

Photometer Method

CHLORINE DIOXIDE HR

**AUTOMATIC
WAVELENGTH
SELECTION**

**TEST FOR CHLORINE DIOXIDE
RESIDUALS IN WATER**

0 – 20 mg/l

Chlorine dioxide is increasingly being chosen ahead of chlorine for use in many applications where it is believed to have several advantages.

Chlorine dioxide is used in water disinfection, where its ability to disrupt biofilm in pipe work makes it useful against certain waterborne micro organisms such as Legionella. Chlorine dioxide is also used in the food industry for control of micro organisms in fruit washing and is popular in the pulp and paper industry as a bleaching agent. The USEPA has rated chlorine dioxide as the best available technology for paper pulp bleaching due to its low environmental impact.

Chlorine dioxide may be generated on-site either electrolytically or by reacting chlorine with sodium chlorite solution. Water treated with chlorine dioxide may therefore also contain amounts of chlorine and chlorite. For the control of water treatment systems it is necessary to determine chlorine dioxide in the presence of these other residuals.

The Palintest Chlorine Dioxide method provides a specific method of determining chlorine dioxide in treated water, in the presence of free and combined chlorine and chlorite.

Method

In the Palintest Chlorine Dioxide test, Lissamine Green B is bleached under alkaline conditions by chlorine dioxide. An ammonium salt is used to prevent any interference by chlorine. This method can determine chlorine dioxide accurately in the presence of free and complexed chlorine, chlorite, chlorate, ozone, bromine and permanganate.

Reagents and Equipment

Palintest Chlordiox Buffer Tablets

Palintest Chlordiox HR Tablets

Palintest Automatic Wavelength Selection Photometer

Palintest Round Test Tubes, 10 ml glass (PT 595)

Important Note

Chlorine dioxide is extremely volatile and can be lost from solution very easily. Extreme care must be taken when extracting and dispensing samples to minimise any loss from solution to ensure accurate measurement. When pouring the sample into a test tube, it is recommended that this is done by holding the tube at a slight angle and pouring slowly and gently down the side of the tube to minimise any splashing and turbulence which may cause loss of chlorine dioxide vapour.

Test Procedure - Chlorine Dioxide

- 1 Rinse a clean test tube with sample leaving **a few drops** in the tube.
- 2 Add one Chlordiox Buffer tablet and one Chlordiox HR tablet, crush and mix both together in the small volume of sample left in the tube to produce an even mixture of well crushed material.
- 3 Rinse and fill another clean test tube with sample to the 10 ml mark and slowly pour this into the tube containing the crushed tablets.
- 4 Mix the tube contents with a crushing rod to ensure complete dissolution of the tablet material.
- 5 Stand for **two minutes** to allow the chlorine dioxide to react with the indicator.
- 6 Select Phot 76 on photometer.
- 7 Take photometer reading (%T) in usual manner (see photometer instructions). This result represents the chlorine dioxide residual in terms of mg/l ClO_2 .

Notes

- 1 To obtain the chlorine dioxide residual as mg/l Cl_2 , divide the result by 1.9.
- 2 For the greatest accuracy below 2.5 mg/l ClO_2 , use the Palintest Chlorine Dioxide LR test.

Interferences

Studies of the effect of expected levels of common species which may be present in chlorine dioxide containing waters were undertaken to determine if these would detrimentally affect the results of the test. These included other chlorine compounds and oxidising agents, metal ions, hardness, alkalinity, nitrate, phosphate and sulphate. No interference effect was observed.

Temperature Effect

The method is calibrated for use at 15 – 25°C - lower temperatures will cause a slightly high bias to results. For accurate results, equilibrate a full glass bottle of sample, with no headspace, to room temperature for analysis.