



Czech Metrology Institute

Dept. of Reference Materials Certification

Radiová 3

102 00 Praha 10

CERTIFICATE

No. 1014-CM-2026-07

CERTIFIED REFERENCE MATERIAL CZ 2026 A

FREE - CUTTING STEEL WITH CERTIFIED CONTENT OF CARBON AND SULPHUR

Designed for the calibration and validation of combustion methods with a minimum sample weight 0,25 g. CRM, complementary to the set CZ 2003 - 2008 extends its range to the higher sulphur content.

Manufacture and technical parameters

The candidate material was a wire chopped to the typical grain mass 0,008g, cleaned and homogenised. CRM is available in 250 g units in glass bottles with plastic lids, sealed in plastic containers.

Homogeneity was tested by combustion - IR MAS according to the ISO REMCO Guide 35. Both within-bottle and between-bottles inhomogeneity were tested and found statistically insignificant.

Stability and storage

The CRM materials and certified constituents are stable over the entire period of validity. The CRM must be stored in dry and non-corrosive environment, with the lid replaced immediately after each weighing.

Producer

SPL, Šunychelská ul. 1159, CZ - 735 81 Bohumín, Czech Republic
tel./fax +420 596014627, email: info@spl-bohumin.cz

Project manager: Iva Bogumská

Production and procurements, testing and certification were carried out in compliance with the ISO REMCO Guide 34 (2000).

CERTIFIED VALUES AND THEIR UNCERTAINTIES (expressed in % m/m)

Carbon $0,068 \pm 0,001$

Sulphur $0,255 \pm 0,005$

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Ing. Vladimír Peršl
Director of Regional Branch Praha



CERTIFICATION

Characterisation was based on the interlaboratory experiment carried out by selected competent laboratories, in compliance with the ISO REMCO Guide 35 (1989).

Traceability

The laboratory results were traced to the matrix-matching CRMs, primary substances and to SI units (carbon gravimetrically).

Methods

The combustion in a stream of oxygen with infrared – molecular absorption spectrometry was applied for both carbon and sulphur, along with gravimetry for carbon.

Participating laboratories

| | |
|----------------------------------------------|----------------|
| BAS, Middlesbrough | United Kingdom |
| Edelstahl Witten-Kreifeld GmbH | Germany |
| Ferromet Group, s.r.o. Veselí nad Moravou | Czechia |
| Henningsdorfer Elektrostahlwerke GmbH | Germany |
| Hüttenwerke Krupp Mannesmann, Duisburg | Germany |
| Chemopetrol a.s., Litvínov | Czechia |
| ICRM, Ekaterinburg, | Russia |
| Instytut Metalurgii Żelaza, Gliwice | Poland |
| ISPAT NOVÁ HUŤ, a.s., Ostrava | Czechia |
| Moravské železářny a.s., Olomouc | Czechia |
| PSP Slévárna, a.s., Přerov | Czechia |
| Qualitest Lab. Ltd., Dunaújváros | Hungary |
| Tafonco a.s., Kopřivnice | Czechia |
| Třinecké železářny a.s., Třinec | Czechia |
| Ů.S. Steel Košice-Labortest s.r.o., Košice | Slovakia |
| VÍTKOVICE-Zkušebny a laboratoře spol. s r.o. | Czechia |
| ZPS – Slévárna, a.s., Zlín | Czechia |
| ŽDB a.s., Bohumín | Czechia |
| ŽDAS a.s., Žďár nad Sázavou | Czechia |

Evaluation

First the distribution of the laboratory values and their means were assessed technically to justify the deletion of possible outliers, than the gross means were computed by a standard statistical software.

Certified values are the arithmetic means of 14 laboratory means for carbon and 15 for sulphur accepted by the technical and statistical assessment, rounded identically as their stated uncertainties.

Uncertainty was estimated with respect to ISO Guide to Expression of Uncertainty in Measurement, 1993 and Document EURACHEM, Quantifying Uncertainty in Analytical Measurement, 1995, as the standard deviation of the gross mean expanded by multiplying by the coverage factor $k=t$ (for $\alpha=0,05$). It is expressed as a halfwidth of the two-sided interval. The uncertainty estimates were rounded to one valid figure.

Users instruction

The CRM must be used under the same conditions (crucible, accelerators, time-temperature setting), as used for the analysed samples, in accordance with the instrument manual.

CMI responsible person: Jan Tichý