

REEF ICP TOTAL

Methodology: ICP-OES, photometric and electrochemical methods specific for seawater. Further methods possible via upgrades.

Recommended values are optimized for coral reef aquariums.

Sample ID: 20324278

Analysis ID: 232267

Booked upgrades: non

Sampling Point: Waterbox 180g

Volume in Liters: 681

Sampling Date: 07-08-2025

Sample Arrival: 07-22-2025

[To the dosing and action recommendations](#)



PHYSICAL-CHEMICAL BASIC VALUES

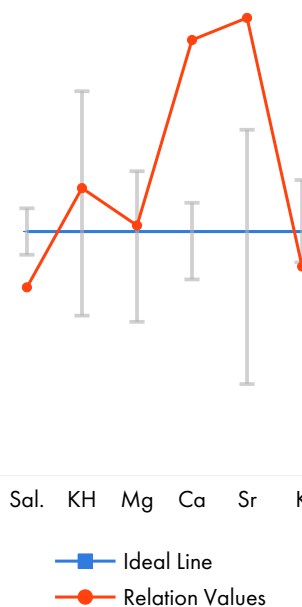
	measured	Reference Range
Electrical Conductivity (mS/cm 25°C)	49,8	51,7 - 53,0 - 54,5
Density (kg/Liter, calculated 25°C)	1,022	1,022 - 1,023 - 1,024
Relative Density (calculated 25°C)	1,025	1,026 - - - 1,027
Salinity (psu, calculated)	32,6	34 - 35 - 36
pH Value	7,57	7,9 - 8,3 - 8,4
Carbonate Hardness (°dKH)	7,9	6,5 - 7,3 - 8,5
CO2 Content (mg/l)	6,17	0,04 - - - 2,5
Alkalinity pH 4.3 (mmol/L)	2,82	2,3 - 2,58 - 3,0
Smell	none	none
Color	none	colorless

MACROELEMENTS, CALCIUM BALANCE ELEMENTS, AND HALOGENS in mg/Lit

		measured	Reference Range	rel. 35 psu
Sodium	Na	10275	9500 - 10700 - 11500	11042
Sulfur	S	871	850 - 900 - 950	936
Sulfate	SO ₄ ²⁻	2610	2550 - 2700 - 2850	2804
Potassium	K	378	380 - 395 - 420	406
Boron	B	4,2	3,8 - 4,5 - 5,5	4,51
Magnesium	Mg	1360	1200 - 1350 - 1450	1461
Calcium	Ca	525	400 - 425 - 440	564
Strontium	Sr	10,1	6,5 - 8,0 - 9,0	10,85
Chloride	Cl ⁻	18197	18700 - 19500 - 20300	19555
Bromine (total bromine, ICP-OES)	Br	78,1	55 - 67 - 75	83,9
Fluoride	F ⁻	0,89	0,9 - 1,3 - 1,6	0,96
Iodine (Total Iodine, ICP-OES)	I	0,023	0,055 - 0,065 - 0,080	0,025

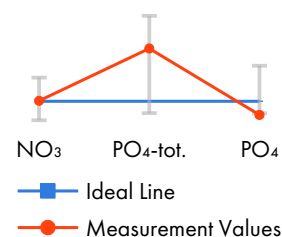
RELATION VALUES OF MACROELEMENTS AND HALOGENS

		measured	Reference Range
Salinity Meas. : Target Value	Sal.	0,93	0,97 - 1,00 - 1,03
KH Measurement : Target Value	KH	1,09	0,90 - 1,00 - 1,17
Magnesium : Salinity	Mg	41,8	33,3 - 38,6 - 42,6
Calcium : Salinity	Ca	16,1	11,1 - 12,1 - 12,9
Strontium: Salinity	Sr	0,31	0,18 - 0,23 - 0,26
Potassium : Salinity	K	11,6	10,6 - 11,3 - 12,4
Boron : Salinity	B	0,13	0,11 - 0,13 - 0,16
Chloride : Salinity	Cl ⁻	559	519 - 557 - 597
Sulfate : Salinity	SO ₄ ²⁻	80,1	71 - 77 - 84
Chloride : Sulfate	Cl ⁻ /SO ₄ ²⁻	6,97	6,6 - 7,2 - 8,0
Magnesium : Calcium	Mg/Ca	2,59	2,7 - 3,2 - 3,6
Calcium : Strontium	Ca/Sr	52	44 - 53 - 68
Bromide : Fluoride	Br ⁻ /F ⁻	87,8	34 - 52 - 83
Fluoride : Iodine	F ⁻ /I ⁻	38,7	11 - 20 - 29
Fluoride : Sulfur : Strontium	FSS	86,7	80 - 100 - 120



