

REEF ICP TOTAL

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

Recommended values are optimized for coral reef aquariums.

Sample ID: 20047573

Analysis ID: 169403

Sample Type: Seawater

Volume in Liters: 220

Sampling Point: Aquarium 1

Sampling Date: 10-14-2024

Sample Arrival: 10-18-2024

[To the dosing and action recommendations](#)



PHYSICAL-CHEMICAL BASIC VALUES

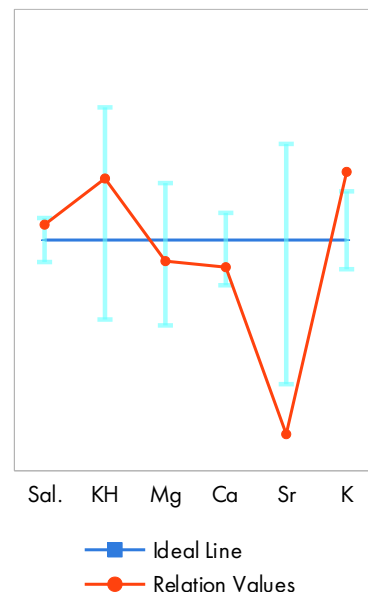
	measured	Reference Range
Electrical Conductivity (mS/cm 25°C)	54	51,7 - 53,0 - 54,5
Density (kg/Liter, calculated 25°C)	1.024	1,022 - 1,023 - 1,024
Relative Density (calculated 25°C)	1.027	1,026 - - - 1,027
Salinity (psu, calculated)	35.7	34 - 35 - 36
pH Value	8.17	7,9 - 8,3 - 8,4
Carbonate Hardness (°dKH)	8.1	6,5 - 7,3 - 8,5
CO2 Content (mg/l)	1.59	0,04 - - - 2,5
Alkalinity pH 4.3 (mmol/L)	2.89	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	10234	9500 - 10700 - 11500	10045
Sulfur	S	840	850 - 900 - 950	824
Sulfate	SO ₄ ²⁻	2517	2550 - 2700 - 2850	2470
Potassium	K	430	380 - 395 - 420	422
Boron	B	4.37	3,8 - 4,5 - 5,5	4.29
Magnesium	Mg	1313	1200 - 1350 - 1450	1289
Calcium	Ca	410	400 - 425 - 440	402
Strontium	Sr	5.98	6,5 - 8,0 - 9,0	5.87
Chloride	Cl ⁻	19738	18700 - 19500 - 20300	19374
Bromine (total bromine, ICP-OES)	Br	69.5	55 - 67 - 75	68.2
Fluoride	F ⁻	0.58	0,9 - 1,3 - 1,6	0.57
Iodine (Total Iodine, ICP-OES)	I	0.033	0,055 - 0,065 - 0,080	0.032

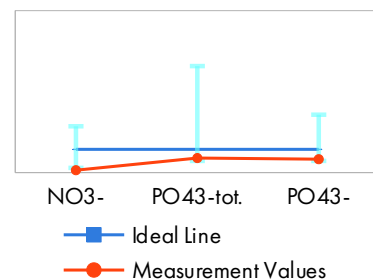
RELATION VALUES OF MACROELEMENTS AND HALOGENS

		measured	Reference Range
Salinity Meas. : Target Value	Sal.	1.02	0,97 - 1,00 - 1,03
KH Measurement : Target Value	KH	1.12	0,90 - 1,00 - 1,17
Magnesium : Salinity	Mg	36.8	33,3 - 38,6 - 42,6
Calcium : Salinity	Ca	11.5	11,1 - 12,1 - 12,9
Strontium: Salinity	Sr	0.17	0,18 - 0,23 - 0,26
Potassium : Salinity	K	12.1	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⁻	70.6	71 - 77 - 84
Chloride : Sulfate	Cl ⁻ /SO ₄ ²⁻	7.84	6,6 - 7,2 - 8,0
Magnesium : Calcium	Mg/Ca	3.2	2,7 - 3,2 - 3,6
Calcium : Strontium	Ca/Sr	68.6	44 - 53 - 68
Bromide : Fluoride	Br ⁻ /F ⁻	119.8	34 - 52 - 83
Fluoride : Iodine	F ⁻ /I ⁻	17.6	11 - 20 - 29
Fluoride : Sulfur : Strontium	FSS	63.7	80 - 100 - 120



