

REEF ICP TOTAL

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

Recommended values are optimized for coral reef aquariums.

Sample ID: 20106188

Analysis ID: 161817

Sample Type: Seawater

Volume in Liters: 220

Sampling Point: Aquarium 1

Sampling Date: 09-09-2024

Sample Arrival: 09-13-2024

[To the dosing and action recommendations](#)



PHYSICAL-CHEMICAL BASIC VALUES

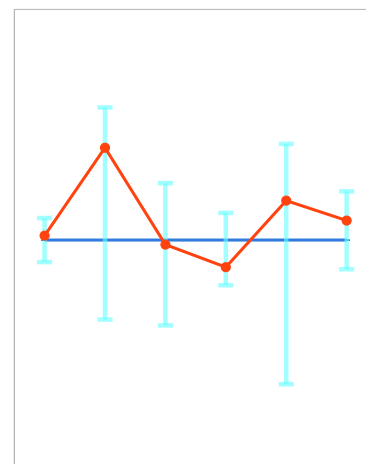
	measured	Reference Range
Electrical Conductivity (mS/cm 25°C)	53.4	51,7 - 53,0 - 54,5
Density (kg/Liter, calculated 25°C)	1.024	1,022 - 1,023 - 1,024
Relative Density (calculated 25°C)	1.027	1,026 - - - 1,027
Salinity (psu, calculated)	35.2	34 - 35 - 36
pH Value	8.13	7,9 - 8,3 - 8,4
Carbonate Hardness (°dKH)	8.4	6,5 - 7,3 - 8,5
CO2 Content (mg/l)	1.81	0,04 - - - 2,5
Alkalinity pH 4.3 (mmol/L)	3	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	11196	9500 - 10700 - 11500	11128
Sulfur	S	801	850 - 900 - 950	796
Sulfate	SO ₄ ²⁻	2400	2550 - 2700 - 2850	2385
Potassium	K	405	380 - 395 - 420	403
Boron	B	4.35	3,8 - 4,5 - 5,5	4.32
Magnesium	Mg	1342	1200 - 1350 - 1450	1334
Calcium	Ca	410	400 - 425 - 440	408
Strontium	Sr	8.41	6,5 - 8,0 - 9,0	8.36
Chloride	Cl ⁻	19493	18700 - 19500 - 20300	19374
Bromine (total bromine, ICP-OES)	Br	64.5	55 - 67 - 75	64.1
Fluoride	F ⁻	0.7	0,9 - 1,3 - 1,6	0.7
Iodine (Total Iodine, ICP-OES)	I	0.115	0,055 - 0,065 - 0,080	0.114

RELATION VALUES OF MACROELEMENTS AND HALOGENS

		measured	Reference Range
Salinity Meas. : Target Value	Sal.	1.01	0,97 - 1,00 - 1,03
KH Measurement : Target Value	KH	1.16	0,90 - 1,00 - 1,17
Magnesium : Salinity	Mg	38.1	33,3 - 38,6 - 42,6
Calcium : Salinity	Ca	11.6	11,1 - 12,1 - 12,9
Strontium: Salinity	Sr	0.24	0,18 - 0,23 - 0,26
Potassium : Salinity	K	11.5	10,6 - 11,3 - 12,4
Boron : Salinity	B	0.12	0,11 - 0,13 - 0,16
Chloride : Salinity	Cl ⁻	554	519 - 557 - 597
Sulfate : Salinity	SO ₄ ²⁻	68.1	71 - 77 - 84
Chloride : Sulfate	Cl ⁻ /SO ₄ ²⁻	8.12	6,6 - 7,2 - 8,0
Magnesium : Calcium	Mg/Ca	3.27	2,7 - 3,2 - 3,6
Calcium : Strontium	Ca/Sr	48.8	44 - 53 - 68
Bromide : Fluoride	Br ⁻ /F ⁻	92.1	34 - 52 - 83
Fluoride : Iodine	F ⁻ /I	6.1	11 - 20 - 29
Fluoride : Sulfur : Strontium	FSS	74	80 - 100 - 120

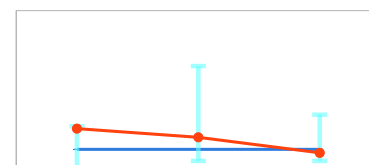


Sal. KH Mg Ca Sr K

— Ideal Line
—●— Relation Values

MACRO NUTRIENTS in mg/Liter

		measured	Reference Range
Nitrate	NO ₃ ⁻	9.5	1 - 10
Nitrite	NO ₂ ⁻	0.09	< 0,20
Phosphorus (ICP-OES)	P	0.02	< 0,06
Total Phosphate (calculated)	PO ₄ ³⁻ _{tot.}	0.061	0,02 - 0,18
ortho-Phosphate (photometric)	PO ₄ ³⁻	0.034	0,02 - 0,10
Silicon	Si	0.16	0,1 - 0,2
Silicate (calculated)	SiO ₂	0.34	0,2 - 0,4



