

# ICP Water Analysis

Plus



**Sample-ID:** TM6200002011

**Sample type:** Seawater  
**Aquarium volume in liters:** 681  
**From your aquarium:** Waterbox custom  
**Date of taking the water sample:** 12-26-2025  
**Receipt of the sample:** 01-07-2026

Methodology: ICP-OES (inductively coupled plasma with optical emission spectrometry) and other methods specific for seawater; recommended values are optimized for coral reef aquariums. Detailed information on the elements as well as specific recommendations for action and precise dosing instructions can be found at <https://lab.tropic-marin.com/de/home/analysis/11513>

## Basic physical and chemical values

	meas. Value	Optimal range	Recommendation
Electrical conductivity (mS/cm 25°C)	50.9	49 - 53	Ideal
Density (kg/liter, calculated 25°C)	1.0221	1,022 - 1,023	Ideal
Relative density (calculated 25°C)	1.0251	1,024 - 1,026	lower
Salinity (psu, calculated)	33.375	32 - 35	Ideal
pH value	7.89	7,8 - 8,4	Ideal
Alkalinity (°dKH)	8.7	6,5 - 8,0	lower
CO <sub>2</sub> -Content (mg/l)	3.25	0,04 - 2,50	lower
Acid binding capacity pH 4.3 (mmol/L)	3.1059	2,32 - 2,85	lower
Odor	none	none	
Coloring	none	colorless	

## Tropic Marin Block Analysis System

	meas. Value	Rel. 35 psu	Optimal range	Recommendation	Product recd.
Iodine (total iodine, ICP-OES) (mg/l) I	0.018	0.019	0,05 - 0,09	increase	Block Iodine
Molybdenum (µg/l) Mo	7.8	8.22	10 - 20	increase	Block Molybdenum
Nickel (µg/l) Ni	7.5	7.87	3 - 6	lower	Block Nickel
Strontium (mg/l) Sr	7.24	7.59	6,5 - 9,0	Ideal	Block Strontium
Zinc (µg/l) Zn	3.9	4.09	3 - 8	Ideal	Block Zinc

### Tropic Marin Block Analysis System

**Tropic Marin** has developed a system that can support ICP-OES analysis: We know that different elements are consumed in the aquarium in relation to each other. Changes in the concentration of a single element therefore result in proportionally equal changes in the concentration of the other elements in this group. If you know the requirement of an element, you can use this indicator element to calculate the consumption of several other elements. Defined indicator or lead elements can be analyzed very well using ICP-OES and have a very low tolerance range.

Particularly in the case of seawater salts, which contain a large number of elements, it is more expedient to consider only special indicator elements (with low measurement tolerance) among the measured values of the ICP-OES and to include the elements with a very low concentration in a certain ratio. Concentration data with high measurement tolerances of the ICP-OES for elements that are difficult to determine can be neglected in this way without causing a deficiency in these elements. **Tropic Marin** has developed element mixtures from the above-mentioned element groups: the **Tropic Marin BAS Solutions** (BAS = Block Analysis System). Based on the lead elements, all other elements in the aquarium are (co-)dosed - even elements with very low natural concentrations, which may not be analyzed in the ICP-OES (as they are below the measuring limit).

## Makroelemente, lime household elements and halogens in mg/Liter (1 mg = 0,001 g)

		meas. Value	Rel. 35 psu	Optimal range	Recommendation	Product recd.
Chloride	Cl-	18474.4	19374	18000 - 19500	Ideal	
Sodium	Na	10736	11259	9400 - 11000	Ideal	
Sulfur	S	821	861	820 - 950	Ideal	Sulfur
Sulphate	SO42-	2459.716	2579	2470 - 2800	increase	
Potassium	K	417	437	380 - 420	Ideal	Potassium
Boron	B	4.19	4.39	3,8 - 5,5	Ideal	Boron
Magnesium	Mg	1371	1438	1200 - 1450	Ideal	Magnesium
Calcium	Ca	465	488	400 - 480	Ideal	Calcium
Strontium	Sr	7.24	7.59	6,5 - 9,0	Ideal	Strontium
Bromine	Br	78.3	82.1	55 - 75	lower	Bromine
Fluoride	F-	0.59	0.62	0,9 - 1,6	increase	Fluorine
Iodine (total iodine, ICP-OES)	I	0.018	0.019	0,05 - 0,09	increase	Iodine

## Relative values of macroelements and halogens (relative factors)

		Relative value	Optimal range
Salinity meas. value : target value	Sal.	0.954	0,94 - 1,03
KH measured value : target value	KH	1.2	0,87 - 1,07
Magnesium : Salinity	Mg	41.079	33,3 - 42,6
Calcium : Salinity	Ca	13.933	11,1 - 12,9
Strontium: Salinity	Sr	0.217	0,18 - 0,26
Potassium : Salinity	K	12.49	10,6 - 12,4
Boron : Salinity	B	0.126	0,11 - 0,16
Chloride : Salinity	Cl-	553.541	519 - 597
Sulphate : Salinity	SO42-	73.6995	2,9 - 3,1
Chloride : Sulphate	Cl-/SO42	7.511	6,6 - 8,0
Magnesium : Calcium	Mg/Ca	2.948	2,7 - 3,6
Calcium : Strontium	Ca/Sr	64.227	44 - 68
Bromide : Fluoride	Br-/F-	132.712	34 - 83
Fluoride : Iodine	F-/I	32.24	11 - 29

