



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 785



Certificate of Analysis SETOC 785

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 785 of Sediment, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 7 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
2025	2	1
2022	1	2
2019	1	3
2018	3	4
2016	3	3



Consensus Values SETOC 785

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	755	307	40.6	155	763	202	30.8	4.08
acenaphthylene	µg/kg	114	49.7	43.5	135	116	29.8	5.35	4.68
acenaphthene	µg/kg	131	33.5	25.5	143	131	20.8	3.51	2.67
fluorene	µg/kg	169	54.3	32.1	144	170	40.0	5.65	3.35
phenanthrene	µg/kg	1150	238	20.7	159	1150	161	23.6	2.05
anthracene	µg/kg	1222	279	22.8	160	1233	171	27.5	2.25
fluoranthene	µg/kg	1752	299	17.1	159	1728	185	29.7	1.69
pyrene	µg/kg	1321	248	18.8	144	1303	153	25.9	1.96
chrysene	µg/kg	1129	237	21.0	160	1150	151	23.5	2.08
benz(a)anthracene	µg/kg	879	217	24.6	159	881	132	21.5	2.44
benzo(b)fluoranthene	µg/kg	1275	319	25.0	135	1273	203	34.3	2.69
benzo(k)fluoranthene	µg/kg	559	108	19.3	156	564	64.0	10.8	1.93
benzo(a)pyrene	µg/kg	633	131	20.7	160	643	78.5	13.0	2.05
dibenz(ah)anthracene	µg/kg	184	39.7	21.6	143	183	23.0	4.15	2.26
indeno(1,2,3-cd)pyrene	µg/kg	655	123	18.7	159	662	69.0	12.2	1.86
benzo(ghi)perylene	µg/kg	656	128	19.6	159	661	86.0	12.7	1.94
EPA ΣPAH(16)	µg/kg	13156	2523	19.2	93	13000	1764	327	2.49

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	169	45.8	27.1	125	173	26.0	5.12	3.03
PCB 052	µg/kg	121	23.3	19.2	129	121	16.4	2.56	2.11
PCB 101	µg/kg	125	26.3	21.1	129	123	18.6	2.89	2.32
PCB 105	µg/kg	6.70	0.978	14.6	31	6.83	0.600	0.220	3.28
PCB 118	µg/kg	71.3	10.9	15.3	118	71.2	7.30	1.26	1.77
PCB 128	µg/kg	11.0	1.96	17.8	24	11.2	1.55	0.500	4.55
PCB 138	µg/kg	63.6	22.5	35.4	129	63.8	14.1	2.48	3.89
PCB 153	µg/kg	115	18.8	16.4	129	114	12.3	2.07	1.80
PCB 156	µg/kg	5.44	1.23	22.7	24	5.26	0.730	0.315	5.79
PCB 180	µg/kg	39.6	7.01	17.7	126	39.3	4.70	0.781	1.97
PCB 077	µg/kg	9.13	1.42	15.6	21	9.21	0.793	0.389	4.26
PCB 167	µg/kg	3.04	0.572	18.8	18	3.07	0.380	0.168	5.53
ΣPCB(7)	µg/kg	739	121	16.4	62	738	73.8	19.3	2.61



Consensus Values SETOC 785

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	30.7	7.03	22.9	39	31.1	3.89	1.41	4.58
pentachlorobenzene	µg/kg	21.5	4.89	22.8	23	21.1	3.31	1.28	5.93
p,p'-DDE	µg/kg	11.4	3.38	29.6	36	12.0	2.00	0.705	6.17
o,p'-DDE	µg/kg	1.17	0.211	18.1	14	1.21	0.083	0.070	6.04

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	741	181	24.4	123	755	122	20.4	2.76
Organic carbon	g/kg	64.4	5.46	8.5	68	64.2	2.95	0.827	1.29
CN - Total	mg/kg	15.5	2.39	15.4	40	15.9	1.59	0.473	3.05

