

MRC 7000 Series bearings are single-row 29° angular contact ball bearings having one heavy race shoulder and one counterbored race shoulder on the outer ring. Because of this construction, it is possible to incorporate a greater number of balls than in the deep groove nonfilling notch bearing. The combination of maximum ball complement and the angular contact feature reduces the specific ball loading under thrust load, resulting in moderate to high thrust load carrying capacity.

MRC 7000 Series angular contact ball bearings should be used in applications in which the thrust load is heavy and beyond the capacity of single-row types; for example, for a heavy thrust load in one direction, or a heavy thrust load in one direction combined with a radial load.

### Cage Types and Materials

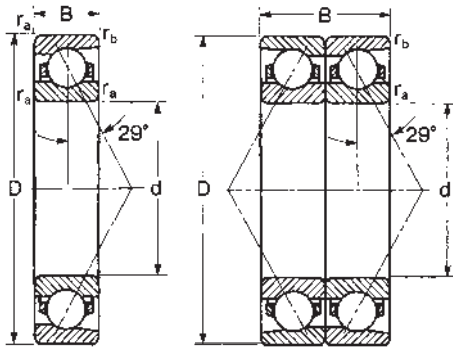
For normal usage: heavy stock, two-piece steel formed pockets, with turned-over fingers or riveted together.

For severe vibration, very high speeds, or high operating temperatures: one-piece, inner ring land-guided, machined construction of suitable material (phenolic/bakelite composition, machined brass, or special material).

Size	Series	Page
<b>7100/D</b>	Extra Large—Single Bearing and Duplex Set	<b>122</b>
<b>7100KR</b>	Extra Light—Single Bearing	<b>123</b>
<b>7100KRD</b>	Extra Light—Duplex Set	<b>124</b>
<b>7200</b>	Light—Single Bearing	<b>125</b>
<b>7200D</b>	Light—Duplex Set	<b>126</b>
<b>7300</b>	Medium—Single Bearing	<b>127</b>
<b>7300D</b>	Medium—Duplex Set	<b>128</b>
<b>7400/D</b>	Heavy—Single Bearing and Duplex Set	<b>129</b>
<b>7000</b>	Equivalent Load and Life	<b>130</b>
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# 7100 and 7100-D Extra Large Series

## MRC Bearing Services



Note: ABEC-1 & 3 stocked as half-pairs, where available.

7100 Series bearings are similar to the 7100-KR Series but have a larger O.D. and narrower width; and are used for one-directional thrust loads or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

**Caution: Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.**

Values for -D bearings are for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7120 <sup>5)</sup>	100	3.9370	160	6.2992	28	1.1024	2.0	.08	1.0	.040	85 200	19 200	86 500	19 400	2 600	4 300
7122	110	4.3307	175	6.8898	30	1.1811	2.0	.08	1.0	.040	104 000	23 400	108 000	24 300	2 400	4 000
7124 <sup>5)</sup>	120	4.7244	190	7.4803	32	1.2598	2.0	.08	1.0	.040	108 000	24 300	127 000	28 600	2 200	3 700
7126 <sup>5)</sup>	130	5.1181	205	8.0709	34	1.3386	2.0	.08	1.0	.040	121 000	27 200	134 000	30 100	2 100	3 500
7128 <sup>5)</sup>	140	5.5118	220	8.6614	36	1.4173	2.0	.08	1.0	.040	138 000	31 000	156 000	35 100	1 900	3 200
7130	150	5.9055	235	9.2520	38	1.4961	2.0	.08	1.0	.040	159 000	35 700	180 000	40 500	1 700	2 800
7132 <sup>5)</sup>	160	6.2992	250	9.8425	40	1.5748	2.0	.08	1.0	.040	174 000	39 100	204 000	45 900	1 600	2 700
7134 <sup>5)</sup>	170	6.6929	265	10.4331	42	1.6535	2.5	.10	1.0	.040	190 000	42 700	232 000	52 200	1 600	2 700
7136 <sup>5)</sup>	180	7.0866	280	11.0236	44	1.7323	2.5	.10	1.0	.040	208 000	46 800	260 000	58 500	1 600	2 600
7138 <sup>5)</sup>	190	7.4803	300	11.8110	46	1.8110	2.5	.10	1.0	.040	242 000	54 400	315 000	70 800	1 400	2 400
7140 <sup>5)</sup>	200	7.8740	320	12.5984	48	1.8898	2.5	.10	1.0	.040	260 000	58 500	355 000	79 800	1 400	2 300
7142 <sup>5)</sup>	210	8.2677	340	13.3858	50	1.9685	2.5	.10	1.0	.040	286 000	64 300	400 000	89 900	1 400	2 300
7144 <sup>5)</sup>	220	8.6614	350	13.7795	51	2.0079	2.5	.10	1.0	.040	291 000	65 400	415 000	93 300	1 300	2 200
7146 <sup>5)</sup>	230	9.0551	370	14.5669	53	2.0866	3.0	.12	1.0	.040	312 000	70 100	455 000	102 000	1 200	2 000
7148 <sup>5)</sup>	240	9.4488	390	15.3543	55	2.1654	3.0	.12	1.0	.040	332 000	74 600	500 000	112 000	1 100	1 900
7152 <sup>5)</sup>	260	10.2362	430	16.9291	59	2.3228	3.0	.12	1.0	.040	364 000	81 800	585 000	132 000	1 100	1 800
7156 <sup>5)</sup>	280	11.0236	460	18.1102	63	2.4803	3.0	.12	1.0	.040	403 000	90 600	600 000	135 000	1 100	1 800
7164 <sup>5)</sup>	320	12.5984	500	19.6850	71	2.7953	3.0	.12	1.0	.040	462 000	104 000	815 000	183 000	960	1 600

### 7100-D

7120-D <sup>5)</sup>	100	3.9370	160	6.2992	56	2.2047	2.0	.08	1.0	.040	140 000	31 500	173 000	38 900	2 100	3 400
7122-D	110	4.3307	175	6.8898	60	2.3622	2.0	.08	1.0	.040	168 000	37 800	216 000	48 600	1 900	3 200
7124-D <sup>5)</sup>	120	4.7244	190	7.4803	64	2.5197	2.0	.08	1.0	.040	178 000	40 000	255 000	57 300	1 800	3 000
7126-D <sup>5)</sup>	130	5.1181	205	8.0709	68	2.6772	2.0	.08	1.0	.040	195 000	43 800	270 000	60 700	1 700	2 800
7128-D <sup>5)</sup>	140	5.5118	220	8.6614	72	2.8346	2.0	.08	1.0	.040	225 000	50 600	310 000	69 700	1 500	2 600
7130-D	150	5.9055	235	9.2520	76	2.9921	2.0	.08	1.0	.040	255 000	57 300	360 000	80 900	1 400	2 200
7132-D <sup>5)</sup>	160	6.2992	250	9.8425	80	3.1496	2.0	.08	1.0	.040	286 000	64 300	405 000	91 000	1 300	2 200
7134-D <sup>5)</sup>	170	6.6929	265	10.4331	84	3.3071	2.5	.10	1.0	.040	312 000	70 100	465 000	105 000	1 300	2 200
7136-D <sup>5)</sup>	180	7.0866	280	11.0236	88	3.4646	2.5	.10	1.0	.040	338 000	76 000	520 000	117 000	1 300	2 100
7138-D <sup>5)</sup>	190	7.4803	300	11.8110	92	3.6220	2.5	.10	1.0	.040	390 000	87 700	630 000	142 000	1 100	1 900
7140-D <sup>5)</sup>	200	7.8740	320	12.5984	96	3.7795	2.5	.10	1.0	.040	423 000	95 100	695 000	156 000	1 100	1 800
7142-D <sup>5)</sup>	210	8.2677	340	13.3858	100	3.9370	2.5	.10	1.0	.040	468 000	105 000	800 000	180 000	1 100	1 800
7144-D <sup>5)</sup>	220	8.6614	350	13.7795	102	4.0157	2.5	.10	1.0	.040	475 000	107 000	830 000	187 000	1 000	1 800
7146-D <sup>5)</sup>	230	9.0551	370	14.5669	106	4.1732	3.0	.12	1.0	.040	507 000	114 000	915 000	206 000	960	1 600
7148-D <sup>5)</sup>	240	9.4488	390	15.3543	110	4.3307	3.0	.12	1.0	.040	540 000	121 000	1 000 000	225 000	880	1 500
7152-D <sup>5)</sup>	260	10.2362	430	16.9291	118	4.6457	3.0	.12	1.0	.040	592 000	133 000	1 160 000	261 000	880	1 400
7156-D <sup>5)</sup>	280	11.0236	460	18.1102	126	4.9606	3.0	.12	1.0	.040	663 000	149 000	1 200 000	270 000	880	1 400
7164-D <sup>5)</sup>	320	12.5984	500	19.6850	142	5.5906	3.0	.12	1.0	.040	761 000	171 000	1 630 000	366 000	770	1 300

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.32 and C<sub>0</sub> by 2.94 (single) and C by 0.81 and C<sub>0</sub> by 1.47 (duplex).

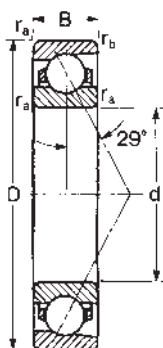
<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice.

For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.

<sup>5)</sup> Typically non-stocked sizes, please check availability before designing into equipment.



This series is available in bore sizes ranging from 10 mm to 320 mm. One-piece machined nonmetallic or solid bronze cages are considered standard for this series. These bearings are appropriate for use with moderate one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7100-KR	10	.3937	26	1.0236	8	.3150	.30	.012	.10	.004	4 620	1 040	2 000	450	30 000	39 000
7101-KR	12	.4724	28	1.1024	8	.3150	.30	.012	.10	.004	4 940	1 110	2 500	562	25 000	32 000
7102-KR	15	.5906	32	1.2598	9	.3543	.30	.012	.10	.004	5 400	1 210	2 900	652	22 000	28 000
7103-KR	17	.6693	35	1.3780	10	.3937	.30	.012	.10	.004	7 610	1 710	4 250	955	19 000	25 000
7104-KR	20	.7874	42	1.6535	12	.4724	.64	.025	.30	.012	9 560	2 150	5 700	1 280	16 000	21 000
7105-KR	25	.9843	47	1.8504	12	.4724	.64	.025	.30	.012	10 600	2 380	6 950	1 560	12 000	16 000
7106-KR	30	1.1811	55	2.1654	13	.5118	1.0	.04	.30	.012	13 800	3 100	9 650	2 170	11 000	14 000
7107-KR	35	1.3780	62	2.4409	14	.5512	1.0	.04	.30	.012	16 800	3 780	12 000	2 700	9 200	12 000
7108-KR	40	1.5748	68	2.6772	15	.5906	1.0	.04	.30	.012	17 200	3 870	13 200	2 970	8 500	11 000
7109-KR	45	1.7717	75	2.9528	16	.6299	1.0	.04	.30	.012	21 200	4 770	17 000	3 820	7 500	9 800
7110-KR	50	1.9685	80	3.1496	16	.6299	1.0	.04	.30	.012	22 100	4 970	18 300	4 110	6 900	9 000
7111-KR	55	2.1654	90	3.5433	18	.7087	1.0	.04	.60	.024	29 600	6 650	25 500	5 730	6 300	8 200
7112-KR	60	2.3622	95	3.7402	18	.7087	1.0	.04	.60	.024	30 700	6 900	27 000	6 070	5 700	7 400
7113-KR	65	2.5591	100	3.9370	18	.7087	1.0	.04	.60	.024	31 200	7 010	29 000	6 520	5 400	7 000
7114-KR	70	2.7559	110	4.3307	20	.7874	1.0	.04	.60	.024	34 500	7 760	35 500	7 980	5 000	6 500
7115-KR	75	2.9528	115	4.5276	20	.7874	1.0	.04	.60	.024	37 700	8 480	37 500	8 430	4 700	6 100
7116-KR	80	3.1496	125	4.9213	22	.8661	1.0	.04	.60	.024	48 800	11 000	49 000	11 000	4 500	5 800
7117-KR	85	3.3465	130	5.1181	22	.8661	1.0	.04	.60	.024	49 400	11 100	52 000	11 700	4 100	5 300
7118-KR	90	3.5433	140	5.5118	24	.9449	1.5	.06	.60	.024	58 500	13 200	61 000	13 700	3 800	4 900
7119-KR	95	3.7402	145	5.7087	24	.9449	1.5	.06	.60	.024	71 500	16 100	72 000	16 200	3 600	4 700
7120-KR	100	3.9370	150	5.9055	24	.9449	1.5	.06	1.0	.040	62 400	14 000	68 000	15 300	3 500	4 500
7121-KR	105	4.1339	160	6.2992	26	1.0236	2.0	.08	1.0	.040	74 100	16 700	80 000	18 000	3 300	4 300
7122-KR	110	4.3307	170	6.6929	28	1.1024	2.0	.08	1.0	.040	87 100	19 600	91 500	20 600	3 200	3 800
7124-KR	120	4.7244	180	7.0866	28	1.1024	2.0	.08	1.0	.040	88 400	19 900	98 000	22 000	2 900	3 800
7126-KR	130	5.1181	200	7.8740	33	1.2992	2.0	.08	1.0	.040	121 000	27 200	134 000	30 100	2 700	3 500
7128-KR	140	5.5118	210	8.2677	33	1.2992	2.0	.08	1.0	.040	121 000	27 200	137 000	30 800	2 500	3 300
7130-KR	150	5.9055	225	8.8583	35	1.3780	2.0	.08	1.0	.040	135 000	30 300	156 000	35 100	2 200	2 900
7132-KR	160	6.2992	240	9.4488	38	1.4961	2.0	.08	1.0	.040	156 000	35 100	180 000	40 500	2 200	2 800
7134-KR	170	6.6929	260	10.2362	42	1.6535	2.0	.08	1.0	.040	186 000	41 800	220 000	49 500	2 100	2 700
7136-KR	180	7.0866	280	11.0236	46	1.8110	2.0	.08	1.0	.040	208 000	46 800	260 000	58 500	2 000	2 600
7138-KR	190	7.4803	290	11.4173	46	1.8110	2.0	.08	1.0	.040	212 000	47 700	270 000	60 700	1 800	2 400
7140-KR	200	7.8740	310	12.2047	51	2.0079	2.0	.08	1.0	.040	238 000	53 500	320 000	71 900	1 800	2 300
7144-KR	220	8.6614	340	13.3858	56	2.2047	2.5	.10	1.0	.040	302 000	67 900	430 000	96 700	1 700	2 200
7148-KR	240	9.4488	360	14.1732	56	2.2047	2.5	.10	1.0	.040	307 000	69 000	455 000	102 000	1 500	2 000
7152-KR	260	10.2362	400	15.7480	65	2.5591	3.0	.12	1.5	.060	377 000	84 800	585 000	132 000	1 500	1 900
7156-KR	280	11.0236	420	16.5354	65	2.5591	3.0	.12	1.5	.060	390 000	87 700	620 000	139 000	1 500	1 900
7160-KR	300	11.8110	460	18.1102	74	2.9134	3.0	.12	1.5	.060	449 000	101 000	765 000	172 000	1 300	1 700
7164-KR	320	12.5984	480	18.8976	74	2.9134	3.0	.12	1.5	.060	462 000	104 000	815 000	183 000	1 200	1 600

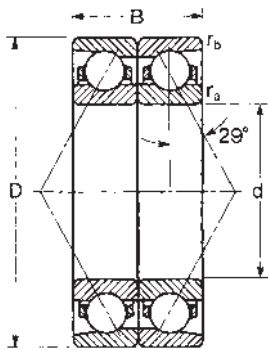
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.32 and C<sub>0</sub> by 2.94.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



Note: ABEC - 1 & 3 stocked as half-pairs, where available.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

