease		kg	
	mm					kN		min ⁻¹			
30	30	60	37.0	37.0	2.5	37.80	31.10	7000	CBK-199TNG	0.450	1
	30	60	37.0	37.0	2.5	36.90	30.40	7000	CBK-199BTNG	0.450	2
	30	60.03	37.0	37.0	2.5	37.80	31.10	7000	CBK-441TNG	0.450	1
	30	60.03	37.0	37.0	3.2	37.80	31.10	7000	CBK-441BTNG	0.450	2
	30	60.03	37.0	37.0	0.3	37.80	31.10	7000	133-637TNG-2RS	0.450	1
34	34	64	37.0	37.0	2.4	42.2	35.40	6300	133-639BATNG	0.430	2
35	34	64	37.0	37.0	2.4	42.2	35.40	6300	133-639BATNG-2RS-2RSS6	0.430	2
	35	66	33.0	33.0	2.5	43.7	36.80	6300	134-781TNG-2RS	0.440	1
	35	68	37.0	37.0	2.5	43.6	37.20	6300	134-643DTNG-2RS	0.490	1
	35	68	37.0	37.0	2.5	43.6	37.20	6300	134-738BTNG-2RS	0.430	2
	35	68.015	37.0	37.0	2.5	41.7	35.5	6300	134-863TNG-2RS	0.563	1
37	37	72	37	37	2.4	44.2	39.7	5000	134-964TNG-2RS	0.577	1
39	39	68	37.0	37.0	3.2	39.8	26.30	5600	134-746BDTNG-2RS	0.420	2
	39	72	37.0	37.0	2.4	44.2	39.70	5000	134-725BTNG-2RS	0.500	2
40	40	72	37.0	37.0	2.4	44.2	39.70	5000	134-797BTNG-2RS	0.540	2
	42	80	42	42	2.4	65	55.5	5000	134-739BTNG-2RS	0.753	2
42	42	80	42.0	42.0	2.4	65	55.50	5000	134-806BTNG-2RS	0.800	2
	48	82	37	33	3.2	53	50	5000	134-905TNGRS6RS	0.631	1
100	100	125	29	-	1	34.3	43.7	3200	135-900TNG	0.640	3
110	110	140	30	-	1	43	57	2800	135-954TNG	0.908	3
130	130	172	38	-	1	86.7	109.8	2300	135-929TNG	1.87	3
160	160	204.576	53	-	1.8	171	263	-	166-1012TNG	2.62	4
190	190	254.035	70.126	-	2.5	281	440	-	166-997TNG	5.29	4
200	200	280.446	93.126	-	2.5	385	620	-	167-994TNG	9.22	4
230	230	311.446	91.626	-	3	405	700	-	167-995TNG	10.64	4

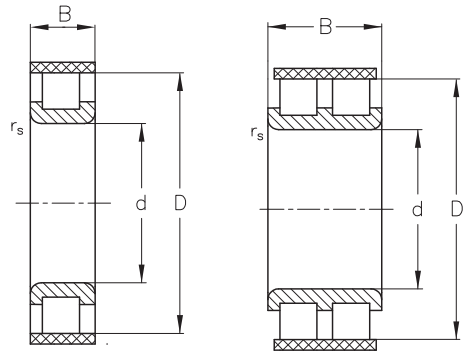
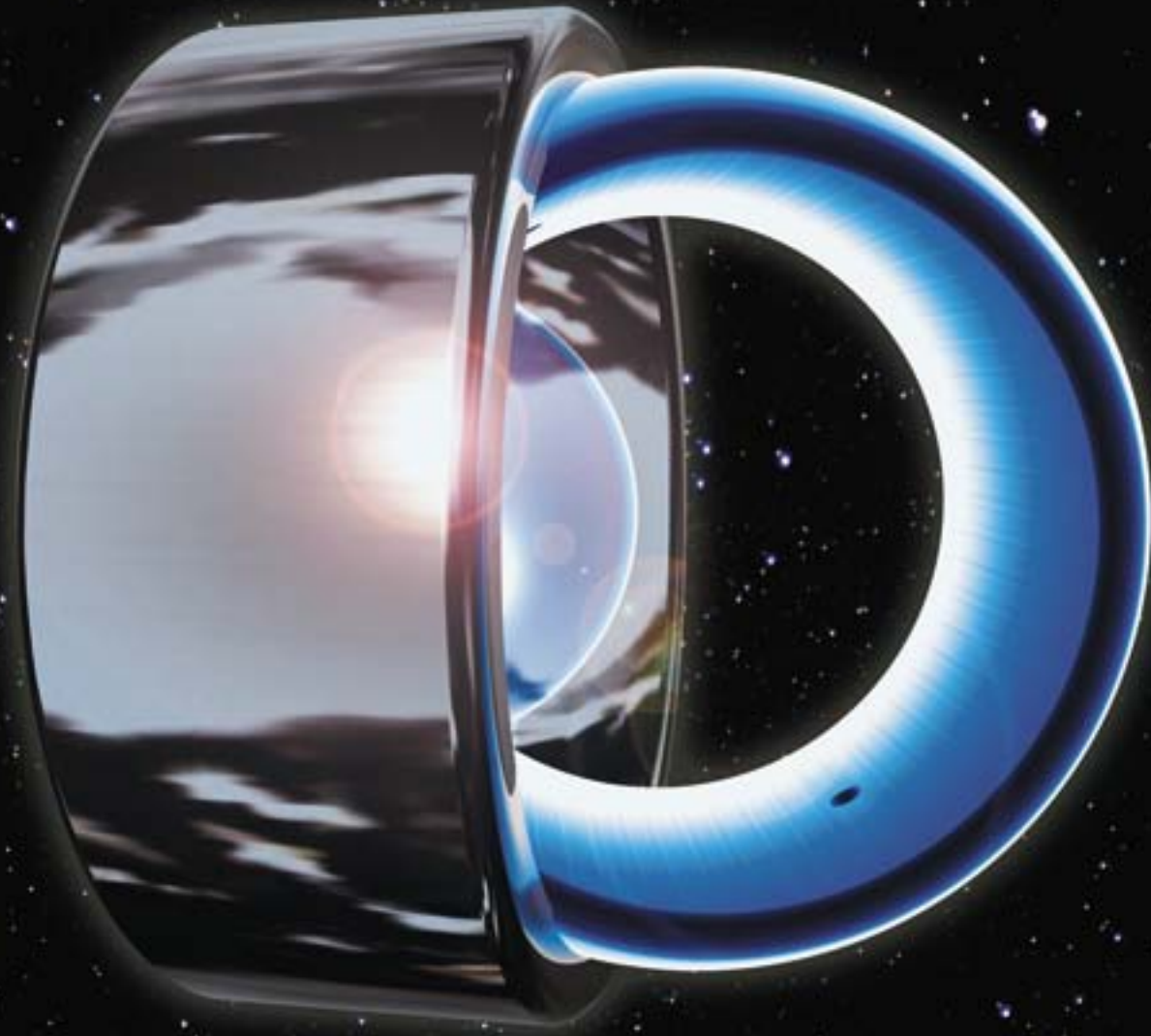


