



# Champion Bearings, Inc.

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**Specialty / Custom Bearing Manufacturer**

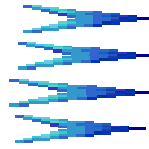
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- Hybrid Bearings
- Solid Film Lubricants
- Custom Cages
- Teflon Fiberglass Seals



# Champion Bearings, Inc.

Decreased Lube Degradation; Less Wear  
 Higher Speed; Harsh Environments  
 Reduce Downtime; Less Maintenance  
 Expanded Design Possibilities



Longer Bearing Life  
 Increased Performance  
 Higher Reliability  
 Solve Problems

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= Lower Total Operating Cost

<u>Index</u>	<u>Page</u>
Index.....	1
Champion Bearings.....	2
Applications.....	3
Champion Hybrid Bearings.....	4
Bearing Sizes	
Bearing Section Guide.....	5
6000 Series.....	6
6200 Series.....	7
6300 Series.....	8
R Series (Inch).....	9
1600 Series (Inch).....	10
Special Dimension & Felt Series.....	11
Miniature Metric Series.....	12
6800 & 6900 Extra Light.....	13
51100, 51200, 51300, 51400 Series .....	14
Aircraft Bearings.....	15
Seals and Shields.....	16
Dry Film Lubricants.....	17-18
Retainers .....	19-20
Lubricants.....	21
Engineering Information.....	22-25

# Champion Bearings, Inc.

3535 Anza Rd. Building U.  
Palm Springs, California 92262

Phone: 800-900-2236  
Fax: 800-292-4748

## Hybrid Bearings Available From Champion Bearings, Inc.

- 6000 Series
- 6200 Series
- 6300 Series
- 6800 Series
- 6900 Series
- R Series Inch
- 1600 Series Inch
- 87000 & 88000 Felt Series
- 5200 & 5300 Double Row
- 7000, 7200 & 7300 Angular Contact
- 1200, 1300, 2200 & 2300 Self Aligning
- W200 & W300 Cartridge Series
- 51100, 51200 & 51300 Thrust Ball
- Miniature Bearings
- B500, B500DD, B5500WZZ Aircraft Bearings

## Dry Film Lubricants Available

- T - 1 (Lead)
- T - 3 (Titanium Nitrate)
- T - 5 (Silver)
- T - 7 (Tungsten Disulfide)
- T - 9 (Moly Disulfide)
- T - 11 (Carbide Diamond)
- T-13 (Parylene)

## Shields and Seals

- Metal Shield
- Teflon Fiberglass
- Metal - Buna Rubber
- Metal Over Teflon Seal
- Viton Rubber
- Virgin Teflon

## Retainers Available

- Metal
- Self-Lubricating Polymide - Vespel
- Self-Lubricating Teflon - Beraloy

## Balls

- Steel
- Beryllium Copper
- Stellite
- Silicon Nitrate Ceramic Balls
  - Grade 5

## Lubrication

- Chevron SRI - 2
- Beacon 325
- Krytox 240ac
- Krytox 227
- Krytox LVP
- Andoc - C
- Andoc - B
- Mobilie 28

## Custom Races

- Chrome Steel
- Stainless Steel
- Beryllium Copper
- Stellite

Champion Bearings manufactures specialty bearings, custom for your needs.

Our Sales Engineers are waiting to help you decide the best combination for your needs.

Give us a call at 1-800-900-2236

Download our Catalog online at [www.championbearings.com](http://www.championbearings.com)

# Champion Bearings, Inc.

## Applications

### High Speed

- Machine Tool Spindles
- Turbochargers
- Hard Disk Drive Spindles
- Dental Handpieces
- Textile Equipment Spindles
- Air Driven Power Tools

### Extremely Low Lube

- Dental and Surgical Handpieces
- Semiconductor Processing Equipment
- Turbo Molecular Pumps
- Liquid Oxygen Pumps
- Flow and Gas Meters

### Clean Environment

#### (Low particulate Emissions)

- Semiconductor Processing Equipment
- Computer Hard Disk Production Machinery
- LCD Panel Production Machinery

### Corrosion Resistance

- Bicycle wheels and Components
- Semiconductor Processing Equipment
- Dental and Surgical Handpieces
- Chemical Processing Equipment
- Food Processing Equipment
- Film Manufacturing Machinery

## Industries

- Aerospace
- Biotechnology
- Defense
- Automotive
- General Industry
- Power Generation
- Robotics
- Laser
- Racing
- Manufacturing

### Extreme Temperatures

- Liquid Oxygen Pumps
- Ovens and Metal processing equipment

### Vacuum

- Turbo Molecular Pumps
- Semiconductor Processing Equipment
- Aerospace Instruments

### Low Torque

- In-Line Skates
- Aerospace Instruments
- Robotics

### Electrical Resistance / Non-Magnetic

- Electric Motors
- Textile Equipment Spindles
- Semiconductor Processing Equipment

### Light Weight

- Race-Car Wheel Bearings
- In-Line Skates

### Oscillating Motion

- Robotics
- Hard Disk Drive Actuators
- Scanners
- Aerospace Instruments

### Contamination & Wear Resistance

- Bicycle wheels and Components
- In-Line Skates
- Air Driven Power Tools
- Electric Motors
- Paper Processing Equipment

# Champion Bearings, Inc.

Superprecision  
Ceramic Hybrid  
Bearing

*Custom Bearings in 10 Days or Less!*

- *Run Longer*
- *Run faster*
- *Run cooler*

- *Run without lube*
- *Run at lower total cost*
- *Run without wear*

- *Run without corrosion*
- *Run with less vibration*
- *Run with less downtime*

**A CHAMPION HYBRID CONSIST OF AN ION DOPED INNER AND OUTER RACE,  
CERAMIC BALLS AND A SACRIFICIAL VACUUM COMPATIBLE,  
MOLY DISULFIDE COMPOUND RETAINER.**

Industry's present day applications place demands on machinery that could not be imagined as little as a decade ago.

Ion doped inner and outer races combined with ceramic balls, Teflon seals and a high temperature Teflon 20% moly disulfide polyimide sacrificial retainer, all expectations are exceeded.

The ion doped races (solid film lubricants) are bonded solids designed to reduce friction and wear by interposing between the bearing surfaces a thin, adherent film lubricant that shears easily and prevents metal to metal contact. A variety of materials are used depending on the environment and applicant of the bearings. Using dry film lubricants instead of oils and greases enhances the ability of the bearings to perform in hazardous environment and in vacuum chambers.

Resistant to abrasives, fluids, and acids, the Teflon shield provides a 100% seal against leakage and an infinite increase in bearing life. Designed with little or no radial interference, the Teflon seal reduces torque significantly over conventional rubber seals.

When properly applied; life can be extended up to 5 times, wear is lessened, heat generation is reduced, spindle stiffness and accuracy is increased up to 50% and corrosion is minimized with inert ceramics.

## Champion Ceramic Hybrid Bearing Benefits

**High Speed** – Oil mist lubricates up to three million DN with reduced skidding, wear, and heat generation; grease-lubricated hybrids up to one million DN. Ion doped races with self lubricating retainers require no hydrocarbon or fluorocarbon lubrication.

**Extended Operating Life** – 3 to 5 times greater than that of steel when properly applied.

**Marginal Lubrication** – Ion doped races with self-lubricating retainers require no hydrocarbon or fluorocarbon lubrication. By using dissimilar materials (ceramic on steel) microscopic adhesion welding is eliminated.

**Corrosion Resistance** – Ceramic material resists corrosion and galling while thin-dense coating may be used to enhance hybrid.

**High Stiffness** – Modulus of elasticity 50% greater than steel increases bearing rigidity.

**Low Torque** – Low friction, even without conventional lubrication, with extremely fine surface finishes.

**Long Wear Life** – High hardness of Rc78 greatly extends bearing wear characteristics.

**Light Weight** – 60 % lighter than steel, reducing centrifugal forces and overall system weight.

**Special Properties** – All ceramic components are:

- Non magnetic
- Electrically non conductive

# Champion Bearings, Inc.

## Bearing Numbering Guide

Bearing codes consist of six basic items. Types of materials of Races and Balls, bearing size number, seals, retainers, type of dry-film lubricant, and type of lubricant oil or grease. Information on each of these categories can be found in the catalog. The item letters and numbers here are the general items we manufacture. All orders that are made with custom materials or specifications, please contact us to get the proper bearing number.



### Example:

For a Hybrid (ceramic balls with AISI 52100 chrome steel races) 6203 with 2 Teflon seals, a beraloy retainer, and carbide diamond dry-film lubrication and no other lubrication (oil or greases).