MACRO NUTRIENTS in mg/Liter

		measured	Reference Range
Nitrate	NO ₃ ⁻	5,1	1 - 10
Nitrite	NO ₂ ⁻	0,16	n.d. - 0,15
Phosphorus (ICP-OES)	P	0,042	0,006 - 0,060
Total Phosphate (calculated)	PO ₄ ³⁻ _{tot.}	0,129	0,02 - 0,18
ortho-Phosphate (photometric)	PO ₄ ³⁻	0,017	0,02 - 0,10
Silicon	Si	0,09	0,1 - 0,2
Silicate (calculated)	SiO ₂	0,2	0,2 - 0,4

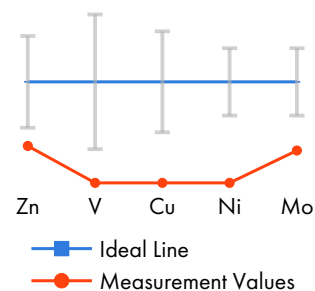


ORGANIC FACTORS

		measured	Reference Range
Total Phosphate : Nitrate	PO ₄ ³⁻ _{tot.} /NO ₃ ⁻	39,53	90 - 110
Total Phosphate : ortho-Phosphate	PO ₄ ³⁻ _{tot.} /PO ₄ ³⁻	7,588	1,00
Total Phosphate : Iodine	PO ₄ ³⁻ _{tot.} /I	5,6	0,13 - 1,67
SAK254 (m ⁻¹)		not measured	only with SAK254 upgrade
NPOC (mg/l)	C	not measured	only with organic upgrade
TNb (mg/l)	N	not measured	only with organic upgrade

Dynamic Elements in µg/Liter

		measured	Reference Range
Zinc	Zn	2,01	3 - 5,5 - 8
Vanadium	V	n.d.	2 - 6 - 10
Copper	Cu	n.d.	2 - 4 - 6
Nickel	Ni	n.d.	3 - 4,5 - 6
Molybdenum	Mo	4,8	10 - 15 - 20

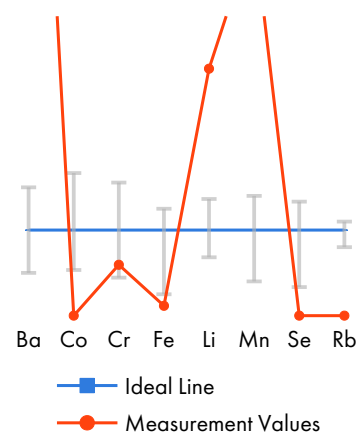


PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range
Barium	Ba	95,7	5 - max. 50
Cobalt	Co	n.d.	n.d. - max. 1,9
Chromium	Cr	1,07	n.d. - max. 2,3
Iron	Fe	0,23	n.d. - max. 2,5
Lithium	Li	* 635	180 - max. 350
Manganese	Mn	0,45	n.d. - max. 0,25
Selenium	Se	n.d.	n.d. - max. 2,0

only with ICP-MS upgrade:

Rubidium	Rb	not measured	
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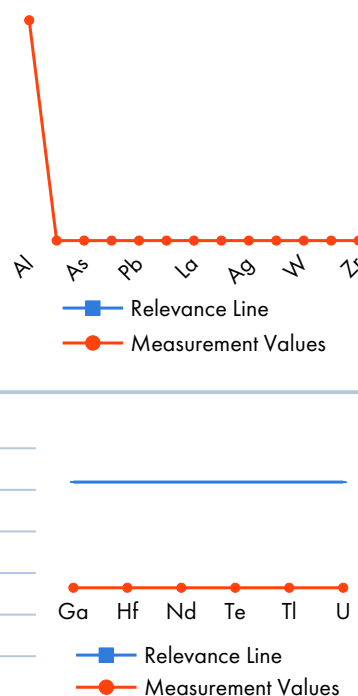


