

**HIGH PRECISION**  
**BEARINGS**  
AND RELATED PRODUCTS



**Call AST Bearings Today... Reducing Friction To Keep You In Motion!**

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# Introduction:

For nearly 40 years, AST has been one of the country's leading providers of high quality precision ball bearings. Our customer base is a broad range of industrial markets – from small OEMs to major aerospace companies.

As a one-source resource for one of the broadest lines of bearing and bearing-related products, AST maintains an extensive inventory, complete technical laboratory services and an engineering department to assist our customers with unique custom designs.

Call us today! We may already have the answer to your bearing needs!



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All information in this catalog has been thoroughly checked for accuracy. However, AST Bearings assumes no liability for possible errors or omissions.

Dimensions and specifications are subject to change without notice.

## Our Commitment:

### Availability.....

AST is committed to providing the widest range of high quality products available today. We maintain an extensive inventory from numerous suppliers and frequently will ship within 24 hours.

### Service.....

The cornerstone of AST is our commitment to our customers. Our staff is friendly, courteous, knowledgeable, and above all, responsive. Your questions and quotes will be answered promptly, your transaction will be implemented efficiently, and your product will be shipped on time, or you will be notified for rescheduling.

### Technology.....

AST is fully aware of the enormous advances in technology during the four decades of our existence, and we pride ourselves in maintaining the most up-to-date facilities, a well-trained technical staff and state-of-the-art equipment.

We have blended the best of modern technology and business practices with the old-fashioned and timeless qualities of respect for our customers, keeping our promises, and working in a spirit of cooperation and fairness.



## Facilities:

AST's main headquarters are located in Montville, New Jersey, the heart of the metropolitan New York corridor. This houses our executive offices, customer service center, master computerized control systems, product testing/analysis laboratories, custom lubrication department, and primary warehouse.



An additional sales and warehousing facility is located in Irvine, California. This national capability helps to extend the AST work day across the four time zones to satisfy our customers' needs, as well as for savings in time and shipping costs.

## AST Products:

Whether it is for new applications, redesigns of existing apparatus, or retrofit and replacement, AST bearings are used extensively wherever precise rotary motion is required. Our products are used in numerous aerospace applications, medical and dental equipment, computer peripherals, power tools, X-Y

plotters, motion control systems, scientific miniature and micro-miniature instrumentation and many other industrial applications.

We maintain superlative products from high-quality manufacturers such as IJK, INA, JAF, KBC, KSK, SMT, Nachi, ORS, URB, NTN and many others. We are also the exclusive U.S. stocking distributor for EZO/Sapporo Precision (Japan) and GRW (Germany) precision bearings.



We are continually expanding our product range and replenishing inventory from world-class manufacturers to reflect the growing demands of our customers. We offer both inch and metric sizes in many of our products as well as a broad range of materials.

Our most recent additions, Plain Bearings, Bushings and Rod Ends are included on pages 38-51. In addition, we have embarked on a full-scale mechanical subassembly program (see page 36 and 37).

Whatever your needs, you can be assured that when you order AST bearings, you will be getting the very best product available.



## Custom Designs:

The heart of AST Bearings is our ability to work with our customers on unique designs and applications. Since we provide only precision devices and related products, we are truly the precision bearing experts. Our team of design engineers and specialists offers more than a century of combined expertise.

We will be happy to come to your facilities. We invite you to visit ours. Together we can create cost-efficient solutions to your most demanding specs, often with tolerances measured in millionths of an inch.

Our technical laboratory is equipped with the most up-to-date precision instruments and computerized equipment to evaluate bearing applications quickly and effectively. The unique AST Bearing Analysis System evaluates bearings from several perspectives, including load and speed requirements and environmental factors that may affect performance.

Send us the specs or samples of the bearings you currently use. We welcome the opportunity to evaluate the pros and cons and make recommendations accordingly. It is not infrequent that we can offer superior quality plus cost savings. This special program has been so effective that many bearing manufacturers themselves have used our services.

## Lubrication Specialists:

Our New Jersey headquarters features the largest bearing-lubrication facility in the country, including a Class 10,000 clean room with Class 100 work stations. Our lubrication specialists work with virtually hundreds of different lubricants, including those that are mil-spec qualified. We can also formulate custom lubricants to meet the needs of unusual applications.



## Quality Control:

AST scrupulously enforces a rigorous quality control program to insure that each bearing shipped is made to the highest standard. Our goal is to meet and exceed the customers' demands. Our QA program conforms to Mil-STD-45208A "Inspection Systems Requirements."

Our QA department is equipped with the latest vibration analyzers, sophisticated dimensional examination systems and high-performance noise measuring devices, which are all routinely inspected for accuracy. This approach to quality assurance reflects AST's uncompromising commitment to zero-defect bearings.



## Inventory Management Systems:

AST contracts with dozens of well-respected manufacturers and stocks millions of bearings of various shapes, sizes and materials. We have made serious investments to develop timely deliveries and inventory management systems to help our customers reduce costs and achieve 100% on-time delivery.

AST employs such inventory management services as Kanban and JIT deliveries, consigned or bonded inventory, kitting, and hold-for-release order management.

Our success is measurable. Many of our most demanding customers have qualified us as a ship-to-stock or ship-to-workcell vendor.

## Customer Service:

There is no replacement for courteous and efficient customer service. AST knows this, and provides experienced and well-trained personnel to assure a quick and reliable response for every customer.

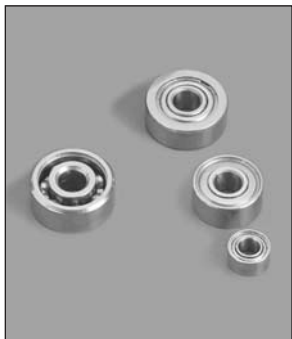
From the initial greeting, through shipping and tracking orders, our customers can be sure of our attention to even the smallest details.



You will get the right product to the right specs, shipped on-time, and at the agreed-upon price.

It is the policy of AST Bearings to provide product knowledge, application and engineering expertise, quality control, consistent and courteous customer service and cost-efficient, high-quality products.

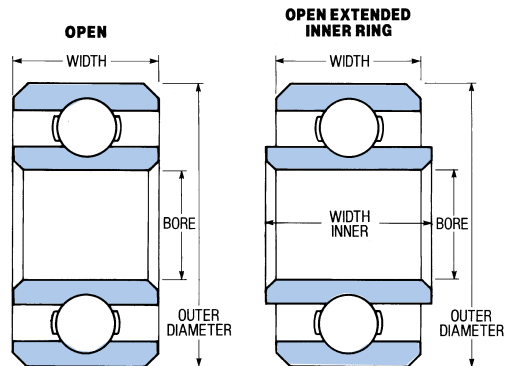
Our customers deserve no less.



# Miniature & Instrument Series

OPEN AND OPEN EXTENDED INNER RING

(Dimensions in Inches)



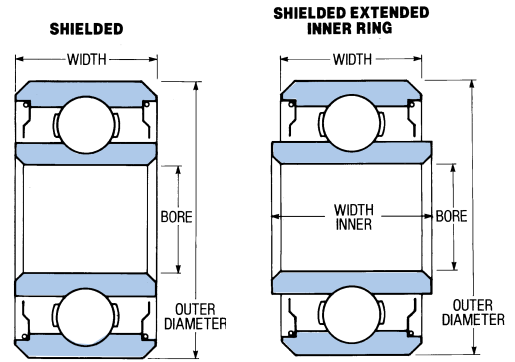
BORE	OUTER DIAMETER	BEARING NUMBER	WIDTH OPEN	BEARING NUMBER	WIDTH OUTER	WIDTH EXTENDED INNER
.0400	.1250	<b>SR09</b>	.0469			
.0469	.1562	<b>SR0</b>	.0625	<b>SRW0</b>	.0625	.0937
.0550	.1875	<b>SR1</b>	.0781	<b>SRW1</b>	.0781	.1094
.0781	.2500	<b>SR1-4</b>	.0937	<b>SRW1-4</b>	.0937	.1250
.0937	.1875	<b>SR133</b>	.0625	<b>SRW133</b>	.0625	.0937
.0937	.3125	<b>SR1-5</b>	.1094	<b>SRW1-5</b>	.1094	.1406
.1250	.2500	<b>SR144</b>	.0937	<b>SRW144</b>	.0937	.1250
.1250	.3125	<b>SR2-5</b>	.1094	<b>SRW2-5</b>	.1094	.1406
.1250	.3750	<b>SR2-6</b>	.1094	<b>SRW2-6</b>	.1094	.1406
.1562	.3125	<b>SR155</b>	.1094	<b>SRW155</b>	.1094	.1406
.1875	.3125	<b>SR156</b>	.1094	<b>SRW156</b>	.1094	.1406
.1875	.3750	<b>SR166</b>	.1250	<b>SRW166</b>	.1250	.1562
.2500	.3750	<b>SR168</b>	.1250	<b>SRW168</b>	.1250	.1562
.2500	.5000	<b>SR188</b>	.1250	<b>SRW188</b>	.1250	.1562
.3125	.5000	<b>SR1810</b>	.1562	<b>SRW1810</b>	.1562	.1875
.1250	.3750	<b>SR2</b>	.1562	<b>SRW2</b>	.1562	.1875
.1250	.5000	<b>SR2A</b>	.1719			
.1875	.5000	<b>SR3</b>	.1562	<b>SRW3</b>	.1562	.1875
.2500	.6250	<b>SR4</b>	.1960	<b>SRW4</b>	.1960	.2272
.2500	.7500	<b>SR4A</b>	.2188			
.3750	.8750	<b>SR6</b>	.2188			
.5000	.8750	<b>SR6-5</b>	.2188			
.5000	1.1250	<b>SR8</b>	.2500			

Retainer types and materials are listed on page 57. Check for availability.  
 ABEC grades 1, 3, 5, 7 and 9 available.  
 Available in 400 and DD type series stainless steel. Also available in 52100 chrome steel.

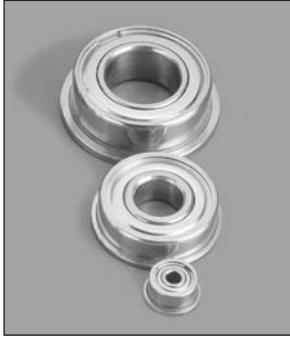
# Miniature & Instrument Series

SHIELDED, SEALED AND EXTENDED INNER RING

(Dimensions in Inches)



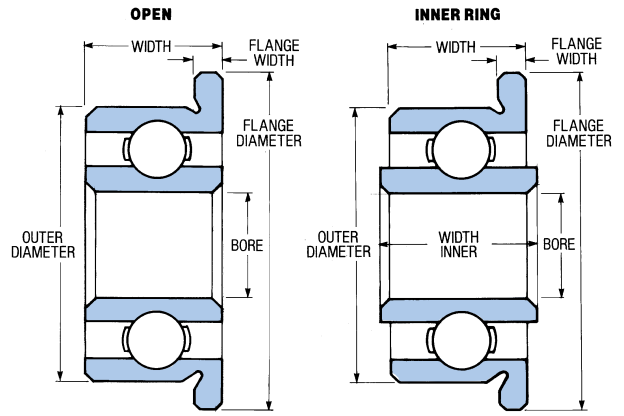
BEARING NUMBER	WIDTH SHIELDED & SEALED	BEARING NUMBER	WIDTH OUTER	WIDTH EXTENDED INNER	LOAD RATINGS (LBS.) DYNAMIC	LOAD RATINGS (LBS.) STATIC
					10	4
<b>SR0ZZ</b>	.0937	<b>SRW0ZZ</b>	.0937	.1250	17	6
<b>SR1ZZ</b>	.1094	<b>SRW1ZZ</b>	.1094	.1406	26	9
<b>SR1-4ZZ</b>	.1406	<b>SRW1-4ZZ</b>	.1406	.1718	36	14
<b>SR133ZZ</b>	.0937	<b>SRW133ZZ</b>	.0937	.1250	14	6
<b>SR1-5ZZ</b>	.1406	<b>SRW1-5ZZ</b>	.1406	.1718	59	24
<b>SR144ZZ</b>	.1094	<b>SRW144ZZ</b>	.1094	.1406	33	13
<b>SR2-5ZZ</b>	.1406	<b>SRW2-5ZZ</b>	.1406	.1718	60	24
<b>SR2-6ZZ</b>	.1406	<b>SRW2-6ZZ</b>	.1406	.1718	60	24
<b>SR155ZZ</b>	.1250	<b>SRW155ZZ</b>	.1250	.1562	33	14
<b>SR156ZZ</b>	.1250	<b>SRW156ZZ</b>	.1250	.1562	33	14
<b>SR166ZZ</b>	.1250	<b>SRW166ZZ</b>	.1250	.1562	76	33
<b>SR168ZZ</b>	.1250	<b>SRW168ZZ</b>	.1250	.1562	37	17
<b>SR188ZZ</b>	.1875	<b>SRW188ZZ</b>	.1875	.2187	114	57
<b>SR1810ZZ</b>	.1562	<b>SRW1810ZZ</b>	.1562	.1875	56	31
<b>SR2ZZ</b>	.1562	<b>SRW2ZZ</b>	.1562	.1875	73	29
<b>SR2AZZ</b>	.1719				73	29
<b>SR3ZZ</b>	.1960	<b>SRW3ZZ</b>	.1960	.2272	148	64
<b>SR4ZZ</b>	.1960	<b>SRW4ZZ</b>	.1960	.2272	168	77
<b>SR4AZZ</b>	.2812				405	198
<b>SR6ZZ</b>	.2812				575	305
<b>SR6-5ZZ</b>	.2812				203	114
<b>SR8ZZ</b>	.3125				885	505



# Miniature & Instrument Series

FLANGED OPEN AND FLANGED OPEN EXTENDED INNER RING

(Dimensions in Inches)



BORE	OUTER DIAMETER	BEARING NUMBER	WIDTH OPEN	BEARING NUMBER	WIDTH OUTER	WIDTH EXTENDED INNER
.0400	.1250	<b>SFR09</b>	.0469			
.0469	.1562	<b>SFR0</b>	.0625	<b>SFRW0</b>	.0625	.0937
.0550	.1875	<b>SFR1</b>	.0781	<b>SFRW1</b>	.0781	.1094
.0781	.2500	<b>SFR1-4</b>	.0937	<b>SFRW1-4</b>	.0937	.1250
.0937	.1875	<b>SFR133</b>	.0625	<b>SFRW133</b>	.0625	.0937
.0937	.3125	<b>SFR1-5</b>	.1094	<b>SFRW1-5</b>	.1094	.1406
.1250	.2500	<b>SFR144</b>	.0937	<b>SFRW144</b>	.0937	.1250
.1250	.3125	<b>SFR2-5</b>	.1094	<b>SFRW2-5</b>	.1094	.1406
.1250	.3750	<b>SFR2-6</b>	.1094	<b>SFRW2-6</b>	.1094	.1406
.1562	.3125	<b>SFR155</b>	.1094	<b>SFRW155</b>	.1094	.1406
.1875	.3125	<b>SFR156</b>	.1094	<b>SFRW156</b>	.1094	.1406
.1875	.3750	<b>SFR166</b>	.1250	<b>SFRW166</b>	.1250	.1562
.2500	.3750	<b>SFR168</b>	.1250	<b>SFRW168</b>	.1250	.1562
.2500	.5000	<b>SFR188</b>	.1250	<b>SFRW188</b>	.1250	.1562
.3125	.5000	<b>SFR1810</b>	.1562	<b>SFRW1810</b>	.1562	.1875
.1250	.3750	<b>SFR2</b>	.1562	<b>SFRW2</b>	.1562	.1875
.1875	.5000	<b>SFR3</b>	.1562	<b>SFRW3</b>	.1562	.1875
.2500	.6250	<b>SFR4</b>	.1960	<b>SFRW4</b>	.1960	.2272
.3750	.8750	<b>SFR6</b>	.2188			
.5000	1.1250	<b>SFR8</b>	.2500			

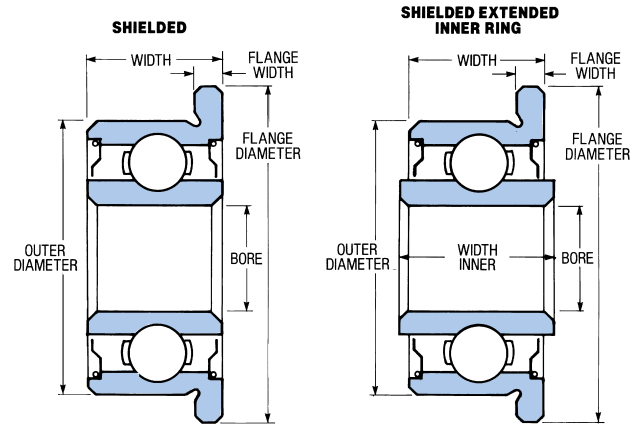
Retainer types and materials are listed on page 57. Check for availability.  
 ABEC grades 1, 3, 5, 7 and 9 available.  
 Available in 400 and DD type series stainless steel. Also available in 52100 chrome steel.



# Miniature & Instrument Series

FLANGED SHIELDED, SEALED AND  
EXTENDED INNER RING

(Dimensions in Inches)



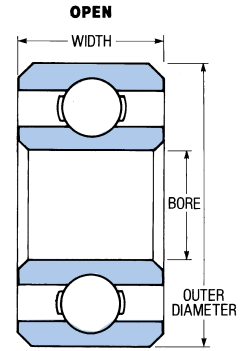
BEARING NUMBER	WIDTH SHIELDED & SEALED	BEARING NUMBER	WIDTH OUTER	WIDTH EXTENDED INNER	FLANGE DIAMETER	FLANGE WIDTH OPEN	FLANGE WIDTH SHIELDED
					.171	.013	
<b>SFR0ZZ</b>	.0937	<b>SFRW0ZZ</b>	.0937	.1250	.203	.013	.031
<b>SFR1ZZ</b>	.1094	<b>SFRW1ZZ</b>	.1094	.1406	.234	.023	.031
<b>SFR1-4ZZ</b>	.1406	<b>SFRW1-4ZZ</b>	.1406	.1718	.296	.023	.031
<b>SFR133ZZ</b>	.0937	<b>SFRW133ZZ</b>	.0937	.1250	.234	.018	.031
<b>SFR1-5ZZ</b>	.1406	<b>SFRW1-5ZZ</b>	.1406	.1718	.359	.023	.031
<b>SFR144ZZ</b>	.1094	<b>SFRW144ZZ</b>	.1094	.1406	.296	.023	.031
<b>SFR2-5ZZ</b>	.1406	<b>SFRW2-5ZZ</b>	.1406	.1718	.359	.023	.031
<b>SFR2-6ZZ</b>	.1406	<b>SFRW2-6ZZ</b>	.1406	.1718	.422	.023	.031
<b>SFR155ZZ</b>	.1250	<b>SFRW155ZZ</b>	.1250	.1562	.359	.023	.036
<b>SFR156ZZ</b>	.1250	<b>SFRW156ZZ</b>	.1250	.1562	.359	.023	.036
<b>SFR166ZZ</b>	.1250	<b>SFRW166ZZ</b>	.1250	.1562	.422	.023	.031
<b>SFR168ZZ</b>	.1250	<b>SFRW168ZZ</b>	.1250	.1562	.422	.023	.036
<b>SFR188ZZ</b>	.1875	<b>SFRW188ZZ</b>	.1875	.2187	.547	.023	.045
<b>SFR1810ZZ</b>	.1562	<b>SFRW1810ZZ</b>	.1562	.1875	.547	.031	.031
<b>SFR2ZZ</b>	.1562	<b>SFRW2ZZ</b>	.1562	.1875	.440	.030	.030
<b>SFR3ZZ</b>	.1960	<b>SFRW3ZZ</b>	.1960	.2272	.565	.042	.042
<b>SFR4ZZ</b>	.1960	<b>SFRW4ZZ</b>	.1960	.2272	.690	.042	.042
<b>SFR6ZZ</b>	.2812				.969	.062	.062
<b>SFR8ZZ</b>	.3125				1.225	.062	.062

Dynamic and Static Load Ratings are the same for standard and flanged bearings.



# Modified Dimension Miniature & Instrument Series

(Dimensions in Inches)



BEARING NUMBER	BORE	OUTER DIAMETER	WIDTH
<b>SR144Y02</b>	.1250	.2500	.0625
<b>SR144ZZY04</b>	.1250	.2500	.0937
<b>SR2-5ZZY05</b>	.1250	.3125	.1094
<b>SR144ZZA0204</b>	.1250	.3750	.0937
<b>SR2-6ZZY05</b>	.1250	.3750	.1094
<b>SR144ZA72</b>	.1250	.4100	.0937
<b>SR144ZA62</b>	.1250	.4250	.0937
<b>SR144ZA63</b>	.1250	.4600	.0937
<b>SR2-5ZZA0305</b>	.1250	.5000	.1094
<b>SR155Z</b>	.1562	.3125	.1094
<b>SR166ZZY05</b>	.1875	.3750	.1094
<b>SR166ZY05</b>	.1875	.3750	.1094
<b>SR166ZA0205</b>	.1875	.5000	.1094
<b>SR156ZZA03</b>	.1875	.5000	.1250
<b>SR166ZZA0208</b>	.1875	.5000	.1562
<b>SR188Z</b>	.2500	.5000	.1250
<b>SR4ZA01</b>	.2500	.6250	.1960
<b>SR1810ZA02</b>	.3125	.6250	.1562

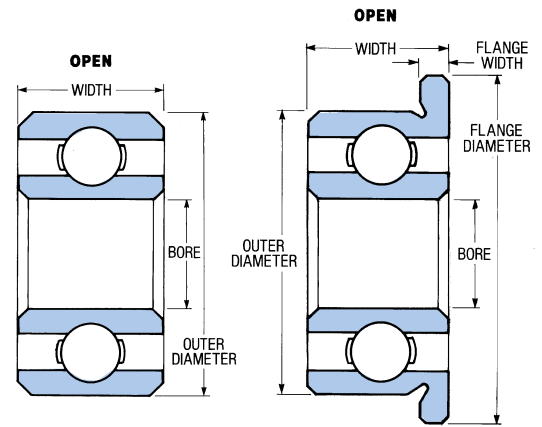
Retainer types and materials are listed on page 57. Check for availability.  
 Available in 400 and DD type series stainless steel. Also available in 52100 chrome steel.  
 Other sizes, not listed, available on request.



# Precision Inch Series

OPEN, SHIELDED AND SEALED

(Dimensions in Inches)



BEARING NUMBER	BORE	OUTER DIA.	WIDTH OPEN	WIDTH EXT. INNER	SEALED AND SHIELDED	SHIELDED EXT. INNER	FLANGE DIA.	FLANGE WIDTH	LOAD RATING (LBS) DYN.	LOAD RATING (LBS) STATIC	WT. (LBS)
<b>R2</b>	.1250	.3750	.1562	.1875	.1562	.1875	.440	.030	73	29	.0031
<b>R2A</b>	.1250	.5000	.1719		.1719				73	29	.0075
<b>R3</b>	.1875	.5000	.1562	.1875	.1960	.2272	.565	.042	148	64	.0057
<b>R4</b>	.2500	.6250	.1960	.2272	.1960	.2272	.690	.042	168	77	.0099
<b>R4A</b>	.2500	.7500	.2188		.2812				405	198	.0161
<b>R5A*</b>	.3125	.8750	.2188		.2812				575	305	.0194
<b>R6</b>	.3750	.8750	.2188		.2812		.969	.062	575	305	.0187
<b>R6-5</b>	.5000	.8750	.2188		.2812				203	114	.0154
<b>R8</b>	.5000	1.1250	.2500		.3125		1.225	.062	885	505	.0392
<b>R10</b>	.6250	1.3750	.2812		.3438				1040	650	.0807
<b>R12</b>	.7500	1.6250	.3125		.4375				1620	1030	.1043
<b>R14</b>	.8750	1.8750	.3750		.5000				1740	1160	.1720
<b>R16</b>	1.0000	2.0000	.3750		.5000				1740	1160	.1918
<b>R18</b>	1.1250	2.1250	.3750		.5000				2290	1630	.2006
<b>R20</b>	1.2500	2.2500	.3750		.5000				2290	1650	.2249
<b>R22</b>	1.3750	2.5000	.4375		.5625				2760	2020	.2320
<b>R24</b>	1.5000	2.6250	.4375		.5625				2900	2200	.3091

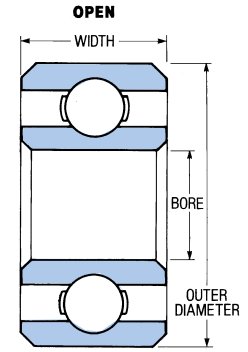
Retainer types and materials are listed on page 57. Check for availability.  
 Available in 400 and DD type series stainless steel. Also available in 52100 chrome steel.  
 \*Non standard available on special request.  
 Seals available in PTFE, Buna-N-Rubber (contact and light contact) on most sizes.  
 Check for availability.



# Commercial Inch Series

1600 SERIES – OPEN, SHIELDED AND SEALED

**These bearings are not electric motor quality as standard.** They can be manufactured to E.M.Q. standards upon special request.  
(Dimensions in Inches)



BEARING NUMBER	BORE FRAC.	BORE INCHES	OUTER DIA. FRAC.	OUTER DIA. INCHES	WIDTH FRAC.	WIDTH INCHES	RADIUS INCHES	LOAD RATINGS (LBS.) DYN.	LOAD RATINGS (LBS.) STATIC	WT. (LBS.)
1601	3/16	.1875	11/16	.6875	†1/4	.2500	.012	294	146	.009
1602	1/4	.2500	11/16	.6875	†1/4	.2500	.012	294	146	.014
1603	5/16	.3125	7/8	.8750	††9/32	.2812	.012	464	228	.021
1604	3/8	.3750	7/8	.8750	††9/32	.2812	.015	464	228	.019
1605	5/16	.3125	29/32	.9062	5/16	.3125	.012	464	228	.037
1606	3/8	.3750	29/32	.9062	5/16	.3125	.015	464	228	.048
1607	7/16	.4375	29/32	.9062	5/16	.3125	.015	400	229	.049
1614	3/8	.3750	1-1/8	1.1250	3/8	.3750	.025	400	229	.077
1615	7/16	.4375	1-1/8	1.1250	3/8	.3750	.025	400	229	.071
1616	1/2	.5000	1-1/8	1.1250	3/8	.3750	.025	400	229	.066
1620	7/16	.4375	1-3/8	1.3750	7/16	.4375	.025	600	354	.100
1621	1/2	.5000	1-3/8	1.3750	7/16	.4375	.025	600	354	.106
1622	9/16	.5625	1-3/8	1.3750	7/16	.4375	.025	600	354	.101
1623	5/8	.6250	1-3/8	1.3750	7/16	.4375	.025	600	354	.088
1628	5/8	.6250	1-5/8	1.6250	1/2	.5000	.025	738	454	.159
1630	3/4	.7500	1-5/8	1.6250	1/2	.5000	.025	738	454	.143
1633	5/8	.6250	1-3/4	1.7500	1/2	.5000	.025	738	454	.203
1635	3/4	.7500	1-3/4	1.7500	1/2	.5000	.025	738	454	.187
1638	3/4	.7500	2	2.0000	9/16	.5625	.035	1100	709	.265
1640	7/8	.8750	2	2.0000	9/16	.5625	.035	1100	709	.247
1641	1	1.0000	2	2.0000	9/16	.5625	.035	1100	709	.221
1652	1-1/8	1.1250	2-1/2	2.5000	5/8	.6250	.035	1306	857	.463
1654	1-1/4	1.2500	2-1/2	2.5000	5/8	.6250	.035	1306	857	.419
1657	1-1/4	1.2500	2-9/16	2.5625	11/16	.6875	.035	1528	1021	.474
1658	1-5/16	1.3125	2-9/16	2.5625	11/16	.6875	.035	1528	1021	.441

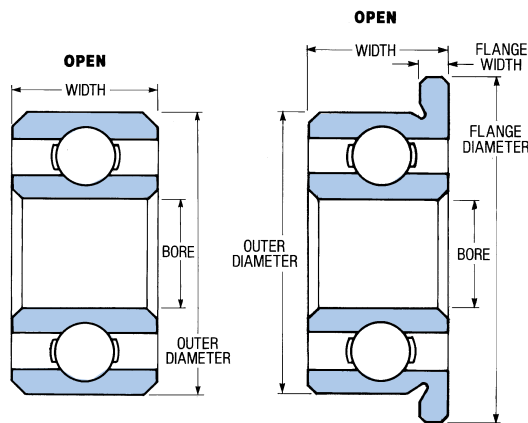
Radius is the maximum shaft radius or housing fillet that the bearing will clear.  
 †Width RS & 2RS = 5/16"  
 ††Width RS & 2RS = 11/32"

**\*REMEMBER: These bearings are not electric motor quality as standard.**



# Extra Small Series Metric Miniatures

OPEN, SHIELDED AND SEALED



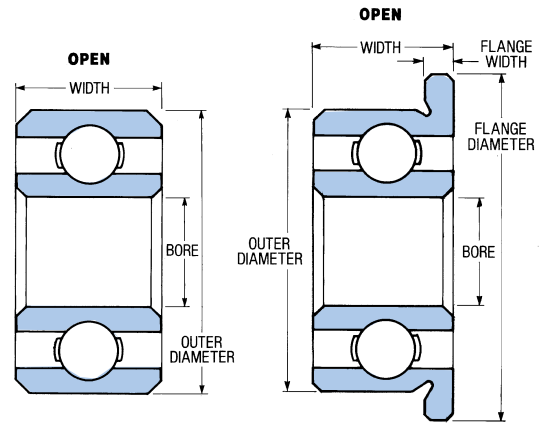
BEARING NUMBER	BORE		OUTER DIA.		WIDTH OPEN		WIDTH DOUBLE SHIELDED OR SEALED		LOAD RATINGS (LBS.)		RADIUS INCHES	FLANGE DIA.	FLANGE WIDTH OPEN	FLANGE WIDTH SHIELDED	WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYN	STATIC					
<b>68/0.6</b>	.6	.0236	2.5	.0984	1	.0394									
<b>681</b>	1	.0394	3	.1181	1	.0394			14	4	.004	.1496	.0118		.0003
<b>MR31</b>	1	.0394	3	.1181	1.5	.0591			14	4	.004				.0001
<b>691</b>	1	.0394	4	.1575	1.6	.0630			24	9	.006	.1969	.0197		.0001
<b>681X</b>	1.5	.0591	4	.1575	1.2	.0472	2	.0787	20	7	.008	.1969	.0157	.0236	.0001
<b>691X</b>	1.5	.0591	5	.1969	2	.0787	2.6	.1024	42	15	.006	.2559	.0236	.0315	.0002
<b>601X</b>	1.5	.0591	6	.2362	2.5	.0984	3	.1181	57	22	.006	.2953	.0236	.0315	.0003
<b>682</b>	2	.0787	5	.1969	1.5	.0591	2.3	.0906	29	11	.006	.2402	.0197	.0236	.0002
<b>MR52</b>	2	.0787	5	.1969	2	.0787	2.5	.0984	29	11	.008	.2441	.0236	.0236	.0002
<b>692</b>	2	.0787	6	.2362	2.3	.0906	3	.1181	57	22	.008	.2953	.0236	.0315	.0006
<b>MR62</b>	2	.0787	6	.2362	2.5	.0984			57	22	.008	.2835	.0236		.0003
<b>MR72</b>	2	.0787	7	.2756	2.5	.0984	3	.1181	44	18	.006	.3228	.0236	.0236	.0005
<b>602</b>	2	.0787	7	.2756	2.8	.1102	3.5	.1378	66	29	.006	.3346	.0276	.0354	.0006
<b>682X</b>	2.5	.0984	6	.2362	1.8	.0709	2.6	.1024	35	14	.006	.2795	.0197	.0315	.0006
<b>692X</b>	2.5	.0984	7	.2756	2.5	.0984	3.5	.1378	66	29	.006	.3346	.0276	.0354	.0005
<b>MR82X</b>	2.5	.0984	8	.3150	2.5	.0984			66	24	.008	.3622	.0236		.0003
<b>602X</b>	2.5	.0984	8	.3150	2.8	.1102	4	.1575	97	40	.006	.3740	.0276	.0354	.0008
<b>MR63</b>	3	.1181	6	.2362	2	.0787	2.5	.0984	35	14	.006	.2835	.0236	.0236	.0003
<b>683</b>	3	.1181	7	.2756	2	.0787	3	.1181	35	14	.006	.3189	.0197	.0315	.0007
<b>MR83</b>	3	.1181	8	.3150	2.5	.0984	3	.1181	66	24	.006	.3622	.0236		.0005
<b>693</b>	3	.1181	8	.3150	3	.1181	4	.1575	66	24	.008	.3740	.0276	.0354	.0014
<b>MR93</b>	3	.1181	9	.3543	2.5	.0984	4	.1575	66	24	.008	.4016	.0236	.0315	.0010
<b>603</b>	3	.1181	9	.3543	3	.1181	5	.1969	66	24	.008	.4134	.0276	.0394	.0015

Retainer types and materials are listed on page 57. Check for availability.  
 Available in 400 and DD type series stainless steel.  
 Seals available in PTFE, Buna-N-Rubber (contact and light contact) on most sizes.  
 Check for availability.



