SPL
solving problem for laboratories

SPL Bohumín

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CERTIFICATE No 01 – 17

REFERENCE MATERIALS OF SILICON STEEL
for solid sample spectrometry, combustion and wet-way methods

SPL SST-1A, SST-2A, SST-3A, SST-4A

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.

Participating Laboratories:

ArcelorMittal - Válcovny plechu Frýdek-Místek, Frýdek-Místek, Czech Republic
ArcelorMittal (AMEH), Eisenhüttenstadt, Germany
ArcelorMittal Maizieres Research SA, Maizieres-les-Metz, France
ArcelorMittal Fos-sur-Mer, France
ArcelorMittal, Kraków, Poland
ArcelorMittal, Ostrava, Czech Republic
ArcelorMittal R&D Gent – OCAS NV, Zelzate, Belgium
Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin, Germany
Dneprospetsstal, Zaporozhiye , Ukraine
Enviform, Třinec, Czech Republic
Forschungs - und Qualitätszentrum Brandenburg (FQZ), Eisenhüttenstadt, Germany
Institute for CRM, Yekaterinburg, Russia
Instytut Metalurgii Żelaza, Gliwice, Poland
Leco Instrumente Plzeň, Plzeň, Czech Republic
Lithea, Brno, Czech Republic
Metal and Quality, Zaporozhiye, Ukraine
MS Utilities and services, Bohumín, Czech Republic
Stalprodukt, Bochnia, Poland
US Steel Košice - Labortest, Slovakia
Viadrus, Bohumín, Czech Republic
Vítkovice Testing Center, Ostrava, Czech Republic
Zaporozhyie Ferro Alloys Plant, Zaporozhye, Ukraine
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 ± 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.

	C	Mn	Si	P	S	Cu	Cr	Ni
SST-1A	**0,072** 0,003	**0,062** 0,004	**2,57** 0,04	**0,041** 0,002	**0,0043** 0,0004	**0,654** 0,013	**0,209** 0,005	**0,155** 0,004
SST-2A	**0,083** 0,003	**0,160** 0,004	**3,07** 0,04	**0,026** 0,002	**0,0089** 0,0008	**0,205** 0,006	**0,138** 0,004	**0,066** 0,002
SST-3A	**0,035** 0,003	**0,221** 0,005	**3,27** 0,05	**0,007** 0,002	**0,0093** 0,0010	**0,096** 0,004	**0,043** 0,002	**0,061** 0,002
SST-4A	**0,062** 0,004	**0,376** 0,010	**4,73** 0,05	**0,031** 0,003	**0,020** 0,002	**0,111** 0,004	**0,105** 0,005	**0,082** 0,002

	Al	Mo	W	V	Ti	Co	As	Sn
SST-1A	**0,061** 0,003	*0,002*	-	**0,006** 0,002	**0,004** 0,001	**0,005** 0,001	**0,002** 0,001	**0,110** 0,006
SST-2A	**0,010** 0,002	**0,054** 0,002	**0,019** 0,002	**0,024** 0,002	**0,016** 0,002	**0,022** 0,002	-	**0,055** 0,004
SST-3A	**0,009** 0,002	**0,036** 0,002	**0,016** 0,002	**0,041** 0,002	**0,009** 0,001	**0,038** 0,003	**0,003** 0,001	**0,015** 0,002
SST-4A	**0,514** 0,018	**0,019** 0,002	**0,026** 0,003	**0,031** 0,002	**0,035** 0,002	**0,012** 0,002	**0,004** 0,001	**0,025** 0,003

	B	Pb	Sb	Zr	Zn	N
SST-1A	**0,0003** 0,0001	*0,002*	0,002	-	-	**0,0059** 0,0005
SST-2A	**0,0089** 0,0006	**0,015** 0,003	**0,008** 0,002	**0,017** 0,002	**0,011** 0,003	**0,0078** 0,0007
SST-3A	**0,0019** 0,0004	**0,013** 0,002	-	-	**0,011** 0,003	**0,0088** 0,0012
SST-4A	**0,0006** 0,0002	**0,008** 0,002	*0,003*	*0,003*	*0,002*	**0,0058** 0,0007

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).

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.

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