Fig. 1

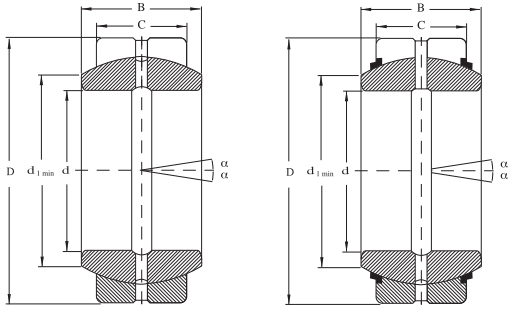
Fig. 2

DIMENSIONS				FtT	BASIC LOAD RATING		LIMITING SPEEDS		MASS ~ kg	FIG No
d	D	B	rs min		dynamic C	static C ₀	grease	oil		
mm					kN		min ⁻¹			
18	30.52	13	2.0	263-899	19.9	21.2	4 600	6 200	0.044	1
20	36.81	16	2.6	263-919	27.5	27.9	3 900	5 200	0.061	1
	36.81	16	2.6	263-1016	27.5	27.9	3 900	5 200	0.061	1
24	33.9	16	2.6	263-1023	27	30	3 900	5 200	0.065	1
	40.25	26	2.5	263-904	44	59.8	3 400	4 600	0.137	2
25	42.51	12	2.6	263-1122	21.9	21.8	3 100	4 100	0.070	1
	46.52	18	3.0	263-898	45	48.1	3 100	4 100	0.156	1
	42.51	16	2.5	263-1021	31.2	34.4	3 100	4 100	0.095	1
	40.25	26	2.5	263-1092	44.0	59.8	3 100	4 100	0.175	2
	42.55	18	3.0	263-1105	40.5	47.8	3 100	4 100	0.110	1
30	49.6	26	3.0	263-920	57.1	70.4	2 800	3 800	0.217	2
	49.6	26	3.0	263-922	57.1	70.4	2 800	3 800	0.188	2
	49.6	25	3.0	263-1089	57.1	70.4	2 800	3 800	0.183	2
32	51.75	29	3.0	263-1017	71.5	95.5	2 600	3 500	0.232	2
	46.6	25	3.0	263-1022	54.3	82.5	2 600	3 500	0.159	2
38	52.95	28	3.0	263-921	59.2	97	2 500	3 400	0.195	2
40	61.74	28	3.5	263-918	70.6	90.6	2 300	3 000	0.279	2
	61.74	32	3.0	263-917	85.4	115.8	2 300	3 000	0.329	2
	61.74	38	1.1	263-962	101	143	2 300	3 000	0.377	2
42	60.75	37	3.0	263-924	100.7	156.9	2 300	3 000	0.347	2
44	62.97	37	2.5	263-1020	103.5	164.4	2 100	2 800	0.267	2
45	66.85	37.5	3.5	263-923	106	157	2 100	2 800	0.428	2
	72.33	40	1.1	263-1024	131	195	1 800	2 500	0.489	2
50	77.33	42	1.1	263-963	131	195	1 800	2 500	0.500	2
	94.75	44	6.2	264-1018	178	237	1 400	1 900	1.270	2
	72	31	4.0	264-1064	114.8	178.7	1 800	2 500	0.391	2

