

C93200 BEARING BRONZE (SAE 660)

High Leaded Tin Bronze



Typical Uses

Oil & Gas

General Utility Bearings and Bushings, Metal to Metal Wear Applications

Automotive

Automotive Fittings, Couplings, Bushings, Earth Moving Equipment

Fasteners

Washers

Other Industrial

Pump Impellers, Main Spindle Bearings, Machine Tool Bearings, Bearings for Cranes, Trunnion Bearings, Roll Neck Bearings, Rolling Mill Bearings, Linkage Bushings for Presses, Fuel Pump Bushings, Water Pump Bushings, Diesel Engine Wrist Pin Bushings, Forging Press Toggle Lever Bearings, Hydraulic Press Stuffing Box, Hydraulic Press Main Lining, Fittings, Pump Fixtures, Insert Bearings, Machine Parts, Bearings, Thrust Washers, Pumps, Bushings, General Purpose Bushings

Sizes Available from NBM

Solid Bar	.....	3/8" - 16" diameter
Hollow Bar (Continuous Cast)	.....	1/2" I.D. x 1" O.D. thru 14" I.D. x 16" O.D.
Hollow Bar (Centrifugal)	.....	up to 30" O.D. (stock) / 100" O.D. plus, special order
Square Bar	.....	up to 10" square
Wear Plate	.....	1/4" - 10" thick thru 16" widths (up to 22" upon request)

Spec Equivalents

Continuous

ASTM B-505
SAE 660, J461, J462

Centrifugal

ASTM B-271
SAE 660, J461, J462

 **NBM Metals**
www.nbmmetals.com

The Leading USA Manufacturer & Master Distributor
of Brass, Bronze, & Copper Alloys

● SAE 660, C93200

Bearing Bronze Round Rod

SIZE	LBS/IN	LBS/FT
3/8	0.043	0.516
1/2	0.075	0.900
5/8	0.120	1.440
3/4	0.160	1.920
7/8	0.220	2.640
1	0.280	3.360
1 1/8	0.350	4.200
1 1/4	0.420	5.040
1 3/8	0.579	6.948
1 1/2	0.610	7.320
1 5/8	0.710	8.520
1 3/4	0.813	9.756
1 7/8	0.925	11.100
2	1.060	12.720
2 1/8	1.190	14.280
2 1/4	1.327	15.924
2 3/8	1.477	17.724
2 1/2	1.636	19.632
2 5/8	1.794	21.528
2 3/4	1.972	23.664
2 7/8	2.150	25.800
3	2.346	28.152
3 1/4	2.738	32.856
3 1/2	3.168	38.016
3 3/4	3.640	43.680
4	4.191	50.292
4 1/4	4.710	56.520
4 1/2	5.280	63.360
4 3/4	5.843	70.116
5	6.503	78.036
5 1/2	7.959	95.508
5 3/4	8.684	104.208
6	9.441	113.292
6 1/2	11.050	132.600
6 3/4	11.901	142.812
7	12.785	153.420
7 1/2	14.646	175.752
8	16.634	199.608
8 1/2	18.748	224.976
9	20.989	251.868
9 1/2	23.360	280.320
10	25.849	310.188
10 1/2	28.469	341.628
11	31.216	374.592
11 1/2	34.089	409.068
12	37.088	445.056
12 1/2	40.214	482.568
13	43.466	521.592
14	50.350	604.200
15	57.740	692.880
16	65.635	787.620

