

SPHERICAL ROLLER BEARING DESIGNS



BR Conventional design with the feature of asymmetrical roller and two piece brass cage. It can be replaced by below mentioned designs.



C Features a stamped steel cage and strengthened symmetric roller. As a second generation design, these bearing designs are optimized to offer considerably higher load ratings than conventional designs for a broad range of applications and long service life.



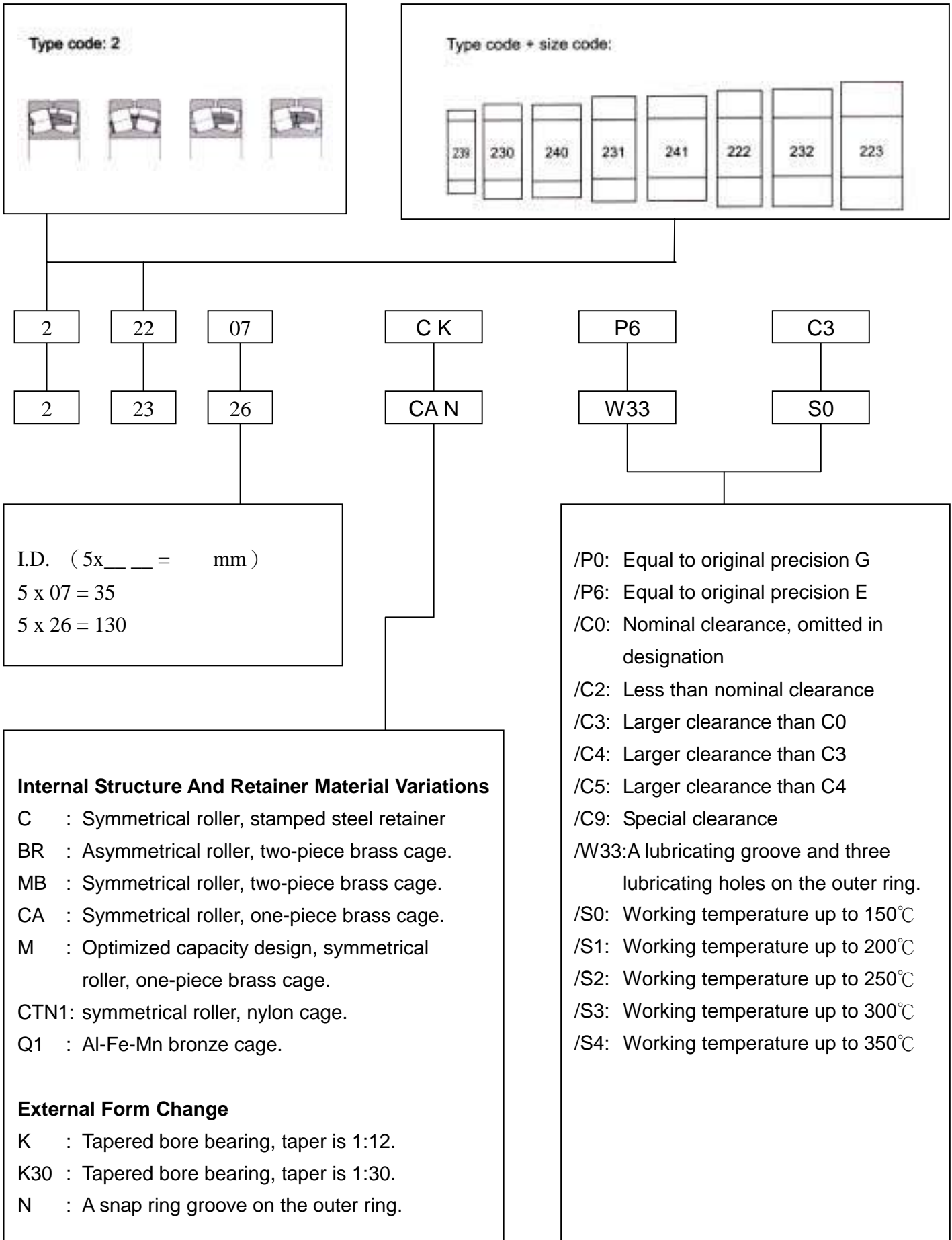
CA The alternative design of the second generation, these bearings feature a precision-machined brass cage and strengthened symmetric roller and are equivalent to C design in load ratings. They are used to exchange with C design, particularly for large sizes.



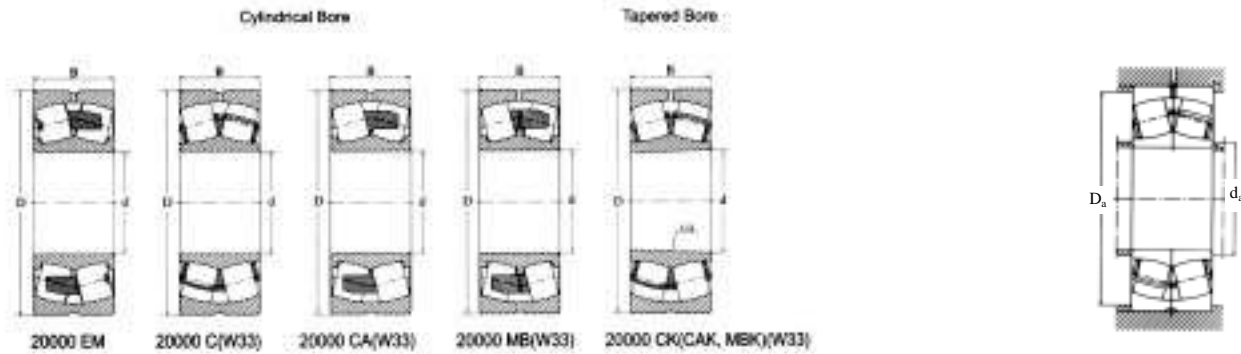
MB Features a two piece precision-machined brass cage. An improvement over the conventional BR design, these bearings incorporate strengthened symmetric rollers, and are equivalent to C design in load capacity.



EM Representing the third generation design with advanced Torrington technology, bearing rolling contact surfaces are completely optimized and have improved stress distribution. These products are made from the world's highest quality bearing materials and produced using high precision machine tool processes to offer world class service life.