SPHERICAL PLAIN BEARINGS



FtT Spherical plain bearings

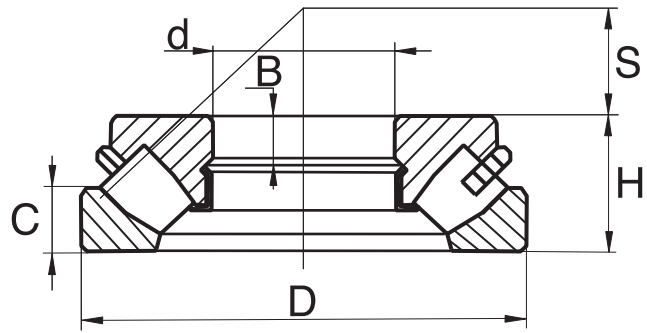


SPHERICAL ROLLER THRUST BEARINGS



DIMENSIONS						BASIC LOAD RATING		BASIC DESIGNATIONS		MASS
d	D	B	C	d _{1 min}	α°	dynamic C	static C ₀			~
mm						kN				kg
15	26	12	9	16.6	8	18	45	GE15ES	-	0.032
20	35	16	12	21.8	9	31.5	78	GE20ES	-	0.065
25	42	20	16	27.7	7	51	127	GE25ES	-	0.12
30	47	22	18	34	6	62	310	GE30ES	GE30ES-2RS	0.15
35	55	25	20	39	6	80	400	GE35ES	GE35ES-2RS	0.23
40	62	28	22	45	7	100	500	GE40ES	GE40ES-2RS	0.31
45	68	32	25	50	7	127	637	GE45ES	GE45ES-2RS	0.41
50	75	35	28	55	6	156	780	GE50ES	GE50ES-2RS	0.56
60	90	44	36	66	6	245	1220	GE60ES	GE60ES-2RS	1.01
70	105	49	40	77	6	315	1560	GE70ES	GE70ES-2RS	1.53
80	120	55	45	88	6	400	2000	GE80ES	GE80ES-2RS	2.28
90	130	60	50	98	5	490	2450	GE90ES	GE90ES-2RS	2.73
100	150	70	55	109	7	610	3050	GE100ES	GE100ES-2RS	4.38
110	160	70	55	120	6	655	3250	GE110ES	GE110ES-2RS	4.8
120	180	85	70	130	6	950	4750	GE120ES	GE120ES-2RS	7.95
140	210	90	70	150	7	1071	5355	GE140ES	GE140ES-2RS	10.98
160	230	105	80	170	8	1360	6800	GE160ES	GE160ES-2RS	13.98
180	260	105	80	192	6	1496	7480	GE180ES	GE180ES-2RS	18.58

F&T Spherical roller thrust bearings

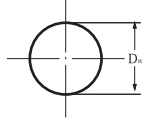


BALLS, NEEDLE
ROLLERS

DIMENSIONS						BASIC LOAD RATING		BASIC DESIGNATIONS	MASS ~ kg
d	D	H	B	C	S	dynamic C	static C ₀		
mm						kN			
100	210	67	43	32	62	836	2500	29420	7.50
120	210	54	19	22.2	70	686	2223	29324	7.35
300	480	109	54	54	168	2280	10396	29360M	72.60
340	620	170	82	84	201	5200	19300	29468M	197.00
380	600	132	44	63	216	3340	14000	29376	140.00
	670	175	65	85	230	6400	24500	29476	260.00
400	620	132	-	64	225	3295	15865	29380M	146.00
	710	185	-	92.3	234	5730	25800	29480M	300.00



