Instruction Manual

HI 38033
Total Hardness
0-30 gpg range
Test Kit

HANNA instruments

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, 1 bottle with dropper (30 mL);
- Calmagite Indicator, 1 bottle with dropper (10 mL);
- HI 38033-0 EDTA Solution, 2 bottles (2x75 mL);
- 1 calibrated plastic vessel (20 mL) with cap;
- 1 plastic pipette (1 mL).

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

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SPECIFICATIONS

Range	0 to 30 gpg $CaCO_3$
Smallest Increment	1 gpg $CaCO_3$
Analysis Method	EDTA titration
Sample Size	10 mL
Number of Tests	100
Case Dimensions	235x175x115 mm (9.2x6.9x4.5")
Shipping Weight	457 g (16.1 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

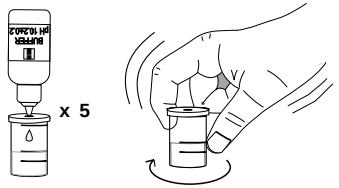
The hardness level as gpg calcium carbonate ($CaCO_3$) is determined by an EDTA (ethylene-diamine-tetraacetic acid) titration. The solution is first adjusted to a pH of 10 using a buffer solution. The indicator chelates with metal ions such as magnesium or calcium to form a red colored complex. As EDTA 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

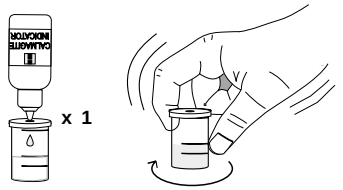
READ ALL THE INSTRUCTIONS BEFORE USING THE TEST KIT

- Remove the cap from the plastic vessel. Rinse the plastic vessel with the water sample, fill to the 10 mL mark and replace the cap.

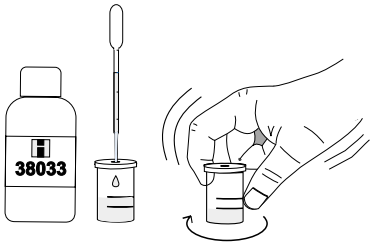
- Add 5 drops of Buffer Solution through the cap port and mix carefully by swirling the vessel in tight circles.



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



- Fill the plastic pipette with HI 38033-0 EDTA Solution and insert the tip into the cap port of the plastic vessel. Add the solution drop by drop, swirling to mix after each drop, while keeping an accurate count of the number of drops being added to the solution in the vessel.



- Continue adding titration solution until the solution in the plastic vessel becomes purple. Then mix for 15 seconds after each additional drop until the solution turns blue.
- Record the number of drops needed to obtain the final color change as gpg $CaCO_3$ of total hardness of your sample.

drops of titrant x 1 = gpg $CaCO_3$

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.