CM

6203

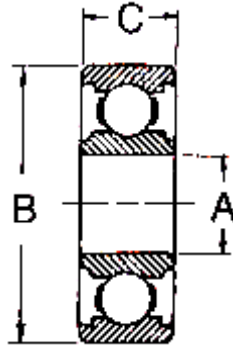
TT

B

T-11

# Champion Bearings, Inc.

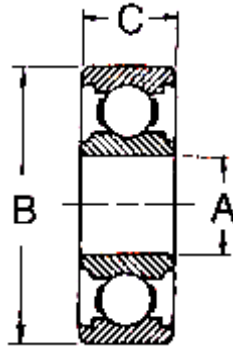
## 6000 Series



Item No. *ZZ/2RS	Bore A		Outer Diameter B		Width C		Basic load Rating (N)		Weight lbs.
	mm	Inch	mm	Inch	mm	Inch	Dynamic Cr	Static Co	
6000	10	0.3937	26	1.0236	8	0.3150	3510	1950	0.046
6001	12	0.4724	28	1.1024	8	0.3150	3930	2230	0.048
6002	15	0.5906	32	1.2598	9	0.3543	4300	2510	0.057
6003	17	0.6693	35	1.3780	10	0.3937	5230	3040	0.079
6004	20	0.7874	42	1.6535	12	0.4724	7210	4460	0.152
6005	25	0.9843	47	1.8504	12	0.4724	7740	4960	0.165
6006	30	1.1811	55	2.1654	13	0.5118	10200	6910	0.198
6007	35	1.3780	62	2.4409	14	0.5512	12300	8530	0.353
6008	40	1.5748	68	2.6772	15	0.5906	12900	9300	0.463
6009	45	1.7717	75	2.9528	16	0.6299	15300	11300	0.529
6010	50	1.9685	80	3.1496	16	0.6299	16000	12200	0.573
6011	55	2.1654	90	3.5433	18	0.7087	21700	17000	0.838
6012	60	2.3622	95	3.7402	18	0.7087	23600	18200	0.904
6013	65	2.5591	100	3.9370	18	0.7087	24700	19700	0.948
6014	70	2.7559	110	4.3307	20	0.7874	29700	24200	1.322
6015	75	2.9528	115	4.5276	20	0.7874	30900	26100	1.389
6016	80	3.1496	125	4.9213	22	0.8661	34900	29100	1.895
6017	85	3.3465	130	5.1181	22	0.8661	36400	31400	1.984
6018	90	3.5433	140	5.5118	24	0.9449	44700	39200	2.557
6019	95	3.7402	145	5.7087	24	0.9449	45500	39800	2.601
6020	100	3.9370	150	5.9055	24	0.9449	46300	42000	2.755
6021	105	4.1339	160	6.2992	26	1.0236	50700	46500	3.570
6022	110	4.3307	170	6.6929	28	1.1024	62900	57400	4.628
6024	120	4.7244	180	7.0866	28	1.1024	65300	61500	5.290

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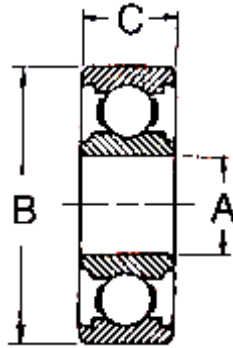
## 6200 Series



Item No. *ZZ/2RS	Bore A		Outer Diameter B		Width C		Basic load Rating (N)		Weight lbs.
	mm	Inch	mm	Inch	mm	Inch	Dynamic Cr	Static Co	
6200	10	0.3937	30	1.1811	9	0.3543	4600	2650	0.071
6201	12	0.4724	32	1.2598	10	0.3937	4700	2650	0.082
6202	15	0.5906	35	1.3780	11	0.4331	5880	3480	0.099
6203	17	0.6693	40	1.5748	12	0.4724	7350	4410	0.145
6204	20	0.7874	47	1.8504	14	0.5512	9800	6180	0.240
6205	25	0.9843	52	2.0472	15	0.5906	10800	6960	0.295
6206	30	1.1811	62	2.4409	16	0.6299	15000	10000	0.439
6207	35	1.3780	72	2.8346	17	0.6693	19700	13600	0.635
6208	40	1.5748	80	3.1496	18	0.7087	25100	17900	0.807
6209	45	1.7717	85	3.3465	19	0.7480	25800	18500	0.897
6210	50	1.9685	90	3.5433	20	0.7874	27000	19800	1.020
6211	55	2.1654	100	3.9370	21	0.8268	33300	25000	1.340
6212	60	2.3622	110	4.3307	22	0.9661	40200	30900	1.730
6213	65	2.5591	120	4.7244	23	0.9055	43900	34000	2.180
6214	70	2.7559	125	4.9213	24	0.9449	47700	37300	2.360
6215	75	2.9528	130	5.1181	25	0.9843	50900	41100	2.550
6216	80	3.1496	140	5.5118	26	1.0236	55800	44500	3.080
6217	85	3.3465	150	5.9055	28	1.1024	64000	53000	4.200
6218	90	3.5433	160	6.2992	30	1.1811	73800	60500	4.680
6219	95	3.7402	170	6.6929	32	1.2598	83500	70600	5.750
6220	100	3.9370	180	7.0866	34	1.3386	93900	79000	6.980
6221	105	4.1339	190	7.4803	36	1.4173	102000	89200	8.070
6222	110	4.3307	200	7.8740	38	1.4961	111000	100000	9.500
6224	120	4.7244	215	8.4646	40	1.5748	118000	110000	11.350

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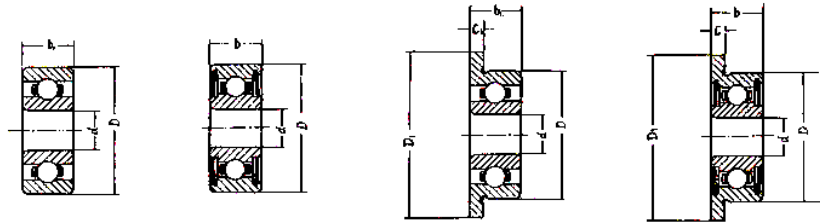
## 6300 Series



Item No. *ZZ/2RS	Bore A		Outer Diameter B		Width C		Basic load Rating (N)		Weight lbs.
	mm	Inch	mm	Inch	mm	Inch	Dynamic Cr	Static Co	
6300	10	0.3937	35	1.3780	11	0.4331	6230	3770	0.108
6301	12	0.4724	37	1.4567	12	0.4724	7470	4650	0.130
6302	15	0.5906	42	1.6535	13	0.5118	8730	5430	0.181
6303	17	0.6693	47	1.8504	14	0.5512	10700	6700	0.258
6304	20	0.7874	52	2.0472	15	0.5906	12300	7810	0.320
6305	25	0.9843	62	2.4409	17	0.6693	17200	11400	0.507
6306	30	1.1811	72	2.8346	19	0.7480	21700	14900	0.771
6307	35	1.3780	80	3.1496	21	0.8268	25700	17900	0.970
6308	40	1.5748	90	3.5433	23	0.9055	31300	22400	1.411
6309	45	1.7717	100	3.9370	25	0.9843	37100	26300	1.829
6310	50	1.9685	110	4.3307	27	1.0630	47500	35700	2.358
6311	55	2.1654	120	4.7244	29	1.1417	55000	41900	2.997
6312	60	2.3622	130	5.1181	31	1.2205	62900	48600	3.681
6313	65	2.5591	140	5.5118	33	1.2992	71300	55800	4.628
6314	70	2.7559	150	5.9055	35	1.3780	80100	63500	5.730
6315	75	2.9528	160	6.2992	37	1.4567	87200	71700	6.656
6316	80	3.1496	170	6.6929	39	1.5354	94600	80300	8.067
6317	85	3.3465	180	7.0866	40	1.5748	102000	89500	9.345
6318	90	3.5433	190	7.4803	43	1.6929	110000	99200	10.866
6319	95	3.7402	200	7.8740	45	1.7717	118000	109000	12.585
6320	100	3.9370	215	8.4646	47	1.8504	133000	131000	15.891
6321	105	4.1339	225	8.8583	49	1.9291	143000	141000	17.323
6322	110	4.3307	240	9.4488	50	1.9685	168000	158000	20.365
6324	120	4.7244	260	10.2362	55	2.1654	181000	167000	32.575

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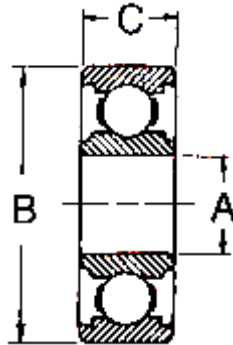
## R Series



Item No.	Bore D Inch	Outer Diameter D Inch	Width		Flange Diameter D1 Inch	Flange Width		Basic Load Rating (N)	
			Open B1 Inch	Shielded/ Sealed B Inch		Open C1 Inch	Shielded/ Sealed C Inch	Dynamic Cr	Static Co
R09	0.0400	0.1250	0.0469					63	16
SR0	0.0469	0.1562	0.0625	0.0937	0.2030	0.013	0.031	153	44
R1	0.0550	0.1875	0.0781	0.1094	0.2340	0.023	0.031	176	51
R1-4	0.0781	0.2500	0.0937	0.1406	0.2960	0.023	0.031	242	69
R133	0.0937	0.1875	0.0625	0.0937	0.2340	0.018	0.031	158	46
R143	0.0937	0.2500	0.0937	0.1094	0.2960	0.023	0.031	248	78
R1-5	0.0937	0.3125	0.1094	0.1406	0.3590	0.023	0.031	410	118
R144	0.1250	0.2500	0.0937	0.1094	0.2960	0.023	0.031	191	59
R154	0.1250	0.3125		0.1094				339	101
R2-5	0.1250	0.3125	0.1094	0.1406	0.3590	0.023	0.031	410	127
R2-6	0.1250	0.3750	0.1094	0.1406	0.4220	0.023	0.031	410	118
R164	0.1250	0.3750	0.0937	0.0937				484	185
R2	0.1250	0.3750	0.1562	0.1562	0.4400	0.030	0.030	637	216
R174	0.1250	0.4100	0.1094	0.1094				483	189
R184	0.1250	0.5000	0.1094	0.1094				205	70
R2A	0.1250	0.5000	0.1719	0.1719				637	216
R1204	0.1250	0.7500	0.1250					1206	582
R155	0.1562	0.3125	0.1094	0.1250	0.3590	0.023	0.036	268	88
R156	0.1875	0.3125	0.1094	0.1250	0.3590	0.023	0.036	268	78
R166	0.1875	0.3725	0.1250	0.1250	0.4220	0.023	0.031	494	167
R186	0.1875	0.5000	0.1094	0.1562				692	211
R3	0.1875	0.5000	0.1562	0.1960	0.5650	0.042	0.042	1300	480
R3A	0.1875	0.6250	0.1960	0.1960				1300	480
R168	0.2500	0.3750	0.1250	0.1250	0.4220	0.023	0.036	268	108
R188	0.2500	0.5000	0.1250	0.1875	0.5470	0.023	0.045	572	216
R4	0.2500	0.6250	0.1960	0.1960	0.6900	0.042	0.042	1482	570
R4A	0.2500	0.7500	0.2188	0.2812				1677	870
R1810	0.3125	0.5000	0.1562	0.1562	0.5470	0.031	0.031	715	274
R6	0.3750	0.8750	0.2188	0.2812	0.9690	0.062	0.062	3328	1350
R8	0.5000	1.1250	0.2500	0.3125				3920	2230
R10	0.6250	1.3750	0.2812	0.3438				4620	2790
R12	0.7500	1.6250	0.3125	0.4375				5971	3720
R14	0.8750	1.8750	0.3750	0.5000				8722	5194
R16	1.0000	2.0000	0.3750	0.5000				8756	5290
R18	1.1250	2.1250	0.3750	0.5000				9102	5677
R20	1.2500	2.2500	0.3750	0.5000				9605	5919
R22	1.3750	2.5000	0.4375	0.5625				12200	6736
R24	1.5000	2.6250	0.4375	0.5625				14500	7981

