

## Instruction Manual

# HI 38081 Calcium and Magnesium Test Kit for Irrigation Water



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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](mailto: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:

- HI 38081A-0 Ca & Mg Reagent, 1 bottle with dropper (30 mL);
- HI 38081B-0 EDTA Solution, 2 bottles (2x120 mL);
- Calmagite Indicator, 1 bottle with dropper (10 mL);
- Demineralizer Bottle with filter cap for about 12 liters of deionized water (depending on the hardness level of water to be treated);
- 1 calibrated plastic vessel (50 mL);
- 1 plastic pipette (1 mL);
- 1 plastic pipette (3 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/L as Ca & Mg
Smallest Increment	0.6 meq/L for 1.0 mL sample 0.2 meq/L for 3.0 mL sample
Analysis Method	Titration
Sample Size	1.0 mL or 3.0 mL
Number of Tests	100 (average)
Case Dimensions	235x175x115 mm (9.2x6.9x4.5")
Shipping Weight	671 g (23.7 oz.)

## SIGNIFICANCE AND USE

Calcium presence in natural waters results from passage through deposits of limestone, dolomite, gypsum and gypsiferous shale. The calcium concentration in water supplies may extend from 0 to several hundred milligrams per liter, depending on its source and treatment.

Magnesium is a common constituent of natural waters; in concentrations greater than 125 mg/L it can cause diuretic effect. It is also an important contributor to the hardness of water: when heated, magnesium salts break down forming incrustation in boilers. Moreover, magnesium is necessary to plant metabolism since it is an essential constituent of organic molecules such as chlorophyll.

## CHEMICAL REACTION

The Hanna Test Kit determines Calcium and Magnesium in irrigation water via a titrimetric method: the indicator chelates with the ions Calcium and Magnesium to form a red colored complex. As EDTA is added, calcium and magnesium complex with it: the reaction end point is indicated by a change in color of the indicator from red to blue.

Note: meq/L is milliequivalent per liter.

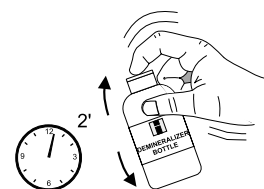
## INSTRUCTIONS

READ THE ENTIRE INSTRUCTIONS BEFORE USING THE KIT

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



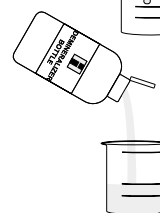
- 2- Replace the cap and shake for at least 2 minutes. The demineralized water is now ready.



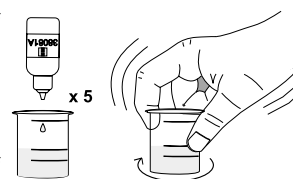
- 3- Using the 3 mL plastic pipette, transfer 3 mL of your water sample to the 50 mL plastic vessel.



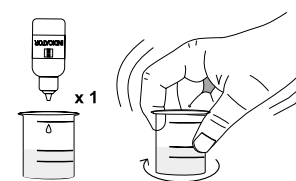
- 4- Flip open the top of the Demineralizer Bottle cap. Squeeze the bottle gently to add demineralized water to the plastic vessel up to the 25 mL mark.



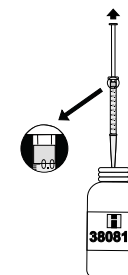
- 5- Add 5 drops of HI 38081A-0 Ca & Mg Reagent and swirl to mix.



- 6- Add 1 drop of Calmagite Indicator and swirl to mix. If calcium and magnesium are present, the solution will turn wine red.

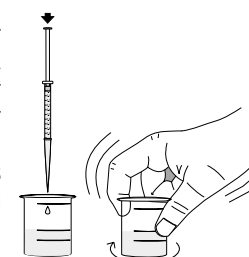


- 7- Take the syringe and push the plunger completely down into the syringe. Insert tip into the HI 38081B-0 EDTA solution and pull the plunger out until the lower edge of the seal is on the 0 mark of the syringe.



- 8- Slowly add the titration solution drop by drop, swirling after each drop.

- 9- As the color changes from pink to purple, swirl for 15 seconds after each additional drop. Repeat this until the solution turns pure blue. Read off the milliliters of titration solution used from the syringe.



- 10- Calculate the meq/L of Calcium and Magnesium in your sample as follows:

$$\text{meq/L (Ca + Mg)} = \text{mL of titrant} \times 20$$

- 11- If your sample requires more than 1 mL of titrant to turn pure blue it requires dilution. Repeat the test by using the 1 mL pipette to transfer 1 mL of your water sample to the plastic vessel.

- 12- Follow the instructions from step 4 to step 9.

- 13- Calculate the meq/L of Calcium and Magnesium in your sample as follows:

$$\text{meq/L (Ca + Mg)} = \text{mL of titrant} \times 60$$

- 14- To convert the reading in mg/L (ppm, parts per million) of  $\text{CaCO}_3$ , multiply the meq/L by 50.

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

Note: High amounts of copper in your sample will alter the final end point 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.

## REFERENCES

Adaptation of *Standard Methods for the Examination of Water and Wastewater*, 18<sup>th</sup> edition, 1992, APA AWWA WEF.

## 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.