WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 680

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis SETOC 680

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 680 of Sediment, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 2 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
2022	4	1
2020	2	1

Consensus Values SETOC 680

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
phenanthrene	µg/kg	53.8	13.0	24.3	44	55.5	7.47	2.46	4.57
anthracene	µg/kg	22.4	4.58	20.5	39	22.0	3.00	0.917	4.10
fluoranthene	µg/kg	99.5	20.6	20.7	49	98.0	13.0	3.67	3.69
pyrene	µg/kg	77.2	15.1	19.5	37	78.0	11.0	3.10	4.02
chrysene	µg/kg	59.5	14.9	25.0	46	60.0	8.00	2.74	4.60
benz(a)anthracene	µg/kg	56.0	11.2	20.0	46	57.0	7.00	2.06	3.68
benzo(b)fluoranthene	µg/kg	68.6	17.6	25.7	37	68.0	11.4	3.63	5.29
benzo(k)fluoranthene	µg/kg	33.7	8.38	24.8	42	34.2	4.89	1.62	4.79
benzo(a)pyrene	µg/kg	53.0	13.6	25.6	46	55.5	6.91	2.50	4.71
indeno(1,2,3-cd)pyrene	µg/kg	45.5	12.2	26.7	41	45.5	6.80	2.37	5.21
benzo(ghi)perylene	µg/kg	44.9	8.14	18.1	41	45.0	5.00	1.59	3.54
EPA ∑PAH(16)	µg/kg	659	141	21.5	28	663	81.0	33.4	5.07

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	0.876	0.124	14.1	10	0.876	0.093	0.049	5.59

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	7.38	0.745	10.1	24	7.56	0.497	0.190	2.57
Cd	mg/kg	0.461	0.038	8.3	20	0.464	0.020	0.011	2.32
Cr	mg/kg	23.4	4.84	20.7	25	23.7	3.37	1.21	5.18
Cu	mg/kg	11.3	1.71	15.0	26	11.7	1.05	0.418	3.69
Hg	mg/kg	0.163	0.028	17.4	20	0.163	0.018	0.008	4.88
Ni	mg/kg	10.6	1.52	14.4	26	10.7	1.01	0.373	3.53
Pb	mg/kg	20.2	2.71	13.4	25	20.7	2.14	0.676	3.35
Zn	mg/kg	92.0	8.57	9.3	26	92.6	5.93	2.10	2.28
Co	mg/kg	4.03	0.391	9.7	18	4.02	0.320	0.115	2.86
Mo	mg/kg	0.391	0.064	16.2	11	0.420	0.020	0.024	6.12

Indicative Values SETOC 680

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	19.6	8.27	42.1	30	21.9	4.63	1.89	9.61
acenaphthylene	µg/kg	6.54	3.16	48.3	17	6.31	1.89	0.957	14.6
acenaphthene	µg/kg	5.63	2.22	39.5	17	6.00	1.36	0.673	12.0
fluorene	µg/kg	9.80	3.87	39.5	21	10.8	2.20	1.06	10.8
dibenz(ah)anthracene	µg/kg	10.9	5.06	46.3	26	12.0	2.89	1.24	11.4

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	0.963	0.433	44.9	26	1.16	0.264	0.106	11.0
PCB 052	µg/kg	1.06	0.338	31.9	25	1.14	0.158	0.085	7.99
PCB 101	µg/kg	1.49	0.584	39.0	30	1.55	0.437	0.133	8.91
PCB 118	µg/kg	0.887	0.318	35.9	22	1.10	0.169	0.085	9.56
PCB 138	µg/kg	1.88	0.782	41.6	33	2.03	0.520	0.170	9.06
PCB 153	µg/kg	2.18	0.786	36.0	34	2.33	0.517	0.169	7.72
PCB 180	µg/kg	1.31	0.652	49.7	27	1.58	0.422	0.157	12.0
∑PCB(7)	µg/kg	11.8	4.75	40.4	12	12.4	3.02	1.71	14.6

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,4 trichlorobenzene	µg/kg	2.43	1.14	47.1	6	2.60	0.704	0.584	24.1
1,3,5 trichlorobenzene	µg/kg	1.42	0.717	50.6	6	1.68	0.393	0.366	25.8

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	47.7	18.5	38.8	34	47.5	12.0	3.96	8.31
Organic carbon	g/kg	9.91	2.85	28.8	22	9.92	1.27	0.760	7.67
Inorganic carbon	g/kg	16.4	1.08	6.6	5	16.0	0.700	0.601	3.67
Particles < 2 µm	%	8.80	0.467	5.3	4	8.95	0.248	0.292	3.31
Particles < 63 µm	%	22.4	0.785	3.5	6	22.5	0.360	0.401	1.79
CN - Total	mg/kg	0.577	0.342	59.3	8	0.599	0.204	0.151	26.2

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ba	mg/kg	31.9	7.87	24.6	17	34.0	6.55	2.38	7.47

Indicative Values SETOC 680

Method: Brominated Flame Retardants

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE 047	ng/kg	110	27.0	24.6	4	117	14.4	16.9	15.4