



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 784



Certificate of Analysis SETOC 784

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.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH₄ (as N) in clay soils (ISE).

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 784 of Sediment, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 28 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. It also gives a better estimate of the concentrations of non-stable or volatile determinands. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2026	1	4
2024	3	2
2021	4	1
2018	4	2
2018	3	1



Consensus Values SETOC 784

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	386	183	47.5	144	384	116	19.1	4.95
acenaphthylene	µg/kg	307	113	36.8	117	300	74.0	13.0	4.25
acenaphthene	µg/kg	170	28.5	16.8	126	170	18.0	3.18	1.87
fluorene	µg/kg	181	37.0	20.4	125	181	23.9	4.13	2.28
phenanthrene	µg/kg	2619	370	14.1	146	2600	230	38.3	1.46
anthracene	µg/kg	649	139	21.5	148	653	83.0	14.3	2.20
fluoranthene	µg/kg	6802	824	12.1	147	6723	513	85.0	1.25
pyrene	µg/kg	5121	601	11.7	125	5120	377	67.2	1.31
chrysene	µg/kg	3705	607	16.4	147	3700	426	62.6	1.69
benz(a)anthracene	µg/kg	3452	527	15.3	147	3445	314	54.4	1.57
benzo(b)fluoranthene	µg/kg	3808	775	20.4	118	3850	461	89.2	2.34
benzo(k)fluoranthene	µg/kg	1906	279	14.6	146	1925	178	28.8	1.51
benzo(a)pyrene	µg/kg	3334	468	14.1	147	3326	304	48.3	1.45
dibenz(ah)anthracene	µg/kg	651	137	21.0	126	651	79.5	15.2	2.34
indeno(1,2,3-cd)pyrene	µg/kg	2602	512	19.7	147	2620	316	52.8	2.03
benzo(ghi)perylene	µg/kg	2664	404	15.2	146	2710	258	41.8	1.57
EPA ΣPAH(16)	µg/kg	38724	4399	11.4	89	38595	2595	583	1.51

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 101	µg/kg	1.45	0.497	34.2	83	1.54	0.369	0.068	4.70
PCB 118	µg/kg	0.900	0.313	34.8	56	1.00	0.207	0.052	5.81
PCB 138	µg/kg	3.97	1.28	32.3	113	4.00	0.995	0.151	3.80
PCB 149	µg/kg	5.05	0.838	16.6	14	5.06	0.545	0.280	5.54
PCB 153	µg/kg	3.54	0.857	24.2	115	3.65	0.605	0.100	2.82
PCB 180	µg/kg	3.82	0.823	21.5	115	3.90	0.560	0.096	2.51
ΣPCB(7)	µg/kg	14.5	3.97	27.3	62	15.1	2.55	0.631	4.34

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
p,p'-DDD	µg/kg	0.901	0.161	17.8	16	0.936	0.101	0.050	5.57

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	486	123	25.2	118	489	76.5	14.1	2.91
Organic carbon	g/kg	32.5	4.55	14.0	68	32.9	2.69	0.690	2.12
Particles > 63 µm	%	55.2	7.09	12.8	13	55.4	4.60	2.46	4.45



Consensus Values SETOC 784

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	15.8	1.57	9.9	57	16.0	1.00	0.260	1.65
Cd	mg/kg	1.34	0.166	12.4	59	1.35	0.099	0.027	2.03
Cr	mg/kg	33.6	7.36	21.9	56	33.1	4.16	1.23	3.66
Cu	mg/kg	46.5	5.37	11.5	58	46.2	3.77	0.881	1.89
Hg	mg/kg	0.445	0.062	13.9	58	0.443	0.043	0.010	2.27
Ni	mg/kg	16.9	2.47	14.6	60	16.7	1.67	0.399	2.36
Pb	mg/kg	238	31.2	13.1	60	235	18.0	5.03	2.11
Zn	mg/kg	375	39.1	10.4	59	375	23.0	6.37	1.70
Ba	mg/kg	111	18.6	16.7	45	112	12.3	3.46	3.11
Co	mg/kg	5.85	0.674	11.5	53	5.92	0.389	0.116	1.98
Mo	mg/kg	1.18	0.176	14.9	40	1.19	0.110	0.035	2.94

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	1.87	0.172	9.2	9	1.84	0.076	0.072	3.83

Indicative Values SETOC 784

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
VROM Σ PAH10	µg/kg	27848	1551	5.6	6	27878	767	792	2.84

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	0.467	0.254	54.5	44	0.483	0.182	0.048	10.3
PCB 031	µg/kg	0.238	0.101	42.4	7	0.244	0.064	0.048	20.0
PCB 052	µg/kg	0.696	0.523	75.2	59	0.849	0.401	0.085	12.2
PCB 105	µg/kg	0.233	0.056	24.2	11	0.236	0.041	0.021	9.11
PCB 128	µg/kg	0.843	0.308	36.5	11	0.880	0.177	0.116	13.8
PCB 156	µg/kg	0.329	0.143	43.5	14	0.365	0.101	0.048	14.5
PCB 077	µg/kg	0.032	0.007	21.3	5	0.034	0.005	0.004	11.9
PCB 157	µg/kg	0.061	0.023	37.9	7	0.072	0.015	0.011	17.9
PCB 167	µg/kg	0.184	0.030	16.4	5	0.195	0.015	0.017	9.16
PCB 189	µg/kg	0.091	0.019	20.5	5	0.094	0.012	0.010	11.5

