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**Purpose:**

Use chemical dosing process to test the concentration change of ozone in water and thus tends to find out the dissipation status.

**Test instrument:** OH-6800

**Test temperature:**

- Lab ambient temperature: 22°C ~23°C
- Pure water temperature: 24°C ~25°C

**Lab operator:** Zhao, Wei-Jun



**Test apparatus and procedure:**

**1. Test apparatus:**

Electronic Balance, Weight-Measurement Paper & Spoon, Triangle Cone Bottle, Volume-Measurement Cylinder, Suction Tube and Dosing Tube & Rack.

**2. Chemicals applied:**

**H<sub>3</sub>BO<sub>3</sub>, KI, 0.01N Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> and Starch TS (Amylum Indicator).**

**3. Test procedure**

- Take 0.6184g of H<sub>3</sub>BO<sub>3</sub> and 1g of KI and solve them into 30mL pure water, then, add 1mL of Starch TS.
- Set the OH-6800 concentration at 150mg/hr, then, introduce O<sub>3</sub> into a triangle cone bottle contained by 70mL pure water for 1 min. and stay for another 0, 5, 10 and 15min.
- When the stay time is due, mix the solution prepared in step a & b; if there is any O<sub>3</sub> contained in the solution, the solution's color would turn to purple.
- Dose 0.01N Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> till the purple color disappears; record the volume (ml) of 0.01N Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> consumed.
- Follow the formula listed below to calculate the O<sub>3</sub> volume introduced within 1min. period, and the weight (mg) dissolved into pure water after 0, 5, 10 & 15 min (the total solution volume is 100mL).

**【Derivation of O<sub>3</sub> concentration】**



$$\text{O}_3 = \text{I}_2 = 2\text{I}^- = 2\text{e}^-$$

$$\text{O}_3 \text{ equivalent quantity} \Rightarrow \text{molecule weight}/2 = 48/2 = 24$$

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$$\frac{\text{O}_3(\text{mg})/\text{min}}{\text{O}_3 \text{ equivalent}} = N_1 \times V_1$$

$$\Rightarrow \frac{\text{O}_3(\text{mg})/\text{min}}{24} = 0.01 \times V_1$$

$$\Rightarrow \text{O}_3(\text{mg}) / \text{min} = 0.24 \times V_1$$

#### Result and discussion:

Stay time	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (mL)	O <sub>3</sub> (mg) introduced within 1 min	ppm (mg/L) (total solution volume is 100mL)
0 min	1.2	0.288	2.88
5min	0.72	0.1728	1.728
10min	0.24	0.0576	0.576
15min	Solution color isn't changed, which means no further O <sub>3</sub> left in the solution		

The O<sub>3</sub> dissipating speed is (2.88-1.728)/5 =0.2304 (ppm/min)



From the above test result we can see that by using OH-6800 to generate O<sub>3</sub> (the concentration is set to 150mg/hr), and introduce it into 70ml pure water for 1 min. and stay, the longer the stay time last, the lower the O<sub>3</sub> concentration becomes. And the O<sub>3</sub> dissipating speed is 0.2304ppm/min (calculated by the test result), or we can say that after staying for 15 min, all O<sub>3</sub> are completely dissipated already. A supplementary is added: the O<sub>3</sub> concentration is brought by introducing O<sub>3</sub> for 1 min, the longer time of O<sub>3</sub> introduced, the higher of O<sub>3</sub> concentration would achieve in the pure water.