



## SPL Bohumín

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### CERTIFICATE No 02 – 15

#### REFERENCE MATERIAL OF NiFeCr alloy for solid sample spectrometry, combustion and wet-way methods

### SPL SP-4C

**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 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 height and on request 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).

*ENVIFORM a.s., Třinec, Czechia*

*HAMAG s.r.o., Zlín, Czechia*

*HUKOS s.r.o., Ostrava, Czechia*

*INSTITUTE FOR CRM, Yekaterinburg, Russia*

*INSTYTUT METALURGII ŻELAZA, Gliwice, Poland*

*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
SP-4C	<b>0,34</b> 0,02	<b>1,66</b> 0,04	<b>1,75</b> 0,04	<b>0,020</b> 0,004	<b>0,010</b> 0,002	<b>0,056</b> 0,007	<b>22,1</b> 0,1	<b>37,1</b> 0,2	<b>0,011</b> 0,003
RM	Mo	W	V	Ti	Co	Nb	N	Fe	
SP-4C	<b>0,105</b> 0,008	<i>0,01</i>	<b>0,059</b> 0,005	<b>0,031</b> 0,003	<b>0,065</b> 0,007	<b>0,022</b> 0,002	<i>0,04</i>	36,6	

**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.

**Responsible person:** Martin Bogumský

Ing. Iva Bogumská - SPL

Služby pro laboratoře

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