Use these values for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7100-KRD	10	.3937	26	1.0236	16	.6299	.30	.012	.10	.004	7 610	1 710	4 150	933	24 000	31 000
7101-KRD	12	.4724	28	1.1024	16	.6299	.30	.012	.10	.004	8 060	1 810	5 000	1 120	20 000	26 000
7102-KRD	15	.5906	32	1.2598	18	.7087	.30	.012	.10	.004	8 840	1 990	5 850	1 320	18 000	22 000
7103-KRD	17	.6693	35	1.3780	20	.7874	.30	.012	.10	.004	12 500	2 810	8 500	1 910	15 000	20 000
7104-KRD	20	.7874	42	1.6535	24	.9449	.64	.025	.30	.012	15 600	3 510	11 400	2 560	13 000	17 000
7105-KRD	25	.9843	47	1.8504	24	.9449	.64	.025	.30	.012	17 400	3 910	14 000	3 150	9 600	13 000
7106-KRD	30	1.1811	55	2.1654	26	1.0236	1.0	.04	.30	.012	22 500	5 060	19 300	4 340	8 800	11 000
7107-KRD	35	1.3780	62	2.4409	28	1.1024	1.0	.04	.30	.012	27 600	6 200	24 000	5 400	7 400	9 600
7108-KRD	40	1.5748	68	2.6772	30	1.1811	1.0	.04	.30	.012	28 100	6 320	26 000	5 850	6 800	8 800
7109-KRD	45	1.7717	75	2.9528	32	1.2598	1.0	.04	.30	.012	34 500	7 760	34 000	7 640	6 000	7 800
7110-KRD	50	1.9685	80	3.1496	32	1.2598	1.0	.04	.30	.012	35 800	8 050	36 500	8 210	5 500	7 200
7111-KRD	55	2.1654	90	3.5433	36	1.4173	1.0	.04	.60	.024	47 500	10 700	51 000	11 500	5 000	6 600
7112-KRD	60	2.3622	95	3.7402	36	1.4173	1.0	.04	.60	.024	49 400	11 100	54 000	12 100	4 600	5 900
7113-KRD	65	2.5591	100	3.9370	36	1.4173	1.0	.04	.60	.024	50 700	11 400	58 500	13 200	4 300	5 600
7114-KRD	70	2.7559	110	4.3307	40	1.5748	1.0	.04	.60	.024	55 900	12 600	71 000	16 000	4 000	5 200
7115-KRD	75	2.9528	115	4.5276	40	1.5748	1.0	.04	.60	.024	61 800	13 900	75 000	16 900	3 800	4 900
7116-KRD	80	3.1496	125	4.9213	44	1.7323	1.0	.04	.60	.024	79 300	17 800	98 000	22 000	3 600	4 600
7117-KRD	85	3.3465	130	5.1181	44	1.7323	1.0	.04	.60	.024	80 600	18 100	104 000	23 400	3 300	4 200
7118-KRD	90	3.5433	140	5.5118	48	1.8898	1.5	.06	.60	.024	95 600	21 500	122 000	27 400	3 000	3 900
7119-KRD	95	3.7402	145	5.7087	48	1.8898	1.5	.06	.60	.024	117 000	26 300	143 000	32 100	2 900	3 800
7120-KRD	100	3.9370	150	5.9055	48	1.8898	1.5	.06	1.0	.040	101 000	22 700	137 000	30 800	2 800	3 600
7121-KRD	105	4.1339	160	6.2992	52	2.0472	2.0	.08	1.0	.040	121 000	27 200	160 000	36 000	2 600	3 400
7122-KRD	110	4.3307	170	6.6929	56	2.2047	2.0	.08	1.0	.040	140 000	31 500	183 000	41 100	2 600	3 300
7124-KRD	120	4.7244	180	7.0866	56	2.2047	2.0	.08	1.0	.040	143 000	32 100	196 000	44 100	2 300	3 000
7126-KRD	130	5.1181	200	7.8740	66	2.5984	2.0	.08	1.0	.040	195 000	43 800	270 000	60 700	2 200	2 800
7128-KRD	140	5.5118	210	8.2677	66	2.5984	2.0	.08	1.0	.040	195 000	43 800	270 000	60 700	2 000	2 600
7130-KRD	150	5.9055	225	8.8583	70	2.7559	2.0	.08	1.0	.040	221 000	49 700	315 000	70 800	1 800	2 300
7132-KRD	160	6.2992	240	9.4488	76	2.9921	2.0	.08	1.0	.040	255 000	57 300	360 000	80 900	1 800	2 200
7134-KRD	170	6.6929	260	10.2362	84	3.3071	2.0	.08	1.0	.040	302 000	67 900	440 000	98 900	1 700	2 200
7136-KRD	180	7.0866	280	11.0236	92	3.6220	2.0	.08	1.0	.040	338 000	76 000	520 000	117 000	1 600	2 100
7138-KRD	190	7.4803	290	11.4173	92	3.6220	2.0	.08	1.0	.040	345 000	77 600	540 000	121 000	1 400	1 900
7140-KRD	200	7.8740	310	12.2047	102	4.0157	2.0	.08	1.0	.040	390 000	87 700	640 000	144 000	1 400	1 800
7144-KRD	220	8.6614	340	13.3858	112	4.4094	2.5	.10	1.0	.040	494 000	111 000	865 000	194 000	1 400	1 800
7148-KRD	240	9.4488	360	14.1732	112	4.4094	2.5	.10	1.0	.040	494 000	111 000	915 000	206 000	1 200	1 600
7152-KRD	260	10.2362	400	15.7480	130	5.1181	3.0	.12	1.5	.060	618 000	139 000	1 180 000	265 000	1 200	1 500
7156-KRD	280	11.0236	420	16.5354	130	5.1181	3.0	.12	1.5	.060	637 000	143 000	1 250 000	281 000	1 200	1 500
7160-KRD	300	11.8110	460	18.1102	148	5.8268	3.0	.12	1.5	.060	728 000	164 000	1 580 000	355 000	1 000	1 400
7164-KRD	320	12.5984	480	18.8976	148	5.8268	3.0	.12	1.5	.060	761 000	171 000	1 630 000	366 000	960	1 300

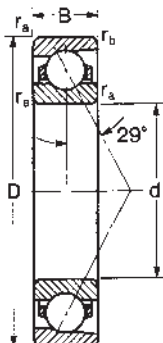
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 0.81 and C<sub>0</sub> by 1.47.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



The 7200 Series contains single-row angular contact ball bearings with a counterbored outer ring. Bore sizes range from 10 mm to 320 mm; and most of these bearings are available with a two-piece pressed steel cage, or a one-piece nonmetallic or solid bronze cage. 7000 Series bearings are designed with an initial contact angle of 29°, although some small sizes may have a lesser angle. 7200 Series bearings can be used with moderate to heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7200	10	.3937	30	1.1811	9	.3543	.64	.025	.30	.012	5 400	1 210	2 750	618	28 000	36 000
7201	12	.4724	32	1.2598	10	.3937	.64	.025	.30	.012	6 240	1 400	3 200	719	22 000	29 000
7202	15	.5906	35	1.3780	11	.4331	.64	.025	.30	.012	9 040	2 030	4 750	1 070	20 000	26 000
7203	17	.6693	40	1.5748	12	.4724	.64	.025	.30	.012	11 900	2 680	6 550	1 470	18 000	23 000
7204	20	.7874	47	1.8504	14	.5512	1.0	.04	.60	.024	12 700	2 860	7 200	1 620	15 000	19 000
7205	25	.9843	52	2.0472	15	.5906	1.0	.04	.60	.024	15 300	3 440	9 500	2 140	12 000	16 000
7206	30	1.1811	62	2.4409	16	.6299	1.0	.04	.60	.024	16 800	3 780	11 800	2 650	10 000	13 000
7207	35	1.3780	72	2.8346	17	.6693	1.0	.04	.60	.024	23 400	5 260	17 000	3 820	9 200	12 000
7208	40	1.5748	80	3.1496	18	.7087	1.0	.04	.60	.024	30 700	6 900	22 800	5 130	7 700	10 000
7209	45	1.7717	85	3.3465	19	.7480	1.0	.04	.60	.024	30 700	6 900	23 200	5 220	7 300	9 500
7210	50	1.9685	90	3.5433	20	.7874	1.0	.04	.60	.024	33 200	7 460	27 000	6 070	6 400	8 300
7211	55	2.1654	100	3.9370	21	.8268	1.5	.06	1.0	.040	48 800	11 000	37 500	8 430	6 000	7 800
7212	60	2.3622	110	4.3307	22	.8661	1.5	.06	1.0	.040	52 700	11 800	44 000	9 890	5 400	7 000
7213	65	2.5591	120	4.7244	23	.9055	1.5	.06	1.0	.040	63 700	14 300	54 000	12 100	4 900	6 400
7214	70	2.7559	125	4.9213	24	.9449	1.5	.06	1.0	.040	63 700	14 300	55 000	12 400	4 600	6 000
7215	75	2.9528	130	5.1181	25	.9843	1.5	.06	1.0	.040	79 300	17 800	69 500	15 600	4 300	5 600
7216	80	3.1496	140	5.5118	26	1.0236	2.0	.08	1.0	.040	74 100	16 700	67 000	15 100	4 100	5 300
7217	85	3.3465	150	5.9055	28	1.1024	2.0	.08	1.0	.040	90 400	20 300	83 000	18 700	3 800	4 900
7218	90	3.5433	160	6.2992	30	1.1811	2.0	.08	1.0	.040	117 000	26 300	118 000	26 500	3 600	4 700
7219	95	3.7402	170	6.6929	32	1.2598	2.0	.08	1.0	.040	121 000	27 200	114 000	25 600	3 500	4 500
7220	100	3.9370	180	7.0866	34	1.3386	2.0	.08	1.0	.040	138 000	31 000	129 000	29 000	3 200	4 100
7221	105	4.1339	190	7.4803	36	1.4173	2.0	.08	1.0	.040	148 000	33 300	137 000	30 800	3 000	3 900
7222	110	4.3307	200	7.8740	38	1.4961	2.0	.08	1.0	.040	163 000	36 600	156 000	35 100	2 900	3 800
7224	120	4.7244	215	8.4646	40	1.5748	2.0	.08	1.0	.040	174 000	39 100	176 000	39 600	2 700	3 500
7226	130	5.1181	230	9.0551	40	1.5748	2.5	.10	1.0	.040	195 000	43 800	208 000	46 800	2 500	3 200
7228	140	5.5118	250	9.8425	42	1.6535	2.5	.10	1.0	.040	208 000	46 800	232 000	52 200	2 300	3 000
7230	150	5.9055	270	10.6299	45	1.7717	2.5	.10	1.0	.040	242 000	54 400	280 000	62 900	2 100	2 700
7232	160	6.2992	290	11.4173	48	1.8898	2.5	.10	1.0	.040	270 000	60 700	325 000	73 100	2 000	2 600
7234	170	6.6929	310	12.2047	52	2.0472	3.0	.12	1.0	.040	286 000	64 300	365 000	82 100	1 900	2 500
7236	180	7.0866	320	12.5984	52	2.0472	3.0	.12	1.0	.040	302 000	67 900	390 000	87 700	1 900	2 400
7238	190	7.4803	340	13.3858	55	2.1654	3.0	.12	1.0	.040	332 000	74 600	450 000	101 000	1 700	2 200
7240	200	7.8740	360	14.1732	58	2.2835	3.0	.12	1.0	.040	351 000	78 900	490 000	110 000	1 600	2 100
7242	210	8.2677	380	14.9606	61	2.4016	3.0	.12	1.0	.040	390 000	87 700	560 000	126 000	1 500	2 000
7244	220	8.6614	400	15.7480	65	2.5591	3.0	.12	1.0	.040	403 000	90 600	600 000	135 000	1 500	2 000
7246	230	9.0551	420	16.5354	68	2.6772	3.0	.12	1.0	.040	442 000	99 400	670 000	151 000	1 500	1 900
7248	240	9.4488	440	17.3228	72	2.8346	3.0	.12	1.0	.040	475 000	107 000	750 000	169 000	1 400	1 800
7250	250	9.8425	460	18.1102	76	2.9921	4.0	.16	1.5	.060	520 000	117 000	830 000	187 000	1 400	1 800
7252	260	10.2362	480	18.8976	80	3.1496	4.0	.16	1.5	.060	559 000	126 000	915 000	206 000	1 300	1 700
7256	280	11.0236	500	19.6850	80	3.1496	4.0	.16	1.5	.060	572 000	129 000	980 000	220 000	1 300	1 700
7260	300	11.8110	540	21.2598	85	3.3465	4.0	.16	1.5	.060	618 000	139 000	1 100 000	247 000	1 200	1 600
7264	320	12.5984	580	22.8346	92	3.6220	4.0	.16	1.5	.060	650 000	146 000	1 220 000	274 000	1 200	1 500

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

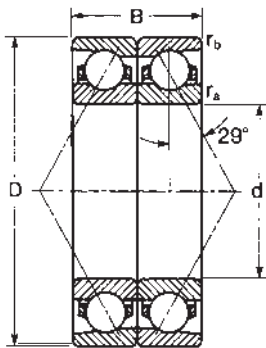
<sup>2)</sup> For thrust rating multiply C by 1.32 and C<sub>0</sub> by 2.94.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.





"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

For duplex sets of 7000 and 9000 series bearings see page 237.

Use these values for back-to-back (DB) or face-to-face (DF) mounting arrangements.

Note: ABEC-1 & 3 stocked as half-pairs, where available.

MRC Bearing Number	Bore		Outside Diameter		Width		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
	d		D		B		r				Dynamic C <sub>d</sub>		Static C <sub>s</sub>		Grease RPM	Oil RPM
	mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf		
7200-D	10	.3937	30	1.1811	18	.7087	.64	.025	.30	.012	8 840	1 900	5 500	1 240	22 000	29 000
7201-D	12	.4724	32	1.2598	20	.7874	.64	.025	.30	.012	10 100	2 270	6 400	1 440	18 000	23 000
7202-D	15	.5906	35	1.3780	22	.8661	.64	.025	.30	.012	14 800	3 330	9 500	2 140	16 000	21 000
7203-D	17	.6693	40	1.5748	24	.9449	.64	.025	.30	.012	19 500	4 380	13 200	2 970	14 000	18 000
7204-D	20	.7874	47	1.8504	28	1.1024	1.0	.04	.60	.024	20 800	4 680	14 600	3 280	12 000	15 000
7205-D	25	.9843	52	2.0472	30	1.1811	1.0	.04	.60	.024	25 100	5 640	19 000	4 270	9 600	13 000
7206-D	30	1.1811	62	2.4409	32	1.2598	1.0	.04	.60	.024	27 600	6 200	23 600	5 310	8 000	10 000
7207-D	35	1.3780	72	2.8346	34	1.3386	1.0	.04	.60	.024	37 700	8 480	34 000	7 640	7 400	9 600
7208-D	40	1.5748	80	3.1496	36	1.4173	1.0	.04	.60	.024	49 400	11 100	45 500	10 200	6 200	8 000
7209-D	45	1.7717	85	3.3465	38	1.4961	1.0	.04	.60	.024	49 400	11 100	46 500	10 500	5 800	7 600
7210-D	50	1.9685	90	3.5433	40	1.5748	1.0	.04	.60	.024	54 000	12 100	54 000	12 100	5 100	6 600
7211-D	55	2.1654	100	3.9370	42	1.6535	1.5	.06	1.0	.040	79 300	17 800	75 000	16 900	4 800	6 200
7212-D	60	2.3622	110	4.3307	44	1.7323	1.5	.06	1.0	.040	85 200	19 100	88 000	19 800	4 300	5 600
7213-D	65	2.5591	120	4.7244	46	1.8110	1.5	.06	1.0	.040	104 000	23 400	110 000	24 700	3 900	5 100
7214-D	70	2.7559	125	4.9213	48	1.8898	1.5	.06	1.0	.040	104 000	23 400	110 000	24 700	3 700	4 800
7215-D	75	2.9528	130	5.1181	50	1.9685	1.5	.06	1.0	.040	130 000	29 200	140 000	31 500	3 400	4 500
7216-D	80	3.1496	140	5.5118	52	2.0472	2.0	.08	1.0	.040	121 000	27 200	134 000	30 100	3 300	4 200
7217-D	85	3.3465	150	5.9055	56	2.2047	2.0	.08	1.0	.040	148 000	33 300	166 000	37 300	3 000	3 900
7218-D	90	3.5433	160	6.2992	60	2.3622	2.0	.08	1.0	.040	190 000	42 700	236 000	53 100	2 900	3 800
7219-D	95	3.7402	170	6.6929	64	2.5197	2.0	.08	1.0	.040	199 000	44 700	228 000	51 300	2 800	3 600
7220-D	100	3.9370	180	7.0866	68	2.6772	2.0	.08	1.0	.040	225 000	50 600	260 000	58 500	2 600	3 300
7221-D	105	4.1339	190	7.4803	72	2.8346	2.0	.08	1.0	.040	242 000	54 400	295 000	66 300	2 400	3 100
7222-D	110	4.3307	200	7.8740	76	2.9921	2.0	.08	1.0	.040	265 000	59 600	310 000	69 700	2 300	3 000
7224-D	120	4.7244	215	8.4646	80	3.1496	2.0	.08	1.0	.040	281 000	63 200	355 000	79 800	2 200	2 800
7226-D	130	5.1181	230	9.0551	80	3.1496	2.5	.10	1.0	.040	319 000	71 700	415 000	93 300	2 000	2 600
7228-D	140	5.5118	250	9.8425	84	3.3071	2.5	.10	1.0	.040	338 000	76 000	465 000	105 000	1 800	2 400
7230-D	150	5.9055	270	10.6299	90	3.5433	2.5	.10	1.0	.040	397 000	89 200	560 000	126 000	1 700	2 200
7232-D	160	6.2992	290	11.4173	96	3.7795	2.5	.10	1.0	.040	442 000	99 400	670 000	135 000	1 600	2 100
7234-D	170	6.6929	310	12.2047	104	4.0945	3.0	.12	1.0	.040	468 000	105 000	735 000	165 000	1 500	2 000
7236-D	180	7.0866	320	12.5984	104	4.0945	3.0	.12	1.0	.040	494 000	111 000	780 000	175 000	1 500	1 900
7238-D	190	7.4803	340	13.3858	110	4.3307	3.0	.12	1.0	.040	540 000	121 000	900 000	202 000	1 400	1 800
7240-D	200	7.8740	360	14.1732	116	4.5669	3.0	.12	1.0	.040	572 000	129 000	965 000	217 000	1 300	1 700
7242-D	210	8.2677	380	14.9606	122	4.8031	3.0	.12	1.0	.040	637 000	143 000	1 120 000	252 000	1 200	1 600
7244-D	220	8.6614	400	15.7480	130	5.1181	3.0	.12	1.0	.040	650 000	146 000	1 200 000	270 000	1 200	1 600
7246-D	230	9.0551	420	16.5354	136	5.3543	3.0	.12	1.0	.040	715 000	161 000	1 340 000	301 000	1 200	1 500
7248-D	240	9.4488	440	17.3228	144	5.6693	3.0	.12	1.0	.040	780 000	175 000	1 500 000	337 000	1 100	1 400
7250-D	250	9.8425	460	18.1102	152	5.9843	4.0	.16	1.5	.060	852 000	192 000	1 660 000	373 000	1 100	1 400
7252-D	260	10.2362	480	18.8976	160	6.2992	4.0	.16	1.5	.060	904 000	203 000	1 830 000	411 000	1 000	1 400
7256-D	280	11.0236	500	19.6850	160	6.2992	4.0	.16	1.5	.060	936 000	210 000	2 000 000	450 000	1 000	1 400
7260-D	300	11.8110	540	21.2598	170	6.6929	4.0	.16	1.5	.060	1 010 000	227 000	2 200 000	495 000	960	1 300
7264-D	320	12.5984	580	22.8346	184	7.2441	4.0	.16	1.5	.060	1 060 000	238 000	2 400 000	540 000	960	1 200