F&T Steel balls

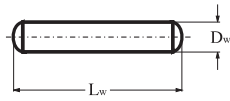


NOMINAL DIAMETER		MASS PER 1000 BALLS	QUANTITY IN CARTON BOX (x1000 PCS)	NET MASS OF CARTON	NOMINAL DIAMETER		MASS PER 1000 BALLS	QUANTITY IN CARTON BOX (x1000 PCS)	NET MASS OF CARTON
D					D				
mm	inch	kg		kg	mm	inch	kg		kg
3.969	5/32	0.254	16	4.07	21.437	27/32	40.05	0.12	4.81
4.0		0.260	16	4.17	22.225	7/8	44.66	0.1	4.47
4.762	3/16	0.439	10	4.39	23.019	29/32	49.68	0.09	4.47
5.0		0.509	8	4.07	23.812	15/16	54.93	0.07	3.85
5.556	7/32	0.698	6	4.19	24.606	31/32	60.61	0.064	3.88
5.953	15/64	0.858	5	4.30	25.4	1	66.67	0.06	4.00
6.0		0.879	5	4.40	26.988	1 1/16	79.97	0.05	4.00
6.35	1/4	1.042	4	4.17	28.575	1 1/8	94.900	0.045	4.27
6.5		1.117	3.6	4.02	30.000		109.800	0.040	4.39
6.747	17/64	1.250	3.5	4.38	30.162	1 3/16	111.600	0.040	4.64
7.0		1.395	3	4.19	31.750	1 1/4	130.200	0.030	3.91
7.144	9/32	1.493	3	4.45	33.338	1 5/16	150.700	0.029	4.37
7.938	5/16	2.035	2	4.07	34.925	1 3/8	173.300	0.024	4.16
8.0		2.093	2	4.17	35.000		174.400	0.024	4.19
8.5		2.499	1.7	4.25	36.512	1 7/16	198.000	0.014	2.77
8.731	11/32	2.708	1.6	4.33	38.100	1 1/2	225.000	0.012	2.70
9.525	3/8	3.516	1.2	4.22	39.688	1 9/16	254.400	0.012	3.06
10.0		4.068	1	4.07	41.275	1 5/8	286.100	0.011	3.15
10.319	13/32	4.470	1	4.00	42.862	1 11/16	320.400	0.011	3.52
11.0		5.415	0.8	4.33	44.450	1 3/4	357.300	0.008	2.86
11.112	7/16	5.582	0.8	4.47	45.000		370.800	0.008	2.97
11.509	29/64	6.202	0.6	3.72	47.625	1 7/8	439.500	0.007	3.08
11.906	15/32	6.866	0.6	4.12	50.000		508.600	0.006	3.05
12.0		7.026	0.6	4.22	50.800	2	533.300	0.006	3.20
12.303	31/64	7.576	0.6	4.55	52.388	2 1/16	585.000	0.006	3.51
12.5		7.946	0.54	4.29	53.975	2 1/8	640.000	0.006	3.84
12.7	1/2	8.333	0.5	4.17	57.150	2 1/4	759.000	0.001	0.759
13.494	17/32	9.996	0.35	3.50	60.325	2 3/8	893.000	0.001	0.893
14.0		11.158	0.35	3.90	63.500	2 1/2	1042.000	0.001	1.042
14.288	9/16	11.870	0.35	4.15	66.675	2 5/8	1206.000	0.001	1.206
14.6		12.66	0.33	4.18	69.850	2 3/4	1386.000	0.001	1.386
14.8		13.194	0.3	3.96	76.200	3	1800.000	0.001	1.800
15.081	19/32	13.96	0.3	4.19	79.375	3 1/8	2035.000	0.001	2.035
15.5		15.15	0.27	4.09	80.000		2083.000	0.001	2.083
15.875	5/8	16.28	0.25	4.07	90.000		2966.000	0.001	2.966
16.669	21/32	18.84	0.22	4.15	100.000		4069.000	0.001	4.069
17.0		19.977	0.21	4.20	108.000		5126.000	0.001	5.126
17.462	11/16	21.66	0.20	4.33	110.000		5416.000	0.001	5.416
17.5		21.805	0.18	3.95	120.000		7031.000	0.001	7.031
18.0		23.728	0.18	4.27	150.000		13733.000	0.001	13.733
18.256	23/32	24.75	0.17	4.21	200.000		32547.000		
19.050	3/4	28.13	0.15	4.22	250.000		63578.000		
19.844	25/32	31.79	0.14	4.45					
20.0		32.55	0.14	4.56					
20.638	13/16	35.77	0.13	4.63					

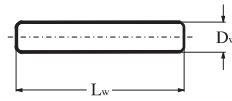
Material carbon chromium steel, Hardness: 60-66 HRC, Tolerances: grade G10 to G100. The dimensional and form accuracy to ISO 3290

Material carbon chromium steel
Hardness: 60-66 HRC
Tolerances: grade G10 to G100. The dimensional and form accuracy to ISO 3290

