



Needle

Unmounted bearing assembly consisting of through hardened precision machined inner and outer raceways with either full complement or separated (cage) needle rolling elements. Depending on the bearing configuration the retainer can be land or roller riding and available with several seal options. Machined race needle bearings provide an antifriction solution when supporting rotating shafts with radial loads.

Bearing Configurations

Separable Or Non-Separable Inner/Outer Raceway

Shaft Diameter Range










1/2" To 9 1/4" And 15 mm To 235 mm

Materials

Bearing Quality Steel

Needle Selection Guide



				SIZE RANGE	
		Product Series	Material / Roller Complement	Inch	Metric Equiv.
CAGEROL		MR	Bearing Steel Caged Needle Roller	5/8" - 9 1/4"	16 - 235
		MR Sealed		5/8" - 4 1/4"	16 - 108
		MR Narrow		5/8" - 6 1/2"	16 - 165
GUIDEROL		GR	Bearing Steel Full Complement Center Guided Needle Roller	1/2" - 9 1/4"	13 - 235
		GR Sealed		5/8" - 4 1/4"	16 - 108
		GR Narrow		5/8" - 6 1/2"	16 - 165
MULTI-ROL		RS	Bearing Steel Full Complement Needle Roller	3/4" - 3"	19 - 76
		RD		1 1/4" - 4"	32 - 102
Journal		200 Series	Bearing Steel Caged Roller	1 3/16" - 8 5/8"	30 - 220
		300 Series		1" - 5 3/16"	25 - 130

Metric dimensions are for reference only.
Listed needle roller bearings are manufactured to inch dimensions.



* For estimating purpose only, individually sizes may vary and are subject to change without notification

Needle Bearings **ROLLWAY** **MCGILL**



DESIGN CHARACTERISTICS						FEATURES							
Limited Radial Space	Dynamic Load Rating	Static Load Rating	Oscillating Capability	High Speed	Relative Base Cost *	Separable Inner Race	Double Row	Oil Holes	Rubber Lip Seal	Metallic Shield	DS Matching	Separable Outer	Page No.
●	●	◐	◐	●	\$	O	-	S	-	-	O	-	C-9
●	●	◐	◐	◐	\$	O	-	S	S	-	O	-	C-9
●	●	◐	◐	●	\$	O	-	S	-	-	O	-	C-9
●	●	●	●	◐	\$\$\$	O	-	S	-	-	O	-	C-21
●	◐	◐	●	◐	\$\$\$	O	-	S	S	-	O	-	C-21
●	◐	◐	●	◐	\$\$\$	O	-	S	-	-	O	-	C-21
●	◐	●	●	◐	\$\$	-	-	S	-	S	O	-	C-33
●	◐	●	●	◐	\$\$	-	S	S	-	S	O	-	C-34
◐	●	●	◐	◐	\$\$\$	O	-	S	-	-	-	S	C-37
◐	●	●	◐	◐	\$\$\$	O	-	S	-	-	-	S	C-37

Utilize Mi Inner Rings For Installations On Unhardened Shafts

Higher Radial Loads

Relubrication To Help Promote Long Operating Life

Contamination Barrier Lubrication Retention

Elevated Temperature Applications (When Applied With Suitable Lubricant)

Recommended For Load Sharing When Mounting Bearing Pairs

Available As Complete Assembly Or Individual Components

O = Optional
S = Standard
◐ = Not Recommended

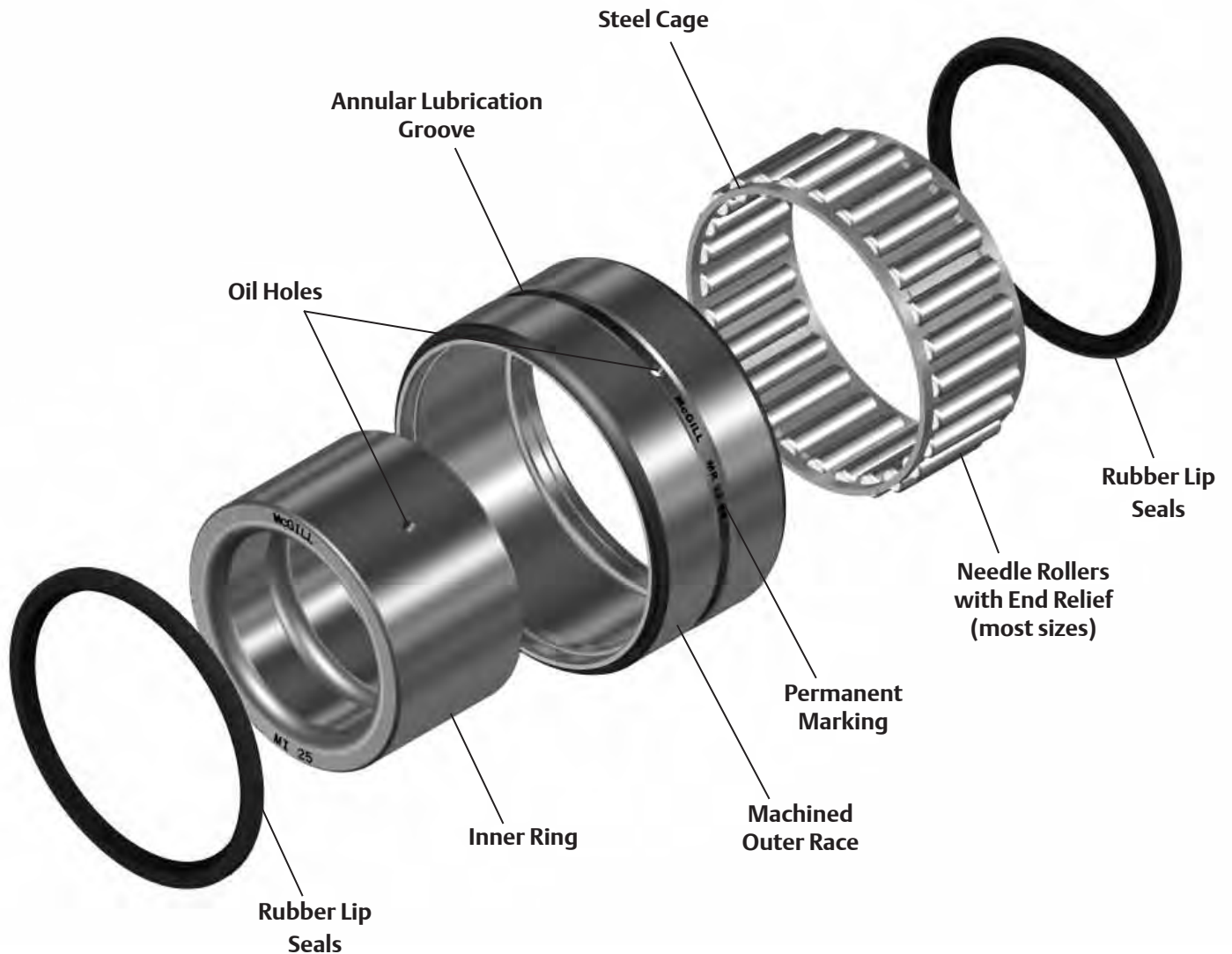
Poor ← → **Best**

Note: Cost ranges are approximate in the secondary dimension

McGill CAGEROL®

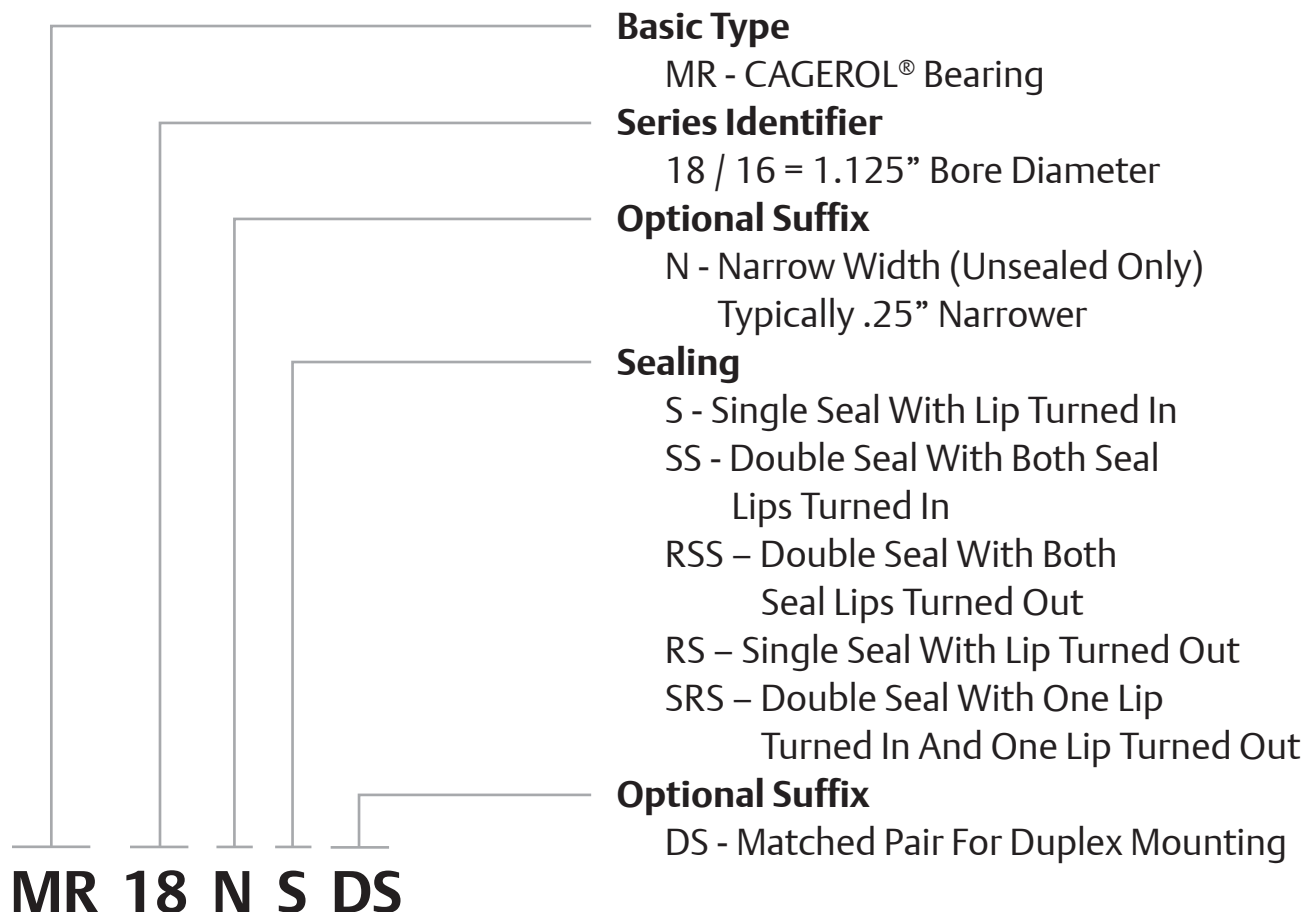
McGill CAGEROL® machined race needle bearings are manufactured from bearing quality steel. Most sizes use crowned, or end relieved, rollers to help reduce end stresses and allows for greater misalignment. The rollers are separated by a steel retainer (cage) to help achieve higher speeds and provide a lubricant reservoir. CAGEROL® bearings are constructed with radial lubrication hole and groove on the outer and optional inner raceway (MI-series) for relubrication through the housing or shaft. Other options include a variety of seal configurations to either help prevent contaminant entry or contain the lubricant. Depending on your preference, these bearings are available in a wide variety of sizes and sealing options as illustrated on the pages to follow.

Needle/Journal Bearings

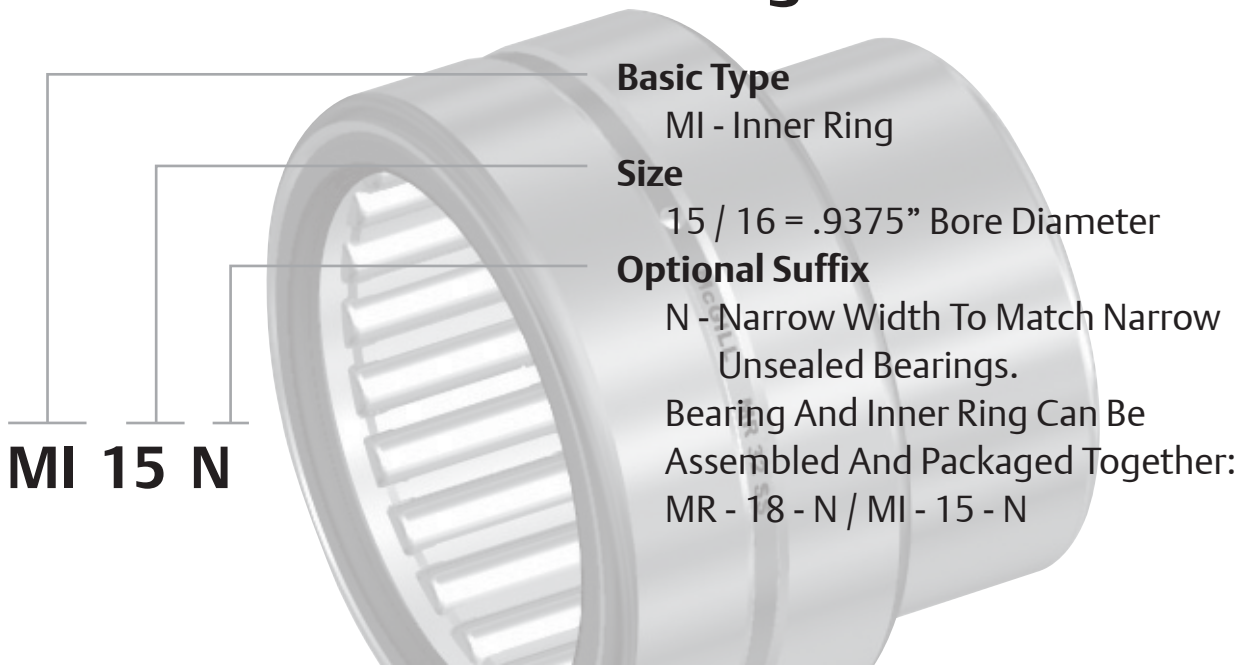




CAGEROL® Nomenclature



Inner Ring



Features and Benefits



Machined Outer Race

Race manufactured from bearing quality steel and hardened to carry heavy dynamic and static loads.



Needle Rollers with End Relief (Most Sizes)

Precision Needle Rollers provide high radial load capabilities in small radial envelope dimension. End relief features help reduce raceway stress when shaft misalignment occurs.



Steel Cage

Welded construction minimizes roller radial play for ease of assembly and provides roller guidance helping to reduce friction. The spacing provided by the retainer contributes to the high speed capabilities and lubricant reservoir within the bearing envelope.



Annular Lubrication Groove

The groove provides a circumferential path to direct lubricant to the hole when lubricating through the housing.

Factory Grease Fill

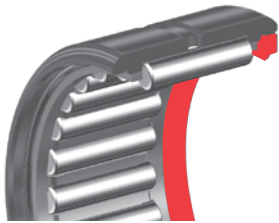
The Sealed CAGEROL bearings are factory lubricated with a medium temperature (-30° to 250°F, -34° to 121° C) NLGI 1 grease, unsealed bearings packaged with light oil film as a rust preventative. Contact Application Engineering when application conditions require special lubricants.



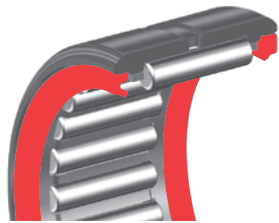
Options

Seals

The rubber lip seal is capable of 250° F maximum temperature and is available in several different configurations.



S



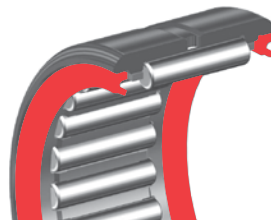
SS



RS



RSS



SRS

“DS” Matched Bearings – Load Sharing

When two bearings are installed with the distance between both bearing less than the width of one bearing, it is recommended the bearings be diametrically matched to prevent unequal load sharing. The option, when applicable matches OD and ID tolerances, diametrical clearance within 30% of the tolerance range and the radial runout within 20% of the tolerance range with high point of runout indicated on the bearing faces. For more information and matching factors please review the engineering section for matched bearings. Matched bearings are packaged as sets.



Machined Inner Ring (MI)

Precision ground inner ring provides a hardened raceway for the rollers when used with an unhardened shaft. The ring contains an oil hole and annular groove for relubrication of the bearing and can be used with both CAGEROL and GUIDEROL bearings or can be utilized as a bushing in plain bearing applications.

Grease Options

When requested, standard bearings can be factory filled with customer specified lubricant.



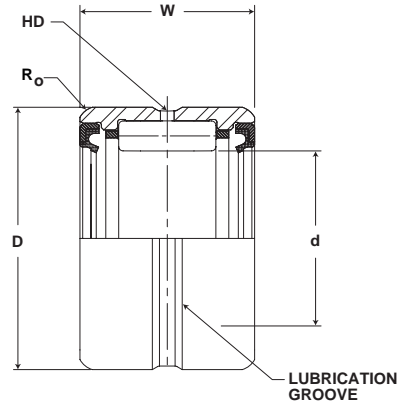
Basic Construction Type: Machined Race with Optional Separable Inner Ring

Rolling Elements: Cage Guided Precision Needles

Bearing Material: Bearing Quality Steel

Seal Type: Rubber Lip

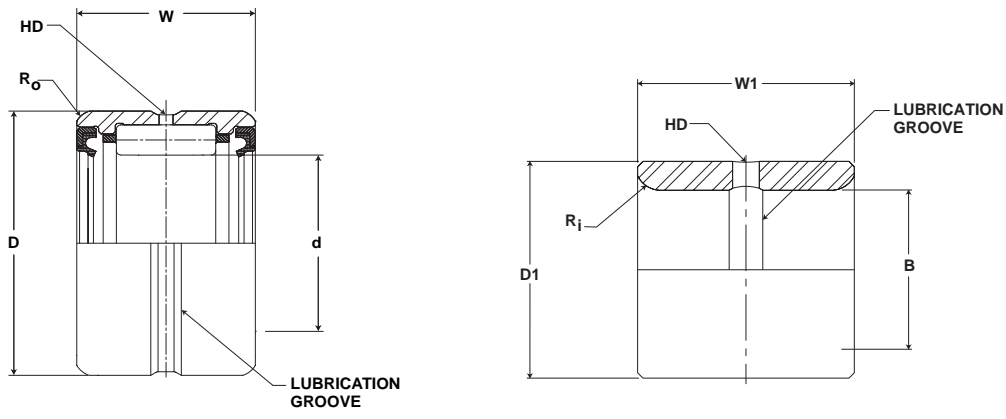
Lubrication: Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative



MR SERIES

Part No.		d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
McGill Outer Ring & Roller Assembly	Military No.	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
		inch	mm	inch	mm		inch	mm	inch	mm	RPM				
		Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
MR 10 N	MS 51961-1 MS 51961-1	.6250 +0/-0.0005 15.9 +0/-0.13	1.1250 +0/-0.0005 28.6 +0/-0.13	.750 19.05	1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.18	.08 2	0.03 1	19250	4,320 19,215	4,300 19,126	.12 .05		
					1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.18	.08 2	0.03 1	19250	4,320 19,215	4,300 19,126	.12 .05		
MR 10 SS, S, RS, SRS, RSS				1.000 25.40	1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.18	.08 2	0.03 1	6100	4,320 19,215	4,300 19,126	.15 .07		
MR 10					1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.18	.08 2	0.03 1	19250	5,930 26,377	6,500 28,912	.15 .07		
MR 12 N	MS 51961-2 MS 51961-2	.7500 +0/-0.0005 19.1 +0/-0.13	1.2500 +0/-0.0005 31.8 +0/-0.13	.750 19.05	1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.18	.08 2	0.04 1	16000	4,990 22,196	5,400 24,019	.14 .06		
					1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.18	.08 2	0.04 1	16000	4,990 22,196	5,400 24,019	.14 .06		
MR 12 SS, S, RS, SRS, RSS				1.000 25.40	1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.18	.08 2	0.04 1	5100	4,990 22,196	5,400 24,019	.17 .08		
MR 12	MS 51961-3				1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.18	.08 2	0.04 1	16000	6,830 30,380	8,100 36,029	.17 .08		
MR 14 N	MS 51961-5 MS 51961-5	.8750 +0/-0.0005 22.2 +0/-0.13	1.3750 +0/-0.0005 34.9 +0/-0.13	.750 19.05	1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.18	.08 2	0.04 1	13750	5,280 23,485	6,000 26,688	.16 .07		
					1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.18	.08 2	0.04 1	13750	5,280 23,485	6,000 26,688	.16 .07		
MR 14 SS, S, RS, SRS, RSS				1.000 25.40	1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.18	.08 2	0.04 1	4400	5,280 23,485	6,000 26,688	.21 .09		
MR 14	MS 51961-6				1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.18	.08 2	0.04 1	13750	7,240 32,204	9,000 40,032	.21 .09		
MR 16 N	MS 51961-8 MS 51961-8	1.0000+0/-0.0005 25.4 +0/-0.13	1.5000 +0/-0.0005 38.1 +0/-0.13	.750 19.05	1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.18	.08 2	0.04 1	12000	5,840 25,976	7,100 31,581	.20 .09		
					1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.18	.08 2	0.04 1	12000	5,840 25,976	7,100 31,581	.20 .09		
MR 16 SS, S, RS, SRS, RSS				1.000 25.40	1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.18	.08 2	0.04 1	3800	5,840 25,976	7,100 31,581	.23 .10		
MR 16	MS 51961-9				1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.18	.08 2	0.04 1	12000	8,000 35,584	10,600 47,149	.23 .10		
MR 18 N	MS 51961-11 MS 51961-11	1.1250+0/-0.0005 28.6 +0/-0.13	1.6250 +0/-0.0005 41.3 +0/-0.13	.750 19.05	1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.18	.09 2	0.04 1	10700	8,720 38,787	12,200 54,266	.24 .11		
					1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.18	.09 2	0.04 1	10700	8,720 38,787	12,200 54,266	.24 .11		
MR 18 SS, S, RS, SRS, RSS				1.000 25.40	1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.18	.09 2	0.04 1	3400	8,720 38,787	12,200 54,266	.32 .15		
MR 18	MS 51961-12				1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.18	.09 2	0.04 1	10700	10,900 48,483	16,300 72,502	.32 .15		
MR 20 N	MS 51961-14			1.000 25.40	1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.18	.09 2	0.04 1	9600	9,020 40,121	13,100 58,269	.27 .12		
MR 20 SS, S, RS, SRS, RSS		1.2500+0/-0.0005 31.8 +0/-0.13	1.7500 +0/-0.0005 44.5 +0/-0.13	1.250 31.75	1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.18	.09 2	0.04 1	3050	9,020 40,121	13,100 58,269	.34 .15		
					1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.18	.09 2	0.04 1	9600	11,300 50,262	17,500 77,840	.34 .15		

Metric dimensions for reference only.
For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
For DS matching as DS suffix to part number
* For bearing properly filled with #1 grease reduce speed by 50%



MR SERIES

Part No.		Military No.	B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
McGill Outer Ring & Roller Assembly	Separable Inner Ring Only		Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				
			inch mm		inch mm		inch mm			inch mm			lb kg
			Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
MR 10 N	MI 6 N	MS 500072-1	.3750 9.529	+0/-0.004 +0/-0.10	.6245 15.9	+0/-0.004 +0/-0.10	.760 19.3	.09 2.4	.25 6.4	.3755 9.541	.3747 9.521	+0/-0.005 +0/-0.13	.05 .02
	MI 7 N		.4375 11.117	+0/-0.004 +0/-0.10	.6245 15.9	+0/-0.004 +0/-0.10	.760 19.3	.09 2.4	.25 6.4	.4380 11.130	.4372 11.109	+0/-0.005 +0/-0.13	.04 .02
MR 10 SS, S, RS, SRS, RSS	MI 6		.3750 9.529	+0/-0.004 +0/-0.10	.6245 15.9	+0/-0.004 +0/-0.10	1.010 25.7	.09 2.4	.25 6.4	.3755 9.541	.3747 9.521	+0/-0.005 +0/-0.13	.05 .02
MR 10			.3750 9.529	+0/-0.004 +0/-0.10	.6245 15.9	+0/-0.004 +0/-0.10	1.010 25.7	.09 2.4	.25 6.4	.3755 9.541	.3747 9.521	+0/-0.005 +0/-0.13	.05 .02
MR 12 N	MI 8 N	MS 500072-2	.5000 12.705	+0/-0.004 +0/-0.10	.7493 19.0	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.5005 12.718	.4997 12.697	+0/-0.005 +0/-0.13	.04 .02
	MI 9 N		.5625 14.293	+0/-0.004 +0/-0.10	.7493 19.0	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.5630 14.306	.5623 14.286	+0/-0.005 +0/-0.13	.04 .02
MR 12 SS, S, RS, SRS, RSS	MI 8	MS 500072-3	.5000 12.705	+0/-0.004 +0/-0.10	.7493 19.0	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.5005 12.718	.4997 12.697	+0/-0.005 +0/-0.13	.06 .03
MR 12			.5000 12.705	+0/-0.004 +0/-0.10	.7493 19.0	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.5005 12.718	.4997 12.697	+0/-0.005 +0/-0.13	.06 .03
MR 14 N	MI 10 N	MS 500072-4	.6250 15.881	+0/-0.004 +0/-0.10	.8743 22.2	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.6255 15.894	.6247 15.874	+0/-0.005 +0/-0.13	.06 .03
	MI 11 N		.6875 17.469	+0/-0.004 +0/-0.10	.8743 22.2	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.6880 17.482	.6872 17.462	+0/-0.005 +0/-0.13	.05 .02
MR 14 SS, S, RS, SRS, RSS	MI 10		.6250 15.881	+0/-0.004 +0/-0.10	.8743 22.2	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.6255 15.894	.6247 15.874	+0/-0.005 +0/-0.13	.08 .04
MR 14			.6250 15.881	+0/-0.004 +0/-0.10	.8743 22.2	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.6255 15.894	.6247 15.874	+0/-0.005 +0/-0.13	.08 .04
MR 16 N	MI 12 N	MS 500072-5	.7500 19.058	+0/-0.004 +0/-0.10	.9993 25.4	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.7505 19.070	.7497 19.050	+0/-0.005 +0/-0.13	.07 .03
	MI 13 N	MS 500072-6	.8125 20.646	+0/-0.005 +0/-0.13	.9993 25.4	+0/-0.005 +0/-0.13	.760 19.3	.13 3.2	.40 10.2	.8130 20.658	.8121 20.638	+0/-0.005 +0/-0.13	.07 .03
MR 16 SS, S, RS, SRS, RSS	MI 12		.7500 19.058	+0/-0.004 +0/-0.10	.9993 25.4	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.7505 19.070	.7497 19.050	+0/-0.005 +0/-0.13	.10 .05
MR 16	MI 13	MS 500072-7	.8125 20.646	+0/-0.005 +0/-0.13	.9993 25.4	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.8130 20.658	.8121 20.638	+0/-0.005 +0/-0.13	.11 .05
MR 18 N	MI 14 N	MS 500072-8	.8750 22.234	+0/-0.005 +0/-0.13	1.124 28.6	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.8755 22.246	.8746 22.226	+0/-0.005 +0/-0.13	.11 .05
	MI 15 N	MS 500072-9	.9375 23.822	+0/-0.005 +0/-0.13	1.124 28.6	+0/-0.005 +0/-0.13	1.010 25.7	.13 3.2	.40 10.2	.9380 23.835	.9371 23.814	+0/-0.005 +0/-0.13	.11 .05
MR 18 SS, S, RS, SRS, RSS	MI 14		.8750 22.234	+0/-0.005 +0/-0.13	1.124 28.6	+0/-0.005 +0/-0.13	1.260 32.0	.13 3.2	.40 10.2	.8755 22.246	.8746 22.226	+0/-0.005 +0/-0.13	.13 .06
MR 18			.8750 22.234	+0/-0.005 +0/-0.13	1.124 28.6	+0/-0.005 +0/-0.13	1.260 32.0	.13 3.2	.40 10.2	.8755 22.246	.8746 22.226	+0/-0.005 +0/-0.13	.13 .06
MR 20 N	MI 16 N	MS 500072-10	1.0000 25.410	+0/-0.005 +0/-0.13	1.249 31.7	+0/-0.006 +0/-0.15	1.010 25.7	.13 3.2	.40 10.2	1.0005 25.423	0.9996 25.402	+0/-0.005 +0/-0.13	.13 .06
MR 20 SS, S, RS, SRS, RSS	MI 16		1.0000 25.410	+0/-0.005 +0/-0.13	1.249 31.7	+0/-0.006 +0/-0.15	1.260 32.0	0.13 3	0.40 10	1.001 25.4	1.000 25.4	+0/-0.005 +0/-0.13	.16 .07
MR 20			MS 500072-11	1.0000 25.410	+0/-0.005 +0/-0.13	1.249 31.7	+0/-0.006 +0/-0.15	1.260 32.0	0.13 3	0.40 10	1.001 25.4	1.000 25.4	+0/-0.005 +0/-0.13

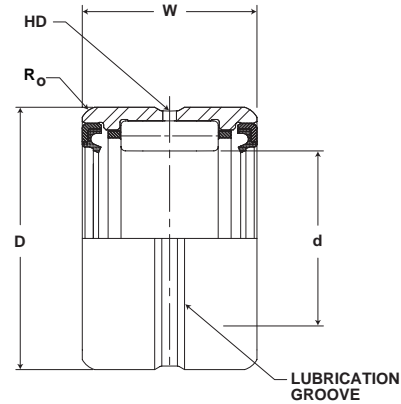
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

McGILL® CAGEROL® Bearings

Needle/Journal Bearings



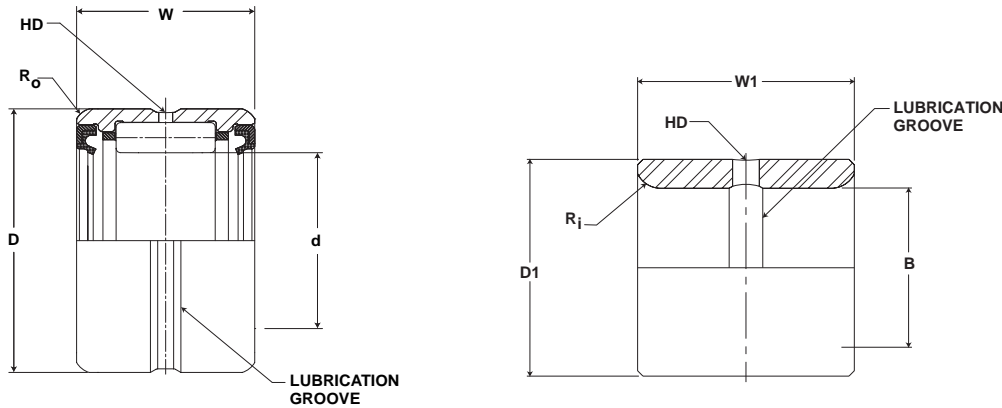
- Basic Construction Type:** Machined Race With Optional Separable Inner Ring
- Rolling Elements:** Cage Guided Precision Needles
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Rubber Lip
- Lubrication:** Sealed Bearings: Lithium Soap Grease NLGI #1 Unsealed Bearings: Rust Preventative



MR SERIES (continued)

Part No.		d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
McGill Outer Ring & Roller Assembly	Military No.	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
		inch mm		inch mm		inch mm	inch mm			inch mm					
		Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)	RPM	lb/N	lb/N	lb kg
MR 22 N	MS 51961-18					1.000 25.40	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	8750	9,640 42,879	14,700 65,386	.31 .14
MR 22 SS, S, RS, SRS, RSS		1.3750+0/-0.0005 34.9 +0/-0.13		1.8750 +0/-0.0006 47.6 +0/-0.15		1.250 31.75	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	2800	9,640 42,879	14,700 65,386	.36 .16
MR 22	MS 51961-19					1.250 31.75	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	8750	12,100 53,821	19,700 87,626	.36 .16
MR 24 N	MS 51961-21					1.000 25.40	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	8000	10,300 45,814	15,500 68,944	.41 .19
MR 24 SS, S, RS, SRS, RSS		1.5000+0/-0.0005 38.1 +0/-0.13		2.0625 +0/-0.0006 52.4 +0/-0.15		1.250 31.75	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2500	10,300 45,814	15,500 68,944	.47 .21
MR 24	MS 51961-22					1.250 31.75	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	8000	13,000 57,824	20,800 92,518	.47 .21
MR 26 N	MS 51961-24					1.000 25.40	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	7400	10,600 47,149	16,400 72,947	.46 .21
MR 26 SS, S, RS, SRS, RSS		1.6250+0/-0.0005 41.3 +0/-0.13		2.1875 +0/-0.0006 55.6 +0/-0.15		1.250 31.75	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2350	10,600 47,149	16,400 72,947	.51 .23
MR 26	MS 51961-25					1.250 31.75	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	7400	13,300 59,158	22,100 98,301	.51 .23
MR 28 N	MS 51961-27					1.000 25.40	2.3121 58.750	2.3132 58.778	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6850	11,200 49,818	18,100 80,509	.47 .21
MR 28 SS, S, RS, SRS, RSS		1.7500+0/-0.0005 44.5 +0/-0.13		2.3125 +0/-0.0006 58.8 +0/-0.15		1.250 31.75	2.3121 59	2.3132 59	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2200	11,200 49,818	18,100 80,509	.55 .25
MR 28	MS 51961-28 MS 51961-28					1.250 31.75	2.3121 59	2.3132 59	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6850	14,100 62,717	24,400 108,531	.55 .25
MR 30 SS, S, RS, SRS, RSS		1.8750+0/-0.0005 47.6 +0/-0.13		2.4375 +0/-0.0006 61.9 +0/-0.15		1.250 31.75	2.4371 61.927	2.4382 61.955	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2040	11,400 50,707	19,000 84,512	.59 .27
MR 30	MS 51961-29					1.250 31.75	2.4371 62	2.4382 62	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6400	14,400 64,051	25,600 113,869	.59 .27
MR 31		1.9375+0/-0.0005 49.2 +0/-0.13		2.5000 +0/-0.0006 63.5 +0/-0.15		1.250 31.75	2.4996 63.515	2.5007 63.543	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6200	12,400 55,155	22,400 99,635	.60 .27
MR 32 N						1.000 25.40	2.5621 65.103	2.5632 65.131	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6000	12,000 53,376	20,700 92,074	.55 .25
MR 32 SS, S, RS, SRS, RSS		2.0000+0/-0.0005 50.8 +0/-0.13		2.5625 +0/-0.0006 65.1 +0/-0.15		1.250 31.75	2.5621 65	2.5632 65	+0/-0.0007 +0/-0.018	.09 2	0.06 2	1900	12,000 53,376	20,700 92,074	.61 .28
MR 32	MS 51961-30 MS 51961-30					1.250 31.75	2.5621 65	2.5632 65	+0/-0.0007 +0/-0.018	.09 2	0.06 2	6000	15,200 67,610	27,900 124,099	.61 .28
MR 36 N	MS 51961-31					1.500 38.10	2.9996 76.220	3.0007 76.248	+0/-0.0007 +0/-0.018	.13 3	0.08 2	5350	22,400 99,635	39,100 173,917	1.13 .51
MR 36 SS, S, RS, SRS, RSS		2.2500+0/-0.0005 57.2 +0/-0.13		3.0000 +0/-0.0006 76.2 +0/-0.15		1.750 44.45	2.9996 76	3.0007 76	+0/-0.0007 +0/-0.018	.13 3	0.08 2	1700	22,400 99,635	39,100 173,917	1.32 .59
MR 36	MS 51961-32					1.750 44.45	2.9996 76	3.0007 76	+0/-0.0007 +0/-0.018	.13 3	0.08 2	5350	26,000 115,648	47,400 210,835	1.32 .59

Metric dimensions for reference only.
 For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
 For DS matching as DS suffix to part number
 * For bearing properly filled with #1 grease reduce speed by 50%



MR SERIES (continued)