# Extra Small Series Metric Miniatures

OPEN, SHIELDED AND SEALED

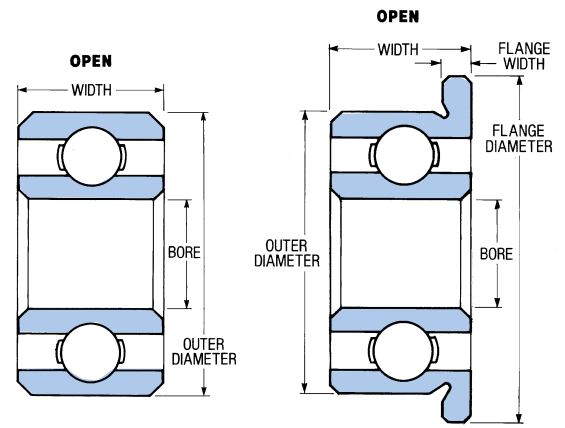


BEARING NUMBER	BORE		OUTER DIA.		WIDTH OPEN		WIDTH DOUBLE SHIELDED OR SEALED		LOAD RATINGS (LBS.)		RADIUS INCHES	FLANGE DIA.	FLANGE WIDTH OPEN	FLANGE WIDTH SHIELDED	WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYN	STATIC					
<b>623</b>	3	.1181	10	.3937	4	.1575	4	.1575	110	49	.006	.4528	.0394	.0394	.0013
<b>633</b>	3	.1181	13	.5118	5	.1969	5	.1969	225	108	.005				.0015
<b>MR74</b>	4	.1575	7	.2756	2	.0787	2.5	.0984	35	13	.006	.3228	.0236	.0236	.001
<b>MR84</b>	4	.1575	8	.3150	2	.0787	3	.1181	44	18	.010	.3622	.0236	.0236	.002
<b>684</b>	4	.1575	9	.3543	2.5	.0984	4	.1575	82	38	.006	.4055	.0236	.0394	.002
<b>MR104</b>	4	.1575	10	.3937	3	.1181	4	.1575	66	26	.012	.4409*	.0236	.0315	.003
<b>694</b>	4	.1575	11	.4331	4	.1575	4	.1575	124	84	.010	.4921	.0394	.0394	.004
<b>604</b>	4	.1575	12	.4724	4	.1575	4	.1575	240	77	.008	.5315	.0394	.0394	.004
<b>624</b>	4	.1575	13	.5118	5	.1969	5	.1969	225	108	.016	.5906	.0394	.0394	.007
<b>634</b>	4	.1575	16	.6299	5	.1969	5	.1969	305	151	.012	.7087	.0394	.0394	.012
<b>MR85</b>	5	.1969	8	.3150	2	.0787	2.5	.0984	37	15	.006	.3622	.0236	.0236	.002
<b>MR95</b>	5	.1969	9	.3543	2.5	.0984	3	.1181	49	20	.008	.4106	.0236	.0236	.002
<b>MR105</b>	5	.1969	10	.3937	3	.1181	4	.1575	49	20	.008	.4409*	.0236	.0315	.003
<b>685</b>	5	.1969	11	.4331	3	.1181	5	.1969	124	58	.012	.4921	.0315	.0394	.003
<b>695</b>	5	.1969	13	.5118	4	.1575	4	.1575	187	90	.016	.5906	.0394	.0394	.005
<b>605</b>	5	.1969	14	.5512	5	.1969	5	.1969	232	110	.008	.6299	.0394	.0394	.006
<b>625</b>	5	.1969	16	.6299	5	.1969	5	.1969	300	199	.020	.7087	.0394	.0394	.011
<b>635</b>	5	.1969	19	.7480	6	.2362	6	.2362	405	203	.020	.8661	.0591	.0591	.020
<b>MR106</b>	6	.2362	10	.3937	2.5	.0984	3	.1181	57	26	.008	.4409	.0236	.0236	.030
<b>MR126</b>	6	.2362	12	.4724	3	.1181	4	.1575	82	35	.008	.5197*	.0236	.0315	.040
<b>686</b>	6	.2362	13	.5118	3.5	.1378	5	.1969	188	90	.012	.5906	.0394	.0433	.005

Retainer types and materials are listed on page 57. Check for availability.  
 Available in 400 and DD type series stainless steel.  
 Radius is the maximum shaft radius or housing fillet that the bearing will clear.  
 \*This dimension increased by 0.0156" for shielded version.  
 Seals available in PTFE, Buna-N-Rubber (contact and light contact) on most sizes.  
 Check for availability.

# Extra Small Series Metric Miniatures

OPEN, SHIELDED AND SEALED



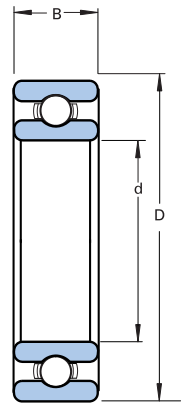
BEARING NUMBER	BORE		OUTER DIA.		WIDTH OPEN		WIDTH DOUBLE SHIELDED OR SEALED		LOAD RATINGS (LBS.)		RADIUS INCHES	FLANGE DIA.	FLANGE WIDTH OPEN	FLANGE WIDTH SHIELDED	WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYN	STATIC					
696	6	.2362	15	.5906	5	.1969	5	.1969	232	110	.016	.6693	.0472	.0472	.009
606	6	.2362	17	.6693	6	.2362	6	.2362	340	163	.012	.7847	.0472	.0472	.011
626	6	.2362	19	.7480	6	.2362	6	.2362	405	203	.012	.8661	.0591	.0591	.018
MR117	7	.2756	11	.4331	2.5	.0984	3	.1181	53	22	.008	.4803	.0236	.0236	.020
MR137	7	.2756	13	.5118	3	.1181	4	.1575	62	31	.012	.5991*	.0236	.0315	.005
687	7	.2756	14	.5512	3.5	.1378	5	.1969	203	104	.012	.6299	.0394	.0433	.006
697	7	.2756	17	.6693	5	.1969	5	.1969	305	156	.012	.7480	.0472	.0472	.025
607	7	.2756	19	.7480	6	.2362	6	.2362	390	195	.012	.8661	.0591	.0591	.026
627	7	.2756	22	.8661	7	.2756	7	.2756	570	305	.012	.9843	.0591	.0591	.029
MR128	8	.3150	12	.4724	2.5	.0984	3.5	.1378	62	31	.012	.5197*	.0236	.0315	.005
MR148	8	.3150	14	.5512	3.5	.1378	4	.1575	93	44	.012	.6142	.0315	.0315	.006
688	8	.3150	16	.6299	4	.1575	5	.1969	216	117	.016	.7087	.0394	.0433	.007
698	8	.3150	19	.7480	6	.2362	6	.2362	325	156	.012	.8661	.0591	.0591	.012
608	8	.3150	22	.8661	7	.2756	7	.2756	570	305	.012	.9843	.0591	.0591	.026
628	8	.3150	24	.9449	8	.3150	8	.3150	435	219	.012				.033
689	9	.3543	17	.6693	4	.1969	5	.1969	229	128	.016	.7480	.0394	.0433	.026
699	9	.3543	20	.7874	6	.2362	6	.2362	328	173	.020	.9055	.0591	.0591	.030
609	9	.3543	24	.9449	7	.2756	7	.2756	582	305	.012	1.0630	.0591	.0591	.032
629	9	.3543	26	1.0236	8	.3150	8	.3150	790	490	.012				.044

Available in 400 and DD type series stainless steel.  
 \*This dimension increased by 0.0156" for shielded version.  
 Seals available in PTFE, Buna-N-Rubber (contact and light contact) on most sizes.  
 Check for availability.



# Metric E-Series

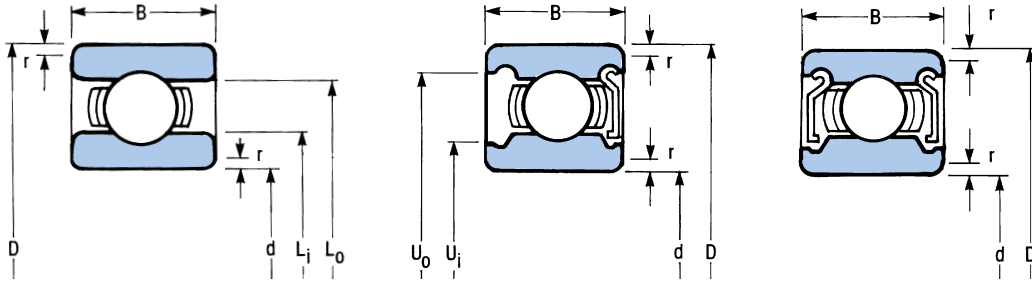
EXTRA THIN BALL BEARINGS,  
OPEN, SHIELDED AND SEALED



BEARING NUMBER		BORE DIA. (d)		OUTER DIAMETER (D)		RADIUS (r) (Min.)		WIDTH (B)		MAX SPEED (RPM)	
OPEN	DOUBLE SHIELDED	MM	INCH	MM	INCH	MM	INCH	MM	INCH	GREASE	OIL
<b>6700</b>		10	.3937	15	.5906	0.15	.0059	3	.1181	36,000	43,000
	<b>6700ZZ</b>			15	.5906	0.15	.0059	4	.1575	36,000	32,000
<b>6800</b>	<b>6800ZZ</b>			19	.7480	0.30	.0118	5	.1969	34,000	40,500
<b>63800</b>	<b>63800ZZ</b>			19	.7480	0.30	.0118	7	.2756	34,000	40,500
<b>6701</b>	<b>6701ZZ</b>	12	.4724	18	.7087	0.20	.0079	4	.1575	31,000	37,000
<b>6801</b>	<b>6801ZZ</b>			21	.8268	0.30	.0118	5	.1969	30,500	36,000
<b>63801</b>	<b>63801ZZ</b>			21	.8268	0.30	.0118	7	.2756	30,500	36,000
<b>6702</b>	<b>6702ZZ</b>	15	.5906	21	.8268	0.20	.0079	4	.1575	27,000	32,000
<b>6802</b>	<b>6802ZZ</b>			24	.9449	0.30	.0118	5	.1969	26,000	31,500
<b>63802</b>	<b>63802ZZ</b>			24	.9449	0.30	.0118	7	.2756	26,000	31,500
<b>6703</b>	<b>6703ZZ</b>	17	.6693	23	.9055	0.20	.0079	4	.1575	25,000	30,000
<b>6803</b>	<b>6803ZZ</b>			26	1.0236	0.30	.0118	5	.1969	24,000	29,500
<b>63803</b>	<b>63803ZZ</b>			26	1.0236	0.30	.0118	7	.2756	24,000	29,500
<b>6704</b>	<b>6704ZZ</b>	20	.7874	27	1.0630	0.20	.0079	4	.1575	21,000	25,000
<b>6804</b>	<b>6804ZZ</b>			32	1.2598	0.30	.0118	7	.2756	19,500	23,500
<b>63804</b>	<b>63804ZZ</b>			32	1.2598	0.30	.0118	10	.3937	21,000	25,000
<b>6705</b>		25	.9843	32	1.2598	0.20	.0079	4	.1575	19,000	23,000
<b>6805</b>	<b>6805ZZ</b>			37	1.4567	0.30	.0118	7	.2756	17,000	20,000
<b>63805</b>	<b>63805ZZ</b>			37	1.4567	0.30	.0118	10	.3937	18,000	25,000
<b>6706</b>		30	1.1811	37	1.4567	0.20	.0079	4	.1575	17,000	20,000
<b>6806</b>	<b>6806ZZ</b>			42	1.6535	0.30	.0118	7	.2756	14,500	17,500
<b>63806</b>	<b>63806ZZ</b>			42	1.6535	0.30	.0118	10	.3937	15,000	18,000
<b>6707</b>		35	1.3780	44	1.7323	0.30	.0118	5	.1969	14,000	17,000
<b>6807</b>	<b>6807ZZ</b>			47	1.8504	0.30	.0118	7	.2756	13,000	15,500
<b>6708</b>		40	1.5748	50	1.9685	0.30	.0118	6	.2362	13,000	16,000
<b>6808</b>	<b>6808ZZ</b>			52	2.0472	0.30	.0118	7	.2756	11,500	14,000
<b>6709</b>		45	1.7717	55	2.1654	0.30	.0118	6	.2372	12,000	14,000
<b>6809</b>	<b>6809ZZ</b>			58	2.2835	0.30	.0118	7	.2756	10,500	12,500

Available in 400 stainless steel.  
Seals available in Buna-N-Rubber (contact and light contact).  
Check for availability.





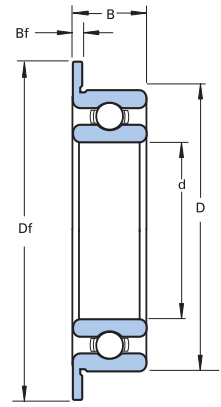
DYN. LOAD RATING (kgf) (C)	STATIC LOAD RATING (kgf) (Co)	LAND DIAMETERS (REF.)								BALL COMPLEMENT		RETAINER TYPE		
		Li		Lo		**Ui		Uo		NO.	SIZE		CROWN	RIBBON
		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN		
66	34	11.21	.4413	13.60	.5354					11	1.588	.0625	•	
66	34	11.21	.4413	13.60	.5354			14.20	.5591	11	1.588	.0625	•	
133	56	12.74	.5016	16.26	.6402	11.80	.4646	17.15	.6752	10	2.381	.0937		•
133	56	12.74	.5016	16.26	.6402	11.80	.4646	17.15	.6752	10	2.381	.0937		•
72	41	13.86	.5457	16.10	.6339			16.70	.6575	13	1.588	.0625	•	
149	68	14.80	.5827	18.30	.7205	13.80	.5433	19.15	.7539	12	2.381	.0937		•
149	68	14.80	.5827	18.30	.7205	13.80	.5433	19.15	.7539	12	2.381	.0937		•
81	44	16.86	.6636	19.10	.7520			19.70	.7756	14	1.588	.0625	•	
162	79	17.80	.7008	21.30	.8386	16.80	.6614	22.15	.8720	14	2.381	.0937		•
162	79	17.80	.7008	21.30	.8386	16.80	.6614	22.15	.8720	14	2.381	.0937		•
80	50	18.86	.7425	21.10	.8307			21.70	.8543	16	1.588	.0625	•	
175	90	19.80	.7795	23.30	.9173	18.80	.7402	24.15	.9508	16	2.381	.0937		•
175	90	18.90	.7795	23.30	.9173	18.80	.7402	24.15	.9508	16	2.381	.0937		•
84	57	22.36	.8803	24.60	.9685			25.30	.9961	18	1.588	.0625	•	
355	217	23.20	.9134	28.70	1.1299	22.10	.8701	29.70	1.1693	11	3.969	.1563		•
410	251	23.20	.9134	28.20	1.1102	22.60	.8898	29.52	1.1622	13	3.500	.1378		•
90	66	27.35	1.0768	29.65	1.1673			30.29	1.1925	21	1.588	.0625	•	
390	257	28.20	1.1102	33.70	1.3268	27.20	1.0709	34.70	1.3661	13	3.969	.1563		•
439	299	28.50	1.1220	33.20	1.3710			34.12	1.3433	15	3.500	.1378		•
95	76	32.35	1.2736	34.65	1.3642			35.29	1.3894	24	1.588	.0625	•	
360	261	33.11	1.3035	38.20	1.5039			39.20	1.5433	17	3.500	.1378		•
463	347	33.11	1.3035	38.20	1.5039			39.20	1.5433	17	3.500	.1378		•
155	130	38.00	1.4961	41.05	1.6161			42.20	1.6614	26	2.000	.0787	•	
379	292	38.21	1.5043	42.80	1.6850			43.75	1.7224	19	3.500	.1378		•
207	177	43.30	1.7047	46.78	1.8417			47.88	1.8850	25	2.381	.0937	•	
397	322	43.30	1.7047	48.10	1.8937			49.02	1.9299					•
213	192	48.30	1.9016	51.80	2.0394			53.20	2.0945				•	
426	369	48.80	1.9213	53.70	2.1142			54.60	2.1496	24	3.500	.1378		•

\*\*Where no Ui dimension is given, inner ring is plain & Li applies.



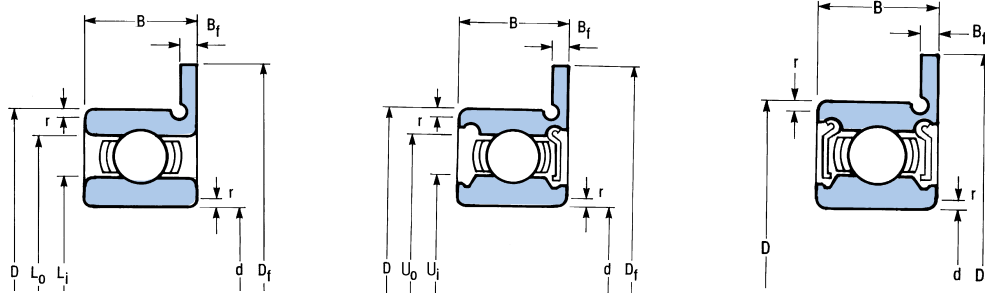
# Metric E-Series

EXTRA THIN BALL BEARINGS,  
FLANGED, OPEN, SHIELDED  
AND SEALED



BEARING REFERENCE		BORE DIA. (d)		OUTER DIAMETER (D)		FLANGE DIAMETER (Df)		RADIUS (r) (Min.)		WIDTH (B)		FLANGE WIDTH (Bf)		MAX SPEED (RPM)	
OPEN	DOUBLE SHIELDED	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	GREASE	OIL
<b>F6700</b>		10	.3937	15	.5906	16.5	.6496	.15	.0059	3	.1181	0.8	.0315	36,000	43,000
	<b>F6700ZZ</b>			15	.5906	16.5	.6496	.15	.0059	4	.1575	0.8	.0315	36,000	43,000
<b>F6800</b>	<b>F6800ZZ</b>			19	.7480	21	.8268	.30	.0118	5	.1969	1.0	.0394	34,000	40,500
<b>F63800</b>	<b>F63800ZZ</b>			19	.7480	21	.8268	.30	.0118	7	.2756	1.5	.0591	34,000	40,500
<b>F6701</b>	<b>F6701ZZ</b>	12	.4724	18	.7087	19.5	.7677	.20	.0079	4	.1575	0.8	.0315	31,000	37,000
<b>F6801</b>	<b>F6801ZZ</b>			21	.8268	23	.9055	.30	.0118	5	.1969	1.1	.0433	30,500	36,000
<b>F63801</b>	<b>F63801ZZ</b>			21	.8268	23	.9055	.30	.0118	7	.2756	1.5	.0591	30,500	36,000
<b>F6702</b>	<b>F6702ZZ</b>	15	.5906	21	.8268	22.5	.8858	.20	.0079	4	.1575	0.8	.0315	27,000	32,000
<b>F6802</b>	<b>F6802ZZ</b>			24	.9449	26	1.0236	.30	.0118	5	.1969	1.1	.0433	26,000	31,500
<b>F63802</b>	<b>F63802ZZ</b>			24	.9449	26	1.0236	.30	.0118	7	.2756	1.5	.0591	26,000	31,500
<b>F6703</b>	<b>F6703ZZ</b>	17	.6693	23	.9055	24.5	.9646	.20	.0079	4	.1575	0.8	.0315	25,000	30,000
<b>F6803</b>	<b>F6803ZZ</b>			26	1.0236	28	1.1024	.30	.0118	5	.1969	1.1	.0433	24,000	29,500
<b>F63803</b>	<b>F63803ZZ</b>			26	1.0236	28	1.1024	.30	.0118	7	.2756	1.5	.0591	24,000	29,500
<b>F6704</b>	<b>F6704ZZ</b>	20	.7874	27	1.0630	28.5	1.1220	.20	.0079	4	.1575	0.8	.0315	21,000	25,000
<b>F6804</b>	<b>F6804ZZ</b>			32	1.2598	35	1.3780	.30	.0118	7	.2756	1.5	.0591	19,500	23,500
<b>F6705</b>		25	.9843	32	1.2598	34	1.3386	.20	.0079	4	.1575	1.0	.0394	19,500	23,000
<b>F6805</b>	<b>F6805ZZ</b>			37	1.4567	40.0	1.5748	.30	.0118	7	.2756	1.5	.0591	17,000	20,000
<b>F6706</b>		30	1.1811	37	1.4567	39.0	1.5354	.20	.0079	4	.1575	1.0	.0394	17,000	20,000
<b>F6806</b>	<b>F6806ZZ</b>			42	1.6535	45	1.7717	.30	.0118	7	.2756	1.5	.5910	14,500	17,500

Available in 400 and DD type series stainless steel.  
Single RS type and Double 2RS type seals available.  
Seals available in Buna-N-Rubber (contact and light contact).  
Check for availability.



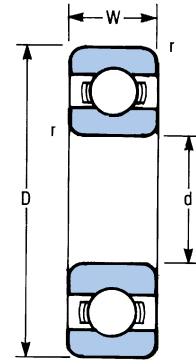
DYN. LOAD RATING (kgf) (C)	STATIC LOAD RATING (kgf) (Co)	LAND DIAMETERS (REF.)								BALL COMPLEMENT			RETAINER TYPE	
		Li		Lo		**Ui		Uo		NO.	SIZE		CROWN	RIBBON
		MM	IN	MM	IN	MM	IN	MM	IN		MM	IN		
44	34	11.21	.4413	13.60	.5354					11	1.588	.0625	•	
44	34	11.21	.4413	13.60	.5354					11	1.588	.0625	•	
133	56	12.74	.5016	16.26	.6402	11.80	.4646	17.15	.6752	10	2.381	.0937		•
133	56	12.74	.5016	16.26	.6402	11.80	.4646	17.15	.6752	10	2.381	.0937		•
48	41	13.86	.5457	16.10	.6339			16.70	.6575	13	1.588	.0625	•	
149	68	14.80	.5827	18.30	.7205	13.80	.5433	19.15	.7539	12	2.381	.0937		•
149	68	14.80	.5827	18.30	.7205	13.80	.5433	19.15	.7539	12	2.381	.0937		•
54	44	16.86	.6638	19.10	.7520			19.70	.7756	14	1.588	.0625	•	
162	79	17.80	.7008	21.30	.8386	16.80	.6614	22.15	.8720	14	2.381	.0937		•
162	79	17.80	.7008	21.30	.8386	16.80	.6614	22.15	.8720	14	2.381	.0937		•
53	50	18.86	.7425	21.10	.8307			21.70	.8543	16	1.588	.0625	•	
175	90	19.80	.7795	23.30	.9173	18.80	.7402	24.15	.9508	16	2.381	.0937		•
175	90	19.80	.7795	23.30	.9173	18.80	.7402	24.15	.9508	16	2.381	.0937		•
84	57	22.36	.8803	24.60	.9685			25.30	.9961	18	1.588	.0625	•	
355	217	23.20	.9134	28.70	1.1299	22.10	.8701	29.70	1.6693	11	3.969	.1563		•
60	66	27.35	1.0768	29.65	1.1673			30.29	1.1925	21	1.588	.0625	•	
390	257	28.20	1.1107	33.70	1.3268	27.20	1.0709	34.70	1.3661	15	3.500	.1378		•
63	76	32.35	1.2736	34.65	1.3642			35.29	1.3894	24	1.588	.0625	•	
360	261	33.11	1.3035	38.20	1.5039			39.20	1.5433	17	3.500	.1378		•

\*\*Where no Ui dimension is given, inner ring is plain & Li applies.



# Extremely Light Metric

6900 SERIES – OPEN, SHIELDED AND SEALED



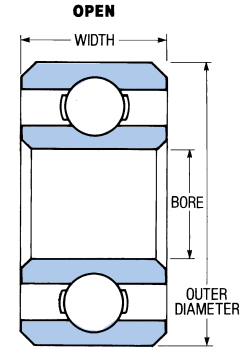
BEARING NUMBER	BORE (d)		OUTER DIA. (D)		WIDTH (W)		RADIAL CAPACITY 1000 RPM	RADIUS INCHES	WT. (LBS.)
	MM	IN	MM	IN	MM	IN			
<b>6900*</b>	10	.3937	22	.8661	6	.2362	150	.012	.02
<b>6901*</b>	12	.4724	24	.9449	6	.2362	185	.012	.03
<b>6902*</b>	15	.5906	28	1.1024	7	.2756	240	.012	.04
<b>6903*</b>	17	.6693	30	1.1811	7	.2756	255	.012	.04
<b>6904*</b>	20	.7874	37	1.4567	9	.3543	410	.012	.09
<b>6905*</b>	25	.9843	42	1.6535	9	.3543	470	.012	.10
<b>6906*</b>	30	1.1811	47	1.8504	9	.3543	520	.012	.12
<b>6907*</b>	35	1.3780	55	2.1654	10	.3937	655	.025	.18
<b>6908*</b>	40	1.5748	62	2.4409	12	.4724	810	.025	.27
<b>6909*</b>	45	1.7717	68	2.6772	12	.4724	870	.025	.31
<b>6910</b>	50	1.9685	72	2.8346	12	.4724	905	.025	.32
<b>6911</b>	55	2.1654	80	3.1496	13	.5118	1100	.040	.43
<b>6912</b>	60	2.3622	85	3.3465	13	.5118	1130	.040	.47
<b>6913</b>	65	2.5591	90	3.5433	13	.5118	1160	.040	.50
<b>6914</b>	70	2.7559	100	3.9370	16	.6299	1320	.040	.82
<b>6915</b>	75	2.9528	105	4.1339	16	.6299	1560	.040	.86
<b>6920</b>	100	3.9370	140	5.5118	20	.7874	2610	.040	1.90
<b>6921</b>	105	4.1339	145	5.7087	20	.7874	2690	.040	2.00
<b>6922</b>	110	4.3307	150	5.9055	20	.7874	2760	.040	2.10
<b>6924</b>	120	4.7244	165	6.4961	22	.8661	3310	.040	2.80

Some sizes available in 400 series stainless steel.  
 \*These sizes available in Flanged versions.  
 Seals available in Buna-N-Rubber (contact and light contact).  
 Check for availability.