○ C93200 Bearing Bronze Hollow Bar

SIZE	LBS/IN	LBS/FT
1/2 x 1	0.220	2.640
x 1 1/4	0.370	4.440
x 1 1/2	0.549	6.588
x 2	1.000	12.000
5/8 x 1 1/8	0.260	3.120
x 1 3/8	0.430	5.160
x 1 3/4	0.727	8.724
3/4 x 1	0.150	1.800
x 1 1/4	0.299	3.588
x 1 3/8	0.380	4.560
x 1 1/2	0.480	5.760
x 1 3/4	0.688	8.256
x 2	0.929	11.148
x 2 1/8	1.062	12.744
x 2 1/4	1.203	14.436
x 2 1/2	1.507	18.084
7/8 x 1 1/4	0.252	3.024
x 1 3/8	0.337	4.044
x 1 1/2	0.430	5.160
x 2	0.882	10.584
1 x 1 1/4	0.197	2.364
x 1 3/8	0.282	3.384
x 1 1/2	0.375	4.500
x 1 5/8	0.476	5.712
x 1 3/4	0.585	7.020
x 2	0.827	9.924
x 2 1/4	1.100	13.200
x 2 1/2	1.405	16.860
x 2 3/4	1.741	20.892
x 3	2.109	25.308
x 3 1/2	2.940	35.280
x 4	3.991	47.892
1 1/8 x 1 5/8	0.413	4.956
x 2	0.764	9.168
1 1/4 x 1 1/2	0.241	2.892
x 1 3/4	0.451	5.412
x 2	0.693	8.316
x 2 1/4	0.966	11.592
x 2 1/2	1.271	15.252
x 2 3/4	1.607	19.284
x 3	1.975	23.700
x 3 1/4	2.375	28.500
x 3 1/2	2.806	33.672
x 4	3.862	46.344
1 3/8 x 2	0.464	5.568
x 2 1/2	1.192	14.304
x 2 3/4	1.528	18.336
x 3	1.896	22.752
1 1/2 x 1 3/4	0.285	3.420
x 2	0.527	6.324
x 2 1/8	0.660	7.920
x 2 1/4	0.800	9.600

SIZE	LBS/IN	LBS/FT
1 1/2 x 2 3/8	0.949	11.388
x 2 1/2	1.105	13.260
x 2 3/4	1.441	17.292
x 3	1.810	21.720
x 3 1/4	2.209	26.508
x 3 1/2	2.641	31.692
x 4	3.702	44.424
x 4 1/2	4.795	57.540
1 5/8 x 2 1/8	0.565	6.780
x 2 1/2	1.010	12.120
1 3/4 x 2 1/8	0.462	5.544
x 2 1/4	0.603	7.236
x 2 1/2	0.908	10.896
x 2 5/8	1.072	12.864
x 2 3/4	1.244	14.928
x 3	1.612	19.344
x 3 1/4	2.012	24.144
x 3 1/2	2.443	29.316
x 3 3/4	2.906	34.872
x 4	3.530	42.360
2 x 2 1/4	0.374	4.488
x 2 1/2	0.679	8.148
x 2 3/4	1.015	12.180
x 3	1.383	16.596
x 3 1/4	1.783	21.396
x 3 1/2	2.214	26.568
x 3 3/4	2.667	32.004
x 4	3.287	39.444
x 4 1/2	4.380	52.560
x 5	5.619	67.428
x 5 1/2	7.101	85.212
x 6	8.583	102.996
x 7	11.926	143.112
2 1/4 x 2 3/4	0.754	9.048
x 3	1.123	13.476
x 3 1/4	1.522	18.264
x 3 1/2	1.954	23.448
x 4	3.032	36.384
x 4 1/4	3.563	42.756
2 3/8 x 3	0.980	11.760
x 4 1/2	3.985	47.820
2 1/2 x 3	0.830	9.960
x 3 1/4	1.230	14.760
x 3 1/2	1.661	19.932
x 3 3/4	2.124	25.488
x 4	2.746	32.952
x 4 1/4	3.276	39.312
x 4 1/2	3.838	46.056
x 5	5.078	60.936
x 5 1/2	6.572	78.864
x 6	8.054	96.648

SIZES NOT SHOWN MAY BE AVAILABLE UPON REQUEST.

