

CERTIFICATE OF REFERENCE MATERIAL

RM 006

CCD1
Copper alloy

The assigned certified values¹ and uncertainties²

	Sn	Zn	Co	Cd	Ni	Fe	Pb	Ag
	mg/kg	%	mg/kg	mg/kg	%	%	mg/kg	mg/kg
CCD1	8.8	0.0101	9.6	11.5	0.1038	0.0116	63	15.3
	±1.6	±0.0012	±1.8	±2.0	±0.0025	±0.0015	±11	±1.8

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 %.

Not certified values

	P	Sb	Bi	Al
	%	mg/kg	mg/kg	mg/kg
CCD1	0.033	2.2	3.1	3.9

Value for P, Sb, Bi and Al are presented as an informative because the values reported by the laboratories varied significantly (unweighted mean value of the means)

Signature

SIEĆ BADAWCZA ŁUKASIEWICZ-
INSTYTUT METALI NIEŻELAZNYCH
DYREKTOR

dr inż. Barbara Juszczyk, MBA

Description of the material:

The certified reference material is available in the form of disc (40 mm in diameter and 25 mm height).

Traceability:

The certified values are traceable to the SI via calibration using pure metals, certified monoelement standard solutions and certified reference materials i.e. 33XRB2B, 32XALB9B, 32XSN4B, 32XSN3F, 32X51000A, 32XALB2L, 32XPB15A, 39X17870AH, 39X17871C, 39X17869 AG, 36XCN10B produced by MBH Analytical Ltd. All values were confirmed in an inter-laboratory comparison using independent analytical methods.

Analytical methods applied for characterization:

Inductively coupled plasma optical emission spectrometry (ICP-OES)

Flame atomic absorption spectrometry (FAAS)

Inductively coupled plasma mass spectrometry (ICP-MS)

Optical emission spectrometry with low-voltage spark excitation (spark-OES)

Participating laboratories:

	P	Sn	Zn	Co	Cd	Sb	Ni	Fe	Pb	Bi	Ag	Al
ICP-OES	1, 4	1, 2, 5	1, 2, 4	1, 2, 4, 5	1, 2, 4, 5	1, 2, 4, 5	1, 2, 4	1, 2, 4	1, 2, 4, 5	1, 2, 4, 5	1, 2, 4, 5	1, 2, 5
FAAS							2	2				
ICP-MS		2	2	2	2	2	2	2	2	2	2	2
Spark-OES	3	3	3	3	3		3	3	3		3	

1. Łukasiewicz Research Network – Institute of Non-Ferrous Metals, Centre of Analytical Chemistry, Laboratory of Emission Spectrometry and Chromatography, Gliwice, Poland
2. Łukasiewicz Research Network – Institute of Non-Ferrous Metals, Centre of Analytical Chemistry, Laboratory of Atomic Spectrometry, Gliwice, Poland
3. CBJ sp. z o. o., Legnica, Poland
4. LITHEA, s.r.o., Brno, The Czech Republic
5. Mitra S. K. Private Limited, West Bengal, India

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 (not verified for micro-analysis).

Minimum sample size:

Minimum 0.5 g of the CRM is required.

Instructions for storage and use:

Storage the material in a dry and clean environment at room temperature.

Transport at normal conditions.

Overheating of the material during preparation should be avoided. Samples should be prepared in the same way as the CRM. Such preparation does not result in change of certified values.

Brief description of the production and certification process:

The material was produced by Łukasiewicz - IMN. Homogeneity testing were carried out taking into account all specimens of the produced material. Investigations were carried out using optical emission spectrometry with low voltage spark excitation source (spark-OES). Homogeneity was estimated statistically with analysis of variance (ANOVA).

The certification of CCD1 is valid 50 years, within the measurement uncertainties specified, provided the CRM is handled in accordance with the instructions given in this certificate.

Expired date:

50 years

Certificate Revision History: 1 st of July 2024 (original certificate date);

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 17034 with certificate number RM 006.

Contact:

Łukasiewicz Research Network —Institute of Non-Ferrous Metals
Centre of Analytical Chemistry
5 Sowińskiego Street
44-100 Gliwice, Poland
e-mail: crm@imn.lukasiewicz.gov.pl
phone: +48 32 23 80 408

www.reference-materials.com