# Single Row Radial

METRIC 6000 SERIES – OPEN, SHIELDED, SEALED, SNAP RING



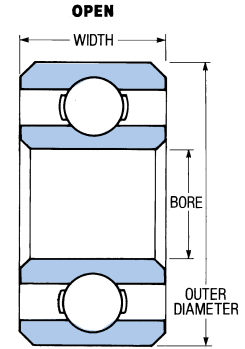
BEARING NUMBER	BORE		OUTER DIAMETER		WIDTH		RADIUS		BASIC LOAD RATING (LBS.)		WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYNAMIC (C)	STATIC (CO)	
<b>6000*</b>	10	.3937	26	1.0236	8	.3150	0.5	.020	790	432	.042
<b>6001*</b>	12	.4724	28	1.1024	8	.3150	0.5	.020	885	500	.049
<b>6002*</b>	15	.5906	32	1.2598	9	.3543	0.5	.020	970	560	.066
<b>6003*</b>	17	.6693	35	1.3780	10	.3937	0.5	.020	1180	680	.086
<b>6004*</b>	20	.7874	42	1.6535	12	.4724	1.0	.039	1620	1000	.152
<b>6005*</b>	25	.9843	47	1.8504	12	.4724	1.0	.039	1740	1110	.176
<b>6006*</b>	30	1.1811	55	2.1654	13	.5118	1.5	.059	2290	1630	.258
<b>6007*</b>	35	1.3780	62	2.4409	14	.5512	1.5	.059	2760	2020	.342
<b>6008*</b>	40	1.5748	68	2.6772	15	.5906	1.5	.059	2900	2220	.423
<b>6009*</b>	45	1.7717	75	2.9528	16	.6299	1.5	.059	3650	2910	.540
<b>6010*</b>	50	1.9685	80	3.1496	16	.6299	1.5	.059	3750	3150	.575
<b>6011*</b>	55	2.1654	90	3.5433	18	.7087	1.5	.059	4900	4100	.849
<b>6012*</b>	60	2.3622	95	3.7402	18	.7087	2.0	.079	5100	4400	.915
<b>6013*</b>	65	2.5591	100	3.9370	18	.7087	2.0	.079	5300	4750	.959
<b>6014*</b>	70	2.7559	110	4.3307	20	.7874	2.0	.079	6600	5900	1.330
<b>6015*</b>	75	2.9528	115	4.5276	20	.7874	2.0	.079	6850	6350	1.410
<b>6016</b>	80	3.1496	125	4.9213	22	.8661	2.0	.079	8200	7080	1.906
<b>6017</b>	85	3.3465	130	5.1181	22	.8661	2.0	.079	8540	7530	1.971
<b>6018</b>	90	3.5433	140	5.5118	24	.9449	2.5	.098	10,115	8754	2.589
<b>6019</b>	95	3.7402	145	5.7087	24	.9449	2.5	.098	10,450	9330	2.688
<b>6020</b>	100	3.9370	150	5.9055	24	.9449	2.5	.098	10,450	9330	2.776
<b>6021</b>	105	4.1339	160	6.2992	26	1.0236	3.0	.1181	12,365	11,240	3.503
<b>6022</b>	110	4.3307	170	6.6929	28	1.1024	3.0	.1181	13,700	12,590	4.362
<b>6024</b>	120	4.7244	180	7.0866	28	1.1024	3.0	.1181	14,390	13,490	4.626

\*Available in 400 series stainless steel.  
Seals available in Buna-N-Rubber (contact and light contact).  
Check for availability.



# Single Row Radial

METRIC 6200 SERIES – OPEN, SHIELDED, SEALED, SNAP RING



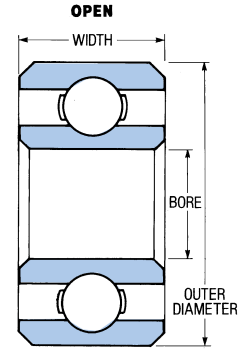
BEARING NUMBER	BORE		OUTER DIAMETER		WIDTH		RADIUS		BASIC LOAD RATING (LBS.)		WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYNAMIC (C)	STATIC (C <sub>0</sub> )	
<b>6200*</b>	10	.3937	30	1.1811	9	.3543	1.0	.039	935	510	.071
<b>6201*</b>	12	.4724	32	1.2598	10	.3937	1.0	.039	1050	595	.082
<b>6202*</b>	15	.5906	35	1.3780	11	.4331	1.0	.039	1340	775	.099
<b>6203*</b>	17	.6693	40	1.5748	12	.4724	1.0	.039	1660	985	.143
<b>6204*</b>	20	.7874	47	1.8504	14	.5512	1.5	.059	2200	1390	.234
<b>6205*</b>	25	.9843	52	2.0472	15	.5906	1.5	.059	2400	1560	.282
<b>6206*</b>	30	1.1811	62	2.4409	16	.6299	1.5	.059	3350	2320	.439
<b>6207*</b>	35	1.3780	72	2.8346	17	.6693	2.0	.079	4450	3150	.635
<b>6208*</b>	40	1.5748	80	3.1496	18	.7087	2.0	.079	5050	3650	.807
<b>6209*</b>	45	1.7717	85	3.3465	19	.7480	2.0	.079	5650	4150	.897
<b>6210*</b>	50	1.9685	90	3.5433	20	.7874	2.0	.079	6050	4650	1.020
<b>6211*</b>	55	2.1654	100	3.9370	21	.8268	2.3	.091	7500	5850	1.340
<b>6212*</b>	60	2.3622	110	4.3307	22	.8661	2.3	.091	9050	7250	1.730
<b>6213</b>	65	2.5591	120	4.7244	23	.9055	2.5	.098	10,228	7980	2.181
<b>6214</b>	70	2.7559	125	4.9213	24	.9449	2.5	.098	10,790	8430	2.368
<b>6215</b>	75	2.9528	130	5.1181	25	.9843	2.5	.098	11,465	9329	2.611
<b>6216</b>	80	3.1496	140	5.5118	26	1.0236	3.0	.118	12,588	9891	3.128
<b>6217</b>	85	3.3465	150	5.9055	28	1.1024	3.0	.118	14,387	11,914	3.987
<b>6218</b>	90	3.5433	160	6.2992	30	1.1811	3.0	.118	15,960	13,488	4.803
<b>6219</b>	95	3.7402	170	6.6929	32	1.2598	3.5	.138	18,658	15,620	5.838
<b>6220</b>	100	3.9370	180	7.0866	34	1.3386	3.5	.138	20,900	17,980	6.984
<b>6221</b>	105	4.1339	190	7.4803	36	1.4173	3.5	.138	22,930	20,230	8.261
<b>6222</b>	110	4.3307	200	7.8740	38	1.4961	3.5	.138	24,730	22,480	9.869
<b>6224</b>	120	4.7244	215	8.4646	40	1.5748	3.5	.138	25,180	22,930	11.786
<b>6226</b>	130	5.1181	230	9.0551	40	1.5748	4.0	.158	29,000	28,100	12.888

\*Available in 400 series stainless steel.  
 For bearings with special inch dimension bores, see page 52.  
 Seals available in Buna-N-Rubber (contact and light contact).  
 Check for availability.



# Single Row Radial

METRIC 6300 SERIES – OPEN, SHIELDED, SEALED, SNAP RING



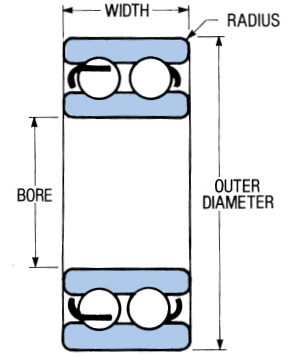
BEARING NUMBER	BORE		OUTER DIAMETER		WIDTH		RADIUS		BASIC LOAD RATING (LBS.)		WT. (LBS.)
	MM	IN	MM	IN	MM	IN	MM	IN	DYNAMIC (C)	STATIC (C <sub>0</sub> )	
<b>6300*</b>	10	.3937	35	1.3780	11	.4331	1.0	.039	1430	825	.117
<b>6301*</b>	12	.4724	37	1.4567	12	.4724	1.5	.059	1740	1015	.132
<b>6302*</b>	15	.5906	42	1.6535	13	.5118	1.5	.059	1960	1180	.181
<b>6303*</b>	17	.6693	47	1.8504	14	.5512	1.5	.059	2345	1430	.254
<b>6304*</b>	20	.7874	52	2.0472	15	.5906	2.0	.079	2750	1715	.317
<b>6305*</b>	25	.9843	62	2.4409	17	.6693	2.0	.079	3650	2370	.511
<b>6306*</b>	30	1.1811	72	2.8346	19	.7480	2.0	.079	4600	3150	.763
<b>6307*</b>	35	1.3780	80	3.1496	21	.8268	2.5	.098	5750	4050	1.010
<b>6308*</b>	40	1.5748	90	3.5433	23	.9055	2.5	.098	7050	5050	1.400
<b>6309*</b>	45	1.7717	100	3.9370	25	.9843	2.5	.098	9150	6800	1.840
<b>6310*</b>	50	1.9685	110	4.3307	27	1.0630	2.5	.098	10,700	8100	2.360
<b>6311*</b>	55	2.1654	120	4.7244	29	1.1417	3.0	.118	13,100	10,110	3.040
<b>6312*</b>	60	2.3622	130	5.1181	31	1.2205	3.5	.138	14,150	10,800	3.789
<b>6313</b>	65	2.5591	140	5.5118	33	1.2992	3.5	.138	15,960	12,590	4.648
<b>6314</b>	70	2.7559	150	5.9055	35	1.3780	3.5	.138	17,980	14,150	5.684
<b>6315</b>	75	2.9528	160	6.2992	37	1.4567	3.5	.138	19,450	15,950	6.873
<b>6316</b>	80	3.1496	170	6.6929	39	1.5354	3.5	.138	21,350	17,980	8.151
<b>6317</b>	85	3.3465	180	7.0866	41	1.6142	4.0	.158	21,690	18,660	9.517
<b>6318</b>	90	3.5433	190	7.4803	43	1.6929	4.0	.158	23,380	20,230	11.059
<b>6319</b>	95	3.7402	200	7.8740	45	1.7717	4.0	.158	24,730	22,480	12.822
<b>6320</b>	100	3.9370	215	8.4646	47	1.8504	4.0	.158	28,550	26,970	15.818

\*Available in 400 series stainless steel.  
Seals available in Buna-N-Rubber (contact and light contact).  
Check for availability.



# Double Row Angular Contact

5200 SERIES – OPEN, SHIELDED, SEALED, SNAP RING



BEARING NUMBER	BORE		OUTER DIAMETER		WIDTH		BALLS PER ROW		LOAD RATING (LBS.)		APPROX. BEARING WEIGHT (LBS.)	RADIUS INCHES
	MM	IN	MM	IN	MM	IN	NO.	SIZE	DYN.	STATIC		
<b>5200</b>	10	.3937	30	1.1811	14.287	.5625	7	5/16	1200	755	.108	.025
<b>5201</b>	12	.4724	32	1.2598	15.875	.6250	7	7/32	1580	1030	.126	.025
<b>5202</b>	15	.5906	35	1.3780	15.875	.6250	8	7/32	1740	1180	.141	.025
<b>5203</b>	17	.6693	40	1.5748	17.462	.6875	8	1/4	2210	1540	.212	.025
<b>5204</b>	20	.7874	47	1.8504	20.638	.8125	8	5/16	3300	2410	.337	.040
<b>5205</b>	25	.9843	52	2.0472	20.638	.8125	12	5/16	3550	2710	.386	.040
<b>5206</b>	30	1.1811	62	2.4409	23.812	.9375	12	3/8	4950	3900	.631	.040
<b>5207</b>	35	1.3780	72	2.8346	26.988	1.0625	14	13/32	6550	5300	.961	.040
<b>5208</b>	40	1.5748	80	3.1496	30.162	1.1875	14	7/16	7400	6100	1.300	.040
<b>5209</b>	45	1.7717	85	3.3465	30.162	1.1875	16	7/16	8300	6900	1.410	.040
<b>5210</b>	50	1.9685	90	3.5433	30.162	1.1875	15	15/32	8850	7700	1.520	.040
<b>5211</b>	55	2.1654	100	3.9370	33.338	1.3125	16	1/2	9180	8490	2.460	.060
<b>5212</b>	60	2.3622	110	4.3307	36.512	1.4375	16	9/16	13700	13200	3.140	.060
<b>5213</b>	65	2.5591	120	4.7244	38.100	1.5000	16	19/32	14900	14700	4.220	.060
<b>5214</b>	70	2.7559	125	4.9213	39.688	1.5625	16	5/8	16200	16000	4.540	.060
<b>5215</b>	75	2.9528	130	5.1181	41.275	1.6250	17	5/8	17700	17100	5.460	.060
<b>5216</b>	80	3.1496	140	5.9055	44.450	1.7500	17	23/32	18620	17900	6.560	.080

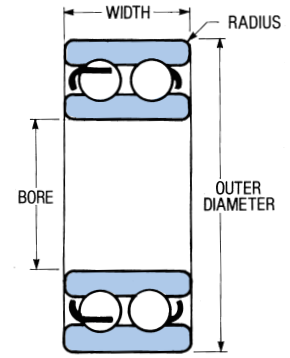
Some sizes available with single RS type and double 2RS type seals.





# Double Row Angular Contact

5300 SERIES – OPEN, SHIELDED, SEALED, SNAP RING



BEARING NUMBER	BORE		OUTER DIAMETER		WIDTH		BALLS PER ROW		LOAD RATING (LBS.)		APPROX. BEARING WEIGHT (LBS.)	RADIUS INCHES
	MM	IN	MM	IN	MM	IN	NO.	SIZE	DYN.	STATIC		
<b>5300</b>	10	.3937	35	1.3780	19.050	.7500	6	9/32	1450	1280	.21	.025
<b>5301</b>	12	.4724	37	1.4567	19.050	.7500	7	17/64	1640	1400	.23	.040
<b>5302</b>	15	.5906	42	1.6535	19.050	.7500	8	15/32	1880	1560	.29	.040
<b>5303</b>	17	.6693	47	1.8504	22.225	.8750	8	5/16	2200	1940	.43	.040
<b>5304</b>	20	.7874	52	2.0472	22.225	.8750	8	5/16	2800	2350	.52	.040
<b>5305</b>	25	.9843	62	2.4409	25.400	1.0000	8	3/8	8110	4360	.75	.040
<b>5306</b>	30	1.1811	72	2.8346	30.163	1.1875	8	15/32	10200	5720	1.13	.040
<b>5307</b>	35	1.3780	80	3.1496	34.925	1.3750	8	17/32	12700	7340	1.75	.060
<b>5308</b>	40	1.5748	90	3.5433	36.513	1.4375	8	19/32	15600	9170	2.31	.060
<b>5309</b>	45	1.7717	100	3.9370	39.688	1.5625	8	21/32	18700	11200	3.13	.060
<b>5310</b>	50	1.9685	110	4.3307	44.450	1.7500	12	23/32	23700	14600	4.25	.080
<b>5311</b>	55	2.1654	120	4.7244	49.213	1.9375	12	25/32	27400	17200	5.06	.080
<b>5312</b>	60	2.3622	130	5.1181	53.975	2.1250	12	7/8	31300	19900	6.96	.080
<b>5313</b>	65	2.5591	140	5.5118	58.738	2.3125	12	29/32	35500	22900	8.61	.080
<b>5314</b>	70	2.7559	150	5.9055	63.500	2.5000	12	1	39800	26000	10.80	.080
<b>5315</b>	75	2.9528	160	6.2992	68.263	2.6875	12	1-1/16	43600	29300	12.10	.080
<b>5316</b>	80	3.1496	170	6.6929	68.263	2.6875	13	1-1/8	47200	32800	15.00	.080

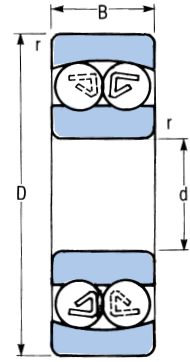
Not all sizes available with seals or shields. Check for availability.



# Self-Aligning

1200, 1300 and  
2200 SERIES

(Dimensions  $\frac{\text{mm}}{\text{Inches}}$ )



BEARING NUMBER	BORE (d)	O.D. (D)	WIDTH (B)	CHAMFER min	BALLS		LOAD RATINGS	
					NO.	SIZE	DYNAMIC C (kgf/lbf)	STATIC Co (kgf/lbf)
<b>1200</b>	$\frac{10}{.3937}$	$\frac{30}{1.1811}$	$\frac{9}{.3543}$	$\frac{0.60}{.024}$	18	$\frac{4.762}{.1875}$	$\frac{435}{959}$	$\frac{136}{300}$
<b>1201</b>	$\frac{12}{.4724}$	$\frac{32}{1.2598}$	$\frac{10}{.3937}$	$\frac{0.60}{.024}$	20	$\frac{4.762}{.1875}$	$\frac{470}{1036}$	$\frac{150}{331}$
<b>1202</b>	$\frac{15}{.5906}$	$\frac{35}{1.3870}$	$\frac{11}{.4331}$	$\frac{0.60}{.024}$	20	$\frac{5.556}{.2188}$	$\frac{600}{1323}$	$\frac{205}{452}$
<b>1203</b>	$\frac{17}{.6693}$	$\frac{40}{1.5748}$	$\frac{12}{.4724}$	$\frac{0.60}{.024}$	24	$\frac{5.556}{.2188}$	$\frac{635}{1400}$	$\frac{247}{545}$
<b>1204</b>	$\frac{20}{.7874}$	$\frac{47}{1.8504}$	$\frac{14}{.5512}$	$\frac{1.00}{.040}$	24	$\frac{6.350}{.2500}$	$\frac{790}{1742}$	$\frac{325}{716}$
<b>1300</b>	$\frac{10}{.3937}$	$\frac{35}{1.3870}$	$\frac{11}{.4331}$	$\frac{0.60}{.024}$	18	$\frac{5.556}{.2188}$	$\frac{580}{1279}$	$\frac{190}{419}$
<b>1301</b>	$\frac{12}{.4724}$	$\frac{37}{1.4567}$	$\frac{12}{.4724}$	$\frac{1.00}{.040}$	18	$\frac{6.350}{.2500}$	$\frac{775}{1709}$	$\frac{241}{531}$
<b>1302</b>	$\frac{15}{.5906}$	$\frac{42}{1.6535}$	$\frac{13}{.5118}$	$\frac{1.00}{.040}$	20	$\frac{6.350}{.2500}$	$\frac{815}{1797}$	$\frac{268}{591}$
<b>1303</b>	$\frac{17}{.6693}$	$\frac{47}{1.8504}$	$\frac{14}{.5512}$	$\frac{1.00}{.040}$	22	$\frac{7.144}{.2812}$	$\frac{970}{2138}$	$\frac{375}{827}$
<b>1304</b>	$\frac{20}{.7874}$	$\frac{52}{2.0472}$	$\frac{15}{.5906}$	$\frac{1.10}{.043}$	24	$\frac{7.144}{.2812}$	$\frac{970}{2138}$	$\frac{410}{904}$
<b>2200</b>	$\frac{10}{.3937}$	$\frac{30}{1.1811}$	$\frac{14}{.5512}$	$\frac{0.60}{.024}$	18	$\frac{5.556}{.2188}$	$\frac{530}{1168}$	$\frac{153}{337}$
<b>2201</b>	$\frac{12}{.4724}$	$\frac{32}{1.2593}$	$\frac{14}{.5512}$	$\frac{0.60}{.024}$	20	$\frac{5.556}{.2188}$	$\frac{600}{1323}$	$\frac{196}{432}$
<b>2202</b>	$\frac{15}{.5906}$	$\frac{35}{1.3780}$	$\frac{14}{.5512}$	$\frac{0.60}{.024}$	22	$\frac{5.556}{.2188}$	$\frac{600}{1323}$	$\frac{219}{483}$
<b>2203</b>	$\frac{17}{.6693}$	$\frac{40}{1.5748}$	$\frac{16}{.6299}$	$\frac{0.60}{.024}$	22	$\frac{6.350}{.2500}$	$\frac{790}{1742}$	$\frac{280}{617}$
<b>2204</b>	$\frac{20}{.7874}$	$\frac{47}{1.8504}$	$\frac{18}{.7087}$	$\frac{1.10}{.043}$	24	$\frac{7.144}{.2812}$	$\frac{980}{2160}$	$\frac{395}{871}$

Some sizes available with single RS type and double 2RS type seals.  
 1200 Series can be misaligned 2.5°  
 1300 Series can be misaligned 3.0°  
 2200 Series can be misaligned 2.5°

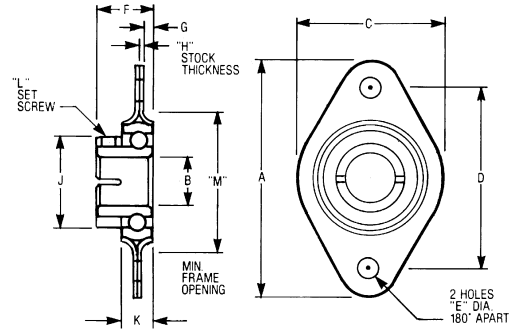


## Flangette Series

### NOTES:

1. Bearing material 52100 Chrome steel
2. Housing material pressed steel
3. Bearings meet ABEC 1 tolerances except bore
4. Bearing double sealed

(Dimensions in Inches)



BEARING NUMBER	(B) +.0005 -.0000	(C)	(D)	(E)	(F)	(G)	(H)	(J)	(K)	(L)	(M)	(A)
<b>S1PPB73ST</b>	.2500	7/8"	1-7/32"	7/32"	.430	.079	.0269	9/16"	7/32"	4-40	25/32"	1-25/32
<b>S3PPB15ST</b>	.3125	1-3/16"	1-17/32"	7/32"	.562	.107	.0329	25/32"	9/32"	8-36	1-3/32"	2-3/32
<b>S3PPB5ST</b>	.3750	1-3/16"	1-17/32"	7/32"	.562	.107	.0329	25/32"	9/32"	8-36	1-3/32"	2-3/32
<b>S5PPB2ST</b>	.5000	1-7/16"	1-25/32"	7/32"	.625	.120	.0359	29/32"	5/16"	8-36	1-9/32"	2-11/32

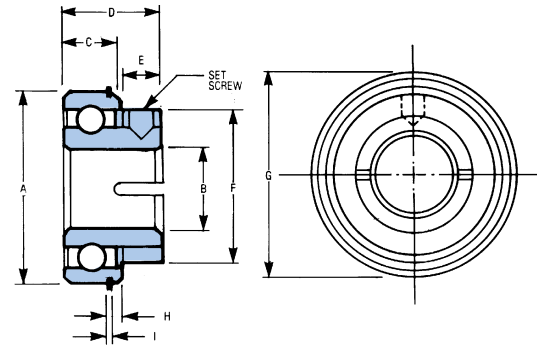
## Collar Bearings Clamp Type

### STANDARD TYPE

#### NOTES:

1. All tolerances ABEC 1 except bore
2. Material: 52100 Chrome steel

(Dimensions in Inches)



BEARING NUMBER	(A) +.0000 -.0004	(B) +.0005 -.0000	(C) +.000 -.005	(D) +.000 -.005	(E)	(F)
<b>S1PP7-4</b>	.6250	.1875	.1960	.4219	3/16"	9/16"
<b>S1PP7-3</b>	.6250	.2500	.1960	.4219	3/16"	9/16"
<b>S3PP16</b>	.8750	.3125	.2812	.5625	1/4"	25/32"
<b>S3PP4</b>	.8750	.3750	.2812	.5625	1/4"	25/32"
<b>S5PP2</b>	1.1250	.5000	.3125	.6250	9/32"	29/32"

### "G" TYPE: SNAP RING MOUNTED ON OUTER DIAMETER

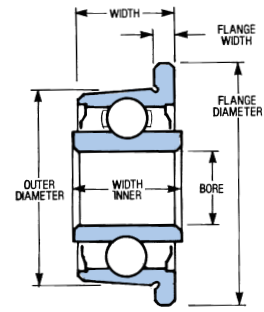
BEARING NUMBER	(A) +.0000 -.0004	(B) +.0005 -.0000	(C) +.000 -.005	(D) +.000 -.005	(E)	(F)	(G)	(H)	(I)
<b>S1PPG7-4</b>	.6250	.1875	.1960	.4219	3/16"	9/16"	47/64"	.070	.026
<b>S1PPG7-3</b>	.6250	.2500	.1960	.4219	3/16"	9/16"	47/64"	.070	.026
<b>S3PPG16</b>	.8750	.3125	.2812	.5625	1/4"	25/32"	63/64"	.090	.026
<b>S3PPG4</b>	.8750	.3750	.2812	.5625	1/4"	25/32"	63/64"	.090	.026
<b>S5PPG2</b>	1.1250	.5000	.3125	.6250	9/32"	29/32"	1-15/64"	.090	.031



## Tapered Outer Diameter Flanged

A Tapered O.D. Bearing will help overcome the mounting problems experienced when using standard bearings in sheet metal or soft metal housings. The inner race is extended from the outer race on both sides.

(Dimensions in Inches)



BEARING NUMBER	BORE +.0003" -.0000"	OUTER DIAM. +.0000" -.0004"	WIDTH		FLANGE		LAND DIAM.		RADIUS INCHES	BALLS		LOAD RATINGS	
			OUTER +.000" -.004"	INNER +.001" -.001"	DIAM. +.005" -.002"	WIDTH +.002" -.002"	INNER	OUTER		NO.	SIZE	DYN. C	STAT. C <sub>0</sub>
<b>F2ZZ*</b>	.1250	.3757	.163	.188	.438	.037	.204	.299	.012	7	1/16	68	28
<b>F3ZZ**</b>	.1875	.5632	.226	.251	.625	.042	.276	.413	.012	6	3/32	141	67
<b>F4ZZ**</b>	.2500	.6257	.226	.250	.687	.042	.365	.510	.012	8	3/32	158	78
<b>F5ZZ**</b>	.3125	.6882	.226	.250	.750	.042	.418	.608	.012	7	1/8	377	139

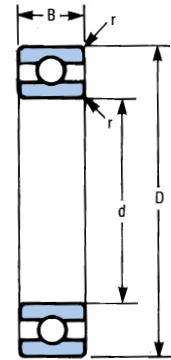
\*Outer diameter tapered 0.075" Per Foot. \*\*Outer diameter tapered 0.068" Per Foot.  
Available in 400 and DD type series stainless steel. Also available in 52100 chrome steel.



## E Series - Inch

OPEN, SHIELDED AND PTFE SEALS  
Bore – .3750 - 1.6250

Optional retainers available.  
Consult factory for availability..



BEARING NUMBER	BORE (d)	O.D. (D)	WIDTH (B)			RADIUS (r)	BALL COMPLEMENT		LOAD RATINGS	
			OPEN	SHIELDED	SHIELDED PHENOLIC RETAINER		NO.	SIZE	DYN. C	STATIC C <sub>0</sub>
<b>SR1038</b>	.3750	.6250	.1562	.1562	.1960	.0100	12	1/16	96	53
<b>SR1238</b>	.3750	.7500	.1960	.1960		.0098	10	3/32	386	190
<b>SR1212</b>	.5000	.7500	.1562	.1562	.1960	.0100	16	1/16	111	71
<b>SR1412</b>	.5000	.8750	.1960	.1960		.0098	12	3/32	430	234
<b>SR1458</b>	.6250	.8750	.1562	.1562	.1960	.0100	18	1/16	116	81
<b>SR1658</b>	.6250	1.0000	.1960	.1960		.0098	16	3/32	503	329
<b>SR1634</b>	.7500	1.0000	.1562	.1562	.1960	.0100	22	1/16	127	99
<b>SR1834</b>	.7500	1.1248	.1960	.1960		.0098	18	1/16	234	163
<b>SR1878</b>	.8750	1.1250	.1562	.1562	.1960	.0100	24	1/16	137	109
<b>SR2117</b>	1.0625	1.3125	.1562	.1562	.1960	.0100	28	1/16	145	128
<b>SR2420</b>	1.2500	1.5000	.1562	.1562	.1960	.0100	32	1/16	154	146
<b>SR2622</b>	1.3750	1.6250	.1562	.1562	.1960	.0100	36	1/16	163	165
<b>SR2824</b>	1.5000	1.7500	.1562	.1562	.1960	.0100	38	1/16	166	174
<b>SR3026</b>	1.6250	1.8750	.1562	.1562	.1960	.0100	42	1/16	175	193

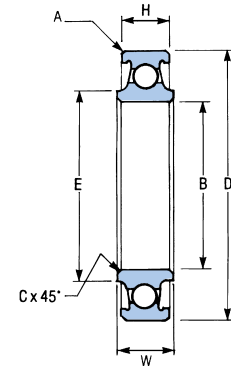
Radius is the maximum shaft radius or housing fillet that the bearing will clear.



