

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

10 components; 10ug/ml each of Gamma-HCH (Lindane) [CAS:58-89-9] ; Heptachlor [CAS:76-44-8] ; Fenitrothion [CAS:122-14-5] ; Aldrin [CAS:309-00-2] ; Chlorpyrifos [CAS:2921-88-2] ; Pendimethalin [CAS:40487-42-1] ; Endrin [CAS:72-20-8] ; 4,4'-DDT [CAS:50-29-3] ; Dieldrin [CAS:60-57-1] ; Sulfotep [CAS:3689-24-5] in Methanol

Lot N: 753630
Barcode: 92749320

Ref N: RD0627801.3

Certification Date: 01.06.2021

Component	Certified Value* and uncertainty [µg/ml]	CAS	Chemical Formula
Gamma-HCH (Lindane)	10.019 ± 0.113	58-89-9	C ₆ H ₆ Cl ₆
Heptachlor	10.035 ± 0.138	76-44-8	C ₁₀ H ₅ Cl ₇
Fenitrothion	10.115 ± 0.123	122-14-5	C ₉ H ₁₂ NO ₅ PS
Aldrin	10.255 ± 0.129	309-00-2	C ₁₂ H ₈ Cl ₆
Chlorpyrifos	10.022 ± 0.115	2921-88-2	C ₉ H ₁₁ Cl ₃ NO ₃ PS
Pendimethalin	10.167 ± 0.115	40487-42-1	C ₁₃ H ₁₉ N ₃ O ₄
Endrin	10.242 ± 0.119	72-20-8	C ₁₂ H ₆ Cl ₆ O
4,4'-DDT	10.110 ± 0.122	50-29-3	C ₁₄ H ₉ Cl ₅
Dieldrin	10.245 ± 0.133	60-57-1	C ₁₂ H ₆ Cl ₆ O
Sulfotep	9.981 ± 0.124	3689-24-5	C ₈ H ₂₀ O ₅ P ₂ S ₂

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

Density 0.7932 g/cm³ at 20°C

Starting Material

Starting Material	Purity, Batch
Gamma-HCH (Lindane)	99.8% (41356807)
Heptachlor	99.5% (41405109)
Fenitrothion	94.84% (41408360)
Aldrin	98.4% (41358030)
Chlorpyrifos	99.6% (41317556)
Pendimethalin	99.7% (41413852)
Endrin	99.4% (41383872)
4,4'-DDT	99.3% (41393796)
Dieldrin	98.2% (41389317)
Sulfotep	98.6% (41414040)

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

Expiry Date: 01.07.2022

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.



C.P.A. chem Ltd is accredited to ISO 17034 and ISO/IEC 17025

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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 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
Gamma-HCH (Lindane)	99.8	41356807	0.02993	3.3665	91738967	8872.8	AS
		91738967	0.1128	7.9571	92753235	125.781	PA
		92753235	1.5931	15.8630	92749320	12.6320	PA
Heptachlor	99.5	41405109	0.02056	2.8427	91738363	7196.4	AS
		91738363	0.1393	7.9571	92753235	125.983	PA
		92753235	1.5931	15.8630	92749320	12.6523	PA
Fenitrothion	94.84	41408360	0.0286	2.8132	91731135	9641.8	AS
		91731135	0.1048	7.9571	92753235	126.988	PA
		92753235	1.5931	15.8630	92749320	12.7533	PA
Aldrin	98.4	41358030	0.02742	3.1871	91738370	8465.8	AS

		91738370	0.121	7.9571	92753235	128.735	PA
		92753235	1.5931	15.8630	92749320	12.9288	PA
Chlorpyrifos	99.6	41317556	0.02702	3.0375	91692375	8860.0	AS
		91692375	0.329	3.1029	91699299	937.55	AS
		91699299	1.0678	7.9571	92753235	125.815	PA
		92753235	1.5931	15.8630	92749320	12.6354	PA
Pendimethalin	99.7	41413852	0.02916	3.1458	91736659	9241.7	AS
		91736659	0.1099	7.9571	92753235	127.642	PA
		92753235	1.5931	15.8630	92749320	12.8190	PA
Endrin	99.4	41383872	0.02793	2.9487	91738936	9415.1	AS
		91738936	0.1092	7.9571	92753235	129.209	PA
		92753235	1.5931	15.8630	92749320	12.9764	PA
4,4'-DDT	99.3	41393796	0.0259	3.0147	91736550	8531.1	AS
		91736550	0.1185	7.9571	92753235	127.049	PA
		92753235	1.5931	15.8630	92749320	12.7594	PA
Dieldrin	99.2	41389317	0.02451	2.9304	91738431	8213.5	AS
		91738431	0.1246	7.9571	92753235	128.615	PA
		92753235	1.5931	15.8630	92749320	12.9166	PA
Sulfotep	99.6	41414040	0.02556	3.2434	91736536	7770.3	AS
		91736536	0.1283	7.9571	92753235	125.288	PA
		92753235	1.5931	15.8630	92749320	12.5826	PA

