

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

ACs Standard Solution 11 components (EPA 8020A)
100ug/ml each of Benzene [CAS:71-43-2] ; Chlorobenzene [CAS:108-90-7] ; 1,2-Dichlorobenzene [CAS:95-50-1] ; 1,3-Dichlorobenzene [CAS:541-73-1] ; 1,4-Dichlorobenzene [CAS:106-46-7] ; Ethylbenzene [CAS:100-41-4] ; Toluene [CAS:108-88-3] ; o-Xylene [CAS:95-47-6] ; m-Xylene [CAS:108-38-3] ; p-Xylene [CAS:106-42-3] ; Styrene [CAS:100-42-5] inMethanol purge-and-trap

Lot N: 727747
Barcode: 92701274

Ref N: F116301

Certification Date: 06.01.2021

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
Benzene	100.97 ± 1.83	71-43-2	C ₆ H ₆
Chlorobenzene	99.99 ± 1.12	108-90-7	C ₆ H ₅ Cl
1,2-Dichlorobenzene	99.30 ± 1.12	95-50-1	C ₆ H ₄ Cl ₂
1,3-Dichlorobenzene	100.05 ± 1.39	541-73-1	C ₆ H ₄ Cl ₂
1,4-Dichlorobenzene	100.33 ± 1.13	106-46-7	C ₆ H ₄ Cl ₂
Ethylbenzene	100.37 ± 1.24	100-41-4	C ₈ H ₁₀
Toluene	99.73 ± 1.29	108-88-3	C ₆ H ₅ CH ₃
o-Xylene	101.80 ± 1.15	95-47-6	C ₈ H ₁₀
m-Xylene	101.84 ± 1.22	108-38-3	C ₈ H ₁₀
p-Xylene	100.65 ± 1.25	106-42-3	C ₈ H ₁₀
Styrene	100.26 ± 1.12	100-42-5	C ₈ H ₈

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

Density 0.7876 g/cm³ at 20°C

Starting Material	Purity, Batch
Benzene	99.9% (41325469)
Chlorobenzene	99.0% (41365434)
1,2-Dichlorobenzene	99.4% (41337127)
1,3-Dichlorobenzene	99.8% (41358689)
1,4-Dichlorobenzene	99.9% (41349663)
Ethylbenzene	99.6% (41380628)
Toluene	99.8% (41387894)
o-Xylene	99.3% (41365311)
m-Xylene	99.5% (41365373)
p-Xylene	99.9% (41376096)
Styrene	99.8% (41380680)

Storage Conditions: Store in a refrigerator at temperatures between 2°C to 8°C

Expiry Date: 06.02.2023

Concept of Certification and traceability statement:

This certified reference material is produced by gravimetric measurement and dissolving the individual substances in Methanol. 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



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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/TCO, 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 24 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 – Testing (ANAB Cert No AT-1836)

- Accredited according to ISO 17034 - Reference Material Producer (ANAB Cert No AR-1835)

Additional Information

Analytical Data:

GC Conditions:

Column	Agilent CP9105 J&W VF-624ms 60m, 0.32mm, 1.80µm	Oven	Temperature	Hold
Flow rate	1.6 ml/min	Initial	40°C	2
Injector	200 °C	5°C/min	180°C	0
Injection volume	1µl split	20°C/min	220°C	3
Carrier gas	He, constant flow			

MS Conditions:

Transfer line	230°C	Ionization mode	EI
MS Source	230°C	Mode	Scan
MS Quad	150°C		

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
Benzene	99.9	41325469	0.01162	2.7610	91699121	4204.4	AS
		91699121	0.4803	15.7519	92701274	128.198	ER
Chlorobenzene	99.0	41365434	0.02963	3.2474	91634672	9033.0	AS
		91634672	0.34745	3.0762	91694119	1020.27	AS
		91694119	1.9601	15.7519	92701274	126.958	ER
1,2-Dichlorobenzene	99.4	41337127	0.02914	3.0016	91651716	9649.9	AS
		91651716	0.2058	15.7519	92701274	126.075	ER
1,3-Dichlorobenzene	99.8	41358689	0.0176	3.3092	91640284	5307.9	AS
		91640284	0.377	15.7519	92701274	127.037	ER
1,4-Dichlorobenzene	99.9	41349663	0.02898	3.2851	91654991	8812.8	AS
		91654991	0.2277	15.7519	92701274	127.392	ER
Ethylbenzene	99.6	41380628	0.02231	2.5427	91678904	8739.2	AS
		91678904	0.2297	15.7519	92701274	127.438	ER
Toluene	99.8	41387894	0.0202	3.1010	91695062	6501.0	AS
		91695062	0.3068	15.7519	92701274	126.619	ER
o-Xylene	99.3	41365311	0.02828	3.1586	91688996	8890.5	AS
		91688996	0.229	15.7519	92701274	129.248	ER
m-Xylene	99.5	41365373	0.0246	2.8565	91675804	8568.7	AS
		91675804	0.2377	15.7519	92701274	129.303	ER
p-Xylene	99.9	41376096	0.0222	2.7619	91675798	8029.8	AS
		91675798	0.2507	15.7519	92701274	127.798	ER
Styrene	99.8	41380680	0.0298	3.1682	91693167	9387.2	AS
		91693167	0.2136	15.7519	92701274	127.292	ER

