

CERTIFICATE OF ANALYSIS

IMZ 102/3

SPECTROMETRIC REFERENCE MATERIAL OF STEEL

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

C	1.11
Mn	0.15
Si	1.06
P	0.014
Cr	1.59
Ni	0.021
Cu	0.13
Mo	0.43
Al	0.017
S	(0.0045)
V	(0.012)

values in brackets are informative

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Analysis	% C	%Mn	% Si	% P	% Cr	% Ni	%Cu	% Mo	%Al	% S	% V	% Zr	% B
1	1.07	0.14	1.01	0.011	1.55	0.016	0.12	0.41	0.015	0.002	0.005	0.007	<0.0005
2	1.10	0.14	1.03	0.012	1.55	0.017	0.13	0.41	0.016	0.0027	0.008		0.0008
3	1.10	0.14	1.03	0.012	1.55	0.019	0.13	0.42	0.016	0.003	0.008		
4	1.10	0.15	1.04	0.013	1.58	0.020	0.13	0.42	0.016	0.003	0.009		
5	1.10	0.15	1.04	0.013	1.58	0.020	0.13	0.42	0.016	0.004	0.010		
6	1.11	0.15	1.05	0.013	1.59	0.020	0.13	0.43	0.016	0.004	0.010		
7	1.12	0.15	1.06	0.013	1.59	0.021	0.13	0.43	0.016	0.004	0.010		
8	1.12	0.15	1.07	0.014	1.59	0.021	0.14	0.43	0.017	0.004	0.010		
9	1.12	0.15	1.07	0.015	1.59	0.022	0.14	0.44	0.018	0.006	0.011		
10	1.12	0.16	1.07	0.015	1.60	0.022	0.14	0.44	0.019	0.006	0.013		
11	1.13	0.16	1.07	0.015	1.60	0.023	0.14	0.45	0.020	0.006	0.015		
12	1.13	0.16	1.09	0.017	1.62	0.024	0.14	0.46	0.021	0.007	0.015		
13	1.13	0.16	1.09	0.018	1.63	0.024	0.14	0.46		0.007	0.030		
Average	1.11	0.15	1.06	0.014	1.59	0.021	0.13	0.43	0.017	(0.0045)	(0.012)		
C(95%)	0.01	0.005	0.02	0.001	0.02	0.001	0.005	0.01	0.001				

$C(95\%) = (t \cdot SD) / \sqrt{n-1}$ - 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.

The laboratories participating in the testing of this Reference Material:

1. Instytut Metalurgii Żelaza, Zakład Chemii Analitycznej – Gliwice,
2. Huta Baildon, Zakład Badawczo Doświadczalny – Katowice,
3. Huta Batory, Zakłady Badawczo-Doświadczalne – Chorzów Batory,
4. Huta Częstochowa, Centralne Laboratorium Chemiczne – Częstochowa,
5. Huta Bobrek, Centralne laboratorium Chemiczne – Bytom,
6. Huta Katowice, Centralne Laboratorium Chemiczne – Katowice,
7. Huta im T.Sendzimira, Ośrodek Badawczo – Doświadczalny – Kraków,
8. Huta Ostrowiec, Centralne Laboratorium Chemiczne – Ostrowiec,
9. Huta Pokój, Centralne Laboratorium Chemiczne – Ruda Śląska,
10. Huta Stalowa Wola, Centralne Laboratorium Chemiczne – Stalowa Wola,
11. Huta Warszawa, Centralne Laboratorium – Warszawa,
12. Huta Zawiercie, Centralne Laboratorium Chemiczne – Zawiercie,
13. Huta Zygmunt, Laboratorium Zakładowe – Bytom

Analytical methods used for certification analysis:

- C** - high frequency infra-red absorption (HFIR), conductometric, volumetric;
Mn - flame AAS, photometric with potassium periodate, titrimetric arsenite-nitrite;
Si - photometric as silicon-molybdenum blue, gravimetric;
P - photometric as molybdenum blue, photometric as phosphovanadomolybdate, titrimetric, gravimetric;
Cr - flame AAS, photometric with diphenylcarbazide, potentiometric, titrimetric;
Ni - flame AAS, photometric with dimethylglyoxime, potentiometric;
Cu - flame AAS, photometric with diethyldithiocarbamate, polarographic;
Mo - photometric with ammonium thiocyanate, flame and GF AAS;
Al - flame AAS, photometric with aluminon, photometric with eriochromocyanin R;
S - high frequency infra-red absorption (HFIR), iodometric titration, alkalimetric titration;

V - flame and GF AAS, photometric , polarographic;
Zr - spectrophotometric with xylene orange;
B - photometric with Nile blue after pyrohydrolysis.

Production of melt: This material was produced by Huta Baildon, Katowice.

Available form: Discs: 40 mm in diameter and 40 mm thick.

Intended use: This Reference Material is intended for use in optical emission and X-ray spectrometric methods.

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 102/3 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.

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

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

Inquiries regarding this Reference Material should be directed to:
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Approved by
Director of the Institute

Prof. Dr. Hab. Eng. Adam Zieliński

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Certificate revision history:

02.06.2025 (editorial changes);

29 April 2021 (change of information regarding validity of certification, editorial changes);

January 2003, February 2019 (editorial changes)

March 1985 (Original certificate date)