

Brammer Standard Company, Inc.

# Certificate of Analysis

## BS 48

**ASTM A182 (F9) CHROMIUM - MOLYBDENUM STEEL  
UNS Number K90941**

Carbon	0.113	Aluminum	(0.004)
Manganese	0.53	Vanadium	(0.014)
Phosphorus	0.031	Cobalt	(0.02)
Sulfur	0.003		
Silicon	0.73		
Copper	0.116		
Nickel	0.27		
Chromium	8.30		
Molybdenum	0.88		
Tin	0.016		

*(analysis listed as percent by weight)*

Some of the co-operating laboratories were:

Alpha Research Laboratory, Stevensville, MI  
Dirats and Co., Inc., Westfield, MA  
Herron Testing Laboratories, Cleveland, OH  
Turret Alloys Ltd., Analytical Services, Sheffield, England  
VHG Labs, Manchester, NH

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

See reverse side for more information.

Certificate Number REC48-050988

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

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

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Line Number	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	V	Co
1	0.105	0.516	0.028	0.0022	0.710	0.110	0.260	8.27	0.860	0.011	0.0020	0.010	0.014
2	0.110	0.520	0.028	0.0030	0.730	0.110	0.260	8.28	0.867	0.015	0.0030	0.010	0.015
3	0.110	0.530	0.029	0.0030	0.730	0.113	0.270	8.30	0.880	0.015	0.0040	0.011	0.020
4	0.110	0.530	0.030	0.0030	0.730	0.120	0.270	8.30	0.880	0.017	0.0048	0.011	0.022
5	0.115	0.530	0.031	0.0031	0.730	0.120	0.270	8.32	0.890	0.017	0.0060	0.018	0.023
6	0.116	0.540	0.031	0.0035	0.740	0.120	0.270	8.32	0.890	0.020		0.019	0.029
7	0.116	0.540	0.034	0.0040	0.752	0.120	0.272	8.33	0.900			0.020	
8	0.119	0.550	0.034				0.280						
Average	0.1126	0.5320	0.0306	0.0031	0.7317	0.1161	0.2690	8.303	0.8810	0.0158	0.0040	0.0141	0.0205
Std.Dev.	0.0046	0.0111	0.0024	0.0005	0.0127	0.0049	0.0065	0.022	0.0139	0.0030	0.0016	0.0046	0.0055
Certified	0.113	0.53	0.031	0.003	0.73	0.116	0.27	8.30	0.88	0.016	(0.004)	(0.014)	(0.02)

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 above are the individual analytical results.

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

Note: This Reference Material was produced by hot-rolling and annealing. This material should be used and compared with material of similar metallurgical history for best results.

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 May 9, 1988.  
G. R. Brammer

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