Supelco®

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1.11110.0001

MQuant®
Calcium Test

Ca

1. Method

Titrimetric determination with titration pipette
Calcium ions react with an indicator to form a red-violet complex compound. The indicator is released from this compound by titration with a solution of ethylenedinitrilotetraacetic acid disodium salt dihydrate (Titriplex® III). At the titration end-point the color changes to blue-violet. The calcium concentration is determined from the consumption of titration solution.
When the total hardness is also determined, it is possible to calculate the magnesium content (see section 7).

2. Measuring range and number of determinations

Measuring range [1]	Graduation of the titration pipette	Number of determinations [2]
2 - 200 mg/l Ca	**2 mg/l Ca**	200 at 170 mg/l Ca

[1] with 1 full pipette
[2] In the case of calcium contents of more than 170 mg/l, the maximum number of determinations possible is fewer than 200 (see section 10).

3. Applications

Sample material:
Groundwater and surface water
Waters from aquaculture
Drinking water
Mineral water
Boiler water
Wastewater
This test is **not suited** for seawater.

4. Influence of foreign substances

Strontium and barium ions are measured at the same time.
Higher concentration of phosphate ions interfere with the determination.

5. Reagents and auxiliaries

Please note the warnings on the packaging materials!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

Package contents:
4 bottles of reagent Ca-1
1 bottle of reagent Ca-2 (indicator)
2 bottles of reagent Ca-3 (titration solution)
1 graduated 5-ml plastic syringe
1 test vessel
1 titration pipette
1 card with brief instruction

Other reagents:
MQuant® Universal indicator strips pH 0 - 14, Cat. No. 1.09535
Sodium hydroxide solution 1 mol/l TitriPUR®, Cat. No. 1.09137
Hydrochloric acid 1 mol/l TitriPUR®, Cat. No. 1.09057
MQuant® Total Hardness Tests, Cat. No. 1.08039,
measuring range 0.25 - 25 °e (with 1 full pipette)
MQuant® Total Hardness Tests, Cat. No. 1.08047,
measuring range 0.13 - 7 °e (with 1 full pipette)
Calcium chloride dihydrate GR for analysis, Cat. No. 1.02382

6. Preparation

The pH must be within the range 6 - 8.
Adjust, if necessary, with sodium hydroxide solution or hydrochloric acid.

7. Procedure

Rinse the test vessel several times with the pretreated sample.		
Pretreated sample (**15 - 30 °C**)	5 ml	Inject into the test vessel with the syringe.
Reagent Ca-1	10 drops [1]	Add and swirl.
Reagent Ca-2	2 level grey microspoons (in the cap of the Ca-2 bottle)	Add and dissolve. The sample turns **red-violet** in color in the presence of calcium.

Place the titration pipette **loosely** on the open reagent bottle Ca-3. **Slowly** withdraw the piston of the titration pipette from its lowest position until the **lower** edge of the black piston seal is level with the zero mark of the scale. (This fills **only the dropping tube** with the titration solution.)

Remove the titration pipette and briefly wipe the tip of the dropping tube. Then **slowly** add the titration solution dropwise to the sample **while swirling** until its color changes from **red-violet** to **blue-violet**. Shortly before the color changes, wait a few seconds after adding each drop.

Read off the result in mg/l from the scale of the titration pipette at the **lower** edge of the black piston seal.

[1] **Hold the bottle vertically while adding the reagent!**

Determination of the magnesium content:

Determine the total hardness in addition to the calcium content:
with the MQuant® Total Hardness Test Cat No. 1.08039
or
with the MQuant® Total Hardness Test Cat. No. 1.08047
(for soft waters)

Mg content [mg/l] = (total hardness [°e] x 5.71 - Ca content [mg/l]) x 0.6064

Notes on the measurement:

- While filling the titration pipette, it must **not** be screwed tightly on the reagent bottle!
- After the analysis inject any titration solution still remaining in the pipette back into the reagent bottle Ca-3 and **close the reagent bottle tightly using the pipette instead of the screw cap**.

8. Conversions

required / given	mg/l Ca	mg/l $CaCO_3$	mmol/l $CaCO_3$ or Ca
mg/l Ca	1	2.50	0.025
mg/l $CaCO_3$	0.400	1	0.010
mmol/l $CaCO_3$ or Ca	40.08	100.1	1

9. Method control

To check test reagents, measurement device, and handling:
Dissolve 3.67 g of calcium chloride dihydrate in distilled water, make up to 1000 ml with distilled water, and mix. Ca content: 1000 mg/l.
Dilute this standard solution to 100 mg/l Ca and analyze as described in section 7.
Additional notes see under **www.qa-test-kits.com**.

10. Notes

- Reclose the reagent bottles immediately after use.
- Store the reagent bottle Ca-3 (titration solution) **with the titration pipette firmly attached** lying flat in the corresponding depression in the pack.
- Rinse the test vessel and the syringe **with distilled water only**.
- In titrimetric determinations the consumption of titration solution is dependent on the concentration of the substance to be determined. The quantities of the indicator and the titration solution contained in the reagent bottles have been calculated to suffice for 200 determinations each of 170 mg/l Ca. The following applies for other calcium contents:

Ca content mg/l	Number of determinations	Indicator solution	Titration solution
2 -170	200	is used up completely	A remainder is left over.
>170	<200	A remainder is left over.	is not sufficient for 200 determinations

- **Information on disposal can be obtained at www.disposal-test-kits.com.**

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