Part No.		Military No.	B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
McGill Outer Ring & Roller Assembly	Separable Inner Ring Only		Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				lb kg
			inch mm		inch mm		inch mm			inch mm			
			Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
MR 22 N	MI 18 N	MS 500072-12	1.1250 28.586	+0/-0.0005 +0/-0.013	1.374 34.9	+0/-0.0006 +0/-0.015	1.010 25.7	.13 3.2	.40 10.2	1.1255 28.599	1.1246 28.579	+0/-0.0005 +0/-0.013	.14 .06
MR 22 SS, S, RS, SRS, RSS	MI 17		1.0625 26.998	+0/-0.0005 +0/-0.013	1.374 34.9	+0/-0.0006 +0/-0.015	1.260 32.0	0.13 3	0.40 10	1.0630 27.011	1.0621 26.991	+0/-0.0005 +0/-0.013	.16 .07
MR 22	MI 18	MS 500072-13	1.1250 28.586	+0/-0.0005 +0/-0.013	1.374 34.9	+0/-0.0006 +0/-0.015	1.260 32.0	0.13 3	0.40 10	1.1255 28.599	1.1246 28.579	+0/-0.0005 +0/-0.013	.17 .08
MR 24 N	MI 20 N	MS 500072-15	1.2500 31.763	+0/-0.0005 +0/-0.013	1.499 38.1	+0/-0.0006 +0/-0.015	1.010 25.7	.13 3.2	.06 1.5	1.2505 31.775	1.2496 31.755	+0/-0.0005 +0/-0.013	.19 .09
MR 24 SS, S, RS, SRS, RSS	MI 19	MS 500072-16	1.250 31.8	+0/-0.0005 +0/-0.013	1.499 38.1	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	.06 1.5	1.2505 31.775	1.2497 31.755	+0/-0.0005 +0/-0.013	.24 .11
	MI 20	MS 500072-14	1.1875 30.174	+0/-0.0005 +0/-0.013	1.499 38.1	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	.06 1.5	1.1880 30.187	1.1871 30.167	+0/-0.0005 +0/-0.013	.22 .09
MR 26 N	MI 21 N	MS 500072-17	1.3125 33.351	+0/-0.0005 +0/-0.013	1.624 41.3	+0/-0.0006 +0/-0.015	1.010 25.7	.13 3.2	.06 1.5	1.3130 33.363	1.3121 33.343	+0/-0.0005 +0/-0.013	.20 .09
MR 26 SS, S, RS, SRS, RSS	MI 21		1.3125 33.351	+0/-0.0005 +0/-0.013	1.624 41.3	+0/-0.0006 +0/-0.015	1.260 32.0	0.13 3	0.06 2	1.3130 33.363	1.3122 33.343	+0/-0.0005 +0/-0.013	.26 .12
MR 26	MI 22 4S	MS 500072-18	1.3750 34.939	+0/-0.0005 +0/-0.013	1.624 41.3	+0/-0.0006 +0/-0.015	1.260 32.0	0.13 3	0.06 2	1.3755 34.951	1.3746 34.931	+0/-0.0005 +0/-0.013	.20 .09
MR 28 N	MI 24 N	MS 500072-21	1.5000 38.115	+0/-0.0005 +0/-0.013	1.749 44.4	+0/-0.0006 +0/-0.015	1.010 25.7	.13 3.2	.06 1.5	1.5005 38.128	1.4996 38.107	+0/-0.0005 +0/-0.013	.22 .09
MR 28 SS, S, RS, SRS, RSS	MI 22	MS 500072-19	1.3750 34.939	+0/-0.0005 +0/-0.013	1.749 44.4	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	.06 1.5	1.3755 34.951	1.3746 34.931	+0/-0.0005 +0/-0.013	.26 .12
	MI 23	MS 500072-20	1.4375 36.527	+0/-0.0005 +0/-0.013	1.749 44.4	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	.06 1.5	1.4380 36.540	1.4371 36.519	+0/-0.0005 +0/-0.013	.27 .12
	MI 24	MS 500072-22	1.5000 38.115	+0/-0.0005 +0/-0.013	1.749 44.4	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	.06 1.5	1.5005 38.128	1.4996 38.107	+0/-0.0005 +0/-0.013	.22 .09
MR 30 SS, S, RS, SRS, RSS	MI 25 4S		1.5625 39.703	+0/-0.0005 +0/-0.013	1.874 47.6	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	0.06 2	1.5630 39.716	1.5621 39.696	+0/-0.0005 +0/-0.013	.27 .12
MR 30			1.5625 39.703	+0/-0.0005 +0/-0.013	1.874 47.6	+0/-0.0006 +0/-0.015	1.260 32.0	.13 3.2	0.06 2	1.5630 39.716	1.5621 39.696	+0/-0.0005 +0/-0.013	.27 .12
MR 31	MI 26 2S		1.6250 41.291	+0/-0.0005 +0/-0.013	1.936 49.2	+0/-0.0007 +0/-0.018	1.260 32.0	.13 3.2	.06 1.5	1.6255 41.304	1.6246 41.284	+0/-0.0005 +0/-0.013	.30 .14
MR 32 N	MI 26 N		1.6250 41.291	+0/-0.0005 +0/-0.013	1.999 50.8	+0/-0.0007 +0/-0.018	1.010 25.7	.13 3.2	.06 1.5	1.6255 41.304	1.6246 41.284	+0/-0.0005 +0/-0.013	.30 .14
MR 32 SS, S, RS, SRS, RSS	MI 25		1.5625 39.703	+0/-0.0005 +0/-0.013	1.999 50.8	+0/-0.0007 +0/-0.018	1.260 32.0	.13 3.2	.06 1.5	1.5630 39.716	1.5621 39.696	+0/-0.0005 +0/-0.013	.30 .14
MR 32	MI 26	MS 500072-23	1.6250 41.291	+0/-0.0005 +0/-0.013	1.999 50.8	+0/-0.0007 +0/-0.018	1.260 32.0	.13 3.2	.06 1.5	1.6255 41.304	1.6246 41.284	+0/-0.0005 +0/-0.013	.38 .17
	MI 27		1.6875 42.879	+0/-0.0005 +0/-0.013	1.999 50.8	+0/-0.0007 +0/-0.018	1.260 32.0	.13 3.2	.06 1.5	1.6880 42.892	1.6871 42.872	+0/-0.0005 +0/-0.013	.32 .15
MR 36 N	MI 28 N	MS 500072-24	1.7500 44.468	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.510 38.4	.19 4.8	.06 1.5	1.7505 44.480	1.7496 44.460	+0/-0.0005 +0/-0.013	.63 .29
MR 36 SS, S, RS, SRS, RSS	MI 28	MS 500072-25	1.750 44.5	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.760 44.7	0.19 5	0.06 2	1.7505 44.480	1.7497 44.460	+0/-0.0005 +0/-0.013	.74 .34
	MI 30		1.8750 47.644	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.760 44.7	0.19 5	0.06 2	1.8755 47.656	1.8746 47.636	+0/-0.0005 +0/-0.013	.85 .39

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



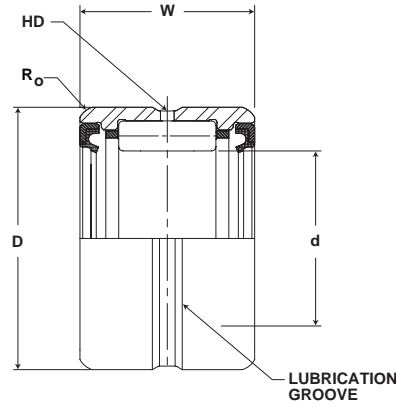
Basic Construction Type: Machined Race With Optional Separable Inner Ring

Rolling Elements: Cage Guided Precision Needles

Bearing Material: Bearing Quality Steel

Seal Type: Rubber Lip

Lubrication: Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative



MR SERIES (continued)

McGill Outer Ring & Roller Assembly	Part No.	Military No.	d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
			Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
			inch mm		inch mm		inch mm	inch mm			inch mm					
			Nom	Tol.	Nom	Tol.	+0/-0.005 (+0/.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
MR 40 N	MS 51961-33		2.5000+0/-0.0005 63.5 +0/-0.013		3.2500 +0/-0.0008 82.6 +0/-0.020		1.500 38.10	3.2496 82.572	3.2507 82.600	+0/-0.0007 +0/-0.018	.13 3	0.08 2	4800	23,400 104,083	42,900 190,819	1.23 .56
MR 40 SS, S, RS, SRS, RSS								3.2496 83	3.2507 83	+0/-0.0007 +0/-0.018	.13 3	0.08 2	1530	23,400 104,083	42,900 190,819	1.44 .65
MR 40	MS 51961-34						1.750 44.45	3.2496 83	3.2507 83	+0/-0.0007 +0/-0.018	.13 3	0.08 2	4800	27,200 120,986	52,100 231,741	1.44 .65
MR 40	MS 51961-34							3.2496 83	3.2507 83	+0/-0.0007 +0/-0.018	.13 3	0.08 2	4800	27,200 120,986	52,100 231,741	1.44 .65
MR 44 N	MS 51961-35		2.7500+0/-0.0005 69.9 +0/-0.013		3.5000 +0/-0.0008 88.9 +0/-0.020		1.500 38.10	3.4995 89	3.5008 89	+0/-0.0010 +0/-0.025	.13 3	0.08 2	4370	24,500 108,976	46,700 207,722	1.36 .62
MR 44 SS, S, RS, SRS, RSS								3.4995 89	3.5008 89	+0/-0.0010 +0/-0.025	.13 3	0.08 2	1390	24,500 108,976	46,700 207,722	1.59 .72
MR 44	MS 51961-36						1.750 44.45	3.4995 89	3.5008 89	+0/-0.0010 +0/-0.025	.13 3	0.08 2	4370	28,400 126,323	56,700 252,202	1.59 .72
MR 48 N	MS 51961-37		3.0000+0/-0.0005 76.2 +0/-0.013		3.7500 +0/-0.0008 95.3 +0/-0.020		1.500 38.10	3.7495 95.275	3.7508 95.308	+0/-0.0010 +0/-0.025	.13 3	0.08 2	4000	26,100 116,093	52,300 232,630	1.53 .69
MR 48 SS, S, RS, SRS, RSS								3.7495 95	3.7508 95	+0/-0.0010 +0/-0.025	.13 3	0.08 2	1270	26,100 116,093	52,300 232,630	1.79 .77
MR 48	MS 51961-38						1.750 44.45	3.7495 95	3.7508 95	+0/-0.0010 +0/-0.025	.13 3	0.08 2	4000	30,300 134,774	63,400 282,003	1.79 .77
MR 48	MS 51961-38							3.7495 95	3.7508 95	+0/-0.0010 +0/-0.025	.13 3	0.08 2	4000	30,300 134,774	63,400 282,003	1.79 .77
† MR 52 SS, S, RS, SRS, RSS			3.2500+0/-0.0005 82.6 +0/-0.013		4.2500 +0/-0.0008 108.0 +0/-0.020		1.750 44.45	4.2495 107	4.2508 108	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1175	25,100 111,645	54,300 241,526	2.64 1.19
MR 52	MS 51961-39							4.2495 108	4.2508 108	+0/-0.0010 +0/-0.025	.19 5	0.08 2	3700	29,900 132,995	64,400 286,451	2.64 1.19
MR 56 N	MS 51961-41		3.5000+0/-0.0005 88.9 +0/-0.013		4.5000 +0/-0.0008 114.3 +0/-0.020		1.750 44.45	4.4995 114	4.5008 114	+0/-0.0010 +0/-0.025	.19 5	0.08 2	3440	31,300 139,222	71,600 318,477	2.88 1.31
MR 56 SS, S, RS, SRS, RSS							2.000 50.80	4.4995 114	4.5008 114	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1090	31,300 139,222	71,600 318,477	3.18 1.44
MR 56	MS 51961-42						2.000 50.80	4.4995 114	4.5008 114	+0/-0.0010 +0/-0.025	.19 5	0.08 2	3440	35,900 159,683	83,500 371,408	3.18 1.44
MR 56	MS 51961-42							4.4995 114	4.5008 114	+0/-0.0010 +0/-0.025	.19 5	0.08 2	3440	35,900 159,683	83,500 371,408	3.18 1.44
† MR 60 SS, S, RS, SRS, RSS			3.7500+0/-0.0005 95.3 +0/-0.013		4.7500 +0/-0.0008 120.7 +0/-0.020		2.000 50.80	4.7495 121	4.7508 121	+0/-0.0010 +0/-0.025	.19 5	0.10 3	1020	31,600 140,557	74,700 332,266	3.38 1.53
MR 60	MS 51961-43							4.7495 121	4.7508 121	+0/-0.0010 +0/-0.025	.19 5	0.10 3	3200	36,500 162,352	87,100 387,421	3.38 1.53
† MR 64 SS, S, RS, SRS, RSS			4.0000+0/-0.0007 101.6 +0/-0.018		5.0000 +0/-0.0010 127.1 +0/-0.025		2.000 50.80	4.9999 127	5.0011 127	+0/-0.0015 +0/-0.038	.19 5	0.10 3	950	32,000 142,336	80,400 357,619	3.56 1.61
MR 64	MS 51961-45							4.9999 127	5.0011 127	+0/-0.0015 +0/-0.038	.19 5	0.10 3	3000	38,000 169,024	93,800 417,222	3.56 1.61

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.

For D5 matching as D5 suffix to part number

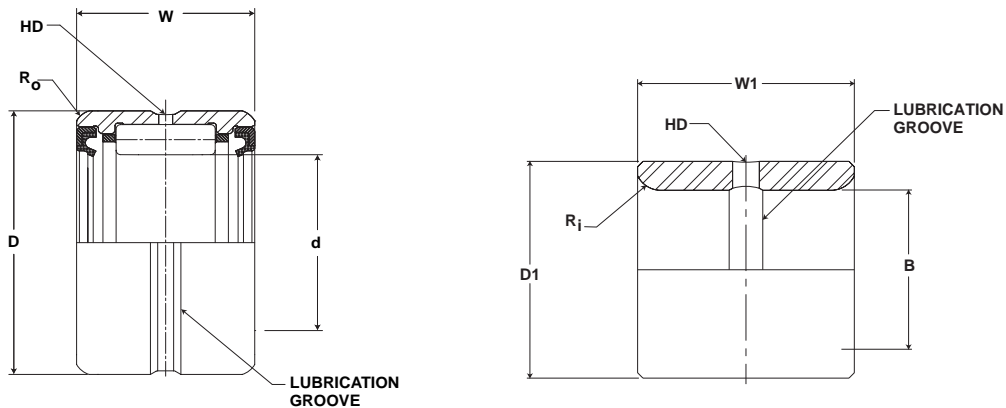
* For bearing properly filled with #1 grease reduce speed by 50%

† Not available from stock. Consult McGill customer service for availability.

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



MR SERIES (continued)

Part No.		Military No.	B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
McGill Outer Ring & Roller Assembly	Separable Inner Ring Only		Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				lb kg
			inch mm		inch mm		inch mm			inch mm			
			Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
MR 40 N	MI 32 N	MS 500072-27	2.0000 50.820	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.510 38.4	.19 4.8	.08 2.0	2.0005 50.833	1.9996 50.812	+0/-0.0005 +0/-0.013	.74 .34
MR 40 SS, S, RS, SRS, RSS	MI 31	MS 500072-26	1.9375 49.232	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.510 38.4	.19 4.8	.08 2.0	1.9380 49.245	1.9371 49.224	+0/-0.0005 +0/-0.013	.97 .44
	MI 32		2.0000 50.820	+0/-0.0005 +0/-0.013	2.249 57.1	+0/-0.0007 +0/-0.018	1.760 44.7	.19 4.8	.08 2.0	2.0005 50.833	1.9996 50.812	+0/-0.0005 +0/-0.013	.87 .39
	MI 34		2.1250 53.996	+0/-0.0006 +0/-0.015	2.249 57.1	+0/-0.0007 +0/-0.018	1.760 44.7	.19 4.8	.08 2.0	2.1258 54.017	2.1247 53.989	+0/-0.0008 +0/-0.020	1.00 .45
MR 44 N	MI 36 N	MS 500072-29	2.2500 57.173	+0/-0.0006 +0/-0.015	2.749 69.8	+0/-0.0007 +0/-0.018	1.510 38.4	.19 4.8	.08 2.0	2.2508 57.193	2.2497 57.165	+0/-0.0008 +0/-0.020	.83 .37
MR 44 SS, S, RS, SRS, RSS	MI 35	MS 500072-28	2.1875 55.584	+0/-0.0006 +0/-0.015	2.749 69.8	+0/-0.0007 +0/-0.018	1.510 38.4	0.19 5	0.08 2	2.1883 55.605	2.1872 55.577	+0/-0.0008 +0/-0.020	1.06 .48
	MI 36		2.2500 57.173	+0/-0.0006 +0/-0.015	2.749 69.8	+0/-0.0007 +0/-0.018	1.760 44.72	0.19 5	0.08 2	2.2508 57.193	2.2497 57.165	+0/-0.0008 +0/-0.020	.97 .44
MR 48 N	MI 40 N	MS 500072-31	2.5000 63.525	+0/-0.0006 +0/-0.015	2.9989 76.202	+0/-0.0007 +0/-0.018	1.510 38.37	.19 4.8	.08 2.0	2.5008 63.545	2.4997 63.517	+0/-0.0008 +0/-0.020	.92 .43
MR 48 SS, S, RS, SRS, RSS	MI 38	MS 500072-30	2.3750 60.349	+0/-0.0006 +0/-0.015	2.9989 76.202	+0/-0.0007 +0/-0.018	1.760 44.72	.19 4.8	.08 2.0	2.3758 60.369	2.3747 60.341	+0/-0.0008 +0/-0.020	1.28 .58
	MI 39		2.4375 61.937	+0/-0.0006 +0/-0.015	2.9989 76.202	+0/-0.0007 +0/-0.018	1.510 38.37	.19 4.8	.08 2.0	2.4383 61.957	2.4372 61.929	+0/-0.0008 +0/-0.020	1.05 .47
	MI 40		2.5000 63.525	+0/-0.0006 +0/-0.015	2.9989 76.202	+0/-0.0007 +0/-0.018	1.760 44.72	.19 4.8	.08 2.0	2.5008 63.545	2.4997 63.517	+0/-0.0008 +0/-0.020	1.07 .48
† MR 52 SS, S, RS, SRS, RSS	MI 42		2.6250 66.701	+0/-0.0006 +0/-0.015	3.2487 82.549	+0/-0.0009 +0/-0.023	1.760 44.72	.19 4.8	0.08 2	2.6258 66.722	2.6247 66.694	+0/-0.0008 +0/-0.020	1.12 .51
MR 52	MI 44	MS 500072-32	2.7500 69.878	+0/-0.0006 +0/-0.015	3.2487 82.549	+0/-0.0009 +0/-0.023	1.760 44.72	0.19 5	0.08 2	2.7508 69.898	2.7497 69.870	+0/-0.0008 +0/-0.020	1.17 .53
MR 56 N	MI 48 N		3.0000 76.230	+0/-0.0006 +0/-0.015	3.4987 88.902	+0/-0.0009 +0/-0.023	1.760 44.72	.25 6.4	.08 2.0	3.0008 76.250	2.9997 76.222	+0/-0.0008 +0/-0.020	1.32 .59
MR 56 SS, S, RS, SRS, RSS	MI 46		2.8750 73.054	+0/-0.0006 +0/-0.015	3.4987 88.902	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.08 2	2.8758 73.074	2.8747 73.046	+0/-0.0008 +0/-0.020	1.30 .59
MR 56	MI 47	MS 500072-34	2.9375 74.642	+0/-0.0006 +0/-0.015	3.4987 88.902	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.08 2	2.9383 74.662	2.9372 74.634	+0/-0.0008 +0/-0.020	1.58 .72
	MI 48		3.0000 76.230	+0/-0.0006 +0/-0.015	3.4987 88.902	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.08 2	3.0008 76.250	2.9997 76.222	+0/-0.0008 +0/-0.020	1.43 .65
† MR 60 SS, S, RS, SRS, RSS	MI 50	MS 500072-35	3.1250 79.406	+0/-0.0006 +0/-0.015	3.7487 95.254	+0/-0.0009 +0/-0.023	2.010 51.07	.25 6.4	.10 2.5	3.1260 79.432	3.1246 79.396	+0/-0.0010 +0/-0.025	1.88 .85
	MI 52	MS 500072-36	3.2500 82.583	+0/-0.0006 +0/-0.015	3.7487 95.254	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6.4	0.10 2.5	3.2510 82.608	3.2496 82.572	+0/-0.0010 +0/-0.025	1.52 .69
† MR 64 SS, S, RS, SRS, RSS	MI 54	MS 500072-38	3.3750 85.759	+0/-0.0008 +0/-0.020	3.9985 101.602	+0/-0.0009 +0/-0.023	2.010 51.07	.25 6.4	.10 2.5	3.3760 85.784	3.3746 85.749	+0/-0.0010 +0/-0.025	2.04 .93
	MI 56		3.5000 88.935	+0/-0.0008 +0/-0.020	3.9985 101.602	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6.4	0.10 2.5	3.5010 88.960	3.4996 88.925	+0/-0.0010 +0/-0.025	1.63 .74

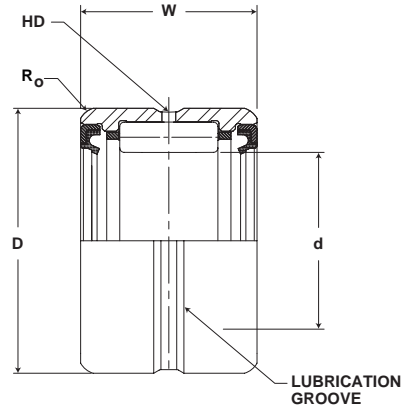
† Not available from stock. Consult McGill customer service for availability.

McGILL® CAGEROL® Bearings

Needle/Journal Bearings



- Basic Construction Type:** Machined Race With Optional Separable Inner Ring
- Rolling Elements:** Cage Guided Precision Needles
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Rubber Lip
- Lubrication:** Sealed Bearings: Lithium Soap Grease NLGI #1 Unsealed Bearings: Rust Preventative



MR SERIES (continued)

Part No.		d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
McGill Outer Ring & Roller Assembly	Military No.	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
		inch	mm	inch	mm	inch	inch			inch	mm				
		Nom	Tol.	Nom	Tol.	mm	Rotating	Stationary	Tol.	(Ref)	(Ref)	RPM	lb/N	lb/N	lb kg
† MR 68 SS, S, RS, SRS, RSS		4.2500	+0/-0.007	5.2500	+0/-0.0010	2.000	5.2499	5.2511	+0/-0.0015	.19	0.10	900	34,000	86,200	3.74
MR 68	MS 51961-46	108.0	+0/-0.018	133.4	+0/-0.025	50.80	133	133	+0/-0.038	5	3	2820	151,232	383,418	1.69
MR 72	MS 51961-48	114.3	+0/-0.018	152.5	+0/-0.025	57.15	133	133	+0/-0.038	5	3	2660	39,500	101,000	3.74
MR 80		127.1	+0/-0.018	165.2	+0/-0.025	57.15	152	152	+0/-0.038	5	3	800	175,696	449,248	1.69
MR 88 N	MS 51961-52	139.8	+0/-0.018	177.9	+0/-0.025	76.20	5.9999	6.0011	+0/-0.0015	.19	0.10	2180	60,300	130,000	7.13
MR 88	MS 51961-53	139.8	+0/-0.018	177.9	+0/-0.025	76.20	165	165	+0/-0.038	5	3	2660	268,214	578,240	3.23
MR 96 N	MS 51961-55	152.5	+0/-0.025	190.6	+0/-0.030	76.20	6.4999	6.5011	+0/-0.0015	.19	0.10	800	64,600	148,000	7.78
MR 96	MS 51961-56	152.5	+0/-0.025	190.6	+0/-0.030	76.20	165	165	+0/-0.038	5	3	800	287,341	658,304	3.53
MR 104 N	MS 51961-57	165.2	+0/-0.025	203.3	+0/-0.030	76.20	6.9999	7.0011	+0/-0.0015	.25	0.10	2180	70,200	169,800	10.40
MR 104	MS 51961-58	165.2	+0/-0.025	203.3	+0/-0.030	76.20	178	178	+0/-0.038	6	3	2180	312,250	755,270	4.72
MR 116	MS 51961-59	184.2	+0/-0.025	231.9	+0/-0.030	76.20	6.9999	7.0011	+0/-0.0015	.25	0.10	2180	85,700	222,000	11.82
† MR 124		209.6	+0/-0.025	257.3	+0/-0.030	76.20	178	178	+0/-0.038	6	3	2180	381,194	987,456	5.36
† MR 132		209.6	+0/-0.025	257.3	+0/-0.030	76.20	7.4998	7.5011	+0/-0.0015	.25	0.12	2000	71,000	177,000	11.08
† MR 140		222.3	+0/-0.025	270.0	+0/-0.036	76.20	190	190	+0/-0.038	6	3	2000	315,808	787,296	5.02
MR 148		235.0	+0/-0.025	282.7	+0/-0.036	76.20	7.4998	7.5011	+0/-0.0015	.25	0.12	2000	86,600	228,000	12.69
		235.0	+0/-0.025	282.7	+0/-0.036	76.20	190	190	+0/-0.038	6	3	2000	385,197	1,014,144	5.76
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	8.0011	8.0011	+0/-0.0015	.25	0.12	1850	71,700	183,000	11.85
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	203	203	+0/-0.038	6	3	1850	318,922	813,984	5.37
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	7.9998	8.0011	+0/-0.0015	.25	0.12	1850	87,500	237,000	13.55
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	203	203	+0/-0.038	6	3	1850	389,200	1,054,176	6.15
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	9.1248	9.1261	+0/-0.0015	.25	0.12	1680	95,200	234,000	19.32
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	231	231	+0/-0.038	6	3	1680	423,450	1,040,832	8.76
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	9.6250	9.6265	+0/-0.0020	.25	0.12	1530	99,100	252,000	19.80
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	244	244	+0/-0.051	6	3	1530	440,797	1,120,896	8.97
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	10.1250	10.1265	+0/-0.0020	.25	0.12	1460	103,000	270,000	21.63
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	257	257	+0/-0.051	6	3	1460	458,144	1,200,960	9.81
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	10.6250	10.6265	+0/-0.0020	.25	0.16	1370	104,000	280,000	22.73
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	269	270	+0/-0.051	6	4	1370	462,592	1,245,440	10.31
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	11.1250	11.1265	+0/-0.0020	.25	0.16	1300	108,000	292,000	24.90
		222.3	+0/-0.025	270.0	+0/-0.036	76.20	282	282	+0/-0.051	6	4	1300	480,384	1,298,816	10.88

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.

For DS matching as DS suffix to part number

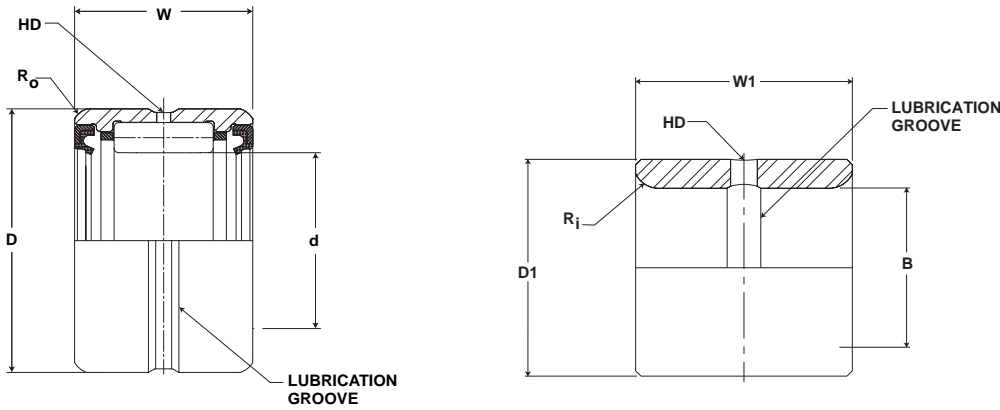
* For bearing properly filled with #1 grease reduce speed by 50%

† Not available from stock. Consult McGill customer service for availability.

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



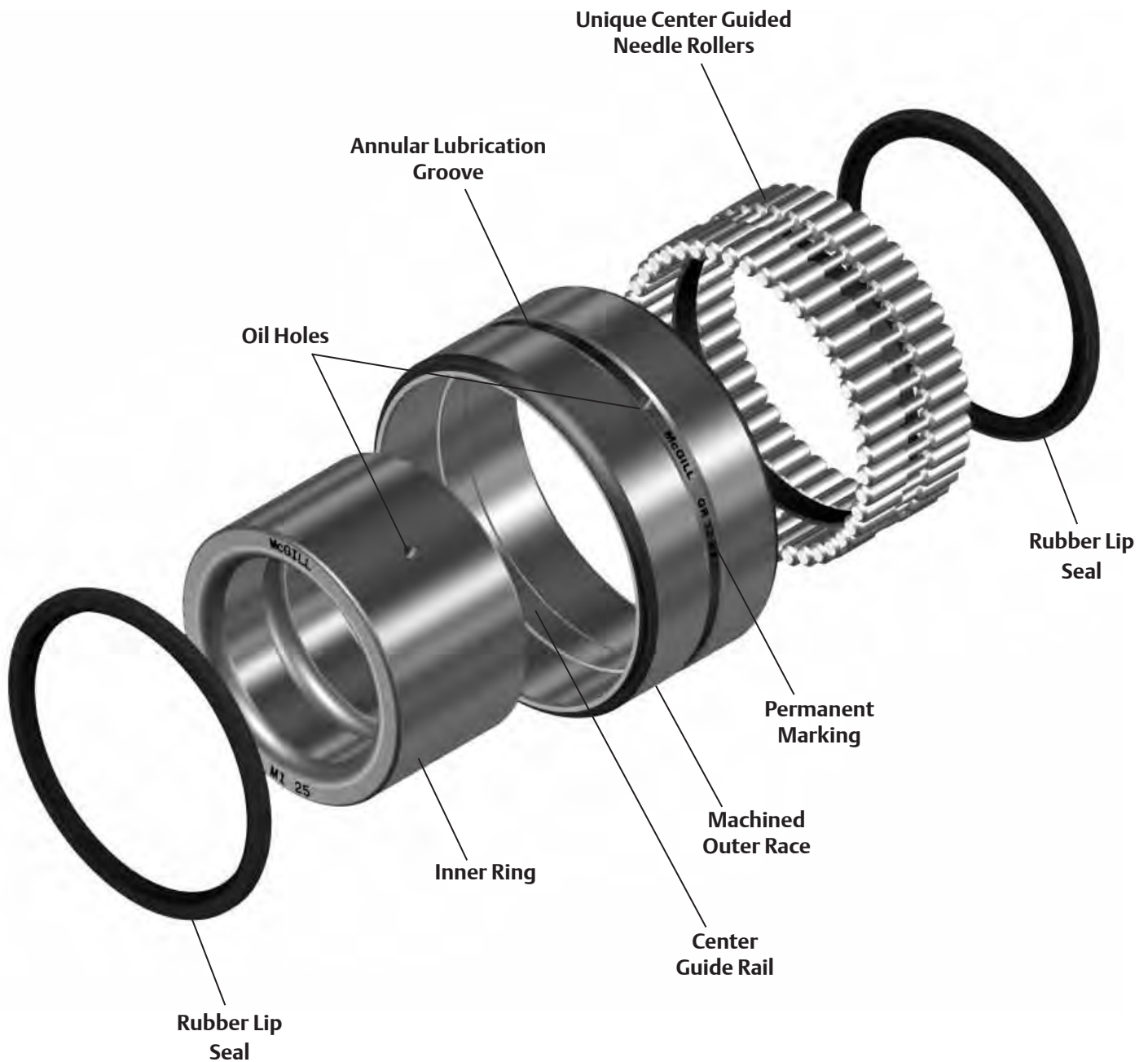
MR SERIES (continued)

Part No.		Military No.	B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
McGill Outer Ring & Roller Assembly	Separable Inner Ring Only		Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				lb kg
			inch mm		inch mm		inch mm			inch mm			
			Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
† MR 68 SS, S, RS, SRS, RSS	MI 58		3.6250 92.111	+0/-0.0008 +0/-0.020	4.2485 107.954	+0/-0.0009 +0/-0.023	2.010 51.07	.25 6.4	0.10 3	3.6260 92.137	3.6246 92.101	+0/-0.0010 +0/-0.025	1.70 .77
MR 68	MI 60	MS 500072-40	3.7500 95.288	+0/-0.0008 +0/-0.020	4.2485 107.954	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.10 3	3.7510 95.313	3.7496 95.277	+0/-0.0010 +0/-0.025	1.75 .79
MR 72	MI 62		3.8750 98.464	+0/-0.0008 +0/-0.020	4.4985 114.307	+0/-0.0009 +0/-0.023	2.260 57.43	.25 6.4	.10 2.5	3.8760 98.489	3.8746 98.454	+0/-0.0010 +0/-0.025	3.25 1.47
MR 80	MI 64		4.0000 101.640	+0/-0.0008 +0/-0.020	4.9985 127.012	+0/-0.0010 +0/-0.025	2.260 57.43	.25 6.4	0.10 3	4.0010 101.665	3.9996 101.630	+0/-0.0010 +0/-0.025	4.38 1.99
	MI 68		4.2500 107.993	+0/-0.0008 +0/-0.020	4.9985 127.012	+0/-0.0010 +0/-0.025	2.260 57.43	0.25 6	0.10 3	4.2510 108.018	4.2496 107.982	+0/-0.0010 +0/-0.025	5.24 2.37
MR 88 N	MI 72 N	MS 500072-43	4.5000 114.345	+0/-0.0008 +0/-0.020	5.4985 139.717	+0/-0.0010 +0/-0.025	2.515 63.91	.25 6.4	0.10 3	4.5010 114.370	4.4996 114.332	+0/-0.0010 +0/-0.025	5.43 2.47
MR 88	MI 72	MS 500072-44	4.5000 114.345	+0/-0.0008 +0/-0.020	5.4985 139.717	+0/-0.0010 +0/-0.025	3.015 76.61	0.25 6	0.10 3	4.5010 114.370	4.4995 114.332	+0/-0.0010 +0/-0.025	5.97 2.71
MR 96 N	MI 80 N	MS 500072-46	5.0000 127.050	+0/-0.0010 +0/-0.025	5.9983 152.417	+0/-0.0010 +0/-0.025	2.515 63.91	.31 7.9	0.12 3	5.0010 127.075	4.9995 127.037	+0/-0.0010 +0/-0.025	5.97 2.71
MR 96	MI 80	MS 500072-47	5.0000 127.050	+0/-0.0010 +0/-0.025	5.9983 152.417	+0/-0.0010 +0/-0.025	3.015 76.61	0.31 8	0.12 3	5.0010 127.075	4.9995 127.037	+0/-0.0010 +0/-0.025	7.12 3.23
MR 104 N	MI 88 N	MS 500072-48	5.5000 139.755	+0/-0.0010 +0/-0.025	6.4983 165.122	+0/-0.0010 +0/-0.025	2.515 63.91	.31 7.9	0.12 3	5.5010 139.780	5.4995 139.742	+0/-0.0010 +0/-0.025	6.30 2.88
† MR 104	MI 88	MS 500072-49	5.5000 139.755	+0/-0.0010 +0/-0.025	6.4983 165.122	+0/-0.0010 +0/-0.025	3.015 76.61	0.31 8	0.12 3	5.5010 139.780	5.4995 139.742	+0/-0.0010 +0/-0.025	7.56 3.43
MR 116	MI 96	MS 500072-50	6.0000 152.460	+0/-0.0010 +0/-0.025	7.2481 184.174	+0/-0.0012 +0/-0.030	3.015 76.61	.31 7.9	.12 3.0	6.0012 152.490	5.9995 152.447	+0/-0.0012 +0/-0.030	11.06 5.03
† MR 124	MI 104		6.5000 165.165	+0/-0.0010 +0/-0.025	7.7481 196.879	+0/-0.0012 +0/-0.030	3.015 76.61	.31 7.9	.12 3.0	6.5012 165.195	6.4995 165.152	+0/-0.0012 +0/-0.030	11.99 5.39
† MR 132	MI 112		7.0000 177.870	+0/-0.0010 +0/-0.025	8.2481 209.584	+0/-0.0012 +0/-0.030	3.015 76.61	.31 7.9	.12 3.0	7.0012 177.900	6.9995 177.857	+0/-0.0012 +0/-0.030	12.70 5.77
† MR 140	MI 120		7.5000 190.575	+0/-0.0012 +0/-0.030	8.7480 222.287	+0/-0.0012 +0/-0.030	3.015 76.61	.31 7.9	.16 4.1	7.5012 190.605	7.4995 190.562	+0/-0.0012 +0/-0.030	13.60 6.17
† MR 148	MI 128		8.0000 203.280	+0/-0.0012 +0/-0.030	9.2480 234.992	+0/-0.0012 +0/-0.030	3.015 76.61	.31 7.9	.16 4.1	8.0012 203.310	7.9995 203.267	+0/-0.0012 +0/-0.030	14.40 6.55

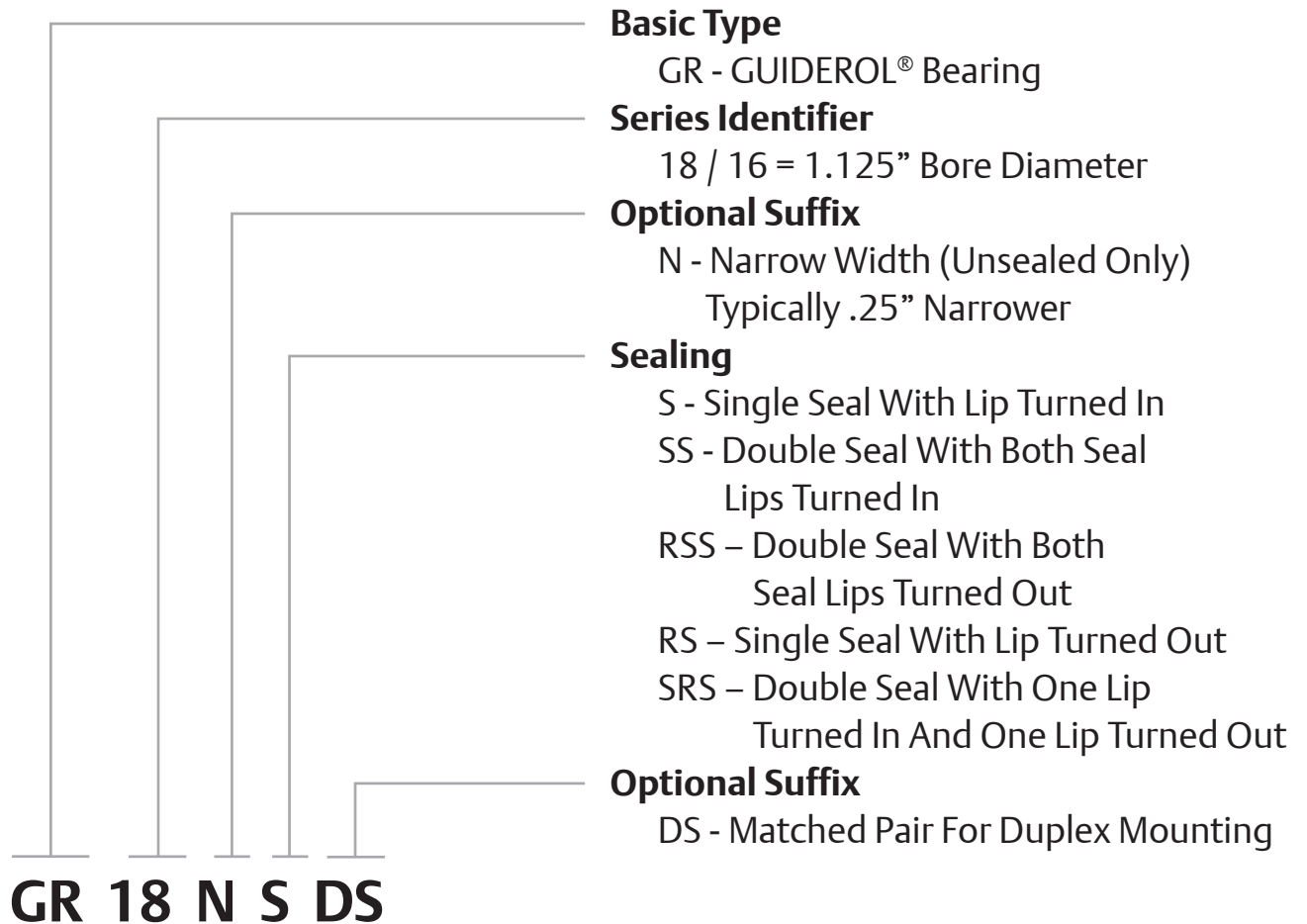
† Not available from stock. Consult McGill customer service for availability.

