VOCs Analyzer

YL VOCs Analyzer accurately tests for the presence of volatile organic compounds (VOCs) which may be dissolved in drinking and waste water supplies. The Analyzer operates by first purging VOCs from a water sample under pressure using inert gasses such as helium or nitrogen. The VOCs are trapped on a solid carbon-based sorbant in a trap tube and are concentrated by thermal de-sorption, and then separated by passing the VOCs through a column in a column oven. The separated volatile constituents are qualitative and/or quantitative detected with either the flame ionization detector (FID) or electron capture detector (ECD).

Of the about 300 VOCs known, 70 are easily dissolved in water; of these 70 VOCs, 18 are regulated by the Korean Ministry of the Environment for meeting drinking water quality standards (KDWR and the EPA 500 series method).

YL VOCs Analyzer accurately tests for the presence of VOCs and measures their concentration. The system contains all necessary reagents and equipment for conducting the analyses, including detailed procedures and protocols for conducting the tests. These protocols are in full compliance with approved U.S. EPA methods.

• Useful Information

1) Sample Collection

Compounds	Container	Additives	Storage
Volatile Organic Compounds	Glass/Brown bottle	Ascorbic acid or Sodium Thiosulfate	4 °C

VOCs are collected as a sample in a 40 ml vial. Collection must be done carefully so as to avoid any empty space or air bubble in the sample vial, which would interfere with the accuracy of downstream measurements of VOCs in the sample. The collected sample may be stored at 4 °C for up to 14 days, but it is recommended analyses of the collected sample be conducted as soon as possible but no later than 14 days of sampling.

2) Sample preparation after collecting the sample

Add ascorbic acid to the collected sample in the 40 ml vial. Ascorbic acid prevents the oxidation of any VOCs present in the sample. Such oxidation would be THM in the presence of Humic acid, Fluvic acid and Choloride. Adjust the pH of the sample to pH 2.0 or less with 6N HCl. Store the sample in a dark location until ready to proceed with the analysis.
If using the Purge & Trap method, inject the thermal-desorbed compound to the Oven system module. Proceed with the detection and measurement of VOCs that may be present in the sample.

3) Preparation of Calibration Standards

Use the standards included in the kit. In order to make a VOC blank solution and standards, it is suggested that ultra-pure water (YL aquaMAX Ultra System) be used. Prepare the water by first the heated water passing with 99.995 % of Nigrogen gas for one hour, and then the water is allowed to cool passing with Nitrogen gas, which is a VOC blank solution. Using the prepared blank solution, dilute the highly concentrated standards based on the calibration of concentration standards to make a standard.

4) Detectors Used in the Analysis of VOCs

We recommend the use of the detectors listed in [Table 1] when testing for the presence of the 18 volatile organic compounds, which are restricted by KDWR regulations for water quality standards set for drinking water.

	Targeted compounds	Detectors suggested by regulation of water quality for drinking water
1	Phenol	UV
2	THM	FID, ECD, ELCD, PID
3	1.1.1-Trichloroethane	FID, ECD, ELCD, PID
4	Tetrachloroethylene	ECD
5	Trichloroethylene	ECD
6	Dichloromethane	ECD
7	Benzene	FID, ECD, ELCD, PID
8	Toluene	FID, ECD, ELCD, PID
9	Ethylbenzene	FID, ECD, ELCD, PID
10	Xylenes (-o, -p, -m)	FID, ECD, ELCD, PID
11	1.1-Dichloroethylene	FID, ECD, ELCD, PID
12	Carbon tetrachloride	FID, ECD, ELCD, PID
13	1.2-dibromo-3-chloropropane	ECD, Mass
14	Chloralhydrate	ECD, Mass
15	Dibromoacetonitrile	ECD, Mass
16	Dichloroacetonitrile	ECD, Mass
17	Trichloroaceetonitrile	ECD, Mass
18	Haloaceticacid (6 kinds)	ECD, Mass

[Table 1] Detectors are recommended for testing the presence of VOCs restricted by the KDWR water quality regulations established for drinking water supplies

• Application

- Sterilized by-product in water
- VOC in drinking water

■ Halogenated Compounds

- Injection transfer line : 280 °C
- Column : HP-VOC (60 mm, 0.32 mm, 1.8 μm)
- Oven temperature program

5 °C/min 7 °C/min

35 °C (5 min) 60 °C (0 min) 200 °C (10 min)

- Purge & Trap :
  - -Trap : Charcoal/Tenax/Silica
  - -Purge flow : 40 ml/min
  - -Purge time : 7 min
  - -Desorption temp : 225 °C
  - -Desorption time : 4 min
  - -Injection temp : 180 °C
  - -Injection time : 1 min
- Detector : ECD, 250 °C
- Carrier gas : N2