



# QUASIMEME

Quality assurance of information  
for marine environmental monitoring

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## Certificate of Analysis



Metals in seawater

REFERENCE MATERIAL

AQ3 sample 156

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## Certificate of Analysis    AQ3 156

### 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 156 of Seawater (diluted) spiked with high conc. Metals from North Sea (near Neeltje Jans) 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
2020.1	AQ3	QTM298SW



## Consensus Values AQ3

### Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Arsenic	µg/l	145	16.3	11.2	16	143	10.9	5.1	136	-	153
Cadmium	µg/l	12.5	1.32	10.6	15	12.7	0.90	0.43	11.8	-	13.2
Chromium	µg/l	95.8	8.27	8.6	13	95.0	5.88	2.87	90.9	-	101
Cobalt	µg/l	18.8	1.03	5.5	12	18.6	0.69	0.37	18.2	-	19.5
Copper	µg/l	118	10.1	8.6	13	119	6.9	3.5	112	-	124
Iron	µg/l	226	20.7	9.2	11	224	14.2	7.8	213	-	240
Lead	µg/l	71.1	10.53	14.8	15	70.3	7.64	3.40	65.3	-	76.9
Manganese	µg/l	192	9.6	5.0	12	191	6.9	3.5	186	-	198
Nickel	µg/l	62.6	4.40	7.0	14	61.9	2.92	1.47	60.0	-	65.1
Vanadium	µg/l	96.2	9.32	9.7	12	96.1	6.71	3.36	90.3	-	102
Zinc	µg/l	370	56.3	15.2	13	373	38.0	19.5	336	-	403



### Indicative Values AQ3

**Method: Metals - AQ3**

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Boron	µg/l	1980	221	11.1	6	1990	157	113	1763	-	2204
Silver	µg/l	23.0	1.62	7.1	6	23.3	1.20	0.83	21.3	-	24.6
Tin	µg/l	81.6	8.05	9.9	6	80.4	5.26	4.11	73.6	-	89.6