FtT Needle rollers



Forme A



Forme B

DESIGNATIONS	DIMENSIONS				MASS PER 1000 PCS	DESIGNATIONS	DIMENSIONS				MASS PER 1000 PCS
	D _w	L _w	r min	r max			D _w	L _w	r min	r max	
mm					kg	mm					kg
1.5 x 5.3 B	1.5	5.3			0.076	3.0 x 17.8 A	3.0	17.8			0.932
1.5 x 5.8 B	1.5	5.3	0.1	0.4	0.080	3.0 x 19.8 A	3.0	19.8			1.041
1.5 x 7.8 A	1.5	7.8			0.108	3.0 x 21.8 A	3.0	21.8			1.151
1.59 x 10.3 A	1.59	10.3			0.158	3.0 x 23.8 A	3.0	23.8			1.261
1.6 x 6.8 A	1.6	6.8			0.102	3.0 x 27.8 A	3.0	27.8			1.481
1.6 x 8.8 A	1.6	8.8			0.133	3.0 x 29.8 A	3.0	29.8			1.591
1.984 x 11.3 B	1.984	11.3	0.1	0.4	0.267	3.1 x 23.8 A	3.1	23.8			1.396
2.0 x 6.3 A	2.0	6.3			0.143	3.175 x 10.8 B	3.175	10.8	0.1	0.6	0.658
2.0 x 7.3 B	2.0	7.3	0.1	0.4	0.174	3.175 x 12.7 A	3.175	12.7			0.775
2.0 x 7.8 A	2.0	7.8			0.180	3.175 x 13.97 A	3.175	13.97			0.853
2.0 x 8.8 B	2.0	8.8	0.1	0.4	0.215	3.175 x 20.6 A	3.175	20.6			1.261
2.0 x 9.8 A	2.0	9.8			0.229	3.175 x 21.59 A	3.175	21.59			1.321
2.0 x 11.3 B	2.0	11.3	0.1	0.4	0.272	3.2 x 19.3 A	3.2	19.3			1.435
2.0 x 11.8 A	2.0	11.8			0.278	3.3 x 23.8 A	3.3	23.8			1.526
2.0 x 12.8 B	2.0	12.8	0.1	0.4	0.308	3.46 x 19.8 A	3.46	19.8			1.500
2.0 x 13.8 A	2.0	13.8			0.327	3.5 x 12.8 B	3.5	12.8	0.1	0.6	0.980
2.0 x 15.8 A	2.0	15.8			0.376	3.5 x 17.8 A	3.5	17.8			1.350
2.0 x 17.8 A	2.0	17.8			0.424	3.5 x 19.8 A	3.5	19.8			1.510
2.0 x 19.8 A	2.0	19.8			0.473	3.5 x 29.8 A	3.5	29.8			2.250
2.22 x 7.3 B	2.22	7.3	0.1	0.4	0.215	3.968 x 22.5 B	3.968	22.5	0.1	0.6	2.153
2.249 x 6.3 B	2.249	6.3	0.1	0.4	0.190	4.0 x 12.8 B	4.0	12.8	0.1	0.6	1.254
2.286 x 8.5 B	2.286	8.5	0.1	0.4	0.312	4.0 x 15.8 B	4.0	15.8	0.1	0.6	1.550
2.317 x 10.3 A	2.317	10.3			0.320	4.0 x 18.3 A	4.0	18.3			1.698
2.39 x 9.8 B	2.39	9.8	0.1	0.4	0.341	4.0 x 19.8 B	4.0	19.8	0.1	0.6	1.945
2.5 x 7.8 A	2.5	7.8			0.274	4.0 x 23.8 A	4.0	23.8			2.236
2.5 x 9.8 A	2.5	9.8			0.352	4.0 x 29.8 A	4.0	29.8			2.821
2.5 x 9.8 B	2.5	9.8	0.1	0.4	0.369	4.0 x 34.8 A	4.0	34.8			3.310
2.5 x 10.8 B	2.5	10.8	0.1	0.4	0.406	4.0 x 39.8 A	4.0	39.8			3.710
2.5 x 13.8 A	2.5	13.8			0.503	4.7625 x 15.7 A	4.7625	15.7			2.192
2.5 x 14.8 B	2.5	14.8	0.1	0.4	0.556	4.763 x 15.8 A	4.763	15.8			
2.5 x 15.3 B	2.5	15.3	0.1	0.4	0.578	4.763 x 30.5 B	4.763	30.5	0.1	0.6	4.259
2.5 x 15.8 A	2.5	15.8			0.579	4.763 x 35.8 B	4.763	35.8	0.1	0.6	4.999
2.5 x 17.8 A	2.5	17.8			0.656	4.769 x 44.45 B	4.769	44.45	0.1	0.6	6.223
2.5 x 19.8 A	2.5	19.8			0.732	5.0 x 8.1 B	5.0	8.1	0.1	0.6	1.350
2.5 x 23.8 A	2.5	23.8			0.884	5.0 x 29.8 A	5.0	29.8			4.536
2.6 x 15.8 A	2.6	15.8			0.651	5.0 x 33.8 B	5.0	33.8	0.1	0.6	5.156
2.6 x 19.8 A	2.6	19.8			0.817	5.0 x 34.8 A	5.0	34.8			
2.778 x 11.17 A	2.779	11.17			0.520	5.0 x 37.8 B	5.0	37.8	0.1	0.6	5.767
3.0 x 7.8 B	3.0	7.8	0.1	0.4	0.422	5.0 x 39.8 A	5.0	39.8			6.021
3.0 x 9.3 B	3.0	9.3	0.1	0.4	0.504	5.0 x 43.8 A	5.0	43.8			6.632
3.0 x 13.8 A	3.0	13.8			0.712	5.0 x 44.8 A	5.0	44.8			6.794
3.0 x 13.8 B	3.0	13.8	0.1	0.4	0.752	5.5 x 26.8 B	5.5	26.8	0.1	0.6	1.947
3.0 x 14.5 B	3.0	14.5	0.1	0.4	0.787	5.542 x 13.67 B	5.542	13.67	0.1	0.6	2.562
3.0 x 15.8 A	3.0	15.8			0.822	5.544 x 13.67 A	5.544	13.67			2.590
3.0 x 15.8 B	3.0	15.0	0.1	0.4	0.822	5.544 x 23.75 A	5.544	23.75			3.500

Material: carbon chromium steel
 Hardness: 58-65 HRC (670-840 HV)
 Tolerances: grade G2, G3 and G5 in accordance with ISO 3096

FlT Bearing Data - General

Bearings tolerances

Normal tolerances for radial (except taper roller bearings)

Bearings tolerances

Class P6 tolerances for radial bearings (except taper roller bearings)

