



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



Metals in seawater

REFERENCE MATERIAL

AQ3 sample 177

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## Certificate of Analysis    AQ3 177

### 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 177 of Seawater unspiked from North Sea 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
2023.1	AQ3	QTM343SW



### Consensus Values    AQ3

**Method: Metals - AQ3**

<b>Element</b>	<b>Unit</b>	<b>Mean</b>	<b>Std.Dev.</b>	<b>CV %</b>	<b>N</b>	<b>Median</b>	<b>MAD</b>	<b>Uncertainty</b>	<b>95 % confidence limits</b>		
Copper	µg/l	4.52	0.572	12.6	18	4.50	0.335	0.169	4.24	-	4.81
Vanadium	µg/l	1.58	0.244	15.4	10	1.59	0.115	0.096	1.41	-	1.75



### Indicative Values AQ3

#### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cadmium	µg/l	0.0138	0.0088	63.8	11	0.0140	0.0047	0.0033	0.0080	-	0.0197
Lead	µg/l	0.0107	0.0079	73.8	9	0.0130	0.0048	0.0033	0.0047	-	0.0166
Iron	µg/l	-	-	-	5	12.5	12.3	-	-	-	-
Manganese	µg/l	0.213	0.0354	16.6	9	0.224	0.0180	0.0147	0.186	-	0.240
Arsenic	µg/l	2.76	0.567	20.5	12	2.83	0.380	0.205	2.41	-	3.12
Nickel	µg/l	0.431	0.0755	17.5	12	0.435	0.0420	0.0273	0.383	-	0.478
Zinc	µg/l	2.73	0.540	19.8	15	2.80	0.250	0.174	2.43	-	3.03
Boron	µg/l	4383	332.9	7.6	8	4446	145.0	147.1	4112	-	4654
Magnesium	mg/l	1190	46.4	3.9	6	1192	33.0	23.7	1143	-	1236
Strontium	mg/l	7.10	0.361	5.1	6	7.09	0.153	0.184	6.74	-	7.46