

Metal and Quality, LLC
CERTIFICATE OF ANALYSIS
DSZU C085
Tool Steel

**INFORMATION**

Reference Material DSZU C085 is intended for calibration of measuring instruments at definition of chemical composition of tool steels by using of Optical Emission and X-ray Spectrometry methods

DEVELOPER AND MANUFACTURER

Metal and Quality, LLC

CERTIFIED VALUES

	C	Mn	Si	P	S	Cr	Ni	Cu	W	V	Mo	Ti	Al	Co
Mass fraction in %, M(M)	1.58	0.166	0.21	0.031	0.035	11.77	0.30	0.083	0.075	0.272	0.670	0.003	0.012	0.013
Uncertainty C(95%)	0.01	0.008	0.01	0.002	0.002	0.07	0.01	0.003	0.006	0.005	0.008	0.001	0.001	0.001

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

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

SPECIFICATION

Reference material is made of hot rolled steel in the form of cylinders diameter of 39 mm, height 25 mm.

HOMOGENEITY

The OES method was used to assess homogeneity in one laboratory and the homogeneity was found to be acceptable

TRACEABILITY

The characterization of RM was achieved by means inter-laboratory experiment. Chemical analyses were carried out by the participants in the certification tests both on monolithic samples and on chips taken from monolithic samples. The participating laboratories followed the requirements of ISO 17025 and used standardized analytical methods - national standards DSTU GOST 18895-97, DSTU GOST 12345:2004, DSTU GOST 12344:2005, DSTU GOST 8920:2019 and the following certified reference materials for verification of analytical data: DSZU: C03, C015-C018, C041-C046, C048, C115; ICRM: UNL9v, UG0k, UG5k, UG17e, UG18e, UG7l, UNL9a, UNL18, C31g, C34d; NCS AH11367; MBH 13X 42000A, 13X 8001B, 13X 42027A; IRSID 1825; BS 316F, BS 37E; IMZ 162

RM VALIDITY

This reference material has no expiration date. The working surface of these samples should be purified before use. The reference material remain stable if not exposed to excessive heat (e.g., during surface preparation)

DATE OF ISSUE

December 2025

DELIVERY

The DSZU C085 is supplied in a cardboard box with its certificate

SAFETY

A Safety Data Sheet (SDS) is not required for this reference material. Material and packing does not contain hazardous chemicals, explosives and radioactive substances and substances which might influence health and the environment

LABORATORY MEANS, mass fraction in %

DSZU C085	C	Mn	Si	P	S	Cr	Ni	Cu	W	V	Mo	Ti	Al	Co
1	1.550	0.147	0.190	0.0280	0.0320	11.58	0.280	0.070	0.064	0.270	0.650	0.0014	0.0100	0.0110
2	1.545	0.153	0.190	0.0280	0.0300	11.61	0.281	0.080	0.064	0.255	0.654	0.0020	0.0100	0.0116
3	1.560	0.155	0.192	0.0287	0.0311	11.70	0.285	0.080	0.065	0.261	0.655	0.0023	0.0110	0.0117
4	1.571	0.158	0.198	0.0295	0.0320	11.71	0.286	0.081	0.070	0.264	0.659	0.0028	0.0110	0.0133
5	1.575	0.159	0.198	0.0300	0.0340	11.75	0.290	0.082	0.071	0.265	0.665	0.0030	0.0118	0.0137
6	1.580	0.162	0.198	0.0310	0.0350	11.77	0.290	0.083	0.075	0.270	0.665	0.0035	0.0120	0.0142
7	1.580	0.170	0.201	0.0311	0.0354	11.79	0.292	0.084	0.075	0.275	0.666	0.0040	0.0125	0.0150
8	1.590	0.170	0.210	0.0315	0.0360	11.80	0.295	0.085	0.080	0.275	0.666	0.0040	0.0131	0.0160
9	1.590	0.171	0.212	0.0320	0.0360	11.83	0.296	0.085	0.082	0.275	0.670		0.0135	
10	1.592	0.178	0.226	0.0320	0.0360	11.83	0.300	0.086	0.082	0.275	0.672		0.0150	
11	1.593	0.180	0.228	0.0320	0.0370	11.85	0.307	0.087	0.087	0.279	0.680		0.0160	
12	1.597	0.187	0.235	0.0350	0.0370	11.85	0.315	0.088	0.090	0.282	0.685			
13	1.600		0.235	0.0370	0.0375	11.93	0.323			0.286	0.687			
14	1.610		0.239		0.0382	12.02	0.337				0.690			
15					0.0394						0.693			
M(M)	1.581	0.166	0.211	0.0312	0.0351	11.79	0.298	0.083	0.075	0.272	0.670	0.0029	0.0124	0.0133
s(M)	0.019	0.012	0.018	0.0026	0.0028	0.12	0.017	0.005	0.009	0.009	0.014	0.0009	0.0019	0.0018

M(M) - Mean of intralaboratory means

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

PARTICIPATING LABORATORIES (Ukraine)

ArcelorMittal Krivy Rig PJSC
Dneprospetsstal (DSS) JSC
Dneprometiz JSC
Dnieper Railway Switch Plant JSC
Kharkiv Tractor Plant PJSC
Kremenchuk Steel Works JSC
Metal and Quality LLC
SANDLAB LLC
VELES AGRO LLC
Zaporizhstal PJSC
Zaporizhia Foundry and Mechanical Plant LLC

ANALYTICAL METHODS

C, S - AES, Infrared absorption, Coulometric titration
Cr - Titrimetric, ICP-AES, AES, XRF
Mo - Photometric, ICP-AES, AES, XRF
Mn, Si, P, Ni, Cu, W, V, Co - ICP-AES, AES, XRF
Ti, Al - ICP-AES, AES

CONTACT INFORMATION

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