Inter ring

d		Δ_{dmp}		V _{dp}			V _{dmp}	ΔB_s		V _{Bs}	K _{ia}
				DIAMETER SERIES							
				8.9	0.1	2.3.4					
over	incl.	high	low	max	max	max	max	high	low	max	max
mm		μm		μm			μm	μm		μm	μm
2.5	10	0	-8	10	8	6	6	0	-120	15	10
10	18	0	-8	10	8	6	6	0	-120	20	10
18	30	0	-10	13	10	8	8	0	-120	20	13
30	50	0	-12	15	12	9	9	0	-120	20	15
50	80	0	-15	19	19	11	11	0	-150	25	20
80	120	0	-20	25	25	15	15	0	-200	25	25
120	180	0	-25	31	31	19	19	0	-250	30	30
150	250	0	-30	38	38	23	23	0	-300	30	40
250	315	0	-35	44	44	26	26	0	-350	35	50

Inter ring

d		Δ_{dmp}		V _{dp}			V _{dmp}	ΔB_s		V _{Bs}	K _{ia}
				DIAMETER SERIES							
				8.9	0.1	2.3.4					
over	incl.	high	low	max	max	max	max	high	low	max	max
mm		μm		μm			μm	μm		μm	μm
2.5	10	0	-7	9	7	5	5	0	-120	15	6
10	18	0	-7	9	7	5	5	0	-120	20	7
18	30	0	-8	10	8	6	6	0	-120	20	8
30	50	0	-10	13	10	8	8	0	-120	20	10
50	80	0	-12	15	15	9	9	0	-150	25	10
80	120	0	-15	19	19	11	11	0	-200	25	13

Outer ring

d		Δ_{Dmp}		V _{dp}			BEARINGS WITH SHIELDS OR SEALS*	V _{dmp}	$\Delta C_s'$	V _{Cs}	K _{ea}
				DIAMETER SERIES							
				8.9	0.1	2.3.4					
over	incl.	high	low	max	max	max	max			max	
mm		μm		μm			μm	μm			μm
6	18	0	-8	10	8	6	10	6		15	
18	30	0	-9	12	9	7	12	7	Values are identical to those for inner ring of same bearing ($\Delta B_s'$, V _{Bs})	15	
30	50	0	-11	14	11	8	16	8		20	
50	80	0	-13	16	13	10	20	10		25	
80	120	0	-15	19	19	11	26	11		35	
120	150	0	-18	23	23	14	30	14		40	
150	180	0	-25	31	31	19	38	19		45	
180	250	0	-30	38	38	23		23		50	
250	315	0	-35	44	44	26		26		60	
315	400	0	-40	50	50	30		30		70	
400	500	0	-45	56	56	34		34		80	

Outer ring

d		Δ_{Dmp}		V _{dp}			BEARINGS WITH SHIELDS OR SEALS*	V _{dmp}	$\Delta C_s'$	V _{Cs}	K _{ea}
				DIAMETER SERIES							
				8.9	0.1	2.3.4					
over	incl.	high	low	max	max	max	max			max	
mm		μm		μm			μm	μm			μm
6	18	0	-7	9	7	5	9	5	Values are identical to those for inner ring of same bearing ($\Delta B_s'$, V _{Bs})	8	
18	30	0	-8	10	8	6	10	6		9	
30	50	0	-9	11	9	7	13	7		10	
50	80	0	-11	14	11	8	16	8		13	
80	120	0	-13	16	16	10	20	10		13	
120	150	0	-15	19	19	11	25	11		18	

*Applies only to bearings of Diameter series 2, 3 and 4

*Applies only to bearings of Diameter series 0, 1, 2, 3 and 4

FlT Bearing Data - General

Bearings tolerances

Normal tolerances for taper roller bearings (metric sizes)

Inter ring and bearing width

d		Δdmp		Vdp	Vdmp	ΔBs		Kia	ΔTs		ΔT1s		ΔT2s	
over	incl.	high	low	max	max	high	low	max	high	low	high	low	high	low
mm		μm		μm	μm	μm		μm	μm		μm		μm	
10	18	0	-12	12	9	0	-120	15	+200	0	+100	0	+100	0
18	30	0	-12	12	9	0	-120	18	+200	0	+100	0	+100	0
30	50	0	-12	12	9	0	-120	20	+200	0	+100	0	+100	0
50	80	0	-15	15	11	0	-150	25	+200	0	+100	0	+100	0
80	120	0	-20	20	15	0	-200	30	+200	-200	+100	-100	+100	-100
120	180	0	-25	25	19	0	-250	35	+350	-250	+150	-150	+200	-100
180	250	0	-30	30	23	0	-300	50	+350	-250	+150	-150	+200	-100

Outer ring

D		ΔDmp		VDP	VDP	ΔCs	Kea
over	incl.	high	low	max	max	μm	μm
mm		μm		μm	μm	μm	μm
18	30	0	-12	12	9	Values are identical to those for inner ring of same bearing (ΔBs)	18
30	50	0	-14	14	11		20
50	80	0	-16	16	12		25
80	120	0	-18	18	14		35
120	150	0	-20	20	15		40
150	180	0	-25	25	19		45
180	250	0	-30	30	23		50
250	315	0	-35	35	26	60	
315	400	0	-40	40	30	70	

