Hardness (Total & Calcium) Test Kit TK4040-Z

1 drop = 2 or 10 ppm as $CaCO_3$ / 25 mL **blue caps**

KIT COMPONENTS:

ED2073-B	Hardness Titrant Low, 60 mL
ED2070-B	Hardness Titrant High, 60 mL
HA7405-A	Hardness Buffer Solution, 30 mL
HA7475-H	Hardness Indicator Powder, 10 g
CA1119-A	Calcium Buffer, 30 mL
CA1100-H	Calcium Indicator Powder, 10 g
VL-1005-V	Vial, 10-50 mL

SAFETY TIPS:


Wear Gloves


Use Eye Protection

Read SDS

TESTING TIPS:


Collect Accurate Sample


Hold Bottles Vertically


Ensure Proper Lighting

INTERFERENCES: Metals may cause difficulty in seeing the endpoint. If metal interference is presumed, add one drop of Hardness Titrant to the sample before adding buffer or indicator. Include this drop of titrant when calculating your results. Additional Hardness Buffer may be necessary to view a clean endpoint.

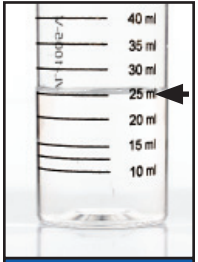
ATTENTION: As necessary, calibrate this kit against a known standard made with plant / make-up water. Be sure to collect a representative sample.

EndPoint ID® Test Procedure

Hardness (Total & Calcium) Test Kit — TK4040-Z

1 Rinse vial three times with sample to be tested. **Fill vial to 25 mL.**

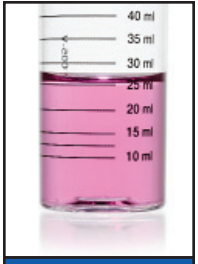
For Total Hardness, go to Step 2.
For Calcium Hardness, go to Step 4.



STEP 1

2 **Add 5 drops of Hardness Buffer** (HA7405) and swirl to mix. **Add 1 scoop of Hardness Indicator Powder** (HA7475) and swirl to mix.

Note: The sample will turn red if hardness is present and blue if there is no hardness.



STEP 2 & 4

3 **Add Hardness Titrant** one drop at a time while swirling. Count the number of drops until the color changes from red to blue. Record drops as Total Hardness. Multiply drops by factor to obtain results.

4 **Add 5 drops of Calcium Buffer** (CA1119) and swirl to mix. **Add 1 scoop of Calcium Indicator Powder** (CA1100) and swirl to mix.

Note: The sample will turn red if hardness is present and blue if there is no hardness.

STEP 3 & 5

5 **Add Hardness Titrant** one drop swirling. Count the number of drops changes from red to blue. Record drops as Multiply drops by factor to obtain results.

Factor:

Hardness Titrant Low (ED2073)
# of drops x 2 = ppm as $CaCO_3$

Hardness Titrant High (ED2070)
# of drops x 10 = ppm as $CaCO_3$

Magnesium Hardness
Total Hardness – Calcium Hardness = Magnesium Hardness

To convert to magnesium (Mg^{+2}) multiply test results by 0.24

Chloride Test Kit

TK4040-Z
yellow caps

KIT COMPONENTS:

SN3410-B	Chloride Titrant, 60 mL
PC8025-B	Potassium Chromate Indicator, 60 mL
PH1605-A	Phenolphthalein Indicator, 30 mL
SA1555-B	Alkalinity Titrant Low, 60 mL
VL-1005-V	Vial, 10-50 mL

SAFETY TIPS:


Wear Gloves


Use Eye Protection

Read SDS

TESTING TIPS:


Collect Accurate Sample


Hold Bottles Vertically


Ensure Proper Lighting

INTERFERENCES: The effect of interferences increases as the sample size increases. Iron concentrations can mask the endpoint. Orthophosphate in excess of 25 ppm will precipitate the silver. Cyanide, Bromide and Iodide interfere directly and create a positive interference. Sulfite provides a positive interference. Sulfite can be eliminated with Hydrogen Peroxide 3% before testing.

ATTENTION: As necessary, calibrate this kit against a known standard made with plant / make-up water. Be sure to collect a representative sample.

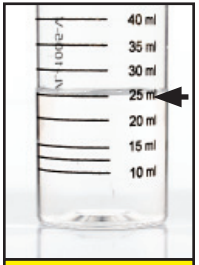
EndPoint ID® Test Procedure

Chloride Test Kit TK4040-Z

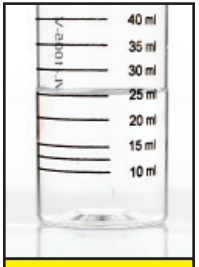
1 Select a sample size based on the desired drop equivalency. For smaller sample sizes, use a 5 mL syringe to collect the sample and dilute to 10 mL if necessary.

1 drop = 10 ppm	25 mL sample
1 drop = 25 ppm	10 mL sample
1 drop = 50 ppm	5 mL sample
1 drop = 100 ppm	2.5 mL sample
1 drop = 500 ppm	0.5 mL sample

2 Add 2 drops of Phenolphthalein Indicator (PH1605) and swirl to mix. If the sample remains colorless, proceed to step 3. If the sample turns red, add Alkalinity Titrant Low (SA1555) one drop at a time, while swirling, until the sample color changes from red to colorless.



