

HARDNESS LR

Tablet Count Method

**TEST FOR LOW LEVELS OF
HARDNESS IN SOFT AND
SOFTENED WATERS**

0 – 50 mg/l CaCO₃

Water Hardness can cause problems in boilers and steam raising plant, in certain industrial processes and in industrial water systems. Ion-exchange water softeners are widely used for the removal of water hardness. It is often desirable to test the softened water to ensure that the correct degree of hardness removal has taken place.

The Palintest Hardness LR test provides a simple method of checking low levels of water hardness in soft or softened waters over the range 0 - 50 mg/l CaCO₃.

Method

Calcium and magnesium ions, which cause water hardness, are complexed by reaction with ethylenediaminetetraacetic acid (EDTA). Excess calcium and magnesium ions react with a specific indicator to produce a distinctive coloration. The Palintest Hardness LR test uses a tablet reagent containing a standardized amount of EDTA with eriochrome black as indicator. The test is carried out by adding tablets one at a time to a sample of water until the colour changes from plum red to blue. The result is calculated from the number of tablets used in relation to the volume of water sample taken.

Reagents and Equipment

Palintest Hardness LR Tablets
Palintest Sample Container, 50/10 ml plastic (PT 506, PT 519) or
Palintest Sample Containers, 100/50/10 ml plastic (PT 510) or
Palintest Sample Containers, 200/100/50 ml glass (PT 505)

Test Range

The test is normally carried out on a 50 ml sample although a larger sample may be used if a lower test range is required. The table below indicates the sample size appropriate to various hardness test ranges :-

<i>Test Range</i>	<i>Sample Size</i>
0 – 25 mg/l CaCO ₃	100 ml
0 – 50 mg/l CaCO ₃	50 ml

Test Procedure

- 1 Select the sample size appropriate to the hardness range under test. Take a sample of the correct size in the Palintest sample container.
- 2 Add one Hardness LR tablet and shake the container until the tablet disintegrates.
- 3 Continue adding tablets one at a time in this manner until the colour of the solution changes from plum red to blue.
- 4 Note the number of tablets used and calculate the result from the formula below appropriate to the sample volume taken :-

Sample Size	Calculation - Hardness (mg/l CaCO ₃)
100 ml	= (No of Tablets x 2) - 1
50 ml	= (No of Tablets x 4) - 2

Notes

- 1 The expression of hardness results sometimes causes confusion. It is normal practice to express the result of hardness tests as mg/l CaCO₃ (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.
 - 2 For a simple routine control test for domestic and industrial water softeners, use the Palintest Hardness Yes/No test.
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HARDNESS VLR

Tablet Count Method

**TEST FOR VERY LOW LEVELS OF
HARDNESS IN SOFT AND
SOFTENED WATERS**

0 – 10 mg/l CaCO₃

There are a number of situations where it is necessary to measure very low levels of water hardness. These include the testing of very soft natural waters in acid rain areas, and the testing of high quality softened water used in certain industrial processes.

The Palintest Hardness VLR test provides a simple method of checking very low levels of water hardness over the range 0 - 10 mg/l CaCO₃.

Method

Calcium and magnesium ions, which cause water hardness, are complexed by reaction with ethylenediaminetetraacetic acid (EDTA). Excess calcium and magnesium ions react with a specific indicator to produce a distinctive coloration. The Palintest Hardness VLR test uses a tablet reagent containing a standardized amount of EDTA with eriochrome black as indicator. The test is carried out by adding tablets one at a time to a sample of water until the colour changes from plum red to blue. The result is calculated from the number of tablets used in relation to the volume in the water sample taken.

Reagents and Equipment

Palintest Hardness VLR Tablets

Palintest Sample Container, 50/10 ml plastic (PT 506, PT 519)

Test Procedure

- 1 Fill sample container to 50 ml mark.
- 2 Add one Hardness VLR tablet and shake the container until the tablet disintegrates.
- 3 Continue adding tablets one at a time in this manner until the colour of the solution changes from plum red to blue.

- Note the number of tablets used and calculate the result from the formula below :-

$$\text{Hardness (mg/l CaCO}_3\text{)} = \text{No of Tablets} - 1$$

Note

The expression of hardness results sometimes causes confusion. It is normal practice to express the result of hardness tests as mg/l CaCO₃ (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.