# KP Series Control Bearings

HEAVY DUTY SINGLE ROW BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+ .0000 - .0005	+ .0000 - .0005	+ .000 - .005	+ .000 - .005	NO.	SIZE	REF.	+ .015 - .000	+ .015 - .000
<b>KP3L</b>	.1900	.6250	.203	.245	10	1/8	.280	.005	.010
<b>KP3</b>	.1900	.7774	.270	.297	12	1/8	.331	.005	.022
<b>KP4</b>	.2500	.9014	.335	.484	11	5/32	.390	.005	.032
<b>KP5</b>	.3125	1.2500	.375	.558	9	1/4	.469	.015	.032
<b>KP6</b>	.3750	1.4375	.469	.620	10	9/32	.591	.015	.032
<b>KP8</b>	.5000	1.6875	.500	.620	10	11/32	.768	.015	.044
<b>KP10</b>	.6250	1.9375	.500	.620	10	3/8	.850	.015	.044

For non-military applications without cadmium plating.  
 \*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
 For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>KP3L</b>	1560	700	1520	1260
<b>KP3</b>	1880	900	1700	1450
<b>KP4</b>	2680	1200	2410	2030
<b>KP5</b>	5620	2500	4900	3870
<b>KP6</b>	7910	3500	6540	5410
<b>KP8</b>	11800	5200	9320	7700
<b>KP10</b>	14100	6200	11000	9060

### Features:

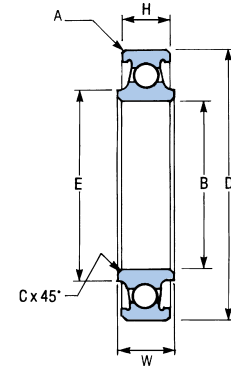
- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request



# KPA Series Control Bearings

DEEP GROOVE, SINGLE ROW BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+ .0000 - .0005	+ .0000 - .0005	+ .000 - .005	+ .000 - .005	NO.	SIZE	REF.	+ .015 - .000	+ .015 - .000
<b>KP3A</b>	.1900	.6250	.234	.297	10	1/8	.297	.005	.016
<b>KP4A</b>	.2500	.7500	.219	.281	12	1/8	.380	.005	.016
<b>KP5A</b>	.3125	.8125	.234	.297	14	1/8	.415	.015	.016
<b>KP6A</b>	.3750	.8750	.250	.313	16	1/8	.495	.015	.016
<b>KP8A</b>	.5000	1.1250	.313	.375	16	5/32	.616	.015	.016
<b>KP10A</b>	.6250	1.3750	.344	.406	14	7/32	.768	.015	.032
<b>KP12A</b>	.7500	1.6250	.375	.437	16	15/64	.919	.015	.032
<b>KP16A</b>	1.0000	2.0000	.438	.500	19	1/4	1.241	.015	.032
<b>KP20A</b>	1.2500	2.2500	.438	.500	22	1/4	1.478	.015	.032

For non-military applications without cadmium plating.  
 \*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
 For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>KP3A</b>	1560	700	1500	1250
<b>KP4A</b>	1880	900	1690	1450
<b>KP5A</b>	2190	1000	1820	1600
<b>KP6A</b>	2500	1100	1920	1710
<b>KP8A</b>	3910	1700	2870	2550
<b>KP10A</b>	6700	3000	4980	4360
<b>KP12A</b>	8790	3900	5980	5320
<b>KP16A</b>	11900	5200	7070	6400
<b>KP20A</b>	13800	6100	7400	6810

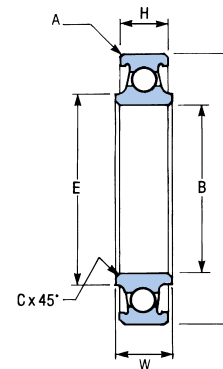
### Features:

- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request

# KPB Series Control Bearings

THIN SECTION, SINGLE ROW  
BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.000 -0.010	+0.000 -0.010	+0.000 -0.005	+0.000 -0.005	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>KP16B</b>	1.0000	1.7500	.375	.437	23	3/16	1.141	.024	.024
<b>KP21B</b>	1.3130	2.0625	.375	.437	28	3/16	1.454	.024	.024
<b>KP23B</b>	1.4380	2.1875	.375	.437	30	3/16	1.574	.024	.024
<b>KP25B</b>	1.5630	2.3125	.375	.437	32	3/16	1.693	.024	.024
<b>KP29B</b>	1.8130	2.5625	.375	.437	36	3/16	1.931	.024	.024
<b>KP33B</b>	2.0630	2.8125	.375	.437	41	3/16	2.231	.024	.024
<b>KP37B</b>	2.3130	3.0625	.375	.437	45	3/16	2.468	.024	.024
<b>KP47B</b>	2.9380	3.8750	.469	.531	45	15/64	3.093	.039	.039
<b>KP49B</b>	3.0630	4.0000	.469	.531	44	1/4	3.222	.039	.039
<b>KP52B</b>	3.2500	4.1875	.469	.531	46	1/4	3.479	.039	.039
<b>KP56B</b>	3.5000	4.4375	.469	.531	50	1/4	3.775	.039	.039

For non-military applications without cadmium plating.  
\*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>KP16B</b>	8090	3600	4260	3960
<b>KP21B</b>	9840	4400	4590	4290
<b>KP23B</b>	10500	4700	4650	4360
<b>KP25B</b>	11300	5000	4680	4420
<b>KP29B</b>	12700	5600	4760	4530
<b>KP33B</b>	14400	6400	4820	4630
<b>KP37B</b>	15800	7000	4880	4690
<b>KP47B</b>	24700	10900	6600	6390
<b>KP49B</b>	27500	12100	8150	7840
<b>KP52B</b>	28700	12600	8210	7880
<b>KP56B</b>	31200	13700	8240	7970

### Features:

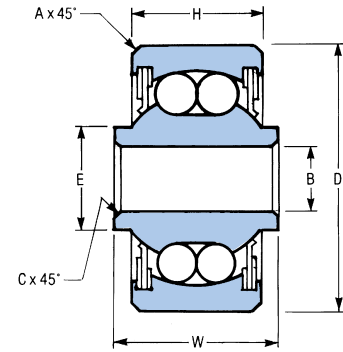
- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request



# DSP Series Control Bearings

SELF-ALIGNING, DOUBLE ROW BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.000 -0.0005	+0.000 -0.0005	+0.000 -0.005	+0.000 -0.0025	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>DSP3</b>	.1900	.7774	.392	.500	24	1/8	.304	.005	.022
<b>DSP4</b>	.2500	.9014	.464	.687	30	1/8	.430	.005	.032
<b>DSP5</b>	.3125	1.2500	.656	.812	28	3/16	.515	.015	.032
<b>DSP6</b>	.3750	1.4375	.750	.937	28	7/32	.564	.015	.032
<b>DSP8</b>	.5000	1.6875	.812	1.000	30	1/4	.775	.015	.044
<b>DSP10</b>	.6250	1.9375	.937	1.125	30	9/32	.869	.015	.044

For non-military applications without cadmium plating.  
 \*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
 For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>DSP3</b>	1420	200	1420	1220
<b>DSP4</b>	1780	300	1780	1600
<b>DSP5</b>	3740	600	3740	3300
<b>DSP6</b>	5100	800	4980	4370
<b>DSP8</b>	7120	1000	6340	5570
<b>DSP10</b>	9000	1300	7780	6860

### Features:

- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request

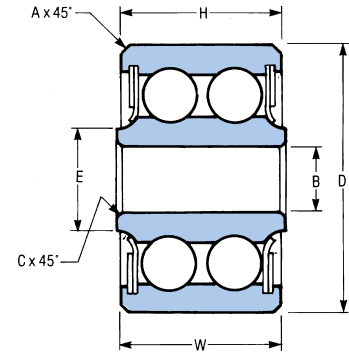
These bearings are self-aligning for 10° in either direction. They should not be used as track rollers, cam follower rolls, and the like.



# DPP Series Control Bearings

DOUBLE ROW  
BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.000 -0.0005	+0.000 -0.0005	+0.000 -0.005	+0.000 -0.005	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>DPP3</b>	.1900	.7774	.473	.495	20	5/32	.302	.005	.018
<b>DPP4</b>	.2500	.9014	.491	.620	22	5/32	.410	.005	.032
<b>DPP5</b>	.3125	1.2500	.687	.745	22	15/64	.469	.015	.032
<b>DPP6</b>	.3750	1.4375	.794	.870	20	9/32	.551	.015	.032
<b>DPP8</b>	.5000	1.6875	.856	.932	20	11/32	.735	.015	.044
<b>DPP10</b>	.6250	1.9375	.920	.995	24	11/32	.890	.015	.044

For non-military applications without cadmium plating.  
\*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>DPP3</b>	2950	1700	2950	2830
<b>DPP4</b>	5370	1800	3550	3020
<b>DPP5</b>	11000	4000	7360	6250
<b>DPP6</b>	15760	5300	9690	8120
<b>DPP8</b>	23600	7800	14100	11600
<b>DPP10</b>	28400	9400	15300	13100

### Features:

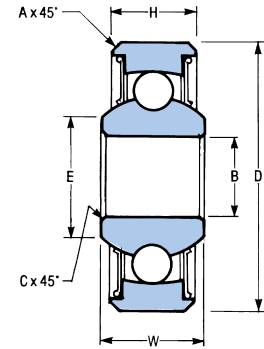
- Recommended when high moment rigidity required
- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request



# KSP Series Control Bearings

SELF-ALIGNING, SINGLE ROW BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.000 -0.005	+0.000 -0.005	+0.000 -0.005	+0.000 -0.005	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>KSP3L</b>	.1900	.6250	.203	.245	13	3/32	.256	.005	.016
<b>KSP4A</b>	.2500	.7500	.219	.281	12	1/8	.328	.005	.016
<b>KSP5A</b>	.3125	.8125	.234	.297	14	1/8	.389	.015	.016
<b>KSP6A</b>	.3750	.8750	.250	.313	15	1/8	.462	.016	.016
<b>KSP3</b>	.1900	.7774	.270	.297	12	1/8	.297	.005	.022
<b>KSP4</b>	.2500	.9014	.335	.484	13	9/64	.396	.005	.032
<b>KSP5</b>	.3125	1.2500	.375	.558	13	3/16	.567	.015	.032
<b>KSP6</b>	.3750	1.4375	.469	.620	13	7/32	.612	.015	.032
<b>KSP8</b>	.5000	1.6875	.500	.620	16	7/32	.796	.015	.044
<b>KSP10</b>	.6250	1.9375	.625	.813	14	9/32	.922	.015	.044

For non-military applications without cadmium plating.  
 \*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
 For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>KSP3L</b>	550	100	550	480
<b>KSP4A</b>	900	200	900	770
<b>KSP5A</b>	1000	200	950	815
<b>KSP6A</b>	1120	200	1120	990
<b>KSP3</b>	900	200	900	770
<b>KSP4</b>	1410	300	1230	1230
<b>KSP5</b>	2190	300	2190	1890
<b>KSP6</b>	2980	400	2980	2580
<b>KSP8</b>	3670	500	3670	3290
<b>KSP10</b>	5320	600	4980	4360

### Features:

- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request

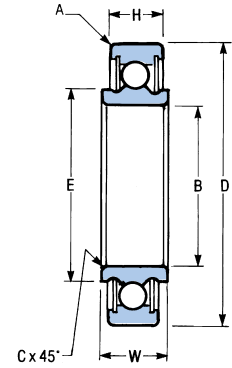
These bearings are self-aligning for 10° in either direction except KSP4A which are self-aligning for 8° in either direction. They should not be used as track rollers, cam follower rolls, and the like.



# Torque Tube Bearings

EXTRA LIGHT, SINGLE ROW, BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.007 -0.007	+0.00 -0.001	+0.00 -0.005	+0.00 -0.005	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>B538DD</b>	.6250	1.0625	.250	.281	21	1/8	.777	.015	.015
<b>B539DD</b>	.7500	1.1875	.250	.281	24	1/8	.895	.015	.015
<b>B540DD</b>	.8750	1.3125	.250	.281	27	1/8	1.016	.015	.015
<b>B541DD</b>	1.0625	1.5000	.250	.281	32	1/8	1.216	.015	.015
<b>B542DD</b>	1.3125	1.7500	.250	.281	38	1/8	1.451	.015	.015
<b>B543DD</b>	1.5625	2.0000	.250	.281	44	1/8	1.702	.015	.015
<b>B544DD</b>	1.8125	2.2500	.250	.281	51	1/8	1.970	.015	.015
<b>B545DD</b>	2.0625	2.6250	.250	.281	59	1/8	2.286	.015	.015
<b>B546DD</b>	2.3125	2.8750	.250	.281	65	1/8	2.527	.015	.015

For non-military applications without cadmium plating.  
 \*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
 For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>B538DD</b>	3280	1500	1990	1820
<b>B539DD</b>	3750	1700	2050	1900
<b>B540DD</b>	4220	1900	2110	1970
<b>B541DD</b>	5000	2200	2170	2020
<b>B542DD</b>	5950	2700	2220	2130
<b>B543DD</b>	6880	3200	2260	2180
<b>B544DD</b>	7980	3600	2300	2220
<b>B545DD</b>	9220	4000	2340	2260
<b>B546DD</b>	10150	4400	2360	2280

### Features:

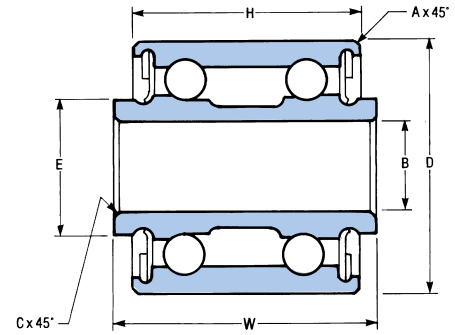
- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request



# DW Series Control Bearings

EXTRA WIDE, DOUBLE ROW  
BALL BEARINGS

(Dimensions in Inches)



PART NUMBER	(B) BORE DIAM.	(D) OUTSIDE DIAM.	(H) OUTER RING WIDTH	(W) INNER RING WIDTH	BALLS		(E) INNER SHOULDER DIAM.	(C) 45° CHAMFER INNER RING I.D.	(A) 45° CHAMFER OUTER RING O.D.
	+0.000 -0.0005	+0.000 -0.0005	+0.000 -0.005	+0.000 -0.005	NO.	SIZE	REF.	+0.015 -0.000	+0.015 -0.000
<b>DW4K2</b>	.2500	.6250	.500	.562	16	3/32	.344	.005	.016
<b>DW4K</b>	.2500	.7500	.750	.875	14	9/64	.435	.005	.016
<b>DW4</b>	.2500	.7500	.750	.875	24	1/8	.375	.005	.016
<b>DW5</b>	.3125	.8750	.813	.938	26	9/64	.472	.005	.016
<b>DW6</b>	.3750	1.0625	1.063	1.188	24	3/16	.576	.005	.016
<b>DW8</b>	.5000	1.4375	1.375	1.500	22	17/64	.715	.005	.032

For non-military applications without cadmium plating.  
\*Teflon is a trademark of E.I. duPont de Nemours & Co., Inc.  
For military applications with cadmium plating.

## LOAD RATINGS

PART NUMBER	STATIC LIMIT LOADS LBS.		DYNAMIC RADIAL LOAD RATINGS LBS.	
	RADIAL	THRUST	INNER RACE ROTATING	OUTER RACE ROTATING
<b>DW4K2</b>	1400	500	1050	960
<b>DW4K</b>	2770	900	2070	1850
<b>DW4</b>	3750	1240	2650	2300
<b>DW5</b>	5140	1600	2600	2320
<b>DW6</b>	8440	2600	4220	3740
<b>DW8</b>	15520	4700	7610	6520

### Features:

- Removable Teflon® seals
- Operating temperature -65° to +250°F
- Lubricated in accordance to MIL-G-81322
- Stainless steel also available
- Custom sizes, tolerances, radial clearances, lubrication, etc. available on request

# Specialty Products Section

**Mechanical  
Subassemblies**

Page.....36-37



**Rod  
Ends**

Page.....42-45



**Spherical  
Plain Bearings**

Page.....38-41



**Maintenance-Free  
Bushings**

Page.....46-51



# Precision Mechanical Assemblies

AST, the nation's leading supplier of miniature and instrument series bearings, can also provide precision mechanical sub-assemblies. We specialize in rotary assemblies that incorporate precision bearings and components manufactured to the most exacting specifications.

AST can conduct design reviews and provide assemblies manufactured to your specifications or ours. Our technicians know the correct way to handle and install bearings, and can provide you with a more reliable assembly at a significant cost savings.

## AST Capabilities:

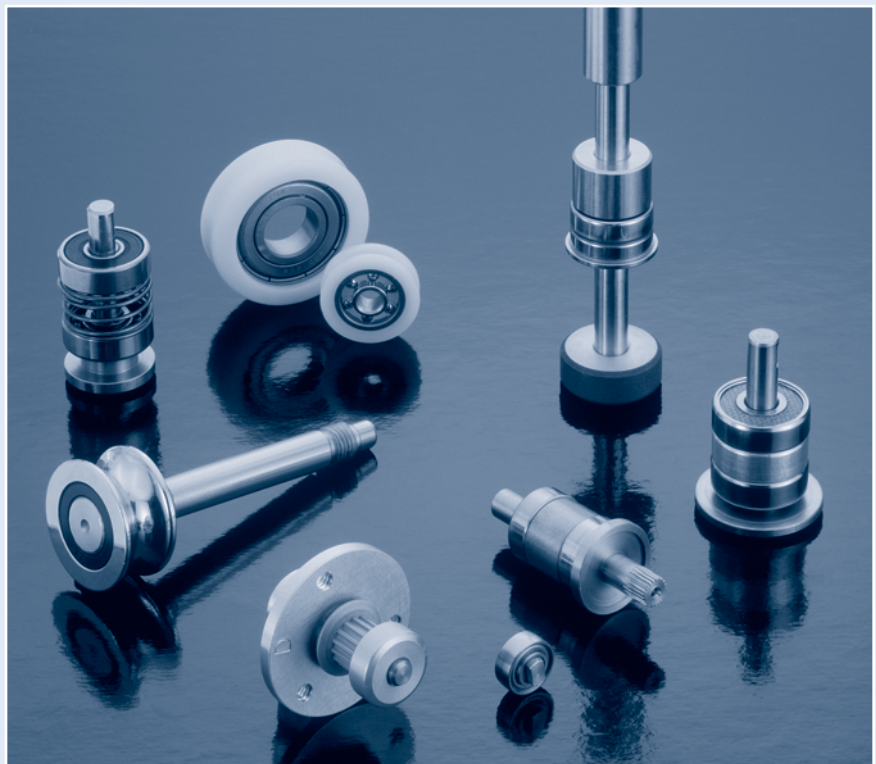
- Tight tolerance machining, castings, injection molding
- Component materials: metals (various alloys) and plastics
- Specialty materials and lubricants
- Protective coatings
- Commercial or super-precision bearings with precise quantities of lubrication.

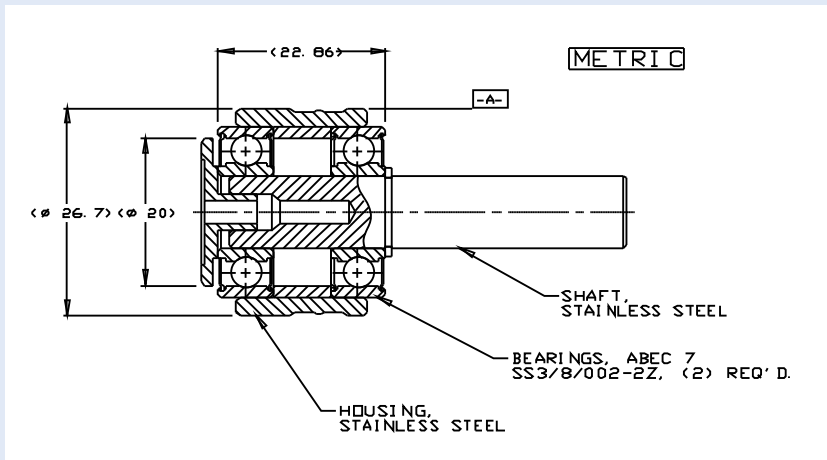
## AST Services:

- Engineering expertise (CAD drawings provided upon request)
- Contract assembly
- Class 100 and Class 10,000 assembly and test environments
- Product inspection and testing
- World-class bearing laboratory
- Low-cost sourcing

Let AST quote your next mechanical assembly requirement. We have already helped our customers in such industries as:

- Office & Factory Automation
- Scientific and Medical Instrumentation
- Robotics
- Currency Counters
- Automotive
- Process Control



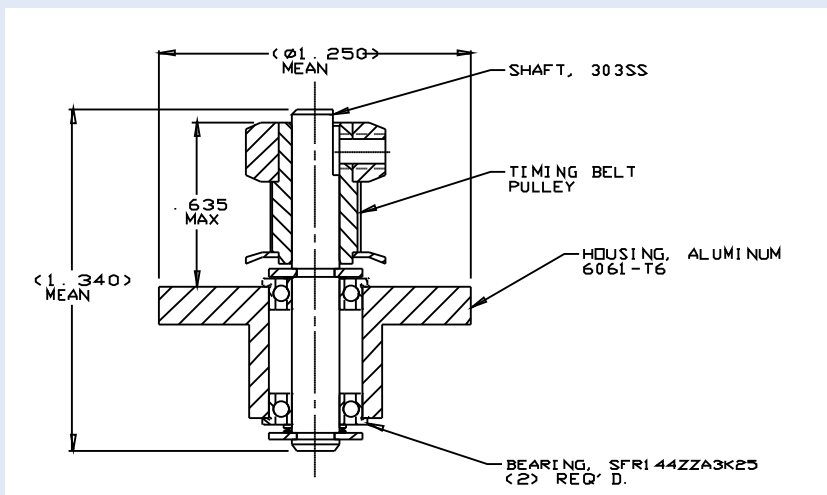


## Precision Spindle Assembly for Industrial Encoder

Bearings: (2) Stainless steel, ABEC 7 with shields, bonded in place under pre-load.

Shaft and Housing: Stainless steel.

Very precise running geometry, lubricated with special grease for low noise and increased life.



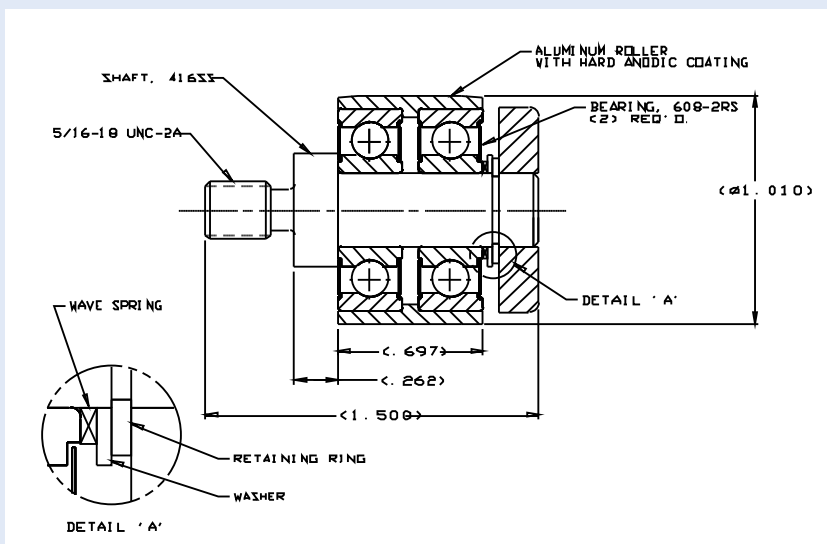
## Timing Belt Idler Assembly

Used in Electronic Media Storage System.

Bearings: (2) Flanged miniature series, stainless steel.

Housing and Pulley: Aluminum.

Shaft: Stainless steel pre-loaded with wave spring.



## Pulley Assembly for Paper Transport System

Bearings: (2) Chrome ABEC 3 with PTFE seals.

Housing: Anodized aluminum.

Shaft: Stainless steel.

Low-cost, maintenance-free assembly for long life in a harsh, paper dust environment.

**Call us with your next design....we can help with the solution.**

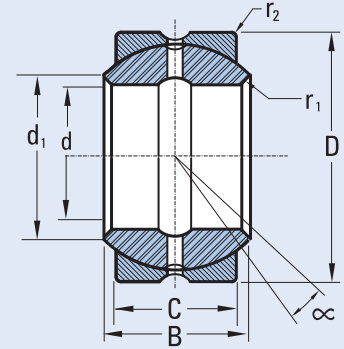


# Inch Spherical Plain Radial Bearings

STEEL-ON-STEEL

- Outer ring with single split in axial direction
- Lubrication grooves and holes in the outer and inner rings

(Dimensions in Inches)



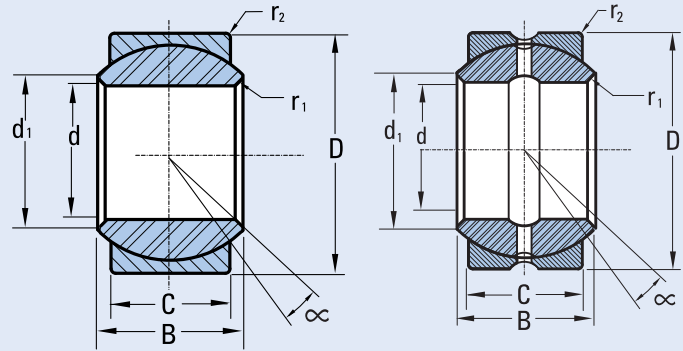
BEARING NUMBER Z SERIES		DIMENSIONS							LOAD RATINGS kN		$\alpha^\circ$	WEIGHT ≈ kg
OPEN	SEALED	(d)	(D)	(B)	(C)	(d <sub>1</sub> ) MIN	(r <sub>1</sub> ) MIN	(r <sub>2</sub> ) MIN	DYN.	STATIC	≈	
GEZ12ES		0.500	0.8750	0.4375	0.3750	0.5551	.006	.024	13	41	6	0.022
GEZ15ES		0.625	1.0625	0.5470	0.4690	0.7204	.006	.024	22	65	6	0.036
GEZ19ES		0.750	1.2500	0.6560	0.5620	0.8583	.012	.024	31	95	6	0.053
GEZ22ES		0.875	1.4375	0.7650	0.6560	1.0000	.012	.024	42	127	6	0.085
GEZ25ES	GEZ25ES-2RS	1.000	1.6250	0.8750	0.7500	1.0866	.012	.024	56	166	6	0.121
GEZ31ES	GEZ31ES-2RS	1.250	2.0000	1.0930	0.9370	1.4173	.024	.024	86	260	6	0.232
GEZ34ES	GEZ34ES-2RS	1.375	2.1875	1.1875	1.0310	1.5197	.024	.039	102	310	6	0.351
GEZ38ES	GEZ38ES-2RS	1.500	2.4375	1.3125	1.1250	1.6221	.024	.039	125	375	6	0.422
GEZ44ES	GEZ44ES-2RS	1.750	2.8125	1.5310	1.3125	1.9961	.024	.039	170	510	6	0.641
GEZ50ES	GEZ50ES-2RS	2.000	3.1875	1.7500	1.5000	2.2795	.024	.039	224	670	6	0.932
GEZ57ES	GEZ57ES-2RS	2.250	3.5625	1.9690	1.6875	2.5551	.024	.039	280	850	6	1.330
GEZ63ES	GEZ63ES-2RS	2.500	3.9375	2.1875	1.8750	2.8858	.039	.039	355	1060	6	1.850
GEZ69ES	GEZ69ES-2RS	2.750	4.3750	2.4060	2.0625	3.1142	.039	.039	415	1250	6	2.420
GEZ76ES	GEZ76ES-2RS	3.000	4.7500	2.6250	2.2500	3.4173	.039	.039	500	1500	6	3.100
GEZ82ES	GEZ82ES-2RS	3.250	5.1250	2.8440	2.4375	3.7205	.039	.039	585	1760	6	3.820
GEZ88ES	GEZ88ES-2RS	3.500	5.5000	3.0625	2.6250	4.0000	.039	.039	680	2040	6	4.790
GEZ95ES	GEZ95ES-2RS	3.750	5.8750	3.2810	2.8125	4.2795	.039	.039	780	2360	6	5.780
GEZ101ES	GEZ101ES-2RS	4.000	6.2500	3.5000	3.0000	4.5591	.039	.039	900	2650	6	6.990
GEZ107ES	GEZ107ES-2RS	4.250	6.6250	3.7190	3.1875	4.8347	.039	.039	1000	3000	6	8.410
GEZ114ES	GEZ114ES-2RS	4.500	7.0000	3.9375	3.3750	5.1417	.039	.039	1120	3400	6	9.790
GEZ120ES	GEZ120ES-2RS	4.750	7.3750	4.1560	3.5625	5.4173	.039	.039	1250	3750	6	11.500
GEZ127ES	GEZ127ES-2RS	5.000	7.7500	4.3750	3.7500	5.7205	.039	.039	1400	4150	6	13.500
GEZ152ES	GEZ152ES-2RS	6.000	8.7500	4.7500	4.1250	6.6221	.039	.039	1730	5200	5	17.500
GEZ165ES	GEZ165ES-2RS	6.500	9.7500	4.8750	4.0625	7.2913	.043	.043	1830	5500	7	22.900
GEZ177ES	GEZ177ES-2RS	7.000	10.5000	5.2500	4.3750	7.8543	.043	.043	2120	6390	7	28.600
GEZ190ES	GEZ190ES-2RS	7.500	11.2500	5.6250	4.6875	8.4134	.043	.043	2440	7340	7	35.100
GEZ203ES	GEZ203ES-2RS	8.000	12.0000	6.0000	5.0000	8.9764	.043	.043	2770	8350	7	42.600
GEZ215ES	GEZ215ES-2RS	8.500	12.7500	6.3750	5.3125	9.5354	.043	.043	3130	9420	7	51.100
GEZ228ES	GEZ228ES-2RS	9.000	13.5000	6.7500	5.6250	10.0945	.043	.043	3510	10500	7	60.700
GEZ241ES	GEZ241ES-2RS	9.500	14.2500	7.1250	5.9370	10.6575	.043	.043	3910	11700	7	71.400
GEZ254ES	GEZ254ES-2RS	10.000	15.0000	7.5000	6.2500	11.2165	.043	.043	4340	13050	7	83.300
GEZ266ES	GEZ266ES-2RS	10.500	15.7500	7.8750	6.5625	11.7795	.043	.043	4780	14300	7	96.400
GEZ279ES	GEZ279ES-2RS	11.000	16.5000	8.2500	6.8750	12.3386	.043	.043	5250	15700	7	110.800
GEZ292ES	GEZ292ES-2RS	11.500	17.2500	8.6250	7.1875	12.9016	.043	.043	5740	17200	7	126.700
GEZ304ES	GEZ304ES-2RS	12.000	18.0000	9.0000	7.5000	13.4606	.043	.043	6250	18700	7	143.900





