

Instruction Manual

HI 38080 Calcium and Magnesium Test Kit for Soil



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Dear Customer,

Thank you for choosing a Hanna Product.

Please read the instruction sheet carefully before using the test kit. It will provide you with the necessary information for correct use of the kit. If you need additional information, do not hesitate to e-mail us at tech@hannainst.com.

Remove the chemical test kit from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any noticeable damage, notify your Dealer or the nearest Hanna office immediately.

Each kit is supplied with:

- Buffer Solution pH 10.2 ± 0.2 , 1 bottle (100 mL);
- Calmagite Indicator, 1 bottle with dropper (10 mL);
- HI 38080-0 EDTA Solution, 1 bottle (120 mL);
- 1 calibrated vessel (50 mL);
- 1 plastic pipette (3 mL);
- 1 plastic pipette (1 mL);
- 1 syringe (1 mL) with tip.

Note: Any damaged or defective item must be returned in its original packing materials.

SPECIFICATIONS

Range	> 0 meq/100 g
Smallest Increment	1.5 meq/100 g
Analysis Method	Titration
Sample Size	1.0 mL
Number of Tests	100 (average)
Case Dimensions	195x123x53 mm (7.7x4.8x2.1")
Shipping Weight	336 g (11.8 oz.)

SIGNIFICANCE AND USE

Calcium and Magnesium are often present in soil as carbonates (e.g.: dolomite), sulfates (in arid regions) and silicates. They are necessary nutrients for plants since they have an important role in plant metabolism and growth.

They can be removed from soil by leaching (for instance in acidic soil of humid regions) or by crop production; a deficiency of calcium and magnesium in soil will manifest itself in stunted growth and in yellow and deformed leaf tips. On the other hand, soil with an excess of Calcium and Magnesium will lock up other necessary micronutrients, making them unavailable to plant roots (e.g.: available phosphorus forms an insoluble salt with calcium at pH values above 7.5, thus decreasing the efficiency of applied phosphorus fertilizers).

Note: meq/100 g is milliequivalent per 100 grams.

CHEMICAL REACTION

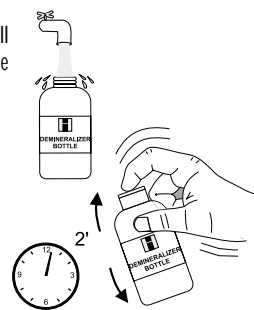
The Hanna Test Kit extracts Calcium and Magnesium from soil in acidic medium and then determines them via a titrimetric method: the indicator chelates with the Calcium and Magnesium ions to form a red colored complex. As EDTA is added, calcium and magnesium complex with it: the reaction endpoint is indicated by a change in color of the indicator from red to blue.

INSTRUCTIONS

READ THE ENTIRE INSTRUCTIONS BEFORE USING THE KIT

- Obtain a Mehlich extract from the soil sample by performing the Mehlich extraction.

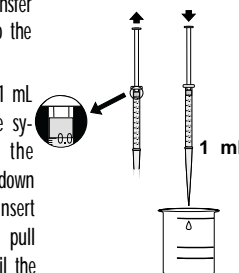
- Remove the cap and fill the Demineralizer Bottle with tap water.



- Replace the cap and shake for at least 2 minutes. The demineralized water is now ready.

- Using the syringe, transfer 1 mL of soil extract to the calibrated vessel.

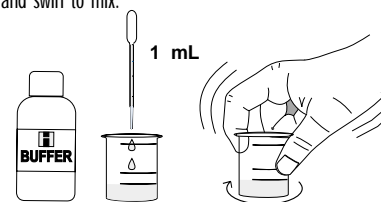
Note: to measure exactly 1 mL of sample, take the syringe and push the plunger completely down into the syringe. Insert tip into sample and pull the plunger out until the lower edge of the seal is on the 0 mark of the syringe. Insert the syringe into the vessel and push the sample out until the lower edge of the seal is on the 1.0 mL mark.



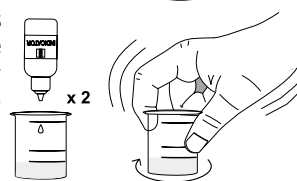
- Flip open the top of the Demineralizer Bottle cap. By gently squeezing the bottle, add demineralized water to the plastic vessel up to the 25 mL mark.



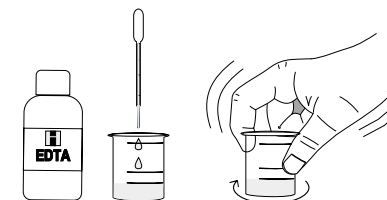
- Using the 1 mL pipette, add 1 mL of Buffer Solution and swirl to mix.



- Add 2 drops of Calmagite Indicator and swirl to mix. If calcium and magnesium are present, the solution will turn wine red.



- Using the 3 mL plastic pipette, add drops of HI 38080-0 EDTA Solution, swirling after each drop, while keeping an accurate count of the number of drops being added to the solution.



- As the color changes from pink to purple, swirl for 15 seconds after each additional drop, until the solution turns pure blue. Record the number of drops needed to obtain the final color change (from wine red to pure blue).

Note: High amounts of copper in your sample will alter the final endpoint color. The solution will change from wine red to purple, without turning pure blue. In this case, add drops of titrant until no visible change in color is obtained.

- Calculate the meq/100 g of Calcium and Magnesium in your sample as follows:

$$\text{meq/100 g [Ca + Mg]} = \text{drops of Titrant} \times 1.5$$

- Rinse all labware with demineralized water after each analysis and shake dry.

REFERENCES

Adaptation of the *Standard Methods for the Examination of water and wastewater*, 18th Ed. 1992, APA AWWA WEF.

P. Sequi, *Chimica del suolo*, Patron Editore, Ed. 1991

HEALTH AND SAFETY

The chemicals contained in this kit may be hazardous if improperly handled. Read Health and Safety Data Sheet before performing this test.