

Brammer Standard Company, Inc.

# Certificate of Analysis

B.S. 32C

Grade M-2 Tool Steel

Carbon	0.84	Chromium	3.98
Manganese	0.29	Molybdenum	4.85
Phosphorus	(0.018)	Tin	(0.01)
Sulfur	0.0010	Aluminum	(0.02)
Silicon	0.29	Vanadium	2.03
Copper	0.13	Cobalt	0.31
Nickel	0.35	Tungsten	6.3

*(analysis listed as percent by weight)*

Some of the co-operating laboratories were:

Bowser-Morner Testing Laboratories, Inc., Dayton, OH  
Cameron Iron Works, Houston, TX  
Chicago Spectro Service Labs., Inc., Chicago, IL  
Crucible Inc./Specialty Metals Div., Syracuse, NY  
Midstates Analytical Laboratories, Inc., Tulsa, OK  
Republic Steel Corporation, Canton, OH  
Spectrochemical Laboratories, Inc., Pittsburgh, PA  
Universal Cyclops-Specialty Steel Div., Bridgeville, PA

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

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

See data on reverse side .

Certificate Number REC32C-052087

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

Analysis Number	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	W
1	0.838	0.270	0.012	0.00095	0.29	0.120	0.340	3.95	4.77	6.045
2	0.839	0.280	0.016	0.00100	0.29	0.126	0.340	3.97	4.80	6.060
3	0.840	0.290	0.017	0.00110	0.29	0.128	0.346	3.97	4.83	6.060
4		0.290	0.020	0.00110	0.29	0.130	0.350	3.98	4.83	6.170
5		0.292	0.025		0.30	0.130	0.350	3.98	4.85	6.260
6		0.310			0.30	0.140	0.350	3.98	4.87	6.300
7								4.00	4.88	6.350
8								4.00	4.88	6.400
9								4.02	4.90	6.400
10									4.92	6.440
11										6.450
Average	0.8390	0.2887	0.0180	0.00104	0.293	0.1290	0.3460	3.983	4.853	6.2668
Std.Dev.	0.0010	0.0134	0.0048	0.00008	0.005	0.0065	0.0049	0.021	0.046	0.1585
Certified	0.84	0.29	(0.018)	0.0010	0.29	0.13	0.35	3.98	4.85	6.3

Continued

Analysis Number	Al	V	Co	Sn
1	0.007	1.96	0.298	0.005
2	0.010	2.00	0.300	0.006
3	0.015	2.01	0.300	0.009
4	0.021	2.03	0.300	0.009
5	0.024	2.04	0.320	0.018
6	0.031	2.09	0.320	
7		2.10	0.320	
Average	0.0180	2.033	0.3083	0.0094
Std.Dev.	0.0090	0.050	0.0110	0.0051
Certified	(0.02)	2.03	0.31	(0.01)

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

This Reference Material (RM) was produced by hot-rolling and annealing. This RM should be used and compared with material of similar metallurgical history as it may not plot well with chill-cast materials on some instruments.

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Certified by: G. R. Brammer on May 20, 1987.

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