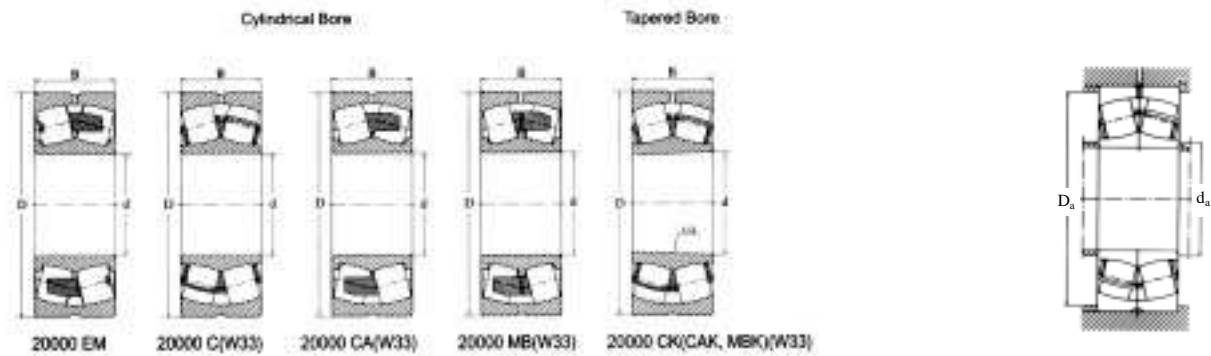


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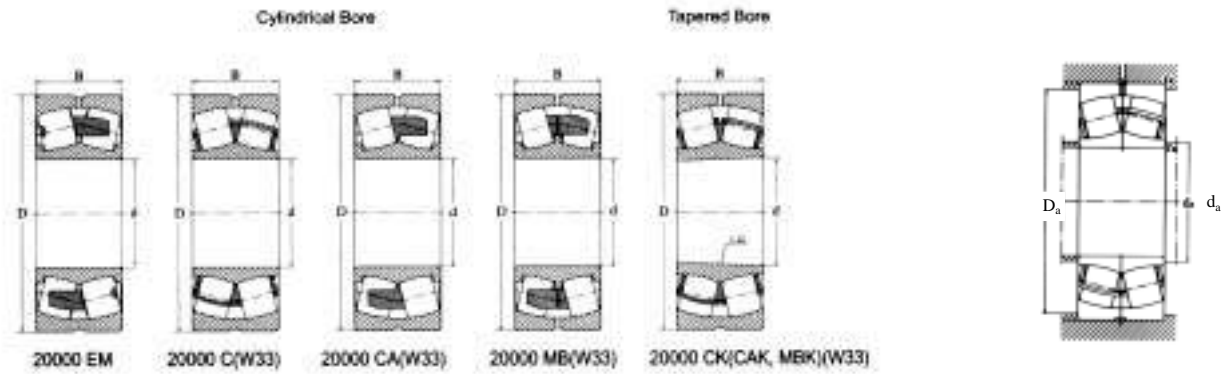
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	mm	mm	mm					
25	52	18	42.1	43.5	8100	11000	0.186	30	47	1	0.35	1.92	2.86	1.88	22205 CA
25	52	18	42.1	43.5	8100	11000	0.186	30	47	1	0.35	1.92	2.86	1.88	22205 CTN1
25	52	18	43.0	42.1	8100	11000	0.179	30	47	1	0.34	2.00	2.98	1.96	22205 EM
30	62	20	38.0	46.0	5100	6800	0.294	36	56	1	0.33	2.03	3.02	1.98	22206 BR
30	62	20	51.7	55.0	6800	9100	0.294	36	56	1	0.33	2.03	3.02	1.98	22206 CA
30	62	20	51.7	55.0	6800	9100	0.294	36	56	1	0.33	2.03	3.02	1.98	22206 C
30	62	20	51.7	55.0	6800	9100	0.294	36	56	1	0.33	2.03	3.02	1.98	22206 MB
30	62	20	55.2	56.8	6800	9100	0.286	36	56	1	0.31	2.15	3.02	2.10	22206 EM
35	72	23	50.0	62.0	4400	5900	0.447	42	65	1	0.33	2.03	3.20	1.98	22207 BR
35	72	23	67.0	73.9	5900	7800	0.447	42	65	1	0.33	2.03	3.02	1.98	22207 CA
35	72	23	67.0	73.9	5900	7800	0.447	42	65	1	0.33	2.03	3.02	1.98	22207 C
35	72	23	67.0	73.9	5900	7800	0.447	42	65	1	0.33	2.03	3.02	1.98	22207 MB
35	72	23	74.1	82.2	5900	7800	0.437	42	65	1	0.31	2.21	3.29	2.16	22207 EM
40	80	23	57.0	71.0	3900	5200	0.536	47	73	1	0.29	2.35	3.50	2.30	22208 BR
40	80	23	76.9	85.0	5200	6900	0.536	47	73	1	0.29	2.35	3.50	2.30	22208 CA
40	80	23	76.9	85.0	5200	6900	0.536	47	73	1	0.29	2.35	3.50	2.30	22208 C
40	80	23	76.9	85.0	5200	6900	0.536	47	73	1	0.29	2.35	3.50	2.30	22208 MB
40	80	23	85.4	93.4	5200	6900	0.525	47	73	1	0.27	2.47	3.67	2.41	22208 EM
40	90	33	85.0	107.0	3000	4000	1.030	47	82	1.5	0.39	1.75	2.61	1.71	22308 BR
40	90	33	115.0	127.0	4000	5300	1.030	48	82	1.5	0.39	1.75	2.61	1.71	22308 CA
40	90	33	115.0	127.0	4000	5300	1.030	48	82	1.5	0.39	1.75	2.61	1.71	22308 C
40	90	33	115.0	127.0	4000	5300	1.030	48	82	1.5	0.39	1.75	2.61	1.71	22308 MB
40	90	33	132.0	147.0	4000	5300	1.020	48	82	1.5	0.36	1.87	2.79	1.83	22308 EM
45	85	23	60.0	77.0	3700	4900	0.597	52	78	1	0.27	2.50	3.72	2.44	22209 BR
45	85	23	80.5	91.9	4900	6500	0.597	52	78	1	0.27	2.50	3.72	2.44	22209 CA
45	85	23	80.5	91.9	4900	6500	0.597	52	78	1	0.27	2.50	3.72	2.44	22209 C
45	85	23	80.5	91.9	4900	6500	0.597	52	78	1	0.27	2.50	3.72	2.44	22209 MB
45	85	23	89.6	101.0	4900	6500	0.585	52	78	1	0.26	2.64	3.93	2.58	22209 EM
45	100	36	108.0	141.0	2700	3600	1.430	53	92	1.5	0.39	1.71	2.54	1.67	22309 BR
45	100	36	146.0	168.0	3600	4800	1.430	53	92	1.5	0.39	1.71	2.54	1.67	22309 CA
45	100	36	146.0	168.0	3600	4800	1.430	53	92	1.5	0.39	1.71	2.54	1.67	22309 C
45	100	36	146.0	168.0	3600	4800	1.430	53	92	1.5	0.39	1.71	2.54	1.67	22309 MB
45	100	36	162.0	182.0	3600	4800	1.420	53	92	1.5	0.36	1.90	2.83	1.86	22309 EM
50	90	23	61.0	82.0	3400	4500	0.641	57	83	1	0.25	2.71	4.04	2.65	22210 BR
50	90	23	83.1	97.8	4500	6000	0.641	57	83	1	0.25	2.71	4.04	2.65	22210 CA

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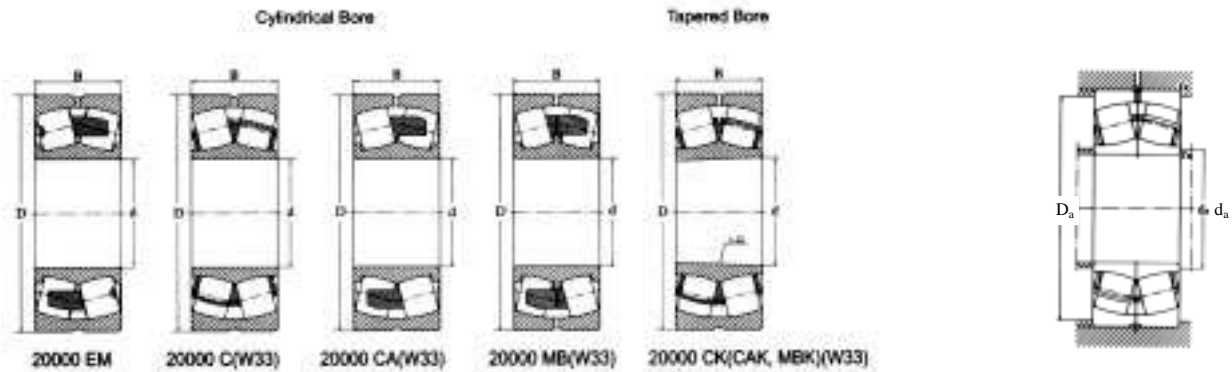
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	mm	mm	mm					
50	90	23	83.1	97.8	4500	6000	0.641	57	83	1	0.25	2.71	4.04	2.65	22210 C
50	90	23	83.1	97.8	4500	6000	0.641	57	83	1	0.25	2.71	4.04	2.65	22210 MB
50	90	23	96.5	112.0	4500	6000	0.629	57	83	1	0.24	2.84	4.23	2.78	22210 EM
50	110	40	134.0	175.0	2400	3200	1.87	59	101	2	0.38	1.78	2.65	1.74	22310 BR
50	110	40	181.0	208.0	3200	4300	1.87	59	101	2	0.38	1.78	2.65	1.74	22310 CA
50	110	40	181.0	208.0	3200	4300	1.87	59	101	2	0.38	1.78	2.65	1.74	22310 C
50	110	40	181.0	208.0	3200	4300	1.87	59	101	2	0.38	1.78	2.65	1.74	22310 MB
50	110	40	197.0	226.0	3200	4300	1.85	59	101	2	0.36	1.87	2.79	1.83	22310 EM
55	100	25	75.0	100.0	3100	4100	0.849	63	92	1.5	0.26	2.64	3.93	2.58	22211 BR
55	100	25	102.0	119.0	4100	5400	0.849	63	92	1.5	0.26	2.64	3.93	2.58	22211 CA
55	100	25	102.0	119.0	4100	5400	0.849	63	92	1.5	0.26	2.64	3.93	2.58	22211 C
55	100	25	102.0	119.0	4100	5400	0.849	63	92	1.5	0.26	2.64	3.93	2.58	22211 MB
55	100	25	120.0	142.0	4100	5400	0.835	63	92	1.5	0.23	2.95	4.40	2.89	22211 EM
55	120	43	158.0	208.0	2300	2900	2.43	65	110	2	0.37	1.80	2.69	1.76	22311 N
55	120	43	213.0	248.0	3000	3900	2.43	65	110	2	0.37	1.80	2.69	1.76	22311 CA
55	120	43	213.0	248.0	3000	3900	2.43	65	110	2	0.37	1.80	2.69	1.76	22311 C
55	120	43	213.0	248.0	3000	3900	2.43	65	110	2	0.37	1.80	2.69	1.76	22311 MB
55	120	43	233.0	267.0	3000	3900	2.4	65	110	2	0.36	1.87	2.79	1.83	22311 EM
60	110	28	94.0	129.0	2800	3700	1.200	68	102	1.5	0.25	2.71	4.04	2.65	22212 BR
60	110	28	127.0	154.0	3700	4900	1.200	68	102	1.5	0.25	2.71	4.04	2.65	22212 CA
60	110	28	127.0	154.0	3700	4900	1.200	68	102	1.5	0.25	2.71	4.04	2.65	22212 C
60	110	28	127.0	154.0	3700	4900	1.200	68	102	1.5	0.25	2.71	4.04	2.65	22212 MB
60	110	28	140.0	164.0	3700	4900	1.190	68	102	1.5	0.24	2.84	4.23	2.78	22212 EM
60	130	46	180.0	239.0	2000	2700	3.01	70	120	2.1	0.37	1.80	2.69	1.76	22312 BR
60	130	46	243.0	284.0	2700	3600	3.01	70	120	2.1	0.37	1.80	2.69	1.76	22312 CA
60	130	46	243.0	284.0	2700	3600	3.01	70	120	2.1	0.37	1.80	2.69	1.76	22312 C
60	130	46	243.0	284.0	2700	3600	3.01	70	120	2.1	0.37	1.80	2.69	1.76	22312 MB
60	130	46	269.0	312.0	2700	3600	2.98	70	120	2.1	0.35	1.95	2.90	1.91	22312 EM
65	120	31	112.0	158.0	2600	3500	1.610	74	111	1.5	0.27	2.49	3.71	2.43	22213 BR
65	120	31	151.0	188.0	3400	4600	1.610	74	111	1.5	0.27	2.49	3.71	2.43	22213 CA
65	120	31	151.0	188.0	3400	4600	1.610	74	111	1.5	0.27	2.49	3.71	2.43	22213 C
65	120	31	151.0	188.0	3400	4600	1.610	74	111	1.5	0.27	2.49	3.71	2.43	22213 MB
65	120	31	170.0	204.0	3400	4600	1.590	74	111	1.5	0.24	2.79	4.15	2.73	22213 EM
65	140	48	186.0	244.0	1900	2600	3.53	76	129	2.1	0.35	1.92	2.86	1.88	22313 BR
65	140	48	251.0	291.0	2500	3400	3.53	76	129	2.1	0.35	1.92	2.86	1.88	22313 CA

