



# INDUSTRIAL BEARINGS

**Ball Bearings**

**V-Groove**

**DW Series**

**Rod Ends**

**Commercial Spherical Plain**



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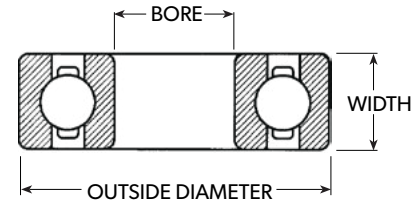
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# R Series

## Extra Light Inch

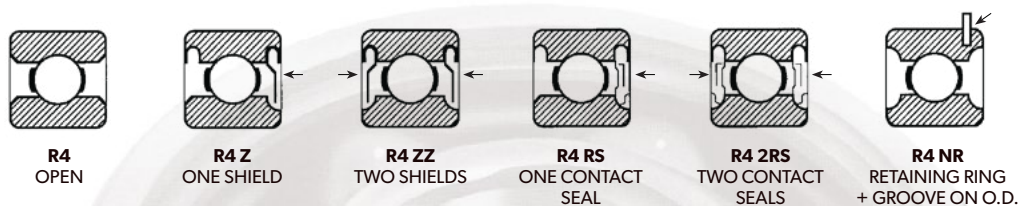


Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE			OUTSIDE DIAMETER			WIDTH		MAX FILLET RADIUS	BALLS		STATIC LOAD-LBS	DYNAMIC LOAD-LBS
	FRAC.	INCH	TOL.	FRAC.	INCH	TOL.	TOL. +.0000 -.0050			NO.	DIAM.		
							OPEN	SEAL/ SHIELD					
R 2	1/8	.1250	-.0003	3/8	.3750	0004	.1562	.1562	.012	7	1/16	49	113
R 3	3/16	.1875	-.0003	1/2	.5000	-.0004	.1562	.1960	.012	7	3/32	70	145
R 4	1/4	.2500	-.0003	5/8	.6250	-.0004	.1960	.1960	.012	7	1/8	195	385
R 4A	1/4	.2500	-.0003	3/4	.7500	-.0004	.2188	.2812	.016	6	9/54	150	320
R 6	3/8	.3750	-.0003	7/8	.8750	-.0004	.2188	.2812	.016	7	5/32	305	570
R 8	1/2	.5000	-.0003	1 1/8	1.1250	-.0004	.2500	.3125	.016	8	3/16	500	885
R 10	5/8	.6250	-.0003	1 3/8	1.3750	-.0005	.2812	.3438	.031	9	3/16	565	970
R 12	3/4	.7500	-.0004	1 5/8	1.6250	-.0005	.3125	.4375	.031	10	7/32	850	1265
R 14	7/8	.8750	-.0004	1 7/8	1.8750	-.0005	.3750	.5000	.031	10	1/4	1110	1735
R 16	1	1.0000	-.0004	2	2.0000	-.0005	.3750	.5000	.031	10	1/4	1110	1735
R 18	1 1/8	1.1250	-.0004	2 1/8	2.1250	-.0005	.3750	.5000	.031	11	1/4	1225	1840
R 20	1 1/4	1.2500	-.0005	2 1/4	2.2500	-.0005	.3750	.5000	.031	12	1/4	1335	1920

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request

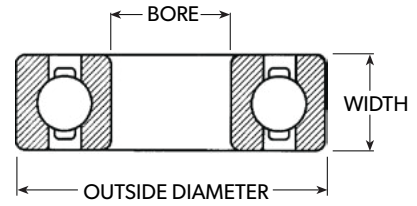


# 600 Series

## Extra Small

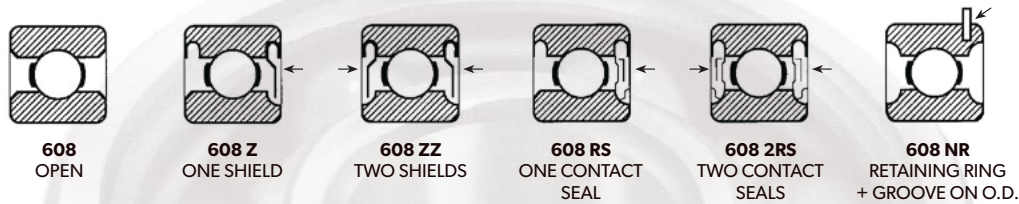


Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE			OUTSIDE DIAMETER			WIDTH		MAX FILLET RADIUS	BALLS		STATIC LOAD-LBS	DYNAMIC LOAD-LBS
	MM	INCH	TOL.	MM	INCH	TOL.	TOL. +.0000 -.0050			NO.	DIAM.		
							MM	INCH					
634	4	.1575	-.0003	16	.6299	-.0004	5	.1969	.012	6	1/8	165	330
635	5	.1969	-.0003	19	.7480	-.0004	6	.2362	.012	7	1/8	195	385
626	6	.2362	-.0003	19	.7480	-.0004	6	.2362	.012	7	1/8	195	385
627	7	.2756	-.0003	22	.8661	-.0004	7	.2756	.012	7	5/32	305	570
608	8	.3150	-.0003	22	.8661	-.0004	7	.2756	.012	7	5/32	305	570
608 N2	7.932	.3123	-.0003	22	.8661	-.0004	7	.2756	.012	7	5/32	305	570
608 N3	7.940	.3126	-.0003	22	.8661	-.0004	7	.2756	.012	7	5/32	305	570
629	9	.3543	-.0003	26	1.0236	-.0004	8	.3150	.025	7	3/16	440	780

