Hardness (Total and Calcium) Test Kit

HA-4P GPG (145700) DOC326.97.00113

Test preparation

CAUTION: ⚠ Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

- Hold the dropper vertically above the sample. Do not let the dropper touch the bottle during the titration.
- Rinse the tubes and bottles with sample before the test. Rinse the tubes and bottles with deionized water after the test.
- The primary ions that cause hardness in natural waters are calcium and magnesium. To calculate the magnesium hardness (as $CaCO_3$), subtract the calcium hardness value from the total hardness value.
- To record the test result as mg/L $CaCO_3$, multiply the test result in gpg by 17.1.

Replacement items

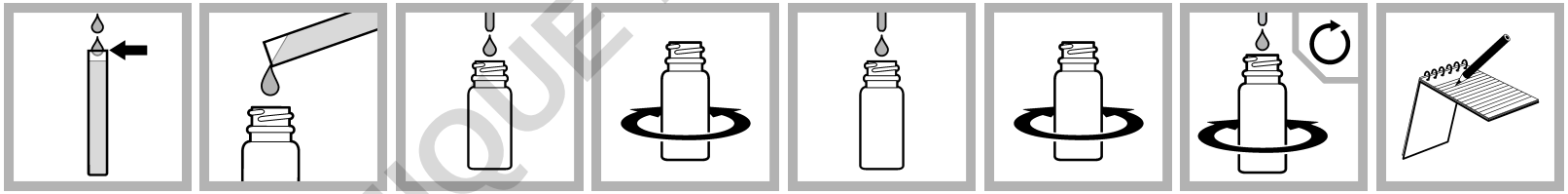
NOTE: Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.

Description	Unit	Item no.
Hardness 1 Buffer Solution	100 mL MDB	42432
Hardness 2 Indicator Solution	100 mL MDB	42532
Hardness 3 Titrant Solution	100 mL MDB	42632
CalVer 2 Calcium Indicator Powder Pillows	100/pkg	94799
Potassium Hydroxide Standard Solution, 8.00 N	100 mL MDB	28232H
Bottle, square, glass, 29 mL	6/pkg	43906
Measuring tube, plastic, 5.83 mL	each	43800

Optional items

Description	Unit	Item no.
Water, deionized	500 mL	27249

Test procedure—Total Hardness (0–20 gpg as $CaCO_3$)



1. Fill the measuring tube with sample.

2. Pour the sample into the mixing bottle.

3. Add three drops of the Hardness 1 Buffer Solution.

4. Turn the bottle left and right to mix.

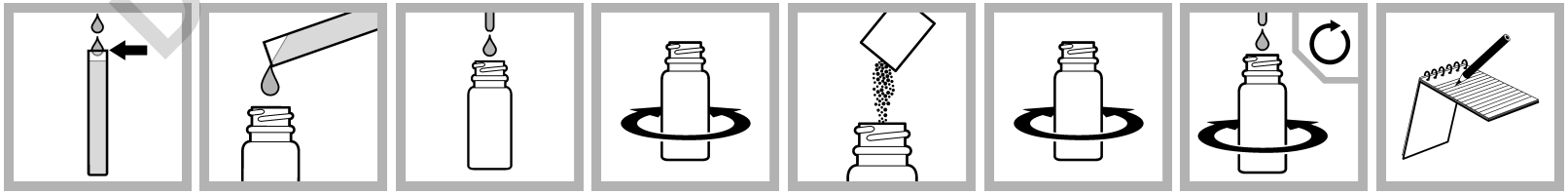
5. Add one drop of the Hardness 2 Indicator Solution. A pink color develops.

6. Turn the bottle left and right to mix.

7. Add the Hardness 3 Titrant Solution by drops. Mix after each drop. Count the drops until the color changes from pink to blue.

8. Record the number of drops. The number of drops of the titrant solution is equal to the result in gpg.

Test procedure—Calcium Hardness (0–20 gpg as $CaCO_3$)



1. Fill the measuring tube with sample.

2. Pour the sample into the mixing bottle.

3. Add two drops of the 8 N Potassium Hydroxide Solution.

4. Turn the bottle left and right to mix.

5. Add one CalVer 2 Calcium Indicator Powder Pillow. A pink color develops.

6. Turn the bottle left and right to mix.

7. Add the Hardness 3 Titrant Solution by drops. Mix after each drop. Count the drops until the color changes from pink to blue.

8. Record the number of drops. The number of drops of the titrant solution is equal to the result in gpg.

DOMINIQUE DUTSCHER SA

Interferences—Hardness

Substance	Interference level
Iron	More than 8 mg/L iron causes an orange-red to green endpoint. Results are accurate to 20 mg/L iron with the orange-red to green endpoint.
Manganese	Manganese interferes at more than 5 mg/L manganese.
Aluminum	Aluminum causes a slow endpoint. The sample can contain a maximum of 200 mg/L aluminum if sufficient time is given for the color change.
Magnesium (applicable to calcium hardness test only)	The formation of magnesium hydroxide at the high test pH prevents interference from 200 mg/L magnesium. Samples with more than 200 mg/L magnesium do not give a good endpoint.
Orthophosphate	Orthophosphate forms calcium phosphate and causes a slow endpoint. If sufficient time is given to let the calcium phosphate dissolve during the titration, the orthophosphate will not interfere with the test.
Polyphosphates	Polyphosphates interfere directly and are included in the test result.
Barium and strontium	Barium and strontium interfere with this test, but it is unusual to have high levels of barium or strontium in natural waters.
Chloride	The chloride level in seawater does not interfere. Solutions that are saturated with chloride do not show a sharp endpoint.
Acidity or alkalinity	10,000 mg/L acidity or alkalinity as $CaCO_3$ does not interfere. The level of alkalinity in seawater samples does not interfere.
Temperature	Titrate samples that are at 20 °C (68 °F) or less slowly near the endpoint to give sufficient time for the color change.

DOMINIQUE DUTSCHER SA

© Hach Company/Hach Lange GmbH, 2019. All rights reserved. Printed in U.S.A. www.hach.com 800-227-4224 techhelp@hach.com