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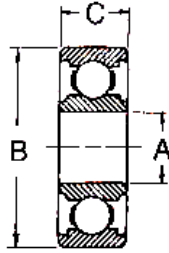
## 1600 Series



Item No.	Bore A Inch	Outer Diameter B Inch	Width C			Dynamic Cr	Static Co	Weight lbs.
			Open Inch	Shield Inch	Sealed Inch			
1601	0.1875	0.6875	0.2500	0.2500	0.3125	1514	744	0.009
1602	0.2500	0.6875	0.2500	0.2500	0.3125	1514	744	0.014
1603	0.3125	0.8750	0.2500	0.2500	0.3438	3060	1380	0.021
1604	0.3750	0.8750	0.2813	0.2813	0.3438	3228	1420	0.019
1605	0.3125	0.9063	0.3125	0.3125	0.3125	3060	1420	0.037
1606	0.3750	0.9063	0.3125	0.3125	0.3125	3128	1420	0.048
1607	0.4375	0.9063	0.3125	0.3125	0.3125	3128	1420	0.049
1614	0.3750	1.1250	0.3750	0.3750	0.3750	3930	2230	0.077
1615	0.4375	1.1250	0.3750	0.3750	0.3750	3930	2230	0.071
1616	0.5000	1.1250	0.3750	0.3750	0.3750	3930	2230	0.066
1620	0.4375	1.3750	0.4375	0.4375	0.4375	4620	2790	0.100
1621	0.5000	1.3750	0.4375	0.4375	0.4375	4620	2790	0.106
1622	0.5625	1.3750	0.4375	0.4375	0.4375	4620	2790	0.101
1623	0.6250	1.3750	0.4375	0.4375	0.4375	4620	2790	0.089
1628	0.6250	1.6250	0.5000	0.5000	0.5000	8230	4700	0.161
1630	0.7500	1.6250	0.5000	0.5000	0.5000	8230	4700	0.145
1633	0.6250	1.7500	0.5000	0.5000	0.5000	8230	4700	0.204
1635	0.7500	1.7500	0.5000	0.5000	0.5000	8230	4700	0.188
1638	0.7500	2.0000	0.5625	0.5625	0.5625	8720	5190	0.266
1640	0.8750	2.0000	0.5625	0.5625	0.5625	8720	5190	0.247
1641	1.0000	2.0000	0.5625	0.5625	0.5625	8720	5190	0.225
1652	1.1250	2.5000	0.6250	0.6250	0.6250	11544	7713	0.464
1654	1.2500	2.5000	0.6250	0.6250	0.6250	11544	7713	0.421
1657	1.2500	2.5625	0.6875	0.6875	0.6875	14975	9996	0.474
1658	1.3125	2.5625	0.6875	0.6875	0.6875	14975	9996	0.441

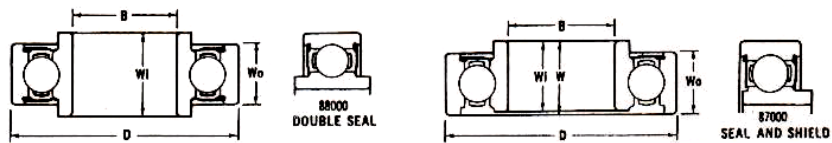
# Champion Bearings, Inc.

## Special Dimension



Item No.	Bore A		Outer Diameter B		Width C		Basic Load Rating (N)	
	mm	Inch	mm	Inch	mm	Inch	Dynamic Cr	Static Co
6201-8	12.700	0.5000	32	1.2598	10	0.3937	4700	2650
6202-8	12.700	0.5000	35	1.3780	11	0.4331	5880	3480
6202-16	16.000	0.6299	35	1.3780	11	0.4331	5880	3480
6203-6	9.525	0.3750	40	1.5748	12	0.4724	7350	4410
6203-8	12.700	0.5000	40	1.5748	12	0.4724	7350	4410
6203-10	15.875	0.6250	40	1.5748	12	0.4724	7350	4410
6203-12	19.050	0.7500	40	1.5748	12	0.4724	7350	4410
6204-12	19.050	0.7500	47	1.8504	14	0.5512	9800	6180
6205-16	25.400	1.0000	52	2.0472	15	0.5906	10800	6960
6305-16	25.400	1.0000	62	2.4409	17	0.6693	17200	11400
6305-20	31.750	1.2500	62	2.4409	17	0.6693	17200	11400
6306-20	31.750	1.2500	72	2.8346	19	0.7480	21700	14900
99502H	15.875	0.6250	34.925	1.3750	11	0.4331	21700	14900
499502HNR	15.875	0.6250	34.925	1.3750	11	0.4331	21700	14900
Z9504RST	19.050	0.7500	45.225	1.7805	15.494	0.6100	21700	14900

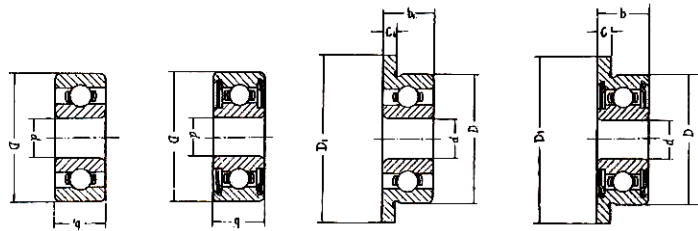
## 87000 Series



Item No.	Bore B		Outer Diameter D		Width			Basic Load Rating (N)	
	mm	Inch	mm	Inch	Outer Ring Wo Inch	Inner Ring Wi Inch	Overall W Inch	Dynamic Cr	Static Co
87503	17.00	0.6693	40.00	1.5748	0.4724	0.5380	0.5625	1660	985
88503	17.00	0.6693	40.00	1.5748	0.4724	0.6536		1660	985
87504	20.00	0.7874	47.00	1.8504	0.5512	0.6000	0.6250	2220	1410
88504	20.00	0.7874	47.00	1.8504	0.5512	0.6988		2220	1410
87505	25.00	0.9843	52.00	2.0472	0.5906	0.6000	0.6250	2430	1610
88505	25.00	0.9843	52.00	2.0472	0.5906	0.694		2430	1610
87506	30.00	1.1811	62.00	2.4409	0.6299	0.7480	0.7874	3350	2320
88506	30.00	1.1811	62.00	2.4409	0.6299	0.9449		3350	2320
87507	35.00	1.3780	72.00	2.8346	0.6693	0.7874	0.8268	4450	3150
88507	35.00	1.3780	72.00	2.8346	0.6693	0.9843		4450	3150
87508	40.00	1.5748	80.00	3.1496	0.8268	0.9449	0.9449	5050	3650
88508	40.00	1.5748	80.00	3.1496	0.8268	1.0630		5050	3650
87509	45.00	1.7717	85.00	3.3465	0.8268	0.9449	0.9449	5650	4150
88509	45.00	1.7717	85.00	3.3465	0.8268	1.0630		5650	4150
87510	50.00	1.9685	90.00	3.5433	0.8661	1.0236	1.0236	6050	4650
88510	50.00	1.9685	90.00	3.5433	0.8661	1.1811		6050	4650
88128	38.98	1.5346	80.00	3.1496	0.8268	1.0831	1.0831	5645	4025
88128R	38.98	1.5346	80.00	3.1496	0.8268	1.0831	1.0831	5645	4025