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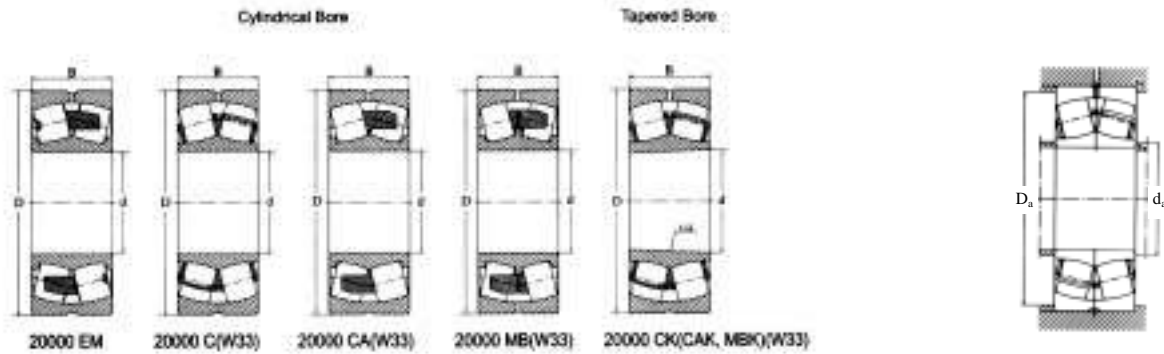
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	mm	mm	mm					
65	140	48	251.0	291.0	2500	3400	3.53	76	129	2.1	0.35	1.92	2.86	1.88	22313 C
65	140	48	251.0	291.0	2500	3400	3.53	76	129	2.1	0.35	1.92	2.86	1.88	22313 MB
65	140	48	290.0	333.0	2500	3400	3.51	76	129	2.1	0.33	2.06	3.06	2.01	22313 EM
70	125	31	115.0	162.0	2400	3200	1.68	79	116	1.5	0.24	2.83	4.21	2.77	22214 BR
70	125	31	155.0	193.0	3200	4300	1.68	79	116	1.5	0.24	2.83	4.21	2.77	22214 CA
70	125	31	155.0	193.0	3200	4300	1.68	79	116	1.5	0.24	2.83	4.21	2.77	22214 C
70	125	31	155.0	193.0	3200	4300	1.68	79	116	1.5	0.24	2.83	4.21	2.77	22214 MB
70	125	31	177.0	219.0	3200	4300	1.66	79	116	1.5	0.22	3.01	4.48	2.94	22214 EM
70	150	51	222.0	304.0	1800	2300	4.37	81	139	2.1	0.35	1.95	2.91	1.91	22314 BR
70	150	51	300.0	362.0	2400	3100	4.37	81	139	2.1	0.35	1.95	2.91	1.91	22314 CA
70	150	51	300.0	362.0	2400	3100	4.37	81	139	2.1	0.35	1.95	2.91	1.91	22314 C
70	150	51	300.0	362.0	2400	3100	4.37	81	139	2.1	0.35	1.95	2.91	1.91	22314 MB
70	150	51	331.0	385.0	2400	3100	4.32	81	139	2.1	0.34	2.00	2.98	1.96	22314 EM
75	130	31	119.0	171.0	2300	3100	1.77	84	121	1.5	0.25	2.74	4.08	2.68	22215 BR
75	130	31	161.0	204.0	3100	4100	1.77	84	121	1.5	0.25	2.74	4.08	2.68	22215 CA
75	130	31	161.0	204.0	3100	4100	1.77	84	121	1.5	0.25	2.74	4.08	2.68	22215 C
75	130	31	161.0	204.0	3100	4100	1.77	84	121	1.5	0.25	2.74	4.08	2.68	22215 MB
75	130	31	183.0	228.0	3100	4100	1.75	84	121	1.5	0.22	3.14	4.67	3.07	22215 EM
75	160	55	260.0	367.0	1700	2200	5.50	87	148	2.1	0.36	1.87	2.79	1.83	22315 BR
75	160	55	351.0	437.0	2200	2900	5.50	87	148	2.1	0.36	1.87	2.79	1.83	22315 CA
75	160	55	351.0	437.0	2200	2900	5.50	87	148	2.1	0.36	1.87	2.79	1.83	22315 C
75	160	55	351.0	437.0	2200	2900	5.50	87	148	2.1	0.36	1.87	2.79	1.83	22315 MB
75	160	55	387.0	455.0	2200	2900	5.45	87	148	2.1	0.34	2.00	2.98	1.96	22315 EM
80	140	33	129.0	189.0	2200	2900	2.20	90	130	2	0.22	3.01	4.48	2.94	22216 BR
80	140	33	174.0	225.0	2900	3800	2.20	90	130	2	0.22	3.01	4.48	2.94	22216 CA
80	140	33	174.0	225.0	2900	3800	2.20	90	130	2	0.22	3.01	4.48	2.94	22216 C
80	140	33	174.0	225.0	2900	3800	2.20	90	130	2	0.22	3.01	4.48	2.94	22216 MB
80	140	33	210.0	263.0	2900	3800	2.18	90	130	2	0.22	3.14	4.67	3.07	22216 EM
80	170	58	292.0	417.0	1600	2100	6.54	92	158	2.1	0.36	1.87	2.79	1.83	22316 BR
80	170	58	395.0	496.0	2100	2800	6.54	92	158	2.1	0.36	1.87	2.79	1.83	22316 CA
80	170	58	395.0	496.0	2100	2800	6.54	92	158	2.1	0.36	1.87	2.79	1.83	22316 C
80	170	58	395.0	496.0	2100	2800	6.54	92	158	2.1	0.36	1.87	2.79	1.83	22316 MB
80	170	58	427.0	510.0	2100	2800	6.49	92	158	2.1	0.34	2.00	2.98	1.96	22316 EM
85	150	36	60.0	233.0	2000	2700	2.73	95	140	2	0.23	2.95	4.40	2.89	22217 BR
85	150	36	216.0	277.0	2700	3600	2.73	95	140	2	0.23	2.95	4.40	2.89	22217 CA

