

**Palintest**Test Instructions

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**DROP COUNT TESTS****Instructions for using Palintest Drop Count Tests for Testing Industrial Waters**

Palintest drop counts tests provide a simple means of testing for a wide range of water parameters. They are particularly suitable for testing industrial water samples.

Drop count tests provide the simplest form of test procedure. An indicator tablet, or drop of indicator solution, is added to a sample of the water, then test reagent is added drop by drop until a colour change takes place. The test result is calculated by the number of drops of test reagent used.

The range of tests covered includes those needed for the testing and control of boiler water, cooling water and other industrial water systems. The tests may be combined in test kits with Palintest Diskette Comparator tests, or other Palintest methods, so as to provide a complete range of tests for industrial water monitoring and control.

**Sample Collection and Preparation**

Collect the samples from a proper sampling point where available. Cool hot samples to room temperature before carrying out the test. Test as soon as possible after taking the sample.

It is not normally necessary to filter the sample unless it contains large amounts of suspended or particulate matter. Filtration equipment is included in certain kits or is available as an optional extra for use in such cases.

**Test Instructions**

Specific instruction for each test are given in the subsequent sections of this leaflet. The general procedure described will help you get the best results from Palintest Drop Count Tests.

Place the test tube in the Comparator and match against the disc in the usual manner.

1. Fill the screw-capped test tube with the sample to the 10 ml mark.
2. Add an indicator tablet, or drops of indicator solution, as directed in the individual test instructions. Swirl the container, or shake gently, in order to mix.
3. Take the bottle of the test reagent and remove the cap. Hold the bottle, nozzle down, above the test tube and add a drop of reagent. Swirl the container gently to mix.
4. Continue adding drops, one at a time, in this manner until the colour change described in the individual test instructions takes place.
5. Note the number of drops of test reagent used. Work out the test result from the formula given in the individual test instructions. Certain test reagents are available in different strengths. Be sure to use the formula appropriate to the test reagent used.
6. After using the kit, wash out the test container thoroughly and replace the cap securely on the dropper bottle.

**Drop Count Test Instructions**

**Acidity to pH 8.3****Colour change: Colourless - Pink**

*Acidity to pH 8.3 is a control test for source water and for general water testing*  
Range 0 - 1200+ mg/l

1. Fill a sample container to the 10 mark.
2. Add one drop of AC-B and shake container to mix.
3. Add AC-D40 drop by drop until the colour changes from colourless to pink.
4. Note the number of drops of AC-D40 used (N) and calculate the result from the formula below:

$$\text{Acidity (mg/l H}_2\text{SO}_4) = N \times 40$$

**Acidity to pH 4.5****Colour change: Orange - Blue**

*Acidity to pH 4.5 is a control test for source water and for general water testing*  
Range 0 - 1200+ mg/l

1. Fill a sample container to the 10 mark.
2. Add one drop of AC-A and shake container to mix.
3. Add AC-D40 drop by drop until the colour changes from orange to blue.
4. Note the number of drops of AC-D40 used (N) and calculate the result from the formula below:

$$\text{Acidity (mg/l H}_2\text{SO}_4) = N \times 40$$

**Alkalinity M****Colour change: Blue - Orange**

*Alkalinity M is a control test for source water, steam boilers and cooling systems*  
Range 0 - 300+ mg/l (use AL-D10) or Range 0 - 1200+ mg/l (use AL-D40)

1. Fill a sample container to the 10 mark.
2. Add one drop of AL-M and shake container to mix.
3. Add AL-D10 or AL-D40 drop by drop until the colour changes from blue to orange.
4. Note the number of drops of AL-D10 or AL-D40 used (N) and calculate the result from the formula below:

**For AL-D10:**

$$\text{Alkalinity M (mg/l CaCO}_3) = N \times 10$$

**For AL-D40:**

$$\text{Alkalinity M (mg/l CaCO}_3) = N \times 40$$

**Alkalinity P****Colour change: Pink - Colourless**

*Alkalinity P is a control test for steam boilers*

Range 0 - 300+ mg/l (use AL-D10) or Range 0 - 1200+ mg/l (use AL-D40)

