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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: 0811431 Ref N: 38279 Certification Date: 17.09.2025
Barcode: 93406116

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
1,2-Dichloroethane	1024.1 ± 9.9	107-06-2	$C_2H_4Cl_2$
Acetone	5001 ± 47	67-64-1	C_3H_6O
Acetonitrile	5010 ± 48	75-05-8	C_2H_3N
Benzene	1002.4 ± 10.2	71-43-2	C_6H_6
Chloroform	1006.2 ± 9.6	67-66-3	$CHCl_3$
Ethanol	5000 ± 52	64-17-5	C_2H_5OH
Ethyl Acetate	4991 ± 54	141-78-6	$C_4H_8O_2$
Diethylether	5167 ± 48	60-29-7	$C_4H_{10}O$
n-Heptane	4995 ± 47	142-82-5	C_7H_{16}
n-Hexane	5009 ± 51	110-54-3	C_6H_{14}
2,2-Dimethylbutane	5003 ± 51	75-83-2	C_6H_{14}
2,3-Dimethylbutane	4983 ± 47	79-29-8	C_6H_{14}
2-Methylpentane	5008 ± 47	107-83-5	C_6H_{14}
3-Methylpentane	5005 ± 47	96-14-0	C_6H_{14}
2-Propanol	5049 ± 55	67-63-0	C_3H_7OH
Methanol	4988 ± 53	67-56-1	CH_4O
Dichloromethane	5075 ± 48	75-09-2	CH_2Cl_2
n-Pentane	5029 ± 48	109-66-0	C_5H_{12}
2-Methylbutane	4999 ± 47	78-78-4	C_5H_{12}
Trichloroethene	999.5 ± 9.5	79-01-6	C_2HCl_3
Toluene	4999 ± 47	108-88-3	$C_6H_5CH_3$
o-Xylene	4996 ± 49	95-47-6	C_8H_{10}
m-Xylene	5004 ± 49	108-38-3	C_8H_{10}
p-Xylene	5010 ± 50	106-42-3	C_8H_{10}

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

Density 0.9128 g/cm^3 at 20°C

Starting Material	Purity, Batch
1,2-Dichloroethane	99.81% (41604755)
Acetone	99.66% (41630341)
Acetonitrile	99.6% (41613535)
Benzene	99.64% (41590935)
Chloroform	99.92% (41603888)

Produced by:
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Ethanol	99.85% (41615621)
Ethyl Acetate	99.64% (41611869)
Diethylether	99.9% (41555682)
n-Heptane	98.7% (41629949)
n-Hexane	98.83% (41587638)
2,2-Dimethylbutane	98.28% (41581773)
2,3-Dimethylbutane	96.88% (41609217)
2-Methylpentane	98.94% (41626788)
3-Methylpentane	99.3% (41563809)
2-Propanol	99.61% (41628201)
Methanol	99.33% (41628188)
Dichloromethane	99.9% (41626856)
n-Pentane	99.5% (41596951)
2-Methylbutane	98.88% (41598191)
Trichloroethene	99.85% (41613504)
Toluene	99.93% (41591017)
o-Xylene	99.08% (41582930)
m-Xylene	99.69% (41587263)
p-Xylene	99.7% (41587249)

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

Expiry Date: 17.10.2027

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.

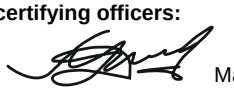
Instructions for the correct use of this certified reference material:
This CRM can be used directly or can be diluted in an appropriate solvent. Only a clean class A glassware should be used. Do not pipet from container. Obtained concentration (in mg/l) after dilution is a result from the multiplication 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 ±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 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

Gravimetric Data

Component	Purity %	Source Lot No	Weighed quantity, g	Final quantity, g	Bulk/ Standard Solution lot No	Concen-tration mg/kg	Chemist ID
1,2-Dichloroethane	99.81	41604755	0.1026	91.276	93406116	1121.93	KR
Acetone	99.66	41630341	0.5018	91.276	93406116	5478.9	KR
Acetonitrile	99.6	41613535	0.503	91.276	93406116	5488.7	KR
Benzene	99.64	41590935	0.1006	91.276	93406116	1098.19	KR
Chloroform	99.92	41603888	0.1007	91.276	93406116	1102.36	KR
Ethanol	99.85	41615621	0.5007	91.276	93406116	5477.3	KR
Ethyl Acetate	99.64	41611869	0.5009	91.276	93406116	5468.0	KR
Diethylether	99.9	41555682	0.5172	91.276	93406116	5660.6	KR
n-Heptane	98.7	41629949	0.5061	91.276	93406116	5472.6	KR
n-Hexane	98.83	41587638	0.5068	91.276	93406116	5487.4	KR
2,2-Dimethylbutane	98.28	41581773	0.5091	91.276	93406116	5481.6	KR
2,3-Dimethylbutane	96.88	41609217	0.5143	91.276	93406116	5458.7	KR
2-Methylpentane	98.94	41626788	0.5062	91.276	93406116	5487.0	KR
3-Methylpentane	99.3	41563809	0.504	91.276	93406116	5483.0	KR
2-Propanol	99.61	41628201	0.5069	91.276	93406116	5531.8	KR
Methanol	99.33	41628188	0.5022	91.276	93406116	5465.2	KR
Dichloromethane	99.9	41626856	0.508	91.276	93406116	5560.0	KR
n-Pentane	99.5	41596951	0.5054	91.276	93406116	5509.3	KR
2-Methylbutane	98.88	41598191	0.5056	91.276	93406116	5477.2	KR
Trichloroethene	99.85	41613504	0.1001	91.276	93406116	1095.03	KR
Toluene	99.93	41591017	0.5002	91.276	93406116	5476.2	KR
o-Xylene	99.08	41582930	0.5042	91.276	93406116	5473.1	KR
m-Xylene	99.69	41587263	0.502	91.276	93406116	5482.7	KR
p-Xylene	99.7	41587249	0.5025	91.276	93406116	5488.7	KR