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request

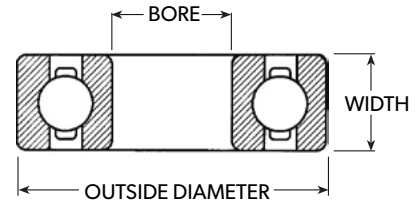


# 6000 Series

## Extra Light

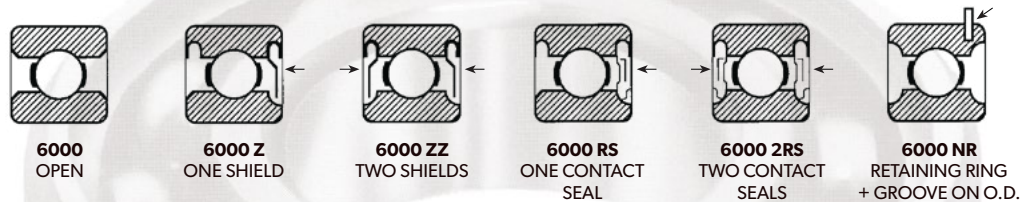


Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE			OUTSIDE DIAMETER			WIDTH		MAX FILLET RADIUS	BALLS		STATIC LOAD-LBS	DYNAMIC LOAD-LBS
	MM	INCH	TOL.	MM	INCH	TOL.	TOL. +.0000 -.0050			NO.	DIAM.		
							MM	INCH					
6000	10	.3937	-.0003	26	1.0236	-.0004	8	.3150	.012	7	3/16	440	790
6001	12	.4724	-.0003	28	1.1024	-.0004	8	.3150	.012	7	3/16	500	805
6002	15	.5906	-.0003	32	1.2598	-.0005	9	.3543	.012	9	3/16	565	965
6003	17	.6693	-.0003	35	1.3780	-.0005	10	.3937	.012	10	3/16	625	1040
6004	20	.7874	-.0004	42	1.6535	-.0005	12	.4724	.024	8	1/4	1000	1500
6005	25	.9843	-.0004	47	1.8504	-.0005	12	.4724	.024	10	1/4	1115	1730
6006	30	1.1811	-.0004	55	2.1654	-.0005	13	.5118	.039	11	9/32	1550	2280
6007	35	1.3780	-.0005	62	2.4409	-.0005	14	.5512	.039	11	5/16	1905	2760
6008	40	1.5748	-.0005	68	2.6772	-.0005	15	.5906	.039	13	5/16	2085	3050
6009	45	1.7717	-.0005	75	2.9528	-.0005	16	.6299	.039	13	11/32	2735	3620
6010	50	1.9685	-.0005	80	3.1496	-.0005	16	.6299	.039	14	11/32	2945	3760
6011	55	2.1654	-.0006	90	2.5433	-.0006	18	.7087	.039	13	13/32	3820	4870
6012	60	2.3622	-.0006	95	3.7402	-.0006	18	.7087	.039	14	13/32	4115	5070
6013	65	2.5591	-.0006	100	3.9370	-.0006	18	.7087	.039	15	12/32	4405	5260
6014	70	2.7559	-.0006	110	4.3307	-.0006	20	.7874	.039	14	15/32	5475	6560

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request



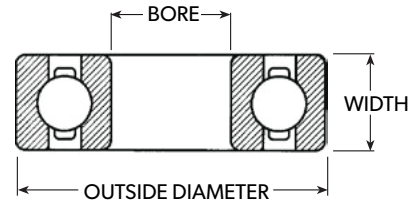
6000 Series

# 6200 Series

Light

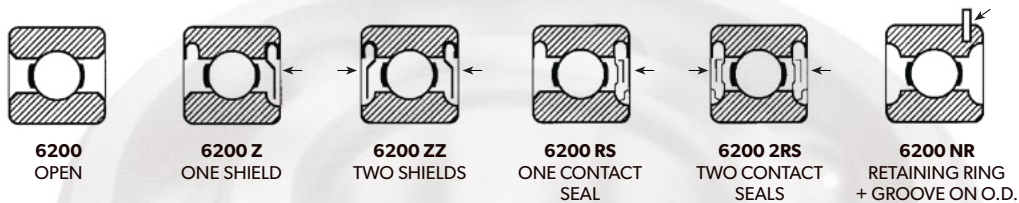


Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE			OUTSIDE DIAMETER			WIDTH		MAX FILLET RADIUS	BALLS		STATIC LOAD-LBS	DYNAMIC LOAD-LBS
	MM	INCH	TOL.	MM	INCH	TOL.	TOL. +.0000 -.0050			NO.	DIAM.		
							MM	INCH					
6200	10	.3937	-.0003	30	1.1811	-.0004	9	.3543	.025	8	3/16	500	885
6201	12	.4724	-.0003	32	1.2598	-.0005	10	.3937	.025	7	7/32	595	1055
6202	15	.5906	-.0003	35	1.3780	-.0005	11	.4331	.025	8	7/32	675	1180
6203	17	.6693	-.0003	40	1.5748	-.0005	12	.4724	.025	8	1/4	890	1500
6204	20	.7874	-.0004	47	1.8504	-.0005	14	.5512	.040	8	5/16	1390	2220
6205	25	.9843	-.0004	52	2.0472	-.0005	15	.5906	.040	9	5/16	1565	2415
6206	30	1.1811	-.0004	62	2.4409	-.0005	16	.6299	.040	9	3/8	2255	3360
6207	35	1.3780	-.0005	72	2.8346	-.0005	17	.6693	.040	9	7/16	3070	4430
6208	40	1.5748	-.0005	80	3.1496	-.0005	18	.7087	.040	9	15/32	3520	5035
6209	45	1.7717	-.0005	85	3.3465	-.0005	19	.7480	.040	9	1/2	4005	5655
6210	50	1.9685	-.0005	90	3.5433	-.0006	20	.7874	.040	10	1/2	4450	6065
6211	55	2.1654	-.0006	100	3.9370	-.0006	21	.8268	.060	10	9/16	5630	7500
6212	60	2.3622	-.0006	110	4.3307	-.0006	22	.8661	.060	10	5/8	6955	9065
6213	65	2.5591	-.0006	120	4.7244	-.0006	23	.9055	.060	10	21/32	7665	9900
6214	70	2.7559	-.0006	125	4.9213	-.0008	24	.9449	.060	10	11/16	8415	10715