# Metric Spherical Plain Radial Bearings

STEEL-ON-STEEL



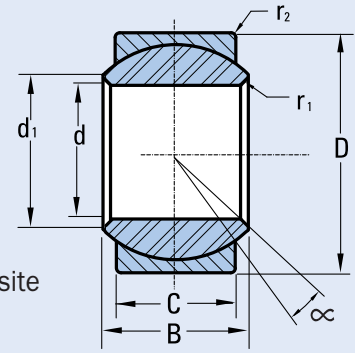
BEARING NUMBER E SERIES		DIMENSIONS				MM			LOAD RATINGS kN		$\alpha^\circ$	WEIGHT ≈ kg
OPEN	SEALED	(d)	(D)	(B)	(C)	(d <sub>1</sub> ) MIN	(r <sub>1</sub> ) MIN	(r <sub>2</sub> ) MIN	DYN.	STATIC	≈	
GE4E		4	12	5	3	6	0.3	0.3	2.0	10	16	0.003
GE5E		5	14	6	4	8	0.3	0.3	3.4	17	13	0.004
GE6E		6	14	6	4	8	0.3	0.3	3.4	17	13	0.004
GE8E		8	16	8	5	10	0.3	0.3	5.5	27	15	0.008
GE10E		10	19	9	6	13	0.3	0.3	8.1	40	12	0.011
GE12E		12	22	10	7	15	0.3	0.3	10.0	53	10	0.015
GE15ES	GE15ES-2RS	15	26	12	9	18	0.3	0.3	16.0	84	8	0.027
GE17ES	GE17ES-2RS	17	30	14	10	20	0.3	0.3	21.0	106	10	0.041
GE20ES	GE20ES-2RS	20	35	16	12	24	0.3	0.3	30.0	146	9	0.066
GE25ES	GE25ES-2RS	25	42	20	16	29	0.6	0.6	48.0	240	7	0.119
GE30ES	GE30ES-2RS	30	47	22	18	34	0.6	0.6	62.0	310	6	0.153
GE35ES	GE35ES-2RS	35	55	25	20	39	0.6	1.0	79.0	399	6	0.233
GE40ES	GE40ES-2RS	40	62	28	22	45	0.6	1.0	99.0	495	7	0.306
GE45ES	GE45ES-2RS	45	68	32	25	50	0.6	1.0	127.0	637	7	0.427
GE50ES	GE50ES-2RS	50	75	35	28	55	0.6	1.0	156.0	780	6	0.546
GE60ES	GE60ES-2RS	60	90	44	36	66	1.0	1.0	245.0	1220	6	1.040
GE70ES	GE70ES-2RS	70	105	49	40	77	1.0	1.0	313.0	1560	6	1.550
GE80ES	GE80ES-2RS	80	120	55	45	88	1.0	1.0	400.0	2000	6	2.310
GE90ES	GE90ES-2RS	90	130	60	50	98	1.0	1.0	488.0	2440	5	2.750
GE100ES	GE100ES-2RS	100	150	70	55	109	1.0	1.0	607.0	3030	7	4.450
GE110ES	GE110ES-2RS	110	160	70	55	120	1.0	1.0	654.0	3270	6	4.820
GE120ES	GE120ES-2RS	120	180	85	70	130	1.0	1.0	950.0	4750	6	8.050
GE140ES	GE140ES-2RS	140	210	90	70	150	1.0	1.0	1070.0	5355	7	11.020
GE160ES	GE160ES-2RS	160	230	105	80	170	1.0	1.0	1360.0	6800	8	14.010
GE180ES	GE180ES-2RS	180	260	105	80	192	1.1	1.1	1530.0	7650	6	18.650
GE200ES	GE200ES-2RS	200	290	130	100	212	1.1	1.1	2120.0	10600	7	28.030
GE220ES	GE220ES-2RS	220	320	135	100	238	1.1	1.1	2320.0	11600	8	35.510
GE240ES	GE240ES-2RS	240	340	140	100	265	1.1	1.1	2550.0	12700	8	39.910
GE260ES	GE260ES-2RS	260	370	150	110	285	1.1	1.1	3038.0	15190	7	51.540
GE280ES	GE280ES-2RS	280	400	155	120	310	1.1	1.1	3570.0	17850	6	65.060
GE300ES	GE300ES-2RS	300	430	165	120	330	1.1	1.1	3800.0	19100	7	78.070

- Outer ring with single split in axial direction
- Lubrication grooves and holes in the outer and inner rings of type ES



# Metric Spherical Plain Maintenance-Free Radial Bearings

- Sliding surface of inner ring is chromium plated
- Sliding surface of outer ring is sintered bronze composite



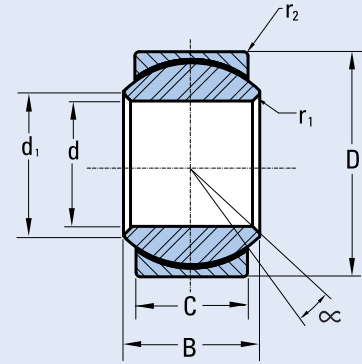
BEARING NUMBER E SERIES OPEN	DIMENSIONS							LOAD RATINGS kN		$\alpha^\circ$ ≈	WEIGHT ≈ kg
	(d)	(D)	(B)	(C)	(d <sub>1</sub> ) MIN	(r <sub>1</sub> ) MIN	(r <sub>2</sub> ) MIN	DYN.	STATIC		
<b>GE4C</b>	4	12	5	3	6	0.3	0.3	2.1	5.4	16	0.003
<b>GE5C</b>	5	14	6	4	8	0.3	0.3	3.6	9.1	13	0.005
<b>GE6C</b>	6	14	6	4	8	0.3	0.3	3.6	9.1	13	0.004
<b>GE8C</b>	8	16	8	5	10	0.3	0.3	5.8	14.0	15	0.008
<b>GE10C</b>	10	19	9	6	13	0.3	0.3	8.6	21.0	12	0.011
<b>GE12C</b>	12	22	10	7	15	0.3	0.3	11.0	28.0	10	0.015
<b>GE15C</b>	15	26	12	9	18	0.3	0.3	18.0	45.0	8	0.027
<b>GE17C</b>	17	30	14	10	20	0.3	0.3	22.0	56.0	10	0.041
<b>GE20C</b>	20	35	16	12	24	0.3	0.3	31.0	78.0	9	0.066
<b>GE25C</b>	25	42	20	16	29	0.6	0.6	51.0	127.0	7	0.119
<b>GE30C</b>	30	47	22	18	34	0.6	0.6	65.0	166.0	6	0.163

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BEARING NUMBER G SERIES OPEN	DIMENSIONS							LOAD RATINGS kN		$\alpha^\circ$ ≈	WEIGHT ≈ kg
	(d)	(D)	(B)	(C)	(d <sub>1</sub> ) MIN	(r <sub>1</sub> ) MIN	(r <sub>2</sub> ) MIN	DYN.	STATIC		
<b>GEG4C</b>	4	14	7	4	8	0.3	0.3	3.6	9.1	20	0.005
<b>GEG5C</b>	5	16	9	5	8	0.3	0.3	5.8	14.0	21	0.006
<b>GEG6C</b>	6	16	9	5	9	0.3	0.3	5.8	14.0	21	0.008
<b>GEG8C</b>	8	19	11	6	11	0.3	0.3	8.6	21.0	21	0.014
<b>GEG10C</b>	10	22	12	7	13	0.3	0.3	11.0	28.0	18	0.021
<b>GEG12C</b>	12	26	15	9	16	0.3	0.3	18.0	45.0	18	0.033
<b>GEG15C</b>	15	30	16	10	19	0.3	0.3	22.0	56.0	16	0.049
<b>GEG17C</b>	17	35	20	12	21	0.3	0.3	31.0	78.0	19	0.083
<b>GEG20C</b>	20	42	25	16	24	0.3	0.3	51.0	127.0	17	0.153
<b>GEG25C</b>	25	47	28	18	29	0.6	0.6	65.0	166.0	17	0.203
<b>GEG30C</b>	30	55	32	20	34	0.6	0.6	83.0	212.0	17	0.304



# Metric Spherical Plain Maintenance-Free Radial Bearings PTFE Lined



BEARING NUMBER E SERIES SEALED	DIMENSIONS							LOAD RATINGS		∞ ≈	WEIGHT ≈ kg
	(d)	(D)	(B)	(C)	(d <sub>1</sub> ) MIN	(r <sub>1</sub> ) MIN	(r <sub>2</sub> ) MIN	DYN.	STATIC		
<b>GE17ET-2RS</b>	17	30	14	10	20	0.3	0.3	30	60	10	0.041
<b>GE20ET-2RS</b>	20	35	16	12	24	0.3	0.3	42	83	9	0.066
<b>GE25ET-2RS</b>	25	42	20	16	29	0.6	0.6	68	137	7	0.119
<b>GE30ET-2RS</b>	30	47	22	18	34	0.6	0.6	88	176	6	0.153
<b>GE35ET-2RS</b>	35	55	25	20	39	0.6	1.0	112	224	6	0.233
<b>GE40ET-2RS</b>	40	62	28	22	45	0.6	1.0	140	280	7	0.306
<b>GE45ET-2RS</b>	45	68	32	25	50	0.6	1.0	180	360	7	0.427
<b>GE50ET-2RS</b>	50	75	35	28	55	0.6	1.0	220	440	6	0.546
<b>GE60ET-2RS</b>	60	90	44	36	66	1.0	1.0	345	695	6	1.040
<b>GE70ET-2RS</b>	70	105	49	40	77	1.0	1.0	440	880	6	1.550
<b>GE80ET-2RS</b>	80	120	55	45	88	1.0	1.0	567	1140	6	2.310
<b>GE90ET-2RS</b>	90	130	60	50	98	1.0	1.0	690	1370	5	2.750
<b>GE100ET-2RS</b>	100	150	70	55	109	1.0	1.0	858	1730	7	4.450
<b>GE110ET-2RS</b>	110	160	70	55	120	1.0	1.0	924	1860	6	4.820
<b>GE120ET-2RS</b>	120	180	85	70	130	1.0	1.0	1340	2700	6	8.050
<b>GE140XT-2RS</b>	140	210	90	70	150	1.0	1.0	1500	3000	7	11.200
<b>GE160XT-2RS</b>	160	230	105	80	170	1.0	1.0	1920	3800	8	13.200
<b>GE180XT-2RS</b>	180	260	105	80	199	1.1	1.1	2160	4300	6	18.600
<b>GE200XT-2RS</b>	200	290	130	100	212	1.1	1.1	3000	6000	7	28.000
<b>GE220XT-2RS</b>	220	320	135	100	238	1.1	1.1	3300	6550	8	35.500
<b>GE240XT-2RS</b>	240	340	140	100	265	1.1	1.1	3600	7200	8	39.900
<b>GE260XT-2RS</b>	260	370	150	110	285	1.1	1.1	4290	8650	7	51.500
<b>GE280XT-2RS</b>	280	400	155	120	310	1.1	1.1	5000	10000	6	65.100
<b>GE300XT-2RS</b>	300	430	165	120	330	1.1	1.1	5400	10800	7	78.100

- Outer ring of type GE...ET-2RS with single split in axial direction.
- Outer ring of type GE...XT-2RS with two axial pieces.
- Sliding surface of outer ring is PTFE fabric.
- Sliding surface of inner ring is chromium plated.

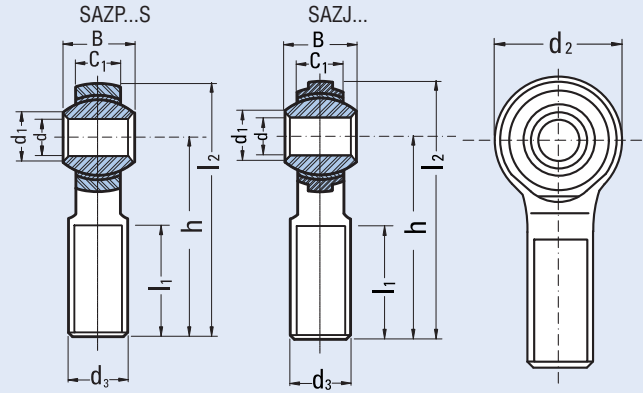


# Rod Ends

## MALE THREAD

- Zinc coated external surface
- Inner ring with chromium plated sliding surface
- Outer ring with bronze sliding surface

(Dimensions in Inches)



BEARING NUMBER P SERIES	DIMENSIONS										LOAD RATINGS kN		$\alpha^\circ$ ≈	WEIGHT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h)	(l <sub>1</sub> ) MIN	(l <sub>2</sub> ) MAX	DYN.	STATIC		
<b>SAZP4S</b>	0.1900	0.312	0.012	0.250	0.307	0.625	10-32	1.250	0.750	1.563	3.4	3.8	10	0.013
<b>SAZP6S</b>	0.2500	0.375	0.012	0.281	0.331	0.750	1/4-28	1.562	1.000	1.937	4.5	6.6	13	0.022
<b>SAZP7S</b>	0.3125	0.437	0.012	0.344	0.449	0.875	5/16-24	1.875	1.250	2.312	6.9	8.4	10	0.037
<b>SAZP9S</b>	0.3750	0.500	0.024	0.406	0.516	1.000	3/8-24	1.938	1.250	2.438	9.4	10	9	0.055
<b>SAZP11S</b>	0.4375	0.562	0.024	0.437	0.587	1.125	7/16-20	2.125	1.375	2.688	11	13	11	0.078
<b>SAZP12S</b>	0.5000	0.625	0.024	0.500	0.697	1.312	1/2-20	2.438	1.500	3.094	15	19	9	0.120
<b>SAZP15S</b>	0.6250	0.750	0.024	0.562	0.839	1.500	5/8-18	2.625	1.625	3.375	20	21	11	0.180
<b>SAZP19S</b>	0.7500	0.875	0.024	0.687	0.976	1.750	3/4-16	2.875	1.750	3.750	29	29	10	0.290
<b>SAZP25S</b>	1.0000	1.375	0.024	1.000	1.268	2.750	1 1/4-12	4.125	2.125	5.500	60	101	14	1.100

BEARING NUMBER ZJ SERIES	DIMENSIONS										LOAD RATINGS kN		$\alpha^\circ$ ≈	WEIGHT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h)	(l <sub>1</sub> ) MIN	(l <sub>2</sub> ) MAX	DYN.	STATIC		
<b>SAZJ4*</b>	0.1900	0.312	0.012	0.234	0.307	0.625	10-32	1.250	0.750	1.563	3.6	3.8	10.0	0.014
<b>SAZJ6*</b>	0.2500	0.375	0.012	0.250	0.331	0.750	1/4-28	1.562	1.000	1.937	5.4	6.6	13.5	0.018
<b>SAZJ7*</b>	0.3125	0.437	0.012	0.312	0.449	0.875	5/16-24	1.875	1.250	2.312	8.5	12	11.0	0.032
<b>SAZJ9</b>	0.3750	0.500	0.024	0.359	0.516	1.000	3/8-24	1.938	1.250	2.438	11	16	11.0	0.050
<b>SAZJ11</b>	0.4375	0.562	0.024	0.406	0.587	1.125	7/16-20	2.125	1.375	2.688	14	21	10.5	0.068
<b>SAZJ12</b>	0.5000	0.625	0.024	0.453	0.697	1.312	1/2-20	2.438	1.500	3.094	18	28	10.0	0.110
<b>SAZJ15</b>	0.6250	0.750	0.024	0.484	0.839	1.500	5/8-18	2.625	1.625	3.375	23	29	13.0	0.160
<b>SAZJ19</b>	0.7500	0.875	0.024	0.593	0.976	1.750	3/4-16	2.875	1.750	3.750	34	44	12.0	0.260

NOTES: For left-hand thread, suffix "L" is added to bearings number and suffix "LH" is added to thread sign, e.g. SALZJ9 3/8-24-3ALH.  
 Add "S" to part number for grease nipple e.g. SAZJ12S.  
 \*A lubrication hole or a grease nipple is not available on these sizes.

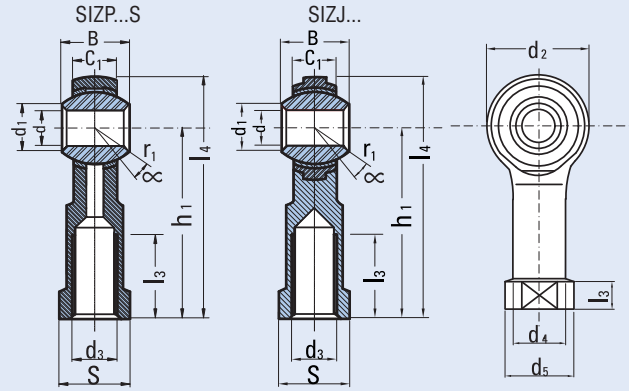


# Rod Ends

## FEMALE THREAD

- Zinc coated external surface
- Inner ring with chromium plated sliding surface
- Outer ring with bronze sliding surface

(Dimensions in Inches)



BEARING NUMBER ZP SERIES	DIMENSIONS													LOAD RATINGS kN			α° ≈	WT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h <sub>1</sub> )	(l <sub>3</sub> ) MIN	(l <sub>4</sub> ) MAX	(l <sub>5</sub> ) MAX	(d <sub>4</sub> ) MAX	(d <sub>5</sub> ) MAX	S	DYN	STA		
<b>SIZP4S</b>	0.1900	0.312	0.012	0.250	0.307	0.625	10-32	1.062	0.562	1.375	0.187	0.297	0.406	0.312	3.4	4.6	10	0.015
<b>SIZP6S</b>	0.2500	0.375	0.012	0.281	0.331	0.750	1/4-28	1.312	0.750	1.687	0.187	0.360	0.469	0.375	4.5	7.7	13	0.025
<b>SIZP7S</b>	0.3125	0.437	0.012	0.344	0.449	0.875	5/16-24	1.375	0.750	1.812	0.187	0.422	0.500	0.437	6.9	8.4	10	0.036
<b>SIZP9S</b>	0.3750	0.500	0.024	0.406	0.516	1.000	3/8-24	1.625	0.937	2.125	0.250	0.547	0.687	0.562	9.4	10	9	0.061
<b>SIZP11S</b>	0.4375	0.562	0.024	0.437	0.587	1.125	7/16-20	1.812	1.062	2.375	0.250	0.610	0.750	0.625	11	13	11	0.081
<b>SIZP12S</b>	0.5000	0.625	0.024	0.500	0.697	1.312	1/2-20	2.125	1.187	2.781	0.250	0.735	0.875	0.750	15	19	9	0.133
<b>SIZP15S</b>	0.6250	0.750	0.024	0.562	0.839	1.500	5/8-18	2.500	1.500	3.250	0.312	0.860	1.0000	0.875	20	21	11	0.190
<b>SIZP19S</b>	0.7500	0.875	0.024	0.687	0.976	1.750	3/4-16	2.875	1.750	3.750	0.312	0.985	1.125	1.000	29	29	10	0.285
<b>SIZP25S</b>	1.0000	1.375	0.024	1.000	1.268	2.750	1 1/4-12	4.125	2.125	5.500	0.437	1.485	1.750	1.500	60	101	14	1.000

BEARING NUMBER ZJ SERIES	DIMENSIONS													LOAD RATINGS kN			α° ≈	WT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h <sub>1</sub> )	(l <sub>3</sub> ) MIN	(l <sub>4</sub> ) MAX	(l <sub>5</sub> ) MAX	(d <sub>4</sub> ) MAX	(d <sub>5</sub> ) MAX	S	DYN	STA		
<b>SIZJ4*</b>	0.1900	0.312	0.012	0.234	0.307	0.625	10-32	1.062	0.500	1.375	0.187	0.297	0.406	0.312	3.6	6.8	10	0.018
<b>SIZJ6*</b>	0.2500	0.375	0.012	0.250	0.331	0.750	1/4-28	1.312	0.625	1.687	0.187	0.360	0.469	0.375	5.4	9.6	13.5	0.023
<b>SIZJ7*</b>	0.3125	0.437	0.012	0.312	0.449	0.875	5/16-24	1.375	0.625	1.812	0.187	0.422	0.500	0.437	8.5	12	11	0.036
<b>SIZJ9</b>	0.3750	0.500	0.024	0.359	0.516	1.000	3/8-24	1.625	0.750	2.125	0.250	0.547	0.687	0.562	11	16	11	0.059
<b>SIZJ11</b>	0.4375	0.562	0.024	0.406	0.587	1.125	7/16-20	1.812	0.875	2.375	0.250	0.610	0.750	0.625	14	21	10.5	0.082
<b>SIZJ12</b>	0.5000	0.625	0.024	0.453	0.697	1.312	1/2-20	2.125	1.000	2.781	0.250	0.735	0.875	0.750	18	28	10	0.132
<b>SIZJ15</b>	0.6250	0.750	0.024	0.484	0.839	1.500	5/8-18	2.500	1.250	3.250	0.312	0.860	1.000	0.875	23	29	13	0.195
<b>SIZJ19</b>	0.7500	0.875	0.024	0.593	0.976	1.750	3/4-16	2.875	1.375	3.750	0.312	0.985	1.125	1.000	34	44	12	0.295

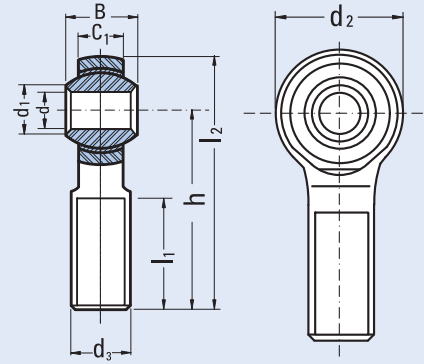
NOTES: For left-hand thread, suffix "L" is added to bearing number and suffix "LH" is added to thread sign, e.g. SILZP 15 S 5/8-18-3BLH.  
 Add "S" to part number for grease nipple e.g. SIZJ12S.  
 \*A lubrication hole or a grease nipple is not available on these sizes.



# Metric Maintenance-Free Rod Ends

## MALE THREAD

- Zinc coated external surface
- Inner ring with chromium plated sliding surface



BEARING NUMBER JK SERIES	DIMENSIONS										LOAD RATINGS		$\alpha^\circ$	WEIGHT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h)	(l <sub>1</sub> ) MIN	(l <sub>2</sub> ) MAX	DYN.	STATIC		
SAJK5C	5	8	0.3	7.5	7.7	18	M5	33	19	42	3.6	3.9	4	0.013
SAJK6C	6	9	0.3	7.5	8.9	20	M6	36	21	46	4.7	5.2	9	0.015
SAJK8C	8	12	0.3	9.5	10.3	24	M8	42	25	54	7.6	8.2	12	0.034
SAJK10C	10	14	0.6	11.5	12.9	30	M10	48	28	63	12.0	15.0	10	0.071
SAJK12C	12	16	0.6	12.5	15.4	34	M12	54	32	71	14.0	19.0	12	0.110
SAJK14C	14	19	0.6	14.5	16.8	38	M14	60	36	79	19.0	24.0	14	0.130
SAJK16C	16	21	0.6	15.5	19.3	42	M16	66	37	87	23.0	29.0	14	0.220
SAJK18C	18	23	0.6	17.5	21.8	46	M18x1.5	72	41	95	29.0	34.0	13	0.290
SAJK20C	20	25	0.6	18.5	24.3	50	M20x1.5	78	45	103	34.0	40.0	14	0.360
SAJK22C	22	28	0.6	21.0	25.8	56	M22x1.5	84	48	112	42.0	50.0	14	0.490
SAJK25C	25	31	0.6	23.0	29.5	60	M24x2	94	55	124	52.0	57.0	14	0.650
SAJK28C	28	35	0.6	26.0	32.2	66	M27x2	103	62	136	66.0	69.0	14	0.870
SAJK30C	30	37	0.6	27.0	34.8	70	M30x2	110	66	145	73.0	77.0	15	1.100

BEARING NUMBER E SERIES	DIMENSIONS										LOAD RATINGS		$\alpha^\circ$	WEIGHT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h)	(l <sub>1</sub> ) MIN	(l <sub>2</sub> ) MAX	DYN.	STATIC		
SA5C	5	6	0.3	4.5	7	21	M5	36	16	46.5	3.6	3.9	13	0.011
SA6C	6	6	0.3	4.5	8	21	M6	36	16	46.5	3.6	5.5	13	0.013
SA8C	8	8	0.3	6.5	10	24	M8	42	21	54	5.8	10.0	15	0.026
SA10C	10	9	0.3	7.5	13	29	M10	48	26	62.5	8.6	16.0	12	0.044
SA12C	12	10	0.3	8.5	15	34	M12	54	28	71	11.0	23.0	10	0.066
SA15C	15	12	0.3	10.5	18	40	M14	63	34	83	18.0	32.0	8	0.120
SA17C	17	14	0.3	11.5	20	46	M16	69	36	92	22.0	44.0	10	0.170
SA20C	20	16	0.3	13.5	24	53	M20x1.5	78	43	104.5	31.0	60.0	9	0.280
SA25C	25	20	0.6	18.0	29	64	M24x2	94	53	126	51.0	83.0	7	0.510
SA30C	30	22	0.6	20.0	34	73	M30x2	110	65	146.5	65.0	110.0	6	0.840
SA35ET-2RS	35	25	0.6	22.0	39	82	M36x3	140	82	181	112.0	146.0	6	1.400
SA40ET-2RS	40	28	0.6	24.0	45	92	M39x3	150	86	196	140.0	180.0	7	1.800
SA45ET2RS	45	32	0.6	28.0	50	102	M42x3	163	92	214	180.0	240.0	7	2.500
SA50ET2RS	50	35	0.6	31.0	55	112	M45x3	185	104	241	220.0	290.0	6	3.600
SA60ET2RS	60	44	1.0	39.0	66	135	M52x3	210	115	277.5	345.0	450.0	6	5.700
SA70ET2RS	70	49	1.0	43.0	77	160	M56x4	235	125	315	440.0	610.0	6	7.900
SA80ET2RS	80	55	1.0	48.0	88	180	M64x4	270	140	360	567.0	750.0	6	12.000

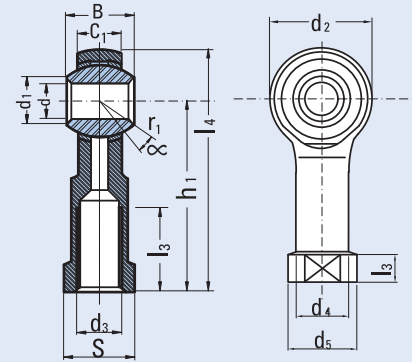
NOTES: For left-hand thread, suffix "L" is added to bearings number and thread sign, e.g. SALJK10C M10L-6G or SAL35ET-2RS M36x3L-6G.



