

## Instruction Manual

# HI 3841 Hardness Medium Range Test Kit

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Dear Customer,

Thank you for choosing a Hanna Product.

Please read the instructions carefully before using the chemical test kit. It will provide you with the necessary information for a correct use of the kit.

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 3841-0 Hardness MR Reagent, 1 bottle (30 mL) with dropper;
- 1 calibrated plastic vessel (50 mL).

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

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## SPECIFICATIONS

Range	40 to 500 mg/L (ppm) CaCO <sub>3</sub>
Smallest Increment	20 mg/L (ppm) CaCO <sub>3</sub>
Analysis Method	Drop count titration
Sample Size	50 mL
Number of Tests	50 (average)
Case Dimensions	115x105x80 mm (4.5x4.1x3.1")
Shipping Weight	120 g (4.2 oz.)

## SIGNIFICANCE AND USE

Historically, water hardness had been defined by the capacity of water to precipitate soap. The ionic species in water causing the precipitation were later found to be primarily calcium and magnesium. Currently, therefore, water hardness is actually a quantitative measure of these ions in the water sample.

## CHEMICAL REACTION

The Hanna Test Kit determines total hardness in water via a titrimetric method. Calcium and magnesium form a complex with EDTA and the reaction end-point is indicated by the change in color of the indicator from red to blue.

## INSTRUCTIONS

READ THE ENTIRE INSTRUCTIONS BEFORE USING THE KIT

- Remove the cap from the plastic vessel. Rinse the plastic vessel with the water sample, and fill it to the 50 mL mark with the sample.



- Before start adding reagent, check carefully that the dropper tip is clean. If not, clean it with a soft tissue before use it.
- Add drops of HI 3841-0 reagent until the color changes to pink and then to blue (titration end point), while swirling the sample after each drop and counting the drops needed to reach the end point.

**Note:** To dose the right drops volume squeeze gently the reagent bottle.



Use the Conversion Table or calculate the Hardness:

$$\# \text{ of DROPS} * 20 = \text{ppm CaCO}_3$$

$$1 \text{ ppm} = 1 \text{ mg/L} = 0.1^\circ\text{f} = 0.0556^\circ\text{D} = 0.07^\circ\text{E}$$

**NOTE:** ppm : is milligrams CaCO<sub>3</sub> per Liter

- °f : French Degrees
- °D : German Degrees
- °E : English Degrees

Store the reagent bottle out of direct sunlight

## REFERENCES

Adaptation of the E.P.A. recommended 130.2 method.

## HEALTH AND SAFETY

The chemicals contained in this test kit are safe in normal domestic term. Read Health and Safety Data Sheet before performing the test.

## TABLE 1 HARDNESS OF WATER

Drops:

- 1 - 4 very soft
- 5 - 8 soft
- 9 - 12 medium
- 13 - 16 hard
- 17 very hard

To measure: Hardness Low Range use HI 3840 Test Kit  
Hardness High Range use HI 3842 Test Kit

**TABLE 2  
CONVERSION DATA**

Drops	ppm	°f	°D	°E
2	40	4	2.22	2.80
3	60	6	3.33	4.20
4	80	8	4.44	5.60
5	100	10	5.56	7.00
6	120	12	6.67	8.40
7	140	14	7.78	9.80
8	160	16	8.89	11.2
9	180	18	10.0	12.6
10	200	20	11.1	14.0
11	220	22	12.2	15.4
12	240	24	13.3	16.8
13	260	26	14.4	18.2
14	280	28	15.6	19.6
15	300	30	16.7	21.0
16	320	32	17.8	22.4
17	340	34	18.9	23.8
18	360	36	20.0	25.3
19	380	38	21.1	26.6
20	400	40	22.2	28.0
21	420	42	23.3	29.4
22	440	44	24.4	30.8
23	460	46	25.6	32.2
24	480	48	26.7	33.6
25	500	50	27.8	35.0