

1.14815.0001

Spectroquant® Calcium Test

Ca

1. Method

In alcoholic-alkaline solution calcium ions react with modified glyoxal-bis(2-hydroxyanil) to form a red-violet complex that is determined photometrically.

2. Measuring range and number of determinations

Cell mm	Measuring range			Number of determinations
	mg/l Ca	mg/l CaO	mg/l CaCO ₃	
10	1.0 - 15.0	1.4 - 21.0	2.5 - 37.5	100
10	10 - 160	14 - 224	25 - 400	
20	5 - 80	7 - 112	12 - 200	

For programming data for selected photometers / spectrophotometers see www.service-test-kits.com.

3. Applications

Sample material:

Groundwater and surface water
Seawater
Drinking water and mineral water
Boiler water
Soils after appropriate sample pretreatment

4. Influence of foreign substances

This was checked in solutions containing 100 (10) and 0 mg/l Ca. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. The values in parentheses apply for the measuring range 1.0 - 15.0 mg/l Ca.

Concentrations of foreign substances in mg/l or %					
Al ³⁺	1000	Mg ²⁺	500 (100)	EDTA	0
Cr ³⁺	5 (1)	Mn ²⁺	50 (10)	Surfactants ¹⁾	1000
Cr ₂ O ₇ ²⁻	1000	NH ₄ ⁺	1000	Na-acetate	1 % (0.2 %)
Cu ²⁺	0.5 (0.1)	Ni ²⁺	500 (100)	NaCl	20 % (4 %)
F ⁻	500 (100)	NO ₂ ⁻	1000	NaNO ₃	20 % (4 %)
Fe ³⁺	5 (1)	PO ₄ ³⁻	5 (1)	Na ₂ SO ₄	10 % (2 %)
K ⁺	1000	Zn ²⁺	50 (10)		

¹⁾ tested with nonionic, cationic, and anionic surfactants

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:

1 bottle of reagent Ca-1
1 bottle of reagent Ca-2
1 bottle of reagent Ca-3
2 AutoSelectors

Other reagents and accessories:

MColorpHast™ Universal indicator strips pH 0 - 14, Cat. No. 109535
Sodium hydroxide solution 1 mol/l TitriPUR®, Cat. No. 109137
Hydrochloric acid 1 mol/l TitriPUR®, Cat. No. 109057
Calcium standard solution CertiPUR®, 1000 mg/l Ca, Cat. No. 119778
Hydrochloric acid 25 % for analysis EMSURE®, Cat. No. 100316
2-Propanol for analysis EMSURE®, Cat. No. 109634

Pipettes for pipetting volumes of 0.10, 0.50 and 5.0 ml
Rectangular cells 10 and 20 mm (2 of each), Cat. Nos. 114946 and 114947

6. Preparation

- **The glassware and the cells must be free from surfactants!** It is thus recommended to leave these items to stand filled with alcoholic hydrochloric acid (25 ml of hydrochloric acid 25 % + 75 ml of 2-propanol) for several hours and subsequently rinse them thoroughly with distilled water.
- Analyze immediately after sampling.
- **The pH must be within the range 4 - 10.** Adjust, if necessary, with sodium hydroxide solution or hydrochloric acid.
- Filter turbid samples.

7. Procedure

Measuring range 1.0 - 15.0 mg/l Ca:

Pretreated sample (20 - 35 °C)	0.50 ml	Pipette into a test tube.
Reagent Ca-1	5.0 ml	Add with pipette and mix.
Reagent Ca-2	4 drops ¹⁾	Add and mix.
Reagent Ca-3	4 drops ¹⁾	Add and mix.

Leave to stand for exactly 8 min (reaction time), then fill the sample into a 10-mm cell, and measure in the photometer.

¹⁾ Hold the bottle vertically while adding the reagent!

Measuring range 5 - 160 mg/l Ca:

Pretreated sample (20 - 35 °C)	0.10 ml	Pipette into a test tube.
Reagent Ca-1	5.0 ml	Add with pipette and mix.
Reagent Ca-2	4 drops ¹⁾	Add and mix.
Reagent Ca-3	4 drops ¹⁾	Add and mix.

Leave to stand for exactly 8 min (reaction time), then fill the sample into the cell, and measure in the photometer.

¹⁾ Hold the bottle vertically while adding the reagent!

Notes on the measurement:

- **Certain photometers may require a blank** (preparation as per measurement sample, but with distilled water instead of sample).
- For photometric measurement the cells must be clean. Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-high readings.
- The pH of the measurement solution must be above 12.
- **The color of the measurement solution remains stable for only a short time after the end of the reaction time stated above.** (After 10 min the measurement value would have diminished by 5 %, after 30 min by 25%.)

8. Analytical quality assurance

recommended before each measurement series

To check the photometric measurement system (test reagents, measurement device, handling) and the mode of working, a dilute calcium standard solution containing 7.5 or 80 mg/l Ca can be used.

Sample-dependent interferences (matrix effects) can be determined by means of standard addition.

Additional notes see under www.qa-test-kits.com.

Characteristic quality data:

In the production control, the following data were determined in accordance with ISO 8466-1 and DIN 38402 A51:

	Measuring range mg/l Ca	
	1.0 - 15.0	5 - 160
Standard deviation of the method (mg/l Ca)	± 0.20	± 1.5
Coefficient of variation of the method (%)	± 3.0	± 1.9
Confidence interval (mg/l Ca)	± 0.6	± 3
Number of lots	28	28

Characteristic data of the procedure:

	Measuring range mg/l Ca		
	1.0 - 15.0	5 - 80	10 - 160
Sensitivity: Absorbance 0.010 A corresponds to (mg/l Ca)	0.3	0.7	1.4
Accuracy of a measurement value (mg/l Ca)	max. ± 1.8	max. ± 3	max. ± 6

For quality and batch certificates for Spectroquant® test kits see the website.

9. Notes

- Reclose the reagent bottles immediately after use.
- **Information on disposal can be obtained at www.disposal-test-kits.com.**

