

APPLICATION NOTE

Exaqua
method procedure
Z480M Iodine I₂
Marine water

Exaqua



Measurement procedure for determining the content of iodine in marine water

SPECIFICATION

Description:	Test for determining the content of iodine in marine water
Range:	10 – 200 ppb
Resolution:	5 ppb
Wavelength:	520 nm
Temperature range:	14 – 34 °C (53 – 93 °F)

Reagent set:

List of components:

Product code 8480

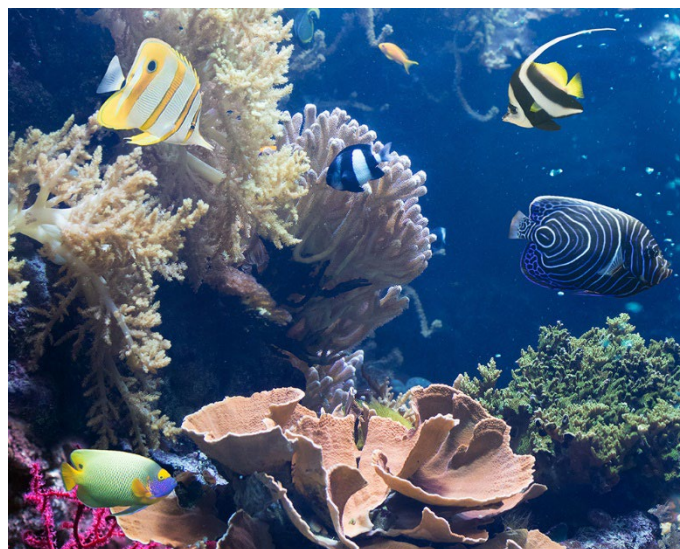
- Reagent I₂-1
- Reagent I₂-2 – 2 pcs.
- Reagent I₂-3 – 3 pcs.

Reagents for approx. 25 tests

IODINE IN MARINE WATER

Iodine is an essential element for the proper functioning of many marine organisms. In marine water, iodine occurs mainly in two forms - as iodide and iodate. Studies show that the ratio of these two forms in marine water is 1 : 1. Corals and shellfish such as shrimp and crabs need iodine to regulate their metabolism and produce hormones. Additionally, iodine plays a key role in the synthesis of pigments that allow corals to adapt to changing light conditions and protect their tissues from UV light.

Iodine deficiency can inhibit important biological processes. On the other hand, excess of iodine is toxic to fish and invertebrates. For this reason, iodine levels in marine water must be effectively controlled. Typical iodine concentrations in marine water are between 0 and 25 ppb. However, an optimal level of iodine in a healthy reef tank is considered to be 60 ppb.



Iodine plays a key role for marine organisms

PERFORMING THE MEASUREMENT

METHOD DESCRIPTION

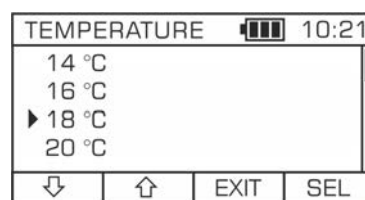
Exaqua colorimetric-kinetic method for iodine in marine water takes advantage of the catalytic effect of iodides and iodates on changing the colour of a coloured complex. Laboratory tests conducted so far required long reaction times and strict sample temperature control. Exaqua offers its users an adaptation of the catalytic method in the form of a method for determining iodine in marine water adjusted to the needs of water analysis. To enhance user convenience, the method incorporates temperature setting which adjusts the reaction time based on the entered ambient temperature. At room temperature, the waiting time for the result is limited to a dozen of minutes. The method allows determination of iodine content in the form of iodides, iodates and even their mixtures at levels as low as 10 ppb with a resolution of 5 ppb.

PERFORMING THE MEASUREMENT

1. Select the **Z480M Iodine I2** method (Methods → Select method → Z480M Iodine I2).
2. Start the test by activating the Guide function by pressing the **GUIDE** key. Go to the next step in the Guide after completing each of the steps below.

GUIDE function is a convenient system that will provide you with step-by-step basic instructions how to perform measurement. It also counts down and signals the end of the reaction wherever required.

3. Prepare two vials and rinse them three times with the tested water.
4. Choose from the list the ambient temperature and confirm it by pressing the **SEL** button. The accuracy of temperature setting does not affect the accuracy of the result, the given temperature is indicative and affects only the reaction time selected by the photometer.

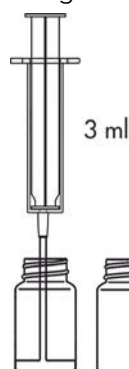


Choose from the list the ambient temperature and confirm with **SEL** button.

