

CERTIFIED REFERENCE MATERIAL

24 components: 1,2-Dichloroethane [CAS:107-06-2] 1g/l ; Acetone [CAS:67-64-1] 5g/l ; Acetonitrile [CAS:75-05-8] 5g/l ; Benzene [CAS:71-43-2] 1g/l ; Chloroform [CAS:67-66-3] 1g/l ; Ethanol [CAS:64-17-5] 5g/l ; Ethyl Acetate [CAS:141-78-6] 5g/l ; Diethylether [CAS:60-29-7] 5g/l ; n-Heptane [CAS:142-82-5] 5g/l ; n-Hexane [CAS:110-54-3] 5g/l ; 2,2-Dimethylbutane [CAS:75-83-2] 5g/l ; 2,3-Dimethylbutane [CAS:79-29-8] 5g/l ; 2-Methylpentane [CAS:107-83-5] 5g/l ; 3-Methylpentane [CAS:96-14-0] 5g/l ; 2-Propanol [CAS:67-63-0] 5g/l ; Methanol [CAS:67-56-1] 5g/l ; Dichloromethane [CAS:75-09-2] 5g/l ; n-Pentane [CAS:109-66-0] 5g/l ; 2-Methylbutane [CAS:78-78-4] 5g/l ; Trichloroethene [CAS:79-01-6] 1g/l ; Toluene [CAS:108-88-3] 5g/l ; o-Xylene [CAS:95-47-6] 5g/l ; m-Xylene [CAS:108-38-3] 5g/l ; p-Xylene [CAS:106-42-3] 5g/l in N,N-Dimethylacetamide

Lot N: 0826947
Barcode: 93609425

Ref N: 38279

Certification Date: 28 Sep 2026

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
1,2-Dichloroethane	1008.8 ± 9.7	107-06-2	C ₂ H ₄ Cl ₂
Acetone	5063 ± 47	67-64-1	C ₃ H ₆ O
Acetonitrile	5019 ± 48	75-05-8	C ₂ H ₃ N
Benzene	1014.8 ± 10.3	71-43-2	C ₆ H ₆
Chloroform	1002.5 ± 9.9	67-66-3	CHCl ₃
Ethanol	5018 ± 52	64-17-5	C ₂ H ₅ OH
Ethyl Acetate	5015 ± 50	141-78-6	C ₄ H ₈ O ₂
Diethylether	5036 ± 47	60-29-7	C ₄ H ₁₀ O
n-Heptane	5000 ± 55	142-82-5	C ₇ H ₁₆
n-Hexane	5014 ± 47	110-54-3	C ₆ H ₁₄
2,2-Dimethylbutane	5010 ± 47	75-83-2	C ₆ H ₁₄
2,3-Dimethylbutane	5020 ± 47	79-29-8	C ₆ H ₁₄
2-Methylpentane	5039 ± 47	107-83-5	C ₆ H ₁₄
3-Methylpentane	5011 ± 47	96-14-0	C ₆ H ₁₄
2-Propanol	5040 ± 57	67-63-0	C ₃ H ₇ OH
Methanol	5051 ± 47	67-56-1	CH ₃ O
Dichloromethane	5041 ± 47	75-09-2	CH ₂ Cl ₂
n-Pentane	5029 ± 47	109-66-0	C ₅ H ₁₂
2-Methylbutane	5102 ± 48	78-78-4	C ₅ H ₁₂
Trichloroethene	1010.5 ± 10.9	79-01-6	C ₂ HCl ₃
Toluene	5002 ± 53	108-88-3	C ₆ H ₅ CH ₃
o-Xylene	5012 ± 54	95-47-6	C ₈ H ₁₀
m-Xylene	5032 ± 52	108-38-3	C ₈ H ₁₀
p-Xylene	5018 ± 47	106-42-3	C ₈ H ₁₀

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

Density 0.9172 g/cm³ at 20°C

Starting Material	Purity, Batch
1,2-Dichloroethane	99.81% (41604755)
Acetone	99.66% (41630341)
Acetonitrile	99.6% (41613535)
Benzene	99.88% (41623848)
Chloroform	99.92% (41648353)

