



**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 681**



## Certificate of Analysis SETOC 681

### 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 681 of Marine 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
2019	3	1



## Consensus Values SETOC 681



Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
fluoranthene	µg/kg	15.2	3.55	23.4	18	16.5	2.70	1.05	13.4	-	16.9
pyrene	µg/kg	10.8	2.63	24.4	18	11.7	2.02	0.77	9.49	-	12.1



## Indicative Values SETOC 681

### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
benzo(a)pyrene	µg/kg	6.34	2.027	32.0	16	6.80	1.524	0.634	5.27	-	7.42
benzo(b)fluoranthene	µg/kg	12.7	5.28	41.4	16	12.9	3.73	1.65	9.95	-	15.5
benzo(ghi)perylene	µg/kg	6.91	1.432	20.7	13	6.95	1.050	0.496	6.05	-	7.77
benzo(k)fluoranthene	µg/kg	5.27	1.772	33.6	13	5.60	1.300	0.614	4.21	-	6.33
chrysene	µg/kg	7.27	2.502	34.4	15	8.00	1.900	0.808	5.90	-	8.65
indeno(1,2,3-cd)pyrene	µg/kg	7.78	2.666	34.3	15	8.60	2.100	0.860	6.31	-	9.24
phenanthrene	µg/kg	12.3	5.83	47.4	18	12.2	3.90	1.72	9.42	-	15.2
EPA ΣPAH(16)	µg/kg	93.8	32.77	35.0	11	109.0	24.90	12.35	72.0	-	115

### Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB 101	µg/kg	0.655	0.2508	38.3	9	0.680	0.1700	0.1045	0.466	-	0.844
PCB 138	µg/kg	1.60	0.797	49.8	12	1.60	0.543	0.288	1.10	-	2.10
PCB 153	µg/kg	1.53	0.744	48.5	13	1.54	0.538	0.258	1.09	-	1.98
PCB 180	µg/kg	1.31	0.521	39.7	13	1.33	0.370	0.181	0.999	-	1.62

### Method: Other parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Organic carbon	g/kg	3.18	1.341	42.2	14	3.43	0.935	0.448	2.41	-	3.95
Mineral oil, GC	mg/kg	17.4	6.58	37.9	18	18.9	4.61	1.94	14.1	-	20.6

### Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	mg/kg	11.6	0.57	4.9	13	11.6	0.40	0.20	11.29	-	11.97
Ba	mg/kg	7.06	1.678	23.8	9	7.70	1.237	0.699	5.80	-	8.33
Co	mg/kg	1.91	0.404	21.2	11	1.90	0.300	0.152	1.64	-	2.18
Cr	mg/kg	23.4	3.18	13.6	13	22.8	2.21	1.10	21.5	-	25.3
Cu	mg/kg	2.11	0.517	24.6	12	2.16	0.355	0.187	1.78	-	2.43
Ni	mg/kg	4.26	0.728	17.1	13	4.16	0.501	0.253	3.82	-	4.69
Pb	mg/kg	8.35	0.565	6.8	13	8.30	0.373	0.196	8.01	-	8.69
Zn	mg/kg	25.9	3.20	12.3	13	26.9	2.40	1.11	24.0	-	27.8



## Informative Values SETOC 681



### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
acenaphthene	µg/kg	2.10	1.100	7	20.00	19
acenaphthylene	µg/kg	2.13	1.194	9	20.00	16
anthracene	µg/kg	3.52	1.488	11	20.00	21
benz(a)anthracene	µg/kg	7.15	2.485	16	50.00	16
dibenz(ah)anthracene	µg/kg	1.45	0.688	7	20.00	17
fluorene	µg/kg	4.90	1.750	9	20.00	17
naphthalene	µg/kg	10.25	7.604	12	50.00	19

### Method: Polychlorobiphenyls

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
PCB 028	µg/kg	0.500	0.0460	5	1.000	18
PCB 052	µg/kg	0.350	0.1900	5	1.000	19
PCB 118	µg/kg	0.340	0.1400	7	2.000	15
PCB 149	µg/kg	2.00	0.100	3		
∑PCB(7)	µg/kg	5.96	1.685	6	13.00	5

### Method: Organochlorine pesticides

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
endrin	µg/kg	-	-	0	1.00	6
hexachlorobenzene	µg/kg	-	-	0	1.00	6
hexachlorobutadiene	µg/kg	-	-	0	1.00	5

### Method: Other parameters

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
CN - Total	mg/kg	-	-	0	1.00	8
Inorganic carbon	g/kg	9.94	0.560	3		
Particles < 2 µm	%	6.15	0.900	4		
Particles < 63 µm	%	11.7	2.02	5		
Particles > 63 µm	%	86.3	1.82	3		

### Method: Metals

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
Cd	mg/kg	0.0540	0.0080	7	0.1500	6
Hg	mg/kg	0.0257	0.0057	7	0.1000	6



**Informative Values SETOC 681**

Mo	mg/kg	0.200	0.0895	8
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