THM 1000

SELECTIVE VOC ANALYZER FOR WATER MONITORING

BROCHURE
XA00321

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Drinking Water Safety Relies on **THM Analysis**

The demand for clean, reliable drinking water has and will continue to be of primary concern for consumers and around the world. In the U.S., 90% of people receive their drinking water through a public water system, where contaminants are regulated by the Safe Drinking Water Act (SDWA).

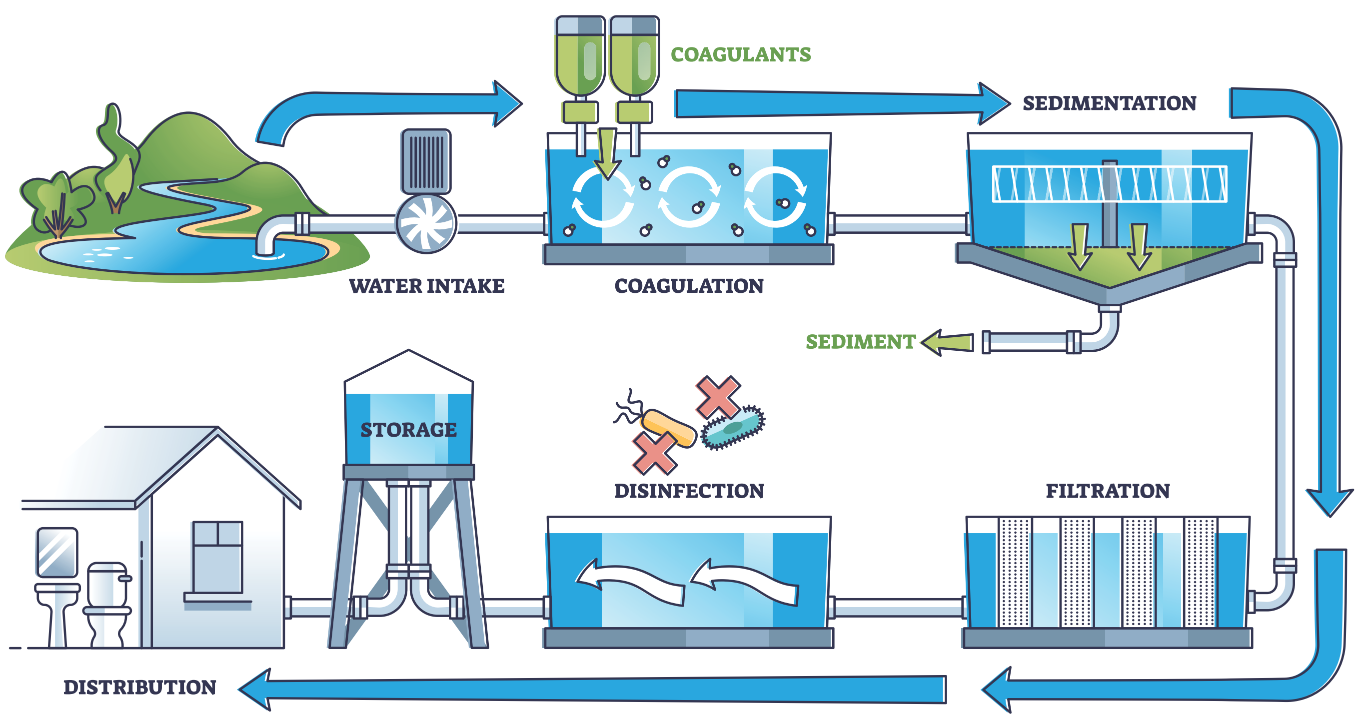
Regulations

One such set of regulations – Stage 1 and Stage 2 Disinfectant By-Product Rules (DBPR) – set a safe limit of the contaminants formed by disinfecting water with chlorine or chloramine: most notably, Trihalomethanes (THMs) and Haloacetic Acids (HAAs). Effective in 2012, the Stage 2 DBP rule regulates THMs (chloroform, dichlorobromomethane, dibromochloromethane, and bromoform) to 0.080 mg/L **(80 ppb)** total concentration. Water treatment plants and distribution systems are required to implement this rule and meet THM levels at each monitoring site in the distribution system. To reach this level, water plants must monitor THM levels to optimize their treatment process.

