WAGENINGEN EVALUATING PROGRAMS

FOR ANALYTICAL LABORATORIES

Certificate of Analysis

International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 772

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis SETOC 772

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 772 of Sediment, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 9 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2024	4	2
2022	4	2
2020	2	4
2017	2	2
2014	3	1

Consensus Values SETOC 772

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	35.2	16.3	46.3	103	37.0	10.1	2.01	5.70
acenaphthene	µg/kg	147	50.8	34.6	112	147	35.5	6.00	4.09
fluorene	µg/kg	268	102	38.2	113	249	71.0	12.0	4.49
phenanthrene	µg/kg	9042	1306	14.4	140	9046	840	138	1.53
anthracene	µg/kg	616	161	26.1	141	637	110	16.9	2.75
fluoranthene	µg/kg	12024	1806	15.0	141	12000	1100	190	1.58
pyrene	µg/kg	5652	992	17.5	112	5616	748	117	2.07
chrysene	µg/kg	4428	723	16.3	139	4477	453	76.7	1.73
benz(a)anthracene	µg/kg	2914	454	15.6	140	2895	261	48.0	1.65
benzo(b)fluoranthene	µg/kg	3896	768	19.7	105	3878	498	93.7	2.41
benzo(k)fluoranthene	µg/kg	1808	254	14.0	136	1800	155	27.2	1.51
benzo(a)pyrene	µg/kg	2144	301	14.0	141	2147	175	31.7	1.48
dibenz(ah)anthracene	µg/kg	573	135	23.6	110	581	81.0	16.1	2.81
indeno(1,2,3-cd)pyrene	µg/kg	1981	330	16.7	139	1987	185	35.0	1.77
benzo(ghi)perylene	µg/kg	1764	310	17.6	138	1771	180	33.0	1.87
EPA ∑PAH(16)	µg/kg	46896	5597	11.9	59	47247	3586	911	1.94

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 153	µg/kg	1.40	0.587	41.8	76	1.57	0.407	0.084	5.99

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
p,p`-DDT	µg/kg	89.2	31.1	34.8	53	89.6	16.3	5.34	5.98
p,p`-DDE	µg/kg	307	69.8	22.7	55	298	39.5	11.8	3.83
p,p`-DDD	µg/kg	378	112	29.5	57	390	77.2	18.5	4.89
o,p`-DDD	µg/kg	80.5	20.6	25.6	45	78.1	12.3	3.84	4.76

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Organic carbon	g/kg	44.5	3.75	8.4	61	44.4	2.60	0.601	1.35
Particles < 63 µm	%	57.3	8.75	15.3	16	56.7	4.15	2.73	4.77

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	20.8	1.99	9.6	68	21.0	1.12	0.302	1.45
Cd	mg/kg	0.708	0.092	13.0	64	0.725	0.052	0.014	2.03

Consensus Values SETOC 772

Method: Metals									(cont.)
Element	**Unit**	**Mean**	**Std.Dev.**	**CV %**	**N**	**Median**	**MAD**	**Uncertainty**	**Rel.Uncert. %**
Cr	mg/kg	51.1	11.9	23.2	70	50.7	7.32	1.77	3.47
Cu	mg/kg	55.0	5.38	9.8	72	55.1	2.98	0.792	1.44
Hg	mg/kg	0.448	0.063	14.1	63	0.450	0.040	0.010	2.23
Ni	mg/kg	32.6	3.34	10.2	72	32.8	1.68	0.492	1.51
Pb	mg/kg	69.0	10.9	15.8	71	70.0	7.10	1.62	2.34
Zn	mg/kg	154	12.8	8.3	71	154	8.90	1.90	1.23
Ba	mg/kg	256	31.7	12.4	52	254	16.1	5.50	2.15
Co	mg/kg	10.4	0.793	7.6	55	10.4	0.500	0.134	1.29
Mo	mg/kg	1.23	0.227	18.5	41	1.23	0.148	0.044	3.61