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request



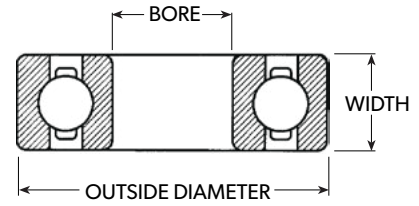
6200 Series

# 6300 Series

## Medium

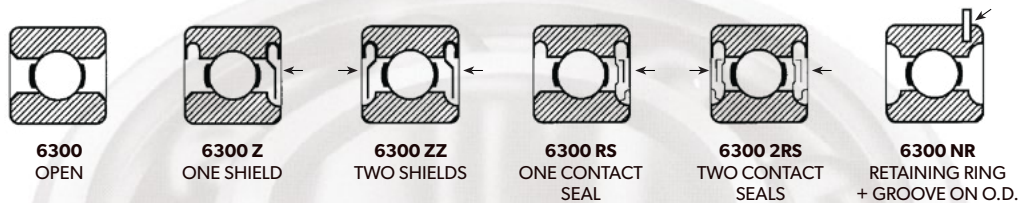


Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE			OUTSIDE DIAMETER			WIDTH		MAX FILLET RADIUS	BALLS		STATIC LOAD-LBS	DYNAMIC LOAD-LBS
	MM	INCH	TOL.	MM	INCH	TOL.	TOL. +.0000 -.0050			NO.	DIAM.		
							MM	INCH					
6300	10	.3937	-.0003	35	1.3780	-.0005	11	.4331	.025	6	9/32	845	1430
6301	12	.4724	-.0003	37	1.4567	-.0005	12	.4724	.040	6	5/16	1045	1655
6302	15	.5906	-.0003	42	1.6535	-.0005	13	.5118	.040	7	5/16	1215	1975
6303	17	.6693	-.0003	47	1.8504	-.0005	14	.5512	.040	7	11/32	1470	2335
6304	20	.7874	-.0004	52	2.0472	-.0005	15	.5906	.040	7	3/8	1750	2730
6305	25	.9843	-.0004	62	2.4409	-.0005	17	.6693	.040	7	7/16	2385	3690
6306	30	1.1811	-.0004	72	2.8346	-.0005	19	.7480	.040	8	15/32	3130	4605
6307	35	1.3780	-.0005	80	3.1496	-.0005	21	.8268	.060	8	17/32	4020	5775
6308	40	1.5748	-.0005	90	3.5433	-.0006	23	.9055	.060	8	19/32	5020	7060
6309	45	1.7717	-.0005	100	3.9370	-.0006	25	.9843	.060	8	11/16	7000	9120
6310	50	1.9685	-.0005	110	4.3307	-.0006	27	1.0630	.080	8	3/4	8010	10750
6311	55	2.1654	-.0006	120	4.7244	-.0006	29	1.1417	.080	8	13/16	9400	12410
6312	60	2.3622	-.0006	130	5.1181	-.0008	31	1.2205	.080	8	7/8	10900	14180
6313	65	2.5591	-.0006	140	5.5118	-.0008	33	1.2292	.080	8	15/16	12515	16050
6314	70	2.7559	-.0006	150	5.9055	-.0008	35	1.3780	.080	8	1	14240	18025

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request



6300  
OPEN

6300 Z  
ONE SHIELD

6300 ZZ  
TWO SHIELDS

6300 RS  
ONE CONTACT SEAL

6300 2RS  
TWO CONTACT SEALS

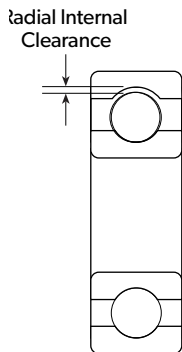
6300 NR  
RETAINING RING  
+ GROOVE ON O.D.

National Precision	S.K.F.	Koyo	Nachi	B.C.A.	Fafnir Torrington	Federal	HOOVER	NTN	M.R.C.	Norma Hoffman	New Departure	FAG	NSK	STEYR	ISO Series
6000	6000	6000	6000	100	9100 K	9100	100	6000	100 KS	6100	3 L00	6000	6000	6000	6000
6000 Z	6000 Z	6000 Z	6000 Z	100 S	9100 KD	9100 F	7100	6000 Z	100 KSF	6100 P	73 L00	6000 Z	6000 Z	6000 Z	6000 Z
6000 ZZ	6000-ZZ	6000-ZZ	6000-2Z	100 SS	9100 KDD	9100 FF	77100	6000 ZZ	100 KSFF	6100 PP	773 L00	6000 ZZ	6000 ZZ	6000-2Z	6000 ZZ
6000 RS	6000 RS	6000 RS	6000 NSL	100 D	9100 P	9100 R	9100	6000 L	100 KSZ	100 N	93 L00	6000 RS	6000 V	6000 G	6000 RS
6000-2RS	6000-2RS	6000-2RS	6000-2NSL	100 DD	9100 PP	9100 RR	99100	6000 LL	100 KSZZ	100 NN	993 L00	6000-2RS	6000 VV	6000-2G	6000-2RS
6000 NR	6000 NR	6000 NR	6000 NR	100 L	9100 KG	9100 CG	100 G	6000 NR	100 KSG	4100	43 L00	6000 N & Snap-Ring	6000 NR	6000 NR	6000 NR
6000 ZNR	6000 ZNR	6000 ZNR	6000 ZNR	100 SL	9100 KDG	9100 GF	7100 G	6000 ZNR	100 KSFG	4100 P	473 L00	6000 ZN & Snap-Ring	6000 ZNR	6000 ZNR	6000 ZNR
6200	6200	6200	6200	200	200 K	1200	200	6200	200 S	200	3200	6200	6200	6200	6200
6200 Z	6200 Z	6200 Z	6200 Z	200 S	200 KD	1200 F	7200	6200 Z	200 SF	200 P	7500	6200 Z	6200 Z	6200 Z	6200 Z
6200 ZZ	6200-ZZ	6200-ZZ	6200-2Z	200 SS	200 KDD	1200 FF	77200	6200-ZZ	200 SFF	200 PP	77500	6200 ZZ	6200-ZZ	6200-2Z	6200 ZZ
6200 RS	6200 RS	6200 RS	6200 NSL	200 D	200 P	1200 R	9200	6200 L	200 SZ	200 N	9500	6200 RS	6200 V	6200 G	6200 RS
6200-2RS	6200-2RS	6200-2RS	6200-2NSL	200 DD	200 PP	1200 RR	99200	6200 LL	200 SZZ	200 NN	99500	6200-2RS	6200 VV	6200-2G	6200-2RS
6200 NR	6200 NR	6200 NR	6200 NR	200 L	200 KG	1200 CG	200 G	6200 NR	200 SG	4200	43200	6200 N & Snap-Ring	6200 NR	6200 NR	6200 NR
6200 ZNR	6200 ZNR	6200 ZNR	6200 ZNR	200 LS	200 KDG	1200 GF	7200 G	6200 ZNR	200 SFG	4200 P	47500	6200 ZN & Snap-Ring	6200 ZNR	6200 ZNR	6200 ZNR
6300	6300	6300	6300	300	300 K	1300	300	6300	300 S	300	3300	6300	6300	6300	6300
6300Z	6300 Z	6300 Z	6300 Z	300 S	300 KD	1300 F	7300	6300 Z	300 SF	300 P	7600	6300 Z	6300 Z	6300 Z	6300 Z
6300 ZZ	6300-ZZ	6300-ZZ	6300-2Z	300 SS	300 KDD	1300 FF	77300	6300-ZZ	300 SFF	300 PP	77600	6300 ZZ	6300-ZZ	6300-2Z	6300 ZZ
6300 RS	6300 RS	6300 RS	6300 NSL	300 D	300 P	1300 R	9300	6300 L	300 SZ	300 N	9600	6300 RS	6300 V	6300 G	6300 RS
6300-2RS	6300-2RS	6300-2RS	6300-2NSL	300 DD	300 PP	1300 RR	99300	6300 LL	300 SZZ	300 NN	99600	6300-2RS	6300 VV	6300-2G	6300-2RS
6300 NR	6300 NR	6300 NR	6300 NR	300 L	300 KG	1300 CG	300 G	6300 NR	300 SG	4300	43300	6300 N & Snap-Ring	6300 NR	6300 NR	6300 NR
6300 ZNR	6300 ZNR	6300 ZNR	6300 ZNR	300 SL	300 KDG	1300 GF	7300 G	6300 ZNR	300 SFG	4300 P	47600	6300 ZN & Snap-Ring	6300 ZNR	6300 ZNR	6300 ZNR

