Instruction Manual

HI 3810
Dissolved Oxygen Test Kit

HANNA instruments®

www.hannainst.com

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 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:

- Manganous Sulphate Solution, 1 bottle with dropper (30 mL);
- Alkali-Azide Reagent, 1 bottle with dropper (30 mL);
- Sulphuric Acid Solution, 2 bottles with dropper (60 mL);
- Starch Indicator, 1 bottle with dropper (10 mL);
- HI3810-0 Reagent Titrant Solution, 1 bottle (120 mL);
- 1 glass stoppered bottle;
- 1 calibrated vessel (10 mL);
- 1 calibrated syringe with tip.

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

SPECIFICATIONS

Range	0 to 10 mg/L (ppm) O_2
Smallest Increment	0.1 mg/L (ppm) O_2
Analysis Method	Azide Modification Titration
Sample Size	5 mL
Number of Tests	110 (average)
Case Dimensions	260x120x60 mm (10.2x4.7x2.4")
Shipping Weight	910 g (34.0 oz.)

SIGNIFICANCE AND USE

The concentration of dissolved oxygen in water is extremely important in nature as well in man's environment. In the oceans, lakes, rivers, and other surface water bodies, dissolved oxygen is essential to the growth and development of aquatic life. Without oxygen, the water can become toxic due to the anaerobic decaying of organic matter. In man's environment, water must contain at least 2 mg/L of oxygen to protect water pipes from corrosion. However, boiler system water, in many cases, cannot contain greater than 10 mg/L oxygen.

The Hanna Dissolved Oxygen Test Kit can determine the oxygen concentration in water quickly and easily. The kit is portable and can be used in the field as well in the laboratory.

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

CHEMICAL REACTION

A modified Winkler method is used. Manganous ions react with oxygen in the presence of potassium hydroxide to form a manganese oxide precipitate (Step 1). An azide is present to prevent any nitrite ions from interfering with the test. On addition of acid, manganese oxide hydroxide oxidizes the iodide to iodine (Step 2). Since the amount of iodine generated is equivalent to the oxygen in the sample, the concentration of iodine is calculated by titration of thiosulfate ions that reduce the iodine back to iodide ions.

Step 1: $2Mn^{2+} + O_2 + 4OH^- \rightarrow 2MnO(OH)_2$

Step 2: $MnO(OH)_2 + 2I^- + 4H^+ \rightarrow Mn^{2+} + I_2 + 3H_2O$

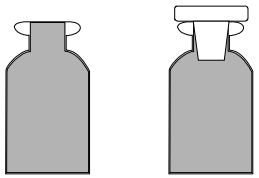
Step 3: $I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$

INSTRUCTIONS

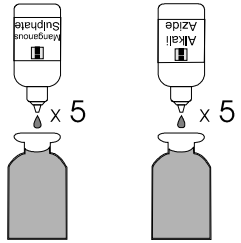
READ ALL THE INSTRUCTIONS BEFORE USING THE TEST KIT

LOOK AT THE BACK PAGE FOR THE ILLUSTRATED PROCEDURE

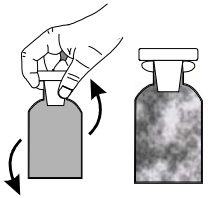
- Rinse the glass bottle 3 times with water sample and fill to overflow. Insert stopper and ensure that a small part of the sample spills over.



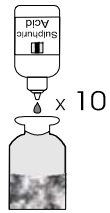
- Remove the stopper and add 5 drops each of Manganous Sulphate Solution and Alkali-Azide Reagent.



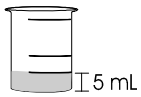
- Add some more sample to fill the bottle completely. Carefully stopper the bottle again and ensure that a part of the sample spills over. This is to make sure that no air bubbles have been trapped inside, which would corrupt the reading.
- Invert several times the bottle. The sample becomes orange-yellow and a flocculent precipitate will form if oxygen is present.



- Let the sample stand and the flocculent precipitate will start to settle.
- After approximately 2 minutes, when the upper half of the bottle becomes limpid, add 10 drops of Sulphuric Acid Solution.

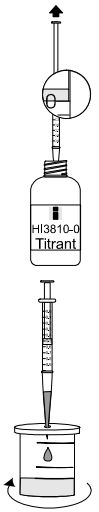


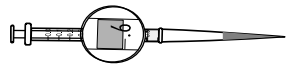
- Again stopper the bottle and invert it until all particulate material is dissolved. The sample is ready for measurement when it is yellow and completely limpid.
- Remove the cap from the plastic vessel. Rinse the plastic vessel with the solution in the bottle, fill to the 5 mL mark and replace the cap.



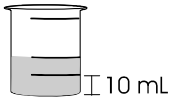
- Add 1 drop of Starch Indicator through the cap port and mix by carefully swirling the vessel in tight circles. The solution will turn a violet to blue color.

