



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 687



Certificate of Analysis SETOC 687

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 687 of Soil from pollution area, from Belgium, is prepared for the WEPAL proficiency programs. The sample has been used in 3 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
2025	1	3
2021	2	4
2018	3	2

Consensus Values SETOC 687

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	126	43.5	34.4	82	130	30.2	6.00	4.75
acenaphthylene	µg/kg	51.8	18.7	36.1	66	52.4	11.4	2.88	5.56
acenaphthene	µg/kg	131	33.0	25.2	76	130	23.1	4.73	3.62
fluorene	µg/kg	148	41.3	27.9	75	148	30.5	5.96	4.03
phenanthrene	µg/kg	1630	248	15.2	88	1621	146	33.0	2.03
anthracene	µg/kg	303	67.1	22.2	87	298	42.0	8.99	2.97
fluoranthene	µg/kg	2892	391	13.5	88	2865	278	52.2	1.80
pyrene	µg/kg	2140	307	14.3	78	2110	193	43.4	2.03
chrysene	µg/kg	1542	311	20.1	88	1511	198	41.4	2.68
benz(a)anthracene	µg/kg	1452	287	19.8	88	1466	207	38.3	2.63
benzo(b)fluoranthene	µg/kg	1797	425	23.6	73	1800	250	62.2	3.46
benzo(k)fluoranthene	µg/kg	802	158	19.7	85	800	110	21.4	2.67
benzo(a)pyrene	µg/kg	1299	253	19.5	87	1300	163	33.9	2.61
dibenz(ah)anthracene	µg/kg	297	63.3	21.3	77	300	43.0	9.02	3.03
indeno(1,2,3-cd)pyrene	µg/kg	1095	217	19.8	87	1100	150	29.1	2.66
benzo(ghi)perylene	µg/kg	1111	185	16.7	88	1095	107	24.7	2.22
EPA ΣPAH(16)	µg/kg	17027	2326	13.7	56	16822	1484	388	2.28

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 052	µg/kg	4.69	1.84	39.2	65	5.00	1.20	0.285	6.08
PCB 101	µg/kg	16.0	3.95	24.7	73	16.2	2.67	0.578	3.61
PCB 118	µg/kg	8.87	2.83	31.9	66	9.02	1.98	0.436	4.91
PCB 138	µg/kg	34.0	8.79	25.9	74	33.3	4.83	1.28	3.76
PCB 153	µg/kg	29.4	5.31	18.1	74	29.0	3.20	0.772	2.63
PCB 180	µg/kg	22.7	3.92	17.2	73	22.8	2.40	0.574	2.52
ΣPCB(7)	µg/kg	123	24.3	19.8	34	123	14.2	5.21	4.24

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
p,p'-DDE	µg/kg	5.26	0.803	15.2	14	5.28	0.385	0.268	5.09

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	1457	345	23.7	69	1440	187	51.9	3.56
Organic carbon	g/kg	23.3	3.89	16.7	38	23.6	2.03	0.789	3.39



Consensus Values SETOC 687

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	15.9	0.761	4.8	34	16.0	0.452	0.163	1.02
Cd	mg/kg	2.60	0.198	7.6	33	2.62	0.096	0.043	1.66
Cr	mg/kg	62.2	8.21	13.2	34	61.9	3.90	1.76	2.83
Cu	mg/kg	151	19.1	12.7	34	152	10.8	4.10	2.71
Hg	mg/kg	0.400	0.039	9.7	38	0.400	0.023	0.008	1.97
Ni	mg/kg	24.8	2.80	11.3	35	25.0	1.90	0.591	2.38
Pb	mg/kg	304	29.5	9.7	34	308	16.5	6.32	2.08
Zn	mg/kg	453	32.7	7.2	34	454	17.3	7.01	1.55
Ba	mg/kg	302	23.5	7.8	24	300	16.1	6.01	1.99
Co	mg/kg	6.77	0.676	10.0	29	6.80	0.500	0.157	2.32
Mo	mg/kg	3.50	0.394	11.3	23	3.52	0.240	0.103	2.93