NO3- PO43-tot. PO43-

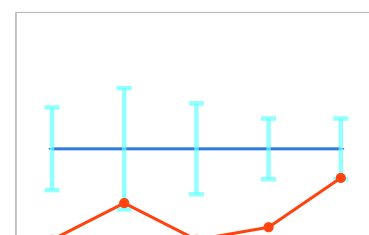
— Ideal Line
—●— Measurement Values

ORGANIC FACTORS

		measured	Reference Range
Total Phosphate : Nitrate	PO ₄ ³⁻ _{tot.} /NO ₃ ⁻	154.92	90 - 110
Total Phosphate : ortho-Phosphate	PO ₄ ³⁻ _{tot.} /PO ₄ ³⁻	1.794	1,00
Total Phosphate : Iodine	PO ₄ ³⁻ _{tot.} /I	0.53	0,13 - 1,67
SAK254 (m ⁻¹)		0.6	0,5 - 5,0

Dynamic Elements in µg/Liter

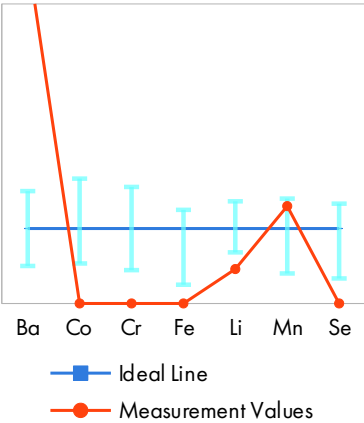
		measured	Reference Range
Zinc	Zn	n.d.	3 - 5,5 - 8
Vanadium	V	2.42	2 - 6 - 10
Copper	Cu	n.d.	2 - 4 - 6
Nickel	Ni	0.62	3 - 4,5 - 6
Molybdenum	Mo	10.2	10 - 15 - 20



— Ideal Line
—●— Measurement Values

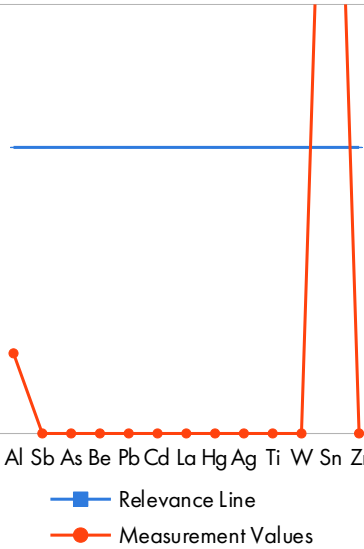
PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range		
					Max.
Barium	Ba	46.4	5	-	50
Cobalt	Co	n.d.	n.d.	-	1,9
Chromium	Cr	n.d.	n.d.	-	2,3
Iron	Fe	n.d.	n.d.	-	2,5
Lithium	Li	101	180	-	350
Manganese	Mn	0.13	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	8.4	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	16	n.d.	- (max.)	10
Zirconium	Zr	n.d.	n.d.	-	2,2



OSMOSIS WATER

in mg/Liter		measured	Reference Range
Calcium	Ca	3	n.d.
Potassium	K	45.2	n.d.
Magnesium	Mg	0.6	n.d.
Sodium	Na	75	n.d.
Sulfur	S	25.6	n.d.
Bromine (total bromine, ICP-OES)	Br	7.4	n.d.
Iodine (Total Iodine, ICP-OES)	I	n.d.	n.d.
Phosphorus (ICP-OES)	P	0.03	n.d.
Total Phosphate (calculated)	PO ₄ ³⁻ tot.	0.09	n.d.
Silicon	Si	20	n.d.
Silicate (calculated)	SiO ₂	43	n.d.
in µg/Liter			
Aluminum	Al	243	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	0.09	n.d.
Cadmium	Cd	9.9	n.d.
Chromium	Cr	25.3	n.d.
Cobalt	Co	7.88	n.d.
Iron	Fe	16.3	n.d.
Copper	Cu	2.86	n.d.
Lanthanum	La	n.d.	n.d.
Lithium	Li	73.7	n.d.
Manganese	Mn	n.d.	n.d.
Molybdenum	Mo	3.71	n.d.
Nickel	Ni	9.64	n.d.
Mercury	Hg	n.d.	n.d.
Selenium	Se	n.d.	n.d.
Silver	Ag	n.d.	n.d.
Strontium	Sr	163	n.d.
Titanium	Ti	n.d.	n.d.
Thallium	Tl	n.d.	n.d.
Vanadium	V	120	n.d.
Tungsten	W	n.d.	n.d.
Tin	Sn	5.18	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).