

R series bearings are single-row radial conrad-type bearings that are available in inch sizes for shafts from 1/8" to 1 1/2" in diameter. Open, shielded, and sealed types are available, and many sizes are available in stainless steel.

R Series supplied with ABMA CO radial clearance unless otherwise specified.

MRC Bearing Number	Bore d		Outside Diameter D		Width B Plain		Shielded or Sealed		Fillet Radius ¹⁾ r _a		ZD ²⁾		Basic Radial Load Rating				Speed Rating ²⁾		
													Dynamic C ³⁾		Static C ₀		Open and Shielded Grease		Shielded Oil
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	RPM	RPM	RPM
R-2	3.2	.1250	9.5	.3750	4.0	.1562	4.0	.1562	.30	.012	19	.03	312	70	120	27	75 000	91 000	52 000
R-2-A	3.2	.1250	12.7	.5000	4.4	.1719	4.4	.1719	.30	.012	19	.03	312	70	120	27	75 000	91 000	52 000
R-3	4.8	.1875	12.7	.5000	4.0	.1562	5.0	.1960	.30	.012	39	.06	956	215	490	110	57 000	69 000	40 000
R-4	6.4	.2500	15.9	.6250	5.0	.1960	5.0	.1960	.30	.012	45	.07	1 480	332	620	139	44 000	54 000	31 000
R-4-A	6.4	.2500	19.1	.7500	5.6	.2188	7.1	.2812	.41	.016	71	.11	2 810	632	1 160	261	39 000	48 000	27 000
R-6	9.5	.3750	22.2	.8750	5.6	.2188	7.1	.2812	.41	.016	110	.17	3 320	746	1 340	301	31 000	38 000	21 000
R-8	12.7	.5000	28.6	1.1250	6.4	.2500	7.9	.3125	.41	.016	181	.28	5 070	1 140	2 400	540	24 000	29 000	16 000
R-10	15.9	.6250	34.9	1.3750	7.1	.2812	8.7	.3438	.79	.031	226	.35	6 050	1 360	3 250	731	18 000	22 000	13 000
R-12	19.1	.7500	41.3	1.6250	7.9	.3125	11.1	.4375	.79	.031	361	.56	9 360	2 100	5 100	1 150	16 000	19 000	11 000
R-14	22.2	.8750	47.6	1.8750	9.5	.3750	12.7	.5000	.79	.031	406	.63	10 100	2 270	5 850	1 320	14 000	17 000	9 600
R-16	25.4	1.0000	50.8	2.0000	9.5	.3750	12.7	.5000	.79	.031	406	.63	10 100	2 270	6 000	1 350	13 000	16 000	9 000
R-18	28.6	1.1250	54.0	2.1250	9.5	.3750	12.7	.5000	.79	.031	510	.79	12 500	2 810	7 500	1 690	11 000	14 000	7 900
R-20	31.8	1.2500	57.2	2.2500	9.5	.3750	12.7	.5000	.79	.031	613	.95	14 000	3 150	9 300	2 090	11 000	13 000	7 500
R-24	38.1	1.5000	66.7	2.6250	11.1	.4375	14.3	.5625	.79	.031	755	1.17	16 800	3 780	11 800	2 650	9 000	11 000	6 200

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

²⁾ Listed values are for pressed steel or polyamide cage, ABEC-1.

For phenolic composition cage, multiply by 1.66 for grease and 2.00 for oil. For machined bronze cage, multiply by 1.25 for grease and 1.50 for oil. For phenolic composition cage, ABEC-5 or 7, multiply by 2.30 for grease and 2.80 for oil. The speed rating adjustment factors have been determined through historical application and practice. For a more complete explanation, see page 276.

