

Brammer Standard Company, Inc.

# Certificate of Analysis

B.S. 66K

AISI Grade 1215 Resulfurized Steel

Carbon	0.051	Molybdenum	0.003
Manganese	0.86	Aluminum	0.002
Phosphorus	0.062	Cobalt	0.005
Sulfur	0.322	Nitrogen	(0.0074)
Silicon	(0.004)	Tin	<0.001
Copper	0.013	Titanium	<0.002
Nickel	0.012	Vanadium	0.001
Chromium	0.006	Arsenic	(0.006)

*(analysis listed as percent by weight)*

Some of the co-operating laboratories were:

Brammer Standard Co., Inc., Houston, Texas  
Hoesch Stahl AG, Dortmund, Germany  
J. Dirats and Co., Inc., Westfield, Massachusetts  
VHG Laboratories, Inc., Manchester, New Hampshire

See reverse side for more information.

Certificate No. 66K-081892

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

BS 66K

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Analysis	C	Mn	P	S	Si	Cu	Ni	Cr	Mo
1	0.0496	0.844	0.0612	0.317	0.002	0.0116	0.0098	0.005	0.0011
2	0.050	0.845	0.0616	0.319	0.0025	0.0117	0.011	0.005	0.0028
3	0.0502	0.857	0.062	0.319	0.0031	0.0125	0.0117	0.0054	0.0029
4	0.0511	0.86	0.062	0.323	0.006	0.013	0.013	0.0064	0.003
5	0.0513	0.864	0.0633	0.323	0.0075	0.013	0.013	0.007	0.003
6	0.0514	0.888		0.325		0.013	0.013	0.0071	0.0031
7	0.0515			0.325		0.014			
8				0.326					
Average	0.0507	0.860	0.0620	0.3221	0.0042	0.0127	0.0119	0.0060	0.0027
Std Dev	0.0008	0.016	0.0008	0.0034	0.0024	0.0008	0.0013	0.0010	0.0008
Certified	0.051	0.86	0.062	0.322	(0.004)	0.013	0.012	0.006	0.003

Analysis	Al	Co	N	Sn	Ti	V	As
1	0.0008	0.004	0.0072	0.0001	0.0002	0.001	0.0056
2	0.0014	0.0041	0.0076	0.00015	<0.0001	0.0012	0.0058
3	0.0019	0.0055		0.0006	<0.002	0.0015	
4	0.002	0.0055		0.001		0.002	
5	0.003	0.0056		<0.001			
6		0.006		<0.001			
Average	0.0018	0.0051	0.0074			0.0014	0.0057
Std Dev	0.0008	0.0008	0.0003			0.0004	0.0001
Certified	0.002	0.005	(0.0074)	<0.001	<0.002	0.001	(0.006)

Data in parentheses 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 results.

Methods of analysis used were a combination of ASTM Standard Methods E 350, E 415, 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 106b, 293, 361 to 365; BAM 039-2, 044-1; BCS 455/1, 456/1, 458/1; ECRM 085-1, 088-1, 096-1, 184-1, 481-1; GBW 01402; IMZ 1.22, 1.74

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 1222, 1224, 1225, 1261A to 1265A, 1761 to 1767

NOTE: The presence of high sulfur concentrations may produce erroneously higher readings for manganese and other elements when analyzed by optical emission spectrometry.

The bar stock used for this material was produced by hot-rolling billets and annealing. The entire depth of the disc may be used. Avoid sparking the center of the disc on optical emission spectrometers.

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 August 18, 1992.

G. R. Brammer