Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

VOCs - Sediment

Number CRM640-25G
Lot 014727
Solvent (Matrix) Lake Sediment
Hazard Irritant
Storage &Handling Store at -20ºC.
Expiration Date See Sample Label
Certification Date: November 26, 2010
Certified By: Christopher Rucinski - QA Director

ISO Guide 34
Cert# AR-1470

ISO/IEC 17025
Cert# AT-1467

Analyte	*Units*	*Certified* [1,4] *Value*	*k*[5]	*Standard* [2] *Deviation*	*Confidence Interval*	*Prediction Interval*
Acetone	µg/Kg	20200 ± 2960	1.96	10500	16800 - 23500	0.00 - 41100
Benzene Traceable to: NIST SRM 3000 Lot 16/11/2009	µg/Kg	4610 ± 146	1.96	476	4470 - 4750	3670 - 5550
Bromobenzene	µg/Kg	3650 ± 88.5	1.96	276	3570 - 3730	3110 - 4200
Bromodichloromethane	µg/Kg	7950 ± 255	1.96	855	7710 - 8180	6250 - 9640
Bromoform	µg/Kg	7100 ± 303	1.96	1100	6800 - 7410	4930 - 9280
2-Butanone (Methyl ethyl ketone, MEK)	µg/Kg	18400 ± 1690	1.96	6190	16600 - 20300	6170 - 30700
Carbon tetrachloride	µg/Kg	8640 ± 304	1.96	1070	8340 - 8930	6510 - 10800
Chlorobenzene	µg/Kg	3420 ± 81.1	1.96	252	3350 - 3490	2920 - 3920
Chloroethane	µg/Kg	2960 ± 248	1.96	888	2670 - 3250	1200 - 4720
1,2-Dibromo-3-chloropropane (DBCP)	µg/Kg	7730 ± 378	1.96	1300	7350 - 8110	5150 - 10300
Dibromochloromethane	µg/Kg	2580 ± 93.5	1.96	318	2500 - 2670	1950 - 3210
Dibromomethane	µg/Kg	7010 ± 223	1.96	732	6800 - 7210	5560 - 8460
1,2-Dichlorobenzene	µg/Kg	7440 ± 230	1.96	778	7220 - 7660	5900 - 8980
1,3-Dichlorobenzene	µg/Kg	4020 ± 98.6	1.96	315	3930 - 4110	3400 - 4640
1,4-Dichlorobenzene	µg/Kg	2370 ± 70.0	1.96	221	2300 - 2430	1930 - 2800
1,1-Dichloroethane	µg/Kg	6390 ± 238	1.96	845	6150 - 6630	4720 - 8060
1,2-Dichloroethane	µg/Kg	8500 ± 286	1.96	1020	8210 - 8780	6480 - 10500
1,1-Dichloroethylene	µg/Kg	7200 ± 346	1.96	1230	6850 - 7540	4760 - 9630
cis-1,2-Dichloroethylene	µg/Kg	5460 ± 209	1.96	736	5250 - 5660	4000 - 6920
trans-1,3-Dichloropropene	µg/Kg	2370 ± 116	1.96	410	2260 - 2480	1560 - 3180
trans-1,2-Dichloroethylene	µg/Kg	6360 ± 263	1.96	933	6110 - 6620	4520 - 8210
Ethylbenzene	µg/Kg	5490 ± 192	1.96	646	5310 - 5670	4210 - 6770
2-Hexanone	µg/Kg	15800 ± 1110	1.96	3930	14700 - 17000	8060 - 23600

