



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Sediment Exchange for Tests on Organic Contaminants

REFERENCE MATERIAL

SETOC sample 680



Certificate of Analysis SETOC 680

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 680 of Sediment from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 1 period (or round). The results on which the values in this report are based were taken from the period given in the following table.

Year	Round	Number
2020	2	1



Consensus Values SETOC 680



Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
anthracene	µg/kg	22.5	3.82	17.0	18	22.4	2.50	1.12	20.6	-	24.4
benz(a)anthracene	µg/kg	59.7	7.33	12.3	21	60.0	5.00	2.00	56.4	-	63.1
benzo(a)pyrene	µg/kg	56.2	11.16	19.9	19	57.0	7.76	3.20	50.9	-	61.6
benzo(b)fluoranthene	µg/kg	72.1	16.18	22.4	16	73.0	10.85	5.05	63.5	-	80.6
benzo(ghi)perylene	µg/kg	45.2	7.29	16.1	19	46.0	5.00	2.09	41.7	-	48.7
chrysene	µg/kg	63.9	14.48	22.7	20	62.6	10.10	4.05	57.1	-	70.7
fluoranthene	µg/kg	97.3	15.91	16.4	24	97.6	10.60	4.06	90.6	-	104
indeno(1,2,3-cd)pyrene	µg/kg	44.0	7.11	16.2	17	44.3	4.70	2.16	40.4	-	47.7
phenanthrene	µg/kg	54.3	10.16	18.7	21	55.0	7.04	2.77	49.7	-	58.9
pyrene	µg/kg	78.8	18.17	23.0	18	76.5	12.75	5.35	69.8	-	87.8



Indicative Values SETOC 680

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
benzo(k)fluoranthene	µg/kg	34.6	8.66	25.0	18	36.4	6.00	2.55	30.4	-	38.9
dibenz(ah)anthracene	µg/kg	12.1	3.81	31.5	10	12.6	2.70	1.50	9.41	-	14.8
fluorene	µg/kg	12.7	3.08	24.3	9	13.0	2.00	1.28	10.3	-	15.0
naphthalene	µg/kg	26.5	13.15	49.7	14	24.5	9.50	4.39	18.9	-	34.0
EPA ΣPAH(16)	µg/kg	683	96.9	14.2	13	676	68.0	33.6	625	-	741

Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB 028	µg/kg	1.11	0.176	15.8	12	1.10	0.110	0.064	1.00	-	1.22
PCB 052	µg/kg	1.14	0.150	13.1	13	1.14	0.110	0.052	1.05	-	1.23
PCB 101	µg/kg	1.49	0.590	39.6	14	1.49	0.414	0.197	1.15	-	1.83
PCB 118	µg/kg	1.13	0.217	19.2	10	1.16	0.153	0.086	0.975	-	1.28
PCB 138	µg/kg	2.14	0.569	26.6	14	2.17	0.370	0.190	1.82	-	2.47
PCB 153	µg/kg	2.33	0.586	25.1	16	2.35	0.410	0.183	2.02	-	2.64
PCB 180	µg/kg	1.66	0.614	37.0	10	1.60	0.400	0.243	1.22	-	2.09

Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Organic carbon	g/kg	10.4	2.55	24.4	8	10.2	1.75	1.13	8.36	-	12.5
Mineral oil, GC	mg/kg	48.4	13.06	27.0	16	49.1	9.07	4.08	41.5	-	55.4

Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	mg/kg	7.47	0.652	8.7	8	7.57	0.445	0.288	6.94	-	8.00
Cr	mg/kg	24.3	3.70	15.2	8	23.9	2.51	1.64	21.3	-	27.4
Cu	mg/kg	11.1	1.13	10.1	8	11.2	0.80	0.50	10.2	-	12.0
Ni	mg/kg	11.0	1.00	9.1	8	11.0	0.67	0.44	10.2	-	11.8
Pb	mg/kg	20.4	2.08	10.2	8	21.0	1.46	0.92	18.7	-	22.1
Zn	mg/kg	90.8	8.19	9.0	8	92.8	6.19	3.62	84.1	-	97.5



Informative Values SETOC 680

Method: Polycyclic aromatic hydrocarbons

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
acenaphthene	µg/kg	7.00	0.500	7	20.00	12
acenaphthylene	µg/kg	6.35	2.070	6	20.00	12

Method: Polychlorobiphenyls

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
∑PCB(7)	µg/kg	11.2	3.10	4	13.0	5

Method: Organochlorine pesticides

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
1,2,3,4 tetrachlorobenzene	µg/kg	-	-	0	1.00	5
dieldrin	µg/kg	-	-	0	1.00	7
heptachlor epoxide	µg/kg	-	-	0	2.00	7
hexachlorobenzene	µg/kg	0.953	0.0845	4	1.150	6
o,p`-DDT	µg/kg	-	-	0	1.00	9
p,p`-DDE	µg/kg	-	-	0	1.00	10
p,p`-DDT	µg/kg	-	-	0	1.00	10

Method: Other parameters

Element	Unit	Median	MAD	N	Results smaller than (<) Median of <	N
CN - Total	mg/kg	0.522	0.0775	4	1.000	5
Particles < 63 µm	%	22.5	0.49	3		

Method: Metals

Element	Unit	Median	MAD	N
Ba	mg/kg	30.2	4.21	5
Cd	mg/kg	0.451	0.0134	6
Co	mg/kg	3.99	0.225	6
Hg	mg/kg	0.176	0.0211	7
Mo	mg/kg	0.404	0.0036	3