Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 623A

CDA Copper Alloy 623

Copper	88.13	Silicon	0.014
Tin	0.002	Manganese	0.273
Lead	0.001	Phosphorus	<0.002
Zinc	0.008	Arsenic	(0.006)
Iron	2.19	Antimony	<0.002
Nickel	0.146	Carbon	(0.002)
Aluminum	9.12	Sulfur	(<0.0005)

(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. 623A-011792

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

B.S. No. 623A Certificate Number 623A-011792

Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al
1	88.09	0.0014	0.001	0.007	2.18	0.141	9.03
2	88.13	0.002	0.001	0.0077	2.19	0.147	9.11
3	88.16	0.002	0.0010	0.0082	2.19	0.148	9.15
4		0.0031	0.0014	0.0089		0.148	9.16
5		0.004					
Average	88.127	0.0025	0.0011	0.0080	2.187	0.1460	9.120
Std Dev	0.035	0.0010	0.0002	0.0008	0.006	0.0034	0.046
Certified	88.13	0.002	0.001	0.008	2.19	0.146	9.12

Analysis	Si	Mn	P	As	Sb	C	S
1	0.0114	0.269	<0.001	0.0032	<0.002	0.002	0.0001
2	0.012	0.272	<0.002	0.0046	<0.002	0.0021	<0.0005
3	0.018	0.274	<0.002	0.005	<0.002		
4		0.277		0.010			
Average	0.0138	0.2730		0.0057		0.0021	0.0001
Std Dev	0.0036	0.0034		0.0030		0.0001	0.0001
Certified	0.014	0.273	<0.002	(0.006)	<0.002	(0.002)	(<0.0005)

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 54-80, E 62-89, E 478-89a, 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; German BAM 227, BAM 228, BAM 361; British BCS 183/4, and Brasilian IPT 10A, IPT 15.

This Reference Material was tested for homogeneity using ASTM Standard Method E 826 and found acceptable. It was also examined by optical emission spectrometry and found to be compatible with the following NIST Certified Reference Materials: NIST SRM 1111 through 1117.

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 Fax: (281) 440-4432
Houston, Texas 77069-2895 USA

Certified by: _____ on January 17, 1992.
G. R. Brammer