



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 788

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 788 of Sediment, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 6 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	3	3
2022	1	3
2019	3	3
2016	4	2
2013	2	2

Consensus Values SETOC 788

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	261	107	40.8	160	269	80.0	10.5	4.03
acenaphthylene	µg/kg	55.4	22.2	40.0	121	57.6	12.4	2.52	4.55
acenaphthene	µg/kg	50.8	12.8	25.1	125	51.8	8.34	1.43	2.81
fluorene	µg/kg	74.5	23.1	31.0	135	76.7	14.7	2.49	3.34
phenanthrene	µg/kg	502	97.3	19.4	164	511	62.4	9.50	1.89
anthracene	µg/kg	355	89.0	25.1	166	354	65.6	8.63	2.43
fluoranthene	µg/kg	986	128	13.0	165	982	79.0	12.5	1.26
pyrene	µg/kg	822	122	14.9	144	823	76.4	12.7	1.55
chrysene	µg/kg	616	109	17.8	165	624	75.0	10.6	1.73
benz(a)anthracene	µg/kg	542	103	19.0	165	538	65.9	10.0	1.85
benzo(b)fluoranthene	µg/kg	748	179	23.9	137	745	111	19.1	2.56
benzo(k)fluoranthene	µg/kg	327	50.6	15.5	161	332	31.0	4.98	1.52
benzo(a)pyrene	µg/kg	396	78.2	19.8	166	398	52.5	7.59	1.92
dibenz(ah)anthracene	µg/kg	103	23.3	22.8	137	103	13.6	2.49	2.43
indeno(1,2,3-cd)pyrene	µg/kg	384	78.0	20.3	165	385	45.6	7.59	1.98
benzo(ghi)perylene	µg/kg	367	63.0	17.2	164	365	37.4	6.15	1.67
EPA ΣPAH(16)	µg/kg	6583	1008	15.3	75	6590	613	146	2.21

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	76.8	21.4	27.9	125	76.8	11.6	2.40	3.12
PCB 052	µg/kg	48.6	9.01	18.5	131	48.4	5.40	0.984	2.02
PCB 101	µg/kg	45.5	9.20	20.2	132	45.0	6.00	1.00	2.20
PCB 105	µg/kg	3.55	0.538	15.1	26	3.45	0.425	0.132	3.71
PCB 118	µg/kg	26.4	4.73	17.9	124	26.2	2.74	0.531	2.01
PCB 128	µg/kg	4.65	1.08	23.2	24	4.62	0.615	0.275	5.92
PCB 138	µg/kg	28.7	9.48	33.0	132	29.2	6.60	1.03	3.59
PCB 153	µg/kg	43.6	9.21	21.1	133	42.7	6.54	0.998	2.29
PCB 156	µg/kg	2.56	0.486	19.0	17	2.80	0.480	0.147	5.76
PCB 180	µg/kg	17.4	3.95	22.7	131	17.5	2.51	0.432	2.48
ΣPCB(7)	µg/kg	290	58.6	20.2	54	285	33.5	9.97	3.43

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	20.5	4.06	19.8	37	20.3	2.40	0.834	4.08
pentachlorobenzene	µg/kg	14.7	1.91	13.0	19	14.9	1.10	0.547	3.72
1,2,3 trichlorobenzene	µg/kg	7.49	1.03	13.7	12	7.43	0.680	0.370	4.94



Consensus Values SETOC 788

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,3,4 tetrachlorobenzene	µg/kg	12.2	1.34	10.9	13	12.4	0.820	0.464	3.79
p,p'-DDE	µg/kg	11.6	2.64	22.7	32	11.7	1.40	0.584	5.02

(cont.)

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	340	82.9	24.4	128	339	49.5	9.16	2.70
Organic carbon	g/kg	30.9	3.82	12.4	72	30.8	2.60	0.562	1.82
Inorganic carbon	g/kg	10.5	1.68	16.0	15	10.6	1.00	0.541	5.17
CN - Total	mg/kg	2.41	0.675	28.0	44	2.49	0.392	0.127	5.27

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	29.0	2.04	7.0	69	29.0	1.20	0.306	1.06
Cd	mg/kg	9.36	0.983	10.5	70	9.45	0.555	0.147	1.57
Cr	mg/kg	180	21.0	11.7	72	177	13.9	3.10	1.72
Cu	mg/kg	94.8	9.13	9.6	73	94.0	5.26	1.34	1.41
Hg	mg/kg	3.02	0.276	9.2	69	3.00	0.170	0.042	1.38
Ni	mg/kg	34.8	3.30	9.5	73	34.6	2.10	0.482	1.39
Pb	mg/kg	158	12.4	7.8	73	159	7.00	1.81	1.14
Zn	mg/kg	709	66.4	9.4	73	702	43.9	9.72	1.37
Ba	mg/kg	401	44.5	11.1	48	395	24.8	8.03	2.00
Co	mg/kg	11.7	1.45	12.4	56	11.5	0.945	0.242	2.07
Mo	mg/kg	0.975	0.238	24.4	37	0.966	0.154	0.049	5.01