1. Fill a sample container to the 10 mark.
2. Add one drop of AL-P and shake container to mix.
3. Add AL-D10 or AL-D40 drop by drop until the colour changes from pink to colourless.
4. Note the number of drops of AL-D10 or AL-D40 used (N) and calculate the result from the formula below:

**For AL-D10:**

$$\text{Alkalinity P (mg/l CaCO}_3\text{)} = N \times 10$$

**For AL-D40:**

$$\text{Alkalinity P (mg/l CaCO}_3\text{)} = N \times 40$$

**Alkalinity OH****Colour change: Pink - Colourless**

*Alkalinity OH (caustic alkalinity, hydroxide alkalinity) is a control test for steam boilers*

Range 0 - 300+ mg/l (use AL-D10) or Range 0 - 1200+ mg/l (use AL-D40)

1. Fill a sample container to the 10 mark.
2. Add one drop of AP-S and shake container to mix.
3. Add one drop of AL-P and shake container to mix. A pink colour indicates the presence of Alkalinity OH.
4. Add AL-D10 or AL-D40 drop by drop until the colour changes from pink to colourless.
5. Note the number of drops of AL-D10 or AL-D40 used (N) and calculate the result from the formula below:

**For AL-D10:**

$$\text{Alkalinity OH (mg/l CaCO}_3\text{)} = N \times 10$$

**For AL-D40:**

$$\text{Alkalinity OH (mg/l CaCO}_3\text{)} = N \times 40$$

**Calcium Hardness****Colour change: Pink - Colourless**

*Calcium Hardness is an indicator of scaling potential in cooling systems.*

Range 0 - 300+ mg/l (use CH-D10) or Range 0 - 600+ mg/l (use CH-D20)

1. Fill a sample container to the 10 mark.
2. Add one drop of CH-A and shake container until tablet disintegrates.

3. Add one drop CH-D10 or CH-D20 drop by drop until the colour changes from pink to violet.
4. Note the number of drops of CH-D10 or CH-D20 used (N) and calculate the result from the formula below:

**For CH-D10:**

$$\text{Calcium Hardness (mg/l CaCO}_3\text{)} = N \times 10$$

**For CH-D20:**

$$\text{Calcium Hardness (mg/l CaCO}_3\text{)} = N \times 20$$

**Carbon Dioxide**

**Colour change: Colourless - Pink**

*Free carbon dioxide is an indicator of potential for steam condensate and softened feed waters.*

Range 0 - 100+ mg/l

1. Fill a sample container to the 10 mark.
2. Add one drop of CO-A and shake container to mix. If the solution turns pink, no carbon dioxide is present. If the solution is colourless, continue the test as per the instructions.
3. Add CO-D5 drop by drop until the colour changes from colourless to pink. The colour must persist for at least 30 seconds.
4. Note the number of drops of CO-D5 used (N) and calculate the result from the formula below:

$$\text{Carbon Dioxide (mg/l CO}_2\text{)} = N \times 10$$

**Chloride  
Orange**

**Colour change: Yellow - Deep**

*Chloride is a control test for source water, steam boiler water, condensate and cooling systems.*

Range 0 - 150+ mg/l (use CL-D5) or Range 0 - 600+ mg/l (use CL-D20)

1. Fill a sample container to the 10 mark.
2. Add one drop of CL-A and shake container until tablet disintegrates.
3. Add CL-D5 or CL-D20 drop by drop until the colour changes from yellow to deep orange.
4. Note the number of drops of CL-D5 or CL-D20 used (N) and calculate the result from the formula below:

