

Overview

The test is suitable for the photometric determination of total hardness. The test is suitable for water.

- Measuring range:
 - 1.0–20.0 mg/L °d (method 0431)
 - 0.2–3.6 mmol/L (method 0432)
 - 1–25 mg/L °e (method 0433)
 - 2–36 mg/L °f (method 0434)
 - 10–100 mg/L Ca²⁺ (method 0435)
 - 5–50 mg/L Mg²⁺ (method 5–50 mg/L Mg²⁺)
 - 20–350 mg/L CaCO₃ (method 20–350 mg/L CaCO₃)
- Number of tests: 20
- Wavelengths for photometric determination: 540 / 570 nm
- Shelf life: 18 months
- Reaction time: 1 minute
- Storage temperature: 15–25 °C
- Storage conditions: upright

Method

Photometric determination of total hardness with phthalein purple. The use of a selective masking agent permits a differentiation between calcium and magnesium.

Interferences

The following contaminants do not interfere with the test up to the indicated concentrations. The cumulative effect of different interfering ions has not been tested.

Data in mg/L:

- Cu²⁺: 5

The method is suitable for the analysis of seawater after 1+29 dilution. Turbidities cause higher measurement values.

Concentrations above the double measuring range can simulate results within the measuring range and can therefore be misinterpreted. Dilute the sample until the measured value is within the measuring range. For waters of unknown concentrations we recommend that you perform the test with widely different dilutions until the last dilution confirms the previous value.

Reagents and accessories

Contents of reagents set:

- 20 test tubes R0
- 1 reagent R3
- 1 NANOFIX R2

Required devices:

- MACHEREY-NAGEL photometer
- Digital piston pipette 200–1000 µL (REF 91671) with pipette tips (REF 91667)
- Digital piston pipette 50–200 µL (REF 916914) with pipette tips (REF 916915)
- Tweezers for sampling NANOFIX capsules (REF 916114)

Sampling and preparation

See DIN EN ISO 5667-3-A 21.

Adjust to pH 4–9 prior to analysis.

Quality control

The measurement of a blank value and a standard is recommended before every measuring series as quality control measure.

Quality data:

The following data were determined during production according to ISO 8466-1 and DIN 38402-A51:

- Number of LOTS: 24
- Standard deviation of the method: ± 0.4 mg/L °dH
- Coefficient of variation of the process: ± 4.2 %
- Confidence interval: ± 1.2 mg/L °dH

Specified data for procedure:

- Sensitivity (absorbance of 0.010 A corresponds to): ± 0.2 mg/L °dH
- Accuracy of a measurement value: ± 1.9 mg/L °dH
- LOT-specific certificates are available at www.mn-net.com.

Procedure

Determination of total hardness (method 0431–0434)

1. Open test tube
2. Add 1 NANOFIX R2
3. Seal test tube and shake vigorously
4. Open test tube again
5. Pipette 200 µL of sample into test tube
6. Seal test tube and shake vigorously
7. Wait 1 min
8. Clean outside of test tube
9. Measure

Determination of calcium (method 0435, switch sub method)

10. Measurement against blank value (cuvette with measuring value total hardness instead of sample) is necessary
11. Open test tube
12. Add 200 µL R3
13. Seal test tube and shake vigorously
14. Wait 1 min
15. Clean outside of test tube
16. Measure
17. Determination of magnesium (methode 0436)
18. Measure (cuvette with measuring value calcium)

Disposal

Information regarding disposal can be found in the safety data sheet. You can download the SDS from www.mn-net.com/SDS.

Notes

When using a standard, the measured value is constant over a period of min. 30 min.

When using other photometers, make sure measurements are possible in test tubes (16 mm OD) and calibrate the method.

Test a sample of distilled water (REF 918932) to generate a blank value for the reagent.

Use the correction value when measuring cloudy or colored samples (see photometer handbook).

Information regarding safety can be found on the box' label and in the safety data sheet. You can download the SDS from www.mn-net.com/SDS.

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