

BRAMMER STANDARD COMPANY, INC.

Provisional Certificate of Analysis BS FSX414

Certified Reference Material for Cobalt Alloy FSX414LC

	Estimated Analysis ¹		Estimated Analysis ¹
Analysis listed as percent by weight			
Al	0.012	Nb	0.013
B	<0.05	Ni	10.25
C	0.13	O	<0.005
Co	[50.1]	P	0.003
Cr	29.8	S	<0.05
Cu	<0.5	Si	0.81
Fe	0.15	Ta	<0.05
H	<0.0005	Ti	0.018
Mn	0.79	V	0.006
Mo	0.21	W	7.48
N	<0.05	Zr	<0.005

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 41mm in diameter and 19mm thick by Brammer Standard Company, Inc.

A detailed final certificate of analysis will be supplied by July 20, 2024.

FSX414	Al	As	B	Be	Bi	C	Ca	Ce	Co	Cr	Cu	Fe	H	Mg
CSONH						0.126							0.000038	
BSC SAES	0.0096		0.0025			0.107			50.21	30.55	0.0149	0.0724		
BSC GDS	0.0222		0.0007			0.125			50.87	29.14	0.0127	0.0796		
BSC GDS	0.0041		0.0021			0.113			49.09	30.63	0.001	0.323		
LTI Top						0.14				29.17		0.04		
LTI Bottom						0.14				29.26		0.10		
MTR Top						0.13				30.31		0.22		
MTR Bottom						0.13				29.59		0.20		
Average	0.012		0.00177			0.12638			50.05666667	29.8071	0.0095	0.1479	0.000038	
Certificate	0.012		<0.05			0.13			[50.1]	29.8	<0.5	0.15	<0.0005	
FSX414	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Si	Sn	Ta	Ti
CSONH			0.0026			0.00035			0.0007					
BSC SAES	0.827	0.0726			10.17						0.703		0.0098	0.0154
BSC GDS	0.686	0.0158		0.0071	10.52		0.0047		0.0000080		0.683			0.0145
BSC GDS	0.788	0.542		0.02	9.23		0.0016		0.0036000		0.779		0.0038	0.0231
LTI Top	0.78				10.44				0.001		0.83			
LTI Bottom	0.82				10.46				0.001		0.89			
MTR Top	0.72				10.53						0.80			
MTR Bottom	0.95				10.38						0.98			
Average	0.79586	0.2101	0.0026	0.0136	10.247	0.00035	0.0032		0.0012616		0.80929		0.0068	0.0177
Certificate	0.79	0.21	<0.05	0.013	10.25	<0.005	0.003		<0.05		0.81		<0.05	0.018
FSX414	V	W	Zn	Zr										
CSONH														
BSC SAES	0.0068	7.22												
BSC GDS	0.0079	7.8												
BSC GDS	0.0031	8.45												
LTI Top		7.51												
LTI Bottom		7.55												
MTR Top		7.18		0.001										
MTR Bottom		6.65												
Average	0.0059	7.48		0.001										
Certificate	0.006	7.48		<0.005	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 — 111X12671J, 112X14943H; BS 170A, 170B, 171, 171B, 172A, 172B, 173; ECRM 378-1D; IARM CoE118; IMZ 186; SRM 1199, 1200, 1242.

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 FSX414 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:

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Certified by: _____ on July 20,2022.

Beau R. Brammer
President

