REEF ICP

Methodology: ICP-OES specific for seawater. Further methods possible via upgrades.

Recommended values are optimized for coral reef aquariums.

Sample ID:	**01156904**
Analysis ID:	**234172**
Booked upgrades:	**non**

Sampling Point:	Aquarium 1
Volume in Liters:	662
Sampling Date:	07-22-2025
Sample Arrival:	07-31-2025

To the dosing and action recommendations

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

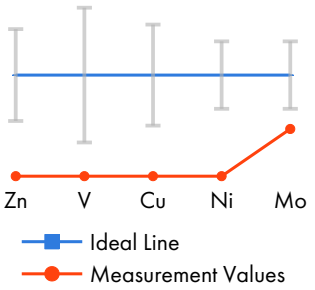
		measured	Reference Range		
Sodium	Na	**11203**	9500	**- 10700 -**	11500
Sulfur	S	**915**	850	**- 900 -**	950
Sulfate	SO_4^{2-}	**2741**	2550	**- 2700 -**	2850
Potassium	K	**437**	380	**- 395 -**	420
Boron	B	**4,49**	3,8	**- 4,5 -**	5,5
Magnesium	Mg	**1431**	1200	**- 1350 -**	1450
Calcium	Ca	**428**	400	**- 425 -**	440
Strontium	Sr	**8,1**	6,5	**- 8,0 -**	9,0
Bromine (total bromine, ICP-OES)	Br	**69**	55	**- 67 -**	75
Iodine (Total Iodine, ICP-OES)	I	**0,015**	0,055	**- 0,065 -**	0,080

MACRO NUTRIENTS in mg/Liter

		measured	Reference Range		
Phosphorus (ICP-OES)	P	**0,004**	0,006	- max.	0,060
Total Phosphate (calculated)	$PO_4^{3-}{}_{tot.}$	**0,012**	0,02	-	0,18
Silicon	Si	**0,08**	0,1	-	0,2
Silicate (calculated)	SiO_2	**0,17**	0,2	-	0,4

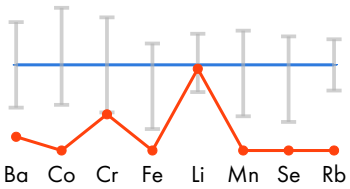
Dynamic Elements in µg/Liter

		measured	Reference Range		
Zinc	Zn	**n.d.**	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	**7**	10	- 15 -	20



PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range		
Barium	Ba	**1,6**	5	- max.	50
Cobalt	Co	**n.d.**	n.d.	- max.	1,9
Chromium	Cr	**0,76**	n.d.	- max.	2,3
Iron	Fe	**n.d.**	n.d.	- max.	2,5
Lithium	Li	**210**	180	- max.	350
Manganese	Mn	**n.d.**	n.d.	- max.	0,25
Selenium	Se	**n.d.**	n.d.	- max.	2

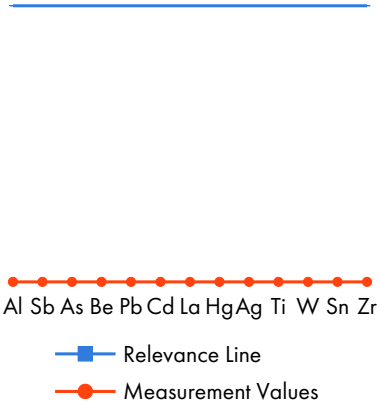


only with ICP-MS upgrade:

Rubidium	Rb	**not measured**

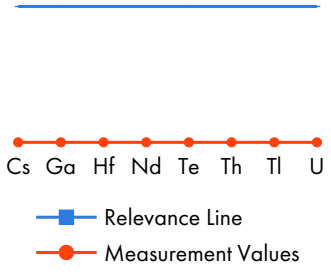
OTHER TRACE ELEMENTS AND POTENTIAL POLLUTANTS in µg/Liter

		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	**n.d.**	n.d.	- max.	10
Zirconium	Zr	**n.d.**	n.d.	-	2,2



only with ICP-MS upgrade:

Cesium	Cs	**not measured**
Gallium	Ga	**not measured**
Hafnium	Hf	**not measured**
Neodymium	Nd	**not measured**
Tellurium	Te	**not measured**
Thorium	Th	**not measured**
Thallium	Tl	**not measured**
Uranium	U	**not measured**



ORGANIC FACTORS

		measured	Reference Range	
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

Overview of dosages

Product	Total quantity	spread over ...	corresponds	Priority	Checkbox
SALINITY	no need for action				
ELEMENTALS S	No dosage				
ELEMENTALS K	Water change			1	
ELEMENTALS B	No dosage				
ELEMENTALS MG	No dosage				
ELEMENTALS SR	No dosage				
ELEMENTALS BR	No dosage				
TRACE I	33,1 ml	2 days	16,6 ml/day	2	☐☐
ELEMENTALS P	No dosage				
TRACE ZN	3,6 ml	2 days	1,8 ml/day	3	☐☐
TRACE V	7,9 ml	4 days	2,0 ml/day	3	☐☐☐☐
TRACE CU	26,5 ml	2 days	13,3 ml/day	3	☐☐
TRACE NI	7,4 ml	2 days	3,7 ml/day	3	☐☐
TRACE MO	8,8 ml	2 days	4,4 ml/day	3	☐☐
TRACE BA	111,0 ml	2 days	55,5 ml/day	4	☐☐
TRACE CO	1,7 ml	1 day	1,7 ml/day	4	☐
TRACE CR	No dosage				
TRACE FE	2,5 ml	2 days	1,3 ml/day	4	☐☐
TRACE LI	No dosage				
TRACE MN	0,3 ml	1 day	0,3 ml/day	4	☐
TRACE SE	42,4 ml	4 days	10,6 ml/day	4	☐☐☐☐
TRACE RB	No dosage				

Upgrade options for a Reef ICP:

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).