## Macronutrients in mg/Liter (1 mg = 0,001 g)

		meas. Value	Optimal range	Recommendation	Product recd.
Nitrate	NO3-	14.84	0,1 - 2,0	lower	Nitrogen
Nitrite	NO2-	0.09	0,0 - 0,2	Ideal	Nitrogen
Phosphorus (ICP-OES)	P	0.032	0,016 - 0,098	Ideal	Phosphate
Total phosphate (calculated)	PO43-tot	0.09811	0,05 - 0,30	Ideal	Phosphate
Orthophosphate (photometric)	PO43-	0.076	0,05 - 0,30	Ideal	Phosphate
Silicon	Si	0.114	0,1 - 0,2	Ideal	
Silicate (calculated)	SiO2	0.245	0,2996 - 0,5992	increase	

### Relative values

Total phosphate : Nitrate	151.255708	2 - 20
Total phosphate : Ortho-phosphate	1.289	0,9 - 1,1
Total phosphate : Iodine	5.3613	0,8 - 5,0

## Physiologically relevant trace substances and color-relevant micronutrients

In µg/Liter (1 µg = 0,000001 g)

		meas. Value	Optimal range	Recommendation	Product recd.
Zinc	Zn	<b>3.9</b>	3 - 8	Ideal	Zinc
Vanadium	V	<b>5.1</b>	2 - 10	Ideal	Vanadium
Copper	Cu	<b>0.62</b>	2 - 6	increase	Copper
Nickel	Ni	<b>7.5</b>	3 - 6	lower	Nickel
Manganese	Mn	<b>0.2</b>	0,5 - 1,2	increase	Manganese
Molybdenum	Mo	<b>7.8</b>	10 - 20	increase	Molybdenum
Iron	Fe	<b>n.n.</b>	0,05 - 0,60	increase	Iron
Chrome	Cr	<b>2</b>	0,05 - 2,30	Ideal	Chromium
Cobalt	Co	<b>n.n.</b>	0,02 - 1,90	increase	Cobalt

## Other trace elements and potential pollutants

in µg/Liter (1 µg = 0,000001 g)

		meas. Value	Optimal range	Recommendation	Product recd.
Lithium	Li	<b>205</b>	180 - 350	Ideal	Lithium
Barium	Ba	<b>19.4</b>	5 - 20	Ideal	Barium
Aluminium	Al	<b>31.1</b>	5 - 30	lower	
Antimony	Sb	<b>n.n.</b>	0 - 10	increase	
Tin	Sn	<b>n.n.</b>	0 - 10	increase	
Beryllium	Be	<b>n.n.</b>	0,1 - 1,4	increase	
Selenium	Se	<b>n.n.</b>	0,15 - 0,30	increase	
Silber	Ag	<b>n.n.</b>	0 - 10	increase	
Tungsten	W	<b>n.n.</b>	0 - 30	increase	
Lanthanum	La	<b>n.n.</b>	2 - 10	increase	
Titanium	Ti	<b>n.n.</b>	0,5 - 3,5	increase	
Zirconium	Zr	<b>n.n.</b>	1,0 - 2,2	increase	
Arsenic	As	<b>n.n.</b>	0 - 1	increase	
Cadmium	Cd	<b>n.n.</b>	0 - 1	increase	
Mercury	Hg	<b>n.n.</b>	0 - 1	increase	
Lead	Pb	<b>n.n.</b>	0 - 1	increase	

**Osmosis water in mg/Liter (1 mg = 0,001 g)**

		meas. Value	Optimal range
Calcium	Ca	<b>5.6</b>	n.n.
Potassium	K	<b>n.n.</b>	n.n.
Magnesium	Mg	<b>n.n.</b>	n.n.
Sodium	Na	<b>7.14</b>	n.n.
Sulphur	S	<b>0.51</b>	n.n.
Phosphorus (ICP-OES)	P	<b>n.n.</b>	n.n.
Total phosphate (calculated)	PO <sub>4</sub> <sup>3-</sup> tot.	<b>n.n.</b>	n.n.
Silicon	Si	<b>0.02</b>	n.n.
Silicate (calculated)	SiO <sub>2</sub>	<b>0.05</b>	n.n.

**Osmosis water in µg/Liter (1 µg = 0,000001 g)**

		meas. Value	Optimal range
Aluminium	Al	<b>n.n.</b>	n.n.
Lead	Pb	<b>n.n.</b>	n.n.
Cadmium	Cd	<b>n.n.</b>	n.n.
Chrome	Cr	<b>n.n.</b>	n.n.
Iron	Fe	<b>n.n.</b>	n.n.
Copper	Cu	<b>n.n.</b>	n.n.
Lithium	Li	<b>n.n.</b>	n.n.
Nickel	Ni	<b>n.n.</b>	n.n.
Mercury	Hg	<b>n.n.</b>	n.n.
Tin	Sn	<b>n.n.</b>	n.n.
Zinc	Zn	<b>n.n.</b>	n.n.

Measured values of the type "> 24" indicate that the concentration is above the calibrated range and therefore cannot be definitively determined. In these cases, the minimum amount present is indicated (e.g. 24 µg/l). Abbreviations: n.g. (not measured), n.n. (not detectable).