



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



**Sediment**

**REFERENCE MATERIAL**

**Sediment sample 46**

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## Certificate of Analysis Sediment 46

### 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 46 of harbor sediment from Klaipeda and Zeebrugge harbor 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	MS6	QSP074MS
2019.2	MS7	QBC061MS
2019.1	MS3	QPH102MS
2019.1	MS6	QSP069MS
2018.2	MS8	QPF006MS



## 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	40.3	8.47	21.0	21	40.6	5.60	2.31	36.5	-	44.2
Benzo[a]pyrene	µg/kg	34.4	7.88	22.9	23	34.0	5.35	2.05	31.0	-	37.8
Benzo[g,h,i]perylene	µg/kg	33.3	7.20	21.6	23	32.3	4.75	1.88	30.2	-	36.4
Chrysene	µg/kg	45.5	7.83	17.2	17	44.6	5.37	2.37	41.5	-	49.5
Dibenz[a,h]anthracene	µg/kg	7.70	1.697	22.0	20	7.60	1.155	0.474	6.91	-	8.49
Fluoranthene	µg/kg	107	17.2	16.0	22	104	11.3	4.6	99.5	-	115
Indeno[1,2,3-cd]pyrene	µg/kg	38.7	7.51	19.4	23	38.9	5.05	1.96	35.5	-	41.9
Phenanthrene	µg/kg	71.5	11.55	16.2	22	72.2	7.70	3.08	66.4	-	76.6
Pyrene	µg/kg	75.1	10.77	14.3	22	72.9	6.94	2.87	70.3	-	79.8



## Indicative Values MS3

### Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Acenaphthene	µg/kg	4.31	0.996	23.1	16	4.44	0.693	0.311	3.79	-	4.84
Acenaphthylene	µg/kg	2.60	1.400	53.9	15	2.68	0.958	0.452	1.83	-	3.37
Anthracene	µg/kg	8.84	2.121	24.0	22	8.71	1.435	0.565	7.90	-	9.78
Benzo[b]fluoranthene	µg/kg	54.1	17.13	31.7	19	56.8	11.90	4.91	45.9	-	62.3
Benzo[e]pyrene	µg/kg	39.2	8.34	21.3	16	38.0	5.68	2.60	34.7	-	43.6
Benzo[k]fluoranthene	µg/kg	25.4	6.54	25.7	20	25.1	4.56	1.83	22.4	-	28.5
Chrysene + Triphenylene	µg/kg	54.7	1.20	2.2	9	54.9	1.00	0.50	53.8	-	55.6
Dibenzothiophene	µg/kg	7.64	2.983	39.0	9	8.71	1.888	1.243	5.39	-	9.89
Fluorene	µg/kg	7.14	2.214	31.0	18	6.99	1.485	0.652	6.04	-	8.24
Naphthalene	µg/kg	12.5	3.78	30.1	18	12.8	2.37	1.11	10.7	-	14.4
Perylene	µg/kg	21.4	4.71	22.1	14	21.0	3.32	1.57	18.7	-	24.1
Triphenylene	µg/kg	12.1	1.78	14.7	5	11.6	1.20	1.00	10.1	-	14.2
2-methylphenanthrene	µg/kg	20.2	4.43	21.9	6	19.9	2.89	2.26	15.8	-	24.6
3-6-dimethylphenanthrene	µg/kg	2.59	0.916	35.4	6	2.96	0.749	0.467	1.67	-	3.50
C1-phenanthr.+anthrac.	µg/kg	60.8	24.21	39.8	8	65.8	17.08	10.70	41.0	-	80.5
C2-phenanthr.+anthrac.	µg/kg	58.9	4.58	7.8	7	56.7	3.80	2.16	54.9	-	63.0
C3-phenanthr.+anthrac.	µg/kg	23.8	8.81	37.0	5	25.4	5.86	4.93	13.7	-	33.9
C1-pyrenes+fluoranthenes	µg/kg	48.5	17.55	36.2	5	47.1	11.02	9.81	28.3	-	68.6
C1-chrysenes	µg/kg	30.3	6.19	20.4	5	30.0	4.48	3.46	23.2	-	37.4
C1-naphthalenes	µg/kg	13.9	5.14	36.9	6	15.4	3.47	2.62	8.81	-	19.1
C2-naphthalenes	µg/kg	16.7	10.00	59.7	6	15.3	6.28	5.10	6.76	-	26.7

### Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
TOC	%	0.839	0.2005	23.9	12	0.823	0.1405	0.0724	0.713	-	0.965

### Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	0.0978	0.0071	7.3	4	0.0980	0.0045	0.0045	0.0878	-	0.108



## Indicative Values MS6

### Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Tributyltin (TBT)	µg Sn/kg	2.65	0.937	35.4	33	2.90	0.660	0.204	2.32	-	2.98
Dibutyltin (DBT)	µg Sn/kg	2.59	0.902	34.8	29	2.80	0.647	0.209	2.25	-	2.93
Monobutyltin (MBT)	µg Sn/kg	6.52	2.556	39.2	25	6.85	1.852	0.639	5.47	-	7.57
Triphenyltin (TPhT)	µg Sn/kg	0.488	0.3472	71.1	11	0.594	0.2605	0.1309	0.258	-	0.719
Diphenyltin (DPhT)	µg Sn/kg	1.01	0.654	64.4	9	0.826	0.422	0.272	0.521	-	1.51



### Indicative Values MS7

#### Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
BDE047	µg/kg	0.0206	0.0078	37.8	5	0.0210	0.0061	0.0043	0.0116 - 0.0295
BDE099	µg/kg	0.0141	0.0064	45.2	4	0.0147	0.0041	0.0040	0.0053 - 0.0229
BDE183	µg/kg	0.0270	0.0018	6.6	4	0.0277	0.0014	0.0011	0.0245 - 0.0294
BDE209	µg/kg	18.4	2.34	12.7	6	18.4	1.50	1.20	16.0 - 20.7



### Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
n-PFOS	µg/kg	0.499	0.0491	9.8	7	0.504	0.0351	0.0232	0.455 - 0.543
PFOA	µg/kg	0.149	0.0106	7.1	5	0.151	0.0066	0.0059	0.137 - 0.162
PFNA	µg/kg	0.0681	0.0233	34.2	4	0.0706	0.0152	0.0146	0.0358 - 0.101
PFDA	µg/kg	0.134	0.0369	27.5	5	0.145	0.0235	0.0206	0.0916 - 0.176
PFUnDA	µg/kg	0.0646	0.0277	42.9	5	0.0680	0.0160	0.0155	0.0328 - 0.0964