

JOINT RESEARCH CENTRE
Directorate F – Health, Consumers and Reference Materials

CERTIFICATE OF ANALYSIS

ERM® - CC537a

FRESHWATER SEDIMENT

Mass Fraction (dry mass basis)

	Certified value ³⁾	Uncertainty ⁴⁾
BDE-28 (2,4,4'-tribromodiphenyl ether) ¹⁾	0.28 µg/kg	0.05 µg/kg
BDE-47 (2,2',4,4'-tetrabromodiphenyl ether) ¹⁾	16.5 µg/kg	1.8 µg/kg
BDE-99 (2,2',4,4',5-pentabromodiphenyl ether) ¹⁾	34 µg/kg	4 µg/kg
BDE-100 (2,2',4,4',6-pentabromodiphenyl ether) ¹⁾	5.8 µg/kg	0.6 µg/kg
BDE-153 (2,2',4,4',5,5'-hexabromodiphenyl ether) ¹⁾	6.6 µg/kg	0.9 µg/kg
BDE-154 (2,2',4,4',5,6'-hexabromodiphenyl ether) ¹⁾	3.5 µg/kg	0.5 µg/kg
BDE-183 (2,2',3,4,4',5',6-heptabromodiphenyl ether) ¹⁾	1.41 µg/kg	0.21 µg/kg
BDE-209 (decabromodiphenyl ether) ¹⁾	7.8 mg/kg	0.7 mg/kg
α-HBCD (1,2,5,6,9,10-hexabromocyclododecane) ²⁾	8.3 µg/kg	1.6 µg/kg
β-HBCD (1,2,5,6,9,10-hexabromocyclododecane) ²⁾	2.3 µg/kg	0.5 µg/kg
γ-HBCD (1,2,5,6,9,10-hexabromocyclododecane) ²⁾	60 µg/kg	16 µg/kg

1) as obtained by using gas chromatography.
2) as obtained by using liquid chromatography.
3) Certified values are values that fulfil the highest standards of accuracy. The given values represent the 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. The certified value and its uncertainty are traceable to the International System of Units (SI).
4) The uncertainty of the certified value is the expanded uncertainty with a coverage factor $k = 2$ corresponding to a level of confidence of about 95 % estimated in accordance with ISO/IEC Guide 98-3, Guide to the Expression of Uncertainty in Measurement (GUM:1995), ISO, 2008.

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used is 750 mg.

Geel, February 2018

Signed:

Dr. Doris Florian
Head of Unit Reference Materials
European Commission, Joint Research Centre
Directorate F – Health, Consumers and Reference Materials
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Additional Material Information	
Mass Fraction (air-dried basis)	
	Value ¹⁾ [m/m %] ²⁾
Total organic carbon	0.691
Total sulfur	0.073
<p>1) These values correspond to the unweighted mean value of the means of three replicates performed on two bottles of ERM-CC537a, obtained by a single laboratory with a method of determination based on combustion and infrared detection. They are stated without an uncertainty and give merely information about material properties that may be of interest for the user.</p> <p>2) equivalent to 10⁻² g/g</p>	

DESCRIPTION OF THE MATERIAL

The starting material of ERM-CC537a is a freshwater sediment originating from a Belgian small river. It was air-dried, jet-milled, sieved to < 250 µm and finally homogenised. The obtained powdered sediment was bottled under argon and sterilised by γ-irradiation. ERM-CC537a is available in amber glass bottles (sealed with a shrink film on the cap) containing about 40 g of sediment.

ANALYTICAL METHODS USED FOR CERTIFICATION

- GC-HRMS [different combinations of extraction and clean-up procedures e.g., Soxhlet, ASE (accelerated solvent extraction), liquid-liquid extraction, multi-layer silica gel columns]
- GC-MS [different combinations of extraction and clean-up procedures e.g., Soxhlet, ASE, multi-layer silica gel columns, gel permeation chromatography (GPE), solid phase extraction (SPE)]
- GC-MS/MS (different combinations of extraction and clean-up procedures e.g., ASE, SPE, multilayer silica gel columns)
- LC-MS/MS (different combinations of extraction and clean-up procedures e.g., Soxhlet, SPE, sonication, ASE, GPE, multilayer silica gel columns)
- LC-MS (Soxhlet extraction, clean-up with sulfuric acid)
- UPLC-MS/MS (Soxhlet extraction, clean-up with GPE and acidified silica gel column)

PARTICIPANTS

Aarhus Universitet, Institut for Miljøvidenskab, Roskilde, DK

ALS Czech Republic, Praha, CZ

measurements under the scope of ISO/IEC 17025 Czech Accreditation Institute; 319/2016

Centre for Environment, Fisheries & Aquaculture Science (Cefas), Suffolk, UK

European Commission, Joint Research Centre, Directorate F - Health, Consumers and Reference Materials, Reference Materials Unit, Geel, BE

measurements under the scope of ISO/IEC 17025 accreditation BELAC No. 268-TEST

Fera Science Ltd, York, UK

measurements under the scope of ISO/IEC 17025 accreditation UKAS; 1642

GBA, Gesellschaft für Bioanalytik mbH, Pinneberg, DE

measurements under the scope of ISO/IEC 17025 accreditation DAkkS; D-PL-14170-01-00

Helmholtz Zentrum München, Deutsches Forschungszentrum für Gesundheit und Umwelt, Neuherberg, DE

Ministry of Environment and Climate Change, Laboratory Services Branch, Etobicoke, Ontario, Canada

measurements under the scope of ISO/IEC 17025 accreditation CALA; 2081

VITO NV, Vlaamse Instelling voor Technologisch Onderzoek, Mol, BE

Vrije Universiteit Amsterdam, Institute for Environmental Studies (IVM), Amsterdam, NL

Umweltbundesamt GmbH, Wien, AU

measurements partially under the scope of ISO/IEC 17025 accreditation BMWFJ; 0200

Universiteit Antwerpen, Toxicologie, Antwerpen, NL

Wageningen University & Research, Wageningen Marine Research, Chemical Laboratory of the Fish Division, IJmuiden, NL

measurements under the scope of ISO/IEC 17025 accreditation Raad voor Accreditatie/Dutch Accreditation Council; L09

SAFETY INFORMATION

The usual laboratory safety precautions apply.

INSTRUCTIONS FOR USE AND INTENDED USE

The units shall be shaken by turning upside down for at least 2 min before opening to ensure material re-homogenisation. The correction to dry mass should be made by taking two separate portions of at least 1 g and drying them in an oven at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ until constant mass is attained (successive weighing should not differ by more than 0.5 mg). Weighing of samples for dry mass determination and for analysis shall be done at the same time to avoid differences due to possible take up of moisture by the material.

The main purpose of this material is to assess method performance, i.e. for checking accuracy of analytical results. As any reference material, it can also be used for control charts or validation studies.

STORAGE

The materials shall be stored at $18\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ in the dark. The user is reminded to close bottles immediately after taking a sample.

However, the European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

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