Bearings tolerances

Tolerance for thrust bearings

Shaft washer

d		TOLERANCE CLASS PO, P6			TOLERANCE CLASS	
over	incl.	ΔDmp		VDP	PO	P6
mm		high	low	max	Si*	Si*
		μm		μm	max	max
18	30	0	-8	6	10	5
30	50	0	-10	8	10	5
50	80	0	-12	9	10	6
80	120	0	-15	11	10	7
120	180	0	-20	15	15	8
180	250	0	-25	19	15	9
250	315	0	-30	23	20	10
315	400	0	-35	26	25	13
400	500	0	-40	30	30	15
500	630	0	-45	34	30	18
		0	-50	38	35	21

*For double direction bearings, the value for the single direction bearing having the same outside diameter applies

Housing washer

D		TOLERANCE CLASS			S _e
over	incl.	ΔDmp		VDP	
mm		high	low	max	
		μm		μm	
18	30	0	-13	10	Values are identical to those for inner ring of same bearing (Si)
30	50	0	-16	12	
50	80	0	-19	14	
80	120	0	-22	17	
120	180	0	-25	19	
180	250	0	-30	23	
250	315	0	-35	26	
315	400	0	-40	30	
400	500	0	-45	34	
500	630	0	-50	38	
630	800	0	-75	55	
800	1000	0	-100	75	

Tolerances of hardened carbon chromium steel balls (ISO 3290)

Internal Clearances

Radial internal clearance of deep groove ball bearings

GRADE	BALL DIAMETER		TOLERANCES				GAUGE INTERVAL	GAUGE MEAN VALUES (deviation range)					BORE DIAMETER		RADIAL INTERNAL CLEARANCE									
			D _w		V _{Dws}	t _{Dw}							R _s	V _{DwL}	I	d		C2		NORMAL		C3		C4
	over	incl.	max	max	max	max	μm	μm	μm	μm	μm	μm	μm	μm		μm	μm	μm	μm	μm	μm			
	mm		μm				μm	μm					mm		μm		μm		μm		μm		μm	
G3	-	12.7	0.08	0.08	0.012	0.13	0.5	-5...	-0.5	0	+0.5...	+5	2.5	10	0	7	2	13	8	23	14	29	20	37
G5	-	12.7	0.13	0.13	0.020	0.25	1	-5...	-1	0	+1...	+5	10	18	0	9	3	18	11	25	18	33	25	45
G10	-	25.4	0.25	0.25	0.025	0.5	1	-9...	-1	0	+1...	+9	18	24	0	10	5	20	13	28	20	36	28	48
G16	-	25.4	0.4	0.4	0.032	0.8	2	-10...	-2	0	+2...	+10	24	30	1	11	5	20	13	28	23	41	30	53
G20	-	25.4	0.5	0.5	0.040	1	2	-10...	-2	0	+2...	+10	30	40	1	11	6	20	15	33	28	46	40	64
G28	25.4	50.8	0.7	0.7	0.050	1.4	2	-12...	-2	0	+2...	+12	40	50	1	11	6	23	18	36	30	51	45	73
G40	-	101.6	1	1	0.080	2	4	-16...	-4	0	+4...	+16	50	65	1	15	8	28	23	43	38	61	55	90
G100	101.6	152.4	2.5	2.5	0.125	5	5	-20...	-5	0	+5...	+20	65	80	1	15	10	30	25	51	46	71	65	105
	152.4	175	2.5	2.5	0.125	5	10	-40...	-10	0	+10...	+40	80	100	1	18	12	36	30	58	53	84	75	120
G200	175	250	5	5	0.200	10	15	-60...	-15	0	+15...	+60	100	120	2	20	15	41	36	66	61	97	90	140
													120	140	2	23	18	48	41	81	71	114	105	160
													140	160	2	23	18	53	46	91	81	130	120	180
													160	180	2	25	20	61	53	102	91	147	135	200
													180	200	2	30	25	71	63	117	107	163	150	230
													200	225	4	32	28	82	73	132	120	187	175	255

