

# REEF ICP TOTAL

**METHODOLOGY:** ICP-OES, photometric and electrochemical methods specific to seawater.

Recommended values are optimized for coral reef aquariums.

**Sample ID:** 20039936  
**Analysis ID:** 181016  
 Sample Type: Seawater  
 Volume in Liters: 550  
 Sampling Point: Innovative Marine 150 EXT  
 Sampling Date: 12-02-2024  
 Sample Arrival: 12-10-2024

[To the dosing and action recommendations](#)



## PHYSICAL-CHEMICAL BASIC VALUES

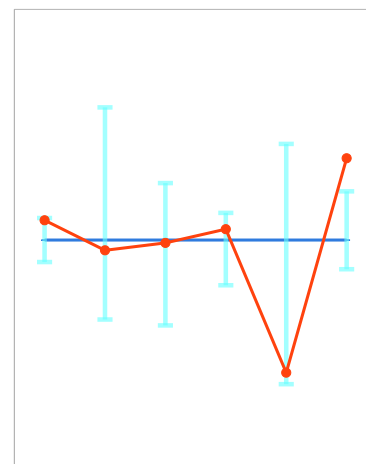
	measured	Reference Range
Electrical Conductivity (mS/cm 25°C)	54.3	51,7 - 53,0 - 54,5
Density (kg/Liter, calculated 25°C)	1.024	1,022 - 1,023 - 1,024
Relative Density (calculated 25°C)	1.027	1,026 - - - 1,027
Salinity (psu, calculated)	35.9	34 - 35 - 36
pH Value	7.8	7,9 - 8,3 - 8,4
Carbonate Hardness (°dKH)	7.4	6,5 - 7,3 - 8,5
CO2 Content (mg/l)	3.4	0,04 - - - 2,5
Alkalinity pH 4.3 (mmol/L)	2.64	2,3 - 2,58 - 3,0
Smell	none	none
Color	none	colorless

## MACROELEMENTS, CALCIUM BALANCE ELEMENTS, AND HALOGENS in mg/Liter

		measured	Reference Range	rel. 35 psu
Sodium	Na	11449	9500 - 10700 - 11500	11168
Sulfur	S	900	850 - 900 - 950	878
Sulfate	SO <sub>4</sub> <sup>2-</sup>	2696	2550 - 2700 - 2850	2630
Potassium	K	437	380 - 395 - 420	426
Boron	B	6.31	3,8 - 4,5 - 5,5	6.16
Magnesium	Mg	1345	1200 - 1350 - 1450	1312
Calcium	Ca	431	400 - 425 - 440	420
Strontium	Sr	6.62	6,5 - 8,0 - 9,0	6.46
Chloride	Cl <sup>-</sup>	20003	18700 - 19500 - 20300	19512
Bromine (total bromine, ICP-OES)	Br	71.2	55 - 67 - 75	69.5
Fluoride	F <sup>-</sup>	0.89	0,9 - 1,3 - 1,6	0.87
Iodine (Total Iodine, ICP-OES)	I	0.076	0,055 - 0,065 - 0,080	0.074

## RELATION VALUES OF MACROELEMENTS AND HALOGENS

		measured	Reference Range
Salinity Meas. : Target Value	Sal.	1.03	0,97 - 1,00 - 1,03
KH Measurement : Target Value	KH	1.02	0,90 - 1,00 - 1,17
Magnesium : Salinity	Mg	37.5	33,3 - 38,6 - 42,6
Calcium : Salinity	Ca	12	11,1 - 12,1 - 12,9
Strontium: Salinity	Sr	0.18	0,18 - 0,23 - 0,26
Potassium : Salinity	K	12.2	10,6 - 11,3 - 12,4
Boron : Salinity	B	0.18	0,11 - 0,13 - 0,16
Chloride : Salinity	Cl <sup>-</sup>	557	519 - 557 - 597
Sulfate : Salinity	SO <sub>4</sub> <sup>2-</sup>	75.2	71 - 77 - 84
Chloride : Sulfate	Cl <sup>-</sup> /SO <sub>4</sub> <sup>2-</sup>	7.42	6,6 - 7,2 - 8,0
Magnesium : Calcium	Mg/Ca	3.12	2,7 - 3,2 - 3,6
Calcium : Strontium	Ca/Sr	65.1	44 - 53 - 68
Bromide : Fluoride	Br <sup>-</sup> /F <sup>-</sup>	80	34 - 52 - 83
Fluoride : Iodine	F <sup>-</sup> /I	11.7	11 - 20 - 29
Fluoride : Sulfur : Strontium	FSS	74	80 - 100 - 120

