Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 715A

Alloyed Copper

Copper	68.0	Silicon	0.10
Tin	0.008	Manganese	0.82
Lead	(0.007)	Phosphorus	0.006
Zinc	0.10	Arsenic	(0.0014)
Iron	0.61	Antimony	(0.003)
Nickel	30.22	Sulfur	0.001
Aluminum	(0.01)	Carbon	0.03

(analysis listed as percent by weight)

Some of the co-operating laboratories were:

Brammer Standard Co., Houston, Texas
Colonial Metals, Columbia, Pennsylvania
J. Dirats and Co., Inc., Westfield, Massachusetts
Metals Analysis Inc., Huntington Park, California
Technical Service Laboratories Inc., Mississauga, Ontario, Canada
VHG Labs, Manchester, New Hampshire

See data on reverse side.

Certificate No. 715A-110190A

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
1	67.92	0.006	0.004	0.09	0.597	30.17	0.002
2	67.95	0.008	0.006	0.103	0.601	30.20	0.008
3	68.02	0.0089	0.007	0.106	0.61	30.23	0.010
4	68.07	0.009	0.0084	0.11	0.62	30.24	0.015
5	68.20		0.011		0.641	30.27	
Average	68.032	0.0080	0.0073	0.102	0.614	30.222	0.0088
Std Dev	0.111	0.0014	0.0026	0.009	0.018	0.038	0.0054
Certified	68.0	0.008	(0.007)	0.10	0.61	30.22	(0.01)

Analysis	Si	Mn	P	As	Sb	C	S
1	0.09	0.79	0.0056	0.0013	0.0015	0.027	0.0007
2	0.091	0.80	0.006	0.0015	0.003	0.030	0.0009
3	0.095	0.823	0.0069		0.0037	0.036	0.0011
4	0.102	0.828	0.007				
5	0.107	0.83	0.007				
6	0.11	0.835					
Average	0.099	0.818	0.0065	0.0014	0.0027	0.0310	0.0009
Std Dev	0.008	0.018	0.0007	0.0001	0.0011	0.0046	0.0002
Certified	0.10	0.82	0.006	(0.0014)	(0.003)	0.03	0.001

This material was produced by hot-rolling ingots into bar form. Chemical analyses were made on millings from cross-sections of the bars. The values listed above are individual laboratory analytical results. Data in parentheses are not certified but provided for information only.

Methods of analysis used were a combination of ASTM Standard Method 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 874, NIST 875, and BCS 180/2.

This Reference Material was tested for homogeneity by optical emission spectrometry using ASTM Standard Method E 826 and found acceptable. NIST Certified Reference Material SRM 1276 was used for optical emission and XRF spectrometric comparison during the testing of this material.

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: G. R. Brammer _____
on November 1, 1990