



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



Metals in seawater

REFERENCE MATERIAL

AQ3 sample 183

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## Certificate of Analysis    AQ3 183

### 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 183 of Low salinity seawater spiked with 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
2023.2	AQ3	QTM353SW



## Consensus Values AQ3

### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Copper	µg/l	10.8	0.65	6.0	17	10.9	0.39	0.20	10.48	-	11.15
Cadmium	µg/l	0.467	0.0453	9.7	17	0.478	0.0240	0.0137	0.444	-	0.490
Lead	µg/l	5.07	0.572	11.3	17	5.12	0.257	0.173	4.77	-	5.36
Manganese	µg/l	7.64	0.718	9.4	11	7.72	0.388	0.271	7.16	-	8.12
Arsenic	µg/l	5.37	0.279	5.2	14	5.34	0.170	0.093	5.21	-	5.53
Chromium	µg/l	4.80	0.214	4.5	12	4.82	0.123	0.077	4.67	-	4.94
Nickel	µg/l	21.1	1.67	7.9	15	21.4	0.70	0.54	20.2	-	22.1
Zinc	µg/l	14.8	1.21	8.2	15	14.6	0.63	0.39	14.1	-	15.4
Vanadium	µg/l	8.13	0.257	3.2	10	8.14	0.132	0.101	7.95	-	8.31



### Indicative Values AQ3

#### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cobalt	µg/l	1.65	0.164	9.9	9	1.63	0.120	0.068	1.53	-	1.78
Iron	µg/l	11.3	2.83	25.1	7	11.1	1.60	1.34	8.74	-	13.8
Silver	µg/l	0.482	0.1011	21.0	7	0.505	0.0500	0.0478	0.391	-	0.572
Boron	µg/l	1627	69.7	4.3	6	1619	39.0	35.6	1557	-	1696
Tin	µg/l	-	-	-	4	3.37	2.4	-	-	-	-
Uranium	µg/l	-	-	-	5	1.57	0.1	-	-	-	-
Magnesium	mg/l	437	26.3	6.0	7	437	23.0	12.4	414	-	461
Strontium	mg/l	2.62	0.181	6.9	7	2.61	0.099	0.085	2.46	-	2.79