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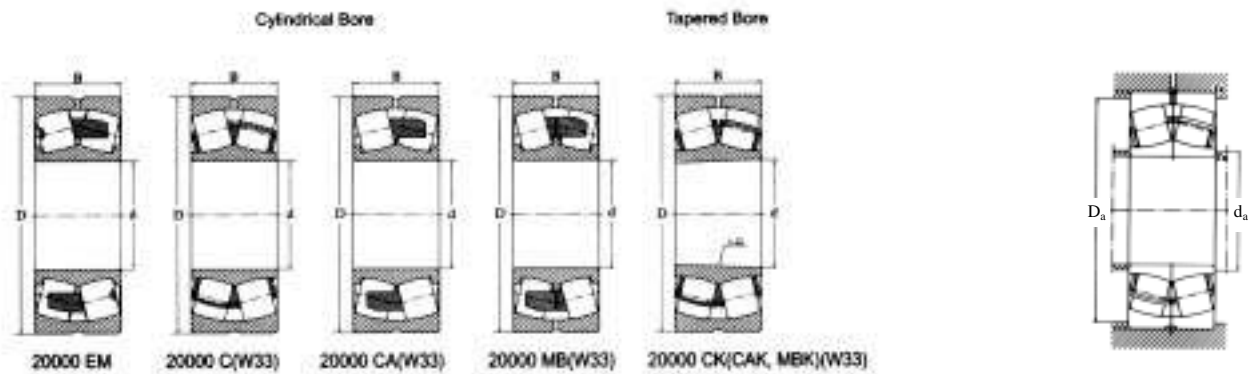
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C_r	Cor	Grease	Oil	wt	d_a	D_a	r_a	e	Y_1	Y_2	Y_0	
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max					
85	150	36	216.0	277.0	2700	3600	2.73	95	140	2	0.23	2.95	4.40	2.89	22217 C
85	150	36	216.0	277.0	2700	3600	2.73	95	140	2	0.23	2.95	4.40	2.89	22217 MB
85	150	36	244.0	302.0	2700	3600	2.68	95	140	2	0.22	3.07	4.57	3.00	22217 EM
85	180	60	319.0	453.0	1500	2000	7.42	97	168	3	0.34	2.01	3.00	1.97	22317 BR
85	180	60	431.0	539.0	2000	2600	7.42	97	168	3	0.34	2.01	3.00	1.97	22317 CA
85	180	60	431.0	539.0	2000	2600	7.42	97	168	3	0.34	2.01	3.00	1.97	22317 C
85	180	60	431.0	539.0	2000	2600	7.42	97	168	3	0.34	2.01	3.00	1.97	22317 MB
85	180	60	474.0	591.0	200	2600	7.36	97	168	3	0.32	2.09	3.11	2.04	22317 EM
90	140	50	229.0	386.0	1600	2200	2.89	99	131	1.5	0.32	2.09	3.11	2.04	24018 CA
90	160	40	186.0	279.0	1900	2500	3.47	101	149	2	0.23	2.90	4.31	2.83	22218 BR
90	160	40	252.0	332.0	2500	3300	3.47	101	149	2	0.23	2.90	4.31	2.83	22218 CA
90	160	40	252.0	332.0	2500	3300	3.47	101	149	2	0.23	2.90	4.31	2.83	22218 C
90	160	40	252.0	332.0	2500	3300	3.47	101	149	2	0.23	2.90	4.31	2.83	22218 MB
90	160	40	303.0	388.0	2500	3300	3.42	101	149	2	0.23	2.90	4.31	2.83	22218 EM
90	160	52.4	316.0	453.0	1600	2200	4.64	101	149	2	0.33	2.07	3.09	2.03	23218 CA
90	160	52.4	316.0	453.0	1600	2200	4.64	101	149	2	0.33	2.07	3.09	2.03	23218 MB
90	160	52.4	369.0	500.0	1600	2200	4.62	101	149	2	0.30	2.25	3.34	2.20	23218 EM
90	190	64	360.0	523.0	1400	1900	8.87	103	177	3	0.34	1.98	2.94	1.93	22318 BR
90	190	64	486.0	623.0	1900	2500	8.87	103	177	3	0.34	1.98	2.94	1.93	22318 CA
90	190	64	486.0	623.0	1900	2500	8.87	103	177	3	0.34	1.98	2.94	1.93	22318 C
90	190	64	486.0	623.0	1900	2500	8.87	103	177	3	0.34	1.98	2.94	1.93	22318 MB
90	190	64	529.0	638.0	1900	2500	8.91	103	177	3	0.33	2.06	3.06	2.01	22318 EM
95	170	43	202.0	302.0	1800	2400	4.32	106	159	2.1	0.26	2.64	3.93	2.59	22219 BR
95	170	43	273.0	359.0	2400	3200	4.32	106	159	2.1	0.26	2.64	3.93	2.58	22219 CA
95	170	43	273.0	359.0	2400	3200	4.32	106	159	2.1	0.26	2.64	3.93	2.58	22219 C
95	170	43	273.0	359.0	2400	3200	4.32	106	159	2.1	0.26	2.64	3.93	2.58	22219 MB
95	170	43	334.0	431.0	2400	3200	4.27	106	159	2.1	0.24	2.79	4.15	2.73	22219 EM
95	200	67	395.0	576.0	1400	1700	10.4	108	187	3	0.35	1.92	2.86	1.88	22319 BR
95	200	67	534.0	686.0	1800	2300	10.40	108	187	3	0.35	1.92	2.86	1.88	22319 CA
95	200	67	534.0	686.0	1800	2300	10.40	108	187	3	0.35	1.92	2.86	1.88	22319 C
95	200	67	534.0	686.0	1800	2300	10.40	108	187	3	0.35	1.92	2.86	1.88	22319 MB
95	200	67	580.0	735.0	1800	2300	10.30	108	187	3	0.32	2.09	3.11	2.04	22319 EM
100	150	50	242.0	425.0	1500	2000	3.15	109	141	1.5	0.30	2.23	3.32	2.18	24020 CA
100	165	52	326.0	490.0	1700	2000	4.39	111	154	2	0.31	2.21	3.29	2.16	23120 CA
100	165	52	326.0	490.0	1700	2200	4.39	111	154	2	0.31	2.21	3.29	2.16	23120 MB

SPHERICAL ROLLER BEARINGS



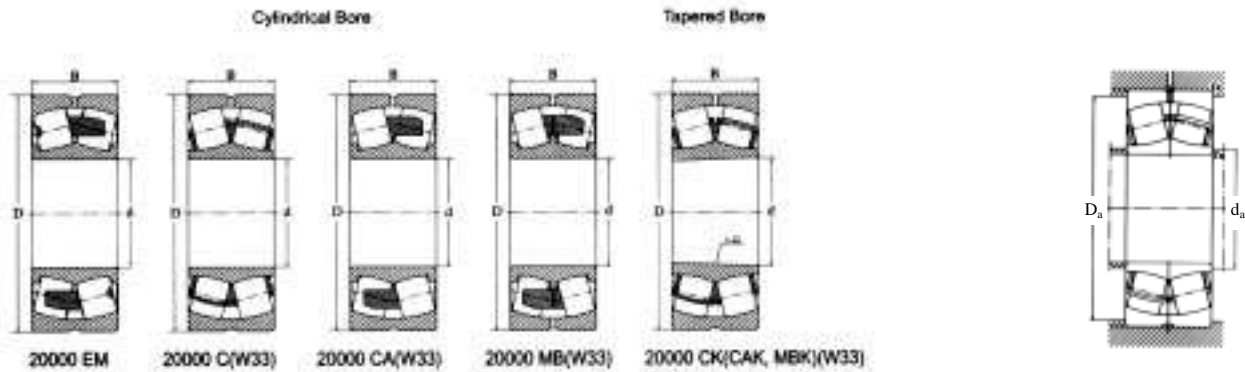
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	mm	mm	mm					
100	165	52	379	575	1700	2200	4.37	111	154	2	0.28	2.39	3.56	2.34	23120 EM
100	180	46	235	355	1700	2300	5.1	112	168	2.1	0.26	2.55	3.8	2.5	22220 BR
100	180	46	317	423	2200	3000	5.1	112	168	2.1	0.26	2.55	3.8	2.5	22220 CA
100	180	46	317	423	2200	3000	5.1	112	168	2.1	0.26	2.55	3.8	2.5	22220 CA
100	180	46	317	423	2200	3000	5.1	112	168	2.1	0.26	2.55	3.8	2.5	22220 MB
100	180	46	373	484	2200	3000	5.04	112	168	2.1	0.24	2.84	4.23	2.78	22220 EM
100	180	60.3	405	589	1500	1900	6.81	112	168	2.1	0.33	2.03	3.02	1.98	23220 CA
100	180	60.3	405	589	1500	1900	6.81	112	168	2.1	0.33	2.03	3.02	1.98	23220 MB
100	215	73	613	799	1600	2200	13.3	114	201	3	0.35	1.91	2.85	1.87	22320 CA
100	215	73	454	697	1200	1700	13.3	114	201	3	0.35	1.91	2.85	1.87	22320 BR
100	215	73	613	799	1600	2200	13.3	114	201	3	0.35	1.91	2.85	1.87	22320 CA
100	215	73	613	799	1600	2200	13.3	114	201	3	0.35	1.91	2.85	1.87	22320 MB
100	215	73	653	824	1600	2200	13.2	114	201	3	0.34	1.98	2.94	1.93	22320 EM
110	170	45	304	489	1900	2500	3.79	120	160	2	0.25	2.67	3.97	2.61	23022 CA
110	170	45	304	489	1900	2500	3.79	120	160	2	0.25	2.67	3.97	2.61	23022 CA
110	170	45	304	489	1900	2500	3.79	120	160	2	0.25	2.67	3.97	2.61	23022 MB
110	170	45	329	505	1900	2500	3.77	120	160	2	0.23	2.95	4.4	2.89	23022 EM
110	170	60	294	506	1300	1800	5.04	120	160	2	0.32	2.12	3.15	2.07	24022 CA
110	180	56	382	596	1500	2000	5.72	121	169	2	0.29	2.32	3.45	2.26	23122 CA
110	180	56	382	596	1500	2000	5.72	121	169	2	0.29	2.32	3.45	2.26	23122 MB
110	180	56	433	654	1500	2000	5.7	121	169	2	0.28	2.43	3.61	2.37	23122 EM
110	180	69	462	758	1200	1500	7.15	121	169	2	0.36	1.89	2.81	1.84	24122 CA
110	200	53	306	482	1500	2000	7.69	123	187	2.1	0.26	2.55	3.8	2.5	22222 BR
110	200	53	414	574	2000	2700	7.69	123	187	2.1	0.26	2.55	3.8	2.5	22222 CA
110	200	53	414	574	2000	2700	7.69	123	187	2.1	0.26	2.55	3.8	2.5	22222 CA
110	200	53	414	574	2000	2700	7.69	123	187	2.1	0.25	2.55	3.8	2.5	22222 MB
110	200	53	475	627	2000	2700	7.63	123	187	2.1	0.25	2.69	4	2.63	22222 EM
110	200	69.8	528	786	1300	1800	9.79	123	187	2.1	0.34	2	2.97	1.95	23222 CA
110	200	69.8	528	786	1300	1800	9.79	123	187	2.1	0.34	2	2.97	1.95	23222 MB
110	200	69.8	597	853	1300	1800	9.76	123	187	2.1	0.32	2.12	3.15	2.07	23222 EM
110	240	80	536	769	1100	1500	18.3	125	225	3	0.35	1.91	2.85	1.87	22322 BR
110	240	80	724	915	1500	2000	18.3	125	225	3	0.35	1.91	2.85	1.87	22322 CA
110	240	80	724	915	1500	2000	18.3	125	225	3	0.35	1.91	2.85	1.87	22322 MB
110	240	80	771	951	1500	2000	18.1	125	225	3	0.32	2.09	3.11	2.04	22322 EM
120	180	48	317	514	1700	2300	4.1	131	169	2	0.24	2.79	4.15	2.73	23024 CA