# Champion Bearings, Inc.

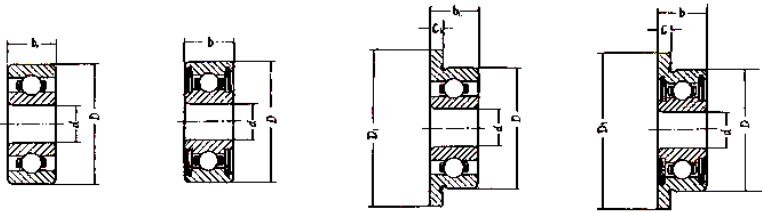
## Metric Series



Item No.	Bore D mm	Outer Diameter D mm	Width		Flange Diameter D1 mm	Flange Width		Basic Load Rating	
			Open B1 mm	Shielded/ Sealed B mm		Open C1 mm	Shielded/ Sealed C mm	Dynamic Kg	Static Kg
681	1.000	3.000	1.000		3.800	0.300		7.5	2.5
691	1.000	4.000	1.600		4.000	0.500		7.5	2.5
682	2.000	5.000	1.500	2.300	6.100	0.500	0.600	13.0	4.5
MR52	2.000	5.000	2.000	2.500	6.200	0.600	0.600	13.0	4.5
692	2.000	6.000	2.300	3.000	7.500	0.600	0.800	25.0	10.0
MR62	2.000	6.000	2.500	2.500				25.0	10.0
MR72	2.000	7.000	2.500	3.000	8.200	0.600	0.600	30.0	15.0
602	2.000	7.000	2.800	3.500	8.500	0.700	0.900	30.0	15.0
682-5	2.500	6.000	1.800	2.600	7.100	0.500	0.800	16.0	6.0
692-5	2.500	7.000	2.500	3.500	8.500	0.700	0.900	30.0	15.0
MR63	3.000	6.000	2.000	2.500	7.200	0.600	0.600	16.0	6.0
683	3.000	7.000	2.000	3.000	8.100	0.500	0.800	24.0	10.0
MR83	3.000	8.000	2.500	3.000	9.200	0.600	0.600	43.0	19.0
693	3.000	8.000	3.000	4.000	9.500	0.700	0.900	43.0	19.0
MR93	3.000	9.000	2.500	4.000	10.200	0.600	0.800	44.0	19.0
603	3.000	9.000	3.000	5.000	10.500	0.700	0.700	44.0	19.0
623	3.000	10.000	4.000	4.000	11.500	1.000	1.000	49.0	22.0
633	3.000	13.000	5.000	5.000				101.0	49.0
MR74	4.000	7.000	2.000	2.500	8.200	0.600	0.600	16.0	6.0
MR84	4.000	8.000	2.000	3.000	9.200	0.600	0.600	30.0	12.0
684	4.000	9.000	2.500	4.000	10.300	0.600	1.000	49.0	22.0
MR104	4.000	10.000	3.000	4.000	11.200	0.600	0.800	45.0	19.0
694	4.000	11.000	4.000	4.000	12.500	1.000	1.000	55.0	25.0
604	4.000	12.000	4.000	4.000	13.500	1.000	1.000	74.0	35.0
624	4.000	13.000	5.000	5.000	15.000	1.000	1.000	101.0	49.0
634	4.000	16.000	5.000	5.000	18.000	1.000	1.000	103.0	49.0
MR85	5.000	8.000	2.000	2.500	9.200	0.600	0.600	21.0	10.0
MR95	5.000	9.000	2.500	3.000	10.200	0.600	0.600	33.0	14.0
MR105	5.000	10.000	3.000	4.000	11.200	0.600	0.800	33.0	14.0
MR115	5.000	11.000		4.000	12.600		0.800	55.0	25.0
685	5.000	11.000	3.000	5.000	12.500	0.800	1.000	55.0	25.0
695	5.000	13.000	4.000	4.000	15.000	1.000	1.000	83.0	40.0
605	5.000	14.000	5.000	5.000	16.000	1.000	1.000	102.0	49.0
625	5.000	16.000	5.000	5.000	18.000	1.000	1.000	134.0	67.0
635	5.000	19.000	6.000	6.000	22.000	1.500	1.500	182.0	92.0

# Champion Bearings, Inc.

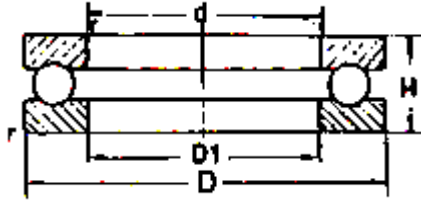
## Metric Series



Item No.	Bore d mm	Outer Diameter D mm	Width		Flange Diameter D1 F-OD mm	Flange Width D1 F-OD mm	Flange Width D1 F-OD mm	Basic Load Rating (N)	
			b1 mm	b mm				Dynamic Kg	Static Kg
MR106	6.000	10.000	2.500	3.000	11.200	0.600	0.600	38.0	18.0
MR126	6.000	12.000	3.000	4.000	13.200	0.600	0.800	55.0	25.0
686	6.000	13.000	3.500	5.000	15.000	1.000	1.100	83.0	40.0
696	6.000	15.000	5.000	5.000	17.000	1.200	1.200	103.0	49.0
606	6.000	17.000	6.000	6.000	19.000	1.200	1.200	153.0	75.0
626	6.000	19.000	6.000	6.000	22.000	1.500	1.500	182.0	92.0
MR117	7.000	11.000	2.500	3.000	12.200	0.600	0.600	35.0	16.0
687	7.000	14.000	3.500	5.000	16.000	1.000	1.100	91.0	45.0
697	7.000	17.000	5.000	5.000	19.000	1.200	1.200	124.0	64.0
607	7.000	19.000	6.000	6.000	22.000	1.500	1.500	182.0	92.0
627	7.000	22.000	7.000	7.000	25.000	1.500	1.500	256.0	138.0
MR128	8.000	12.000	2.500	3.500	13.200	0.600	0.800	42.0	21.0
MR148	8.000	14.000	3.500	4.000	15.600	0.800	0.800	63.0	31.0
688	8.000	16.000	4.000	5.000	18.000	1.000	1.100	97.0	50.0
698	8.000	19.000	6.000	6.000	22.000	1.500	1.500	173.0	88.0
608	8.000	22.000	7.000	7.000	25.000	1.500	1.500	256.0	138.0
628	8.000	24.000	8.000	8.000				258.0	138.0
689	9.000	17.000	4.000	5.000	19.000	1.000	1.100	103.0	55.0
699	9.000	20.000	6.000	6.000	23.000	1.500	1.500	192.0	101.0
609	9.000	24.000	7.000	7.000				260.0	138.0
629	9.000	26.000	8.000	8.000				354.0	199.0
6800	10.000	19.000	5.000	5.000				110.2	64.3
6900	10.000	22.000	6.000	6.000				260.2	139.8
6801	12.000	21.000	5.000	5.000				114.3	72.5
6901	12.000	24.000	6.000	6.000				265.3	139.8
6802	15.000	24.000	5.000	5.000				124.5	97.6
6902	15.000	28.000	7.000	7.000				316.3	175.5
6803	17.000	26.000	5.000	5.000				134.7	93.9
6903	17.000	30.000	7.000	7.000				339.8	194.9
6804	20.000	32.000	7.000	7.000				208.2	142.9
6904	20.000	37.000	9.000	9.000				515.3	315.3
6805	25.000	37.000	7.000	7.000				232.7	173.5
6905	25.000	42.000	9.000	9.000				575.5	375.5
6806	30.000	42.000	7.000	7.000				232.6	183.7
6906	30.000	47.000	9.000	9.000				594.9	405.1
6807	35.000	47.000	7.000	7.000				240.8	204.1
6907	35.000	55.000	10.000	10.000				751.2	540.8
6808	40.000	52.000	7.000	7.000				250.1	224.5
6908	40.000	62.000	12.000	12.000				956.1	705.1
6809	45.000	58.000	7.000	7.000				474.5	387.8
6909	45.000	68.000	12.000	12.000				979.6	755.1
6810	50.000	65.000	7.000	7.000				489.8	433.7
6910	50.000	72.000	12.000	12.000				1010.2	810.2

# Champion Bearings, Inc.

51100 Series  
 51200 Series  
 51300 Series  
 51400 Series



Item No.	Dimensions (mm)					Basic Load Rating		Minimum Preload Coefficient A	Limiting Speeds	
	d	D	H	D1	r	Dynamic C(Kn)	Static Co(Kn)		Grease R/min	Oil R/min
51100	10	24	9	11	0.3	7.65	11.2	7000	9500	0.001
51200	10	26	11	12	0.6	9.80	13.7	6000	8000	0.002
51101	12	26	9	13	0.3	8.00	12.2	7000	9500	0.001
51201	12	28	11	14	0.6	10.20	15.0	5600	7500	0.002
51102	15	28	9	16	0.3	8.15	13.4	6300	8500	0.002
51202	15	32	12	17	0.6	12.70	19.6	5300	7000	0.003
51103	17	30	9	18	0.3	8.80	15.6	6300	8500	0.002
51203	17	35	12	19	0.6	13.20	21.6	5300	7000	0.004
51104	20	35	10	21	0.3	11.60	21.2	5600	7500	0.004
51204	20	40	14	22	0.6	17.30	30.0	4300	5600	0.008
51304	20	47	18	22	1.0	27.00	44.5	3600	4500	0.010
51105	25	42	11	26	0.6	14.00	28.0	4800	6300	0.006
51205	25	47	15	27	0.6	21.20	40.0	3800	5000	0.013
51305	25	52	18	27	1.0	28.50	49.0	3400	4500	0.022
51405	25	60	24	27	1.0	41.50	69.5	2000	3600	0.043
51106	30	47	11	32	0.6	14.60	32.0	4500	6000	0.009
51206	30	52	16	32	0.6	22.00	44.0	3600	4800	0.017
51306	30	60	21	32	1.0	32.50	63.0	2800	3800	0.034
51406	30	70	28	32	1.0	58.50	100.0	2200	3200	0.085
51107	35	52	12	37	0.6	15.30	37.5	4300	5000	0.011
51207	35	62	18	37	1.0	30	62	3200	4300	0.032
51307	35	68	24	37	1.0	43	85	2400	3400	0.06
51407	35	80	32	37	1.1	68	125	1800	2600	0.13
51108	40	60	13	42	0.6	20.8	50	3800	5000	0.02
51208	40	68	19	42	1.0	36	78	2800	3800	0.05
51308	40	78	26	42	1.0	53	108	2000	3000	0.095
51408	40	90	36	42	1.1	80	150	1700	2400	0.19
51109	45	65	14	47	0.6	21.6	55.0	3400	4500	0.024
51209	45	73	20	47	1.0	34.5	78.0	2600	3600	0.053
51309	45	85	28	47	1.0	65.5	134	1900	2800	0.15
51409	45	100	39	47	1.1	102	196	1600	2200	0.32
51110	50	70	14	52	0.6	22	60	3400	4500	0.03
51210	50	78	22	52	1.0	41.5	96.5	2400	3400	0.08
51310	50	95	31	52	1.1	72	150	1800	2600	0.2
51410	50	110	43	52	1.5	114	224	1500	2000	0.45
51111	55	78	16	57	0.6	26.5	72	3000	4000	0.043
51211	55	90	25	57	1.0	52	122	2000	3000	0.13
51311	55	105	35	57	1.1	83	180	1600	2200	0.28
51411	55	120	48	57	1.5	137	280	1300	1800	0.67