SIZE	LBS/IN	LBS/FT
2^{3/4} x 3^{1/4}	0.906	10.872
x 3 ^{1/2}	1.338	16.056
x 3 ^{3/4}	1.800	21.600
x 4	2.427	29.124
x 4 ^{1/4}	2.958	35.496
x 4 ^{1/2}	3.520	42.240
3 x 3^{1/2}	0.982	11.784
x 3 ^{3/4}	1.445	17.340
x 4	2.078	24.936
x 4 ^{1/4}	2.608	31.296
x 4 ^{1/2}	3.170	38.040
x 4 ^{3/4}	3.764	45.168
x 5	4.410	52.920
x 5 ^{1/2}	5.917	71.004
x 6	7.399	88.788
x 6 ^{1/2}	9.007	108.084
x 7	10.742	128.904
x 8	14.591	175.092
x 9	18.946	227.352
3^{1/4} x 3^{3/4}	1.058	12.696
x 4	1.696	20.352
x 4 ^{1/4}	2.227	26.724
x 4 ^{1/2}	2.789	33.468
x 4 ^{3/4}	3.383	40.596
x 5	4.029	48.348
x 5 ^{1/2}	5.541	66.492
3^{1/2} x 4	1.283	15.396
x 4 ^{1/4}	1.814	21.768
x 4 ^{1/2}	2.376	28.512
x 4 ^{3/4}	2.970	35.640
x 5	3.616	43.392
x 5 ^{1/2}	5.135	61.620
x 6	6.617	79.404
x 6 ^{1/2}	8.225	98.700
3^{3/4} x 4^{1/2}	1.931	23.172
x 4 ^{3/4}	2.525	30.300
x 5	3.171	38.052
x 5 ^{1/2}	4.696	56.352
4 x 4^{1/2}	1.455	17.460
x 4 ^{3/4}	2.049	24.588
x 5	2.695	32.340
x 5 ^{1/4}	3.533	42.396
x 5 ^{1/2}	4.226	50.712
x 6	5.589	67.068
x 6 ^{1/2}	7.178	86.136
x 7	8.907	106.884
x 7 ^{1/2}	10.748	128.976
x 8	12.710	152.520
x 9	17.000	204.000
x 10	22.116	265.392
4^{1/4} x 5^{1/4}	3.060	36.720
x 5 ^{1/2}	3.617	43.404
x 6	5.093	61.116

SIZE	LBS/IN	LBS/FT
4^{1/2} x 5	1.542	18.504
x 5 ^{1/4}	2.346	28.152
x 5 ^{1/2}	3.103	37.236
x 6	4.551	54.612
x 6 ^{1/2}	6.159	73.908
x 7	7.860	94.320
4^{3/4} x 6	3.972	47.664
5 x 5^{1/2}	1.925	23.100
x 5 ^{3/4}	2.636	31.632
x 6	3.512	42.144
x 6 ^{1/2}	5.120	61.440
x 7	6.855	82.260
x 7 ^{1/2}	8.561	102.732
x 8	10.704	128.448
x 9	14.813	177.756
x 10	20.056	240.672
x 11	25.287	303.444
5^{1/2} x 6	2.103	25.236
x 6 ^{1/2}	3.692	44.304
x 7	5.421	65.052
x 7 ^{1/2}	7.262	87.144
x 8	9.224	110.688
6 x 6^{1/2}	2.252	27.024
x 6 ^{3/4}	3.121	37.452
x 7	3.991	47.892
x 7 ^{1/2}	5.832	69.984
x 8	8.002	96.024
x 8 ^{1/2}	9.916	118.992
x 9	12.112	145.344
x 10	17.218	206.616
x 11	22.421	269.052
x 12	28.271	339.252
6^{1/2} x 7^{1/2}	4.299	51.588
x 8	6.282	75.384
x 8 ^{1/2}	8.374	100.488
x 9	10.589	127.068
x 9 ^{1/2}	13.184	158.208
6^{3/4} x 14	39.360	472.320
7 x 8	4.798	57.576
x 8 ^{1/2}	6.692	80.304
x 9	8.916	106.992
x 9 ^{1/2}	11.421	137.052
x 10	13.897	166.764
x 11	19.271	231.252
x 12	25.168	302.016
x 13	31.627	379.524
7^{1/2} x 8^{1/2}	4.916	58.992
x 9	7.112	85.344
x 9 ^{1/2}	9.617	115.404
x 10	12.019	144.228
8 x 9	5.308	63.696
x 9 ^{1/2}	7.729	92.748

