

SPL REFERENCE MATERIALS

CERTIFICATE

Low Alloy Steel QCM for Spectrometry CM 1 – CM 10

Status

The Quality Control Materials – QCM comply with the latest ISO Guide 35 definition of the Reference Material.

Purpose

The QCM are primarily intended for quality assurance purposes in the routine spectrometric analysis of matrix-matching steels, that is to control the state of statistic regulation of continuously operating analysers („setting-up“) to verify the matrix-match in metal sorting etc. They may not substitute the CRM in establishing traceability of values.

Source and Manufacture

The candidate materials were either cast to ingots with head, bottom and centre removed and the rest machined to final diameter, or meticulously selected from the commercially available rolled steel bars.

Supply units

The QCM of 35 to 43 mm in diameter are regularly supplied in heights of 10 and 25mm (as set or individually), with the option of longer samples upon request.

Homogeneity and Stability

Both random and trend (axial, radial) inhomogeneity was tested in compliance with ISO Guide 35 by various spectrometric techniques of excellent repeatability, and found statistically insignificant. The QCM are stable by the nature of material.

Characterisation

The QCM were characterised by an interlaboratory experiment with participation of the most competent and experienced industrial and application laboratories. Various spectrometric methods were applied for each value (AES with spark and glow discharge excitation, XRF), supported when necessary by alternative techniques (wet-way, combustion, thermoevolution). The **participating laboratories** were:

Leco Instrumente Plzeň, Plzeň
Mittal Steel Ostrava, Ostrava
PCS, Žďár nad Sázavou
PSP Slévárna, Přešov
Škoda Kovárny, Plzeň

Thermo ARL, Ecublens
Třinecké Železářny, Třinec
Vítkovice Testing Center, Ostrava
Západočeská Univerzita v Plzni, Plzeň
Žďas, Žďár nad Sázavou

Assigned values

are robust means of at least five laboratory means accepted by the technical assessment. The values of the successive batches, distinguished by the last capital of the QCM code are traced to the original batch values by three qualified laboratories. The particular **uncertainties** are not stated, yet their estimates do not exceed double

of those for the corresponding elements/contents in the contemporary matrix-matching CRM. They are reflected by rounding of the assigned values. The assigned values are **traceable** to the adequate CRM (ČKD, BAS, Brammer Standards and other) only, no direct traceability has been established.

Assigned values in % m/m*

QCM	C	Mn	Si	P	S	Cu	Cr	Ni
CM-1B	0.75	1.88	0.25	0.017	0.012	0.10	0.60	0.51
CM-2A	0.20	0.97	1.66	0.10	0.012	1.01	1.50	1.20
CM-3A	0.295	0.37	0.27	0.016	0.0013	0.16	1.87	1.82
CM-4B	0.72	0.50	0.80	0.023	0.012	0.40	2.23	1.40
CM-5B	1.09	1.28	0.39	0.021	0.012	0.13	2.07	0.23
CM-6A	0.52	0.37	0.27	0.016	0.058	0.05	0.37	0.19
CM-7A	0.05	1.17	0.56	0.011	0.016	0.09	0.10	0.05
CM-8A	0.16	2.13	0.18	0.007	0.011	0.03	1.38	0.03
CM-10A	0.694	1.00	0.817	0.040	0.022	0.31	5.48	2.38
QCM	Al	Mo	W	V	Ti	Co	As	Sn
CM-1B	0.045	0.068	0.065	0.075	0.055	0.022	0.032	0.007
CM-2A	0.03	0.33	0.23	0.10	0.34	0.43	0.11	0.08
CM-3A	0.05	0.33	0.015	0.007	0.006	0.012	0.005	0.007
CM-4B	0.025	0.33	0.12	0.174	0.12	0.12		0.028
CM-5B	0.083	0.10	0.03	0.06	0.02	0.022	0.018	0.012
CM-6A	0.02	0.04	0.04	0.05	0.03	0.03	0.025	0.017
CM-7A	0.13	0.015	0.01	0.012	0.14	0.007	0.005	0.008
CM-8A	0.02	0.001	0.01	0.008	0.001	0.004	0.002	0.003
CM-10A	0.086	1.234	0.96	0.908	0.0189	0.114	0.03	0.062
QCM	B	Nb	Pb	Sb	N	Zr	Ta	Zn
CM-1B	0.0028	0.05	0.0013	0.008	0.008	0.037		
CM-2A	0.0005	0.48	0.06	0.008		0.03	0.027	
CM-3A	0.0002	0.006			0.007			
CM-4B	0.017		0.022	0.052	0.012			0.007
CM-5B	0.002	0.015	0.01	0.006	0.0135	0.09		
CM-6A	0.015	0.028	0.017	0.03	0.009	0.04		
CM-7A	0.0003	0.004	0.0014	0.0003	0.01	0.042		
CM-8A	0.004	0.034						
CM-10A	0.05							

*sum of non-listed TMI below 0.05%

Users instruction

The working surface of the QCM must be prepared before the analysis in accordance with the particular analyser manual. The storage in dry and non-corrosive environment is recommended. There are no safety hazards in the storage and proper use of QCM.

Producer

SPL is the authorised producer of the CRM for the Czech Metrology Institute, producer of its own RM, QCM and laboratory consumables, organiser of the

Proficiency Testing Programs on behalf of the Czech Accreditation Institute, expert in sample management and provider of sampling devices, with the QM compliant to ISO 17025 and ISO Guide 34.

Address: SPL, ul. 1. máje 432, CZ - 735 31 Bohumín, Czech Republic
Tel./fax +420 596014627, e-mail: info@spl-bohumin.cz

Responsible person

Vladimír Bogumský, SPL manager, member of the Czech Committee for Chemical Metrology

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Ing. Iva Bogumská, SPL

Služby pro laboratoře

1. máje 432

735 31 Bohumín, CZ

IČO: 46605134 DIČ: CZ515414033