Note:

The method is intended for measurements in the temperature range from 14 – 34 °C (53 – 93 °F).

5. Fill both vials with exactly 3 ml of the tested water using a 5 ml syringe.

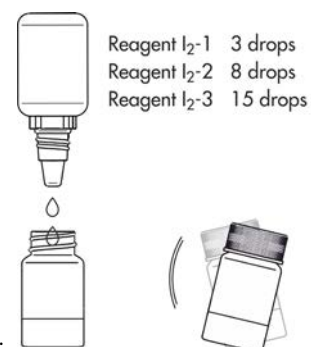


Note:

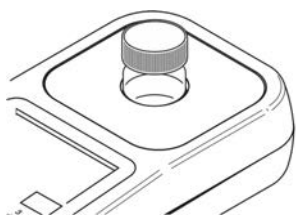
Make sure no air bubbles are present in the syringe. Trapped air bubbles can affect accuracy of the measurement.

First vial

6. Add **3** drops of **Reagent I₂-1** and shake gently to mix.
7. Add **8** drops of **Reagent I₂-2** and shake gently to mix.
8. Add **15** drops of **Reagent I₂-3** and shake gently to mix.



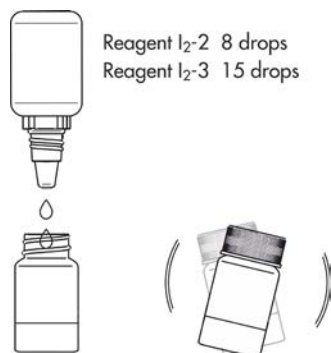
- Replace cap on the vial and quickly insert into the vial holder. Press the **MEAS** key to perform the first measurement.



- Set the vial aside.

Second vial

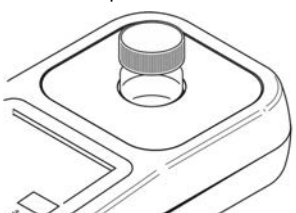
- Add **8** drops of **Reagent I₂-2** and shake gently to mix.
- Add **15** drops of **Reagent I₂-3** and shake gently to mix.
- Replace the cap on the vial and quickly insert into the vial holder. Press the **MEAS** key to perform the second measurement.



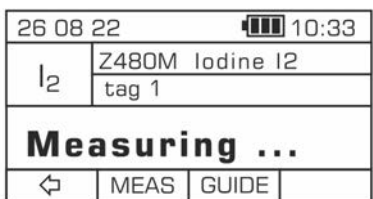
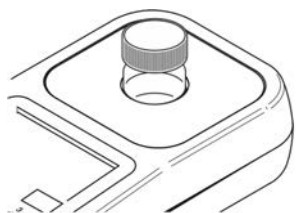
- Set the vial aside.

Final measurement

- Insert the **first vial** into the round vial holder.
- Wait until the time displayed on the timer elapses. The reaction time depends on the set ambient temperature.



- The photometer will automatically perform a third measurement after the time set on the in-built timer has passed.
- Insert the **second vial** into the round vial holder.
- Wait until the photometer automatically performs the final measurement after the built-in timer has elapsed.
- The result – **the concentration of iodine** – is displayed in **ppb (µg/l)**.



METHOD PERFORMANCE

The table below shows results obtained using the method Z480M. The term 'spike' used in this table stands for the water samples with the addition of a standard, i.e. with an increased iodine content. The reading is presented as an arithmetic mean of the obtained results ± standard deviation (SD). The recovery is calculated as a reading value reduced by an average value of marine water without the addition of a standard (spike).

	Reading [ppb] Average ± SD	Recovery
Marine aquarium 1	20 ± 2	n/a
Spike 40 ppb	62 ± 6	41 ppb (103%)
Spike 80 ppb	106 ± 4	86 ppb (107%)
Marine aquarium 2	25 ± 0,2	n/a
Spike 40 ppb	66 ± 2	41 ppb (103%)
Spike 80 ppb	99 ± 3	74 ppb (93%)
Synthetic sea water	14 ± 5	n/a
Spike 40 ppb	48 ± 4	34 ppb (84%)
Spike 80 ppb	93 ± 2	78 ppb (98%)
Demineralised water	12 ± 2	n/a

POTENTIAL INTERFERENCES

strongly oxidizing or reducing agents	may cause falsely high readings
the presence of: mercury (Hg) and silver (Ag) ions	may cause falsely low readings
very low content of chloride, below 500 ppm	may cause falsely low readings

CAUTION

Reagent I₂-3 contains nitric acid and shall be handled with care. Wear gloves and eye protection. Wash hand thoroughly after handling. Irritating to eyes. Irritating to skin. Keep out of the reach of children. Follow all precautions specified in the safety data sheet.