McGill GUIDEROL® Bearings

McGill GUIDEROL® machined race full complement needle bearings are manufactured from bearing quality steel with unique roller and race design to provide center-guided rolling elements for higher radial load capacity and is well suited for oscillating applications. GUIDEROL® bearings are constructed with radial lubrication hole and groove on the outer and optional inner raceway (MI-series) for relubrication through the housing or shaft. Other options include a variety of seal configurations to either help prevent contaminant entry or contain the lubricant. Depending on your preference, these bearings are available in a wide variety of sizes and sealing options as illustrated on the pages to follow.



GUIDEROL® Nomenclature



Inner Ring



Features and Benefits



Machined Outer Race

Race manufactured from bearing quality steel and hardened to carry heavy dynamic and static loads.



Unique Center Guided Needle Rollers

Centered guided rollers designed to fit a mating guide rail and allow for maximum width of roller within the bearing.



Retaining Ring and Center Rail

Provides retention of needle rollers and helps guide rollers to prevent skewing.



Annular Lubrication Groove

The groove provides a circumferential path to direct lubricant to the oil hole, when lubricating through the housing.

Factory Grease Fill

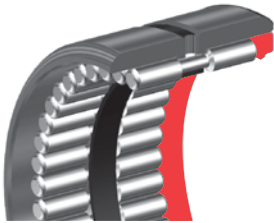
The sealed GUIDEROL® bearings are factory lubricated with a medium temperature (-30° to 250°F, -34° to 121° C) NLGI 1 grease, unsealed bearings packaged with light oil film as a rust preventative. Contact Application Engineering when application conditions require special lubricants.



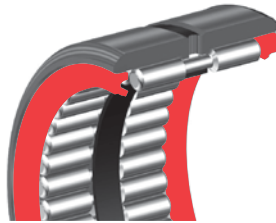
Options

Seals

The rubber lip seal is capable of 250° F maximum temperature and is available in several different configurations on bearings capable being sealed.



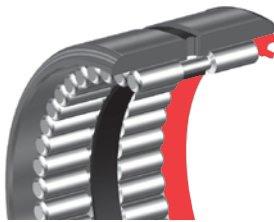
S



SS



RS



RSS



SRS

“DS” Matched Bearings – Load Sharing

When two bearings are installed with the distance between both bearing less than the width of one bearing, it is recommended the bearings be diametrically matched to prevent unequal load sharing. The option matches OD and ID tolerances, diametrical clearance within 30% of the tolerance range and the radial runout within 20% of the tolerance range with high point of runout indicated on the bearing faces. For more information and matching factors please review the engineering section for matched bearings. Matched bearings are packaged as sets, but can be used individually if desired.



Machined Inner Ring (MI)

Precision ground inner ring provides a hardened raceway for the rollers when used with an unhardened shaft. The ring contains an oil hole and annular groove for relubrication of the bearing and can be used with both CAGEROL and GUIDEROL bearings or can be utilized as a bushing in plain bearing applications.

Grease Options

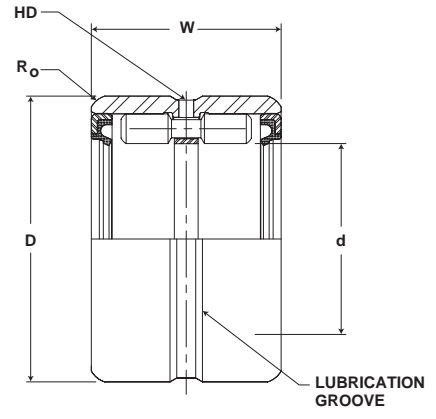
When requested, standard bearings can be factory filled with customer specified lubricant.

McGILL® GUIDEROL® Bearings

Needle/Journal Bearings



- Basic Construction Type:** Machined Race with full Complement of Needles
- Rolling Elements:** Center Guided Precision Needles
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Rubber Lip
- Lubrication:** Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative

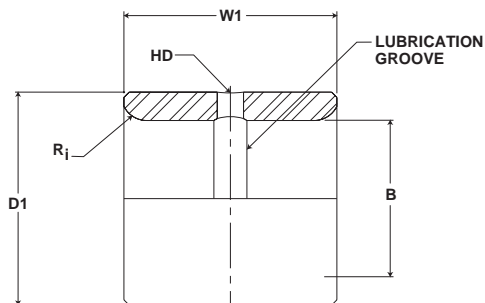
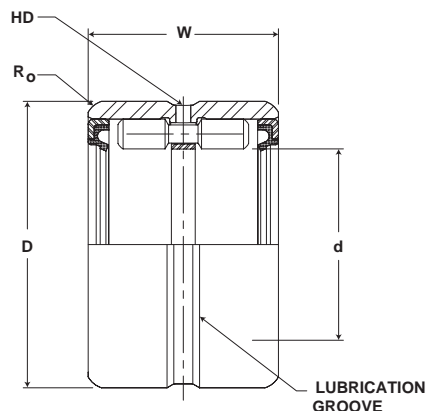


GR SERIES

Part No.	d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm		inch mm		inch mm	inch mm			inch mm					
	Nom	Tol.	Nom	Tol.	+Tol +0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
GR 8 N	.5000 12.7	+0/-0.0005 +0/-0.013	1.0000 25.4	+0/-0.0005 +0/-0.013	.750 19.05	0.9997 25.402	1.0070 25.588	+0/-0.0007 +0/-0.018	.08 2	0.03 1	TBD	2,600 11,565	4,500 20,016	.12 .05
GR 10 N	.6250 15.9	+0/-0.0005 +0/-0.013	1.1250 28.6	+0/-0.0005 +0/-0.013	.750 19.05	1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.018	.08 2	0.03 1	9,600	3,400 15,123	6,400 28,467	.12 .05
GR 10 SS, S, RS, SRS, RSS					1.000 25.40	1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.018	.08 2	0.03 1	6,100	3,400 15,123	6,400 28,467	.15 .07
GR 10					1.000 25.40	1.1247 28.579	1.1257 28.604	+0/-0.0007 +0/-0.018	.08 2	0.03 1	9,600	4,700 20,906	9,100 40,477	.15 .07
GR 12 N	.7500 19.1	+0/-0.0005 +0/-0.013	1.2500 31.8	+0/-0.0005 +0/-0.013	.750 19.05	1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.018	.08 2	0.04 1	8,000	3,700 16,458	7,200 32,026	.14 .06
GR 12 SS, S, RS, SRS, RSS					1.000 25.40	1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.018	.08 2	0.04 1	5,100	3,700 16,458	7,200 32,026	.17 .08
GR 12					1.000 25.40	1.2497 31.755	1.2507 31.780	+0/-0.0007 +0/-0.018	.08 2	0.04 1	8,000	5,100 22,685	10,900 48,483	.17 .08
GR 14 N	.8750 22.2	+0/-0.0005 +0/-0.013	1.3750 34.9	+0/-0.0005 +0/-0.013	.750 19.05	1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.018	.08 2	0.04 1	6,800	4,150 18,459	8,400 37,363	.16 .07
GR 14 SS, S, RS, SRS, RSS					1.000 25.40	1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.018	.08 2	0.04 1	4,400	4,150 18,459	8,400 37,363	.21 .09
GR 14					1.000 25.40	1.3747 34.931	1.3757 34.957	+0/-0.0007 +0/-0.018	.08 2	0.04 1	6,800	5,700 25,354	12,800 56,934	.21 .09
GR 16 N	1.0000 25.4	+0/-0.0005 +0/-0.013	1.5000 38.1	+0/-0.0005 +0/-0.013	.750 19.05	1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.018	.08 2	0.04 1	6,000	4,350 19,349	9,600 42,701	.20 .09
GR 16 SS, S, RS, SRS, RSS					1.000 25.40	1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.018	.08 2	0.04 1	3,800	4,350 19,349	9,600 42,701	.23 .10
GR 16					1.000 25.40	1.4997 38.107	1.5007 38.133	+0/-0.0007 +0/-0.018	.08 2	0.04 1	6,000	6,050 26,910	14,500 64,496	.23 .10
GR 18 N	1.1250 28.6	+0/-0.0005 +0/-0.013	1.6250 41.3	+0/-0.0005 +0/-0.013	.750 19.05	1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.018	.09 2	0.04 1	5,300	6,250 27,800	15,200 67,610	.24 .11
GR 18 SS, S, RS, SRS, RSS					1.000 25.40	1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.018	.09 2	0.04 1	3,400	6,250 27,800	15,200 67,610	.3 .14
GR 18					1.000 25.40	1.6247 41.284	1.6257 41.309	+0/-0.0007 +0/-0.018	.09 2	0.04 1	5,300	7,900 35,139	20,900 92,963	.3 .14

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
For DS matching as DS suffix to part number
* For bearing properly filled with #1 grease reduce speed by 50%

Metric dimensions for reference only.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



GR SERIES

Part No.		B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
Outer Ring & Roller Assembly	Separable Inner Ring Only	Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				
		inch mm		inch mm			inch mm		inch mm			lb kg
		Nom	Tol.	Nom	Tol.	Tol +0/-.005 (+0/.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
GR 8 N	-	-	-	-	-	-	-	-	-	-	-	-
GR 10 N	MI 6 N	.3750 9.529	+0/-.0004 +0/-.010	.6245 15.869	+0/-.0004 +0/-.010	.760 19.31	0.09 2	0.25 6	.3755 9.5	.3747 9.5	+0/-.0005 +0/-.013	.05 .02
	MI 7 N	.4375 11.117	+0/-.0004 +0/-.010	.6245 15.869	+0/-.0004 +0/-.010	.760 19.31	0.09 2	0.25 6	.4380 11.1	.4372 11.1	+0/-.0005 +0/-.013	.04 .02
GR 10 SS, S, RS, SRS, RSS	MI 6	.3750 9.529	+0/-.0004 +0/-.010	.6245 15.869	+0/-.0004 +0/-.010	1.010 25.66	0.09 2	0.25 6	.3755 9.5	.3747 9.5	+0/-.0005 +0/-.013	.05 .02
GR 10	MI 6	.3750 9.529	+0/-.0004 +0/-.010	.3750 9.530	+0/-.0004 +0/-.010	1.010 25.66	0.09 2	0.25 6	.3755 9.5	.3747 9.5	+0/-.0005 +0/-.013	.05 .02
GR 12 N	MI 8 N	.5000 12.705	+0/-.0004 +0/-.010	.7493 19.040	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.5005 12.7	.4997 12.7	+0/-.0005 +0/-.013	.04 .02
	MI 9 N	.5625 14.293	+0/-.0004 +0/-.010	.7493 19.040	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.5630 14.3	.5623 14.3	+0/-.0005 +0/-.013	.04 .02
GR 12 SS, S, RS, SRS, RSS	MI 8	.5000 12.705	+0/-.0004 +0/-.010	.7493 19.040	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.5005 12.7	.4997 12.7	+0/-.0005 +0/-.013	.06 .03
GR 12	MI 8	.5000 12.705	+0/-.0004 +0/-.010	.7493 19.040	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.5005 12.7	.4997 12.7	+0/-.0005 +0/-.013	.06 .03
GR 14 N	MI 10 N	.6250 15.881	+0/-.0004 +0/-.010	.8743 22.216	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.6255 15.9	.6247 15.9	+0/-.0005 +0/-.013	.06 .03
	MI 11 N	.6875 17.469	+0/-.0004 +0/-.010	.8743 22.216	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.6880 17.5	.6872 17.5	+0/-.0005 +0/-.013	.05 .02
GR 14 SS, S, RS, SRS, RSS	MI 10	.6250 15.881	+0/-.0004 +0/-.010	.8743 22.216	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.6255 15.9	.6247 15.9	+0/-.0005 +0/-.013	.08 .04
GR 14	MI 10	.6250 15.881	+0/-.0004 +0/-.010	.8743 22.216	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.6255 15.9	.6247 15.9	+0/-.0005 +0/-.013	.08 .04
GR 16 N	MI 12 N	.7500 19.058	+0/-.0004 +0/-.010	.9993 25.392	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.7505 19.1	.7497 19.0	+0/-.0005 +0/-.013	.07 .03
	MI 13 N	.8125 20.646	+0/-.0004 +0/-.010	.9993 25.392	+0/-.0005 +0/-.013	.760 19.31	0.13 3	0.40 10	.8130 20.7	.8121 20.6	+0/-.0005 +0/-.013	.07 .03
GR 16 SS, S, RS, SRS, RSS	MI 12	.7500 19.058	+0/-.0004 +0/-.010	.9993 25.392	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.7505 19.1	.7497 19.0	+0/-.0005 +0/-.013	.10 .05
GR 16	MI 13	.8125 20.646	+0/-.0004 +0/-.010	.9993 25.392	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.8130 20.7	.8121 20.6	+0/-.0005 +0/-.013	.11 .05
GR 18 N	MI 14 N	.8750 22.234	+0/-.0005 +0/-.013	1.124 28.563	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.8755 22.2	.8746 22.2	+0/-.0005 +0/-.013	.11 .05
	MI 15 N	.9375 23.822	+0/-.0005 +0/-.013	1.124 28.563	+0/-.0005 +0/-.013	1.010 25.66	0.13 3	0.40 10	.9380 23.8	.9371 23.8	+0/-.0005 +0/-.013	.11 .05
GR 18 SS, S, RS, SRS, RSS	MI 14	.8750 22.234	+0/-.0005 +0/-.013	1.124 28.563	+0/-.0005 +0/-.013	1.260 32.02	0.13 3	0.40 10	.8755 22.2	.8746 22.2	+0/-.0005 +0/-.013	.13 .06
GR 18	MI 15	.9375 23.822	+0/-.0005 +0/-.013	1.124 28.563	+0/-.0005 +0/-.013	1.260 32.02	0.13 3	0.40 10	.9380 23.8	.9371 23.8	+0/-.0005 +0/-.013	.12 .06

McGILL® GUIDEROL® Bearings

Needle/Journal Bearings



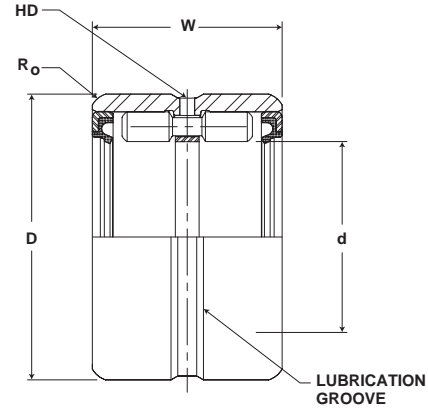
Basic Construction Type: Machined Race with full Complement of Needles

Rolling Elements: Center Guided Precision Needles

Bearing Material: Bearing Quality Steel

Seal Type: Rubber Lip

Lubrication: Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative



GR SERIES (continued)

Part No.	d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm		inch mm		inch mm	inch mm			inch mm					
	Nom	Tol.	Nom	Tol.	+0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
GR 20 N					1.000 25.40	1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.018	.09 2	0.04 1	4,800	6,500 28,912	17,000 75,616	.27 .12
GR 20 SS, S, RS, SRS, RSS	1.2500 31.8	+0/-0.0005 +0/-0.013	1.7500 44.5	+0/-0.0005 +0/-0.013	1.250 31.75	1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.018	.09 2	0.04 1	3,050	6,500 28,912	17,000 75,616	.39 .15
GR 20					1.250 31.75	1.7497 44.460	1.7507 44.485	+0/-0.0007 +0/-0.018	.09 2	0.04 1	4,800	8,300 36,918	23,100 102,749	.39 .15
GR 22 N					1.000 25.40	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	4,400	7,100 31,581	18,600 82,733	.31 .14
GR 22 SS, S, RS, SRS, RSS	1.3750 34.9	+0/-0.0005 +0/-0.013	1.8750 47.6	+0/-0.0006 +0/-0.015	1.250 31.75	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	2,800	7,100 31,581	18,600 82,733	.36 .16
GR 22					1.250 31.75	1.8747 47.636	1.8757 47.662	+0/-0.0007 +0/-0.018	.09 2	0.04 1	4,400	9,050 40,254	25,500 113,424	.36 .16
GR 24 N					1.000 25.40	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	4,000	7,150 31,803	20,200 89,850	.41 .19
GR 24 SS, S, RS, SRS, RSS	1.5000 38.1	+0/-0.0005 +0/-0.013	2.0625 52.4	+0/-0.0006 +0/-0.015	1.250 31.75	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2,500	7,150 31,803	20,200 89,850	.47 .21
GR 24					1.250 31.75	2.0621 52.398	2.0632 52.426	+0/-0.0007 +0/-0.018	.09 2	0.06 2	4,000	9,150 40,699	27,800 123,654	.47 .21
GR 26 N					1.000 25.40	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,700	7,500 33,360	21,700 96,522	.46 .21
GR 26 SS, S, RS, SRS, RSS	1.6250 41.3	+0/-0.0005 +0/-0.013	2.1875 55.6	+0/-0.0006 +0/-0.015	1.250 31.75	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2,350	7,500 33,360	21,700 96,522	.51 .23
GR 26					1.250 31.75	2.1871 55.574	2.1882 55.602	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,700	9,600 42,701	29,800 132,550	.51 .23
GR 28 N					1.000 25.40	2.3121 58.750	2.3132 58.778	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,400	7,750 34,472	23,300 103,638	.47 .21
GR 28 SS, S, RS, SRS, RSS	1.7500 44.5	+0/-0.0005 +0/-0.013	2.3125 58.8	+0/-0.0006 +0/-0.015	1.250 31.75	2.3121 58.750	2.3132 58.778	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2,200	7,750 34,472	23,300 103,638	.55 .25
GR 28					1.250 31.75	2.3121 58.750	2.3132 58.778	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,400	9,850 43,813	32,100 142,781	.55 .25
GR 30 SS, S, RS, SRS, RSS	1.8750 47.6	+0/-0.0005 +0/-0.013	2.4375 61.9	+0/-0.0006 +0/-0.015	1.250 31.75	2.4371 61.927	2.4382 61.955	+0/-0.0007 +0/-0.018	.09 2	0.06 2	2,040	8,150 36,251	25,200 112,090	.59 .27
GR 30					1.250 31.75	2.4371 61.927	2.4382 61.955	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,100	8,150 36,251	25,200 112,090	.59 .27
GR 32 N					1.000 25.40	2.5621 65.103	2.5632 65.131	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,000	8,000 35,584	26,700 118,762	.55 .25
GR 32 SS, S, RS, SRS, RSS	2.0000 50.8	+0/-0.0005 +0/-0.013	2.5625 65.1	+0/-0.0006 +0/-0.015	1.250 31.75	2.5621 65.103	2.5632 65.131	+0/-0.0007 +0/-0.018	.09 2	0.06 2	1,900	8,000 35,584	26,700 118,762	.61 .28
GR 32					1.250 31.75	2.5621 65.103	2.5632 65.131	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,000	10,250 45,592	36,700 163,242	.61 .28
						2.5621 65.103	2.5632 65.131	+0/-0.0007 +0/-0.018	.09 2	0.06 2	3,000	10,250 45,592	36,700 163,242	.61 .28

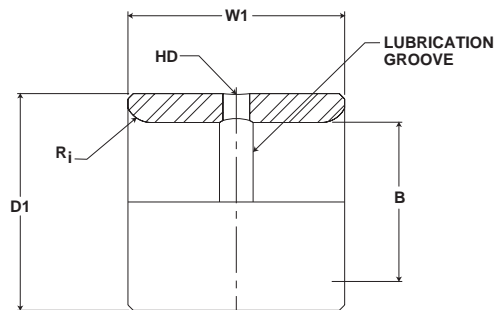
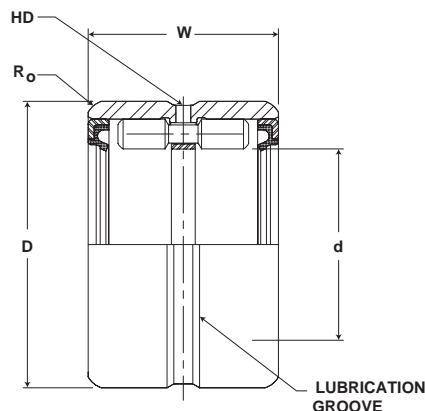
For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
For DS matching as DS suffix to part number

* For bearing properly filled with #1 grease reduce speed by 50%

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



GR SERIES (continued)

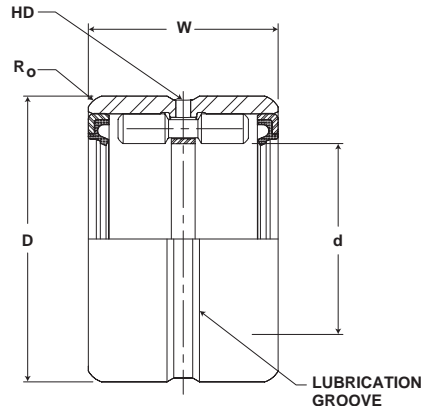
Part No.		B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
Outer Ring & Roller Assembly	Separable Inner Ring Only	Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				
		inch mm		inch mm		inch mm			inch mm			lb kg
		Nom	Tol.	Nom	Tol.	Tol +0/-.005 (+0/.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
GR 20 N	MI 16 N	1.0000 25.410	+0/-.0005 +0/-.013	1.2491 31.740	+0/-.0006 +0/-.015	1.010 25.66	0.13 3	0.40 10	1.0005 25.4	0.9996 25.4	+0/-.0005 +0/-.013	.13 .06
GR 20 SS, S, RS, SRS, RSS	MI 16	1.0000 25.410	+0/-.0005 +0/-.013	1.2491 31.740	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.40 10	1.0005 25.4	0.9996 25.4	+0/-.0005 +0/-.013	.16 .07
GR 20	MI 16	1.0000 25.410	+0/-.0005 +0/-.013	1.2491 31.740	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.40 10	1.0005 25.4	0.9996 25.4	+0/-.0005 +0/-.013	.16 .07
GR 22 N	MI 18 N	1.1250 28.586	+0/-.0005 +0/-.013	1.3741 34.916	+0/-.0006 +0/-.015	1.010 25.66	0.13 3	0.40 10	1.1255 28.6	1.1246 28.6	+0/-.0005 +0/-.013	.14 .06
GR 22 SS, S, RS, SRS, RSS	MI 18	1.1250 28.586	+0/-.0005 +0/-.013	1.3741 34.916	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.40 10	1.1255 28.6	1.1246 28.6	+0/-.0005 +0/-.013	.17 .08
GR 22	MI 17	1.0625 26.998	+0/-.0005 +0/-.013	1.3741 34.916	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.40 10	1.0630 27.0	1.0621 27.0	+0/-.0005 +0/-.013	.16 .07
GR 24 N	MI 20 N	1.2500 31.763	+0/-.0005 +0/-.013	1.4990 38.090	+0/-.0006 +0/-.015	1.010 25.66	0.13 3	0.06 2	1.2505 31.8	1.2496 31.8	+0/-.0005 +0/-.013	.19 .09
GR 24 SS, S, RS, SRS, RSS	MI 20	1.2500 31.763	+0/-.0005 +0/-.013	1.4990 38.090	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.2505 31.8	1.2496 31.8	+0/-.0005 +0/-.013	.22 .09
GR 24	MI 19	1.1875 30.174	+0/-.0005 +0/-.013	1.4990 38.090	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.1880 30.2	1.1871 30.2	+0/-.0005 +0/-.013	.24 .11
GR 26 N	MI 21 N	1.3125 33.351	+0/-.0005 +0/-.013	1.6240 41.266	+0/-.0006 +0/-.015	1.010 25.66	0.13 3	0.06 2	1.3130 33.4	1.3121 33.3	+0/-.0005 +0/-.013	.20 .09
GR 26 SS, S, RS, SRS, RSS	MI 21	1.3125 33.351	+0/-.0005 +0/-.013	1.6240 41.266	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.3130 33.4	1.3121 33.3	+0/-.0005 +0/-.013	.26 .12
GR 26	MI 22 4S	1.3750 34.939	+0/-.0005 +0/-.013	1.6240 41.266	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.3755 35.0	1.3746 34.9	+0/-.0005 +0/-.013	.20 .09
GR 28 N	MI 24 N	1.5000 38.115	+0/-.0005 +0/-.013	1.7490 44.442	+0/-.0006 +0/-.015	1.010 25.66	0.13 3	0.06 2	1.5005 38.1	1.4996 38.1	+0/-.0005 +0/-.013	.22 .09
GR 28 SS, S, RS, SRS, RSS	MI 22	1.3750 34.939	+0/-.0005 +0/-.013	1.7490 44.442	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.3755 35.0	1.3746 34.9	+0/-.0005 +0/-.013	.26 .12
GR 28	MI 23	1.4375 36.527	+0/-.0005 +0/-.013	1.7490 44.442	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.4380 36.5	1.4371 36.5	+0/-.0005 +0/-.013	.27 .12
	MI 24	1.5000 38.115	+0/-.0005 +0/-.013	1.7490 44.442	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.5005 38.1	1.4996 38.1	+0/-.0005 +0/-.013	.22 .09
GR 30 SS, S, RS, SRS, RSS	MI 25 4S	1.5625 39.703	+0/-.0005 +0/-.013	1.8740 47.618	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.5630 39.7	1.5621 39.7	+0/-.0005 +0/-.013	.27 .12
GR 30	MI 25 4S	1.5625 39.703	+0/-.0005 +0/-.013	1.8740 47.618	+0/-.0006 +0/-.015	1.260 32.02	0.13 3	0.06 2	1.5630 39.7	1.5621 39.7	+0/-.0005 +0/-.013	.27 .12
GR 32 N	MI 26 N	1.6250 41.291	+0/-.0005 +0/-.013	1.9989 50.792	+0/-.0007 +0/-.018	1.010 25.66	0.13 3	0.06 2	1.6255 41.3	1.6246 41.3	+0/-.0005 +0/-.013	.30 .14
GR 32 SS, S, RS, SRS, RSS	MI 25	1.5625 39.703	+0/-.0005 +0/-.013	1.9989 50.792	+0/-.0007 +0/-.018	1.260 32.02	0.13 3	0.06 2	1.5630 39.7	1.5621 39.7	+0/-.0005 +0/-.013	.30 .14
GR 32	MI 26	1.6250 41.291	+0/-.0005 +0/-.013	1.9989 50.792	+0/-.0007 +0/-.018	1.260 32.0	0.13 3	0.06 2	1.6255 41.3	1.6246 41.3	+0/-.0005 +0/-.013	.38 .17
	MI 27	1.6875 42.879	+0/-.0005 +0/-.013	1.9989 50.792	+0/-.0007 +0/-.018	1.260 32.0	0.13 3	0.06 2	1.6880 42.9	1.6871 42.9	+0/-.0005 +0/-.013	.32 .15

McGILL® GUIDEROL® Bearings

Needle/Journal Bearings



- Basic Construction Type:** Machined Race with full Complement of Needles
- Rolling Elements:** Center Guided Precision Needles
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Rubber Lip
- Lubrication:** Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative

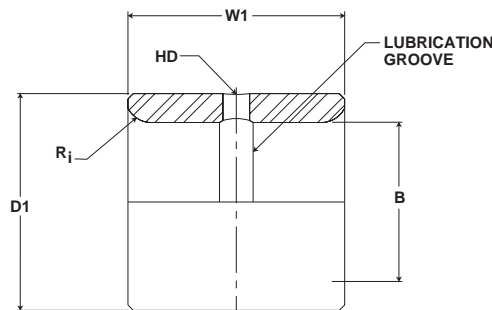
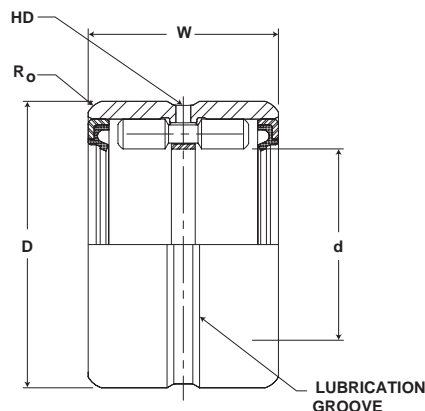


GR SERIES (continued)

Part No.	d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm		inch mm		inch mm	inch mm			inch mm					
	Nom	Tol.	Nom	Tol.	Tol. +0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
GR 36 N					1.500 38.10	2.9996 76.220	3.0007 76.248	+0/-0.0007 +0/-0.018	.13 3	0.08 2	2,700	15,250 67,832	49,100 218,397	1.13 .51
GR 36 SS, S, RS, SRS, RSS	2.2500 57.2	+0/-0.0005 +0/-0.013	3.0000 76.2	+0/-0.0006 +0/-0.015	1.750 44.45	2.9996 76.220	3.0007 76.248	+0/-0.0007 +0/-0.018	.13 3	0.08 2	1,700	15,250 67,832	49,100 218,397	1.32 .59
GR 36					1.750 44.45	2.9996 76.220	3.0007 76.248	+0/-0.0007 +0/-0.018	.13 3	0.08 2	2,700	18,450 82,066	60,200 267,770	1.32 .59
GR 40 N					1.500 38.10	3.2496 82.572	3.2507 82.600	+0/-0.0007 +0/-0.018	.13 3	0.08 2	2,400	16,200 72,058	54,500 242,416	1.23 .56
GR 40 SS, S, RS, SRS, RSS	2.5000 63.5	+0/-0.0005 +0/-0.013	3.2500 82.6	+0/-0.0008 +0/-0.020	1.750 44.45	3.2496 82.572	3.2507 82.600	+0/-0.0007 +0/-0.018	.13 3	0.08 2	1,530	16,200 72,058	54,500 242,416	1.44 .65
GR 40					1.750 44.45	3.2496 82.572	3.2507 82.600	+0/-0.0007 +0/-0.018	.13 3	0.08 2	2,400	19,800 88,070	66,800 297,126	1.44 .65
GR 44 N					1.500 38.10	3.4995 88.922	3.5008 88.955	+0/-0.0010 +0/-0.025	.13 3	0.08 2	2,200	16,800 74,726	59,900 266,435	1.36 .62
GR 44 SS, S, RS, SRS, RSS	2.7500 69.9	+0/-0.0005 +0/-0.013	3.5000 88.9	+0/-0.0008 +0/-0.020	1.750 44.45	3.4995 88.922	3.5008 88.955	+0/-0.0010 +0/-0.025	.13 3	0.08 2	1,390	16,800 74,726	59,900 266,435	1.59 .72
GR 44					1.750 44.45	3.4995 88.922	3.5008 88.955	+0/-0.0010 +0/-0.025	.13 3	0.08 2	2,200	20,350 90,517	73,400 326,483	1.59 .72
GR 48 N					1.500 38.10	3.7495 95.275	3.7508 95.308	+0/-0.0010 +0/-0.025	.13 3	0.08 2	2,000	20,500 91,184	65,400 290,899	1.53 .69
GR 48 SS, S, RS, SRS, RSS	3.0000 76.2	+0/-0.0005 +0/-0.013	3.7500 95.3	+0/-0.0008 +0/-0.020	1.750 44.45	3.7495 95.275	3.7508 95.308	+0/-0.0010 +0/-0.025	.13 3	0.08 2	1,270	20,500 91,184	65,400 290,899	1.70 .77
GR 48					1.750 44.45	3.7495 95.275	3.7508 95.308	+0/-0.0010 +0/-0.025	.13 3	0.08 2	2,000	20,600 91,629	80,200 356,730	1.70 .77
GR 52 SS, S, RS, SRS, RSS	3.2500 82.6	+0/-0.0005 +0/-0.013	4.2500 108.0	+0/-0.0008 +0/-0.020	1.750 44.45	4.2495 107.980	4.2508 108.013	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1,175	25,100 111,645	63,800 283,782	2.64 1.19
GR 52					1.750 44.45	4.2495 107.980	4.2508 108.013	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1,850	23,950 106,530	80,100 356,285	2.64 1.19
GR 56 N					1.750 44.45	3.2496 82.572	3.2507 82.600	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1,700	25,100 111,645	86,500 384,752	2.88 1.31
GR 56 SS, S, RS, SRS, RSS	3.5000 88.9	+0/-0.0005 +0/-0.013	4.5000 114.3	+0/-0.0008 +0/-0.020	2.000 50.80	3.4995 88.922	3.5008 88.955	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1,090	25,100 111,645	86,500 384,752	3.18 1.44
GR 56					2.000 50.80	3.4995 88.922	3.5008 88.955	+0/-0.0010 +0/-0.025	.19 5	0.08 2	1,700	28,900 128,547	104,000 462,592	3.18 1.44
GR 60 SS, S, RS, SRS, RSS	3.7500 95.3	+0/-0.0005 +0/-0.013	4.7500 120.7	+0/-0.0008 +0/-0.020	2.000 50.80	4.7495 120.685	4.7508 120.718	+0/-0.0010 +0/-0.025	.19 5	0.10 3	1,020	25,450 113,202	92,300 410,550	3.38 1.53
GR 60					2.000 50.80	4.7495 120.685	4.7508 120.718	+0/-0.0010 +0/-0.025	.19 5	0.10 3	1,600	29,300 130,326	111,000 493,728	3.38 1.53

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
For DS matching as DS suffix to part number
* For bearing properly filled with #1 grease reduce speed by 50%

Metric dimensions for reference only.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



GR SERIES (continued)