MACRO NUTRIENTS in mg/Liter

		measured	Reference Range
Nitrate	NO ₃ ⁻	0.5	1 - 10
Nitrite	NO ₂ ⁻	0.02	< 0,20
Phosphorus (ICP-OES)	P	0.008	< 0,06
Total Phosphate (calculated)	PO ₄ ³⁻ _{tot.}	0.025	0,02 - 0,18
ortho-Phosphate (photometric)	PO ₄ ³⁻	0.023	0,02 - 0,10
Silicon	Si	0.16	0,1 - 0,2
Silicate (calculated)	SiO ₂	0.34	0,2 - 0,4

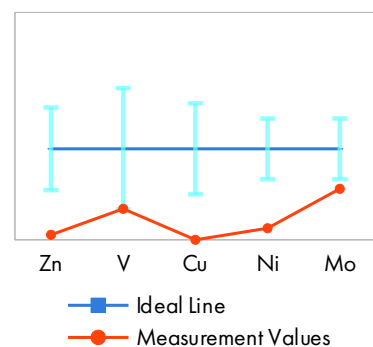


ORGANIC FACTORS

		measured	Reference Range
Total Phosphate : Nitrate	PO ₄ ³⁻ _{tot.} /NO ₃ ⁻	20.79	90 - 110
Total Phosphate : ortho-Phosphate	PO ₄ ³⁻ _{tot.} /PO ₄ ³⁻	1.087	1,00
Total Phosphate : Iodine	PO ₄ ³⁻ _{tot.} /I ⁻	0.74	0,13 - 1,67
SAK254 (m ⁻¹)		0.9	0,5 - 5,0

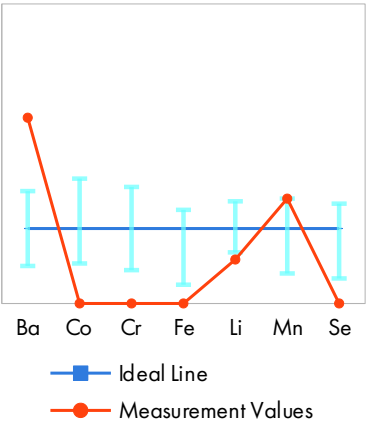
Dynamic Elements in µg/Liter

		measured	Reference Range
Zinc	Zn	0.3	3 - 5,5 - 8
Vanadium	V	2.04	2 - 6 - 10
Copper	Cu	n.d.	2 - 4 - 6
Nickel	Ni	0.57	3 - 4,5 - 6
Molybdenum	Mo	8.4	10 - 15 - 20



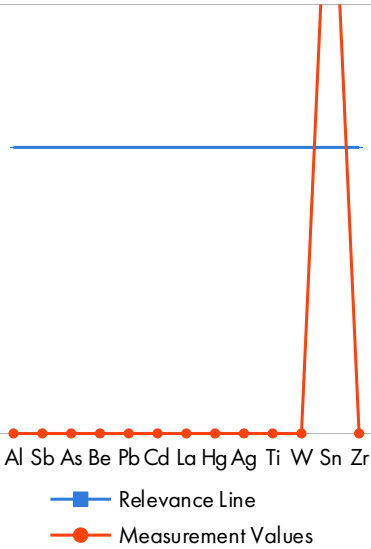
PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range		
					Max.
Barium	Ba	24.8	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	129	180	-	350
Manganese	Mn	0.14	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	n.d.	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	11.2	n.d.	- (max.)	10
Zirconium	Zr	n.d.	n.d.	-	2,2



OSMOSIS WATER

in mg/Liter		measured	Reference Range
Calcium	Ca	6.3	n.d.
Potassium	K	n.d.	n.d.
Magnesium	Mg	n.d.	n.d.
Sodium	Na	0.6	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 ₄ ³⁻ tot.	n.d.	n.d.
Silicon	Si	0.31	n.d.
Silicate (calculated)	SiO ₂	0.66	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	0.03	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	4.14	n.d.
Lanthanum	La	n.d.	n.d.
Lithium	Li	n.d.	n.d.
Manganese	Mn	0.64	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	113	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	4.46	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).