SPHERICAL ROLLER BEARINGS



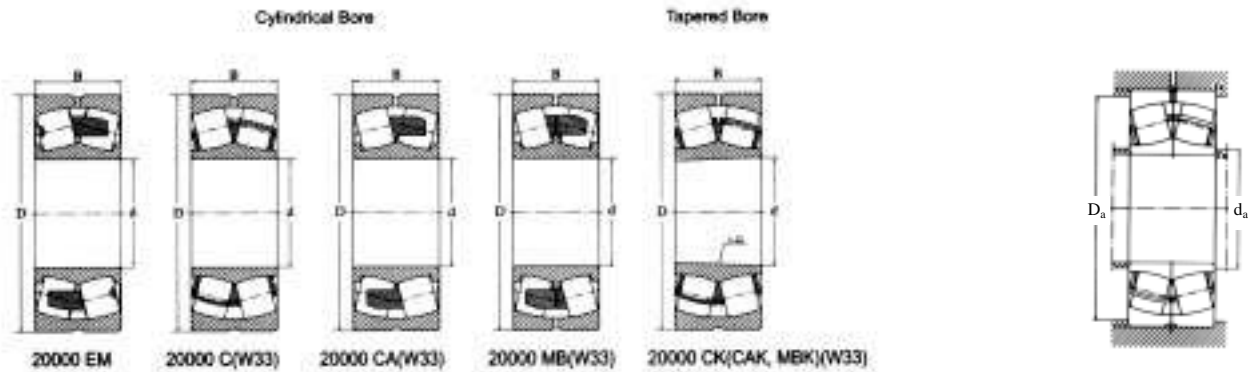
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a	D _a	r _a	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max					
120	180	46	317	514	1700	2300	4.10	131	169	2	0.24	2.79	4.16	2.73	23024 MB
120	180	46	353	564	1700	2300	4.07	131	169	2	0.22	3.14	2.67	3.07	23024 EM
120	180	60	386	573	1200	1700	5.40	131	169	2	0.30	2.26	3.37	2.21	24024 CA
120	200	62	468	726	1400	1900	8.01	132	188	2	0.30	2.25	3.34	2.20	23124 CA
120	200	62	468	726	1400	1900	8.01	132	188	2	0.30	2.25	3.34	2.20	23124 MB
120	200	62	524	803	1400	1900	7.98	132	188	2	0.28	2.43	3.61	2.37	23124 EM
120	200	80	601	994	1100	1400	10.20	132	188	2	0.39	1.74	2.59	1.70	24124 CA
120	215	58	351	559	1400	1900	9.06	133	202	2.1	0.27	2.49	3.71	2.43	22224 BR
120	215	58	488	666	1900	2500	9.06	133	202	2.1	0.27	2.49	3.71	2.43	22224 CA
120	215	58	488	666	1900	2500	9.06	133	202	2.1	0.27	2.49	3.71	2.43	22224 MB
120	215	58	543	735	1900	2500	8.94	133	202	2.1	0.25	2.74	4.08	2.68	22224 EM
120	215	76	592	904	1200	1600	12.10	133	202	2.1	0.34	1.98	2.94	1.93	23224 CA
120	215	76	592	904	1200	1600	12.10	133	202	2.1	0.34	1.98	2.94	1.93	23224 MB
120	260	86	628	949	1100	1400	23.40	136	244	3	0.34	1.96	2.92	1.92	22324 BR
120	260	86	848	1130	1400	1800	23.40	136	244	3	0.34	1.96	2.92	1.92	22324 CA
120	260	86	848	1130	1400	1800	23.40	136	244	3	0.34	1.96	2.92	1.92	22324 MB
120	260	86	929	1260	1400	1800	23.20	136	244	3	0.32	2.09	3.11	2.04	22324 EM
130	200	52	401	660	1600	2100	6.02	142	188	2	0.25	2.71	4.04	2.65	23026 CA
130	200	52	401	660	1600	2100	6.02	142	188	2	0.25	2.71	4.04	2.65	23026 MB
130	200	52	446	703	1600	2100	5.99	142	88	2	0.22	3.01	4.48	2.94	23026 EM
130	200	69	484	841	1100	1500	8.16	142	188	2	0.31	2.15	3.20	2.10	24026 CA
130	210	64	512	798	1300	1800	8.75	142	198	2	0.28	2.40	3.58	2.35	23126 CA
130	210	64	512	798	1300	1800	8.75	142	198	2	0.28	2.40	3.58	2.35	23126 MB
130	210	64	562	888	1300	1800	8.69	142	198	2	0.27	2.51	3.74	2.45	23126 EM
130	210	80	597	1020	980	1300	11.10	142	198	2	0.35	1.94	2.88	1.89	24126 CA
130	230	64	428	675	1400	1700	11.20	144	216	3	0.28	2.43	3.61	2.37	22226 BR
130	230	64	579	804	1800	2300	11.20	144	216	3	0.28	2.43	3.61	2.37	22226 CA
130	230	64	579	804	1800	2300	11.20	144	216	3	0.28	2.43	3.61	2.37	22226 MB
130	230	64	640	879	1800	2300	11.10	144	216	3	0.25	2.69	4.00	2.63	22226 EM
130	230	80	670	1020	1100	1500	14.30	144	216	3	0.34	1.99	2.96	1.94	23226 CA
130	230	80	670	1020	1100	1500	14.30	144	216	3	0.34	1.99	2.96	1.94	23226 MB
130	280	93	720	1110	1000	1300	28.50	147	263	4	0.35	1.95	2.90	1.91	22326 BR
130	280	93	978	1320	1300	1700	28.50	147	263	4	0.35	1.95	2.90	1.91	22326 CA
130	280	93	978	1320	1300	1700	28.50	147	263	4	0.35	1.95	2.90	1.91	22326 MB
130	280	93	1050	1370	1300	1700	28.20	147	263	4	0.35	2.06	3.06	2.01	22326 EM