Interchange / Internal Clearance

### Radial Internal Clearance Options Single Row Deep Groove Ball Bearings

- C/1 - Internal Clearance is smaller than C/2.
- C/2 - Internal Clearance is smaller than STANDARD.
- STANDARD - No clearance marking is indicated on the bearing or packaging.
- C/3 - Internal Clearance larger than STANDARD.
- C/4 - Internal Clearance larger than C/3.
- C/5 - Internal Clearance larger than C/4.



BORE DIAMETER d (METRIC)		RADIAL INTERNAL CLEARANCE (INCH)									
Over	Incl.	C/2		STANDARD		C/3		C/4		C/5	
		min	max	min	max	min	max	min	max	min	max
2.5	6	.0000	.0003	.0001	.0005	.0003	.0009	.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



Numerous special applications require non-standard bearings. A few of the more popular sizes are listed to the right. A wide variety of additional Specials are available upon request.

PART NUMBER	DESCRIPTION
6201 ZZ-1/2	6201 ZZ with a .500 bore
6201-2RS-1/2	6201-2RS with a .500 bore
6201 ZZ-13	6201 ZZ with a 13mm bore
6202-2RS-13	6202-2RS with a 13mm bore
6202 ZZ-5/8	6202 ZZ with a .625 bore
6202 ZZ-16	6202 ZZ with a 16mm bore
99502H	6202-2RS with a .625 bore and a 1.375 O.D.
499502H	6202-2RS with a .625 bore, 1.375 O.D. and a Snap Ring on the O.D
6203 ZZ-5/8	6203 ZZ with a .625 bore
6203-2RS-5/8	6203-2RS with a .625 bore

Applications that require such things as high temperature seals, non-metallic retainers, etc. can be supplied.

*Consult National Precision for engineering assistance at 1-800-426-8038.*

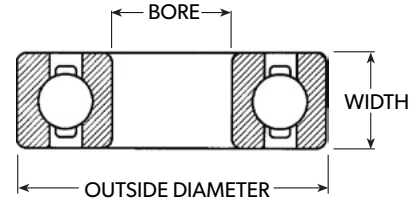


# 1600 Series

## Commercial Inch



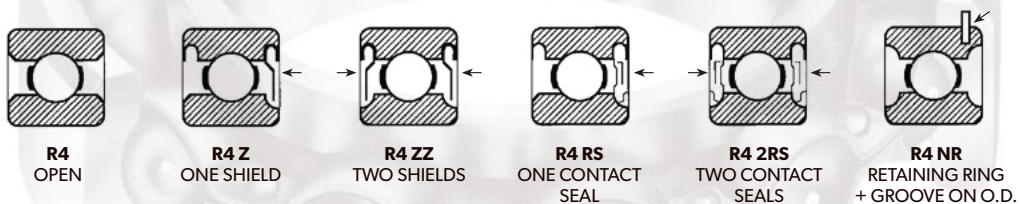
Reliable.  
Responsive.  
Relentless.



BASIC PART NUMBER	BORE		OUTSIDE DIAMETER		WIDTH		RADIUS INCHES	LOAD RATING		BEARING WEIGHT (lbs.)
	FRAC.	INCHES	TOL. +.0000 -.0050		TOL. +.0000 -.0050			DYNAMIC LOAD-LBS	STATIC LOAD-LBS	
			FRAC.	INCHES	FRAC.	INCHES				
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

MATERIAL - Standard SAE 52100  
Stainless Steel available upon request

\* WIDTH RS & 2RS = 5/16  
\*\*WIDTH RS & 2RS = 11/32



1600 Series

# 1600 Series Interchange



Reliable.  
Responsive.  
Relentless.



NATIONAL PRECISION	GENERAL	RBC	SCHATZ
1601 1601 ZZ 1601 2RS	21103-00 21103-77 21103-78	1601NS 1601DS 1601DC	BR 01 BR 7701 BR 9901A
1602 1602 ZZ 1602 2RS	21104-00 21104-77 21104-88	1602NS 1602DS 1602DC	BR 02 BR 7702 BR 9902A
1603 1603 ZZ 1603 2RS	21405-00 21405-77 21405-88	1603NS 1603DS 1603DC	BR 03 BR 7703 BR 9903A
1604 1604 ZZ 1604 2RS	21406-00 21406-77 21406-88	1604NS 1604DS 1604DC	BR 04 BR 7704 BR 9904A
1605 1605 ZZ 1605 2RS	21505-00 21505-77 21505-88	1605NS 1605DS 1605DC	BR 05 BR 7705 BR 9905A
1606 1606 ZZ 1606 2RS	21506-00 21506-77 21506-88	1606NS 1606DS 1606DC	BR 06 BR 7706 BR 9906A
1607 1607 ZZ 1607 2RS	21507-00 21507-77 21507-88	1607NS 1607DS 1607DC	BR 07 BR 7707 BR 9907A
1614 1614 ZZ 1614 2RS	21806-00 21806-77 21806-88	1614NS 1614DS 1614DC	BR 14 BR 7714 BR 9914A
1615 1615 ZZ 1615 2RS	21807-00 21807-77 21807-88	1615NS 1615DS 1615DC	BR 15 BR 7715 BR 9915A
1616 1616 ZZ 1616 2RS	21808-00 21808-77 21808-88	1616NS 1616DS 1616DC	BR 16 BR 7716 BR 9916A
1620 1620 ZZ 1620 2RS	22207-00 22207-77 22207-88	1620NS 1620DS 1620DC	BR 20 BR 7720 BR 9920A
1621 1621 ZZ 1621 2RS	22208-00 22208-77 22208-88	1621NS 1621DS 1621DC	BR 21 BR 7721 BR 9921A
1622 1622 ZZ 1622 2RS	22209-00 22209-77 22209-88	1622NS 1622DS 1622DC	BR 22 BR 7722 BR 9922A

