

Brammer Standard Company, Inc.
Certificate of Analysis

B.S. 72B

Reference Material for Leaded Steel Grade 41L50

	Certified Value ¹	Estimate of Uncertainty ²		Certified Value ¹	Estimate of Uncertainty ²
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Analysis listed as percent by weight

C	0.497	0.006		Co	0.012	0.002
Mn	0.87	0.01		N	0.0081	0.0002
P	0.029	0.003		Pb	0.174	0.004
S	0.029	0.002		Sn	0.014	0.002
Si	0.26	0.01		V	0.004	0.001
Cu	0.21	0.01				
Ni	0.169	0.002		Information Values ³		
Cr	0.985	0.010		As	(0.006)	
Mo	0.187	0.008		Nb	(0.001)	
Al	0.020	0.002		Ti	(0.002)	

¹ The certified value listed is the present best estimate of the true value based on the results of an interlaboratory testing program.

² The uncertainties listed are based on value judgments of the material inhomogeneity and the 95% confidence interval. The half-width confidence interval C(95%) is shown on page 2.

³ Values in parentheses are not certified and are provided for information only.

This Reference Material is primarily intended for use in x-ray spectrometric methods of analysis due to the high lead content.

See the following pages for more information.

Replaces Certificate Number 72B-101791
New Certificate Number REV72B-020910

Brammer Standard Company, Inc., 14603 Benfer Road, Houston, TX 77069-2895
Telephone (281) 440-9396 Fax (281) 440-4432

BS 72B	analysis listed as percent by weight					Certificate Number REV72B-020910			
Analysis	C	Mn	P	S	Si	Cu	Ni	Cr	Mo
1	0.495	0.858	0.027	0.028	0.248	0.20	0.167	0.978	0.179
2	0.497	0.863	0.028	0.029	0.25	0.205	0.168	0.981	0.182
3	0.499	0.871	0.030	0.0294	0.253	0.207	0.169	0.984	0.185
4		0.872	0.031	0.030	0.26	0.211	0.169	0.99	0.191
5		0.877	0.031	0.0302	0.269	0.212	0.17	0.994	0.192
6						0.224	0.172		0.192
Average	0.4970	0.8682	0.0294	0.0293	0.256	0.210	0.1692	0.985	0.1868
Std Dev	0.0020	0.0076	0.0018	0.0009	0.009	0.008	0.0017	0.006	0.0056
Certified	0.497	0.87	0.029	0.029	0.26	0.21	0.169	0.985	0.187
t	4.30	2.78	2.78	2.78	2.78	2.57	2.57	2.78	2.57
C(95%)	0.0050	0.0094	0.0023	0.0011	0.011	0.009	0.0018	0.008	0.0059

continued from above

Analysis	Al	Co	N	Pb	Sn	V	As	Nb	Ti
1	0.0182	0.0099	0.0080	0.170	0.012	0.003	0.003	0.0005	0.0011
2	0.019	0.0107	0.0080	0.173	0.0133	0.0039	0.006	0.001	0.002
3	0.0195	0.012	0.0082	0.174	0.0138	0.004	0.0064	0.001	0.002
4	0.0208	0.0133	0.0082	0.175	0.014	0.0043	0.0078		0.003
5	0.0209	0.014		0.175	0.015	0.0045			
6	0.021			0.178		0.005			
Average	0.0199	0.0120	0.00810	0.1742	0.0136	0.0041	0.0058	0.0008	0.0020
Std Dev	0.0012	0.0017	0.00012	0.0026	0.0011	0.0007	0.0020	0.0003	0.0008
Certified	0.020	0.012	0.0081	0.174	0.014	0.004	(0.006)	(0.001)	(0.002)
t	2.57	2.78	3.18	2.57	2.78	2.57	3.18	4.30	3.18
C(95%)	0.0012	0.0021	0.00018	0.0028	0.0014	0.0007	0.0032	0.0007	0.0012

$C(95\%) = (t \times sd) / \sqrt{n}$ The half-width confidence interval, where t is the appropriate Student's t value, sd is the interlaboratory standard deviation, and n is the number of acceptable mean values. For further information regarding the confidence interval for the certified value see ISO Guide 35:2006 section 6.

Analysis: Chemical analyses were made on millings from the cross-section of the bars. The values listed above are the individual laboratory analytical results.

Co-operating Laboratories: Some of the co-operating laboratories were:

Brammer Standard Company, Inc., Houston, TX
 Crucible Specialty Metals, Syracuse, NY
 J. Dirats and CO., Inc. Westfield, MA
 Hoesch Stahl AG, Dortmund, Germany
 VHG Laboratories, Inc. Manchester, NH

Homogeneity: This Reference Material was tested for homogeneity and found acceptable.

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

instruments.

Available Form: This Reference Material is available in the form of a disc, approximately 41mm in diameter and 12 mm thick.

Use: This Reference Material is primarily intended for use in x-ray spectrometric methods of analysis. The entire depth of the disc may be used.

Caution: As with any bar material, avoid spark atomic emission spectrometric burns in the center of the disc (5 mm radius), as some segregation may be present.

Because this Reference Material contains a high percent of lead, care must be taken in its application. Poor results will be obtained on a spark atomic emission spectrometer if the instrument is not specifically configured for high lead solid test specimens.

Certificate Number: The unique identification number for this certificate of analysis is REV-72B-020910. This BS 72B Certificate of Analysis was revised to show the estimate of uncertainty for the certified values. After reviewing the analytical data a third decimal place was certified for nickel, chromium and molybdenum. The titanium value was changed from certified to uncertified to conform to current versions of ISO Guides. The original certificate of analysis was dated October 17, 1991.

Refer to the "Certificates" section of the Brammer Standard Company website for any revision to this or other Brammer Standard Company's Certificates of Analysis.

Sample Preparation: For best analytical results, use the same method for preparing the analytical surface on all reference materials as you use for production specimens. It is important to use a surfacing method which will give the reference materials a coarse surface. A sanding belt no finer than 40 grit is recommended. Grinding the surface with a finer grit will produce a lead-smear effect. Avoid overheating the disc during surface preparation.

Safety Notice: 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

website: brammerstandard.com

Fax: (281) 440-4432

email: contact@brammerstandard.com

Certified by: _____ on February 9, 2010.
Beau R. Brammer

Certificate Number REV72B-020910

**Brammer Standard Company, Inc., is accredited to ISO Guide 34 as a Reference Material Producer for the production of Certified Reference Materials and Reference Materials by A2LA (Certificate Number 656.02)
The scope of accreditation is listed on the website: www.brammerstandard.com**

**Brammer Standard Company's Chemical Laboratory is accredited to ISO Standard 17025 by A2LA.
(Certificate Number 656.01)**

By Certificate Number 10539, the Quality System of Brammer Standard Company, Inc., is registered to ISO 9001:2008 by National Quality Assurance, U.S.A.

Referenced Documents

ISO Guides and Standards available from Global Engineering - www.global.ihs.com

ISO Guide 35 Reference Materials - General and statistical principles for certification

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