

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

17 components; Benzene [CAS:71-43-2] 1000mg/l ; Bromodichloromethane [CAS:75-27-4] 2500mg/l ; Chlorobenzene [CAS:108-90-7] 1000mg/l ; Chloroform [CAS:67-66-3] 2500mg/l ; Dibromochloromethane [CAS:124-48-1] 2500mg/l ; Ethylbenzene [CAS:100-41-4] 1000mg/l ; Tetrachloroethene [CAS:127-18-4] 2500mg/l ; Tetrachloromethane [CAS:56-23-5] 2500mg/l ; Toluene [CAS:108-88-3] 1000mg/l ; Tribromomethane [CAS:75-25-2] 2500mg/l ; 1,1,1-Trichloroethane [CAS:71-55-6] 2500mg/l ; Trichloroethene [CAS:79-01-6] 2500mg/l ; o-Xylene [CAS:95-47-6] 1000mg/l ; m-Xylene [CAS:108-38-3] 1000mg/l ; p-Xylene [CAS:106-42-3] 1000mg/l ; Styrene [CAS:100-42-5] 1000mg/l ; 1,2-Dichlorobenzene [CAS:95-50-1] 1000mg/l in Methanol

Lot N: 741650
Barcode: 92728943

Ref N: RD0167721.5

Certification Date: 21.03.2021

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
Benzene	1000.2 ± 9.4	71-43-2	C ₆ H ₆
Bromodichloromethane	2501.8 ± 25.4	75-27-4	CHBrCl ₂
Chlorobenzene	1006.1 ± 9.5	108-90-7	C ₆ H ₅ Cl
Chloroform	2511.3 ± 23.8	67-66-3	CHCl ₃
Dibromochloromethane	2502.7 ± 23.4	124-48-1	CHBr ₂ Cl
Ethylbenzene	1010.4 ± 9.5	100-41-4	C ₈ H ₁₀
Tetrachloroethene	2506.6 ± 23.5	127-18-4	C ₂ Cl ₄
Tetrachloromethane	2515.1 ± 23.7	56-23-5	CCl ₄
Toluene	1001.7 ± 9.4	108-88-3	C ₆ H ₅ CH ₃
Tribromomethane	2505.4 ± 26.6	75-25-2	CHBr ₃
1,1,1-Trichloroethane	2509.0 ± 26.8	71-55-6	C ₂ H ₃ Cl ₃
Trichloroethene	2510.4 ± 23.7	79-01-6	C ₂ HCl ₃
o-Xylene	1004.0 ± 9.5	95-47-6	C ₈ H ₁₀
m-Xylene	1007.1 ± 9.5	108-38-3	C ₈ H ₁₀
p-Xylene	1019.2 ± 9.6	106-42-3	C ₈ H ₁₀
Styrene	1007.5 ± 9.5	100-42-5	C ₈ H ₈
1,2-Dichlorobenzene	1011.4 ± 9.5	95-50-1	C ₆ H ₄ Cl ₂

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

Density 0.8041 g/cm³ at 20°C

Starting Material	Purity, Batch
Benzene	99.9% (41325469)
Bromodichloromethane	98.5% (41374665)
Chlorobenzene	99.0% (41365434)
Chloroform	99.5% (41398173)
Dibromochloromethane	98.0% (41363829)
Ethylbenzene	99.6% (41380628)
Tetrachloroethene	99.9% (41359556)
Tetrachloromethane	99.6% (41363959)
Toluene	99.8% (41387894)
Tribromomethane	99.4% (41384039)
1,1,1-Trichloroethane	97.4% (41386378)
Trichloroethene	99.0% (41365670)
o-Xylene	99.3% (41365311)
m-Xylene	99.8% (41331101)



p-Xylene	99.9% (41376096)
Styrene	99.8% (41380680)
1,2-Dichlorobenzene	99.7% (41388419)

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

Expiry Date: 21.04.2022

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 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 – Testing (ANAB Cert No AT-1836)
- Accredited according to ISO 17034 – Reference Material Producer (ANAB Cert No AR-1835)

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
Benzene	99.9	41325469	0.29407	3.3468	91714077	87779	AS
		91714077	0.2279	16.0824	92728943	1243.89	PA
Bromodichloromethane	98.5	41374665	0.3074	3.4233	91707376	88448	AS
		91707376	0.5657	16.0824	92728943	3111.17	PA
Chlorobenzene	99.0	41365434	0.14898	2.2795	91710758	64703	AS
		91710758	0.311	16.0824	92728943	1251.22	PA
Chloroform	99.5	41398173	0.11733	2.1519	91720641	54251	AS
		91720641	0.9258	16.0824	92728943	3123.02	PA
Dibromochloromethane	98.0	41363829	0.4266	3.8788	91703477	107782	AS
		91703477	0.4644	16.0824	92728943	3112.35	PA
Ethylbenzene	99.6	41380628	0.2676	2.6985	91690739	98770	AS
		91690739	0.2046	16.0824	92728943	1256.55	PA
Tetrachloroethene	99.9	41359556	0.2882	3.0858	91722553	93302	AS
		91722553	0.5373	16.0824	92728943	3117.15	PA
Tetrachloromethane	99.6	41363959	0.15487	3.3354	91716637	46246	AS
		91716637	1.0877	16.0824	92728943	3127.75	PA
Toluene	99.8	41387894	0.2647	2.8918	91703415	91352	AS
		91703415	0.2193	16.0824	92728943	1245.67	PA
Tribromomethane	99.4	41384039	0.16952	2.3059	91710772	73075	AS
		91710772	0.6857	16.0824	92728943	3115.68	PA
1,1,1-Trichloroethane	97.4	41386378	0.18903	2.9012	91699947	63462	AS
		91699947	0.7907	16.0824	92728943	3120.14	PA
Trichloroethene	99.0	41365670	0.15765	2.8860	91710765	54080	AS
		91710765	0.9284	16.0824	92728943	3121.91	PA
o-Xylene	99.3	41365311	0.177	2.9708	91722546	59163	AS
		91722546	0.3394	16.0824	92728943	1248.57	PA
m-Xylene	99.8	41331101	0.2855	3.2832	91695208	86783	AS
		91695208	0.2321	16.0824	92728943	1252.45	PA
p-Xylene	99.9	41376096	0.2917	3.1794	91703439	91655	AS
		91703439	0.2224	16.0824	92728943	1267.47	PA
Styrene	99.8	41380680	0.3276	3.3701	91703422	97013	AS
		91703422	0.2077	16.0824	92728943	1252.90	PA
1,2-Dichlorobenzene	99.7	41388419	0.2925	2.9813	91690746	97817	AS
		91690746	0.2068	16.0824	92728943	1257.81	PA

