CERTIFICATE OF ANALYSIS

ERM®-CD100

Trace elements and pentachlorophenol (PCP) in wood		
Analyte	Certified value [1]	Uncertainty [2]
	Mass fraction in mg/kg [3]	
Arsenic	3.1	± 0.5
Cadmium	3.02	± 0.24
Chromium	36.4	± 2.6
Copper	22.9	± 1.7
Mercury	0.60	± 0.14
Lead	39	± 4
Pentachlorophenol	7.9	± 0.6

[1] For the trace elements, the certified value is the mean of 7 - 10 laboratory means obtained using different AAS and ICP techniques. For PCP, the certified value is the mean of 8 laboratory means obtained using GC-ECD, GC-MS including IDMS and HPLC-MS/MS. The values are traceable to the SI (Système International d'Unités) via calibration using substances with certified purity.

[2] Estimated expanded uncertainty *U* with a coverage factor of $k = 2$, corresponding to a level of confidence of approximately 95 %, as defined in the Guide to the expression of uncertainty in measurement, ISO, 1993.

[3] All results are corrected to the dry mass content of the wood material determined after drying to constant mass at (103 ± 2) °C.

This certificate is valid for a period of 12 months beginning with the dispatch of the reference material from BAM.

Date of dispatch:

The minimum sample size for one determination is 0.5 g for trace elements and 4 g for pentachlorophenol.

NOTE

The European Reference Material ERM®-CD100 was produced and certified under the responsibility of BAM Bundesanstalt für Materialforschung und –prüfung according to the principles laid down in ISO guide 35:2006 and in the technical guidelines of the European Reference Materials® co-operation agreement between BAM-LGC-IRMM.

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ADDITIONAL MATERIAL INFORMATION

The moisture content of the bottled wood material at the time of certification was (7.48 ± 0.14) %, corresponding to a drying temperature of (103 ± 2) °C. The indicated uncertainty represents the standard deviation of the mean of 10 laboratory means. The given value of the moisture content should be regarded as being indicative.

DESCRIPTION OF THE SAMPLE

The certified reference material ERM®-CD100 is intended for the verification of a correct implementation of standardised analytical methods for waste wood characterisation such as CEN/TR 14823 [1] for the determination of PCP or digestion methods according to EN 13657 [2] for the determination of trace elements. Furthermore, it can be used for the validation of modified or new analytical procedures.

ERM®-CD100 originates from different impregnated wood materials which were ground and thoroughly mixed in order to obtain this combination of trace elements and PCP in a wood matrix. It is provided in 250 ml amber glass bottles each containing approximately 74 grams of ground wood material that passed a sieve of 1 mm mesh size. The screw caps with PTFE inserts are sealed with shrinking foil.
Until dispatch to the customer the bottled material is stored at BAM at -(20 ± 2) °C.

The initial stability study after storage of selected units at different temperatures did not reveal any statistically significant deterioration of the reference material. Starting with the date of sale, the validity of the certificate expires after 12 months. Post-certification measurements will be conducted in order to keep this information up to date.

The tests for homogeneity and stability are described in detail in a technical report (see overleaf).

PARTICIPANTS

The following laboratories, including three independent operator/equipment combinations at BAM, Division I.1 (for trace elements) and two independent operator/equipment combinations at BAM, Division I.2 (for PCP) participated in the certification study using different AAS and ICP techniques (in case of the trace elements) and GC-ECD, GC-MS including IDMS and HPLC-MS/MS (in case of PCP).

Pfleiderer AG, DUROPAL GmbH, Arnsberg (DE)
SGS Institut Fresenius GmbH, Berlin (DE)
BAM Bundesanstalt für Materialforschung und –prüfung, Division I.1, Berlin (DE)
BAM Bundesanstalt für Materialforschung und –prüfung, Division I.2, Berlin (DE)
Fraunhofer-Institut für Holzforschung, Wilhelm-Klauditz-Institut (WKI), Braunschweig (DE)
Materialprüfungsanstalt Eberswalde GmbH, Eberswalde (DE)
Johann Heinrich von Thünen-Institut, Hamburg (DE)
Institut für Hygiene und Umwelt, Hamburg (DE)
EUKOS Umweltanalytik Nord GmbH, Plön (DE)
Holzforschung Austria, Wien (AT)

SAFETY INFORMATION

This reference material contains hazardous substances in very low mass fractions. Proper use of the reference material is essential for avoiding potential harm to the user. It is strongly recommended to handle and to dispose of the reference material in accordance with the guidelines for hazardous materials legally in force at the site of end use and disposal.

INSTRUCTIONS FOR USE

Before withdrawing a sub-sample, the bottle should be allowed to reach room temperature. Thereafter, the bottle should be closed tightly and stored at (4 ± 2) °C. The stability of the reference material is not affected by short periods of handling at ambient temperature during transport and use.
Analytical results have to be corrected to the dry mass content of the material. In this context it should be noted that under appropriate storage and handling conditions no significant moisture exchange between the bottled material and the ambient atmosphere may occur. Thus, at least at the beginning of the use of the material the required dry mass correction can be made on the basis of the indicated moisture content at the time of certification (7.48 %). Nevertheless, after repeated use of the material its moisture content should be determined (at least in duplicate) either by Karl Fischer titration method or by heating in an oven at a temperature of (103 ± 2) °C using separate sub-samples.

STORAGE

The reference material must be stored in its original bottle at (4 ± 2) °C.

TECHNICAL REPORT

A detailed technical report describing the analytical procedures and the statistical treatment of the analytical data used to certify the reference material ERM®-CD100 is available on request or can be downloaded from BAM website

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REFERENCES

[1] CEN/TR 14823 (2003): Durability of wood and wood-based products - Quantitative determination of pentachlorophenol in wood - Gas chromatographic method

[2] EN 13657 (2002): Characterization of waste - Digestion for subsequent determination of aqua regia soluble portion of elements

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