

JOINT RESEARCH CENTRE  
Institute for Reference Materials and Measurements

# CERTIFICATE OF ANALYSIS

ERM<sup>®</sup>-CA100

SURFACE WATER				
	Mass concentration			
	Certified value <sup>1)</sup>		Uncertainty <sup>2)</sup>	
Naphthalene	1.21	µg/L	0.13	µg/L
Anthracene	91	ng/L	11	ng/L
Fluoranthene	104	ng/L	11	ng/L
Benzo[b]fluoranthene	32	ng/L	9	ng/L
Benzo[k]fluoranthene	38	ng/L	9	ng/L
Benzo[a]pyrene	42	ng/L	8	ng/L
Indeno[1,2,3-cd]pyrene	29	ng/L	7	ng/L

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 after sample reconstitution strictly following the protocol specified in the "Instructions for use". The certified value and its uncertainty are traceable to the International System of units (SI).

2) 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 equal to 500 mL. Details are given in the "Instructions for use".

## NOTE

European Reference Material ERM<sup>®</sup>-CA100 was produced and certified under the responsibility of the Institute for Reference Materials and Measurements of the European Commission's Joint Research Centre according to the principles laid down in the technical guidelines of the European Reference Materials<sup>®</sup> co-operation agreement between BAM-IRMM-LGC. Information on these guidelines is available on the internet (<http://www.erm-crm.org>).

Accepted as an ERM<sup>®</sup>, Geel, April 2016

Signed:   
**INFORMATION ONLY**  
European Commission

Joint Research Centre  
Institute for Reference Materials and Measurements  
Retieseweg 111  
B-2440 Geel, Belgium

All following pages are an integral part of the certificate.

ERM<sup>®</sup>-CA100

Page 1 of 4

Additional Material Information	
	Mass concentration
	Value <sup>1)</sup> [ng/L]
Benzo[ghi]perylene	31
1) This value is stated without an uncertainty and corresponds to the unweighted mean value of the means of two accepted sets of data, each set being obtained in a different laboratory and with a method of determination based on GC-MS. The value is traceable to the International System of units (SI).	

## DESCRIPTION OF THE MATERIAL

The CRM is available as unit kit that includes a plastic container with at least 1000 mL of surface water, an amber glass ampoule with at least 24 mL humic acids solution in water and an amber glass ampoule with at least 2 mL PAH solution in acetonitrile. The reconstitution protocol specified in the "Instructions for use" must be strictly followed to obtain the final CRM (approximate concentration of carbon: 0.02 g/L).

## ANALYTICAL METHODS USED FOR CERTIFICATION

Liquid liquid extraction (LLE) / gas chromatography – mass spectrometry (GC-MS)

Solid phase extraction (SPE) / GC-MS

LLE / high performance liquid chromatography – fluorescence detection (HPLC-FLD)

## PARTICIPANTS

BAM, Bundesanstalt für Materialforschung und –prüfung, Berlin, DE  
(measurements under the scope of ISO/IEC 17025 accreditation DAkkS; D-PL-11075-14-00)

European Commission, Joint Research Centre, Institute for Reference Materials and Measurements (IRMM), Geel, BE  
(accredited to ISO Guide 34 for production of reference materials, BELAC No. 268-RM)

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, German Research Center for Environmental Health, Neuherberg, DE  
(measurements under the scope of ISO/IEC 17025 accreditation DAkkS; D-PL-14138-02-00)

INERIS, Institut National de l'Environnement Industriel et des Risques, Verneuil-En-Halatte, FR

IVL Svenska Miljöinstitutet, Swedish Environmental Research Institute Ltd, Stockholm, SE  
(measurements under the scope of ISO/IEC 17025 accreditation SWEDAC; 1213)

NCSR Demokritos, National Center for Scientific Research, Athens, GR  
(measurements under the scope of ISO/IEC 17025 accreditation E.SY.D.; 580-2)

