MRC 5000 type double-row bearings are made in three series — 5200 Light, 5300 Medium, and 5400 Heavy — each with progressively larger sections. The old-style 5000 type double-rows are available in the SB Conrad and maximum capacity configurations. The SB Conrad version has contact angles which diverge inwardly, thereby increasing resistance to misalignment. The maximum capacity version has contact angles which converge inwardly, giving it the capability of handling moderate misalignment. It also has filling notches on both sides, for the introduction of a maximum complement of balls.

Our new-style double-row bearings are available in the C-type (Conrad construction) and M type (with filling notches on one side only). Both types feature inwardly diverging contact angles, which provide greater rigidity than found in previous double-row filling-notch type bearings.

A unique manufacturing system utilizing "common parts" is employed in the manufacture of the new-style bearings. Using a minimum number of components, the system provides greater flexibility for producing either conrad or maximum-capacity types as open bearings or with a variety of closures. Twenty-two variations of a single bearing size can be made, for a total of 1185 double-row bearing variations to solve your application problems.

This chart outlines the suffixes and widths of MRC 5000 type bearings. The data on this chart do not represent actual availability of double-row products. These data are intended to be used as references for interchanging. New style double-rows appear next to their old-style counterparts that are the same width.

MRC Double-Row Suffix Identification Summary

Suffix	Description
B	Rigid construction, maximum capacity
BK	Rigid construction, maximum capacity, standard width
C	Conrad, rigid construction, standard width
C1	1/8″ additional width from standard; 5205C1 & 5212C1 are 1/16″ wider than standard
F	One shield
FF	Two shields
G	One snap-ring
K	Standard width
M	Maximum capacity, rigid construction, standard width Suffix Description

Suffix	Description
M1	1/8″ additional width from standard; 5205M1 & 5212M1 are 1/16″ wider than standard
Plain	Maximum capacity, nonrigid construction, narrow width in 5200 series, extra width is required with closures
S	Conrad construction (note: always combined with additional suffix letters)
SB	Conrad, rigid construction, narrow width, extra width is required with closures
SBK	Conrad, rigid construction, standard width
Z	One seal
ZZ	Two seals

Basic Bearing Number	Old—Style Suffix	New—Style Suffix	Width (inches)
5200 Series			
5106	SBZZ		29/32
5200	SB		9/16
	SBKF		9/16
	SBKFF		9/16
	SBKZ		9/16
	SBKZZ		9/16
5201	SB		5/8
	SBFG		5/8
	SBKF		5/8
	SBKFF		5/8
	SBKFFG		5/8
	SBKFG		5/8
	SBKZ		5/8
	SBKZZ		5/8
5202	Plain		5/8
	SB		5/8
	SBFG		11/16
	SBKF		5/8
	SBKFF		5/8
	SBKFG		5/8
	SBKZZ		5/8
5203	SB		11/16
	SBKF		11/16
	SBKFF		11/16
	SBKFFG		11/16
	SBKFG		11/16
	SBKZ		11/16
	SBKZZ		11/16
5204	Plain		3/4
	K	M	13/16
	KF	MF	13/16
	SB		3/4
	SBK	C	13/16
	SBKF	CF	13/16
	SBKFF	CFF	13/16
	SBKFFG	CFFG	13/16
	SBKFG	CFG	13/16
	SBKG	CG	13/16
	SBKZ	CZ	13/16
5205	F	MF1	7/8
	K	M	13/16
	KG	MG	13/16
	Plain		3/4
	SB		3/4
	SBF	CF1	7/8
	SBK	C	13/16
	SBKF	CF	13/16
	SBKFF	CFF	13/16
	SBKFG	CFG	13/16
	SBKG	CG	13/16
	—	C1, M1	7/8
5206	F	MF1	1 1/16
	K	M	15/16
	KF	MF	15/16
	KFF	MFF	15/16
	KG	MG	15/16
	Plain		3/4
	SBF	CF1	1 1/16
	SBK	C	15/16
	SBKF	CF	15/16
	SBKFF	CFF	15/16
	SBKFFG	CFFG	15/16
	SBKFG	CFG	15/16
	SBKG	CG	15/16
	SBZZ	CZZ1	1 1/16
	SBKZZG	CZZG1	1 1/16
	—	C1, M1	1 1/16
5207	F	MF1	1 3/16
	K	M	1 1/16
	KF	MF	1 1/16
	KFF	MFF	1 1/16
	KFG	MFG	1 1/16
	KG	MG	1 1/16
	Plain		7/8
	SBK	C	1 1/16
	SBKF	CF	1 1/16
	SBKFF	CFF	1 1/16
	SBKFG	CFG	1 1/16
	SBKFFG	CFFG	1 1/16
	SBKG	CG	1 1/16
	—	C1, M1	1 3/16
5208	BKF	MF	1 3/16
	BKFF	MFF	1 3/16
	K	M	1 3/16
	KF	MF	1 3/16
	KFF	MFF	1 3/16
	KFG	MFG	1 3/16
	KG	MG	1 3/16
	Plain		1
	SBK	C	1 3/16
	SBKF	CF	1 3/16
	SBKFF	CFF	1 3/16
	SBKFG	CFG	1 3/16
	SBKG	CG	1 3/16
5209	K	M	1 3/16
	KF	MF	1 3/16
	KG	MG	1 3/16
	Plain		1
	SBK	C	1 3/16
	SBKF	CF	1 3/16
	SBKFF	CFF	1 3/16
5210	K	M	1 3/16
	KF	MF	1 3/16
	KFF	MFF	1 3/16
	KG	MG	1 3/16
	Plain		1
	—	C	1 3/16
5211	BK	M	1 5/16
	BKG	MG	1 5/16
	K	M	1 5/16
	KF	MF	1 5/16
	KFG	MFG	1 5/16
	KG	MG	1 5/16
	Plain		1 3/16
		C	1 5/16
5212	F	MF1	1 1/2
	FG	MFG1	1 1/2
	K	M	1 7/16
	KF	MF	1 7/16
	KFG	MFG	1 7/16
	KG	MG	1 7/16
	Plain		1 3/8
	—	C1, M1	1 1/2
	—	C	1 7/16
5213	K	M	1 1/2
	KF	MF	1 1/2
	KFG	MFG	1 1/2
	KG	MG	1 1/2
	Plain		1 3/8
	—	C	1 1/2
5214	K	M	1 9/16
	KF	MF	1 9/16
	KFG	MFG	1 9/16
	KG	MG	1 9/16
	Plain		1 7/16
	—	C	1 9/16
5215	K	M	1 5/8
	KF	MF	1 5/8
	KFF	MFF	1 5/8
	KFG	MFG	1 5/8
	KG	MG	1 5/8
	Plain		1 7/16
	—	C	1 5/8
5216	BFF		1 7/8
	K	M	1 3/4
	KF	MF	1 3/4
	KFG	MFG	1 3/4
	KG	MG	1 3/4
	Plain		1 5/8
	—	C	1 3/4
5217	K	M	1 15/16
	KF	MF	1 15/16
	KG	MG	1 15/16
	Plain		1 3/4
	—	C	1 15/16
5218	K	M	2 1/16
	KF	MF	2 1/16
	KG	MG	2 1/16
	Plain		2
	—	C	2 1/16

