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CERTIFICATE OF CHEMICAL ANALYSIS No 07 – 23

STAINLESS STEEL (grade AISI316L, DIN 1.4404, X2CrNiMo17-2-2) for solid sample spectrometry, combustion and wet-way methods

SPL SL-2B (PT 31/6A)

CERTIFIED VALUES – Mass content in %wt.

Element	Value [%wt.]	Uncertainty [%wt.]
C	0.0179	0.0007
Mn	1.706	0.011
Si	0.414	0.008
P	0.041	0.002
S	0.0207	0.0011
Cu	0.688	0.009
Cr	16.98	0.06
Ni	10.15	0.06
Al	0.0048	0.0010
Mo	2.010	0.030
W	0.069	0.005

Element	Value [%wt.]	Uncertainty [%wt.]
V	0.066	0.002
Ti	0.0030	0.0006
Co	0.267	0.007
Sn	0.0108	0.0008
B	0.0012	0.0003
Ca	0.0008	0.0003
Nb	0.064	0.003
Zr	<i>0.003</i>	
Zn	<i>0.011</i>	
N	0.0788	0.0021

PARTICIPATING LABORATORIES:

CMC Poland, Poland
COGNOR S.A. - Ferrostal Łabędy, Poland
COMTES, Czech Republic
ČEZ - JE Temelín, Czech Republic
ČZ, Czech Republic
DAIMLER TRUCK AG, Germany
DEFEKTA NDT, Czech Republic
DUNAFERR Labor Nonprofit, Hungary
ESAB CZ, Czech Republic
GENERALZOLLDIREKTION BWZ, Germany
GO STEEL, Czech Republic
INSPEKT, Slovakia

IT Łukasiewicz, Poland
MATERIÁLOVÉ LAB. CHOMUTOV, Czech Republic
SVÚM, Czech Republic
TÜV NORD Czech, Czech Republic
ÚJV Řež, Czech Republic
VOESTALPINE STAHL, Austria
VÚHŽ Foundry, Czech Republic
VÝZKUMNÝ A ZKUŠ. ÚSTAV PLZEŇ, Czech Republic
VÝZKUMNÝ ÚSTAV ZVÁRAČSKÝ, Slovakia
ZPS - SLÉVÁRNA, Czech Republic
ŽĐAS, Czech Republic

COMMENTS:

Value – reference value, s_M – standard deviation of intralaboratory means (* - result excluded as outlier)

U – Uncertainty of the reference value $U \geq \pm \frac{t_{5;0,05}}{\sqrt{n}} \cdot s_M$ in the sense of the ISO Guide to the Expression of the Uncertainty of Measurement (1993), dependent on the standard deviation of the laboratory results.

Certified fully compliant with the ISO 17034 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.

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 results from SPL proficiency test **PT 31/6A** - laboratories by various spectrometric methods (AES spark, glow discharge, XRF) and alternative methods (combustion, thermoevolution, wet-way) standard methods, with measurements metrological traceable to adequate CRM (CZ 2001, 2003 - 2008, 2015-2024, BAS, Brammer Standard). Identity of PT participating laboratories is confidential.

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.

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-LABMAT s.r.o.

Responsible person: Martin Bogumský

Issued in Bohumín in December 2023

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