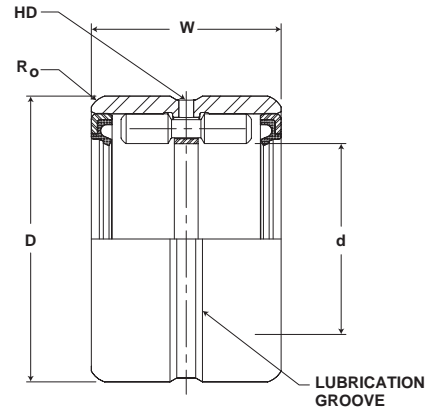
Part No.		B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
Outer Ring & Roller Assembly	Separable Inner Ring Only	Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear	Recommended Shaft Diameter with inner ring			lb kg
		inch mm		inch mm		inch mm			inch mm			
		Nom	Tol.	Nom	Tol.	Tol +0/-.005 (+0/.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
GR 36 N	MI 28 N	1.7500	+0/-.0005	2.2489	+0/-.0007	1.510	0.19	0.06	1.7505	1.7496	+0/-.0005	.63
		44.468	+0/-.013	57.145	+0/-.018	38.37	5	2	44.5	44.5	+0/-.013	.29
GR 36 SS, S, RS, SRS, RSS	MI 28	1.7500	+0/-.0005	2.2489	+0/-.0007	1.760	0.19	0.06	1.7505	1.7497	+0/-.0005	.74
		44.468	+0/-.013	57.1	+0/-.018	44.72	5	2	44.5	44.5	+0/-.013	.34
GR 36	MI 30	1.8750	+0/-.0005	2.2489	+0/-.0007	1.760	0.19	0.06	1.8755	1.8746	+0/-.0005	.85
		47.644	+0/-.013	57.1	+0/-.018	44.72	5	2	47.7	47.6	+0/-.013	.39
GR 40 N	MI 32 N	2.0000	+0/-.0005	2.2489	+0/-.0007	1.510	0.19	0.08	2.0005	1.9996	+0/-.0005	.74
		50.820	+0/-.013	57.145	+0/-.018	38.37	5	2	50.8	50.8	+0/-.013	.34
GR 40 SS, S, RS, SRS, RSS	MI 31	1.9375	+0/-.0005	2.2489	+0/-.0007	1.510	0.19	0.08	1.9380	1.9371	+0/-.0005	.97
		49.232	+0/-.013	57.1	+0/-.018	38.4	5	2	49.2	49.2	+0/-.013	.44
GR 40	MI 32	2.0000	+0/-.0005	2.2489	+0/-.0007	1.760	0.19	0.08	2.0005	1.9996	+0/-.0005	.87
		50.820	+0/-.013	57.1	+0/-.018	44.72	5	2	50.8	50.8	+0/-.013	.39
	MI 34	2.1250	+0/-.0006	2.2489	+0/-.0007	1.760	0.19	0.08	2.1258	2.1247	+0/-.0008	1.00
		53.996	+0/-.015	57.1	+0/-.018	44.7	5	2	54.0	54.0	+0/-.020	.45
GR 44 N	MI 36 N	2.2500	+0/-.0006	2.7489	+0/-.0007	1.510	0.19	0.08	2.2508	2.2497	+0/-.0008	.83
		57.173	+0/-.015	69.850	+0/-.018	38.37	5	2	57.2	57.2	+0/-.020	.36
GR 44 SS, S, RS, SRS, RSS	MI 35	2.1875	+0/-.0006	2.7489	+0/-.0007	1.510	0.19	0.08	2.1883	2.1872	+0/-.0008	1.06
		55.584	+0/-.015	69.8	+0/-.018	38.4	5	2	55.6	55.6	+0/-.020	.48
GR 44	MI 36	2.2500	+0/-.0006	2.7489	+0/-.0007	1.760	0.19	0.08	2.2508	2.2497	+0/-.0008	.97
		57.173	+0/-.015	69.8	+0/-.018	44.72	5	2	57.2	57.2	+0/-.020	.44
GR 48 N	MI 40 N	2.5000	+0/-.0006	2.9989	+0/-.0007	1.510	0.19	0.08	2.5008	2.4997	+0/-.0008	.92
		63.525	+0/-.015	76.202	+0/-.018	38.37	5	2	63.5	63.5	+0/-.020	.43
GR 48 SS, S, RS, SRS, RSS	MI 38	2.3750	+0/-.0006	2.9989	+0/-.0007	1.760	0.19	0.08	2.3758	2.3747	+0/-.0008	1.28
		60.349	+0/-.015	76.2	+0/-.018	44.72	5	2	60.4	60.3	+0/-.020	.58
GR 48	MI 39	2.4375	+0/-.0006	2.9989	+0/-.0007	1.510	0.19	0.08	2.4383	2.4372	+0/-.0008	1.05
		61.937	+0/-.015	76.2	+0/-.018	38.37	5	2	62.0	61.9	+0/-.020	.47
	MI 40	2.5000	+0/-.0006	2.9989	+0/-.0007	1.760	0.19	0.08	2.5008	2.4997	+0/-.0008	1.07
		63.525	+0/-.015	76.2	+0/-.018	44.72	5	2	63.5	63.5	+0/-.020	.48
GR 52 SS, S, RS, SRS, RSS	MI 42	2.6250	+0/-.0006	3.2487	+0/-.0009	1.760	0.19	0.08	2.6258	2.6247	+0/-.0008	1.12
		66.701	+0/-.015	82.549	+0/-.023	44.72	5	2	66.7	66.7	+0/-.020	.51
GR 52	MI 44	2.7500	+0/-.0006	3.2487	+0/-.0009	1.760	0.19	0.08	2.7508	2.7497	+0/-.0008	1.17
		69.878	+0/-.015	82.549	+0/-.023	44.72	5	2	69.9	69.9	+0/-.020	.53
GR 56 N	MI 48 N	3.0000	+0/-.0006	3.4987	+0/-.0009	1.760	0.25	0.08	3.0008	2.9997	+0/-.0008	1.32
		76.230	+0/-.015	88.902	+0/-.023	44.72	6	2	76.3	76.2	+0/-.020	.55
GR 56 SS, S, RS, SRS, RSS	MI 46	2.8750	+0/-.0006	3.4987	+0/-.0009	2.010	0.25	0.08	2.8758	2.8747	+0/-.0008	1.30
		73.054	+0/-.015	88.9	+0/-.023	51.07	6	2	73.1	73.0	+0/-.020	.59
GR 56	MI 47	2.9375	+0/-.0006	3.4987	+0/-.0009	2.010	0.25	0.08	2.9383	2.9372	+0/-.0008	1.58
		74.642	+0/-.015	88.9	+0/-.023	51.07	6	2	74.7	74.6	+0/-.020	.72
	MI 48	3.0000	+0/-.0006	3.4987	+0/-.0009	2.010	0.25	0.08	3.0008	2.9997	+0/-.0008	1.43
		76.230	+0/-.015	88.9	+0/-.023	51.1	6	2	76.3	76.2	+0/-.020	.65
GR 60 SS, S, RS, SRS, RSS	MI 50	3.1250	+0/-.0006	3.7487	+0/-.0009	2.010	0.25	0.10	3.1260	3.1246	+0/-.0010	1.88
		79.406	+0/-.015	95.254	+0/-.023	51.07	6	3	79.4	79.4	+0/-.025	.85
GR 60	MI 52	3.2500	+0/-.0006	3.7487	+0/-.0009	2.010	0.25	0.10	3.2510	3.2496	+0/-.0010	1.52
		82.583	+0/-.015	95.254	+0/-.023	51.07	6	3	82.6	82.6	+0/-.025	.69

McGILL® GUIDEROL® Bearings

Needle/Journal Bearings



- Basic Construction Type:** Machined Race with full Complement of Needles
- Rolling Elements:** Center Guided Precision Needles
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Rubber Lip
- Lubrication:** Sealed Bearings: Lithium Soap Grease NLGI #1
Unsealed Bearings: Rust Preventative

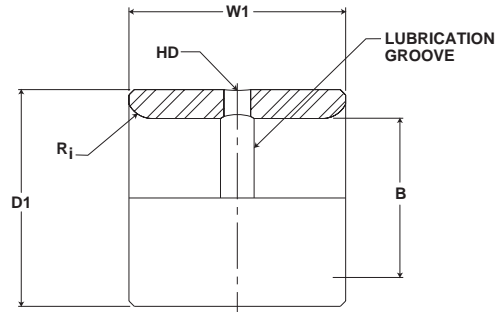
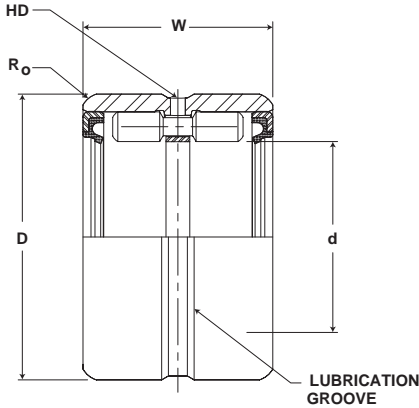


GR SERIES (continued)

Part No.	d		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Outer & Roller Assembly Weight
	Shaft Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm		inch mm		inch mm	inch mm			inch mm		RPM	lb/N	lb/N	lb kg
	Nom	Tol.	Nom	Tol.	Tol. +0/-0.005 (+0/.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
GR 64 SS, S, RS, SRS, RSS	4.0000	+0/-0.0007	5.0000	+0/-0.0010	2.000	4.9999	5.0011	+0/-0.0015	.19	0.10	950	26,750	98,800	3.56
	101.6	+0/-0.018	127.1	+0/-0.025	50.80	127.047	127.078	+0/-0.038	5	3		118,984	439,462	1.61
GR 64						4.9999	5.0011	+0/-0.0015	.19	0.10	1,500	30,900	119,000	3.56
						127.047	127.078	+0/-0.038	5	3		137,443	529,312	1.61
GR 68 SS, S, RS, SRS, RSS	4.2500	+0/-0.0007	5.2500	+0/-0.0010	2.000	5.2499	5.2511	+0/-0.0015	.19	0.10	900	27,400	104,000	3.74
	108.0	+0/-0.018	133.4	+0/-0.025	50.80	133.400	133.430	+0/-0.038	5	3		121,875	462,592	1.69
GR 68						5.2499	5.2511	+0/-0.0015	.19	0.10	1,410	31,500	126,000	3.74
						133.400	133.430	+0/-0.038	5	3		140,112	560,448	1.69
GR 72	4.5000	+0/-0.0007	6.0000	+0/-0.0010	2.250	5.9999	6.0011	+0/-0.0015	.19	0.10	1,330	43,400	145,000	7.13
	114.3	+0/-0.018	152.5	+0/-0.025	57.15	152.457	152.488	+0/-0.038	5	3		193,043	644,960	3.23
GR 80	5.0000	+0/-0.0007	6.5000	+0/-0.0010	2.250	6.4999	6.5011	+0/-0.0015	.19	0.10	1,200	48,800	161,000	7.78
	127.1	+0/-0.018	165.2	+0/-0.025	57.15	165.162	165.193	+0/-0.038	5	3		217,062	716,128	3.53
GR 80						6.4999	6.5011	+0/-0.0015	.19	0.10	1,200	48,800	161,000	7.78
						165.162	165.193	+0/-0.038	5	3		217,062	716,128	3.53
GR 88 N	5.5000	+0/-0.0007	7.0000	+0/-0.0010	2.500	4.7495	4.7508	+0/-0.0015	.25	0.10	1,090	60,700	171,000	10.40
	139.8	+0/-0.018	177.9	+0/-0.025	63.50	120.685	120.718	+0/-0.038	6	3		269,994	760,608	4.73
GR 88						3.000	4.7495	4.7508	+0/-0.0015	.25	1,090	65,000	205,000	11.82
						76.20	120.685	120.718	+0/-0.038	6		3	289,120	911,840
GR 96 N	6.0000	+0/-0.0010	7.5000	+0/-0.0012	2.500	5.2499	5.2511	+0/-0.0015	.25	0.12	1,000	65,700	223,000	11.08
	152.5	+0/-0.025	190.6	+0/-0.030	63.50	133.400	133.430	+0/-0.038	6	3		292,234	991,904	5.02
GR 96						3.000	5.2499	5.2511	+0/-0.0015	.25	1,000	71,400	283,000	12.69
						76.20	133.400	133.430	+0/-0.038	6		3	317,587	1,258,784
GR 104 N	6.5000	+0/-0.0010	8.0000	+0/-0.0012	2.500	5.9999	6.0011	+0/-0.0015	.25	0.12	930	68,900	242,000	11.85
	165.2	+0/-0.025	203.3	+0/-0.030	63.50	152.457	152.488	+0/-0.038	6	3		306,467	1,076,416	5.37
GR 104						3.000	5.9999	6.0011	+0/-0.0015	.25	930	75,000	308,000	13.55
						76.20	152.457	152.488	+0/-0.038	6		3	333,600	1,369,984
GR 116	7.2500	+0/-0.0010	9.1250	+0/-0.0012	3.000	9.1248	9.1261	+0/-0.0015	.25	0.12	840	83,900	332,000	19.32
	184.2	+0/-0.025	231.9	+0/-0.030	76.20	231.861	231.894	+0/-0.038	6	3		373,187	1,476,736	8.76
GR 124	7.7500	+0/-0.0010	9.6250	+0/-0.0012	3.000	6.6250	6.6265	+0/-0.0020	.25	0.12	770	86,200	355,000	19.80
	196.9	+0/-0.025	244.6	+0/-0.030	76.20	168.341	168.379	+0/-0.051	6	3		383,418	1,579,040	8.97
GR 132	8.2500	+0/-0.0010	10.1250	+0/-0.0012	3.000	10.1250	10.1265	+0/-0.0020	.25	0.12	730	88,700	378,000	21.63
	209.6	+0/-0.025	257.3	+0/-0.030	76.20	257.276	257.314	+0/-0.051	6	3		394,538	1,681,344	9.81
GR 140	8.7500	+0/-0.0010	10.6250	+0/-0.0014	3.000	10.6250	10.6265	+0/-0.0020	.25	0.16	690	91,500	401,000	22.73
	222.3	+0/-0.025	270.0	+0/-0.036	76.20	269.981	270.019	+0/-0.051	6	4		406,992	1,783,648	10.31
GR 148	9.2500	+0/-0.0010	11.1250	+0/-0.0014	3.000	11.1250	11.1265	+0/-0.0020	.25	0.16	650	93,500	423,000	24.00
	235.0	+0/-0.025	282.7	+0/-0.036	76.20	282.686	282.724	+0/-0.051	6	4		415,888	1,881,504	10.88

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
 For DS matching as DS suffix to part number
 * For bearing properly filled with #1 grease reduce speed by 50%

Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



GR SERIES (continued)

Part No.		B		D1		W1	HD	Ri	Recommended Shaft Diameter with inner ring			Inner Weight
Outer Ring & Roller Assembly	Separable Inner Ring Only	Bore Diameter		Outside Diameter		Width	Radial Lub. Hole Diameter	Max Shaft Radius to Clear				
		inch mm		inch mm		inch mm			inch mm			lb kg
		Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/.13)	(Ref)	(Ref)	Rotating	Stationary	Tol.	
GR 64 SS, S, RS, SRS, RSS	MI 54	3.3750 85.759	+0/-0.0008 +0/-0.020	3.9985 101.602	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.10 3	3.3760 85.8	3.3746 85.7	+0/-0.0010 +0/-0.025	2.04 .93
GR 64	MI 56	3.5000 88.935	+0/-0.0008 +0/-0.020	3.9985 101.602	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.10 3	3.5010 89.0	3.4996 88.9	+0/-0.0010 +0/-0.025	1.63 .74
GR 68 SS, S, RS, SRS, RSS	MI 58	3.6250 92.111	+0/-0.0008 +0/-0.020	4.2485 107.954	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.10 3	3.6260 92.1	3.6246 92.1	+0/-0.0010 +0/-0.025	1.70 .77
GR 68	MI 60	3.7500 95.288	+0/-0.0008 +0/-0.020	4.2485 107.954	+0/-0.0009 +0/-0.023	2.010 51.07	0.25 6	0.10 3	3.7510 95.3	3.7496 95.3	+0/-0.0010 +0/-0.025	1.75 .79
GR 72	MI 62	3.8750 98.464	+0/-0.0008 +0/-0.020	4.4985 114.307	+0/-0.0009 +0/-0.023	2.260 57.43	0.25 6	0.10 3	3.8760 98.5	3.8746 98.5	+0/-0.0010 +0/-0.025	3.25 1.47
GR 80	MI 64	4.0000 101.640	+0/-0.0008 +0/-0.020	4.9985 127.012	+0/-0.0010 +0/-0.025	2.260 57.43	0.25 6	0.10 3	4.0010 101.7	3.9996 101.6	+0/-0.0010 +0/-0.025	4.38 1.99
	MI 68	4.2500 107.993	+0/-0.0008 +0/-0.020	4.9985 127.012	+0/-0.0010 +0/-0.025	2.260 57.43	0.25 6	0.10 3	4.2510 108.0	4.2496 108.0	+0/-0.0010 +0/-0.025	5.24 2.37
GR 88 N	MI 72 N	4.5000 114.345	+0/-0.0008 +0/-0.020	5.4985 139.717	+0/-0.0010 +0/-0.025	2.515 63.91	0.25 6	0.10 3	4.5010 114.4	4.4996 114.3	+0/-0.0010 +0/-0.025	5.43 2.47
GR 88	MI 72	4.5000 114.345	+0/-0.0008 +0/-0.020	5.4985 139.717	+0/-0.0010 +0/-0.025	3.015 76.61	0.25 6	0.10 3	4.5010 114.4	4.4996 114.3	+0/-0.0010 +0/-0.025	5.97 2.71
GR 96 N	MI 80 N	5.0000 127.050	+0/-0.0010 +0/-0.025	5.9983 152.417	+0/-0.0010 +0/-0.025	2.515 63.91	0.31 8	0.12 3	5.0010 127.1	4.9995 127.0	+0/-0.0010 +0/-0.025	5.97 2.71
GR 96	MI 80	5.0000 127.050	+0/-0.0010 +0/-0.025	5.9983 152.417	+0/-0.0010 +0/-0.025	3.015 76.61	0.31 8	0.12 3	5.0010 127.1	4.9995 127.0	+0/-0.0010 +0/-0.025	7.12 3.23
GR 104 N	MI 88 N	5.5000 139.755	+0/-0.0010 +0/-0.025	6.4983 165.122	+0/-0.0010 +0/-0.025	2.515 63.91	0.31 8	0.12 3	5.5010 139.8	5.4995 139.7	+0/-0.0010 +0/-0.025	6.30 2.88
GR 104	MI 88	5.5000 139.755	+0/-0.0010 +0/-0.025	6.4983 165.122	+0/-0.0010 +0/-0.025	3.015 76.61	0.31 8	0.12 3	5.5010 139.8	5.4995 139.7	+0/-0.0010 +0/-0.025	7.56 3.43
GR 116	MI 96	6.0000 152.460	+0/-0.0010 +0/-0.025	7.2481 184.174	+0/-0.0012 +0/-0.030	3.015 76.61	0.31 8	0.12 3	6.0012 152.5	5.9995 152.4	+0/-0.0012 +0/-0.030	11.06 5.03
GR 124	MI 104	6.5000 165.165	+0/-0.0010 +0/-0.025	7.7481 196.879	+0/-0.0012 +0/-0.030	3.015 76.61	0.31 8	0.12 3	6.5012 165.2	6.4995 165.2	+0/-0.0012 +0/-0.030	11.99 5.39
GR 132	MI 112	7.0000 177.870	+0/-0.0010 +0/-0.025	8.2481 209.584	+0/-0.0012 +0/-0.030	3.015 76.61	0.31 8	0.12 3	7.0012 177.9	6.9995 177.9	+0/-0.0012 +0/-0.030	12.70 5.77
GR 140	MI 120	7.5000 190.575	+0/-0.0012 +0/-0.030	8.7480 222.287	+0/-0.0012 +0/-0.030	3.015 76.61	0.31 8	0.16 4	7.5012 190.6	7.4995 190.6	+0/-0.0012 +0/-0.030	13.60 6.17
GR 148	MI 128	8.0000 203.280	+0/-0.0012 +0/-0.030	9.2480 234.992	+0/-0.0012 +0/-0.030	3.015 76.61	0.31 8	0.16 4	8.0012 203.3	7.9995 203.3	+0/-0.0012 +0/-0.030	14.40 6.55

McGill Machined Inner Ring

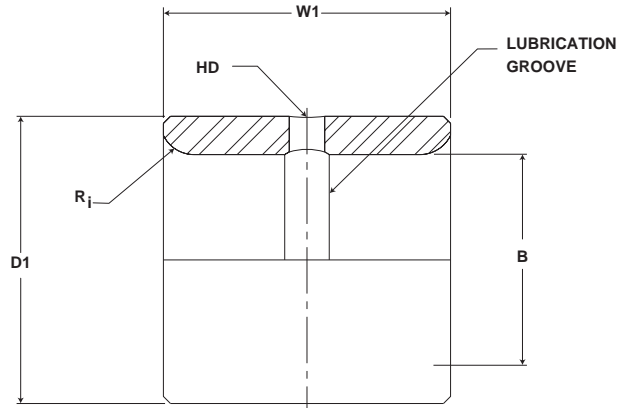
Precision ground inner ring provides a hardened raceway for the rollers when used with an unhardened shaft. The ring contains an oil hole and annular groove for relubrication of the bearing and can be used with both CAGEROL and GUIDEROL bearings or can be utilized as a bushing in plain bearing applications.

Needle/Journal Bearings



Basic Construction Type: Thru Hardened Precision Ground Rings

Ring Material: Bearing Quality Steel



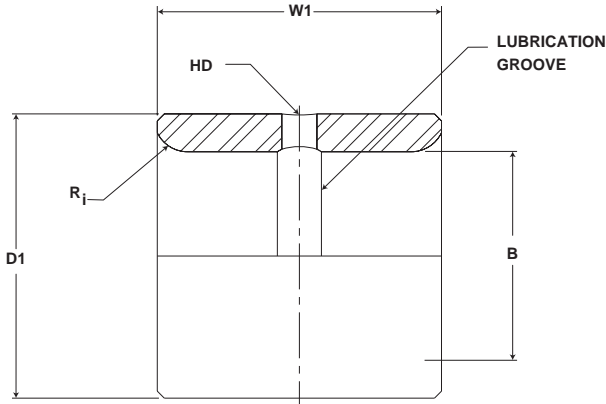
MI Series

Part No.	Military No.	B		D1		W1	Ri	Recommended Shaft Diameter with Inner Ring			Inner Weight
		Bore Diameter		Outside Diameter		Width	Inner Ring Corner	inch mm			lb kg
		inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	Rotating	Stationary	Tol.	
MI 6 N	MS 51962-1	.3750 9.5	+0/-.0004 +0/-.010	.6245 15.9	+0/-.0004 +0/-.010	.760 19.3	.25 6	.3755 9.5	.3747 9.5	+0/-.0005 +0/-.013	.05 .02
MI 6						1.010 25.7	.25 6	.3755 9.5	.3747 9.5	+0/-.0005 +0/-.013	.05 .02
MI 7 N		.4375 11.1	+0/-.0004 +0/-.010	.6245 15.9	+0/-.0004 +0/-.010	.760 19.3	.25 6	.4380 11.1	.4372 11.1	+0/-.0005 +0/-.013	.04 .02
MI 8 N	MS 51962-2	.5000 12.7	+0/-.0004 +0/-.010	.7493 19.0	+0/-.0005 +0/-.013	.760 19.3	.40 10	.5005 12.7	.4997 12.7	+0/-.0005 +0/-.013	.04 .02
MI 8	MS 51962-3					1.010 25.7	.40 10	.5005 12.7	.4997 12.7	+0/-.0005 +0/-.013	.06 .03
MI 9 N		.5625 14.3	+0/-.0004 +0/-.010	.7493 19.0	+0/-.0005 +0/-.013	.760 19.3	.40 10	.5630 14.3	.5622 14.3	+0/-.0005 +0/-.013	.04 .02
MI 10		.6250 15.9	+0/-.0004 +0/-.010	.8743 22.2	+0/-.0005 +0/-.013	1.010 25.7	.40 10	.6255 15.9	.6247 15.9	+0/-.0005 +0/-.013	.08 .04
MI 10 N	MS 51962-4					.760 19.3	.40 10	.6255 15.9	.6247 15.9	+0/-.0005 +0/-.013	.06 .03
MI 11 N		.6875 17.5	+0/-.0004 +0/-.010	.8743 22.2	+0/-.0005 +0/-.013	.760 19.3	.40 10	.6880 17.5	.6872 17.5	+0/-.0005 +0/-.013	.05 .02
MI 12 N	MS 51962-5	.7500 19.1	+0/-.0004 +0/-.010	.9993 25.4	+0/-.0005 +0/-.013	.760 19.3	.40 10	.7505 19.1	.7497 19.0	+0/-.0005 +0/-.013	.07 .03
MI 12						1.010 25.7	.40 10	.7505 19.1	.7497 19.0	+0/-.0005 +0/-.013	.10 .05
MI 13 N	MS 51962-6	.8125 20.6	+0/-.0005 +0/-.013	.9993 25.4	+0/-.0005 +0/-.013	.760 19.3	.40 10	.8129 20.7	.8121 20.6	+0/-.0005 +0/-.013	.07 .03
MI 13	MS 51962-7					1.010 25.7	.40 10	.8130 20.7	.8122 20.6	+0/-.0005 +0/-.013	.11 .05
MI 14 N	MS 51962-8	.8750 22.2	+0/-.0005 +0/-.013	1.124 28.6	+0/-.0005 +0/-.013	1.010 25.7	.40 10	.8754 22.2	.8746 22.2	+0/-.0005 +0/-.013	.11 .05
MI 14						1.260 32.0	.40 10	.8755 22.2	.8747 22.2	+0/-.0005 +0/-.013	.13 .06
MI 14 N	MS 51962-8	.8750 22.2	+0/-.0005 +0/-.013	1.124 28.6	+0/-.0005 +0/-.013	1.010 25.7	.40 10	.9379 23.8	.9371 23.8	+0/-.0005 +0/-.013	.11 .05
MI 15						1.260 32.0	.40 10	.9380 23.8	.9372 23.8	+0/-.0005 +0/-.013	.12 .05

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



MI Series

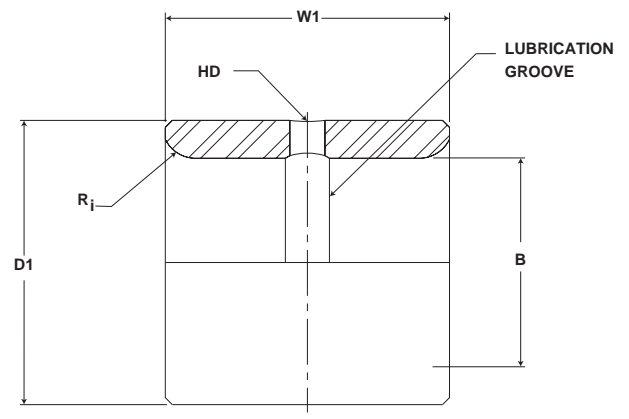
Part No.	Military No.	B		D1		W1	Ri	Recommended Shaft Diameter with Inner Ring			Inner Weight
		Bore Diameter		Outside Diameter		Width	Inner Ring Corner				
Inner Ring		inch mm		inch mm		inch mm		inch mm			lb kg
		Nom	Tol.	Nom	Tol.	Tol +0/- .005 (+0/- .13)	(Ref)	Rotating	Stationary	Tol.	
MI 16 N	MS 51962-10	1.000	+0/- .0005	1.249	+0/- .0006	1.010 25.7	.40 10	1.0004 25.4	.9996 25.4	+0/- .0005 +0/- .013	.13 .06
MI 16	MS 51962-11	1.000	+0/- .0005	1.249	+0/- .0006	1.260 32.0	.40 10	1.001 25.4	1.000 25.4	+0/- .0005 +0/- .013	.16 .07
MI 17		1.063	+0/- .0005	1.374	+0/- .0006	1.260 32.0	.40 10	1.063 27.0	1.0621 27.0	+0/- .0005 +0/- .013	.16 .07
MI 18 N	MS 51962-12	1.125	+0/- .0005	1.374	+0/- .0006	1.010 25.7	.40 10	1.1255 28.6	1.1246 28.6	+0/- .0005 +0/- .013	.14 .06
MI 18	MS 51962-13	1.125	+0/- .0005	1.374	+0/- .0006	1.260 32.0	.40 10	1.126 28.6	1.125 28.6	+0/- .0005 +0/- .013	.17 .08
MI 19	MS 51962-14	1.188	+0/- .0005	1.499	+0/- .0006	1.260 32.0	.06 2	1.188 30.2	1.1871 30.2	+0/- .0005 +0/- .013	.24 .11
MI 20 N	MS 51962-15	1.250	+0/- .0005	1.499	+0/- .0006	1.010 25.7	.06 2	1.2505 31.8	1.2496 31.8	+0/- .0005 +0/- .013	.19 .09
MI 20	MS 51962-16	1.250	+0/- .0005	1.499	+0/- .0006	1.260 32.0	.06 2	1.251 31.8	1.250 31.8	+0/- .0005 +0/- .013	.22 .09
MI 21 N	MS 51962-17	1.313	+0/- .0005	1.624	+0/- .0006	1.010 25.7	.06 2	1.313 33.4	1.3121 33.3	+0/- .0005 +0/- .013	.20 .09
MI 21		1.313	+0/- .0005	1.624	+0/- .0006	1.260 32.0	.06 2	1.313 33.4	1.312 33.3	+0/- .0005 +0/- .013	.26 .12
MI 22 4S	MS 51962-18	1.375	+0/- .0005	1.624	+0/- .0006	1.260 32.0	.06 2	1.3755 35.0	1.3746 34.9	+0/- .0005 +0/- .013	.20 .09
MI 22	MS 51962-19	1.375	+0/- .0005	1.749	+0/- .0006	1.260 32.0	.06 2	1.376 35.0	1.375 34.9	+0/- .0005 +0/- .013	.26 .12
MI 23	MS 51962-20	1.438	+0/- .0005	1.749	+0/- .0006	1.260 32.0	.06 2	1.438 36.5	1.4371 36.5	+0/- .0005 +0/- .013	.27 .12
MI 24 N	MS 51962-21	1.500	+0/- .0005	1.749	+0/- .0006	1.010 25.7	.06 2	1.5005 38.1	1.4996 38.1	+0/- .0005 +0/- .013	.22 .09
MI 24	MS 51962-22	1.500	+0/- .0005	1.749	+0/- .0006	1.260 32.0	.06 2	1.501 38.1	1.500 38.1	+0/- .0005 +0/- .013	.22 .09
MI 25 4S		1.563	+0/- .0005	1.874	+0/- .0006	1.260 32.0	.06 2	1.563 39.7	1.5621 39.7	+0/- .0005 +0/- .013	.27 .12
MI 25		1.563	+0/- .0005	1.999	+0/- .0007	1.260 32.0	.06 2	1.563 39.7	1.562 39.7	+0/- .0005 +0/- .013	.30 .14
MI 26 N		1.625	+0/- .0005	1.999	+0/- .0007	1.010 25.7	.06 2	1.6255 41.3	1.6246 41.3	+0/- .0005 +0/- .013	.30 .14
MI 26	MS 51962-23	1.625	+0/- .0005	1.999	+0/- .0007	1.260 32.0	.06 2	1.6255 41.3	1.6246 41.3	+0/- .0005 +0/- .013	.38 .17
MI 26 2S		1.625	+0/- .0005	1.936	0/- .0007	1.260 32.0	.06 2	1.6255 41.3	1.625 41.3	+0/- .0005 +0/- .013	.30 .14
MI 27 N		1.688	+0/- .0005	1.999	+0/- .0007	1.010 25.7	.06 2	1.688 42.9	1.6871 42.9	+0/- .0005 +0/- .013	.30 .14
MI 27		1.688	+0/- .0005	1.999	+0/- .0007	1.260 32.0	.06 2	1.688 42.9	1.687 42.9	+0/- .0005 +0/- .013	.32 .15

McGILL® Machined Inner Rings

Needle/Journal Bearings



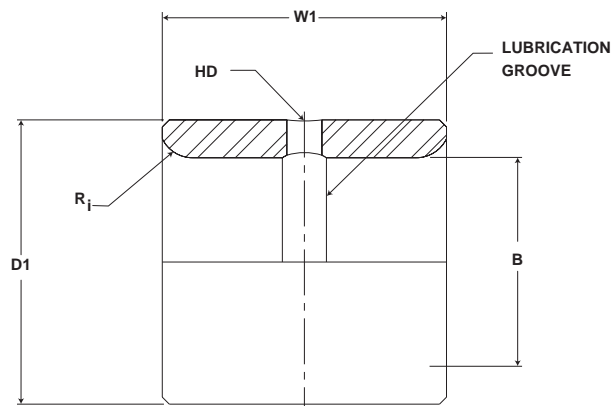
Basic Construction Type: Thru Hardened Precision Ground Rings
Bearing Material: Bearing Quality Steel



MI Series (continued)

Part No.	Military No.	B		D1		W1	Ri	Recommended Shaft Diameter with Inner Ring			Inner Weight
		Bore Diameter		Outside Diameter		Width	Inner Ring Corner	inch mm			lb kg
		inch mm	inch mm	inch mm	inch mm	inch mm	(Ref)	Rotating	Stationary	Tol.	
Inner Ring		Nom	Tol.	Nom	Tol.	Tol +0/-.005 (+0/.13)					
MI 27 N		1.688	+0/-.0005	1.999	+0/-.0007	1.010 25.7	.06 2	1.688 42.9	1.6871 42.9	+0/-.0005 +0/-.013	.32 .15
MI 28	MS 51962-25	42.9	+0/-.013	50.8	+0/-.018	1.760 44.7	.06 2	1.751 44.5	1.750 44.5	+0/-.0005 +0/-.013	.63 .29
MI 30		1.875	+0/-.0005	2.249	+0/-.0007	1.760 44.7	.06 2	1.8755 47.7	1.8746 47.6	+0/-.0005 +0/-.013	.85 .39
MI 31	MS 51962-26	1.938	+0/-.0005	2.249	+0/-.0007	1.510 38.4	.08 2	1.938 49.2	1.9371 49.2	+0/-.0005 +0/-.013	.97 .43
MI 32 N	MS 51962-27	2.000	+0/-.0005	2.249	+0/-.0007	1.510 38.4	.08 2	2.0005 50.8	1.9996 50.8	+0/-.0005 +0/-.013	.74 .33
MI 32		50.8	+0/-.013	57.1	+0/-.018	1.760 44.7	.08 2	2.001 50.8	2.000 50.8	+0/-.0005 +0/-.013	.87 .39
MI 34		2.125	+0/-.0006	2.249	+0/-.0007	1.760 44.7	.08 2	2.1258 54.0	2.1247 54.0	+0/-.0008 +0/-.020	1.00 .45
MI 35	MS 51962-28	2.188	+0/-.0006	2.749	+0/-.0007	1.510 38.4	.08 2	2.1883 55.6	2.1872 55.6	+0/-.0008 +0/-.020	1.06 .48
MI 36 N	MS 51962-29	2.250	+0/-.0006	2.749	+0/-.0007	1.510 38.4	.08 2	2.2508 57.2	2.2497 57.2	+0/-.0008 +0/-.020	.83 .37
MI 36		57.2	+0/-.015	69.8	+0/-.018	1.760 44.7	.08 2	2.2508 57.2	2.2497 57.2	+0/-.0008 +0/-.020	.97 .44
MI 38	MS 51962-30	2.375	+0/-.0006	2.999	+0/-.0007	1.760 44.7	.08 2	2.3758 60.4	2.3747 60.3	+0/-.0008 +0/-.020	1.28 .58
MI 39		2.438	+0/-.0006	2.999	+0/-.0007	1.510 38.4	.08 2	2.4383 62.0	2.4372 61.9	+0/-.0008 +0/-.020	1.05 .47
MI 40 N	MS 51962-31	2.500	+0/-.0006	2.999	+0/-.0007	1.510 38.4	.08 2	2.5008 63.5	2.4997 63.5	+0/-.0008 +0/-.020	.92 .43
MI 40		63.5	+0/-.015	76.2	+0/-.018	1.760 44.7	.08 2	2.501 63.5	2.500 63.5	+0/-.0008 +0/-.020	1.07 .48
MI 42		2.625	+0/-.0006	3.249	+0/-.0009	1.760 44.7	.08 2	2.6258 66.7	2.6247 66.7	+0/-.0008 +0/-.020	1.12 .51
MI 44	MS 51962-32	2.750	+0/-.0006	3.249	+0/-.0009	1.760 44.7	.08 2	2.7508 69.9	2.7497 69.9	+0/-.0008 +0/-.020	1.17 .53
MI 46		2.875	+0/-.0006	3.499	+0/-.0009	2.010 51.1	.08 2	2.8758 73.1	2.8747 73.0	+0/-.0008 +0/-.020	1.30 .59
MI 47	MS 51962-34	2.938	+0/-.0006	3.499	+0/-.0009	2.010 51.1	.08 2	2.9383 74.7	2.9372 74.6	+0/-.0008 +0/-.020	1.58 .72
MI 48 N		3.000	+0/-.0006	3.499	+0/-.0009	1.760 44.7	.08 2	3.0008 76.3	2.9997 76.2	+0/-.0008 +0/-.020	1.32 .59
MI 48		76.2	+0/-.015	88.9	+0/-.023	2.010 51.1	.08 2	3.001 76.3	3.000 76.2	+0/-.0008 +0/-.020	1.43 .65
MI 50	MS 51962-35	3.125	+0/-.0006	3.749	+0/-.0009	2.010 51.1	.10 3	3.126 79.4	3.1246 79.4	+0/-.0010 +0/-.025	1.88 .85
MI 52	MS 51962-36	3.250	+0/-.0006	3.749	+0/-.0009	2.010 51.1	.10 3	3.251 82.6	3.2496 82.6	+0/-.0010 +0/-.025	1.52 .69

Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.



