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GIT

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CERTIFICATE OF ANALYSIS

IMZ 75A

CERTIFIED REFERENCE MATERIAL
LOW ALLOY STEEL

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

	Certified value	Uncertainty		Certified value	Uncertainty
C	0.112	± 0.006	Co	0.0037	± 0.0003
Si	0.618	± 0.009	V	0.013	± 0.001
Mn	0.394	± 0.006	Ti	0.023	± 0.001
P	0.080	± 0.005	Cu	0.428	± 0.008
S	0.016	± 0.001	Al	0.009	± 0.001
Cr	0.401	± 0.005	Nb	0.024	± 0.001
Ni	0.041	± 0.002	N	0.0024	± 0.0003
Mo	0.018	± 0.001	Sn	0.023	± 0.001
			B	0.0021	± 0.0001

the uncertainty bases on 95% confidence limit and material inhomogeneity

Certificate Number: IMZ75A-23072024
Certificate revision history on page 4

Analysis	C	*	Si	*	Mn	*	P	*	S	*	Cr	*	Ni	*	Mo	*
1	0.1070	2	0.60	6	0.37	6	0.073	1	0.0139	5	0.390	12	0.038	9	0.016	7
2	0.109	2	0.60	7	0.385	5	0.073	6	0.014	1	0.39	9	0.03887	7	0.01621	7
3	0.109	5	0.607	1	0.387	1	0.0746	1	0.015	2	0.39	7	0.039	7	0.0163	7
4	0.110	2	0.6088	7	0.3895	1	0.075	5	0.0150	5	0.39	5	0.039	6	0.017	7
5	0.110	2	0.61	1	0.39	7	0.0771	7	0.0156	2	0.3904	7	0.040	5	0.017	5
6	0.11	5	0.610	12	0.39	5	0.078	6	0.0159	2	0.40	1	0.040	7	0.017	6
7	0.11	2	0.615	5	0.391	14	0.079	5	0.016	5	0.40	5	0.0402	14	0.018	5
8	0.1108	2	0.6150	1	0.392	5	0.079	12	0.0160	2	0.399	7	0.0404	7	0.0184	1
9	0.112	2	0.6182	7	0.392	12	0.080	5	0.017	5	0.40	5	0.0405	7	0.019	5
10	0.113	2	0.62	5	0.3922	7	0.0810	7	0.017	2	0.400	5	0.0406	7	0.019	5
11	0.113	2	0.62	12	0.393	7	0.081	7	0.017	5	0.40	5	0.041	5	0.019	5
12	0.114	5	0.62	5	0.395	5	0.081	12	0.0170	10	0.40	5	0.041	5	0.019	5
13	0.114	13	0.62	5	0.396	7	0.082	5	0.017	5	0.40	6	0.0410	1	0.019	1
14	0.1160	5	0.624	12	0.40	5	0.084	5	0.01717	7	0.4033	1	0.041	1	0.0192	7
15	0.1163	5	0.626	5	0.40	5	0.085	5	0.0175	2	0.405	14	0.042	5	0.02	12
16	0.12	5	0.63	5	0.40	7	0.0863	7	0.0177	2	0.4062	7	0.0424	12	0.0200	1
17			0.63	8	0.40	5	0.088	5	0.018	2	0.41	5	0.045	5	0.020	5
18			0.630	8	0.40	12			0.0182	2	0.416	7	0.045	5		
19			0.63	5	0.4080	7					0.42	7	0.045	5		
20			0.632	7	0.41	1					0.42	1				
Average	0.1121		0.6183		0.3940		0.0798		0.0164		0.4011		0.0411		0.0182	
SD	0.0034		0.0100		0.0086		0.0045		0.0013		0.0095		0.0021		0.0014	
Certified value	**0.112**		**0.618**		**0.394**		**0.080**		**0.016**		**0.401**		**0.041**		**0.018**	
C(95%)	0.0018		0.0047		0.0040		0.0023		0.0006		0.0045		0.0010		0.0007	
Standard deviation of homogeneity	0.006		0.008		0.004		0.004		0.001		0.002		0.002		0.001	
Uncertainty	**0.006**		**0.009**		**0.006**		**0.005**		**0.001**		**0.005**		**0.002**		**0.001**	

