



Nitrate Test

 1.10020.0001
 1.10020.0002

NO₃⁻

1. Method

Nitrate ions are reduced to nitrite ions by a reducing agent. In the presence of an acidic buffer, these nitrite ions react with an aromatic amine to form a diazonium salt, which in turn reacts with N-(1-naphthyl)-ethylene-diamine to form a red-violet azo dye. The nitrate concentration is measured **semiquantitatively** by visual comparison of the reaction zone of the test strip with the fields of a colour scale.

Each strip also features a second reaction zone (**alert zone**), the colour of which changes in the presence of nitrite ions.

2. Measuring range and number of determinations

Measuring range / colour-scale graduation ¹⁾	Number of determinations
10 - 25 - 50 - 100 - 250 - 500 mg/l NO₃⁻	25 (Cat. No. 1.10020.0002) or
2.3 - 5.6 - 11 - 23 - 56 - 113 mg/l NO₃-N	100 (Cat. No. 1.10020.0001)

¹⁾ for conversion factors see section 8

3. Applications

The determination can be performed not only in liquid samples, but also on moist surfaces of e.g. freshly cut fruit and vegetables (see section 7).

Sample material:

Groundwater, wellwater, and drinking water
 Spring water and mineral water
 Industrial water, wastewater, percolating water
 Aquarium water
 Pressed plant and fruit juices
 Food and animal fodder after appropriate sample pre-treatment
 Soils and fertilizers after appropriate sample pretreatment
 This test is **only conditionally suited** for seawater (false-low readings).

4. Influence of foreign substances

This was checked in solutions with 50 and 0 mg/l NO₃⁻. The concentrations of foreign substances given in the table lie below the limit at which the determination is interfered with.

Concentrations of foreign substances in mg/l			
Ag ⁺	50	Fe ³⁺	250
Al ³⁺	1000	[Fe(CN) ₆] ⁴⁻	100
Ba ²⁺	1000	[Fe(CN) ₆] ³⁻	100
Ca ²⁺	1000	Hg ⁺	50
Cl ⁻	1000	Hg ²⁺	100
CN ⁻	1000	K ⁺	1000
Co ²⁺	1000	Mg ²⁺	1000
CrO ₄ ²⁻	20	Mn ²⁺	1000
Cu ²⁺	1000	MnO₄⁻	10
Fe ²⁺	500	Ni ²⁺	1000
		NO₂⁻	0.5
		Pb ²⁺	1000
		PO ₄ ³⁻	1000
		S ²⁻	25
		SCN ⁻	100
		SO ₃ ²⁻	500
		SO ₄ ²⁻	1000
		S ₂ O ₃ ²⁻	250
		Zn ²⁺	1000

5. Reagents and auxiliaries

The test strips are stable up to the date stated on the pack when stored closed at +2 to +8 °C.

Package contents:

Tube containing 25 test strips (Cat. No. 1.10020.0002)
 or
 containing 100 test strips (Cat. No. 1.10020.0001)

Other reagents:

Universal indicator strips pH 0 - 14, Cat. No. 109535
 Sodium acetate anhydrous GR for analysis, Cat. No. 106268
 L-(+)-Tartaric acid GR for analysis, Cat. No. 100804
 Amidosulfuric acid GR for analysis, Cat. No. 100103
 Nitrate standard solution CertiPUR[®], 1000 mg/l NO₃⁻, Cat. No. 119811

6. Preparation

- Extract solid sample materials by an appropriate method.
- Samples containing more than 500 mg/l NO₃⁻ must be diluted with distilled water.
- **The pH must be within the range 1 - 12.**
 If the pH is lower than 1, buffer the sample with sodium acetate; if it is greater than 12, adjust to approx. 3 - 5 with tartaric acid.

7. Procedure

Immerse **both reaction zones** of the test strip in the pre-treated sample (15 - 25 °C) for 1 sec.

Shake off excess liquid from the strip and **after 1 min** determine with which colour field on the label the colour of the NO₃⁻ reaction zone coincides most exactly. **If the NO₂⁻ alert zone changes colour see "Notes on the measurement".**

Read off the corresponding result in mg/l NO₃⁻ or, if necessary, estimate an intermediate value.

Determination on vegetable surfaces:

Cut plant material (e.g. fruit, vegetables, potatoes) with a knife, lightly press the reaction zone of the test strip on the moist surface **for 1 - 10 sec**, and **after 1 min** compare with the colour scale.

Notes on the measurement:

- The colour of the reaction zone may continue to change after the specified reaction time has elapsed. This must not be considered in the measurement.
- If necessary (discolouration of the alert zone), eliminate interfering nitrite ions:
 To 5 ml of sample (pH < 10) add 5 drops of a 10 % aqueous amidosulfuric acid solution and shake several times.
 Subsequently repeat the nitrate measurement.
- If the colour of the reaction zone is equal to or more intense than the darkest colour on the scale, repeat the measurement using **fresh**, diluted samples until a value of less than 500 mg/l NO₃⁻ is obtained.
 Concerning the result of the analysis, the dilution (see also section 6) must be taken into account:

Result of analysis = measurement value x dilution factor

- **It is recommended to treat the measurement results obtained on moist surfaces only as guideline values.**

8. Conversions

Units required	= units given	x	conversion factor
mg/l NO ₃ -N	mg/l NO ₃ ⁻		0.226
mg/l NO ₃ ⁻	mg/l NO ₃ -N		4.43

9. Method control

To check test strips and handling:
 Dilute the nitrate standard solution with distilled water to 250 mg/l NO₃⁻ and analyze as described in section 7.

10. Note

Reclose the tube containing the test strips immediately after use.