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	0.614	0.184	30.0	14	0.569	0.119	0.062	10.0
pentachlorobenzene	µg/kg	0.336	0.177	52.6	8	0.340	0.073	0.078	23.2
1,2,4 trichlorobenzene	µg/kg	2.72	0.736	27.0	14	2.81	0.315	0.246	9.03
1,3,5 trichlorobenzene	µg/kg	0.633	0.185	29.1	11	0.647	0.088	0.070	11.0
dieldrin	µg/kg	0.942	0.386	41.0	11	1.01	0.223	0.145	15.4
p,p'-DDT	µg/kg	0.851	0.509	59.8	21	1.36	0.360	0.139	16.3
p,p'-DDE	µg/kg	0.379	0.215	56.7	9	0.373	0.122	0.089	23.6
o,p'-DDD	µg/kg	0.442	0.443	100.2	8	0.705	0.373	0.196	44.3
Sum trichlorobenzenes	µg/kg	4.09	1.19	29.0	4	4.04	0.570	0.742	18.1

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	408	149	36.4	6	395	103	75.9	18.6
EOX	mg/kg	0.274	0.130	47.6	15	0.290	0.090	0.042	15.4
Inorganic carbon	g/kg	9.24	2.25	24.3	13	9.22	1.09	0.779	8.43
Particles < 2 µm	%	11.6	7.57	65.5	14	13.2	2.87	2.53	21.9
Particles < 63 µm	%	33.7	13.8	40.9	16	32.5	9.30	4.31	12.8
CN - Total	mg/kg	0.547	0.515	94.2	15	0.586	0.452	0.166	30.4
Particles < 16 µm	%	17.4	5.49	31.6	4	16.8	2.96	3.43	19.8
Particles < 50 µm	%	28.7	5.24	18.3	4	29.3	2.45	3.28	11.4



Indicative Values SETOC 784

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Sb	mg/kg	2.08	0.534	25.7	11	2.20	0.374	0.201	9.67
Sn	mg/kg	13.7	2.93	21.3	12	13.7	1.84	1.06	7.70
V	mg/kg	38.7	11.3	29.1	11	39.8	6.87	4.25	11.0

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,3,7,8 Cl5DD	ng/kg	0.776	0.196	25.2	7	0.820	0.080	0.093	11.9
1,2,3,4,7,8 Cl6DD	ng/kg	0.763	0.383	50.1	6	0.815	0.190	0.195	25.6
1,2,3,7,8,9 Cl6DD	ng/kg	1.37	0.536	39.1	8	1.51	0.320	0.237	17.3
1,2,3,6,7,8 Cl6DD	ng/kg	2.08	0.441	21.2	8	2.10	0.269	0.195	9.36
1,2,3,4,6,7,8 Cl7DD	ng/kg	23.5	7.83	33.4	11	24.0	5.86	2.95	12.6
Cl8DD	ng/kg	131	49.0	37.3	11	130	26.0	18.5	14.1

Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	6.44	3.12	48.4	11	5.40	2.32	1.18	18.3
2,3,4,7,8 Cl5DF	ng/kg	5.66	1.46	25.9	8	6.10	0.859	0.646	11.4
1,2,3,7,8 Cl5DF	ng/kg	4.34	1.42	32.7	8	4.54	0.719	0.628	14.5
1,2,3,4,7,8 Cl6DF	ng/kg	12.3	3.26	26.4	11	12.6	2.41	1.23	9.96
1,2,3,7,8,9 Cl6DF	ng/kg	1.43	0.368	25.7	5	1.52	0.180	0.206	14.4
1,2,3,6,7,8 Cl6DF	ng/kg	4.50	1.26	28.1	10	4.63	0.702	0.499	11.1
2,3,4,6,7,8 Cl6DF	ng/kg	3.13	0.832	26.6	9	2.93	0.418	0.347	11.1
1,2,3,4,6,7,8 Cl7DF	ng/kg	46.5	14.7	31.7	11	48.9	11.6	5.55	11.9
1,2,3,4,7,8,9 Cl7DF	ng/kg	3.85	1.23	32.1	9	3.98	0.720	0.515	13.4
Cl8DF	ng/kg	111	24.0	21.5	11	110	18.5	9.05	8.11

Method: Experimental

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyl Tin (TBT)	µg/kg	21.4	9.86	46.2	13	25.5	7.51	3.42	16.0
DEHP	µg/kg	164	52.7	32.1	5	181	28.0	29.4	17.9