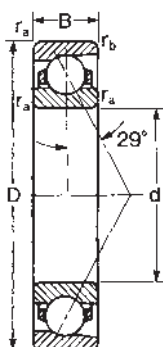
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 0.81 and C<sub>0</sub> by 1.47.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



7300 series bearings have the same ring and ball cage construction as the 7200 Series but are heavier sectioned bearings with a ball complement capable of handling heavier loads. 7300 Series are listed with bore sizes from 10 mm to 280 mm. For two directional thrust loads, use duplex bearings.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub>		Static C <sub>s</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7300	10	.3937	35	1.3780	11	.4331	.64	.025	.60	.024	6 370	1 430	3 200	719	24 000	31 000
7301	12	.4724	37	1.4567	12	.4724	1.0	.04	.60	.024	7 020	1 580	3 750	843	19 000	25 000
7302	15	.5906	42	1.6535	13	.5118	1.0	.04	.60	.024	13 500	3 030	7 100	1 600	16 000	21 000
7303	17	.6693	47	1.8504	14	.5512	1.0	.04	.60	.024	15 900	3 570	8 650	1 940	15 000	19 000
7304	20	.7874	52	2.0472	15	.5906	1.0	.04	.60	.024	18 600	4 180	10 600	2 380	13 000	17 000
7305	25	.9843	62	2.4409	17	.6693	1.0	.04	.60	.024	21 200	4 770	13 700	3 080	11 000	14 000
7306	30	1.1811	72	2.8346	19	.7480	1.0	.04	.60	.024	28 100	6 320	18 600	4 180	9 200	12 000
7307	35	1.3780	80	3.1496	21	.8268	1.5	.06	1.0	.040	35 800	8 050	24 000	5 400	8 500	11 000
7308	40	1.5748	90	3.5433	23	.9055	1.5	.06	1.0	.040	44 200	9 940	30 500	6 860	7 300	9 500
7309	45	1.7717	100	3.9370	25	.9843	1.5	.06	1.0	.040	52 700	11 800	37 500	8 430	6 400	8 300
7310	50	1.9685	110	4.3307	27	1.0630	2.0	.08	1.0	.040	74 100	16 700	53 000	11 900	5 800	7 500
7311	55	2.1654	120	4.7244	29	1.1417	2.0	.08	1.0	.040	85 200	19 200	62 000	13 900	5 100	6 600
7312	60	2.3622	130	5.1181	31	1.2205	2.0	.08	1.0	.040	97 500	21 900	72 000	16 200	4 900	6 400
7313	65	2.5591	140	5.5118	33	1.2992	2.0	.08	1.0	.040	108 000	24 300	86 500	19 400	4 600	6 000
7314	70	2.7559	150	5.9055	35	1.3780	2.0	.08	1.0	.040	111 000	25 000	85 000	19 100	4 100	5 300
7315	75	2.9528	160	6.2992	37	1.4567	2.0	.08	1.0	.040	138 000	31 000	114 000	25 600	3 900	5 000
7316	80	3.1496	170	6.6929	39	1.5354	2.0	.08	1.0	.040	143 000	32 100	120 000	27 000	3 600	4 700
7317	85	3.3465	180	7.0866	41	1.6142	2.5	.10	1.0	.040	163 000	36 600	143 000	32 100	3 500	4 500
7318	90	3.5433	190	7.4803	43	1.6929	2.5	.10	1.0	.040	168 000	37 800	150 000	33 700	3 200	4 200
7319	95	3.7402	200	7.8740	45	1.7717	2.5	.10	1.0	.040	178 000	40 000	166 000	37 300	3 100	4 000
7320	100	3.9370	215	8.4646	47	1.8504	2.5	.10	1.0	.040	190 000	42 700	183 000	41 100	3 000	3 900
7321	105	4.1339	225	8.8583	49	1.9291	2.5	.10	1.0	.040	203 000	45 600	200 000	45 000	2 900	3 800
7322	110	4.3307	240	9.4488	50	1.9685	2.5	.10	1.0	.040	229 000	51 500	236 000	53 100	2 700	3 500
7324	120	4.7244	260	10.2362	55	2.1654	2.5	.10	1.0	.040	260 000	58 500	275 000	61 800	2 500	3 200
7326	130	5.1181	280	11.0236	58	2.2835	3.0	.12	1.0	.040	286 000	64 300	320 000	71 900	2 300	3 000
7328	140	5.5118	300	11.8110	62	2.4409	3.0	.12	1.0	.040	312 000	70 100	375 000	84 300	2 200	2 800
7330	150	5.9055	320	12.5984	65	2.5591	3.0	.12	1.0	.040	345 000	77 600	430 000	96 700	2 000	2 600
7332	160	6.2992	340	13.3858	68	2.6772	3.0	.12	1.0	.040	377 000	84 800	490 000	110 000	1 900	2 500
7334	170	6.6929	360	14.1732	72	2.8346	3.0	.12	1.0	.040	397 000	89 200	520 000	117 000	1 900	2 400
7336	180	7.0866	380	14.9606	75	2.9528	3.0	.12	1.0	.040	423 000	95 100	585 000	132 000	1 800	2 300
7338	190	7.4803	400	15.7480	78	3.0709	4.0	.16	1.5	.060	462 000	104 000	655 000	147 000	1 600	2 100
7340	200	7.8740	420	16.5354	80	3.1496	4.0	.16	1.5	.060	494 000	111 000	720 000	162 000	1 500	2 000
7342	210	8.2677	440	17.3228	84	3.3071	4.0	.16	1.5	.060	527 000	118 000	800 000	180 000	1 500	1 900
7344	220	8.6614	460	18.1102	88	3.4646	4.0	.16	1.5	.060	559 000	126 000	865 000	194 000	1 400	1 800
7348	240	9.4488	500	19.6850	95	3.7402	4.0	.16	1.5	.060	605 000	136 000	965 000	217 000	1 400	1 700
7352	260	10.2362	540	21.2598	102	4.0157	5.0	.20	2.0	.080	663 000	149 000	1 140 000	256 000	1 300	1 600
7356	280	11.0236	580	22.8346	108	4.2520	5.0	.20	2.0	.080	741 000	167 000	1 340 000	301 000	1 200	1 500

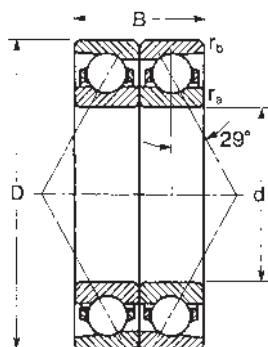
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.32 and C<sub>0</sub> by 2.94.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



“D” indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

For duplex sets of 7000 and 9000 series bearings see page 237.

Note: ABEC-1 & 3 stocked as half-pairs where available.

Use these values for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub> <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7300-D	10	.3937	35	1.3780	22	.8661	.64	.025	.60	.024	10 400	2 340	6 400	1 440	19 000	25 000
7301-D	12	.4724	37	1.4567	24	.9449	1.0	.04	.60	.024	11 400	2 560	7 500	1 690	15 000	20 000
7302-D	15	.5906	42	1.6535	26	1.0236	1.0	.04	.60	.024	21 600	4 860	14 300	3 210	13 000	17 000
7303-D	17	.6693	47	1.8504	28	1.1024	1.0	.04	.60	.024	26 000	5 850	17 300	3 890	12 000	15 000
7304-D	20	.7874	52	2.0472	30	1.1811	1.0	.04	.60	.024	30 200	6 790	21 200	4 770	10 000	14 000
7305-D	25	.9843	62	2.4409	34	1.3386	1.0	.04	.60	.024	34 500	7 760	27 000	6 070	8 800	11 000
7306-D	30	1.1811	72	2.8346	38	1.4961	1.0	.04	.60	.024	46 200	10 400	37 500	8 430	7 400	9 600
7307-D	35	1.3780	80	3.1478	42	1.6535	1.5	.06	1.0	.040	58 500	13 200	48 000	10 800	6 800	8 800
7308-D	40	1.5748	90	3.5433	46	1.8110	1.5	.06	1.0	.040	71 500	16 100	61 000	13 700	5 800	7 600
7309-D	45	1.7717	100	3.9370	50	1.9685	1.5	.06	1.0	.040	85 200	19 200	75 000	16 900	5 100	6 600
7310-D	50	1.9685	110	4.3307	54	2.1260	2.0	.08	1.0	.040	121 000	27 200	106 000	23 800	4 600	6 000
7311-D	55	2.1654	120	4.7244	58	2.2835	2.0	.08	1.0	.040	140 000	31 500	125 000	28 100	4 100	5 300
7312-D	60	2.3622	130	5.1181	62	2.4409	2.0	.08	1.0	.040	159 000	35 700	146 000	32 800	3 900	5 100
7313-D	65	2.5591	140	5.5118	66	2.5984	2.0	.08	1.0	.040	178 000	40 000	173 000	38 900	3 700	4 800
7314-D	70	2.7559	150	5.9055	70	2.7559	2.0	.08	1.0	.040	182 000	40 900	170 000	38 200	3 300	4 200
7315-D	75	2.9528	160	6.2992	74	2.9134	2.0	.08	1.0	.040	225 000	50 600	228 000	51 300	3 100	4 000
7316-D	80	3.1496	170	6.6929	78	3.0709	2.0	.08	1.0	.040	234 000	52 600	240 000	54 000	2 900	3 800
7317-D	85	3.3465	180	7.0866	82	3.2283	2.5	.10	1.0	.040	265 000	59 600	285 000	64 100	2 800	3 600
7318-D	90	3.5433	190	7.4803	86	3.3858	2.5	.10	1.0	.040	276 000	62 000	300 000	67 400	2 600	3 400
7319-D	95	3.7402	200	7.8740	90	3.5433	2.5	.10	1.0	.040	291 000	65 400	325 000	73 100	2 500	3 200
7320-D	100	3.9370	215	8.4646	94	3.7008	2.5	.10	1.0	.040	312 000	70 100	365 000	82 100	2 400	3 100
7321-D	105	4.1339	225	8.8583	98	3.8583	2.5	.10	1.0	.040	332 000	74 600	400 000	89 900	2 300	3 000
7322-D	110	4.3307	240	9.4488	100	3.9370	2.5	.10	1.0	.040	371 000	83 400	475 000	107 000	2 200	2 800
7324-D	120	4.7244	260	10.2362	110	4.3307	2.5	.10	1.0	.040	423 000	95 100	560 000	126 000	2 000	2 600
7326-D	130	5.1181	280	11.0236	116	4.5669	3.0	.12	1.0	.040	468 000	105 000	640 000	144 000	1 800	2 400
7328-D	140	5.5118	300	11.8110	124	4.8819	3.0	.12	1.0	.040	507 000	114 000	735 000	165 000	1 800	2 200
7330-D	150	5.9055	320	12.5984	130	5.1181	3.0	.12	1.0	.040	559 000	126 000	865 000	194 000	1 600	2 100
7332-D	160	6.2992	340	13.3858	136	5.3543	3.0	.12	1.0	.040	618 000	139 000	965 000	217 000	1 500	2 000
7334-D	170	6.6929	360	14.1732	144	5.6693	3.0	.12	1.0	.040	650 000	146 000	1 040 000	234 000	1 500	1 900
7336-D	180	7.0866	380	14.9606	150	5.9055	3.0	.12	1.0	.040	689 000	155 000	1 160 000	261 000	1 400	1 800
7338-D	190	7.4803	400	15.7480	156	6.1417	4.0	.16	1.5	.060	761 000	171 000	1 290 000	270 000	1 300	1 700
7340-D	200	7.8740	420	16.5354	160	6.2992	4.0	.16	1.5	.060	806 000	181 000	1 430 000	321 000	1 200	1 600
7342-D	210	8.2677	440	17.3228	168	6.6142	4.0	.16	1.5	.060	852 000	192 000	1 600 000	360 000	1 200	1 500
7344-D	220	8.6614	460	18.1102	176	6.9291	4.0	.16	1.5	.060	904 000	203 000	1 730 000	389 000	1 100	1 400
7348-D	240	9.4488	500	19.6850	190	7.4803	4.0	.16	1.5	.060	975 000	219 000	1 930 000	434 000	1 000	1 400
7352-D	260	10.2362	540	21.2598	204	8.0315	5.0	.20	2.0	.080	1 080 000	243 000	2 280 000	513 000	960	1 300
7356-D	280	11.0236	580	22.8346	216	8.5039	5.0	.20	2.0	.080	1 210 000	272 000	2 650 000	596 000	960	1 200

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

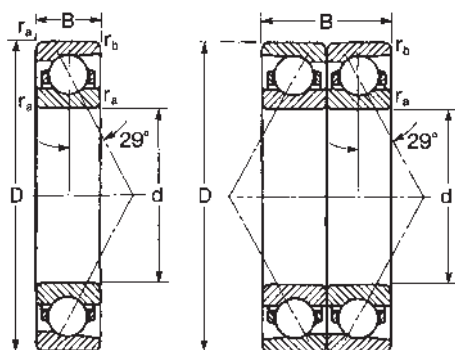
<sup>2)</sup> For thrust rating multiply C by 0.81 and C<sub>0</sub> by 1.47.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33⅓ RPM.





Note: ABEC 1 & 3 stocked as half-pairs where available.