# Metric Maintenance-Free Rod Ends

## FEMALE THREAD

- Zinc coated external surface
- Inner ring with chromium plated sliding surface



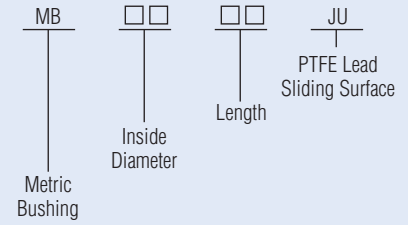
BEARING NUMBER JK SERIES	DIMENSIONS													LOAD RATINGS kN			$\alpha^\circ$ ≈	WT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h <sub>1</sub> )	(l <sub>3</sub> ) MIN	(l <sub>4</sub> ) MAX	(l <sub>5</sub> ) MAX	(d <sub>4</sub> ) MAX	(d <sub>5</sub> ) MAX	S	DYN	STA		
SIJK5C	5	8	0.3	7.5	7.7	18	M5	27	8	36	4.0	9.0	12	10	3.6	4.6	4	0.016
SIJK6C	6	9	0.3	7.5	8.9	20	M6	30	9	40	5.0	10.0	13	10	4.7	5.2	9	0.019
SIJK8C	8	12	0.3	9.5	10.3	24	M8	36	12	48	5.0	12.5	16	13	7.6	8.2	12	0.036
SIJK10C	10	14	0.6	11.5	12.9	30	M10	43	15	58	6.5	15.0	19	16	12.0	15.0	10	0.088
SIJK12C	12	16	0.6	12.5	15.4	34	M12	50	18	67	6.5	17.5	22	18	14.0	19.0	12	0.120
SIJK14C	14	19	0.6	14.5	16.8	38	M14	57	21	76	8.0	20.0	25	21	19.0	24.0	14	0.140
SIJK16C	16	21	0.6	15.5	19.3	42	M16	64	24	85	8.0	22.0	27	24	23.0	29.0	14	0.240
SIJK18C	18	23	0.6	17.5	21.8	46	M18x1.5	71	27	94	10.0	25.0	31	27	29.0	34.0	13	0.320
SIJK20C	20	25	0.6	18.5	24.3	50	M20x1.5	77	30	102	10.0	27.5	34	30	34.0	40.0	14	0.430
SIJK22C	22	28	0.6	21.0	25.8	56	M22x1.5	84	33	112	12.0	30.0	37	34	42.0	50.0	14	0.610
SIJK25C	25	31	0.6	23.0	29.5	60	M24x2	94	36	124	12.0	33.5	42	36	52.0	57.0	14	0.810
SIJK28C	28	35	0.6	26.0	32.2	66	M27x2	103	41	136	14.0	37.0	46	41	66.0	69.0	14	1.200
SIJK30C	30	37	0.6	27.0	34.8	70	M30x2	110	45	145	15.0	40.0	50	46	73.0	77.0	15	1.400

BEARING NUMBER E SERIES	DIMENSIONS													LOAD RATINGS kN			$\alpha^\circ$ ≈	WT ≈ kg
	(d)	(B)	(R <sub>1</sub> ) MIN	(C <sub>1</sub> ) MAX	(d <sub>1</sub> ) MIN	(d <sub>2</sub> ) MAX	(d <sub>3</sub> )	(h <sub>1</sub> )	(l <sub>3</sub> ) MIN	(l <sub>4</sub> ) MAX	(l <sub>5</sub> ) MAX	(d <sub>4</sub> ) MAX	(d <sub>5</sub> ) MAX	S	DYN	STA		
SI5C	5	6	0.3	4.5	7	21	M5	30	11	41.5	5.0	10	13	10	3.6	8.1	13	0.016
SI6C	6	6	0.3	4.5	8	21	M6	30	11	41.5	5.0	11	13	11	3.6	8.1	13	0.017
SI8C	8	8	0.3	6.5	10	24	M8	36	15	48.0	5.0	13	16	13	5.8	12.9	15	0.035
SI10C	10	9	0.3	7.5	13	29	M10	43	15	57.5	6.5	16	19	16	8.6	17.6	12	0.061
SI12C	12	10	0.3	8.5	15	34	M12	50	18	67.0	7.0	19	22	18	11.0	24.5	10	0.096
SI15C	15	12	0.3	10.5	18	40	M14	61	21	81.0	8.0	21	26	21	18.0	36.0	8	0.160
SI17C	17	14	0.3	11.5	20	46	M16	67	24	90.0	10.0	25	29	27	22.0	45.0	10	0.230
SI20C	20	16	0.3	13.5	24	53	M20x1.5	77	30	103.5	10.0	28	34	30	31.0	60.0	9	0.320
SI25C	25	20	0.6	18.0	29	64	M24x2	94	36	126.0	12.0	35	42	36	51.0	83.0	7	0.620
SI30C	30	22	0.6	20.0	34	73	M30x2	110	45	146.5	15.0	42	50	46	65.0	110.0	6	0.970
SI35ET-2RS	35	25	0.6	22.0	39	82	M36x3	125	60	166.0	15.0	48	58	55	112.0	146.0	6	1.500
SI40ET-2RS	40	28	0.6	24.0	45	92	M39x3	142	65	188.0	18.0	52	65	60	140.0	180.0	7	2.100
SI45ET-2RS	45	32	0.6	28.0	50	102	M42x3	145	65	196.0	20.0	58	70	65	180.0	240.0	7	2.700
SI50ET-2RS	50	35	0.6	31.0	55	112	M45x3	160	68	216.0	20.0	62	75	70	220.0	290.0	6	3.500
SI60ET-2RS	60	44	1.0	39.0	66	135	M52x3	175	70	242.5	20.0	70	88	80	345.0	450.0	6	5.600
SI70ET-2RS	70	49	1.0	43.0	77	160	M56x4	200	80	280.0	20.0	80	98	85	440.0	610.0	6	8.300
SI80ET-2RS	80	55	1.0	48.0	88	180	M64x4	230	85	320.0	25.0	95	110	95	567.0	750.0	6	13.000

NOTES: For left-hand thread, suffix "L" is added to bearings number and thread sign, e.g. SILJK8C M8L-6H or SIL40ET-2RS M39x3L-6H.



# JU Self-Lubricating Metric Bushings

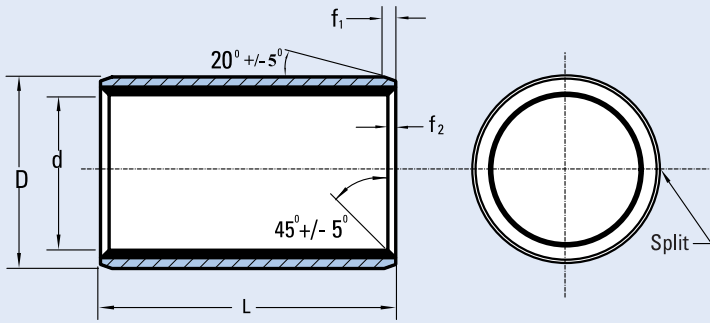


Example Part #: MB0606JU = 6 mm Bore, 8 mm O.D., 6 mm Length

d	D	SHAFT DIAMETER	HOUSING	WALL THICKNESS		f <sub>1</sub>	f <sub>2</sub>	(L) LENGTH									
				MIN.	MAX.			6	8	10	12	15	20	25	30	40	50
6	8	6 <sup>-0.013</sup> / <sub>-0.028</sub>	8 <sup>+0.015</sup>	0.980	1.005	0.5	0.3	0606	0608	0610							
8	10	8 <sup>-0.013</sup> / <sub>-0.028</sub>	10 <sup>+0.015</sup>	0.980	1.005	0.5	0.3	0806	0808	0810	0812	0815					
10	12	10 <sup>-0.016</sup> / <sub>-0.034</sub>	12 <sup>+0.018</sup>	0.980	1.005	0.5	0.3	1006	1008	1010	1012	1015	1020				
12	14	12 <sup>-0.016</sup> / <sub>-0.034</sub>	14 <sup>+0.018</sup>	0.980	1.005	0.5	0.3	1206	1208	1210	1212	1215	1220	1225			
13	15	13 <sup>-0.016</sup> / <sub>-0.034</sub>	15 <sup>+0.018</sup>	0.980	1.005	0.5	0.3			1310			1320				
14	16	14 <sup>-0.016</sup> / <sub>-0.034</sub>	16 <sup>+0.018</sup>	0.980	1.005	0.5	0.3			1410	1412	1415	1420	1425			
15	17	15 <sup>-0.016</sup> / <sub>-0.034</sub>	17 <sup>+0.018</sup>	0.980	1.005	0.5	0.3			1510	1512	1515	1520	1525			
16	18	16 <sup>-0.016</sup> / <sub>-0.034</sub>	18 <sup>+0.018</sup>	0.980	1.005	0.5	0.3			1610	1612	1615	1620	1625			
17	19	17 <sup>-0.016</sup> / <sub>-0.034</sub>	19 <sup>+0.018</sup>	0.980	1.005	0.5	0.3			1710	1712		1720				
18	20	18 <sup>-0.020</sup> / <sub>-0.041</sub>	20 <sup>+0.021</sup>	0.980	1.005	0.5	0.3			1810	1812	1815	1820	1825			
20	23	20 <sup>-0.020</sup> / <sub>-0.041</sub>	23 <sup>+0.021</sup>	1.475	1.505	0.8	0.4			2010	2012	2015	2020	2025	2030		
22	25	22 <sup>-0.020</sup> / <sub>-0.041</sub>	25 <sup>+0.021</sup>	1.475	1.505	0.8	0.4			2210	2212	2215	2220	2225	2230		
24	27	24 <sup>-0.020</sup> / <sub>-0.041</sub>	27 <sup>+0.021</sup>	1.475	1.505	0.8	0.4					2415	2420	2425	2430		
25	28	25 <sup>-0.020</sup> / <sub>-0.041</sub>	28 <sup>+0.021</sup>	1.475	1.505	0.8	0.4			2510	2512	2515	2520	2525	2530	2540	2550
28	32	28 <sup>-0.020</sup> / <sub>-0.041</sub>	32 <sup>+0.025</sup>	1.970	2.005	1.0	0.5					2815	2820	2825	2830	2840	
30	34	30 <sup>-0.025</sup> / <sub>-0.050</sub>	34 <sup>+0.025</sup>	1.970	2.005	1.0	0.5				3012	3015	3020	3025	3030	3040	
32	36	32 <sup>-0.025</sup> / <sub>-0.050</sub>	36 <sup>+0.025</sup>	1.970	2.005	1.0	0.5						3220		3230	3240	
35	39	35 <sup>-0.025</sup> / <sub>-0.050</sub>	39 <sup>+0.025</sup>	1.970	2.005	1.0	0.5				3512	3515	3520	3525	3530	3540	3550
38	42	38 <sup>-0.025</sup> / <sub>-0.050</sub>	42 <sup>+0.025</sup>	1.970	2.005	1.0	0.5					3815			3830	3840	
40	44	40 <sup>-0.025</sup> / <sub>-0.050</sub>	44 <sup>+0.025</sup>	1.970	2.005	1.0	0.5				4012		4020	4025	4030	4040	4050

Available with copper or tin plating (check for availability).



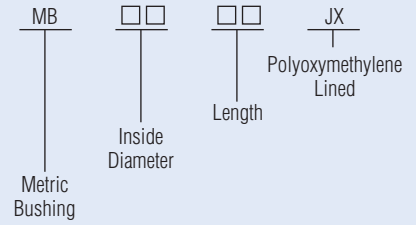


d	D	SHAFT DIAMETER	HOUSING BORE	WALL THICKNESS		f <sub>1</sub>	f <sub>2</sub>	LENGTH										
				MIN.	MAX.			20	25	30	40	50	60	70	80	90	100	115
45	50	45 <sup>-0.025/-0.050</sup>	50 <sup>+0.025</sup>	2.460	2.505	1.2	0.6	4520	4525	4530	4540	4550						
50	55	50 <sup>-0.030/-0.060</sup>	55 <sup>+0.030</sup>	2.460	2.505	1.2	0.6	5020		5030	5040	5050	5060					
55	60	55 <sup>-0.030/-0.060</sup>	60 <sup>+0.030</sup>	2.460	2.505	1.2	0.6			5530	5540	5550	5560					
60	65	60 <sup>-0.030/-0.060</sup>	65 <sup>+0.030</sup>	2.460	2.505	1.2	0.6			6030	6040	6050	6060	6070				
65	70	65 <sup>-0.030/-0.060</sup>	70 <sup>+0.030</sup>	2.460	2.505	1.2	0.6			6530	6540	6550	6560	6570				
70	75	70 <sup>-0.030/-0.060</sup>	75 <sup>+0.030</sup>	2.460	2.505	1.2	0.6				7040	7050	7060	7070	7080			
75	80	75 <sup>-0.030/-0.060</sup>	80 <sup>+0.030</sup>	2.460	2.505	1.2	0.6			7530	7540	7550	7560	7570	7580			
80	85	80 <sup>-0.035</sup>	85 <sup>+0.035</sup>	2.440	2.490	1.4	0.7				8040	8050	8060	8070	8080	80100		
85	90	85 <sup>-0.035</sup>	90 <sup>+0.035</sup>	2.440	2.490	1.4	0.7				8540		8560		8580	85100		
90	95	90 <sup>-0.035</sup>	95 <sup>+0.035</sup>	2.440	2.490	1.4	0.7				9040	9050	9060		9080	90100		
95	100	95 <sup>-0.035</sup>	100 <sup>+0.035</sup>	2.440	2.490	1.4	0.7	9520				9550	9560		9580	95100		
100	105	100 <sup>-0.035</sup>	105 <sup>+0.035</sup>	2.440	2.490	1.4	0.7					10050	10060		10080			100115
105	110	105 <sup>-0.035</sup>	110 <sup>+0.035</sup>	2.440	2.490	1.4	0.7						10560		10580			105115
110	115	110 <sup>-0.035</sup>	115 <sup>+0.035</sup>	2.440	2.490	1.4	0.7						11060		11080			110115
120	125	120 <sup>-0.04</sup>	125 <sup>+0.035</sup>	2.415	2.465	1.6	0.8						12060		12080	120100		
125	130	125 <sup>-0.04</sup>	130 <sup>+0.040</sup>	2.415	2.465	1.6	0.8						12560			125100	125115	
130	135	130 <sup>-0.04</sup>	135 <sup>+0.040</sup>	2.415	2.465	1.6	0.8						13060		13080	130100		
140	145	140 <sup>-0.04</sup>	145 <sup>+0.040</sup>	2.415	2.465	1.6	0.8						14060		14080	140100		
150	155	150 <sup>-0.04</sup>	155 <sup>+0.040</sup>	2.415	2.465	1.6	0.8						15050	15060	15080	150100		
160	165	160 <sup>-0.04</sup>	165 <sup>+0.040</sup>	2.415	2.465	1.6	0.8						16060		16080	160100	160115	
180	185	180 <sup>-0.046</sup>	185 <sup>+0.046</sup>	2.415	2.465	1.6	0.8								18080	180100		
190	195	190 <sup>-0.046</sup>	195 <sup>+0.046</sup>	2.415	2.465	1.6	0.8								19080	190100		
200	205	200 <sup>-0.046</sup>	205 <sup>+0.046</sup>	2.415	2.465	1.6	0.8						20060		20080	200100		
220	225	220 <sup>-0.046</sup>	225 <sup>+0.046</sup>	2.415	2.465	1.6	0.8								22080	220100		
250	255	250 <sup>-0.052</sup>	255 <sup>+0.052</sup>	2.415	2.465	1.6	0.8								25080	250100		
260	265	260 <sup>-0.052</sup>	265 <sup>+0.052</sup>	2.415	2.465	1.6	0.8								26080	260100		
280	285	280 <sup>-0.052</sup>	285 <sup>+0.052</sup>	2.415	2.465	1.6	0.8								28080	280100		
300	305	300 <sup>-0.052</sup>	305 <sup>+0.052</sup>	2.415	2.465	1.6	0.8								30080	300100		

Non standard widths can be supplied upon special request.



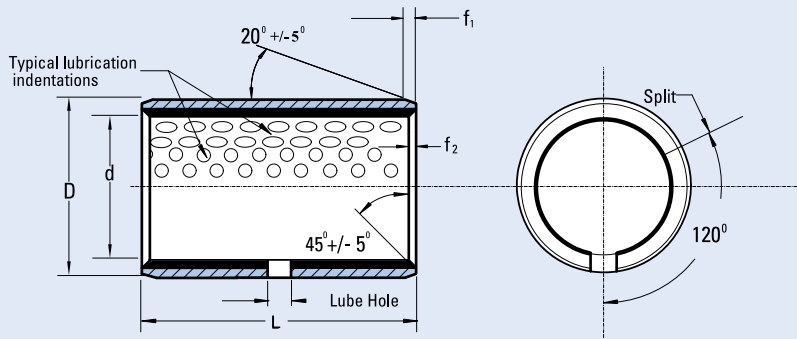
# JX Metric Bushings



Example Part #:  
MB1010JX = 10 mm Bore, 12 mm O.D., 10 mm Length

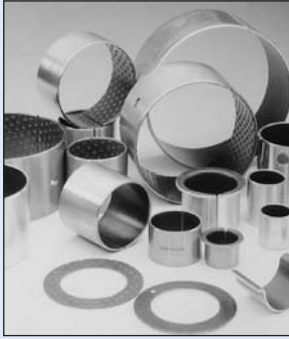
d	D	SHAFT DIAMETER	HOUSING BORE	WALL THICKNESS		φ	f <sub>1</sub>	f <sub>2</sub>	(L) LENGTH													
				MIN.	MAX.				10	12	15	20	25	30	35	40	45	50	55	60		
10	12	10 <sub>-0.022</sub>	12 <sup>+0.018</sup>	0.955	0.980	4	0.5	0.3	1010		1015	1020										
12	14	12 <sub>-0.027</sub>	14 <sup>+0.018</sup>	0.955	0.980	4	0.5	0.3	1210		1215	1220										
14	16	14 <sub>-0.027</sub>	16 <sup>+0.018</sup>	0.955	0.980	4	0.5	0.3			1415	1420										
15	17	15 <sub>-0.027</sub>	17 <sup>+0.018</sup>	0.955	0.980	4	0.5	0.3			1515	1520	1525									
16	18	16 <sub>-0.027</sub>	18 <sup>+0.018</sup>	0.955	0.980	4	0.5	0.3			1615	1620	1625									
18	20	18 <sub>-0.027</sub>	20 <sup>+0.021</sup>	0.955	0.980	4	0.5	0.3			1815	1820	1825									
20	23	20 <sub>-0.033</sub>	23 <sup>+0.021</sup>	1.445	1.475	4	0.8	0.4			2015	2020	2025	2030								
22	25	22 <sub>-0.033</sub>	25 <sup>+0.021</sup>	1.445	1.475	6	0.8	0.4			2215		2225									
25	28	25 <sub>-0.033</sub>	28 <sup>+0.021</sup>	1.445	1.475	6	0.8	0.4			2515	2520	2525	2530								
28	32	28 <sub>-0.033</sub>	32 <sup>+0.025</sup>	1.935	1.970	6	1.0	0.5				2820		2830								
30	34	30 <sub>-0.033</sub>	34 <sup>+0.025</sup>	1.935	1.970	6	1.0	0.5				3020	3025	3030		3040						
35	39	35 <sub>-0.039</sub>	39 <sup>+0.025</sup>	1.935	1.970	6	1.0	0.5				3520		3530	3535	3540						
40	44	40 <sub>-0.039</sub>	44 <sup>+0.025</sup>	1.935	1.970	8	1.0	0.5				4020		4030		4040		4050				
45	50	45 <sub>-0.039</sub>	50 <sup>+0.025</sup>	2.415	2.460	8	1.2	0.6				4520		4530		4540	4545	4550				
50	55	50 <sub>-0.046</sub>	55 <sup>+0.030</sup>	2.415	2.460	8	1.2	0.6						5030		5040		5050	5055	5060		
55	60	55 <sub>-0.046</sub>	60 <sup>+0.030</sup>	2.415	2.460	8	1.2	0.6						5530		5540		5550		5560		
60	65	60 <sub>-0.046</sub>	65 <sup>+0.030</sup>	2.415	2.460	8	1.2	0.6						6030		6040		6050		6060		

Available with copper or tin plating (check for availability).



d	D	SHAFT DIAMETER	HOUSING BORE	WALL THICKNESS		φ	f <sub>1</sub>	f <sub>2</sub>	LENGTH											
				MIN.	MAX.				40	45	50	60	65	80	90	95	100	110	120	
65	70	65 <sub>-0.046</sub>	70 <sup>+0.03</sup>	2.415	2.460	8	1.2	0.6	6540				6560							
70	75	70 <sub>-0.046</sub>	75 <sup>+0.03</sup>	2.415	2.460	8	1.2	0.6	7040		7050		7065	7080						
75	80	75 <sub>-0.046</sub>	80 <sup>+0.03</sup>	2.415	2.460	9.5	1.2	0.6	7540				7560		7580					
80	85	80 <sub>-0.046</sub>	85 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7	8040				8060		8080					
85	90	85 <sub>-0.054</sub>	90 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7	8540				8560		8580					
90	95	90 <sub>-0.054</sub>	95 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7	9040				9060		9080	9090				
100	105	100 <sub>-0.054</sub>	105 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7			10050			10080		10095				
105	110	105 <sub>-0.054</sub>	110 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7					10560		10580		10595		105110	
110	115	110 <sub>-0.054</sub>	115 <sup>+0.035</sup>	2.385	2.450	9.5	1.4	0.7					11060		11080		11095		110110	
120	125	120 <sub>-0.054</sub>	125 <sup>+0.035</sup>	2.385	2.450	9.5	1.6	0.8					12060		12080				120110	
125	130	125 <sub>-0.063</sub>	130 <sup>+0.040</sup>	2.385	2.450	9.5	1.6	0.8					12560						125110	
130	135	130 <sub>-0.063</sub>	135 <sup>+0.040</sup>	2.385	2.450	9.5	1.6	0.8				13050	13060		13080			130100		
140	145	140 <sub>-0.063</sub>	145 <sup>+0.040</sup>	2.385	2.450	9.5	1.6	0.8				14050	14060		14080			140100		
150	155	150 <sub>-0.063</sub>	155 <sup>+0.040</sup>	2.385	2.450	9.5	1.6	0.8				15050	15060		15080			150100		
160	165	160 <sub>-0.063</sub>	165 <sup>+0.040</sup>	2.385	2.450	11	1.6	0.8				16050	16060		16080			160100		
170	175	170 <sub>-0.063</sub>	175 <sup>+0.040</sup>	2.385	2.450	11	1.6	0.8				17050			17080			170100		
180	185	180 <sub>-0.072</sub>	185 <sup>+0.040</sup>	2.385	2.450	11	1.6	0.8				18050	18060		18080			180100		
190	195	190 <sub>-0.072</sub>	195 <sup>+0.046</sup>	2.385	2.450	11	1.6	0.8				19050	19060		19080			190100		190120
200	205	200 <sub>-0.072</sub>	205 <sup>+0.046</sup>	2.385	2.450	11	1.6	0.8				20050	20060		20080			200100		200120
220	225	220 <sub>-0.072</sub>	225 <sup>+0.046</sup>	2.385	2.450	12	1.6	0.8				22050	22060		22080			220100		220120
240	245	240 <sub>-0.072</sub>	245 <sup>+0.046</sup>	2.385	2.450	12	1.6	0.8				24050	24060		24080			240100		240120
250	255	250 <sub>-0.081</sub>	255 <sup>+0.052</sup>	2.385	2.450	12	1.6	0.8				25050	25060		25080			250100		250120
260	265	260 <sub>-0.081</sub>	265 <sup>+0.052</sup>	2.385	2.450	12	1.6	0.8				26050	26060		26080			260100		260120
280	285	280 <sub>-0.081</sub>	285 <sup>+0.052</sup>	2.385	2.450	12	1.6	0.8				28050	28060		28080			280100		280120
300	305	300 <sub>-0.081</sub>	305 <sup>+0.052</sup>	2.385	2.450	12	1.6	0.8				30050	30060		30080			300100		300120

Non standard widths can be supplied upon special request.



# JU & JX Inch Bushings

JU

Example Part #:  
02JU03 = .125" Bore, .1875" O.D., .1875" Length

or

JX

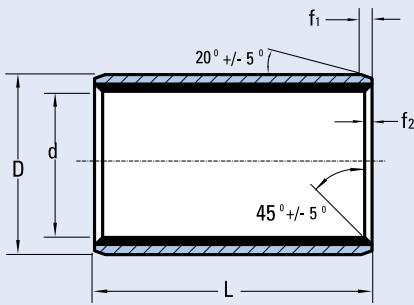
Example Part #:  
32JX16 = 2" Bore, 2.1875" O.D., 1" Length

d	D	NOMINAL BEARING BORE	RECOMMENDED SHAFT DIA.	HOUSING BORE	LENGTH										
					.1875	.25	.375	.5	.625	.75	.875	1	1.25	1.5	1.75
.1250	.1875	.1250	0.1243 0.1236	0.1873 0.1878	0203										
.1562	.2188	.1562	0.1554 0.1547	0.2186 0.2191		02504									
.1875	.2500	.1875	0.1865 0.1858	0.2497 0.2503	0303	0304	0306								
.2500	.3125	.2500	0.2490 0.2481	0.3122 0.3128		0404	0406								
.3125	.3750	.3125	0.3115 0.3106	0.3747 0.3753			0506	0508							
.3750	.4687	.3750	0.3740 0.3731	0.4684 0.4691	0603	0604	0606	0608		0612					
.4375	.5312	.4375	0.4365 0.4355	0.5309 0.5316				0708		0712					
.5000	.5937	.5000	0.4990 0.4980	0.5934 0.5941		0804	0806	0808	0810	0812	0814				
.5625	.6562	.5625	0.5615 0.5605	0.6559 0.6566			0906	0908	0910	0912					
.6250	.7187	.6250	0.6240 0.6230	0.7184 0.7192		1004		1008	1010	1012	1014	1016			
.6875	.7812	.6875	0.6865 0.6855	0.7809 0.7817							1114				
.7500	.8750	.7500	0.7491 0.7479	0.8747 0.8755		1204	1206	1208	1210	1212		1216			
.8750	1.0000	.8750	0.8741 0.8729	0.9997 1.0005		1404	1406			1412	1414	1416	1420		
1.0000	1.1250	1.0000	0.9991 0.9979	1.1247 1.1255			1606	1608		1612		1616	1620	1624	
1.1250	1.2812	1.1250	1.1238 1.1226	1.2808 1.2818			1806		1810	1812		1816			
1.2500	1.4062	1.2500	1.2488 1.2472	1.4058 1.4068			2006			2012	2014	2016	2020		2028
1.3750	1.5312	1.3750	1.3738 1.3722	1.5308 1.5318						2212		2216		2224	2228
1.5000	1.6562	1.5000	1.4988 1.4972	1.6558 1.6568				2408				2416	2420	2424	
1.6250	1.7812	1.6250	1.6238 1.6222	1.7808 1.7818								2616		2624	
1.7500	1.9375	1.7500	1.7487 1.7471	1.9371 1.9381								2816		2824	2828
1.8750	2.0625	1.8750	1.8737 1.8721	2.0621 2.0633						3012		3016			
2.0000	2.1875	2.0000	1.9987 1.9969	2.1871 2.1883				3208				3216		3224	3228

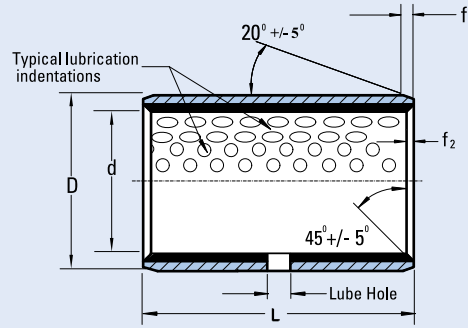
- Other sizes available in shorter and longer lengths.
- Bushings available in: Polyoxymethylene Sliding Surface (JX)  
PTFE-Lead Sliding Surface (JU)

Available in copper or tin plating (check for availability).

