

MRC's single-row Maximum "M-type" bearings have a single filling slot in both the inner and outer ring, enabling more balls to be added. Because of the increased ball compliment, filling slot bearings have a higher radial load carrying capacity than bearings without filling slots, but their axial load carrying capacity is reduced. They can be used in applications with heavy radial loads, or a combination of radial and thrust loads, where the radial load is predominant. They are not recommended for use where only thrust loads are present.

The M-type bearing is also designated as the "notched" type because it has a filling notch on one side of the inner and outer rings.

Normally furnished with ABMA CO radial clearance.

Cage Types and Materials

Type and material available is a two-piece, pressed steel, ball riding, stayrod cage.

Size	Series	Page
100M	Narrow-Type Light	58
200M	Light	59
300M	Medium	60
400M	Heavy	61
Equivalent Load and Life		62
Life Calculation Examples		63



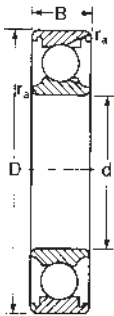
The 100-M Narrow-type Light Series consists of single-row radial filling-notch bearings having bores ranging from 50 mm to 160 mm. They can be used in applications with high radial loads, or a combination of radial and thrust loads, where the radial load is predominant. They are not recommended for use where only thrust loads are present.

NOTE: This series is obsolete but is still manufactured in a few sizes for replacement parts, please check availability before designing into equipment.

MRC Bearing Number	Bore d		Outside Diameter D		Width B		Fillet Radius ¹⁾ r _a		Basic Radial Load Rating				Speed Rating ²⁾			
									Dynamic C ³⁾		Static C ₀		Open and Shielded Grease		Oil	
									N	lbf	N	lbf	RPM	RPM		
110-M ⁴⁾	50	1.9685	90	3.5433	11	.4331	1.0	.04	18 700	4 200	19 600	4 400	5 600	6 800		
113-M ⁴⁾	65	2.5591	115	4.5276	14	.5512	1.0	.04	31 900	7 170	36 500	8 210	4 400	5 400		
117-M ⁴⁾	85	3.3465	145	5.7087	18	.7087	1.5	.06	58 300	13 100	68 000	15 300	3 400	4 200		
120-M	100	3.9370	160	6.2992	28	1.1024	2.0	.08	96 800	21 800	108 000	24 300	3 000	3 700		
124-M	120	4.7244	190	7.4803	32	1.2598	2.0	.08	123 000	27 700	146 000	32 800	2 500	3 100		
126-M	130	5.1181	205	8.0709	34	1.3386	2.0	.08	138 000	31 000	166 000	37 300	2 300	2 800		
128-M	140	5.5118	220	8.6614	36	1.4173	2.0	.08	157 000	35 300	190 000	42 800	2 100	2 600		
132-M	160	6.2992	250	9.8425	40	1.5748	2.0	.08	190 000	42 700	255 000	57 300	1 900	2 300		

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.
 The values have been determined through historical application and practice. For a more complete explanation, see page 274.
³⁾ Rating for one million revolutions or 500 hours at 33⅓ RPM.
⁴⁾ Typically non-stocked sizes, please check availability before designing into equipment.

200-M Light Series bearings are single-row maximum capacity filling-notch bearings. They are used in applications with heavy radial loads, or a combination of radial and thrust loads where the radial load is predominant. They are not to be used where only thrust loads are present.