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	60.3	4.11	6.8	60	60.6	2.21	0.663	1.10
Cd	mg/kg	16.7	1.38	8.3	62	16.6	0.715	0.219	1.31
Cr	mg/kg	311	36.5	11.8	63	309	24.7	5.75	1.85
Cu	mg/kg	198	14.4	7.3	65	197	7.60	2.24	1.13
Hg	mg/kg	7.18	0.679	9.5	68	7.15	0.443	0.103	1.43
Ni	mg/kg	56.7	6.29	11.1	65	57.0	4.05	0.975	1.72
Pb	mg/kg	297	25.2	8.5	65	300	14.5	3.91	1.32
Zn	mg/kg	1277	84.3	6.6	64	1278	55.0	13.2	1.03
Ba	mg/kg	992	93.7	9.4	45	969	59.3	17.5	1.76
Co	mg/kg	19.7	2.33	11.8	53	20.0	1.50	0.401	2.03
Mo	mg/kg	1.63	0.256	15.7	42	1.60	0.182	0.049	3.03

Indicative Values SETOC 785

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 031	µg/kg	136	36.2	26.6	14	130	28.4	12.1	8.88
PCB 149	µg/kg	98.4	18.6	18.9	14	97.4	11.1	6.21	6.31
PCB 081	µg/kg	0.862	1.22	141.4	10	1.05	0.856	0.482	55.9
PCB 114	µg/kg	0.626	0.461	73.6	7	0.590	0.259	0.218	34.8
PCB 123	µg/kg	7.96	6.09	76.5	16	9.17	4.58	1.90	23.9
PCB 126	µg/kg	0.945	1.20	127.4	12	1.41	1.11	0.434	46.0
PCB 157	µg/kg	0.888	0.662	74.6	12	1.40	0.509	0.239	26.9
PCB 169	µg/kg	1.34	2.38	177.9	10	2.15	2.03	0.940	70.3
PCB 189	µg/kg	1.14	0.305	26.8	11	1.30	0.165	0.115	10.1

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobutadiene	µg/kg	21.9	5.54	25.3	25	22.0	4.00	1.38	6.32
1,2,3 trichlorobenzene	µg/kg	11.1	3.18	28.7	14	11.4	1.85	1.06	9.60
1,2,3,4 tetrachlorobenzene	µg/kg	15.8	4.11	26.0	15	15.9	2.08	1.33	8.39
1,2,4 trichlorobenzene	µg/kg	212	91.7	43.3	16	220	62.3	28.7	13.5
1,3,5 trichlorobenzene	µg/kg	138	43.6	31.7	16	137	26.6	13.6	9.91
1,2,3,5 tetrachlorobenzene	µg/kg	5.48	0.664	12.1	4	5.69	0.350	0.415	7.58
alpha-HCH	µg/kg	0.776	0.375	48.3	13	0.880	0.237	0.130	16.8
beta-HCH	µg/kg	0.800	0.732	91.5	16	0.890	0.385	0.229	28.6
gamma-HCH	µg/kg	0.591	0.305	51.7	12	0.710	0.180	0.110	18.6
delta-HCH	µg/kg	0.449	0.879	195.7	8	1.11	0.641	0.388	86.5
aldrin	µg/kg	3.62	5.44	150.3	11	14.8	7.62	2.05	56.7
p,p'-DDT	µg/kg	1.18	0.884	75.1	16	1.60	0.621	0.276	23.5
p,p'-DDD	µg/kg	8.49	3.59	42.3	32	9.51	2.41	0.793	9.34
o,p'-DDD	µg/kg	2.67	1.82	67.9	20	3.17	1.07	0.508	19.0
Sum trichlorobenzenes	µg/kg	345	85.1	24.7	4	334	39.5	53.2	15.4

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	680	9.52	1.4	4	683	4.85	5.95	0.874
EOX	mg/kg	6.15	2.39	38.8	20	6.48	1.84	0.667	10.8
Inorganic carbon	g/kg	13.5	3.47	25.6	13	12.5	1.60	1.20	8.88
Particles < 2 µm	%	31.9	16.5	51.9	10	31.8	8.70	6.54	20.5
Particles < 63 µm	%	67.3	21.3	31.6	12	65.3	12.5	7.68	11.4
Particles > 63 µm	%	17.6	11.6	65.8	8	17.8	7.49	5.12	29.1
CN - Free	mg/kg	0.871	0.205	23.6	5	0.883	0.112	0.115	13.2



Indicative Values SETOC 785

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Sb	mg/kg	2.85	0.997	35.0	6	3.05	0.710	0.509	17.9
Sn	mg/kg	24.3	5.63	23.1	6	23.7	2.67	2.87	11.8
V	mg/kg	77.4	17.7	22.9	6	74.7	9.45	9.05	11.7