Basic Bearing Number	Old—Style Suffix	New—Style Suffix	Width (inches)
5219	G		2 3/16
	Plain		2 3/16
5220	G		2 3/8
	Plain		2 3/8
5221	Plain		2 9/16
5222	KF		2 3/4
	Plain		2 3/4
5300 Series			
5300	SB		3/4
5301	SB		3/4
5302	Plain		3/4
	SB		3/4
5303	G		7/8
	KF		7/8
	KFG		7/8
	SB		7/8
	SBG		7/8
	SBKF		7/8
	SBKFF		7/8
	SBKFG		7/8
5304	F	MF1	1
	Plain	M	7/8
	SB	C	7/8
	SBF	CF1	1
	SBG	CG	7/8
	SBKF	CF	7/8
	SBKFF	CFF	7/8
	SBKFFG	CFFG	7/8
	SBKFG	CFG	7/8
	—	C1, M1	1
5305	F		1 1/8
	FG		1 1/8
	G	MG	1
	KFF	MFF	1
	Plain	M	1
	SB	C	1
	SBF		1 1/8
	SBFG		1 1/8
	SBG	CG	1
	SBKF	CF	1
	SBKFF	CFF	1
	SBKFG	CFG	1
5306	B	M	1 3/16
	BKFF	MFF	1 3/16
	F	MF1	1 5/16
	FG	MFG1	1 5/16
	G	MG	1 3/16
	KF	MF	1 3/16
	KFF	MFF	1 3/16
	KFG	MFG	1 3/16
	Plain	M	1 3/16
	—	C1, M1	1 5/16
	—	C	1 3/16
5307	BKFF	MFF	1 3/8
	F	MF1	1 1/2
	FG	MFG1	1 1/2
	G	MG	1 3/8
	KF	MF	1 3/8
	KFG	MFG	1 3/8
	Plain	M	1 3/8
	—	C1, M1	1 1/2
	—	C	1 3/8
5308	BG	MG	1 7/16
	F	MF1	1 9/16
	FG	MFG1	1 9/16
	G	MG	1 7/16
	Plain	M	1 7/16
	—	C	1 7/16
	—	C1, M1	1 9/16
5309	B	M	1 9/16
	F	MF1	1 11/16
	FG	MFG1	1 11/16
	G	MG	1 9/16
	Plain	M	1 9/16
	—	C	1 9/16
	—	C1, M1	1 11/16
5310	F	MF1	1 7/8
	FG	MFG1	1 7/8
	G	MG	1 3/4
	KF	MF	1 3/4
	KFG	MFG	1 3/4
	Plain	M	1 3/4
	—	C	1 3/4
	—	C1, M1	1 7/8
5311	F	MF1	2 1/16
	FG	MFG1	2 1/16
	G	MG	1 15/16
	Plain	M	1 15/16
	—	C	1 15/16
	—	C1, M1	2 1/16
5312	F	MF1	2 1/4
	FG	MFG1	2 1/4
	G	MG	2 1/8
	Plain	M	2 1/8
	—	C	2 1/8
	—	C1, M1	2 1/4
5313	F	MF1	2 7/16
	FG	MFG1	2 7/16
	G	MG	2 5/16
	Plain	M	2 5/16
	—	C	2 5/16
	—	C1, M1	2 7/16
5314	F	MF1	2 5/8
	G	MG	2 1/2
	KF	MF	2 1/2
	KFG	MFG	2 1/2
	Plain	M	2 1/2
	—	C	2 1/2
	—	C1, M1	2 5/8
5315	F	MF1	2 13/16
	G	MG	2 11/16
	Plain	M	2 11/16
	—	C	2 11/16
	—	C1, M1	2 13/16
5316	G	MG	2 11/16
	Plain	M	2 11/16
	—	C	2 11/16
5317	Plain		2 7/8
	—	C	2 7/8
5318	Plain		2 7/8
	—	C	2 7/8
5319	Plain		3 1/16
	—	C	3 1/16
5320	Plain		3 1/4
5321	Plain		3 7/16
5322	Plain		3 5/8
5400 Series			
5403	Plain		1 3/16
5404	Plain		1 3/8
5405	Plain		1 3/8
5406	Plain		1 9/16
	—	C	1 9/16
5407	G		1 3/4
	Plain		1 3/4
	—	C	1 3/4
5408	Plain		1 15/16
	—	C	1 15/16
5409	G		2 1/8
	Plain		2 1/8
	—	C	2 1/8
5410	F		2 7/16
	Plain		2 5/16
	—	C	2 5/16
5411	F		2 5/8
	G		2 1/2
	Plain		2 1/2
	—	C	2 1/2
5412	Plain		2 5/8
	—	C	2 5/8
5413	Plain		2 13/16
	—	C	2 13/16
5414	Plain		3 1/8
	—	C	3 1/8
5415	Plain		3 1/4
	—	C	3 1/4
5416	Plain		3 7/16
	—	C	3 7/16
5417	Plain		3 5/8
	—	C	3 5/8
5418	Plain		3 7/8
	—	C	3 7/8
5419	Plain		4 3/16

Bearing numbers of MRC double-row ball bearings produced before 1983 differ from the new C- and M-types listed in this catalog. Shown below is the interchange of pre-1983 bearing numbers with the new C- and M-types.

