TOTAL REEF ICP TEST

FAUNA MARIN ICP LAB

Sample ID:	**019394Q**
Sample type:	Seawater
Volume aquarium in Litre:	380
Sample name:	Reef 90G
Sampling date:	05-17-2022
Date of receipt:	06-07-2022

Method: ICP-OES (inductively coupled plasma with optical emission spectrometry) and further procedures specifically for seawater.

Recommended values are optimized for coral reef aquariums.

You can find detailed information on the elements as well as recommendations for action and precise dosing instructions at:

https://lab.faunamarin.de/en/home/analysis/26852

Basic physical-chemical values

	measured	reference range
Conductivity (mS/cm 25°C)	**49.4**	51,7 - 53,0 - 54,5
Density (kg/Liter 25°C)	**1.021**	1,022 - 1,023 - 1,024
Specific density (25°C)	**1.024**	1,026 - 1,027
Salinity (ppt, psu)	**32.3**	34,0 - 35,0 - 36,0
pH level	**7.32**	7,90 - 8,30 - 8,40
Carbonate hardness (in °dKH)	**6.7**	6,5 - 7,3 - 8,5
CO_2 (mg/l)	**9.31**	0,04 - 2,5
acid binding capacity pH 4,3 (mmol/L)	**2.39**	2,3 - 2,58 - 3,0
odor	**none**	none
colour	**none**	none

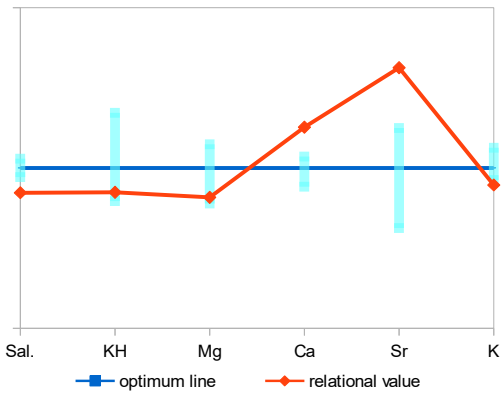
Major elements, lime elements and halogens
in mg/Litre (1 mg = 0,001 g)

		measured	reference range	rel. 35 psu
Chloride	Cl^-	**17867**	18700 - 19500 - 20300	**19374**
Sodium	Na	**10035**	9500 - 10700 - 11500	**10881**
Sulphur	S	**824**	850 - 900 - 950	**893**
Sulphate	SO_4^{2-}	**2469**	2550 - 2700 - 2850	**2677**
Potassium	K	**374**	380 - 395 - 420	**406**
Boron	B	**3.93**	3,80 - 4,50 - 5,50	**4.26**
Magnesium	Mg	**1226**	1200 - 1350 - 1450	**1329**
Calcium	Ca	**479**	400 - 425 - 440	**519**
Strontium	Sr	**10.5**	6,50 - 8,00 - 9,00	**11.39**
Bromine	Br	**64.4**	55,0 - 67,0 - 75,0	**69.8**
Fluoride	F^-	**0.92**	0,90 - 1,30 - 1,60	**1**
Iodine (total iodine, ICP-OES)	I	**0.01**	0,055 - 0,065 - 0,080	**0.011**

Relational values major elements and halogens - graphic representation salinity line

		relational value	reference range
Salinity measured : nominal	Sal.	**0.92**	0,97 - 1,00 - 1,03
KH measured : nominal	KH	**0.92**	0,90 - 1,00 - 1,17
Magnesium : Salinity	Mg	**38**	33,3 - 38,6 - 42,6
Calcium : Salinity	Ca	**14.8**	11,1 - 12,1 - 12,9
Strontium: Salinity	Sr	**0.33**	0,18 - 0,23 - 0,26
Potassium : Salinity	K	**11.6**	10,6 - 11,3 - 12,4
Boron : Salinity	B	**0.12**	0,11 - 0,13 - 0,16
Chloride : Salinity	Cl^-	**554**	519 - 557 - 597
Sulphate : Salinity	SO_4^{2-}	**76.5**	71,0 - 77,0 - 84,0
Chloride : Sulphate	Cl^-/SO_4^{2-}	**7.24**	6,60 - 7,20 - 8,00
Magnesium : Calcium	Mg/Ca	**2.56**	2,70 - 3,20 - 3,60
Calcium : Strontium	Ca/Sr	**45.6**	44,0 - 53,0 - 68,0
Bromide : Fluoride	Br^-/F^-	**70**	34,0 - 52,0 - 83,0
Fluoride : Iodine	F^-/I	**92**	11,0 - 20,0 - 29,0

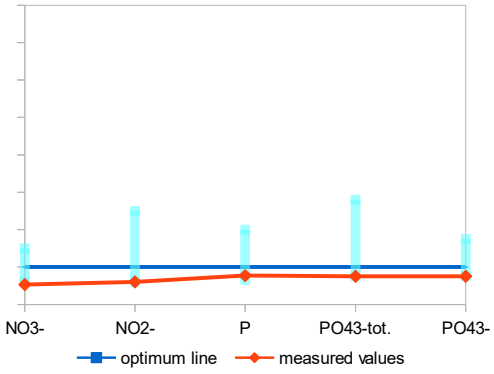
Salinity line



Macronutrients
in mg/Litre (1 mg = 0,001 g)

		measured	reference range
Nitrate	NO_3^-	**0.3**	1,00 - 10,0
Nitrite	NO_2^-	**0.01**	< 0,20
Phosphorus (ICP-OES)	P	**0.007**	< 0,06
Total Phosphate (calculated)	$PO_{4\ tot.}^{3-}$	**0.02**	0,02 - 0,18
Ortho-Phosphate (photometric)	PO_4^{3-}	**0.02**	0,02 - 0,10
Silicon	Si	**0.96**	0,10 - 0,20
Silicate (calculated)	SiO_2	**2.07**	0,20 - 0,40
Relational values			
Total Phosphate : Nitrate		**16**	90 - 110
Total Phosphate : Ortho-Phosphate		**1**	~ 1,00
Total Phosphate : Iodine		**2.15**	0,13 - 1,67

