

Metal and Quality, LLC
CERTIFICATE OF ANALYSIS
DSZU C030
Stainless Steel



INFORMATION Certified reference material DSZU C030 is intended for the calibration of measuring instruments when determining the chemical composition of stainless steels similar to AISI 310S (EN 1.4845, DIN X8CrNi25-21) using optical emission spectroscopy (OES) and X-ray fluorescence (XRF) analysis methods

MANUFACTURER Metal and Quality, LLC

CERTIFIED (mass fraction in %)

	C	Si	Mn	P	S	Cr	Ni	Mo	Ti	W	V	Cu	Al _(tot)	Co	B	Ca	As	Pb	Sn	Sb	N
Certified M(M)	0.060	0.662	1.47	0.0264	0.0028	22.82	18.69	0.160	0.037	0.039	0.042	0.256	0.013	0.082	0.010	0.0005	0.017	0.004	0.015	0.010	0.038
Expanded uncertainty U	0.002	0.014	0.02	0.0009	0.0002	0.07	0.08	0.007	0.002	0.003	0.002	0.007	0.002	0.003	0.003	0.0001	0.002	0.001	0.001	0.002	0.003

Expanded uncertainty U given at a 95% level of confidence k = 2

SPECIFICATION The material was melted in a vacuum induction furnace. The resulting ingot was forged to a diameter of 42 mm. The forged material was subsequently machined into disc-shaped samples with a nominal diameter of 39 mm and a thickness of 25 mm

HOMOGENEITY The material homogeneity of the billets was evaluated by spark optical emission spectrometry using one-way analysis of variance (ANOVA) based on a randomized repeated measurements scheme in accordance with ISO 33405:2024 and ISO 17034. No statistically significant macro-inhomogeneity was detected among the samples. The standard uncertainty due to inhomogeneity was evaluated for each element and included in the combined standard uncertainty of the certified value (see next page).

Minimum analytical sample for OES is defined as the average of at least three spark burns on a freshly prepared surface (spot diameter ≥ 4 mm)

TRACEABILITY The characterization of CRM C030 was achieved through an interlaboratory study. 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 and the following certified reference materials to validate the analytical data: DSZU C016, BS 9842, BS 82E, DSZU C014-1, DSZU C014-2, DSZU C120, ICRM LG73, ICRM 2FM5, LECO 502-94, MBH 13X NSA4, ECRM 274-1, ECRM 295-1, NCS NS 20304

RM VALIDITY The shelf life of this reference material is not limited. The working surface of these samples should be purified before use. The reference material will remain stable provided they are not subjected to excessive heat (e.g. during preparation of the working surface)

DATE OF ISSUE August 2026

DELIVERY The CRM is supplied in a box with the accompanying certificate

SAFETY A Safety Data Sheet (SDS) is not required for this reference material. The material and its packaging do not contain hazardous chemicals, explosives, radioactive substances, or substances that may adversely affect human health or the environment