STEP 1



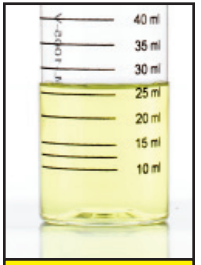
STEP 2

3 Add 6 drops of Potassium Chromate Indicator (PC8025) and swirl to mix. The sample should turn yellow.

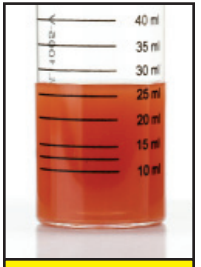
4 Add Chloride Titrant (SN3410) one drop at a time while swirling. Count the number of drops until the sample color changes from yellow to red. The first color change is the endpoint.

drops x factor = ppm Chloride (Cl)

To convert Chloride (Cl) to Sodium Chloride (NaCl): Multiply results by 1.65.



STEP 3



STEP 4

Sulfate Test Kit

TK4040-Z

KIT COMPONENTS:

6456	Sulfate Turb Tablets, 50
0106	Test Tube, square, w/cap
7779-01	Sulfate Octa-Slide 2 Bar
1101	Octa-Slide Viewer

SAFETY TIPS:


Wear Gloves


Use Eye Protection

Read SDS

TESTING TIPS:


Collect Accurate Sample


Hold Bottles Vertically


Ensure Proper Lighting

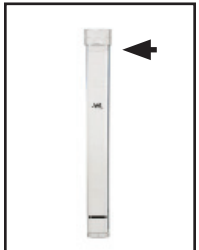
INTERFERENCES: None known.

ATTENTION: As necessary, calibrate this kit against a known standard made with plant / make-up water. Be sure to collect a representative sample.

EndPoint ID® Test Procedure

Sulfate Test Kit **TK4040-Z**

1 Rinse test tube three times with sample to be tested. **Fill test tube to the 10 mL line.**



STEP 1

2 **Add 1 Sulfate Turb Tablet** (6456). Cap and mix until the tablet disintegrates.

STEP 2

3 **Insert Sulfate Octa-Slide 2 bar** (7779-01) into the Octa-Slide 2 Viewer (1101).

STEP 3

4 **Insert test tube** into Octa-Slide Viewer.

Match the sample with the standards by comparing the degree to which the black lines are obscured by the turbidity of the sample.

The Octa-Slide Viewer should be held so non-direct light enters through the back of the Viewer.

STEP 4

Alkalinity (P/T) Test Kit

1 drop = 10 ppm as $CaCO_3$ / 25 mL

TK4040-Z
red caps

KIT COMPONENTS:

SA1555-B	Alkalinity Titrant Low, 60 mL
PH1605-A	Phenolphthalein Indicator, 30 mL
AI6925-A	Total Alkalinity Indicator, 30 mL
VL-1005-V	Vial, 10-50 mL

SAFETY TIPS:


Wear Gloves


Use Eye Protection

Read SDS

TESTING TIPS:


Collect Accurate Sample


Hold Bottles Vertically


Ensure Proper Lighting

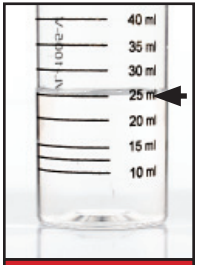
INTERFERENCES: Turbid samples may mask the color change at the endpoint. Use a pH meter for these samples titrating for the phenolphthalein alkalinity and for total alkalinity.

ATTENTION: As necessary, calibrate this kit against a known standard made with plant / make-up water. Be sure to collect a representative sample.

EndPoint ID® Test Procedure

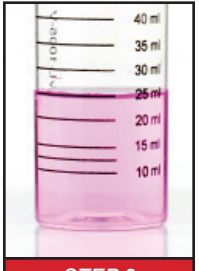
Alkalinity (P/T) Test Kit — TK4040-Z

1 Rinse vial three times with sample to be tested. **Fill vial to 25 mL.**



STEP 1

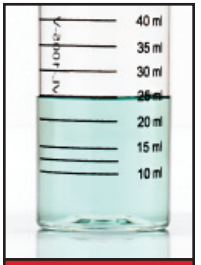
2 **Add 3 drops of Phenolphthalein Indicator** (PH1605) and swirl to mix. The sample should turn pink.



STEP 2

3 **Add Alkalinity Titrant** (SA1555) one drop at a time while swirling. Count the number of drops until the sample color changes from pink to colorless. Record the number of drops as P-Alkalinity.

4 **Add 3 drops of Total Alkalinity Indicator** (AI6925) and swirl to mix. The sample should turn green.

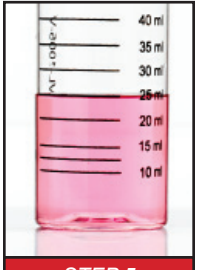


STEP 4

5 **Add Alkalinity Titrant** (SA1555) one drop at a time while swirling. Count the number of drops until the sample color changes from green to red. Record the total number of drops (from step 3 & 5) as T-Alkalinity.

drops x 10 = ppm as $CaCO_3$

OH Alkalinity = (2xP) - M



STEP 5

Sodium (by calculation)
TK4040-Z

Negative Ions

$$\frac{\text{\_\_\_\_\_}Chloride\ (ppm)}{35} + \frac{\text{\_\_\_\_\_}Sulfate\ (ppm)}{48} + \frac{\text{\_\_\_\_\_}Alkalinity\ (ppm)}{50} = A$$

Positive Ions

$$\frac{\text{\_\_\_\_\_}Total\ Hardness\ (ppm\ as\ CaCO_3)}{50} = B$$

$$\text{\_\_\_\_\_}Sodium\ (ppm) = (A - B) \times 23$$