7400 Series bearings are similar to the 7200 and 7300 Series but are heavier sectioned and are used for heavy one-directional thrust loads or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

Values for -D bearings are for back-to-back or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7403	17	.6693	62	2.4409	17	.6693	1.0	.04	.60	.024	26 000	5 850	13 700	3 080	14 000	18 000
7404	20	.7874	72	2.8346	19	.7480	1.0	.04	.60	.024	32 500	7 310	17 600	3 960	12 000	15 000
7405	25	.9843	80	3.1496	21	.8268	1.5	.06	1.0	.040	42 300	9 510	24 500	5 510	9 200	12 000
7406	30	1.1811	90	3.5433	23	.9055	1.5	.06	1.0	.040	54 000	12 100	34 000	7 640	7 700	10 000
7407	35	1.3780	100	3.9370	25	.9843	1.5	.06	1.0	.040	63 700	14 300	40 500	9 100	6 600	8 500
7408	40	1.5748	110	4.3307	27	1.0630	2.0	.08	1.0	.040	74 100	16 700	49 000	11 000	5 400	7 700
7409	45	1.7717	120	4.7244	29	1.1417	2.0	.08	1.0	.040	85 200	19 200	57 000	12 800	5 300	6 900
7410	50	1.9685	130	5.1181	31	1.2205	2.0	.08	1.0	.040	95 600	21 500	72 000	16 200	4 900	6 400
7411	55	2.1654	140	5.5118	33	1.2992	2.0	.08	1.0	.040	108 000	24 300	78 000	17 500	4 500	5 800
7412	60	2.3622	150	5.9055	35	1.3780	2.0	.08	1.0	.040	127 000	28 600	93 000	20 900	4 100	5 300
7413	65	2.5591	160	6.2992	37	1.4567	2.0	.08	1.0	.040	138 000	31 000	106 000	23 800	3 800	4 900
7414	70	2.7559	180	7.0866	42	1.6535	2.5	.10	1.0	.040	168 000	37 800	140 000	31 500	3 500	4 600
7415	75	2.9528	190	7.4803	45	1.7717	2.5	.10	1.0	.040	182 000	40 900	156 000	35 100	3 300	4 300
7416	80	3.1496	200	7.8740	48	1.8898	2.5	.10	1.0	.040	190 000	42 700	170 000	38 200	3 200	4 100
7417	85	3.3465	210	8.2677	52	2.0472	3.0	.12	1.0	.040	203 000	45 600	186 000	41 800	2 900	3 800
7418	90	3.5433	225	8.8583	54	2.1260	3.0	.12	1.0	.040	229 000	51 500	220 000	49 500	2 700	3 500
7419	95	3.7402	250	9.8425	55	2.1654	3.0	.12	1.0	.040	255 000	57 300	255 000	57 300	2 500	3 300
7420	100	3.9370	265	10.4331	60	2.3622	3.0	.12	1.0	.040	276 000	62 000	290 000	65 200	2 400	3 200
7421	105	4.1339	290	11.4173	65	2.5591	3.0	.12	1.0	.040	332 000	74 600	325 000	73 100	2 300	3 000
7422	110	4.3307	320	12.5984	70	2.7559	3.0	.12	1.0	.040	371 000	83 400	390 000	87 700	2 200	2 900

### 7400-D

7403-D	17	.6693	62	2.4409	34	1.3386	1.0	.04	.60	.024	42 300	9 510	27 000	6 070	11 000	14 000
7404-D	20	.7874	72	2.8346	38	1.4961	1.0	.04	.60	.024	52 700	11 800	35 500	7 980	9 600	12 000
7405-D	25	.9843	80	3.1496	42	1.6535	1.5	.06	1.0	.040	68 900	15 500	49 000	11 000	7 400	9 600
7406-D	30	1.1811	90	3.5433	46	1.8110	1.5	.06	1.0	.040	88 400	19 900	68 000	15 300	6 200	8 000
7407-D	35	1.3780	100	3.9370	50	1.9685	1.5	.06	1.0	.040	104 000	23 400	81 500	18 300	5 300	6 800
7408-D	40	1.5748	110	4.3307	54	2.1260	2.0	.08	1.0	.040	121 000	27 200	96 500	21 700	4 300	6 200
7409-D	45	1.7717	120	4.7244	58	2.2835	2.0	.08	1.0	.040	138 000	31 000	114 000	25 600	4 200	5 500
7410-D	50	1.9685	130	5.1181	62	2.4409	2.0	.08	1.0	.040	156 000	35 100	146 000	32 800	3 900	5 100
7411-D	55	2.1654	140	5.5118	66	2.5984	2.0	.08	1.0	.040	178 000	40 000	156 000	35 100	3 600	4 600
7412-D	60	2.3622	150	5.9055	70	2.7559	2.0	.08	1.0	.040	203 000	45 600	190 000	42 700	3 300	4 200
7413-D	65	2.5591	160	6.2992	74	2.9134	2.0	.08	1.0	.040	225 000	50 600	215 000	61 800	3 000	3 900
7414-D	70	2.7559	180	7.0866	84	3.3071	2.5	.10	1.0	.040	276 000	62 000	280 000	62 900	2 800	3 700
7415-D	75	2.9528	190	7.4803	90	3.5433	2.5	.10	1.0	.040	291 000	65 400	310 000	69 700	2 600	3 400
7416-D	80	3.1496	200	7.8740	96	3.7795	2.5	.10	1.0	.040	312 000	70 100	340 000	76 400	2 500	3 300
7417-D	85	3.3465	210	8.2677	104	4.0945	3.0	.12	1.0	.040	332 000	74 200	375 000	84 300	2 300	3 000
7418-D	90	3.5433	225	8.8583	108	4.2520	3.0	.12	1.0	.040	371 000	83 400	440 000	98 900	2 200	2 800
7419-D	95	3.7402	250	9.8425	110	4.3307	3.0	.12	1.0	.040	410 000	92 200	510 000	115 000	2 000	2 600
7420-D	100	3.9370	265	10.4331	120	4.7244	3.0	.12	1.0	.040	449 000	101 000	585 000	132 000	1 900	2 600
7421-D	105	4.1339	290	11.4173	130	5.1181	3.0	.12	1.0	.040	540 000	121 000	670 000	151 000	1 800	2 400
7422-D	110	4.3307	320	12.5984	140	5.5118	3.0	.12	1.0	.040	605 000	136 000	800 000	180 000	1 700	2 300

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.32 and C<sub>0</sub> by 2.94 (single) and C by 0.81 and C<sub>0</sub> by 1.47 (duplex).

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.

## 7000 Series 29° Angular Contact Ball Bearings Single Bearing

### Dynamic and static equivalent radial load and life rating

#### Dynamic equivalent radial load

$$P = F_R \quad \text{when } F_A/F_R \leq 0.80$$

or

$$P = 0.39 F_R + 0.76 F_A \quad \text{when } F_A/F_R > 0.80$$

P = Dynamic equivalent radial load  
F<sub>R</sub> = Radial load  
F<sub>A</sub> = Thrust load

#### Static equivalent radial load

$$P_0 = 0.50 F_R + 0.34 F_A$$

P<sub>0</sub> is always  $\geq F_R$

P<sub>0</sub> = Static equivalent radial load  
F<sub>R</sub> = Radial load  
F<sub>A</sub> = Thrust load

#### Life rating

$$L_{10} = \left( \frac{C}{P} \right)^3 \quad (\text{millions of revolutions})$$

or

$$L_{10h} = \frac{10^6}{60n} \left( \frac{C}{P} \right)^3 \quad (\text{Hours})$$

C = Basic dynamic radial load rating (from single bearing tables)  
P = Dynamic equivalent radial load  
n = Speed in rpm

### Minimum Thrust Load For Angular Contact Ball Bearings

Satisfactory operation of angular contact ball bearings requires sufficient traction forces between the balls and races to minimize damage caused by sliding or skidding. This is particularly important at high speeds where the inertia forces of the balls and cage and the viscous drag in the lubricant can have a detrimental influence on the rolling conditions.

The minimum required thrust load can be determined from the following formula.

$$F_A = A \left( \frac{n}{1000} \right)^2 \text{ Newtons}$$

or

$$F_A = 0.2248 A \left( \frac{n}{1000} \right)^2 \text{ Pounds}$$

Where, F<sub>A</sub> = Minimum thrust load  
A = Bearing design factor listed in the following tables  
n = Speed in RPM

Note: For Duplex Bearings mounted in tandem, multiply the single-bearing thrust value by the number of bearings in tandem.

#### Minimum Thrust Load A Factor

Size	A	Size	A	Size	A	Size	A
7100KR	0.06	7120	63.09	7200	0.07	7300	0.11
7101KR	0.08	7122	94.78	7201	0.11	7301	0.15
7102KR	0.11	7124	131.20	7202	0.19	7302	0.29
7103KR	0.20	7126	150.30	7203	0.30	7303	0.63
7104KR	0.37	7128	200.70	7204	0.42	7304	1.19
7105KR	0.52	7130	264.00	7205	0.94	7305	1.85
7106KR	0.95	7132	342.50	7206	1.41	7306	3.45
7107KR	1.50	7134	435.90	7207	2.82	7307	5.77
7108KR	1.83	7136	547.00	7208	4.95	7308	9.31
7109KR	2.88	7138	794.20	7209	5.46	7309	14.26
7110KR	3.37	7140	977.30	7210	6.87	7310	26.44
7111KR	6.14	7142	1289.00	7211	13.36	7311	36.89
7112KR	7.02	7144	1408.00	7212	17.51	7312	50.17
7113KR	7.97	7146	1686.00	7213	25.86	7313	64.73
7114KR	11.45	7148	2003.00	7214	27.74	7314	73.28
7115KR	12.79	7152	2769.00	7215	40.59	7315	110.90
7116KR	20.43	7156	3679.00	7216	41.61	7316	131.40
7117KR	22.59	7164	5481.00	7217	61.05	7317	178.20
7118KR	32.62			7218	95.12	7318	205.60
7119KR	44.04			7219	108.60	7319	252.80
7120KR	39.28			7220	141.50	7320	314.00
7121KR	54.28			7221	169.80	7321	378.20
7122KR	72.46			7222	212.20	7322	516.40
7124KR	82.13			7224	271.90	7324	713.30
7126KR	147.60			7226	369.40	7326	961.80
7128KR	157.90			7228	466.10	7328	1270.00
7130KR	211.10			7230	664.90	7330	1628.00
7132KR	276.80			7232	921.10	7332	2089.00
7134KR	410.40			7234	1182.00	7334	2442.00
7136KR	546.70			7236	1316.00	7336	3061.00
7138KR	600.00			7238	1662.00	7338	3791.00
7140KR	831.20			7240	1965.00	7340	4644.00
7144KR	1485.00			7242	2538.00	7342	5634.00
7148KR	1685.00			7244	3048.00	7344	6774.00
7152KR	2784.00			7246	3822.00	7348	8517.00
7156KR	3121.00			7248	4734.00	7352	11310.00
7160KR	4790.00			7250	5799.00	7356	15430.00
7164KR	5325.00			7252	7034.00		
				7256	7940.00		
				7260	9950.00		
				7264	12310.00		

**7000 Series**  
**29° Angular Contact Ball Bearings**  
**Single Bearing**

**Dynamic equivalent radial load  
and life calculation examples**

Bearing size: 7309

Speed: 2000 RPM

Basic dynamic radial load rating (C) = 11800

---

**Case 1**

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 1310

Equivalent load (P) =  $F_R$  or  $0.39 F_R + 0.76 F_A$

$F_A/F_R = 1310/1750 = 0.75$

Since  $F_A/F_R < 0.80$ ,  $P = F_R = 1750$

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11800}{1750}\right)^3 = 307 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11800}{1750}\right)^3 \\ &= 2555 \text{ Hrs} \end{aligned}$$

---

**Case 2**

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 2100

Equivalent load (P) =  $F_R$  or  $0.39 F_R + 0.76 F_A$

$F_A/F_R = 2100/1750 = 1.20$

Since  $F_A/F_R > 0.80$ ,  $P = 0.39 \times 1750 + 0.76 \times 2100 = 2279$

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11800}{2279}\right)^3 = 139 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11800}{2279}\right)^3 \\ &= 1157 \text{ Hrs} \end{aligned}$$

---

**Case 3**

Thrust load ( $F_A$ ) = 2100

Equivalent load (P) =  $0.39 F_R + 0.76 F_A$

$F_A/F_R = 2100/0 = \infty$

Since  $F_A/F_R > 0.80$ ,  $P = 0.76 \times 2100 = 1596$

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11800}{1596}\right)^3 = 404 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11800}{1596}\right)^3 \\ &= 3368 \text{ Hrs} \end{aligned}$$

---

**7000-D Series**

**29° Angular Contact Ball Bearings**

**Duplex**

**Dynamic and static equivalent radial load and life rating**

**Dynamic equivalent radial load**

DB or DF pair  
 $P = 1.0 F_R + 0.78 F_A$  when  $\frac{F_A}{F_R} \leq 0.80$

$P = 0.63 F_R + 1.24 F_A$  when  $\frac{F_A}{F_R} > 0.80$

Tandem DT  
 $P = 1.0 F_R$  when  $\frac{F_A}{F_R} \leq 0.80$

$P = 0.39 F_R + 0.76 F_A$  when  $\frac{F_A}{F_R} > 0.80$

$P$  = Dynamic equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

**Life rating**

$L_{10} = \left(\frac{C}{P}\right)^3$  (millions of revolutions)

or

$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3$  (Hours)

$P$  = Dynamic equivalent radial load

$n$  = Speed in rpm

For DB or DF mounting:

$C$  = Duplex pair dynamic radial load rating (from duplex bearing tables)

or

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i = 2$

For DT tandem mounting:

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i$  = number of bearings in set

**Static equivalent radial load**

$P_0 = 1.0 F_R + 0.66 F_A$

$P_0$  is always  $\geq F_R$

$P_0$  = Static equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

## 7000-D Series 29° Angular Contact Ball Bearings Duplex

### Dynamic equivalent radial load and life calculation examples

Bearing size: 7309DU (DB or DF pair)  
Speed: 2000 RPM  
Duplex pair basic dynamic radial load  
rating (C) = 19200

#### Case 1

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 1310  
 $F_A/F_R = 1310/1750 = 0.75$   
Since  $F_A/F_R < 0.80$ , equivalent load  
(P) =  $1.0 F_R + 0.78 F_A$   
=  $1.0 \times 1750 + 0.78 \times 1310 = 2772$

$$\text{Life (L}_{10}) = \left(\frac{C}{P}\right)^3 = \left(\frac{19200}{2772}\right)^3 = 332 \times 10^6 \text{ Rev.}$$

or

$$\text{Life (L}_{10\text{h}}) = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{19200}{2772}\right)^3$$

$$= 2769 \text{ Hrs}$$

#### Case 2

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 2100  
 $F_A/F_R = 2100/1750 = 1.20$   
Since  $F_A/F_R > 0.80$ , equivalent load  
(P) =  $0.63 F_R + 1.24 F_A$   
=  $0.63 \times 1750 + 1.24 \times 2100 = 3707$

$$\text{Life (L}_{10}) = \left(\frac{C}{P}\right)^3 = \left(\frac{19200}{3707}\right)^3 = 139 \times 10^6 \text{ Rev.}$$

or

$$\text{Life (L}_{10\text{h}}) = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{19200}{3707}\right)^3$$

$$= 1158 \text{ Hrs}$$

#### Case 3

Thrust load ( $F_A$ ) = 2100  
 $F_A/F_R = 2100/0 = \infty$   
Since  $F_A/F_R > 0.80$ , equivalent load  
(P) =  $0.63 F_R + 1.24 F_A = 1.24 \times 2100 = 2604$

$$\text{Life (L}_{10}) = \left(\frac{C}{P}\right)^3 = \left(\frac{19200}{2604}\right)^3 = 401 \times 10^6 \text{ Rev.}$$

or

$$\text{Life (L}_{10\text{h}}) = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{19200}{2604}\right)^3$$

$$= 3340 \text{ Hrs}$$

Bearing size: 7309DT  
3 bearings in tandem  
Speed: 2000 RPM  
Single-row basic dynamic radial load  
rating (C) = 11800

#### Case 1

Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/0 = \infty$   
Since  $F_A/F_R > 0.80$ , equivalent load  
(P) =  $0.39 F_R + 0.76 F_A = 0.76 \times 4200 = 3192$   
Load rating = (i) $^{0.7} \times 11800$   
=  $(3)^{0.7} \times 11800 = 25460$

$$\text{Life (L}_{10}) = \left(\frac{C}{P}\right)^3 = \left(\frac{25460}{3192}\right)^3 = 507 \times 10^6 \text{ Rev.}$$

or

$$\text{Life (L}_{10\text{h}}) = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{25460}{3192}\right)^3$$

$$= 4229 \text{ Hrs}$$

#### Case 2

Radial load ( $F_R$ ) = 3500  
Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/3500 = 1.20$   
Since  $F_A/F_R > 0.80$ , equivalent load  
(P) =  $0.39 F_R + 0.76 F_A$   
=  $0.39 \times 3500 + 0.76 \times 4200 = 4557$   
Load rating = (i) $^{0.7} \times 11800$   
=  $(3)^{0.7} \times 11800 = 25460$

$$\text{Life (L}_{10}) = \left(\frac{C}{P}\right)^3 = \left(\frac{25460}{4557}\right)^3 = 174 \times 10^6 \text{ Rev.}$$

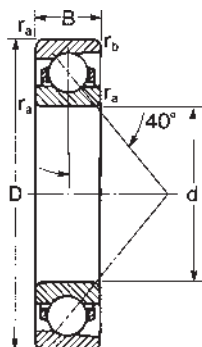
or

$$\text{Life (L}_{10\text{h}}) = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{25460}{4557}\right)^3$$

$$= 1453 \text{ Hrs}$$







MRC 7000-P Series bearings are similar in design to 7000 Series bearings, but the 7000-P Series bearings have features that give them a greatly increased thrust capacity. They are especially recommended for those applications where maximum thrust capacity is required.

This heavy-duty angular contact ball bearing series is designed with an optimum ball complement and race groove depth, and have a 40° contact angle. 7000-P

bearings are restricted to applications involving primarily thrust loads. They should **not** be used where the bearing will be subjected to radial load exclusively, or combined radial and thrust load where the radial load is predominant.

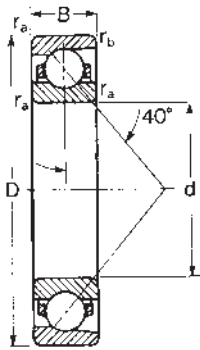
### *Cage Types and Materials*

Furnished in one-piece, inner-ring land-guided, machined brass, phenolic/bakelite composition or special material.

