



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



**Sediment**

**REFERENCE MATERIAL**

**Sediment sample 40**

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## Certificate of Analysis Sediment 40

### 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 40 of Open Sea sediment from Mix from Norwegian Trench, Isle of Man 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
2020.1	MS2	QOR142MS
2020.1	MS3	QPH105MS
2017.2	MS6	QSP063MS



### Consensus Values MS2

#### Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB101	µg/kg	1.55	0.258	16.6	17	1.53	0.186	0.078	1.42	-	1.68
PCB118	µg/kg	1.10	0.210	19.1	16	1.07	0.143	0.065	0.985	-	1.21
PCB153	µg/kg	1.39	0.283	20.3	17	1.40	0.180	0.086	1.25	-	1.54
pp'-DDD	µg/kg	0.477	0.0711	14.9	11	0.472	0.0500	0.0268	0.430	-	0.525

#### Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.36	0.102	7.5	11	1.37	0.070	0.038	1.29	-	1.43



## Indicative Values MS2

### Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PCB18	µg/kg	0.0513	0.0056	10.8	4	0.0535	0.0042	0.0035	0.0436	- 0.0590
PCB28	µg/kg	0.219	0.0550	25.0	14	0.217	0.0380	0.0184	0.188	- 0.251
PCB31	µg/kg	0.209	0.0254	12.2	9	0.202	0.0170	0.0106	0.190	- 0.228
PCB44	µg/kg	0.530	0.0916	17.3	5	0.529	0.0600	0.0512	0.425	- 0.635
PCB49	µg/kg	0.311	0.0502	16.2	6	0.324	0.0358	0.0256	0.260	- 0.361
PCB52	µg/kg	0.982	0.2299	23.4	17	0.978	0.1620	0.0697	0.864	- 1.10
PCB66	µg/kg	0.492	0.0655	13.3	4	0.473	0.0465	0.0409	0.401	- 0.582
PCB105	µg/kg	0.354	0.0805	22.7	8	0.352	0.0580	0.0356	0.288	- 0.420
PCB110	µg/kg	1.30	0.113	8.7	4	1.26	0.085	0.071	1.15	- 1.46
PCB128	µg/kg	0.132	0.0393	29.8	4	0.135	0.0253	0.0245	0.0771	- 0.186
PCB138+PCB163	µg/kg	1.71	0.380	22.2	8	1.73	0.267	0.168	1.40	- 2.02
PCB138	µg/kg	1.23	0.320	26.1	14	1.20	0.213	0.107	1.04	- 1.41
PCB141	µg/kg	0.252	0.0555	22.0	4	0.251	0.0360	0.0347	0.175	- 0.329
PCB149	µg/kg	1.27	0.109	8.6	5	1.24	0.080	0.061	1.15	- 1.40
PCB151	µg/kg	0.321	0.0582	18.2	4	0.324	0.0384	0.0364	0.240	- 0.402
PCB156	µg/kg	0.0974	0.0477	48.9	8	0.1105	0.0365	0.0211	0.0585	- 0.136
PCB158	µg/kg	0.104	0.0356	34.2	4	0.110	0.0236	0.0222	0.0546	- 0.153
PCB170	µg/kg	0.400	0.0713	17.8	6	0.397	0.0465	0.0364	0.329	- 0.472
PCB180	µg/kg	0.760	0.3730	49.1	17	0.746	0.2530	0.1131	0.569	- 0.951
PCB183	µg/kg	0.146	0.0296	20.4	4	0.147	0.0202	0.0185	0.104	- 0.187
PCB187	µg/kg	0.386	0.0967	25.0	5	0.395	0.0730	0.0541	0.275	- 0.498
PCB194	µg/kg	0.0993	0.0459	46.2	5	0.1070	0.0339	0.0256	0.0466	- 0.152
b-HCH	µg/kg	0.0108	0.0056	51.8	5	0.0150	0.0047	0.0031	0.0044	- 0.0172
g-HCH	µg/kg	0.0406	0.0270	66.4	6	0.0581	0.0175	0.0138	0.0137	- 0.0676
HCB	µg/kg	0.152	0.0397	26.0	11	0.160	0.0270	0.0150	0.126	- 0.179
Dieldrin	µg/kg	0.133	0.0813	61.3	6	0.127	0.0575	0.0415	0.0515	- 0.214
pp'-DDE	µg/kg	0.310	0.0615	19.9	11	0.308	0.0450	0.0232	0.269	- 0.351
op'-DDT	µg/kg	0.0425	0.0260	61.3	5	0.0474	0.0194	0.0146	0.0125	- 0.0724
pp'-DDT	µg/kg	0.167	0.0879	52.7	11	0.166	0.0570	0.0331	0.109	- 0.225



