

## Technical Specification

Tests For: Soluble Manganese in Water

Test Range: 0–5 mg/L

Reagent Chemistry Used: Formaldoxime

Basis of Test Method: ISO6333

Method Detection Limit\*: 0.03 mg/L

Limit of Quantification\*\*: 0.08 mg/L

\*The Method Detection Limit (MDL) is defined as the minimum measured concentration of a substance that can be reported with 99% confidence to be different from the method blank results.<sup>i</sup>

\*\*The Limit of Quantification (LOQ) is the smallest quantity that can be detected with reasonable certainty for a given analytical procedure.<sup>ii</sup>

## Testing for Manganese

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 0–5 mg/L.

## Reagent Chemistry

Manganese may occur in water in various different valency states. This method offered is the Formaldoxime Method, with a range of 0–5 mg/L Mn. In alkaline solution manganese reacts with formaldoxime to form an orange-red complex. The colour developed is proportional to the manganese concentration.

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

## Interferences

Iron (II) and Iron (III) will interfere with the test and cause false positive results. Even low levels of Iron (0.1 mg/L) will interfere.

Copper will interfere and cause false positive results; this is characterised by the formation of a blue solution during the test.

## Best Practice Advice for Testing

- Manganese is readily absorbed onto the surfaces of sample contained. 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.

---

<sup>i</sup> EPA, Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, Dec 2016.

<sup>ii</sup> IUPAC. *Compendium of Chemical Terminology, 2nd ed. (the "Gold Book")*.