

Metal and Quality LLC
CERTIFICATE OF ANALYSIS
CRM CX09
High Manganese Steel
(ASTM A128, GOST 7370-98, GOST 977-88)



INFORMATION

Certified Reference Material of High Manganese Steel CX09 (DSZU 083.30-2010), authorized by State Committee of Ukraine for Technical Regulation and Consumer Policy

APPLICABILITY

The **CRM CX09** is intended for verification, calibration of measuring instruments, for metrological certification and control of errors of measurements methods at definition of chemical compound of high manganese steels (ASTM A128, GOST 7370-98, GOST 977-88) using chemical and physical-chemical methods

DEVELOPER AND MANUFACTURER

Metal and Quality, LLC

CERTIFIED VALUES (mass fraction in % by weight)

CRM CX09	C	Si	Mn	P	S	Cr	Ni	Cu
Certified value	1.16	0.35	12.90	0.087	0.0057	0.193	0.121	0.101
Estimate of uncertainty	0.01	0.01	0.06	0.002	0.0006	0.006	0.007	0.004

The certified values are calculated in accordance with the national standard DSTU GOST 8.532-2003. Uncertainty estimated as the half width confidence interval C(95%) of Student's t-distribution.

Minimum sample for analysis – 0.5 gram, for sulfur – 1.0 gram

Indicative content

Al	V	Nb	N	B	Ti
0.007	0.03	0.014	0.013	0.0012	0.006

SPECIFICATION

CRM is available as shaving of thickness less than 0.3 mm. Shavings was obtained on a lathe from heat-treated rod diameter 50 mm with the selection of factions 0.315 - 1.5 mm. One gram contained approximately 400 pieces

TRACEABILITY

The traceability of CRM DSZU CX09 established in accordance with ISO Guide 30-35. The characterization of CRM achieved by means inter-laboratory experiment. Average results of chemical analysis of the chips have been obtained by two analysts, from 3 to 6 measurements by each. Original rod of diameter 50 mm before grinding was also carefully analyzed by spectral methods. Average results of spectral methods have been obtained from 10 measurements. The number of average results of chemical and spectral analysis was approximately the same. At analyses used standardized and certified methods of analysis: combustion coulometric and infrared, potentiometric, titrimetric, photometric, ICP-OES, F-AAS, Spark-OES, JDS-OES, XRF. At analysis reference materials were used: ICRM CRM C51g, BAM ECRM 235-1, BAS SS-CRM 491/2, BAS SS-CRM 491/2, SS-CRM 493/2, BAS SS-CRM 494/2, BAS SS-CRM 495/3, BAS SS-CRM 495/4, MBH CRM 14XMN1 - 14XMN5, Brammer BS18A

HOMOGENEITY

The homogeneity was evaluated according to ISO Guide 35:2006 (7.7 Evaluating a homogeneity study) and DSTU GOST 8.531:2002 "Reference materials of composition of solid and disperse materials. Ways of homogeneity assessment"

CRM VALIDITY

October 2030. The chip sample will remain stable, provided that the bottle remains sealed and is stored in a cool and dry atmosphere. When the bottle has been opened the lid should be secured immediately after use. If the contents should become discoloured (e.g. oxidised) due to atmospheric contamination they should be discarded

DATE OF ISSUE

October 2010

DELIVERY

CRM in glass (75 g), packed into a box and the Certificate

STORAGE

The material should be kept in a dry cool room in the carefully closed bottle. When the bottle is opened, then it should be resealed immediately after use. Transportation of CRM is supposed only in the packing protected from atmospheric moisture. It is forbidden to transport CRM by waterway

SAFETY

The reference material and packing do not contain substances which can directly influence health. Do not inhale. It is necessary to handle cautiously with glass

ANALYSES

Laboratory means, mass content in %

Independent data	C	Si	Mn	P	S	Cr	Ni	Cu
1	1.120	0.301	12.70	0.0800	0.0040	0.180	0.108	0.088
2	1.121	0.315	12.75	0.0820	0.0044	0.180	0.110	0.090
3	1.147	0.317	12.80	0.0840	0.0048	0.180	0.112	0.092
4	1.153	0.340	12.81	0.0850	0.0050	0.182	0.113	0.095
5	1.155	0.340	12.85	0.0859	0.0050	0.184	0.113	0.098
6	1.155	0.340	12.86	0.0860	0.0054	0.187	0.114	0.100
7	1.158	0.343	12.87	0.0865	0.0055	0.190	0.120	0.100
8	1.160	0.349	12.88	0.0878	0.0055	0.190	0.120	0.100
9	1.160	0.349	12.89	0.0880	0.0058	0.193	0.120	0.100
10	1.161	0.355	12.90	0.0883	0.0060	0.199	0.128	0.103
11	1.170	0.357	12.91	0.0888	0.0060	0.200	0.135	0.105
12	1.172	0.360	12.92	0.0890	0.0061	0.200	0.136	0.106
13	1.173	0.365	12.94	0.0900	0.0065	0.202	0.147	0.107
14	1.179	0.367	13.00	0.0900	0.0067	0.203		0.111
15	1.180	0.373	13.00	0.0910	0.0081	0.208		0.114
16	1.186		13.02			0.210		
17			13.05					
18			13.12					
Certified	1.16	0.35	12.90	0.087	0.0057	0.193	0.121	0.101
Standard Deviation	0.02	0.02	0.11	0.003	0.0010	0.010	0.012	0.007

PARTICIPATING LABORATORIES

OJSC "Dneprospetsstal", Ukraine
 OJSC "Ilyich Iron and Steel Works", Ukraine
 "Kerch Switch Plant Ltd.", Ukraine
 OJSC "Dnepropetrovsk Pointer Factory", Ukraine
 State enterprise "Ukrainian Special Steels Institute"
 OJSC "MECHEL", Russia
 OJSC "UralSteel", Metalloinvest, Russia
 OJSC "Alchevsk Iron & Steel Works", Ukraine
 OJSC "REGOM", Ukraine
 CJSC "KZGO" Mountain Equipment Works, Ukraine
 "SPL-Bohumin", Czech Republic
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