



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 32



Certificate of Analysis Sediment 32

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 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 10 results while the relative uncertainty is smaller than 6.25%. Indicative Values are based on a relative uncertainty of maximum 35% with at least 4 and less than 10 results or a relative uncertainty higher than 6.25%.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation) and the uncertainty in the assigned value. The confidence limits (at 95 % probability) are calculated for these determinands.

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 oC and milled to pass a 0.5 mm sieve.

This Sediment sample 32 of Open sea sediment from Burbo bight, United Kingdom 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
2020.2	MS3	QPH107MS
2018.2	MS3	QPH099MS
2017.2	MS2	QOR132MS
2016.2	MS2	QOR129MS
2016.1	MS3	QPH090MS
2015.2	MS3	QPH087MS
2015.2	MS6	QSP055MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB31	µg/kg	0.238	0.0647	27.2	38	0.249	0.0483	0.0131	0.217	-	0.260
PCB52	µg/kg	0.387	0.1205	31.2	42	0.381	0.0810	0.0232	0.349	-	0.424
PCB118	µg/kg	0.363	0.1150	31.7	42	0.369	0.0760	0.0222	0.327	-	0.399
PCB153	µg/kg	0.540	0.1518	28.1	43	0.540	0.1060	0.0289	0.493	-	0.587
pp'-DDD	µg/kg	0.504	0.1254	24.9	30	0.530	0.0885	0.0286	0.458	-	0.551
pp'-DDE	µg/kg	0.185	0.0320	17.3	31	0.187	0.0230	0.0072	0.174	-	0.197

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	0.364	0.0793	21.8	23	0.375	0.0555	0.0207	0.329	-	0.398



Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PCB101	µg/kg	0.471	0.1543	32.8	42	0.490	0.1050	0.0298	0.423	- 0.519
PCB105	µg/kg	0.113	0.0454	40.1	24	0.117	0.0295	0.0116	0.0941	- 0.132
PCB138+PCB163	µg/kg	0.639	0.0982	15.4	9	0.655	0.0680	0.0409	0.565	- 0.713
PCB138	µg/kg	0.515	0.1766	34.3	40	0.532	0.1270	0.0349	0.459	- 0.571
PCB156	µg/kg	0.0577	0.0368	63.7	18	0.0700	0.0283	0.0108	0.0395	- 0.0759
PCB180	µg/kg	0.288	0.1051	36.5	42	0.284	0.0705	0.0203	0.255	- 0.321
g-HCH	µg/kg	0.0164	0.0097	59.2	10	0.0210	0.0068	0.0038	0.0096	- 0.0233
HCB	µg/kg	0.120	0.0394	32.7	28	0.128	0.0270	0.0093	0.105	- 0.135
HCBD	µg/kg	0.0587	0.0196	33.4	7	0.0570	0.0130	0.0093	0.0412	- 0.0762
pp'-DDT	µg/kg	0.0865	0.0348	40.2	19	0.0900	0.0240	0.0100	0.0698	- 0.103



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Acenaphthene	µg/kg	4.05	1.373	34.0	74	4.18	0.956	0.200	3.73	- 4.36
Anthracene	µg/kg	8.43	2.250	26.7	96	8.30	1.550	0.287	7.98	- 8.89
Benzo[a]anthracene	µg/kg	26.3	5.63	21.4	97	26.5	3.87	0.71	25.2	- 27.5
Benzo[a]pyrene	µg/kg	36.2	5.85	16.1	102	36.4	3.98	0.72	35.1	- 37.4
Benzo[b]fluoranthene	µg/kg	47.2	13.50	28.6	87	46.0	9.28	1.81	44.3	- 50.0
Benzo[e]pyrene	µg/kg	39.9	6.72	16.9	65	41.2	4.60	1.04	38.2	- 41.5
Benzo[g,h,i]perylene	µg/kg	39.8	6.67	16.7	102	40.2	4.67	0.83	38.5	- 41.1
Benzo[k]fluoranthene	µg/kg	21.8	4.64	21.3	92	22.2	3.24	0.60	20.8	- 22.7
Chrysene + Triphenylene	µg/kg	36.7	5.54	15.1	38	37.4	3.64	1.12	34.9	- 38.6
Chrysene	µg/kg	28.1	5.92	21.0	75	28.2	4.15	0.85	26.8	- 29.5
Dibenz[a,h]anthracene	µg/kg	7.94	2.002	25.2	94	7.99	1.360	0.258	7.53	- 8.35
Dibenzothiophene	µg/kg	4.16	1.070	25.7	40	4.17	0.725	0.211	3.82	- 4.50
Fluoranthene	µg/kg	52.2	7.16	13.7	105	52.1	4.90	0.87	50.8	- 53.5
Fluorene	µg/kg	6.96	2.286	32.8	82	7.13	1.600	0.316	6.46	- 7.47
Indeno[1,2,3-cd]pyrene	µg/kg	38.3	9.06	23.7	102	39.0	6.20	1.12	36.5	- 40.1
Naphthalene	µg/kg	16.0	5.51	34.4	84	16.3	3.80	0.75	14.8	- 17.2
Perylene	µg/kg	11.4	2.23	19.6	57	11.5	1.53	0.37	10.8	- 12.0
Phenanthrene	µg/kg	43.9	8.60	19.6	100	44.6	5.84	1.08	42.1	- 45.6
Pyrene	µg/kg	49.3	7.85	15.9	100	49.3	5.32	0.98	47.7	- 50.8