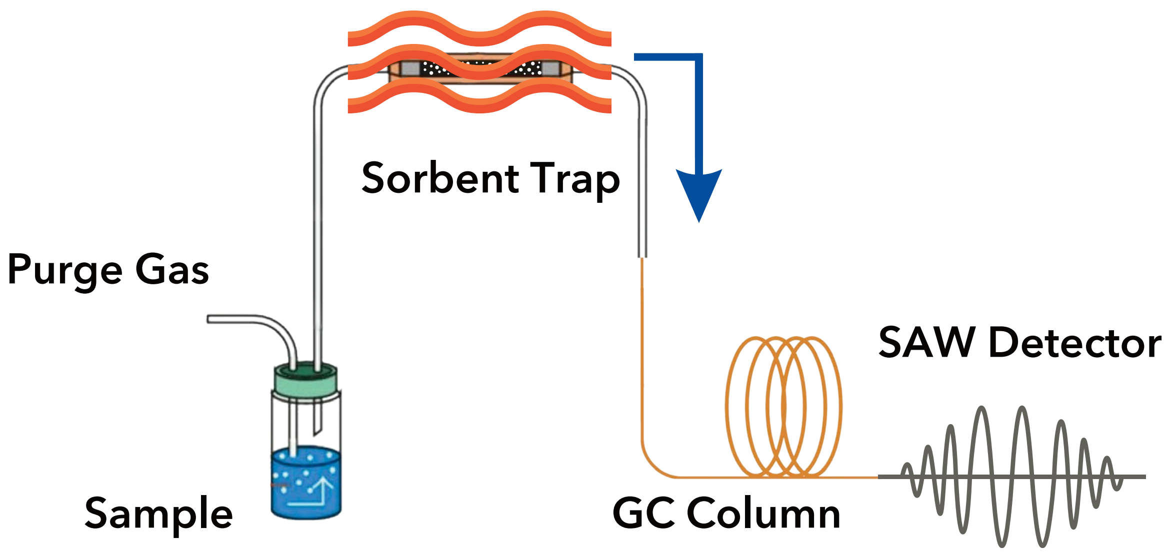
Current Practices

Today, many drinking water facilities rely on contract laboratories for their THM analysis. Although this data is reliable and accurate, the time it takes to receive THM data and the high cost per sample make outside lab analysis impractical for real-time optimization of water treatment processes. Plant operators require immediate data to adjust the pH, coagulant, and disinfectant dosage that impact THM formation. Reliable and timely THM data is essential for water treatment process optimization.

The Drinking Water Treatment Process



Rapid measurement of THMs when, where, and as often as you want.



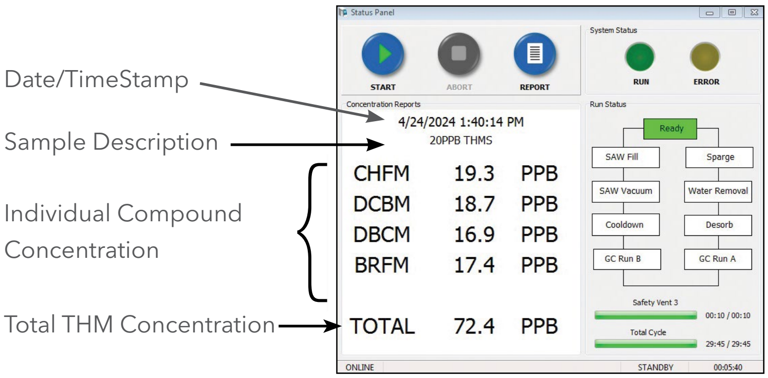
YSI's new THM Analyzer is an easy to operate, integrated Purge & Trap Gas Chromatograph (GC) that measures THM concentration at ppb levels in less than 30 minutes right at your own facility with a simple walk up and run protocol. This integrated system is a powerful new tool that can help operators optimize water treatment at the plant and evaluate water age in the distribution system for improved control over the formation of THMs.