Size	Series	Page
<b>7200P</b>	Light—Single Bearing	<b>136</b>
<b>7200PD</b>	Light—Duplex Set	<b>137</b>
<b>7300P</b>	Medium—Single Bearing	<b>138</b>
<b>7300PD</b>	Medium—Duplex Set	<b>139</b>
<b>7400P/PD</b>	Heavy—Single Bearing and Duplex Set	<b>140</b>
<b>7000P</b>	Equivalent Load and Life	<b>142</b>
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## 7200-P Light Series (Single Bearings)

## MRC Bearing Services



7200-P Light Series bearings are available in bore sizes ranging from 10 mm to 200 mm. They are used with heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d	in	mm	in	mm	in	r <sub>a</sub>	r <sub>b</sub>	r <sub>a</sub>	r <sub>b</sub>	N	lbf	N	lbf		
7200-P	10	.3937	30	1.1811	9	.3543	.64	.025	.30	.012	7 020	1 580	3 200	719	19 000	28 000
7201-P	12	.4724	32	1.2598	10	.3937	.64	.025	.30	.012	7 610	1 710	3 750	843	18 000	26 000
7202-P	15	.5906	35	1.3780	11	.4331	.64	.025	.30	.012	8 840	1 990	4 250	955	17 000	24 000
7203-P	17	.6693	40	1.5748	12	.4724	.64	.025	.30	.012	11 700	2 630	6 000	1 350	15 000	20 000
7204-P	20	.7874	47	1.8504	14	.5512	1.0	.04	.60	.024	14 800	3 330	8 300	1 870	12 000	17 000
7205-P	25	.9843	52	2.0472	15	.5906	1.0	.04	.60	.024	16 800	3 780	10 400	2 340	10 000	15 000
7206-P	30	1.1811	62	2.4409	16	.6299	1.0	.04	.60	.024	21 200	4 770	12 700	2 860	8 500	12 000
7207-P	35	1.3780	72	2.8346	17	.6693	1.0	.04	.60	.024	29 100	6 540	19 300	4 340	8 000	11 000
7208-P	40	1.5748	80	3.1496	18	.7087	1.0	.04	.60	.024	32 500	7 310	22 400	5 040	7 000	9 500
7209-P	45	1.7717	85	3.3465	19	.7480	1.0	.04	.60	.024	39 000	8 770	27 500	6 180	6 700	9 000
7210-P	50	1.9685	90	3.5433	20	.7874	1.0	.04	.60	.024	40 300	9 060	30 000	6 740	6 000	8 000
7211-P	55	2.1654	100	3.9370	21	.8268	1.5	.06	1.0	.040	48 800	11 000	37 500	8 430	5 600	7 500
7212-P	60	2.3622	110	4.3307	22	.8661	1.5	.06	1.0	.040	58 500	13 200	45 500	10 200	5 000	6 700
7213-P	65	2.5591	120	4.7244	23	.9055	1.5	.06	1.0	.040	63 700	14 300	51 000	11 500	4 500	6 000
7214-P	70	2.7559	125	4.9213	24	.9449	1.5	.06	1.0	.040	68 900	15 500	56 000	12 600	4 300	5 600
7215-P	75	2.9528	130	5.1181	25	.9843	1.5	.06	1.0	.040	71 500	16 100	60 000	13 500	4 000	5 300
7216-P	80	3.1496	140	5.5118	26	1.0236	2.0	.08	1.0	.040	83 200	18 700	71 000	16 000	3 800	5 000
7217-P	85	3.3465	150	5.9055	28	1.1024	2.0	.08	1.0	.040	95 600	21 500	83 000	18 700	3 600	4 800
7218-P	90	3.5433	160	6.2992	30	1.1811	2.0	.08	1.0	.040	108 000	24 300	95 000	21 400	3 400	4 500
7219-P	95	3.7402	170	6.6929	32	1.2598	2.0	.08	1.0	.040	124 000	27 900	110 000	24 700	3 200	4 300
7220-P	100	3.9370	180	7.0866	34	1.3386	2.0	.08	1.0	.040	130 000	29 200	125 000	28 100	3 000	4 000
7221-P	105	4.1339	190	7.4803	36	1.4173	2.0	.08	1.0	.040	143 000	32 100	129 000	29 000	2 800	3 800
7222-P	110	4.3307	200	7.8740	38	1.4961	2.0	.08	1.0	.040	153 000	34 400	156 000	35 100	2 600	3 600
7224-P	120	4.7244	215	8.4646	40	1.5748	2.0	.08	1.0	.040	165 000	37 100	163 000	36 600	2 200	3 200
7226-P	130	5.1181	230	9.0551	40	1.5748	2.5	.10	1.0	.040	186 000	41 800	193 000	43 400	1 900	2 800
7228-P	140	5.5118	250	9.8425	42	1.6535	2.5	.10	1.0	.040	199 000	44 700	216 000	48 600	1 800	2 600
7230-P	150	5.9055	270	10.6299	45	1.7717	2.5	.10	1.0	.040	216 000	48 600	260 000	58 500	1 700	2 400
7232-P	160	6.2992	290	11.4173	48	1.8898	2.5	.10	1.0	.040	238 000	53 500	280 000	62 900	1 600	2 200
7234-P	170	6.6929	310	12.2047	52	2.0472	3.0	.12	1.0	.040	265 000	59 600	335 000	75 300	1 600	2 200
7236-P	180	7.0866	320	12.5984	52	2.0472	3.0	.12	1.0	.040	276 000	62 000	355 000	79 800	1 500	2 000
7238-P	190	7.4803	340	13.3858	55	2.1654	3.0	.12	1.0	.040	302 000	67 900	405 000	91 000	1 400	1 900
7240-P	200	7.8740	360	14.1732	58	2.2835	3.0	.12	1.0	.040	319 000	71 700	440 000	98 900	1 300	1 800

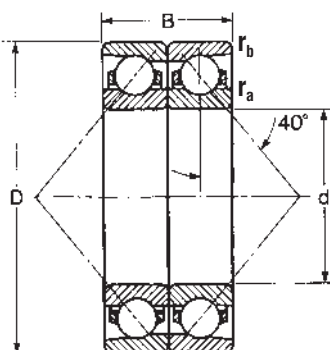
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>0</sub> by 3.85.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



Note: ABEC - 1 & 3 stocked as half-pairs, where available.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

For duplex sets of 7000 and 9000 series bearings see page 237.

Use these values for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf		
7200-PD	10	.3937	30	1.1811	18	.7087	.64	.025	.30	.012	11 400	2 560	6 400	1 440	16 000	22 000
7201-PD	12	.4724	32	1.2598	20	.7874	.64	.025	.30	.012	12 500	2 810	7 500	1 690	13 000	18 000
7202-PD	15	.5906	35	1.3780	22	.8661	.64	.025	.30	.012	14 300	3 210	8 500	1 910	12 000	17 000
7203-PD	17	.6693	40	1.5748	24	.9449	.64	.025	.30	.012	19 000	4 270	12 000	2 700	11 000	16 000
7204-PD	20	.7874	47	1.8504	28	1.1024	1.0	.04	.60	.024	24 200	5 440	16 600	3 730	9 500	14 000
7205-PD	25	.9843	52	2.0472	30	1.1811	1.0	.04	.60	.024	27 000	6 070	20 800	4 680	8 500	12 000
7206-PD	30	1.1811	62	2.4409	32	1.2598	1.0	.04	.60	.024	34 500	7 760	25 500	5 730	7 500	10 000
7207-PD	35	1.3780	72	2.8346	34	1.3386	1.0	.04	.60	.024	47 500	10 700	39 000	8 770	6 300	8 500
7208-PD	40	1.5748	80	3.1496	36	1.4173	1.0	.04	.60	.024	52 700	11 800	45 000	10 100	5 600	7 500
7209-PD	45	1.7717	85	3.3465	38	1.4961	1.0	.04	.60	.024	62 400	14 000	55 000	12 400	5 300	7 000
7210-PD	50	1.9685	90	3.5433	40	1.5748	1.0	.04	.60	.024	65 000	14 600	60 000	13 500	4 800	6 300
7211-PD	55	2.1654	100	3.9370	42	1.6535	1.5	.06	1.0	.040	79 300	17 800	75 000	16 900	4 500	6 000
7212-PD	60	2.3622	110	4.3307	44	1.7323	1.5	.06	1.0	.040	95 600	21 500	91 600	20 600	4 000	5 300
7213-PD	65	2.5591	120	4.7244	46	1.8110	1.5	.06	1.0	.040	104 000	23 400	100 000	22 500	3 600	4 800
7214-PD	70	2.7559	125	4.9213	48	1.8898	1.5	.06	1.0	.040	112 000	25 200	112 000	25 200	3 400	4 500
7215-PD	75	2.9528	130	5.1181	50	1.9685	1.5	.06	1.0	.040	117 000	26 300	120 000	27 000	3 200	4 300
7216-PD	80	3.1496	140	5.5118	52	2.0472	2.0	.08	1.0	.040	135 000	30 300	140 000	31 500	3 000	4 000
7217-PD	85	3.3465	150	5.9055	56	2.2047	2.0	.08	1.0	.040	156 000	35 100	166 000	37 300	2 800	3 800
7218-PD	90	3.5433	160	6.2992	60	2.3622	2.0	.08	1.0	.040	178 000	40 000	190 000	42 700	2 600	3 600
7219-PD	95	3.7402	170	6.6929	64	2.5197	2.0	.08	1.0	.040	199 000	44 700	220 000	49 500	2 400	3 400
7220-PD	100	3.9370	180	7.0866	68	2.6772	2.0	.08	1.0	.040	212 000	47 700	250 000	56 200	2 200	3 200
7221-PD	105	4.1339	190	7.4803	72	2.8346	2.0	.08	1.0	.040	229 000	51 500	260 000	58 500	2 000	3 000
7222-PD	110	4.3307	200	7.8740	76	2.9921	2.0	.08	1.0	.040	251 000	56 400	310 000	69 700	1 900	2 800
7224-PD	120	4.7244	215	8.4646	80	3.1496	2.0	.08	1.0	.040	270 000	60 700	325 000	73 100	1 700	2 400
7226-PD	130	5.1181	230	9.0551	80	3.1496	2.5	.10	1.0	.040	302 000	67 900	390 000	87 700	1 700	2 400
7228-PD	140	5.5118	250	9.8425	84	3.3071	2.5	.10	1.0	.040	319 000	71 700	430 000	96 700	1 600	2 200
7230-PD	150	5.9055	270	10.6299	90	3.5433	2.5	.10	1.0	.040	351 000	78 900	520 000	117 000	1 500	2 000
7232-PD	160	6.2992	290	11.4173	96	3.7795	2.5	.10	1.0	.040	390 000	87 700	560 000	126 000	1 300	1 700
7234-PD	170	6.6929	310	12.2047	104	4.0945	3.0	.12	1.0	.040	436 000	98 000	655 000	147 000	1 200	1 600
7236-PD	180	7.0866	320	12.5984	104	4.0945	3.0	.12	1.0	.040	449 000	101 000	710 000	160 000	1 100	1 500
7238-PD	190	7.4803	340	13.3858	110	4.3307	3.0	.12	1.0	.040	488 000	110 000	815 000	183 000	1 100	1 500
7240-PD	200	7.8740	360	14.1732	116	4.5669	3.0	.12	1.0	.040	520 000	117 000	880 000	198 000	1 000	1 400

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.08 and C<sub>0</sub> by 1.93.

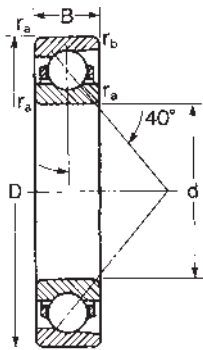
<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.

## 7300-P Medium Series (Single Bearings)

## MRC Bearing Services



7300-P Medium Series bearings are available in bore sizes from 10 mm to 200 mm. They can accommodate very heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub> <sup>4)</sup>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7300-P	10	.3937	35	1.3780	11	.4331	.64	.025	.30	.012	9 360	2 100	4 150	933	18 000	26 000
7301-P	12	.4724	37	1.4567	12	.4724	1.0	.04	.60	.024	11 200	2 520	5 000	1 120	17 000	24 000
7302-P	15	.5906	42	1.6535	13	.5118	1.0	.04	.60	.024	12 700	2 860	6 100	1 370	15 000	20 000
7303-P	17	.6693	47	1.8504	14	.5512	1.0	.04	.60	.024	16 800	3 780	8 500	1 910	13 000	18 000
7304-P	20	.7874	52	2.0472	15	.5906	1.0	.04	.60	.024	18 600	4 180	9 500	2 140	11 000	16 000
7305-P	25	.9843	62	2.4409	17	.6693	1.0	.04	.60	.024	24 200	5 440	13 400	3 010	9 000	13 000
7306-P	30	1.1811	72	2.8346	19	.7480	1.0	.04	.60	.024	32 500	7 310	19 600	4 410	8 000	11 000
7307-P	35	1.3780	80	3.1496	21	.8268	1.5	.06	1.0	.040	39 700	8 920	24 500	5 510	7 500	10 000
7308-P	40	1.5748	90	3.5433	23	.9055	1.5	.06	1.0	.040	47 500	10 700	30 500	6 860	6 700	9 000
7309-P	45	1.7717	100	3.9370	25	.9843	1.5	.06	1.0	.040	59 200	13 300	40 000	8 990	6 000	8 000
7310-P	50	1.9685	110	4.3307	27	1.0630	2.0	.08	1.0	.040	68 900	15 500	52 000	11 700	5 300	7 000
7311-P	55	2.1654	120	4.7244	29	1.1417	2.0	.08	1.0	.040	79 300	17 800	56 000	12 600	4 800	6 300
7312-P	60	2.3622	130	5.1181	31	1.2205	2.0	.08	1.0	.040	90 400	20 300	64 000	14 400	4 500	6 000
7313-P	65	2.5591	140	5.5118	33	1.2992	2.0	.08	1.0	.040	101 000	22 700	80 000	18 000	4 300	5 600
7314-P	70	2.7559	150	5.9055	35	1.3780	2.0	.08	1.0	.040	117 000	26 300	93 000	20 900	3 800	5 000
7315-P	75	2.9528	160	6.2992	37	1.4567	2.0	.08	1.0	.040	127 000	28 600	100 000	22 500	3 600	4 800
7316-P	80	3.1496	170	6.6929	39	1.5354	2.0	.08	1.0	.040	138 000	31 000	110 000	24 700	3 400	4 500
7317-P	85	3.3465	180	7.0866	41	1.6142	2.5	.10	1.0	.040	148 000	33 300	122 000	27 400	3 200	4 300
7318-P	90	3.5433	190	7.4803	43	1.6929	2.5	.10	1.0	.040	159 000	35 700	137 000	30 800	3 000	4 000
7319-P	95	3.7402	200	7.8740	45	1.7717	2.5	.10	1.0	.040	168 000	37 800	150 000	33 700	2 800	3 800
7320-P	100	3.9370	215	8.4646	47	1.8504	2.5	.10	1.0	.040	190 000	42 700	190 000	42 700	2 600	3 600
7321-P	105	4.1339	225	8.8583	49	1.9291	2.5	.10	1.0	.040	203 000	45 600	196 000	44 100	2 400	3 400
7322-P	110	4.3307	240	9.4488	50	1.9685	2.5	.10	1.0	.040	212 000	47 700	228 000	51 300	2 200	3 200
7324-P	120	4.7244	260	10.2362	55	2.1654	2.5	.10	1.0	.040	238 000	53 500	265 000	59 600	1 900	2 800
7326-P	130	5.1181	280	11.0236	58	2.2835	3.0	.12	1.0	.040	276 000	62 000	305 000	68 600	1 800	2 600
7328-P	140	5.5118	300	11.8110	62	2.4409	3.0	.12	1.0	.040	302 000	67 900	345 000	77 600	1 700	2 400
7330-P	150	5.9055	320	12.5984	65	2.5591	3.0	.12	1.0	.040	325 000	73 100	390 000	87 700	1 600	2 200
7332-P	160	6.2992	340	13.3858	68	2.6772	3.0	.12	1.0	.040	345 000	77 600	425 000	95 500	1 500	2 000
7334-P	170	6.6929	360	14.1732	72	2.8346	3.0	.12	1.0	.040	377 000	84 800	490 000	110 000	1 400	1 900
7336-P	180	7.0866	380	14.9606	75	2.9528	3.0	.12	1.0	.040	403 000	90 600	540 000	121 000	1 300	1 800
7338-P	190	7.4803	400	15.7480	78	3.0709	4.0	.16	1.5	.060	416 000	93 500	570 000	128 000	1 200	1 700
7340-P	200	7.8740	420	16.5354	80	3.1496	4.0	.16	1.5	.060	449 000	101 000	655 000	147 000	1 100	1 600

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

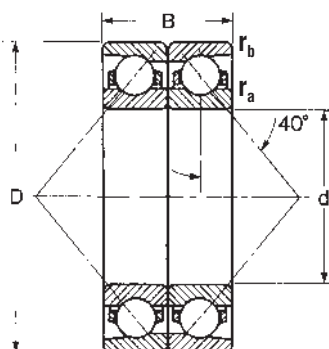
<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>0</sub> by 3.85.

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33⅓ RPM.





Note: ABEC-1 & 3 stocked as half-pairs, where available.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

For duplex sets of 7000 and 9000 series bearings see page 237.