FtT Bearing Data - General

Internal Clearances

Internal Clearances

Radial internal clearance of self-aligning ball bearings

Radial internal clearance of cylindrical roller bearings

BORE DIAMETER		RADIAL INTERNAL CLEARANCE								BORE DIAMETER		RADIAL INTERNAL CLEARANCE							
d		C2		NORMAL		C3		C4		d		C2		NORMAL		C3		C4	
over	incl.	min	max	min	max	min	max	min	max	over	incl.	min	max	min	max	min	max	min	max
mm		µm		µm		µm		µm		mm		µm		µm		µm		µm	
Bearings with cylindrical bore																			
2.5	6	1	8	5	15	10	20	15	25	-	24	0	25	20	45	35	60	50	75
6	10	2	9	6	17	12	25	19	33	24	30	0	25	20	45	35	60	50	75
10	14	2	10	6	19	13	26	21	35	30	40	5	30	25	50	45	70	60	85
14	18	3	12	8	21	15	28	23	37	40	50	5	35	30	60	50	80	70	100
18	24	4	14	10	23	17	30	25	39	50	65	10	40	40	70	60	90	80	110
24	30	5	16	11	24	19	35	29	46	65	80	10	45	40	75	65	100	90	125
30	40	6	18	13	29	23	40	34	53	80	100	15	50	50	85	75	110	105	140
40	50	6	19	14	31	25	44	37	57	100	120	15	55	50	90	85	125	125	165
50	65	7	21	16	36	30	50	45	69	120	140	15	60	60	105	100	145	145	190
65	80	8	24	18	40	35	60	54	83	140	160	20	70	70	120	115	165	165	215
80	100	9	27	22	48	42	70	64	96	160	180	25	75	75	125	120	170	170	220
100	120	10	31	25	56	50	83	75	114	180	200	35	90	90	145	140	195	195	250
120	140	10	38	30	68	60	100	90	135	200	225	45	105	105	165	160	220	220	280
Bearings with tapered bore																			
18	24	7	17	13	26	20	33	28	42	225	250	45	110	110	175	170	235	235	300
24	30	9	20	15	28	23	39	33	50	250	280	55	125	125	195	190	260	260	330
30	40	12	24	19	35	29	46	40	59	280	315	55	130	130	205	200	275	275	350
40	50	14	27	22	39	33	52	45	65	315	355	65	145	145	225	225	305	305	385
50	65	18	32	27	47	41	61	56	80	355	400	100	190	190	280	280	370	370	460
65	80	23	39	35	57	50	75	69	98	400	450	110	210	210	310	310	410	410	510
80	100	29	47	42	68	62	90	84	116	450	500	110	220	220	330	330	440	440	550
100	120	35	56	50	81	75	108	100	139	500	560	120	240	240	360	360	480	480	600

FlT Bearing Data - General

Internal Clearances

Internal Clearances

Radial internal clearance of spherical roller bearings with cylindrical bore

Radial internal clearance of spherical roller bearings with tapered bore

BORE DIAMETER		RADIAL INTERNAL CLEARANCE										BORE DIAMETER		RADIAL INTERNAL CLEARANCE									
d		C2		NORMAL		C3		C4		C5		d		C2		NORMAL		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max	over	incl.	min	max	min	max	min	max	min	max	min	max
mm		µm		µm		µm		µm		µm		mm		µm		µm		µm		µm		µm	
18	24	10	20	20	35	35	45	45	60	60	75	24	30	20	30	30	40	40	55	55	75	-	-
24	30	15	25	25	40	40	55	55	75	75	95	30	40	25	35	35	50	50	65	65	85	85	105
30	40	15	30	30	45	45	60	60	80	80	100	40	50	30	45	45	60	60	80	80	100	100	130
40	50	20	35	35	55	55	75	75	100	100	125	50	65	40	55	55	75	75	95	95	120	120	160
50	65	20	40	40	65	65	90	90	120	120	150	65	80	50	70	70	95	95	120	120	150	150	160
65	80	30	50	50	80	80	110	110	145	145	180	80	100	55	80	80	110	110	140	140	180	180	230
80	100	35	60	60	100	100	135	135	180	180	225	100	120	65	100	100	135	135	170	170	220	220	280
100	120	40	75	75	120	120	160	160	210	210	260	120	140	80	120	120	160	160	200	200	260	260	330
120	140	50	95	95	145	145	190	190	240	240	300	140	160	90	130	130	180	180	230	230	300	300	380
140	160	60	110	110	170	170	220	220	280	280	350	160	180	100	140	140	200	200	260	260	340	340	430
160	180	65	120	120	180	180	240	240	310	310	390	180	200	110	160	160	220	220	290	290	370	370	470
180	200	70	130	130	200	200	260	260	340	340	430	200	225	120	180	180	250	250	320	320	410	410	520
200	225	80	140	140	220	220	290	290	380	380	470	225	250	140	200	200	270	270	350	350	450	450	570
225	250	90	150	150	240	240	320	320	420	420	520	250	280	150	220	220	300	300	390	390	490	490	620
250	280	100	170	170	260	260	350	350	460	460	570	280	315	170	240	240	330	330	430	430	540	540	680
280	315	110	190	190	280	280	370	370	500	500	630	315	355	190	270	270	360	360	470	470	590	590	740
315	355	120	200	200	310	310	410	410	550	550	690	355	400	210	300	300	400	400	520	520	650	650	820
355	400	130	220	220	340	340	450	450	600	600	750	400	450	230	330	330	440	440	570	570	720	720	910
400	450	140	240	240	370	370	500	500	660	660	820	450	500	260	370	370	490	490	630	630	790	790	1000
450	500	140	260	260	410	410	550	550	720	720	900	500	560	290	410	410	540	540	680	680	870	870	1100
500	560	150	280	280	440	440	600	600	780	780	1000	560	630	320	460	460	600	600	760	760	980	980	1230
560	630	170	310	310	480	480	650	650	850	850	1100												
630	710	190	350	350	530	530	700	700	920	920	1190												
710	800	210	390	390	580	580	770	770	1010	1010	1300												



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