MRC Bearing Number	Bore d		Outside Diameter D		Width B		Fillet Radius ¹⁾ r _a		Basic Radial Load Rating				Speed Rating ²⁾	
									Dynamic C ³⁾		Static C ₀		Open and Shielded Grease Oil	
									N	lbf	N	lbf	RPM	RPM
202-M ⁴⁾	15	.5906	35	1.3780	11	.4331	.64	.025	8 250	1 850	5 100	1 150	16 000	20 000
203-M ⁴⁾	17	.6693	40	1.5748	12	.4724	.64	.025	8 970	2 020	6 000	1 350	14 000	17 000
204-M ⁴⁾	20	.7874	47	1.8504	14	.5512	1.0	.04	12 500	2 810	8 300	1 870	12 000	15 000
205-M ⁴⁾	25	.9843	52	2.0472	15	.5906	1.0	.04	16 100	3 620	11 200	2 510	11 000	13 000
206-M	30	1.1811	62	2.4409	16	.6299	1.0	.04	22 900	5 150	17 000	3 820	9 000	11 000
207-M	35	1.3780	72	2.8346	17	.6693	1.0	.04	29 700	6 680	22 800	5 130	7 800	9 500
208-M	40	1.5748	80	3.1496	18	.7087	1.0	.04	33 600	7 550	26 500	5 960	7 000	8 500
209-M	45	1.7717	85	3.3465	19	.7480	1.0	.04	39 300	8 840	32 500	7 310	6 200	7 500
210-M	50	1.9685	90	3.5433	20	.7874	1.0	.04	39 100	8 790	34 500	7 760	5 700	7 000
211-M	55	2.1654	100	3.9370	21	.8268	1.5	.06	48 400	10 900	44 000	9 890	5 200	6 300
212-M	60	2.3622	110	4.3307	22	.8661	1.5	.06	56 100	12 600	51 000	11 500	4 900	6 000
213-M	65	2.5591	120	4.7244	23	.9055	1.5	.06	69 300	15 600	65 500	14 700	4 300	5 300
214-M	70	2.7559	125	4.9213	24	.9449	1.5	.06	69 300	15 600	65 500	14 700	4 100	5 000
215-M	75	2.9528	130	5.1181	25	.9843	1.5	.06	74 800	16 800	72 000	16 200	3 900	4 800
216-M	80	3.1496	140	5.5118	26	1.0236	2.0	.08	85 800	19 300	86 500	19 400	3 700	4 500
217-M	85	3.3465	150	5.9055	28	1.1024	2.0	.08	88 000	19 800	93 000	20 900	3 500	4 300
218-M	90	3.5433	160	6.2992	30	1.1811	2.0	.08	101 000	22 700	108 000	24 300	3 300	4 000
219-M	95	3.7482	170	6.6929	32	1.2598	2.0	.08	111 000	25 000	118 000	26 500	3 100	3 800
220-M	100	3.9370	180	7.0866	34	1.3386	2.0	.08	127 000	28 600	134 000	30 100	2 800	3 400
221-M	105	4.1339	190	7.4803	36	1.4173	2.0	.08	142 000	31 900	153 000	34 400	2 600	3 200
222-M	110	4.3307	200	7.8740	38	1.4961	2.0	.08	154 000	34 600	170 000	38 200	2 500	3 100
224-M	120	4.7244	215	8.4646	40	1.5748	2.0	.08	172 000	38 700	200 000	45 000	2 300	2 800
226-M	130	5.1181	230	9.0551	40	1.5748	2.5	.10	179 000	40 300	216 000	48 500	2 100	2 600

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.

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

³⁾ Rating for one million revolutions or 500 hours at 33⅓ RPM.

⁴⁾ Typically non-stocked sizes, please check availability before designing into equipment.

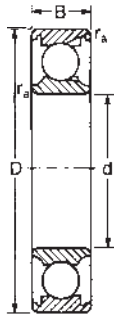
The 300-M Medium Series consists of single-row maximum capacity filling-notch bearings with bores ranging from 17 mm to 110 mm. They are used with very heavy radial loads, or a combination of radial and thrust loads where the radial load is predominant. They are not to be used where only a thrust load is present.



MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius ¹⁾ r _a		Basic Radial Load Rating				Speed Rating ²⁾	
	d mm	in	mm	in	mm	in	mm	in	Dynamic C ³⁾		Static C ₀		Open and Shielded Oil Grease	
									N	lbf	N	lbf	RPM	RPM
303-M	17	.6693	47	1.8504	14	.5512	1.0	.04	14 200	3 200	8 500	1 910	12 000	15 000
304-M	20	.7874	52	2.0472	15	.5906	1.0	.04	15 900	3 570	10 200	2 280	11 000	14 000
305-M	25	.9843	62	2.4409	17	.6693	1.0	.04	22 900	5 150	15 600	3 510	9 800	12 000
306-M	30	1.1811	72	2.8346	19	.7480	1.0	.04	29 200	6 560	20 800	4 680	7 800	9 500
307-M	35	1.3780	80	3.1496	21	.8268	1.5	.06	39 300	8 830	28 500	6 410	7 000	8 500
308-M	40	1.5748	90	3.5433	23	.9055	1.5	.06	46 800	10 500	36 000	8 090	6 200	7 500
309-M	45	1.7717	100	3.9370	25	.9843	1.5	.06	59 400	13 400	46 500	10 500	5 700	7 000
310-M	50	1.9685	110	4.3307	27	1.0630	2.0	.08	64 400	14 500	52 000	11 700	5 200	6 300
311-M	55	2.1654	120	4.7244	29	1.1417	2.0	.08	79 200	17 800	65 500	14 700	4 600	5 600
312-M	60	2.3622	130	5.1181	31	1.2205	2.0	.08	91 300	20 500	78 000	17 500	4 300	5 300
313-M	65	2.5591	140	5.5118	33	1.2992	2.0	.08	102 000	22 900	90 000	20 200	3 900	4 800
314-M	70	2.7559	150	5.9055	35	1.3780	2.0	.08	114 000	25 600	102 000	22 900	3 700	4 500
315-M	75	2.9528	160	6.2992	37	1.4567	2.0	.08	125 000	28 000	116 000	26 000	3 500	4 300
316-M	80	3.1496	170	6.6929	39	1.5354	2.0	.08	138 000	31 000	129 000	29 000	3 300	4 000
317-M	85	3.3465	180	7.0866	41	1.6142	2.5	.10	147 000	33 000	146 000	32 800	3 100	3 800
318-M	90	3.5433	190	7.4803	43	1.6929	2.5	.10	157 000	35 300	160 000	36 000	2 800	3 400
319-M	95	3.7402	200	7.8740	45	1.7717	2.5	.10	168 000	37 800	180 000	40 500	2 600	3 200
320-M	100	3.9370	215	8.4646	47	1.8504	2.5	.10	194 000	43 600	212 000	47 700	2 500	3 000
321-M	105	4.1339	225	8.8583	49	1.9291	2.5	.10	205 000	46 100	232 000	52 200	2 400	2 900
322-M	110	4.3307	240	9.4488	50	1.9685	2.5	.10	216 000	48 600	250 000	56 200	2 200	2 700

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.
 The values have been determined through historical application and practice. For a more complete explanation, see page 274.
³⁾ Rating for one million revolutions or 500 hours at 33⅓ RPM.

400-M Heavy Series bearings are single-row maximum capacity filling-notch bearings with bores ranging from 17 mm to 100 mm. They are used with extremely heavy radial loads, or a combination of radial and thrust loads where the radial load is predominant. They are not used where only thrust loads are present.