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

Single-Row Deep Groove Ball Bearings, S-Type

Dynamic and static equivalent radial load and life rating

Dynamic equivalent radial load

$P = XF_R + YF_A$ P = Dynamic equivalent radial load
 F_R = Radial load
 F_A = Thrust load
 Z = Number of balls
 D = Ball diameter
 X = Radial load factor
 Y = Thrust load factor
 e = Limiting factor for F_A/F_R

Life rating

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

or

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

C = Basic dynamic load rating
 P = Dynamic equivalent radial load
 n = Speed in RPM

Internal Radial Clearance	F_A ZD^2		$F_A > e F_R$		e
	Units N, mm	Units lb, in	X	Y	
Standard (ABMA C0)	0.172	25		2.30	0.19
	0.345	50		1.99	0.22
	0.689	100		1.71	0.26
	1.03	150		1.56	0.28
	1.38	200	0.56	1.45	0.30
	2.07	300		1.31	0.34
	3.45	500		1.15	0.38
	6.89	750		1.04	0.42
			1.00	0.44	
Loose (ABMA C3)	0.172	25		1.47	0.38
	0.345	50		1.40	0.40
	0.689	100		1.30	0.43
	1.03	150		1.23	0.46
	1.38	200	0.44	1.19	0.47
	2.07	300		1.12	0.50
	3.45	500		1.02	0.55
	6.89	750		1.00	0.56
			1.00	0.56	

When $F_A/F_R \leq e$, use $X = 1.0$, $Y = 0$.
 Values of Y and e for loads not shown are obtained from chart to the right.

Static equivalent radial load

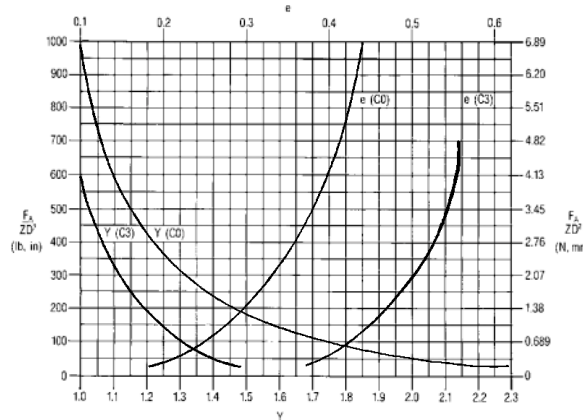
$$P_0 = 0.6 F_R + 0.5 F_A$$

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: 309S

Speed = 2000 RPM

Basic dynamic load rating (C) = 11900 lbf

ZD² = 3.62**ABMA CO Internal Clearance****Case 1**Radial load (F_R) = 1890Equivalent load (P) = X F_R + Y F_AP = F_R = 1890

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{1890}\right)^3 = 249.6 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{1890}\right)^3 \\ &= 2080 \text{ Hrs} \end{aligned}$$

Case 2Radial load (F_R) = 1890Thrust load (F_A) = 1250Equivalent load (P) = X F_R + Y F_AF_A/ZD² = 1250/3.62 = 345

X = 0.56

Y = 1.27

P = 0.56 × 1890 + 1.27 × 1250 = 2646

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{2646}\right)^3 = 91.0 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{2646}\right)^3 \\ &= 758 \text{ Hrs} \end{aligned}$$

Case 3Thrust load (F_A) = 1250Equivalent load (P) = X F_R + Y F_AF_A/ZD² = 1250/3.62 = 345

Y = 1.27

P = 1.27 × 1250 = 1588

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{1588}\right)^3 = 420.8 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{1588}\right)^3 \\ &= 3507 \text{ Hrs} \end{aligned}$$

ABMA C3 Internal Clearance**Case 1**Radial load (F_R) = 1890Equivalent load (P) = X F_R + Y_AP = F_R = 1890

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{1890}\right)^3 = 249.6 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{1890}\right)^3 \\ &= 2080 \text{ Hrs} \end{aligned}$$

Case 2Radial load (F_R) = 1890Thrust load (F_A) = 1250Equivalent load (P) = X F_R + Y F_AF_A/ZD² = 1250/3.62 = 345

X = 0.44

Y = 1.08

P = 0.44 × 1890 + 1.08 × 1250 = 2182

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{2182}\right)^3 = 162.2 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{2182}\right)^3 \\ &= 1352 \text{ Hrs} \end{aligned}$$

Case 3Thrust load (F_A) = 1250Equivalent load (P) = X F_R + Y F_AF_A/ZD² = 1250/3.62 = 345

Y = 1.08

P = 1.08 × 1250 = 1350

$$\text{Life (L10)} = \left(\frac{C}{P}\right)^3 = \left(\frac{11900}{1350}\right)^3 = 684.9 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned} \text{Life (L10h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{11900}{1350}\right)^3 \\ &= 5708 \text{ Hrs} \end{aligned}$$