

Supelco®

1.14839.0001

Spectroquant® Boron Test

B

1. Method

In acidic solution borate ions react with a diol to form chelates that are selectively extracted. In the extract the chelates react with curcumin to form a red complex that is determined photometrically.

The method is analogous to EPA 212.3, APHA 4500-B B, and ASTM D3082-15.

2. Measuring range and number of determinations

Cell	Measuring range	Number of determinations
10 mm	0.050 - 0.800 mg/l B	60

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

3. Applications

This test measures all boric acids and their respective salts. It is also capable of measuring perborates of the formula $\text{NaBO}_2 \times \text{H}_2\text{O}_2$. Samples must be decomposed by digestion before complex-bound boron can be measured.

Sample material:

Groundwater and surface water
Drinking water and mineral water
Wastewater
Soils after appropriate sample pretreatment
Fertilizers after appropriate sample pretreatment
This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked individually in solutions containing 0.2 and 0 mg/l B. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l or %					
Ag ⁺	1000	Cu ²⁺	1000	Pb ²⁺	1000
Al ³⁺	1000	F ⁻	100	PO ₄ ³⁻	1000
Ca ²⁺	1000	Fe ³⁺	1000	S ²⁻	1000
Cd ²⁺	1000	Hg ²⁺	100	SiO ₃ ²⁻	1000
CN ⁻	100	Mg ²⁺	1000	Sn ²⁺	1000
Co ²⁺	1000	Mn ²⁺	1000	SO ₃ ²⁻	1000
CO ₃ ²⁻	10	NH ₄ ⁺	1000	Zn ²⁺	1000
Cr ³⁺	1000	Ni ²⁺	1000		
Cr ₂ O ₇ ²⁻	25	NO ₂ ⁻	100		
				EDTA	1000
				Surfactants ¹⁾	250
				Na-acetate	15 %
				NaCl	20 %
				NaNO ₃	5 %
				Na ₂ SO ₄	20 %

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 B-1
1 bottle of reagent B-2
1 bottle of reagent B-3
1 bottle of reagent B-4
1 bottle of reagent B-5¹⁾
1 bottle of reagent B-6
2 test tubes with screw caps
1 AutoSelector

¹⁾ The bottle containing the reagent B-5 may become discolored. Any discoloration have no negative impact on the functionality of the test.

Other reagents and accessories:

MQuant® pH-indicator strips pH 0 - 6.0, Cat. No. 109531
Boron standard solution Certipur®, 1000 mg/l B, Cat. No. 119500

Pipettes for pipetting volumes of 0.50, 0.80, 1.0, 1.5, 5.0, and 6.0 ml
Rectangular cells 10 mm (2 pcs), Cat. No. 114946

6. Preparation

- Thoroughly rinse the test tubes with distilled water prior to each determination.
- Analyze immediately after sampling.
- The pH must be within the range 1 - 13.

7. Procedure

Pretreated sample (20 - 40 °C)	5.0 ml	Pipette into a test tube with screw cap.
Reagent B-1	1.0 ml	Add with pipette and mix. The pH must be below 1. Check with MQuant® pH-indicator strips. Adjust the pH, if necessary, by adding reagent B-1 dropwise.
Reagent B-2	1.5 ml	Attention! The reagent contains chloroform! Add carefully with pipette, close the test tube tightly , and shake vigorously for 1 min: lower (organic) phase = extract
Extract	0.50 ml	Withdraw with pipette and transfer to the second test tube.
Reagent B-3	0.80 ml	Add to the second tube with pipette, close tightly , and mix.
Reagent B-4	4 drops ¹⁾	Add to the second tube, close tightly , and mix.
Reagent B-5	18 drops ^{1, 2)}	Attention! The reagent contains concentrated sulfuric acid! Wear eye protection! Carefully add the reagent to the second tube, close tightly , and mix.

Leave to stand for 12 min (reaction time A).

Reagent B-6	6.0 ml	Add to the second test tube with pipette, close tightly , and mix.
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Leave to stand for 2 min (reaction time B), then fill the sample into a 10-mm cell, and measure in the photometer.

¹⁾ Hold the bottle vertically while adding the reagent!

²⁾ The bottle containing the reagent B-5 may become discolored. Any discoloration have no negative impact on the functionality of the test.

Notes on the measurement:

- Due to the temperature dependence of the color reaction, both the sample and the reagents should have a temperature of at least 20 °C.
- Certain photometers may require a blank** (preparation as per measurement sample, but with distilled water instead of sample). The blank is yellow in color.
- 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 color of the measurement solution remains stable for at least 60 min after the end of the reaction time B stated above.

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 boron standard solution containing 0.400 mg/l B 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.

For quality and batch certificates for Spectroquant® test kits see the website, where you will find all data in production control, that are determined in accordance with ISO 8466-1 and DIN 38402 A51.

9. Notes

- Reclose the reagent bottles immediately after use.
- The contents of the test tubes and of the cells as well as the test reagents must not be run off with the wastewater! Information on disposal can be obtained at www.disposal-test-kits.com.**

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