Indicative Values SETOC 687

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	2.22	1.39	62.6	53	2.60	0.950	0.238	10.7
PCB 031	µg/kg	3.34	1.01	30.2	4	3.40	0.550	0.630	18.9
PCB 105	µg/kg	2.73	1.10	40.2	11	3.33	0.430	0.415	15.2
PCB 128	µg/kg	7.27	1.55	21.3	12	7.43	0.775	0.558	7.68
PCB 149	µg/kg	27.8	2.59	9.3	6	27.5	1.70	1.32	4.74
PCB 156	µg/kg	2.77	0.849	30.6	10	2.88	0.423	0.336	12.1
PCB 077	µg/kg	0.977	0.537	55.0	6	1.09	0.260	0.274	28.1
PCB 167	µg/kg	2.06	0.669	32.5	8	2.15	0.252	0.296	14.4
PCB 189	µg/kg	0.642	0.169	26.3	5	0.700	0.090	0.094	14.7

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	1.16	0.390	33.7	12	1.18	0.165	0.141	12.2
pentachlorobenzene	µg/kg	0.875	0.242	27.7	10	0.863	0.154	0.096	10.9
1,2,4 trichlorobenzene	µg/kg	1.12	0.581	51.8	5	1.27	0.333	0.325	29.0
gamma-HCH	µg/kg	0.264	0.057	21.5	5	0.288	0.038	0.032	12.0
p,p'-DDT	µg/kg	60.6	18.9	31.2	20	59.8	10.3	5.29	8.73
o,p'-DDT	µg/kg	5.82	2.25	38.7	13	6.30	0.700	0.781	13.4
o,p'-DDE	µg/kg	0.971	0.622	64.1	8	1.49	0.360	0.275	28.3
p,p'-DDD	µg/kg	23.0	7.78	33.8	20	23.5	5.05	2.17	9.44
o,p'-DDD	µg/kg	5.84	1.49	25.5	14	6.00	0.711	0.497	8.51

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
EOX	mg/kg	0.851	0.365	42.9	11	0.852	0.225	0.138	16.2
Particles < 63 µm	%	31.6	6.14	19.5	6	32.2	4.33	3.13	9.93
CN - Total	mg/kg	0.801	0.253	31.6	10	0.840	0.155	0.100	12.5

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Sb	mg/kg	7.12	1.87	26.3	8	7.19	1.32	0.828	11.6
Sn	mg/kg	29.9	5.44	18.2	7	30.0	2.30	2.57	8.59
V	mg/kg	32.0	7.82	24.4	7	30.6	3.66	3.69	11.5

Indicative Values SETOC 687

Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	1.11	0.270	24.2	6	1.08	0.129	0.138	12.4
1,2,3,7,8 Cl5DD	ng/kg	5.98	1.18	19.8	5	5.98	0.772	0.662	11.1
1,2,3,4,7,8 Cl6DD	ng/kg	4.26	1.23	28.7	5	4.10	0.704	0.685	16.1
1,2,3,7,8,9 Cl6DD	ng/kg	17.6	1.20	6.8	6	18.0	0.735	0.615	3.49
1,2,3,6,7,8 Cl6DD	ng/kg	31.9	3.99	12.5	6	32.2	1.50	2.04	6.39
1,2,3,4,6,7,8 Cl7DD	ng/kg	169	29.7	17.5	6	177	11.7	15.1	8.94
Cl8DD	ng/kg	989	123	12.4	6	985	48.4	62.7	6.34

Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	10.6	3.34	31.5	6	11.4	1.93	1.71	16.1
2,3,4,7,8 Cl5DF	ng/kg	15.4	2.09	13.5	6	15.7	1.19	1.07	6.91
1,2,3,7,8 Cl5DF	ng/kg	10.5	2.83	26.9	6	11.2	2.04	1.44	13.8
1,2,3,4,7,8 Cl6DF	ng/kg	22.1	3.01	13.6	6	22.2	1.41	1.53	6.95
1,2,3,7,8,9 Cl6DF	ng/kg	4.21	1.79	42.5	5	4.10	1.00	1.00	23.8
1,2,3,6,7,8 Cl6DF	ng/kg	17.2	4.71	27.4	6	18.0	2.05	2.40	14.0
2,3,4,6,7,8 Cl6DF	ng/kg	19.0	5.16	27.1	6	18.9	2.22	2.63	13.8
1,2,3,4,6,7,8 Cl7DF	ng/kg	294	43.3	14.8	6	296	30.1	22.1	7.54
1,2,3,4,7,8,9 Cl7DF	ng/kg	8.89	2.83	31.8	6	9.35	1.31	1.44	16.2
Cl8DF	ng/kg	290	29.4	10.1	6	288	19.4	15.0	5.17