Indicative Values SETOC 788

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 031	µg/kg	51.5	22.8	44.2	11	50.0	14.0	8.59	16.7
PCB 149	µg/kg	33.4	8.32	24.9	12	34.5	5.70	3.00	8.99
PCB 077	µg/kg	3.95	0.958	24.3	19	4.00	0.690	0.275	6.96
PCB 114	µg/kg	0.231	0.082	35.3	5	0.240	0.047	0.046	19.8
PCB 123	µg/kg	1.60	1.72	107.6	10	3.05	1.47	0.680	42.6
PCB 157	µg/kg	0.405	0.163	40.3	7	0.395	0.095	0.077	19.0
PCB 167	µg/kg	0.841	0.321	38.1	8	1.14	0.110	0.142	16.9
PCB 189	µg/kg	0.495	0.144	29.1	6	0.507	0.080	0.073	14.8

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobutadiene	µg/kg	14.2	4.29	30.2	24	14.2	2.31	1.10	7.70
1,2,4 trichlorobenzene	µg/kg	160	47.8	29.9	15	153	28.0	15.4	9.64
1,3,5 trichlorobenzene	µg/kg	75.5	16.5	21.8	15	77.3	12.7	5.32	7.05
1,2,3,5 tetrachlorobenzene	µg/kg	4.56	1.33	29.1	5	4.53	0.467	0.742	16.3
1,2,4,5 tetrachlorobenzene	µg/kg	30.1	3.87	12.9	5	29.7	2.31	2.16	7.19
p,p'-DDT	µg/kg	1.17	0.843	72.3	13	2.61	0.510	0.292	25.1
o,p'-DDE	µg/kg	0.682	0.169	24.8	7	0.733	0.087	0.080	11.7
p,p'-DDD	µg/kg	11.2	3.29	29.4	25	11.9	1.92	0.821	7.35
o,p'-DDD	µg/kg	1.13	1.29	114.4	11	2.70	1.30	0.486	43.1

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	325	56.7	17.4	5	321	21.1	31.7	9.75
EOX	mg/kg	3.01	0.969	32.2	23	3.10	0.580	0.253	8.40
Particles < 2 µm	%	13.2	7.72	58.4	17	15.0	4.28	2.34	17.7
Particles < 63 µm	%	42.7	11.8	27.5	18	42.6	7.78	3.47	8.11
Particles > 63 µm	%	48.5	9.51	19.6	13	47.7	3.70	3.30	6.79

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Sb	mg/kg	1.53	0.638	41.6	6	1.58	0.384	0.326	21.2
Sn	mg/kg	11.7	1.63	14.0	5	11.8	0.938	0.912	7.80
V	mg/kg	42.7	17.6	41.3	5	38.4	9.63	9.84	23.1



Indicative Values SETOC 788

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	118	19.7	16.7	4	118	10.5	12.3	10.4
1,2,3,7,8 Cl5DD	ng/kg	4.57	0.721	15.8	4	4.70	0.350	0.451	9.87
1,2,3,4,7,8 Cl6DD	ng/kg	5.44	0.992	18.2	4	5.46	0.690	0.620	11.4
1,2,3,7,8,9 Cl6DD	ng/kg	7.44	2.15	28.9	4	7.38	0.985	1.34	18.0
1,2,3,6,7,8 Cl6DD	ng/kg	12.7	1.65	13.0	4	13.2	0.875	1.03	8.12
1,2,3,4,6,7,8 Cl7DD	ng/kg	184	15.4	8.4	4	189	8.15	9.60	5.22
Cl8DD	ng/kg	2103	213	10.1	4	2103	96.0	133	6.32

Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	36.3	10.3	28.4	4	35.8	5.30	6.45	17.8
2,3,4,7,8 Cl5DF	ng/kg	29.4	9.83	33.5	4	31.9	5.25	6.14	20.9
1,2,3,7,8 Cl5DF	ng/kg	33.8	4.19	12.4	4	34.8	2.20	2.62	7.73
1,2,3,4,7,8 Cl6DF	ng/kg	157	31.8	20.3	4	155	19.5	19.9	12.7
1,2,3,7,8,9 Cl6DF	ng/kg	28.9	6.02	20.9	4	28.0	3.00	3.77	13.0
1,2,3,6,7,8 Cl6DF	ng/kg	69.5	7.98	11.5	4	68.7	4.35	4.99	7.18
2,3,4,6,7,8 Cl6DF	ng/kg	42.2	15.6	36.9	4	43.4	8.50	9.73	23.1
1,2,3,4,6,7,8 Cl7DF	ng/kg	715	193	27.1	4	704	88.8	121	16.9
1,2,3,4,7,8,9 Cl7DF	ng/kg	94.8	12.4	13.1	4	94.0	6.05	7.73	8.16
Cl8DF	ng/kg	4000	1221	30.5	4	3884	605	763	19.1

Method: Experimental

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Tributyl Tin (TBT)	µg/kg	6.90	4.35	63.0	6	8.00	1.79	2.22	32.2