



**WAGENINGEN EVALUATING PROGRAMS  
FOR ANALYTICAL LABORATORIES**

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**Certificate of Analysis**



**International Sediment Exchange for Tests on Organic Contaminants**

**REFERENCE MATERIAL**

**SETOC sample 744**



## Certificate of Analysis SETOC 744

### 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 744 of Channel sludge, from Netherlands, 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
2002	4	3
2001	4	3
1998	4	4



## Consensus Values SETOC 744



### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
phenanthrene	µg/kg	68.4	24.9	36.5	159	70.0	18.0	2.47	3.61
fluoranthene	µg/kg	244	90.1	36.9	170	250	56.5	8.64	3.54
pyrene	µg/kg	157	52.8	33.7	159	159	35.0	5.23	3.34
chrysene	µg/kg	106	36.3	34.3	163	110	21.0	3.55	3.36
benz(a)anthracene	µg/kg	74.6	23.0	30.8	161	77.0	16.0	2.27	3.04
benzo(b)fluoranthene	µg/kg	125	39.8	31.9	148	130	23.5	4.09	3.28
benzo(k)fluoranthene	µg/kg	55.6	20.0	36.0	150	58.2	11.4	2.04	3.67
benzo(a)pyrene	µg/kg	65.8	22.3	33.9	162	68.3	12.3	2.19	3.33
indeno(1,2,3-cd)pyrene	µg/kg	74.1	28.6	38.6	155	78.0	16.6	2.88	3.88
benzo(ghi)perylene	µg/kg	66.2	28.4	42.9	146	70.0	16.9	2.93	4.44

### Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 052	µg/kg	317	93.3	29.4	106	321	59.0	11.3	3.57
PCB 101	µg/kg	31.4	9.53	30.4	106	31.6	5.69	1.16	3.69
PCB 118	µg/kg	28.0	7.09	25.4	93	28.0	4.14	0.919	3.29
PCB 138	µg/kg	10.7	3.62	34.0	99	11.0	2.20	0.455	4.27
PCB 153	µg/kg	10.8	3.02	28.0	101	11.0	2.00	0.375	3.49
PCB 180	µg/kg	6.12	2.00	32.8	94	6.12	1.12	0.258	4.22

### Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, GC	mg/kg	143	54.0	37.8	72	151	35.0	7.95	5.57
AOX	mg/kg	94.8	9.49	10.0	11	94.0	6.00	3.58	3.78
EOX	mg/kg	10.6	4.18	39.4	66	10.7	2.62	0.643	6.07
Organic carbon	g/kg	64.2	7.92	12.3	26	65.2	4.05	1.94	3.02
Particles < 2 µm	%	17.9	1.17	6.5	23	17.9	0.700	0.306	1.70
Particles < 63 µm	%	45.4	3.31	7.3	9	45.0	1.80	1.38	3.04

### Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	18.1	2.42	13.4	89	18.0	1.90	0.321	1.77
Cd	mg/kg	0.509	0.102	20.0	74	0.510	0.050	0.015	2.91
Cr	mg/kg	56.3	8.36	14.9	96	56.0	5.40	1.07	1.89
Cu	mg/kg	43.9	3.40	7.7	95	44.0	2.40	0.436	0.993
Hg	mg/kg	0.137	0.041	29.7	79	0.140	0.030	0.006	4.18
Ni	mg/kg	25.3	2.58	10.2	95	25.0	1.80	0.331	1.31



## Consensus Values SETOC 744

Method: Metals									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Pb	mg/kg	32.5	4.34	13.4	96	32.5	2.55	0.553	1.70
Zn	mg/kg	329	31.4	9.6	97	331	20.0	3.99	1.21

### Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
1,2,3,7,8,9 Cl6DD	ng/kg	64.0	10.7	16.6	30	64.8	5.75	2.43	3.80
1,2,3,6,7,8 Cl6DD	ng/kg	462	56.9	12.3	30	460	34.0	13.0	2.81
1,2,3,4,6,7,8 Cl7DD	ng/kg	17759	3187	17.9	29	17680	2138	740	4.17

### Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DF	ng/kg	4.00	0.872	21.8	24	4.17	0.470	0.222	5.56
1,2,3,4,7,8 Cl6DF	ng/kg	43.0	9.62	22.4	29	45.0	6.00	2.23	5.19
1,2,3,4,6,7,8 Cl7DF	ng/kg	2331	326	14.0	29	2310	210	75.7	3.25
1,2,3,4,7,8,9 Cl7DF	ng/kg	279	40.3	14.4	29	278	28.0	9.35	3.35
Cl8DF	ng/kg	8428	1990	23.6	29	8235	1155	462	5.48



## Indicative Values      SETOC 744



### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
naphthalene	µg/kg	12.1	9.70	80.4	73	16.1	6.52	1.42	11.8
acenaphthylene	µg/kg	4.60	4.91	106.7	44	6.50	3.82	0.925	20.1
acenaphthene	µg/kg	8.98	5.98	66.5	68	10.0	5.00	0.906	10.1
fluorene	µg/kg	20.2	11.3	55.7	111	23.0	7.00	1.34	6.61
anthracene	µg/kg	14.0	11.5	82.5	121	18.0	8.00	1.31	9.38
dibenz(ah)anthracene	µg/kg	17.6	10.3	58.4	109	20.0	6.90	1.23	6.99

### Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB 028	µg/kg	930	496	53.4	95	928	277	63.6	6.84
PCB 105	µg/kg	19.2	6.22	32.4	26	18.9	3.15	1.53	7.95
PCB 128	µg/kg	1.83	1.44	78.3	13	2.20	0.850	0.498	27.2
PCB 149	µg/kg	7.26	3.59	49.5	13	8.00	1.80	1.24	17.1
PCB 156	µg/kg	0.972	0.194	20.0	12	1.03	0.125	0.070	7.21

### Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
hexachlorobenzene	µg/kg	0.588	0.621	105.6	13	2.00	1.07	0.215	36.6
heptachlor	µg/kg	1.56	2.28	146.2	8	11.3	4.23	1.01	64.6
alpha-endosulfan	µg/kg	92.4	35.9	38.9	33	88.9	21.1	7.82	8.46
beta-endosulfan	µg/kg	38.1	39.5	103.8	14	50.0	30.8	13.2	34.7
p,p'-DDT	µg/kg	0.841	1.63	194.3	16	3.95	2.94	0.510	60.7
p,p'-DDE	µg/kg	33.3	13.7	41.3	54	33.4	8.00	2.34	7.03
o,p'-DDE	µg/kg	1.98	2.63	132.7	17	9.10	1.90	0.797	40.2
p,p'-DDD	µg/kg	5.32	2.85	53.6	33	6.80	1.80	0.621	11.7
o,p'-DDD	µg/kg	1.39	2.39	171.6	13	5.90	4.33	0.827	59.5

### Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mineral oil, IR	mg/kg	127	75.7	59.5	51	130	50.0	13.2	10.4
Inorganic carbon	g/kg	3.90	1.64	42.0	13	3.80	0.900	0.568	14.6
CN - Total	mg/kg	0.798	0.625	78.4	21	0.840	0.560	0.171	21.4
CN - Free	mg/kg	0.348	0.143	41.1	6	0.380	0.110	0.073	21.0



## Indicative Values SETOC 744



### Method: Dibenzo-P Dioxin

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,7,8 Cl4DD	ng/kg	1.48	0.596	40.4	22	1.64	0.365	0.159	10.8
1,2,3,7,8 Cl5DD	ng/kg	4.69	1.90	40.5	26	5.24	0.990	0.466	9.94
1,2,3,4,7,8 Cl6DD	ng/kg	29.4	10.1	34.4	28	31.0	6.95	2.39	8.13
Cl8DD	ng/kg	285738	92287	32.3	26	301500	61325	22624	7.92

### Method: Dibenzofuran

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
2,3,4,7,8 Cl5DF	ng/kg	3.51	2.05	58.3	26	4.00	1.43	0.502	14.3
1,2,3,7,8 Cl5DF	ng/kg	2.85	1.14	39.9	23	3.00	0.710	0.296	10.4
1,2,3,7,8,9 Cl6DF	ng/kg	3.78	4.35	115.0	20	4.10	2.52	1.22	32.1
1,2,3,6,7,8 Cl6DF	ng/kg	28.9	8.00	27.6	29	29.0	5.00	1.86	6.42
2,3,4,6,7,8 Cl6DF	ng/kg	21.2	10.7	50.4	29	23.3	7.00	2.48	11.7