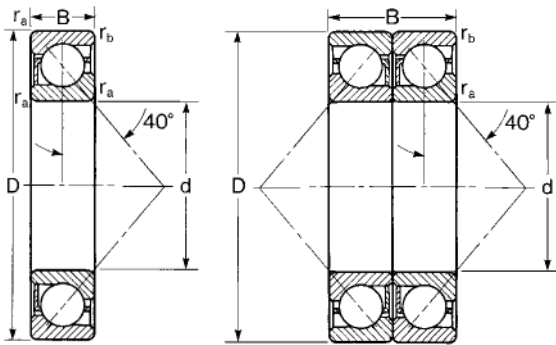


# 7200-PJ Light Series and 7200-PJD Light Series, Duplex

# MRC Bearing Services



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 thrust 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 236 and 237 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>0</sub>		Grease	Oil
	d	mm	in	mm	in	mm	in	r <sub>a</sub>	r <sub>b</sub>	mm	in	N	lbf	N	lbf	RPM
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	6 290	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	9 360	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	30 300	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

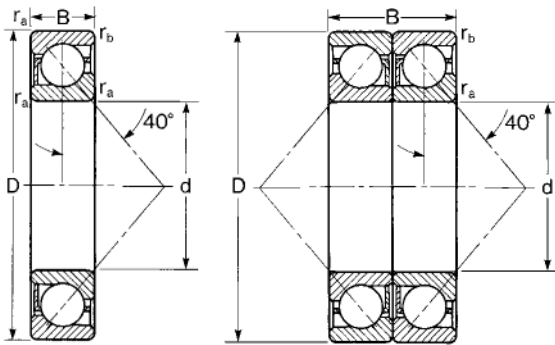
<sup>1)</sup> Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

<sup>2)</sup> For thrust rating multiply C by 1.75 and C<sub>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 276

<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 thrust 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 236 and 237 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 d mm      in		Outside Diameter D mm      in		Width B mm      in		Fillet Radius <sup>1)</sup> r <sub>a</sub> r <sub>b</sub> mm      in      mm      in				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
											N	lbf	N	lbf		
7304-PJ	20	.7874	52	2.0472	15	.5906	1.0	.04	.60	.024	19 000	4 270	10 200	2 290	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	32 100	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	1.6299	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
<b>7300-PJD</b>																
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.

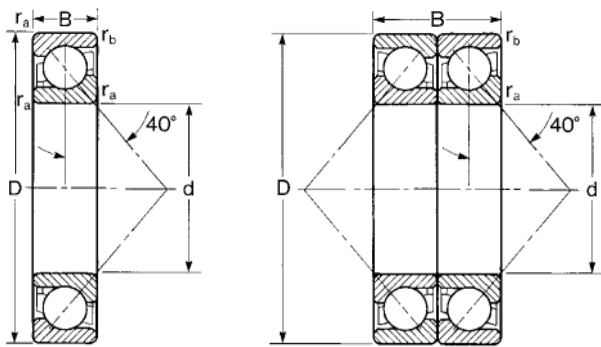
The values have been determined through historical application and practice. For a more complete explanation, see page 276

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

# 7400-PJ Heavy Series

## 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 thrust loads or combined radial and thrust loads where thrust 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 236 and 237 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>0</sub>		Grease	Oil
	d	mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	RPM
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	45 000	10 100	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	183 000	41 100	156 000	35 100	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	90 000	20 200	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	296 000	66 500	310 000	69 700	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 276

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

**7000-PJ Series**  
**40 Degree 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

$F_R$  = Radial load

$F_A$  = Thrust load

**Static equivalent radial load**

$$P_0 = 0.5 F_R + 0.26 F_A$$

$P_0$  is always  $\geq F_R$

$P_0$  = Static equivalent radial load

$F_R$  = Radial load

$F_A$  = 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-row bearing tables)

P = Dynamic equivalent radial load

n = Speed in rpm

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

Bearing size: 7309 PJ

Speed: 2000 RPM

Basic dynamic radial load rating (C) = 13600

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**Case 1**Radial load ( $F_R$ ) = 1750Thrust load ( $F_A$ ) = 1960 $F_A/F_R = 1960/1750 = 1.12$ Since  $F_A/F_R < 1.14$ , Equivalent load (P) =  $F_R = 1750$ 

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

or

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

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**Case 2**Radial load ( $F_R$ ) = 1750Thrust load ( $F_A$ ) = 2450 $F_A/F_R = 2450/1750 = 1.40$ Since  $F_A/F_R > 1.14$ , equivalent load (P) =  $0.35 F_R + 0.57 F_A$  $P = 0.35 \times 1750 + 0.57 \times 2450 = 2009$ 

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

or

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

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**Case 3**Thrust load ( $F_A$ ) = 2450 $F_A/F_R = 2450/0 = \infty$ Since  $F_A/F_R > 1.14$ , equivalent load (P) =  $0.35 F_R + 0.57 F_A$  $P = 0.57 \times 2450 = 1397$ 

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

or

$$\begin{aligned} \text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13600}{1397}\right)^3 \\ &= 7688 \text{ Hrs} \end{aligned}$$

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

*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)

For DB or DF mounting:

C = Duplex 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

P = Dynamic equivalent radial load

n = Speed in rpm

**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 lbf

**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) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2828}\right)^3 = 464 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2828}\right)^3$   
 $= 3867$  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) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{3276}\right)^3 = 299 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{3276}\right)^3$   
 $= 2490$  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) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{2279}\right)^3 = 887 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{2279}\right)^3$   
 $= 7392$  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) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{21900}{1750}\right)^3 = 1960 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{21900}{1750}\right)^3$   
 $= 16333$  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)<sup>0.7</sup> × 13600  
 $= (3)^{0.7} \times 13600 = 29344$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{29344}{2394}\right)^3 = 1842 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{29344}{2394}\right)^3$   
 $= 15346$  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) =  
 $0.35 F_R + 0.57 F_A$   
 $P = 0.35 \times 3500 + 0.57 \times 4200 = 3619$   
Load rating = (i)<sup>0.7</sup> × 13600  
 $= (3)^{0.7} \times 13600 = 29344$   
Life (L10) =  $\left(\frac{C}{P}\right)^3 = \left(\frac{29344}{3619}\right)^3 = 533 \times 10^6$  Rev.  
or  
Life (L10h) =  $\frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{29344}{3619}\right)^3$   
 $= 4442$  Hrs