# Champion Bearings, Inc.

## Aircraft Bearings

### B500 Series

### B500DD Series

### B5500WZZ Series

### 555 Series



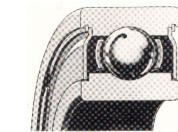
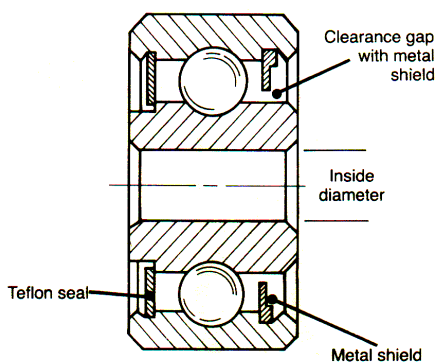
Item No.	Bore +.0007 -.0007	Outside Diameter +.0000 -.0010	Ring Widths		Shoulder Diameter Inner Ring Approx.	Limit Load Rating lbs.		Weight lbs.	Features
			Inner +.000 -.005	Outer +.000 -.005		Radial	Thrust		
<b>B500 Series</b>									
B538	.6250	1.0625	.281	.250	0.777	3280	1500	.02	Extra-Light Duty Single Row Ball Torque Tube Type
B539	.7500	1.1875	.281	.250	0.895	3750	1700	.03	
B540	.8750	1.3125	.281	.250	1.016	4220	1900	.04	
B541	1.0625	1.5000	.281	.250	1.216	5000	2200	.05	
B542	1.3125	1.7500	.281	.250	1.451	5950	2700	.07	
B543	1.5625	2.0000	.281	.250	1.702	6880	3200	.08	
B544	1.8125	2.2500	.281	.250	1.970	7980	3600	.09	
B545	2.0625	2.6250	.281	.250	2.286	9220	4000	.13	
B546	2.3125	2.8750	.281	.250	2.527	10150	4400	.15	
<b>B500DD Series</b>									
B538DD	.6250	1.0625	.281	.250	0.777	3280	1500	.03	Shielded Extra- Light Duty Single Row Ball Torque Tube Type
B539DD	.7500	1.1875	.281	.250	0.895	3750	1700	.04	
B540DD	.8750	1.3125	.281	.250	1.016	4220	1900	.05	
B541DD	1.0625	1.5000	.281	.250	1.216	5000	2200	.06	
B542DD	1.3125	1.7500	.281	.250	1.451	5950	2700	.09	
B543DD	1.5625	2.0000	.281	.250	1.702	6880	3200	.10	
B544DD	1.8125	2.2500	.281	.250	1.970	7980	3600	.11	
B545DD	2.0625	2.6250	.281	.250	2.286	9220	4000	.15	
B546DD	2.3125	2.8750	.281	.250	2.527	10150	4400	.17	
<b>B5500WZZ Series</b>									
B5538	.6250	1.0625	.562	.500	.745	6250	2060	.04	Extra-Light Duty Double Row Ball Torque Tube Type Sealed
B5539	.7500	1.1875	.562	.500	.865	7190	2370	.06	
B5540	.8750	1.3125	.562	.500	.989	8120	2680	.08	
B5541	1.0625	1.5000	.562	.500	1.190	9690	3200	.10	
B5542	1.3125	1.7500	.562	.500	1.430	11600	3820	.14	
B5543	1.5625	2.0000	.562	.500	1.665	13400	4430	.16	
B5544	1.8125	2.2500	.562	.500	1.935	15600	5160	.18	
B5545	2.0625	2.6250	.562	.500	2.265	18100	5980	.26	
B5546	2.3125	2.8750	.562	.500	2.505	20000	6600	.30	
<b>555 Series</b>									
555FT	4.5000	5.3750	.437	.437	4.807	38800	17100	.58	Single Row Ball Large Diameter Thin Section
555K	4.5000	5.3750	.437	.437	4.780	20000	8800	.58	
557FT	4.9062	5.7812	.437	.437	5.205	41900	18500	.63	
559FT	5.5000	6.5000	.500	.500	5.913	53000	2340	1.06	
561FT	6.0937	7.1250	.500	.500	6.540	58500	25800	1.20	
563FT	6.3750	7.6250	.563	.563	6.898	75600	33300	1.75	
565FT	7.1875	8.5000	.563	.563	7.664	83900	37000	2.06	

# Champion Bearings, Inc.

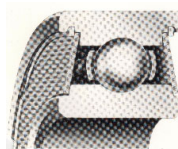
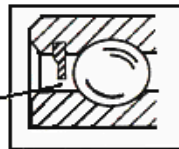
## Seals & Shields Selection Guide

To retain lubrication & exclude dirt by Champion Bearings, Inc.

We can provide any of the below in any brand bearing with your specifications.

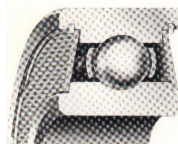
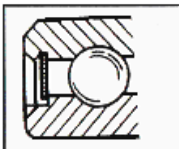
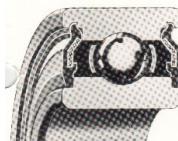
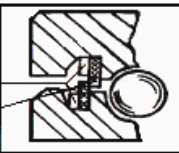


Clearance gap with metal shield

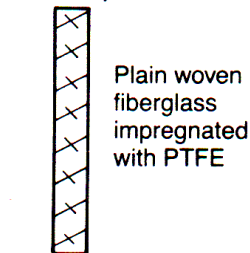
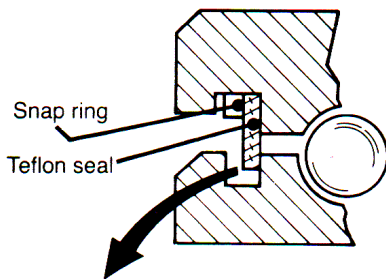
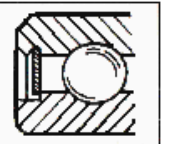
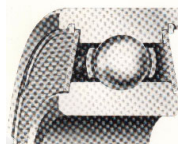
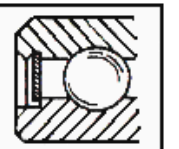
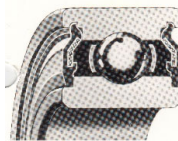
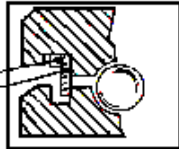


Snap Rings (2 places)

Teflon® Seals (2 places)



Snap Ring Teflon® Seal



50-70% PTFE

### 1. Metal Shield

- Least Expensive Shield
- Dust & Dirt Entry Possible
- No Contact

### 2. Teflon® Fiberglass Seal

- For High Temperatures
- Low Torque
- Maximum Sealability

### 3. Metal – Buna Rubber

- Least Expensive Seal

### 4. Metal Over Teflon Seal

- Shock Resistant

### 5. Viton Rubber

- High Temperature

### 6. Virgin Teflon®

- Minimum Noise Seal

### Teflon® Seals

- Are available on all standard metric and inch-sized ball bearings.
- Provide reduced torque (up to 100%) compared to rubber-shielded bearings.
- Give increase sealability over metal-shielded bearings.
- Can withstand temperatures considerably higher and longer than silicone or Buna rubber.
- Provide abrasion and/or impingement resistance, and can be enhanced by altering material thickness or fiberglass density.

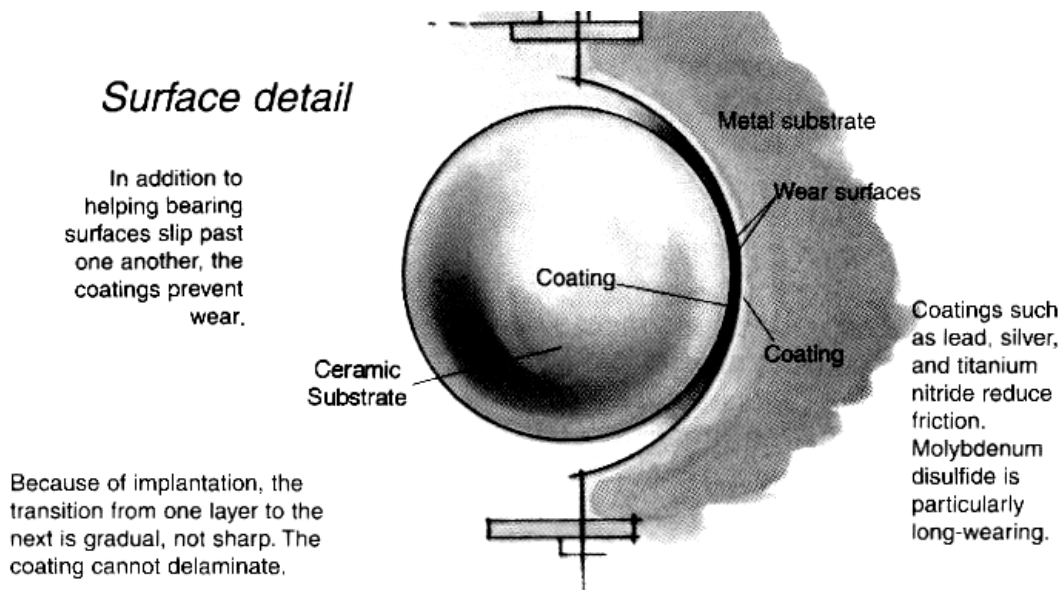
# Champion Bearings, Inc.

## Why A Solid Film Lubricant?

Ball bearings often suffer premature failure due to galling caused by a lack of lubrication. This condition frequently occurs due to rotation required in abnormal environments. High temperatures, corrosive chemicals and vacuum are but a few of the contributors.

A classic example is the positioning equipment for the Silicon Valley with its harsh environment (high temperatures and vacuum.) Besides being subject to high temperatures and in a vacuum system, these systems also demanded an alternative to oil and grease lubricants.

