



## SPL Bohumín

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### CERTIFICATE No 05 – 17

#### REFERENCE MATERIAL OF LOW ALLOY STEEL for solid sample spectrometry, combustion and wet-way methods

### SPL CM-20A

**Certified** fully compliant with the ISO Guide 35 definition of Reference Material – with the characterization for determining the property values and their associated uncertainties.

**Intended** for calibration, matrix-match verification and statistical process control of low alloy steel spectrometric analysis from a plane of solid sample. They may not substitute CRM in a statement of metrological traceability, method validation. A single analysis area of at least 4 mm in diameter defines the minimum sample intake. They may be used for combustion and wet-way methods too.

**Manufactured** by casting to a special ingot with discarding of the parts, which have been suspected inhomogenous and the rest has been machined to the samples of the ultimate size.

**Supplied** as discs 37 mm in diameter and 25 mm of standard height, as option is possible up to 50 mm high and on request steel chips for combustion and wet-way methods.

**Homogeneity** (random and trend, within- and between- samples) was tested by various analytical techniques of adequate repeatability. Its uncertainty contribution, when statistically significant, was combined to the ultimate uncertainty statement. The RM are stable by a nature of material.

**Characterised** by inter-laboratory study of the expert laboratories listed below by various spectrometric methods (AES spark, glow discharge, XRF) and alternative methods (combustion, thermoevolution, wet-way) standard methods, with measurements metrological **traceabled** to adequate CRM (CZ 2001, 2003 - 2008, BAS, Brammer Standard).

*ARCELORMITTAL a.s., Ostrava, Czechia*

*BONATRANS GROUP a.s., Bohumín, Czechia*

*ENVIFORM a.s., Třinec, Czechia*

*U. S. STEEL KOŠICE – LABORTEST, Košice, Slovakia*

*VIADRUS a.s., Bohumín, Czechia*

*VÍTKOVICE TESTING CENTER s.r.o., Ostrava, Czechia*

*ZPS-SLÉVÁRNA, a.s., Zlín, Czechia*

*ŽĎAS a.s., Žďár nad Sázavou, Czechia*

**Certified values** in % m/m, tabulated below in bold, are robust means of a minimum five accepted laboratory means. They are rounded to the same digit as their uncertainty statement.

**Uncertainty** is expressed as a  $\pm$  half width interval combined from the standard uncertainty, expanded by the coverage factor  $k = 2$  (corresponding to 95% level of confidence). It does not exceed 1,5 multiple of the typical uncertainty of the matching CRM.

**Non-certified values** in regular without the uncertainty statement do not meet the requirements for certification and are intended for the matrix information.

RM	C	Mn	Si	P	S	Cu	Cr	Ni	Al
CM-20A	<b>0.63</b> 0.01	<b>0.594</b> 0.005	<b>1.74</b> 0.02	<b>0.0383</b> 0.0015	<b>0.020</b> 0.001	<b>0.237</b> 0.008	<b>0.97</b> 0.01	<b>1.007</b> 0.015	<b>0.076</b> 0.002
RM	Mo	W	V	Ti	Co	As	Sn	B	Nb
CM-20A	<b>0.365</b> 0.007	<b>0.104</b> 0.007	<b>0.225</b> 0.004	<b>0.175</b> 0.008	<b>0.124</b> 0.002	<b>0.073</b> 0.005	<b>0.033</b> 0.001	<b>0.0071</b> 0.0004	<b>0.074</b> 0.003
RM	Pb	Sb	Zr	Zn	N				
CM-20A	<b>0.015</b> 0.002	<b>0.025</b> 0.001	<b>0.083</b> 0.004	<b>0.007</b> 0.001	<b>0.0086</b> 0.0012				

**User instruction:** the surface of the specimens and RM should be prepared in a similar manner in accordance with manufacture's instructions of spectrometers. It is recommended to storage of RM in dry and non-corrosive conditions.

**Produced by:** SPL, the authorised producer of CRM for the Czech Metrology Institute and the provider of the interlaboratory Proficiency Testing accredited by the Czech Accreditation Institute, in a strict compliance with ISO/IEC 17025, 17043 and in particular with ISO Guide 34 and 35.

**Responsible person:** Martin Bogumský

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Ing. Iva Bogumská - SPL

Služby pro laboratoře

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