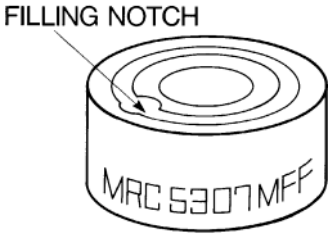
5000 Series double-row bearings not listed here maintain the original bearing number and must be specified by that number when ordering.

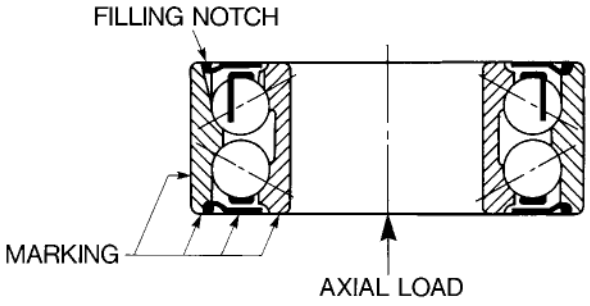
MRC Bearing Numbers	
Prior to 1983	**Superseded by**
5200SB	**5200C***
5200SBKF	**5200CF***
5200SBKFF	**5200CFF***
5200SBKZ	**5200CZ***
5200SBKZZ	**5200CZZ***
5201SB	**5201C***
5201SBKF	**5201CF***
5201SBKFF	**5201CFF***
5201SBKZ	**5201CZ***
5201SBKZZ	**5201CZZ***
5202SB	**5202C***
5202SBKFF	**5202CFF***
5202SBFG	**5202CFG-1***
5202SBKFG	**5202CFG***
5202SBKZ	**5202CZ***
5202SBKZZ	**5202CZZ***
5203SB	**5203C***
5203SBKF	**5203CF***
5203SBKFF	**5203CFF***
5203SBKFG	**5203CFG***
5203SBKZ	**5203CZ***
5203SBKZZ	**5203CZZ***
5204SBK	**5204C**
5204SBKF	**5204CF**
5204SBKFF	**5204CFF**
5204SBKFG	**5204CFG**
5204SBKFFG	**5204CFFG**
5204SBKG	**5204CG**
5204SBKZ	**5204CZ**
5205SBK	**5205C**
5205SBF	**5205CF-1**
5205SBKF	**5205CF**
5205SBKFF	**5205CFF**
5205SBKG	**5205CG**
5206SBK	**5206C**
5206SBF	**5206CF-1**
5206SBKF	**5206CF**
5206SBKFF	**5206CFF**
5206SBKFG	**5206CFG**
5206SBKG	**5206CG**
5206SBZZ	**5206CZZ-1**
5207F	**5207MF-1**
5207SBK	**5207C**
5207SBKF	**5207CF**
5207SBKFF	**5207CFF**
5207SBKFG	**5207CFG**
5207SBKG	**5207CG**
5208SBK	**5208C**
5208SBKF	**5208CF**
5208SBKFF	**5208CFF**
5208SBKFG	**5208CFG**
5208SBKG	**5208CG**
5209K	**5209M**
5209KF	**5209MF**
5209SBFF	**5209CFF**
5209KG	**5209MG**
5210K	**5210M**
5210KF	**5210MF**
5210KFF	**5210MFF**
5210KG	**5210MG**

MRC Bearing Numbers	
Prior to 1983	**Superseded by**
5211K	**5211M**
5211KF	**5211MF**
5211KFG	**5211MFG**
5211KG	**5211MG**
5212F	**5212MF-1**
5212FG	**5212MFG-1**
5212K	**5212M**
5212KF	**5212MF**
5212KFG	**5212MFG**
5212KG	**5212MG**
5213K	**5213M**
5213KF	**5213MF**
5213KFG	**5213MFG**
5213KG	**5213MG**
5214K	**5214M**
5214KF	**5214MF**
5214KG	**5214MG**
5215K	**5215M**
5215KF	**5215MF**
5215KFF	**5215MFF**
5215KFG	**5215MFG**
5215KG	**5215MG**
5216K	**5216M**
5216KF	**5216MF**
5216KFG	**5216MFG**
5216KG	**5216MG**
5217K	**5217M**
5217KF	**5217MF**
5217KG	**5217MG**
5218K	**5218M**
5218KF	**5218MF**
5218KG	**5218MG**
5219	**5219**
5219G	**5219G**
5220	**5220**
5220G	**5220G**
5221	**5221**
5222	**5222**
5222KF	**5222KF**
5300SB	**5300C***
5301SB	**5301C***
5302SB	**5302C***
5303SB	**5303C***
5303SBG	**5303CG***
5303SBKF	**5303CF***
5303SBKFF	**5303CFF***
5303SBKFG	**5303CFG***
5304SB	**5304C**
5304SBF	**5304CF-1**
5304SBKF	**5304CF**
5304SBKFF	**5304CFF**
5305SB	**5305C**
5305SBG	**5305CG**
5305SBKF	**5305CF**
5305SBKFF	**5305CFF**
5305SBKFG	**5305CFG**

MRC Bearing Numbers	
Prior to 1983	**Superseded by**
5306	**5306M**
5306F	**5306MF-1**
5306FG	**5306MFG-1**
5306G	**5306MG**
5306KF	**5306MF**
5306KFF	**5306MFF**
5306KFG	**5306MFG**
5307	**5307M**
5307F	**5307MF-1**
5307FG	**5307MFG-1**
5307G	**5307MG**
5307KF	**5307MF**
5307KFG	**5307MFG**
5308	**5308M**
5308F	**5308MF-1**
5308FG	**5308MFG-1**
5308G	**5308MG**
5309	**5309M**
5309B	**5309M**
5309F	**5309MF-1**
5309FG	**5309MFG-1**
5309G	**5309MG**
5310	**5310**
5310F	**5310MF-1**
5310FG	**5310MFG-1**
5310G	**5310MG**
5310KF	**5310MF**
5310KFG	**5310MFG**
5311	**5311M**
5311F	**5311MF-1**
5311FG	**5311MFG-1**
5311G	**5311MG**
5312	**5312M**
5312F	**5312MF-1**
5312FG	**5312MFG-1**
5312G	**5312MG**
5313	**5313M**
5313F	**5313MF-1**
5313FG	**5313MFG1**
5313G	**5313MG**
5314	**5314M**
5314F	**5314MF-1**
5314G	**5314MG**
5314KF	**5314MF**
5315	**5315M**
5315F	**5315MF1**
5315G	**5315MG**
5316	**5316M**
5316G	**5316MG**
5317	**5317**
5318	**5318**
5319	**5319**
5320	**5320**
5321	**5321**
5322	**5322**

*Listed for information only. Not currently in production. Use SB types.