LABORATORY MEANS, mass fraction in %

	C	Si	Mn	P	S	Cr	Ni	Mo	Ti	W	V	Cu	Al	Co	B	Ca	As	Pb	Sn	Sb	N
1	0.0538	0.615	1.428	0.0248	0.0023	22.67	18.51	0.140	0.0326	0.0298	0.0368	0.239	0.0070	0.0768	0.0060	0.00040	0.0140	0.0025	0.0111	0.0073	0.0358
2	0.0571	0.636	1.445	0.0248	0.0025	22.68	18.53	0.147	0.0337	0.0301	0.0370	0.240	0.0072	0.0770	0.0077	0.00041	0.0140	0.0027	0.0138	0.0075	0.0366
3	0.0580	0.647	1.445	0.0253	0.0027	22.68	18.63	0.150	0.0350	0.0340	0.0381	0.246	0.0100	0.0780	0.0080	0.00043	0.0151	0.0034	0.0140	0.0080	0.0374
4	0.0585	0.648	1.447	0.0258	0.0027	22.72	18.65	0.150	0.0350	0.0350	0.0388	0.246	0.0110	0.0780	0.0080	0.00044	0.0153	0.0037	0.0142	0.0091	0.0375
5	0.0588	0.648	1.450	0.0260	0.0028	22.76	18.66	0.155	0.0355	0.0374	0.0410	0.250	0.0127	0.0783	0.0089	0.00045	0.0155	0.0043	0.0144	0.0093	0.0378
6	0.0590	0.659	1.453	0.0260	0.0028	22.80	18.67	0.158	0.0370	0.0378	0.0410	0.250	0.0130	0.0812	0.0090	0.00059	0.0173	0.0052	0.0147	0.0102	0.0380
7	0.0610	0.670	1.460	0.0260	0.0028	22.80	18.67	0.160	0.0370	0.0394	0.0420	0.251	0.0145	0.0820	0.0110	0.00066	0.0180	0.0054	0.0150	0.0106	0.0399
8	0.0618	0.678	1.460	0.0264	0.0028	22.81	18.67	0.162	0.0373	0.0397	0.0445	0.254	0.0145	0.0823	0.0145		0.0190	0.0060	0.0150	0.0137	0.0440
9	0.0625	0.680	1.472	0.0265	0.0028	22.81	18.67	0.164	0.0380	0.0403	0.0446	0.256	0.0150	0.0853	0.0150		0.0230	0.0063	0.0150		
10	0.0625	0.683	1.484	0.0273	0.0031	22.82	18.69	0.166	0.0380	0.0404	0.0447	0.258	0.0153	0.0880	0.0156				0.0155		
11	0.0637	0.687	1.485	0.0274	0.0034	22.83	18.71	0.176	0.0384	0.0425	0.0450	0.259	0.0196	0.0886					0.0167		
12	0.0640	0.688	1.498	0.0275		22.86	18.76	0.176	0.0398	0.0440	0.0460	0.270		0.0920					0.0177		
13	0.0647		1.512	0.0292		22.87	18.76	0.180	0.0420	0.0450	0.0468	0.273									
14			1.536			22.91	18.86			0.0470		0.274									
15						22.94	18.88					0.278									
16						23.00															
17						23.01															
p	13	12	14	13	11	17	15	13	13	14	13	15	11	12	10	7	9	9	12	8	8
M(M)	0.0604	0.662	1.470	0.0264	0.0028	22.82	18.69	0.1603	0.0369	0.0387	0.0420	0.256	0.0127	0.0823	0.0104	0.00048	0.0168	0.0044	0.0148	0.0095	0.0384
s(M)	0.0032	0.023	0.030	0.0012	0.0003	0.104	0.100	0.0121	0.0026	0.0052	0.0035	0.012	0.0040	0.0051	0.0035	0.00010	0.0029	0.0014	0.0016	0.0021	0.0026
u _{bb}	0.0005	0.002	0.0048	0.00026	0.00008	0.025	0.031	0.0007	0.0009	0.00068	0.00013	0.0014	0.0003	0.0007	0.00011	0.000008	0.00017	0.0005	0.00016	0.00002	0.0012
U	0.0020	0.014	0.0187	0.0009	0.0002	0.071	0.081	0.0069	0.0023	0.0031	0.0020	0.0070	0.0023	0.0033	0.0022	0.00008	0.0019	0.0014	0.0010	0.0015	0.0030

- p - The number of means
 M(M) - Interlaboratory mean
 s(M) - Interlaboratory standard deviation
 u_{bb} - Inhomogeneity uncertainty
 U - Expanded uncertainty (K=2)

The expanded uncertainty U is calculated according to the formula:

$$U = 2 \cdot \sqrt{\frac{s(M)^2}{p} + u_{bb}^2}$$

METHODS USED

C, S - Infrared absorption, Coulometric titration, OES
 Si, Mn - Photometric, ICP-OES, DCP-AES, OES, XRF
 P - ICP-OES, DCP-AES, OES, XRF
 Ni - Gravimetric, ICP-OES, DCP-AES, FAAS, OES, XRF
 Cr - Titrimetric, ICP-OES, DCP-AES, OES, XRF
 Mo, W, Cu - ICP-OES, DCP-AES, OES, XRF
 Ti, V, Co, Al, As, Sb - ICP-OES, ICP-MS, DCP-AES, OES
 Pb - ICP-MS, DCP-AES, OES
 Sn - ICP-MS, ICP-OES, GFAAS, OES
 B - ICP-OES, DCP-AES, OES
 N - Inert gas fusion with thermal conductivity

CONTACTS

37 Nezaleznoi Ukrainy Street, Zaporizhzhia City 69019, Ukraine
 Tel/fax: +380 61 7171800
 Email: rm@rm.co.ua
 Website: <https://rm.co.ua>

PARTICIPATING LABORATORIES

ArcelorMittal Kryvyi Rih PJSC, Ukraine
 Dnepropress Steel LLC, Ukraine
 Dniprospsststal (DSS) PJSC, Ukraine
 Certification Services LLC (Luvak Laboratories), USA
 Metal and Quality LLC, Ukraine
 Metinvest Machinery LLC, Ukraine
 Oy NAREMA, Finland
 PlasmaTec LLC, Ukraine
 Trubostal PSC LLC, Ukraine
 VÍTKOVICE TESTING, Czech Republic
 Zaporizhstal PJSC, Ukraine