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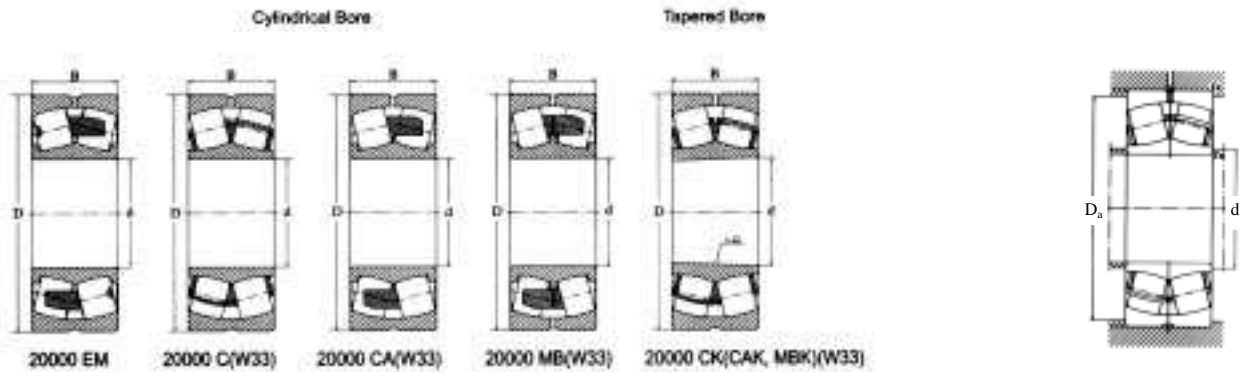
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a	D _a	r _a	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max					
140	210	53	415	689	1500	2000	6.43	152	198	2	0.24	2.81	4.19	2.75	23028 CA
140	210	53	415	689	1500	2000	6.43	152	198	2	0.24	2.81	4.19	2.75	23028 MB
140	210	53	472	764	1500	2000	6.37	152	198	2	0.22	3.14	4.67	3.07	23028 EM
140	210	69	495	865	1100	1400	8.42	152	198	2	0.29	2.3	3.42	2.25	24028 CA
140	225	68	546	876	1200	1600	10.7	153	212	2.1	0.28	2.39	3.56	2.34	23128 CA
140	225	68	546	876	1200	1600	10.7	153	212	2.1	0.28	2.39	3.56	2.34	23128 MB
140	225	68	636	1010	1200	1600	10.6	153	212	2.1	0.26	2.55	3.8	2.5	23128 EM
140	225	85	634	1100	920	1200	13.1	153	212	2.1	0.35	1.94	2.88	1.89	24128 CA
140	250	68	656	920	1600	2200	14.3	155	235	3	0.27	2.49	3.71	2.43	22228 CA
140	250	68	656	920	1600	2200	14.3	155	235	3	0.27	2.49	3.71	2.43	22228 MB
140	250	68	719	984	1600	2200	14.2	155	235	3	0.25	2.74	4.08	2.68	22228 EM
140	250	88	818	1230	1000	1400	18.9	155	235	3	0.35	1.92	2.85	1.87	23228 CA
140	250	88	818	1230	1000	1400	18.9	155	235	3	0.35	1.92	2.85	1.87	23228 MB
140	300	102	840	1300	900	1200	35.9	158	262	4	0.35	1.91	2.85	1.87	22328 BR
140	300	102	1140	1550	1200	1600	35.9	158	282	4	0.35	1.91	2.85	1.87	22328 CA
140	300	102	1140	1550	1200	1600	35.9	158	282	4	0.35	1.91	2.85	1.87	22328 MB
140	300	102	1220	1680	1200	1600	35.5	158	282	4	0.33	2.03	3.02	1.98	22328 EM
150	225	56	467	789	1400	1900	7.81	162	213	2.1	0.24	2.84	4.23	2.78	23030 CA
150	225	56	467	789	1400	1900	7.81	162	213	2.1	0.24	2.84	4.23	2.78	23030 MB
150	225	56	522	872	1400	1900	7.74	162	213	2.1	0.21	3.2	4.77	3.13	23030 EM
150	225	75	564	1010	990	1300	10.5	162	213	2.1	0.30	2.26	3.37	2.21	24030 CA
150	250	80	716	1150	1100	1500	16.2	164	236	2.1	0.31	2.16	3.22	2.12	23130 CA
150	250	80	716	1150	1100	1500	16.2	164	236	2.1	0.31	2.16	3.22	2.12	23130 MB
150	250	80	838	1320	1100	1500	16.1	164	236	2.1	0.29	2.35	3.5	2.3	23130 EM
150	250	100	891	1520	840	1100	20.2	164	236	2.1	0.37	1.83	2.72	1.79	24130 CA
150	270	73	560	890	1100	1500	18.1	165	255	3	0.27	2.49	3.71	2.43	22230 BR
150	270	73	750	1060	1500	2000	18.1	165	255	3	0.27	2.49	3.71	2.43	22230 CA
150	270	73	750	1060	1500	2000	18.1	165	255	3	0.27	2.49	3.71	2.43	22230 MB
150	270	73	854	1200	1500	2000	17.9	165	255	3	0.25	2.74	4.08	2.68	22230 EM
150	270	96	925	1450	980	1300	24.3	165	255	3	0.36	1.87	2.79	1.83	23230 CA
150	270	96	925	1450	980	1300	24.3	165	255	3	0.36	1.87	2.79	1.83	23230 MB
150	270	96	1060	1590	980	1300	24.1	165	255	3	0.33	2.03	3.02	1.98	23230 EM
150	320	108	940	1470	800	1100	43.7	168	302	4	0.35	1.92	2.86	1.88	22330 BR
150	320	108	1270	1750	1100	1500	43.7	168	302	4	0.35	1.92	2.86	1.88	22330 CA
150	320	108	1270	1750	1100	1500	43.7	168	302	4	0.35	1.92	2.86	1.88	22330 MB

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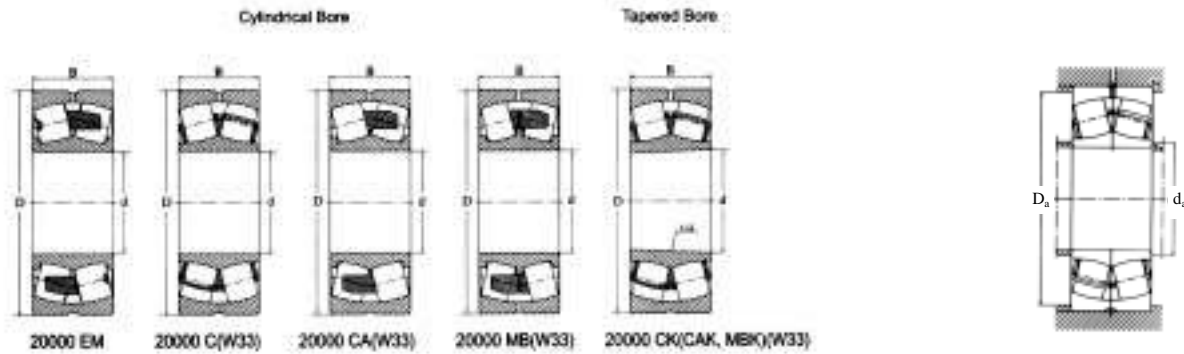
Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number	
d	D	B	C _r	Cor	Grease	Oil	wt	d _a	D _a	r _a	e	Y ₁	Y ₂	Y ₀		
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max						
150	320	108	1380	1850	1100	1500	43.3	168	302	2.1	0.34	2	2.98	1.96	22330	EM
160	240	60	538	917	1300	1700	9.56	173	227	2.1	0.24	2.84	4.23	2.78	23032	CA
160	240	60	538	917	1300	1700	9.56	173	227	2.1	0.24	2.84	4.23	2.78	23032	MB
160	240	60	592	979	1300	1700	9.43	173	227	2.1	0.21	3.2	4.77	3.13	23032	EM
160	240	80	655	1180	930	1200	13	173	227	2.1	0.3	2.26	3.37	2.21	23132	CA
160	270	86	841	1370	1000	1400	20.8	175	255	2.1	0.31	2.16	3.22	2.12	23132	CA
160	270	86	841	1370	1000	1400	20.8	175	255	2.1	0.31	2.16	3.22	2.12	23132	MB
160	270	86	968	1560	1000	1400	20.6	175	255	2.1	0.29	2.35	3.5	2.3	24132	EM
160	270	109	1050	1810	780	1000	26.1	175	255	3	0.39	1.74	2.59	1.7	22232	CA
160	290	80	650	1020	1100	1400	22.8	176	274	3	0.28	2.43	3.61	2.37	22232	BR
160	290	80	879	1220	1400	1900	22.8	176	274	3	0.28	2.43	3.61	2.37	22232	CA
160	290	80	879	1220	1400	1900	22.8	176	274	3	0.28	2.43	3.61	2.37	22232	MB
160	290	80	964	1360	1400	1900	22.6	176	274	3	0.25	2.69	4	2.63	23232	EM
160	290	104	1050	1670	910	1200	30	176	274	3	0.36	1.87	2.79	1.83	23232	CA
160	340	104	1050	1670	910	1200	6	176	274	4	0.36	1.87	2.79	1.83	22332	MB
160	340	114	1000	1560	800	1100	30.6	179	321	4	0.35	1.91	2.85	1.87	22332	BR
160	340	114	1350	1860	1000	1400	51.9	179	321	4	0.35	1.91	2.85	1.87	22332	CA
160	340	114	1350	1860	1000	1400	51.9	179	321	4	0.35	1.91	2.85	1.87	22332	MB
160	260	114	1540	2170	1000	1400	51.9	179	321	2.1	0.33	2.03	3.02	1.98	23034	EM
170	260	67	652	1110	1200	1600	51.5	184	246	2.1	0.25	2.74	4.08	2.68	23034	CA
170	260	67	652	1110	1200	1600	13	184	246	2.1	0.25	2.74	4.08	2.68	23034	MB
170	260	67	725	1220	1200	1600	13	184	246	2.1	0.22	3.07	4.57	3	24034	EM
170	280	90	800	1470	860	1200	12.9	184	246	2.1	0.32	2.12	3.15	2.07	23134	CA
170	280	88	887	1490	990	1300	17.6	185	246	2.1	0.31	2.21	3.29	2.16	23134	CA
170	280	88	887	1490	990	1300	22.2	185	265	2.1	0.31	2.21	3.29	2.16	23134	MB
170	280	88	1000	1670	990	1300	22.2	185	265	2.1	0.28	2.39	3.56	2.34	24134	EM
170	280	109	1080	1870	740	990	22	185	265	2.1	0.37	1.8	2.69	1.76	22234	CA
170	310	86	730	1160	1000	1400	27.2	187	265	2.4	0.28	2.41	3.59	2.35	22234	BR
170	310	86	983	1380	1300	1800	29.2	187	293	4	0.28	2.41	3.59	2.35	22234	CA
170	310	86	983	1380	1300	1800	29.2	187	293	4	0.28	2.41	3.59	2.35	22234	MB
170	310	86	1110	1580	1300	1800	29.2	187	293	4	0.26	2.6	3.87	2.54	23234	EM
170	310	110	1230	1970	840	1100	28.8	187	293	4	0.34	1.99	2.96	1.94	23234	CA
170	310	110	1230	1970	840	1100	37.4	187	293	4	0.34	1.99	2.96	1.94	22334	MB
170	360	120	1110	1760	700	1000	37.4	190	340	4	0.35	1.91	2.85	1.87	22334	BR
170	360	120	1500	2090	980	1300	61.1	190	340	4	0.35	1.91	2.85	1.87	22334	CA