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
acenaphthylene	µg/kg	88.4	55.9	63.3	98	94.0	35.6	7.06	7.99

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	0.675	0.391	57.9	39	0.709	0.267	0.078	11.6
PCB 031	µg/kg	0.381	0.156	41.0	5	0.420	0.104	0.087	22.9
PCB 052	µg/kg	0.510	0.298	58.5	32	0.578	0.194	0.066	12.9
PCB 101	µg/kg	0.978	0.387	39.5	53	1.04	0.213	0.066	6.79
PCB 105	µg/kg	0.149	0.048	32.0	5	0.165	0.032	0.027	17.9
PCB 118	µg/kg	0.513	0.198	38.7	41	0.550	0.127	0.039	7.56
PCB 138	µg/kg	1.31	0.707	54.1	73	1.50	0.500	0.103	7.92
PCB 149	µg/kg	1.18	0.306	25.8	7	1.20	0.200	0.145	12.2
PCB 156	µg/kg	0.147	0.078	52.9	4	0.166	0.042	0.049	33.1
PCB 180	µg/kg	0.820	0.471	57.5	62	1.10	0.344	0.075	9.12
PCB 077	µg/kg	0.039	0.017	42.9	4	0.042	0.009	0.010	26.8
PCB 167	µg/kg	0.071	0.037	51.4	4	0.080	0.020	0.023	32.1
∑PCB(7)	µg/kg	6.74	2.95	43.8	24	7.02	1.85	0.754	11.2

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	0.197	0.099	50.1	9	0.222	0.047	0.041	20.9
1,2,4 trichlorobenzene	µg/kg	2.21	1.07	48.2	14	2.54	0.595	0.356	16.1
beta-HCH	µg/kg	0.437	0.867	198.2	10	0.770	0.452	0.343	78.4
gamma-HCH	µg/kg	0.181	0.056	30.9	5	0.200	0.033	0.031	17.3
heptachlor epoxide	µg/kg	0.607	0.415	68.4	7	1.40	0.400	0.196	32.3
o,p`-DDT	µg/kg	8.77	3.30	37.6	38	9.58	1.92	0.669	7.62
o,p`-DDE	µg/kg	8.12	2.82	34.7	38	8.01	1.84	0.571	7.03
Sum trichlorobenzenes	µg/kg	2.59	0.951	36.6	5	2.54	0.570	0.532	20.5

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	145	35.9	24.8	4	146	17.5	22.5	15.5
Mineral oil, GC	mg/kg	160	96.3	60.2	100	179	75.9	12.0	7.52
EOX	mg/kg	0.772	0.161	20.9	16	0.800	0.100	0.050	6.53
Inorganic carbon	g/kg	4.11	1.79	43.5	17	3.95	1.05	0.542	13.2
Particles < 2 µm	%	21.7	11.1	51.1	11	25.0	4.97	4.18	19.3
Particles > 63 µm	%	28.6	11.4	40.0	11	28.1	5.10	4.31	15.1

Indicative Values SETOC 772

Method: Other parameters									(cont.)
Element	**Unit**	**Mean**	**Std.Dev.**	**CV %**	**N**	**Median**	**MAD**	**Uncertainty**	**Rel.Uncert. %**
CN - Total	mg/kg	0.821	0.374	45.6	28	0.910	0.285	0.088	10.8

Method: Metals								
Element	**Unit**	**Mean**	**Std.Dev.**	**CV %**	**N**	**Median**	**MAD**	**Uncertainty**	**Rel.Uncert. %**
Sb	mg/kg	1.38	0.482	34.9	5	1.43	0.370	0.269	19.5
Sn	mg/kg	6.38	1.24	19.4	7	6.68	0.620	0.585	9.18
V	mg/kg	44.0	13.1	29.9	7	39.8	6.98	6.21	14.1