

Metal and Quality, LLC
CERTIFICATE OF ANALYSIS
CRM CX04
Carbon Steel



APPLICABILITY

CRM CX04 is intended for verification of analytical methods, for calibration of analytical instruments at definition of chemical compound carbon steels

MEAN VALUES OF LABORATORIES

Lab. No.	C	Si	Mn	S	P	Cr	Cu	N
1	0.539	0.304	0.588	0.0200	0.0119	0.0560	0.0130	0.0065
2	0.543	0.310	0.602	0.0204	0.0126	0.0560	0.0135	0.0067
3	0.554	0.316	0.602	0.0210	0.0127	0.0567	0.0138	0.0073
4	0.556	0.321	0.602	0.0210	0.0130	0.0570	0.0140	0.0076
5	0.557	0.325	0.605	0.0213	0.0132	0.0571	0.0144	0.0077
6	0.558	0.327	0.606	0.0215	0.0133	0.0575	0.0150	0.0079
7	0.559	0.327	0.608	0.0215	0.0134	0.0576	0.0150	0.0080
8	0.559	0.3275	0.610	0.0216	0.0143	0.0580	0.0160	0.0080
9	0.560	0.328	0.613	0.0216	0.0146	0.0582	0.0165	0.0081
10	0.560	0.329	0.6175	0.0220	0.0150	0.0600	0.0167	0.0081
11	0.560	0.334	0.618	0.0221	-	-	-	0.0082
12	0.567	0.339	0.640	0.0225	-	-	-	-
13	0.575	-	-	0.0245	-	-	-	-
M(M)	0.558	0.324	0.609	0.0216	0.0134	0.0574	0.0148	0.0076
s(M)	0.009	0.010	0.013	0.0011	0.0010	0.0012	0.0013	0.0006

M(M) - Mean of intralaboratory means

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

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

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

CERTIFIED VALUES

Elements	C	Si	Mn	S	P	Cr	Cu	N
Certified value (Mass fraction in %)	0.558	0.324	0.609	0.0216	0.0134	0.0574	0.0148	0.0076
Estimate of uncertainty (Confidence 0.95)	0.006	0.006	0.008	0.0007	0.0007	0.0008	0.0009	0.0004

Information values (mass fraction in % by weight)

Ni	As	Al	Ti	V	Co	Pb	Sn	Sb	Zn
0.017	0.002	0.004	0.002	0.005	0.002	0.0001	0.0009	0.001	0.001

CERTIFICATE VALIDITY

December 2031

SPECIFICATION

CRM is made as granules of steel wire in diameter 0.8 mm, length 0.5 – 1.0 mm

DELIVERY

CRM in glass (250 g), packed into a box and the Certificate

NOTE

Minimum sample size for chemical analysis is 0.5 g

STORAGE

The material should be kept in a dry room in the closed bottle

SAFETY

CRM CX04 and packing does not contain explosives and radioactive substances and substances which might influence health and the environment

HE METHODS USED

Combustion coulometric and infrared, Gravimetric, Photometric, Titration, Flame AAS, ICP OES, Inert gas fusion

PARTICIPATING LABORATORIES (Ukraine)

ArcelorMittal Krivy Rig PJSC
Azovstal PJSC
Ilyich Iron and Steel Works of Mariupol PJSC
Zaporizhstal PJSC
Dneprospetsstal PJSC
DMKD PJSC
Khartsyzsk Tube Works PJSC
Ukrainian Special Steels Institute SE
Scientific Research Tube Institute SE
Powder Metallurgy Plant SE
Energostal Scientific Research Centre SE
Zirconium Research and Production Enterprise SE

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