



# MG • CA

## For the determination of the magnesium content in marine aquariums by complexometric titration Visual method of color change

### Definition

This test is designed to determine the magnesium content in marine aquariums in the range of 1100 to 1500 mg/L Mg.

Organisms like hard corals, sea urchins, crayfish and seashells form calcareous skeletons and calcareous shells respectively. To ensure a balanced growth and optimal living conditions they require sufficient amounts of calcium as well as magnesium. Furthermore magnesium serves as calcification inhibitor which prevents the precipitation of calcium as lime.

### Method

The determination of the magnesium content is carried out in two consecutive steps by complexometric titration.

It is impossible to analyse solely the magnesium content. Initially the total content of alkaline earth ions (magnesium and calcium) has to be determined, followed by a second step in which the calcium content is determined. The magnesium content of the water occurs via the subtraction of the calcium content from the total amount of alkaline earth ions.

Alkaline earth ions form a red colored complex with the used indicator. Titration with Na<sub>2</sub>-EDTA (Titriplex III) releases the indicator while the alkaline earth ions are complexed by EDTA. The free indicator has a greenish-blue color. A change of color from red to greenish-blue indicates the endpoint of the titration.

### Reagents

The reagents are ready for use and have a shelf life until the printed expiry date. Store reagents at +15 ... 25 °C and protected from direct light at the dark.

### Number of Determinations

The content is sufficient for approximately 30 analyses.

Resolution/measuring accuracy: 1 drop corresponds to 75 mg/L alkaline earth ions.

Resolution/measuring accuracy: 1 drop corresponds to 20 mg/L Ca.

### Risks and Safety

Please observe the necessary precautions for use of laboratory reagents. Applications should be performed by expert personnel only. Follow the national and laboratory internal guidelines for work safety. Wear suitable protective clothing and disposable gloves while handling.



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For additional safety information please refer to the information on the label and the corresponding Safety Data Sheet (SDS).

Download by QR-Code or link:

[www.sds-id.com/100156-5.100157-4.100158-3.100159-2.100160-9](http://www.sds-id.com/100156-5.100157-4.100158-3.100159-2.100160-9)

### Content

073010-6001	KIT	MG Magnesium; consisting of:
073011-0030	MG1	1× 30 mL Reagent MG1
073012-0030	MG2	1× 30 mL Reagent MG2
073021-0030	CA1	1× 30 mL Reagent CA1
073022-0002	CA2	1× 2.0 g Reagent CA2
073023-0030	CA3	1× 30 mL Reagent CA3
		1× Syringe 5 mL
		2× Testing vial
		1× Measuring spoon for CA2

### Reference Range

The optimal magnesium content of marine aquariums varies from 1200 to 1400 mg/L Mg.

### Application

#### Preparation

Use fresh aquarium water for analysis. \*1)

Rinse the testing vial several times with the sample water to be tested.



## Procedure

Hold the dropper bottle vertically while adding drops. Close reagent bottle immediately after use.

Use testing vial "MG" solely for the determination of the total content (Mg + Ca).

Use testing vial "CA" solely for the determination of the calcium content.

### Step 1: Total content alkaline earth ions

- Use the enclosed syringe to fill the testing vial "MG" with exactly **5 mL** of the aquarium water.<sup>2)</sup>
- Add **3** drops of reagent **MG1** and mix well by gentle shaking. The solution changes to red.
- Add reagent **MG2** dropwise. Count the number of drops needed until the color of the solution changes to greenish-blue. Note the number of drops needed.

### Step 2: Calcium content

- Use the enclosed syringe to fill the testing vial "CA" with exactly **5 mL** of the aquarium water.<sup>2)</sup>
- Add **10** drops of reagent **CA1** and mix by shaking briefly. Possible turbidity of the solution does not impact further measurements.
- Add **1** spoonful of reagent **CA2** and mix well by shaking briefly. The color changes to red.<sup>3)</sup>
- Add reagent **CA3** dropwise. Mix the solution sufficiently after each drop by rotating movement. Count the number of drops needed until the solution changes to pure blue. Note the number of drops needed.

Procedure chart:

#### Step 1: Total content alkaline earth ions

**Sample:** 5 mL

**Reagent MG1:** 3 drops

**Reagent MG2:** X. drops

Mix well after each drop.

Color change from red via grey to greenish-blue.

#### Step 2: Calcium content

**Sample:** 5 mL

**Reagent CA1:** 10 drops

**Reagent CA2:** 1 spoonful

**Reagent CA3:** X. drops

Mix well after each drop.

Color change from red via purple to blue.

To make sure the color change does not occur delayed at end of the titration wait shortly after each drop added.

Place the testing vial in front of a white background or on a white piece of paper in order to see the color change more clearly.

To assure that the actual endpoint of the titration is reached add an additional drop to the sample. If the color does not change for 30 seconds the titration is finished (the additional drop is not counted).

## Analysis

Initially the alkaline earth ion content and the calcium content have to be calculated.

Step 1:                      Number of drops × 75                      = mg/L Alkaline earth ions

Step 2:                      Number of drops × 20                      = mg/L Calcium

Then the calculated amounts have to be subtracted.

mg/L Alkaline earth ions - mg/L Calcium                      = mg/L Magnesium

## Notes

This product information exclusively relates to the product described in this leaflet. In particular, this product information cannot be applied to similar reagents from other manufacturers.

### Instructions for Use

Close reagent bottle immediately after use, avoid touching the dropper.

Rinse testing vial and syringe with distilled water.

Solutions containing dyes are subject to a limited shelf life. If the test results deviate strongly from the expected results the test should be reviewed with a reference solution.

### Support / Information service

For methodological and technical support, please contact us by E-Mail at [support@bioanalytic.de](mailto:support@bioanalytic.de) (German, English).

Periodically check for updates of this product information on our website.

### Feedback

Information from users can be reported to [support@bioanalytic.de](mailto:support@bioanalytic.de) (German, English).

Suggestions for further developments will be considered.

### Waste Management

Please observe your national laws and regulations.

Used and expired solutions must be disposed of in accordance with your local regulations.

Inside the EU, national regulations apply that are based on the current, amended version of Council Directive 67/548/EEG on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

Decontaminated packaging can be disposed of as household waste or recycled, unless otherwise specified.

## Literature & Footnotes

Legends for the graphic symbols and tags used follow relevant norms or are available on our internet pages.

- \*1) Rinse testing vial solely with distilled water after use. Rinse with tap water can lead to higher test results in following determinations due to containing ions. Store testing vial dry and dust free.
- \*2) The precision of the volume is substantial for the accuracy of the measuring result. The expire date printed on the blister package of the syringe refers to the sterility and has no relevance to the measuring result.