

TEST INSTRUCTIONS

CHLORINE/CHLORAMINES (DPD)

**TEST FOR FREE CHLORINE,
MONOCHLORAMINE AND
DICHLORAMINE IN WATER**

Colour Match Method

Using Palintest Comparator

0 – 0.1 mg/l**0 – 2.0 mg/l****0 – 5.0 mg/l**

Chlorine and chlorine release compounds are widely used for the disinfection of water. When dissolved in water chlorine forms hypochlorous acid and hypochlorite ions. Chlorine remaining in the water in this form is known as the free chlorine residual.

Chlorine does however react with ammonia and nitrogen-based species to form chloramines. These compounds are poor disinfectants and can also impart a characteristic taste or odour to the water. It is important therefore in certain applications to be able to distinguish between chlorine residual present as free chlorine and as chloramines.

The Palintest DPD Chlorine/Chloramines method provides a simple means of measuring free chlorine ($\text{HOCl}/\text{HOCl}^-$), monochloramine (NH_2Cl) and dichloramine (NHCl_2).

Method

The Palintest Chlorine/Chloramines test uses the DPD method. This method is internationally recognised as the standard method of testing for chlorine and other residuals. In the Palintest 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. Addition of a trace amount of potassium iodide induces further reaction with any monochloramine present.

The increase in colour intensity is therefore proportional to the monochloramine concentration. Subsequent addition of excess potassium iodide causes dichloramine to react in a similar manner. The increase in colour intensity is now proportional to the dichloramine concentration.

In this way it is possible to differentiate between free chlorine, monochloramine and dichloramine residuals present in the sample. The colour intensities are measured by comparison against colour standards using a Palintest Comparator and Disc.

Reagents and Equipment

Palintest DPD No 1 Tablets

Palintest DPD No 2 Tablets

Palintest DPD No 3 Tablets

Palintest Comparator (PT 520)

Palintest Comparator Disc CD 011/1, CD011/2 or CD 011/5 Chlorine

Square Test Tubes 13.5 mm, 10 ml (PT 521)

Disc CD 011/1 covers the range 0 - 1 mg/l chlorine in steps 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 and 1.0 mg/l.

Disc CD 011/2 covers the range 0 - 2.0 mg/l chlorine in steps 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6 and 2.0 mg/l.

Disc CD 011/5 covers the range 0 - 5.0 mg/l chlorine in steps 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 and 5.0 mg/l.

Test Procedure

- 1 Rinse a square 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 Place the test tube in the Comparator and match immediately against disc in the usual manner (see Comparator instructions).
- 4 The disc reading represents the free chlorine residual as mg/l Cl₂ (Result A).
- 5 To measure monochloramine, continue the test on the same test portion. Add one DPD No 2 tablet, crush and mix to dissolve.
- 6 Place the test tube in the Comparator and match against the disc in the usual manner (Result B) then :-
$$\text{Monochloramine (mg/l Cl}_2\text{)} = \text{Result B} - \text{Result A}$$
- 7 To measure dichloramine, continue the test on the same test portion. Add one DPD No 3 tablet, crush and mix to dissolve.
- 8 Allow to stand for two minutes for maximum colour development.
- 9 Place the test tube in the Comparator and match against the disc in the usual manner (Result C) then :-

$$\text{Dichloramine (mg/l Cl}_2\text{)} = \text{Result C} - \text{Result B}$$

TEST INSTRUCTIONS

**ALKALINITY
(ALKAVIS)****Colour Match Method**

Using Palintest Comparator

**TEST FOR TOTAL ALKALINITY IN
NATURAL AND TREATED WATERS****0 – 250 mg/l CaCO₃**

Natural and treated waters may contain a variety of dissolved alkaline substances such as carbonates, bicarbonates, hydroxides and - to a lesser extent - borates, phosphates and silicates. In water at neutral pH the alkalinity derives mainly from the presence of bicarbonates.

Total alkalinity is an important test in determining the aggressiveness or scale forming tendency of the water. If the total alkalinity is low the water may be aggressive and cause corrosion to pipework and structures; if the total alkalinity is high the water may more readily promote scale formation. Alkalinity control is therefore an important part of many water treatment programmes.

The Palintest Alkavis test uses a colorimetric method and covers the total alkalinity range 0 - 250 mg/l CaCO₃. The test is particularly suitable for checking natural and drinking waters, swimming pool water, boiler water, etc.

Method

The Palintest Alkavis test is based on a unique colorimetric method and uses a single tablet reagent. The test is simply carried out by adding a tablet to a sample of the water. Under the conditions of the test a distinctive range of colours from yellow, through green, to blue are produced over the alkalinity range 0 - 250 mg/l CaCO₃. The colour produced in the test is indicative of the alkalinity of the water and is measured by comparison against colour standards using a Palintest Comparator and Disc.

Reagents and Equipment

Palintest Alkavis Tablets

Palintest Comparator (PT 520)

Palintest Comparator Disc CD 192 Alkalinity

Square Test Tubes, 13.5 mm, 10 ml (PT 521)

Disc CD 192 covers the range 0 - 250 mg/l alkalinity in steps 0, 25, 50, 75, 100, 125, 150, 200 and 250 mg/l as CaCO₃.

Test Procedure

- 1 Fill a square test tube with sample to the 10 ml mark.
 - 2 Add one Alkavis tablet, crush and mix thoroughly to dissolve.
 - 3 Place the test tube in the Comparator and match against the disc in the usual manner (see Comparator instructions).
 - 4 The disc reading represents the total alkalinity of the sample as milligrams per litre CaCO_3 .
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TEST INSTRUCTIONS

pH VALUE**Colour Match Method**
Using Palintest Comparator**TEST FOR pH VALUE OF WATER
AND AQUEOUS SOLUTIONS****5.2 – 9.6 (4 Ranges)**
4 - 11

pH value is a parameter frequently determined on water and aqueous solutions. The Palintest pH method provides a simple test for the determination of pH for a variety of applications. The test is available in four narrow ranges covering pH values between 5.2 and 9.6; and one wide range covering pH values from 4 to 11.

Method

Palintest pH methods use standard pH indicators in tablet form. Different indicators are used to cover different pH ranges. Each tablet contains the precise amount of indicator needed for the test. All Palintest pH tablets contain a dechlorinating agent so that the tests can be carried out in water containing chlorine or other disinfectant residuals.

The colour produced when the indicator tablet is added to a sample of the water is indicative of the pH value. This colour is measured by comparison against colour standards using a Palintest Comparator and Disc.

Reagents and Equipment

Palintest pH Indicator Tablets (see table)
Palintest Comparator (PT 520)
Palintest Comparator Disc - pH (see table)
Square Test Tubes, 13.5 mm, 10 ml (PT 521)

Disc Code	Range of Standards	Indicator Tablet Required
CD 128	5.2 - 6.8	Bromocresol Purple
CD 129	6.0 - 7.6	Bromothymol Blue
CD 131	6.8 - 8.4	Phenol Red
CD 135	8.0 - 9.6	Thymol Blue
CD 136	4 - 11	Universal pH

Test Instructions

- 1 Select the appropriate disc and indicator tablets for the pH range under test.
- 2 Fill a square test tube with sample to the 10 ml mark.
- 3 Add one pH indicator tablet, crush and mix to dissolve.
- 4 Place the test tube in the Comparator and match against the disc in the usual manner (see Comparator instructions).
- 5 The disc reading represents the pH value of the sample.

Note

If the colour is outside the range of the disc and cannot be matched, the test should be repeated using a higher or lower range disc with the corresponding indicator tablets.
