Brammer Standard Company, Inc.

Provisional Certificate of Analysis

BS H3D

Certified Reference Material for Hastelloy X - UNS Number N06002

Analysis listed as percent by weight

	Estimated Analysis[1]		Estimated Analysis[1]
Al	0.14	Nb	0.40
B	0.003	Ni	[47.5]
C	0.068	O	<0.005
Co	0.70	P	0.010
Cr	21.8	S	<0.005
Cu	0.067	Si	0.27
Fe	19.3	Ti	0.045
H	<0.005	V	0.024
Mn	0.63	W	0.58
Mo	8.47	Zr	0.002
N	<0.05		

[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 38mm in diameter and 19mm thick by Brammer Standard Company, Inc.

A detailed final certificate of analysis will be supplied by August 24, 2024.

Brammer Standard Company, Inc. **14603 Benfer Road, Houston, TX 77069-2895 USA**
Telephone: (281) 440-9396 **Fax: (281) 440-4432** **Website: www.brammerstandard.com**

H3D	Al	As	B	Be	Bi	C	Ca	Ce	Co	Cr	Cu	Fe	H	Mg
CSONH						0.0664							0.00037	
BSC SAES	0.135		0.0034			0.0685			0.679	21.8	0.0892	19.33		
BSC GDS	0.145		0.0036			0.0666			0.732	22.05	0.0528	19.09		
MTR	0.14		0.002			0.07			0.70	21.69	0.06	19.36		
Average	0.14		0.003			0.0679			0.7037	21.847	0.0673	19.26	0.00037	
Certificate	**0.14**		**0.003**			**0.068**			**0.70**	**21.8**	**0.067**	**19.3**	**<0.005**	

H3D	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Si	Sn	Ta	Ti
CSONH			0.0209			0.00061			0.0003					
BSC SAES	0.65	8.51		0.357	47.4		0.0112				0.285			0.0436
BSC GDS	0.642	8.42		0.434	47.43		0.0131		0.0005		0.245			0.0422
MTR	0.61	8.48			47.6		0.007		0.001		0.28			0.05
Average	0.634	8.47	0.0209	0.3955	47.477	0.00061	0.0104		0.0006		0.27			0.0453
Certificate	**0.63**	**8.47**	**<0.05**	**0.40**	**[47.5]**	**<0.005**	**0.010**		**<0.005**		**0.27**			**0.045**

H3D	V	W	Zn	Zr										
CSONH														
BSC SAES	0.0162	0.62		0.0015										
BSC GDS	0.0317	0.591		0.0022										
MTR		0.53												
Average	0.024	0.5803		0.0019										
Certificate	**0.024**	**0.58**		**0.002**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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 H3, H3A, H3B, H4, H4A, H4B, 6255.

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 H3D 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 entire depth of the CRM may be used.

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

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:

Brammer Standard Co., Inc.
14603 Benfer Road
Houston, Texas 77069-2895 USA
Phone: (281) 440-9396
Fax: (281) 440-4432
Web: www.brammerstandard.com
Email: contact@brammerstandard.com

Certified by: _____ on August 24, 2022.

Beau R. Brammer

President