



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



**Sediment**

**REFERENCE MATERIAL**

**Sediment sample 44**

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## Certificate of Analysis Sediment 44

### 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 44 of Mix of two types of open sea sediment from Burbo Bight Liverpool/Norwegian trench 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
2021.1	MS2	QOR146MS
2021.1	MS3	QPH109MS



### Consensus Values MS2

#### Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB52	µg/kg	0.624	0.1153	18.5	17	0.610	0.0800	0.0350	0.565	-	0.683
PCB101	µg/kg	0.594	0.1169	19.7	19	0.619	0.0838	0.0335	0.538	-	0.650
pp'-DDE	µg/kg	0.206	0.0191	9.3	12	0.208	0.0135	0.0069	0.194	-	0.218

#### Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.15	0.067	5.8	10	1.15	0.048	0.026	1.10	-	1.20



## Indicative Values MS2

### Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PCB18	µg/kg	0.0581	0.0250	42.9	4	0.0668	0.0187	0.0156	0.0235	- 0.0927
PCB28	µg/kg	0.212	0.0600	28.2	16	0.220	0.0425	0.0187	0.181	- 0.244
PCB31	µg/kg	0.162	0.0602	37.3	10	0.152	0.0410	0.0238	0.119	- 0.204
PCB44	µg/kg	0.325	0.0933	28.7	6	0.315	0.0600	0.0476	0.232	- 0.419
PCB49	µg/kg	0.274	0.0325	11.9	5	0.278	0.0232	0.0182	0.236	- 0.311
PCB66	µg/kg	0.343	0.0881	25.7	4	0.338	0.0568	0.0551	0.220	- 0.465
PCB105	µg/kg	0.130	0.0681	52.4	11	0.140	0.0490	0.0257	0.0849	- 0.175
PCB110	µg/kg	0.506	0.1778	35.1	5	0.540	0.1233	0.0994	0.302	- 0.710
PCB118	µg/kg	0.318	0.1088	34.3	16	0.367	0.0805	0.0340	0.260	- 0.375
PCB138+PCB163	µg/kg	1.01	0.465	46.1	7	1.01	0.335	0.219	0.592	- 1.42
PCB138	µg/kg	0.547	0.1412	25.8	15	0.549	0.0996	0.0456	0.470	- 0.625
PCB149	µg/kg	0.760	0.3615	47.5	7	0.709	0.2434	0.1708	0.437	- 1.08
PCB151	µg/kg	0.336	0.0901	26.8	5	0.340	0.0520	0.0504	0.232	- 0.440
PCB153	µg/kg	0.674	0.2724	40.4	18	0.675	0.1795	0.0803	0.539	- 0.809
PCB156	µg/kg	0.0825	0.0567	68.7	8	0.0860	0.0420	0.0251	0.0363	- 0.129
PCB158	µg/kg	0.123	0.0084	6.8	4	0.127	0.0064	0.0053	0.111	- 0.135
PCB170	µg/kg	0.323	0.1898	58.8	7	0.321	0.1360	0.0897	0.153	- 0.493
PCB180	µg/kg	0.410	0.2102	51.3	17	0.424	0.1440	0.0637	0.303	- 0.518
PCB183	µg/kg	0.142	0.0520	36.8	4	0.141	0.0345	0.0325	0.0693	- 0.214
PCB187	µg/kg	0.222	0.1174	52.9	5	0.190	0.0740	0.0656	0.0869	- 0.357
PCB194	µg/kg	0.124	0.0049	3.9	5	0.123	0.0040	0.0027	0.118	- 0.130
HCB	µg/kg	0.129	0.0471	36.5	11	0.120	0.0310	0.0177	0.0977	- 0.160
Dieldrin	µg/kg	0.0973	0.0481	49.4	7	0.0900	0.0327	0.0227	0.0543	- 0.140
pp'-DDD	µg/kg	0.319	0.0608	19.1	13	0.331	0.0400	0.0211	0.282	- 0.355

### Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PN	%	0.144	0.0130	9.0	4	0.144	0.0090	0.0081	0.126	- 0.162



## Consensus Values MS3

### Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Benzo[a]anthracene	µg/kg	22.3	5.18	23.3	24	23.3	3.33	1.32	20.1	-	24.4
Benzo[a]pyrene	µg/kg	29.2	5.35	18.3	25	29.5	3.50	1.34	27.0	-	31.4
Benzo[g,h,i]perylene	µg/kg	61.8	14.60	23.6	25	59.2	9.67	3.65	55.8	-	67.8
Benzo[k]fluoranthene	µg/kg	27.7	6.00	21.7	20	27.1	4.05	1.68	24.9	-	30.5
Fluoranthene	µg/kg	47.7	9.25	19.4	25	49.2	5.99	2.31	43.9	-	51.5
Pyrene	µg/kg	42.2	9.34	22.1	24	42.2	6.48	2.38	38.2	-	46.1

### Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.16	0.049	4.3	12	1.15	0.035	0.018	1.12	-	1.19



## Indicative Values MS3

### Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthene	µg/kg	2.86	0.903	31.6	17	2.79	0.650	0.274	2.40	-	3.32
Acenaphthylene	µg/kg	2.54	1.065	41.9	17	2.83	0.750	0.323	2.00	-	3.09
Anthracene	µg/kg	6.45	2.878	44.6	23	6.46	1.951	0.750	5.21	-	7.69
Benzo[b]fluoranthene	µg/kg	74.9	21.23	28.3	19	71.9	14.52	6.09	64.7	-	85.1
Benzo[e]pyrene	µg/kg	47.1	11.89	25.2	16	47.8	8.41	3.72	40.8	-	53.4
Chrysene + Triphenylene	µg/kg	33.7	5.94	17.6	10	33.7	3.97	2.35	29.5	-	37.9
Chrysene	µg/kg	24.1	7.65	31.7	18	23.9	5.35	2.25	20.4	-	27.9
Dibenz[a,h]anthracene	µg/kg	12.9	5.60	43.4	24	13.7	4.05	1.43	10.5	-	15.3
Dibenzothiophene	µg/kg	5.30	3.380	63.8	9	6.29	2.680	1.408	2.75	-	7.85
Fluorene	µg/kg	6.36	2.197	34.5	19	6.90	1.480	0.630	5.31	-	7.42
Indeno[1,2,3-cd]pyrene	µg/kg	73.2	19.43	26.6	25	71.7	13.35	4.86	65.2	-	81.2
Naphthalene	µg/kg	17.0	6.02	35.4	19	17.4	4.07	1.73	14.1	-	19.9
Perylene	µg/kg	13.1	4.68	35.6	12	12.6	3.25	1.69	10.2	-	16.1
Phenanthrene	µg/kg	47.3	19.76	41.8	24	48.7	14.05	5.04	39.0	-	55.6
Triphenylene	µg/kg	9.49	2.647	27.9	6	9.41	1.765	1.351	6.84	-	12.1
Benzo[fluoranthenes (a+b+j+k)	µg/kg	119	26.5	22.3	4	120	18.0	16.6	82.1	-	156
Benzo[fluoranthenes (b+j)	µg/kg	102	18.1	17.8	5	99.6	12.8	10.1	80.9	-	123
1-methylphenanthrene	µg/kg	21.2	5.08	23.9	4	21.1	3.59	3.17	14.2	-	28.3
2-methylphenanthrene	µg/kg	29.4	3.62	12.3	6	28.8	2.29	1.85	25.8	-	33.0
3-6-dimethylphenanthrene	µg/kg	3.87	1.123	29.0	4	3.87	0.755	0.702	2.31	-	5.43
1-methylnaphtalene	µg/kg	22.3	6.59	29.5	7	23.1	4.50	3.11	16.4	-	28.2
2-methylnaphtalene	µg/kg	32.2	8.51	26.4	6	33.5	5.61	4.34	23.7	-	40.7
C1-phenanthr.+anthrac.	µg/kg	74.2	24.53	33.0	6	79.1	16.34	12.52	49.7	-	98.7
C2-phenanthr.+anthrac.	µg/kg	54.9	23.63	43.0	7	55.5	17.50	11.17	33.8	-	76.0
C3-phenanthr.+anthrac.	µg/kg	25.9	2.67	10.3	5	26.0	2.00	1.49	22.8	-	28.9
C1-pyrenes+fluoranthenes	µg/kg	51.6	29.43	57.0	5	54.5	20.62	16.45	17.8	-	85.4
C1-chrysenes	µg/kg	35.6	15.12	42.5	5	31.1	11.15	8.45	18.2	-	53.0
C1-naphtalenes	µg/kg	61.0	24.18	39.6	4	61.2	17.22	15.11	27.4	-	94.6
C2-naphtalenes	µg/kg	61.0	32.31	53.0	6	60.8	22.15	16.49	28.7	-	93.3
C3-naphtalenes	µg/kg	35.9	22.62	62.9	6	39.7	16.62	11.54	13.3	-	58.5
C1-dibenzothiophenes	µg/kg	14.7	5.11	34.8	4	16.7	3.87	3.19	7.57	-	21.8
C2-dibenzothiophenes	µg/kg	21.4	6.74	31.5	4	21.8	4.30	4.21	12.0	-	30.7

### Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	0.150	0.0150	10.0	6	0.153	0.0105	0.0076	0.135	-	0.165



**Indicative Values MS3**