ICP Water Analysis

Sample-ID: **TM0100004984**

Sample type:	**Seawater**
Aquarium volume in liters:	**775**
From your aquarium:	**Waterbox 230.6**
Date of taking the water sample:	**01-20-2026**
Receipt of the sample	**01-26-2026**

Methodology: ICP-OES (inductively coupled plasma with optical emission spectrometry) and other methods specific for seawater; recommended values are optimized for coral reef aquariums.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/11827

Basic physical and chemical values

	meas. Value	Optimal range	Recommendation
Electrical conductivity (mS/cm 25°C)	n.g.	49 - 53	-
Density (kg/liter, calculated 25°C)	n.g.	1,022 - 1,023	-
Relative density (calculated 25°C)	n.g.	1,024 - 1,026	-
Salinity (psu, calculated)	n.g.	32 - 35	-
pH value	n.g.	7,8 - 8,4	-
Alkalinity (°dKH)	n.g.	6,5 - 8,0	-
CO_2-Content (mg/l)	n.g.	0,04 - 2,50	-
Acid binding capacity pH 4.3 (mmol/L)	n.g.	2,32 - 2,85	-
Odor	none	none	
Coloring	none	colorless	

Tropic Marin Block Analysis System

		Messwert	Rel. 35 psu	Optimal range	Recommend.	Product recd.
Iodine (total iodine, ICP-OES) (mg/l)	I	0.275	n.g.	0,05 - 0,09	lower	Block Iodine
Molybdenum (µg/l)	Mo	14.1	n.g.	10 - 20	Ideal	Block Molybdenum
Nickel (µg/l)	Ni	5.33	n.g.	3 - 6	Ideal	Block Nickel
Strontium (mg/l)	Sr	6.55	n.g.	6,5 - 9,0	Ideal	Block Strontium
Zinc (µg/l)	Zn	246	n.g.	3 - 8	lower	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).

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

		meas. Value	Rel. 35 psu	Optimal range	Recommend.	Product recd.
Chloride	Cl-	n.g.	35	18000 - 19500	-	
Natrium	Na	9614	n.g.	9400 - 11000	Ideal	
Sulfur	S	688	n.g.	820 - 950	increase	Sulfur
Potassium	K	369	n.g.	380 - 420	increase	Potassium
Boron	B	6.71	n.g.	3,8 - 5,5	lower	Boron
Magnesium	Mg	1293	n.g.	1200 - 1450	Ideal	Magnesium
Calcium	Ca	418	n.g.	400 - 480	Ideal	Calcium
Strontium	Sr	6.55	n.g.	6,5 - 9,0	Ideal	Strontium
Bromine	Br	72.4	n.g.	55 - 75	Ideal	Bromine
Iodine (total iodine, ICP-OES)	I	0.275	n.g.	0,05 - 0,09	lower	Iodine

Relative values of macroelements and halogens (relative factors)

		Relative value	Optimal range
Salinity meas. value : target value	Sal.	n.g.	0,94 - 1,03
KH measured value : target value	KH	n.g.	0,87 - 1,07
Magnesium : Salinity	Mg	n.g.	33,3 - 42,6
Calcium : Salinity	Ca	n.g.	11,1 - 12,9
Strontium: Salinity	Sr	n.g.	0,18 - 0,26
Potassium : Salinity	K	n.g.	10,6 - 12,4
Boron : Salinity	B	n.g.	0,11 - 0,16
Chloride : Salinity	Cl-	n.g.	519 - 597
Magnesium : Calcium	Mg/Ca	3.093	2,7 - 3,6
Calcium : Strontium	Ca/Sr	63.817	44 - 68

Physiologically relevant trace substances and color-relevant micronutrients
In µg/Liter (1 µg = 0,000001 g)

		meas. Value	Optimal range	Recommend.	Product recd.
Zinc	Zn	246	3 - 8	lower	Zinc
Vanadium	V	7.7	2 - 10	Ideal	Vanadium
Copper	Cu	2.81	2 - 6	Ideal	Copper
Nickel	Ni	5.33	3 - 6	Ideal	Nickel
Manganese	Mn	74	0,5 - 1,2	lower	Manganese
Molybdenum	Mo	14.1	10 - 20	Ideal	Molybdenum
Iron	Fe	21.9	0,05 - 0,60	lower	Iron
Chrome	Cr	n.n.	0,05 - 2,30	increase	Chromium
Cobalt	Co	3.48	0,02 - 1,90	lower	Cobalt

Other trace elements and potential pollutants
in µg/Liter (1 µg = 0,000001 g)

		meas. Value	Optimal range	Recommend.	Product recd.
Lithium	Li	**19**	180 - 350	increase	Lithium
Barium	Ba	**462**	5 - 20	lower	Barium
Aluminium	Al	**8**	5 - 30	Ideal	
Antimony	Sb	**n.n.**	0 - 10	increase	
Tin	Sn	**n.n.**	0 - 10	increase	
Beryllium	Be	**n.n.**	0,1 - 1,4	increase	
Selenium	Se	**n.n.**	0,15 - 0,30	increase	
Silber	Ag	**n.n.**	0 - 10	increase	
Tungsten	W	**n.n.**	0 - 30	increase	
Lanthanum	La	**n.n.**	2 - 10	increase	
Titanium	Ti	**n.n.**	0,5 - 3,5	increase	
Zirconium	Zr	**n.n.**	1,0 - 2,2	increase	
Arsenic	As	**n.n.**	0 - 1	increase	
Cadmium	Cd	**n.n.**	0 - 1	increase	
Mercury	Hg	**n.n.**	0 - 1	increase	
Lead	Pb	**n.n.**	0 - 1	increase	

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).