Use these values for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7300-PD	10	.3937	35	1.3780	22	.8661	.64	.025	.30	.012	15 300	3 440	8 300	1 870	15 000	21 000
7301-PD	12	.4724	37	1.4567	24	.9449	1.0	.04	.60	.024	18 200	4 090	10 200	2 290	14 000	19 000
7302-PD	15	.5906	42	1.6535	26	1.0236	1.0	.04	.60	.024	20 300	4 560	12 200	2 740	11 000	16 000
7303-PD	17	.6693	47	1.8504	28	1.1024	1.0	.04	.60	.024	27 600	6 200	17 000	3 820	9 500	14 000
7304-PD	20	.7874	52	2.0472	30	1.1811	1.0	.04	.60	.024	30 200	6 790	19 000	4 270	9 000	13 000
7305-PD	25	.9843	62	2.4409	34	1.3386	1.0	.04	.60	.024	39 000	8 770	27 000	6 070	7 500	10 000
7306-PD	30	1.1811	72	2.8346	38	1.4961	1.0	.04	.60	.024	52 700	11 800	39 000	8 770	6 700	9 000
7307-PD	35	1.3780	80	3.1496	42	1.6535	1.5	.06	1.0	.040	63 700	14 300	49 000	11 000	6 000	8 000
7308-PD	40	1.5748	90	3.5433	46	1.8110	1.5	.06	1.0	.040	76 100	17 100	61 000	13 700	5 300	7 000
7309-PD	45	1.7717	100	3.9370	50	1.9685	1.5	.06	1.0	.040	97 500	21 900	80 000	18 000	4 800	6 300
7310-PD	50	1.9685	110	4.3307	54	2.1260	2.0	.08	1.0	.040	112 000	25 200	104 000	23 400	4 300	5 600
7311-PD	55	2.1654	120	4.7244	58	2.2835	2.0	.08	1.0	.040	130 000	29 200	112 000	25 200	3 800	5 000
7312-PD	60	2.3622	130	5.1181	62	2.4409	2.0	.08	1.0	.040	148 000	33 300	129 000	29 000	3 600	4 800
7313-PD	65	2.5591	140	5.5118	66	2.5984	2.0	.08	1.0	.040	165 000	37 100	160 000	36 000	3 200	4 300
7314-PD	70	2.7559	150	5.9055	70	2.7559	2.0	.08	1.0	.040	190 000	42 700	186 000	41 800	3 000	4 000
7315-PD	75	2.9528	160	6.2992	74	2.9134	2.0	.08	1.0	.040	208 000	46 800	200 000	45 000	2 800	3 800
7316-PD	80	3.1496	170	6.6929	78	3.0709	2.0	.08	1.0	.040	225 000	50 600	220 000	49 500	2 600	3 600
7317-PD	85	3.3465	180	7.0866	82	3.2283	2.5	.10	1.0	.040	238 000	53 500	245 000	55 100	2 400	3 400
7318-PD	90	3.5433	190	7.4803	86	3.3858	2.5	.10	1.0	.040	255 000	57 300	270 000	60 700	2 200	3 200
7319-PD	95	3.7402	200	7.8740	90	3.5433	2.5	.10	1.0	.040	276 000	62 000	300 000	67 400	2 000	3 000
7320-PD	100	3.9370	215	8.4646	94	3.7008	2.5	.10	1.0	.040	307 000	69 000	380 000	85 400	1 900	2 800
7321-PD	105	4.1339	225	8.8583	98	3.8583	2.5	.10	1.0	.040	325 000	73 100	390 000	87 700	1 800	2 600
7322-PD	110	4.3307	240	9.4488	100	3.9370	2.5	.10	1.0	.040	345 000	77 600	455 000	102 000	1 700	2 400
7324-PD	120	4.7244	260	10.2362	110	4.3307	2.5	.10	1.0	.040	390 000	87 700	530 000	119 000	1 600	2 200
7326-PD	130	5.1181	280	11.0236	116	4.5669	3.0	.12	1.0	.040	449 000	101 000	610 000	137 000	1 500	2 000
7328-PD	140	5.5118	300	11.8110	124	4.8819	3.0	.12	1.0	.040	488 000	110 000	695 000	156 000	1 400	1 900
7330-PD	150	5.9055	320	12.5984	130	5.1181	3.0	.12	1.0	.040	540 000	121 000	780 000	175 000	1 200	1 700
7332-PD	160	6.2992	340	13.3858	136	5.3543	3.0	.12	1.0	.040	553 000	124 000	850 000	191 000	1 200	1 600
7334-PD	170	6.6929	360	14.1732	144	5.6693	3.0	.12	1.0	.040	605 000	136 000	965 000	217 000	1 000	1 500
7336-PD	180	7.0866	380	14.9606	150	5.9055	3.0	.12	1.0	.040	650 000	146 000	1 100 000	247 000	950	1 400
7338-PD	190	7.4803	400	15.7480	156	6.1417	4.0	.16	1.5	.060	676 000	152 000	1 160 000	261 000	950	1 400
7340-PD	200	7.8740	420	16.5354	160	6.2992	4.0	.16	1.5	.060	741 000	167 000	1 320 000	297 000	880	1 300

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.08 and C<sub>0</sub> by 1.93.

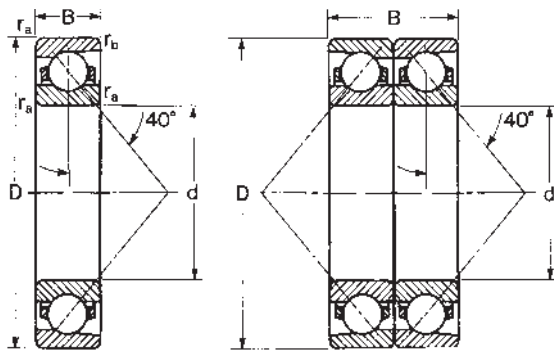
<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.

# 7400-P and 7400-PD Heavy Series

## MRC Bearing Services



Note: ABEC 1 & 3 stocked as half-pairs where available.

7400-P Series bearings are similar to the 7200-P and 7300-P Series, but are heavier sectioned, and are used for very heavy thrust loads or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

For duplex sets of 7000 and 9000 series bearings see page 237.

**Caution: Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.**

Values for -D bearings are for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub>		Static C <sub>0</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	r <sub>b</sub> mm	r <sub>a</sub> in	r <sub>b</sub> in	N	lbf	N	lbf		
7405P	25	.9843	80	3.1496	21	.8268	1.5	.060	1.0	.040	39 700	8 920	23 600	5 310	7 000	10 000
7406P	30	1.1811	90	3.5433	23	.9055	1.5	.060	1.0	.040	47 500	10 700	29 000	6 520	6 300	9 000
7407P	35	1.3780	100	3.9370	25	.9843	1.5	.060	1.0	.040	60 500	13 600	38 000	8 540	5 600	7 500
7408P	40	1.5748	110	4.3307	27	1.0630	2.0	.080	1.0	.040	70 200	15 800	45 000	10 100	5 300	7 000
7409P	45	1.7717	120	4.7244	29	1.1417	2.0	.080	1.0	.040	85 200	19 200	55 000	12 400	4 800	6 300
7410P	50	1.9685	130	5.1181	31	1.2205	2.0	.080	1.0	.040	95 600	21 500	64 000	14 400	4 300	6 000
7411P	55	2.1654	140	5.5118	33	1.2992	2.0	.080	1.0	.040	111 000	25 000	76 500	17 200	4 000	5 600
7412P	60	2.3622	150	5.9055	35	1.3780	2.0	.080	1.0	.040	119 000	26 800	86 500	19 400	3 600	5 000
7413P	65	2.5591	160	6.2992	37	1.4567	2.0	.080	1.0	.040	130 000	29 200	96 500	21 700	3 400	4 800
7414P	70	2.7559	180	7.0866	42	1.6535	2.5	.100	1.0	.040	159 000	35 700	127 000	28 600	3 000	4 300
7415P	75	2.9528	190	7.4803	45	1.7717	2.5	.100	1.0	.040	168 000	37 800	140 000	31 500	2 800	4 000
7416P	80	3.1496	200	7.8740	48	1.8898	2.5	.100	1.0	.040	183 000	41 100	156 000	35 100	2 600	3 800
7417P	85	3.3465	210	8.2677	52	2.0472	3.0	.120	1.0	.040	190 000	42 700	166 000	37 300	2 500	3 600
7418P	90	3.5433	225	8.8583	54	2.1260	3.0	.120	1.0	.040	216 000	48 600	200 000	45 000	2 400	3 400
7419P	95	3.7402	250	9.8425	55	2.1654	3.0	.120	1.0	.040	251 000	56 400	245 000	55 100	2 200	3 000
7420P	100	3.9370	265	10.4331	60	2.3622	3.0	.120	1.0	.040	276 000	62 000	275 000	61 800	2 000	2 800
7421P	105	4.1339	290	11.4173	65	2.5591	3.0	.120	1.0	.040	265 000	59 600	280 000	62 900	1 900	2 600

### 7400-PD

7405PD	25	.9843	80	3.1496	42	1.6535	1.5	.060	1.0	.040	65 000	14 500	47 500	10 600	5 600	8 000
7406PD	30	1.1811	90	3.5433	46	1.8110	1.5	.060	1.0	.040	78 000	17 400	58 500	13 000	5 000	7 200
7407PD	35	1.3780	100	3.9370	50	1.9685	1.5	.060	1.0	.040	97 500	22 100	76 500	17 100	4 500	6 000
7408PD	40	1.5748	110	4.3307	54	2.1260	2.0	.080	1.0	.040	114 000	25 700	90 000	20 200	4 300	5 600
7409PD	45	1.7717	120	4.7244	58	2.2835	2.0	.080	1.0	.040	138 000	31 200	110 000	24 800	3 800	5 000
7410PD	50	1.9685	130	5.1181	62	2.4409	2.0	.080	1.0	.040	156 000	34 900	129 000	28 800	3 400	4 800
7411PD	55	2.1654	140	5.5118	66	2.5984	2.0	.080	1.0	.040	182 000	40 600	153 000	34 400	3 200	4 500
7412PD	60	2.3622	150	5.9055	70	2.7559	2.0	.080	1.0	.040	195 000	43 600	173 000	38 800	2 800	4 000
7413PD	65	2.5591	160	6.2992	74	2.9134	2.0	.080	1.0	.040	212 000	47 400	193 000	43 400	2 700	3 800
7414PD	70	2.7559	180	7.0866	84	3.3071	2.5	.100	1.0	.040	260 000	58 000	255 000	57 200	2 400	3 400
7415PD	75	2.9528	190	7.4803	90	3.5433	2.5	.100	1.0	.040	276 000	61 400	280 000	63 000	2 200	3 200
7416PD	80	3.1496	200	7.8740	96	3.7795	2.5	.100	1.0	.040	296 000	66 500	310 000	69 700	2 000	3 000
7417PD	85	3.3465	210	8.2677	104	4.0945	3.0	.120	1.0	.040	307 000	69 400	335 000	74 600	2 000	2 800
7418PD	90	3.5433	225	8.8583	108	4.2520	3.0	.120	1.0	.040	351 000	78 900	400 000	89 900	1 900	2 700
7419PD	95	3.7402	250	9.8425	110	4.3307	3.0	.120	1.0	.040	410 000	92 200	490 000	110 000	1 800	2 400
7420PD	100	3.9370	265	10.4331	120	4.7244	3.0	.120	1.0	.040	449 000	101 000	550 000	124 000	1 600	2 200
7421PD	105	4.1339	290	11.4173	130	5.1181	3.0	.120	1.0	.040	436 000	96 900	560 000	126 000	1 500	2 000

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>0</sub> by 3.85 (single) and C by 1.08 and C<sub>0</sub> by 1.93 (duplex).

<sup>3)</sup> Listed values are for machined bronze cage, ABEC-1.

For phenolic composition cage, multiply by 1.33 for both grease and oil. For phenolic composition cage, ABEC-5 or 7, multiply by 1.86 for both grease and oil. For pressed steel cage, ABEC-1, multiply by 0.67 for grease and 0.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 276.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



## 7000-P Series

### 40° Angular Contact Ball Bearings

#### Single Bearing

#### Dynamic and static equivalent radial load and life rating

##### Dynamic equivalent radial load

$$P = F_R \quad \text{when } F_A/F_R \leq 1.14$$

or

$$P = 0.35 F_R + 0.57 F_A \quad \text{when } F_A/F_R > 1.14$$

P = Dynamic equivalent radial load

F<sub>R</sub> = Radial load

F<sub>A</sub> = Thrust load

##### Static equivalent radial load

$$P_0 = 0.5 F_R + 0.26 F_A$$

P<sub>0</sub> is always  $\geq F_R$

P<sub>0</sub> = Static equivalent radial load

F<sub>R</sub> = Radial load

F<sub>A</sub> = Thrust load

##### Life rating

$$L_{10} = \left(\frac{C}{P}\right)^3 \quad (\text{millions of revolutions})$$

or

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 \quad (\text{Hours})$$

C = Basic dynamic radial load rating (from single bearing tables)

P = Dynamic equivalent radial load

n = Speed in rpm

#### Minimum Thrust Load For Angular Contact Ball Bearings

Satisfactory operation of angular contact ball bearings requires sufficient traction forces between the balls and races to minimize damage caused by sliding or skidding. This is particularly important at high speeds where the inertia forces of the balls and cage and the viscous drag in the lubricant can have a detrimental influence on the rolling conditions.

The minimum required thrust load can be determined from the following formula.

$$F_A = A \left(\frac{n}{1000}\right)^2 \text{ Newtons}$$

or

$$F_A = 0.2248 A \left(\frac{n}{1000}\right)^2 \text{ Pounds}$$

Where, F<sub>A</sub> = Minimum thrust load

A = Bearing design factor listed in the following tables

n = Speed in RPM

##### Minimum Thrust Load A Factor

Size	A	Size	A
7200P	0.23	7300P	0.41
7201P	0.29	7301P	0.59
7202P	0.42	7302P	0.85
7203P	0.74	7303P	1.53
7204P	1.32	7304P	1.91
7205P	1.90	7305P	3.85
7206P	3.45	7306P	7.39
7207P	6.73	7307P	11.66
7208P	9.28	7308P	17.31
7209P	13.13	7309P	29.08
7210P	15.48	7310P	36.26
7211P	23.88	7311P	57.36
7212P	35.31	7312P	77.30
7213P	44.55	7313P	111.40
7214P	53.74	7314P	144.60
7215P	61.15	7315P	182.70
7216P	84.07	7316P	215.80
7217P	112.90	7317P	269.40
7218P	148.50	7318P	332.30
7219P	191.90	7319P	405.70
7220P	224.10	7320P	629.40
7221P	282.70	7321P	673.40
7222P	352.10	7322P	904.70
7224P	450.50	7324P	1227.00
7226P	604.70	7326P	1631.00
7228P	761.60	7328P	2128.00
7230P	1074.00	7330P	2731.00
7232P	1314.00	7332P	3198.00
7234P	1777.00	7334P	3717.00
7236P	1981.00	7336P	5006.00
7238P	2499.00	7338P	5739.00
7240P	3081.00	7340P	7048.00
		7405P	10.80
		7406P	16.17
		7407P	27.54
		7408P	38.49
		7409P	58.46
		7410P	78.46
		7411P	111.70
		7412P	143.60
		7413P	181.90
		7414P	309.20
		7415P	376.40
		7416P	452.40
		7417P	542.30
		7418P	724.60
		7419P	1083.00
		7420P	1387.00
		7421P	1546.00

Note: For Duplex Bearings mounted in tandem, multiply the single-bearing thrust value by the number of bearings in tandem.

