

Metal and Quality, LLC
CERTIFICATE OF ANALYSIS
DSZU C083
Tool Powdered Steel



INFORMATION Reference Material DSZU C083 is intended for calibration of measuring instruments when determining the chemical composition of tool powdered steels and similar ones using spark atomic emission spectrometry and X-ray methods

MANUFACTURER Metal and Quality, LLC

CERTIFIED VALUES (mass fraction in %)

	C	Si	Mn	P	S	Cr	V	Mo	Ni	Cu	N	W	Al	Co	Ti
Certified M(M)	1.497	0.97	0.402	0.0189	0.0203	7.830	3.88	1.488	0.139	0.095	0.094	<i>0.050</i>	<i>0.008</i>	<i>0.027</i>	<i>0.003</i>
Uncertainty C(95%)	0.005	0.02	0.004	0.0007	0.0013	0.024	0.04	0.008	0.003	0.006	0.004	-	-	-	-

Italic - indicative values

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 The steel ingot used for this reference material was manufactured by powder metallurgy and rolled into 55 mm diameter rods at the Dneprospetsstal electrometallurgical plant. One of the rods was then forged to a diameter of 40 mm and annealed. After turning and cutting, the resulting DSZU C083 discs have a final diameter of 38 mm and a thickness of 25 mm

HOMOGENEITY The spark atomic emission method was used to assess homogeneity in one laboratory. The homogeneity was found to be acceptable

TRACEABILITY Certified values for DSZU C083 were established during an interlaboratory characterization study conducted in accordance with the principles of ISO 17034 and ISO 33405:2024. Participating laboratories performed chemical analysis using both monolithic samples and chips made from this material.

Multiple measurements of characteristics were carried out primarily using comparative analytical methods. The elemental composition of DSZU C083 was determined primarily by calibration against the certified reference material ECRM 274-1, supplemented by CRM DSZU C081 and CRM DSZU C082, all of which were manufactured using powder metallurgy. The certified elemental composition ranges of these CRMs fully encompass the concentration levels of DSZU C083, thereby ensuring metrological traceability of the certified values

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 April 2026

DELIVERY DSZU C083 is supplied in a cardboard box with its certificate

SAFETY A safety data sheet (SDS) is not required for the DSZU C083. The material and packaging do not contain hazardous chemicals, explosives, radioactive substances, or substances that may affect health or the environment

LABORATORY MEANS, mass fraction in % by weight

n	C	Si	Mn	P	S	Cr	V	Mo	Ni	Cu	N	W	Al	Co	Ti
1	1.478	0.930	0.390	0.0177	0.0171	7.756	3.762	1.470	0.129	0.0809	0.087	0.0302	0.0043	0.0200	0.0021
2	1.487	0.943	0.395	0.0179	0.0178	7.769	3.790	1.470	0.135	0.0812	0.090	0.0341	0.0070	0.0215	0.0028
3	1.489	0.949	0.398	0.0179	0.0180	7.801	3.810	1.473	0.136	0.0865	0.095	0.0554	0.0075	0.0225	0.0028
4	1.490	0.951	0.400	0.0180	0.0183	7.810	3.861	1.476	0.139	0.0890	0.096	0.0570	0.0083	0.0230	0.0028
5	1.494	0.957	0.400	0.0185	0.0198	7.821	3.861	1.483	0.140	0.0913	0.097	0.0600	0.0090	0.0294	0.0029
6	1.498	0.957	0.402	0.0186	0.0200	7.822	3.870	1.483	0.140	0.0920	0.097	0.0610	0.0110	0.0300	0.0035
7	1.500	0.960	0.402	0.0186	0.0202	7.835	3.876	1.486	0.140	0.0930			0.0111	0.0300	0.0050
8	1.500	0.975	0.402	0.0190	0.0206	7.841	3.893	1.488	0.142	0.0950				0.0356	0.0050
9	1.500	0.978	0.402	0.0192	0.0210	7.847	3.900	1.489	0.143	0.0988					
10	1.502	0.979	0.403	0.0200	0.0213	7.848	3.908	1.494	0.145	0.1010					
11	1.503	1.000	0.407	0.0208	0.0215	7.880	3.923	1.494	0.145	0.1020					
12	1.505	1.001	0.408	0.0209	0.0229	7.880	3.939	1.500		0.1100					
13	1.509	1.020	0.417		0.0250	7.886	3.994	1.500		0.1130					
14		1.032						1.520							
M(M)	1.497	0.974	0.402	0.0189	0.0203	7.830	3.876	1.488	0.139	0.0949	0.094	0.0496	0.0083	0.0265	0.0034
s(M)	0.009	0.030	0.006	0.0011	0.0022	0.040	0.063	0.014	0.005	0.0099	0.004	0.0137	0.0024	0.0055	0.0011

M(M) - Mean of laboratory means

s(M) - Standard deviation of the laboratory means

PARTICIPATING LABORATORIES

ArcelorMittal Kryvyi Rih, Ukraine

Dnepropress Steel LLC, Ukraine

Dneprosptsstal (DSS) PJSC, Ukraine

Metal and Quality LLC, Ukraine

PlasmaTech LLC, Ukraine

Zaporizhia Foundry and Mechanical Plant LLC, Ukraine

ANALYTICAL METHODS USED

Carbon (C), Sulfur (S): AES, Infrared Absorption, Coulometric Titration

Phosphorus (P), Silicon (Si), Manganese (Mn), Molybdenum (Mo): Photometric, ICP-AES, AES

Nickel (Ni): Photometric, Gravimetric, ICP-AES, AES

Chromium (Cr): Titrimetric, ICP-AES, AES

Vanadium (V): Potentiometric, ICP-AES, AES

Copper (Cu), Cobalt (Co), Tungsten (W): ICP-AES, AES

Nitrogen (N): Inert Gas Fusion, AES

CONTACT INFORMATION

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