

FLUORIDE METHOD 2

Using Acid Alizarin-Zirconium

PRINCIPLE OF THE METHOD

Zirconyl chloride and sodium alizarin sulphonate react, in acid solution, to form a brilliant reddish-violet lake. This colour is destroyed by fluoride to give the pale yellow colour of the alizarin sulphonate. Thus varying amounts of fluoride ion produce a range of colours from red to yellow and the concentration of fluoride can be measured by comparing the colour produced with a range of Lovibond permanent colour glass standards.

In this version of the method a novel procedure is introduced in order to cancel out interference. This makes use of a prepared blank in which the fluoride has been rendered in-active by complexing it with an excess of an aluminium salt. Phosphates can interfere but normally there is insufficient natural phosphate in waters to interfere significantly. Where waters are treated with hexametaphosphate amounts to 2mg./l. cause no interference.

REAGENTS REQUIRED

To simplify the use of this test in the field all the necessary reagents have been prepared in tablet form. The following tablets are required:

1. *Lovibond Fluoride A-Z Tablets*
2. *Lovibond Fluoride Excess AL Tablets*

THE STANDARD LOVIBOND NESSLERISER DISCS NOM AND NOT

Disc NOM is a wide range disc for general use. It covers the range 0 - 1.6mg./l. of fluoride (as F), in steps of 0.2mg./l.

Disc NOT is a narrow range disc for use with control of water fluoridation. It has nine standards with increments of 0.1mg./l., covering 0.2 to 0.5 and 1.1 to 1.5 inclusive. Intermediate values are found "by difference" as explained below.

TECHNIQUE

1. Fill two 50ml. Nessler cylinders to the mark with sample and to one add one Excess AL tablet.
2. Crush the tablet with the flattened end of a clean glass stirring rod and mix until the powder has completely dissolved. Any turbidity which develops at this stage can be ignored.
3. To each tube add one A-Z tablet, crush and mix rapidly until all of the powder has dissolved. If the same stirring rod is used for both cylinders make sure it is thoroughly rinsed before being transferred to the second cylinder.
4. Fill a third 50ml. Nessler cylinder to the mark with sample and place this in the left-hand compartment of the Nessleriser.
5. Allow the two treated samples to stand until the developed colours are both within the range of the standards on the disc (15 to 60 minutes).
6. Place the cylinders in turn in the right-hand compartment of the Nessleriser and match the colour against the standards in the disc using either North daylight or the Lovibond Daylight 2000 unit.

The difference between the readings from these two cylinders is the fluoride content of the sample in mg./l.

IMPORTANT

Allowing the samples to stand for too long before matching will result in the excess-Al colour being deeper than the lowest standard. Too short a development time on the other hand will result in the colour of the sample in the second cylinder being lighter than the highest standard. If using the narrow range disc (NOT), a shorter time period, say 15 to 30 minutes, is desirable.

NOTES

1. To determine Total Fluoride, as normally required for fluoridation control at waterworks and in distribution systems, follow the above procedure.
2. To check the fluoride dose at treatment works, determine total fluoride before and after fluoridation. The difference represents artificially added fluoride.
3. In the case of water samples which are turbid or discoloured by the presence of iron, it may be found desirable for correct colour matching to acidify the 50ml. sample placed in the left-hand compartment of the Nessleriser by the addition of 2 or 3ml. of diluted sulphuric acid.
4. The readings obtained by means of this disc and a Nessleriser are accurate only provided that Nessler cylinders are used which conform to the specification of those used in the original calibration i.e. that the 50ml. calibration mark is at a height of 113 ± 3 mm. from the bottom of the cylinder when measured internally.

REVISION HISTORY

Date	Change Note	Issue
14/05/02	36/460	2
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