



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 716



Certificate of Analysis SETOC 716

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 mean and standard deviation are calculated using all reported data when at least 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into three sections: Consensus Values, Indicative Values and Values for Information. The division is made on the reliability of the data. Consensus Values are based on at least 16 results while the coefficient of variation is smaller than 25 %. Indicative Values are based on at least 8 and less than 16 results or a coefficient of variation between 25 % and 50 %. Other values, based on more than 2 and less than 8 results or a coefficient of variation higher than 50 %, are given for information only.

In the sections with Consensus Values and Indicative Values the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median and MAD (Median of Absolute Deviation) and the uncertainty in the consensus values. The confidence limits (at 95 % probability) are calculated for these determinands.

In the section with Information Values the following parameters are given: median, MAD and number of results. For determinands which have at least 5 results reported as smaller than (<) the median of these 'smaller than results' is calculated. In some cases this median of '<' values is much smaller than median and mean of the indicative values. This may be caused by a too optimistic (too low) value for the detection limit reported by a (small) majority of participating laboratories who report '<' -values.

All values, expressed on a weight basis (kg or %), are reported in oven dry (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 716 of Sediment from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 2 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
1995	3	3
1994	2	2



Consensus Values SETOC 716

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
benzo(k)fluoranthene	µg/kg	91.8	21.08	23.0	93	94.5	14.50	2.73	87.4	-	96.1
fluoranthene	µg/kg	254	59.1	23.2	100	255	40.5	7.4	243	-	266
pyrene	µg/kg	216	52.6	24.4	94	214	36.5	6.8	205	-	226

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Particles < 2 µm	%	16.9	1.47	8.7	17	16.8	1.00	0.45	16.1	-	17.6

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	mg/kg	15.3	1.99	13.0	44	15.5	1.46	0.38	14.7	-	15.9
Cd	mg/kg	1.33	0.199	15.0	50	1.38	0.135	0.035	1.27	-	1.38
Cr	mg/kg	51.1	6.85	13.4	49	51.0	4.70	1.22	49.2	-	53.1
Cu	mg/kg	22.9	1.67	7.3	50	23.0	1.07	0.29	22.4	-	23.3
Hg	mg/kg	0.379	0.0738	19.5	43	0.380	0.0500	0.0141	0.357	-	0.402
Ni	mg/kg	17.3	1.98	11.4	49	17.2	1.33	0.35	16.7	-	17.8
Pb	mg/kg	43.1	4.88	11.3	50	43.0	3.25	0.86	41.7	-	44.5
Zn	mg/kg	159	13.1	8.3	50	160	9.3	2.3	155.5	-	163.0

Indicative Values SETOC 716

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
anthracene	µg/kg	34.7	15.37	44.3	82	33.5	10.85	2.12	31.3	-	38.1
benz(a)anthracene	µg/kg	115	33.9	29.5	94	114	23.5	4.4	108	-	122
benzo(a)pyrene	µg/kg	134	39.6	29.5	97	133	27.0	5.0	126	-	142
benzo(b)fluoranthene	µg/kg	199	72.1	36.1	93	200	50.0	9.3	185	-	214
benzo(ghi)perylene	µg/kg	110	38.8	35.2	92	110	27.0	5.1	102	-	118
chrysene	µg/kg	125	35.1	28.1	94	130	24.5	4.5	118	-	132
fluorene	µg/kg	23.8	10.13	42.5	61	24.0	7.00	1.62	21.3	-	26.4
indeno(1,2,3-cd)pyrene	µg/kg	135	46.3	34.3	88	139	31.0	6.2	125	-	145
phenanthrene	µg/kg	108	36.5	33.7	96	110	25.0	4.7	101	-	116

