Instytut Metali Nieżelaznych

44-100 Gliwice, Sowińskiego 5,
tel. (032) 2380200, fax (032) 2316933
e-mail: imn@zyzio.imn.gliwice.pl

Reference Material Certification

Copper of attested oxygen content Cu 10/I

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

A single container holds eight rods 11 cm long and 6 mm in diameter, of a total mass 240 g +/- 5 g.

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

Storage: The material should be kept in the original container. 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 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.

Origin of the material and a method of its preparation: The reference material was manufactured in the result of application of plastic working technology on copper of M00B grade. The received material was in a form of 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.

Determination of homogeneity: Homogeneity of the reference material was examined in IMN laboratory by making five determinations of oxygen content in the samples taken at random from 17 rods (27% of all the rods) with a use of Leco RO-316 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 oxygen 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***
Oxygen	**3,8**	0,7*

*/ Coverage factor k of expanded uncertainty is 2.45

Analytical methods used in certification

Method of reduction melting in the inert atmosphere

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

- *Zofia Mzyk*
- *Jan Mzyk*
- *Lucja Buzek*

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*
- *Non-Ferrous Metals Works Szopienice,*
- *Institute of Ferrous Metallurgy,*
- *KGHM Polska Miedź, S. A. Copper Smelter "Cedynia".*

44-100 Gliwice, ul. Sowińskiego 5
Date of certification: March 2002 r.

Head of Analytical Chemistry Department

Ewa Szmyd Ph. D.