Champion offers a wide range of balls bearing brands and ABEC tolerances with selected solid film lubricants to provide the maximum in rotary performance under what was previously thought of as impossible conditions.



## Dry Film Lubricants Benefits

### Reduces

- Friction
- Wear
- Heat Generation
- Torque Required

### Increase

- Life of Bearings
- Performance

### Hazardous Condition Protection

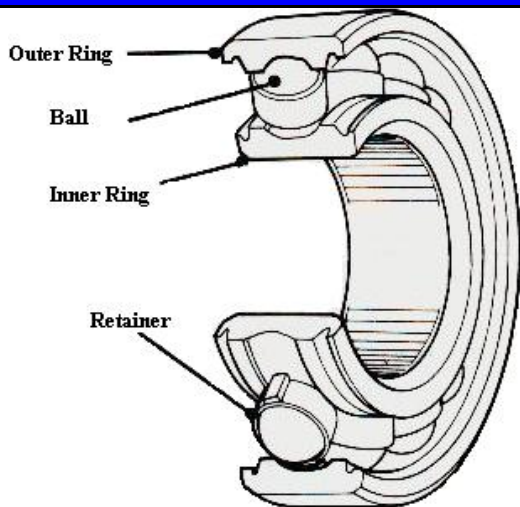
- Hazardous Environments
- Vacuum Systems
- Extreme Temperatures
- Acids and Corrosive Chemicals

# Champion Bearings, Inc.

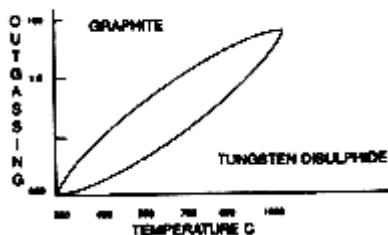
## Dry Film Lubrication For Hostile Environments

Now there is a source for rolling element bearings operating in severe environments. Champion Industries is proud to offer a variety of solid film lubricants used to optimize rotation. Intermolecular adhesion through ion deposition provides coating to virtually any surface. This is a new but successful technology offered through off the self and customized ball bearings.

### Coated Surfaces

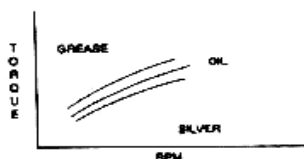


Out gassing can be significantly reduced over graphite lubrication  
**OUTGASSING vs. TEMPERATURE**



Torque can be significantly reduced compared to hydrocarbon lubrication

**TORQUE vs. RPM  
 CONVENTIONAL (ANDOK C GREASE)  
 vs. SOLID FILM LUBRICANT**



### Champion Solid Film Lubricants

- T-1 Lead** – Useful temperature 450°F. Used to lubricate and decrease electrical resistance in bearings proven lubricant in vacuum and on spacecraft.
- T-3 Titanium Nitride** – Useful Temperature 1500°F. Very Hard wear resistant coating. Excellent corrosion resistance. Proven lubricant in salt water and acidic environments.
- T-5 Silver** – Useful temperature 1200°F. Proven lubricant in high temperature vacuum.
- T-7 Tungsten Disulfide** – Non-toxic, non-magnetic, vacuum stable, minimum out gassing.
- T-9 Moly Disulfide** – With 10% nickel provides lowest friction in a vacuum. Nickel included for extended life in air. Successfully used on spacecraft.
- T-11 Carbide Diamond** – an amorphous carbon with diamond. Proven non reactive in acid, water, and highly corrosive environments. Provides the strength of chrome steel and the corrosion resistance superior to that of stainless steel.
- T-13 Parylene** – a polymer coating, pinhole-free, resistant to acids and water corrosion.

# Champion Bearings, Inc.



## SELF LUBRICATING TEFLON\*

Putting BERALOY PARTS TO WORK FOR YOU  
DATA SHEET for Beraloy\* 95-5

Physical Properties	Units	ASTM Method	Actual s
Tensile Strength	PSI	D1457-56T	2400
Tensile Elongation	%	D1457-56T	225
Compressive Strength	PSI	D695-54	1800
Compressive Modules	PSI	D695-54	125,000
Flexural Strength	PSI	D740	1400
Hardness	ShD	D1760-61	65
Co. Thermal Expantion	in x 10-5		
	in x F		
Thermal Conductivity	BTU/in hrsqtF	Cenco Finch	2.67
Specific Gravity		D1457-62	2.24
Deformation	600psi/500/24hrs		4.3-9.0%
Wear Factor	K x 10-5		8
Co. of Friction	Static - Dry		0.14
	Dynamic - Dry		0.23

## OUTGASING OF PLASTIC MATERIALS IN VACUUM'S

MATERIAL	%TML	%WVR	%CVCM
PEEK	0.30	0.20	0.00
Ultern 1000	0.65	0.29	0.01
Polycarbonate	0.30	0.25	0.04
Polysulfone	0.40	N/A	0.01
Acetal	0.28	N/A	0.02
PET Ertalyte	0.37	N/A	0.05
Torlon 4203	1.85	N/A	0.00
Torlon 5030	0.58	N/A	0.00
Fluorosint 500	0.05	N/A	0.00
Beraloy 95-5	0.02	N/A	0.01
Rulon AR	0.01	N/A	0.01
Rulon J	0.18	N/A	0.01
Rulon 7035	0.03	N/A	0.02
Rulon 123	0.01	N/A	0.01
Rulon 641	0.01	N/A	0.00
Rulon LR	0.00	N/A	0.00
Rulon 488	0.01	N/A	0.00
Rulon W2	0.01	N/A	0.00
Meldin 2001	1.63	1.04	0.01
Meldin 2030	1.25	1.15	0.00
PBI	2.51	2.13	0.00
Noryl En265	0.17	N/A	0.00
Noryl N300	0.25	N/A	0.00
Noryl 534	0.04	N/A	0.01

Tests conducted to ASTM E595-77/84 and -90 by Goddard / Flight Center, Maryland.

BERALOY 95-5 IS A REGISTERED TRADEMARK OF CHAMPION INDUSTRIES

## SELF LUBRICATING POLYIMIDE Putting Vespel\* Parts to Work For You SELF LUBRICATING VACUUM COMPATIBLE

TABLE 1: SUMMARY OF TYPICAL PROPERTIES(Machining Stock)

Property	Method (F)Temp	Units	SP-1	SP-21	SP22	SP-211	SP-3
Tensile Strength, Ultimate	ASTM D-638 500	73 PSI	12,500	9,500	7,500	6,500	8,200
Elongation, Ultimate	ASTM D-638 500	73 %	7.5	4.5	3.0	3.5	4.0
Flexural	ASTM D-790 500	1000 PSI	450	550	700	450	--
Compressive Modulus	ASTM D-695 73	1000 PSI	250	370	400	200	--
Wear Rate, PV=25,000	Unlub.	in-1000 hrs.	.25-1.2	.09	.06	.07	.25-.33
Friction Coefficient Dynamic*	Unlab.		.29	.24	.20	.12	.25
Static			.35	.30	.27	.20	--
Static in Vacuum			--	--	--	--	.03
Coefficient of Linear Expansion	E-228 73-572	10-6in/in/of	30	27	21	30	--
Dielectric Constant	D-150 73	@10'Hz	3.64	13.28	--	--	--

Underwriters Laboratory Flame Rating: 94-VO

**VESPEL\* parts and machining stock are made by DuPont from SP polyimide resins, available in these five compositions to provide a range of property combinations**




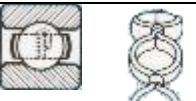








RESIN DESIGNATION	Description	Characteristics
SP-1	Unfilled base resin	Provides maximum physical properties and best electrical and thermal insulation
SP-21	*15%, by weight graphite filler	Graphite added to provide low wear and friction for bearings, thrust washers, and dynamic seals
SP-22	*40%, by weight, graphite filler	Same as SP-21 for wear and friction plus improved dimensional stability. It has the lowest coefficient of thermal expansion
SP-211	*15%, by weight, graphite and 10% by weight TEFLON* fluorocarbon resin fillers	Has lowest coefficient of friction over wide range of operating conditions. Also, has lowest wear rate up to 300oF
SP-3	*15%, by weight, molybdenum disulfide	MoS2 added to provide lubrication for seals and bearings in vacuum or dry environments

\*Nominal

DU PONT REGISTERED TRADEMARK FOR POLYIMIDE PARTS AND MACHINING STOCK

# Champion Bearings, Inc.

## Retainer Selection Guide

Deep Groove Bearing Cages					
Type	Illustration	Material	Construction	Temperature Range	Applications / Comments
FC		None			Full complement
Q		Stainless Steel, AISI 410	One-piece, stamped, with coined ball pockets and polished surfaces	Normal To 600°F	General Purpose. Not available for balls larger than 3/32" dia.
P		Stainless Steel, AISI 430, AISI 305	Two-piece, stamped, ribbons to form ball pockets with fully clinched ears.	Normal To 900°F	General Purpose. Not available for bearings with bore smaller than 5 mm.
W		Stainless Steel, AISI 430, AISI 305	Two-piece, stamped, ribbons to form ball pockets with loosely clinched ears.	Normal To 900°F	Low torque instrument application.
T		Phenolic	One-piece, machined from fiber-reinforced phenolic; side assembled snap-in type	Normal To 300°F	High speed, general purpose uses.
TA		Phenolic, Aluminum Reinforced	Two-piece, machined from phenolic reinforced with aluminum side plates, secured with rivets.	Normal To 300°F	High speed, general purpose uses. Do not allow contact with chlorinated solvents.
B		Beraloy® – Self Lubricating Teflon	One-piece, machined from self-lubricating Teflon®; side assembled snap-in type	Normal To 550°F	High speed, general purpose uses. Lowest coefficient of friction of any solid. Universal chemical resistance.
V		Vespel® – Self lubricating polyimide	One-piece, machined from self-lubricating polyimide; side assembled snap-in type	Normal To 600°F	High speed, general purpose uses. Low coefficient of friction. Chemical resistant.
ZA		Teflon®	Hollow cylinders of Teflon®	Cryogenic to 450°F	Low speed. Low torque applications. If used without lubricant, bearing material should be stainless steel.
Angular Contact Bearing Cages					
BA		Beraloy® – Self Lubricating Teflon	One-piece, machined from self-lubricating Teflon® with cylindrical ball pockets.	Normal To 550°F	High speed, general purpose uses. Lowest coefficient of friction of any solid. Universal chemical resistance.
VA		Vespel® – Self lubricating polyimide	One-piece, machined from self-lubricating polyimide with cylindrical ball pockets.	Normal To 600°F	High speed, general purpose uses. Low coefficient of friction. Chemical resistant.
C		Phenolic	One-piece, machined from fiber-reinforced phenolic with cylindrical ball pockets.	Normal To 300°F	High speed, general purpose uses.

