

## NITRATE METHOD 6

### Using Nitrate Test Powder

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#### INTRODUCTION

The Nitrate test provides a simple means of measuring Nitrate levels in water. Drinking waters containing excessive amounts of Nitrates can cause methaemoglobinaemia in bottle-fed infants (blue babies). For this reason a level of 10 mg/l of Nitrate has been established in the USA as the maximum allowable concentration of in public drinking water supplies. The EEC has set down a recommended maximum of 25mg./l. with an absolute maximum of 50mg./l. of NO<sub>3</sub> these amounts being equivalent to 5.65mg./l. and 11.3mg./l. as N respectively.

Nitrates, or Nitrogen compounds subsequently oxidized to form Nitrates, may enter water supplies from sewage effluents and from some industrial wastes. Furthermore, the use of chemical fertilisers in modern agriculture has led to a rapid rise in Nitrate levels of water sources and it is predicted that these levels will continue to rise.

#### PRINCIPLE OF THE METHOD

The Nitrate is first converted to nitrite by a simple rapid reduction procedure based on the use of a Nitrate Test powder, containing zinc as the reducing agent, and a Nitrate Test tablet for rapid flocculation and settlement after the one-minute contact period. The resultant nitrite concentration is then measured by the standard Nitrite LR method, the intensity of the colour produced being measured against Lovibond permanent colour glass standards calibrated in terms of Nitrate-Nitrogen. A correction may be required for any Nitrite originally present as such in the sample.

#### REAGENTS REQUIRED

1. **Lovibond Nitrate Test Powder**
2. **Lovibond Nitrate Test Tablets**
3. **Lovibond Nitrite LR Tablets**

The Nitrate Test powder is provided in a plastic tube with measuring spoon.

#### THE STANDARD LOVIBOND COMPARATOR DISC 3/124

The disc covers the range 0.1 to 1.0mg./l. Nitrate Nitrogen (N) in steps of 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 and 1.0mg./l. as N. This range may be extended to 0 to 20mg./l. by a simple dilution technique.

#### METHOD

1. Fill the special Nitrate test tube with sample to the mark (20ml.) (see Note 2). Then add one level spoonful of Nitrate Test powder and one Nitrate Test tablet. Do not crush the tablet. Replace screw cap and shake well for one minute. Allow to stand for about one minute. Then gently invert the tube 3 or 4 times to ensure complete flocculation, afterwards allowing a further two minute standing period for final settlement. Decant carefully into a 13.5mm./10ml. Comparator cell filling up to the 10ml. mark. (See Note 1).
2. Add to the 10ml. of treated sample one Nitrite LR tablet, crush and mix to dissolve. Place in the right-hand compartment of the Comparator.
3. Place a 13.5mm. cell containing the untreated sample in the left hand compartment (should the water sample be turbid or discoloured, use deionised or tap water for this blank).

4. After standing 10 minutes, match by holding the Comparator against a standard source of white light, such as the Lovibond Daylight 2000 Unit, or against North daylight (not fluorescent lighting), then rotating the disc until the nearest colour match is obtained.
5. The figure displayed in the bottom right-hand corner of the Comparator is the concentration of Nitrate in terms of Nitrogen (N) in mg./l.
6. Concentrations of Nitrate greater than 1.0mg./l. as N may be determined by diluting the original sample with deionised water free from Nitrate and Nitrite:-
7. First rinse the Nitrate Test tube with deionised water, then add the required volume of sample and make-up to the 20ml. mark with the same dilution water. Continue with the Nitrate Test reduction procedure and subsequent Nitrite LR colour test as given above. The disc reading is multiplied by the appropriate factor, for instance, if 1ml. of sample is taken, multiply by 20 thus giving a range 0 to 20mg./l. as N.

## NOTES

1. To correct for any Nitrite present in the original sample omit the Nitrate Test reduction stage and add one Nitrite LR tablet direct to 10ml. of sample in the cell. Crush and mix to dissolve and, after standing 10 minutes, match as before against the Nitrate disc.

Multiply this reading by 0.7 and deduct this value from the result of the full Nitrate test procedure. If a sample dilution procedure has been followed, multiply the disc reading by the appropriate factor before applying the Nitrite correction.

2. The special Nitrate Test tube is a graduated sample container, with hopper bottom to facilitate settlement and decantation.
3. To convert Nitrate results from mg./l. as N to mg./l. as  $\text{NO}_3$  multiply disc readings by 4.4.
4. Although Nitrite disc 3/103 and Nitrate 3/124 both use Nitrite LR tablets they are not interchangeable because of the different proportions of nitrogen in the nitrite & the nitrate ions respectively. If it is desired to obtain the Nitrite as (N) concentration from the Nitrate disc 3/124 reading, multiply by 0.7 as in the correction procedure of Note 1.

## REVISION HISTORY

Date	Change Note	Issue
17/06/02	36/460	2
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