

Photometer Method

MANGANESE

AUTOMATIC WAVELENGTH SELECTION

**TEST FOR SOLUBLE
MANGANESE IN WATER**
(see also Phot 113)

0 – 0.030 mg/L

Manganese-containing minerals occur widely and manganese salts are commonly found in many natural waters. Manganese is an objectionable constituent in water used for domestic purposes or industrial applications. In domestic situations, manganese will cause brown or black staining to laundry or plumbing fittings even at very low concentrations. In process applications such as paper manufacturing or textile finishing similar staining can occur. Manganese salts may impart an astringent taste to drinking water supplies, and in swimming pool applications can give an aesthetically displeasing brown coloration to the water.

In most cases where manganese salts occur naturally in the water, it will be necessary to apply special methods of removal before the water can be used for domestic or industrial purposes. The Palintest Manganese test provides an extremely sensitive method of measuring low concentrations of manganese for the assessment of natural waters and the control of manganese removal plant. The test measures total manganese over the range 0 - 0.030 mg/L.

Method

Manganese may occur in water in various different valency states. In the first stage of the Palintest method, manganese in lower valency states is oxidised to form permanganate by the action of an oxidising agent. In the second stage the permanganate formed is further reacted with leucomalachite green to form an intense turquoise coloured complex. Catalysts and inhibitors are incorporated into the tablet reagents to ensure that the colour reaction proceeds correctly and interferences are eliminated.

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

Reagents and Equipment

Palintest Manganese No 1 Tablets
Palintest Manganese No 2 Tablets
Palintest Automatic Wavelength Selection Photometer
Round Test Tubes, 10 mL glass (PT 595)

Sample Collection

Manganese is readily absorbed onto the surfaces of sample containers. To avoid loss of manganese test sample as soon as possible after collection.

It is important, because of the extreme sensitivity of this test, to ensure that glassware used for the sample collection and test procedure is scrupulously clean. For most accurate results in laboratory use it is recommended that all glassware is acid-rinsed and then thoroughly washed out with deionised water before use.

Test Procedure

- 1 Fill test tube with sample to the 10 mL mark (see Note 1).
- 2 Add one Manganese No 1 tablet, crush and mix to dissolve.
- 3 Add one Manganese No 2 tablet, crush and mix to dissolve then cap the tube.
- 4 Stand for 20 minutes to allow colour development (see Note 2).
- 5 Select Phot 20 on Photometer.
- 6 Take Photometer reading in usual manner (see Photometer instructions).
- 7 The result is displayed as mg/L Mn.

Notes

- 1 Colour formation is extremely sensitive to temperature. The sample temperature should be $20^{\circ} \pm 1^{\circ}\text{C}$ for optimum test results.
 - 2 It is important to observe the standing period of 20 minutes \pm 1 minute for optimum test results. Any continuing colour development or colour change after this period should be ignored.
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