MI Series (continued)

Part No.	Military No.	B		D1		W1	Ri	Recommended Shaft Diameter with Inner Ring			Inner Weight
		Bore Diameter		Outside Diameter		Width	Inner Ring Corner				
		inch	mm	inch	mm	inch	mm	Rotating	Stationary	Tol.	lb
MI 54	MS 51962-38	3.375 85.8	+0/-.0008 +0/-.020	3.999 101.6	+0/-.0009 +0/-.023	2.010 51.1	.10 3	3.3758 85.8	3.3746 85.7	+0/-.0010 +0/-.025	2.04 .93
MI 56		3.500 88.9	+0/-.0008 +0/-.020	3.999 101.6	+0/-.0009 +0/-.023	2.010 51.1	.10 3	3.5008 89.0	3.4996 88.9	+0/-.0010 +0/-.025	1.63 .74
MI 56 8G				4.249 108.0	+0/-.0009 +0/-.023	2.010 51.1	.10 3	3.501 89.0	3.500 88.9	+0/-.0010 +0/-.025	1.67 .75
MI 58		3.625 92.1	+0/-.0008 +0/-.020	4.249 108.0	+0/-.0009 +0/-.023	2.010 51.1	.10 3	3.6258 92.1	3.6246 92.1	+0/-.0010 +0/-.025	1.70 .77
MI 60	MS 51962-40	3.750 95.3	+0/-.0008 +0/-.020	4.249 108.0	+0/-.0009 +0/-.023	2.010 51.1	.10 3	3.7508 95.3	3.7496 95.3	+0/-.0010 +0/-.025	1.75 .79
MI 62		3.875 98.5	+0/-.0008 +0/-.020	4.499 114.3	+0/-.0009 +0/-.023	2.260 57.4	.10 3	3.876 98.5	3.875 98.5	+0/-.0010 +0/-.025	3.25 1.47
MI 64		4.000 101.6	+0/-.0008 +0/-.020	4.999 127.0	+0/-.0010 +0/-.025	2.260 57.4	.10 3	4.001 101.7	4.000 101.6	+0/-.0010 +0/-.025	4.38 1.99
MI 68		4.250 108.0	+0/-.0008 +0/-.020	4.999 127.0	+0/-.0010 +0/-.025	2.260 57.4	.10 3	4.251 108.0	4.250 108.0	+0/-.0010 +0/-.025	5.24 2.37
MI 72 N	MS 51962-43	4.500 114.3	+0/-.0008 +0/-.020	5.499 139.7	+0/-.0010 +0/-.025	2.515 63.9	.10 3	4.501 114.4	4.500 114.3	+0/-.0010 +0/-.025	5.43 2.47
MI 72	MS 51962-44			3.015 76.6	.10 3	4.501 114.4	4.500 114.3	+0/-.0010 +0/-.025	5.97 2.71		
MI 80 N	MS 51962-46	5.000 127.1	+0/-.0010 +0/-.025	5.998 152.4	+0/-.0010 +0/-.025	2.515 63.9	.12 3	5.001 127.1	5.000 127.0	+0/-.0010 +0/-.025	5.97 2.71
MI 80				2.010 51.1	.10 3	3.501 89.0	3.500 88.9	+0/-.0010 +0/-.025	7.12 3.23		
MI 88 N	MS 51962-48	5.500 139.8	+0/-.0010 +0/-.025	6.498 165.1	+0/-.0010 +0/-.025	2.515 63.9	.12 3	5.501 139.8	5.500 139.7	+0/-.0010 +0/-.025	6.30 2.88
MI 88	MS 51962-49			3.015 76.6	.12 3	5.501 139.8	5.500 139.7	+0/-.0010 +0/-.025	7.56 3.54		
MI 96	MS 51962-50	6.000 152.5	+0/-.0010 +0/-.025	7.248 184.2	+0/-.0012 +0/-.030	3.015 76.6	.12 3	6.001 152.5	6.000 152.4	+0/-.0012 +0/-.030	11.06 5.03
MI 104		6.500 165.2	+0/-.0010 +0/-.025	7.748 196.9	+0/-.0012 +0/-.030	3.015 76.6	.12 3	6.501 165.2	6.500 165.2	+0/-.0012 +0/-.030	11.90 5.39
MI 112		7.000 177.9	+0/-.0010 +0/-.025	8.248 209.6	+0/-.0012 +0/-.030	3.015 76.6	.12 3	7.001 177.9	7.000 177.9	+0/-.0012 +0/-.030	12.70 5.77
MI 120		7.500 190.6	+0/-.0012 +0/-.030	8.748 222.3	+0/-.0012 +0/-.030	3.015 76.6	.16 4	7.501 190.6	7.500 190.6	+0/-.0012 +0/-.030	13.60 6.17
MI 128		8.000 203.3	+0/-.0012 +0/-.030	9.248 235.0	+0/-.0012 +0/-.030	3.015 76.6	.16 4	8.001 203.3	8.000 203.3	+0/-.0012 +0/-.030	14.40 6.55

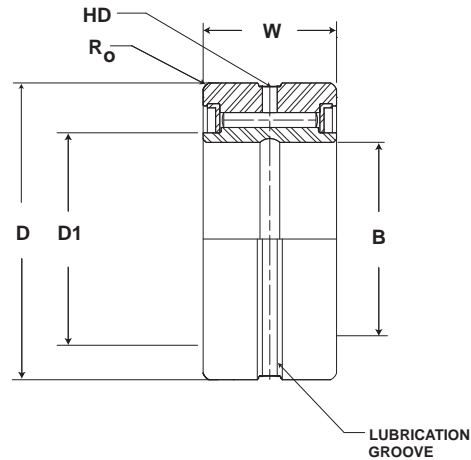
McGill MULTI-ROL Needle Bearings

Full complement needle bearing provides high radial load rating with good shaft support, angular rigidity, and is dimensionally equivalent to most plain bearings with bronze or babbitt bushing. Available in both single and two row designs with non separable inner race and metallic shields for pure radial load applications. The angular lube groove provides a circumferential path to direct lubricant to the oil hole.

Needle/Journal Bearings



- Basic Construction Type:** Full Complement Machined Race Needle Bearing and Non Separable Inner Ring
- Rolling Elements:** Single Row Precision Ground Needle
- Bearing Material:** Bearing Quality Steel
- Seal Type:** Metallic Shield



RS Series

Part No.	B		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Weight
	Bore Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm	inch mm	inch mm	inch mm	inch mm	Rotating	Stationary	Tol.	inch mm	inch mm	RPM	lb/N	lb/N	lb kg
RS 6	.7500 19.058	+0/-.0004 +0/-.010	1.5000 38.115	+0/-.0005 +0/-.013	.8750 22.234	1.5000 38.115	1.5005 38.128	.0007 0.018	.1250 3.176	.0313 0.794	5,000	3850 17,125	11500 51,152	.26 .12
RS 7	.8750 22.234	+0/-.0005 +0/-.013	1.6250 41.291	+0/-.0005 +0/-.013	1.0000 25.410	1.6250 41.291	1.6255 41.304	.0007 0.018	.1250 3.176	.0313 0.794	4,400	5560 24,731	15550 69,166	.34 .15
RS 8	1.0000 25.410	+0/-.0005 +0/-.013	1.8125 46.056	+0/-.0005 +0/-.013	1.0625 26.998	1.8125 46.056	1.8130 46.068	.0007 0.018	.1250 3.176	.0313 0.794	4,000	6170 27,444	18700 83,178	.42 .19
RS 9	1.1250 28.586	+0/-.0005 +0/-.013	1.9375 49.232	+0/-.0005 +0/-.013	1.0625 26.998	1.9375 49.232	1.9875 50.502	.0007 0.018	.1250 3.176	.0313 0.794	3,600	6500 28,912	20500 91,184	.46 .21
RS 10	1.2500 31.763	+0/-.0005 +0/-.013	2.0625 52.408	+0/-.0006 +0/-.015	1.0625 26.998	2.0625 52.408	2.0630 52.421	.0007 0.018	.1250 3.176	.0313 0.794	3,300	6830 30,380	22400 99,635	.49 .22
RS 12	1.5000 38.115	+0/-.0005 +0/-.013	2.5000 63.525	+0/-.0006 +0/-.015	1.1250 28.586	2.5000 63.525	2.5005 63.538	.0007 0.018	.1250 3.176	.0625 1.588	2,900	7740 34,428	27500 122,320	.83 .37
RS 14	1.7500 44.468	+0/-.0005 +0/-.013	2.7500 69.878	+0/-.0006 +0/-.015	1.1250 28.586	2.7500 69.878	2.7505 69.890	.0007 0.018	.1250 3.176	.0625 1.588	2,500	8330 37,052	31400 139,667	.93 .42
RS 16	2.0000 50.820	+0/-.0005 +0/-.013	3.2500 82.583	+0/-.0006 +0/-.015	1.1875 30.174	3.2499 82.580	3.2505 82.595	.0007 0.018	.1250 3.176	.0625 1.588	2,000	9820 43,679	42200 187,706	1.45 .66
RS 20	2.5000 63.525	+0/-.0006 +0/-.015	3.7500 95.288	+0/-.0008 +0/-.020	1.2500 31.763	3.7498 95.282	3.7507 95.305	.0010 0.025	.1875 4.764	.0938 2.382	1,700	11200 49,818	52900 235,299	1.79 .81
RS 22	2.7500 69.878	+0/-.0006 +0/-.015	4.0000 101.640	+0/-.0008 +0/-.020	1.2500 31.763	3.9998 101.635	4.0007 101.658	.0010 0.025	.1875 4.764	.0938 2.382	1,500	9920 44,124	46700 207,722	2.00 .91
RS 24	3.0000 76.230	+0/-.0006 +0/-.015	4.5000 114.345	+0/-.0008 +0/-.020	1.3750 34.939	4.4998 114.340	4.5007 114.363	.0010 0.025	.1875 4.764	.0938 2.382	1,400	14500 64,496	58100 258,429	2.88 1.31

* For bearing properly filled with #1 grease reduce speed by 50%

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

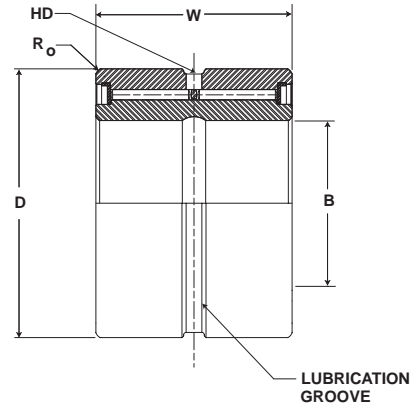


Basic Construction Type: Full Complement Machined Race Needle Bearing and Non Separable Inner Ring

Rolling Elements: Double Row Precision Ground Needle

Bearing Material: Bearing Quality Steel

Seal Type: Metallic Shield



RD Series

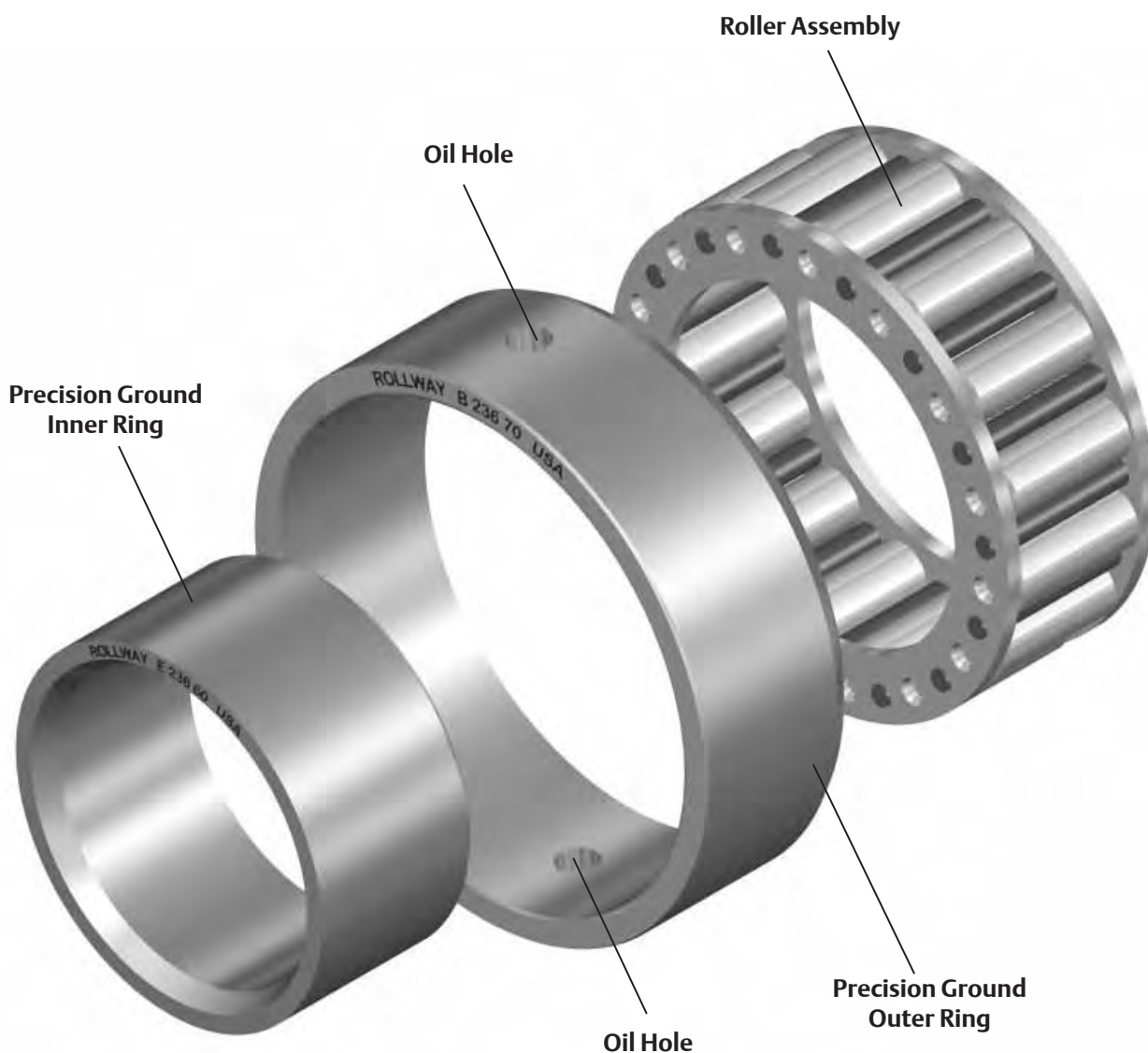
Part No.	B		D		W	Housing Bore Diameter			HD	Ro	Limiting Speed (In Oil)*	Basic Dynamic Rating	Basic Static Rating	Weight
	Bore Diameter		Outside Diameter		Width				Radial Lub. Hole Diameter	Max Hsg Radius to Clear				
	inch mm		inch mm		inch mm	inch mm			inch mm		RPM	lb/N	lb/N	lb kg
Single Row	Nom	Tol.	Nom	Tol.	Tol +0/-0.005 (+0/-0.13)	Rotating	Stationary	Tol.	(Ref)	(Ref)				
RD 10	1.2500 31.763	+0/-0.0005 +0/-0.013	2.0625 52.408	+0/-0.0006 +0/-0.015	2.2500 57.173	2.0625 52.408	2.0630 52.421	.0007 0.018	.1875 4.764	.0313 0.794	3,300	13600 60,493	54300 241,526	1.16 .53
RD 12	1.5000 38.115	+0/-0.0005 +0/-0.013	2.5000 63.525	+0/-0.0006 +0/-0.015	2.3750 60.349	2.5000 63.525	2.5005 63.538	.0007 0.018	.1875 4.764	.0625 1.588	2,900	15200 67,610	65700 292,234	1.83 .83
RD 14	1.7500 44.468	+0/-0.0005 +0/-0.013	2.7500 69.878	+0/-0.0006 +0/-0.015	2.3750 60.349	2.7500 69.878	2.7505 69.890	.0007 0.018	.1875 4.764	.0625 1.588	2,500	16400 72,947	75100 334,045	2.06 .93
RD 16	2.0000 50.820	+0/-0.0005 +0/-0.013	3.2500 82.583	+0/-0.0006 +0/-0.015	2.3750 60.349	3.2499 82.580	3.2505 82.595	.0007 0.018	.1875 4.764	.0625 1.588	2,000	18300 81,398	94000 418,112	3.09 1.40
RD 18	2.2500 57.173	+0/-0.0005 +0/-0.013	3.5000 88.935	+0/-0.0008 +0/-0.020	2.5000 63.525	3.4998 88.930	3.5007 88.953	.0010 0.025	.1875 4.764	.0625 1.588	1,800	19200 85,402	102600 456,365	3.57 1.62
RD 20	2.5000 63.525	+0/-0.0006 +0/-0.015	3.7500 95.288	+0/-0.0008 +0/-0.020	2.5000 63.525	3.7498 95.282	3.7507 95.305	.0010 0.025	.1875 4.764	.0938 2.382	1,700	20800 92,518	117000 520,416	3.8 1.72
RD 24	3.0000 76.230	+0/-0.0006 +0/-0.015	4.5000 114.345	+0/-0.0008 +0/-0.020	2.7500 69.878	4.4998 114.340	4.5007 114.363	.0010 0.025	.1875 4.764	.0938 2.382	1,400	29400 130,771	144500 642,736	6.14 2.78
RD 28	3.5000 88.935	+0/-0.0008 +0/-0.020	5.0000 127.050	+0/-0.0010 +0/-0.025	3.0000 76.230	5.0003 127.058	5.0011 127.078	.0015 0.038	.1875 4.764	.0938 2.382	1,250	34400 153,011	184900 822,435	7.54 3.42
RD 32	4.0000 101.640	+0/-0.0008 +0/-0.020	5.5000 139.755	+0/-0.0010 +0/-0.025	3.0000 76.230	5.5003 139.763	5.5011 139.783	.0015 0.038	.1875 4.764	.0938 2.382	1,100	34600 153,901	194600 865,581	8.29 3.76

* For bearing properly filled with #1 grease reduce speed by 50%

Rollway Journal Roller Bearings

Rollway Journal bearings feature through hardened bearing quality steel raceways, with an oil hole in the outer raceway, “trunion style” rollers, and a non-separable steel retainer (cage) assembly. The bearing design is well suited for high radial load, low speed applications. Rollway Journal bearings are available as components or complete assemblies and conform to industry dimensions and manufactured with Rollway quality standards. Depending on your preference, these bearings are available in a wide variety of sizes and options as illustrated on the pages to follow.

Needle/Journal Bearings





Features and Benefits



Precision Ground Races and Rollers

Races and Rollers are manufactured from high quality, bearing grade steel and are hardened to Rc 58 minimum.



Roller Assembly

Roller assemblies have flush ground ends and heavy duty built-up retainers featuring steel stay rods rigidly held between stamped steel endplates.



Oil Holes

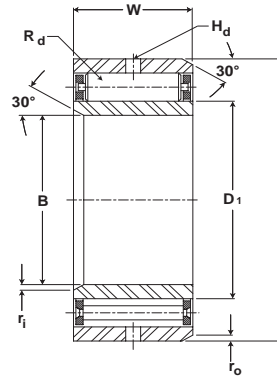
All outer rings are supplied with oil holes in the outer race to allow lubrication.

ROLLWAY® *Journal Bearings*

Needle/Journal Bearings



Basic Construction Type: Journal Roller Bearing
Rolling Elements: Trunion Style Cylindrical Rollers
Bearing Material: Bearing Grade Quality Steel
Retainer Type: Steel Cage With Flush Ground Ends



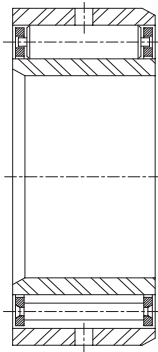
Journals

Complete Assembly Nomenclature	B	D	W	Recommended Shaft Diameter		Housing Bore Diameter	
	Bore Diameter	Outside Diameter	Width	Max	Min	Max	Min
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
D-305-18	0.9843 25	2.441 62	1.125 28.58	0.9850 25.02	0.9845 25.01	2.4419 62.024	2.4409 61.999
D-206-13	1.1811 30	2.441 62	0.813 20.64	1.1819 30.02	1.1814 30.01	2.4419 62.024	2.4409 61.999
D-206-18			1.125 28.58	1.1819 30.02	1.1814 30.01	2.4419 62.024	2.4409 61.999
D-207-15	1.3779 35	2.835 72.00	0.938 23.81	1.3788 35.02	1.3783 35.01	2.8357 72.027	2.8346 71.999
D-207-19			1.188 30.16	1.3788 35.02	1.3783 35.01	2.8357 72.027	2.8346 71.999
D-307			3.15 80	1.375 34.93	1.3788 35.02	1.3783 35.01	3.1508 80.030
D-208-16	1.5748 40	3.15 80	1 25.4	1.5758 40.03	1.5752 40.01	3.1508 80.030	3.1496 80.000
D-208-22			1.375 34.93	1.5758 40.03	1.5752 40.01	3.1508 80.030	3.1496 80.000
D-209-18	1.7717 45	3.347 85	1.125 28.58	1.7728 45.03	1.7722 45.01	3.3478 85.034	3.3465 85.001
D-209-25			1.563 39.69	1.7728 45.03	1.7722 45.01	3.3478 85.034	3.3465 85.001
D-309		3.937 100	1.563 39.69	1.7728 45.03	1.7722 45.01	3.9384 100.035	3.9369 99.997
D-210-20	1.9685 50	3.543 90	1.25 31.75	1.9697 50.03	1.9691 50.02	3.5446 90.033	3.5432 89.997
D-210-28			1.75 44.45	1.9697 50.03	1.9691 50.02	3.5446 90.033	3.5432 89.997
D-210-56			3.5 88.90	1.9697 50.03	1.9691 50.02	3.5446 90.033	3.5432 89.997
D-211	2.1654 55	3.937 100	1.313 33.34	2.1666 55.03	2.1660 55.02	3.9384 100.035	3.9369 99.997
D-211-29			1.813 46.04	2.1666 55.03	2.1660 55.02	3.9384 100.035	3.9369 99.997
D-211-58			3.625 92.08	2.1666 55.03	2.1660 55.02	3.9384 100.035	3.9369 99.997
D-311		4.724 120	1.938 49.21	2.1666 55.03	2.1660 55.02	4.726 120.040	4.7243 119.997
D-212	2.3622 60	4.331 110	1.438 36.51	2.3635 60.03	2.3628 60.02	4.3322 110.038	4.3306 109.997
D-212-31			1.938 49.21	2.3635 60.03	2.3628 60.02	4.3322 110.038	4.3306 109.997
D-212-62			3.875 98.43	2.3635 60.03	2.3628 60.02	4.3322 110.038	4.3306 109.997

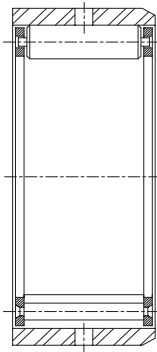
For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
 Journal bearings and manufactured to the ABMA RBEC-1 tolerance class.
 Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

Journal Bearings **ROLLWAY**[®]

Needle/Journal Bearings



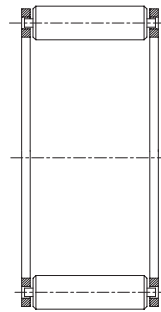
Assembly
D-XXX



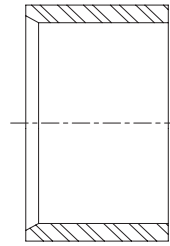
Outer Ring and
Roller Assembly
B-XXX



Outer Ring
B-XXX-70



Roller Assembly
WS-XXX



Inner Ring
E-XXX-60

Journals

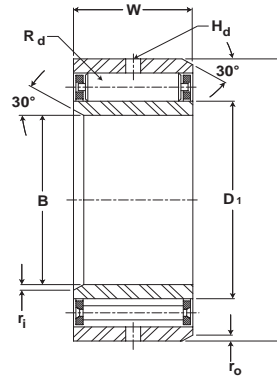
D1	Rd	ri	ro	Hd	Components			Assembly Basic Dynamic Rating	Assembly Basic Static Rating	Assembly weight
				Oil Hole Dia	Component Nomenclature					
inch mm	inch mm	inch mm	inch mm	inch mm	Inner Ring	Outer Ring	Roller Assembly	lb/N	lb/N	lb kg
1.2500 31.75	0.4375 11.11	0.062 1.57	0.062 1.57	0.250 6.35	E-305-18-60	B-305-18-70	WS-305-18	8,000 35,900	12,200 54,200	1.0 0.5
1.5000 38.10	0.3125 7.94	0.062 1.57	0.062 1.57	0.265 6.73	E-206-13-60	B-206-13-70	WS-206-13	6,900 30,900	13,000 58,100	0.7 0.3
1.5000 38.10	0.3125 7.94	0.062 1.57	0.062 1.57	0.265 6.73	E-206-18-60	B-206-18-70	WS-206-18	10,000 44,400	20,800 92,700	1.0 0.5
1.7500 44.45	0.3750 9.53	0.062 1.57	0.062 1.57	0.250 6.35	E-207-15-60	B-207-15-70	WS-207-15	9,600 42,700	18,000 80,200	1.0 0.5
1.7500 44.45	0.3750 9.53	0.062 1.57	0.062 1.57	0.250 6.35	E-207-19-60	B-207-19-70	WS-207-19	12,400 55,100	24,900 111,100	1.3 0.6
1.7500 44.45	0.5000 12.75	0.062 1.57	0.078 1.98	0.250 6.35	E-307-60	B-307-70	WS-307	12,900 57,600	24,500 108,900	2.0 0.9
2.0000 50.8	0.3750 9.53	0.078 1.98	0.078 1.98	0.250 6.35	E-208-16-60	B-208-16-70	WS-208-16	10,000 44,600	19,300 85,800	1.5 0.7
2.0000 50.8	0.3750 9.53	0.078 1.98	0.078 1.98	0.250 6.35	E-208-22-60	B-208-22-70	WS-208-22	14,100 62,900	29,900 133,400	2.0 0.9
2.1870 55.55	0.3750 9.53	0.078 1.98	0.078 1.98	0.250 6.35	E-209-18-60	B-209-18-70	WS-209-18	12,600 56,000	26,500 117,900	1.8 0.8
2.1870 55.55	0.3750 9.53	0.078 1.98	0.078 1.98	0.250 6.35	E-209-25-60	B-209-25-70	WS-209-25	17,600 78,500	40,900 182,300	2.5 1.1
2.2490 57.12	0.6250 15.88	0.094 2.39	0.078 1.98	0.328 8.33	E-309-60	B-309-70	WS-309	20,200 90,200	35,500 158,200	3.6 1.6
2.3750 60.33	0.3750 9.53	0.078 1.98	0.078 1.98	0.312 7.92	E-210-20-60	B-210-20-70	WS-210-20	14,500 64,500	32,500 144,500	2.1 0.9
2.3750 60.33	0.3750 9.53	0.078 1.98	0.078 1.98	0.312 7.92	E-210-28-60	B-210-28-70	WS-210-28	20460 91011	49,400 219,900	3.0 1.4
2.3750 60.33	0.3750 9.53	0.078 1.98	0.078 1.98	0.312 7.92	E-210-56-60	B-210-56-70	WS-210-28 (X2)	35,400 157,600	102,400 455,800	5.9 2.7
2.6250 66.68	0.4375 11.11	0.078 1.98	0.078 1.98	0.312 7.92	E-211-60	B-211-70	WS-211	18,200 81,100	40,600 180,900	2.7 1.2
2.6250 66.68	0.4375 11.11	0.078 1.98	0.078 1.98	0.312 7.92	E-211-29-60	B-211-29-70	WS-211-29	25,200 112,100	61,600 274,100	3.9 1.8
2.6250 66.68	0.4375 11.11	0.078 1.98	0.078 1.98	0.312 7.92	E-211-58-60	B-211-58-70	WS-211-58	43,200 192,300	123,200 548,200	7.8 3.5
2.7500 69.85	0.6875 17.46	0.109 2.77	0.109 2.77	0.375 9.53	E-311-60	B-311-70	WS-311	31,400 139,700	62,500 278,000	6.6 3.0
2.8750 73.03	0.5000 12.75	0.094 2.39	0.094 2.39	0.312 7.92	E-212-60	B-212-70	WS-212	21,000 93,700	45,700 203,600	3.7 1.7
2.8750 73.03	0.5000 12.75	0.094 2.39	0.094 2.39	0.312 7.92	E-212-31-60	B-212-31-70	WS-212-31			5.0 2.0
2.8750 73.03	0.5000 12.75	0.094 2.39	0.094 2.39	0.328 8.33	E-212-62-60	B-212-62-70	WS-212-31 (X2)	48,900 217,700	135,400 602,200	9.9 4.5

ROLLWAY® *Journal Bearings*

Needle/Journal Bearings



- Basic Construction Type:** Journal Roller Bearing
- Rolling Elements:** Trunion Style Cylindrical Rollers
- Bearing Material:** Bearing Grade Quality Steel
- Retainer Type:** Steel Cage With Flush Ground Ends



Journals (continued)

Complete Assembly Nomenclature	B		D		W		Recommended Shaft Diameter		Housing Bore Diameter					
	Bore Diameter		Outside Diameter		Width		Max	Min	Max	Min				
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm				
D-213	2.5591	65	4.7244	120	1.5	38.10	2.5605	65.04	2.5598	65.02	4.726	120.040	4.7243	119.997
D-213-33					2.063	52.40	2.5605	65.04	2.5598	65.02	4.726	120.040	4.7243	119.997
D-313-35			5.5118	140	2.188	55.58	2.5605	65.04	2.5598	65.02	5.5135	140.043	5.5116	139.995
D-313					2.313	58.74	2.5605	65.04	2.5598	65.02	5.5135	140.043	5.5116	139.995
D-214-26	2.7559	70	4.921	125	1.625	41.28	2.7574	70.04	2.7566	70.02	4.9229	125.042	4.9212	124.998
D-214-38					2.375	60.33	2.7574	70.04	2.7566	70.02	4.9229	125.042	4.9212	124.998
D-214-76					4.75	120.65	2.7574	70.04	2.7566	70.02	4.9229	125.042	4.9212	124.998
D-215	2.9528	75	5.118	130	1.625	41.28	2.9544	75.04	2.9536	75.02	5.1197	130.040	5.1179	129.995
D-215-28					1.75	44.45	2.9544	75.04	2.9536	75.02	5.1197	130.040	5.1179	129.995
D-215-42					2.625	66.68	2.9544	75.04	2.9536	75.02	5.1197	130.040	5.1179	129.995
D-215-84					5.25	133.35	2.9544	75.04	2.9536	75.02	5.1197	130.040	5.1179	129.995
D-315-39			6.299	160	2.438	61.91	2.9544	75.04	2.9536	75.02	6.3011	160.048	6.299	159.995
D-216	3.1496	80	5.512	140	1.75	44.45	3.1512	80.04	3.1504	80.02	5.5135	140.043	5.5116	139.995
D-216-29					1.813	46.04	3.1512	80.04	3.1504	80.02	5.5135	140.043	5.5116	139.995
D-216-42					2.625	66.68	3.1512	80.04	3.1504	80.02	5.5135	140.043	5.5116	139.995
D-216-84					5.25	133.35	3.1512	80.04	3.1504	80.02	5.5135	140.043	5.5116	139.995
D-316			6.693	170	2.688	68.26	3.1512	80.04	3.1504	80.02	6.6948	170.048	6.6926	169.992
D-217	3.3465	85	5.906	150	1.938	49.21	3.3482	85.04	3.3474	85.02	5.9073	150.045	5.9053	149.995
D-217-44					2.75	69.85	3.3482	85.04	3.3474	85.02	5.9073	150.045	5.9053	149.995
D-317			7.087	180	2.875	73.03	3.3482	85.04	3.3474	85.02	7.0886	180.050	7.0863	179.992

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit. Journal bearings and manufactured to the ABMA RBEC-1 tolerance class.

