Łukasiewicz
Instytut Metali
Nieżelaznych

CERTIFICATE OF REFERENCE MATERIAL

Cu 600/I

Copper of attested oxygen content

The assigned certified values[1] and uncertainties[2]

	O
	mg/kg
Cu 600/I	581
	±12

[1] Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination.
[2] The certified uncertainty is the expanded uncertainty with a coverage factor k=2, corresponding to a level of confidence of about 95 %.

Certified on March 2002

Signature

SIEĆ BADAWCZA ŁUKASIEWICZ-
INSTYTUT METALI NIEŻELAZNYCH
DYREKTOR
dr inż. Barbara Juszczyk, MBA

Version 2 from 28th of October 2025

Description of the material:

The certified reference material is in form of rods 6 mm in diameter. Each package contains 260 g ± 5 g of reference material.

Traceability:

The certified values are traceable to the SI via calibration using certified reference materials i.e. Cu 10, Cu 100 and Cu 600 Łukasiewicz – IMN and 503-532 nickel plated copper pin LECO.

Analytical methods applied for characterization:

Combustion method with IR detection (IR)

Participating laboratories:

	O
IR	1, 2, 3, 4, 5, 6

1. Institute of Non-Ferrous Metals, Laboratory L3, Poland
2. Centrum Badań jakości Storesund. Z o. o.: WBJ 1 Głogów I, WBJ 1 Głogów 2, WKJ 2, Poland
3. Hutmen S.A., Poland
4. Non-ferrous metals smelter "Szopienice", Poland
5. Institute of Ferrous Metallurgy, Poland
6. KGHM Polska Miedź, S. A. Copper Smelter "Cedynia".

Intended use:

The CRM is intended for establishing or checking the calibration of chemical analysis methods, for validation and to demonstrate results traceability of samples with similar matrix composition.

Minimum sample size:

Not lower that 0.4 g.

Instructions for storage and use:

The material should be kept in the original container. It should not be exposed to the action of acid vapours.

The reference material should be used for analysis in a form of a weighted amount, of a mass not lower that 0.4 g. The samples should be prepared directly before the analysis, through cleaning of the surface by turning or etching in solution of nitric acid (V) and water in ratio 8:2.

Brief description of the production and certification process:

The reference material was manufactured from copper rods of diameter 9 mm, produced at H. M. Cedynia. Determined by the producer oxygen content was close to the level planned by the authors of the project. The copper rods were then subject to plastic working to receive rods 6 mm in diameter and 2 m long. After confirmation of the planned level of oxygen content, the material was subject to further examination, like homogeneity examination and interlaboratory attestation.

Homogeneity of the reference material was examined in IMN laboratory by making five determinations of oxygen content in the samples taken at random from 19 rods (17% of all the rods) with a use of Leco RO-316 analyser. The obtained set of results was evaluated statistically by F-Snedecor test.

The produced reference material is stable. Institute of Non-Ferrous Metals controls certified oxygen content on a regular basis. If a deterioration in the certified properties occurs, the customers will be notified immediately.

Expired date:

50 years

Certificate Revision History: March 2002 (original certificate date), October 2025 (change of graphic design, adaptation of the certificate to the requirements of the ISO 17034 standard).

Since 2018 our production of the certified reference materials is carried out in accordance with requirements of the ISO 17034 standard.

The Łukasiewicz Research Network —Institute of Non-Ferrous Metals holds an accreditation of the Polish Centre for Accreditation as a reference material producer according to ISO/IEC 17034 with certificate number RM 006.

Contact:

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