



Reference Material Certification

Copper of attested sulphur content CuS-20

The reference material is intended for calibration of automatic analysers for determination of sulphur content in copper.

A single container holds 150 g of chops.

Certified values: The certified value is presented in Table 1. It was calculated basing on results from nine laboratories participating in the attestation.

Storage: The material should be kept in the original container and closed tightly. It should not be exposed to the action of acid vapours.

Usage: The reference material should be used for analysis in a form of a weighted amount, of a mass not lower than 0.5 g.

Origin of the material and a method of its preparation: The reference material is made from copper of MOOB grade, enriched in sulphur up to the planned level, through its introduction in a form of preliminary alloy CuS and casting in a form of an ingot. After preliminary examination of sulphur content in the ingot it is subject to hot working. Then the material is subject to mechanical working by milling, divided into unit containers of a mass 150 g, examined for homogeneity and subject to interlaboratory attestation.

Determination of homogeneity: Homogeneity of the reference material was examined in IMN laboratory by making five determinations of sulphur content in the samples taken at random from 28 unit containers (10% of all the containers) with a use of Leco CS-444 analyser. The obtained set of results was evaluated statistically by F-Snedecor test. Calculated value of the F-Snedecor factor was smaller than the critical value given in tables, which is a proof of homogeneity of the material.

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

Table 1. Certified value [ppm]

Element	Content	Uncertainty*
Sulphur	23,1	1,9*

*/ Coverage factor k of expanded uncertainty is 2.36

Analytical methods used in certification

- Method of combustion in the atmosphere of oxygen
- Method of Optical Emission Spectrometry with excitation in inductive coupled plasma

Analytical chemists of IMN participating in preparation and certification of the reference material

- Zofia Mzyk
- Jan Mzyk
- Łucja Buzek
- Ewa Muller

Laboratories participating in the attestation

- Centrum Badań Jakości Sp. z o.o. (Quality Control Centre) 3 laboratories: WBJ-1 Głogów I and Głogów II, WKJ-2
- Hutmen S. A.,
- Institute of Non-Ferrous Metals – Laboratory L-3, Laboratory L-2,
- Non-Ferrous Metals Works Szopienice,
- Institute of Ferrous Metallurgy,
- KGHM Polska Miedź, S. A. Copper Smelter “Cedynia”.

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