NATIONAL PRECISION	GENERAL	RBC	SCHATZ
1623 1623 ZZ 1623 2RS	22210-00 22210-77 22210-88	1623NS 1623DS 1623DC	BR 23 BR 7723 BR 9923A
1628 1628 ZZ 1628 2RS	22610-00 22610-77 22610-88	1628NS 1628DS 1628DC	BR 28 BR 7728 BR 9928A
1630 1630 ZZ 1630 2RS	22612-00 22612-77 22612-88	1630NS 1630DS 1630DC	BR 30 BR 7730 BR 9930A
1633 1633 ZZ 1633 2RS	22810-00 22810-77 22810-88	1633NS 1633DS 1633DC	BR 33 BR 7733 BR 9933A
1635 1635 ZZ 1635 2RS	22812-00 22812-77 22812-88	1635NS 1635DS 1635DC	BR 35 BR 7735 BR 9935A
1638 1638 ZZ 1638 2RS	23212-00 23212-77 23212-88	1638NS 1638DS 1638DC	BR 38 BR 7738 BR 9938A
1640 1640 ZZ 1640 2RS	23214-00 23214-77 23214-88	1640NS 1640DS 1640DC	BR 40 BR 7740 BR 9940A
1641 1641 ZZ 1641 2RS	23216-00 23216-77 23216-88	1641NS 1641DS 1641DC	BR 41 BR 7741 BR 9941A
1652 1652 ZZ 1652 2RS	24018-00 24018-77 24018-88	1652NS 1652DS 1652DC	BR 52 BR 7752 BR 9952A
1654 1654 ZZ 1654 2RS	24020-00 24020-77 24020-88	1654NS 1654DS 1654DC	BR 54 BR 7754 BR 9954A
1657 1657 ZZ 1657 2RS	24120-00 24120-77 24120-88	1657NS 1657DS 1657DC	BR 57 BR 7757 BR 9957A
1658 1658 ZZ 1658 2RS	24121-00 24121-77 24121-88	1658NS 1658DS 1658DC	BR 58 BR 7758 BR 9958A

Interchange

# Industrial Airframe Type

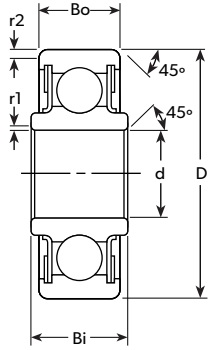
## Ball Bearings

(Not intended for aircraft applications)



Reliable.  
Responsive.  
Relentless.

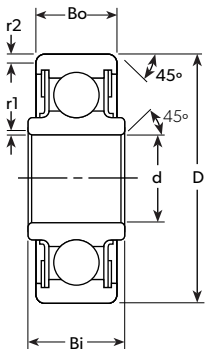
### KP Series Single Row Radial Type



Equipped with Teflon® seals

PART NUMBER	BORE d +.0000 -.0005	O.D. D +.0000 -.0005	WIDTH		MINIMUM CHAMFER		BALLS		THRUST LOAD LBS.	STATIC RADIAL LOAD LBS.
			Bi +.000 -.005	Bo +.000 -.005	r1 +.015 -.000	r2 +.015 -.000	NO.	DIAM.		
KP 3L	.1900	.6250	.245	.203	.005	.010	10	1/8	700	1560
KP 3	.1900	.7774	.297	.270	.005	.022	12	1/8	900	1880
KP 4	.2500	.9014	.484	.335	.005	.032	11	5/32	1200	2680
KP 5	.3125	1.2500	.558	.375	.015	.032	9	1/4	2500	5620
KP 6	.3750	1.4375	.620	.469	.015	.032	10	9/32	3500	7910
KP 8	.5000	1.6875	.620	.500	.015	.044	10	3/8	5200	11800
KP 10	.6250	1.9375	.620	.500	.015	.044	10	3/8	6200	14100

### KPA Series Single Row Radial Type



Equipped with Teflon® seals

PART NUMBER	BORE d +.0000 -.0005	O.D. D +.0000 -.0005	WIDTH		MINIMUM CHAMFER		BALLS		THRUST LOAD LBS.	STATIC RADIAL LOAD LBS.
			Bi +.000 -.005	Bo +.000 -.005	r1 +.015 -.000	r2 +.015 -.000	NO.	DIAM.		
KP 3AL	.1900	.5000	.237	.196	.005	.012	11	3/32	430	970
KP 3A	.1900	.6250	.297	.234	.005	.016	10	1/8	700	1560
KP 4A	.2500	.7500	.281	.219	.005	.016	12	1/8	900	1880
KP 5A	.3125	.8125	.297	.234	.015	.016	14	1/8	1000	2190
KP 6A	.3750	.8750	.313	.250	.015	.016	16	1/8	1100	2500
KP 8A	.5000	1.1250	.375	.313	.015	.016	16	5/32	1700	3910
KP 10A	.6250	1.3750	.406	.344	.015	.032	14	7/32	3000	6700

# Industrial Airframe Type

## Ball Bearings

(Not intended for aircraft applications)



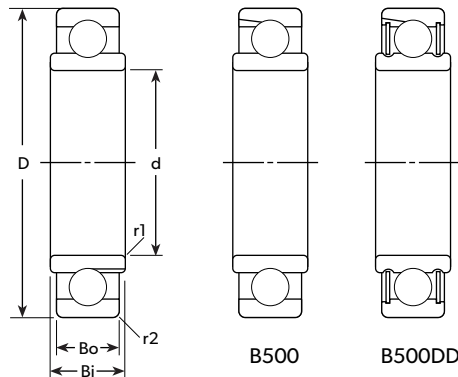
Reliable.  
Responsive.  
Relentless.

