Brammer Standard Company, Inc.

Certificate of Analysis

B.S. H-6A

Hastelloy Alloy C-22

(analysis listed as percent by weight)

Carbon	0.005	Vanadium	0.17
Manganese	0.31	Cobalt	1.11
Phosphorus	0.010	Aluminum	0.24
Sulfur	<0.002	Niobium	0.029
Silicon	(0.03)	Titanium	0.007
Copper	0.070	Boron	0.0012
Chromium	21.37	Tin	0.003
Molybdenum	13.37	Tungsten	3.09
Iron	4.34		

Some of the co-operating laboratories were:

Allegheny Ludlum Steel Corp., Brackenridge, Pennsylvania
Allegheny Ludlum Steel Corp., Lockport, New York
Brammer Standard Co., Inc., Houston, Texas
J. Dirats and Co., Inc., Westfield, Massachusetts
Ledoux & Company, Teaneck, New Jersey
VHG Laboratories, Inc., Manchester, New Hampshire

CAUTION: Because this Reference Material contains a high percent of chromium, molybdenum, iron and tungsten, care must be taken in its application. Make certain that corrections are made for possible element interference and dilution effects.

See reverse side for more information. Certificate Number H6A-090691

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

BS H-6A Certificate No. H6A-090691

Analysis	C	Mn	P	S	Si	Cu	Cr	Mo	W
1	0.0049	0.30	0.007	0.0006	0.016	0.068	21.26	13.32	3.04
2	0.0049	0.302	0.009	<0.0002	0.034	0.069	21.30	13.35	3.05
3	0.0052	0.305	0.0094	<0.002	0.042	0.070	21.31	13.383	3.09
4		0.312	0.010			0.072	21.39	13.39	3.11
5		0.33	0.012			0.0731	21.46	13.42	3.11
6		0.33					21.49		3.12
Average	0.0050	0.313	0.0095		0.031	0.0704	21.368	13.373	3.087
Std Dev	0.0002	0.014	0.0018		0.013	0.0021	0.093	0.039	0.034
Certified	0.005	0.31	0.010	<0.002	(0.03)	0.070	21.37	13.37	3.09

Analysis	V	Co	Sn	Al	Nb	Ti	B	Fe
1	0.168	1.07	0.0026	0.23	0.027	0.005	0.0010	4.25
2	0.168	1.08	0.003	0.24	0.029	0.0062	0.0011	4.31
3	0.17	1.10	0.004	0.242	0.032	0.007	0.0011	4.35
4	0.171	1.11		0.244		0.007	0.0014	4.37
5	0.172	1.13		0.252		0.009		4.44
6		1.15		0.26				
Average	0.170	1.107	0.0032	0.245	0.0293	0.0068	0.0012	4.344
Std Dev	0.002	0.030	0.0007	0.010	0.0025	0.0015	0.0002	0.071
Certified	0.17	1.11	0.003	0.24	0.029	0.007	0.0012	4.34

Silicon data is not certified but provided for information only.

Chemical analyses were made on millings from cross-sections of the bars. The individual values listed above are the average of each analyst's analytical results. The bar stock used for this material was produced by hot-rolling billets. The entire depth of the disc may be used.

Methods of analysis used were a combination of ASTM Standard Methods E 354, E 1019, plus additional ICP, and AA spectrometric methods. The following Certified Reference Materials were used to validate the analytical data listed above: NIST SRMs 349a, 864, 865, 3171, 3172; British CRM BCS 350

This Reference Material was tested for homogeneity using ASTM Standard Method E 826 and found acceptable.

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.
14603 Benfer Road
Houston, Texas 77069-2895 USA

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

Certified by: _____ on September 9, 1991.
G. R. Brammer