## 7000-P Series 40° Angular Contact Ball Bearings Single Bearing

### Dynamic equivalent radial load and life calculation examples

Bearing size: 7309 P

Speed: 2000 RPM

Basic dynamic radial load rating (C) = 13300

#### Case 1

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 1960

$F_A/F_R = 1960/1750 = 1.12$

Since  $F_A/F_R < 1.14$ , equivalent load (P) =  $F_R = 1750$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13300}{1750}\right)^3 = 439 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13300}{1750}\right)^3 \\ &= 3658 \text{ Hrs}\end{aligned}$$

#### Case 2

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 2450

$F_A/F_R = 2450/1750 = 1.40$

Since  $F_A/F_R > 1.14$ , equivalent load (P) =  $0.35 F_R + 0.57 F_A$

$P = 0.35 \times 1750 + 0.57 \times 2450 = 2009$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13300}{2009}\right)^3 = 290 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13300}{2009}\right)^3 \\ &= 2418 \text{ Hrs}\end{aligned}$$

#### Case 3

Thrust load ( $F_A$ ) = 2450

$F_A/F_R = 2450/0 = \infty$

Since  $F_A/F_R > 1.14$ , equivalent load (P) =  $0.35 F_R + 0.57 F_A$

$P = 0.57 \times 2450 = 1397$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13300}{1397}\right)^3 = 863 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13300}{1397}\right)^3 \\ &= 7191 \text{ Hrs}\end{aligned}$$



**7000-PD Series**  
**40° Angular Contact Ball Bearings**  
**Duplex**

**Dynamic and static equivalent radial load and life rating**

**Dynamic equivalent radial load**

DB or DF pair  
 $P = 1.0 F_R + 0.55 F_A$  when  $\frac{F_A}{F_R} \leq 1.14$

$P = 0.57 F_R + 0.93 F_A$  when  $\frac{F_A}{F_R} > 1.14$

Tandem DT  
 $P = 1.0 F_R$  when  $\frac{F_A}{F_R} \leq 1.14$

$P = 0.35 F_R + 0.57 F_A$  when  $\frac{F_A}{F_R} > 1.14$

$P$  = Dynamic equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

**Life rating**

$L_{10} = \left(\frac{C}{P}\right)^3$  (millions of revolutions)

or

$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3$  (Hours)

$P$  = Dynamic equivalent radial load

$n$  = Speed in rpm

For DB or DF mounting:

$C$  = Duplex pair dynamic radial load rating (from duplex bearing tables)

or

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i = 2$

For DT tandem mounting:

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i$  = number of bearings in set

**Static equivalent radial load**

$P_0 = 1.0 F_R + 0.52 F_A$

$P_0$  is always  $\geq F_R$

$P_0$  = Static equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

## 7000-PD Series 40° AngularContact Ball Bearings Duplex

### Dynamic equivalent radial load and life calculation examples

Bearing size: 7309PDU (DB or DF pair)  
Speed: 2000 RPM  
Duplex pair basic dynamic radial load  
rating (C) = 21900

#### Case 1

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 1960  
 $F_A/F_R = 1960/1750 = 1.12$   
Since  $F_A/F_R < 1.14$ , equivalent load  
(P) =  $1.0 F_R + 0.55 F_A$   
 $= 1.0 \times 1750 + 0.55 \times 1960 = 2828$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2828}\right)^3 = 464 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2828}\right)^3$   
 $= 3870 \text{ Hrs}$

#### Case 2

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 2450  
 $F_A/F_R = 2450/1750 = 1.40$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.57 F_R + 0.93 F_A$   
 $= 0.57 \times 1750 + 0.93 \times 2450 = 3276$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{3276}\right)^3 = 299 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{3276}\right)^3$   
 $= 2490 \text{ Hrs}$

#### Case 3

Thrust load ( $F_A$ ) = 2450  
 $F_A/F_R = 2450/0 = \infty$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.57 F_R + 0.93 F_A = 0.93 \times 2450 = 2279$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2279}\right)^3 = 887 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2279}\right)^3$   
 $= 7395 \text{ Hrs}$

Bearing size: 7309 PDT  
3 bearings in tandem  
Speed: 2000 RPM  
Single-row basic dynamic radial load  
rating (C) = 13300

#### Case 1

Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/0 = \infty$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.35 F_R + 0.57 F_A = 0.57 \times 4200 = 2394$   
Load rating = (i) $^{0.7} \times 13300$   
 $= (3)^{0.7} \times 13300 = 28697$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{28697}{2394}\right)^3 = 1722 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{28697}{2394}\right)^3$   
 $= 14353 \text{ Hrs}$

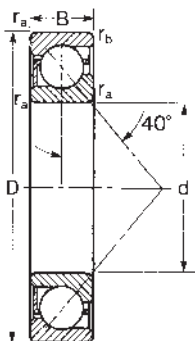
#### Case 2

Radial load ( $F_R$ ) = 3500  
Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/3500 = 1.20$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.35 F_R + 0.57 F_A$   
 $= 0.35 \times 3500 + 0.57 \times 4200 = 3619$   
Load rating = (i) $^{0.7} \times 13300$   
 $= (3)^{0.7} \times 13300 = 28697$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{28697}{3619}\right)^3 = 499 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{28697}{3619}\right)^3$   
 $= 4155 \text{ Hrs}$

#### Case 4

Radial load ( $F_R$ ) = 1750  
 $F_A/F_R = 0/1750 = 0$   
Since  $F_A/F_R < 1.14$ , equivalent load  
(P) =  $1.0 F_R + 0.55 F_A = 1.0 \times 1750 = 1750$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{1750}\right)^3 = 1960 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{1750}\right)^3$   
 $= 16332 \text{ Hrs}$





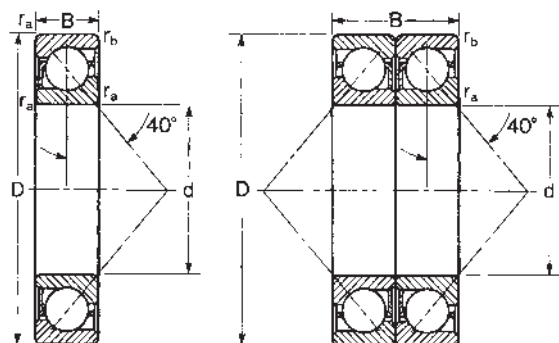
MRC angular contact ball bearings with a PJ suffix have one heavy race shoulder and one counterbored race shoulder on the outer ring; opposing one heavy race shoulder and one counterbored race shoulder on the inner ring. Because of this construction, it is possible for this bearing to incorporate a greater number of balls than a deep groove, nonfilling notch bearing. The combination of maximum ball complement, optimum race groove depth, and the 40° contact angle results in high thrust load carrying capacity.

MRC 7000-PJ Series bearings are particularly suitable for positions where the thrust is always present in **one** direction. They should **not** be used where the bearing is subjected to radial load only; or combined radial and thrust load where the radial load is predominant. When heavy thrust must be taken in **both** directions, the PJD series angular contact ball bearings may be mounted in a back-to-back or face-to-face duplex arrangement with another angular contact bearing.

MRC 7000-PJ Series bearings are available with either pressed brass or machined brass, ball centered cages. The low shoulder diameters on the nonthrust sides of the inner and outer rings, combined with large clearances between the land diameters and the cage, allow for large quantities of oil to flow through these bearings. The increased oil flow reduces operating temperature and theoretically increases bearing life.

ABEC-3 bore tolerances reduce the range of interference fits between the shaft and bearing bore. These tighter tolerances result in closer control of preload and minimize the risk of thermal runaway.

Size	Series	Page
<b>7200-PJ</b>	Light—Single Bearing	<b>148</b>
<b>7200-PJD</b>	Light—Duplex Set	<b>148</b>
<b>7300-PJ</b>	Medium—Single Bearing	<b>149</b>
<b>7300-PJD</b>	Medium—Duplex Set	<b>149</b>
<b>7400-PJ</b>	Heavy—Single Bearing	<b>150</b>
<b>7400-PJD</b>	Heavy—Duplex Set	<b>150</b>
<b>7000-PJ</b>	Equivalent Load and Life	<b>152</b>
<b>7000-PJ</b>	Minimum Load Calculations	<b>152</b>
<b>7000-PJ</b>	Life Calculation Examples	<b>153</b>
<b>7000-PJD</b>	Equivalent Load and Life	<b>154</b>
<b>7000-PJD</b>	Life Calculation Examples	<b>154</b>



Note: ABEC 1 & 3 stocked as half-pairs, where available.

7200-PJ and -PJD Series bearings are used for heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

Values for -PJD bearings are for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub> <sup>4)</sup>		Static C <sub>s</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7205-PJ	25	.9843	52	2.0472	15	.5906	1.0	.04	.60	.024	15 600	3 510	10 200	2 290	10 000	15 000
7206-PJ	30	1.1811	62	2.4409	16	.6299	1.0	.04	.60	.024	23 800	5 350	15 600	3 510	8 500	12 000
7207-PJ	35	1.3780	72	2.8346	17	.6693	1.0	.04	.60	.024	30 700	6 900	20 800	4 680	8 000	11 000
7208-PJ	40	1.5748	80	3.1496	18	.7087	1.0	.04	.60	.024	36 400	8 180	26 000	5 850	7 000	9 500
7209-PJ	45	1.7717	85	3.3465	19	.7480	1.0	.04	.60	.024	37 700	8 480	28 000	6 300	6 700	9 000
7210-PJ	50	1.9685	90	3.5433	20	.7874	1.0	.04	.60	.024	39 000	8 770	30 500	6 860	6 000	8 000
7211-PJ	55	2.1654	100	3.9370	21	.8268	1.5	.06	1.0	.040	48 800	11 000	38 000	8 540	5 600	7 500
7212-PJ	60	2.3622	110	4.3307	22	.8661	1.5	.06	1.0	.040	57 200	12 900	45 500	10 200	5 000	6 700
7213-PJ	65	2.5591	120	4.7244	23	.9055	1.5	.06	1.0	.040	66 300	14 900	54 000	12 100	4 500	6 000
7214-PJ	70	2.7559	125	4.9213	24	.9449	1.5	.06	1.0	.040	71 500	16 100	60 000	13 500	4 300	5 600
7215-PJ	75	2.9528	130	5.1181	25	.9843	1.5	.06	1.0	.040	72 800	16 400	64 000	14 400	4 000	5 300
7216-PJ	80	3.1496	140	5.5118	26	1.0236	2.0	.08	1.0	.040	83 200	18 700	73 500	16 500	3 800	5 000
7217-PJ	85	3.3465	150	5.9055	28	1.1024	2.0	.08	1.0	.040	95 600	21 500	83 000	18 700	3 600	4 800
7218-PJ	90	3.5433	160	6.2992	30	1.1811	2.0	.08	1.0	.040	108 000	24 300	96 500	21 700	3 400	4 500

#### 7200-PJD

7205-PJD	25	.9843	52	2.0472	30	1.1811	1.0	.04	.60	.024	25 100	5 640	20 400	4 590	8 500	12 000
7206-PJD	30	1.1811	62	2.4409	32	1.2598	1.0	.04	.60	.024	39 000	8 770	31 000	6 970	7 500	10 000
7207-PJD	35	1.3780	72	2.8346	34	1.3386	1.0	.04	.60	.024	50 700	11 400	41 500	9 330	6 300	8 500
7208-PJD	40	1.5748	80	3.1496	36	1.4173	1.0	.04	.60	.024	59 200	13 300	52 000	11 700	5 600	7 500
7209-PJD	45	1.7717	85	3.3465	38	1.4961	1.0	.04	.60	.024	61 800	13 900	56 000	12 600	5 300	7 000
7210-PJD	50	1.9685	90	3.5433	40	1.5748	1.0	.04	.60	.024	63 700	14 300	61 000	13 700	4 800	6 300
7211-PJD	55	2.1654	100	3.9370	42	1.6535	1.5	.06	1.0	.040	78 000	17 500	76 500	17 200	4 500	6 000
7212-PJD	60	2.3622	110	4.3307	44	1.7323	1.5	.06	1.0	.040	93 600	21 000	91 500	20 600	4 000	5 300
7213-PJD	65	2.5591	120	4.7244	46	1.8110	1.5	.06	1.0	.040	108 000	24 300	108 000	24 300	3 600	4 800
7214-PJD	70	2.7559	125	4.9213	48	1.8898	1.5	.06	1.0	.040	114 000	25 600	118 000	26 500	3 400	4 500
7215-PJD	75	2.9528	130	5.1181	50	1.9685	1.5	.06	1.0	.040	119 000	26 800	127 000	28 600	3 200	4 300
7216-PJD	80	3.1496	140	5.5118	52	2.0472	2.0	.08	1.0	.040	135 000	30 400	146 000	32 800	3 000	4 000
7217-PJD	85	3.3465	150	5.9055	56	2.2047	2.0	.08	1.0	.040	156 000	35 100	166 000	37 300	2 800	3 800
7218-PJD	90	3.5433	160	6.2992	60	2.3622	2.0	.08	1.0	.040	178 000	40 000	193 000	43 400	2 600	3 600

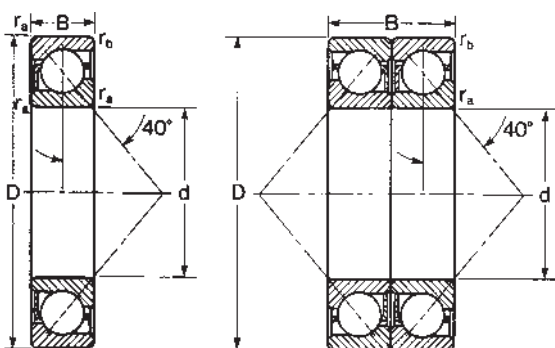
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>s</sub> by 3.85 (single) and C by 1.08 and C<sub>s</sub> by 1.93 (duplex).

<sup>3)</sup> Listed values are for pressed brass and steel or polyamide cage.

The values have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.



Note: ABEC 1 & 3 stocked as half-pairs, where available.

7300-PJ and -PJD Series bearings are used for very heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

Values for -PJD bearings are for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub> <sup>4)</sup>		Static C <sub>s</sub>		Grease RPM	Oil RPM
	d mm	in	mm	in	mm	in	r <sub>a</sub> mm	in	r <sub>b</sub> mm	in	N	lbf	N	lbf		
7304-PJ	20	.7874	52	2.0472	15	.5906	1.0	.04	.60	.024	19 000	4 270	10 400	2 340	11 000	16 000
7305-PJ	25	.9843	62	2.4409	17	.6693	1.0	.04	.60	.024	26 000	5 850	15 600	3 510	9 000	13 000
7306-PJ	30	1.1811	72	2.8346	19	.7480	1.0	.04	.60	.024	34 500	7 760	21 200	4 770	8 000	11 000
7307-PJ	35	1.3780	80	3.1496	21	.8268	1.5	.06	1.0	.040	39 000	8 770	24 500	5 510	7 500	10 000
7308-PJ	40	1.5748	90	3.5433	23	.9055	1.5	.06	1.0	.040	49 400	11 100	33 500	7 530	6 700	9 000
7309-PJ	45	1.7717	100	3.9370	25	.9843	1.5	.06	1.0	.040	60 500	13 600	41 500	9 330	6 000	8 000
7310-PJ	50	1.9685	110	4.3307	27	1.0630	2.0	.08	1.0	.040	74 100	16 700	51 000	11 500	5 300	7 000
7311-PJ	55	2.1654	120	4.7244	29	1.1417	2.0	.08	1.0	.040	85 200	19 200	60 000	13 500	4 800	6 300
7312-PJ	60	2.3622	130	5.1181	31	1.2205	2.0	.08	1.0	.040	95 600	21 500	69 500	15 600	4 500	6 000
7313-PJ	65	2.5591	140	5.5118	33	1.2992	2.0	.08	1.0	.040	108 000	24 300	80 000	18 000	4 300	5 600
7314-PJ	70	2.7559	150	5.9055	35	1.3780	2.0	.08	1.0	.040	119 000	26 800	90 000	20 200	3 800	5 000
7315-PJ	75	2.9528	160	6.2992	37	1.4567	2.0	.08	1.0	.040	133 000	29 900	106 000	23 800	3 600	4 800
7316-PJ	80	3.1496	170	6.6929	39	1.5354	2.0	.08	1.0	.040	143 000	32 200	118 000	26 500	3 400	4 500
7317-PJ	85	3.3465	180	7.0866	41	1.6142	2.5	.10	1.0	.040	153 000	34 400	132 000	29 700	3 200	4 300
7318-PJ	90	3.5433	190	7.4803	43	1.6929	2.5	.10	1.0	.040	165 000	37 100	146 000	32 800	3 000	4 000
7319-PJ	95	3.7402	200	7.8740	45	1.7717	2.5	.10	1.0	.040	178 000	40 000	163 000	36 600	2 800	3 800

### 7300-PJD

7304-PJD	20	.7874	52	2.0472	30	1.1811	1.0	.04	.60	.024	30 700	6 900	20 800	4 680	9 000	13 000
7305-PJD	25	.9843	62	2.4409	34	1.3386	1.0	.04	.60	.024	42 300	9 510	31 000	6 970	7 500	10 000
7306-PJD	30	1.1811	72	2.8346	38	1.4961	1.0	.04	.60	.024	55 900	12 600	42 500	9 550	6 700	9 000
7307-PJD	35	1.3780	80	3.1496	42	1.6535	1.5	.06	1.0	.040	62 400	14 000	49 000	11 000	6 000	8 000
7308-PJD	40	1.5748	90	3.5433	46	1.8110	1.5	.06	1.0	.040	79 300	17 800	65 500	14 700	5 300	7 000
7309-PJD	45	1.7717	100	3.9370	50	1.9685	1.5	.06	1.0	.040	97 500	21 900	81 500	18 300	4 800	6 300
7310-PJD	50	1.9685	110	4.3307	54	2.1260	2.0	.08	1.0	.040	119 000	26 800	102 000	22 900	4 300	5 600
7311-PJD	55	2.1654	120	4.7244	58	2.2835	2.0	.08	1.0	.040	138 000	31 000	120 000	27 000	3 800	5 000
7312-PJD	60	2.3622	130	5.1181	62	2.4409	2.0	.08	1.0	.040	156 000	35 100	140 000	31 500	3 600	4 800
7313-PJD	65	2.5591	140	5.5118	66	2.5984	2.0	.08	1.0	.040	174 000	39 100	160 000	36 000	3 200	4 300
7314-PJD	70	2.7559	150	5.9055	70	2.7559	2.0	.08	1.0	.040	195 000	43 800	180 000	40 500	3 000	4 000
7315-PJD	75	2.9528	160	6.2992	74	2.9134	2.0	.08	1.0	.040	212 000	47 700	212 000	47 700	2 800	3 800
7316-PJD	80	3.1496	170	6.6929	78	3.0709	2.0	.08	1.0	.040	229 000	51 500	236 000	53 100	2 600	3 600
7317-PJD	85	3.3465	180	7.0866	82	3.2283	2.5	.10	1.0	.040	251 000	56 400	265 000	59 600	2 400	3 400
7318-PJD	90	3.5433	190	7.4803	86	3.3858	2.5	.10	1.0	.040	270 000	60 700	290 000	65 200	2 200	3 200
7319-PJD	95	3.7402	200	7.8740	90	3.5433	2.5	.10	1.0	.040	286 000	64 300	325 000	73 100	2 000	3 000

<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>0</sub> by 3.85 (single) and C by 1.08 and C<sub>0</sub> by 1.93 (duplex).