## 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	39.7	6.22	15.6	17	38.3	3.95	1.88	36.6	-	42.9
Benzo[a]pyrene	µg/kg	45.3	5.96	13.1	18	45.8	3.90	1.76	42.4	-	48.3
Benzo[b]fluoranthene	µg/kg	125	22.7	18.2	14	127	15.4	7.6	112	-	138
Benzo[e]pyrene	µg/kg	78.9	7.85	9.9	11	78.4	5.21	2.96	73.7	-	84.1
Benzo[k]fluoranthene	µg/kg	46.4	7.48	16.1	15	47.0	5.34	2.41	42.2	-	50.5
Fluoranthene	µg/kg	72.6	9.70	13.4	18	73.2	6.28	2.86	67.8	-	77.5
Fluorene	µg/kg	13.2	2.45	18.5	16	13.3	1.58	0.77	11.9	-	14.5
Indeno[1,2,3-cd]pyrene	µg/kg	105	19.2	18.2	18	105	13.0	5.6	96.0	-	115
Phenanthrene	µg/kg	79.6	10.36	13.0	17	77.7	6.31	3.14	74.3	-	84.9
Pyrene	µg/kg	68.3	9.77	14.3	17	71.0	6.60	2.96	63.3	-	73.3

### Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	1.34	0.132	9.8	11	1.36	0.087	0.050	1.26	-	1.43



## Indicative Values MS3

### Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Acenaphthene	µg/kg	8.61	2.171	25.2	15	8.43	1.420	0.701	7.41	- 9.80
Acenaphthylene	µg/kg	3.74	1.474	39.5	14	3.88	1.060	0.492	2.89	- 4.58
Anthracene	µg/kg	8.72	2.585	29.6	17	8.80	1.800	0.784	7.40	- 10.0
Benzo[g,h,i]perylene	µg/kg	92.8	22.72	24.5	18	95.9	16.80	6.69	81.6	- 104
Chrysene + Triphenylene	µg/kg	57.4	16.27	28.4	7	59.4	12.20	7.69	42.8	- 71.9
Chrysene	µg/kg	43.9	12.57	28.6	13	43.8	8.80	4.36	36.4	- 51.5
Dibenz[a,h]anthracene	µg/kg	17.7	4.77	26.9	17	18.4	3.20	1.45	15.3	- 20.2
Dibenzothiophene	µg/kg	10.5	2.75	26.3	8	10.3	1.96	1.22	8.22	- 12.7
Naphthalene	µg/kg	28.0	8.07	28.8	15	28.0	5.64	2.60	23.6	- 32.5
Perylene	µg/kg	20.4	6.23	30.5	9	21.0	4.56	2.59	15.7	- 25.1
Triphenylene	µg/kg	17.1	5.29	30.9	5	17.8	3.70	2.96	11.0	- 23.2
2-methylphenanthrene	µg/kg	37.9	5.03	13.3	4	37.2	3.28	3.14	30.9	- 44.8
3-6-dimethylphenanthrene	µg/kg	6.08	2.006	33.0	4	6.10	1.435	1.254	3.30	- 8.87
1-methylnaphtalene	µg/kg	34.1	2.00	5.9	5	34.7	1.52	1.12	31.8	- 36.4
2-methylnaphtalene	µg/kg	47.2	3.38	7.1	5	47.6	2.50	1.89	43.4	- 51.1
C1-phenanthr. +anthrac.	µg/kg	120	40.2	33.5	5	123	29.0	22.5	73.9	- 166
C2-phenanthr. +anthrac.	µg/kg	86.1	37.47	43.5	5	80.6	22.30	20.95	43.0	- 129
C3-phenanthr. +anthrac.	µg/kg	47.7	7.84	16.5	4	44.8	5.95	4.90	36.8	- 58.6
C1-pyrenes+fluoranthenes	µg/kg	102	39.7	38.8	4	102	26.8	24.8	47.3	- 158
C1-chrysenes	µg/kg	79.4	27.69	34.9	4	77.3	18.35	17.31	41.0	- 118
C2-naphtalenes	µg/kg	190	65.6	34.5	5	209	41.5	36.7	115	- 266
C1-dibenzothiophenes	µg/kg	14.1	0.36	2.5	4	14.3	0.28	0.22	13.62	- 14.61
C2-dibenzothiophenes	µg/kg	12.8	1.20	9.3	4	13.3	0.90	0.75	11.2	- 14.5

### Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
PN	%	0.171	0.0138	8.1	4	0.173	0.0090	0.0086	0.152	- 0.190



## Indicative Values MS6

### Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Dibutyltin (DBT)	µg Sn/kg	0.155	0.0845	54.6	7	0.190	0.0700	0.0399	0.0793 - 0.230
Monobutyltin (MBT)	µg Sn/kg	0.474	0.3097	65.3	9	0.591	0.2306	0.1290	0.241 - 0.708