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CERTIFICATE OF ANALYSIS

IMZ 73

REFERENCE MATERIAL
OF LOW ALLOY STEEL

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

C	0.097
Mn	0.68
Si	0.12
P	0.019
S	0.013
Cr	0.079
Ni	0.13
Cu	0.17
Mo	0.013
Al	0.010
V	0.022

Certificate Number: IMZ73-150724

Certificate revision history on page 4

Analysis	% C	%Mn	% Si	% P	% S	% Cr	% Ni	%Cu	% Mo	% V	% Al	% Ti	% Nb	Zr
1	0.093	0.66	0.10	0.016	0.012	0.074	0.12	0.15	0.010	0.020	0.007	<0.01	0.010	0.002
2	0.094	0.66	0.11	0.016	0.012	0.076	0.12	0.16	0.011	0.021	0.008	0.0010	0.012	0.003
3	0.094	0.67	0.12	0.017	0.012	0.078	0.12	0.17	0.011	0.021	0.009	0.0023	0.013	
4	0.095	0.67	0.12	0.018	0.013	0.078	0.12	0.17	0.011	0.022	0.009			
5	0.096	0.67	0.12	0.018	0.013	0.078	0.13	0.17	0.012	0.022	0.010			
6	0.097	0.68	0.12	0.019	0.013	0.078	0.13	0.17	0.014	0.022	0.010			
7	0.097	0.68	0.13	0.019	0.013	0.079	0.13	0.17	0.014	0.022	0.010			
8	0.098	0.69	0.13	0.020	0.013	0.079	0.13	0.17	0.015	0.022	0.011			
9	0.100	0.70	0.13	0.020	0.013	0.080	0.13	0.18	0.015	0.023	0.011			
10	0.101	0.70	0.14	0.022	0.014	0.082	0.13	0.18		0.023	0.011			
11	0.103	0.70	0.14	0.022	0.015	0.083	0.13	0.18			0.012			
Average	0.097	0.68	0.12	0.019	0.013	0.079	0.13	0.17	0.013	0.022	0.010			
C(95%)	0.002	0.01	0.008	0.001	0.0006	0.002	0.004	0.005	0.002	0.0007	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.

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 - 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;
S - high frequency infra-red absorption (HFIR), iodometric titration, alkalimetric titration;
Cr - flame AAS, photometric with diphenylcarbazide, potentiometric, titrimetic;
Ni - flame AAS, photometric with dimethylglyoxime, potentiometric;
Cu - flame AAS, photometric with diethyldithiocarbamate, polarographic;
Mo - photometric with ammonium thiocyanate, flame and GF AAS;
Nb - photometric with xylenol orange, photometric with nitrosulphophenol S, photometric with ammonium thiocyanate, polarographic;
Al - flame AAS, photometric with aluminon, photometric with eriochromocyanin R;
V - flame and GF AAS, photometric, polarographic;
Ti - flame and GF AAS, photometric with diantipirylmethane, polarographic;
Zr - photometric with xylenol orange;

The laboratories participating in the testing of this Reference Material were:

- Instytut Metalurgii Żelaza, Zakład Chemii Analitycznej, Gliwice, Poland
- Instytut Odlewnictwa, Zakład Laboratoriów, Kraków, Poland
- Huta Baildon, Zakład Badawczo - Doświadczalny, Katowice, Poland
- Huta Baildon, Zakład Wytwórczo - Doświadczalny, Strzemieszyce, Poland
- Huta Batory, Zakład Badawczo - Rozwojowy, Chorzów Batory, Poland
- Huta Częstochowa, Centralne Laboratorium Chemiczne, Częstochowa, Poland
- Huta Katowice, Centralne Laboratorium Chemiczne, Katowice, Poland
- Huta im Sendzimira, Ośrodek Badawczo – Doświadczalny, Kraków, Poland
- Huta Ostrowiec, Centralne Laboratorium Chemiczne, Ostrowiec Świętokrzyski, Poland
- Huta Pokój, Centralne Laboratorium Chemiczne, Ruda Śląska, Poland
- Huta Warszawa, Centralne Laboratorium Chemiczne, Warszawa, Poland

Homogeneity: The homogeneity of this Reference Material was evaluated with the use of statistic parameters obtained during interlaboratory tests and found acceptable.

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 73 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.

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: 15 July 2024

Certificate revision history:
15 July 2024 (editorial changes)
11 February 2021 (change of information regarding validity of certification, editorial changes);
January 2003 (editorial changes)
July 1983 (Original certificate date)