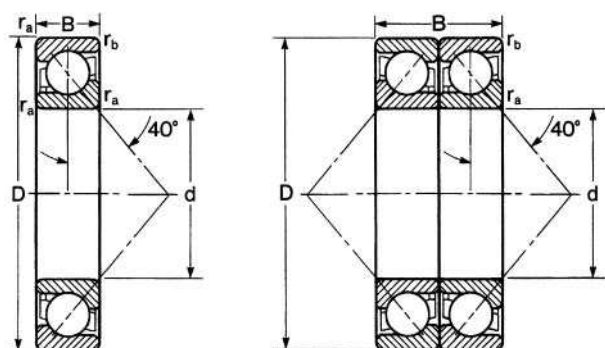
<sup>3)</sup> Listed values are for pressed brass and steel or polyamide cage.

The values have been determined through historical application and practice. For a more complete explanation, see page 274.

<sup>4)</sup> Rating for one million revolutions or 500 hours at 33 1/3 RPM.

# 7400-PJ Heavy Series and 7400-PJD Heavy Series, Duplex

## MRC Bearing Services



Note: ABEC 1 & 3 stocked as half-pairs, where available.

7400-PJ and -PJD Series bearings are similar to the 7200-PJ and 7300-PJ Series, but are heavier sectioned; and are used for very heavy one-directional thrust loads, or combined radial and thrust loads where the thrust load is predominant.

"D" indicates a duplex ground half pair matched with an identical half pair and is followed by an additional suffix letter to describe the type of duplex. See pages 234 and 235 for suffix description.

**Caution:** Single bearings are not to be used where only radial loads are present. For two-direction thrust loads, use duplex bearings.

Values for -D bearings are for back-to-back (DB) or face-to-face (DF) mounting arrangements.

MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius <sup>1)</sup>				Basic Radial Load Rating <sup>2)</sup>				Speed Rating <sup>3)</sup>	
											Dynamic C <sub>d</sub> <sup>4)</sup>		Static C <sub>s</sub>		Grease RPM	Oil RPM
	d	in	mm	in	mm	in	r <sub>a</sub>	r <sub>b</sub>	r <sub>a</sub>	r <sub>b</sub>	N	lbf	N	lbf		
7405-PJ	25	.9843	80	3.1496	21	.8268	1.5	.060	1.0	.040	39 700	8 920	23 600	5 310	7 000	10 000
7406-PJ	30	1.1811	90	3.5433	23	.9055	1.5	.060	1.0	.040	47 500	10 700	29 000	6 520	6 300	9 000
7407-PJ	35	1.3780	100	3.9370	25	.9843	1.5	.060	1.0	.040	60 500	13 600	38 000	8 540	5 600	7 500
7408-PJ	40	1.5748	110	4.3307	27	1.0630	2.0	.080	1.0	.040	70 200	15 800	45 500	10 200	5 300	7 000
7409-PJ	45	1.7717	120	4.7244	29	1.1417	2.0	.080	1.0	.040	85 200	19 200	55 000	12 400	4 800	6 300
7410-PJ	50	1.9685	130	5.1181	31	1.2205	2.0	.080	1.0	.040	95 600	21 500	64 000	14 400	4 300	6 000
7411-PJ	55	2.1654	140	5.5118	33	1.2992	2.0	.080	1.0	.040	111 000	25 000	76 500	17 200	4 000	5 600
7412-PJ	60	2.3622	150	5.9055	35	1.3780	2.0	.080	1.0	.040	119 000	26 800	86 500	19 400	3 600	5 000
7413-PJ	65	2.5591	160	6.2992	37	1.4567	2.0	.080	1.0	.040	130 000	29 200	96 500	21 700	3 400	4 800
7414-PJ	70	2.7559	180	7.0866	42	1.6535	2.5	.100	1.0	.040	159 000	35 700	127 000	28 600	3 000	4 300
7415-PJ	75	2.9528	190	7.4803	45	1.7717	2.5	.100	1.0	.040	168 000	37 800	140 000	31 500	2 800	4 000
7416-PJ	80	3.1496	200	7.8740	48	1.8898	2.5	.100	1.0	.040	178 000	40 000	153 000	34 400	2 600	3 800
7417-PJ	85	3.3465	210	8.2677	52	2.0472	3.0	.120	1.0	.040	190 000	42 700	166 000	37 300	2 500	3 600
7418-PJ	90	3.5433	225	8.8583	54	2.1260	3.0	.120	1.0	.040	216 000	48 600	200 000	45 000	2 400	3 400
7419-PJ	95	3.7402	250	9.8425	55	2.1654	3.0	.120	1.0	.040	251 000	56 400	245 000	55 100	2 200	3 000
7420-PJ	100	3.9370	265	10.4331	60	2.3622	3.0	.120	1.0	.040	276 000	62 000	275 000	61 800	2 000	2 800
7421-PJ	105	4.1339	290	11.4173	65	2.5591	3.0	.120	1.0	.040	265 000	59 600	280 000	62 900	1 900	2 600

### 7400-PJD

7405-PJD	25	.9843	80	3.1496	42	1.6535	1.5	.060	1.0	.040	65 000	14 500	47 500	10 600	5 600	8 000
7406-PJD	30	1.1811	90	3.5433	46	1.8110	1.5	.060	1.0	.040	78 000	17 400	58 500	13 000	5 000	7 200
7407-PJD	35	1.3780	100	3.9370	50	1.9685	1.5	.060	1.0	.040	97 500	22 100	76 500	17 100	4 500	6 000
7408-PJD	40	1.5748	110	4.3307	54	2.1260	2.0	.080	1.0	.040	114 000	25 700	91 000	20 400	4 300	5 600
7409-PJD	45	1.7717	120	4.7244	58	2.2835	2.0	.080	1.0	.040	138 000	31 200	110 000	24 800	3 800	5 000
7410-PJD	50	1.9685	130	5.1181	62	2.4409	2.0	.080	1.0	.040	156 000	34 900	129 000	28 800	3 400	4 800
7411-PJD	55	2.1654	140	5.5118	66	2.5984	2.0	.080	1.0	.040	182 000	40 600	153 000	34 400	3 200	4 500
7412-PJD	60	2.3622	150	5.9055	70	2.7559	2.0	.080	1.0	.040	195 000	43 600	173 000	38 800	2 800	4 000
7413-PJD	65	2.5591	160	6.2992	74	2.9134	2.0	.080	1.0	.040	212 000	47 400	193 000	43 400	2 700	3 800
7414-PJD	70	2.7559	180	7.0866	84	3.3071	2.5	.100	1.0	.040	260 000	58 000	255 000	57 200	2 400	3 400
7415-PJD	75	2.9528	190	7.4803	90	3.5433	2.5	.100	1.0	.040	276 000	61 400	280 000	63 000	2 200	3 200
7416-PJD	80	3.1496	200	7.8740	96	3.7795	2.5	.100	1.0	.040	288 000	64 800	306 000	68 800	2 000	3 000
7417-PJD	85	3.3465	210	8.2677	104	4.0945	3.0	.120	1.0	.040	307 000	69 400	335 000	74 600	2 000	2 800
7418-PJD	90	3.5433	225	8.8583	108	4.2520	3.0	.120	1.0	.040	351 000	78 900	400 000	89 900	1 900	2 700
7419-PJD	95	3.7402	250	9.8425	110	4.3307	3.0	.120	1.0	.040	410 000	92 200	490 000	110 000	1 800	2 400
7420-PJD	100	3.9370	265	10.4331	120	4.7244	3.0	.120	1.0	.040	449 000	101 000	550 000	124 000	1 600	2 200
7421-PJD	105	4.1339	290	11.4173	130	5.1181	3.0	.120	1.0	.040	436 000	96 900	560 000	126 000	1 500	2 000

1) Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

2) For thrust rating multiply C by 1.75 and C<sub>0</sub> by 3.85 (single) and C by 1.08 and C<sub>0</sub> by 1.93 (duplex).

3) Listed values are for machined bronze cage, ABEC-1.

The values have been determined through historical application and practice. For a more complete explanation, see page 274.

4) Rating for one million revolutions or 500 hours at 33C<sub>z</sub> RPM.





## 7000-PJ Series 40° Angular Contact Ball Bearings Single Bearing

### Dynamic and static equivalent radial load and life rating

#### Dynamic equivalent radial load

$$P = F_R \quad \text{when } F_A/F_R \leq 1.14$$

or

$$P = 0.35 F_R + 0.57 F_A \quad \text{when } F_A/F_R > 1.14$$

P = Dynamic equivalent radial load

F<sub>R</sub> = Radial load

F<sub>A</sub> = Thrust load

#### Life rating

$$L_{10} = \left(\frac{C}{P}\right)^3 \quad (\text{millions of revolutions})$$

or

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 \quad (\text{Hours})$$

C = Basic dynamic radial load rating  
(from single bearing tables)

P = Dynamic equivalent radial load

n = Speed in rpm

### Minimum Thrust Load For Angular Contact Ball Bearings

Satisfactory operation of angular contact ball bearings requires sufficient traction forces between the balls and races to minimize damage caused by sliding or skidding. This is particularly important at high speeds where the inertia forces of the balls and cage and the viscous drag in the lubricant can have a detrimental influence on the rolling conditions.

The minimum required thrust load can be determined from the following formula.

$$F_A = A \left(\frac{n}{1000}\right)^2 \text{ Newtons}$$

OR

$$F_A = 0.2248 A \left(\frac{n}{1000}\right)^2 \text{ Pounds}$$

Where, F<sub>A</sub> = Minimum thrust load  
A = Bearing design factor  
listed in the following tables  
n = Speed in RPM

Note: For Duplex Bearings mounted in tandem, multiply the single-bearing thrust value by the number of bearings in tandem.

#### Static equivalent radial load

$$P_0 = 0.5 F_R + 0.26 F_A$$

P<sub>0</sub> is always ≥ F<sub>R</sub>

P<sub>0</sub> = Static equivalent radial load

F<sub>R</sub> = Radial load

F<sub>A</sub> = Thrust load

#### Minimum Thrust Load A Factor

Size	A
7205PJ	1.71
7206PJ	4.07
7207PJ	7.29
7208PJ	10.92
7209PJ	12.80
7210PJ	15.04
7211PJ	23.48
7212PJ	34.61
7213PJ	47.73
7214PJ	56.67
7215PJ	63.52
7216PJ	84.96
7217PJ	113.70
7218PJ	148.60
7304PJ	2.07
7305PJ	4.30
7306PJ	8.13
7307PJ	11.10
7308PJ	18.88
7309PJ	29.19
7310PJ	45.54
7311PJ	62.57
7312PJ	84.44
7313PJ	111.50
7314PJ	144.60
7315PJ	184.90
7316PJ	233.80
7317PJ	291.90
7318PJ	360.00
7319PJ	439.50

## 7000-PJ Series 40° Angular Contact Ball Bearings Single Bearing

### Dynamic equivalent radial load and life calculation examples

Bearing size: 7309 PJ

Speed: 2000 RPM

Basic dynamic radial load rating (C) = 13600

#### Case 1

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 1960

$F_A/F_R = 1960/1750 = 1.12$

Since  $F_A/F_R < 1.14$ , equivalent load ( $P$ ) =  $F_R = 1750$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13600}{1750}\right)^3 = 469 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13600}{1750}\right)^3 \\ &= 3911 \text{ Hrs}\end{aligned}$$

#### Case 2

Radial load ( $F_R$ ) = 1750

Thrust load ( $F_A$ ) = 2450

$F_A/F_R = 2450/1750 = 1.40$

Since  $F_A/F_R > 1.14$ , equivalent load ( $P$ ) =  $0.35 F_R + 0.57 F_A$

$P = 0.35 \times 1750 + 0.57 \times 2450 = 2009$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13600}{2009}\right)^3 = 310 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13600}{2009}\right)^3 \\ &= 2585 \text{ Hrs}\end{aligned}$$

#### Case 3

Thrust load ( $F_A$ ) = 2450

$F_A/F_R = 2450/0 = \infty$

Since  $F_A/F_R > 1.14$ , equivalent load ( $P$ ) =  $0.35 F_R + 0.57 F_A$

$P = 0.57 \times 2450 = 1397$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13600}{1397}\right)^3 = 923 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13600}{1397}\right)^3 \\ &= 7689 \text{ Hrs}\end{aligned}$$

**7000-PJD Series**  
**40° Angular Contact Ball Bearings**  
**Duplex**

**Dynamic and static equivalent radial load and life rating**

**Dynamic equivalent radial load**

DB or DF pair  
 $P = 1.0 F_R + 0.55 F_A$  when  $\frac{F_A}{F_R} \leq 1.14$

$P = 0.57 F_R + 0.93 F_A$  when  $\frac{F_A}{F_R} > 1.14$

Tandem DT  
 $P = 1.0 F_R$  when  $\frac{F_A}{F_R} \leq 1.14$

$P = 0.35 F_R + 0.57 F_A$  when  $\frac{F_A}{F_R} > 1.14$

$P$  = Dynamic equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

**Life rating**

$L_{10} = \left(\frac{C}{P}\right)^3$  (millions of revolutions)

or

$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^3$  (Hours)

$P$  = Dynamic equivalent radial load

$n$  = Speed in rpm

For DB or DF mounting:

$C$  = Duplex pair dynamic radial load rating (from duplex bearing tables)

or

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i = 2$

For tandem mounting:

$C$  = Single-row dynamic radial load rating times  $(i)^{0.7}$ , where  $i$  = number of bearings in set

**Static equivalent radial load**

$P_0 = 1.0 F_R + 0.52 F_A$

$P_0$  is always  $\geq F_R$

$P_0$  = Static equivalent radial load

$F_R$  = Radial load

$F_A$  = Thrust load

## Dynamic equivalent radial load and life calculation examples

Bearing size: 7309 PJDU (DB or DF pair)  
Speed: 2000 RPM  
Duplex pair basic dynamic radial load rating (C) = 21900

### Case 1

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 1960  
 $F_A/F_R = 1960/1750 = 1.12$   
Since  $F_A/F_R < 1.14$ , equivalent load  
(P) =  $1.0 F_R + 0.55 F_A$   
 $= 1.0 \times 1750 + 0.55 \times 1960 = 2828$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2828}\right)^3 = 464 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2828}\right)^3$   
 $= 3870 \text{ Hrs}$

### Case 2

Radial load ( $F_R$ ) = 1750  
Thrust load ( $F_A$ ) = 2450  
 $F_A/F_R = 2450/1750 = 1.40$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.57 F_R + 0.93 F_A$   
 $= 0.57 \times 1750 + 0.93 \times 2450 = 3276$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{3276}\right)^3 = 299 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{21900}{3276}\right)^3$   
 $= 2490 \text{ Hrs}$

### Case 3

Thrust load ( $F_A$ ) = 2450  
 $F_A/F_R = 2450/0 = \infty$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.57 F_R + 0.93 F_A = 0.93 \times 2450 = 2279$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2279}\right)^3 = 887 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2279}\right)^3$   
 $= 7395 \text{ Hrs}$

### Case 4

Radial load ( $F_R$ ) = 1750  
 $F_A/F_R = 0/1750 = 0$   
Since  $F_A/F_R < 1.14$ , equivalent load  
(P) =  $1.0 F_R + 0.55 F_A = 1.0 \times 1750 = 1750$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{1750}\right)^3 = 1960 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{21900}{1750}\right)^3$   
 $= 16332 \text{ Hrs}$

Bearing size: 7309 PJDT  
3 bearings in tandem  
Speed: 2000 RPM  
Single-row basic dynamic radial load rating (C) = 13600

### Case 1

Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/0 = \infty$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.35 F_R + 0.57 F_A = 0.57 \times 4200 = 2394$   
Load rating = (i) $^{0.7} \times 13600$   
 $= (3)^{0.7} \times 13600 = 29344$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{29344}{2394}\right)^3 = 1842 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{29344}{2394}\right)^3$   
 $= 15346 \text{ Hrs}$

### Case 2

Radial load ( $F_R$ ) = 3500  
Thrust load ( $F_A$ ) = 4200  
 $F_A/F_R = 4200/3500 = 1.20$   
Since  $F_A/F_R > 1.14$ , equivalent load  
(P) =  $0.35 F_R + 0.57 F_A$   
 $= 0.35 \times 3500 + 0.57 \times 4200 = 3619$   
Load rating = (i) $^{0.7} \times 13600$   
 $= (3)^{0.7} \times 13600 = 29344$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{29344}{3619}\right)^3 = 533 \times 10^6 \text{ Rev.}$   
or  
Life (L10h) =  $\frac{10^6 (C)^3}{60n (P)^3} = \frac{10^6}{60 \times 2000} \left(\frac{29344}{3619}\right)^3$   
 $= 4442 \text{ Hrs}$