

Instruction Manual

HI 38034 Total Hardness 0-20 gpg range 0-20 ppm range Test Kit



www.hannainst.com

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 , 2 bottles with dropper (2x30 mL);
- Calmagite Indicator, 1 bottle with dropper (10 mL);
- EDTA Solution 0-20 gpg range, 1 bottle (100 mL);
- EDTA Solution 0-20 ppm range, 1 bottle (100 mL);
- 1 calibrated plastic vessel (50 mL) with cap;
- 2 syringes (1 mL) with tips.

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

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SPECIFICATIONS

Range	0 to 20 gpg CaCO_3 0 to 20 ppm CaCO_3
Smallest Increment	0.2 gpg CaCO_3 0.2 ppm CaCO_3
Analysis Method	EDTA titration
Sample Size	25 mL
Number of Tests	100 for the gpg range 100 for the ppm range
Case Dimensions	235x175x115 mm (9.2x6.9x4.5")
Shipping Weight	567 g (20.0 oz.)

SIGNIFICANCE AND USE

Water hardness has traditionally been defined as the capacity of water to precipitate soap. The ionic species in water causing the precipitation were later found to be primarily calcium and magnesium. At the present time, water hardness is a quantitative measure of these ions in the water sample. Now it is also known that certain other ion species, such as iron, zinc and manganese, contribute to the overall hardness of water. The measure and subsequent control of water hardness is essential to prevent scaling and clogging in water pipes. The Hanna hardness test kit makes monitoring easy and quick. The compact size provides the versatility to use the kit anywhere and the design makes the kit easy to handle.

Note: 1 gpg (grains per gallon) CaCO_3 is equivalent to 17 ppm CaCO_3 (where ppm - parts per million - is equivalent to mg/L).

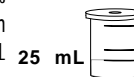
CHEMICAL REACTION

The hardness level is determined by an EDTA (ethylenediamine-tetraacetic acid) titration. The solution is first adjusted to a pH of 10 using a buffer solution. The indicator chelates with metal ions such as magnesium or calcium to form a red colored complex. As EDTA is added, metal ions complex with it. After all the free metal ions have been complexed, an excess EDTA removes the metal ions complexed with the indicator to form a blue colored solution. This color change from red to blue is the endpoint of the titration.

INSTRUCTIONS

READ ALL THE INSTRUCTIONS BEFORE USING THE TEST KIT

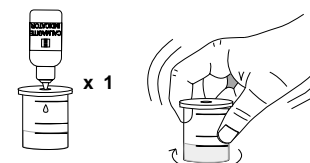
- Remove the cap from the plastic vessel. Rinse the plastic vessel with the water sample, fill to the 25 mL mark and replace the cap.



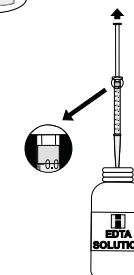
- Add 5 drops of Buffer Solution through the cap port and mix carefully by swirling the vessel in tight circles.



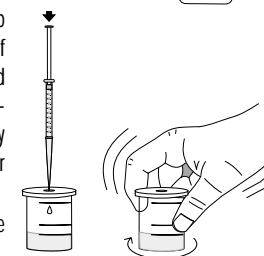
- Add 1 drop of Calmagite Indicator through the cap port and mix as described above. The solution becomes a red-violet color.



- Take the syringe and push the plunger completely down into the syringe. Insert tip into the EDTA solution gpg range (or EDTA solution ppm range) and pull the plunger out until the lower edge of the seal is on the 0.0 mL mark of the syringe.



- Place the syringe tip into the cap port of the plastic vessel and slowly add the titration solution drop by drop, swirling after each drop.
- Continue adding the



EDTA Solution until the solution in the vessel becomes purple. Then mix for 15 seconds after each additional drop until the solution in the vessel turns blue.

- Read off the milliliters of titration solution used from the syringe and multiply by 20 to obtain the hardness level of your sample as gpg (or as ppm) CaCO_3 .

If it has been used EDTA Solution 0-20 gpg range:

$$\text{mL of titrant} \times 20 = \text{gpg } \text{CaCO}_3$$

If it has been used EDTA Solution 0-20 ppm range:

$$\text{mL of titrant} \times 20 = \text{ppm } \text{CaCO}_3$$

REFERENCES

Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985, p. 210-214.

1987 Annual Book of ASTM Standard, vol. 11.01 Water (1), p. 212-215.

HEALTH AND SAFETY

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