

PERSULPHATE

TEST FOR ACTIVITY OF PERSULPHATE IN WATER

Photometer Method

AUTOMATIC WAVELENGTH SELECTION

0 – 5.0 mg/l

Chlorine Equivalent

Chlorine and chlorine-release compounds are widely used for the disinfection of swimming pools. Activated persulphate chemicals are used for shock dosing pools to regenerate free chlorine.

The Persulphate activity can be expressed in terms of its chlorine equivalent. The Palintest DPD Method provides a simple means of measuring the persulphate activity over the range 0 - 5 mg/l chlorine equivalent and separating it from chlorine residuals.

Method

The Palintest method uses the DPD method developed by Dr A T Palin for chlorine testing. 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. Addition of DPD Oxystop reagent prevents reaction of potassium monopersulphate shock dosing chemicals, and addition of 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 colour represents the combined chlorine concentration.

Using a fresh portion of sample, DPD in buffered solution in the presence of iodide produces a pink coloration. The intensity of the colour is proportional to the total chlorine plus the persulphate activity.

The colour intensities are measured using a Palintest Photometer. The difference between the total chlorine reading and the total chlorine plus persulphate reading is a measure of persulphate in the pool.

Reagents and Equipment

Palintest DPD No 1 Clear Tablets

Palintest DPD Oxystop Tablets

Palintest DPD No 3 Clear Tablets

Palintest DPD No 4 Clear Tablets

Palintest Automatic Wavelength Selection Photometer

Round Test Tubes, 10 ml glass (PT 595)

Test Instructions

- 1 Rinse test tube with sample leaving two or three drops of sample in the tube.
- 2 Add one DPD No 1 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet.
- 3 Select Phot 7 on the Photometer.
- 4 Take photometer reading **immediately** (as result may drift on standing), in usual manner - see Photometer instructions.
- 5 The result represents the free chlorine residual as milligrams per litre. (Reading A).
- 6 Continue the test on the same test portion. Select 'Follow-On' from screen options to continue the test program. Add one DPD Oxystop tablet, crush and mix to dissolve. Stand for one minute before proceeding.
- 7 Add one DPD No 3 tablet, crush and mix to dissolve.
- 8 Stand for two minutes to allow full colour development.
- 9 Take photometer reading. The result represents the **total chlorine** residual as milligrams per litre. (Reading B).
- 11 The combined chlorine residual is obtained by subtracting the free chlorine residual result from the chlorine residual result. (Reading B - Reading A).
- 12 Rinse a second test tube with sample leaving 2 or 3 drops of sample in the tube.
- 13 Add one DPD No 4 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet.
- 14 Stand for two minutes to allow full colour development.
- 15 Take photometer reading. The result represents total chlorine residual plus persulphate activity expressed as milligrams per litre chlorine. (Reading C).
- 16 If Reading C is greater than Reading B, then persulphate is present. The measurement of persulphate activity is obtained by subtracting Reading B from Reading C.

$$\text{Persulphate Activity} = \text{Reading C} - \text{Reading B mg/l Cl}$$

Note

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 when 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.