### B500 Series

Single Row  
Torque Tube Type

BEARING NUMBER	BORE	O.D.	WIDTH		MINIMUM CHAMFER		BALLS		THRUST LOAD LBS.	STATIC RADIAL LOAD LBS.			
			TYPE	d +.0007 -.0007	D +.0000 -.0010	Bi +.000 -.005	Bo +.000 -.005	r1			r2	NO.	DIAM.
B538	B538DD	.6250	1.0625	.281	.250	.015	.015	21	1/8	1500	3280		
B539	B539DD	.7500	1.1875	.281	.250	.015	.015	24	1/8	1700	3750		
B540	B540DD	.8750	1.3125	.281	.250	.015	.015	27	1/8	1900	4220		
B541	B541DD	1.0625	1.5000	.281	.250	.015	.015	32	1/8	2200	5000		
B542	B542DD	1.3125	1.7500	.281	.250	.015	.015	38	1/8	2700	5950		
B543	B543DD	1.5625	2.0000	.281	.250	.015	.015	44	1/8	3200	6880		

DD = Equipped with Teflon® coated fabric seal

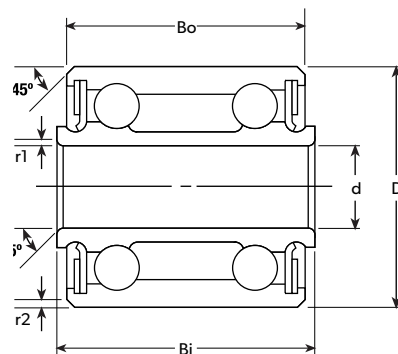


### DW Series

Double Row  
Extra Wide Type

BEARING NUMBER	BORE	O.D.	WIDTH		MINIMUM CHAMFER		BALLS		THRUST LOAD LBS.	STATIC RADIAL LOAD LBS.
			Bi +.000 -.005	Bo +.000 -.005	r1 +.015 -.000	r2 +.015 -.000	NO.	DIAM.		
DW4K <sup>(1)</sup>	.2500	.6250	.562	.500	.005	.016	16	3/32	500	1400
DW4K <sup>(1)</sup>	.2500	.7500	.875	.750	.005	.016	14	9/64	900	2770
DW4	.2500	.7500	.875	.750	.005	.016	24	1/8	1240	3750
DW5	.3125	.8750	.938	.813	.005	.016	26	9/64	1600	5140
DW6	.3750	1.0625	1.188	1.063	.005	.016	24	3/16	2600	8440

<sup>(1)</sup> Retainer type



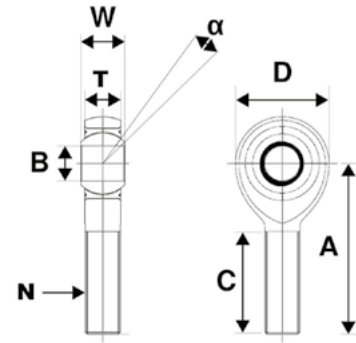
Equipped with Teflon® seals

# Commercial Rod Ends

## Male External Thread - Inch



Reliable.  
Responsive.  
Relentless.



NATIONAL PRECISION PART NUMBER	STANDARD REFERENCE NUMBER	BORE DIA. B	O.D. D	BALL WIDTH W	BODY WIDTH T	BALL DIA.	LENGTH TO BALL CTR. A	SHAFT LENGTH C	THREAD SIZE	RADIAL LOADS (lbs)		MIS-ALIGNMENT $\alpha$	WEIGHT (LBS)
										METAL TO METAL	PTFE LINED		
CM3 <sup>(1)</sup>	CM3	0.1900	0.625	0.312	0.234	0.437	1.250	0.750	10-32	1210	902	20	0.03
CM4 <sup>(1)</sup>	CM4	0.2500	0.750	0.375	0.250	0.500	1.562	1.000	1/4-28	2225	1809	27	0.04
CM5 <sup>(1)</sup>	CM5	0.3125	0.875	0.437	0.312	0.625	1.875	1.250	5/16-24	3600	2984	22	0.07
CM6	CM6	0.3750	1.000	0.500	0.359	0.719	1.938	1.250	3/8-24	5100	4244	22	0.11
CM7	CM7	0.4375	1.125	0.562	0.406	0.812	2.125	1.375	7/16-20	6402	5312	21	0.15
CM8	CM8	0.5000	1.312	0.625	0.453	0.937	2.438	1.500	1/2-20	5386	7211	20	0.24
CM10	CM10	0.6250	1.500	0.750	0.484	1.125	2.625	1.625	5/8-18	9813	8403	26	0.36
CM12	CM12	0.7500	1.750	0.875	0.593	1.312	2.875	1.750	3/4-16	14290	12321	24	0.57

**NOTES:**

FOR LEFT-HAND THREAD ADD "L" TO SUFFIX - EXAMPLE: CM10L

FOR PTFE LINER ADD "T" TO SUFFIX - EXAMPLE: CM10T

FOR GREASE FITTING ADD "Z" TO SUFFIX - EXAMPLE: CM10Z <sup>(1)</sup> GREASE FITTINGS ARE NOT SUPPLIED ON THESE SIZES

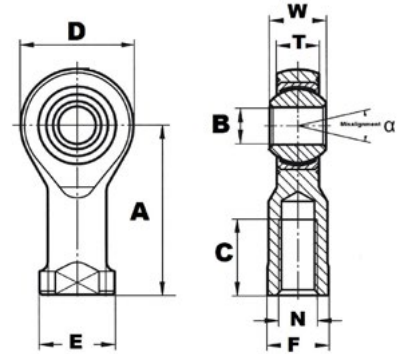
Rod Ends - Male External Thread

# Commercial Rod Ends

## Female Internal Thread - Inch



Reliable.  
Responsive.  
Relentless.



NATIONAL PRECISION PART NUMBER	STANDARD REFERENCE NUMBER	BORE DIA. B	O.D. D	BALL WIDTH W	BODY WIDTH T	BALL DIA.	LENGTH TO BALL CTR. A	SHAFT LENGTH C	THREAD SIZE	SHAFT DIA. E	SHAFT FLAT WIDTH F	RADIAL LOADS (lbs)		MIS-ALIGNMENT $\alpha$	WEIGHT (LBS)
												METAL TO METAL	PTFE LINED		
CF3 <sup>(1)</sup>	CF3	0.1900	0.625	0.312	0.234	0.437	1.062	0.500	10-32	0.406	0.312	2100	1637	20	0.04
CF4-3 <sup>(2)</sup>	CF4-3	0.2500	0.750	0.375	0.250	0.500	1.312	0.687	10-32	0.468	0.375	3250	2612	27	0.05
CF4	CF4	0.2500	0.750	0.375	0.250	0.500	1.312	0.687	1/4-28	0.468	0.375	3250	2612	27	0.05
CF5	CF5	0.3125	0.875	0.437	0.312	0.625	1.375	0.687	5/16-24	0.500	0.437	3934	3110	22	0.08
CF6	CF6	0.3750	1.000	0.500	0.359	0.719	1.625	0.812	3/8-24	0.687	0.562	5100	4206	22	0.13
CF7	CF7	0.4375	1.125	0.562	0.406	0.812	1.812	0.937	7/16-20	0.750	0.625	6420	5384	21	0.18
CF8	CF8	0.5000	1.312	0.625	0.453	0.937	2.125	1.062	1/2-20	0.875	0.750	9100	7826	20	0.29
CF10	CF10	0.6250	1.500	0.750	0.484	1.125	2.500	1.375	5/8-18	1.000	0.875	9800	8343	26	0.43
CF12	CF12	0.7500	1.750	0.875	0.593	1.312	2.875	1.562	3/4-16	1.125	1.000	14250	12342	24	0.65