**For CL-D5:**

$$\text{Chloride (mg/l Cl)} = (N - 1) \times 5$$

**For CL-D20:**

$$\text{Chloride (mg/l Cl)} = (N - 1) \times 20$$

**Hardness - Total****Colour change: Plum Red - Blue**

*Hardness is a control test for pre-treatment plant, steam boilers, and cooling systems.*

Range 0 - 30+ mg/l (use HA-D1) or Range 0 - 300+ mg/l (use HA-D10) or Range 0 - 600+ mg/l (use HA-D20)

1. Fill a sample container to the 10 mark.
2. Add one HA-A tablet and shake container until tablet disintegrates.
3. Add HA-D1, HA-D10 or HA-D20 drop by drop until the colour changes from plum red to blue.
4. Note the number of drops of HA-D1, HA-D10 or HA-D20 used (N) and calculate the result from the formula below:

**For HA-D1:**

$$\text{Hardness (mg/l CaCO}_3\text{)} = N \times 1$$

**For HA-D10:**

$$\text{Hardness (mg/l CaCO}_3\text{)} = N \times 10$$

**For HA-D20:**

$$\text{Hardness (mg/l CaCO}_3\text{)} = N \times 20$$

**Organophosphonate****Colour change: Green - Purple**

*Organophosphonates are used as inhibitors in cooling systems.*

Range 0 - 30+ mg/l

1. Fill a sample container to the 10 mark.
2. Add one OR-A tablet and shake container until tablet disintegrates.
3. Add OR-D1 drop by drop until the colour changes from green to purple.
4. Note the number of drops of OR-D1 used (N) and calculate the result from the formula below:

$$\text{Organophosphonate (mg/l)} = N - 2$$

For most accurate results, a blank should be carried out on the water without organophosphonate, or on the make-up water to the system, and the result subtracted from the test result.

**Nitrite****Colour change: To Persistent Pink**

*Nitrite is used as a corrosion inhibitor in chilled water and cooling systems.*

Range 0 - 30+ mg/l (use NI-D1) or Range 0 - 1500+ mg/l (use NI-D50)

1. Fill a sample container to the 10 mark.
2. Add one NI-A tablet and shake container until tablet disintegrates.

3. Add NI-D10, or NI-D50 drop by drop until a pink colour persists for one minute.
4. Note the number of drops of NI-D10, or NI-D50 used (N) and calculate the result from the formula below:

**For NI-D10:**

$$\text{Nitrite (mg/l NaCO}_2\text{)} = N \times 10$$

**For NI-D50:**

$$\text{Nitrite (mg/l NaCO}_2\text{)} = N \times 50$$

**Sulphite**

**Colour change: To Permanent Blue**

*Sulphite is used as an oxygen scavenger for steam boilers*

Range 0 - 150+ mg/l (use SI-D5) or Range 0 - 600+ mg/l (use SI-D20)

1. Fill a sample container to the 10 mark.
2. Add one SI-A tablet and shake container until tablet disintegrates.
3. Add SI-D5, or SI-D20 drop by drop until permanent blue colouration appears.
4. Note the number of drops of SI-D5, or SI-D20 used (N) and calculate the result from the formula below:

**For SI-D5:**

$$\text{Sulphite (mg/l Na}_2\text{SO}_2\text{)} = N \times 5$$

**For SI-D20:**

$$\text{Sulphite (mg/l Na}_2\text{SO}_2\text{)} = N \times 20$$

**Tannin**

**Colour change: To Permanent Blue**

*Tannin is used as an oxygen scavenger for steam boilers*

Range 0 - 150+ mg/l (use TN-D5) or Range 0 - 600+ mg/l (use TN-D20)

1. Fill a sample container to the 10 mark.
2. Add one TN-A tablet and shake container until tablet disintegrates.
3. Add TN-D10 drop by drop until permanent blue colouration appears.
4. Note the number of drops of TN-D10 (N) and calculate the result from the formula below:

$$\text{Tannin (mg/l)} = N \times 10$$

$$\text{Tannin Index} = N$$