Analyte	*Units*	*Certified Value* [1,4]	*k* [5]	*Standard Deviation* [2]	*Confidence Interval*	*Prediction Interval*
Isopropylbenzene	µg/Kg	4430 ± 130	1.96	435	4300 - 4560	3570 - 5290
Methyl bromide (Bromomethane)	µg/Kg	1410 ± 184	1.96	558	1240 - 1580	301 - 2510
Methyl chloride (Chloromethane)	µg/Kg	4400 ± 326	1.96	1100	4060 - 4730	2230 - 6570
Methylene chloride (Dichloromethane)	µg/Kg	9130 ± 403	1.96	1400	8750 - 9500	6350 - 11900
4-Methyl-2-pentanone (MIBK)	µg/Kg	13900 ± 540	1.96	1830	13400 - 14400	10200 - 17500
Methyl tert-butyl ether (MTBE)	µg/Kg	5450 ± 220	1.96	760	5240 - 5660	3950 - 6960
Naphthalene	µg/Kg	6090 ± 220	1.96	777	5870 - 6310	4550 - 7630
Styrene	µg/Kg	6370 ± 197	1.96	676	6180 - 6550	5030 - 7700
1,1,1,2-Tetrachloroethane	µg/Kg	3220 ± 101	1.96	338	3120 - 3320	2550 - 3890
1,1,2,2-Tetrachloroethane	µg/Kg	4110 ± 187	1.96	676	3930 - 4300	2770 - 5450
Toluene	µg/Kg	2700 ± 75.6	1.96	240	2630 - 2770	2220 - 3180
1,2,4-Trichlorobenzene	µg/Kg	3340 ± 111	1.96	391	3230 - 3450	2570 - 4120
1,1,1-Trichloroethane	µg/Kg	7650 ± 287	1.96	1020	7370 - 7920	5630 - 9670
Trichloroethene (Trichloroethylene)	µg/Kg	7620 ± 206	1.96	710	7420 - 7820	6210 - 9020
Trichlorofluoromethane	µg/Kg	5340 ± 363	1.96	1280	4980 - 5690	2810 - 7870
1,2,3-Trichloropropane	µg/Kg	7330 ± 395	1.96	1360	6940 - 7720	4640 - 10000
1,2,4-Trimethylbenzene	µg/Kg	13700 ± 431	1.96	1470	13300 - 14100	10800 - 16600
1,3,5-Trimethylbenzene	µg/Kg	16300 ± 544	1.96	1830	15800 - 16900	12700 - 20000
Vinyl chloride	µg/Kg	5320 ± 367	1.96	1290	4960 - 5680	2770 - 7870
m+p-Xylene	µg/Kg	9960 ± 324	1.96	952	9650 - 10300	8070 - 11900
o-Xylene	µg/Kg	3630 ± 106	1.96	292	3530 - 3720	3050 - 4210
Xylene, total	µg/Kg	13800 ± 357	1.96	1160	13400 - 14100	11500 - 16100

Additional Information

Description

This standard consists of a 25-grams of soil containing volatile organics.

The soil has been chemically stabilized with 25 mL of methanol to minimize degradation of the sample.

Preparation Instructions

Certificate of Analysis

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Preparation Instructions

The sample is to be extracted using the solid waste method for sediment/soil using methanol as the extraction solvent.

Sample should be maintained at 4ºC. Shake sample for two minutes prior to opening.

Using a gas tight syringe, aliquot 100µL of methanol extract and inject into your purge and trap vessel below the surface of 5 or 25 mL of organic free water. Using more than 100µL may exceed the trapping capacity and detector response the the purge and trap system.

After sampling, tightly reseal the vial ensuring there is no sample remaining between the vial rim, threads and cap.

Immediately complete other sample preparation according to your analytical procedures.

To calculate your results, use 25 grams as the sample weight and 25 mL as the extraction volume. Report results as µg/Kg

Report on a wet weight basis, do not correct results for moisture content.

Storage

After sub-sampling of the soil matrix, replace cap securely, and store at 4ºC.

The shelf life of the product was determined by historic stability of similar CRM's. The expiration date may be extended based on stock and popularity upon successful stability testing by a 17025 accredited laboratory.

Stability and shelf life after opening must be determined by the user, taking into account sampling frequency/volume and all local conditions.

Scope and Application

Being a natural matrix waste sample the analyst is challenged by the same preparation problems, analytical interferences, etc. as is typical for similar matrices received by the laboratory for analysis.

Rigorous analysis identified, quantified, and certified the volatile organic compounds which are listed on the enclosed Certificate of Analysis.

The sample has been analyzed by 24 independent laboratories in a round-robin to meet the requirements specified by the ISO Guides 34 and 35, and ISO 17025.