Rijkswaterstaat - Institute for Inland Water Management and Waste Water Treatment RIZA, Lelystad, NL  
(measurements under the scope of ISO/IEC 17025 accreditation Raad voor Accreditatie/Dutch Accreditation Council; L521)

SGS Belgium NV, NK–'s-Gravenpolder, NL  
(measurements under the scope of ISO/IEC 17025 accreditation BELAC; 005-TEST)

TNO, Earth, Life & Social Sciences (ELSS), Utrecht, NL  
(measurements under the scope of ISO/IEC 17025 accreditation Raad voor Accreditatie/Dutch Accreditation Council; L026)

Umweltbundesamt GmbH, Wien, AU  
(measurements under the scope of ISO/IEC 17025 accreditation BMWFJ; 0200)

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

## SAFETY INFORMATION

The usual laboratory safety precautions apply.

## INSTRUCTIONS FOR USE AND INTENDED USE

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

The CRM unit contains enough water and spiking solution to prepare two reconstituted samples of 500 mL, corresponding to the prescribed minimum sample intake. The two samples shall be prepared at the same time.

To make it ready for use, the material has to be reconstituted according to the following procedure:

The ERM-CA100 unit box set contains:

A bottle with at least 1 L water

An ampoule with at least 24 mL humic acids spiking solution A (water)

An ampoule with at least 2 mL PAH spiking solution B (acetonitrile)

Recommended glassware (use of glassware should take place in a temperature range that complies with their calibrated volume):

- Volumetric glass flask, volume 500 mL, with glass stopper
- Volumetric glass pipette Class A, volume 1 mL
- Volumetric glass pipette Class A, volume 10 mL
- Volumetric glass pipette Class A, volume 2 mL

Reconstitution protocol:

1. Transfer approximately 450 mL of the water into the 500 mL volumetric glass flask.
2. Shake spiking solution A (humic acids solution) manually for approximately 1 minute.
3. Open the ampoule of spiking solution A and pipette 12 mL into the volumetric glass flask.
4. Shake the volumetric flask gently (also by inversion) for approximately 1 minute.
5. Pipette 1 mL from the spiking solution B (PAH solution) into the volumetric glass flask.

N.B.: the pipette tip ought to be immersed below the water surface (to avoid loss of the most volatile PAHs) inside the volumetric glass flask until solution is delivered (flow out from the pipette by gravity) and slowly pulled back.

6. Mix gently by inversion of the volumetric flask for 1 minute.
7. Fill the volumetric flask with water up to the calibration mark.
8. Mix gently by inversion of the volumetric glass flask once again for 1 minute to achieve good homogeneity.
9. Leave the solution for about 24 hours in a dark place at  $+4\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ .
10. After this period, mix gently by inversion of the volumetric glass flask once again for 1 minute and proceed with the analysis according to the laboratory procedure within 24 hours.

N.B.: During the operations of mixing of the volumetric flask (4, 6, 8, and 10) pay attention not to lose drops of sample (e.g., due to leaking stoppers).

## STORAGE

The materials shall be stored at  $18\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  in the dark.

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 units.

## LEGAL NOTICE

Neither the European Commission, its contractors nor any person acting on their behalf:

(a) make any warranty or representation, express or implied, that the use of any information, material, apparatus, method or process disclosed in this document does not infringe any privately owned intellectual property rights; or

(b) assume any liability with respect to, or for damages resulting from, the use of any information, material, apparatus, method or process disclosed in this document save for loss or damage arising solely and directly from the negligence of the Institute for Reference Materials and Measurements of the European Commission's Joint Research Centre.

## NOTE

A detailed technical report is available at [www.irmm.jrc.be](http://www.irmm.jrc.be). A paper copy is obtainable from the Joint Research Centre, Institute for Reference Materials and Measurements on request.

---

European Commission – Joint Research Centre  
Institute for Reference Materials and Measurements (IRMM)  
Retieseweg 111, B - 2440 Geel (Belgium)  
Telephone: +32-(0)14-571.722 - Fax: +32-(0)14-590.406