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	194	61.6	31.7	7	201	38.0	29.1	15.0
1,2,3,7,8 Cl5DD	ng/kg	8.60	2.68	31.1	7	8.36	1.55	1.26	14.7
1,2,3,4,7,8 Cl6DD	ng/kg	8.69	1.55	17.9	7	9.18	1.18	0.733	8.44
1,2,3,7,8,9 Cl6DD	ng/kg	15.7	4.17	26.6	7	16.9	3.91	1.97	12.6
1,2,3,6,7,8 Cl6DD	ng/kg	25.9	2.36	9.1	7	26.5	1.67	1.11	4.30
1,2,3,4,6,7,8 Cl7DD	ng/kg	396	47.3	12.0	7	410	27.5	22.3	5.65
Cl8DD	ng/kg	5241	570	10.9	7	5419	219	269	5.14

Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	62.9	12.3	19.5	6	66.3	4.73	6.26	9.94
2,3,4,7,8 Cl5DF	ng/kg	57.6	3.53	6.1	6	58.5	2.24	1.80	3.13
1,2,3,7,8 Cl5DF	ng/kg	69.9	17.6	25.1	6	70.0	9.30	8.96	12.8
1,2,3,4,7,8 Cl6DF	ng/kg	304	7.69	2.5	6	305	3.50	3.92	1.29
1,2,3,7,8,9 Cl6DF	ng/kg	57.2	8.53	14.9	6	56.5	6.31	4.36	7.62
1,2,3,6,7,8 Cl6DF	ng/kg	138	15.2	11.1	6	136	6.14	7.78	5.65
2,3,4,6,7,8 Cl6DF	ng/kg	94.2	9.42	10.0	6	93.1	5.22	4.81	5.11
1,2,3,4,6,7,8 Cl7DF	ng/kg	1462	117	8.0	6	1452	60.3	59.9	4.09
1,2,3,4,7,8,9 Cl7DF	ng/kg	204	30.2	14.8	6	208	16.9	15.4	7.55
Cl8DF	ng/kg	8897	1123	12.6	6	8814	901	573	6.44

Method: Brominated Flame Retardants

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE 028	ng/kg	2495	637	25.5	6	2550	462	325	13.0
BDE 047	ng/kg	15937	6013	37.7	6	16016	4027	3069	19.3
BDE 099	ng/kg	8005	5024	62.8	6	8231	2342	2564	32.0
BDE 100	ng/kg	4829	1656	34.3	6	4878	1008	845	17.5
BDE 153	ng/kg	3355	1474	43.9	6	3324	819	752	22.4
BDE 154	ng/kg	1714	286	16.7	6	1710	138	146	8.52
BDE 183	ng/kg	996	384	38.5	4	1048	180	240	24.1

Method: Experimental



Indicative Values SETOC 785

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyl Tin (TBT)	µg/kg	16.7	6.69	40.1	11	16.5	2.33	2.52	15.1

Method: Env. availability of non-polar organic compounds ISO 16751

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 180 avail	µg/kg	3.13	1.36	43.5	4	3.08	0.837	0.851	27.2
benz(a)anthracene avail	µg/kg	163	70.0	43.1	5	157	40.9	39.1	24.1
benzo(b)fluoranthene avail	µg/kg	115	69.4	60.5	5	107	67.7	38.8	33.8
naphthalene res	µg/kg	545	37.4	6.9	4	557	19.9	23.4	4.29
acenaphthene res	µg/kg	82.6	30.9	37.5	4	82.4	19.2	19.3	23.4
fluorene res	µg/kg	147	24.9	16.9	4	146	15.5	15.5	10.6
phenanthrene res	µg/kg	978	254	26.0	4	992	119	159	16.2
anthracene res	µg/kg	810	268	33.1	4	822	121	167	20.7
fluoranthene res	µg/kg	1145	397	34.7	4	1177	184	248	21.7
pyrene res	µg/kg	791	149	18.8	4	829	79.4	92.8	11.7
chrysene res	µg/kg	749	330	44.0	4	726	146	206	27.5
benz(a)anthracene res	µg/kg	573	46.3	8.1	4	587	24.6	28.9	5.05
benzo(b)fluoranthene res	µg/kg	957	253	26.5	4	997	126	158	16.6
benzo(k)fluoranthene res	µg/kg	418	34.4	8.2	4	428	18.3	21.5	5.14
benzo(a)pyrene res	µg/kg	629	143	22.8	4	626	65.2	89.5	14.2
indeno(1,2,3-cd)pyrene res	µg/kg	724	342	47.2	4	776	165	213	29.5