

CERTIFIED REFERENCE MATERIAL

16 components: Benzo(a)pyrene [CAS:50-32-8] 1mg/l ; Naphthalene [CAS:91-20-3] 10mg/l ; Acenaphthylene [CAS:208-96-8] 10mg/l ; Acenaphthene [CAS:83-32-9] 10mg/l ; Fluorene [CAS:86-73-7] 10mg/l ; Phenanthrene [CAS:85-01-8] 10mg/l ; Anthracene [CAS:120-12-7] 10mg/l ; Fluoranthene [CAS:206-44-0] 10mg/l ; Pyrene [CAS:129-00-0] 10mg/l ; Benzo(a)anthracene [CAS:56-55-3] 10mg/l ; Chrysene [CAS:218-01-9] 10mg/l ; Benzo(b)fluoranthene [CAS:205-99-2] 10mg/l ; Benzo(k)fluoranthene [CAS:207-08-9] 10mg/l ; Dibenzo(a,h)anthracene [CAS:53-70-3] 10mg/l ; Benzo(g,h,i)perylene [CAS:191-24-2] 10mg/l ; Indeno(1,2,3-c,d)pyrene [CAS:193-39-5] 10mg/l in Acetonitrile

Lot N: 1005203
Barcode: 93190015

Ref N: RD0551922

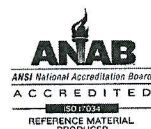
Certification Date: 16.05.2024

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
Benzo(a)pyrene	1.003 ± 0.036	50-32-8	C ₂₀ H ₁₂
Naphthalene	10.104 ± 0.115	91-20-3	C ₁₀ H ₈
Acenaphthylene	10.198 ± 0.162	208-96-8	C ₁₂ H ₈
Acenaphthene	10.169 ± 0.197	83-32-9	C ₁₂ H ₁₀
Fluorene	10.087 ± 0.352	86-73-7	C ₁₃ H ₁₀
Phenanthrene	10.131 ± 0.185	85-01-8	C ₁₄ H ₁₀
Anthracene	10.200 ± 0.172	120-12-7	C ₁₄ H ₁₀
Fluoranthene	10.106 ± 0.318	206-44-0	C ₁₆ H ₁₀
Pyrene	10.134 ± 0.183	129-00-0	C ₁₆ H ₁₀
Benzo(a)anthracene	10.107 ± 0.208	56-55-3	C ₁₈ H ₁₂
Chrysene	10.080 ± 0.216	218-01-9	C ₁₈ H ₁₂
Benzo(b)fluoranthene	10.061 ± 0.339	205-99-2	C ₂₀ H ₁₂
Benzo(k)fluoranthene	10.173 ± 0.201	207-08-9	C ₂₀ H ₁₂
Dibenzo(a,h)anthracene	10.083 ± 0.331	53-70-3	C ₂₂ H ₁₄
Benzo(g,h,i)perylene	10.113 ± 0.272	191-24-2	C ₂₂ H ₁₂
Indeno(1,2,3-c,d)pyrene	10.112 ± 0.210	193-39-5	C ₂₂ H ₁₂

* WQP 5.15.1/2 The certified value was obtained gravimetrically and confirmed experimentally by GC/MS or HPLC

Density 0.8067 g/cm³ at 20°C

Starting Material	Purity, Batch
Benzo(a)pyrene	99.9% (41530320)
Naphthalene	99.6% (41466544)
Acenaphthylene	94.5% (41497753)
Acenaphthene	99.5% (41543160)
Fluorene	98.2% (41543153)
Phenanthrene	98.7% (41547236)
Anthracene	98.4% (41465158)
Fluoranthene	96.8% (41543122)
Pyrene	99.9% (41396773)
Benzo(a)anthracene	99.5% (41514795)
Chrysene	99.0% (41542934)
Benzo(b)fluoranthene	99.9% (41394786)
Benzo(k)fluoranthene	99.9% (41540503)
Dibenzo(a,h)anthracene	99.9% (41545867)
Benzo(g,h,i)perylene	97.0% (41482575)



CPAchem Ltd. is ISO 17034 (Cert No AR-1835)
and ISO/IEC 17025 (Cert No AT-1836) accredited by ANAB

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Indeno(1,2,3-c,d)pyrene

99.2% (41530108)

Storage Conditions: Store in a refrigerator and protected from light

Expiry Date: 16.06.2025

Concept of Certification and traceability statement:

This certified reference material is produced by gravimetric measurement and dissolving the individual substances in Acetonitrile. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA 4/02 and incorporates the uncertainties of the raw-material purity, the mass and the volume. The metrological traceability is defined as the "property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty". The metrological traceability is ensured through gravimetric measurement and dissolving of certified reference material/s (traceable to SI) from laboratories/producers, accredited according to ISO 17034. The measurement results are traceable to SI. All analytical balances used for the preparation of the solution are calibrated yearly under an in-house procedure with class E1 and class E2 analytical weights, traceable to SI (DKD), and are checked daily. Class A laboratory glassware is used. The results from temperature measurement are traceable to SI. The thermometers used for solution's calibration are calibrated from an ISO 17025 accredited laboratory. The ambient conditions are controlled with a hygrometer calibrated from an ISO 17025 accredited laboratory. Both, purity of the starting materials and solvent, were checked using appropriate analytical instrument.

Intended use: For Laboratory Use Only

This CRM is intended for:
Calibration of TLC, GC/FID, GC/TCD, GC/ECD, GC/MS, GC/MS/MS, LC/UV, LC/MS and LC/MS/MS
Validation of analytical methods
Preparation of "working reference samples"
Detection limit and linearity studies
This statement is not intended to restrict the use for other purposes.

