

Brammer Standard Company, Inc.

# Certificate of Analysis

## B.S. 630A

CDA Copper Alloy 630

Copper	81.0	Silicon	0.037
Tin	0.019	Manganese	0.11
Lead	0.0069	Phosphorus	<0.01
Zinc	0.17	Arsenic	(0.002)
Iron	3.73	Antimony	<0.001
Nickel	4.81	Carbon	0.005
Aluminum	10.05	Sulfur	(0.001)

*(analysis listed as percent by weight)*

Some of the co-operating laboratories were:

Brammer Standard Co. Inc., Houston, Texas  
J. Dirats and Co., Inc., Westfield, Massachusetts  
VHG Labs, Manchester, New Hampshire

See data on reverse side.

Certificate No. 630A-030392

**Brammer Standard Company, Inc., 14603 Benfer Road, Houston, TX 77069-2895**  
**Telephone (281) 440-9396 Fax (281) 440-4432**

B.S. No. 630A

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Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al	Si
1	80.97	0.016	0.0067	0.17	3.67	4.78	9.931	0.036
2	81.06	0.019	0.0068	0.17	3.72	4.80	10.04	0.037
3		0.0193	0.0070	0.172	3.75	4.80	10.07	0.037
4		0.020	0.0071	0.174	3.77	4.82	10.10	
5		0.021		0.179		4.86	10.12	
Average	81.015	0.0191	0.0069	0.173	3.728	4.812	10.052	0.0367
Std Dev	0.064	0.0019	0.0002	0.004	0.043	0.030	0.074	0.0006
Certified	81.0	0.019	0.0069	0.17	3.73	4.81	10.05	0.037

Analysis	Mn	P	As	Sb	Ag	C	S
1	0.10	0.001	0.0003	0.00025	0.0016	0.0052	0.0002
2	0.106	0.005	0.0012	0.00025		0.0054	0.0015
3	0.112	0.006	0.0022	<0.001			0.002
4	0.114	<0.002	0.003	<0.002			
5	0.12						
Average	0.110		0.0017			0.0053	0.0012
Std Dev	0.008		0.0012			0.0001	0.0009
Certified	0.11	<0.01	(0.002)	<0.001	(0.0016)	0.005	(0.001)

Chemical analyses were made on millings from cross-sections of the bars. The individual values listed above are the average of each analyst's results.

Methods of analysis used were a combination of ASTM Standard Methods E 54-86a, E 478, plus additional ICP, and AA spectrometric methods. The following Certified Reference Materials were used to validate the analytical data listed above: NIST SRM 871, SRM 872; BAM 227, BAM 228, BAM 361; BCS 183/4, and IPT 10A, IPT 15.

This Reference Material was tested for homogeneity by optical emission spectrometry using ASTM Standard Method E 826 and found acceptable. NIST had no similar Certified Reference Materials procurable in solid form for spectrometric comparison during the testing of this material.

A Material Safety Data Sheet (MSDS) is not required for this material. This material will not release or otherwise result in exposure to a hazardous chemical, under normal conditions of use. Inquiries concerning this Reference Material should be directed to:

Brammer Standard Co., Inc. Phone: (281) 440-9396  
 14603 Benfer Road  
 Houston, Texas 77069-2895 Fax: (281) 440-4432  
 USA

Certified by \_\_\_\_\_ on March 3, 1992.  
 G. R. Brammer