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CERTIFICATE OF ANALYSIS

IMZ 150A

REFERENCE MATERIAL
AUSTENITIC STEEL

Analysis listed as percent by weight [% m/m]

C	0.048	Cu	0.090
Mn	1.35	Mo	0.12
Si	0.59	W	0.11
P	0.0064	Ti	0.021
S	0.0095	Co	0.125
Cr	18.89	Nb	0.0026
Ni	12.75	V	(0.027)
Al	0.022		

Values in brackets are informative

Certificate Number: IMZ 150A-020625

Certificate revision history on page 4

Analysis	C	Si	Mn	P	S	Al	Ti	Co
1	0.045	0.588	1.32	0.0055	0.0086	0.020	0.019	0.120
2	0.046	0.589	1.34	0.0060	0.0090	0.021	0.020	0.121
3	0.046	0.590	1.35	0.0062	0.0090	0.021	0.020	0.124
4	0.047	0.591	1.35	0.0063	0.0099	0.023	0.021	0.126
5	0.048	0.591	1.35	0.0063	0.0099	0.023	0.022	0.128
6	0.049	0.592	1.36	0.0066	0.0099	0.024	0.023	0.130
7	0.049	0.593	1.36	0.0070	0.0100	0.024	0.023	
8	0.050	0.600	1.36	0.0070	0.0100		0.023	
9		0.600						
10		0.600						
11		0.601						
Average	0.0475	0.594	1.349	0.00636	0.00954	0.0223	0.0214	0.1248
SD	0.002	0.005	0.014	0.0005	0.0006	0.002	0.002	0.0039
Certified value	**0.048**	**0.59**	**1.35**	**0.0064**	**0.0095**	**0.022**	**0.021**	**0.125**
C(95%)	0.0015	0.0035	0.0118	0.0004	0.0005	0.0016	0.001	0.0043

Analysis	Cr	Cu	Ni	Mo	Nb	W	V
1	18.71	0.086	12.52	0.115	0.0020	0.102	0.026
2	18.74	0.086	12.63	0.115	0.0022	0.108	0.026
3	18.76	0.087	12.69	0.118	0.0023	0.109	0.030
4	18.78	0.090	12.72	0.120	0.0026	0.109	
5	18.89	0.090	12.74	0.129	0.0027	0.114	
6	18.95	0.091	12.75	0.129	0.0030	0.118	
7	18.95	0.093	12.82	0.131	0.0033	0.120	
8	18.96	0.094	12.83	0.132			
9	19.03		12.90				
10	19.14		12.91				
11							
Average	18.891	0.0896	12.751	0.1236	0.0026	0.1114	0.0273
SD	0.141	0.003	0.121	0.0073	0.0005	0.0063	0.0023
Certified value	**18.89**	**0.090**	**12.75**	**0.12**	**0.0026**	**0.11**	
C(95%)	0.105	0.003	0.090	0.006	0.0004	0.006	

$C(95\%) = (t \cdot SD)/\sqrt{n-1}$ - *The half-width confidence interval, calculated for the 95 % confidence level, 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 35:1989 section 4.*

Certification Process: Both preparation of this Reference Material and certification process were prepared according to requirements of ISO Guide 31, ISO Guide 34 and ISO Guide 35. This Reference material is in agreement with ISO Guide 30.

Chemical Analysis: Chemical analyses were carried out on chips prepared by milling of the certified portion of the bars. Single values in the above table are the means obtained by individual laboratories. The following methods were used for analysis:

C and S - high frequency infra-red absorption (HFIR), AES spark;
Mn - ICP-AES, AES spark, WD XRF;
Si - gravimetric, AES spark, ICP-AES, WD XRF;
P - ICP-AES, AES spark, WD XRF;
Cr - titrimetic, ICP-AES, AES spark, WD XRF;
Ni - gravimetric with dimethylglyoxime, ICP-AES, AES spark, WD XRF;
Cu - ICP-AES, AES spark, WD XRF;
Mo - ICP-AES, AES spark, WD XRF;
V - ICP-AES, AES spark, WD XRF;
Ti - ICP-AES, AES spark, WD XRF;
Nb - ICP-AES, AES spark, WD XRF;
W - ICP-AES, AES spark, WD XRF;
Al - ICP-AES, AES spark, WD XRF;
Co - ICP-AES, AES spark, WD XRF.

The laboratories participating in the testing of this Reference Material:

Arcelor Mittal Kraków, Kraków
Huta Małapanew – Ozimek
Instytut Metalurgii Żelaza, Gliwice
ISD Huta Częstochowa, Częstochowa
Zakład Badań Ochrony Środowiska i Technologii Hutniczych, Dąbrowa Górnicza
Třinecke Żelezarny, a.s., Třinec, Czech Republic

Homogeneity: The homogeneity of this Reference Material was evaluated with the use of statistic parameters obtained during interlaboratory tests in 1996 and found acceptable. Optical emission spectrometry with spark excitation method was used.

Traceability: This Reference Material was tested with the use of optical emission spectrometry with spark excitation and was found compatible to the following CRMs: BCS SS460/1-468/1, IMZ155, BS SS3951.

Production of melt: This material was produced by Instytut Metalurgii Żelaza, Gliwice, Poland. Melting was performed in a vacuum induction furnace VSG 100S.

Available form: Discs: 40 mm in diameter and 40 mm thick; chips: bottles 100g

Intended use: This Reference Material is intended for use in optical emission and X-ray spectrometric methods (bulks sample) and also in classical wet methods, UV-Vis spectrometry, AAS, ICP-AES, C,S- and N- analyzers and other wet methods (chips). Caution: In optical emission spectrometry with spark excitation the central part of the surface of discs (approximately 5 mm) should be avoided because of possible segregation of the material.

Validity of certification: The certification of IMZ 150A is valid indefinitely provided this Reference Material is stored in dry place and in environment free from chemical or other aggressive vapours. Periodic recertification is not required. The certification is nullified if this Reference Material is damaged, contaminated or otherwise modified. Chips: if the contents of the bottle becomes changed (for example oxidized) or contaminated, the whole contents of bottle should be discarded.

Safety: This Reference Material and packing does not contain substances which can directly influence health.

Storage: This Reference Material should be stored in dry place and in environment free from chemical or other aggressive vapours.

Inquiries regarding this Reference Material should be directed to:
rm@git.lukasiewicz.gov.pl

Approved by
Director of the Institute

Prof. Dr. Hab. Eng. Adam Zieliński

Certificate issue date: 02 June 2025

Certificate revision history:
02 June 2025 (editorial changes);
21 January 2020 (change of information regarding validity of certification, editorial changes);
December 2009 (Original certificate date).