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COMPANY**

REFERENCE BOOK

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SECTION M

BRASS BAR AND TUBING

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C36000 1/2 HARD BRASS
CDA 360 FREE CUTTING ALLOY

ASTM B 16
UNS C36000

Color Marking: Ends painted Orange

This grade of brass was developed with lead additive and surface hardness to promote superior machinability compared to other red metal products.

ANALYSIS

Copper 60.0/63.0	Iron .35 Max.	Lead 2.5/3.7	Zinc Remainder
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MECHANICAL PROPERTIES

Tensile Strength (psi) 45,000-50,000	Yield Strength (psi) 15,000-25,000	Elongation 10-25%	Rockwell B Hardness 55-70
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MACHINABILITY — The machinability rating of this grade is 100% based on 1212.

APPLICATIONS — This material is primarily intended for use in fasteners, valve stems, valve seats, fluid connectors, automatic screw machine parts, faucet stems and seats, and other plumbing fittings.

BRASS ROD AND BAR TOLERANCES

Reference ASTM B249

Diameter or Distance Between Parallel Surfaces, inches (mm)	<u>Tolerance, Plus and Minus, inches (mm)</u>	
	Round	Hexagon, Octagon
Up to .150 (3.8), incl.	0.0013 (0.035)	0.0025 (0.06)
Over .150-.500 (3.8-12) incl.	0.0015 (.04)	0.003 (0.08)
Over .500-1.00 (12-25) incl.	0.002 (0.05)	0.004 (0.10)
Over 1.00-2.00 (25-50) incl.	0.0025 (0.06)	0.005 (0.13)
Over 2.00 (50)	.15%	.30%

Note: When tolerances are expressed as all plus or minus, double the values given.

C35300 LEADED COMMERCIAL BRASS 1/2 HARD
CDA 353
ASTM B 453
UNS C35300
Color Marking: Ends painted Black

This alloy is intended for applications requiring extensive machining.

ANALYSIS

Cu	Fe	Pb	Zn
60.0/63.0	.15 Max.	1.5/2.5	Remainder 36.0 Nominal

MECHANICAL PROPERTIES

Tensile Strength (psi)	Yield Strength (psi)	Elongation
68,000	45,000	10%

APPLICATIONS — Hardware, industrial fasteners, gears, ratchets, adapters, flare fittings, couplings, watch parts, automatic screw machine parts and a variety of plumbing parts.

MACHINABILITY — The machinability of this grade is 90% based on alloy 360 being 100%.

WELDING — This alloy is suitable for soldering and brazing. Most welding processes are not recommended.

C46400 NAVAL BRASS 1/2 HARD

CDA 464

ASTM B 21 AMS 4611

UNS C46400

Color Marking: Ends painted Red

This grade of brass was developed with lead additive and surface hardness to promote superior machinability compared to other red metal products.

ANALYSIS

Cu	Sn	Pb	Fe	Sum Min.	Zn
59.0/62.0	0.50/1.0	.020 Max.	.010 Max.	99.6	Remainder

MECHANICAL PROPERTIES

	Tensile Strength (psi) Minimum	Yield Strength (psi) Minimum	Elongation Minimum
Up to .500 incl.	60.0	27.0	22%
.501-1.000 incl.	60.0	27.0	25%
1.001-2.500 incl.	58.0	26.0	26%
2.501-3.500 incl.	54.0	25.0	27%
Over 3.500	54.0	22.0	30%

APPLICATION — This material is commonly used for fasteners and hardware for corrosion resistance, including marine applications. This alloy is also used for high strength cold headed products.

MACHINABILITY — This grade has a machinability rating of 30 based on Alloy 360 being 100%.

WELDING — Soldering and Brazing are rated as excellent. All other forms of joining are fair.

FORGING — The hot forgability rating of this alloy is 90% with Forging Brass at 100%. The recommended hot working temperature for this alloy is 1200° to 1500° F.

