



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 77



Certificate of Analysis Sediment 77

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.

The results of each determinand is expressed on dried sediment.

Sample information

QUASIMEME reference materials cover a range of natural Marine sediment species from contaminated waters from the North Sea and/or Mediterranean. There is no spiking, mixing or other alterations of the samples. For sample preparation the sediment samples are dried at 40 °C and milled to pass a 0.5 mm sieve.

This Sediment sample 77 of North Sea (near Sylt) from North Sea (near Sylt) is prepared for the QUASIMEME proficiency programs. The results on which the values in this report are based were taken from the periods given in the following table.

Year.Round	Program	Sample Round Id
2023.2	MS2	QOR157MS
2023.2	MS3	QPH120MS
2024.1	MS7	QBC080MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PCB153	µg/kg	0.679	0.141	20.7	21	0.678	0.087	0.038	5.65

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.60	0.099	6.2	11	1.63	0.055	0.037	2.34



Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.020	0.003	14.8	6	0.021	0.001	0.001	7.55
g-HCH	µg/kg	0.020	0.007	36.2	6	0.023	0.005	0.004	18.5
pp'-DDE	µg/kg	0.268	0.087	32.6	15	0.267	0.054	0.028	10.5
pp'-DDT	µg/kg	0.181	0.165	91.0	10	0.179	0.108	0.065	36.0
pp'-DDD	µg/kg	0.401	0.111	27.7	14	0.396	0.066	0.037	9.27
HCB	µg/kg	0.316	0.074	23.5	13	0.318	0.038	0.026	8.13
b-HCH	µg/kg	0.031	0.014	45.5	5	0.031	0.012	0.008	25.4
PCB28	µg/kg	0.115	0.055	47.7	18	0.124	0.028	0.016	14.0
PCB31	µg/kg	0.082	0.018	22.5	9	0.085	0.009	0.008	9.38
PCB52	µg/kg	0.212	0.062	29.0	20	0.199	0.038	0.017	8.11
PCB101	µg/kg	0.364	0.115	31.7	21	0.380	0.071	0.031	8.64
PCB105	µg/kg	0.068	0.036	53.3	8	0.070	0.023	0.016	23.5
PCB118	µg/kg	0.242	0.066	27.2	21	0.240	0.040	0.018	7.41
PCB138+PCB163	µg/kg	0.822	0.265	32.3	6	0.837	0.153	0.135	16.5
PCB156	µg/kg	0.057	0.040	71.0	8	0.055	0.023	0.018	31.4
PCB180	µg/kg	0.321	0.123	38.3	21	0.330	0.068	0.034	10.4
PCB138	µg/kg	0.550	0.197	35.8	19	0.533	0.120	0.056	10.3
PCB47	µg/kg	0.067	0.024	35.4	5	0.066	0.008	0.013	19.8
PCB49	µg/kg	0.120	0.016	13.7	6	0.126	0.012	0.008	6.99
PCB66	µg/kg	0.120	0.042	35.2	6	0.123	0.016	0.022	18.0
PCB110	µg/kg	0.294	0.140	47.5	5	0.307	0.087	0.078	26.5
PCB128	µg/kg	0.093	0.027	29.3	6	0.098	0.018	0.014	14.9
PCB149	µg/kg	0.527	0.086	16.4	9	0.530	0.072	0.036	6.84
PCB170	µg/kg	0.143	0.026	18.1	9	0.149	0.015	0.011	7.56
PCB183	µg/kg	0.065	0.024	36.8	5	0.061	0.015	0.013	20.6
PCB187	µg/kg	0.192	0.044	23.2	7	0.189	0.026	0.021	10.9
PCB141	µg/kg	0.072	0.028	38.2	5	0.074	0.017	0.015	21.4
PCB151	µg/kg	0.108	0.028	25.9	6	0.106	0.020	0.014	13.2
PCB194	µg/kg	0.048	0.012	24.5	7	0.052	0.006	0.006	11.6

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.198	0.016	8.0	4	0.198	0.008	0.010	5.01