Analysis	Co	*	V	*	W**	*	Ti	*	Cu	*	Al	*	Nb	*	N	*
1	0.0030	5	0.0100	7	0.0008	7	0.021	1	0.41	7	0.007	7	0.0217	7	0.0022	3
2	0.00308	7	0.01049	7	0.00153	7	0.0211	7	0.413	1	0.008	5	0.022	1	0.0022	3
3	0.0032	7	0.011	5	0.002	5	0.02193	7	0.414	5	0.0080	5	0.0224	7	0.0023	3
4	0.0034	7	0.012	5	0.0023	1	0.022	1	0.420	5	0.0084	5	0.02259	7	0.0024	3
5	0.0034	7	0.012	5	0.003	5	0.022	6	0.4295	7	0.0087	7	0.023	5	0.0025	5
6	0.0036	6	0.013	5	0.003	6	0.022	7	0.43	5	0.009	5	0.023	5	0.0029	3
7	0.004	5	0.013	7	0.0045	7	0.023	5	0.43	5	0.0091	6	0.024	5		
8	0.004	5	0.013	6			0.023	7	0.43	5	0.0099	7	0.024	5		
9	0.004	5	0.013	7			0.023	5	0.43	1	0.010	5	0.024	5		
10	0.0041	5	0.013	5			0.0231	7	0.43	12	0.010	5	0.024	1		
11	0.0043	1	0.0135	7			0.0234	1	0.43	7	0.010	7	0.024	5		
12	0.0048	1	0.014	5			0.024	5	0.4358	5	0.01092	7	0.0250	1		
13			0.014	5			0.024	5	0.438	7	0.011	1	0.025	6		
14			0.014	1			0.024	5	0.440	5	0.012	5	0.025	7		
15			0.0148	1			0.025	5	0.4411	7						
16							0.025	5								
Average	0.0037		0.0127		0.0024		0.0230		0.4281		0.0094		0.0235		0.0024	
SD	0.0005		0.0014		0.0012		0.0012		0.0097		0.0014		0.0011		0.0003	
Certified value	**0.0037**		**0.013**				**0.023**		**0.428**		**0.009**		**0.024**		**0.0024**	
C(95%)	0.0003		0.0008				0.0007		0.0054		0.0008		0.0006		0.0003	
Standard deviation of homogeneity			0.0002				0.0008		0.006		0.0004		0.0009			
Uncertainty	**0.0003**		**0.001**				**0.001**		**0.008**		**0.001**		**0.001**		**0.0003**	

Analysis	**Sn**	*	**As****	*	**Sb****	*	**Pb****	*	**B**	*
1	0.020	7	0.001	5	0.00303	7	0.0007	4	0.0019	7
2	0.021	6	0.0011	5	0.004	5	0.001	5	0.0019	5
3	0.02158	7	0.0011	5	0.0049	5	0.0014	5	0.0020	5
4	0.0216	7	0.0012	1	0.005	5	0.0014	6	0.002	5
5	0.023	1	0.0013	7	0.0053	4	0.00143	7	0.0020	5
6	0.0239	7	0.0014	7	0.0053	6	0.0015	7	0.00201	7
7	0.024	5	0.00260	7	0.005	1	0.0017	5	0.0021	6
8	0.024	5	0.0059	4	0.006	4	0.0017	4	0.0022	5
9	0.024	5	0.0084	6	0.006	5	0.0018	1	0.0023	5
10	0.024	4	< 0.001	5	0.0076	7	0.0020	5	0.0024	5
11	0.024	5			0.0084	7	0.002	14	0.0025	7
12	0.024	5								
13	0.024	5								
14	0.0242	1								
15	0.025	1								
Average	0.0232		0.0027		0.0055		0.0015		0.0021	
SD	0.0015		0.0027		0.0015		0.0004		0.0002	
Certified value	**0.023**								**0.0021**	
C(95%)	0.0006								0.0001	
Standard deviation of homogeneity	0.001								0.0001	
Uncertainty	**0.001**								**0.0001**	

