

Photometer Method

NITRATE (NITRATEST)

**AUTOMATIC
WAVELENGTH
SELECTION**

**TEST FOR NITRATE IN NATURAL,
DRINKING AND WASTE WATERS**

**0 – 1 mg/l N
0 – 20 mg/l N**

Nitrates are normally present in natural, drinking and waste waters. Nitrates enter water supplies from the breakdown of natural vegetation, the use of chemical fertilisers in modern agriculture and from the oxidation of nitrogen compounds in sewage effluents and industrial wastes.

Nitrate is an important control test for water supplies. Drinking waters containing excessive amounts of nitrates can cause methaemoglobinaemia in bottle-fed infants (blue babies). The EEC has set a recommended maximum of 5.7 mg/l N (25 mg/l NO₃) and an absolute maximum of 11.3 mg/l N (50 mg/l NO₃) for nitrate in drinking water.

The Palintest Nitratetest method provides a simple test for nitrate nitrogen over the range 0 - 1 mg/l N. The test can however be extended to cover the range 0 - 20 mg/l by a simple dilution technique.

Method

In the Palintest Nitratetest method nitrate is first reduced to nitrite, the resulting nitrite is then determined by a diazonium reaction to form a reddish dye.

The reduction stage is carried out using the unique zinc-based Nitratetest Powder, and Nitratetest Tablet which aids rapid flocculation after the one minute contact period. The test is conducted in a special Nitratetest Tube - a graduated sample container with hopper bottom to facilitate settlement and decanting of the sample.

The nitrite resulting from the reduction stage, is determined by reaction with sulphanilic acid in the presence of N-(1-naphthyl)-ethylene diamine to form a reddish dye. The reagents are provided in a single Nitricol tablet which is simply added to the test solution.

The intensity of the colour produced in the test is proportional to the nitrate concentration and is measured using a Palintest Photometer.

Reagents and Equipment

Palintest Nitratetest Powder (Spoon Pack)

Palintest Nitratetest Tablets

Palintest Nitricol Tablets

Palintest Nitratetest Tube, 20 ml (PT 526)

Palintest Automatic Wavelength Selection Photometer

Round Test Tubes, 10 ml (PT 595)

Test Procedure

- 1 Fill the Nitratest Tube with sample to the 20 ml mark.
- 2 Add one level spoonful of Nitratest Powder and one Nitratest tablet. Do not crush the tablet. Replace screw cap and shake tube well for one minute.
- 3 Allow tube to stand for about one minute then gently invert three or four times to aid flocculation. Allow tube to stand for three minutes or longer to ensure complete settlement.
- 4 Remove screw cap and wipe around the top of the tube with a clean tissue. Carefully decant the clear solution into a round test tube, filling to the 10 ml mark.
- 5 Add one Nitricol tablet, crush and mix to dissolve.
- 6 Stand for 10 minutes to allow full colour development.
- 7 Select Phot 23 on Photometer for result as mg/l N, or Phot 63 for result as mg/l NO₃.
- 8 Take Photometer reading in usual manner (see Photometer instructions).

Note

To convert mg/l N to mg/l NO₃ multiply result by 4.4.

Concentrations of nitrate greater than 1.0 mg/l may be determined by diluting the original sample with deionised water. The test can be conveniently carried out over a range 0 - 20 mg/l N as follows :-

Take a clean Nitratest Tube. Add 1 ml of sample using a pipette or graduated dropper. Fill the Nitratest Tube to the 20 ml mark with deionised water. Continue the test procedure as given in steps 2 to 9 above. Multiply the chart reading obtained by 20 to obtain the nitrate concentration in the original sample.

Nitrite Correction

The Nitratest method will also respond to any nitrite present in the sample. In most natural and drinking waters the amount of nitrite will be small in comparison to the nitrate concentration. If it is desired to correct for nitrite, determine nitrite concentration (as mg/l N) in the prescribed manner (see PHOT.24.) and deduct from the nitrate concentration (as mg/l N) obtained from the Nitratest procedure.
