

Brammer Standard Company, Inc.

Certificate of Analysis

B.S. 954B

CDA Copper Alloy 954

Copper	83.9	Silicon	0.07
Tin	0.07	Manganese	0.27
Lead	0.047	Phosphorus	0.012
Zinc	0.10	Arsenic	(0.005)
Iron	3.90	Antimony	(0.001)
Nickel	1.38	Silver	(0.003)
Aluminum	10.20	Carbon	(0.005)
		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. 954B-081892

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

BS 954B

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Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al	Si
1	83.88	0.062	0.043	0.083	3.86	1.351	10.19	0.066
2	83.92	0.062	0.047	0.084	3.87	1.37	10.19	0.072
3		0.066	0.047	0.105	3.88	1.38	10.20	0.0721
4		0.078	0.0478	0.108	3.88	1.38	10.20	
5		0.079	0.0501	0.108	3.931	1.40		
6					3.95	1.42		
Average	83.900	0.0694	0.0470	0.098	3.895	1.384	10.195	0.0700
Std Dev	0.028	0.0085	0.0026	0.013	0.036	0.024	0.006	0.0035
Certified	83.9	0.07	0.047	0.10	3.90	1.38	10.20	0.07

Analysis	Mn	P	As	Sb	Ag	C	S
1	0.255	0.010	0.002	0.0007	0.003	0.0053	0.0001
2	0.262	0.011	0.0041	0.0017	0.0034	0.0059	<0.0005
3	0.266	0.012	0.0057	0.0025			
4	0.267	0.014	0.008				
5	0.298						
Average	0.2696	0.0118	0.0050	0.0016	0.0032	0.0056	
Std Dev	0.0166	0.0017	0.0025	0.0009	0.0003	0.0004	
Certified	0.27	0.012	(0.005)	(0.001)	(0.003)	(0.006)	(<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
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 USA

Certified by G. R. Brammer on August 18, 1992.