WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 709

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis SETOC 709

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 709 of Marine Sediment, 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
1999	2	1
1997	2	2
1996	2	3
1993	3	2

Consensus Values SETOC 709

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pyrene	µg/kg	9.58	4.01	41.9	71	10.0	2.00	0.595	6.21

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	2.47	0.589	23.9	82	2.50	0.395	0.081	3.30
Cr	mg/kg	14.5	2.46	17.0	114	14.6	1.40	0.288	1.99
Cu	mg/kg	1.82	0.578	31.8	76	2.00	0.400	0.083	4.56
Ni	mg/kg	6.22	1.10	17.7	106	6.30	0.670	0.134	2.15
Pb	mg/kg	4.40	1.21	27.4	80	4.50	0.600	0.169	3.84
Zn	mg/kg	16.1	2.03	12.6	120	16.1	1.20	0.232	1.44

Indicative Values SETOC 709

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	6.47	6.88	106.4	48	8.90	5.80	1.24	19.2
acenaphthylene	µg/kg	1.99	4.19	210.6	12	5.15	5.07	1.51	76.0
acenaphthene	µg/kg	1.18	1.03	87.1	21	1.62	0.620	0.280	23.8
fluorene	µg/kg	2.23	2.50	112.2	34	2.78	1.59	0.536	24.0
phenanthrene	µg/kg	6.87	5.58	81.2	82	11.7	5.40	0.770	11.2
anthracene	µg/kg	1.26	1.06	83.7	33	1.74	0.740	0.230	18.2
fluoranthene	µg/kg	11.8	6.43	54.6	104	14.7	4.65	0.788	6.69
chrysene	µg/kg	6.50	3.26	50.1	59	7.00	2.60	0.530	8.16
benz(a)anthracene	µg/kg	4.82	1.91	39.6	49	5.16	1.16	0.341	7.08
benzo(b)fluoranthene	µg/kg	6.52	3.63	55.7	72	10.0	2.45	0.535	8.20
benzo(k)fluoranthene	µg/kg	4.27	2.86	67.1	43	5.25	2.25	0.546	12.8
benzo(a)pyrene	µg/kg	4.86	3.14	64.6	51	6.00	2.30	0.549	11.3
dibenz(ah)anthracene	µg/kg	1.31	0.778	59.3	22	1.41	0.520	0.207	15.8
indeno(1,2,3-cd)pyrene	µg/kg	7.44	4.82	64.8	48	9.10	3.10	0.869	11.7
benzo(ghi)perylene	µg/kg	6.14	4.05	66.0	48	7.00	3.00	0.731	11.9

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	0.298	0.728	243.9	14	0.790	0.720	0.243	81.5
PCB 052	µg/kg	0.327	0.420	128.7	18	0.750	0.550	0.124	37.9
PCB 101	µg/kg	0.418	0.509	121.7	19	0.550	0.410	0.146	34.9
PCB 118	µg/kg	0.182	0.148	81.5	10	0.205	0.095	0.059	32.2
PCB 138	µg/kg	0.619	0.518	83.7	25	0.630	0.390	0.130	20.9
PCB 149	µg/kg	0.752	0.383	51.0	5	0.820	0.240	0.214	28.5
PCB 153	µg/kg	0.492	0.468	95.1	21	0.600	0.400	0.128	25.9
PCB 180	µg/kg	0.380	0.441	116.0	21	0.610	0.450	0.120	31.6

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	13.6	17.5	128.5	15	24.0	14.3	5.64	41.5
Mineral oil, GC	mg/kg	13.7	11.7	85.7	11	15.0	8.00	4.43	32.3
AOX	mg/kg	18.3	5.07	27.6	18	19.3	3.00	1.49	8.14
EOX	mg/kg	0.057	0.051	89.5	29	0.200	0.100	0.012	20.8
Organic carbon	g/kg	2.56	1.71	66.9	16	2.90	0.950	0.535	20.9
Inorganic carbon	g/kg	3.57	0.728	20.4	9	3.70	0.500	0.304	8.49
Particles < 2 µm	%	2.40	0.977	40.7	36	2.50	0.725	0.204	8.48
Particles < 63 µm	%	4.29	1.63	37.9	15	4.50	1.30	0.525	12.2

Method: Other parameters									(cont.)
Element	**Unit**	**Mean**	**Std.Dev.**	**CV %**	**N**	**Median**	**MAD**	**Uncertainty**	**Rel.Uncert. %**
Particles > 63 µm	%	89.0	3.03	3.4	6	89.4	1.73	1.54	1.74
CN - Total	mg/kg	0.076	0.099	129.0	9	0.200	0.100	0.041	53.7

Method: Metals									
Element	**Unit**	**Mean**	**Std.Dev.**	**CV %**	**N**	**Median**	**MAD**	**Uncertainty**	**Rel.Uncert. %**
Cd	mg/kg	0.066	0.037	55.3	42	0.070	0.020	0.007	10.7
Hg	mg/kg	0.026	0.018	71.2	37	0.030	0.010	0.004	14.6