

# Certificate of Analysis

R0004 - 39 / 40 / 41 / 42 / 43

## CERTIFIED REFERENCE MATERIAL

10 components: 100ug/ml each of 1,1-Dichloroethene [CAS:75-35-4] ; Dichloromethane [CAS:75-09-2] ; Chloroform [CAS:67-66-3] ; 1,1,1-Trichloroethane [CAS:71-55-6] ; Tetrachloromethane [CAS:56-23-5] ; Trichloroethene [CAS:79-01-6] ; Bromodichloromethane [CAS:75-27-4] ; Tetrachloroethene [CAS:127-18-4] ; Dibromochloromethane [CAS:124-48-1] ; Tribromomethane [CAS:75-25-2] in Methanol

Lot N: 968629  
Barcode: 93132404

Ref N: RD0070471.5

Certification Date: 16.01.2024

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
1,1-Dichloroethene	100.16 ± 1.19	75-35-4	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>
Dichloromethane	100.02 ± 1.20	75-09-2	CH <sub>2</sub> Cl <sub>2</sub>
Chloroform	100.44 ± 1.10	67-66-3	CHCl <sub>3</sub>
1,1,1-Trichloroethane	99.44 ± 1.09	71-55-6	C <sub>2</sub> H <sub>3</sub> Cl <sub>3</sub>
Tetrachloromethane	99.93 ± 1.28	56-23-5	CCl <sub>4</sub>
Trichloroethene	99.70 ± 1.03	79-01-6	C <sub>2</sub> HCl <sub>3</sub>
Bromodichloromethane	100.41 ± 1.27	75-27-4	CHBrCl <sub>2</sub>
Tetrachloroethene	100.15 ± 1.82	127-18-4	C <sub>2</sub> Cl <sub>4</sub>
Dibromochloromethane	100.30 ± 1.25	124-48-1	CHBr <sub>2</sub> Cl
Tribromomethane	100.15 ± 1.10	75-25-2	CHBr <sub>3</sub>

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

Density 0.7877 g/cm<sup>3</sup> at 20°C

Starting Material	Purity, Batch
1,1-Dichloroethene	99.7% (41507476)
Dichloromethane	99.7% (41477311)
Chloroform	99.6% (41493496)
1,1,1-Trichloroethane	97.7% (41533604)
Tetrachloromethane	99.3% (41508015)
Trichloroethene	99.7% (41512470)
Bromodichloromethane	98.0% (41529492)
Tetrachloroethene	99.9% (41458204)
Dibromochloromethane	98.8% (41501986)
Tribromomethane	99.3% (41504369)

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

Expiry Date: 16.02.2025

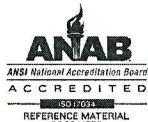
### Concept of Certification and traceability statement:

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.



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

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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, $\text{kg} \cdot 10^{-3}$	Bulk/Standard Solution lot No	Concentration mg/kg	Chemist ID
1,1-Dichloroethene	99.7	41507476	0.02494	3.2092	91948694	7748.1	AS
		91948694	0.1939	11.8152	93132404	127.154	KR
Dichloromethane	99.7	41477311	0.02453	3.4135	91915870	7164.7	AS
		91915870	0.2094	11.8152	93132404	126.979	KR
Chloroform	99.6	41493496	0.03272	3.2641	94011746	9984.0	AS
		94011746	0.1509	11.8152	93132404	127.512	KR
1,1,1-Trichloroethane	97.7	41533604	0.03245	3.4050	94004533	9310.9	AS
		94004533	0.1602	11.8152	93132404	126.244	KR
Tetrachloromethane	99.3	41508015	0.02094	2.8007	94011180	7424.4	AS



		94011180	0.2019	11.8152	93132404	126.869	KR
Trichloroethene	99.7	41512470	0.04597	3.3098	94011753	13847.4	AS
		94011753	0.108	11.8152	93132404	126.572	KR
Bromodichloromethane	98.0	41529492	0.02146	2.8848	94011197	7290.2	AS
		94011197	0.2066	11.8152	93132404	127.476	KR
Tetrachloroethene	99.9	41458204	0.01161	3.0767	94005073	3769.7	AS
		94005073	0.3985	11.8152	93132404	127.143	KR
Dibromochloromethane	98.8	41501986	0.0253	3.1201	94005097	8011.4	AS
		94005097	0.1878	11.8152	93132404	127.340	KR
Tribromomethane	99.3	41504369	0.03426	3.0844	94004540	11029.8	AS
		94004540	0.1362	11.8152	93132404	127.148	KR

