

## Instruction Manual

# HI 38022 Total Chlorine High Range Test Kit



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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:

- Potassium Iodide Solution, 1 bottle with dropper (30 mL);
- Sulfamic Reagent, packets (100 pcs);
- Starch Indicator, 1 bottle with dropper (25 mL);
- Thiosulfate Reagent, 1 bottle (100 mL);
- 1 calibrated plastic vessel (50 mL);
- 1 calibrated plastic vessel (20 mL);
- 1 plastic pipette (3 mL);
- 1 plastic pipette (1 mL);
- 1 spoon.

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

ISTR38022 12/00 PRINTED IN ITALY

## SPECIFICATIONS

Range	0 to 4.0 mg/L (ppm) as Chlorine 0 to 20.0 mg/L (ppm) as Chlorine
Smallest Increment	0.2 mg/L in the 0-4.0 range 1.0 mg/L in the 0-20.0 range
Analysis Method	Drop count titration
Sample Size	10 mL and 50 mL
Number of Tests	100
Case Dimensions	235x175x115 mm (9.2x6.9x4.5")
Shipping Weight	561 g (19.8 oz.)

## SIGNIFICANCE AND USE

The chlorination of water supplies and polluted waters is used mainly to destroy or deactivate disease-producing microorganisms. It also serves to improve the quality of drinking waters, as chlorine reacts with ammonia, iron, manganese, sulfide and some organic substances.

Nevertheless high amounts of chlorine will produce adverse effects, like formation of compounds which are potentially carcinogenic (e.g. chloroform) or harmful to aquatic life (e.g. chloramines). Thus it is essential to control that the proper amount of chlorine has been added in order to fulfill the primary purpose of disinfecting and to minimize any adverse effect.

**Note:** mg/L is equivalent to ppm (parts per million).

## CHEMICAL REACTION

An iodometric titration method is used. The water sample is treated with potassium iodide and strongly acidified with acid. The amount of iodine generated is equivalent to the chlorine in the sample; the concentration of iodine is calculated by titration with thiosulfate ions that reduce iodine back to iodide ions.

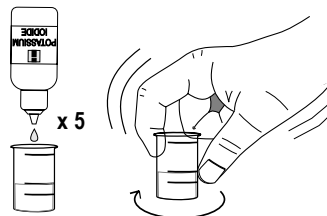
## INSTRUCTIONS

READ THE ENTIRE INSTRUCTIONS BEFORE USING THE KIT

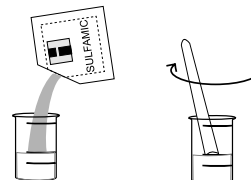
- 1- Using the 3 mL plastic pipette, fill the small (20 mL) vessel with water sample up to the 10 mL mark.



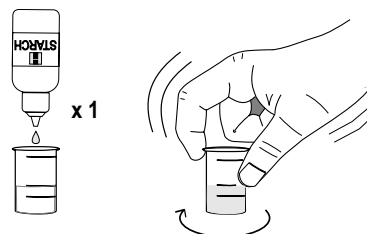
- 2- Add 5 drops of Potassium Iodide Solution and swirl gently to mix.



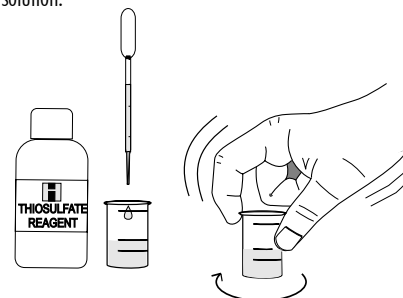
- 3- Add 1 packet of Sulfamic Reagent. Use the spoon to mix and dissolve.



- 4- Add 1 drop of Starch Indicator and swirl gently to mix. If chlorine is present, the solution will turn a blue color.



- 5- Using the 1 mL plastic pipette, add Thiosulfate Reagent drop by drop, swirling after each drop, while keeping an accurate count of the drops being added to the solution.

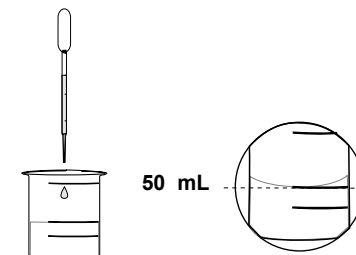


- 6- Continue adding Thiosulfate Reagent until the solution changes from blue to colorless.
- 7- The concentration in mg/L (or ppm) of total chlorine in your sample is equal to the number of drops of Thiosul-

fate Reagent used to turn the solution colorless.

$$\text{drops} \times 1 = \text{mg/L Total Chlorine}$$

- 8- If the result is lower than 4 ppm, the precision of test can be improved as follows.
- 9- Fill the large (50 mL) plastic vessel with water sample up to the 50 mL mark; use the 3 mL pipette to adjust the sample level so that the meniscus formed on the walls of the vessel is exactly on the 50 mL mark.



- 10- Add 5 drops of Potassium Iodide Solution and swirl gently to mix.

- 11- Add 1 packet of Sulfamic Acid Reagent and use the spoon to mix and dissolve.

- 12- Add 4 drops of Starch Indicator and swirl gently to mix. If chlorine is present, the solution will turn a blue color.

- 13- Using the 1 mL plastic pipette, add Thiosulfate Reagent drop by drop, swirling after each drop, while keeping an accurate count of the drops being added to the solution.

- 14- Continue adding Thiosulfate Reagent until the solution changes from blue to colorless.

- 15- To obtain the concentration in mg/L (or ppm) of total chlorine in your sample, multiply by 0.2 the number of drops of Thiosulfate Reagent used to turn the solution from blue to colorless.

$$\text{drops} \times 0.2 = \text{mg/L Total Chlorine}$$

## REFERENCES

Standard methods for the Examination of Water and Wastewater, 20<sup>th</sup> Ed., 1998, APHA-AWWA-WEF

## HEALTH AND SAFETY

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