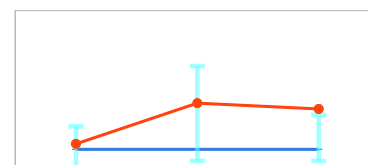


Sal. KH Mg Ca Sr K

— Ideal Line  
—●— Relation Values

## MACRO NUTRIENTS in mg/Liter

		measured	Reference Range
Nitrate	NO <sub>3</sub> <sup>-</sup>	6.2	1 - 10
Nitrite	NO <sub>2</sub> <sup>-</sup>	0.02	< 0,20
Phosphorus (ICP-OES)	P	0.039	< 0,06
Total Phosphate (calculated)	PO <sub>4</sub> <sup>3-</sup> <sub>tot.</sub>	0.12	0,02 - 0,18
ortho-Phosphate (photometric)	PO <sub>4</sub> <sup>3-</sup>	0.11	0,02 - 0,10
Silicon	Si	0.2	0,1 - 0,2
Silicate (calculated)	SiO <sub>2</sub>	0.44	0,2 - 0,4



NO3- PO43-tot. PO43-

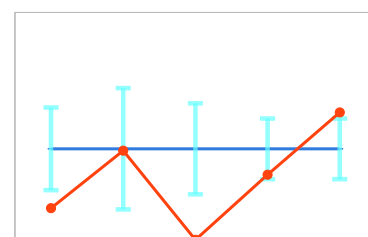
— Ideal Line  
—●— Measurement Values

## ORGANIC FACTORS

		measured	Reference Range
Total Phosphate : Nitrate	PO <sub>4</sub> <sup>3-</sup> <sub>tot.</sub> /NO <sub>3</sub> <sup>-</sup>	52.27	90 - 110
Total Phosphate : ortho-Phosphate	PO <sub>4</sub> <sup>3-</sup> <sub>tot.</sub> /PO <sub>4</sub> <sup>3-</sup>	1.091	1,00
Total Phosphate : Iodine	PO <sub>4</sub> <sup>3-</sup> <sub>tot.</sub> /I	1.57	0,13 - 1,67
SAK254 (m <sup>-1</sup> )		0.5	0,5 - 5,0

## Dynamic Elements in µg/Liter

		measured	Reference Range
Zinc	Zn	1.91	3 - 5,5 - 8
Vanadium	V	5.88	2 - 6 - 10
Copper	Cu	n.d.	2 - 4 - 6
Nickel	Ni	3.22	3 - 4,5 - 6
Molybdenum	Mo	21	10 - 15 - 20