NOTES:  
 FOR LEFT-HAND THREAD ADD "L" TO SUFFIX - EXAMPLE: CF10L <sup>(2)</sup> LEFT-HAND THREAD NOT SUPPLIED ON THESE SIZES  
 FOR PTFE LINER ADD "T" TO SUFFIX - EXAMPLE: CF10T  
 FOR GREASE FITTING ADD "Z" TO SUFFIX - EXAMPLE: CF10Z <sup>(1)</sup> GREASE FITTINGS ARE NOT SUPPLIED ON THESE SIZES

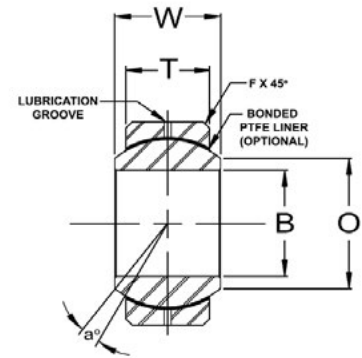
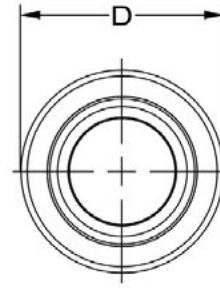
Rod Ends - Female Internal Thread

# Commercial Spherical Plain

## COM/COMT/SSCOM/COMH - Inch



Reliable.  
Responsive.  
Relentless.



NATIONAL PRECISION PART NUMBER	STANDARD REFERENCE NUMBER	PART NUMBER OPTIONS		BORE DIA. B	O.D. D	BALL WIDTH W	BODY WIDTH T	DIA. O	BALL DIA. REF.	CHAMFER F	STATIC RADIAL LOADS (lbs)	MIS-ALIGNMENT α	WEIGHT (LBS)
		STAINLESS STEEL PREFIX	PTFE LINER SUFFIX										
COM3	COM3	SS	T	0.1900	0.5625	0.281	0.218	0.293	0.406	0.015	3250	11	0.014
COM4	COM4	SS	T	0.2500	0.6562	0.343	0.250	0.364	0.500	0.022	4950	13.5	0.022
COM5	COM5	SS	T	0.3125	0.7500	0.375	0.281	0.419	0.562	0.032	6475	12	0.030
COM6	COM6	SS	T	0.3750	0.8125	0.406	0.312	0.516	0.656	0.032	8400	10	0.038
COM7	COM7	SS	T	0.4375	0.9062	0.437	0.343	0.530	0.687	0.032	9453	8	0.047
COM8	COM8	SS	T	0.5000	1.0000	0.500	0.390	0.600	0.781	0.032	13250	9.5	0.065
COM8-101	COM8-101	SS	T	0.5000	1.0000	1.000	0.390	0.600	0.781	0.032	13250	9.5	0.065
COM8-103	COM8-103	SS	T	0.5000	1.0000	1.500	0.390	0.600	0.781	0.032	13250	9.5	0.065
COM9	COM9	SS	T	0.5625	1.0937	0.562	0.437	0.671	0.875	0.032	16630	9.5	0.086
COM10	COM10	SS	T	0.6250	1.1875	0.625	0.500	0.739	0.968	0.032	21280	8.5	0.110
COM12	COM12	SS	T	0.7500	1.4375	0.750	0.593	0.920	1.187	0.044	31920	9	0.204
COM12T-3R**	COM12T-3R**	-	-	0.7500	1.4375	0.750	0.593	0.920	1.187	0.044	31920	9	0.204
COM14	COM14	SS	T	0.8750	1.5625	0.875	0.703	0.980	1.312	0.044	41960	9.5	0.263
COM16	COM16	SS	T	1.0000	1.7500	1.000	0.797	1.118	1.500	0.044	55200	10	0.386
COMH16***	COMH16***	SS	T	1.0000	2.0000	1.000	0.781	1.360	1.687	0.032	70820	9	0.553
COMH19***	COMH19***	SS	T	1.1875	2.3750	1.187	0.937	1.610	2.000	0.032	100730	8.5	0.895
COMH20***	COMH20***	SS	T	1.2500	2.3750	1.187	0.937	1.610	2.000	0.032	100730	8.5	0.895
COMH24***	COMH24***	SS	T	1.5000	2.7500	1.375	1.094	1.860	2.312	0.032	135950	8.5	1.358
COMH28***	COMH28***	SS	T	1.7500	3.1250	1.562	1.250	2.110	2.625	0.044	176370	8	1.948
COMH32***	COMH32***	SS	T	2.0000	3.5000	1.750	1.375	2.360	2.937	0.044	217060	8.5	2.650

\*\* BEARING COMES STANDARD WITH SNAP RING AND PTFE LINER

\*\*\* BORE TOLERANCE: +.0025 / -.0005

NOTES:  
LUBRICATION GROOVES IN I.D. & O.D. OF RACE

FOR STAINLESS STEEL, ADD "SS" TO PREFIX - EXAMPLE: SSCOM10

FOR PTFE LINER, ADD "T" TO SUFFIX - EXAMPLE: COM10T  
(UNITS WITH PTFE LINERS HAVE NO LUBRICATION HOLES OR GROOVES IN RACE)

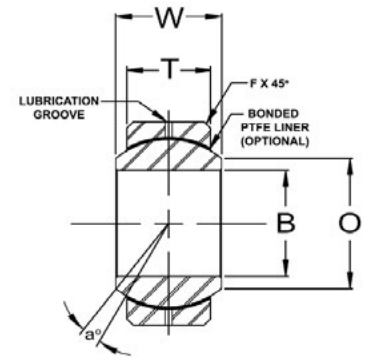
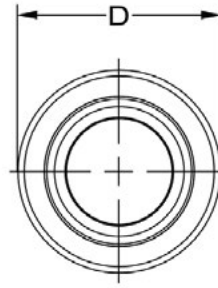
Spherical Plain - COM/COMT/SSCOM/COMH

# Commercial Spherical Plain

## COM-M/COM-MT/SSCOM-M - Metric



Reliable.  
Responsive.  
Relentless.



