

## Technical Specification

**Tests For:** Low levels of iron (total) in natural and treated water

**Test Range:** 0–1.0 mg/L

**Reagent Chemistry Used:** BIPY complexation

**Method Detection Limit\*:** 0.01 mg/L

**Limit of Quantification\*\*:** 0.04 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 Iron

Iron occurs widely in nature and is found in many natural and treated waters. Iron is an objectionable constituent in both domestic and industrial water supplies. The presence of iron affects the taste of beverages and causes unsightly staining of laundered clothes, plumbing fittings, swimming pool surfaces and the like. The formation of insoluble iron deposits is troublesome in many industrial applications and in agricultural water uses such as drip feed irrigation. In industry iron salts occur through corrosion of plant and equipment, and from industrial processes.

Iron is therefore an important test for the monitoring of natural and drinking waters, for corrosion control in industry and for the checking of effluents and waste waters. The Palintest Iron LR test provides a simple test for the determination of low levels of iron in water over the range 0-1 mg/l Fe. The test responds to both ferrous and ferric iron and thus gives a measure of the total iron content of the water.

## Reagent Chemistry

The Palintest Iron LR test is based on a single tablet reagent containing 3-(2-Pyridyl)-5, 6-bis(4-phenyl-sulphonic acid)-1, 2, 4-triazine (PPST) formulated with a decomplexing/reducing agent in an acid buffer. The test is simply carried out by adding a tablet to a sample of the water under test. The decomplexing/reducing agent breaks down weakly complexed forms of iron and converts the iron from the ferric to the ferrous form. The ferrous iron reacts with PPST to form a pink coloration.

The intensity of the colour produced is proportional to the iron concentration and is measured using a Palintest Photometer.

## Interferences

### Iron Complexes

The test colour development will normally be complete within one minute. Continued colour development after this time is indicative of more strongly bound iron complexes in the water. In such cases the test solution should be stood for a longer period of 10-15 minutes, until colour development is complete.

In certain industrial applications strong complexing agents are added to act as corrosion inhibitors. Moreover, some samples may contain precipitated iron complexes or particles of metallic iron. These samples will require pre-treatment by a standard laboratory procedure if it is required to determine the total iron content. The usual method of pre-treatment is acidification-with or without boiling, depending, on the nature of the sample.

To use the Palintest Iron LR test after such pre-treatment procedures, add the Iron LR tablet to the acidified sample, adjust to pH 3.5 - 4.0 using ammonia or sodium hydroxide, then take the photometer reading in the normal manner.

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<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")*.