WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 728

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis SETOC 728

General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model, the mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

All values, expressed on a weight basis (kg or %), are reported as oven-dried (105°C) material. Moisture is reported in the material as received.

Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation, the SETOC samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This SETOC sample 728 of Sandy Soil, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 4 periods (or rounds). The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2013	4	3
2007	3	2
1998	1	3
1996	1	2

Consensus Values SETOC 728

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
phenanthrene	µg/kg	69.7	21.9	31.5	176	70.0	13.8	2.06	2.96
anthracene	µg/kg	13.0	6.30	48.4	123	15.0	5.00	0.710	5.46
fluoranthene	µg/kg	134	34.3	25.5	178	140	21.5	3.21	2.39
pyrene	µg/kg	106	29.7	28.1	164	110	19.3	2.90	2.75
chrysene	µg/kg	60.2	17.2	28.5	173	60.0	10.0	1.63	2.71
benz(a)anthracene	µg/kg	57.5	16.0	27.9	171	60.0	10.0	1.53	2.66
benzo(b)fluoranthene	µg/kg	67.0	20.5	30.5	154	70.0	10.4	2.06	3.08
benzo(k)fluoranthene	µg/kg	32.9	9.07	27.6	146	33.0	6.00	0.938	2.86
benzo(a)pyrene	µg/kg	61.4	15.7	25.6	176	62.0	9.15	1.48	2.41
indeno(1,2,3-cd)pyrene	µg/kg	49.4	16.8	33.9	158	50.8	10.2	1.67	3.37
benzo(ghi)perylene	µg/kg	49.0	12.9	26.3	159	50.0	10.0	1.28	2.60

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Particles > 63 µm	%	97.0	2.11	2.2	11	97.0	1.30	0.796	0.821

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	2.28	0.499	21.9	63	2.36	0.320	0.079	3.46
Cr	mg/kg	10.4	3.02	29.0	96	10.6	2.20	0.385	3.70
Cu	mg/kg	5.38	1.83	34.0	91	5.70	1.30	0.240	4.46
Ni	mg/kg	6.22	1.39	22.3	93	6.21	0.840	0.180	2.89
Pb	mg/kg	62.8	13.8	21.9	103	62.4	9.20	1.69	2.70
Zn	mg/kg	53.0	5.64	10.6	105	52.7	3.60	0.688	1.30
Co	mg/kg	1.52	0.145	9.5	9	1.52	0.080	0.060	3.97

Indicative Values SETOC 728

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	8.50	6.87	80.9	63	8.46	5.04	1.08	12.7
acenaphthylene	µg/kg	4.38	5.40	123.2	50	5.86	3.86	0.954	21.8
acenaphthene	µg/kg	4.61	3.49	75.8	50	5.05	2.08	0.617	13.4
fluorene	µg/kg	5.59	3.73	66.7	64	6.42	2.42	0.583	10.4
dibenz(ah)anthracene	µg/kg	7.79	4.45	57.2	88	10.8	3.24	0.594	7.62

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	0.245	0.383	156.2	14	0.370	0.331	0.128	52.2
PCB 052	µg/kg	0.305	0.593	194.5	14	0.500	0.482	0.198	65.0
PCB 101	µg/kg	0.252	0.374	148.2	14	0.650	0.413	0.125	49.5
PCB 118	µg/kg	0.132	0.278	210.5	8	0.147	0.124	0.123	93.0
PCB 138	µg/kg	0.333	0.617	185.3	21	0.800	0.714	0.168	50.5
PCB 153	µg/kg	0.327	0.419	128.3	19	0.700	0.300	0.120	36.8
PCB 180	µg/kg	0.237	0.426	179.9	18	0.400	0.348	0.125	53.0

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	13.5	15.9	117.6	23	20.9	12.0	4.15	30.7
AOX	mg/kg	13.2	4.99	37.8	15	14.0	2.00	1.61	12.2
EOX	mg/kg	0.049	0.041	82.1	15	0.200	0.140	0.013	26.5
Organic carbon	g/kg	0.723	0.455	62.9	21	1.00	0.250	0.124	17.1
Inorganic carbon	g/kg	2.53	0.667	26.4	12	2.55	0.400	0.241	9.52
Particles < 2 µm	%	1.15	1.29	112.6	16	1.53	0.900	0.403	35.2
Particles < 63 µm	%	2.50	1.65	66.0	15	2.79	1.39	0.532	21.3
CN - Total	mg/kg	0.144	0.179	124.2	9	0.200	0.130	0.074	51.8

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.072	0.059	81.3	30	0.080	0.041	0.013	18.6
Hg	mg/kg	0.081	0.038	46.5	64	0.095	0.025	0.006	7.26
Ba	mg/kg	26.5	7.46	28.2	13	27.9	5.50	2.58	9.76
Mo	mg/kg	0.466	0.238	51.0	4	0.482	0.111	0.149	31.9