

CERTIFICATE OF ANALYSIS

CRM C01 - CRM C08

Set for Spectral Analysis of Low Alloy Steels



INFORMATION

Certified Reference Materials of Low Alloy Steels C01 – C08 (DSZU 083.21-06) as complete set for a spectral analysis.

Produced in conformity to the Certificate No.1022 from 21.12.2006, authorized by State Committee of Ukraine for Technical Regulation and Consumer Policy

APPLICABILITY

The CRM C01 – CRM C08 is intended for calibration of spectral measuring means and for the control of errors at definition of chemical compound of steels by Optical Emission Spectroscopy

DEVELOPER AND MANUFACTURER

Metal and Quality LLC

CERTIFIED VALUES – mass content in % (Bold)

CRM	C	Mn	Si	P	S	Cr	Ni	Cu	W	V	Mo	Ti	Al	Co	Nb	Sn	B	As	Pb	Sb	Zr	Zn
C01	0.004	0.049	0.014	0.002	0.0020	0.040	0.530	0.008	0.026	0.003	0.124	0.002	0.0040	0.217	0.001	0.0008	0.0004	0.002	0.003	-	0.0004	-
C02	0.081	1.32	0.505	0.0070	0.0091	0.460	0.330	0.332	0.053	0.084	0.091	0.017	0.008	0.063	0.026	0.011	0.0050	0.008	0.0006	0.011	-	-
C03	0.029	0.09	0.145	0.0062	0.0081	0.27	0.146	0.206	0.009	0.004	0.031	0.002	0.014	0.013	0.002	0.011	0.0004	0.008	0.007	0.003	0.0006	0.003
C04	0.155	0.635	0.291	0.066	0.029	0.370	0.070	0.774	0.022	0.214	0.079	0.005	0.013	0.006	0.022	0.003	0.005	0.003	0.001	0.001	0.0006	0.0006
C06	0.395	0.416	0.097	0.035	0.039	0.315	0.459	0.040	0.026	0.072	0.016	0.002	0.029	0.034	0.029	0.006	0.003	0.003	0.002	-	0.0001	-
C07	0.589	0.903	1.00	0.033	0.037	0.201	0.263	0.130	0.140	0.988	0.377	0.059	0.039	0.165	0.091	0.004	0.005	0.003	0.001	0.001	-	0.003
C08	0.184	0.756	0.389	0.019	0.008	2.34	6.6	0.550	0.966	0.216	0.514	0.060	0.011	0.062	0.122	0.014	0.011	0.011	-	-	0.006	0.003

Italics - indicative values

THE UNCERTAINTY OF CERTIFIED VALUES

CRM	C	Mn	Si	P	S	Cr	Ni	Cu	W	V	Mo	Ti	Al	Co	Nb	Sn	B	As	Pb	Sb	Zr	Zn
C01	0.001	0.002	0.001	0.0005	0.0002	0.001	0.011	0.002	-	-	0.003	0.001	0.0010	0.009	-	-	-	-	-	-	-	-
C02	0.003	0.01	0.007	0.0004	0.0006	0.005	0.007	0.006	-	0.002	0.003	0.001	0.001	0.002	0.003	0.001	0.0005	-	-	-	-	-
C03	0.002	0.003	0.002	0.0003	0.0003	-	0.003	0.003	-	0.001	0.002	0.001	0.001	0.001	-	0.001	0.0001	0.001	-	-	-	-
C04	0.004	0.009	0.006	0.002	0.001	0.007	0.002	0.011	-	0.007	0.003	0.001	0.001	0.002	-	-	0.001	-	-	-	-	-
C06	0.007	0.005	0.003	0.002	0.001	0.007	0.011	0.002	0.003	0.003	0.002	-	0.002	0.002	-	-	0.001	-	-	-	-	-
C07	0.009	0.007	0.01	0.002	0.002	0.006	0.008	0.005	0.010	0.023	0.010	0.003	0.003	0.004	0.005	-	0.001	-	-	-	-	-
C08	0.006	0.013	0.009	0.002	0.001	0.03	-	0.017	0.022	0.005	0.011	0.003	0.001	0.004	0.011	-	0.001	-	-	-	-	-

The uncertainty was estimated in accordance with the national standard DSTU GOST 8.532-2003.

HOMOGENEITY

The homogeneity of CRMs C01 - C08 were evaluated according to national standard DSTU GOST 8.531:2002 "Reference materials of composition of solid and disperse materials. Ways of homogeneity assessment". To evaluate the homogeneity OES method was used.

TRACEABILITY

The traceability of CRMs C01 - C08 established in accordance with ISO Guide 30-35. The characterization of CRMs achieved by means inter-laboratory experiment. Independent data of chemical analyses are received in each laboratory (see below) by two analysts as a result from three up to six measurements by everyone. The mean values of spectral analysis are received from the information on different days. At analyses following standardized methods were used: Spark-OES (Lab. No.: 1, 3, 4, 5, 6, 7, 12) GD-OES (7), ICP-OES (2), XRF-spectrometry (13), Combustion Methods (titration - 2, 5, 6, 8, 7, 10, 11 and infrared - 1, 3, 4), F-AAS (8, 10), ET-AAS (5) and Classic Chemical Methods (Gravimetric, Photometric, Titration – 1, 3-11). At the analyses only CRMs and State Standard Reference Materials were used

SPECIFICATION

CRM in diameter of 36-40 mm, height 30 mm, forged steels of electro-slag (C03) and vacuum-induction melting (C01, C02, C04-C08)

DELIVERY

CRM, packed into a box and the Certificate

DATE OF ISSUE

December, 2006

SAFETY

The reference material and packing do not contain substances which can directly influence health

PARTICIPATING LABORATORIES

- 1 ArcelorMittal Kriviy Rig, OJSC
- 2 Azovstal, OJSC
- 3 Ilyich Iron and Steel Works of Mariupol, OJSC
- 4 Zaporizhstal, OJSC
- 5 Dneprospetsstal, OJSC
- 6 DMKD, OJSC
- 7 Khartsyzsk Tube Works, OJSC
- 8 Ukrainian Special Steels Institute, SE
- 9 Scientific Research Tube Institute, SE
- 10 Powder Metallurgy Plant, SE
- 11 Scientific Research Centre Energostal, SE
- 12 Krivorozhskiy Factory of Mountain Equipment (KZGO), PJSC
- 13 Dnepropetrovsk Iron and Steel Works named after Petrovsky, OJSC

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