

CHLORINE METHOD 2

Using Acid *o*-Tolidine

PRINCIPLE OF THE METHOD

For low concentrations of chlorine in potable and swimming waters, use is made of the reaction with *ortho*-tolidine, which gives a yellow colour in the presence of chlorine concentrations of the order of 5 parts per million and under. The same colour is given by nitrites in water, but if their presence is suspected a simple test is available. The yellow colour due to chlorine is destroyed by sodium thiosulphate (photographers' "hypo"), while that due to nitrites is not so destroyed. If, therefore, on the addition of a small crystal of "hypo" the yellow vanishes, this is confirmation that the colour is in fact due to chlorine. The moulded cell must be carefully washed after each test, or subsequent tests would be spoiled by any residual "hypo". **This method is no longer used in the U.K. as *o*-tolidine is a known carcinogen.**

REAGENTS REQUIRED

1. ***o*-Tolidine** 1g.
2. **Hydrochloric Acid (HCl)** concentrated 100ml.
3. **Deionised Water** zero chlorine demand, to produce 1000ml.

Add the *o*-Tolidine to the acid, premixed with about 200ml. water. Mix to dissolve and dilute to 1litre with the rest of the water.

All chemicals should be of analytical reagent quality, (***o*-tolidine is carcinogenic, and must be handled with due precautions**).

THE STANDARD LOVIBOND DISCS

Comparator:

3/2A	0.1 to 1.0mg./l. chlorine)	
3/2B	1.2 to 2.0mg./l. chlorine)	10ml. sample in 13.5mm./10ml. cells.
3/2AB	0.15 to 2.0mg./l. chlorine)	
3/2APC	1.0 to 5.0mg./l. chlorine	used with 5mm. cells; sample prepared in 10ml. cells.
3/2APA	0.02 to 0.3mg./l. chlorine)	20ml. sample in 40mm./20ml. cells.
3/2APB	0.2 to 0.8mg./l. chlorine)	

Nessleriser:

NCA	0.01 to 0.09mg./l. chlorine)	
NCB	0.1 to 0.5mg./l. chlorine)	50ml. sample in Nessler tubes
NCAB	0.02 to 0.5mg./l. chlorine)	

METHOD

Discs 3/2A, 3/2B and 3/2AB

1. Fill two 13.5mm./10ml. cells to the 10ml. mark with sample. Place one of the cells in the left-hand compartment of the Comparator.
2. To the other cell add 0.1ml reagent. Mix well, place the cell in the right-hand compartment and immediately match the colour produced by holding the Comparator facing a standard source of white light such as the Lovibond Daylight 2000 Unit or, failing this North daylight. Rotate the disc until the nearest colour match is obtained.

3. The value displayed in the bottom right-hand corner of the Comparator is the free chlorine concentration of the sample in mg./l..
 4. If the colour continues to develop after the initial reading (as indicated by a second reading after say 5 minutes) this indicates the presence of chloramines. In this case, allow to stand for a total of 15 to 20 minutes and take a second reading.
 5. If the colour continues to develop (as indicated by a second reading at say 5 minutes) this indicates the presence of chloramines. In this case, take a reading after allowing to stand for 15 to 20 minutes, which gives total residual chlorine. The difference between this and the original free chlorine reading gives combined chlorine.
- . Strongly alkaline water may require acidification, by the use of double the proper proportion of reagent, for full development of the colour.

Discs 3/2APA AND 3/2APB.

Follow the method above but take a 20ml. sample and 0.2ml. of reagent.

Disc 3/2APC.

Prepare a 10ml. sample as in the method above and transfer some of the mixture to a 5mm. cell.

Discs NCA, NCB and NCAB.

Follow the method above but take a 50ml. sample in a Nessler cylinder and add 0.5ml of reagent..

NOTES

It must be emphasized that the reading obtained by means of the Lovibond Nessleriser and disc are only accurate provided that Nessler cylinders are used which conform to the specification employed when the discs were calibrated, i.e. that the 50ml. calibration mark is at a height of 113 ± 3 mm. measured internally.

REVISION HISTORY

Date	Change Note	Issue
23/05/02	36/460	2
18/04/05	CA243	3
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