# Champion Bearings, Inc.

## Lubrication

Along with the dry film lubrication we offer other lubricants to aid or replace the dry film lubricants.

Because we are a custom bearing manufacturer, we are able to add any lubricant into any of our bearings. One of our sales engineers can help you decide what lubricant best fits your needs.

<u>Trade Name</u>	<u>Temp Range</u>	<u>Base Oil</u>	<u>Thickener</u>	<u>Mil-Spec</u>
<u>Chevron</u> <u>SRI-2</u>	-20 +350	Mineral	Polyurea	MIL-G-3545G
<u>Beacon 325</u>	-65 +250	Diester	Lithium	MIL-G-3278
<u>Krytox</u> <u>240ac</u>	-30 +550	Fluorocarbon	Udax	MIL-G-27617A
<u>Andok – C</u>	-20 +250	Mineral	Sodium	
<u>Moblie 28</u>	-65 +350	Synthetic Hydrocarbon	Clay Bentonite	MIL-G-81322D
<u>Royal 13CF</u>	-100 +450			MIL-G-25013
<u>Royal 27</u>	-100 +275			MIL-G-23827
<u>Supermil</u> <u>A72832</u>	-65 +250	Diester	Lithium Soap	Mil-G-23827
<u>Krytox</u> <u>143AC</u>	-30 +550	Fluorocarbon		
<u>Anderol</u> <u>401D</u>	-60 +200	Diester		Mil-L-6085A
<u>AeroShell</u>				Mil-G-23827B
<u>Mystic FG-2</u>				Mil-G-25013E LY332

# Champion Bearings, Inc.

## BEARING TOLERANCES

### Radial Bearings – Metric

Inner Ring Nominal Bore Diameter		Bore Tolerances				Width Tolerances		Radial Runout
(Metric) d		(Inch)				(Inch) B		(Inch)
Over	Incl.	Low	High	Minimum	Maximum	Maximum	Minimum	Maximum
<b>Tolerance Class- Standard (ABEC-1)</b>								
2.5	10	-0.003	+0.000	-0.004	+0.001	+0.000	-0.045	.0004
10	18	-0.003	+0.000	-0.004	+0.001	+0.000	-0.045	.0004
18	30	-0.004	+0.000	-0.005	+0.001	+0.000	-0.045	.0005
30	50	-0.005	+0.000	-0.006	+0.001	+0.000	-0.045	.0006
50	80	-0.006	+0.000	-0.0075	+0.0015	+0.000	-0.060	.0008
80	120	-0.008	+0.000	-0.010	+0.002	+0.000	-0.080	.0010
120	180	-0.010	+0.000	-0.012	+0.0025	+0.000	-0.100	.0012
180	250	-0.012	+0.000	-0.015	+0.003	+0.000	-0.120	.0016
250	315	-0.014	+0.000	-0.017	+0.0035	+0.000	-0.140	.0020
315	400	-0.016	+0.000	-0.020	+0.004	+0.000	-0.155	.0024
400	500	-0.018	+0.000	-0.022	+0.005	+0.000	-0.175	.0026
500	630	-0.020	+0.000	-0.025	+0.0055	+0.000	-0.200	.0028
630	800	-0.0295	+0.000	-0.035	+0.006	+0.000	-0.295	.0032
800	1000	-0.039	+0.000	-0.047	+0.008	+0.000	-0.395	.0035
<b>Tolerance Class – P/6 (ABEC-3)</b>								
2.5	10	-0.003	+0.000	-0.003	+0.0005	+0.000	-0.045	.0002
10	18	-0.003	+0.000	-0.003	+0.0005	+0.000	-0.045	.0003
18	30	-0.003	+0.000	-0.0035	+0.0005	+0.000	-0.045	.0003
30	50	-0.004	+0.000	-0.004	+0.0005	+0.000	-0.045	.0004
50	80	-0.005	+0.000	-0.0055	+0.001	+0.000	-0.060	.0004
80	120	-0.006	+0.000	-0.007	+0.001	+0.000	-0.080	.0005
120	180	-0.007	+0.000	-0.008	+0.001	+0.000	-0.100	.0007
180	250	-0.009	+0.000	-0.010	+0.0015	+0.000	-0.120	.0008
250	315	-0.010	+0.000	-0.012	+0.002	+0.000	-0.140	.0010
315	400	-0.012	+0.000	-0.014	+0.002	+0.000	-0.155	.0012
400	500	-0.014	+0.000	-0.016	+0.0025	+0.000	-0.175	.0014
500	630	-0.016	+0.000	-0.019	+0.003	+0.000	-0.200	.0016
<b>Tolerance Class – P/5 (ABEC-5)</b>								
2.5	10	-0.002	+0.000	-0.002	+0.000	+0.000	-0.0157	.00015
10	18	-0.002	+0.000	-0.002	+0.000	+0.000	-0.0315	.00015
18	30	-0.0025	+0.000	-0.0025	+0.000	+0.000	-0.045	.00015
30	50	-0.003	+0.000	-0.003	+0.000	+0.000	-0.045	.0002
50	80	-0.0035	+0.000	-0.0035	+0.000	+0.000	-0.060	.0002
80	120	-0.004	+0.000	-0.004	+0.000	+0.000	-0.080	.00025
120	180	-0.005	+0.000	-0.005	+0.000	+0.000	-0.100	.0003
180	250	-0.006	+0.000	-0.006	+0.000	+0.000	-0.120	.0004
250	315	-0.007	+0.000	-0.007	+0.000	+0.000	-0.140	.0005
315	400	-0.009	+0.000	-0.009	+0.000	+0.000	-0.155	.0006
<b>Tolerance Class – P/4 (ABEC-7)</b>								
2.5	10	-0.0015	+0.000	-0.0015	+0.000	+0.000	-0.0157	.0001
10	18	-0.0015	+0.000	-0.0015	+0.000	+0.000	-0.0315	.0001
18	30	-0.002	+0.000	-0.002	+0.000	+0.000	-0.045	.0001
30	50	-0.002.5	+0.000	-0.0025	+0.000	+0.000	-0.045	.00015
50	80	-0.003	+0.000	-0.003	+0.000	+0.000	-0.060	.00015
80	120	-0.003	+0.000	-0.003	+0.000	+0.000	-0.080	.0002
120	180	-0.004	+0.000	-0.004	+0.000	+0.000	-0.100	.00025
180	250	-0.005	+0.000	-0.005	+0.000	+0.000	-0.120	.0003

# Champion Bearings, Inc.

## BEARING TOLERANCES

### Radical Bearings – Metric

Outer Ring Nominal O.D. Diameter (Metric) d		Bore Tolerances				Width Tolerances		Radial Runout
		(Inch)				(Inch) B		(Inch)
Over	Incl.	Low	High	d min Minimum	d min Maximum	Maximum	Minimum	Maximum
<b>Tolerance Class – Standard (ABEC-1)</b>								
6	18	+0.000	-0.003	+0.001	-0.004	Tolerances are identical to those of inner ring of the same bearing		.0006
18	30	+0.000	-0.0035	+0.001	-0.004		.0006	
30	50	+0.000	-0.004	+0.001	-0.0055		.0008	
50	80	+0.000	-0.005	+0.0015	-0.007		.0010	
80	120	+0.000	-0.006	+0.002	-0.008		.0014	
120	150	+0.000	-0.007	+0.0025	-0.0095		.0016	
150	180	+0.000	-0.010	+0.003	-0.0125		.0018	
180	250	+0.000	-0.012	+0.003	-0.015		.0020	
250	315	+0.000	-0.014	+0.0035	-0.017		.0024	
315	400	+0.000	-0.016	+0.004	-0.020		.0028	
400	500	+0.000	-0.018	+0.005	-0.0225		.0032	
500	630	+0.000	-0.020	+0.0055	-0.0285		.0039	
630	800	+0.000	-0.0295	+0.007	-0.036		.0047	
800	1000	+0.000	-0.039	+0.008	-0.047		.0047	
<b>Tolerance Class – P/6 (ABEC-3)</b>								
6	18	+0.000	-0.003	+0.0005	-0.003	Tolerances are identical to those of inner ring of the same bearing		.0006
18	30	+0.000	-0.003	+0.0005	-0.0035		.0006	
30	50	+0.000	-0.0035	+0.001	-0.004		.0008	
50	80	+0.000	-0.004	+0.001	-0.005		.0010	
80	120	+0.000	-0.005	+0.001	-0.006		.0014	
120	150	+0.000	-0.006	+0.001	-0.007		.0008	
150	180	+0.000	-0.007	+0.001	-0.008		.0003	
180	250	+0.000	-0.008	+0.0015	-0.0095		.0010	
250	315	+0.000	-0.010	+0.0015	-0.0115		.0012	
315	400	+0.000	-0.011	+0.002	-0.013		.0014	
400	500	+0.000	-0.013	+0.002	-0.015		.0016	
500	630	+0.000	-0.015	+0.002	-0.018		.0020	
630	800	+0.000	-0.018	+0.004	-0.022		.0024	
<b>Tolerance Class – P/5 (ABEC-5)</b>								
6	18	+0.000	-0.002	+0.000	-0.002	Tolerances are identical to those of inner ring of the same bearing		.0002
18	30	+0.000	-0.0025	+0.000	-0.0025		.00025	
30	50	+0.000	-0.003	+0.000	-0.003		.0003	
50	80	+0.000	-0.0035	+0.000	-0.0035		.0003	
80	120	+0.000	-0.004	+0.000	-0.004		.0004	
120	150	+0.000	-0.004	+0.000	-0.004		.0004	
150	180	+0.000	-0.005	+0.000	-0.005		.0005	
180	250	+0.000	-0.006	+0.000	-0.006		.0006	
250	315	+0.000	-0.007	+0.000	-0.007		.0007	
315	400	+0.000	-0.008	+0.000	-0.008		.0007	
400	500	+0.000	-0.009	+0.000	-0.009		.0009	
500	630	+0.000	-0.011	+0.000	-0.011		.0010	
630	800	+0.000	-0.014	+0.000	-0.014		.0012	
<b>Tolerance Class – P/4 (ABEC-7)</b>								
6	18	+0.000	-0.0015	+0.000	-0.0015	Tolerances are identical to those of inner ring of the same bearing		.0001
18	30	+0.000	-0.002	+0.000	-0.002		.00015	
30	50	+0.000	-0.0025	+0.000	-0.0025		.0002	
50	80	+0.000	-0.003	+0.000	-0.003		.0002	
80	120	+0.000	-0.003	+0.000	-0.003		.00025	
120	150	+0.000	-0.0035	+0.000	-0.0035		.0003	
150	180	+0.000	-0.004	+0.000	-0.004		.0003	
180	250	+0.000	-0.004	+0.000	-0.004		.0004	
250	315	+0.000	-0.005	+0.000	-0.005		.0004	
315	400	+0.000	-0.006	+0.000	-0.006		.0005	