SPHERICAL ROLLER BEARINGS



Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil	wt	d _a	D _a	r _a	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max					
170	360	120	1500	2090	980	1300	61.1	190	340	4	0.35	1.91	2.85	1.87	22334 MB
170	360	120	1750	2590	980	1300	60.7	190	340	4	0.32	2.09	3.11	2.04	22334 EM
180	280	74	702	1170	1100	1500	17.3	195	265	2.1	0.24	2.76	4.11	2.7	23036 CA
180	280	74	702	1170	1100	1500	17.3	195	265	2.1	0.24	2.76	4.11	2.7	23036 MB
180	280	74	852	1420	1100	1500	17.1	195	265	2.1	0.23	2.95	4.4	2.89	23036 EM
180	280	100	936	1710	810	1100	23.5	195	284	2.1	0.33	2.03	3.02	1.98	24036 CA
180	300	96	999	1650	930	1200	28	196	284	3	0.32	2.13	3.17	2.08	23136 CA
180	300	96	999	1650	930	1200	28	196	284	3	0.32	2.13	3.17	2.08	23136 MB
180	300	96	1180	1920	930	1200	27.7	196	284	3	0.29	2.32	3.45	2.26	23136 EM
180	300	118	1240	2180	700	930	33.5	196	303	3	0.38	1.77	2.64	1.73	24136 CA
180	320	86	770	1250	1000	1300	30	197	303	4	0.27	2.51	3.74	2.45	22236 BR
180	320	86	1040	1490	1300	1700	30	197	303	4	0.27	2.51	3.74	2.45	22236 CA
180	320	86	1040	1490	1300	1700	30	197	303	4	0.27	2.51	3.74	2.45	22236 MB
180	320	86	1150	1630	1300	1700	29.6	197	303	4	0.25	2.74	4.08	2.68	22236 EM
180	320	112	1270	2050	820	1100	39.5	197	359	4	0.35	1.94	2.88	1.89	23236 CA
180	320	112	1270	2050	820	1100	39.5	197	359	4	0.35	1.94	2.88	1.89	22336 MB
180	380	126	1210	1920	700	900	71.4	201	359	4	0.35	1.92	2.86	1.88	22336 BR
190	380	126	1640	2290	930	1200	71.4	201	275	4	0.35	1.92	2.86	1.88	22336 CA
190	380	126	1640	2290	930	1200	71.4	201	275	4	0.35	1.92	2.86	2.7	23038 MB
190	290	75	781	1360	1100	1400	18.2	205	275	2.1	0.24	2.76	4.11	2.7	23038 CA
190	290	75	781	1360	1100	1400	18.2	205	275	2.1	0.24	2.76	4.11	2.94	23038 MB
190	290	75	902	1540	1100	1400	17.9	205	303	2.1	0.22	3.01	4.48	2.13	24038 EM
190	290	100	931	1800	780	1000	23.8	207	303	2.1	0.31	2.18	3.24	2.07	23138 CA
190	320	104	1170	1960	870	1200	34.9	207	303	3	0.32	2.12	3.15	2.07	23138 CA
190	320	104	1170	1960	870	1200	34.9	207	322	3	0.32	2.12	3.15	1.78	24138 MB
190	320	128	1330	2340	650	870	42.3	208	322	3	0.37	1.82	2.71	2.43	22238 CA
190	340	92	850	1430	900	1200	37.3	208	322	4	0.27	2.49	3.71	2.43	22238 BR
190	340	92	1150	1700	1200	1600	37.3	208	322	4	0.27	2.49	3.71	2.43	22238 CA
190	340	92	1150	1700	1200	1600	37.3	208	322	4	0.27	2.49	3.71	2.43	23238 MB
190	340	120	1420	2340	760	1000	48	208	379	4	0.33	2.03	3.03	1.99	23238 CA
190	340	120	1420	2340	760	1000	48	208	379	4	0.33	2.03	3.03	1.99	22338 MB
190	400	132	1340	2130	700	900	82.7	211	379	5	0.35	1.94	2.88	1.89	22338 BR
190	400	132	1810	2540	880	1200	82.7	211	379	5	0.35	1.94	2.88	1.89	22338 CA
190	400	132	1810	2540	880	1200	82.7	211	379	5	0.35	1.94	2.88	1.89	22338 MB
170	360	120	1500	2090	980	1300	61.1	190	340	4	0.35	1.91	2.85	1.87	22334 CA

