Brammer Standard Company, Inc.

Provisional Certificate of Analysis

BS 285CD

Certified Reference Material for Chill Cast Iron

Analysis listed as percent by weight

	Estimated Analysis[1]		Estimated Analysis[1]
Al	0.020	Nb	0.005
As	0.002	Ni	1.28
B	0.008	P	0.050
C	3.30	Pb	0.001
Ca	0.002	S	0.009
Co	0.005	Sb	0.013
Cr	1.00	Si	1.95
Cu	0.30	Sn	0.002
Fe	[90.9]	Ti	0.045
Mg	0.035	V	0.13
Mn	0.70	W	0.048
Mo	0.19	Zr	0.006

[1] The estimated value listed is the present best estimate of the true value. Values are given in weight percent.

Form: This CRM is machined in the form of a disc approximately 33mm in diameter and 30mm thick by Brammer Standard Company, Inc.

A detailed final certificate of analysis will be supplied by November 23, 2024.

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285CD	Al	As	B	Be	Bi	C	Ca	Ce	Co	Cr	Cu	Fe	La	Mg
CSONH						3.22								
SAES 10/19	0.020	0.0022	0.0077			3.27	0.0021		0.0044	0.996	0.295	90.95		0.035
SAES 10/24	0.020	0.0023	0.0076			3.3	0.0021		0.0041	0.997	0.294	90.94		0.035
SAES 10/26	0.020	0.0021	0.0076			3.3	0.0021		0.004	0.999	0.292	90.94		0.035
SAES 10/31	0.019	0.002	0.0076			3.29	0.0022		0.0041	0.994	0.292	90.96		0.035
SAES 11/3	0.020	0.0023	0.0076			3.31	0.0018		0.0042	0.997	0.291	90.94		0.035
SAES Depth	0.020	0.0022	0.0078			3.3	0.003		0.0047	1	0.296	90.9		0.035
GDS 10/26	0.020		0.0081			3.31	0.0014		0.0047	0.996	0.311	90.86		0.035
GDS 10/31	0.021		0.0081			3.31	0.0015		0.0047	0.993	0.311	90.86		0.035
GDS 11/3	0.020		0.0082			3.32	0.0017		0.0045	0.997	0.312	90.83		0.035
GDS 11/3	0.021		0.0081			3.3	0.0017		0.0052	0.998	0.31	90.88		0.035
GDS 11/3	0.021		0.0081			3.31	0.0015		0.0045	0.991	0.312	90.88		0.035
GDS Depth	0.020		0.0084			3.36	0.0016		0.0054	0.987	0.311	90.79		0.035
SAES	0.020													0.035
SAES	0.020													0.035
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SAES	0.020													0.035
SAES	0.020													0.035
SAES	0.020													0.035
MTR						3.3151				1.02586	0.3099			
Average	0.0201	0.00218	0.00791			3.30108	0.00189		0.00454	0.99776	0.30284	90.8942		0.035
Certificate	**0.020**	**0.002**	**0.008**			**3.30**	**0.002**		**0.005**	**1.00**	**0.30**	**[90.9]**		**0.035**

285CD	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Si	Sn	Ta	Ti
CSONH									0.0083					
SAES 10/19	0.688	0.178		0.005	1.26		0.047	0.0027	0.0076	0.0221	1.96	0.0006		0.0439
SAES 10/24	0.69	0.184		0.005	1.25		0.0465		0.0078	0.009	1.95	0.0011		0.0438
SAES 10/26	0.692	0.194		0.0053	1.25		0.0461	0.0005	0.0078	0.0114	1.95	0.0007		0.0441
SAES 10/31	0.69	0.192		0.005	1.25		0.046	0.0002	0.008	0.0093	1.94	0.0008		0.0439
SAES 11/3	0.692	0.191		0.0046	1.25		0.0445		0.0078	0.0207	1.95	0.0007		0.044
SAES Depth	0.692	0.18		0.0054	1.27		0.05	0.0025	0.0084	0.0171	1.96	0.0006		0.0452
GDS 10/26	0.707	0.191		0.0038	1.3		0.0462	0.0008	0.0093	0.0031	1.94	0.0019		0.0446
GDS 10/31	0.703	0.191		0.004	1.3		0.0466	0.0007	0.0091	0.0035	1.95	0.0021		0.045
GDS 11/3	0.706	0.192		0.0037	1.3		0.0468	0.0012	0.0092	0.0247	1.95	0.0026		0.0445
GDS 11/3	0.705	0.192		0.0039	1.3		0.0463	0.0009	0.0095	0.0018	1.94	0.0031		0.0444
GDS 11/3	0.704	0.191		0.0041	1.3		0.0464	0.0009	0.0088	0.0061	1.95	0.0018		0.045
GDS Depth	0.698	0.191		0.0038	1.3		0.0477	0.0018	0.0102	0.024	1.96	0.0051		0.0451
MTR	0.7234	0.2112			1.3292		0.04523		0.01335		1.9178			0.0445
Average	0.69926	0.19063		0.00447	1.28148		0.04656	0.00122	0.00894	0.01273	1.94752	0.00176		0.04446
Certificate	**0.70**	**0.19**		**0.005**	**1.28**		**0.050**	**0.001**	**0.009**	**0.013**	**1.95**	**0.002**		**0.045**

285CD	V	W	Zn	Zr
CSONH				
SAES 10/19	0.134	0.0484		0.0049
SAES 10/24	0.133	0.0486		0.005
SAES 10/26	0.134	0.0484		0.005
SAES 10/31	0.133	0.0481		0.0049
SAES 11/3	0.133	0.0477		0.0049
SAES Depth	0.135	0.0489		0.005
GDS 10/26	0.134	0.0466		0.0061
GDS 10/31	0.135	0.0463		0.007
GDS 11/3	0.135	0.0478		0.0066
GDS 11/3	0.135	0.0469		0.007
GDS 11/3	0.134	0.0464		0.0069
GDS Depth	0.134	0.0477		0.0068
MTR	0.1412			
Average	0.13463	0.04765		0.00584
Certificate	**0.13**	**0.048**		**0.006**

Homogeneity: This Certified Reference Material (CRM) was tested for homogeneity using ASTM Standard Method E826 and found acceptable. It was also examined by spark atomic emission spectrometry and found to be compatible with the following Reference Materials — BS 27, 284D, 285, 285AA, 285BB, 285BF, 285BJ, 286CF; CKD 244.

Validity statement: ISO Guide 31 states that the certification should contain an expiration date for all materials where instability has been demonstrated or is considered possible, after which the certified value is no longer guaranteed by the certifying body. The certification of BS 285CD is valid indefinitely. The certification is nullified if this CRM is damaged, contaminated, or otherwise modified.

Storage: This CRM must be stored in a cool, dry, non-corrosive environment.

Certified Area: The certified area of each disc is the portion extending upward 25mm from the analytical surface.

Note: Shrinkage cavities may appear in the top portion of some discs. These cavities are normal and will not affect the certified portion of the disc.

Sample Preparation: For best analytical results, use the same method for preparing the analytical surface on all reference materials as used for production specimens. Avoid overheating the sample during surface preparation.

Caution: CRM contains significant insoluble soft metal inclusions. Surface smearing may occur. Spark atomic emission spectrometers may require extended preburns to compensate.

Safety Notice: A Safety Data Sheet (SDS) 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:

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Certified by: _____ on November 23, 2022.

Beau R. Brammer

President