Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 954C

CDA Copper Alloy 954

Copper	83.9	Silicon	0.07
Tin	0.08	Manganese	0.29
Lead	0.050	Phosphorus	0.011
Zinc	0.09	Arsenic	(0.006)
Iron	3.9	Antimony	<0.003
Nickel	1.38	Carbon	(0.004)
Aluminum	10.21	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. 954C-081892

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

BS 954C Certificate Number 954C-081892

Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al	Si
1	83.81	0.0645	0.045	0.082	3.78	1.33	10.18	0.0647
2	83.98	0.065	0.050	0.0862	3.83	1.36	10.21	0.065
3		0.073	0.0502	0.089	3.90	1.37	10.25	0.073
4		0.081	0.052	0.093	3.94	1.38		
5		0.085	0.052	0.096	3.99	1.40		
6		0.088	0.0522	0.099	3.99	1.42		
7		0.090				1.42		
Average	83.895	0.0781	0.0502	0.0909	3.905	1.383	10.213	0.0676
Std Dev	0.120	0.0106	0.0027	0.0063	0.086	0.033	0.035	0.0047
Certified	83.9	0.08	0.050	0.09	3.9	1.38	10.21	0.07

Analysis	Mn	P	As	Sb	Ag	C	S
1	0.271	0.011	0.002	0.0006	0.003	0.0032	<0.0001
2	0.28	0.011	0.0038	0.0018	0.0031	0.0037	<0.0005
3	0.287	0.011	0.0041	0.0021			
4	0.288	0.011	0.007	<0.002			
5	0.294		0.012				
6	0.296						
Average	0.286	0.0110	0.0058		0.0031	0.0035	
Std Dev	0.009	0	0.0039		0.0001	0.0004	
Certified	0.29	0.011	(0.006)	<0.003	(0.003)	(0.004)	<0.0005

Data in parentheses is not certified but provided for information only.

Chemical analyses were made on millings from cross-sections of the cast discs. 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 222, BAM227, 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 August 18, 1992.
G. R. Brammer