

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

19 components: Dichloromethane [CAS:75-09-2] 80mg/l ; 1,1-Dichloroethene [CAS:75-35-4] 80mg/l ; Chloroform [CAS:67-66-3] 80mg/l ; 1,1,1-Trichloroethane [CAS:71-55-6] 80mg/l ; Triclocarban [CAS:101-20-2] 80mg/l ; Trichloroethene [CAS:79-01-6] 80mg/l ; Bromodichloromethane [CAS:75-27-4] 80mg/l ; Tetrachloroethene [CAS:127-18-4] 80mg/l ; Dibromochloromethane [CAS:124-48-1] 80mg/l ; Tribromomethane [CAS:75-25-2] 80mg/l ; Benzene [CAS:71-43-2] 10mg/l ; Toluene [CAS:108-88-3] 10mg/l ; Ethylbenzene [CAS:100-41-4] 10mg/l ; o-Xylene [CAS:95-47-6] 10mg/l ; m-Xylene [CAS:108-38-3] 10mg/l ; p-Xylene [CAS:106-42-3] 10mg/l ; 1,2-Dichloroethane [CAS:107-06-2] 30mg/l ; Styrene [CAS:100-42-5] 10mg/l ; Vinylchloride [CAS:75-01-4] 5mg/l in Methanol

Lot N: 858994
Barcode: 92959880

Ref N: RD0310721.5

Certification Date: 10.11.2022

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
Dichloromethane	80.06 ± 0.77	75-09-2	CH ₂ Cl ₂
1,1-Dichloroethene	81.07 ± 0.84	75-35-4	C ₂ H ₂ Cl ₂
Chloroform	80.49 ± 0.77	67-66-3	CHCl ₃
1,1,1-Trichloroethane	80.32 ± 0.87	71-55-6	C ₂ H ₃ Cl ₃
Triclocarban	80.42 ± 0.88	101-20-2	C ₁₃ H ₉ Cl ₃ N ₂ O
Trichloroethene	80.28 ± 0.77	79-01-6	C ₂ HCl ₃
Bromodichloromethane	79.89 ± 0.78	75-27-4	CHBrCl ₂
Tetrachloroethene	80.85 ± 0.77	127-18-4	C ₂ Cl ₄
Dibromochloromethane	81.37 ± 0.78	124-48-1	CHBr ₂ Cl
Tribromomethane	80.17 ± 0.77	75-25-2	CHBr ₃
Benzene	10.082 ± 0.113	71-43-2	C ₆ H ₆
Toluene	10.112 ± 0.124	108-88-3	C ₆ H ₅ CH ₃
Ethylbenzene	10.022 ± 0.114	100-41-4	C ₈ H ₁₀
o-Xylene	10.076 ± 0.118	95-47-6	C ₈ H ₁₀
m-Xylene	10.077 ± 0.126	108-38-3	C ₈ H ₁₀
p-Xylene	10.120 ± 0.117	106-42-3	C ₈ H ₁₀
1,2-Dichloroethane	30.085 ± 0.297	107-06-2	C ₂ H ₄ Cl ₂
Styrene	10.015 ± 0.116	100-42-5	C ₈ H ₈
Vinylchloride	5.008 ± 0.049	75-01-4	C ₂ H ₃ Cl

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

Density 0.7893 g/cm³ at 20°C

Starting Material

Purity, Batch

Dichloromethane	99.7% (41477311)
1,1-Dichloroethene	98.8% (41459942)
Chloroform	99.8% (41465752)
1,1,1-Trichloroethane	97.4% (41466605)
Triclocarban	99.2% (41424964)
Trichloroethene	99.8% (41463512)
Bromodichloromethane	98.0% (41430477)
Tetrachloroethene	99.8% (41454510)
Dibromochloromethane	98.8% (41471722)
Tribromomethane	99.6% (41403556)
Benzene	99.8% (41393208)



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

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Toluene	99.8% (41387894)
Ethylbenzene	99.8% (41431436)
o-Xylene	99.1% (41477281)
m-Xylene	99.7% (41467329)
p-Xylene	99.8% (41403495)
1,2-Dichloroethane	99.3% (41442579)
Styrene	99.7% (41477335)
Vinylchloride	98.8% (41341353)