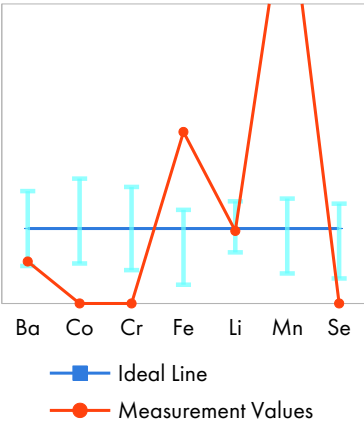


Zn V Cu Ni Mo

— Ideal Line  
—●— Measurement Values

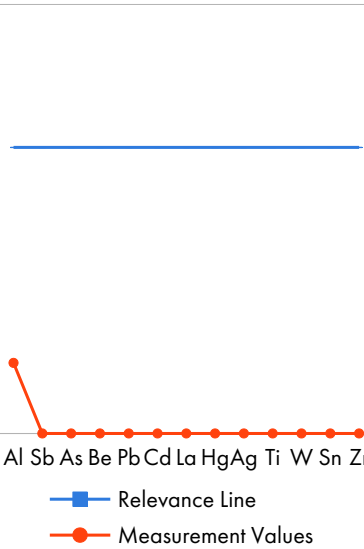
PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range		
					Max.
Barium	Ba	5.6	5	-	50
Cobalt	Co	n.d.	n.d.	-	1,9
Chromium	Cr	n.d.	n.d.	-	2,3
Iron	Fe	4.58	n.d.	-	2,5
Lithium	Li	213	180	-	350
Manganese	Mn	0.56	n.d.	-	0,25
Selenium	Se	n.d.	n.d.	-	2,0



OTHER TRACE ELEMENTS AND POTENTIAL POLLUTANTS in µg/Liter

		measured	Reference Range		
Aluminum	Al	7.4	5	-	30
Antimony	Sb	n.d.	n.d.	- (max.)	10
Arsenic	As	n.d.	n.d.		
Beryllium	Be	n.d.	n.d.		
Lead	Pb	n.d.	n.d.		
Cadmium	Cd	n.d.	n.d.		
Lanthanum	La	n.d.	2	-	10
Mercury	Hg	n.d.	n.d.		
Silver	Ag	n.d.	n.d.	- (max.)	10
Titanium	Ti	n.d.	n.d.	-	3,5
Tungsten	W	n.d.	n.d.	- (max.)	30
Tin	Sn	n.d.	n.d.	- (max.)	10
Zirconium	Zr	n.d.	n.d.	-	2,2



# OSMOSIS WATER

in mg/Liter		measured	Reference Range
Calcium	Ca	n.d.	n.d.
Potassium	K	n.d.	n.d.
Magnesium	Mg	n.d.	n.d.
Sodium	Na	n.d.	n.d.
Sulfur	S	n.d.	n.d.
Bromine (total bromine, ICP-OES)	Br	n.d.	n.d.
Iodine (Total Iodine, ICP-OES)	I	n.d.	n.d.
Phosphorus (ICP-OES)	P	n.d.	n.d.
Total Phosphate (calculated)	PO <sub>4</sub> <sup>3-</sup> tot.	n.d.	n.d.
Silicon	Si	n.d.	n.d.
Silicate (calculated)	SiO <sub>2</sub>	n.d.	n.d.
in µg/Liter			
Aluminum	Al	n.d.	n.d.
Antimony	Sb	n.d.	n.d.
Arsenic	As	n.d.	n.d.
Barium	Ba	n.d.	n.d.
Beryllium	Be	n.d.	n.d.
Lead	Pb	n.d.	n.d.
Boron	B	n.d.	n.d.
Cadmium	Cd	n.d.	n.d.
Chromium	Cr	n.d.	n.d.
Cobalt	Co	n.d.	n.d.
Iron	Fe	n.d.	n.d.
Copper	Cu	n.d.	n.d.
Lanthanum	La	n.d.	n.d.
Lithium	Li	n.d.	n.d.
Manganese	Mn	n.d.	n.d.
Molybdenum	Mo	n.d.	n.d.
Nickel	Ni	n.d.	n.d.
Mercury	Hg	n.d.	n.d.
Selenium	Se	n.d.	n.d.
Silver	Ag	n.d.	n.d.
Strontium	Sr	n.d.	n.d.
Titanium	Ti	n.d.	n.d.
Thallium	Tl	n.d.	n.d.
Vanadium	V	n.d.	n.d.
Tungsten	W	n.d.	n.d.
Tin	Sn	n.d.	n.d.
Zinc	Zn	n.d.	n.d.
Zirconium	Zr	n.d.	n.d.

**Abbreviations:** ICP-OES (inductively coupled plasma with optical emission spectrometry), SAK254 (spectral absorption coefficient at 254 nm), n.m. (not measured), n.d. (not detectable).