Instructions for the correct use of this certified reference material:

This CRM can be used directly or can be diluted in an appropriate solvent. Only a clean class A glassware should be used. Do not pipet from container. Obtained concentration (in mg/l) after dilution is a result from the multiplication of certified value of CRM concentration and the CRM's volume used for dilution and divided into the flask's volume used for dilution. For quantitative analysis, we recommend analyzing this mixture separately, without mixing it with other solutions, to ensure accurate results for every compound.

Stability and storage:

This CRM is with a guaranteed stability until $\pm 5\%$ of the certified concentration for a period of 12 months. Stability is guaranteed of an unopened original packaging stored, as written in the section: Storage Conditions. Even if the product is stable at normal laboratory conditions, in order to increase its stability, we highly recommend it to be stored in a refrigerator. The product should be used shortly after opening to avoid concentration changes due to evaporation. Warranty does not apply to a product stored after opening.

Hazardous situation:

The normal laboratory safety precautions should be observed when working with this RM. Further details for the handling of this RM are available in a safety data sheet.

Level of homogeneity

This solution was mixed according to an in-house procedure (MQP 5.13.1) and is guaranteed to be homogeneous. To ensure sufficient homogeneity of the sample prior to use thoroughly mix by inversion or sonicate.

Names of certifying officers:

Laboratory:  Margarita Dimitrova

Manager:  Krassimira Taralova

This document QF 5.17.1/1 version 1 is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31, ISO Guide 35, and Eurachem / CITAC Guides

This certificate relates solely to the lot number given above.

All processes (including generating of this certificate) are completely controlled by the specialized Computer-Aided-Manufacturing (CAM) software.

This Certified Reference Material was produced under a quality management system that is:

- Registered to ISO 9001 Quality Management System (Lloyd's Register Quality Assurance Ltd Cert No 0039638)
- Accredited according to ISO/IEC 17025
- Accredited according to ISO 17034

Additional Information

Gravimetric Data

Component	Purity %	Source Lot No	Weighed quantity, g	Final quantity, kg.10 ⁻³	Bulk/ Standard Solution lot No	Concentration mg/kg	Chemist ID
Benzo(a)pyrene	99.9	41530320	0.00516	5.5965	94049688	921.08	AS
		94049688	0.1088	7.8401	93189187	12.7822	KR
		93189187	0.7849	8.0672	93190015	1.2436	KR
Naphthalene	99.6	41466544	0.02982	3.4714	94029475	8555.9	AS
		94029475	0.1171	10.3825	93189217	96.499	KR
		93189217	1.0471	8.0672	93190015	12.5253	KR
Acenaphthylene	94.5	41497753	0.01413	3.2986	94009361	4048.1	AS
		94009361	0.2498	10.3825	93189217	97.396	KR
		93189217	1.0471	8.0672	93190015	12.6417	KR
Acenaphthene	99.5	41543160	0.01068	3.7236	94049831	2853.85	AS
		94049831	0.3533	10.3825	93189217	97.112	KR
		93189217	1.0471	8.0672	93190015	12.6049	KR
Fluorene	98.2	41543153	0.00537	3.6574	94039580	1441.82	AS
		94039580	0.6937	10.3825	93189217	96.334	KR
		93189217	1.0471	8.0672	93190015	12.5038	KR
Phenanthrene	98.7	41547236	0.01154	2.8370	94030457	4014.8	AS
		94030457	0.2502	10.3825	93189217	96.751	KR
		93189217	1.0471	8.0672	93190015	12.5580	KR
Anthracene	98.4	41465158	0.01291	4.3636	94034134	2911.22	AS
		94034134	0.3474	10.3825	93189217	97.410	KR
		93189217	1.0471	8.0672	93190015	12.6435	KR
Fluoranthene	96.8	41543122	0.006	3.8400	94039665	1512.49	AS
		94039665	0.6625	10.3825	93189217	96.510	KR
		93189217	1.0471	8.0672	93190015	12.5268	KR
Pyrene	99.9	41396773	0.01177	4.1213	94034141	2853.05	AS
		94034141	0.3522	10.3825	93189217	96.782	KR
		93189217	1.0471	8.0672	93190015	12.5620	KR
Benzo(a)anthracene	99.5	41514795	0.00987	4.0333	94040609	2434.87	AS
		94040609	0.4116	10.3825	93189217	96.527	KR
		93189217	1.0471	8.0672	93190015	12.5289	KR
Chrysene	99.0	41542934	0.00939	3.3882	94040586	2743.67	AS
		94040586	0.3643	10.3825	93189217	96.270	KR
		93189217	1.0471	8.0672	93190015	12.4955	KR
Benzo(b)fluoranthene	99.9	41394786	0.00834	3.2455	94040616	2567.17	AS
		94040616	0.3886	10.3825	93189217	96.085	KR
		93189217	1.0471	8.0672	93190015	12.4715	KR
Benzo(k)fluoranthene	99.9	41540503	0.01039	3.5850	94045338	2895.29	AS
		94045338	0.3484	10.3825	93189217	97.156	KR
		93189217	1.0471	8.0672	93190015	12.6104	KR
Dibenzo(a,h)anthracene	99.9	41545867	0.00573	3.4045	94039597	1681.39	AS
		94039597	0.5946	10.3825	93189217	96.292	KR
		93189217	1.0471	8.0672	93190015	12.4984	KR
Benzo(g,h,i)perylene	97.0	41482575	0.00717	5.0417	94045345	1379.48	AS
		94045345	0.7269	10.3825	93189217	96.580	KR
		93189217	1.0471	8.0672	93190015	12.5357	KR
Indeno(1,2,3-c,d)pyrene	99.2	41530108	0.00978	5.5580	94047769	1745.55	AS
		94047769	0.5744	10.3825	93189217	96.570	KR
		93189217	1.0471	8.0672	93190015	12.5345	KR

