

TOTAL CALCIUM AND MAGNESIUM HARDNESS TEST KIT

Model HA-4P

Cat. No. 1457-00



To ensure accurate results please read carefully before proceeding.

Iron will interfere with the results of this test in concentrations above 8 mg/L by causing an orange-red to green color change at the end point. Accurate results can still be obtained up to about 20 mg/L iron with this end point. Manganese interferes above 5 mg/L. Aluminum interferes by causing a slow end point, but up to 200 mg/L aluminum can be tolerated by allowing sufficient time for the color change. Interference from magnesium in the calcium test is prevented up to 200 mg/L by the formation of magnesium hydroxide at the high test pH, but higher levels prevent a distinct end point. Orthophosphate causes a slow end point but does not interfere if the calcium phosphate that forms is allowed time to redissolve during the titration.

Polyphosphates interfere directly and must be absent. Barium and strontium are titrated along with calcium but are seldom found in natural waters in significant amounts. The test can tolerate 10,000 mg/L acidity or alkalinity and can be run directly in sea water. Solutions saturated with sodium chloride do not give a distinct end point. Samples at about 20°C (68°F) or colder should be titrated slowly near the end point to allow sufficient time for the color change.

WARNING: The chemicals in this kit may be hazardous to the health and safety of the user if inappropriately handled. Please read all warnings before performing the test and use appropriate safety equipment.

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It is important that the titrant reagent dropper be held vertically and the drops dispensed at a rate no faster than one per second. Hold the dropper slightly above the top of the mixing bottle so that it does not touch the side of the bottle.

Total Hardness Test Instructions

1. Fill the plastic measuring tube level full of the water to be tested. Pour the contents of the tube into the mixing bottle.
2. Add three drops of Buffer Solution, Hardness 1, and swirl to mix as shown in Figure 1.
3. Add one drop of ManVer® Hardness Indicator Solution, Hardness 2.
4. Add Titrant Reagent, Hardness 3, drop by drop, to the mixing bottle. Swirl the bottle as each drop is added and count each drop. Continue adding drops until the sample color changes from pink to blue.
5. The hardness in grains per gallon is equal to the number of drops of Titrant Reagent, Hardness 3, required to bring about the color change.

Calcium Hardness Test Instructions

1. Fill the plastic measuring tube level full of the water to be tested and pour the contents of the tube into the mixing bottle.
2. Add two drops of 8N Potassium Hydroxide Solution to the mixing bottle.
3. Use the clippers to open one CalVer® 2 Calcium Indicator Powder Pillow. Add contents of the pillow to the mixing bottle.

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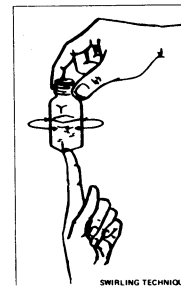
4. Add Titrant Reagent, Hardness 3, drop by drop to the mixing bottle. Swirl the bottle as each drop is added and count each drop. Continue adding drops until the sample color changes from pink to blue.
5. The calcium hardness in grains per gallon as calcium carbonate (CaCO_3) is equal to the number of drops of Titrant Reagent, Hardness 3, required to bring about the color change.

Magnesium Hardness Test Instructions

To obtain the magnesium hardness in grains per gallon subtract the calcium hardness value from the total hardness value.

REPLACEMENTS

Cat. No.	Description	Unit
424-37	Buffer Solution, Hardness 1	118 mL (4 oz) MDB*
947-99	CalVer 2 Calcium Indicator Powder Pillows	pkg/100
425-37	ManVer Hardness Indicator Solution, Hardness 2	118 mL (4 oz) MDB*
282-37	Potassium Hydroxide Solution, 8N	118 mL (4 oz) MDB*
426-37	Titrant Reagent, Hardness 3	118 mL (4 oz) MDB*
936-00	Clippers	each
438-00	Measuring Tube, plastic 5.83 mL	each
439-06	Mixing Bottle	pkg/6



*Marked Dropping Bottle

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