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Benzo[e]pyrene	µg/kg	67.3	10.9	16.1	12	66.8	5.90	3.92	5.82
Pyrene	µg/kg	90.1	16.5	18.3	20	90.3	9.71	4.60	5.11
Benzo[a]anthracene	µg/kg	48.6	9.99	20.6	20	49.6	6.04	2.79	5.75
Benzo[a]pyrene	µg/kg	45.5	8.36	18.4	20	45.1	4.02	2.34	5.14
Fluorene	µg/kg	16.1	3.60	22.3	20	15.7	2.37	1.01	6.24
Chrysene	µg/kg	50.9	10.2	20.1	18	50.9	8.05	3.01	5.92

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.58	0.106	6.7	11	1.60	0.040	0.040	2.53



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	72.2	18.9	26.2	6	70.6	13.6	9.64	13.4
Indeno[1,2,3-cd]pyrene	µg/kg	70.0	19.6	28.1	20	70.6	15.9	5.49	7.84
Phenanthrene	µg/kg	59.8	14.0	23.4	20	61.5	9.48	3.91	6.54
Benzo[g,h,i]perylene	µg/kg	63.7	17.4	27.3	20	62.6	10.8	4.87	7.64
Fluoranthene	µg/kg	124	28.1	22.7	20	118	18.7	7.85	6.34
Benzo[b]fluoranthene	µg/kg	97.9	30.4	31.0	17	105	18.2	9.22	9.41
Naphthalene	µg/kg	44.6	13.2	29.7	20	45.9	7.40	3.70	8.30
Dibenz[a,h]anthracene	µg/kg	13.7	4.69	34.2	20	14.0	3.33	1.31	9.56
Benzo[k]fluoranthene	µg/kg	44.5	11.8	26.5	19	45.5	6.71	3.38	7.60
Anthracene	µg/kg	17.4	4.15	23.9	20	16.6	2.64	1.16	6.69
Acenaphthene	µg/kg	6.35	1.79	28.2	18	6.64	1.17	0.527	8.30
Acenaphthylene	µg/kg	4.99	2.16	43.2	16	5.09	1.54	0.674	13.5
Dibenzothiophene	µg/kg	7.92	1.33	16.8	10	7.69	0.665	0.527	6.65
2-methylphenanthrene	µg/kg	14.6	6.62	45.4	6	15.0	2.52	3.38	23.1
Perylene	µg/kg	66.1	19.1	28.8	12	66.4	11.0	6.88	10.4
Triphenylene	µg/kg	22.7	4.27	18.8	7	23.0	2.02	2.02	8.89
Benzofluoranthenes (b+j)	µg/kg	137	29.2	21.4	5	142	16.3	16.3	12.0
C1-phenanthr.+anthrac.	µg/kg	57.1	9.95	17.4	8	59.5	6.93	4.40	7.70
C2-phenanthr.+anthrac.	µg/kg	52.5	15.7	29.9	8	53.0	10.8	6.92	13.2
C3-phenanthr.+anthrac.	µg/kg	39.6	15.0	37.8	5	36.5	10.0	8.38	21.1
C1-pyrenes+fluoranthenes	µg/kg	63.0	24.5	38.9	4	65.6	11.5	15.3	24.3
C1-naphtalenes	µg/kg	53.2	11.6	21.8	7	56.3	9.60	5.48	10.3
C2-naphtalenes	µg/kg	58.2	13.4	23.1	8	60.8	6.65	5.93	10.2
C3-naphtalenes	µg/kg	44.3	22.7	51.2	8	46.7	13.6	10.0	22.6
C1-dibenzothiophenes	µg/kg	9.16	2.40	26.2	6	9.23	1.44	1.22	13.4
C2-dibenzothiophenes	µg/kg	13.8	3.52	25.6	6	13.8	3.29	1.80	13.0
C3-dibenzothiophenes	µg/kg	9.66	3.28	34.0	6	9.80	2.29	1.68	17.3
1-methylphenanthrene	µg/kg	14.6	2.46	16.8	4	14.7	1.12	1.54	10.5
1-methylnaphtalene	µg/kg	16.9	7.47	44.1	9	17.3	4.80	3.11	18.4
2-methylnaphtalene	µg/kg	30.0	11.4	37.9	9	29.4	7.46	4.74	15.8

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.202	0.005	2.6	5	0.201	0.002	0.003	1.45



Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE047	µg/kg	0.020	0.018	91.8	8	0.020	0.010	0.008	40.6
BDE209	µg/kg	1.73	1.01	58.5	7	1.93	0.656	0.479	27.6