Since the filling notch row is not visible on 5000MFF and 5000MZZ bearings, it is necessary to identify which row has the notch in those cases where the bearing subject to axial load. Axial load should be carried on the non-filling notch row. A moderate reversing axial load is permissible on the filling notch row.

The filling notch is oriented in relation to the bearing identification marking on the bearing which will be found in one of the following locations:

- Face of the outer ring
- Face of the inner ring
- OD surface of the outer ring
- Face of the closure

In each case the marking will occur on the side of the bearing opposite the filling notch as illustrated above. When the O.D. surface marking is “right side up” the filling notch is in the uppermost row and it is located closest to the non-filling notch row.

A typical application of a 5000MFF or 5000MZZ bearing is shown above in which it is subjected to an axial load in an upward direction. The bearing should be mounted with the filling notch up so that the axial load is taken by the bottom, non-filling notch row.

5200 and 5300 Series

Bore Diameter d				Axial Internal Clearance															
Over		Including		C2				Normal C0				C3				C4			
				.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in	
mm	in	mm	in	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		10	.3937	1	11	0	4	5	21	2	8	12	28	5	11	25	45	10	18
10	.3937	18	7087	1	12	0	5	6	23	2	9	13	31	5	12	27	47	11	19
18	.7087	24	.9449	2	14	1	6	7	25	3	10	16	34	6	13	28	48	11	19
24	.9449	30	1.1811	2	15	1	6	8	27	3	11	18	37	7	15	30	50	12	20
30	1.1811	40	1.5748	2	16	1	6	9	29	4	11	21	40	8	16	33	54	13	21
40	1.5748	50	1.9685	2	18	1	7	11	33	4	13	23	44	9	17	36	58	14	23
50	1.9685	65	2.5591	3	22	1	9	13	36	5	14	26	48	10	19	40	63	16	25
65	2.5591	80	3.1496	3	24	1	9	15	40	6	16	30	54	12	21	46	71	18	28
80	3.1496	100	3.9370	3	26	1	10	18	46	7	18	35	63	14	25	55	83	22	33
100	3.9370	110	4.3307	4	30	2	12	22	53	9	21	42	73	17	29	65	96	26	38

Bore Diameter d				Radial Internal Clearance															
Over		Including		C2				Normal C0				C3				C4			
				.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in	
mm	in	mm	in	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		10	.3937	0.6	7	0	2.4	3	13	1.2	5	8	18	3	7	15	27	6	11
10	.3937	18	.7087	0.6	7	0	3	3.6	14	1.2	5	8	18	3	7	18	27	7	11
18	.7087	24	.9449	1.2	8	0.6	3.6	4	15	1.8	6	11	21	4	8	18	27	7	11
24	.9449	30	1.1811	1.2	9	0.6	3.6	5	16	1.8	7	11	23	4	9	18	31	7	12
30	1.1811	40	1.5748	1.2	10	0.6	3.6	5	17	2.4	7	12	25	5	10	21	33	8	13
40	1.5748	50	1.9685	1.2	11	0.6	4	7	20	2.4	8	12	25	5	10	21	36	8	14
50	1.9685	65	2.5591	1.8	13	0.6	5	8	22	3	8	15	27	6	11	25	38	10	15
65	2.5591	80	3.1496	1.8	14	0.6	5	9	24	3.6	10	18	33	7	13	27	44	11	17
80	3.1496	100	3.9370	1.8	16	0.6	6	11	28	4	11	21	38	8	15	33	50	13	20
100	3.9370	110	4.3307	2.4	18	1.2	7	13	32	5	13	25	44	10	17	40	58	16	23

5400 Series

Bore Diameter d				Axial Internal Clearance															
Over		Including		C2				Normal C0				C3				C4			
				.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in	
mm	in	mm	in	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		30	1.1811	2	15	1	6	8	27	3	11	28	47	11	19	45	75	18	30
30	1.1811	40	1.5748	2	16	1	6	9	29	4	11	31	50	12	20	48	84	19	33
40	1.5748	50	1.9685	2	18	1	7	11	33	4	13	33	54	13	21	51	90	20	35
50	1.9685	65	2.5591	3	22	1	9	13	36	5	14	36	58	14	23	55	96	22	38
65	2.5591	70	2.7559	3	24	1	9	15	40	6	16	40	64	16	25	61	106	24	42
70	2.7559	80	3.1496	0	165	0	65	165	305	65	120	305	430	120	170	430	510	170	200
80	3.1496	90	3.5433	0	200	0	80	200	360	80	140	360	480	140	190	480	610	190	240

Bore Diameter d				Radial Internal Clearance															
Over		Including		C2				Normal C0				C3				C4			
				.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in		.001 mm		.0001 in	
mm	in	mm	in	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		30	1.1811	1	8	0.4	3	2	13	1	5	13	23	5	9	20	38	8	15
30	1.1811	40	1.5748	1	8	0.5	3	6	13	2	5	15	23	6	9	23	41	9	16
40	1.5748	50	1.9685	1	8	0.5	3	6	15	2	6	15	25	6	10	23	44	9	17
50	1.9685	65	2.5591	1	11	0.5	4	6	15	2	6	15	28	6	11	25	45	10	18
65	2.5591	70	2.7559	1	11	0.5	4	6	18	2	7	18	31	7	12	28	48	11	19
70	2.7559	80	3.1496	0	6	0	2	6	18	2	7	18	33	7	13	33	48	13	19
80	3.1496	90	3.5433	0	7	0	3	7	23	3	9	23	44	9	17	44	65	17	26

Dynamic Rating

To obtain dynamic thrust rating multiply dynamic radial rating C by the factor shown below.

