



**SPL-LABMAT s.r.o.**

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**CERTIFICATE No 04 – 18**

**REFERENCE MATERIAL OF FREE-CUTTING STAINLESS STEEL  
for solid sample spectrometry, combustion and wet-way methods**

**SPL SP-1B**

Grade 1.4305 (AISI 303)

**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** from cylindrical rod 38mm in diameter.

**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 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, Ostrava, Czech Republic*

*ENVIFORM, Třinec, Czech Republic*

*FYZIKÁLNÍ ÚSTAV AVČR, Praha, Czech Republic*

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

*VÍTKOVICE TESTING CENTER, Ostrava, Czech Republic*

*ZPS-SLÉVÁRNA, Zlín, Czech Republic*

*ŽĎAS, Žďár nad Sázavou, Czech Republic*

**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-1B	<b>0.050</b> 0.002	<b>1.67</b> 0.03	<b>0.505</b> 0.017	<b>0.039</b> 0.003	<b>0.30</b> 0.02	<b>0.47</b> 0.01	<b>17.42</b> 0.12	<b>8.32</b> 0.16	<b>0.003</b>
RM	Mo	W	V	Ti	Co	As	Sn	B	Nb
SP-1B	<b>0.40</b> 0.01	<b>0.032</b> 0.003	<b>0.060</b> 0.004	<i>0.002</i>	<b>0.161</b> 0.003	<i>0.003</i>	<b>0.013</b> 0.001	<b>0.0007</b> 0.0002	<b>0.012</b> 0.002
RM	N								
SP-1B	<b>0.063</b> 0.005								

**User instruction:** the surface of the specimens and RM should be prepared in a similar manner in accordance with manufacturer'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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