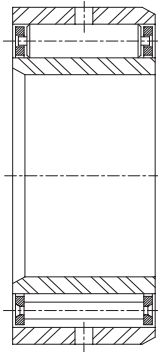
Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

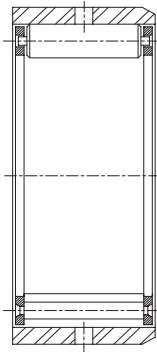
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

Journal Bearings **ROLLWAY**[®]

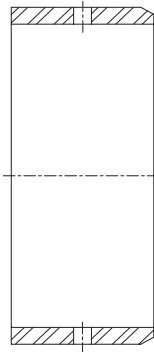
Needle/Journal Bearings



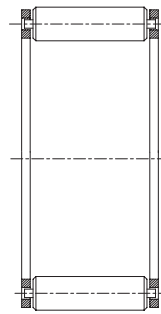
Assembly
D-XXX



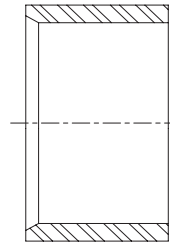
Outer Ring and
Roller Assembly
B-XXX



Outer Ring
B-XXX-70



Roller Assembly
WS-XXX



Inner Ring
E-XXX-60

Journals (continued)

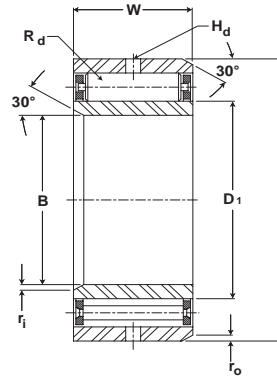
D1	Rd	ri	ro	Hd	Components			Assembly Basic Dynamic Rating	Assembly Basic Static Rating	Assembly weight
				Oil Hole Dia	Component Nomenclature					
inch mm	inch mm	inch mm	inch mm	inch mm	Inner Ring	Outer Ring	Roller Assembly	lb/N	lb/N	lb kg
3.1250 79.38	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-213-60	B-213-70	WS-213	20,800 92,800	46,000 204,600	4.7 2.1
3.1250 79.38	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-213-33-60	B-213-33-70	WS-213-33	28,700 127,700	69,400 308,800	6.4 2.9
3.2500 82.55	0.8125 20.64	0.125 3.18	0.125 3.18	0.437 11.11	E-313-35-60	B-313-35-70	WS-313-35	40,800 181,800	82,000 365,000	9.9 4.5
3.2500 82.55	0.8125 20.64	0.125 3.18	0.125 3.18	0.468 11.89	E-313-60	B-313-70	WS-313	42,900 190,900	87,300 388,500	10.0 4.5
3.3120 84.12	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-214-26-60	B-214-26-70	WS-214-26	25,800 115,100	62,000 275,700	5.3 2.4
3.3120 84.12	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-214-38-60	B-214-38-70	WS-214-38	37,400 166,500	99,600 443,300	7.6 3.5
3.3120 84.12	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-214-76-60	B-214-76-70	WS-214-38 (X2)	64,200 285,500	199,300 886,600	15.0 7.0
3.5000 88.90	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-215-60	B-215-70	WS-215	25,700 114,500	62,400 277,700	5.6 2.5
3.5000 88.90	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-215-28-60	B-215-28-70	WS-215-28	27,700 123,400	68,700 305,600	6.0 2.7
3.5000 88.90	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-215-42-60	B-215-42-70	WS-215-42	40,800 181,800	113,000 502,700	9.1 4.0
3.5000 88.90	0.5000 12.75	0.109 2.77	0.109 2.77	0.375 9.53	E-215-84-60	B-215-84-70	WS-215-42 (X2)	84,700 376,900	288,600 1,283,800	18.0 8.2
3.7500 95.25	0.9375 23.81	0.156 3.96	0.125 3.18	0.437 11.11	E-315-39-60	B-315-39-70	WS-315-39	50,200 223,500	101,300 450,700	14.0 6.4
3.7500 95.25	0.5625 14.29	0.125 3.18	0.125 3.18	0.438 11.13	E-216-60	B-216-70	WS-216	31,600 140,700	76,800 341,900	7.0 3.2
3.7500 95.25	0.5625 14.29	0.125 3.18	0.125 3.18	0.438 11.13	E-216-29-60	B-216-29-70	WS-216-29	52,700 234,400	79,200 352,500	7.6 3.5
3.7500 95.25	0.5625 14.29	0.125 3.18	0.125 3.18	0.438 11.13	E-216-42-60	B-216-42-70	WS-216-42	46,600 207,200	126,400 562,300	10.0 5.0
3.7500 95.25	0.5625 14.29	0.125 3.18	0.125 3.18	0.438 11.13	E-216-84-60	B-216-84-70	WS-216-42 (X2)	79,900 355,400	252,800 1,124,600	20.0 9.0
4.000 101.6	1.0000 25.40	0.156 3.96	0.125 3.18	0.438 11.13	E-316-60	B-316-70	WS-316	57,930 257,600	118,600 527,800	17.0 7.7
4.0000 101.6	0.6250 15.88	0.125 3.18	0.125 3.18	0.438 11.13	E-217-60	B-217-70	WS-217	34,100 151,700	80,000 355,900	9.0 4.1
4.0000 101.6	0.6250 15.88	0.125 3.18	0.125 3.18	0.438 11.13	E-217-44-60	B-217-44-70	WS-217-44	47,400 211,100	122,300 544,200	13.0 5.9
4.2500 107.95	1.0000 25.40	0.156 3.96	0.156 3.96	0.562 14.27	E-314-60	B-317-70	WS-317	57,900 257,900	120,000 533,800	21.0 9.5

ROLLWAY® *Journal Bearings*

Needle/Journal Bearings



Basic Construction Type: Journal Roller Bearing
Rolling Elements: Trunion Style Cylindrical Rollers
Bearing Material: Bearing Grade Quality Steel
Retainer Type: Steel Cage With Flush Ground Ends



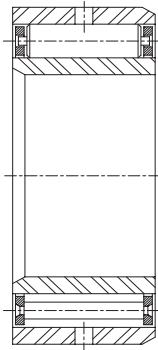
Journals (continued)

Complete Assembly Nomenclature	B	D	W	Recommended Shaft Diameter		Housing Bore Diameter	
	Bore Diameter	Outside Diameter	Width	Max	Min	Max	Min
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
D-218	3.5433 90	6.299 160	2.063 52.39	3.5450 90.04	3.5442 90.02	6.3011 160.048	6.299 159.995
D-218-45			2.8125 71.44	3.5450 90.04	3.5442 90.02	6.3011 160.048	6.299 159.995
D-219	3.7402 95	6.693 170	2.188 55.56	3.7420 95.05	3.7412 95.03	6.6948 170.048	6.6926 169.992
D-219-48			3.000 76.2	3.7420 95.05	3.7412 95.03	6.6948 170.048	6.6926 169.992
D-319	3.7402 95	7.874 200	3.063 77.79	3.7420 95.05	3.7412 95.03	7.8762 200.055	7.8737 199.992
D-319-50			3.125 79.38	3.7420 95.05	3.7412 95.03	7.8762 200.055	7.8737 199.992
D-220-37	3.9370 100	7.087 180	2.313 58.74	3.9389 100.05	3.9380 100.03	7.0886 180.050	7.0863 179.992
D-220			2.375 60.33	3.9389 100.05	3.9380 100.03	7.0886 180.050	7.0863 179.992
D-220-52			3.25 82.55	3.9389 100.05	3.9380 100.03	7.0886 180.050	7.0863 179.992
D-220-104			6.5 165.10	3.9389 100.05	3.9380 100.03	7.0886 180.050	7.0863 179.992
D-320	3.9370 100	8.465 215	3.25 82.55	3.9389 100.05	3.9380 100.03	8.4669 215.059	8.4643 214.993
D-222-41		7.874 200	2.563 65.09	4.3328 110.05	4.3318 110.03	7.8762 200.055	7.8737 199.992
D-222	2.75 69.85		4.3328 110.05	4.3318 110.03	7.8762 200.055	7.8737 199.992	
D-222-56	3.5 88.90		4.3328 110.05	4.3318 110.03	7.8762 200.055	7.8737 199.992	
D-222-112	7 177.80		4.3328 110.05	4.3318 110.03	7.8762 200.055	7.8737 199.992	
D-322	4.3307 110	9.449 240	3.625 92.08	4.3328 110.05	4.3318 110.03	9.4512 240.060	9.4484 239.989
D-322-60			3.75 95.25	4.3328 110.05	4.3318 110.03	9.4512 240.060	9.4484 239.989
D-224-45	4.7244 120	8.465 215	2.813 71.44	4.7266 120.06	4.7256 120.03	8.4669 215.059	8.4643 214.993
D-224			3.00 76.2	4.7266 120.06	4.7256 120.03	8.4669 215.059	8.4643 214.993
D-224-62			3.875 98.425	4.7266 120.06	4.7256 120.03	8.4669 215.059	8.4643 214.993
D-324			10.236 260	4.125 104.78	4.7266 120.06	4.7256 120.03	10.2388 260.066

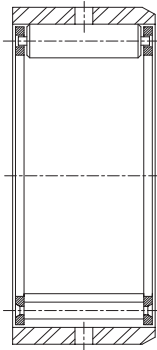
For sealed bearings, Outside diameter may be slightly oversize due to seal press fit.
 Journal bearings and manufactured to the ABMA RBEC-1 tolerance class.
 Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

Journal Bearings **ROLLWAY**[®]

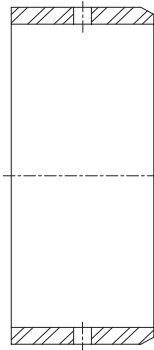
Needle/Journal Bearings



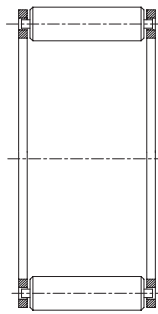
Assembly
D-XXX



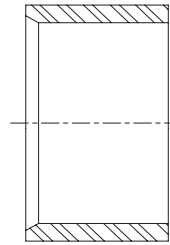
Outer Ring and
Roller Assembly
B-XXX



Outer Ring
B-XXX-70



Roller Assembly
WS-XXX



Inner Ring
E-XXX-60

Journals (continued)

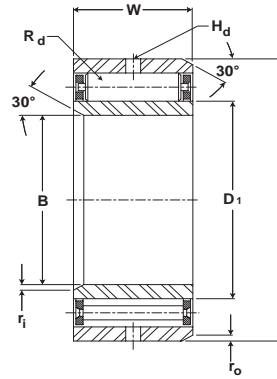
D1	Rd	ri	ro	Hd Oil Hole Dia	Components			Assembly Basic Dynamic Rating	Assembly Basic Static Rating	Assembly weight
					Inner Ring	Outer Ring	Roller Assembly			
inch mm	inch mm	inch mm	inch mm	inch mm	Component Nomenclature			lb/N	lb/N	lb kg
4.2480 107.90	0.6875 17.46	0.125 3.18	0.125 3.18	0.438 11.13	E-218-60	B-218-70	WS-218	37,900 168,500	87,600 389,700	11.0 5.0
4.2480 107.90	0.6875 17.46	0.125 3.18	0.125 3.18	0.438 11.13	E-218-45-60	B-218-45-70	WS-218-45	51,600 229,700	130,400 580,100	15.0 6.8
4.5000 114.30	0.7500 19.05	0.125 3.18	0.125 3.18	0.438 11.13	E-219-60	B-219-70	WS-219	46,500 206,900	109,700 488,300	15.0 6.8
4.5000 114.30	0.7500 19.05	0.125 3.18	0.125 3.18	0.438 11.13	E-219-48-60	B-219-48-70	WS-219-48	63,400 282,100	163,500 727,500	18.0 8.2
4.7500 120.65	1.1250 28.58	0.187 4.75	0.156 3.96	0.562 14.27	E-319-60	B-319-70	WS-319	66,000 293,800	135,500 602,900	28.0 12.7
4.7500 120.65	1.1250 28.58	0.187 4.75	0.156 3.96	0.562 14.27	E-319-50-60	B-319-50-70	WS-319-50	67,500 300,500	139,500 620,700	29.0 13.2
4.7500 120.65	0.7500 19.05	0.156 3.96	0.156 3.96	0.562 14.27	E-220-37-60	B-220-37-70	WS-220-37	49,000 218,000	118,000 529,100	16.0 7.3
4.7500 120.65	0.7500 19.05	0.156 3.96	0.156 3.96	0.562 14.27	E-220-60	B-220-70	WS-220	50,300 223,800	123,000 547,500	17.0 7.7
4.7500 120.65	0.7500 19.05	0.156 3.96	0.156 3.96	0.562 14.27	E-220-52-60	B-220-52-70	WS-220-52	68,000 302,700	181,300 806,800	23.0 10.5
4.7500 120.65	0.7500 19.05	0.156 3.96	0.156 3.96	0.562 14.27	E-220-104-60	B-220-104-70	WS-220-52 (X2)	116,600 519,000	362,700 1,613,700	45.0 20.5
5.0000 127.0	1.2500 31.75	0.187 4.75	0.187 4.75	0.562 14.27	E-320-60	B-320-70	WS-320	92,800 412,800	200,400 891,400	34.0 15.5
5.2500 133.35	0.8750 22.23	0.156 3.96	0.156 3.96	0.562 14.27	E-222-41-60	B-222-41-70	WS-222-41	59,800 266,300	142,800 635,500	22.0 10.0
5.2500 133.35	0.8750 22.23	0.156 3.96	0.156 3.96	0.562 14.27	E-222-60	B-222-70	WS-222	64,200 285,600	156,300 695,300	23.0 10.5
5.2500 133.35	0.8750 22.23	0.156 3.96	0.156 3.96	0.562 14.27	E-222-56-60	B-222-56-70	WS-222-56	80,900 359,900	210,500 936,300	30.0 13.6
5.2500 133.35	0.8750 22.23	0.156 3.96	0.156 3.96	0.562 14.27	E-222-112-60	B-222-112-70	WS-222-56 (X2)	138,700 617,100	421,000 1,872,700	59.0 26.8
5.5000 139.70	1.3750 34.93	0.219 5.56	0.219 5.56	0.562 14.27	E-322-60	B-322-70	WS-322	101,600 452,300	216,600 963,800	49.0 22.3
5.5000 139.70	1.3750 34.93	0.219 5.56	0.219 5.56	0.562 14.27	E-322-60-60	B-322-60-70	WS-322-60	105,000 467,400	226,020 1,005,300	51.0 23.2
5.6250 142.88	0.9375 23.81	0.156 3.96	0.187 4.75	0.562 14.27	E-224-45-60	B-224-45-70	WS-224-45	72,200 321,200	177,100 787,700	28.0 12.7
5.6250 142.88	0.9375 23.81	0.156 3.96	0.187 4.75	0.562 14.27	E-224-60	B-224-70	WS-224	76,700 341,400	191,500 852,200	29.0 13.2
5.6250 142.88	0.9375 23.81	0.156 3.96	0.187 4.75	0.562 14.27	E-224-62-60	B-224-62-70	WS-224-62	95,600 425,500	254,200 1,130,800	38.0 17.0
6.0620 153.97	1.3750 34.93	0.250 6.35	0.250 6.35	0.562 14.27	E-324-60	B-324-70	WS-324	123,400 549,000	283,600 1,261,700	67.0 30.0

ROLLWAY® *Journal Bearings*

Needle/Journal Bearings



- Basic Construction Type:** Journal Roller Bearing
- Rolling Elements:** Trunion Style Cylindrical Rollers
- Bearing Material:** Bearing Grade Quality Steel
- Retainer Type:** Steel Cage With Flush Ground Ends



Journals (continued)

Complete Assembly Nomenclature	B		D		W		Recommended Shaft Diameter		Housing Bore Diameter			
	Bore Diameter		Outside Diameter		Width		Max	Min	Max	Min		
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm		
D-226	5.1181 130	9.055 230	3.125	79.38	5.1204	130.06	5.1194	130.03	9.0574	230.058	9.0547	229.989
D-226-68			4.25	107.95	5.1204	130.06	5.1194	130.03	9.0574	230.058	9.0547	229.989
D-226-136			8.5	215.90	5.1204	130.06	5.1194	130.03	9.0574	230.058	9.0547	229.989
D-326			11.024	280	4.375	111.13	5.1204	130.06	5.1194	130.03	11.0263	280.068
D-228	5.5118 140	9.843 250	3.25	82.55	5.5142	140.06	5.5131	140.03	9.845	250.063	9.8421	249.989
D-228-76			4.75	120.65	5.5142	140.06	5.5131	140.03	9.845	250.063	9.8421	249.989
D-228-152			9.5	241.3	5.5142	140.06	5.5131	140.03	9.845	250.063	9.8421	249.989
D-230	5.9055 150	10.63 270	3.5	88.90	5.9080	150.06	5.9069	150.04	10.6326	270.068	10.6295	269.989
D-230-76			4.75	120.65	5.9080	150.06	5.9069	150.04	10.6326	270.068	10.6295	269.989
D-232	6.2992 160	11.417 290	3.875	98.43	6.3019	160.07	6.3007	160.04	11.4201	290.071	11.4168	289.987
D-232-78			4.875	123.83	6.3019	160.07	6.3007	160.04	11.4201	290.071	11.4168	289.987
D-232-156			9.75	247.65	6.3019	160.07	6.3007	160.04	11.4201	290.071	11.4168	289.987
D-234-86	6.6929 170	12.205 310	5.375	136.53	6.6957	170.07	6.6944	170.04	12.2076	310.073	12.2042	309.987
D-234-172			10.75	273.05	6.6957	170.07	6.6944	170.04	12.2076	310.073	12.2042	309.987
D-236-94	7.0866 180	12.598 320	5.875 149.23	7.0895 180.07	7.0882 180.04	12.6013 320.073	12.5978 319.984					
SD-240	7.8740 200	13.386 340	4.75	120.65	7.8770	200.08	7.8757	200.04	13.3888	340.076	13.3852	339.984
SD240-110			6.875	174.63	7.8770	200.08	7.8757	200.04	13.3888	340.076	13.3852	339.984
SD-244-110	8.6614 220	14.961 380	6.875 174.63	8.6644 220.08	8.6631 220.04	14.9637 380.078	14.9599 379.981					

For sealed bearings, Outside diameter may be slightly oversize due to seal press fit. Journal bearings and manufactured to the ABMA RBEC-1 tolerance class.

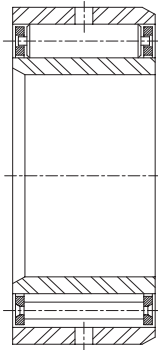
Metric dimensions for reference only.

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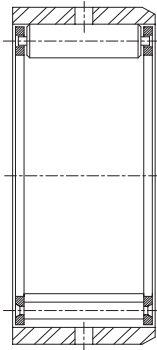
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Journal Bearings **ROLLWAY**[®]

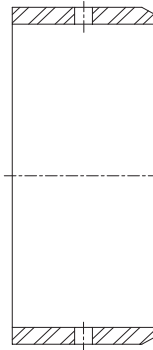
Needle/Journal Bearings



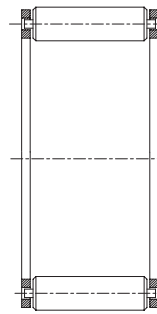
Assembly
D-XXX



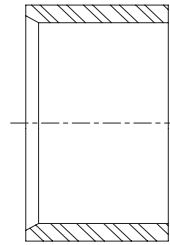
Outer Ring and
Roller Assembly
B-XXX



Outer Ring
B-XXX-70



Roller Assembly
WS-XXX



Inner Ring
E-XXX-60

Journals (continued)

D1	Rd	ri	ro	Hd Oil Hole Dia	Components			Assembly Basic Dynamic Rating	Assembly Basic Static Rating	Assembly weight
					Component Nomenclature					
inch mm	inch mm	inch mm	inch mm	inch mm	Inner Ring	Outer Ring	Roller Assembly	lb/N	lb/N	lb kg
6.062 153.97	1.0000 25.40	0.156 3.96	0.187 4.75	0.562 14.27	E-226-60	B-226-70	WS-226	89,600 398,800	229,300 1,020,200	33.0 15.0
6.062 153.97	1.0000 25.40	0.156 3.96	0.187 4.75	0.562 14.27	E-226-68-60	B-226-68-70	WS-226-68	117,100 520,800	323,200 1,437,700	45.0 20.0
6.062 153.97	1.0000 25.40	0.156 3.96	0.187 4.75	0.562 14.27	E-226-136-60	B-226-136-70	WS-226-68 (X2)	200,700 893,000	646,400 2,875,500	90.0 41.0
6.5580 166.57	1.5000 38.10	0.250 6.35	0.250 6.35	0.562 14.27	E-326-60	B-326-70	WS-326	143,500 638,300	332,500 1,479,300	80.0 36.0
6.6250 168.28	1.0625 26.99	0.219 5.56	0.219 5.56	0.562 14.27	E-228-60	B-228-70	WS-228	99,000 440,500	256,400 1,140,600	43.0 20.0
6.6250 168.28	1.0625 26.99	0.219 5.56	0.219 5.56	0.562 14.27	E-228-76-60	B-228-76-70	WS-228-76	137,700 612,800	391,800 1,743,200	63.0 29.0
6.6250 168.28	1.0625 26.99	0.219 5.56	0.219 5.56	0.563 14.30	E-228-152-60	B-228-152-70	WS-228-76 (X2)	236,200 1,050,600	783,800 3,486,500	125.0 57.0
7.0620 179.37	1.1875 30.16	0.219 5.56	0.219 5.56	0.625 15.88	E-230-60	B-230-70	WS-230	128,500 571,700	341,200 1,517,700	52.0 24.0
7.0620 179.37	1.1875 30.16	0.219 5.56	0.250 6.35	0.625 15.88	E-230-76-60	B-230-76-70	WS-230-76	169,800 755,500	488,290 2,172,000	70.0 32.0
7.6250 193.68	1.2500 31.75	0.250 6.35	0.250 6.35	0.625 15.88	E-232-60	B-232-70	WS-232	149,000 662,900	407,000 1,810,700	67.0 30.0
7.6250 193.68	1.2500 31.75	0.250 6.35	0.250 6.35	0.625 15.88	E-232-78-60	B-323-78-70	WS-232-78	183,300 815,500	531,300 2,363,600	85.0 39.0
7.6250 193.68	1.2500 31.75	0.250 6.35	0.250 6.35	0.625 15.88	E-232-156-60	B-232-156-70	WS-232-78 (X2)	314,300 1,398,200	1,062,700 4,727,300	169.0 77.0
8.0620 204.77	1.3750 34.93	0.250 6.35	0.250 6.35	0.687 17.45	E-234-86-60	B-234-86-70	WS-234-86	185,900 827,300	513,800 2,285,600	108.0 49.0
8.0625 204.79	1.3750 34.93	0.250 6.35	0.250 6.35	0.688 17.48	E-234-172-60	B-234-172-70	WS-234-86 (X2)	318,900 1,418,800	1,027,100 4,569,000	217.0 99.0
8.4680 215.09	1.3750 34.93	0.250 6.35	0.250 6.35	0.687 17.45	E-236-94-60	B-236-94-70	WS-236-94	220,500 980,800	649,700 2,890,200	125.0 57.0
9.2500 234.95	1.3750 34.93	0.250 6.35	0.250 6.35	0.687 17.45	SE-240-60	SB-240-70	SWS-240	187,840 835,500	540,900 2,406,400	132.0 60.0
9.2500 234.95	1.3750 34.93	0.250 6.35	0.250 6.35	0.687 17.45	SE-240-110-60	SB-240-110-70	SWS-240-110	261,900 1,165,000	842,100 3,746,100	190.0 86.0
10.4370 265.10	1.3750 34.93	0.250 6.35	0.250 6.35	0.687 17.45	SE-244-110-60	SB-244-110-70	SWS-244-110	272,700 1,213,200	888,900 3,954,400	137.0 62.0

Load Ratings and Life

Life Calculations

The L10 (rating) life for any given application and bearing selection can be calculated in terms of millions of revolutions by using the bearing Basic Dynamic Rating and applied radial load (or, equivalent radial load in the case of radial bearing applications having combined radial and thrust loads). The L10 life for any given application can be calculated in terms of hours, using the bearing Basic Dynamic Rating, applied load (or equivalent radial load) and suitable speed factors, by the following equation:

$$L_{10} = \left(\frac{C}{P}\right) \times \frac{1,000,000}{60 \times n} = \left(\frac{C}{P}\right)^{10/3} \times \frac{16667}{n}$$

Where:

L_{10} = The # of hours that 90% of identical bearings under ideal conditions will operate at a specific speed and condition before fatigue is expected to occur.

C = Basic Dynamic Rating (lbs)
1,000,000 Revolutions

P = Constant Equivalent Radial Load (lbs)

n = Speed (RPM)

Additionally, the ABMA provides application factors for all types of bearings which need to be considered to determine an adjusted Rated Life (L_{na}). L10 life rating is based on laboratory conditions yet other factors are encountered in actual bearing application that will reduce bearing life. L_{na} life rating takes into account reliability factors, material type, and operating conditions.

$$L_{na} = a_1 \times a_2 \times a_3 \times L_{10}$$

Where:

L_{na} = Adjusted Rated Life.

a_1 = Reliability Factor. Adjustment factor applied where estimated fatigue life is based on reliability other than 90% (See Table No 1).

Table No. 1 Life Adjustment Factor for Reliability

Reliability %	L_{na}	a_1
90	L10	1
95	L5	0.62
96	L4	0.53
97	L3	0.44
98	L2	0.33
99	L1	0.21
50	L50	5

a_2 = Material Factor. Life adjustment for bearing race material. Power Transmission Solutions bearing races are manufactured from bearing quality steel. Therefore the a_2 factor is 1.0.

a_3 = Life Adjustment Factor for Operating Conditions. This factor should take into account the adequacy of lubricant, presence of foreign matter, conditions causing changes in material properties, and unusual loading or mounting conditions. Assuming a properly selected and mounted bearing having adequate seals and lubricant operating below 250°F and tight fitted to the shaft, the a_3 factor should be 1.0.





Load Ratings and Life Continued

Vibration and shock loading can act as an additional loading to the steady expected applied load. When shock or vibration is present, an a3 Life Adjustment Factor can be applied. Shock loading has many variables which often are not easily determined. Typically, it is best to rely on one's experience with the particular application. Consult Application Engineering for assistance with applications involving shock or vibration loading.

The a3 factor takes into account a wide range of application and mounting conditions as well as bearing features and design. Accurate determination of this factor is normally achieved through testing and in-field experience. Power Transmission Solutions offers a wide range of options which can maximize bearing performance. Consult Application Engineering for more information.

Variable Load Formula

Root mean load (RML) is to be used when a number of varying loads are applied to a bearing for varying time limits. Maximum loading still must be considered for bearing size selection.

$$RML^* = \sqrt[10/3]{\frac{(L_1^{10/3} N_1) + (L_2^{10/3} N_2) + (L_3^{10/3} N_3)}{100}}$$

Where:

RML = Root Mean Load (lbs.)

L₁, L₂, etc. = Load in pounds

N₁, N₂, etc. = Percent of total time operated at loads L₁, L₂, etc.

* Apply RML to rating at mean speed to determine resultant life.

Mean Speed Formula

The following formula is to be used when operating speed varies over time.

$$\text{Mean Speed} = \frac{S_1 N_1 + S_2 N_2 + S_3 N_3}{100}$$

S₁, S₂, etc = Speeds in RPM

N₁, N₂, etc = Percentage of total time operated at speeds S₁, S₂, etc

Load Ratings and Life Continued

Bearing Life In Oscillating Applications

The equivalent rotative speed (ERS) is used in life calculations when the bearing does not make complete revolutions during operation. The ERS is then used as the bearing operating speed in the calculation of the L10 (Rating) Life. The formula is based on sufficient angular rotation to have roller paths overlap.

$$\begin{aligned} \text{ERS} &= \text{Equivalent Rotative Speed} \\ \text{N} &= \text{Total number of degrees per minute through} \\ &\quad \text{which the bearing will rotate.} \\ \text{ERS} &= \frac{\text{N}}{360} \end{aligned}$$

In the above formula, allowance is made for the total number of stress applications on the weakest race per unit time, which, in turn, determines fatigue life and the speed factors. The theory behind fretting corrosion is best explained by the fact that the rolling elements in small angles of oscillation retrace a path over an unchanging area of the inner or outer races where the lubricant is prevented by inertia from flowing in behind the roller as the bearing oscillates in one direction. Upon reversal, this small area of rolling contact is traversed by the same roller in the dry state. The friction of the two unlubricated surfaces causes fretting corrosion and produces failures which are unpredictable from a normal life standpoint.

With a given bearing selected for an oscillating application, the best lubrication means is a light mineral oil under positive flow conditions. With a light oil, there is a tendency for all areas in the bearing load zone to be immersed in lubricant at all times. The full flow lubrication dictates that any oxidized material which may form is immediately carried away by the lubricant, and since these oxides are abrasive, further wear tends to be avoided. If grease lubrication must be used, it is best to consult with either the bearing manufacturer or the lubricant manufacturer to determine the best possible type of lubricant. Greases have been compounded to resist the detrimental effect of fretting corrosion for such applications.

Static Load Rating

The “static load rating” for rolling element bearings is that uniformly distributed static radial load acting on a non-rotating bearing, which produces a contact stress of 580,000 psi (roller bearings) or 607,000 psi (ball bearings) at the center of the most heavily loaded rolling element. At this stress level, plastic deformation begins to be significant. Experience has shown that the plastic deformation at this stress level can be tolerated in most bearing applications without impairment of subsequent bearing operation. In certain applications where subsequent rotation of the bearing is slow and where smoothness and friction requirements are not too exacting, a higher static load limit can be tolerated. Where extreme smoothness is required or friction requirements are critical, a lower static load limit may be necessary.

Minimum Bearing Load

Skidding, or sliding, of the rolling elements on the raceway instead of a true rolling motion can cause excessive wear. Applications with high speeds and light loading are particularly prone to skidding. As a general guideline, rolling element bearings should be radially loaded at least 2% of Basic Dynamic Rating. For applications where load is light relative to the bearings dynamic load rating, consult Application Engineering for assistance.





Load Ratings and Life Continued

Needle Roller Bearings Selection - New Applications:

Example #1:

To find theoretical L10 life of an MR 16 bearing operating at a speed of 500 RPM and under a load of 1000 lbs.

Basic Dynamic Rating of MR-16 = 8000 lbs. Use Formula:

$$L_{10} = \frac{16,666}{N} \left(\frac{BDR}{P} \right)^{10/3}$$

$$L_{10} = \frac{16,666}{500} \left(\frac{8000}{1000} \right)^{10/3}$$

$$L_{10} = 34,132 \text{ hours}$$

Example #2:

Find the Basic Dynamic Rating required for a CAGEROL[®] bearing operating at 1000 RPM, with a load of 700 pounds. The required L10 life will be 20,000 hours. Use the Formula:

$$BDR = .054 \times P \times (L_{10} \times N)^3$$

$$BDR = .054 \times 700 \times (20,000 \times 1000)^3$$

$$BDR = .054 \times 700 \times 155$$

$$BDR = 5859 \text{ lbs.}$$



Needle Engineering Section

Type of Load

The load ratings in this catalog are based on uniform and steady loading. When the loading is of a shock nature and/or vibration is present, or the loading is indeterminate, a bearing of greater rating must be selected. If such conditions exist, it is advisable to use the application Type of Load Factor as shown in the table below.

Type of Load Factors

The actual bearing load should be multiplied by the appropriate load factor and the resultant value used to calculate the bearing life or to determine the required basic dynamic rating (BDR).

Type of Load	Factor C
Uniform and Constant	1.0
Light Shock	1.5
Moderate Shock	2.0
Heavy Shock	3.0

Matched Bearings (MR, GR, RS, RD series only)

Where bearings are mounted so that the distance between them is less than the width of one bearing, it is recommended under heavy loading conditions to provide some degree of diametral matching in order to prevent unequal sharing of the applied load. Matching procedures have been developed to provide super precision matching of bearings. Bearings matched in this category are identified by "-DS" suffix for super precision.

- A. O.D. and I.D., where applicable, of matched bearings same diameters within 30% of the respective O.D. or I.D. tolerance.
- B. I.D. of rollers or diametral clearance, where applicable, of matched bearings same within 30% of the tolerance range.
- C. Radial runout of matched bearings same within 20% of the tolerance range.
- D. High point of radial runout marked on the face of each outer and inner ring.
- E. Matched bearings to be packaged as a unit.

Matching Factor	Matching Suffix
1 .37	None
1 .65	"-DS"

Multiply Matching Factor by rating of single bearing to obtain resultant rating for pair of bearings.



Needle Engineering Section continued

Shaft Materials and Their Treatment

In order to obtain the performance built into needle and radial roller bearings when applied without inner races, it is important that the bearing user employ the best possible shaft material and heat treatment.

This is especially critical in cases of outer race rotation where the shaft becomes the weakest member of the bearing assembly.

Manufacturing simplicity as well as reduced operating clearances can be obtained by omission of inner races with their extra expense, as well as build-up of tolerances. This construction is employed frequently in the application of needle bearings and to a somewhat lesser degree in radial roller bearings.

With the conventional application using inner races, the selection of shaft material is principally a matter of manufacturing economy coupled with proper bending and tensile strength, and in most cases surface heat treatments of shafts are dispensed with. However, when the inner race is eliminated, the shaft then becomes an integral member of the bearing and the three following areas must be accurately and correctly covered for best bearing performance:

1. Shaft material selection.
2. Shaft heat treatment.
3. Shaft surface finish.

Under item 1, there are a number of satisfactory shaft materials which can be employed and they can be broken down into two groups as follows:

1. Thru-hardening or induction hardening material.
2. Case hardening material.

Where thru-hardening or induction hardening materials are employed, a sound material would be SAE 52100 steel, such as employed by the bearing manufacturers. This material may be induction zone hardened, or thru-hardened in accordance with the dictates of the application. However, as shaft material in the thru-hardened state, the high core hardness of the 52100 steel causes brittleness that may be objectionable.

Zone hardening or induction hardening that provides a tougher core is usually more satisfactory for shaft applications. Alternate materials, such as SAE 1050, SAE 1150 may be used, employing the induction or flame hardening process. While these steels will induction harden satisfactorily to give the proper hardness ranges, they will not offer the fatigue resistance of the higher alloy content steels.

Examples of higher alloy steels are SAE 4650, SAE 8650, etc. These materials do not require carburization for induction hardening. However, as mentioned above, the absence of excess carbides in the surface structure of the material after heat treatment reduces the fatigue life of the material correspondingly. Hardnesses in the range of 60 HRC should be maintained under all circumstances.

Needle Engineering Section continued

For case hardening, any number of materials can be employed, ranging from the plain carbon SAE 1010 to 1020 up through SAE 4615, 4620, 8615 and 8620. Shafts can be completely carburized and case hardened or zone hardened by masking or copper plating areas desired left in soft state. A minimum hardness of 58 HRC should be employed. For the best quality of heat treatment, it is imperative that the hardening temperature in both the induction and thru-hardening process be held to rather close limits, in order to avoid the formation of retained austenite. In water quenching of induction hardened steels, the cracking of shafts after treatment should be avoided by immediate tempering. Contact Application Engineering for assistance in determining minimum required case depths.

A practical maximum surface finish for shafts being used as inner races would be 12 micro inches RA. Rougher surface finishes can be employed; however, the user will run the risk of more erratic performance due to the wearing in of the shaft as well as a lesser control of dimensional accuracy of the mounted bearing. All bearings wear in to a certain extent and the amount of "wear-in" depends directly upon the surface finish of the mating parts. The rougher the surface the greater the "wear-in" and the greater range of resultant clearance which would ensue.

MR and GR Series Bearing Lubrication

Sealed MR and GR series bearings are factory filled with an NLGI 1 lithium soap thickened grease suitable for operating temperatures of -20°F to +250°F. Unsealed MR, GR, RS, RD and MI inner rings are coated with a corrosion preventive oil. Consult Application Engineering regarding grease compatibility issues.

MR and GR series bearings have a lubrication hole and annular groove centered on the outside diameter to allow relubrication of the bearing through the housing member. The MI inner ring has a lubrication hole and annular groove centered in the bore diameter to allow relubrication of the bearing through the shaft member.

When sealed MR and GR series bearings are to be relubricated, it is recommended that the RS, SRS or RSS seal arrangement is used. These arrangements locate a seal lip outward and allows excess and used grease to vent during relubrication.

Frequency of lubrication depends primarily upon the speed of rotation of the bearing, the type of lubrication employed and the amount of contamination present in the application. For continuously rotating applications, it is necessary to either provide continuous oil lubrication or else frequent grease lubrication, depending upon the severity of service. Automatic lubrication devices are ideal for intermittent lubrication, since accurate metering of grease and consistent relubrication is maintained through the use of these devices. Best determination of relubrication interval can be made by testing or experience in the application. Contact Application Engineering for assistance in determining relubrication interval.

Mounting Details - Heavy-Duty Needle Roller Bearings Series McGill MR, GR, MI, RS, RD, and Rollway Journal Bearings

Proper mounting of CAGEROL® and GUIDEROL® heavy-duty needle roller bearings generally require a press fit of the ring rotating relative to the radial load. A close to loose fit is used for the ring stationary relative to the radial load. Specific shaft and housing diameters are listed in the respective series dimension tables.



Needle Engineering Section continued



For Rollway Journal bearing applications, a rotating shaft is the predominant method of operation. Therefore, recommended shaft and housing tolerances are provided for applications with a rotating shaft only. For Journal applications which require a rotating housing, please consult Application Engineering for specific Journal bearing shaft and housing fits.

The following are some general guidelines and details to bear in mind when installing these bearing series:

1. Inspect housing and shaft.

- Clean, remove burrs and shaft edges.
- If any damage has occurred to the bearing seat in the housing or on the shaft, repair that damage to bring the seat surfaces back to its original condition.

2. Determine which member, shaft or housing, has an interference fit with the bearing.

- In general, the ring rotating relative to the radial load has an interference fit.
- Refer to dimension tables for specific shaft and housing diameters.

3. Install the bearing onto the press-fitted member by applying force against the bearing ring that is press-fitted.

- For a press-fitted inner ring, apply the force required to assemble the bearing onto the shaft against the face of the bearing inner ring.
- For a press-fitted outer ring, apply the force required to assemble the bearing into the housing against the face of the bearing outer ring.
- Care should be exercised to assure that the bearing starts onto the press-fitted member as squarely as possible.
- Use arbor press whenever possible.
- Do not hammer on bearing ring face.

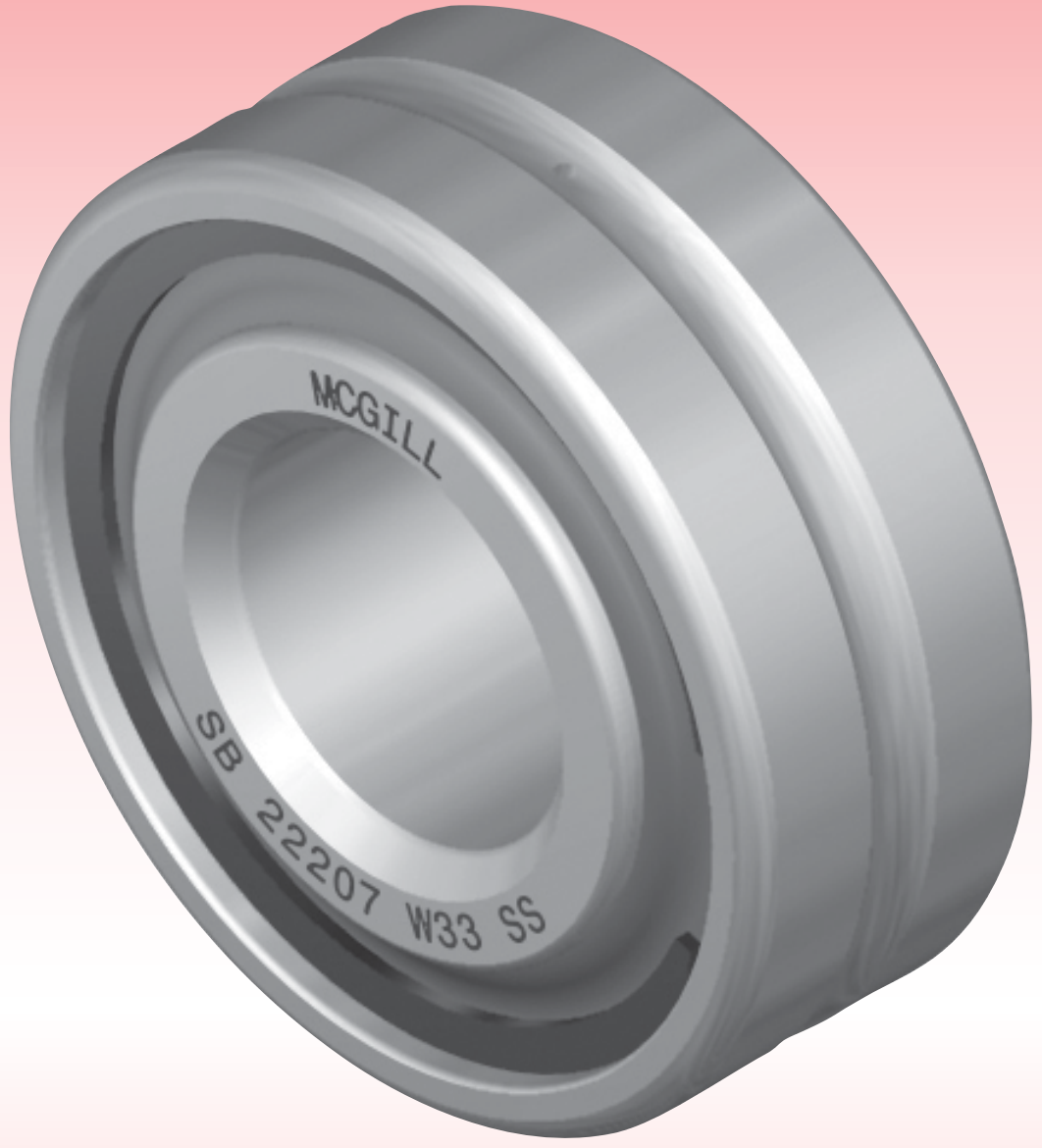
4. Inner rings press-fitted on the shaft may be more easily installed onto the shaft by heating the ring and causing it to shrink-fit.