Size	Factor
5200SB-5203SB 5300SB-5303SB 5403C-5414C	0.71
5204C&M-5218C&M 5304C&M-5319C&M	0.81

Example:

Bearing size: 5307C
Basic dynamic radial load rating (C) =11100 lbf
Thrust rating factor = 0.81
Thrust rating = $0.81 \times 11100 = 8991$

Static Rating

To obtain static thrust rating multiply static radial rating C_0 by the factor shown below.

Size	Factor
5200SB-5203SB 5300SB-5303SB 5204C&M-5206C&M 5403C-5414C	0.57
5207C&M-5218C&M 5304C&M-5319C&M	0.66

Sizes 5415C-5419C have 0˚ contact angles and are not included in the above tables. When thrust load is present, the equivalent radial load should be used to determine life.

Example:

Bearing size: 5214M
Basic static radial load rating (C_0) = 28100 lbf
Thrust rating factor = 0.66
Thrust rating = $0.66 \times 28100 = 18550$

MRC Extra-Wide 5000 Series Double-Row Ball Bearing Retrofit Kit

Double-row ball bearings with non-standard extra wide width are currently available as a retrofit kit. These replacement units consist of a standard width double-row ball bearing and two specially designed spacers packaged together in a single carton.

Spacers
The Extra-Width Double-Row Ball Bearing Retrofit Kit is simple to use. When used with bearings without snap rings, place both spacers on the same side, as shown in Figure 1.

With snap ring bearings, the inner ring spacer must be installed on the side opposite the snap ring, as shown in Figure 2. The outer spacer is not needed in applications where the bearing's snap ring controls the axial location of the outer ring in the housing.

The spacers accommodate slight variations in the shaft and housing seat width. The inner ring and spacer can be secured to the shaft with a retaining ring or threaded locknut. If a locknut is used, the amount of clamping force can be regulated to make slight adjustments in the shaft's axial location. The spacer rings yield slightly when an axial clamping force is applied. The spacer rings also exert a reaction force, which helps maintain the initial clamping force and helps prevent the inner ring from becoming loose on the shaft. The same circumstances apply to the outer ring spacers when an end cap is used to clamp the bearing's outer ring against a housing shoulder.

Because the spacer rings are designed to yield slightly when axial clamping forces are applied, the spacer rings should always be replaced with new spacer rings anytime the bearing is removed, replaced or reinstalled.

Materials for Rings, Balls and Spacers
High-carbon chromium vacuum-processed steel (SAE 52100) is used for all balls and rings. Machined and roll formed spacer rings are fabricated from 1018 carbon steel and 304 stainless steel.

Mounting Instructions

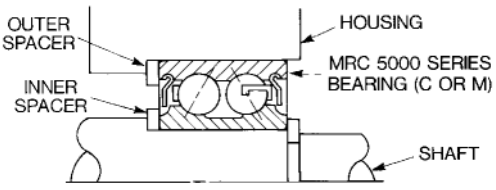


Figure 1

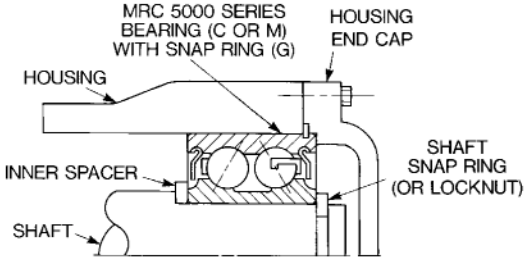


Figure 2

Without Snap Ring

1. Install inner and outer ring spacers onto the shaft and into the housing bore respectively.
2. Install bearing in accordance with normal mounting instructions.
3. If any locking devices such as snap rings or locknuts are normally used to secure the bearing on the shaft or in the housing be sure they are properly installed.
4. These inner and outer ring spacers are adjusted to proper width prior to installation. During bearing installation their width may be slightly altered to accommodate variations in shaft and housing shoulder distances. As a consequence, when a new extra width retrofit bearing kit is installed the new spacer rings supplied with the kit should always be used and the old spacers discarded.

With Snap Ring

1. Install the inner ring spacer onto the shaft. The outer ring spacer is not used with a snap ring bearing and may be discarded.
2. Install bearing in accordance with normal mounting instructions.
3. If any locking devices such as snap rings, locknuts or end caps are normally used to secure the bearing on the shaft or in the housing be sure they are properly installed.
4. These inner and outer ring spacers are adjusted to proper width prior to installation. During bearing installation their width may be slightly altered to accommodate variations in shaft and housing shoulder distances. As a consequence, when a new extra width retrofit bearing kit is installed the new spacer rings supplied with the kit should always be used and the old spacers discarded.

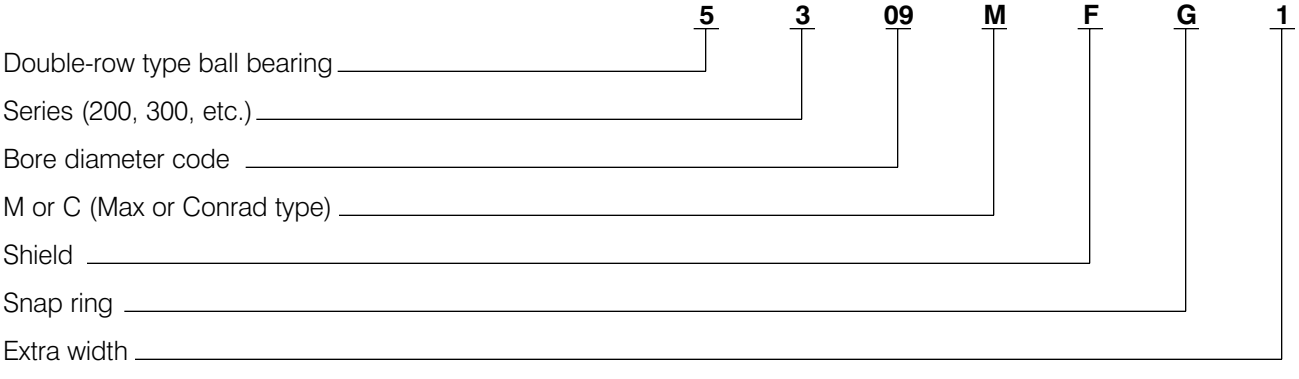
Part Numbers

A listing of available part numbers appears below. This listing may change with sizes being added or deleted based on demand.