OTHER TRACE ELEMENTS AND POTENTIAL POLLUTANTS in µg/Liter

		measured	Reference Range
Aluminum	Al	23	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

only with ICP-MS upgrade:

Gallium	Ga	not measured	
Hafnium	Hf	not measured	
Neodymium	Nd	not measured	
Tellurium	Te	not measured	
Thallium	Tl	not measured	
Uranium	U	not measured	



OSMOSIS WATER

in mg/Liter		measured	Reference Range
Boron	B	0,07	n.d.
Calcium	Ca	4,4	n.d.
Potassium	K	1	n.d.
Magnesium	Mg	3,3	n.d.
Sodium	Na	47,8	n.d.
Sulfur	S	5,1	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	* 1,2	n.d.
Silicate (calculated)	SiO ₂	2,58	n.d.
in µg/Liter			
Barium	Ba	5,54	n.d.
Copper	Cu	n.d.	n.d.
Iron	Fe	n.d.	n.d.
Lithium	Li	n.d.	n.d.
Nickel	Ni	n.d.	n.d.
Zinc	Zn	0,23	n.d.
Aluminum	Al	7,09	n.d.
Antimony	Sb	n.d.	n.d.
Arsenic	As	n.d.	n.d.
Beryllium	Be	n.d.	n.d.
Lead	Pb	n.d.	n.d.
Cadmium	Cd	n.d.	n.d.
Chromium	Cr	n.d.	n.d.
Cobalt	Co	n.d.	n.d.
Lanthanum	La	n.d.	n.d.
Manganese	Mn	n.d.	n.d.
Molybdenum	Mo	n.d.	n.d.
Mercury	Hg	n.d.	n.d.
Selenium	Se	n.d.	n.d.
Silver	Ag	n.d.	n.d.
Strontium	Sr	34,1	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.
Zirconium	Zr	n.d.	n.d.

Overview of dosages

Product	Total quantity	spread over ...	corresponds	Priority	Checkbox
SALINITY	no need for action				
ELEMENTALS S	No dosage				
ELEMENTALS K	116 ml	1 day	116 ml/day	1	☐
ELEMENTALS B	No dosage				
ELEMENTALS MG	No dosage				
ELEMENTALS SR	No dosage				
ELEMENTALS BR	No dosage				
ELEMENTALS F	140 ml	1 day	140 ml/day	2	☐
TRACE I	29 ml	2 days	14 ml/day	2	☐ ☐
ELEMENTALS P	No dosage				
TRACE ZN	2 ml	2 days	1 ml/day	3	☐ ☐
TRACE V	8 ml	3 days	3 ml/day	3	☐ ☐ ☐
TRACE CU	27 ml	2 days	14 ml/day	3	☐ ☐
TRACE NI	8 ml	2 days	4 ml/day	3	☐ ☐
TRACE MO	12 ml	2 days	6 ml/day	3	☐ ☐
TRACE BA	No dosage				
TRACE CO	2 ml	1 day	2 ml/day	4	☐
TRACE CR	No dosage				
TRACE FE	No dosage				
TRACE LI	No dosage				
TRACE MN	No dosage				
TRACE SE	44 ml	4 days	11 ml/day	4	☐ ☐ ☐ ☐
TRACE RB	No dosage				

Upgrade options for a Reef ICP Total:

ICP-MS upgrade: Analysis of all trace elements (except aluminum and lithium) by ICP-MS with up to 1000x higher sensitivity compared to ICP-OES and analysis of exclusive elements. ICP-MS exclusive elements cannot be determined by ICP-OES, or not with sufficient sensitivity.

Organic upgrade: Determination of the concentrations of organic carbon (NPOC) and total nitrogen (TNb).

SAK254 upgrade: Determination of the indicator value for the concentration of unsaturated organic compounds.

Detection limits

Time-averaged detection limits for all relevant values are published regularly on lab.faunamarin.de.

Abbreviations:

ICP-OES (inductively coupled plasma with optical emission spectrometry), ICP-MS (inductively coupled plasma with mass spectrometry), SAK254 (spectral absorption coefficient at 254 nm), NPOC (not easily expelled organic carbon), TNb (total bound nitrogen), n.d. (not detectable).

* Measured value is too far outside the calibration range and cannot be precisely determined.