* - analytical method used
** - informative value

C(95%) = (t · 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

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 and also for bulk samples. Single values in the above table are the means obtained by individual laboratories. The following methods were used for analysis:

1 – wavelength dispersive x-ray fluorescence spectrometry,
2 – high frequency infra red absorption,
3 – high temperature extraction,
4 – graphite furnace atomic absorption spectrometry,
5 – spark atomic emission spectrometry,
6 – inductive coupled plasma mass spectrometry,
7 – inductive coupled plasma atomic emission spectrometry,
8 – gravimetry,
9 – potentiometric titration,
12 – spectrophotometry,
13 – coulometry,
14 – flame atomic emission spectrometry.

The laboratories participating in certification analysis:

- Deutsche Edelstahlwerke GmbH; Abteilung PP-CH, Witten, Germany - accreditation DakkS D-PL-19654-01-00, DIN EN ISO/IEC 17025;
- Enviform a.s., Třinec, Czech Republic; Testing laboratory Nr. 1371; Accreditation Certificate No. 219/2016 by the Czech Accreditation Institute; ČSN EN ISO/IEC 17025:2005;

- Huta Stali Jakościowych Stalowa Wola, Zakładowe Laboratorium Badawczo-Doświadczalne; UDT LB-032/22-16;
- Institute for Certified Reference Materials, Jekatierinburg, Russia, accreditation RU.0001.510008;
- Institute for Ferrous Metallurgy – Gliwice, Poland; PCA 17025 - AB554;
- Lithea, Ltd. Czech Republic;
- OnderzoeksCentrum voor de Aanwending van Staal, Zelzate, Belgium;
- PJSC "Electrometallurgical works "Dneprospetsstal", Zaporozhye, Ukraine;
- U.S. Steel Košice - Labortest, s.r.o., Slovakia, Slovenská národná akreditačná služba ISO/IEC 17025:2005, Reg. No. 026/S-010 and 026/S-011;
- ŽĎAS. a.s. Žďár nad Sázavou. Czech Republic.

Homogeneity: The homogeneity of this Reference Material was evaluated with the use of ASTM E826-81 standard. 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:
1C4-1, 28C1-2, 7C1-3, AR1653, AR645, BCS 451, BCS239/3, BCS/SS456, BCS/SS460, BCS409, BCS433, BCS456, BCS460, BS12B, BS1981, BS 50F, C10-1-1, CKD165B, CKD166B, CKD180B, CKD181A-189A, CZ2006A, EURO-AKP 178-1, EURONORM 85, EURONORM 86, EURONORM 87, EZRM 085-1, EZRM 231-2, Euronorm 281-1, IC5-1, IC6-1, IMZ1.5/3, IMZ1.13/1, IMZ1.3/7, IMZ1.33, IMZ1.71, IMZ1.73, IMZ1.78, IMZ1.85, IMZ112, IMZ117, IMZ124, IMZ138, IMZ55/1, IMZ56, IMZ57, IMZ61/1, IMZ74, IMZ75, IMZ76, IMZ77, JSS164-3, LECO 501-550, LECO 501-675, LECO 501-676, MBH 12X353, MBH 12X353 (F), MBH 12X356, MBH 12X365, MBH 12X41530, MBH 12xLA6B, MBH12xLA6, MBH 13X43100, SPL RM 2014, SPL RM 2005, SPL RM 2006, U10-5, U11-5, UNL17, UNL7-3.

Production of melt: This material was manufactured by Institute for Ferrous Metallurgy, Gliwice, Poland.

Available form: Discs 38 mm in diameter and 20 mm high.

Intended use: This Reference Material is intended for use in optical emission and X-ray spectrometric methods. Note: In optical emission spectrometry with spark excitation it is recommended to avoid using the central part of the surface (diameter approx. 5 mm) due to possible segregation of material.

Validity of certification: The certification of IMZ 75A is valid indefinitely within the uncertainty specified 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.

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: 23 July 2024

Certificate revision history:
23 July 2024 (editorial changes)
3 February 2021 (change of information regarding validity of certification, editorial changes);
December 2017 (Original certificate date)