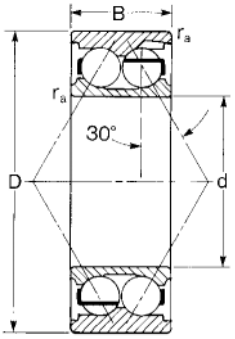
MRC Part Number	Width including Spacers		
	Inches		mm
5205CF1	7/8	.8750	22.23
5205MF1*	7/8	.8750	22.23
5206CF1	1 1/16	1.0625	26.99
5206MF1	1 1/16	1.0625	26.99
5206SBZZ	1 1/16	1.0625	26.99
5212MF1	1 1/2	1.5000	38.10
5304CF1	1	1.0000	25.40
5304MF1	1	1.0000	25.40
5305CF1	1 1/8	1.1250	28.58
5305MFG1	1 1/8	1.1250	28.58
5306MFG1	1 5/16	1.3125	33.34
5306MF1	1 5/16	1.3125	33.34
5307MF1	1 1/2	1.5000	38.10
5307MFG1	1 1/2	1.5000	38.10
5308MFG1	1 9/16	1.5625	39.69
5308MF1	1 9/16	1.5625	39.69
5309MFG1	1 11/16	1.6875	42.86
5309MF1	1 11/16	1.6875	42.86
5310MFG1	1 7/8	1.8750	47.63
5310MF1	1 7/8	1.8750	47.63
5311MFG1	2 1/16	2.0625	52.39
5311MF1	2 1/16	2.0625	52.39
5312MFG1	2 1/4	2.2500	57.15
5312MF1	2 1/4	2.2500	57.15
5313MFG1	2 7/16	2.4375	61.91
5313MF1	2 7/16	2.4375	61.91
5315MF1	2 13/16	2.8125	71.44

*Currently stocked. No spacer needed.

Nomenclature



5200M bearings are used with heavy radial loads, two-directional thrust loads, or a combination of both. Thrust load should be carried on the non-filling notch row. Moderate thrust load is permissible on the filling notch row.



MF
One Shield

MZ
One Seal

MFF
Two Shields

MZZ
Two Seals

MFZ
Shield & Seal

MFG
One Shield
& Snap-Ring

MG
Snap-Ring

MFFG
Two Shields
& Snap-Ring

MFZG
Shield, Seal
& Snap-Ring

MZZG
Two Seals
& Snap-Ring

MZG
One Seal
& Snap-Ring

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	Single and Double Sealed Grease
	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	RPM	RPM	RPM
5204-M	20	**.7874**	47	**1.8504**	20.6	**.8110**	1.0	**.04**	20 500	**4 610**	17 000	**3 820**	9 000	13 000	9 000
5205-M	25	**.9843**	52	**2.0472**	20.6	**.8110**	1.0	**.04**	22 900	**5 150**	21 200	**4 770**	8 000	11 000	8 000
5205-M1	25	**.9843**	52	**2.0472**	22.2	**.8740**	1.0	**.04**	22 900	**5 150**	21 200	**4 770**	8 000	11 000	8 000
5206-M	30	**1.1811**	62	**2.4409**	23.8	**.9370**	1.0	**.04**	30 200	**6 820**	28 000	**6 290**	7 000	9 500	7 000
5206-M1	30	**1.1811**	62	**2.4409**	27.0	**1.0630**	1.0	**.04**	30 300	**6 820**	28 000	**6 290**	7 000	9 500	7 000
5207-M	35	**1.3780**	72	**2.8346**	27.0	**1.0630**	1.0	**.04**	39 100	**8 800**	36 500	**8 210**	6 000	8 000	6 000
5207-M1	35	**1.3780**	72	**2.8346**	30.2	**1.1890**	1.0	**.04**	39 100	**8 800**	36 500	**8 210**	6 000	8 000	6 000
5208-M	40	**1.5748**	80	**3.1496**	30.2	**1.1890**	1.0	**.04**	49 500	**11 100**	49 000	**11 000**	5 600	7 500	5 600
5209-M	45	**1.7717**	85	**3.3465**	30.2	**1.1890**	1.0	**.04**	51 200	**11 500**	54 000	**12 100**	5 000	6 700	5 000
5210-M	50	**1.9685**	90	**3.5433**	30.2	**1.1890**	1.0	**.04**	53 900	**12 100**	58 500	**13 200**	4 800	6 300	4 800
5211-M	55	**2.1654**	100	**3.9370**	33.3	**1.3110**	1.5	**.06**	66 000	**14 900**	76 500	**17 200**	4 300	5 600	4 300
5212-M	60	**2.3622**	110	**4.3307**	36.5	**1.4370**	1.5	**.06**	78 100	**17 600**	88 000	**19 800**	3 800	5 000	3 800
5212-M1	60	**2.3622**	110	**4.3307**	38.1	**1.5000**	1.5	**.06**	78 100	**17 600**	88 000	**19 800**	3 800	5 000	4 300
5213-M	65	**2.5591**	120	**4.7244**	38.1	**1.5000**	1.5	**.06**	88 000	**19 800**	106 000	**23 800**	3 600	4 800	3 600
5214-M	70	**2.7559**	125	**4.9213**	39.7	**1.5630**	1.5	**.06**	101 000	**22 700**	125 000	**28 100**	3 200	4 300	3 200
5215-M	75	**2.9528**	130	**5.1181**	41.3	**1.6260**	1.5	**.06**	108 000	**24 300**	137 000	**30 800**	3 200	4 300	3 200
5216-M	80	**3.1496**	140	**5.5118**	44.4	**1.7480**	2.0	**.08**	128 000	**28 800**	160 000	**36 000**	2 800	3 800	2 800
5217-M	85	**3.3465**	150	**5.9055**	49.2	**1.9370**	2.0	**.08**	142 000	**32 000**	176 000	**39 600**	2 600	3 600	2 600
5218-M	90	**3.5433**	160	**6.2992**	52.4	**2.0630**	2.0	**.08**	151 000	**34 000**	193 000	**43 400**	2 400	3 400	2 400

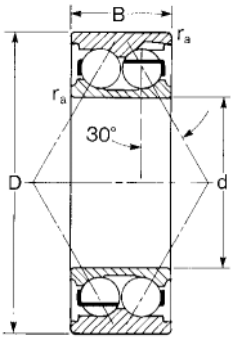
[1] Fillet radius indicates maximum fillet radius on shaft or in housing which bearing corner will clear.