Evaluation of Results

The Reference Value, 95% confidence interval(C.I.) for the Reference Value and 95% Prediction Interval (P.I.) around the Reference Value were obtained by the methods identified in the 'Scope and Application' section of this Certificate of Analysis. Samples were selected in a random fashion from the beginning to the end of the bottling sequence and sent for analysis by an independent laboratory round-robin. The data produced in the round-robin was used to calculate reference values by the USEPA EMSL-CINN's computer program “BIWEIGHT”.

The generated BIWEIGHT mean, BIWEIGHT standard deviation and BIWEIGHT standard deviation of the mean are used to calculate the 95% Confidence Interval (CI) for the mean and the 95% Prediction Interval (PI). For normally distributed data, the BIWEIGHT 95% CI compares well to the classical calculation method used to generate a 95% CI. For non-Gaussian data sets, the BIWEIGHT method is more robust in data treatment.

BIWEIGHT data are also used to calculate a 95% PI. The 95% PI compares well to a 95% tolerance limit calculated using classical methods. For normally distributed data, the BIWEIGHT 95% PI typically represents approximately a ±2 BIWEIGHT standard deviation window around the BIWEIGHT mean. Again, the BIWEIGHT method is more robust than classical methods when handling non-Gaussian data sets.

Laboratories performing the same analytical procedures on a sample whose values have been determined by the BIWEIGHT method can assume that the true mean, as determined by the method, is within the 95% CI window. Laboratories analyzing the sample should have results within the 95% PI window 19 out of 20 analyses. Laboratories should use the PI as guidance for laboratory performance.

Additional information on the program may be obtained by referring to the reference or by downloading the program from the EMSL-CINN web site. Additionally contact RTC for additional guidance - 1(307)742-5452 - support@rt-corp.com - www.rt-corp.com

Health and Safety Information

All RTC Certified Reference Materials are intended only for professional use by properly trained laboratory personnel. This CRM has been reviewed for both health and safety and shipping risks. It is classified as non hazardous and is not classified as hazardous goods for shipping by road, sea or air transport.

A full international MSDS as a downloadable pdf file is available at www.rt-corp.com

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1 Certified values are the robust statisitical mean when prepared according to instructions from an Interlaboratory Study and internal rigorous testing.
2 The standard deviation is the robust statistical standard deviation from the round robin interlaboratory study.
4 Expanded Uncertainty (Ucrm) - All uncertainty values in this document expressed as ± *value* are expanded uncertainties.
5 ***k*:** Coverage factor derived from a t-distribution table, based on the degrees of freedom of the data set. **Confidence interval = 95%**

TRACEABILITY: The standard was manufactured under an ISO 17025 certified quality system. The balance used to weigh raw materials is accurate to +/- 0.0001g and calibrated regularly using mass standards traceable to NIST. All dilutions were preformed gravimetrically. Additionally, individual analytes are traceable to NIST SRMs where available and specified above.

HOMOGENEITY ASSESSMENT: Between-bottle homogeneity was assessed in accordance with ISO Guide 35. Completed units were sampled over the course of the bottling operation. Samples were taken in the following manner: the units produced in the bottling operation were divided into three chronological groups, those from the Early third, the Middle third, and the Late third (Groups). A pre-determined number of sample units were then randomly selected from each group. A subset of each group was then randomly selected for chemical analysis. The results of the chemical analysis were then compared by Single Factor Analysis of Variance (ANOVA).

UNCERTAINTY STATEMENT: Uncertainty values in this document are expressed as Expanded Uncertainty (Ucrm) corresponding to the 95% confidence interval. Ucrm is derived from the combined standard uncertainty multiplied by the coverage factor k, which is obtained from a *t*-distribution and degrees of freedom. The components of combined standard uncertainty include the uncertainties due to characterization, homogeneity, long term stability, and short term stability (transport). The components due to stability are generally considered to be negligible unless otherwise indicated by stability studies.

THIS PRODUCT WAS DESIGNED, PRODUCED AND VERIFIED FOR ACCURACY AND STABILITY IN ACCORDANCE WITH ISO 17025 (AClass Cert AT-1467) and ISO GUIDE 34 (AClass Cert AR-1470).

MSDS reports for components comprising greater than 1.0% of the solution or 0.1% for components known to be carcinogens are available upon request.

Manufactured and certified by Sigma-Aldrich RTC, Inc.

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