



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



**Sediment**

**REFERENCE MATERIAL**

**Sediment sample 43**

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## Certificate of Analysis Sediment 43

### 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 43 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
2019.1	MS1	QTM127MS



## Consensus Values MS1

### Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Aluminium-RT	%	4.06	0.290	7.1	14	4.08	0.195	0.097	3.90	- 4.23
Arsenic-RT	mg/kg	9.58	1.080	11.3	14	9.63	0.755	0.361	8.97	- 10.2
Chromium-RT	mg/kg	72.2	7.41	10.3	14	73.1	5.43	2.47	68.0	- 76.5
Copper-RT	mg/kg	12.9	1.21	9.4	14	12.7	0.85	0.40	12.2	- 13.6
Iron-RT	%	2.25	0.123	5.5	15	2.27	0.083	0.040	2.19	- 2.32
Lead-RT	mg/kg	32.6	2.07	6.4	14	32.1	1.44	0.69	31.4	- 33.7
Lithium-RT	mg/kg	37.4	2.62	7.0	10	37.4	1.83	1.04	35.6	- 39.3
Manganese-RT	mg/kg	462	20.5	4.4	13	459	13.5	7.1	450	- 474
Mercury-RT	µg/kg	93.2	11.59	12.4	11	95.2	8.53	4.37	85.5	- 101
Nickel-RT	mg/kg	30.3	1.85	6.1	15	30.0	1.30	0.60	29.3	- 31.3
Zinc-RT	mg/kg	83.4	6.70	8.0	14	81.6	4.81	2.24	79.5	- 87.2

### Method: Acid extractable (So-called totals) - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Arsenic-AE	mg/kg	8.70	0.813	9.3	19	8.57	0.570	0.233	8.31	- 9.09
Cadmium-AE	µg/kg	90.5	16.39	18.1	22	93.1	11.50	4.37	83.2	- 97.7
Cobalt-AE	mg/kg	8.00	0.967	12.1	10	7.94	0.701	0.382	7.32	- 8.68
Copper-AE	mg/kg	12.2	1.05	8.6	23	12.1	0.74	0.27	11.7	- 12.6
Iron-AE	%	2.09	0.175	8.4	20	2.10	0.121	0.049	2.01	- 2.17
Lead-AE	mg/kg	30.0	2.85	9.5	24	30.2	1.94	0.73	28.8	- 31.2
Lithium-AE	mg/kg	32.0	2.61	8.1	12	31.9	1.74	0.94	30.4	- 33.7
Manganese-AE	mg/kg	444	31.4	7.1	20	445	23.2	8.8	430	- 459
Mercury-AE	µg/kg	94.2	16.35	17.4	21	95.0	11.00	4.46	86.8	- 102
Nickel-AE	mg/kg	27.1	1.44	5.3	22	27.0	1.02	0.38	26.5	- 27.8
Zinc-AE	mg/kg	81.3	5.40	6.6	23	81.7	3.80	1.41	79.0	- 83.7

### Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
TOC	%	1.10	0.127	11.6	14	1.10	0.087	0.043	1.03	- 1.17



## Indicative Values MS1

### Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Barium-RT	mg/kg	251	4.6	1.8	6	250	3.3	2.3	246.6	-	255.7
Cadmium-RT	µg/kg	90.2	23.01	25.5	9	90.0	16.11	9.59	72.8	-	108
Cobalt-RT	mg/kg	8.74	0.709	8.1	5	8.86	0.540	0.396	7.93	-	9.56
Strontium-RT	mg/kg	185	11.3	6.1	5	187	7.1	6.3	172	-	198
Vanadium-RT	mg/kg	75.4	4.56	6.1	8	76.4	3.25	2.02	71.7	-	79.1

### Method: Acid extractable (So-called totals) - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-AE	%	2.08	1.140	54.7	16	2.18	0.845	0.356	1.48	-	2.69
Barium-AE	mg/kg	74.7	36.06	48.3	8	71.9	25.56	15.94	45.3	-	104
Calcium-AE	g/kg	41.2	1.24	3.0	4	41.2	0.80	0.78	39.5	-	42.9
Chromium-AE	mg/kg	52.5	12.92	24.6	21	51.1	8.80	3.52	46.6	-	58.3
Magnesium-AE	mg/kg	8780	827	9.4	7	8760	600	390	8040	-	9520
Molybdenum-AE	mg/kg	1.28	0.425	33.1	4	1.30	0.275	0.266	0.693	-	1.87
Phosphorus-AE	mg/kg	479	33.9	7.1	7	478	25.4	16.0	449	-	509
Scandium-AE	mg/kg	5.36	1.438	26.9	4	5.44	0.915	0.899	3.36	-	7.35
Selenium-AE	mg/kg	0.573	0.1708	29.8	4	0.563	0.1175	0.1068	0.336	-	0.810
Strontium-AE	mg/kg	166	8.5	5.1	6	166	5.5	4.4	158	-	175
Thallium-AE	µg/kg	262	63.7	24.4	6	257	40.0	32.5	198	-	325
Uranium-AE	mg/kg	1.11	0.105	9.5	5	1.11	0.060	0.059	0.985	-	1.23
Vanadium-AE	mg/kg	54.5	11.29	20.7	14	55.9	7.40	3.77	48.0	-	61.0

### Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Inorganic-Carbonate	%	1.29	0.090	7.0	7	1.28	0.062	0.042	1.21	-	1.37