MRC Bearing Number	Bore		Outside Diameter D		Width B		Fillet Radius ¹⁾ r _a		Basic Radial Load Rating				Speed Rating ²⁾	
	d	in	mm	in	mm	in	mm	in	Dynamic C ₃₎		Static C ₀		Open and Shielded Oil	
									N	lbf	N	lbf	RPM	RPM
403-M	17	.6693	62	2.4409	17	.6693	1.0	.04	23 300	5 240	14 600	3 280	11 000	13 000
404-M	20	.7874	72	2.8346	19	.7480	1.0	.04	29 200	6 560	18 600	4 210	9 000	11 000
405-M	25	.9843	80	3.1496	21	.8268	1.5	.06	35 800	8 050	23 600	5 270	7 700	9 400
406-M	30	1.1811	90	3.5433	23	.9055	1.5	.06	45 700	10 300	32 500	7 310	6 200	7 500
407-M	35	1.3780	100	3.9370	25	.9843	1.5	.06	53 900	12 100	39 000	8 770	5 600	6 800
408-M	40	1.5748	110	4.3307	27	1.0630	2.0	.08	68 200	15 300	52 000	11 700	5 300	6 500
409-M	45	1.7717	120	4.7244	29	1.1417	2.0	.08	78 100	17 600	61 000	13 700	4 800	5 900
410-M	50	1.9685	130	5.1181	31	1.2205	2.0	.08	88 000	19 800	71 000	16 000	4 400	5 400
411-M	55	2.1654	140	5.5118	33	1.2992	2.0	.08	108 000	24 200	90 000	20 200	4 100	5 000
412-M	60	2.3622	150	5.9055	35	1.3780	2.0	.08	117 000	26 200	102 000	22 900	3 800	4 600
413-M	65	2.5591	160	6.2992	37	1.4567	2.0	.08	128 000	28 800	112 000	25 200	3 400	4 100
414-M	70	2.7559	180	7.0866	42	1.6535	2.5	.10	147 000	33 100	140 000	31 500	3 200	3 900
415-M	75	2.9528	190	7.4803	45	1.7717	2.5	.10	157 000	55 300	153 000	34 400	3 000	3 600
416-M	80	3.1496	200	7.8740	48	1.8898	2.5	.10	176 000	89 600	176 000	39 600	2 800	3 400
417-M	85	3.3465	210	8.2677	52	2.0472	3.0	.12	190 000	42 700	200 000	45 000	2 600	3 200
418-M	90	3.5433	225	8.8583	54	2.1260	3.0	.12	198 000	44 500	212 000	47 700	2 500	3 000
419-M	95	3.7402	250	9.8425	55	2.1654	3.0	.12	229 000	51 500	260 000	58 500	2 300	2 800
420-M	100	3.9370	265	10.4331	60	2.3622	3.0	.12	251 000	56 500	300 000	67 400	2 100	2 600

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.

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

³⁾ Rating for one million revolutions or 500 hours at 33⅓ RPM.

Dynamic and static equivalent radial load and life rating

Dynamic equivalent radial load

$$P = F_R + F_A \quad \begin{array}{l} P = \text{Dynamic equivalent radial} \\ \text{load} \\ F_R = \text{Radial load} \\ F_A = \text{Thrust load} \end{array}$$

when $F_A/F_R > 0.6$ or $P > 0.5 C_0$, a non-filling notch bearing is suggested.

C_0 = Basic static radial load rating

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

P = Dynamic equivalent radial load

n = Speed in rpm

Static equivalent radial load

$$P_0 = F_R + 0.5 F_A$$

Provided $F_A/F_R \leq 0.6$

P_0 = Static equivalent radial load

F_R = Radial load

F_A = Thrust load

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

Bearing size: 309M

Speed = 2000 RPM

Basic dynamic load rating (C) = 13400 lbf

ABMA CO Internal Clearance

Case 1Radial load (F_R) = 1890Equivalent load (P) = $F_R + F_A$ $P = F_R = 1890$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13400}{1890}\right)^3 = 356 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13400}{1890}\right)^3 \\ &= 2967 \text{ Hrs}\end{aligned}$$

Case 2Radial load (F_R) = 1890Thrust load (F_A) = 950

$$F_A/F_R = 950/1890 = 0.50$$

Since $F_A/F_R < 0.60$

$$P = F_R + F_A = 1890 + 950 = 2840$$

$$\text{Life (L}_{10}\text{)} = \left(\frac{C}{P}\right)^3 = \left(\frac{13400}{2840}\right)^3 = 105 \times 10^6 \text{ Rev.}$$

or

$$\begin{aligned}\text{Life (L}_{10}\text{h)} &= \frac{10^6}{60n} \left(\frac{13400}{2840}\right)^3 = \frac{10^6}{60 \times 2000} \left(\frac{13400}{2840}\right)^3 \\ &= 875 \text{ Hrs}\end{aligned}$$

Case 3Radial load (F_R) = 1890Thrust load (F_A) = 1250

$$F_A/F_R = 1250/1890 = 0.66$$

Since $F_A/F_R > 0.60$, use a non-filling notch bearing
