

# CALCIUM HARDNESS (CALCICOL)

**TEST FOR CALCIUM HARDNESS IN  
NATURAL AND TREATED WATERS**

**Photometer Method**

**AUTOMATIC  
WAVELENGTH  
SELECTION**

**0 – 500 mg/l CaCO<sub>3</sub>**

Calcium hardness is caused by the presence of calcium ions in the water. Calcium salts can be readily precipitated from water and high levels of calcium hardness tend to promote scale formation in water systems. Calcium hardness is an important control test in industrial water systems such as boilers and steam raising plant; and for swimming pool waters.

The Palintest Calcicol test provides a simple method of determining calcium hardness over the range 0 - 500 mg/l CaCO<sub>3</sub>.

## **Method**

The Palintest Calcium Hardness test is based on the Calcicol indicator reagent method. Calcium ions react specifically with Calcicol indicator in alkaline solution to give an orange coloration. The reagent itself gives a violet colour in solution. Thus, at different calcium levels a distinctive range of colours from violet to orange is produced.

The reagents for the method are provided in the form of two tablets. The test is carried out simply by adding one of each tablet to a sample of the water. The colour produced is indicative of the calcium hardness and is measured using a Palintest Photometer.

## **Reagents and Equipment**

Palintest Calcicol No 1 Tablets  
Palintest Calcicol No 2 Tablets  
Palintest Automatic Wavelength Selection Photometer  
Round Test Tubes, 10 ml glass (PT 595)

## Test Procedure

- 1 Filter sample if necessary to obtain a clear solution.
- 2 Fill the test tube with sample to the 10 ml mark.
- 3 Add one Calcicol No 1 tablet, crush and mix to dissolve.
- 4 Add one Calcicol No 2 tablet, crush and mix to dissolve.
- 5 Stand for two minutes to allow full colour development.
- 6 Select Phot 12 on the Photometer for result as mg/l CaCO<sub>3</sub>, or Phot 60 for result as mg/l Ca.
- 7 Take Photometer reading in the usual manner (see Photometer instructions).

## Interferences

- 1 Magnesium hardness (up to 200 mg/l as CaCO<sub>3</sub>) does not interfere with the test.
- 2 Iron at levels above 10 mg/l may cause low results. Zinc above 5 mg/l may cause high results.
- 3 The pH required in the test is closely controlled by a buffer mixture included in the tablet formulation. However, to avoid exceeding the buffer capacity, strongly acid or alkaline samples should be adjusted to within the pH range 4 to 10, prior to the start of the test.

## Notes

- 1 The expression of hardness results sometimes causes confusion. It is normal practice to express the results of hardness tests as mg/l CaCO<sub>3</sub> (calcium carbonate). This is merely a convention to allow the comparison of different results and does not necessarily indicate that the hardness is present in the water in this form.  
Results may also be expressed as mg/l Ca. To convert mg/l CaCO<sub>3</sub> to mg/l Ca multiply by 0.4.
  - 2 Magnesium hardness may be determined using the Palintest Magnecol method (see PHOT.21), or by taking the difference between the Total Hardness (PHOT.15) and Calcium Hardness test results.
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