SIZE	LBS/IN	LBS/FT
8 x 10	10.196	122.352
x 11	15.581	186.972
x 12	21.421	257.052
x 13	28.383	340.596
x 14	34.798	417.576
8^{1/2} x 9^{1/2}	5.869	70.428
x 10	8.159	97.908
x 10 ^{1/2}	10.738	128.856
9 x 10	6.159	73.908
x 10 ^{1/2}	8.673	104.076
x 11	11.327	135.924
x 12	17.290	207.480
x 13	23.694	284.328
x 14	30.578	366.936
9^{1/2} x 11	9.075	108.900
x 13 ^{1/2}	24.774	297.288
10 x 11	6.794	81.528
x 11 ^{1/2}	9.533	114.396
x 12	12.591	151.092
x 13	19.159	229.908
x 14	26.019	312.228
x 15	33.243	398.916
x 16	41.138	493.656
10^{1/2} x 12^{1/2}	13.364	160.368
x 13	16.701	200.412
11 x 12	7.486	89.832
x 13	13.953	167.436
x 14	20.841	250.092
x 15	28.012	336.144
x 16	35.907	430.884
12 x 13	8.001	96.012
x 13 ^{1/2}	11.813	141.756
x 14	15.131	181.572
x 15	22.477	269.724
x 16	30.171	362.052
13 x 14	8.643	103.716
x 14 ^{1/2}	12.274	147.288
x 15	16.542	198.504
x 16	23.298	279.576
14 x 16	17.692	212.304

Dimensions are in inches. All weights are approximate. Sizes not shown may be available upon request.



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C93200 BEARING BRONZE (SAE 660)

Chemical Composition, Tensile & Hardness, Physical Properties

Chemical Composition

	Cu ⁽¹⁾	Al	Sb	Fe	Pb	Ni ⁽²⁾	P ⁽³⁾	Si	S	Sn	Zn
min/max	81.0-85.0	.005	.35	.20	6.0-8.0	1.0	.15	.005	.08	6.3-7.5	1.0-4.0
nominal	83.0	-	-	-	7.0	-	-	-	-	6.9	2.5

(1) In determining Cu min, Cu may be calculated as Cu + Ni.

(2) Ni value includes Co.

(3) For continuous castings, P shall be 1.5%, max.

NOTE: Cu +(sum of named elements) = 99.0% min.

Room Temp Tensile & Hardness Data

Casting Process	Temper	Tensile (KSI) Min	Yield (KSI) Min	Elongation In Hd Min	Brinell (3000 Kg)
Centrifugal	M02	30	14	15	-
Continuous	M07	35	20	10	-

Physical Properties

Melting Point - Liquidus °F.....	1790
Melting Point - Solidus °F.....	1570
Density lb/cu in @ 68 °F.....	0.322
Specific Gravity.....	8.91
Electrical Resistivity ohms-cmil/ft @ 68 °F.....	85.9
Electrical Conductivity %IACS @ 68 °F.....	12
Thermal Conductivity Btu/sq ft/ft hr/°F @ 68 °F.....	33.6
Coefficient of Thermal Expansion 10 ⁻⁶ per °F (68-212 °F).....	10
Specific Heat Capacity Btu/lb/°F @ 68 °F.....	0.09
Modulus of Elasticity in Tension ksi.....	14500
Machinability Rating.....	70%

The values listed on this document represent reasonable approximations suitable for general engineering use. Due to commercial variations in composition and to manufacturing limitations, they should not be used for specification purposes. See applicable A.S.T.M. Specification references.

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