- Normally, heating the ring to 175°F to 212°F (70°C to 100°C) will be sufficient to allow the ring to slide over the interference fit shaft seat.
- Heating the ring should be accomplished with an induction heater or in an oil bath. Never use a torch to heat a bearing for assembly purposes.

5. When outer rings are to be press-fitted into a housing, it is desirable to heat the housing to allow it shrink-fit onto the outer ring outside diameter.

- Freezing the bearing to shrink it for easy assembly into a press-fitted housing is not recommended. Water condensation can form inside the bearing upon its return to room temperature, which can lead to corrosion. Exposure to extreme cold can also affect the metallurgical structure of the bearing.

6. After mounting is complete, the assembly should be inspected to insure that it rotates freely, without unusual drag or noise.





Spherical Roller

Unmounted bearing assembly consisting of through hardened inner and outer raceways with single spherical rolling elements separated by steel land riding retainer (cage) and available with several seal options. SPHERE-ROL® roller bearings provide an antifriction solution when supporting rotating shafts with combination radial and thrust loads.

Bearing Configurations

Sealed / unsealed, straight or tapered bore

Bore Diameter Size Range

20 mm to 150 mm (.5906" to 5.9055")



Materials

Bearing Quality Steel

Spherical Roller Selection Guide

Sphere-Rol
Bearings



			SIZE RANGE		
		Product Series	Material / Roller Complement	Metric	Inch Equiv
SHERE-ROL		22200 Series	Bearing Steel Spherical Roller	20 - 150	.7674 - 5.9055
		22300 Series	Bearing Steel Spherical Roller	40 - 100	1.5748 - 3.9370

* For estimating purpose only, individually sizes may vary and are subject to change without notification



DESIGN CHARACTERISTICS				Features								Page No.
Misalignment	Dynamic Load Rating	High Speed	Relative Base Cost *	Seals	Taper Bore	Oil Holes	High Temp. Seals	Expansion Type	DS Matching	Select OD W22	Standard Clearances C2 thru C4	Page No.
●	●	◐	\$\$	○	○	S	○	○	○	○	○	D-11
●	●	●	\$\$	○	○	S	○	○	○	○	○	D-15

Several sealing options available
 Option for tapered shaft or adapter mounting
 Standard "W33" feature includes annular groove and lubrication holes
 For applications up to 450°F a high temp seal option is offered
 For applications requiring compensation for linear thermal expansion
 Recommended for load sharing when mounting bearing pairs
 Reduced O.D. tolerance, for improved housing fit control
 Depending on the application needs, clearance options are available to help control the internal diametrical clearance

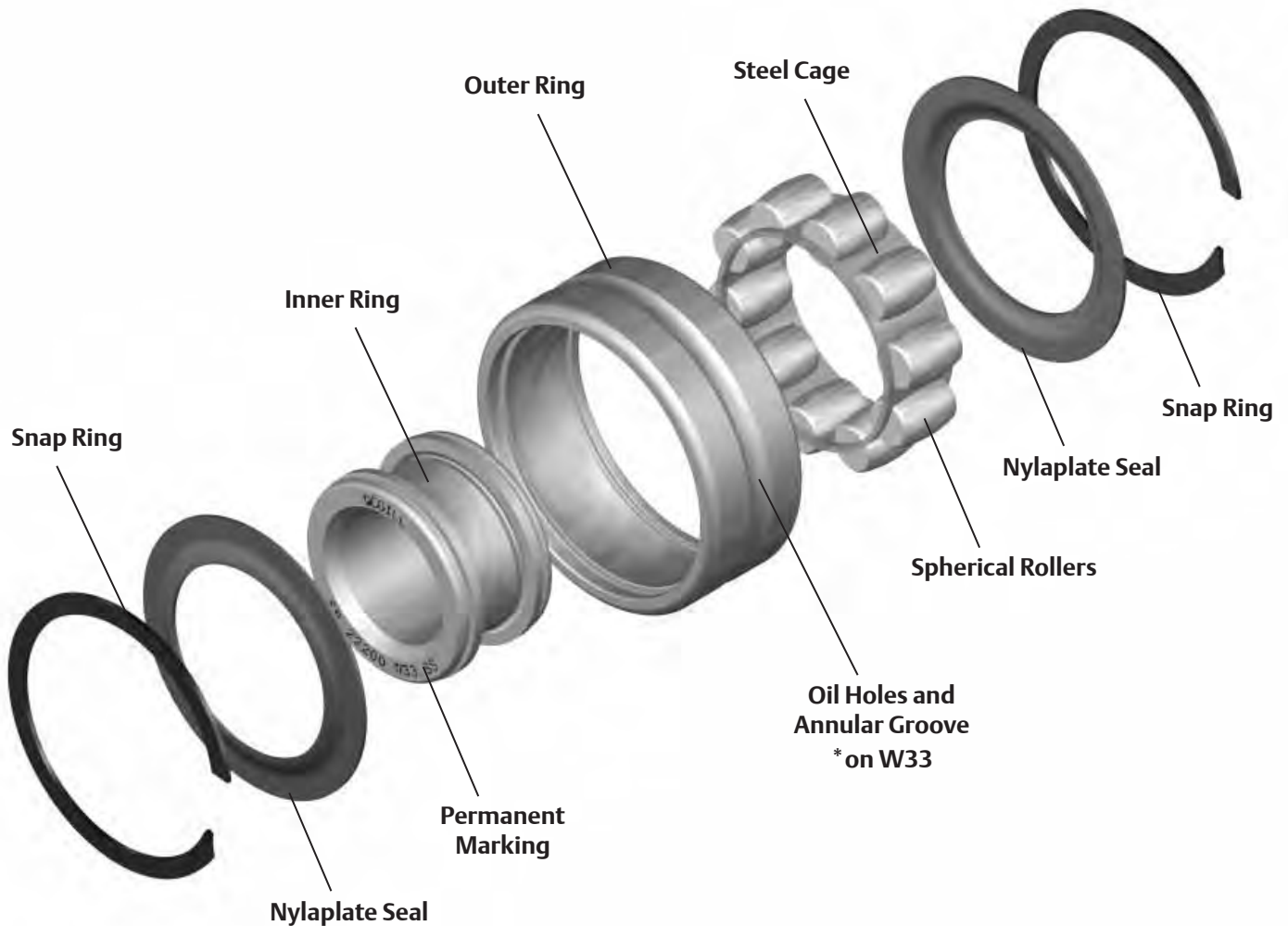
O = Optional
S = Standard
○ = Not Recommended
 ◐ ◑ ◒ ◓ ◔
Poor ← → Best



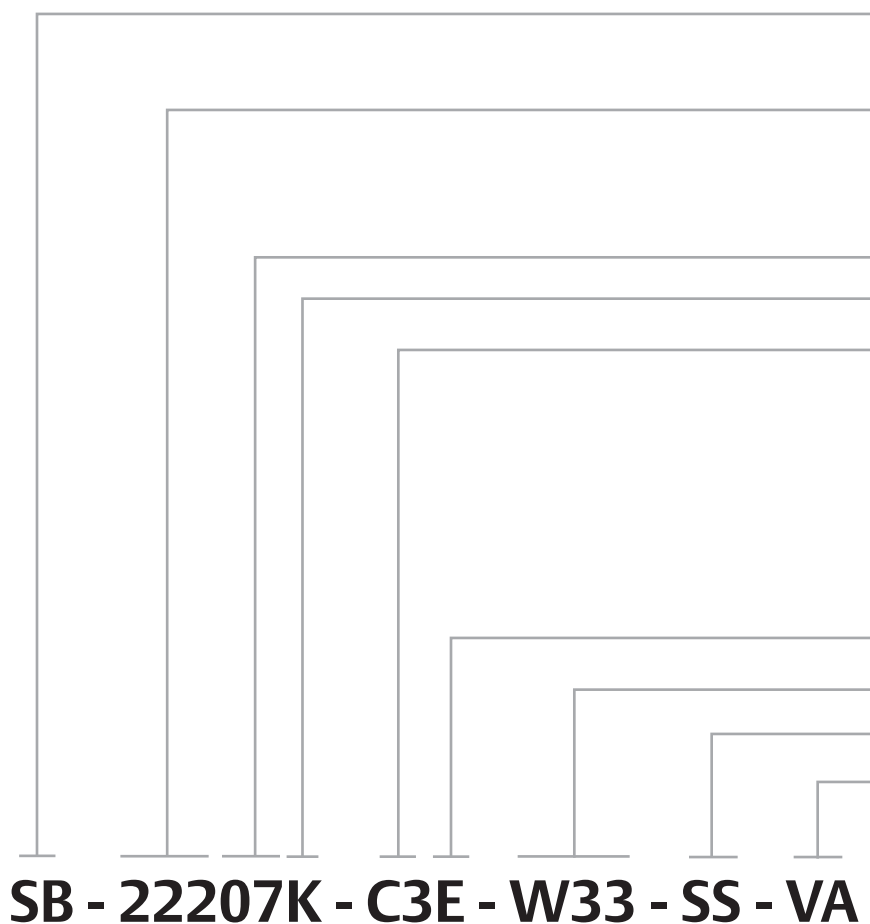
McGill SPHERE-ROL® Spherical Bearings

McGill SPHERE-ROL® Bearings feature an optimal diameter of single row spherical rollers separated by a land riding steel retainer within a dimensionally interchangeable (ABMA/ISO specification) envelope. In addition, SPHERE-ROL® bearings feature NYLAPLATE®, NYLAPLATE high temperature and LAMBDA® seal options and misalignment capabilities, further differentiating SPHERE-ROL® bearings from other types. The bearing design and use of tapered bore with adapter option provide diametrical clearance control and installation ease. Depending on your preference, these bearings are available in a wide variety of sizes, clearances and sealing options as illustrated on the pages to follow.

Sphere-Rol Bearings



SPHERE-ROL® Nomenclature



Prefix

SB - SPHERE-ROL Bearing

Series Identifier

22200

22300

Bore Size (In 5mm)

Optional Tapered Bore

Internal Clearances

None - Standard

C2 - Less Than Standard

C3 - Greater Than
Standard

C4 - Greater Than C3

Optional Expansion Type

Lubrication Feature standard

Sealing Options (see below)

Optional Grease Suffix

VA - High Temp. Grease

- Modification



Standard Bore

S - Nylaplate Seal One Side

SS - Nylaplate Seal Both Sides

TS - High Temp. Seal One Side

TSS - High Temp. Seal Both Sides

YS - Lambda Seal One Side

YSS - Lambda Seal Both Sides

Tapered Bore

S - Nylaplate Seal On Small End

SSL - Nylaplate Seal On Large End

TS - High Temp. Seal On Small End

TSL - High Temp. Seal On Large End

YS - Lambda Seal On Small End

YSL - Lambda Seal On Large End



Features and Benefits

Sphere-Rol
Bearings



Misalignment Capability

As a result of the design geometry, SPHERE-ROL® bearings offer up to $\pm 3^\circ$ misalignment in unsealed versions.



Annular Lubrication Groove and Holes

The groove provides a circumferential path to direct lubricant and to the two oil holes.



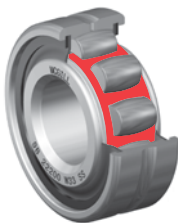
Spherical Roller

Precision spherical rollers provide high radial load capability, while providing the space necessary for seal options within a standard envelope dimension. The design of the roller provides a higher dynamic load rating and optimizes the number of maximum diameter rollers.



Inner Ring Raceway Flanges

Provide roller guidance and surface to support retainer. The raceway width, or distance between the two flanges, also helps define a designed endplay in the bearing. For applications requiring compensation for shaft growth due to linear thermal expansion, SPHERE-ROL bearings are available with increased internal endplay identified by the expansion type(E) option.



Steel Cage

The spacing provided by the heat treated steel cage contributes to the high speed capabilities and provides a lubricant reservoir within the bearing envelope.



Features and Benefits continued

Combination Load Capacity

The SPHERE-ROL® bearing design allows for high radial load capacity and the ability to accommodate a thrust load in combination with a radial load. Thrust load capability is proportional to the amount of radial load and pure thrust loads are not recommended. Typically a ratio less than .20 of axial to radial loads ($F_a/F_r < .20$) is appropriate for SPHERE-ROL bearings, equivalent load formulas specified in the Engineering Section of this catalog.

Factory Grease Fill

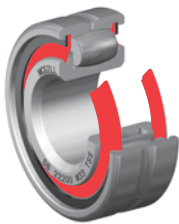
The sealed SPHERE-ROL bearings are factory lubricated with a medium temperature (-30° to 250°F, -34° to 121° C) Polyurea E.P. grease. Unsealed bearings packaged with light oil film as a rust preventative. Contact Application Engineering when application conditions require special lubricants.

Options



“S or SS” Nylaplate Seal

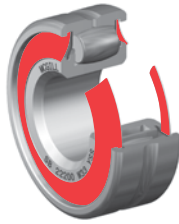
Combination labyrinth and contact seal is capable of 300° F maximum temperature. Bearing misalignment should not to exceed $\pm 2^\circ$ in operation for best seal performance. When ordering seals for tapered bore (-K option) bearing, indication of which side to be sealed must be provided. The “L” in the option suffix defines a seal installed on larger bore diameter side of the taper, no indication will default to seal installed on small bore side.



“TS or TSS” Nylaplate High Temperature Seal

Combination labyrinth and contact seal for operating temperatures up to 450°F. Bearing misalignment should not to exceed $\pm 2^\circ$ in operation for best seal performance. Bearings with this seal option will include a high temperature grease fill designated by the VA grease suffix in the part number. When ordering seals for tapered bore (-K option) bearing, indication of which side to be sealed must be provided. The “L” in the option suffix defines a seal installed on larger bore diameter side of the taper, no indication will default to seal installed on small bore side.

Options continued



“YS or YSS” Lambda Seal

Utilizes a Nylaplate seal with an added contact seal for greater lip wiping seal function. Bearing misalignment should not exceed $\pm 1/2^\circ$ in operation for best seal performance and maximum $\pm 1^\circ$. When ordering seals for tapered bore (-K option) bearing, indication of which side to be sealed must be provided. The “L” in the option suffix defines a seal installed on larger bore diameter side of the taper, no indication will default to seal installed on small bore side.



“E”Expansion – Type E

A special version of the SPHERE-ROL bearing can be provided to accommodate expansion (float) internally to the bearing. The bearing design allows the SPHERE-ROL bearing to be the only spherical roller to have this ability, but does have a 10% reduction in BDR. Typically, application requiring tolerance for linear shaft expansion will have an expansion (Float) and non-expansion (fixed) position as mounted on a common shaft. The expansion-type SPHERE-ROL® bearing will not operate satisfactorily if subjected to thrust loading. Therefore, the expansion-type SPHERE-ROL® bearing must not be used in “fixed” (“held”) positions—it is for use only in “expansion” (“float”) positions. It is recommended that the end-wise restraint of both race rings of the expansion-type bearing be provided, so that the expansion allowance intended to be available is not lost by error in installation



“K” Tapered bore bearing

SPHERE-ROL® bearings are available with tapered bore feature for applications utilizing tapered adapter sleeve mounting arrangements or tapered shaft seats. This feature facilitates the mounting of SPHERE-ROL® bearings and can be used to prevent the necessity for heating of bearings or to eliminate the need for complicated press fitting practices. Standard tapered adapter sleeves, as well as associated lock nuts and lock washers, are tabulated within the engineering section and are identifiable with the appropriate bearing by the suffix number. The separate items may be called out individually by their part number or the complete tapered bore bearing and associated hardware may be identified by the suffix letter “A” following the bearing number. The standard bore taper of these bearings is 1” in 12”, on the diameter, and tapered bore bearings are themselves identified by the suffix letter “K” following the basic bearing number.

Options continued

Diametral Clearance

SPHERE-ROL® bearings are available in internal diametral clearance ranges identified as C2, Standard, C3 and C4. The internal diametral clearances are progressively less than the Standard, while C3 and C4 are progressively looser than Standard. Similarly, four internal clearance ranges are available for tapered bore SPHERE-ROL® bearings. Each of these ranges is somewhat looser than the corresponding cylindrical bore bearing internal diametral clearance range, because of the need to accommodate a somewhat tighter fit with the tapered bore mounting arrangement. The following two charts give the internal diametral clearance ranges normally available with SPHERE-ROL® bearings from McGill. Stock bearings having standard diametral clearance will not be identified by special marking; however, the C2, C3 and C4 clearances will be identified on the bearing inner ring face, following the basic bearing number.

“DS” Matched Bearings

When two SPHERE-ROL bearings are installed with the distance between both bearing less than the width of one bearing, it is recommended the bearings be diametrically matched to prevent unequal load sharing. The option, matches OD and ID tolerances, and Diametral Clearance with high point of runout indicated on the bearing faces. For more information and matching factors please review the engineering section for matched bearings.

Grease Options

When requested, standard bearings can be factory filled with customer specified lubricant or industry equivalent.



McGILL® SPHERE-ROL® Spherical Bearings



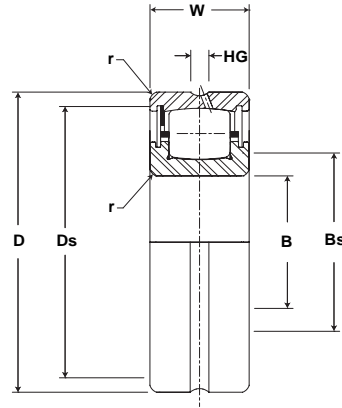
Basic Construction Type: 22200 Series Spherical Bearing With Non-Separable Inner Ring

Rolling Elements: Separated Spherical Rolling Elements

Bearing Material: Bearing Quality Steel

Seal Type: NYLAPLATE or LAMBDA

Lubrication: Sealed Bearings: Polyurea thickened NLGI 2 EP Grease.
Unsealed Bearings: Corrosion Preventive Oil



SB 22200

Part No.	B		D		W		Bs	Ds	HG	J	r	Limiting Speed (In Oil)	BDR	Bearing Weight
	Bore Diameter		Outside Diameter		Width		Min Shoulder Diameter Inner	Min Shoulder Diameter Outer	Annular Lub Groove	Lambda Seal Minimum Clearance	Maximum radius or fillet to clear		Basic Dynamic Rating	
	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	RPM*	N/lb	kg lb	
SB-22204	20.000	+0/- .010	47.000	+0/- .013	18.00	+0/- .13	25	41	3	3	1.0	11000	31,140	.15
	0.7874	+0/- .0004	1.8504	+0/- .0005	.709	+0/- .005	1.0	1.6	.1	.1	.04		7,000	.32
SB-22205	25.000	+0/- .010	52.000	+0/- .013	18.00	+0/- .13	30	46	5	3	1.0	9000	36,030	.18
	0.9843	+0/- .0004	2.0472	+0/- .0005	.709	+0/- .005	1.2	1.8	.2	.1	.04		8,100	.40
SB-22206	30.000	+0/- .010	62.000	+0/- .013	20.00	+0/- .13	36	56	5	3	1.0	8100	51,150	.29
	1.1811	+0/- .0004	2.4409	+0/- .0005	.787	+0/- .005	1.4	2.2	.2	.1	.04		11,500	.64
SB-22207	35.000	+0/- .013	72.000	+0/- .013	23.00	+0/- .13	41	61	5	3	1.0	6800	67,160	.43
	1.378	+0/- .0005	2.8346	+0/- .0005	.906	+0/- .005	1.6	2.4	.2	.1	.04		15,100	.95
SB-22208	40.000	+0/- .013	80.000	+0/- .013	23.00	+0/- .13	48	71	5	3	1.0	6000	74,730	.54
	1.5748	+0/- .0005	3.1496	+0/- .0005	.906	+0/- .005	1.9	2.8	.2	.1	.04		16,800	1.20
SB-22209	45.000	+0/- .013	85.000	+0/- .015	23.00	+0/- .13	53	74	5	3	1.0	5600	79,170	.59
	1.7717	+0/- .0005	3.3465	+0/- .0006	.906	+0/- .005	2.1	2.9	.2	.1	.04		17,800	1.30
SB-22210	50.000	+0/- .013	90.000	+0/- .015	23.00	+0/- .13	58	79	5	3	1.0	5250	83,180	.64
	1.9685	+0/- .0005	3.5433	+0/- .0006	.906	+0/- .005	2.3	3.1	.2	.1	.04		18,700	1.40
SB-22211	55.000	+0/- .015	100.000	+0/- .015	25.00	+0/- .15	64	89	5	3	1.5	4650	102,300	.86
	2.1654	+0/- .0006	3.937	+0/- .0006	.984	+0/- .006	2.5	3.5	.2	.1	.06		23,000	1.90
SB-22212	60.000	+0/- .015	110.000	+0/- .015	28.00	+0/- .15	71	99	5	3	1.5	4200	129,880	1.18
	2.3622	+0/- .0006	4.3307	+0/- .0006	1.102	+0/- .006	2.8	3.9	.2	.1	.06		29,200	2.60
SB-22213	65.000	+0/- .015	120.000	+0/- .015	31.00	+0/- .15	74	107	5	3	1.5	3800	157,900	1.54
	2.5591	+0/- .0006	4.7244	+0/- .0006	1.221	+0/- .006	2.9	4.2	.2	.1	.06		35,500	3.40
SB-22214	70.000	+0/- .015	125.000	+0/- .020	31.00	+0/- .15	79	112	5	3	1.5	3650	159,680	1.63
	2.7559	+0/- .0006	4.9213	+0/- .0008	1.221	+0/- .006	3.1	4.4	.2	.1	.06		35,900	3.60
SB-22215	75.000	+0/- .015	130.000	+0/- .020	31.00	+0/- .15	84	117	5	3	1.5	3500	167,240	1.77
	2.9528	+0/- .0006	5.1181	+0/- .0008	1.221	+0/- .060	3.3	4.6	.2	.1	.06		37,600	3.90

Add K to base number indicate K bore option

Add W22 for select OD

All bearings are supplied with W33 option unless otherwise specified

*Refers to oil lubrication and moderate load, use 50% of value for grease lubrication.

Complete adapter number indicated adapter sleeve, locknut, and washer, for components refer to S=sleeve, N= lock Nut, W= lock washer

For Expansion type bearing add E suffix immediately after diametrical clearance specification per nomenclature diagram.

For Sealing options see page D-8

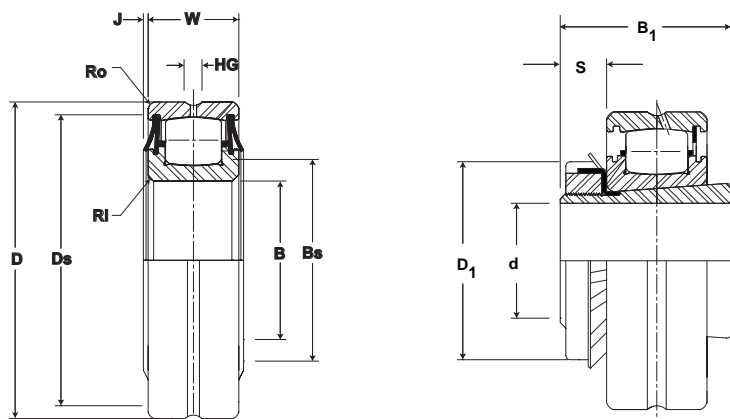
Outside diameter may be oversized, due to internal retaining ring

Metric dimensions for reference only.

Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

SPHERE-ROL® Spherical Bearings MCGILL®



SB 22200

Part No.	Straight Bore Internal Radial Clearance								Taper (K) Bore Internal Radial Clearance (1" in 12" on Diameter)								Optional Adapter Dimensions				
	C2		Standard		C3		C4		C2		Standard		C3		C4		Adapter No.	Adapter Shaft Dimension	B1	S	D1
	mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch			mm inch	mm inch		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	(Ref)	(Ref)	(Ref)	(Ref)	
SB-22204	.0102 .0004	.2032 .0008	.0356 .0014	.0457 .0018	.0610 .0024	.0152 .0006	.0254 .0010	.0356 .0014	.0457 .0018	.0610 .0024	-	-	-	-	-	-	-	-	-	-	
SB-22205	.0152 .0006	.0254 .0010	.0406 .0016	.0559 .0022	.0711 .0028	.0203 .0008	.0305 .0012	.0432 .0017	.0559 .0022	.0762 .0030	SNW 05*	3.3 .75	5.6 1.27	2.0 .45	6.9 1.56						
SB-22206	.0152 .0006	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.0203 .0008	.0356 .0014	.0508 .0020	.0660 .0026	.0864 .0034	SNW 06*	4.2 .94	6.0 1.36	2.0 .45	7.8 1.75						
SB-22207	.0152 .0006	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.0203 .0008	.0356 .0014	.0508 .0020	.0660 .0026	.0864 .0034	SNW 07*	5.3 1.19	6.4 1.45	2.1 .48	9.2 2.06						
SB-22208	.0203 .0008	.0356 .0014	.0559 .0022	.0762 .0030	.0813 .0032	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.1041 .0041	SNW 08*	5.8 1.31	6.7 1.50	2.2 .50	10.0 2.25						
SB-22209	.0203 .0008	.0356 .0014	.0559 .0022	.0762 .0030	.0813 .0032	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.1041 .0041	SNW 09*	6.4 1.44	7.0 1.58	2.2 .50	11.3 2.53						
SB-22210	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	SNW 10*	7.5 1.69	7.9 1.77	2.5 .56	12.0 2.69						
SB-22211	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	SNW 11*	8.6 1.94	8.2 1.84	2.5 .56	13.2 2.97						
SB-22212	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	-	-	-	-	-						
SB-22213	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	SNW 13	9.7 2.19	9.4 2.11	2.8 .63	15.0 3.38						
SB-22214	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	-	-	-	-	-						
SB-22215	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	SNW 15*	10.9 2.44	10.2 2.30	3.0 .67	17.3 3.88						

* For sizes marked, standard ABMA locknuts and lock washers will not clear the LAMBDA seal unless 1/16" thick spacer is used between the face of bearing and washer (or locknut).

McGILL® SPHERE-ROL® Spherical Bearings



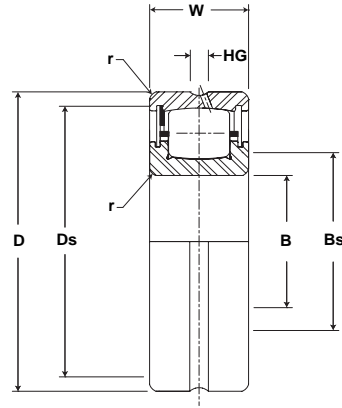
Basic Construction Type: 22200 Series Spherical Bearing With Non-Separable Inner Ring

Rolling Elements: Separated Spherical Rolling Elements

Bearing Material: Bearing Quality Steel

Seal Type: NYLAPLATE or LAMBDA

Lubrication: Sealed Bearings: Polyurea thickened NLGI 2 EP Grease.
Unsealed Bearings: Corrosion Preventive Oil



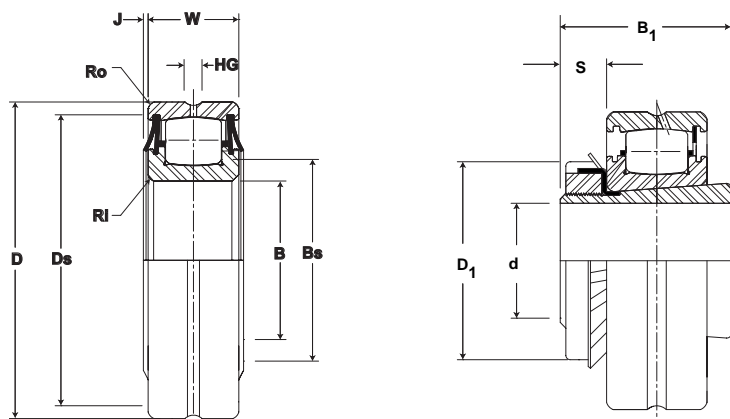
SB 22200 (continued)

Part No.	B		D		W		Bs	Ds	HG	J	r	Limiting Speed (In Oil)	BDR	Bearing Weight
	Bore Diameter		Outside Diameter		Width		Min Shoulder Diameter Inner	Min Shoulder Diameter Outer	Annular Lub Groove	Lambda Seal Minimum Clearance	Maximum radius or fillet to clear		Basic Dynamic Rating	
	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	RPM*	N/lb	kg lb	
SB-22216	80.000	+0/-.015	140.000	+0/-.020	33.00	+0/-.15	91	124	5	3	2.0	3250	188,600	2.09
	3.1496	+0/-.0006	5.5118	+0/-.0008	1.299	+0/-.006	3.6	4.9	.2	.1	.08		42,400	4.60
SB-22217	85.000	+0/-.020	150.000	+0/-.020	36.00	+0/-.20	97	135	5	3	2.0	3000	226,400	2.68
	3.3465	+0/-.0008	5.9055	+0/-.0008	1.417	+0/-.008	3.8	5.3	.2	.1	.08		50,900	5.90
SB-22218	90.000	+0/-.020	160.000	+0/-.025	40.00	+0/-.20	99	145	5	3	2.0	2800	263,320	3.40
	3.5433	+0/-.0008	6.2992	+0/-.0010	1.575	+0/-.008	3.9	5.7	.2	.1	.08		59,200	7.50
SB-22219	95.000	+0/-.020	170.000	+0/-.025	43.00	+0/-.20	107	155	8	3	2.0	2650	315,360	4.17
	3.7402	+0/-.0008	6.6929	+0/-.0010	1.693	+0/-.008	4.2	6.1	.3	.1	.08		70,900	9.20
SB-22220	100.000	+0/-.020	180.000	+0/-.025	46.00	+0/-.20	112	163	8	3	2.0	2500	345,610	5.03
	3.937	+0/-.0008	7.0866	+0/-.0010	1.811	+0/-.008	4.4	6.4	.3	.1	.08		77,700	11.10
SB-22222	110.000	+0/-.020	200.000	+0/-.030	53.00	+0/-.20	124	180	8	3	2.0	2200	444,800	7.21
	4.3307	+0/-.0008	7.874	+0/-.0012	2.087	+0/-.008	4.9	7.1	.3	.1	.08		100,000	15.90
SB-22224	120.000	+0/-.020	215.000	+0/-.030	58.00	+0/-.20	135	196	10	5	2.0	2050	533,760	8.98
	4.7244	+0/-.0008	8.4646	+0/-.0012	2.284	+0/-.008	5.3	7.7	.4	.2	.08		120,000	19.80
SB-22226	130.000	+0/-.025	230.000	+0/-.030	64.00	+0/-.25	150	211	10	5	2.5	1900	589,360	11.29
	5.1181	+0/-.0010	9.0551	+0/-.0012	2.520	+0/-.010	5.9	8.3	.4	.2	.10		132,500	24.80
SB-22228	140.000	+0/-.025	250.000	+0/-.030	68.00	+0/-.25	160	231	10	5	2.5	1750	707,680	14.19
	5.5118	+0/-.0010	9.8425	+0/-.0012	2.677	+0/-.010	6.3	9.1	.4	.2	.10		159,100	31.30
SB-22230	150.000	+0/-.025	270.000	+0/-.036	73.00	+0/-.25	170	246	13	5	2.5	1600	753,050	17.92
	5.9055	+0/-.0010	10.6299	+0/-.0014	2.874	+0/-.010	6.7	9.7	.5	.2	.10		169,300	39.50
SB-22236	180.000	+0/-.025	320.000	+0/-.041	86.00	+0/-.25	213	290	18	5	3.0	1350	1,024,820	21.92
	7.0866	+0/-.0010	12.5984	+0/-.0016	3.386	+0/-.010	8.4	11.4	.7	.2	.12		230,400	48.34

Add K to base number to indicate K bore option
Add W22 for select OD
All bearings are supplied with W33 option unless otherwise specified
*Refers to oil lubrication and moderate load, use 50% of value for grease lubrication.
Complete adapter number indicated adapter sleeve, locknut, and washer, for components refer to S=sleeve, N= lock Nut, W= lock washer
For Expansion type bearing add E suffix immediately after diametrical clearance specification per nomenclature diagram.
For Sealing options see page D-8
Outside diameter may be oversized, due to internal retaining ring

Metric dimensions for reference only.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

SPHERE-ROL® Spherical Bearings **McGILL®**



SB 22200 (continued)

Part No.	Straight Bore Internal Radial Clearance								Taper (K) Bore Internal Radial Clearance (1" in 12" on Diameter)								Optional Adapter Dimensions				
	C2		Standard		C3		C4		C2		Standard		C3		C4		Adapter No.	Adapter Shaft Dimension	B1	S	D1
	mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch			mm inch	mm inch		mm inch
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	(Ref)	(Ref)	(Ref)	(Ref)	
SB-22216	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	SNW 16	12.0	10.6	3.0	18.5						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075		2.69	2.38	.67	4.16						
SB-22217	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	SNW 17	13.1	11.0	3.1	19.6						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075		2.94	2.48	.70	4.41						
SB-22218	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	SNW 18	14.2	11.7	3.5	20.7						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075		3.19	2.64	.78	4.66						
SB-22219	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	-	-	-	-	-						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075											
SB-22220	.0432	.0787	.1219	.1626	.2108	.0635	.0991	.1346	.1753	.2261	SNW 20	15.3	12.8	3.7	23.1						
	.0017	.0031	.0048	.0064	.0083	.0025	.0039	.0053	.0069	.0089		3.44	2.88	.84	5.19						
SB-22222	.0432	.0787	.1219	.1626	.2108	.0635	.0991	.1346	.1753	.2261	SNW 22	17.5	14.2	4.0	25.4						
	.0017	.0031	.0048	.0064	.0083	.0025	.0039	.0053	.0069	.0089		3.94	3.20	.91	5.72						
SB-22224	.0508	.0965	.1448	.1905	.2413	.0762	.1194	.1600	.2057	.2591	SNW 24	18.6	15.4	4.2	27.3						
	.0020	.0038	.0057	.0075	.0095	.0030	.0047	.0063	.0081	.0102		4.19	3.47	.94	6.13						
SB-22226	.0508	.0965	.1448	.1905	.2413	.0762	.1194	.1600	.2057	.2591	SNW 26	19.7	16.8	4.4	30.0						
	.0020	.0038	.0057	.0075	.0095	.0030	.0047	.0063	.0081	.0102		4.44	3.77	1.00	6.75						
SB-22228	.0610	.1092	.1651	.2210	.2794	.0864	.1346	.1803	.2311	.2997	SNW 28	22.0	17.7	4.7	31.5						
	.0024	.0043	.0065	.0087	.0110	.0034	.0053	.0071	.0091	.0118		4.94	3.98	1.06	7.09						
SB-22230	.0610	.1092	.1651	.2210	.2794	.0864	.1346	.1803	.2311	.2997	SNW 30	23.1	18.8	5.0	34.2						
	.0024	.0043	.0065	.0087	.0110	.0034	.0053	.0071	.0091	.0118		5.19	4.23	1.13	7.69						
SB-22236	.0610	.1092	.1651	.2210	.2794	.0864	.1346	.1803	.2311	.2997	SNW 36	28.6	22.5	5.6	40.3						
	.0024	.0043	.0065	.0087	.0110	.0034	.0053	.0071	.0091	.0118		6.44	5.05	1.25	9.06						

McGILL® SPHERE-ROL® Spherical Bearings



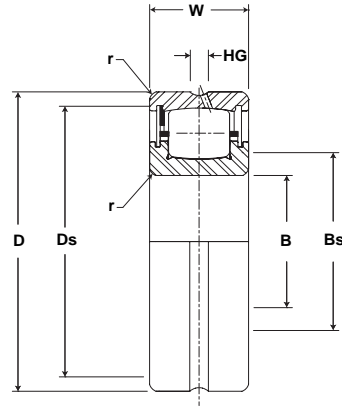
Basic Construction Type: 22300 Series Spherical Bearing With Non-Separable Inner Ring

Rolling Elements: Separated Spherical Rolling Elements

Bearing Material: Bearing Quality Steel

Seal Type: NYLAPLATE or LAMBDA

Lubrication: Sealed Bearings: Polyurea thickened NLGI 2 EP Grease.
Unsealed Bearings: Corrosion Preventive Oil



