

Metal and Quality, LLC
Reference Material MHCX04
Certificate of Chemical Analysis
Silico-Manganese



INFORMATION

Reference Material MHCX04 is intended for calibration of measuring means at definition of chemical compound of silico-manganese

MEAN VALUES OF LABORATORIES, mass fraction in %

	C	S	Mn	Si	P	Fe	Cu	Ni	Al	Ti	Cr	Co	Mo	V	As	Sn	Pb	Zn	Ca	B
1	0.763	0.0100	69.73	22.80	0.146	5.03	0.100	0.109	0.0060	0.257	0.088	0.105	0.014	0.060	0.0034	0.0078	0.0070	0.0097	0.006	0.02
2	0.765	0.0080	69.74	22.86	0.146	5.09	0.100	0.113	0.0100	0.270	0.100	0.110	0.015	0.081	0.0036	0.0080	0.0075	0.0110	0.013	0.04
3	0.777	0.0100	69.77	22.88	0.147	5.09	0.101	0.120	0.0101	0.270	0.100	0.112	0.017	0.087	0.0040	0.0082	0.0079	0.0126	0.025	
4	0.780	0.0114	69.81	22.93	0.148	5.18	0.105	0.120	0.0112	0.283	0.107	0.112	0.019	0.088	0.0043	0.0083	0.0080	0.0127		
5	0.784	0.0120	69.89	22.94	0.149	5.27	0.106	0.122	0.0125	0.284	0.110	0.112		0.090	0.0045	0.0101	0.0086	0.0130		
6	0.790	0.0120	69.91	23.08	0.150	5.31	0.106	0.125	0.0130	0.285	0.110			0.104			0.0095			
7	0.800	0.0120	70.00	23.31	0.151	5.35	0.108	0.127	0.0140	0.307	0.112									
8	0.820	0.0121	70.06	23.52	0.151	5.39														
9	0.850		70.10			5.42														
10			70.14			5.48														
11						5.50														
M(M)	0.792	0.0109	69.92	23.04	0.149	5.28	0.104	0.119	0.0110	0.279	0.104	0.110	0.016	0.085	0.0040	0.0085	0.0081	0.0118	<i>0.015</i>	<i>0.03</i>
s(M)	0.028	0.0015	0.15	0.25	0.002	0.16	0.003	0.006	0.0026	0.016	0.008	0.003	0.002	0.014	0.0005	0.0009	0.0009	0.001	<i>0.010</i>	<i>0.01</i>

M(M) - mean of intralaboratory means; *s(M)* - standard deviation of the mean values of laboratories

CERTIFIED (bold), mass fraction in %, uncertainty C (95%)

C	S	Mn	Si	P	Fe	Cu	Ni	Al	Ti	Cr	Co	Mo	V	As	Sn	Pb	Zn	Ca	B
0.79	0.011	69.9	23.0	0.149	5.28	0.104	0.12	0.011	0.28	0.104	0.110	0.016	0.085	0.0040	0.0085	0.0081	0.012	<i>0.015</i>	<i>0.027</i>
0.02	0.001	0.1	0.2	0.002	0.11	0.003	0.01	0.002	0.01	0.008	0.003	0.003	0.014	0.0005	0.0011	0.0009	0.002	-	-

Uncertainty C(95%) estimated as the half-width confidence interval of Student's t-distribution, when n is the number of laboratory means

$$C(95\%) = \frac{t \cdot s(M)}{\sqrt{n}}$$

Italics - approximate value

SPECIFICATION	Reference material was obtained from the pulverized of melt induction melting as powder fraction less than 160 microns
TRACEABILITY	The characterization of material has been achieved by means interlaboratory experiment in accordance to ISO Guide 35:2006. In each laboratory applied the methods of analysis of their choice
DELIVERY	RM in glass (70 g) and Certificate
DATE OF ISSUE	December, 2015
VALIDITY	December, 2030
NOTE	Reference material should be stored in a tightly closed bottle in a dry and cool place. When the bottle is opened for analysis, it should be stoppered immediately after use

PARTICIPATING LABORATORIES

Azovstal Iron & Steel Works PJSC, Ukraine
 Arcelormittal Ostrava, Czech Republic
 Dneprospetsstal (DSS) PJSC, Ukraine
 Contemporary Certification and Inspection CCI, Ukraine
 Element Materials Technology, USA
 Institute for Ferrous Metallurgy, Poland
 Nikopol Ferroalloy Plant PJSC, Ukraine
 TCR Engineering Services, India
 Zaporozhye Ferro Alloys Plant PJSC, Ukraine
 Zaporizhstal PJSC, Ukraine

THE METHODS USED

Coulometric, IR absorption, Gravimetric, Titrimetric, Potentiometric, Photometric, ICP-OES, Flame AAS, XRF

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