JU



JX



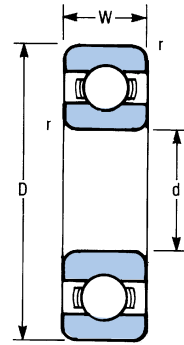
d	D	NOMINAL BEARING BORE	RECOMMENDED SHAFT DIA.	RECOMMENDED HOUSING BORE	LENGTH										
					2	2.25	2.375	2.5	3	3.5	3.75	4	4.5	4.75	5
2.250	2.4375	2.250	2.2507 2.2489	2.4365 2.4377	3632	3636		3640	3648	3656	3660	3664	3672		
2.500	2.6875	2.500	2.5011 2.4993	2.6869 2.6881	4032		4040	4048	4056	4060	4064	4072	4076		
2.750	2.9375	2.750	2.7500 2.7482	2.9358 2.9370	4432	4436		4440	4448	4456	4460	4464	4472	4476	4480
2.875	3.0003	2.875	2.8752 2.8734	3.0610 3.0623	4632	4636		4640	4648	4656	4660	4664	4672	4676	4680
3.000	3.1875	3.000	3.0000 2.9982	3.1858 3.1872	4832	4836		4840	4848	4856	4860	4864	4872	4876	4880
3.250	3.4375	3.250	3.2500 3.2480	3.4358 3.4372	5232		5238	5240	5248	5256	5260	5264	5272	5276	5280
3.500	3.6875	3.500	3.5000 3.4978	3.6858 3.6872	5632		5638	5640	5648	5656	5660	5664	5672	5676	5680
3.625	3.8125	3.625	3.6250 3.6228	3.8108 3.8122	5832	5836		5840	5848	5856	5860	5864	5872	5876	5880
3.750	3.9375	3.750	3.7500 3.7478	3.9358 3.9372	6032			6040	6048	6056	6060	6064	6072	6076	6080
4.000	4.1875	4.000	4.0000 3.9978	4.1858 4.1872	6432			6440	6448	6456	6460	6464	6472	6476	6480
4.250	4.4375	4.250	4.2500 4.2478	4.4358 4.4372	6832	6836		6840	6848	6856	6860	6864	6872	6876	6880
4.375	4.5625	4.375	4.3750 4.3728	4.5608 4.5622	7032	7036		7040	7048	7056	7060	7064	7072	7076	7080
4.500	4.6875	4.500	4.5000 4.4978	4.6858 4.6872	7232	7236		7240	7248	7256	7260	7264	7272	7276	7280
4.750	4.9375	4.750	4.7500 4.7475	4.9358 4.9374	7632	7636		7640	7648	7656	7660	7664	7672	7676	7680
5.000	5.1875	5.000	4.9986 4.9961	5.1844 5.1860	8032	8036		8040	8048	8056	8060	8064	8072	8076	8080
5.250	5.4375	5.250	5.2500 5.2475	5.4358 5.4374	8432	8436		8440	8448	8456	8460	8464	8472	8476	8480
5.500	5.6875	5.500	5.5000 4.4975	5.6858 5.6874	8832	8836		8840	8848	8856	8860	8864	8872	8876	8880
5.750	5.9375	5.750	5.7500 5.7475	5.9358 5.9374	9232	9236		9240	9248	9256	9260	9264	9272	9276	9280
6.000	6.1875	6.000	6.0000 5.9975	6.1858 6.1874	9632	9636		9640	9648	9656	9660	9664	9672	9676	9680
6.250	6.4375	6.250	6.2500 6.2475	6.4358 6.4374	10032	10036		10040	10048	10056	10060	10064	10072	10076	10080
6.500	6.6875	6.500	6.5000 6.4975	6.6858 6.6874	10432	10436		10440	10448	10456	10460	10464	10472	10476	10480
6.750	6.9375	6.750	6.7500 6.7475	6.9358 6.9374	10832	10836		10840	10848	10856	10860	10864	10872	10876	10880
7.000	7.1875	7.000	6.9954 6.9929	7.1812 7.1830	11232	11236		11240	11248	11256	11260	11264	11272	11276	11280



# Special Dimension Bearings

PRECISION ASSEMBLIES,  
INTEGRAL SHAFT BEARINGS  
AND OTHER SPECIAL BEARINGS

(Dimensions in Inches)



BEARING NUMBER	BORE (d)	OD (D)	WIDTH (W)
<b>PWS1KDD7</b>	.2500	.6250	.3438
<b>S676B</b>	.2600	.6250	.1960
<b>X117</b>	.3150	.8661	.2362
<b>608 5/16</b>	.3125	.8661	.2756
<b>608W</b>	.3150	.8661	.4060
<b>R6 8MM</b>	.3150	.8750	.2812
<b>PWS3KDD2</b>	.3750	.8750	.3750
<b>P6 3/4</b>	.3750	.7500	.2812
<b>R6 10MM</b>	.3937	.8750	.2812
<b>6201 1/2</b>	.5000	1.2598	.3937
<b>6201 13MM</b>	.5118	1.2598	.3937
<b>99502H</b>	.6250	1.3750	.4331
<b>S377</b>	.5906	1.3780	.3540
<b>6202 5/8</b>	.6250	1.3780	.4331
<b>6202 16MM</b>	.6299	1.3780	.4331
<b>6203 5/8</b>	.6250	1.5748	.4724
<b>6203 3/4</b>	.7500	1.5748	.4724
<b>Z9504B</b>	.7500	1.7805	.6100
<b>6204 7/8</b>	.8750	1.8504	.5512

Some of the above bearings can be supplied shielded or sealed and with snap rings on the outer diameters. Consult AST Bearings for availability.

AST can supply bearings with integral shafts which help reduce the tolerance buildup of discrete bearings. These bearings will provide the accuracy required for applications such as carriage bearings used in hard disk memory storage devices.

We can also provide precision assemblies manufactured to our customers' specific requirements (see pages 36 and 37). Other special bearings too numerous to catalog can be supplied such as:

- Wire guide bearings with a radius or "V" grooves on the outer diameter
- Bearings with split inner or outer race (to control axial movement)
- Spherical outer diameter bearings
- Gyro quality bearings
- Full ball complement bearings
- Flush ground bearing pairs

### PACKAGING

**Coin Wrap:** The larger ABEC 1 and ABEC 3 bearings are normally packaged 10 bearings or more in plastic-faced brown paper rolls.

**Vial Pack:** Miniature and Instrument bearings are normally packaged 10 bearings or more in clear, sealed plastic vials.

**Pill Pack:** Bearings are individually packaged in plastic compartments 10 or more compartments per strip. The bearing number, customer part number, lubrication and date can be marked on the face of each compartment.

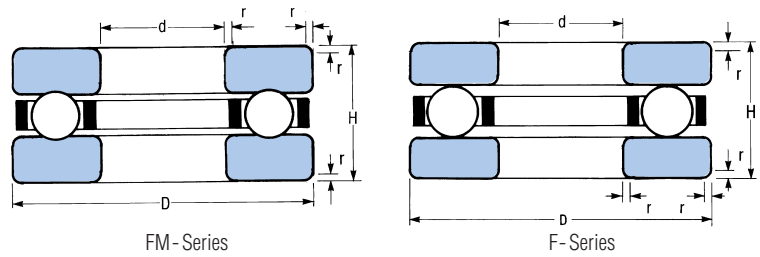
**Kraft Foil Pack:** Each bearing is sealed in a plastic bag which is then hermetically sealed in a kraft foil bag, per Mil-B-197 Method 1A-18.

**Individual Box:** Each bearing is placed in an individual plastic bag or plastic-faced brown paper and then placed in individual boxes. Each box can be labeled with information per customer's request.

**Blister Pack:** Each bearing is hermetically sealed in a plastic bubble, 10 bubbles per sheet in accordance with Mil-B-197C Method 1A-18.

Other types of packaging will be considered per customer's request.

# Metric Thrust Bearings



## FM-SERIES (with Grooved Race)

BEARING NUMBER	(d) +.0"-.0003" BORE	(D) +.0"-.0003" OUTER DIA.	(R) REF.	(H) +.0"-.004" HEIGHT	BASIC LOAD RATING (LBS.)		WEIGHT GRAMS
					DYNAMIC (C)	STATIC (C <sub>0</sub> )	
<b>F3-8M</b>	3	8	0.20	3.5	192	172	1.20
<b>F4-9M</b>	4	9	0.20	4.0	183	172	1.30
<b>F4-10M</b>	4	10	0.20	4.0	179	172	1.35
<b>F5-12M</b>	5	12	0.20	4.0	203	229	1.40
<b>F6-14M</b>	6	14	0.25	5.0	423	454	1.50
<b>F7-13M</b>	7	13	0.20	4.5	344	412	1.50
<b>F7-17M</b>	7	17	0.30	6.0	595	708	1.60
<b>F8-16M</b>	8	16	0.30	5.0	762	950	1.70
<b>F8-19M</b>	8	19	0.40	7.0	765	924	1.80
<b>F9-20M</b>	9	20	0.40	7.0	747	924	1.90
<b>F10-18M</b>	10	18	0.30	5.5	485	648	1.80

## F-SERIES (without Grooved Race)

BEARING NUMBER	(d) +.0"-.0003" BORE	(D) +.0"-.0003" OUTER DIA.	(R) REF.	(H) +.0"-.004" HEIGHT	BASIC LOAD RATING (LBS.)		WEIGHT GRAMS
					DYNAMIC (C)	STATIC (C <sub>0</sub> )	
<b>F2-6</b>	2	6	0.15	3.0	27	19	0.60
<b>F2X-7</b>	2.5	7	0.15	3.5	35	27	0.90
<b>F3-8</b>	3	8	0.20	3.5	40	20	0.60
<b>F4-9</b>	4	9	0.20	4.0	42	24	1.50
<b>F4-10</b>	4	10	0.20	4.5	62	55	2.00
<b>F5-11</b>	5	11	0.20	4.5	64	64	2.40
<b>F6-12</b>	6	12	0.20	4.5	62	64	2.50
<b>F7-15</b>	7	15	0.30	5.0	126	124	4.40
<b>F8-16</b>	8	16	0.30	5.0	135	141	5.00
<b>F9-17</b>	9	17	0.30	5.0	130	141	5.10
<b>F10-18</b>	10	18	0.30	5.5	139	159	6.00

- Thrust bearings must be kept in matched sets.
- The bore (d dimensions) of one washer in the set will conform to the data in the above charts.
- The bore (d dimension) of the mating washer will be  $\approx .007$ " larger, because it is a clearance hole for the shaft.

# Greases

MANUFACTURER AND TRADE NAME	MIL SPEC	OPERATING RANGE °F	BASE OIL	THICKENER	COLOR
<b>AMERICAN OIL CO.</b>					
Rykon Premium #2		-10/200	Mineral	Arylurea	Reddish
Rykon Premium #3		-20/250	Mineral	Arylurea	Pink
Supermil ASU31052	MILG25013	-100/450	Silicone	Arylurea	Lavender
Supermil ASU72832	MILG23827A	-100/250	Diester	Lithium	Amber
<b>BRAY OIL CO.</b>					
Braycote 627S	MILG23827	-100/300	Ester	Organic	Lt. Brown
Braycote 637S	MILG25537	-65/260	Mineral	Calcium Soap	Lt. Brown
601EF		-100/390	Polyether	Tetrafluor	Off White
<b>CHEVRON OIL CO.</b>					
BRB-2	MILG3545C	-20/350	Mineral	Polyurea	Blue/Green
OHT		+20/300	Mineral	Sodium	Greenish
NRRG335		-65/300	Synthetic/Aeromatic	Sodium	Maroon
Poly FM #2	USDA H1	0 -320	White Oil	Polyurea	Apricot
SRI-2	MILG3545G	-20/350	Mineral	Polyurea	Blue/Green
<b>DOW CORNING</b>					
Molykote BR2 Plus		-20/300	Mineral	Lithium	Black
Molykote 33		-100/400	Silicone	Lithium	Gray
Molykote 41		-0/550	Silicone	Lithium	Black
Molykote 44	MILG46886A	-100/400	Silicone	Lithium	Dark Amber
Molykote 55M	MILG4343	-65/350	Silicone	Lithium	Tan
<b>DU PONT, E.I.</b>					
Krytox 240AA	MILG27617	-30/450	Fluor Carbon	Vidax	White
Krytox 240AB	MILG27617	-30/450	Fluor Carbon	Vidax	White
Krytox 240AC	MILG27617A	-30/550	Fluor Carbon	Vidax	White
Krytox 240AZ	MILG27617	-65/300	Fluor Carbon	Vidax	White
Krytox 283AC	MILG27617	-30/550	Perfluor	Tetrafluor	White
<b>EXXON CORP.</b>					
Andok B	MILG18709A	-20/250	Mineral	Sodium	Brown
Andok C		-20/250	Mineral	Sodium	Brown
Andok 260	MILG3545C	-20/250	Mineral	Sodium	Amber
Beacon 325		-65/250	Diester	Lithium	Lt. Tan
<b>HOUGHTON E.F.</b>					
Cosmolube 615	MILG4343	-65/375	Silicone	Lithium	Lt. Brown
<b>KLUBER</b>					
Asonic GLY 32		-58/284	Ester/PAO	Lithium	White/Beige
Asonic GHY 72		-40/356	Ester	Polyurea	Beige
Barrierta L 55/2		-31/482	PFPE	PTFE	Creamy White
Isoflex Super LDS 18	MILG23827	-76/266	Mineral/Ester	Lithium	Yellow
Isoflex LDS 18 Special A	MILG23827	-76/266	Mineral/Ester	Lithium	Yellow
<b>KYODO YUSHI</b>					
PS #2		-60/230	Diester	Lithium	White
SRL		-40/300	Ester	Lithium	Tan
<b>MOBIL OIL</b>					
BRB #23	MILL7711	-0/250	Petroleum	Sodium	Tan
Mobil 24	MILG25013	-100/550	Silicone	Organic	Reddish
Mobil 27	MILG23827	-65/325	Carbon	Non Soap	Tan
Mobil 28	MILG81322A	-65/350	Hydro Carbon	Non Soap	Dark Red



MANUFACTURER AND TRADE NAME	MIL SPEC	OPERATING RANGE °F	BASE OIL	THICKENER	COLOR
<b>MPB CORP.</b>					
MINAPURE	MILG81937	-65/250	Diester	Lithium	Lt. Tan
<b>NYE LUBRICANTS</b>					
703A		-30/250	Mineral	Sodium	Tan
716B		-60/300	Polyol Ester	Lithium	Tan
Rheolube 703A		-30/250	Mineral	Sodium	Tan
Instrument Grease 706E		-65/300	Polyol Ester	Lithium	Light Brown
Rheolube 716B		-60/300	Polyol Ester	Lithium	Tan
Nyogel 781 D	Replaces GE Versilube G-300	-95/390	Silicone	Lithium	Off White
Fluoroether 899 RP		-130/480	PFPE	PTFE	White
Rheolube 2000		-60/260	Hydrocarbon	Organic	Red
Rheotemp 500	MILG3278A	-65/350	Diester	Sodium	Blue
Rheoplex 6000HT		-40/302	Ester	Sodium	Light Brown
<b>SHELL OIL</b>					
Aeroshell #5	MILG3545C	-20/300	Petroleum	Microgel	Dark Brown
Aeroshell #6	MILG24139	-40/250	Mineral	Microgel	Amber
Aeroshell #7	MILG23827A	-100/300	Diester	Microgel	Amber
Aeroshell #14	MILG23827	-65/250	Mineral	Calcium Soap	Tan
Aeroshell #17	MILG21164	-100/300	Diester	Microgel	Dark Gray
Aeroshell #22	MILG81322A	-80/350	Hydrocarbon	Microgel	Dark Gray
Alvania #2	MILG18709	-20/275	Mineral	Lithium	Amber
Alvania #3	MILG81322C	-30/275	Mineral	Lithium	Amber
Cyprina #3	MILG18709	-0/250	Mineral	Lithium	Lt. Tan
Dolium R #2		-30/300	Mineral	Ashless	Amber
Darina	MILG18709	-0/300	Mineral	Microgel	Amber
<b>ROYAL LUBRICANT</b>					
Royco 13D	MILG25013	-100/450	Silicone	PTFE	Lavender
Royco 21	MILG7421	-100/250	Diester	Lithium	Brownish
Royco 22MS	MILG81827	-80/360	Diester	Clay	Black
Royco 27A	MILG23827	-100/275	Diester	Lithium	Brownish
Royco 37	MILG25537	-65/250	Mineral	Calcium Soap	Tan
Royco 64C	MILG21164	-65/250	Diester	Lithium	Black
<b>TENNECO CHEM. (HULS)</b>					
Anderol 753A		-40/300	Diester	Lithium	Lt. Brown
Anderol 757		-40/300	Diester	Lithium	Lt. Brown
Anderol 761		-40/400	Diester	Silica	Lt. Brown
Anderol 793A		-65/300	Diester	Lithium	Lt. Amber
Anderol 794		-65/250	Diester	Lithium	Lt. Amber
Anderol 795		-65/300	Diester	Lithium	Off White
<b>TEXACO OIL CO.</b>					
Premium RB		-30/325	Mineral	Lithium	Orange
Low Temp EP	MILG23827	-65/250	Synthetic Material	Lithium	Purplish Brown
Regal AFB #2	MILG18709	-40/250	Paraffin	Lithium	Green
Unitemp 500		-65/350	Diester	Sodium	Blue

# Oils

MANUFACTURER AND TRADE NAME	MIL SPEC	OPERATING RANGE °F	TYPE	POUR POINT °F	FLASH POINT °F	VISCOSITY CS +75°F/ +210°F
<b>ANDERSON OIL CO.</b>						
L245X	MILL6085A	-70/350	Diester	-75	420	20/3.5
LS252	MIL17353A	-65/250	Diester	-75	340	7.6/1.9
<b>BENDIX CORP.</b>						
P10	MILL6085A	-70/350	Diester	-80	420	23.4/3.8
<b>BRAY OIL CO.</b>						
NPT3A		-65/175	Diester	-90	400	19/3.5
885	MILL6085	-50/400	Diester	-85	410	1875/9
NPT9		-30/350	Ester	-50	495	710/55
<b>DOW CORNING</b>						
DC200	VVL1078	-40/550	Silicone	-50	600	Various
DC510	MILL27694	-70/500	Silicone	-80	600	Various
DC550		-40/450	Silicone	-50	600	125/20
FS1265		-50/300	Silicone	-30	500	Various
<b>DU PONT, E.I.</b>						
Krytox 143 AB		-45/450	Perflour	-45	500	85/10.3
Krytox 143 AC		-30/550	Ester	-35	550	270/26
<b>EXXON CORP.</b>						
P15A	MILL7808	-65/300	Diester	-75	450	22/3.5
Aviation Inst. Oil	MILL7870	-65/290	Petroleum	-70	300	17/2.6
Univis P12	MILL6085A	-75/300	Diester	-90	410	30/3.6
Univis P38	MILL6085	-65/300	Diester	-70	415	72/37
<b>GENERAL ELECTRIC</b>						
Versilube F44		-100/500	Silicone	-100	550	70/15
Versilube F50	MILS81087	-100/400	Silicone	-100	550	75/22
Versilube SF81		-40/400	Silicone	-55	600	Various
Versilube SF96		-40/400	Silicone	-50	600	40/16.5
<b>GULF OIL COMPANY</b>						
Synthetic Fluid #6		-50/275	Mineral	-90	295	3200/12
<b>HOUGHTON OIL</b>						
Cosmolube 270A	MILL6085A	-65/250	Diester	-70	365	15/3.5
<b>MOBIL OIL</b>						
SHC824		-50/350	Synthetic	-65	455	100/6.5
XRL743A		-50/350	Synthetic	-65	520	100/6.5
<b>MPB CORP.</b>						
M0119		-30/250	Synthetic	-80	455	119 @ 100°F
<b>SHELL OIL COMPANY</b>						
Aeroshell #3	MILL7870	-70/240	Petroleum	-75	275	16.5/2.3
Aeroshell #12	MILL6085A	-70/300	Diester	-70	365	21.5/3.5
Aeroshell #4	MILH5606	-70/500	Petroleum	-85	215	859/10.4
<b>TENNECO CHEMICAL</b>						
Anderol L401D	MILL6085A	-75/260	Diester	-80	430	19.7/3.4
Anderol L423		-80/350	Synthetic	-100	370	200/5.1

# The “Shelf Life” of Lubricants in Precision Ball Bearings

There are many misconceptions regarding the “shelf life” of the types of lubricants that are contained in the precision ball bearings that AST Bearings supplies to its customers.

The lubricants that are in the bearings that we supply are high-quality lubricants that are typically qualified to certain military lubrication specifications. The type and quantity of lubricant is in many cases specified by the customer, and in those cases where the customer has not made a particular selection, the bearings would be lubricated to conform to industry standards.

AST Bearings purchases the requested lubricants from a lubricant manufacturer, and then lubricates the bearings accordingly. Regarding the “shelf life” of any lubricant, AST Bearings has to rely upon the recommendations of that particular lubricant’s manufacturer. Our engineering library contains lubrication specification/data sheets, and books describing the attributes of the lubricants offered by most of the world’s major lubricant manufacturers and many of the specialty lubricant manufacturers. It is interesting to note that the majority of these publications convey an absolutely “zero” reference to “shelf life”.

The problem for AST Bearings in addressing the shelf life issue is that AST Bearings simply is not the lubricant manufacturer. It must be emphasized that those lubricant manufacturers who will make recommendations on shelf life will make those recommendations based on shelf life related only to the storage life of the lubricant in the **original container**. Once the lubricant has been applied to a bearing or other device, factors which the manufacturer can neither predict or control will govern lubricant life. **Therefore the onus falls upon the end user to establish a different data base regarding either storage or operating life.**

In order to establish meaningful control procedures at AST Bearings, we elicited the services of a leading “Tribologist” to give us guidance. The advice was that we establish internal control procedures that dictate that we would conduct any age-related testing only after the lubricant or lubricated bearings are at least two years old. This is a scheduled time for testing and does not presuppose that the lubricant has aged beyond its usefulness. It should be noted that any of the lubricants or bearings that we have in stock are inventoried in a controlled environment in sealed containers.

## Retainer Materials and Type

- Brass ribbon retainer
- Stainless steel ribbon retainer
- Steel ribbon retainer
- Stainless steel snap retainer
- Phenolic snap retainer
- Synthetic (polyamide) snap retainer
- Glassfibre reinforced synthetic snap retainer
- Nylon 66

# Bearing Grease Consistency

The consistency of bearing grease can greatly affect bearing performance.

As most people know, the consistency of oil lubricants is measured in terms of viscosity. The consistency of Bearing Grease, on the other hand, is measured in penetration levels.

Penetration is the depth, in tenths of millimeters, to which a standard cone sinks into the grease under prescribed conditions. Thus higher penetration numbers indicate softer greases, since the cone has sunk deeper into the sample.

**Unworked Penetration** is measured when a sample of grease is brought to 77°F and transferred to a standard cup; its surface is smoothed and the cone, in its penetrometer assembly, placed so that its tip just touches the level grease surface. The cone and its movable assembly, weighing 150 Grams (0.33 Lbs.), are permitted to rest on top of the grease for exactly five seconds. The distance dropped is measured and recorded as the unworked penetration level.

Most greases change significantly in consistency when worked (sheared or kneaded). Thus a worked penetration level is considered as significant as the unworked penetration level in regards to the service behavior of the grease. To measure the **Worked Penetration Level**, the grease is first churned for 60 round-trip strokes a standard grease worker. Air is driven out of the sample and the penetration of the cone is again measured; this reading is almost always higher than the unworked penetration level.

It is not only important to know how high or low the unworked penetration level is, but also how much of a spread there is between the unworked and worked levels. A typical, non-channeling (slumping type) instrument bearing grease might have a unworked penetration level of 290 and a worked penetration level of 295. This means that the grease is of fairly light consistency to begin with, and with only a five point spread between the unworked and worked levels, maintains a fairly uniform consistency throughout its service life.

Other grease lubricants with a heavy consistency, called channeling greases, have typically very low penetration levels in the low 200 range and the most common ones will have no more than a 5 to 10 point spread between the worked and unworked penetration levels. These heavy consistency greases (channeling greases) are the lubricants of choice for high speed applications. The initial torque incurred in mechanisms lubricated with channeling greases is very high; however, after a limited amount of movement the majority of the grease will channel (be pushed to one side) and a thin film will be left to adequately lubricate the moving members of the mechanism with a minimum of resistance.

Another small group of greases has yet to be officially named. These greases are typically used to reduce or prevent the possibility of fretting corrosion, and have a very large spread between their worked and unworked penetration levels. Typically they will have an unworked penetration level of about 285 and a worked level of 315 or higher. This large spread means that the grease is quite thick initially and when worked becomes the consistency of a heavy oil. Once the working action has stopped, the grease will return to its original heavy unworked consistency.

# Measurement Equivalents and Conversions

Divide Newtons By 4.448 To = Lbs.
Divide Millimeters By 25.4 To = Inches
Inches x 25.4 = Millimeters
KGf x 2.204622= Lbs.
1MM = .03937007874"
KG'S x 2.204622 = Lbs.
Grams x .002204622 = Lbs.
Grams x .0357397 = Oz.
One Oz. = 28.3495 Grams
One Lb. = 453.5924277 Grams
One Micro Inch = One Millionth Of An Inch Or 0.000001"
One Micron (UM) = One Millionth Meter = 0.00003937007874"

# Grease Plating – MGGP

The solution to achieving low torque in precision ball bearings, without the problems generally associated with lubricant migration.

Micro Grade Grease Plate, known as MGGP, was developed by AST Bearings for those customers that require low torque bearings without the lubricant migration associated with oil lubrication.

MGGP lubricated bearings appear to have all internal surfaces spray painted with grease. All of the working surfaces, such as the balls, ball separators, and raceways, are coated with a thin film of grease that is sufficient for the life of the bearing. Many customers have taken advantage of bearings lubricated with the MGGP process for such applications as optical encoders, printers, brush type D.C. motors, video cameras, clutches/brakes as well as numerous military applications.

The MGGP process involves taking the candidate grease and mixing it with a volatile solvent and additional parts of the grease's base oil (the amounts of each constituent are closely controlled), until it becomes the approximate consistency of enamel paint. This mixture is then injected into the bearing. Next the solvents are baked off at a low temperature, leaving the desired plating of the original grease. The thickness of the final plating can be very accurately controlled.

Most grease lubricants can be applied to precision ball bearings using the MGGP process. Check with one of our application engineers or customer service representatives for availability.

# Fitting Practices

When interference-fitting a ball bearing into a housing or onto a shaft, consideration must be given to the amount of radial play reduction caused by the interference fit. Miniature, Instrument and Thin Cross Section Bearings require a different set of guidelines than heavier cross section bearings.

The method of manufacture of the contiguous components can have an effect on radial play reduction in Miniature, Instrument and Thin Cross Section Bearings, yet will have no significant effect on heavy cross section bearings.

General guidelines are as follows:

## LOSS OF RADIAL PLAY: MINIATURE, INSTRUMENT AND THIN CROSS SECTION BEARINGS.

	1st .0001" OF INTERFERENCE	2nd .0001" OF INTERFERENCE	3rd AND BEYOND .0001" OF INTERFERENCE
<b>MACHINED SURFACE</b>	.000045"	.000065"	.000080"
<b>GROUND SURFACE</b>	.000060"	.000075"	.000080"

## LOSS OF RADIAL PLAY: STANDARD TO HEAVY CROSS SECTIONED BEARINGS.

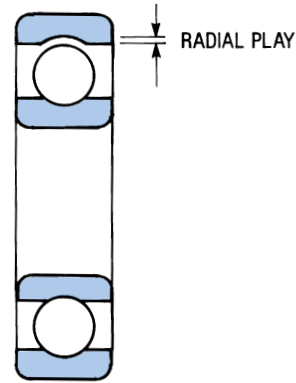
	1st .0001" OF INTERFERENCE	2nd .0001" AND BEYOND OF INTERFERENCE
<b>OUTER RING</b>	.000045"	.000060"
<b>INNER RING</b>	.000065"	.000080"

The above data was determined empirically. Bearings were disassembled and their exact raceway diameters were measured and recorded. The components were then press fitted on a shaft or in a housing. The actual raceway diameters were then measured and the resultant loss or gain in diameter was noted. The difference between the two readings is the actual loss in radial clearance.

**EXAMPLE: Press an inner ring of a miniature bearing onto a machined shaft with a 0.0004" interference fit, the resultant loss in Radial Play is 0.00027"**



# Radial Play



## MC METHOD OF SPECIFYING RADIAL PLAY

SYMBOL	METRIC (0.001MM)		INCH (0.0001")	
	MIN	MAX	MIN	MAX
<b>MC1</b>	0	5	0.0000"	0.0002"
<b>MC2</b>	3	8	0.0001"	0.0003"
<b>MC3</b>	5	10	0.0002"	0.0004"
<b>MC4</b>	8	13	0.0003"	0.0005"
<b>MC5</b>	13	20	0.0005"	0.0008"
<b>MC6</b>	20	28	0.0008"	0.0011"

## AFBMA C2 THROUGH C4 METHOD OF SPECIFYING RADIAL PLAY

BORE IN INCHES		BORE IN MM		C2 (LESS THAN STANDARD CLEARANCE)				C0 (STANDARD CLEARANCE)				C3 (GREATER THAN STANDARD CLEARANCE)				C4 (GREATER THAN C3 CLEARANCE)			
				ACCEPTANCE LIMITS				ACCEPTANCE LIMITS				ACCEPTANCE LIMITS				ACCEPTANCE LIMITS			
				LOW	MFG. LIMITS LOW	HIGH	HIGH	LOW	MFG. LIMITS LOW	HIGH	HIGH	LOW	MFG. LIMITS LOW	HIGH	HIGH	LOW	MFG. LIMITS LOW	HIGH	HIGH
.0984	.3937	2.5	10	—	—	2.5	3	1	1.5	4.5	5	3	4	8	9	5	6	10	11
.3937	.7087	10	18	—	—	3	3.5	1	2	6	7	4	5	9	10	7	8	12	13
.7087	.9450	18	24	—	—	3.5	4	2	3	7	8	5	6	10	11	8	9	13	14
.9450	1.1811	24	30	—	—	4	4.5	2	3	7	8	5	6	10	11	9	10	15	16
1.1811	1.5748	30	40	—	—	4	4.5	2	3	7	8	6	7	12	13	11	12	17	18
1.5748	1.9685	40	50	—	—	4	4.5	2	3	8	9	7	8	13	14	12	13	19	20
1.9685	2.5591	50	65	—	1	5	6	3	4	10	11	9	10	16	17	15	16	23	24
2.5591	3.1496	65	80	—	1	5	6	4	5	11	12	10	11	19	20	18	19	27	28
3.1496	3.9370	80	100	—	1	6	7	5	6	13	14	12	13	22	23	21	22	32	33
3.9370	4.7244	100	120	—	1	7	8	6	7	15	16	14	15	25	26	24	25	37	38
4.7244	5.5118	120	140	—	1	8	9	7	8	18	19	16	18	30	32	28	30	43	45

Measurements described in AFBMA Standards Section 4 Gaging Practices. Values in 0.0001".

