

# CHLORINE (DPD)

**TEST FOR FREE, COMBINED AND  
TOTAL CHLORINE IN WATER**

**Photometer Method**

**AUTOMATIC  
WAVELENGTH  
SELECTION**

**0 – 5.0 mg/l**

Chlorine and chlorine-release compounds are widely used for the disinfection of drinking water and swimming pools, for the control of micro-biological growth in cooling water, and in many other water treatment systems. Accurate measurement of the chlorine residual is an essential aspect of the control of these chlorination processes.

The chlorine level can be expressed in terms of the free chlorine, combined chlorine or total chlorine residuals. For the majority of applications measurement of the free chlorine residual is the most important. The Palintest DPD chlorine method provides a simple means of measuring free, combined and total chlorine residuals over the range 0 - 5 mg/l.

It is recommended that if any shock treatment compounds are known to have been used in the treatment of the water to be tested, that a DPD Oxystop tablet be included in the test procedure as outlined below.

## **Method**

This Palintest chlorine test uses the DPD method developed by Dr A T Palin and now internationally recognised as the standard method of testing for chlorine and other disinfectant residuals. In the Palintest DPD method the reagents are provided in tablet form for maximum convenience and simplicity of use.

Free chlorine reacts with diethyl-p-phenylene diamine (DPD) in buffered solution to produce a pink coloration. The intensity of the colour is proportional to the free chlorine concentration. Subsequent addition of excess potassium iodide induces a further reaction with any combined chlorine present. The colour intensity is now proportional to the total chlorine concentration; the increase in intensity represents the combined chlorine concentration. In this way it is possible to differentiate between free and combined chlorine present in the sample. The colour intensities are measured using a Palintest Photometer.

The DPD Oxystop tablet is added after measurement for free chlorine but before the DPD No 3 tablet. It prevents the reaction between shock treatment chemicals and potassium iodide which would give a positive response.

## **Reagents and Equipment**

Palintest DPD No 1 Tablets

Palintest DPD Oxystop Tablets (Optional)  
Palintest DPD No 3 Tablets  
Palintest Automatic Wavelength Selection Photometer  
Round Test Tubes, 10 ml glass (PT 595)

## Separation of Chlorine Residuals

The photometer is programmed for both free and total chlorine. Use program Phot 7 Free Chlorine, then select the 'Follow On' option on screen to continue test for program Phot 8 Total Chlorine.

### Test Instructions

- 1 Rinse test tube with sample leaving a few drops of sample in the tube.
- 2 Add, and then crush, the DPD No 1 tablet in the few drops of the water sample until the tablet is thoroughly crushed.
- 3 Add the 10ml test solution, mix and seal the tube with the cap.
- 4 Select Phot 7 on Photometer.
- 5 Take Photometer reading in usual manner - see Photometer instructions.
- 6 The result represents the **free chlorine** residual in milligrams per litre (mg/l).

Stop the test at this stage if only free chlorine determination is required.

- 7 If it is desired to measure combined or total chlorine residual continue the test on the same test portion. Select the 'Follow On' from screen options to continue the test program.
- 8 If shock treatment chemicals are present in the pool, add one DPD Oxystop tablet, crush and mix to dissolve. Stand for one minute before proceeding.
- 9 Add one DPD No 3 tablet, crush and mix to dissolve.
- 10 Stand for two minutes to allow full colour development.
- 11 Take photometer reading in the usual manner.
- 12 The result represents the **total chlorine** residual as milligrams per litre(mg/l).
- 13 The **combined chlorine** residual is obtained by subtracting the free chlorine residual result from the total chlorine residual result :-

ie Combined Chlorine = Total Chlorine - Free Chlorine

### Notes

A too high chlorine level (above 10 mg/l) can cause bleaching of the pink coloration formed in the DPD test and give a false negative or lower than expected result. If a colourless or pale pink test solution is obtained then a high level chlorine may be present, check for the possibility of bleaching by repeating the test on a sample diluted with chlorine-free water.