BAM
Bundesanstalt für Materialforschung und -prüfung

Certified Reference Material

BAM-U013b

Polycyclic aromatic hydrocarbons in soil

Certified Values

ausverkauft / out of stock

Measurand	Mass fraction[1] in mg/kg	Uncertainty U[2] in mg/kg
Naphthalene	0.73	0.21
Fluorene	0.45	0.07
Phenanthrene	8.4	0.7
Anthracene	1.45	0.14
Fluoranthene	14.0	1.3
Pyrene	11.3	1.1
Benz[*a*]anthracene	6.0	0.5
Chrysene	5.4	1.2
Benzo[*b*]fluoranthene	6.5	1.0
Benzo[*k*]fluoranthene	3.16	0.24
Benzo[*a*]pyrene	6.6	0.4
Dibenz[*a,h*]anthracene	1.03	0.15
Benzo[*ghi*]perylene	5.0	0.6
Indeno[1,2,3-*cd*]pyrene	4.5	0.6
PAH sum	75.4	6.0

[1] Unweighted mean value of 8-10 laboratory means.

[2] Estimated expanded uncertainty U with a coverage factor of $k = 2$, corresponding to a confidence level of approximately 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement, ISO, 2008.

Indicative Values

Measurand	Mass fraction[1] in mg/kg	Uncertainty U[2] in mg/kg
Acenaphthylene	0.66	0.30
Acenaphthene	0.148	0.027

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

Date of dispatch: Sample No.:

Material Description

The material BAM-U013b is a moderately contaminated soil sampled from a former gasworks site in the city of Berlin, Germany. After drying, sieving and homogenisation, the fraction < 125 µm was subdivided into units of 77 g which were filled in amber glass bottles with screw caps equipped with PTFE-inserts and sealed with shrinking foil. The material is stored at BAM at -20 °C until dispatch. Details on the preparation and characterisation procedure are specified in the certification report.

Recommended Use

BAM-U013b is explicitly meant only to be used in analytical laboratories equipped for environmental analysis. The intended purpose of reference material BAM-U013b is the verification of analytical procedures for the determination of PAH in soils and sediments.

Handling

The minimum sample size for one determination is 5 g. The mass fractions of the PAH are related to sample intake (not to dry mass). The water content is (3.12 ± 0.2) % and remains stable if the material is handled as indicated below. It is strongly recommended to handle and dispose of the reference material in accordance with the guidelines for analytical soil samples legally in force at the site of end use and disposal.

Transport and Storage

BAM-U013b can be shipped at ambient temperature. Upon receipt the material has to be stored at -20 °C in its original bottle. Before taking a subsample the bottle has to have reached ambient temperature. Thereafter, the bottle is to be closed tightly and stored at -20 °C. The stability of the reference material is not affected by short periods of handling at ambient temperature during transport and use.

Participating Laboratories

The following laboratories participated in the certification study:

Bundesanstalt für Materialforschung und -prüfung (BAM)	Berlin (DE)
Chemisches Labor Dr. Barbara Graser	Schonungen (DE)
Chemisches Labor Dr. Wirts und Partner GmbH	Hannover (DE)
Chemlab GmbH	Bensheim (DE)
Eurofins Umwelt West GmbH	Wesseling (DE)
Infraserv GmbH & Co. Höchst KG	Frankfurt/Main (DE)
Institut Koldingen GmbH	Sarstedt (DE)
GEO-data GmbH	Garbsen (DE)
Lausitzer Analytik GmbH	Spremberg (DE)
SGS Institut Fresenius GmbH	Herten (DE)
Wessling GmbH	Hannover (DE)

Details on the analytical procedures are given in the certification report.

Metrological Traceability

All certified values refer to the extractable amount of the PAH congeners and are conventional to this extent. It is known from experience that there is no significant bias among the applied methods and the completeness of extraction was demonstrated for many similar materials. In order to ensure traceability of the extractable content as defined above, certified calibration standards SRM 1647d or SRM 2260, respectively, were employed by the participants.

Literature

R. Becker, A. Buchholz, C. Jung, W. Bremser. BAM-U013b: Polycyclic aromatic hydrocarbons in soil, Certification report, http://www.rm-certificates.bam.de/de/rm-certificates_media/rm_cert_environment/bam_u013b_repe.pdf

ISO 13877:1998 – Soil quality -- Determination of polynuclear aromatic hydrocarbons -- Method using high-performance liquid chromatography

ISO 18287:2006 – Soil quality -- Determination of polycyclic aromatic hydrocarbons (PAH) -- Gas chromatographic method with mass spectrometric detection (GC-MS)

BAM:2006 "Guidelines for the Production of BAM Reference Materials" http://www.bam.de/en/fachthemen/referenzmaterialien/referenzmaterialien_medien/bam_rm_guidelines.pdf

ISO/IEC Guide 98:2008: "Uncertainty of measurement." ISO, Geneva 2008

Accepted as BAM-CRM on March 04, 2013

Bundesanstalt für Materialforschung und –prüfung (BAM)

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