

Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 642A

CDA Copper Alloy 642

Copper	91.0	Silicon	1.80
Tin	0.018	Manganese	0.005
Lead	0.001	Phosphorus	0.001
Zinc	0.011	Arsenic	<0.002
Iron	0.17	Antimony	(<0.002)
Nickel	0.025	Carbon	0.001
Aluminum	6.70	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. 642A-030392

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

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Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al	Si
1	90.97	0.016	0.0005	0.010	0.16	0.023	6.70	1.782
2	91.08	0.0167	0.00077	0.0102	0.171	0.024	6.70	1.80
3		0.018	0.0009	0.011	0.172	0.026	6.71	1.81
4		0.021		0.012	0.176	0.027	6.71	
5					0.176	0.027		
Average	91.025	0.0179	0.0007	0.0108	0.171	0.0254	6.705	1.797
Std Dev	0.078	0.0022	0.0002	0.0009	0.007	0.0018	0.006	0.014
Certified	91.0	0.018	0.001	0.011	0.17	0.025	6.70	1.80

Analysis	Mn	P	As	Sb	Ag	C	S
1	0.004	0.001	<0.00001	0.00007	0.0015	0.0010	0.0004
2	0.005	0.001	<0.002	<0.002		0.0018	<0.0005
3	0.0059	0.0014	<0.002				
4	0.006						
Average	0.0052	0.0011				0.0014	
Std Dev	0.0009	0.0002				0.0006	
Certified	0.005	0.001	<0.002	(<0.002)	(0.0015)	0.001	<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
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 USA

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