# Champion Bearings, Inc.

## BEARING TOLERANCES

For applications with *pure radial loads*, a low contact angle or a lesser radial play is best. For applications where the bearing will see *thrust loads* as well as radial loads, a *higher* contact angle or radial play will become necessary.

If the application requires a *press fit* or *interference fit* on either the inner ring or the outer ring, or in some cases both, care must be taken to assure that all of the bearings internal clearance is not taken up by the *press fits*.

Inner Ring Nominal Bore Diameter		Bore Tolerances		Width Tolerances		Radial Runout
(Inch) D		(Inch) Dm		(Inch) B		(Inch)
Over	Incl.	Low	High	Max	Min	Max
0	1	-0.002	+0.002	+0.000	-0.050	.0004
1	2	-0.003	+0.002	+0.000	-0.050	.0004
2	3	-0.003	+0.002	+0.000	-0.050	.0006
3	6	-0.003	+0.002	+0.000	-0.050	.0008
6	8	-0.005	+0.002	+0.000	-0.050	.0010
8	12	-0.005	+0.002	+0.000	-0.100	.0012
12	15	-0.008	+0.002	+0.000	-0.160	.0015

Outer Ring Nominal O.D. Diameter		Bore Tolerances		Width Tolerances		Radial Runout
(Inch) D		(Inch) Dm		(Inch) B		(Inch)
Over	Incl.	Low	High	Max	Min	Max
0	1	-0.003	-0.007	Tolerances are identical to those of inner ring of the same bearing		.0004
1	2	-0.003	-0.008			.0005
2	3	-0.005	-0.010			.0006
3	6	-0.008	-0.013			.0007
6	8	-0.013	-0.018			.0008
8	12	-0.005	-0.018			.0010
12	15	-0.008	-0.023			.0012
15	20	-0.013	-0.023			.0015

### 1600 Series Radial Bearings - Inch

Inner Ring Nominal Bore Diameter		Bore Tolerances		Width Tolerances	
(Inch) D		(Inch) Dm		(Inch) B	
Over	Incl.	Low	High	Maximum	Minimum
0"	5/8"	-.0003	+0.000	+0.000	-.0050
5/8"	1-1/8"	-.0004	+0.000	+0.000	-.0050
1-1/8"	1-5/16"	-.0005	+0.000	+0.000	-.0050

Outer Ring Nominal O.D. Diameter		Bore Tolerances		Width Tolerances	
(Inch) D		(Inch) Dm		(Inch) B	
Over	Incl.	Low	High	Maximum	Minimum
0"	1-1/6"	-.0004	+0.000	+0.000	-.0050
1-1/8"	2-9/16"	-.0005	+0.000	+0.000	-.0050

# Champion Bearings, Inc.

## BEARING RADIAL INTERNAL CLEARANCES

Single Row Deep Groove Ball Bearings – Cylindrical Bore

Bore Diameter (Metric)		C/2		Standard (No Marking)		C/2		C/2		C/2	
Over	Incl.	Min	Max	Min	Mix	Min	Max	Min	Max	Min	Max
2.5	6	.0000	.0003	.0001	.0005	.0003	.0089	.0005	.0012	.0008	.0014
6	10	.0000	.0003	.0001	.0005	.0003	.0009	.0005	.0012	.0009	.0018
10	18	.0000	.00035	.0001	.0007	.0004	.0010	.0007	.0013	.0010	.0019
18	24	.0000	.0004	.0002	.0008	.0005	.0011	.0008	.0014	.0011	.0018
24	30	.00005	.00045	.0002	.0008	.0005	.0011	.0009	.0016	.0012	.0021
30	40	.00005	.00045	.0002	.0009	.0006	.0013	.0011	.0018	.0015	.0025
40	50	.00005	.00045	.0002	.0009	.0007	.0014	.0012	.0020	.0017	.0029
50	65	.00005	.0006	.0003	.0011	.0009	.0017	.0015	.0024	.0021	.0035
65	80	.00005	.0006	.0004	.0012	.0010	.0020	.0018	.0028	.0025	.0041
80	100	.00005	.0007	.0005	.0014	.0012	.0023	.0021	.0033	.0030	.0047
100	120	.0001	.0008	.0006	.0016	.0014	.0026	.0024	.0038	.0035	.0055
120	140	.0001	.0009	.0007	.0019	.0016	.0032	.0028	.0045	.0041	.0063
140	160	.0001	.0009	.0007	.0021	.0018	.0036	.0032	.0051	.0045	.0071
160	180	.0001	.0010	.0008	.0024	.0021	.0040	.0036	.0058	.0052	.0079
180	200	.0001	.0012	.0010	.0028	.0025	.0046	.0042	.0064	.0058	.0090
200	225	.0001	.0012	.0011	.0032	.0028	.0052	.0047	.0073	.0068	.0100
225	250	.0001	.0014	.0012	.0036	.0034	.0059	.0055	.0085	.0080	.0114
250	280	.0001	.0015	.0014	.0038	.0038	.0064	.0059	.0093	.0088	.0126
280	315	.0003	.0017	.0016	.0043	.0043	.0070	.0068	.0102	.0102	.0141
315	355	.0003	.0019	.0019	.0047	.0047	.0078	.0078	.0114	.0114	.0159
355	400	.0003	.0023	.0023	.0055	.0055	.0090	.0090	.0130	.0130	.0181
400	450	.0004	.0027	.0027	.0063	.0063	.0102	.0102	.0145	.0145	.0204
450	500	.0004	.0031	.0031	.0070	.0070	.0114	.0114	.0161	.0161	.0224
500	560	.0007	.0035	.0035	.0078	.0078	.0126	.0126	.0181	.0181	.0248
560	630	.0007	.0039	.0039	.0086	.0086	.0137	.0137	.0200	.0200	.0275
630	710	.0011	.0047	.0047	.0098	.0098	.0153	.0153	.0220	.0220	.0307
710	800	.0011	.0051	.0051	.0110	.0110	.0173	.0173	.0240	.0240	.0338
800	900	.0011	.0059	.0059	.0122	.0122	.0193	.0193	.0271	.0271	.0378
900	1000	.0015	.0063	.0063	.0133	.0133	.0212	.0212	.0299	.0299	.0409

# Champion Bearings, Inc.

## Disclaimer

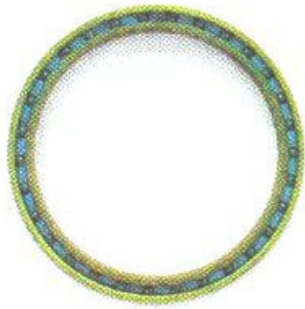
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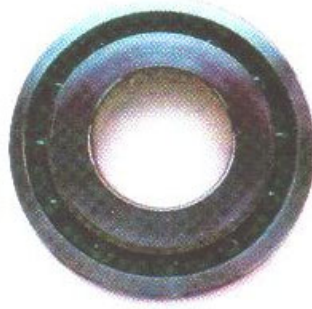
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# Champion Hybrid Bearings



\*Beryllium Copper Races  
Teflon Separator  
Ceramic Balls



\*\*Monel 500 Races  
Beraloy Retainer  
Ceramic Balls



Titanium Races  
Delrin & Ceramic Balls  
Phenolic Retainer



Gold Coated & Ceramic Balls  
Beraloy Retainer  
Gold Doped Stainless Steel Races



\*Stellite Balls and Races



\*\*\*T-7  
Tungsten Disulfide  
Coated Races



Tungsten Disulfide Coated  
Stainless Steel Races  
Ceramic Balls



Silver Coated Races  
Ceramic Balls



Vespel Retainer  
Ceramic Balls

Stainless Steel  
Turlon Balls  
Hybrid Ceramics

## Champion Bearings, Inc.

Specialty Bearing Manufacturer

1-800-900-2236

\*Non-Magnetic  
\*\*Acid Resistant  
\*\*\*No Lube Req'd  
Teflon Seal  
Vespel Retainer  
Ion Deposition

*Custom Bearings in 10 Days or Less*