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
TOC	%	0.385	0.0729	19.0	47	0.380	0.0505	0.0133	0.363	- 0.406



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthylene	µg/kg	3.19	1.502	47.0	68	3.40	1.010	0.228	2.83	-	3.56
Benzo[a]fluorene	µg/kg	7.82	3.213	41.1	10	8.94	2.350	1.270	5.56	-	10.1
Dibenzo[a,i]pyrene	µg/kg	2.86	0.900	31.5	4	2.82	0.557	0.562	1.61	-	4.11
Triphenylene	µg/kg	9.53	2.238	23.5	19	9.70	1.580	0.642	8.46	-	10.6
Benzo[fluoranthenes (a+b+j+k)	µg/kg	83.0	6.87	8.3	7	86.3	4.57	3.24	76.9	-	89.1
Benzo[fluoranthenes (b+j)	µg/kg	68.6	14.88	21.7	10	71.0	10.63	5.88	58.1	-	79.1
1-methylpyrene	µg/kg	10.2	3.93	38.4	7	11.0	2.78	1.86	6.72	-	13.8
2-methylphenanthrene	µg/kg	16.2	5.31	32.8	30	16.4	3.75	1.21	14.2	-	18.2
3-6-dimethylphenanthrene	µg/kg	2.81	1.160	41.2	22	3.04	0.820	0.309	2.30	-	3.33
1-methylnaphtalene	µg/kg	13.1	2.64	20.2	8	13.0	2.06	1.17	10.9	-	15.2
2-methylnaphtalene	µg/kg	18.2	5.25	28.8	7	17.6	3.91	2.48	13.5	-	22.9
C1-phenanthr.+anthrac.	µg/kg	54.8	16.07	29.3	29	56.0	10.70	3.73	48.7	-	61.0
C2-phenanthr.+anthrac.	µg/kg	46.1	16.88	36.6	28	44.7	10.98	3.99	39.6	-	52.7
C3-phenanthr.+anthrac.	µg/kg	27.5	9.44	34.3	20	25.9	6.58	2.64	23.1	-	31.9
C1-pyrenes+fluoranthenes	µg/kg	53.1	25.02	47.1	19	52.9	17.55	7.17	41.1	-	65.1
C2-pyrenes+fluoranthenes	µg/kg	41.4	10.11	24.4	12	40.4	6.74	3.65	35.1	-	47.8
C1-chrysenes	µg/kg	41.4	11.98	28.9	19	43.5	8.60	3.44	35.6	-	47.2
C2-chrysenes	µg/kg	35.9	19.34	53.9	15	38.0	13.20	6.24	25.2	-	46.5
C1-benzofluoranthenes	µg/kg	48.8	12.89	26.4	6	48.4	7.93	6.58	36.0	-	61.7
C1-naphtalenes	µg/kg	42.7	19.02	44.5	10	42.9	13.38	7.52	29.3	-	56.1
C2-naphtalenes	µg/kg	45.3	22.61	49.9	13	43.8	15.42	7.84	31.8	-	58.9
C3-naphtalenes	µg/kg	44.1	29.22	66.2	13	45.9	21.20	10.13	26.6	-	61.6
C1-phenanthrenes	µg/kg	53.4	22.61	42.3	5	58.3	17.07	12.64	27.4	-	79.4
C1-dibenzothiophenes	µg/kg	5.77	0.823	14.3	4	6.07	0.628	0.514	4.63	-	6.91
C2-dibenzothiophenes	µg/kg	8.29	1.565	18.9	4	8.89	1.205	0.978	6.12	-	10.5

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Total petroleum hydrocarbons	mg/kg	55.9	15.54	27.8	4	61.3	11.65	9.71	34.3	-	77.5

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	0.0537	0.0096	18.0	7	0.0530	0.0070	0.0046	0.0451	-	0.0623



Indicative Values MS6

Method: Organometals - MS6

Element

Dibutyltin (DBT)

Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
µg Sn/kg	0.325	0.1036	31.9	6	0.355	0.0805	0.0529	0.221 - 0.428