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB 052	µg/kg	1.90	0.732	38.5	34	1.95	0.495	0.157	1.65	-	2.16
PCB 101	µg/kg	3.56	1.752	49.2	48	3.70	1.280	0.316	3.06	-	4.07
PCB 118	µg/kg	2.36	0.883	37.4	31	2.40	0.600	0.198	2.03	-	2.68
PCB 138	µg/kg	5.34	2.302	43.1	50	5.61	1.610	0.407	4.69	-	5.99
PCB 153	µg/kg	5.24	2.060	39.3	51	5.00	1.400	0.360	4.66	-	5.82
PCB 180	µg/kg	3.28	1.503	45.8	50	3.40	1.055	0.266	2.86	-	3.71

Method: Organochlorine pesticides

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
p,p'-DDD	µg/kg	1.27	0.599	47.1	10	1.38	0.400	0.237	0.849	-	1.69
p,p'-DDE	µg/kg	1.58	0.485	30.7	19	1.70	0.300	0.139	1.35	-	1.81

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
AOX	mg/kg	59.0	11.50	19.5	14	59.9	8.00	3.84	52.4	-	65.6
CN - Total	mg/kg	0.702	0.2737	39.0	11	0.800	0.2000	0.1031	0.521	-	0.884
EOX	mg/kg	0.646	0.2815	43.6	46	0.685	0.1900	0.0519	0.563	-	0.730
Organic carbon	g/kg	16.7	4.79	28.7	10	17.3	3.15	1.89	13.3	-	20.1
Particles < 63 µm	%	60.8	8.87	14.6	10	60.8	6.00	3.51	54.6	-	67.1



Indicative Values SETOC 716



Method: Polycyclic aromatic hydrocarbons

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
acenaphthene	µg/kg	19.0	8.50	40	50.0	47
acenaphthylene	µg/kg	16.5	11.10	18	50.0	65
dibenz(ah)anthracene	µg/kg	30.5	11.50	58	50.0	33
naphthalene	µg/kg	50.0	20.00	54	50.0	39

Method: Polychlorobiphenyls

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
PCB 028	µg/kg	1.00	0.400	26	1.00	36
PCB 128	µg/kg	0.900	0.1500	5		
PCB 149	µg/kg	4.41	1.500	6		
PCB 156	µg/kg	0.900	0.0300	3		

Method: Organochlorine pesticides

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
1,2,3 trichlorobenzene	µg/kg	-	-	0	1.00	5
1,2,3,4 tetrachlorobenzene	µg/kg	-	-	0	1.75	8
alpha-endosulfan	µg/kg	-	-	0	1.00	36
alpha-HCH	µg/kg	-	-	0	1.00	45
beta-endosulfan	µg/kg	-	-	0	1.75	16
beta-HCH	µg/kg	1.20	0.745	4	1.00	41
delta-HCH	µg/kg	-	-	0	1.00	30
dieldrin	µg/kg	2.04	1.380	6	1.00	37
endosulfan sulfate	µg/kg	-	-	0	1.00	11
endrin	µg/kg	-	-	0	1.00	41
gamma-HCH	µg/kg	-	-	0	1.00	42
heptachlor	µg/kg	0.180	0.0200	3	1.000	38
heptachlor epoxide	µg/kg	-	-	0	1.00	42
hexachlorobenzene	µg/kg	0.480	0.2700	3	1.000	41
o,p`-DDD	µg/kg	4.80	2.200	5	1.00	33
o,p`-DDE	µg/kg	2.00	1.000	3	1.00	37
o,p`-DDT	µg/kg	-	-	0	1.00	40
p,p`-DDT	µg/kg	1.000	0.3700	7	1.000	37
pentachlorobenzene	µg/kg	-	-	0	2.25	18
telodrin	µg/kg	-	-	0	1.00	31



			Indicative Values	SETOC 716	
trans-chlordane	µg/kg	-	- 0	1.00	15



Indicative Values SETOC 716



Method: Other parameters

Element	Unit	Median	MAD	N
Inorganic carbon	g/kg	25.2	1.00	4
Particles > 63 μm	%	28.0	11.50	4