

Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 903B

CDA Copper Alloy 903

Copper	86.7	Silicon	0.002
Tin	7.9	Manganese	0.0004
Lead	0.10	Phosphorus	0.073
Zinc	4.39	Arsenic	0.003
Iron	0.049	Antimony	0.003
Nickel	0.50	Carbon	(0.0004)
Aluminum	(0.001)	Sulfur	0.006

(analysis listed as percent by weight)

Some of the co-operating laboratories were:

Brammer Standard Co. Inc., 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. 903B-011592

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

Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al
1	86.61	7.75	0.094	4.36	0.046	0.488	0.0003
2	86.69	7.81	0.095	4.38	0.049	0.49	0.0004
3	86.75	7.82	0.098	4.39	0.049	0.494	0.001
4		7.93	0.0999	4.415	0.0503	0.50	0.002
5		7.99	0.106	4.42	0.051	0.507	
6		8.00	0.11			0.507	
7			0.11				
Average	86.68	7.883	0.102	4.393	0.0491	0.498	0.0009
Std. Dev.	0.070	0.104	0.007	0.025	0.0019	0.008	0.0008
Certified	86.7	7.9	0.10	4.39	0.049	0.50	(0.001)

Analysis	Si	Mn	P	As	Sb	C	S
1	0.001	0.0003	0.071	0.002	0.0018	0.0003	0.005
2	0.002	0.0003	0.073	0.0029	0.0028	0.0005	0.0055
3	0.002	0.0003	0.075	0.003	0.0034		0.006
4		0.0005		0.0036	0.004		
Average	0.0017	0.0004	0.0730	0.0029	0.0030	0.0004	0.0055
Std. Dev.	0.0006	0.0001	0.0020	0.0007	0.0009	0.0001	0.0005
Certified	0.002	0.0004	0.073	0.003	0.003	(0.0004)	0.006

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:

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 USA

Certified by G. R. Brammer on January 15, 1992.