[2] Listed values are for pressed steel cage, ABEC-1.

The values 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 33⅓ RPM.

Note: Extra width bearings identified by the suffix M1 are supplied with a retrofit kit described on pages 147, 148.



5200M bearings are used with heavy radial loads, two-directional thrust loads, or a combination of both. Thrust load should be carried on the non-filling notch row. Moderate thrust load is permissible on the filling notch row.

MF
One Shield

MZ
One Seal

MFF
Two Shields

MZZ
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MFZ
Shield & Seal

MFG
One Shield
& Snap-Ring

MG
Snap-Ring

MFFG
Two Shields
& Snap-Ring

MFZG
Shield, Seal
& Snap-Ring

MZZG
Two Seals
& Snap-Ring

MZG
One Seal
& Snap-Ring

MRC Bearing Number	Bore d		Outside Diameter D		Width B		Fillet Radius[1] r_a		Basic Radial Load Rating: Dynamic C[3]		Basic Radial Load Rating: Static C_0		Speed Rating[2]: Open and Shielded Grease	Speed Rating[2]: Oil	Speed Rating[2]: Single and Double Sealed Grease
	mm	in	mm	in	mm	in	mm	in	N	lbf	N	lbf	RPM	RPM	RPM
5304-M	20	**.7874**	52	**2.0472**	22.2	**.8740**	1.0	**.04**	23 800	**5 360**	20 000	**4 500**	8 500	12 000	8 500
5304-M1	20	**.7874**	52	**2.0472**	25.4	**1.0000**	1.0	**.04**	23 800	**5 360**	20 000	**4 500**	8 500	12 000	8 500
5305-M	25	**.9843**	62	**2.4409**	25.4	**1.0000**	1.0	**.04**	34 100	**7 670**	30 500	**6 860**	7 500	10 000	7 500
5306-M	30	**1.1811**	72	**2.8346**	30.2	**1.1890**	1.0	**.04**	46 800	**10 500**	43 000	**9 670**	6 300	8 500	6 300
5306-M1	30	**1.1811**	72	**2.8346**	33.3	**1.3110**	1.0	**.04**	46 800	**10 500**	43 000	**9 670**	6 300	8 500	6 300
5307-M	35	**1.3780**	80	**3.1496**	34.9	**1.3740**	1.5	**.06**	52 300	**11 800**	48 000	**10 800**	5 600	7 500	5 600
5307-M1	35	**1.3780**	80	**3.1496**	38.1	**1.5000**	1.5	**.06**	52 300	**11 800**	48 000	**10 800**	5 600	7 500	5 600
5308-M	40	**1.5748**	90	**3.5433**	36.5	**1.4370**	1.5	**.06**	67 100	**15 100**	65 500	**14 700**	5 000	6 700	5 000
5308-M1	40	**1.5748**	90	**3.5433**	39.7	**1.5630**	1.5	**.06**	67 100	**15 100**	65 500	**14 700**	5 000	6 700	5 000
5309-M	45	**1.7717**	100	**3.9370**	39.7	**1.5630**	1.5	**.06**	80 900	**18 200**	80 000	**18 000**	4 500	6 000	4 500
5309-M1	45	**1.7717**	100	**3.9370**	42.9	**1.6890**	1.5	**.06**	80 900	**18 200**	80 000	**18 000**	4 500	6 000	4 500
5310-M	50	**1.9685**	110	**4.3307**	44.4	**1.7480**	2.0	**.08**	95 200	**21 400**	95 000	**21 400**	4 000	5 300	4 000
5310-M1	50	**1.9685**	110	**4.3307**	47.6	**1.8740**	2.0	**.08**	95 200	**21 400**	95 000	**21 400**	4 000	5 300	4 000
5311-M	55	**2.1654**	120	**4.7244**	49.2	**1.9370**	2.0	**.08**	119 000	**26 800**	122 000	**27 400**	3 800	5 000	3 800
5311-M1	55	**2.1654**	120	**4.7244**	52.4	**2.0630**	2.0	**.08**	119 000	**26 800**	122 000	**27 400**	3 800	5 000	3 800
5312-M	60	**2.3622**	130	**5.1181**	54.0	**2.1260**	2.0	**.08**	134 000	**30 200**	143 000	**32 100**	3 400	4 500	3 400
5312-M1	60	**2.3622**	130	**5.1181**	57.2	**2.2520**	2.0	**.08**	134 000	**30 200**	143 000	**32 100**	3 400	4 500	3 400
5313-M	65	**2.5591**	140	**5.5118**	58.7	**2.3110**	2.0	**.08**	154 000	**34 700**	163 000	**36 600**	3 200	4 300	3 200
5313-M1	65	**2.5591**	140	**5.5118**	61.9	**2.4370**	2.0	**.08**	154 000	**34 700**	163 000	**36 600**	3 200	4 300	3 200
5314-M	70	**2.7559**	150	**5.9055**	63.5	**2.5000**	2.0	**.08**	172 000	**38 700**	186 000	**41 800**	2 800	3 800	2 800
5314-M1	70	**2.7559**	150	**5.9055**	66.7	**2.6260**	2.0	**.08**	172 000	**38 700**	186 000	**41 800**	2 800	3 800	2 800
5315-M	75	**2.9528**	160	**6.2992**	68.3	**2.6890**	2.0	**.08**	187 000	**42 000**	208 000	**46 800**	2 600	3 600	2 600
5315-M1	75	**2.9528**	160	**6.2992**	71.4	**2.8110**	2.0	**.08**	187 000	**42 000**	208 000	**46 800**	2 600	3 600	2 600
5316-M	80	**3.1496**	170	**6.6929**	68.3	**2.6890**	2.0	**.08**	201 000	**45 200**	236 000	**53 100**	2 400	3 400	2 400
5317	85	**3.3465**	180	**7.0866**	73.0	**2.8740**	2.5	**.10**	198 000	**44 500**	245 000	**55 100**	2 200	3 200	2 200
5318	90	**3.5433**	190	**7.4803**	73.0	**2.8740**	2.5	**.10**	224 000	**50 400**	290 000	**65 200**	2 000	3 000	2 000
5319	95	**3.7402**	200	**7.8740**	77.8	**3.0630**	2.5	**.10**	242 000	**54 400**	315 000	**70 800**	1 900	2 800	1 900
5321	105	**4.1339**	225	**8.8583**	87.3	**3.4370**	2.5	**.10**	275 000	**60 700**	390 000	**87 700**	1 800	2 600	1 800

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

[2] Listed values are for pressed steel cage, ABEC-1.
The values 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 33⅓ RPM.