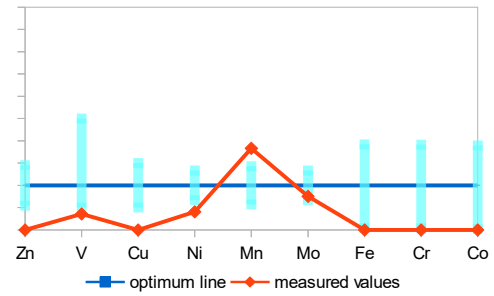
Nutrients



Physiologically relevant trace elements and color-relevant micronutrients
in µg/Litre (1 µg = 0,000001 g)

		measured	reference range
Zinc	Zn	**n.n.**	3,00 - 8,00
Vanadium	V	**1.44**	2,00 - 10,0
Copper	Cu	**n.n.**	2,00 - 6,00
Nickel	Ni	**1.83**	3,00 - 6,00
Manganese	Mn	**0.32**	0,10 - 0,25
Molybdenum	Mo	**11.3**	10,0 - 20,0
Iron	Fe	**n.n.**	0,05 - 2,50
Chrome	Cr	**n.n.**	0,05 - 2,30
Cobalt	Co	**n.n.**	0,02 - 1,90

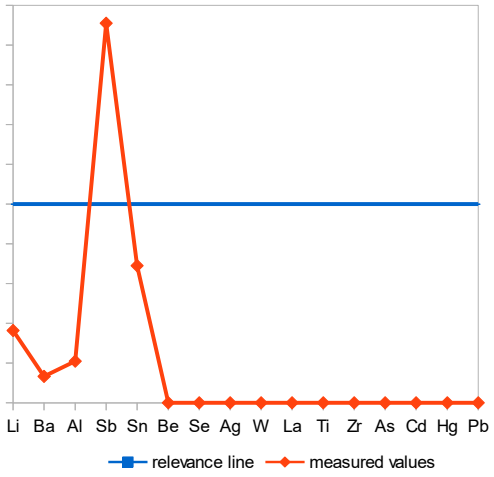
Dynamic Elements



Other trace elements and potential harmful substances
in µg/Litre (1 µg = 0,000001 g)

		measured	reference range
Lithium	Li	**182**	180 - 350
Barium	Ba	**26.6**	5,00 - 50,0
Aluminium	Al	**6.3**	5,00 - 30,0
Antimony	Sb	**19.1**	< 10,0
Tin	Sn	**6.9**	< 10,0
Beryllium	Be	**n.n.**	0,05 - 1,40
Selenium	Se	**n.n.**	0,90 - 5,50
Silver	Ag	**n.n.**	< 10,0
Tungsten	W	**n.n.**	< 30,0
Lanthanum	La	**n.n.**	2,00 - 10,0
Titanium	Ti	**n.n.**	0,50 - 3,50
Zirconium	Zr	**n.n.**	1,00 - 2,20
Arsenic	As	**n.n.**	< 1,00
Cadmium	Cd	**n.n.**	< 1,00
Mercury	Hg	**n.n.**	< 1,00
Lead	Pb	**n.n.**	< 1,00

Relevance line



Osmosis water
in mg/Liter (1 mg = 0,001 g)

		measured	reference range
Calcium	Ca	**n.n.**	n.n.
Potassium	K	**n.n.**	n.n.
Magnesium	Mg	**n.n.**	n.n.
Sodium	Na	**n.n.**	n.n.
Sulphur	S	**n.n.**	n.n.
Phosphorus (ICP-OES)	P	**n.n.**	n.n.
Total Phosphate (calculated)	$PO_{4\ tot.}^{3-}$	**n.n.**	n.n.
Silicon	Si	**0.07**	n.n.
Silicate (calculated)	SiO_2	**0.14**	n.n.

in µg/Liter (1 µg = 0,000001 g)

Aluminium	Al	**n.n.**	n.n.
Lead	Pb	**n.n.**	n.n.
Cadmium	Cd	**n.n.**	n.n.
Chrome	Cr	**n.n.**	n.n.
Iron	Fe	**n.n.**	n.n.
Copper	Cu	**n.n.**	n.n.
Lithium	Li	**1.89**	n.n.
Nickel	Ni	**n.n.**	n.n.
Mercury	Hg	**n.n.**	n.n.
Tin	Sn	**n.n.**	n.n.
Zinc	Zn	**0.86**	n.n.

Measured values of type "> 24" indicate that the concentration is above the calibrated range and therefore cannot be determined definitively. In these cases it is indicated how much at least is present (e.g. 24 µg/l). Abbreviations: n.g. (not measured), n.n. (not detectable).