Push-button Operation with No Sample Prep

Simply collect a sample and connect it to the analyzer sparging system. Then push the start button to begin the measurement cycle. Individual and total THM information is displayed clearly on the analyzer screen and laptop display. Analytical results, including measured concentration and detailed chromatography data are automatically archived for future review. The data may also be transferred to other software packages for more detailed trending analysis of THM information.

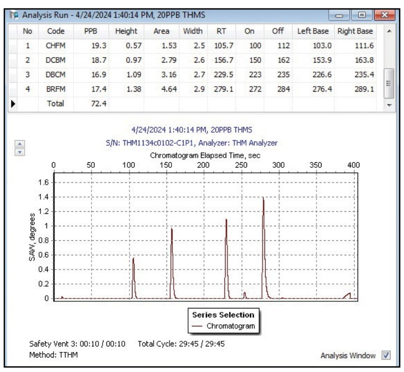
Features:	Benefits
30-minute analysis	Eliminates expensive and time-consuming off-site analysis for process control
Rapid operator feedback	Allows for immediate process adjustment capability
Push-button simplicity	Fast and easy operation; all-in-one sample sparging, component separation, and data analysis
Dedicated instrument	Helps ensure the safety of public drinking water

Powerful software provides critical advantages for THM measurement and data analysis.



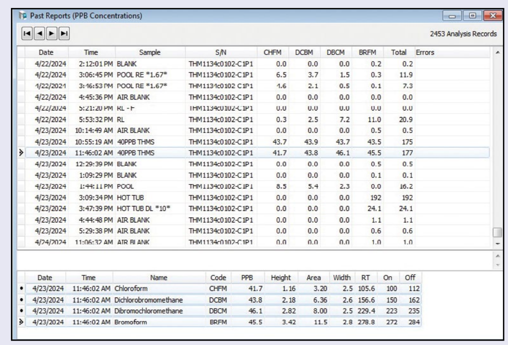
Status Panel Operator Interface

The Status Panel interface is displayed in both the Analyzer unit screen display and laptop program window. A simple click on the start button begins the measurement process. The panel displays measurement progress during an analysis run and then displays the measured concentration levels for individual and total THM.



Annotated Chromatogram

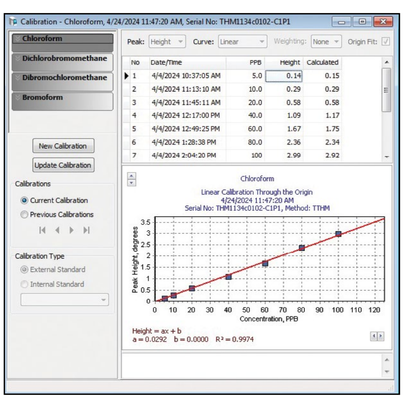
After an analysis run is completed, the laptop software displays the processed chromatogram showing the compound signal peaks with the corresponding chromatography data listed. Also included is key sample identification data. Right clicking on the chromatogram permits additional data display, including carrier gas pressure profile, GC column, and preconcentrator temperature profiles, plus other options for more in-depth data analysis and review.



Viewing Previous Analysis Runs

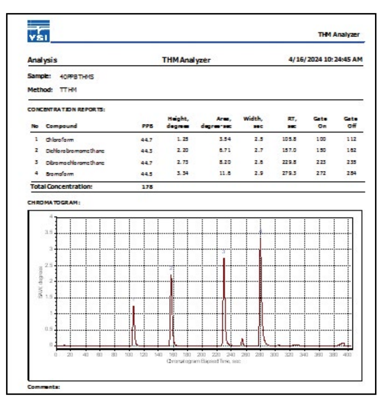
Review of any previous analysis run is made simple with the Past Reports window. The powerful software stores a complete data set of each analysis run, permitting a complete review of all the measurement parameters and data results.

Selecting an analysis in the Run List Panel immediately displays the key chromatography data for the analysis run in the bottom panel. Right clicking on the analysis run allows a user to retrieve a wealth of information concerning the particular analysis.



Calibration

A fully featured, but simple-to-use calibration routine allows users to maintain the accuracy of the THM Analyzer. Calibrations used for previous analysis are stored and can be reviewed with past analysis run data.



THM Analysis Report

A formal report of any analysis run can be quickly generated with a click of the mouse button. The report includes the processed chromatogram, key chromatography data, and sample identification information.