Note: Extra width bearings identified by the suffix M1 are supplied with a retrofit kit described on pages 147, 148.

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
X = Radial load factor
Y = Thrust load factor
C_0 = Basic static radial load rating
e = Limiting factor for F_A/F_R

Size	e	$F_A/F_R \leq e$		$F_A/F_R > e$	
		X	Y	X	Y
5200SB–5206C&M 5300SB–5303SB 5403C–5414C	0.66	1.0	0.92	0.67	1.41
5207C&M–5218C&M 5304C&M–5319C&M	0.80	1.0	0.78	0.63	1.24

Size	F_A/C_0	Normal Clearance (ST Fit)			C3 Clearance (LO Fit)		
		e	X	Y	e	X	Y
5415C–5419C	0.025	0.22	0.56	2.0	0.25	0.52	1.8
	0.040	0.24	0.56	1.8	0.28	0.52	1.65
	0.070	0.27	0.56	1.6	0.30	0.52	1.5
	0.13	0.31	0.56	1.4	0.34	0.52	1.33
	0.25	0.37	0.56	1.2	0.40	0.52	1.17
	0.50	0.44	0.56	1.0	0.48	0.52	1.0

Values of Y and e for loads not shown are obtained by linear interpolation.

Life Rating

$$L10 = \left(\frac{C}{P}\right)^3 \text{ (Millions of revolutions)}$$

or

$$L10h = \frac{10^6}{60\,n}\left(\frac{C}{P}\right)^3 \text{ (Hours)}$$

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

Static equivalent radial load

$P = X_0F_R + Y_0F_A$

P_0 = Static equivalent radial load
F_R = Radial load
F_A = Thrust load
X_0 = Radial load factor
Y_0 = Thrust load factor

Size	X	Y	
5200SB–5206C&M 5300SB–5303SB 5403C–5414C	1.0	0.76	
5207C&M–5218C&M 5304C&M–5319C&M	1.0	0.66	
5415C–5419C	0.60	0.50	Po is always $\geq F_R$

Dynamic equivalent radial load and life calculation examples

Bearing size: 5210 M
Speed: 2000 RPM
Basic dynamic radial load rating (C) = 12100 lbf

Case 1

Radial load (F_R) = 1750
F_A/F_R = 0/1750 = 0
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R < e, equivalent load (P) =
1.0 F_R + 0.78 F_A = 1.0 × 1750 = 1750

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{12100}{1750}\right)^3 = 331 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{12100}{1750}\right)^3$

= 2755 Hrs

Case 2

Radial load (F_R) = 1750
Thrust load (F_A) = 1300
F_A/F_R = 1300/1750 = 0.74
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R < e, equivalent load (P) =
1.0 F_R + 0.78 F_A = 1.0 × 1750 + 0.78 × 1300= 2764

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{12100}{2764}\right)^3 = 83.9 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{12100}{2764}\right)^3$

= 699 Hrs

Case 3

Radial load (F_R) = 1750
Thrust load (F_A) = 13500
F_A/F_R = 1500/1750 = 0.86
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R < e, equivalent load (P) =
0.63 F_R + 1.24 F_A = 0.63 × 1750 + 1.24 × 1500
= 2963

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{12100}{2963}\right)^3 = 68.1 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{12100}{2963}\right)^3$

= 568 Hrs

Case 4

Thrust load (F_R) = 1500
F_A/F_R = 1500/0 = ∞
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R > e, equivalent load (P) =
0.63 F_R + 1.24 F_A = 1.24 × 1500 = 1860

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{12100}{1860}\right)^3 = 275 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{12100}{1860}\right)^3$

= 2294 Hrs

Bearing size: 5203 SB
Speed: 2000 RPM
Basic dynamic radial load Rating (C) = 3330

Case 1

Radial load (F_R) = 500
F_A/F_R = 0/500 = 0
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R < e, equivalent load (P) =
1.0 F_R + 0.78 F_A = 1.0 × 500 = 500

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{3330}{500}\right)^3 = 295 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{3330}{500}\right)^3$

= 2462 Hrs

Case 2

Radial load (F_R) = 500
Thrust load (F_A) = 325
F_A/F_R = 325/500 = 0.65
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R < e, equivalent load (P) =
1.0 F_R + 0.92 F_A = 1.0 × 500 + 0.792 × 1325= 799

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{3330}{799}\right)^3 = 72.4 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{3330}{799}\right)^3$

= 603 Hrs

Case 3

Radial load (F_R) = 500
Thrust load (F_A) = 375
F_A/F_R = 375/500 = 0.75
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R > e, equivalent load (P) =
0.67 F_R + 1.41 F_A
= 0.67 × 500 + 1.41 × 375 = 864

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{3330}{864}\right)^3 = 57.3 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{3330}{864}\right)^3$

= 477 Hrs

Case 4

Thrust load (F_R) = 375
F_A/F_R = 375/0 = ∞
Equivalent load (P) = X F_R + Y F_A
Since F_A/F_R > e, equivalent load (P) =
0.67 F_R + 1.41 F_A = 1.41 × 375 = 529

Life (L10) = $\left(\frac{C}{P}\right)^3 = \left(\frac{3330}{529}\right)^3 = 249 \times 10^6$ Rev.

or

Life (L10h) = $\frac{10^6}{60n}\left(\frac{C}{P}\right)^3 = \frac{10^6}{60 \times 2000}\left(\frac{3330}{529}\right)^3$

= 2075 Hrs