

MBH

ANALYTICAL LTD

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CERTIFICATE OF ANALYSIS

Reference Material Type HIGH NITROGEN STAINLESS STEEL (WROUGHT)

Catalogue Section: 13X Sample No: NSA 3 Batch No: J

Certified Values

ELEMENT	C	Si	Mn	Ni	Cr	Mo	N
%	0.16	0.57	1.07	12.0	16.1	2.8	0.20

Form and Size: Disc 40mm diameter x 15mm thickness

Supplied by: MBH Analytical Limited

Produced by: British Steel Technical

Date of Certification: 20 November 1996

Intended Use: With Optical Emission and X-Ray Fluorescence Spectrometers.

Recommended Method of Use: Steels are generally prepared by finishing (avoiding contamination with abrasives), milling or turning on a lathe avoiding the use of lubricants) or lapping (using a suitable polishing media). However, users are recommended to follow the calibration and sample preparation procedures specified by the relevant instrument manufacturer. Preparation should be the same for reference materials and the samples for test. When using O.E. a minimum of three consistent replicate analyses is recommended to optimise precision and accuracy. Users are advised to check against possible bias between reference materials and production samples due to difference in metallurgical history and be aware of possible inter-element effect.

MBH ANALYTICAL LIMITED

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ISO9002:1994 Cert.No.0524



Method of Preparation: This Reference Material was produced from pure metals, ferro alloys and master alloy. The discs are the product of one melt cast as a single ingot which was forged and rolled to give a single bar, which was then machined to produce discs 15mm thick.

Sampling: Samples were taken from each end of the rolled bar and these were used for chemical analysis and were checked for homogeneity.

Chemical Analysis Data:

Sample	C	Si	Mn	Ni	Cr	Mo	N
1	0.156	0.564	1.06	11.97	15.91	2.77	-
2	0.160	0.571	1.07	11.96	16.10	2.86	-
3	0.153	0.56	1.07	12.02	15.98	2.78	0.202
4	0.152	-	-	-	-	-	0.202
5	0.16	0.55	1.06	12.2	16.2	2.83	0.20
6	-	0.597	1.08	11.96	16.27	2.75	0.199

Mean: 0.156 0.568 1.068 12.02 16.09 2.80 0.201

Stand. Deviation: 0.004 0.018 0.008 0.10 0.15 0.05 0.002

Homogeneity: 2 discs were taken, one from each end of the single bar produced and these were checked for homogeneity using an Optical Emission Spectrometer.

Multiple sparkings were made on each surface and averaged

The mean value of the material was then calculated from these averages.

The difference between the average for each step and the overall mean value is tabulated below in % concentration for each element.

Disc from Beginning of Pour

Position	C	Si	Mn	Ni	Cr	Mo	N
Front	-0.002	-0.006	-0.008	+0.02	-0.07	+0.01	+0.002
Back	0.000	-0.001	+0.002	+0.09	-0.01	0.00	0.000
Avg.	-0.001	-0.003	-0.003	+0.06	-0.04	0.00	+0.001

Disc from End of Pour

Position	C	Si	Mn	Ni	Cr	Mo	N
Front	0.000	-0.003	-0.008	-0.06	0.00	0.00	-0.003
Back	+0.001	+0.008	+0.013	-0.06	+0.07	0.00	+0.001
Avg.	+0.001	+0.003	+0.002	-0.06	+0.04	0.00	-0.001

Participating Laboratories:

Metals Tech (Testing) Ltd	Sheffield, England	NAMAS Approval 0963
MTS Teeside Limited	Middlesbrough, England	NAMAS Approval 0239
Ross & Catherall Limited	Killamarsh, England	NAMAS Approval 0178

Analytical Methods Used:

Carbon	(a)	Combustion (IRD)
Silicon	(a)	Atomic Absorption ICP
Manganese	(a)	Atomic Absorption ICP
Nickel	(a)	Atomic Absorption ICP
Chromium	(a)	Volumetric ICP
Molybdenum	(a)	Atomic Absorption ICP
Nitrogen	(a)	Inert Gas Fusion (Thermal Conductivity)

NOTE :

1. (a) Overchecked by OES

2. Confidence Limits

These are the upper and lower values between which the actual measurements will fall with a certain probability to a gaussian distribution

68.3% of the results will fall within ± 1 x Standard Deviation of the mean

95.4% of the results will fall within ± 2 x Standard Deviation of the mean

99.7% of the results will fall within ± 3 x Standard Deviation of the mean

The material to which the Certificate of Analysis refers is supplied subject to our general conditions of sale.