

1.09713.0001
1.09713.0002Spectroquant®
Nitrate TestNO₃⁻

1. Method

In sulfuric and phosphoric solution nitrate ions react with 2,6-dimethylphenol (DMP) to form 4-nitro-2,6-dimethylphenol that is determined photometrically. The method is analogous to DIN 38405-9.

2. Measuring range and number of determinations

Cell mm	Measuring range		Number of determinations
	mg/l NO ₃ -N	mg/l NO ₃ ⁻	
50	0.10 - 5.00	0.4 - 22.1	100 (Cat. No. 1.09713.0001)
20	0.5 - 12.5	2.2 - 55.3	or
10	1.0 - 25.0	4.4 - 110.7	250 (Cat. No. 1.09713.0002)

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

3. Applications

This test is not suited for the determination in waters with chloride contents exceeding 1000 mg/l and COD values exceeding 500 mg/l.

Sample material:

Groundwater, drinking water, and surface water

Spring water and well water

Mineral water

Wastewater and industrial water

Soils and fertilizers after appropriate sample pretreatment

This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked in solutions containing 10 and 0 mg/l NO₃-N. The determination is not yet interfered with up to the concentrations of foreign substances given in the table.

Concentrations of foreign substances in mg/l or %			
Al ³⁺	1000	Hg ²⁺	100
Ca ²⁺	500	Mg ²⁺	1000
Cd ²⁺	250	Mn ²⁺	1000
Cl ⁻	1000	NH ₄ ⁺	1000
CN ⁻	100	Ni ²⁺	500
Cr ³⁺	500	NO ₂ ⁻	5 ¹⁾
Cr ₂ O ₇ ²⁻	50	Pb ²⁺	100
Cu ²⁺	500	PO ₄ ³⁻	1000
F ⁻	1000	SiO ₃ ²⁻	500
Fe ³⁺	100	Zn ²⁺	1000
		Surfactants ²⁾	1000
		COD (K-hydrogen phthalate)	500
		Organic substances (glucose)	500
		Na-acetate	25 %
		NaCl	0.2 %
		Na ₂ SO ₄	25 %

¹⁾ In cases of higher concentrations, eliminate nitrite ions acc. to section 6.

²⁾ 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 NO₃-11 bottle of reagent NO₃-2

1 AutoSelector

Other reagents and accessories:

MQuant™ Chloride Test, Cat. No. 110079,

measuring range 500 - ≥3000 mg/l Cl⁻

MQuant™ Nitrite Test, Cat. No. 110007,

measuring range 2 - 80 mg/l NO₂⁻ (0.6 - 24 mg/l NO₂-N)

Amidosulfuric acid for analysis EMSURE®, Cat. No. 100103

MColorpHast™ pH-indicator strips pH 0 - 6.0, Cat. No. 109531

Sulfuric acid 25 % for analysis EMSURE®, Cat. No. 100716

MQuant™ Nitrate Test, Cat. No. 110020,

measuring range 10 - 500 mg/l NO₃⁻ (2.3 - 113 mg/l NO₃-N)

Spectroquant® CombiCheck 20, Cat. No. 114675

Nitrate standard solution CRM, 0.500 mg/l NO₃-N, Cat. No. 125036Nitrate standard solution CRM, 2.50 mg/l NO₃-N, Cat. No. 125037Nitrate standard solution CRM, 15.0 mg/l NO₃-N, Cat. No. 125038

Empty cells 16 mm with screw caps (25 pcs), Cat. No. 114724

Pipettes for pipetting volumes of 0.50 and 4.0 ml

Rectangular cells 10, 20, and 50 mm (2 of each), Cat. Nos. 114946, 114947, and 114944

Semi-microcells 50 mm (2 pcs), Cat. No. 173502

6. Preparation

- Analyze immediately after sampling.
- Check the chloride content with the MQuant™ Chloride Test. Samples containing more than 1000 mg/l Cl⁻ must be diluted with distilled water.
- Check the nitrite content with the MQuant™ Nitrite Test. If necessary, eliminate interfering nitrite ions (stated amounts apply for nitrite contents of up to 50 mg/l): To 10 ml of sample add approx. 50 mg of amidosulfuric acid and dissolve. **The pH of this solution must be within the range 1 - 3.** Adjust, if necessary, with sulfuric acid.
- Check the nitrate content with the MQuant™ Nitrate Test. Samples containing more than 25.0 mg/l NO₃-N (110.7 mg/l NO₃⁻) must be diluted with distilled water.
- Filter turbid samples.

7. Procedure

Reagent NO ₃ -1	4.0 ml	Pipette into a dry test tube ¹⁾ .
Pretreated sample (5 - 25 °C)	0.50 ml	Add with pipette, do not mix!
Reagent NO ₃ -2	0.50 ml	Add with pipette (Wear eye protection! The mixture becomes hot!) and mix, holding only the upper part of the tube!

Leave the hot reaction solution to stand for 10 min (reaction time). Do not cool with cold water!

Fill the sample into the rectangular cell and measure in the photometer.

¹⁾ Empty cells Cat. No. 114724 are recommended that can be sealed with screw caps, thus enabling the sample to be mixed safely.

For measurement in the **50-mm cell** both the sample volume as well as the quantities of reagents NO₃-1 and NO₃-2 must be doubled. Alternatively, the semi-microcell Cat. No. 173502 can be used.

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 color of the measurement solution remains stable for 30 min after the end of the reaction time stated above. (After 60 min the measurement value would have increased by 5 %.)

8. Analytical quality assurance

recommended before each measurement series

To check the photometric measurement system (test reagent, measurement device, handling) and the mode of working, the nitrate standard solutions CRM, 0.500 mg/l NO₃-N (Cat. No. 125036), 2.50 mg/l NO₃-N (Cat. No. 125037), and 15.0 mg/l NO₃-N (Cat. No. 125038) or Spectroquant® CombiCheck 20 can be used. Besides a **standard solution** with 9.0 mg/l NO₃-N, CombiCheck 20 also contains an **addition solution** for determining sample-dependent interferences (matrix effects).

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 (10-mm cell):

Standard deviation of the method (mg/l NO ₃ -N)	± 0.10
Coefficient of variation of the method (%)	± 0.82
Confidence interval (mg/l NO ₃ -N)	± 0.3
Number of lots	25

Characteristic data of the procedure:

	Measuring range mg/l NO ₃ -N	
	0.10 - 5.00	1.0 - 25.0
Sensitivity: Absorbance 0.010 A corresponds to (mg/l NO ₃ -N)	0.04	0.2
Accuracy of a measurement value (mg/l NO ₃ -N)	max. ± 0.12	max. ± 0.6

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.**

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