THM Analyzer Specifications	
Size	15.8” l x 15.3” h x 9.4” w (401 mm x 389 mm x 239 mm)
Weight	17 lbs
Power	Universal AC input, 24 VDC internal
Power Consumption (Analyzer without laptop)	150 W (peak), 120 VAC input, 24 VDC internal
Certifications	ETL 61010 / FCC part 15 Class A, ETLC, CE

Performance Specifications	
Measured Compounds	Chloroform, Dichlorobromomethane, Dibromochloromethane, Bromoform
Accuracy	Total THM: 15%*
Precision	Total THM: ±10% RSD
Calibration	External calibration
Factory Calibration Range***	5 ppb to 80 ppb for each THM compound
Sampling and Analysis Time	Approximately 30 minutes
Detector Type	Surface Acoustic Wave (SAW) sensor

Requirements	
Carrier Gas	Helium, UHP grade
Supply Pressure	55 – 60 psig (3.8 – 4.1 bar)
Gas Volume per Sample	Approximately 0.04 ft^3**
Water Sample Volume	40 mL

Environmental	
Operating the Analyzer within the recommended ranges ensures optimum instrument performance.	
Recommended Operating Temperature Range	68°F to 85°F (20°C to 30°C)
Storage Temperature Range	5°C to 40°C (41°F to 104°F)
Relative Humidity	< 90% (non-condensing)

*Standard factory calibration

**Up to 4,000 cycles from a single 300 cu. ft. high pressure cylinder (DOT 3AA2400)

***Instrument may be calibrated at a higher concentration if samples are suspected to have higher THMs

THM Analysis Application Opportunities

The quick, accurate, and inexpensive measurement of THMs using the YSI THM Analyzer creates numerous opportunities to improve the water treatment process.

THM levels can be lowered throughout the distribution system and chemical usage can be optimized to save money. What's more, quick process adjustments can be made to control THM formation when surface water Total Organic Carbon (TOC) characteristics alter due to seasonal or unusual weather conditions.

Where before you might have had limited THM data, you can now greatly expand the sampling frequency and monitoring locations to help you better understand the THM formation characteristics of your water source, treatment process, and distribution system.

Surface Water Supply Matrix Changes

Both human activities and seasonal changes can affect source water, altering the mineral characteristics of the water as well as the reactivity of its dissolved organic carbon. A water plant may observe no significant changes in the quantity of TOC due to seasonal events, but they may find their THM level has changed.

Frequent measurements of THM can help operators better understand the reactivity changes of their source water.

THM Analysis
Application Opportunities

Coagulant Evaluation Test

A successful coagulation process depends on identifying the correct coagulant type and optimum dosage under suitable environmental conditions of pH and alkalinity.

However, without the ability to measure THM concentration of the finished water in real time, the plant operator will not know if the coagulation process has been optimized to also remove the maximum amount of THM precursors.

With the ability to easily measure THM concentration in finished water, the plant operator can adjust the coagulation process to achieve minimal THM formation potential. Additionally, this allows the treatment plant to supply safe drinking water with the required level of disinfectant concentration while also maintaining lower DBP levels throughout the entire distribution system.

Real-Time Monitoring of THM Sampling Locations

Trihalomethane formation in water distribution systems is a function of water travel time, temperature, and physiochemical and biological characteristics of pipe deposits within the distribution system.

The real-time monitoring of THM at different sampling locations will help water distribution operators to identify problematic inorganic/organic pipe deposits that cause increased levels of THM formation.

