

Brammer Standard Company, Inc.
Certificate of Analysis

B.S. 171B
Cobalt Base Alloy L605

Carbon	0.087	Molybdenum	0.65
Manganese	1.90	Tungsten	15.1
Phosphorus	0.008	Vanadium	(0.02)
Sulfur	<0.001	Niobium	0.046
Silicon	0.29	Aluminum	0.08
Copper	0.035	Boron	(0.0025)
Nickel	10.68	Iron	1.82
Chromium	20.5		

(analysis listed as percent by weight)

Some of the co-operating laboratories were:

AB Sandvik Steel, Sandviken, Sweden
Allegheny Ludlum Steel Corp., Brackenridge, Pennsylvania
Allegheny Ludlum Steel Corp., Lockport, New York
Brammer Standard Co., Inc., Houston, Texas
Crucible Research, Pittsburgh, Pennsylvania
J. Dirats and Co., Inc., Westfield, Massachusetts
Howmet Corporation, Dover, New Jersey
Charles C. Kawin Company, Broadview, Illinois
Ledoux & Company, Teaneck, New Jersey
Jeffrey A. Nunes Laboratories, Inc., Washington, Pennsylvania
PTL Testing Laboratory, Inc., Trenton, New Jersey
SKODA Concern Plzen, Central Research Institute, Plzen, Czechoslovakia
TCR Engineering Services, Bombay, India
VHG Laboratories, Inc., Manchester, New Hampshire

CAUTION: Because this Reference Material contains a high percent of nickel, chromium, 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 REV171B-092691

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

Analysis	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	W
1	0.0841	1.87	0.007	<0.0002	0.27	0.032	10.60	20.41	0.64	14.95
2	0.085	1.89	0.007	<0.001	0.28	0.0334	10.62	20.42	0.643	14.99
3	0.086	1.89	0.0073	0.0002	0.283	0.035	10.66	20.43	0.65	15.06
4	0.086	1.90	0.008	0.0009	0.285	0.035	10.67	20.44	0.653	15.08
5	0.089	1.90	0.009		0.30	0.036	10.68	20.46	0.658	15.10
6	0.090	1.92			0.30	0.039	10.70	20.51	0.66	15.20
7		1.92			0.302		10.72	20.58	0.66	15.28
8					0.322		10.78	20.60		15.32
9								20.63		
10								20.64		
11								20.65		
Average	0.087	1.899	0.0077		0.293	0.0351	10.679	20.525	0.652	15.123
Std Dev	0.002	0.018	0.0009		0.016	0.0024	0.057	0.097	0.008	0.133
Certified	0.087	1.90	0.008	<0.001	0.29	0.035	10.68	20.5	0.65	15.1

Analysis	V	Fe	Al	Nb	B
1	0.011	1.80	0.070	0.041	0.0006
2	0.012	1.81	0.081	0.045	0.0010
3	0.018	1.81	0.0813	0.046	0.0012
4	0.020	1.82	0.0874	0.0468	0.0014
5	0.026	1.82		0.048	0.0033
6		1.83		0.050	0.0036
7		1.86			0.0040
8					0.0046
Average	0.0174	1.821	0.0799	0.0461	0.0025
Std Dev	0.0061	0.020	0.0072	0.0031	0.0016
Certified	(0.02)	1.82	0.08	0.046	(0.0025)

Data in parentheses is not certified but provided for information only. Boron testing is not complete.

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 354, E 1019, plus additional ICP, and AA spectrometric methods. The following Certified Reference Material was used to validate the analytical data listed above: BAM 328-1

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 NIST Certified Reference Materials: SRM 1199, SRM 1200

The bar stock used for this material was produced by hot-rolling billets. The entire depth of the disc may be used.

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.
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Houston, Texas 77069-2895 USA

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

Certified by G. R. Brammer _____ on September 26, 1991.