- Push and twist pipet tip onto tapered end of syringe ensuring an air tight-fit. Take the titration syringe and push the plunger completely into the syringe. Insert tip into HI 3810-0 Titrant Solution and pull the plunger out until the lower edge of the plunger seal is on the 0 mL mark of the syringe.
- Place the syringe tip into the cap port of the plastic vessel and slowly add the titration solution dropwise, swirling to mix after each drop. Continue adding titration solution until the solution in the plastic vessel changes from blue to colorless.
- Read off the milliliters of titration solution from the syringe scale and multiply by 10 to obtain mg/L (ppm) oxygen.

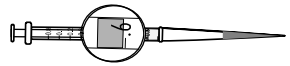




- If results are lower than 5 mg/L, the precision of the test can be improved as follows. Add an amount of unused sample in the glass bottle to the 10 mL mark of the plastic vessel.



- Proceed with the test as described before and multiply the values on the syringe scale by 5 to obtain mg/L oxygen in the sample.



REFERENCES

1987 Annual Book of ASTM Standard, Volume 11.01 Water (1), pages 629-638.

Official Methods of Analysis, A.O.A.C., 14th Edition, 1984, pages 620-621.

Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.

HEALTH AND SAFETY

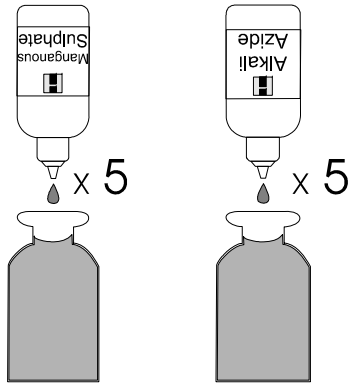
The chemicals contained in this test kit may be hazardous if improperly handled. Read Health and Safety Data Sheets before performing the test.

HI 3810 DISSOLVED OXYGEN TEST KIT

1

Rinse x 3

2



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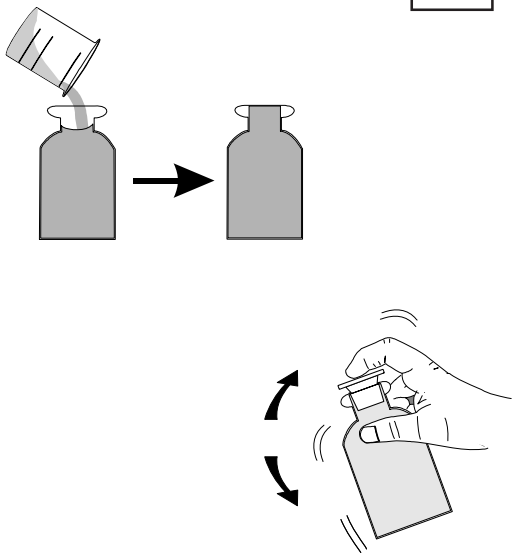

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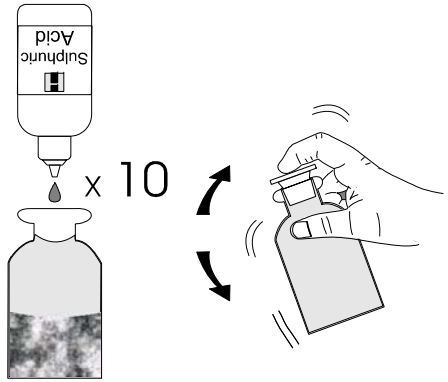
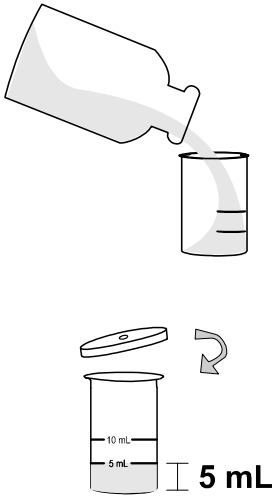


5

5 mL sample



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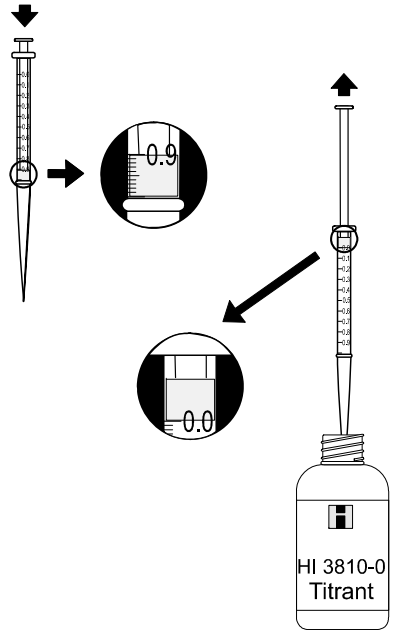

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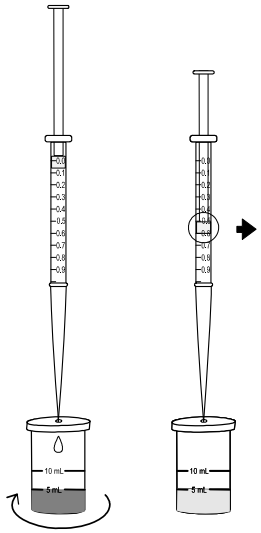

mL x 10 = mg/L O_2