NATIONAL PRECISION PART NUMBER	STANDARD REFERENCE NUMBER	PART NUMBER OPTIONS		BORE DIA.		BALL WIDTH W	BODY WIDTH T	DIA. O	BALL DIA. REF.	CHAMFER F REF.	STATIC RADIAL LOADS (NEWTONS)	MIS-ALIGNMENT α	WEIGHT (kg)
		STAINLESS STEEL PREFIX	PTFE LINER SUFFIX	B	D								
				+0.065 -0.013	+0.000 -0.0127	+0.13 -0.13	+0.13 -0.13						
COM5M	COM5M	SS	T	5	13	8	6	7.7	11.10	0.38	15000	13	0.006
COM6M	COM6M	SS	T	6	16	9	6.75	8.9	12.70	0.56	19300	13	0.01
COM8M	COM8M	SS	T	8	19	12	9	10.3	15.88	0.81	32000	14	0.018
COM10M	COM10M	SS	T	10	22	14	10.5	12.9	19.05	0.81	45000	13	0.027
COM12M	COM12M	SS	T	12	26	16	12	15.4	22.23	0.81	60000	13	0.043
COM14M	COM14M	SS	T	14	28	19	13.5	16.8	25.40	0.81	76500	16	0.055
COM16M	COM16M	SS	T	16	32	21	15	19.3	28.58	0.81	96500	15	0.08
COM18M	COM18M	SS	T	18	35	23	16.5	21.8	31.75	0.81	118000	15	0.10
COM20M	COM20M	SS	T	20	40	25	18	24.3	34.93	0.81	140000	14	0.15
COM22M	COM22M	SS	T	22	42	28	20	25.8	38.10	1.1	170000	15	0.18
COM25M	COM25M	SS	T	25	47	31	22	29.5	42.85	1.1	212000	15	0.24
COM30M	COM30M	SS	T	30	55	34.925	25	34.8	47.62	1.1	285000	17	0.38

NOTES:  
LUBRICATION GROOVES IN I.D. & O.D. OF RACE

FOR STAINLESS STEEL, ADD "SS" TO PREFIX - EXAMPLE: SSCOM10M

FOR PTFE LINER, ADD "T" TO SUFFIX - EXAMPLE: COM10MT  
(UNITS WITH PTFE LINERS HAVE NO LUBRICATION HOLES OR GROOVES IN RACE)

Spherical Plain - COM-M/COM-MT/SSCOM-M

# V Groove

## Guide Wheel Bearings

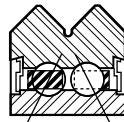


Reliable.  
Responsive.  
Relentless.

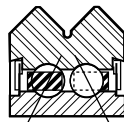
NATIONAL PRECISION PART NUMBER	INDUSTRY PART NUMBER	BORE +.0000 -.0003	O.D. ±.005	WIDTH ±.0000 -.0050	L1 REF.	L2 REF.	R WILL CLEAR RADIUS	GAGE WIRE DIA.	DYNAMIC RADIAL LOAD LBS. Based on average life of 2500 hrs				THRUST LOAD LBS.	STATIC RADIAL LOAD LBS
									33.3 RPM	100 RPM	500 RPM	1000 RPM		
NW1	W1	.1875	.771	.3100	.314	.625	.012	.0937	350	245	145	112	65	245
NW1X	W1X	.1875	.771	.3100	.314	.625	.012	.0937	350	245	145	112	65	245
NW1SSX	W1SSX	.1875	.771	.3100	.314	.625	.012	.0937	310	218	126	100	55	200
NW2	W2	.3750	1.210	.4375	.530	1.000	.012	.1250	734	487	288	227	122	610
NW2X	W2X	.3750	1.210	.4375	.530	1.000	.012	.1250	734	487	288	227	122	610
NW2SSX	W2SSX	.3750	1.210	.4375	.530	1.000	.012	.1250	562	390	230	183	90	455
NW3	W3	.4724	1.803	.6250	.640	1.500	.024	.1875	1338	925	543	435	535	910
NW3X	W3X	.4724	1.803	.6250	.640	1.500	.024	.1875	1338	925	543	435	535	910
NW3SSX	W3SSX	.4724	1.803	.6250	.640	1.500	.024	.1875	1070	745	434	349	428	705
NW4	W4	.5906	2.360	.7500	.878	2.000	.024	.2500	2055	1405	815	650	655	1235
NW4X	W4X	.5906	2.360	.7500	.878	2.000	.024	.2500	2055	1405	815	650	655	1235
NW4SSX	W4SSX	.5906	2.360	.7500	.878	2.000	.024	.2500	1593	1129	648	520	510	955



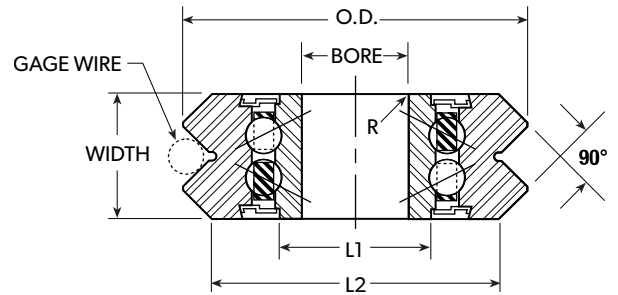
TWO SHIELDS



TWO SEALS



NW1 SAE: 52100 NW1X  
- AISI-440C NW1SSX



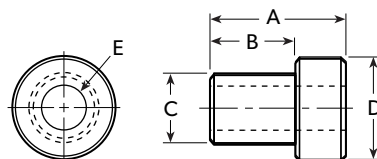
# V Groove

## Guide Wheel Bushings

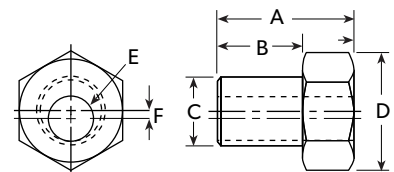
CONCENTRIC		ADJUSTABLE		A	B	C	D	E	NBX SERIES F
NATIONAL PRECISION PART NO.	INDUSTRY PART NO.	NATIONAL PRECISION PART NO.	INDUSTRY PART NO.						
NB1	N1	NBX1	NX1	.550	.300	.1873	7/16	.140	0.012
NB2	N2	NBX2	NX2	.706	.425	.3748	9/16	.250	0.024
NB3	N3	NBX3	NX3	.990	.615	.4722	3/4	.312	0.042
NB4	N4	NBX4	NX4	1.177	.740	.5904	7/8	.375	0.06



NB CONCENTRIC BUSHING



NBX AJUSTABLE BUSHING



V Groove Guide Wheel Bearings



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