



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



Metals in seawater

REFERENCE MATERIAL

AQ3 sample 176

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## Certificate of Analysis    AQ3 176

### 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.

### Sample information

QUASIMEME reference materials cover a range of natural SeaWater species from contaminated waters from the North Sea and/or Mediterranean.

This AQ3 sample 176 of Low sal. Seawater with high conc. Metals from North Sea (diluted) 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
2022.2	AQ3	QTM338SW



## Consensus Values AQ3

### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Arsenic	µg/l	53.0	4.34	8.2	17	53.7	3.07	1.32	50.8	-	55.3
Cadmium	µg/l	8.90	0.731	8.2	19	9.00	0.514	0.209	8.55	-	9.25
Chromium	µg/l	244	9.8	4.0	17	243	6.0	3.0	239	-	249
Cobalt	µg/l	32.5	2.83	8.7	12	33.4	1.91	1.02	30.8	-	34.3
Copper	µg/l	73.7	6.96	9.4	20	75.0	4.60	1.95	70.4	-	76.9
Iron	µg/l	301	44.3	14.7	15	314	32.3	14.3	276	-	325
Lead	µg/l	211	24.9	11.8	20	214	18.0	7.0	199	-	222
Manganese	µg/l	93.8	7.07	7.5	14	95.0	4.93	2.36	89.7	-	97.8
Nickel	µg/l	390	43.5	11.2	18	397	31.4	12.8	368	-	411
Vanadium	µg/l	485	18.5	3.8	10	489	13.8	7.3	472	-	498
Zinc	µg/l	587	29.2	5.0	17	586	19.0	8.9	572	-	601



### Indicative Values AQ3

#### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Boron	µg/l	4070	278	6.8	8	4060	182	123	3840	-	4293
Magnesium	mg/l	1080	71	6.6	8	1080	49	31	1023	-	1139
Silver	µg/l	49.4	5.49	11.1	7	51.0	3.80	2.59	44.5	-	54.3
Strontium	mg/l	6.36	0.521	8.2	8	6.40	0.355	0.230	5.94	-	6.79
Thallium	µg/l	13.1	4.40	33.5	4	12.8	2.78	2.75	7.01	-	19.2
Tin	µg/l	154	8.4	5.4	9	155	5.1	3.5	148	-	160
Uranium	µg/l	5.85	0.276	4.7	4	5.75	0.212	0.172	5.47	-	6.23