Metal and Quality, LLC

CERTIFICATE OF ANALYSIS

Certified Reference Material

CX011

Low Alloy Steel

INFORMATION

Certified Reference Material of alloy steel CX011 (DSZU 083.34-2013) produced in conformity to the Approval Certificate No. 1906, authorized by State Committee of Ukraine for Technical Regulation and Consumer Policy

APPLICABILITY

The CRM CX011 is intended for verification, calibration of measuring instruments, for metrological certification and control of measurements methods at definition of chemical compound of low alloy steel (DIN 1.7715 (14MoV63)) using chemical and physical-chemical methods

DEVELOPER AND MANUFACTURER

Metal and Quality, LLC

CERTIFIED VALUES Mass fraction and uncertainty (P=0.95) in % by weight

C	Mn	Si	P	S	Cr	Ni	Cu	V	Mo	Ti	Al	Sn	As	Ca	N	Nb	Co	B	Pb	W
0.120	**0.562**	**0.319**	**0.0123**	**0.0058**	**0.962**	**0.203**	**0.131**	**0.178**	**0.286**	**0.0018**	**0.023**	**0.006**	**0.0073**	**0.0010**	**0.0100**	*0.003*	*0.010*	*0.0002*	*0.0011*	*0.006*
0.003	**0.008**	**0.004**	**0.0007**	**0.0004**	**0.005**	**0.005**	**0.004**	**0.004**	**0.004**	**0.0004**	**0.002**	**0.001**	**0.0008**	**0.0002**	**0.0005**	-	-	-	-	-

Italics - indicative values

Uncertainty estimated as the half width confidence interval C (95%) of Student's t-distribution.

TRACEABILITY

The traceability of CRM CX011 established in accordance with ISO Guide 30-35. The characterization of CRMs achieved by means inter-laboratory experiment. At analyses applied standardized and certified methods of analysis, certified reference materials were used

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"

SPECIFICATION

CRM is available as chips, fraction 0.315 - 1.5 mm

CRM VALIDITY

December 2029. CRM will remain stable if the bottle carefully capped after use and stored in a dry and cool conditions

DELIVERY

CRM in glass (100 g), packed into a box and the certificate

SAFETY

The CRM CX011 and packing does not contain explosives and radioactive substances and substances which might influence health and the environment

LABORATORY MEANS, mass content in %

	C	Mn	Si	P	S	Cr	Ni	Cu	V	Mo	Ti	Al	Sn	As	Ca	Nb	N	Co	B	Pb	W
1	0.110	0.540	0.305	0.0101	0.0048	0.943	0.190	0.112	0.161	0.273	0.0010	0.0185	0.0050	0.0059	0.00070	*0.0011*	0.0090	*0.0076*	*0.00013*	*0.0002*	*0.0025*
2	0.110	0.541	0.308	0.0105	0.0048	0.950	0.190	0.123	0.170	0.275	0.0011	0.0200	0.0050	0.0060	0.00080	*0.0013*	0.0092	*0.0092*	*0.00020*	*0.0006*	*0.0075*
3	0.117	0.548	0.310	0.0111	0.0050	0.950	0.191	0.123	0.174	0.280	0.0015	0.0210	0.0054	0.0060	0.00094	*0.0019*	0.0097	*0.0095*	*0.00020*	*0.0014*	*0.0090*
4	0.118	0.550	0.313	0.0116	0.0050	0.955	0.200	0.125	0.175	0.280	0.0015	0.0219	0.0056	0.0065	0.00100	*0.0020*	0.0098	*0.0096*	*0.00025*	*0.0021*	
5	0.119	0.554	0.313	0.0120	0.0052	0.957	0.200	0.126	0.176	0.282	0.0015	0.0220	0.0059	0.0066	0.00117	*0.0027*	0.0098	*0.0100*	*0.00029*		
6	0.120	0.558	0.317	0.0120	0.0054	0.958	0.200	0.127	0.177	0.286	0.0019	0.0220	0.0062	0.0067	0.00117	*0.0028*	0.0101	*0.0110*	*0.00030*		
7	0.120	0.559	0.320	0.0120	0.0055	0.959	0.201	0.130	0.178	0.286	0.0019	0.0225	0.0065	0.0071	0.00120	*0.0030*	0.0105				
8	0.120	0.560	0.320	0.0124	0.0057	0.966	0.203	0.130	0.179	0.287	0.0020	0.0227	0.0069	0.0072	0.00130	*0.0038*	0.0106				
9	0.120	0.560	0.320	0.0125	0.0060	0.967	0.205	0.131	0.180	0.287	0.0020	0.0230	0.0080	0.0081		*0.0040*	0.0113				
10	0.120	0.560	0.320	0.0127	0.0060	0.968	0.206	0.133	0.180	0.289	0.0020	0.0250	0.0090	0.0090							
11	0.120	0.569	0.320	0.0129	0.0061	0.970	0.209	0.133	0.180	0.290	0.0032	0.0257		0.0090							
12	0.121	0.570	0.326	0.0138	0.0062	0.970	0.210	0.134	0.181	0.290		0.0260		0.0093							
13	0.122	0.570	0.326	0.0140	0.0063	0.970	0.212	0.138	0.190	0.290		0.0280									
14	0.124	0.572	0.328	0.0140	0.0065	0.974	0.214	0.140	0.191	0.296											
15	0.124	0.580	0.330		0.0065	0.976	0.220	0.140		0.297											
16	0.125	0.591	0.332		0.0070			0.143													
17	0.128																				
18	0.130																				
M(M)	0.120	0.561	0.319	0.0123	0.0058	0.962	0.203	0.131	*0.178*	0.286	0.002	0.0229	0.006	*0.0073*	*0.0010*	0.0025	0.0100	0.0095	*0.0002*	0.0011	*0.0063*
s(M)	0.005	0.014	0.008	0.0012	0.0007	0.010	0.009	0.008	*0.007*	0.007	0.001	0.0026	0.001	*0.0013*	*0.0002*	0.0010	0.0007	0.0011	*0.0001*	0.0009	*0.0034*

M(M) - Mean of intralaboratory means
s(M) - Standard deviation of the mean values of laboratories

PARTICIPATING LABORATORIES (Ukraine)

PJSC “ArcelorMittal Krivy Rig”

PJSC “Dneprospetsstal”

PJSC “Energomashspetsstal”

PJSC “Yenakievo Metallurgical Works”

PJSC "Azovstal"

PJSC “Ilyich Iron and Steel Works of Mariupol”

PJSC Dnieper Metallurgical Combine “DMKD”

PJSC Krivorozhskiy Factory of Mountain Equipment “KZGO”

PJSC "AzovElectroStal"

PJSC “Donetsksteel”

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