SPHERICAL ROLLER BEARINGS



Principal Dimensions			Basic Load Ratings		Limited Speeds		Weight	Shoulder Dia.			Calculation Factors				Bearing Number
d	D	B	C _r	Cor	Grease	Oil		d _a	D _a	r _a	e	Y ₁	Y ₂	Y ₀	
mm	mm	mm	kN	kN	r/min	r/min	kg	min	max	max					
200	310	82	867	1470	1000	1400	23.3	216	294	2.1	0.24	2.76	4.11	2.70	23040 CA
200	310	82	867	1470	1000	1400	23.3	216	294	2.1	0.24	2.76	4.11	2.70	23040 MB
200	310	82	1040	1760	1000	1400	23.0	216	294	2.1	0.23	2.95	4.40	2.89	23040 EM
200	310	109	1170	2170	730	970	31.4	216	294	2.1	0.33	2.07	3.09	2.03	24040 CA
200	340	112	1370	2310	830	1100	43.1	218	322	3	0.32	2.09	3.11	2.04	23140 CA
200	340	112	1370	2310	830	1100	43.1	218	322	3	0.32	2.09	3.11	2.04	23140 MB
200	340	140	1590	2790	620	830	53.3	218	322	3	0.40	1.68	2.50	1.64	24140 CA
200	360	98	1290	1910	1100	1500	43.2	219	341	4	0.27	2.47	3.67	2.41	22240 CA
200	360	98	1290	1910	1100	1500	43.2	219	341	4	0.27	2.47	3.67	2.41	22240 MB
200	360	128	1580	2620	730	970	57.8	219	341	4	0.36	1.9	2.83	1.86	23240 CA
200	360	128	1580	2620	730	970	57.8	219	341	4	0.36	1.9	2.83	1.86	23240 MB
200	420	138	1990	2800	840	1100	95.2	222	398	5	0.35	1.95	2.90	1.91	22340 CA
200	420	138	1990	2800	840	1100	95.2	222	398	5	0.35	1.95	2.90	1.91	22340 MB
220	340	90	1030	1790	930	1200	31.0	237	323	3	0.24	2.79	4.15	2.73	23044 CA
220	340	90	1030	1790	930	1200	31.0	237	323	3	0.24	2.79	4.15	2.73	23044 CA
220	340	118	1370	2550	660	880	40.5	237	323	3	0.32	2.09	3.11	2.04	24044 MB
220	370	120	1500	2570	760	1000	54.1	239	351	4	0.31	2.21	3.29	2.16	23144 CA
220	370	120	1500	2570	760	1000	54.1	239	351	4	0.31	2.21	3.29	2.16	23144 CA
220	370	150	1870	3390	570	750	65.6	239	351	4	0.39	1.74	2.59	1.70	24144 MB
220	400	108	1560	2260	1000	1400	59.5	240	380	4	0.26	2.55	3.80	2.50	22244 CA
220	400	108	1560	2260	1000	1400	59.5	240	380	4	0.26	2.55	3.80	2.50	22244 MB
220	400	144	1960	3270	660	880	81.5	240	380	4	0.36	1.87	2.79	1.83	23244 CA
220	400	144	1960	3270	660	880	81.5	240	380	4	0.36	1.87	2.79	1.83	23244 MB
240	360	92	1130	2080	870	1200	34.3	257	343	3	0.24	2.81	4.19	2.75	23048 CA
240	360	92	1130	2080	870	1200	34.3	257	343	3	0.24	2.81	4.19	2.75	23048 CA
240	360	118	1400	2680	620	830	43.6	257	343	3	0.30	2.26	3.37	2.21	24048 MB
240	400	128	1680	3060	700	930	66.3	259	381	4	0.32	2.13	3.17	2.08	23148 CA
240	400	128	1680	3060	700	930	66.3	259	381	4	0.32	2.13	3.17	2.08	23148 CA
240	400	160	2110	3880	520	700	83.2	259	381	4	0.38	1.77	2.64	1.73	24148 CA
260	400	104	1420	2520	870	1200	49.8	278	382	4	0.25	2.69	4.00	2.63	23052 CA
260	400	140	1650	3340	560	750	66.0	278	382	4	0.33	2.07	3.09	2.03	24052 CA
260	440	180	2650	4940	480	640	115.0	281	419	4	0.39	1.74	2.59	1.70	24152 CA
280	420	106	1480	2710	870	1200	53.8	299	401	4	0.24	2.79	4.15	2.73	23056 CA
300	460	118	1810	3280	870	1200	74.5	320	440	4	0.25	2.74	4.08	2.68	23060 CA

DYNAMIC LOAD RATINGS AND LIFE CALCULATIONS

DYNAMIC EQUIVALENT LOAD

Table 3-Values of X and Y for radial ball bearings

Bearing type	"Relative axial load" ^{1), 2)}		Single row bearings				Double row bearings				e	
			$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$		$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$			
			X	Y	X	Y	X	Y	X	Y		
Radial contact groove ball bearings	$f_0 F_a^{(3)}$	Fa										
	Cor	$i Z D_w^2$										
	0.172	0.172				2.30				2.30	0.19	
	0.345	0.345				1.99				1.99	0.22	
	0.689	0.689				1.71				1.71	0.26	
	1.03	1.03				1.55				1.55	0.28	
	1.38	1.38	1	0	0.56	1.45	1	0	0.56	1.45	0.30	
	2.07	2.07				1.31				1.31	0.34	
	3.45	3.45				1.15				1.15	0.38	
5.17	5.17				1.04				1.04	0.42		
6.89	6.89				1.00				1.00	0.44		
Angular contact groove ball bearings	$f_0 F_a^{(3)}$	Fa										
	Cor	$Z D_w^2$										
	$\alpha = 15^\circ$	0.178	0.172				1.47		1.65		2.39	0.38
		0.357	0.345				1.40		1.57		2.28	0.40
		0.714	0.689				1.30		1.46		2.11	0.43
		1.07	1.03				1.23		1.38		2.00	0.46
		1.43	0.38	1	0	0.44	1.19	1	1.34	0.72	1.93	0.47
		2.14	2.07				1.12		1.26		1.82	0.50
		3.57	3.45				1.02		1.14		1.66	0.55
		5.35	5.17				1.00		1.12		1.63	0.56
	7.14	6.89				1.00		1.12		1.63	0.56	
	$\alpha = 25^\circ$	-	-				0.41	0.87		0.92	0.67	1.41
$\alpha = 40^\circ$	-	-				0.35	0.57		0.55	0.57	0.93	1.14

Note: ¹⁾ Permissible maximum value depends on the bearing design (internal clearance and raceway groove depth). Use the first or second column depending on available information.

²⁾ Values of X, Y and e for intermediate "relative axial loads" and/or contact angles are obtained by linear interpolation.

³⁾ For values of f_0 see ISO 76.

DYNAMIC LOAD RATINGS AND LIFE CALCULATIONS

RATING LIFE

Life : For an individual rolling bearing, the number of revolutions which one of the bearing rings makes in relation to the other ring before the first evidence of fatigue develops in the material of one of the rings or rolling elements.

Basic rating life : For an individual rolling bearing, or a group of apparently identical rolling bearings, operating under the same conditions, the life associated with 90% reliability, with contemporary, commonly used material and conditions. Basic rating life L_{10} can be calculated with following formulas.

For radial ball bearing $L_{10}=(Cr/Pr)^3$ in million revolutions

For radial roller bearing $L_{10}=(Cr/Pr)^{103}$ in million revolutions

Here Cr is basic dynamic radial load rating, in newtons.

Pr is dynamic equivalent radial load, in newtons.

Adjusted rating life : The rating life obtained by adjustment of basic rating life for a desired reliability level, special bearing properties and specific operating conditions. Adjusted rating life can be calculated with following formula:

$$L_{na}=a_1a_2a_3L_{10}$$

Here a_1 is life adjustment factor for reliability. Its values are given in following table.

a_2 is life adjustment factor for special bearing properties. $a_1=1$ for the bearings commonly ordered from FSQ. When the bearing with $a_2>1$ is desired, please specially order from FSQ under guidance of the Sales Engineer.

a_3 is life adjustment factor for operating conditions. Operating conditions taken into account here include the adequacy of lubrication, presence of foreign matter, and conditions causing changes in material properties, for example, high temperature causing reduced hardness. Where the negative influence of above mentioned would not exist, a_3 could be equal to 1, otherwise values of a_3 less than 1 should be considered only where the lubrication conditions are so favourable that the probability of failure caused by surface distress is greatly reduced.

Reliability %	90	95	96	97	98	99
a_1	1	0.62	0.53	0.44	0.33	0.21

DYNAMIC LOAD RATINGS AND LIFE CALCULATIONS

BASIC DYNAMIC LOAD RATING

Basic dynamic radial load rating C_r : The constant stationary radial load which a rolling bearing could theoretically endure for a basic rating life of one million revolutions. In the case of a single row angular contact bearing, the radial load rating refers to the radial component of that load which causes a purely radial displacement of the bearing ring in relation to each other.

The basic dynamic radial load ratings of various bearings can be obtained from the catalog.

Basic dynamic radial load rating for bearing combinations for two similar row radial ball or roller bearings mounted side by side on the same shaft such that they operate as a unit (paired mounting), the basic radial load rating of the pair is the basic radial load rating of the single bearing multiplied by 1.6 for ball bearing or by 1.7 for roller bearing.

DYNAMIC EQUIVALENT LOAD

Dynamic equivalent radial load P_r : That constant stationary radial load under the influence of which a rolling bearing would have the same life as it will attain under the actual load conditions. The dynamic equivalent radial load P_r , for radial ball bearing and spherical roller bearing, under constant radial and axial loads, is given by

$$P_r = X F_r + Y F_a$$

Here F_r is radial component of actual bearing load, in newtons. F_a is axial component of actual bearing load, in newtons.

X is dynamic radial load factor.

Y is dynamic axial load factor.

Values of X and Y for radial ball bearings are listed in Table 3. For spherical roller bearing X and Y are variable on two different conditions:

$$X = 1, \quad Y = Y_1. \text{ when } F_a/F_r \leq e$$

$$X = 0.67, \quad Y = Y_2. \text{ when } F_a/F_r > e$$

Values of e , Y_1 , Y_2 are given in the catalogue. For cylindrical roller bearing, under radial load only

$$P_r = F_r$$

Note – The ability of cylindrical roller bearing to support axial loads varies considerably with bearing design execution. The bearing user should therefore consult Technology Section of FSQ for recommendations regarding the evaluation of equivalent load and life in case where cylindrical roller bearing is subjected to axial load.