Storage Conditions: Store in a freezer at -18°C or below

Expiry Date: 10.12.2023

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 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
Dichloromethane	99.7	41477311	0.07946	3.5183	91903938	22517.1	AS
		91903938	0.3547	7.9330	92961999	1006.78	KR
		92961999	1.1928	11.8387	92959880	101.438	KR
1,1-Dichloroethene	98.8	41459942	0.15124	3.1725	91882868	47101	AS
		91882868	0.1717	7.9330	92961999	1019.44	KR
		92961999	1.1928	11.8387	92959880	102.713	KR
Chloroform	99.8	41465752	0.09232	3.2864	91903914	28035.3	AS
		91903914	0.2864	7.9330	92961999	1012.13	KR
		92961999	1.1928	11.8387	92959880	101.977	KR
1,1,1-Trichloroethane	97.4	41466605	0.17182	3.2123	91882851	52097	AS
		91882851	0.1538	7.9330	92961999	1010.02	KR
		92961999	1.1928	11.8387	92959880	101.764	KR
Triclorcarban	99.2	41424964	0.03269	3.4595	91903921	9373.7	AS
		91903921	0.8559	7.9330	92961999	1011.33	KR
		92961999	1.1928	11.8387	92959880	101.897	KR
Trichloroethene	99.8	41463512	0.19907	2.8030	91891327	70878	AS
		91891327	0.113	7.9330	92961999	1009.61	KR
		92961999	1.1928	11.8387	92959880	101.722	KR
Bromodichloromethane	98.0	41430477	0.1476	2.6770	91898371	54033	AS
		91898371	0.1475	7.9330	92961999	1004.65	KR
		92961999	1.1928	11.8387	92959880	101.223	KR
Tetrachloroethene	99.8	41454510	0.22165	3.2665	91885197	67721	AS
		91885197	0.1191	7.9330	92961999	1016.71	KR
		92961999	1.1928	11.8387	92959880	102.439	KR
Dibromochloromethane	98.8	41471722	0.1337	2.4588	91889515	53724	AS
		91889515	0.1511	7.9330	92961999	1023.28	KR
		92961999	1.1928	11.8387	92959880	103.100	KR
Tribromomethane	99.6	41403556	0.1033	2.6207	91898364	39260	AS
		91898364	0.2037	7.9330	92961999	1008.11	KR
		92961999	1.1928	11.8387	92959880	101.571	KR
Benzene	99.8	41393208	0.03026	3.4861	91903952	8662.8	AS
		91903952	0.1161	7.9330	92961999	126.781	KR
		92961999	1.1928	11.8387	92959880	12.7736	KR
Toluene	99.8	41387894	0.02322	3.3678	91903907	6880.9	AS
		91903907	0.1466	7.9330	92961999	127.157	KR
		92961999	1.1928	11.8387	92959880	12.8117	KR
Ethylbenzene	99.8	41431436	0.02878	3.4330	91903976	8366.6	AS
		91903976	0.1195	7.9330	92961999	126.032	KR
		92961999	1.1928	11.8387	92959880	12.6983	KR
o-Xylene	99.1	41477281	0.02611	2.9166	91887764	8871.6	AS
		91887764	0.1133	7.9330	92961999	126.705	KR
		92961999	1.1928	11.8387	92959880	12.7660	KR
m-Xylene	99.7	41467329	0.02188	3.4611	91872678	6302.7	AS
		91872678	0.1595	7.9330	92961999	126.721	KR
		92961999	1.1928	11.8387	92959880	12.7677	KR

p-Xylene	99.8	41403495	0.0275	3.4333	91903891	7993.8	AS
		91903891	0.1263	7.9330	92961999	127.268	KR
		92961999	1.1928	11.8387	92959880	12.8228	KR
1,2-Dichloroethane	99.3	41442579	0.06508	3.1889	91886989	20265.4	AS
		91886989	0.1481	7.9330	92961999	378.32	KR
		92961999	1.1928	11.8387	92959880	38.118	KR
Styrene	99.7	41477335	0.02716	3.2930	91883407	8223.0	AS
		91883407	0.1215	7.9330	92961999	125.941	KR
		92961999	1.1928	11.8387	92959880	12.6891	KR
Vinylchloride	98.8	41341353	0.0809	6.8743	91830395	11627.3	AS
		91830395	0.4306	39.403	92904293	127.063	KR
		92904293	0.5912	11.8387	92959880	6.3453	KR