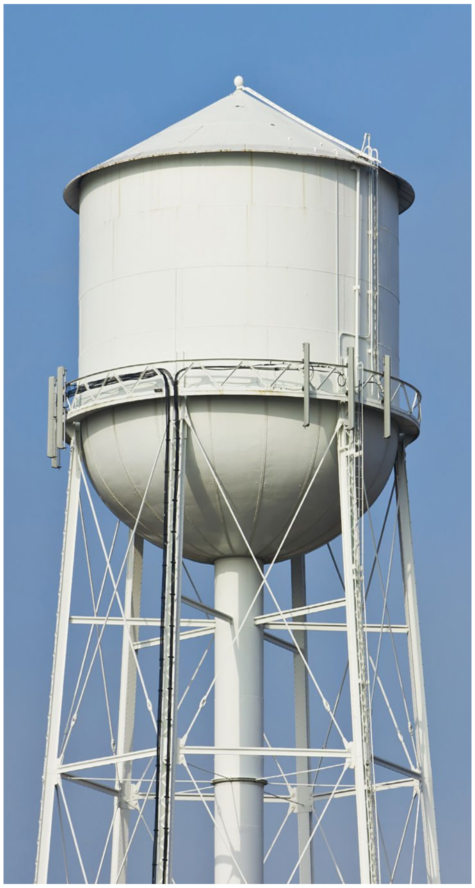
Flushing Program

Water quality levels throughout the distribution system are maintained by systematic flushing programs designed to reduce stationary water in dead end lines and increase flow volume to minimize water age. The distance of water from the water plant, dead ends in the pipe, and low water usage may cause water quality deterioration. Lower residual disinfectant levels indicate the need to flush, which can cause a significant water loss. **By measuring THM concentration in addition to disinfectant levels, operators can better decide on the location and length of flushing to minimize treated water loss.**

Water Quality Model Evaluation/Water Quality Trend

Hydraulic modeling of a water distribution system is an important tool for water quality management. In addition to basic hydraulic characteristics, modeling identifies water aging and predicts disinfectant decay and DBP formation.

Incorporating new data from frequent THM analysis in combination with disinfectant level data will help plant operators build an improved hydraulic model for water quality trend analysis, providing critical information for more targeted and efficient water plant operation.



Water Age Evaluation

Water age is emerging as an important issue due to increased THM formation in water distribution systems. Excessive contact time caused by dampened peak-hour demands, distribution piping configurations, areas of reduced water requirements, and fire protection storage can result in elevated THM concentration. Identifying and then reducing dead spaces and stagnation in water storage tanks and looping pipe configurations in water distribution systems will reduce water age.

These actions can be triggered appropriately by monitoring THM levels in storage tanks and key locations in the distribution system.

How to order

Part Number: 485128

Description: THM Analyzer

Includes:

- 485127 (THM Instrument)
- 485067 (Gas Connection Kit)
- 485002 (Calibration Kit)
- 485074 (THM Standard)

Note: RoHS compliant lead-free chassis

Instrument Accessories

485313
One Year Warranty
One-year plan.
- Must be purchased within 90 days ARO instrument
- Excludes laptop computer and consumables

485314
Installation and User Training
Includes factory installation and user training.

485067
THM Gas connection Kit
For connection to a standard 300 ft^3 high pressure gas cylinder (DOT3AA2400) with a CGA 580 connector.
Includes:
- Veriflo IR6000 two-stage regulator (1); 5 port w/ pressure relief and shutoff valve; 0-60 psi range; 0-100 psi gauge
- 1/4″ NPT to 1/8″ compression fitting (1)
- 1/8″ A-LOK® nuts and ferrules (6)
- 1/8″ OD x 1/16″ ID Teflon tubing (25′)

485070
THM Calibration Kit
A complete set of glassware and syringes required for preparing six standard solutions for routine instrument calibration.
- Syringe, 10 ul gas tight (1)
- Syringe, 100 ul gas tight (1)
- Syringe, 2.5 ml gas tight (1)
- Volumetric flask, 100 ml, Class A, (6)
- 40 ml EPA bottles w/Septa caps (12)

485074
Concentrated Standard Solution for Calibration
Certified stock standard solution containing all four THM compounds. Required for preparing the range of solution standards used for routine instrument calibration.
Includes:
- THM calibration/performance ampoule 100 ug/ml, 1 ml (1)

485075
THM Sparger Bottle

485026
THM Sparger Tube

485094
THM Preconcentrator Trap

Xylem Lab Solutions has you covered for all of your other water quality testing equipment.

BROCHURE XA00321

- pH
- Dissolved oxygen
- Conductivity
- Specific ions
- Temperature
- Total dissolved solids
- BOD
- Automated Chemistry
- TOC
- Turbidity
- VOC Analysis

xylem Lab Solutions

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