Ethanol	99.82% (41655092)
Ethyl Acetate	99.71% (41643174)
Diethylether	99.9% (41648612)
n-Heptane	99.79% (41626726)
n-Hexane	98.8% (41640579)
2,2-Dimethylbutane	97.63% (41607725)
2,3-Dimethylbutane	98.31% (41656877)
2-Methylpentane	98.94% (41626788)
3-Methylpentane	99.79% (41666906)
2-Propanol	99.75% (41621912)
Methanol	99.92% (41626948)
Dichloromethane	99.9% (41626856)
n-Pentane	99.6% (41653647)
2-Methylbutane	98.88% (41598191)
Trichloroethene	99.79% (41654880)
Toluene	99.86% (41643167)
o-Xylene	99.32% (41617731)
m-Xylene	99.55% (41643181)
p-Xylene	99.27% (41649770)

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

Expiry Date: 28 Oct 2028

Concept of Certification and traceability statement:

This certified reference material is produced by gravimetric measurement and directly dissolving the individual substances in the corresponding solvent, when such is needed. In case direct dissolution is not possible, the individual substances are pre-dissolved in a suitable solvent and then gravimetrically added into the solution.

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:

The CRM should be used shortly after opening to avoid concentration changes due to evaporation.

It is recommended to use 1 ml as the minimum sample size.

This CRM can be used directly or can be diluted in an appropriate solvent. Only a clean class A glassware should be used. 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:

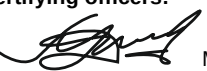
The normal laboratory safety precautions should be observed when working with this RM. Further details for the handling of this RM are available in a safety data sheet.

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 Bochukova

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 33401 , ISO 33405, 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

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, g	Bulk/ Standard Solution lot No	Concentration mg/kg	Chemist ID
1,2-Dichloroethane	99.81	41604755	0.1516	137.585	93609425	1099.78	KR
Acetone	99.66	41630341	0.762	137.585	93609425	5519.6	KR
Acetonitrile	99.6	41613535	0.7559	137.585	93609425	5472.1	KR
Benzene	99.88	41623848	0.1524	137.585	93609425	1106.35	KR
Chloroform	99.92	41648353	0.1505	137.585	93609425	1093.00	KR
Ethanol	99.82	41655092	0.754	137.585	93609425	5470.4	KR
Ethyl Acetate	99.71	41643174	0.7545	137.585	93609425	5468.0	KR
Diethylether	99.9	41648612	0.7562	137.585	93609425	5490.8	KR
n-Heptane	99.79	41626726	0.7516	137.585	93609425	5451.3	KR
n-Hexane	98.8	41640579	0.7612	137.585	93609425	5466.2	KR
2,2-Dimethylbutane	97.63	41607725	0.7697	137.585	93609425	5461.8	KR
2,3-Dimethylbutane	98.31	41656877	0.7659	137.585	93609425	5472.7	KR
2-Methylpentane	98.94	41626788	0.7639	137.585	93609425	5493.4	KR
3-Methylpentane	99.79	41666906	0.7532	137.585	93609425	5463.0	KR
2-Propanol	99.75	41621912	0.7579	137.585	93609425	5494.8	KR
Methanol	99.92	41626948	0.7583	137.585	93609425	5507.1	KR
Dichloromethane	99.9	41626856	0.7569	137.585	93609425	5495.9	KR
n-Pentane	99.6	41653647	0.7573	137.585	93609425	5482.3	KR
2-Methylbutane	98.88	41598191	0.7739	137.585	93609425	5561.9	KR
Trichloroethene	99.79	41654880	0.1519	137.585	93609425	1101.73	KR
Toluene	99.86	41643167	0.7514	137.585	93609425	5453.7	KR

o-Xylene	99.32	41617731	0.757	137.585	93609425	5464.6	KR
m-Xylene	99.55	41643181	0.7582	137.585	93609425	5486.0	KR
p-Xylene	99.27	41649770	0.7583	137.585	93609425	5471.3	KR