## K AND P METHOD OF SPECIFYING RADIAL PLAY

- The K and P methods are the easiest and most straightforward methods of specifying radial play.
- The K and P followed by numbers indicates the radial play in tenths of a thousandth of an inch.

Examples: K13 or P13 = a radial play of .0001" - .0003"  
 K58 or P58 = a radial play of .0005" - .0008"  
 K1014 or P1014 = a radial play of .0010" - .0014"

Radial play is the radial internal looseness between the balls and races, and is the measured value of the total movement of one ring with respect to the other in a plane perpendicular to the bearing axis. Factors that require control of radial play are speeds, loads, thermal conditions, mounting fits, along with axial motion and deflection rates. Improper selec-

tion of radial play can affect bearing torque and overall running performance which could result in premature failure. Please see reference chart for radial play ranges. For more specific application needs, please contact our Engineering Staff for assistance.



# ABEC Tolerances

These standards are known as ABEC Classes as set by the Annular Bearing Engineers Committee of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA). These standards are also accepted by ANSI American National Standard Institute, Inc. and by international agreement for the standards developed by The International Organization of Standardization (ISO).

## INNER RING TOLERANCE — ABEC 3-ABEC 1, VALUES ARE IN .0001”

BORE DIAMETER				BORE TOLERANCE +0		RADIAL RUNOUT		WIDTH TOLERANCES +0	
OVER	MM INCL.	OVER	INCH INCL.	ABEC 3	ABEC 1	ABEC 3	ABEC 1	ABEC 3	ABEC 1
0.6	2.5	.0236	.0984	-3	-3	2	4	-16	-16
2.5	10	.0984	.3937	-3	-3	2.5	4	-47	-47
10	18	.3937	.7087	-3	-3	3	4	-47	-47
18	30	.7087	1.1811	-3	-4	3	5	-47	-47
30	50	1.1811	1.9685	-4	-4.5	4	6	-47	-47
50	80	1.9685	3.1496	-4.5	-6	4	8	-59	-59
80	120	3.1496	4.7244	-6	-8	5	10	-79	-79

## INNER RING TOLERANCE — ABEC 7P — ABEC 5P, VALUES ARE IN .0001”

BORE DIAMETER				BORE TOLERANCE +0		RADIAL RUNOUT (MAX.)		WIDTH VARIATION (MAX.)		REFERENCE RUNOUT WITH BORE (MAX.)	
MM OVER	MM INCL.	INCH OVER	INCH INCL.	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P
0	10	0	.3937	-1.5	-2	1	1.5	1	2	1	3
10	18	.3937	.7087	-1.5	-2	1	1.5	1	2	1	3
18	30	.7087	1.1811	-1.5	-2	1.5	1.5	1	2	1.5	3
30	50	1.1811	1.9685	-2	-2	1.5	2	1	2	1.5	3
50	80	1.9685	3.1496	-2	-3	1.5	2	1.5	2	2	3
80	120	3.1496	4.7244	-2.5	-3	2	2.5	1.5	3	2	3

## OUTER RING TOLERANCE — ABEC 7P — ABEC 5P, VALUES ARE IN .0001”

OUTER DIAMETER				OUTER DIAMETER TOLERANCE +0		RADIAL RUNOUT (MAX.)		WIDTH VARIATION (MAX.)		OUTSIDE CYLINDRICAL SURFACE RUNOUT WITH REFERENCE SIDE (MAX.)	
MM OVER	MM INCL.	INCH OVER	INCH INCL.	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P
0	18	0	.7087	-2	-2	1.5	2	1	2	1.5	3
18	30	.7087	1.1811	-2	-2	1.5	2	1	2	1.5	3
30	50	1.1811	1.9685	-2	-2	2	2	1	2	1.5	3
50	80	1.9685	3.1496	-2	-3	2	3	1	2	1.5	3
80	120	3.1496	4.7244	-3	-3	2	4	2	3	2	3
120	150	4.7244	5.9055	-4	-4	3	4	3	3	2	4

ABEC 9 specifications available upon request.

# ABEC Tolerances

## Precision Classes and Tolerances

ISO 492	DIN 620	ANSI/AFBMA Std. 20
Class Normal	= P0	= ABEC 1
Class 6	= P6	= ABEC 3
Class 5	= P5	= ABEC 5
Class 4	= P4	= ABEC 7
Class 2	= P2	= ABEC 9

OUTER RING TOLERANCE — ABEC 3— ABEC 1 VALUES ARE IN .0001”

OUTER DIAMETER				OUTER DIAMETER TOLERANCE LIMIT +0		RADIAL RUNOUT		WIDTH TOLERANCES +0		FLANGE WIDTH TOLERANCE LIMITS +0		FLANGE DIAMETER TOLERANCE LIMITS +50	
OVER	MM	OVER	INCH	ABEC 3	ABEC 1	ABEC 3	ABEC 1	ABEC 3	ABEC 1	ABEC 1 and 3		ABEC 1 and 3	
	INCL.		INCL.							HIGH	LOW	HIGH	LOW
0	18	0	.7087	-3	-3	3	6	-47	-47	0	-47 <sup>(2)</sup>	+106 <sup>(1)</sup>	-17 <sup>(1)</sup>
18	30	.7087	1.1811	-3	-3.5	4	6	-47	-47	0	-47	+130	-20
30	50	1.1811	1.9685	-3.5	-4.5	4	8	-47	-47	0	-47	+154	-24
50	80	1.9685	3.1496	-4.5	-5	5	10	-47	-47	0	-47	+181	-29
80	120	3.1496	4.7244	-5	-6	7	14	-59	-59	0	-47	+213	-34
120	150	4.7244	5.9055	-6	-7	8	16	-79	-79				

(1) 0-10mm bore, High=+87, Low=-14

(2) 0-10mm, Low=-16

INNER RING TOLERANCE — ABEC 5P & ABEC 7P

GROOVE RUNOUT WITH REFERENCE SIDE (MAX.)		WIDTH TOLERANCES +0		BORE 2-POINT OUT-OF-ROUND (MAX.)		BORE TAPER (MAX.)	
ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P
1	3	-10	-10	1	1	1	1
1	3	-10	-10	1	1	1	1
1.5	3	-10	-10	1	1	1	1
1.5	3	-10	-10				
1.5	3	-10	-15				
2	4	-15	-15				

OUTER RING TOLERANCE — ABEC 5P & ABEC 7P

GROOVE RUNOUT WITH REFERENCE SIDE (MAX.)		WIDTH TOLERANCES +0		FLANGE WIDTH TOLERANCE LIMITS +0		FLANGE DIAMETER TOLERANCE LIMITS +0		OUTER DIAMETER 2 POINT OUT-OF-ROUND (MAX.)		OUTER DIAMETER TAPER (MAX.)	
ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P	ABEC 7P	ABEC 5P
2	3	-10	-10	-20	-20	-10	-10	1	1	1	1
2	3	-10	-10	-20	-20	-10	-10	1	1	1	1
2	3	-10	-10	-20	-20	-10	-10	1	1	1	1
2	4	-10	-15								
2	5	-15	-15								
3	5	-15	-15								



# Interchange Bearing Numbers

## R SERIES (52100 CHROME STEEL)

GRW	NEW DEPARTURE	SKF	MRC	FAFNIR	FAG
1/8B	R-2	EE-0	R-2	33-K-3	R-2
1/8B/083	R-2A		R-2-A	33-K-4	R-2-A
3/16	R-3	EE-1	R-3	33-K-5	R-3
1/4A	R-4	EEA-2	R-4	S-1-K-7	R-4
1/4	R-4A	EE-2	R-4-A	S-1-K	R-4-A
3/8	R-6	EE-3	R-6	S-3-K	R-6
	R-8	EE-4	R-8	S-5-K	R-8
	R-10	EE-5	R-10	S-7-K	R-10
	R-12	EE-6	R-12	S-8-K	R-12
	R-14	EE-8	R-14	S-9-K	R-14
	R-16	EE-9	R-16	S-10-K	R-16
	R-18	EE-10	R-18	S-11-K	R-18
	R-20	EE-11	R-20	S-12-K	R-20
	R-22		R-22		R-22
	R-24		R-24		R-24

## INSTRUMENT SERIES (STAINLESS STEEL)

GRW	NMB	MPB	BARDEN	RMB	EZO	NHBB
SS1/8B	DDR-2	SR2C	SR2	R4012X	SR2	SSR-2
SS1/8B-2Z	DDR-2ZZ	SR2CHH	SR2SS	RF4012X	SR2ZZ	SSR-2ZZ
SS1/8B/083	DDR-2A	SR2AC	SR2A		SR2A	SSR-2A
SS1S/8 B/083-2Z	DDR-2AZZ	SR2ACHH	SR2ASS		SR2AZZ	SSR-2AZZ
SS3/16	DDR-3	SR3C	SR3	R6016X	SR3	SSR-3
SS3/16-2Z	DDR-3ZZ	SR3CHH	SR3SS	RF6016X	SR3ZZ	SSR-3ZZ
SS1/4A	DDR-4	SR4C	SR4	R8020X	SR4	SSR-4
SS1/4A-2Z	DDR-4ZZ	SR4CHH	SR4SS	RF8020X	SR4ZZ	SSR-4ZZ
SS1/4	DDRI-1214	SR4AR	SR4A		SR4A	SSRI-1214
SS1/4-2Z	DDRI-1214ZZ	SR4ARHH	SR4ASS		SR4AZZ	SSRI-1214ZZ
SS3/8	DDRI-1438	SR6R	SR6		SR6	SSRI-1438
SS3/8-2Z	DDRI-1438ZZ	SR6RHH	SR6SS		SR6ZZ	SSRI-1438ZZ
SS1/2	DDRI-1812	SR8R	SR8		SR8	SSRI-1812
SS1/2-2Z	DDRI-1812ZZ	SR8RHH	SR8SS		SR8ZZ	SSRI-1812ZZ
SSF1/8B	DDRF-2	SR2FC	SFR2	RK4012X	SFR2	SSRF-2
SSF1/8B-2Z	DDRF-2ZZ	SR2FCHH	SFR2SS	RKF4012X	SFR2ZZ	SSRF-2ZZ
SSF3/16	DDRF-3	SR3FC	SFR3	ULK6016	SFR3	SSRF-3
SSF3/16-2Z	DDRF-3ZZ	SR3FCHH	SFR3SS	RKF6016X	SFR3ZZ	SSRF-3ZZ
SSF1/4A	DDRF4	SR4FC	SFR4	RK8020X	SFR4	SSRF4
SSF1/4A-2Z	DDRF4ZZ	SR4FCHH	SFR4SS	RKF8020X	SFR4ZZ	SSRF4ZZ
SSF3/8	DDRIF1438	SR6FR	SRF6		SFR6	SSRIF1438
SSF3/8-2Z	DDRIF1438ZZ	SR6FRHH	SFR6SS		SFR6ZZ	SSRIF1438ZZ
SSF1/2	DDRIF1812				SFR8	SSRIF1812
SSF1/2-2Z	DDRIF1812ZZ				SFR8ZZ	SSRIF1812ZZ

Interchange bearing numbers shown are basic numbers only.



# Interchange Bearing Numbers

MINIATURE  
SERIES – INCH

GRW	NMB	MPB	BARDEN	RMB	EZO	NHBB
SS1016	DDRI-2	S2C	SR0-9	UL1304X	SR09	SSRI-2
SS1191	DDRI-2½	S2½C	SR0	UL1505X	SR0	SSRI-2 1/2
SS1191-2Z	DDRI-2½ZZ	S2½CHH	SROSS	ULZ1505X	SR0ZZ	SSRI-2 1/2ZZ
SS1397	DDRI-3	S3C	SR1	R1706X	SR1	SSRI-3
SS1397-2Z	DDRI-3ZZ	S3CHH	SR1SS	RF1706X	SR1ZZ	SSRI-3ZZ
SS5/64	DDRI-4	S4C	SR1-4	R2508X	SR1-4	SSRI-4
SS5/64-2Z	DDRI-4ZZ	S4CHH	SR1-4SS	RF2508X	SR1-4ZZ	SSRI-4ZZ
SS2380	DDRI-3332	S3332C	SR133	UL3006X	SR133	SSRI-3332
SS2380-2Z	DDRI-3332ZZ	S3332CHH	SR133SS	ULZ3006X	SR133ZZ	SSRI-3332ZZ
SS3/32	DDRI-5	S5C	SR1-5	R3010X	SR1-5	SSRI-5
SS3/32-2Z	DDRI-5ZZ	S5CHH	SR1-5SS	RF3010X	SR1-5ZZ	SSRI-5ZZ
SS3175	DDRI-418	S418C	SR144	UL4008X	SR144	SSRI-418
SS3175-2Z	DDRI-418ZZ	S418CHH	SR144SS	ULZ4008X	SR144ZZ	SSRI-418ZZ
SS1/8A	DDRI-518	S518C	SR2-5	R4010X	SR2-5	SSRI-518
SS1/8A-2Z	DDRI-518ZZ	S518CHH	SR2-5SS	RF4010X	SR2-5ZZ	SSRI-518ZZ
SS1/8A/6	DDRI-618	S618C	SR2-6		SR2-6	SSRI-618
SS1/8A/6-2Z	DDRI-618ZZ	S618CHH	SR2-6SS		SR2-6ZZ	SSRI-618ZZ
SS3967	DDRI-5532	S5532C	SR155	UL5010X	SR155	SSRI-5532
SS3967-2Z	DDRI-5532ZZ	S5532CHH	SR155SS	ULZ5010X	SR155ZZ	SSRI-5532ZZ
SS4763A	DDRI-5632	S5632C	SR156	UL6010X	SR156	SSRI-5632
SS4763A-2Z	DDRI-5632ZZ	S5632CHH	SR156SS	ULZ6010X	SR156ZZ	SSRI-5632ZZ
SS4763B	DDRI-6632	S6316C	SR166	UL6012X	SR166	SSRI-6632
SS4763B-2Z	DDRI-6632ZZ	S6316CHH	SR166SS	ULZ6012X	SR166ZZ	SSRI-6632ZZ
SS6350A	DDRI-614	S614C	SR168	UL8012X	SR168	SSRI-614
SS6350A-2Z	DDRI-614ZZ	S614CHH	SR168SS	ULZ8012X	SR168ZZ	SSRI-614ZZ
SS6350B	DDRI-814	S814C	SR188	UL8016X	SR188	SSRI-814
SS6350B-2Z	DDRI-814ZZ	S814CHH	SR188SS	ULZ8016X	SR188ZZ	SSRI-814ZZ
SS7938	DDRI-8516	S8516R	SR1810		SR1810	SSRI-8516
SS7938-2Z	DDRI-8516ZZ	S8516RHH	SR1810SS		SR1810ZZ	SSRI-8516ZZ

Interchange bearing numbers shown are basic numbers only.



# Interchange Bearing Numbers

FLANGED  
MINIATURE SERIES INCH

EZO	GRW	RMB	NHBB	MPB	NMB
		ULK1304X	SSRIF-2	S2FC	DDRIF-2
SFR0	SSF1191	ULK1505X	SSRIF-21/2	S21/2FC	DDRIF-21/2
SFR0ZZ	SSF1191-2Z	ULK1505X	SSRIF21/2ZZ	S21/2FCHH	DDRIF-21/2ZZ
SFR1	SSF1397	RK1706X	SSRIF-3	S3FC	DDRIF-3
SFR1ZZ	SSF1397-2Z	RKF1706X	SSRIF-3ZZ	S3FCHH	DDRIF-3ZZ
SFR1-4	SSF5/64	RK2508X	SSRIF-4	S4FC	DDRIF-4
SFR1-4ZZ	SSF5/64-2Z	RKF2508X	SSRIF-4ZZ	S4FCHH	DDRIF-4ZZ
SFR133	SSF2380	ULK3006X	SSRIF-3332	S3332FC	DDRIF-3332
SFR133ZZ	SSF2380-2Z	ULK3006X	SSRIF-3332ZZ	S3332FCHH	DDRIF-3332ZZ
SFR1-5	SSF3/32	RK3010X	SSRIF-5	S5FC	DDRIF-5
SFR1-5ZZ	SSF3/32-2Z	RKF3010X	SSRIF-5ZZ	S5FCHH	DDRIF-5ZZ
SFR144	SSF3175	ULK4008X	SSRIF-418	S418FC	DDRIF-418
SFR144ZZ	SSF3175-2Z	ULK4008X	SSRIF-418ZZ	S418FCHH	DDRIF-418ZZ
SFR2-5	SSF1/8A	RK4010X	SSRIF-518	S518	DDRIF-518
SFR2-5ZZ	SSF1/8A-2Z	RKF4010X	SSRIF-518ZZ	S518FCHH	DDRIF-518ZZ
SFR2-6	SSF1/8A6		SSRIF-618	S618FC	DDRIF-618
SFR2-6ZZ	SSF1/8A6-2Z		SSRIF-618ZZ	S618FCHH	DDRIF-618ZZ
SFR155	SSF3967	ULK5010X	SSRIF-5532	S5532FC	DDRIF-5532
SFR155ZZ	SSF3967-2Z	ULK5010X	SSRIF-5532ZZ	S5532FCHH	DDRIF-5532ZZ
SFR156	SSF4763A	ULK6010X	SSRIF-5632	S5632FC	DDRIF-5632
SFR156ZZ	SSF4763A-2Z	ULK6010X	SSRIF-5632ZZ	S5632FCHH	DDRIF-5632ZZ
SFR166	SSF4763B	ULK6012X	SSRIF-6632	S6316FC	DDRIF-6632
SFR166ZZ	SSF4763B-2Z	ULK6012X	SSRIF-6632ZZ	S6316FCHH	DDRIF-6632ZZ
SFR168	SSF6350A	ULK8012X	SSRIF-614	S614FC	DDRIF-614
SFR168ZZ	SSF6350A-2Z	ULK8012X	SSRIF-614ZZ	S614FCHH	DDRIF-614ZZ
SFR188	SSF6350B	ULK8016X	SSRIF-814	S814FC	DDRIF-814
SFR188ZZ	SSF6350B-2Z	ULK8016X	SSRIF-814ZZ	S814FCHH	DDRIF-814ZZ
SFR1810	SSF7938		SSRIF-8516	S8516FC	DDRIF-8516
SFR1810ZZ	SSF7938-2Z		SSRIF-8516ZZ	S8516FCHH	DDRIF-8516ZZ

Interchange bearing numbers shown are basic numbers only.  
Add suffix SS for 440C stainless steel or DD for 400 series Martensitic stainless steel.

# Interchange Bearing Numbers

METRIC  
MINIATURE SERIES

GRW	ADR	NMB*	GRW	ADR	NMB*	GRW	ADR	NMB*
60/2.5		R825	691			681	WAX1	L310
623	623	R1030	69/1.5		R515	68/1.5	WAX1.5	L415
624	624	R1340	692	AX2	R620	682	WBX2	L520
634	634	R1640	69/2.5	X2.5	R725	68/2.35		
625	625	R1650	693		R830	68/2.5	WAX2.5	L625
635	635	R1950	694	AY4	R1140	683	WAX3	L730
626	626	R1960	695	AY5	R1350	684	WAX4	L940
607	607	R1970	696	AY6	R1560	685	WX5	L1150
627	627	R2270	697	AY7		686	WAX6	L1360
608	608	R2280	698	AY8		687	WAX7	L1470
609	609		699	AY9		688	WX8	L1680
629	629	R2690	6900	AY10		689	WX9	L1790
6000	6000	6000				6800	WX10	L1910
		RF825	F691					
F623		RF1030	F69/1.5		RF515	F681		LF310
F624		RF1340	F692	WFX2	RF620	F68/1.5	WAX1.5	LF415
F634		RF1640	F69/2.5	WFX2.5	RF725	F682	WFBX2	LF520
F625		RF1650	F693	WFX3	RF830	F68/2.5	WFX2.5	LF625
F635		RF1950	F694		RF1140	F683	WFX3	LF730
F626		RF1960	F695		RF1350	F684	WFX4	LF940
F607			F696		RF1560	F685	WFX5	LF1150
			F697			F686	WFX6	LF1360
60/2.5-2Z		R825ZZ	F698			F687		LF1470
623-2Z	623ZZ	R1030ZZ				F688		LF1680
624-2Z	624ZZ	R1340ZZ	691-2Z			F689		LF1790
634-2Z	634ZZ	R1640ZZ	69/1.5-2Z	X1.5ZZ	R515ZZ	F6800		
625-2Z	625ZZ	R1650ZZ	692-2Z					
635-2Z	635ZZ	R1950ZZ	69/2.5-2Z	X2.5ZZ	R725Y03ZZ	681-2Z		
626-2Z	626ZZ	R1960ZZ	693-2Z		R830ZZ	68/1.5-2Z	WAX1.5ZZ	
607-2Z	607ZZ	R1970ZZ	694-2Z	AY4ZZ	R1140ZZ	682-2Z	WBX2ZZ	L520ZZ
627-2Z	627ZZ	R2270ZZ	695-2Z	AY5ZZ	R1350ZZ	68/2.5-2Z	WAX2.5ZZ	L625ZZ
608-2Z	608ZZ	R2280ZZ	696-2Z	AY6ZZ	R1560ZZ	683-2Z	WAX3ZZ	L730ZZ
609-2Z	609ZZ		697-2Z	AY7ZZ		684-2Z		L940ZZ
629-2Z	629ZZ	R2690ZZ	698-2Z	AY8ZZ		685-2Z		L1150ZZ
6000-2Z	6000ZZ	6000ZZ	699-2Z	AY9ZZ		686-2Z		L1360ZZ
		RF825ZZ	6900-2Z	AY10ZZ		687-2Z	WAX7ZZ	L1470ZZ
F623-2Z		RF1030ZZ				688-2Z		L1680W06ZZ
F624-2Z		RF1340ZZ	F691-2Z			689-2Z		
F634-2Z		RF1640ZZ	F69/1.5-2Z		RF515ZZ	6800-2Z		L1910ZZ
F625-2Z		RF1650ZZ	F692-2 Z					
F635-2Z		RF1950ZZ	F69/2.5-2Z		RF725Y03ZZ	F681-2Z		
F626-2Z		RF1960ZZ	F693-2Z	WFX3ZZ	RF830ZZ	F68/1.5-2Z	WFX1.5ZZ	
F607-2Z			F694-2Z		RF1140ZZ	F682-2Z	WFBX2ZZ	LF520ZZ
			F695-2Z		RF1350ZZ	F68/2.5-2Z	WFX2.5ZZ	LF625ZZ
			F696-2Z		RF1560ZZ	F683-2Z	WFX3ZZ	LF730ZZ
			F697-2Z			F684-2Z		LF940ZZ
			F698-2Z			F685-2Z		LF1150ZZ
						F686-2Z		LF1360ZZ
						F687-2Z		LF1470ZZ
						F688-2Z		
						F689-2Z		
						F6800-2Z		

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\*Add suffix SS for 440C stainless steel or DD for 400 series Martensitic stainless steel.

# Cleaning and Relubricating Facilities

Our contemporary facilities were designed specifically for the custom cleaning and relubrication of commercial and precision ball bearings. This facility is comprised of three separate units:

- **GRAY ROOM:** Employed for the preparation of bearings for the subsequent cleaning procedures, as well as the relubrication of commercial grade bearings.
- **WASH ROOM:** Houses all of the generic and proprietary cleaning equipment utilized in the processes of cleaning bearings in preparation for relubrication.
- **CLEAN ROOM:** A class 10,000 clean room facility with class 100 laminar flow work stations, both of which are **Certified to Federal Standard 209E**. This facility is utilized for the relubrication, testing and final inspection of precision ball bearings.

Our facilities process millions of ball bearings annually and routinely lubricate bearings with standard or exotic lubricants to exacting specifications.

The Quality Assurance Program utilized in this facility conforms to MIL-STD-45208 A "Inspection Systems Requirements." The gage calibration system conforms to MIL-STD-45662 A. Sampling Plans that conform to MIL-STD 105 D are available.

The equipment and verification resources employed are:

- Moore Air Gages
- Vertical Comparators
- "GMN" Noise Tester
- Electronic Balances
- Digital and dial vernier calipers
- Various generic and proprietary wash stations
- Gage Blocks
- Stereo Microscopes
- Radial Play Gages
- Blanchette Vertical Comparator with a resolution of one millionth of an inch.
- Dorsey/Hamilton Radial Play gage with a resolution of twenty millionths of an inch.
- Two Moore air gages with a resolution of ten millionths of an inch.
- Dorsey Mechanical Vertical Comparator with a resolution of twenty millionths of an inch.
- One GMN KGE-3 Ball Bearing Noise and Vibration Analyzer.
- One Bearing Inspection Model BA-20-3 Bearing Analyzer.
- Two Carl Zeiss Stemi-2000C Stereo-Zoom Microscopes.
- One Olympus Stereo Zoom Microscope.
- Mitutoyo No 192-140 12" Vertical Height Gage.
- Starrett Grade A – Inspection Level Granite Surface Plate.
- Inch & Metric, Grade 2, Gage Block Sets.
- One Model 4Tta Wilson Rockwell Hardness Tester.
- Three Electronic & one Mechanical Balance.
- Torque Watches.
- Plug Gages.
- Dial Indicators.
- .0001" Micrometers.
- Barden Smoothrator.
- Proprietary lubricant metering devices.
- Automatic lubricant metering machines.
- A class 10,000 Clean Room with class 100 laminar flow work stations, both Certified to Federal Standard 209.

Please contact any of our Customer Service Representatives or Sales Personnel regarding your custom lubrication requirements.

## World Class Recognition In Quality And Customer Service

To accomplish this objective, we have secured a group of highly talented personnel and provided them with an environment where they can excel in utilizing their talents. AST Bearings is committed to supplying customers with a quality, cost-effective product on a timely basis. The unsurpassed service that we provide, such as JIT deliveries in Kanban quantities, Full Circle Engineering Services, Quality that transcends excellence and Superior Customer Service, are the keystones in our quest for total customer commitment.

### AST Bearings Warranty

AST Bearings warrants that all bearings will be free of defect, both in material and workmanship. If a defect is determined by AST, we agree to supply a replacement bearing free of charge, or, if feasible, issue credit, under the following conditions:

- a. The defect occurs within one year after receipt by the customer.
- b. After inspection by AST, it is determined that the bearing appears to have been properly mounted, protected, and has not been subjected to misuse or mishandling.

After notifying AST Bearings offices of the defect, and after receiving proper approval and procedures from an authorized AST representative, the defective bearing should be returned, shipping prepaid, to the AST Bearing office of origin.

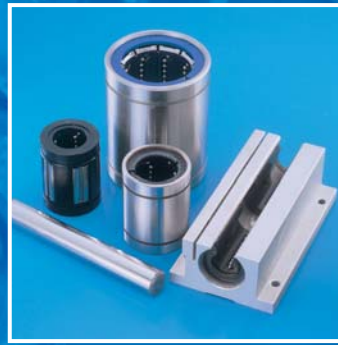
This warranty supersedes all other warranties, either expressed or implied. AST Bearings is not responsible for any other contingent charges.



**MINIATURE AND  
INSTRUMENT BEARINGS**



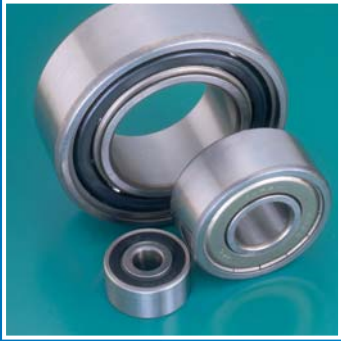
**NEEDLE BEARINGS**



**LINEAR BEARINGS  
AND SHAFTING**



**EXTRA THIN BEARINGS**



**DOUBLE ROW BEARINGS**



**MOUNTED BEARINGS  
AND INSERTS**



**BUSINESS MACHINE  
LOCKING COLLAR AND  
FLANGETTE BEARINGS**



**SINGLE ROW RADIAL  
BEARINGS**



**MODIFIED AND  
SPECIAL-DIMENSION  
BEARINGS**



**RADIAL AND ANGULAR  
CONTACT HIGH-SPEED  
SPINDLE BEARINGS**



**PLAIN BEARINGS:  
SPHERICALS, ROD ENDS,  
AND JU & JX BUSHINGS**



**MECHANICAL  
SUB-ASSEMBLIES**



**MAIN OFFICE AND WAREHOUSE**

115 MAIN ROAD MONTVILLE, NJ 07045-9299  
TEL: 973.335.2230 FAX: 973.335.6987  
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**CALIFORNIA OFFICE AND WAREHOUSE**

3A FARADAY IRVINE, CA 92618-2752  
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TOLL FREE: 800.227.8786