Brammer Standard Company, Inc.

Certificate of Analysis

BS 464

Copper Alloy

(analysis listed as percent by weight)

Copper	(60.2)	Nickel	0.02
Lead	0.034	Phosphorus	0.009
Tin	0.61	Silicon	<0.005
Zinc	39.0	Arsenic	<0.005
Manganese	<0.005	Antimony	0.007
Aluminum	<0.005	Sulfur	(0.001)
Iron	0.08	Carbon	(<0.002)

Some of the co-operating laboratories were:

Alpha Research Laboratories, Stevensville, MI
Brammer Standard Company, Inc., Houston, TX
Dirats Laboratories, Westfield, MA
Herron Testing Laboratories, Inc., Cleveland, OH
Metal Analysis Inc., Huntington Park, CA
Midstates Analytical Laboratories, Tulsa, OK
VHG Labs, Andover, MA

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

The copper data was calculated by difference.

THIS CERTIFICATE OF ANALYSIS HAS BEEN RECREATED FOR POSTING ON THE WEB.

See data on reverse side.

Certificate No. REC464-100587

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

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Analysis Number	Cu***	Pb	Sn	Zn	Mn	Al	Fe	Ni	P
1		0.030	0.59	38.70	<0.002	<0.002	0.060	0.016	0.006
2		0.032	0.60	38.79	<0.005	<0.002	0.070	0.022	0.008
3		0.032	0.60	38.90	<0.005	<0.005	0.080	0.025	0.008
4		0.035	0.62	39.20		<0.005	0.080	0.030	0.009
5		0.040	0.65	39.30			0.092		0.010
6				39.38					
Average	60.192	0.0338	0.612	39.045			0.0764	0.0233	0.0082
Std.Dev.		0.0039	0.024	0.285			0.0120	0.0059	0.0015
Certified	(60.2)	0.034	0.61	39.0	<0.005	<0.005	0.08	0.02	0.009

continued

Analysis Number	Si	As	Sb	C	S
1	<0.002	<0.002	0.005	0.0005	0.0016
2	<0.005	<0.002	0.006	0.0018	0.0007
3	<0.005	<0.005	0.008		
4		<0.005	0.009		
Average			0.0070	0.0012	0.0012
Std.Dev.			0.0018	0.0009	0.0006
Certified	<0.005	<0.005	0.007	(<0.002)	(0.001)

*** Copper by difference.

One laboratory reported 59.96% Cu by electroplating.

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

Chemical analyses were made on millings from cross-sections of the bars. The values listed are the individual laboratory analytical results for the elements listed.

Methods of analysis used were a combination of ASTM Standard Test Methods for classical wet chemistry, ICP and AA spectrometric methods, and combustion procedures for carbon and sulfur.

Inquiries concerning this Reference Material should be directed to:

Brammer Standard Co., Inc.
14603 Benfer Road
Houston, Texas 77069

Phone: (281) 440-9396
Fax: (281) 440-4432

Certified by: _____ on October 5, 1987.
G. R. Brammer

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