

**Brammer Standard Company, Inc.**  
**Certificate of Analysis**

B.S. 932E  
 CDA Grade 932 Copper Alloy

	Certified Value <sup>1</sup>	Estimate of Uncertainty <sup>2</sup>		Certified Value <sup>1</sup>	Estimate of Uncertainty <sup>2</sup>
Analysis listed as percent by weight					
<b>Cu</b>	<b>82.15</b>	0.08	<b>Mn</b>	<b>0.0001</b>	0.00003
<b>Sn</b>	<b>7.33</b>	0.04	<b>P</b>	<b>0.022</b>	0.003
<b>Pb</b>	<b>7.3</b>	0.15	<b>As</b>	<b>0.048</b>	0.004
<b>Zn</b>	<b>2.86</b>	0.10	<b>Sb</b>	<b>0.145</b>	0.010
<b>Fe</b>	<b>0.029</b>	0.003	Ag	(0.007)	
<b>Ni</b>	<b>0.16</b>	0.01	C	(0.004)	
Al	(<0.001)		<b>S</b>	<b>0.053</b>	0.003
Si	(<0.005)				

<sup>1</sup> The certified value listed is the present best estimate of the true value.

<sup>2</sup> The uncertainties listed are based on value judgments of the material inhomogeneity and possible bias in the determined analytical values.

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

See reverse side for more information.

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Analysis	Cu	Sn	Pb	Zn	Fe	Ni	Al
1	82.09	7.30	7.16	2.724	0.027	0.152	<0.0001
2	82.15	7.31	7.17	2.78	0.0276	0.155	<0.0020
3	82.16	7.32	7.25	2.86	0.028	0.159	0.0003
4	82.21	7.32	7.26	2.88	0.029	0.166	0.0005
5		7.32	7.32	2.88	0.0323	0.166	
6		7.33	7.40	2.89		0.167	
7		7.36	7.46	2.93		0.17	
8		7.36		2.94		0.176	
Average	82.153	7.328	7.289	2.861	0.0288	0.164	
Std. Dev.	0.049	0.022	0.112	0.074	0.0021	0.008	
Certified	82.15	7.33	7.3	2.86	0.029	0.16	(<0.001)

Analysis	Si	Mn	P	As	Sb	Ag	C	S
1	<0.001	0.00007	0.018	0.0423	0.139	0.0053	0.0028	0.052
2	0.002	0.0001	0.020	0.047	0.140	0.008	0.0046	0.055
3	0.004	0.0001	0.021	0.047	0.142	0.0085		0.053
4			0.022	0.048	0.142			
5			0.023	0.05	0.144			
6			0.024	0.050	0.150			
7			0.024	0.051	0.150			
8				0.051	0.157			
Average		0.00009	0.0217	0.0483	0.1455	0.0073	0.0037	0.0533
Std. Dev.		0.00002	0.0022	0.0029	0.0062	0.0017	0.0013	0.0015
Certified (<0.005)		0.0001	0.022	0.048	0.145	(0.007)	(0.004)	0.053

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

**Analysis:** Chemical analyses were made on chips prepared by a lathe from the certified portion of the 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 353, E 572, E 1086, E 1019, plus additional ICP, and AA spectrometric methods. The following Certified Reference Materials were used to validate the analytical data listed above: NIST SRM 63b, 124d, 158a, 164, 164a, 400, 874; BAM 228; IPT 10a, 15; BCS 183/3, 304/1

**Co-operating Laboratories:** Some of the co-operating laboratories were:  
 Analytical Associates, Detroit, Michigan  
 Brammer Standard Co., Inc., Houston, Texas  
 Coleman Testing Laboratories, Riverside, New Jersey  
 Crucible Specialty Metals, Syracuse, New York  
 J. Dirats and Co., Inc., Westfield, Massachusetts  
 VHG Laboratories, Inc., Manchester, New Hampshire

**Homogeneity:** 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 -  
Certified Reference Materials: European CRMs: CKD 318 - 320  
Reference Materials: CTIF UE 54, BS 932, BS CC937

**Source:** This material was supplied by the Morris Metals Service, Inc., Houston, Texas.

**Available Form:** This Reference Material is available only in the form of a disc, approximately 38 mm (1.50") in diameter and 12 mm (0.50") thick.

**Use:** This Reference Material is intended for use in optical emission and x-ray spectrometric methods of analysis. The entire depth of the disc may be used.

**Caution:** As with any bar material, avoid optical emission spectrometric burns in the center of the disc (5 mm radius) as some segregation may be present.

Because this Reference Material contains a high percent of tin and lead, care must be taken in its application. Make certain that corrections are made for possible element interference and dilution effects.

**Preparation:** For best analytical results, use the same method for preparing the analytical surface on all reference materials as you use for production specimens. Avoid overheating the disc during surface preparation.

**Safety Notice:** 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 USA Fax: (281) 440-4432

Certified by: \_\_\_\_\_ on November 11, 1993.  
G. R. Brammer

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