Sphere-Rol Bearings



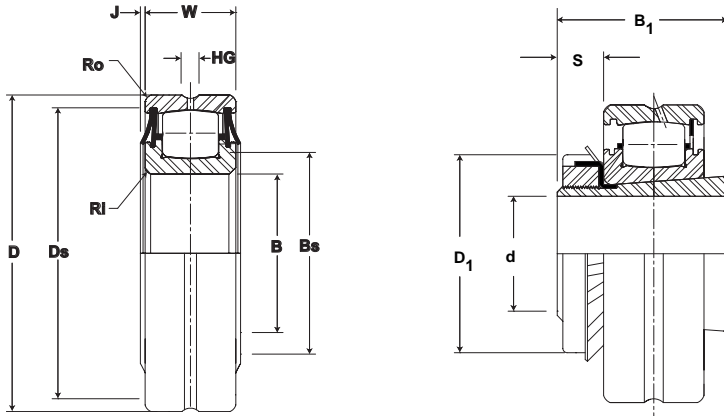
SB 22300

Part No.	B		D		W		Bs	Ds	HG	J	r	Limiting Speed (In Oil)	BDR	Bearing Weight
	Bore Diameter		Outside Diameter		Width		Min Shoulder Diameter Inner	Min Shoulder Diameter Outer	Annular Lub Groove	Lambda Seal Minimum Clearance	Maximum radius or fillet to clear		Basic Dynamic Rating	
	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	RPM*	N/lb	kg lb
SB-22308	40.000	+0/-.013	90.000	+0/-.015	33.00	+0/-.13	48	79	5	2.3	1.5	5250	113,870	1.04
	1.5748	+0/-.0005	3.5433	+0/-.0006	1.299	+0/-.005	1.9	3.1	.2	.09	.06		25,600	2.30
SB-22309	45.000	+0/-.013	110.000	+0/-.015	36.00	+0/-.13	53	89	8	2.3	1.5	4650	133,880	1.41
	1.7717	+0/-.0005	3.937	+0/-.0006	1.417	+0/-.005	2.1	3.5	.3	.09	.06		30,100	3.10
SB-22310	50.000	+0/-.013	110.000	+0/-.015	40.00	+0/-.13	61	99	8	2.3	2.0	4200	166,360	1.86
	1.9685	+0/-.0005	4.3307	+0/-.0006	1.575	+0/-.005	2.4	3.9	.3	.09	.08		37,400	4.10
SB-22311	55.000	+0/-.013	120.000	+0/-.015	43.00	+0/-.15	66	109	8	3.3	2.0	3800	183,700	2.40
	2.1654	+0/-.0005	4.7244	+0/-.0006	1.693	+0/-.006	2.6	4.3	.3	.13	.08		41,300	5.30
SB-22312	60.000	+0/-.013	130.000	+0/-.020	46.00	+0/-.15	71	117	8	3.3	2.0	3500	243,310	2.99
	2.3622	+0/-.0005	5.1181	+0/-.0008	1.811	+0/-.006	2.8	4.6	.3	.13	.08		54,700	6.60
SB-22313	65.000	+0/-.013	140.000	+0/-.020	48.00	+0/-.15	76	124	8	3.3	2.0	3250	265,550	3.54
	2.5591	+0/-.0005	5.5118	+0/-.0008	1.890	+0/-.006	3.0	4.9	.3	.13	.08		59,700	7.80
SB-22314	70.000	+0/-.013	150.000	+0/-.020	51.00	+0/-.15	84	137	8	3.3	2.0	3000	304,240	4.31
	2.7559	+0/-.0005	5.9055	+0/-.0008	2.008	+0/-.006	3.3	5.4	.3	.13	.08		68,400	9.50
SB-22315	75.000	+0/-.013	160.000	+0/-.025	55.00	+0/-.15	86	137	8	3.3	2.0	2800	332,710	5.39
	2.9528	+0/-.0005	6.2992	+0/-.0010	2.165	+0/-.006	3.4	5.4	0.3	.13	.08		74,800	11.90
SB-22316	80.000	+0/-.013	170.000	+0/-.025	58.00	+0/-.15	91	155	8	3.3	2.0	2650	344,720	6.30
	3.1496	+0/-.0005	6.6929	+0/-.0010	2.284	+0/-.006	3.6	6.1	.3	.13	.08		77,500	13.90

Add K to base number indicate K bore option
 Add W22 for select OD
 All bearings are supplied with W33 option unless otherwise specified
 *Refers to oil lubrication and moderate load, use 50% of value for grease lubrication.
 Complete adapter number indicated adapter sleeve, locknut, and washer, for components refer to S=sleeve, N= lock Nut, W= lock washer
 For Expansion type bearing add E suffix immediately after diametrical clearance specification per nomenclature diagram.
 For Sealing options see page D-8
 Outside diameter may be oversized, due to internal retaining ring

Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

SPHERE-ROL® Spherical Bearings MCGILL®



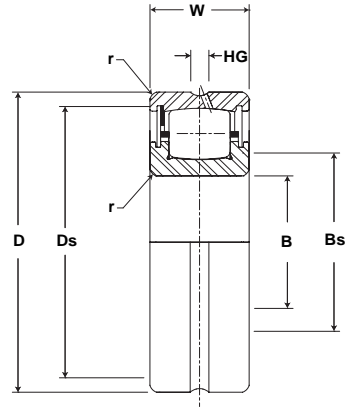
SB 22300

Part No.	Straight Bore Internal Radial Clearance								Taper (K) Bore Internal Radial Clearance (1" in 12" on Diameter)								Optional Adapter Dimensions				
	C2		Standard		C3		C4		C2		Standard		C3		C4		Adapter No.	Adapter Shaft Dimension	B1	S	D1
	mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch			mm inch	mm inch		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	(Ref)	(Ref)	(Ref)	(Ref)	
SB-22308	.0203 .0008	.0356 .0014	.0559 .0022	.0762 .0030	.0813 .0032	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.1041 .0041	-	-	-	-	-	-	-	-	-	-	
SB-22309	.0203 .0008	.0356 .0014	.0559 .0022	.0762 .0030	.0813 .0032	.0305 .0012	.0457 .0018	.0610 .0024	.0813 .0032	.1041 .0041	SNW 109	6.4 1.44	9.5 2.14	2.2 .50	11.3 2.53	-	-	-	-	-	
SB-22310	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	-	-	-	-	-	-	-	-	-	-	
SB-22311	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	SNW 111	8.6 1.94	11.2 2.52	2.5 .56	13.2 2.97	-	-	-	-	-	
SB-22312	.0254 .0010	.0432 .0017	.0660 .0026	.0914 .0036	.1194 .0047	.0356 .0014	.0559 .0022	.0762 .0030	.0991 .0039	.1245 .0049	-	-	-	-	-	-	-	-	-	-	
SB-22313	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	SNW 113	9.7 2.19	12.3 2.77	2.8 .63	15.0 3.38	-	-	-	-	-	
SB-22314	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	-	-	-	-	-	-	-	-	-	-	
SB-22315	.0305 .0012	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.0457 .0018	.0711 .0028	.0940 .0037	.1245 .0049	.1549 .0061	SNW 115	10.9 2.44	13.7 3.08	3.0 .67	17.3 3.88	-	-	-	-	-	
SB-22316	.0356 .0014	.0635 .0025	.0991 .0039	.1346 .0053	.1803 .0071	.0508 .0020	.0813 .0032	.1118 .0044	.1448 .0057	.1905 .0075	SNW 116	12.0 2.69	14.2 3.20	3.0 .67	18.5 4.16	-	-	-	-	-	

McGILL® SPHERE-ROL® Spherical Bearings



- Basic Construction Type:** 22300 Series Spherical Bearing With Non-Separable Inner Ring
- Rolling Elements:** Separated Spherical Rolling Elements
- Bearing Material:** Bearing Quality Steel
- Seal Type:** NYLAPLATE or LAMBDA
- Lubrication:** Sealed Bearings: Polyurea thickened NLGI 2 EP Grease.
Unsealed Bearings: Corrosion Preventive Oil



Sphere-Rol Bearings



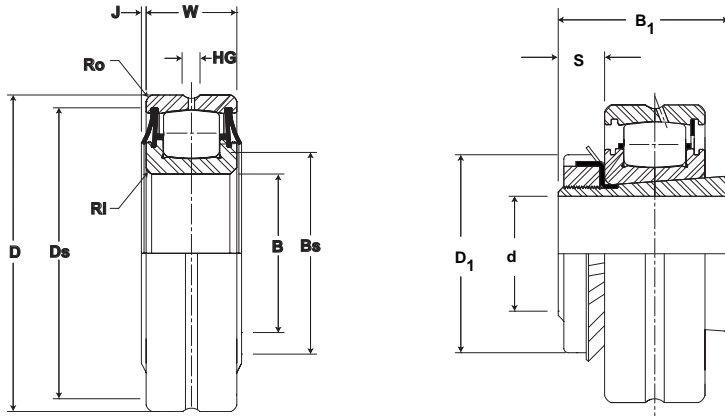
SB 22300 (continued)

Part No.	B		D		W		Bs	Ds	HG	J	r	Limiting Speed (In Oil)	BDR	Bearing Weight
	Bore Diameter		Outside Diameter		Width		Min Shoulder Diameter Inner	Min Shoulder Diameter Outer	Annular Lub Groove	Lambda Seal Minimum Clearance	Maximum radius or fillet to clear		Basic Dynamic Rating	
	Nom.	Tol.	Nom.	Tol.	Nom.	Tol.	Ref	Ref	W33	Ref	Ref	RPM*	N/lb	kg lb
SB-22317	85.000	+0/-.020	180.000	+0/-.025	60.00	+0/-.20	99	163	8	3.3	2.5	2500	423,000	7.35
	3.3465	+0/-.0008	7.0866	+0/-.0010	2.362	+0/-.008	3.9	6.4	.3	.13	.10		95,100	16.20
SB-22318	90.000	+0/-.020	190.000	+0/-.030	64.00	+0/-.20	104	173	10	3.3	2.5	2350	437,680	8.71
	3.5433	+0/-.0008	7.4803	+0/-.0012	2.520	+0/-.008	4.1	6.8	.4	.13	.10		98,400	19.20
SB-22319	95.000	+0/-.020	200.000	+0/-.030	67.00	+0/-.20	112	180	10	4.1	2.5	2200	486,610	10.29
	3.7402	+0/-.0008	7.874	+0/-.0012	2.638	+0/-.008	4.4	7.1	.4	.16	.10		109,400	22.70
SB-22320	100.000	+0/-.020	215.000	+0/-.030	73.00	+0/-.20	117	196	10	4.8	2.5	2050	572,900	12.88
	3.937	+0/-.0008	8.4646	+0/-.0012	2.874	+0/-.008	4.6	7.7	.4	.19	.10		128,800	28.40
SB-22322	110.000	+0/-.203	240.000	+0/-.030	80.00	+0/-.03	130	218	13	4.8	2.5	1800	805,980	19.37
	4.3307	+0/-.0080	9.4488	+0/-.0012	3.150	+0/-.800	5.1	8.6	.5	.19	.10		181,200	42.71

Add K to base number indicate K bore option
 Add W22 for select OD
 All bearings are supplied with W33 option unless otherwise specified
 Refers to oil lubrication and moderate load, use 50% of value for grease lubrication.
 Complete adapter number indicated adapter sleeve, locknut, and washer, for components refer to S=sleeve, N= lock Nut, W= lock washer
 For Expansion type bearing add E suffix immediately after diametrical clearance specification per nomenclature diagram.
 For Sealing options see page D-8
 Outside diameter may be oversized, due to internal retaining ring

Metric dimensions for reference only.
 Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
 For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

SPHERE-ROL® Spherical Bearings **McGILL®**



SB 22300 (continued)

Part No.	Straight Bore Internal Radial Clearance								Taper (K) Bore Internal Radial Clearance (1" in 12" on Diameter)								Optional Adapter Dimensions				
	C2		Standard		C3		C4		C2		Standard		C3		C4		Adapter No.	Adapter Shaft Dimension	B1	S	D1
	mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch		mm inch			mm inch		mm inch	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	(Ref)	(Ref)	(Ref)	(Ref)	
SB-22317	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	SNW 117	13.1	14.7	3.1	19.6						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075		2.94	3.31	.70	4.41						
SB-22318	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	SNW 118	14.2	15.8	3.5	20.7						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075		3.19	3.55	.78	4.66						
SB-22319	.0356	.0635	.0991	.1346	.1803	.0508	.0813	.1118	.1448	.1905	-	-	-	-	-						
	.0014	.0025	.0039	.0053	.0071	.0020	.0032	.0044	.0057	.0075											
SB-22320	.0432	.0787	.1219	.1626	.2108	.0635	.0991	.1346	.1753	.2261	SNW 120	15.3	17.7	3.7	23.1						
	.0017	.0031	.0048	.0064	.0083	.0025	.0039	.0053	.0069	.0089		3.44	3.97	.84	5.19						
SB-22322	.0432	.0787	.1219	.1626	.2108	.0635	.0991	.1346	.1753	.2261	SNW 122	17.5	20.9	4.0	25.4						
	.0017	.0031	.0048	.0064	.0083	.0025	.0039	.0053	.0069	.0089		3.94	4.69	.91	5.72						

Load Ratings and Life

Life Calculations

The L10 (rating) life for any given application and bearing selection can be calculated in terms of millions of revolutions by using the bearing Basic Dynamic Rating and applied radial load (or, equivalent radial load in the case of radial bearing applications having combined radial and thrust loads). The L10 life for any given application can be calculated in terms of hours, using the bearing Basic Dynamic Rating, applied load (or equivalent radial load) and suitable speed factors, by the following equation:

$$L_{10} = \left(\frac{C}{P}\right) \times \frac{1,000,000}{60 \times n} = \left(\frac{C}{P}\right)^{10/3} \times \frac{16667}{n}$$

Where:

L_{10} = The # of hours that 90% of identical bearings under ideal conditions will operate at a specific speed and condition before fatigue is expected to occur.

C = Basic Dynamic Rating (lbs)
1,000,000 Revolutions

P = Constant Equivalent Radial Load (lbs)

n = Speed (RPM)

Additionally, the ABMA provides application factors for all types of bearings which need to be considered to determine an adjusted Rated Life (L_{na}). L10 life rating is based on laboratory conditions yet other factors are encountered in actual bearing application that will reduce bearing life. L_{na} life rating takes into account reliability factors, material type, and operating conditions.

$$L_{na} = a_1 \times a_2 \times a_3 \times L_{10}$$

Where:

L_{na} = Adjusted Rated Life.

a_1 = Reliability Factor. Adjustment factor applied where estimated fatigue life is based on reliability other than 90% (See Table No 1).

Table No. 1 Life Adjustment Factor for Reliability

Reliability %	L_{na}	a_1
90	L10	1
95	L5	0.62
96	L4	0.53
97	L3	0.44
98	L2	0.33
99	L1	0.21
50	L50	5

a_2 = Material Factor. Life adjustment for bearing race material. Power Transmission Solutions bearing races are manufactured from bearing quality steel. Therefore the a_2 factor is 1.0.

a_3 = Life Adjustment Factor for Operating Conditions. This factor should take into account the adequacy of lubricant, presence of foreign matter, conditions causing changes in material properties, and unusual loading or mounting conditions. Assuming a properly selected and mounted bearing having adequate seals and lubricant operating below 250°F and tight fitted to the shaft, the a_3 factor should be 1.0.

Load Ratings and Life Continued

Vibration and shock loading can act as an additional loading to the steady expected applied load. When shock or vibration is present, an a3 Life Adjustment Factor can be applied. Shock loading has many variables which often are not easily determined. Typically, it is best to rely on one's experience with the particular application. Consult Application Engineering for assistance with applications involving shock or vibration loading.

The a3 factor takes into account a wide range of application and mounting conditions as well as bearing features and design. Accurate determination of this factor is normally achieved through testing and in-field experience. Power Transmission Solutions offers a wide range of options which can maximize bearing performance. Consult Application Engineering for more information.



Combined Load – Single Row Spherical Roller Bearings

1. Calculate F_a/F_r .

When $F_a/F_r \leq 0.12$; $P = V F_r$

When $F_a/F_r > 0.12$; $P = 0.4 V F_r + 5.0 F_a$

P = Equivalent radial load, lbs.

F_r = Applied radial load, lbs.

F_a = Applied thrust load, lbs.

V = Rotation factor

= 1.0 for most applications

= 1.2 for vibratory applications

For applications involving combination loads in which $F_a/F_r > 0.20$, consult Application Engineering.

2. Calculate the L10 life using the life equation on page D-19.

Load Ratings and Life Continued

Variable Load Formula

Root mean load (RML) is to be used when a number of varying loads are applied to a bearing for varying time limits. Maximum loading still must be considered for bearing size selection.

$$RML^* = \sqrt[10/3]{\frac{(L_1^{10/3} N_1) + (L_2^{10/3} N_2) + (L_3^{10/3} N_3)}{100}}$$

Where:

RML = Root Mean Load (lbs.)

L₁, L₂, etc. = Load in pounds

N₁, N₂, etc. = Percent of total time operated at loads L₁, L₂, etc.

* Apply RML to rating at mean speed to determine resultant life.

Mean Speed Formula

The following formula is to be used when operating speed varies over time.

$$\text{Mean Speed} = \frac{S_1 N_1 + S_2 N_2 + S_3 N_3}{100}$$

S₁, S₂, etc = Speeds in RPM

N₁, N₂, etc = Percentage of total time operated at speeds S₁, S₂, etc

Bearing Life In Oscillating Applications

The equivalent rotative speed (ERS) is used in life calculations when the bearing does not make complete revolutions during operation. The ERS is then used as the bearing operating speed in the calculation of the L10 (Rating) Life. The formula is based on sufficient angular rotation to have roller paths overlap.

ERS = Equivalent Rotative Speed

N = Total number of degrees per minute through which the bearing will rotate.

$$ERS = \frac{N}{360}$$

In the above formula, allowance is made for the total number of stress applications on the weakest race per unit time, which, in turn, determines fatigue life and the speed factors. The theory behind fretting corrosion is best explained by the fact that the rolling elements in small angles of oscillation retrace a path over an unchanging area of the inner or outer races where the lubricant is prevented by inertia from flowing in behind the roller as the bearing oscillates in one direction. Upon reversal, this small area of rolling contact is traversed by the same roller in the dry state. The friction of the two unlubricated surfaces causes fretting corrosion and produces failures which are unpredictable from a normal life standpoint.



Load Ratings and Life Continued

With a given bearing selected for an oscillating application, the best lubrication means is a light mineral oil under positive flow conditions. With a light oil, there is a tendency for all areas in the bearing load zone to be immersed in lubricant at all times. The full flow lubrication dictates that any oxidized material which may form is immediately carried away by the lubricant, and since these oxides are abrasive, further wear tends to be avoided. If grease lubrication must be used, it is best to consult with either the bearing manufacturer or the lubricant manufacturer to determine the best possible type of lubricant. Greases have been compounded to resist the detrimental effect of fretting corrosion for such applications.



Minimum Bearing Load

Skidding, or sliding, of the rolling elements on the raceway instead of a true rolling motion can cause excessive wear. Applications with high speeds and light loading are particularly prone to skidding. As a general guideline, rolling element bearings should be radially loaded at least 2% of Basic Dynamic Rating. For applications where load is light relative to the bearings dynamic load rating, consult Application Engineering for assistance.

Spherical Engineering Section

Equivalent Loads

When SPHERE-ROL® bearings operate under conditions of combined radial and thrust loads, an equivalent radial load must be calculated to determine resultant bearing life. SPHERE-ROL® bearings are not recommended for applications involving pure thrust loads; however, combination loads may be carried in accordance with the following equivalent radial load formulae:

$$\text{When } \frac{F_a}{F_r} \leq 0.12; P = VF_r$$

$$\text{When } \frac{F_a}{F_r} < 0.12; P = .4VF_r + 5.0 F_a$$

P = Equiv. radial load, lbs.

Fr = Applied radial load, lbs.

Fa = Applied thrust load, lbs.

V = Rotation factor

= 1.0 for most applications

= 1.2 for vibratory applications

For applications involving combination loads in which $F_a/F_r > .20$, consult Application Engineering.

Static Load Rating

The "static load rating" is that uniformly distributed static radial bearing load which produces a maximum contact stress of 580,000 PSI, acting at the center of contact of the most heavily loaded rolling element. At this stress level, plastic deformation begins (or begins to be significant). Experience has shown that the plastic deformation at this stress level can be tolerated in most bearing applications without impairment of subsequent bearing operation. In certain applications where subsequent rotation of the bearing is slow and where smoothness and friction requirements are not too exacting, a higher static load limit can be tolerated. Where extreme smoothness is required or friction requirements are critical, a lower static load limit may be necessary.

When static bearings are subjected to both radial and thrust loads, the equivalent static radial load is defined as:

$$PO = 0.5 Fr + 4.0 Fa \text{ or}$$

$$PO = Fr \text{ whichever is greater.}$$

Contact Application Engineering for specific static load ratings, and applications involving pure static thrust loads.



Spherical Engineering Section continued



Matched Bearings

Where bearings are mounted so that the distance between them is less than the width of one bearing, it is recommended under heavy loading conditions to provide some degree of diametral matching in order to prevent unequal sharing of the applied load.

Matching procedures have been developed to provide super precision matching of bearings.

Bearings matched in this category are identified by "-DS" suffix for super precision.

- A. O.D. and I.D., where applicable, of matched bearings same diameters within 30% of the respective O.D. or I.D. tolerance.
- B. Diametral clearance, where applicable, of matched bearings same within 30% of the tolerance range.
- C. Radial runout of matched bearings same within 20% of the tolerance range.
- D. High point of radial runout marked on the face of each outer and inner ring.
- E. Matched bearings are packaged as a unit.

Matching Factor	Matching Suffix
1.55	None
1.71	"-DS"

Multiply Matching Factor by rating of single bearing to obtain resultant rating for pair of bearings.

Diametral Clearance

SPHERE-ROL® bearings are available in four internal diametral clearance ranges identified as C2, Standard, C3 and C4. The C2 internal diametral clearance is less than the Standard, while C3 and C4 are progressively looser than Standard.

Similarly, four internal clearance ranges are available for tapered bore SPHERE-ROL® bearings. Each of these ranges is somewhat looser than the corresponding cylindrical bore bearing internal diametral clearance range, because of the need to accommodate a somewhat tighter fit with the tapered bore mounting arrangement.

The two charts below give the internal diametral clearance ranges normally available with SPHERE-ROL® bearings

Bearings having standard diametral clearance will not be identified by special marking; however, the C2, C3 and C4 clearances will be identified on the bearing inner ring face, following the basic bearing number. Consult Customer Service for availability on non-standard diametral clearances.

Spherical Engineering Section continued

Radial Clearance (inches) for “SB” Bearings with a Straight Bore

Basic Bore Diameter MM		Radial Clearance in Inches							
		C2		Standard		C3		C4	
Over	Incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
14	24	.0004	.0008	.0008	.0014	.0014	.0018	.0018	0.002
24	30	.0006	.0010	.0010	.0016	.0016	.0022	.0022	0.003
30	40	.0006	.0012	.0012	.0018	.0018	.0024	.0024	0.003
40	50	.0008	.0014	.0014	.0022	.0022	.0030	.0030	0.004
50	65	.0010	.0017	.0017	.0026	.0026	.0036	.0036	0.005
65	80	.0012	.0020	.0020	.0032	.0032	.0044	.0044	0.006
80	100	.0014	.0025	.0025	.0039	.0039	.0053	.0053	0.007
100	120	.0017	.0031	.0031	.0048	.0048	.0064	.0064	0.008
120	140	.0020	.0038	.0038	.0057	.0057	.0075	.0075	0.010
140	160	.0024	.0043	.0043	.0065	.0065	.0087	.0087	0.011
1600	180	.0026	.0047	.0047	.0071	.0071	.0095	.0095	0.012

Radial Clearance (inches) for “SB” Bearings with a Tapered (“K” Type) Bore

Basic Bore Diameter MM		Radial Clearance in Inches							
		C2		Standard		C3		C4	
Over	Incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
14	24	.0006	.0010	.0010	.0014	.0014	.0018	.0018	0.002
24	30	.0008	.0012	.0012	.0017	.0017	.0022	.0022	0.003
30	40	.0008	.0014	.0014	.0020	.0020	.0026	.0026	0.003
40	50	.0012	.0018	.0018	.0024	.0024	.0032	.0032	0.004
50	65	.0014	.0022	.0022	.0030	.0030	.0039	.0039	0.005
65	80	.0018	.0028	.0028	.0037	.0037	.0049	.0049	0.006
80	100	.0020	.0032	.0032	.0044	.0044	.0057	.0057	0.008
100	120	.0025	.0039	.0039	.0053	.0053	.0069	.0069	0.009
120	140	.0030	.0047	.0047	.0063	.0063	.0081	.0081	0.010
140	160	.0034	.0051	.0051	.0071	.0071	.0091	.0091	0.012
1600	180	.0037	.0055	.0055	.0079	.0079	.0102	.0102	0.013

Expansion-Type SPHERE-ROL® Bearings

A special version of the SPHERE-ROL® bearing can be provided for applications requiring the bearing to accommodate expansion (float) internally. This “expansion-type” SPHERE-ROL® bearing is specified and identified by adding the suffix letter “E” immediately following the diametral clearance specification. (For instance, SB-22319-C3E-W33.)

Most applications incorporating two bearings on a common shaft require that one of those bearings be “fixed” and that the other be free to “float,” either in the housing seat bore or on the shaft seat. This float allowance, or expansion allowance, is required to compensate for variations in thermal expansion, or for linear dimension errors resulting from fabrication. In many cases, ordinary nonseparable ball or roller bearings are used for expansion but they are unsatisfactory because of housing or shaft seat diameter tolerances, the application of heavy loads or misalignment.

Spherical Engineering Section continued

Self-aligning bearings are preferred and the expansion-type SPHERE-ROL® roller bearing is the only internally self-aligning bearings having the capability of accommodating expansion or float allowance internally.

This expansion-type SPHERE-ROL® bearing is dimensionally interchangeable, size for size, with "standard" spherical roller bearings; but, because of changes in internal geometry, it does provide substantial axial play of one race ring relative to the other. The expansion allowance in this type SPHERE-ROL® bearing is normally as much as the end play or expansion allowance that would be found in a non-locating cylindrical roller bearing.

The "E" type SPHERE-ROL® bearing is available with the same sealing advantages, diametral clearance values, tapered bore and outer ring relubrication features as standard bearings shown on page D-25. The basic dynamic rating of "E" type SPHERE-ROL® bearings is 10% less than standard SPHERE-ROL® bearings. Maximum seal misalignment is limited due to increased axial play in bearing.

The expansion-type SPHERE-ROL® bearing will not operate satisfactorily if subjected to thrust loading. Therefore, the expansion-type SPHERE-ROL® bearing must not be used in "fixed" ("held") positions—it is for use only in "expansion" ("float") positions. It is recommended that the end-wise restraint of both race rings of the expansion-type bearing be provided, so that the expansion allowance intended to be available is not lost by error in installation.

Expansion-type SPHERE-ROL® bearings are not normally available from stock. Consult Customer Service for availability.



Spherical Engineering Section continued

Lubrication - SPHERE-ROL® Bearings

SPHERE-ROL® bearings as supplied are factory lubricated as follows. Consult Application Engineering regarding grease compatibility issues.

Sphere-Rol Bearings



Lubricant	Bearing Type	Lubricant Temp. Limits (1)
NYLAPLATE® (-S, -SS) LAMBDA® (-YS, -YSS)	NLGI #2 EP grease, polyurea thickened	-30° to +300°F (-34° to 149°C)
High Temp. NYLAPLATE® (-TS, -TSS)	NLGI #2 high temp. grease, inorganic thickener	0° to +400°F (-18° to 204°C)
Unsealed	None, bearing coated with corrosion preventive oil	--

(1) Temperature limits are provided as a capability of the grease lubricant only.

Satisfactory bearing performance at these temperature limits can be dependent on proper lubrication maintenance, internal clearance, bearing materials and installation. Consult Application Engineering for recommendations.

Lubrication Maintenance

For most applications, due to speed, contamination or temperature conditions, some lubrication interval will be required for sealed SPHERE-ROL® bearings. As such, the sealed SPHERE-ROL® bearing can not typically be applied as a maintenance-free bearing. The “-W33” lubrication groove and holes in the outer ring outside diameter provides a means to add fresh grease or oil as applicable to the bearing through the housing. NYLAPLATE® seals have a venting feature which allows excess or old grease to purge from the bearing.

Frequency of lubrication depends primarily upon the speed of rotation of the bearing, the type of lubrication employed, the amount of contamination present and the relationship of thrust to radial loading. For continuously rotating applications, it is necessary to either provide continuous oil lubrication or else periodic grease lubrication, depending upon the severity of service. Automatic lubrication devices are ideal for intermittent lubrication, since accurate metering of grease and consistent relubrication is maintained through the use of these devices.

Best determination of relubrication interval can be made by testing or experience in the application. Contact Application Engineering for assistance in determining relubrication interval.

Spherical Engineering Section continued

Mounting Details - Spherical Roller Bearings Cylindrical Bore

Proper mounting of SPHERE-ROL® spherical roller bearings generally requires a press fit of the ring rotating relative to the radial load. A close to loose fit is used for the ring stationary relative to the radial load. Specific shaft and housing fit selection and respective diameters are listed in the tables below and following pages. The following are some general guidelines and details to bear in mind when installing this bearing series.



1. Inspect housing and shaft.

- Clean, remove burrs and sharp edges.
- If any damage has occurred to the bearing seat in the housing or on the shaft, repair that damage to bring the seat surface back to its original condition.
- Ground shaft finishes are normally suggested. Consult Application Engineering if machined finish is to be used.
- When stationary outer rings are required to float (move axially in the housing bore to compensate for expansion), a housing bore surface finish of 65 microinches Ra is recommended.

2. Determine which member, shaft or housing has an interference fit with the bearing.

- In general, the ring rotating relative to the radial load has an interference fit.
- Refer to Shaft and Housing seat fit tables for respective fits and tolerances. For applications not covered by these tables, consult Application Engineering for recommendations.

3. Install the bearing onto the press-fitted member by applying force against the bearing ring that is press-fitted.

- For a press-fitted inner ring, apply the force required to assemble the bearing onto the shaft against the face of the bearing inner ring.
- For a press-fitted outer ring, apply the force required to assemble the bearing into the housing against the face of the bearing outer ring.
- Care should be exercised to assure that the bearing starts onto the press-fitted member as squarely as possible.
- Use arbor press whenever possible.
- Do not hammer on bearing ring face.

4. Inner rings press-fitted on the shaft may be more easily installed by heating the ring and causing it to shrink fit.

- Normally, heating the ring to 175°F to 212°F (79°C to 100°C) will be sufficient to allow the ring to slide over the interference fit shaft seat.
- Heating the ring should be accomplished with an induction heater or in a mineral oil bath. Never use a torch to heat a bearing for assembly purposes.
- Sealed bearings should not be heated in oil bath as the grease with which the bearings are filled may be affected.

Spherical Engineering Section continued

5. When outer rings are to be press-fitted into a housing, it is desirable to heat the housing to allow it to shrink fit onto the outer ring outside diameter.

- Freezing the bearing to shrink it for easy assembly into a press-fitted housing is not recommended. Water condensation can form inside the bearing upon its return to room temperature, which can lead to corrosion. Exposure to extreme cold can also affect the metallurgical structure of the bearing.

6. Proper caution should be exercised during installation to guard against axial preload of the bearing. This can be checked by:

- Endplay - Check for endwise "shake" which when present shows that the bearings as installed have endplay.
- Ease of Rotation - Rotate assembly by hand. The bearing must be free from unusual drag or noises.

CAUTION - During installation, do not misalign NYLAPLATE® sealed bearing more than 3° and LAMBDA® sealed bearings more than 1° or seal(s) may be damaged.

Mounting Details - Spherical Roller Bearings

Tapered Bore

SPHERE-ROL® bearings are available with tapered bore feature for applications utilizing tapered adapter sleeve mounting arrangements or tapered shaft seats. This feature sometimes facilitates the mounting of SPHERE-ROL® bearings and can be used to prevent the necessity for heating of bearings or to eliminate the need for complicated press fitting practices.

Standard tapered adapter sleeves, as well as associated lock nuts and lock washers, are tabulated on pages D-11 to D-18 and are identifiable with the appropriate bearing by the suffix number. The separate items may be called out individually by their part number or the complete tapered bore bearing and associated hardware may be identified by the suffix letter "A" following the bearing number. The standard bore taper of these bearings is 1" in 12", on the diameter, and tapered bore bearings are themselves identified by the suffix letter "K" following the basic bearing number.

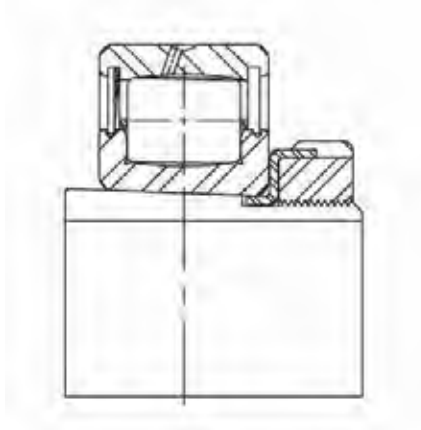
In mounting, the bearing bore is forced against the taper of the split adapter sleeve or the tapered shaft seat by the action of a lock nut. A progressively tighter fit can be obtained by tightening the lock nut to increase the axial displacement of the bearing along the taper. Due to the need for greater take-up of internal clearance with this type of mounting, special internal clearances are provided. Care must be exercised to insure that the optimum take-up of internal clearance is followed. Too great a reduction of internal clearance will result in potential overheating of the bearing in many applications.

The mounting procedure for adapter mounted, tapered bore SPHERE-ROL® bearings does not require the use of feeler gauge or special gauging procedure. The basic principle of this measurement system is the use of the lock nut and lock washer as a protractor device. Because the lock nuts available for each basic bearing size are standard items, they are manufactured to specific thread pitches. Thus, the axial advancement for each revolution of the nut is predetermined, and the portions of revolutions of the lock nuts required to obtain the correct internal clearance reduction is also predetermined. Additionally, the standard lock washers have a specific number of tangs for each size, and these tangs can be used as the protractor for determining the correct portions of revolutions of the lock nuts. The basic procedure is as follows:

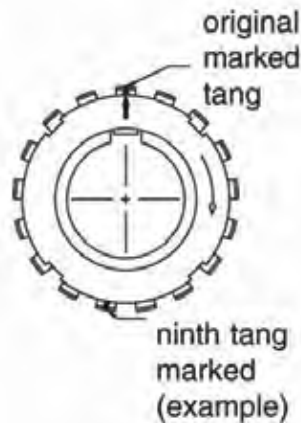


Spherical Engineering Section continued

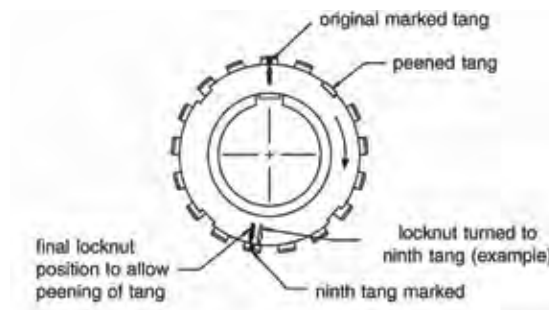
1. To reduce friction and facilitate mounting, apply a medium weight oil to the bearing bore, the outside diameter of the adapter sleeve, all threads and the face of the lock nut.



2. Mount the bearing on the tapered seat with a snug fit between the adapter bore and the shaft seat, with the lock nut and lock washer mounted snugly against the face of the bearing inner ring. (A snug fit is obtained when the adapter sleeve no longer rotates when the lock nut is tightened.) At this point, no internal clearance has been removed from the bearing and any advancement of the lock nut will result in reduction of internal clearance due to interference between the bearing bore and tapered seat.



3. Mark a lock washer tang in any suitable manner, and the adjacent, mating area of the lock nut.
4. Count in the direction of tightening, a certain number of tangs, specified at the right.
5. Mark the specified lock washer tang.



Spherical Engineering Section continued

6. Tighten the lock nut until the marked area on the lock nut is in line with the prescribed lock washer tang. (Lightly striking the face of the lock nut with a soft steel bar will reduce thread pressure and make tightening easier.)
7. If, at this point, none of the tangs line up directly with a corresponding slot in the lock nut OD, rotate the lock nut, in a tightening direction, the additional small amount required to line up the closest slot and tang.
8. The correct internal clearance has now been obtained and the lock washer tang can be peened into the slot of the lock nut, thereby locking the assembly.

The more common procedure used for determining the proper fit of spherical roller bearings on tapered seat is to measure the reduction of internal clearance of the bearing, upon mounting, through the use of feeler gauges or shim stock. This procedure can be utilized with the non-sealed SPHERE-ROL® bearing, if desired. The customer must initially measure and verify the clearance existing in the unmounted bearing, then press the bearing on the tapered seat until the specified amount of clearance has been removed, checking with the feeler gauges. The chart below gives the required diametral clearance reductions which should be used when the feeler gauging procedure is utilized.

Clearance reduction — (-K suffix)

Bearing Bore In Millimeters	Diametrical Clearance Reduction Inches	Lock Nut Turns Degrees	ABMA Lock Washer Number	Req'd No. of Lock Washer Tangs for Clearance Reduction
25	.0009	277	W -05	10
30	.0009	204	W -06	7
35	.0009	204	W -07	9
40	.0009	204	W -08	9
45	.0010	215	W -09	10
50	.0010	215	W -10	10
55	.0010	215	W -11	10
60	.0010	215	W -12	10
65	.0010	215	W -13	11
70	.0015	273	W -14	14
75	.0015	146	W -15	8
80	.0015	146	W -16	8
85	.0015	146	W -17	8
90	.0015	146	W -18	8
95	.0015	146	W -19	8
100	.0015	146	W -20	8
110	.0020	177	W -22	9
120	.0020	177	W -24	9
130	.0025	207	W -26	11
140	.0025	207	W -28	11
150	.0030	238	W -30	13
180	.0030	158	W -36	8

Spherical Bearing Engineering see page D-23.