BRASS BAR WEIGHTS

Size	Round Wt/Ft	Square Wt/Ft	T	W	Wt/Ft
1/8	0.045272	0.057642	0.125	0.5	0.230567
3/16	0.102407	0.130386	0.125	0.75	0.34585
13/64	0.1194	0.152023	0.125	1	0.461134
7/32	0.138963	0.176931	0.188	0.5	0.346772
15/64	0.158651	0.201999	0.188	0.75	0.520159
1/4	.0181089	0.230567	0.188	1	0.693545
9/32	0.228783	0.291293	0.25	0.75	0.6917
5/16	0.283858	0.361414	0.25	1	0.922267
3/8	0.40745	0.518775	0.25	1.5	1.383401
7/16	0.555853	0.707726	0.25	2	1.844534
1/2	0.724356	0.922267	0.25	2.5	2.305668
9/16	0.918393	1.16932	0.25	3	2.766802
5/8	1.131806	1.441043	0.25	4	3.689069
11/16	1.371478	1.746199	0.375	1	1.383401
3/4	1.629801	2.075101	0.375	1.5	2.075101
13/16	1.915107	2.43836	0.375	2	2.766802
7/8	2.21834	2.824443	0.375	2.5	3.458502
15/16	2.549281	3.245805	0.375	3	4.150202
1	2.897424	3.689069	0.375	4	5.533603
11/16	3.273999	4.168533	0.5	1	1.844534
11/8	3.667052	4.668978	0.5	1.5	2.766802
13/16	4.089261	5.206545	0.5	2	3.689069
11/4	4.527224	5.76417	0.5	2.5	4.611336
15/16	4.995068	6.35984	0.5	3	5.533603
13/8	5.477941	6.974646	0.5	4	7.378138
17/16	5.99142	7.628419	0.75	1	2.766802
11/2	6.519203	8.300405	0.75	1.5	4.150202
19/16	7.078316	9.012281	0.75	2	5.533603
15/8	7.651009	9.741447	0.75	2.5	6.917004
111/16	8.255757	10.51143	0.75	3	8.300405
13/4	8.87336	11.29777	0.75	4	11.06721
113/16	9.523742	12.12585	1	1.5	5.533603
17/8	10.18625	12.96938	1	2	7.378138
115/16	10.88227	13.85557	1	2.5	9.222672
2	11.58969	14.75628	1	3	11.06721
21/16	12.33135	15.70056	1	4	14.75628
21/8	13.08368	16.65845	1.25	1.5	6.917004
23/16	13.87096	17.66084	1.25	2	9.222672
21/4	14.66821	18.67591	1.25	2.5	11.52834
25/16	15.50113	19.7364	1.25	3	13.83401
23/8	16.34328	20.80865	1.25	4	18.44534
27/16	17.22183	21.92725	1.5	2	11.06721
21/2	18.1089	23.05668	1.5	2.5	13.83401
29/16	19.03309	24.23338	1.5	3	16.60081
25/8	19.96506	25.41999	1.5	4	22.13441
211/16	20.93488	26.65479	2	3	22.13441
23/4	21.91177	27.89858	2	4	29.51255
213/16	22.92722	29.19149			
27/8	23.94902	30.49246			
215/16	25.01011	31.84347			

COLD DRAWN SEAMLESS C443
INHIBITED ADMIRALTY BRASS TUBING
CDA 443
ASTM B 135 ASTM B 111
UNS C44300

This material is intended for use where corrosion resistance and formability are primary considerations.

ANALYSIS

Cu	Sn	Pb	Fe	Zn	As
70.0/73.0	.90/1.2	.07 Max.	.06 Max.	Remainder	.02/.06

CONDITION — Hard Drawn and Stress Relieved

MECHANICAL PROPERTIES

Tensile Strength (psi)	Yield Strength (psi)	Elongation	Rockwell B Hardness
70,000 Min.	60,000 Min.	10% Min. .2% offset	85 Min.

TOLERANCES

OD +.010/-0.000
ID (when specified) +.000/-0.010

APPLICATION — This alloy is intended for use in condensers, evaporators, heat exchangers, ferrules, subsurface pumps and distillers.

FORGING — The forging temperature for this alloy is 1200°F - 1470°F

WELDING — This alloy is generally brazed.

BRASS TUBING WEIGHTS

Size	OD	WALL	(ID)	Wt/Ft
1 ¹ / ₈	1.125	0.1880	0.75	2.0394
1 ¹ / ₂	1.5	0.1275	1.245	2.0259
1 ¹ / ₂	1.5	0.1880	1.125	2.8556
1 ⁵ / ₈	1.625	0.1875	1.245	3.1204
1 ⁵ / ₈	1.625	0.1900	1.245	3.1565
1 ⁵ / ₈	1.625	0.2840	1.057	4.4091
1 ³ / ₄	1.75	0.1233	1.5035	2.3220
1 ³ / ₄	1.75	0.1250	1.495	2.3516
1 ³ / ₄	1.75	0.1275	1.495	2.3949
1 ⁷ / ₈	1.875	0.1875	1.495	3.6631
1 ⁷ / ₈	1.875	0.1875	1.495	3.7064
2 ¹ / ₈	2.125	0.1900	1.745	4.2058
2 ¹ / ₈	2.125	0.1900	1.745	4.2563
2 ¹ / ₄	2.25	0.1250	1.995	3.0752
2 ¹ / ₄	2.25	0.1275	1.995	3.1330
2 ¹ / ₄	2.25	0.2375	1.77	5.5335
2 ¹ / ₄	2.25	0.2400	1.77	5.5848
2 ¹ / ₄	2.25	0.2525	1.745	5.8391
2 ¹⁵ / ₁₆	2.3125	0.1588	1.995	3.9595
2 ¹⁵ / ₁₆	2.313	0.1560	1.995	3.8956
2 ¹ / ₂	2.5	0.0650	2.37	1.8324
2 ³ / ₄	2.75	0.1250	2.495	3.7987
2 ³ / ₄	2.75	0.1275	2.495	3.8710
2 ³ / ₄	2.75	0.2520	2.245	7.2878
2 ³ / ₄	2.75	0.2525	2.245	7.3007
3 ¹ / ₄	3.25	0.2500	2.745	8.6828
3 ¹ / ₄	3.25	0.2525	2.745	8.7624
3 ³ / ₄	3.75	0.2500	3.245	10.1300
3 ³ / ₄	3.75	0.2525	3.245	10.2240
4 ¹ / ₄	4.25	0.2500	3.745	11.5771
4 ¹ / ₄	4.25	0.2525	3.745	11.6856

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