

## Aqualog® FAQs

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## **What real-world problems around the globe can Aqualog® with Datastream Dashboard address?**

Supplying safe potable water to consumers is a daily challenge for municipalities around the world because drinking water sources are subject to contamination. Also, cancer-causing disinfection by-products may form following treatment in the distribution systems.

Aqualog with Datastream Dashboard can address these problems by: (1) Tracking seasonal or storm event-induced variations of dissolved organic carbon (DOC) and its constituents in source water, such as humic and fulvic acids, protein-like compounds, and biopolymers; (2) Predicting formation of disinfection by-products and their species, such as Trihalomethanes (THMs) and Haloacetic Acids (HAAs); and (3) Early detection of contamination events such as algae, oil compounds, including Total Petroleum Hydrocarbon (TPH) and Polycyclic Aromatic Hydrocarbons (PAHs), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), etc. The water quality results are automatically analyzed and reported on the Datastream Dashboard.

## **What does Aqualog bring to water science, or to a water treatment plant, beyond what can be done with a conventional fluorometer?**

There are many scientists studying the colored dissolved organic matter (CDOM) in water. Given the complex nature of CDOM in water, a rapid and sensitive analytical method is needed for the qualitative and quantitative determinations of CDOM components.

The primary advantages of Aqualog over conventional fluorometers are its: (1) 100-fold increase in speed; (2) High sensitivity; (3) Inner filter effect (IFE) correction; (4) Deep ultra-violet wavelength ranges; and most importantly, (5) Simultaneous absorbance and fluorescence measurement capability. All of the advantages above contribute to making Aqualog a unique tool to fully implement the A-TEEM™ technique that provides distinct molecular fingerprints with numerous potential applications.

For more information on the advantages of an Aqualog over a conventional fluorometer, click below; [Link to the FAQ "What are the advantages of an Aqualog over a conventional fluorometer?"](#)

## **What are the advantages of an Aqualog over a conventional fluorometer?**

The main advantages that the Aqualog provides for simultaneous fluorescence and absorbance analysis of CDOM include:

- Absorbance spectral information can be used to correct the fluorescence spectrum in real time for inner filter effects (IFE). IFE involves both excitation light absorption and fluorescence reabsorption in the sample cuvette;
- Simultaneous acquisition with the same band-pass facilitates true matching of spectral features required for accurate inner filter effect correction;
- Simultaneous measurement allows monitoring of photobleaching of CDOM materials, which are very sensitive to UV wavelengths of the exciting light used to measure the absorbance and excite fluorescence;
- Excitation and absorbance wavelengths are scanned from low energy to high energy (red to UV) to reduce the exposure of the sample to UV, and hence, photobleaching;
- Absorbance data provide complementary, and often vital, concentration-dependent information on non-fluorescent compounds in the water sample;
- IFE correction greatly reduces analysis and sample preparation time, and increases accuracy by eliminating the need for error-prone dilution procedures and their recordkeeping.

### **What is required to use Datastream Dashboard with an Aqualog?**

The customer needs an Aqualog UV-800 unit with Aqualog software version > 4.0 software to be compatible with the Datastream Dashboard. This is due to its default scanning range of 200-800nm expected by Datastream Dashboard. Customers should also have Microsoft® Office with Excel® (version 2013 or later) and preferably the latest Google Chrome web browser.

### **What does the Aqualog Datastream Dashboard predict and report?**

It predicts and reports on dissolved organic carbon (DOC) concentration and composition, disinfection by-product formation potential, selected UV-Vis absorbance wavelengths and slopes, specific UV absorbance (SUVA), Excitation Emission Matrix (EEM) regions, total fluorescence, humic and fulvic acid indices, as well as model fits and residual results. (See the full specification list in [Datastream Brochure](#)).

### **How are Datastream Dashboard parameters reported?**

Datastream Dashboard provides instantaneous reporting, but also archives historical time-series data. Data parameters can be evaluated as high/low threshold settings, with regulatory levels (e.g. Maximum Contamination Levels-MCLs) coded using different color symbols. Tabulated data can be exported in Excel format, suitable for importing into a laboratory information management system (LIMS), and graphical data can be exported in Scalable Vector Graphics (SVG) format.

### **What additional parameters will be targeted in future releases of Datastream Dashboard?**

We are currently considering individual trihalomethane (THM) species, Membrane Fouling Rate Index, Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). Please contact HORIBA at [datastream.us@horiba.com](mailto:datastream.us@horiba.com) to inquire about upcoming new features or additions to the Datastream Dashboard.

### **How do I contact HORIBA for Aqualog and Datastream Dashboard support?**

The following links direct you to the appropriate support departments:

[Datastream.US@horiba.com](mailto:Datastream.US@horiba.com): specific to Datastream application/calibration issues;

[ScientificService.US@horiba.com](mailto:ScientificService.US@horiba.com): hardware, software and maintenance issues.

### **Is post-sales support provided for Datastream Dashboard?**

Yes, yearly, based on software license renewal.

### **What is included with the one-year Datastream Dashboard software license renewal?**

It includes model calibration, remote support, and software version updates. Customers with valid software licenses will be informed via email that a software update is available.

### **Is installation included with the purchase of Datastream Dashboard?**

Yes, HORIBA Instruments Inc. will perform the software installation of Datastream on-site. This includes a one-year license. Datastream Dashboard relies on embedded multivariate tools, and the installation will include customer-specific model calibration. All license renewals relevant to Datastream are managed by HORIBA. Technical support (model calibration and maintenance) is included in the license.

### **How long does the process of setting up the Datastream Dashboard model for a local drinking water treatment plant take?**

It takes typically two or three days on-site to set up the initial PARAFAC calibration model. Then the model can be recalibrated and updated as more samples are collected. Once a good model is established, annual calibrations will suffice.

### **How are independent data obtained for Datastream Dashboard?**

Depending on the model to be calibrated, the customer will periodically enter into the Datastream Dashboard their independent laboratory data (“independent data”), which can include DOC, pH, alkalinity, THM, color, etc. In water treatment plants in the USA, these data are usually readily accessible since these parameters need to be reported for compliance. In labs without the ability to collect these data independently, and in countries and regions with different regulatory requirements, arrangements must be made to collect data with representative samples that can be analyzed by a contract laboratory (at the customers’ expense).

### **What type of independent data are required to create a calibrated Datastream Dashboard model for Aqualog at a drinking water treatment plant?**

Datastream Dashboard requires independent data to calibrate the multivariate results garnered from Aqualog EEM data. During the installation and training period for Datastream Dashboard, a generic model will be provided by HORIBA. The customer should be prepared to collect Dissolved Organic Carbon (DOC), Trihalomethane (THM), THM species, and/or Haloacetic acids (HAA) data after the initial installation, for 7 to 10 working days. Based on this independent data set, the Aqualog Water Applications Team will help to develop, validate and optimize the calibration model for the given WTP. Model and calibration data are typically reviewed annually, or at the customers’ request.

### **What are the browser requirements for Datastream Dashboard?**

The Google Chrome browser is recommended.

### **Why does Datastream Dashboard have separate user and administrator login interfaces?**

The User interface restricts an operator to only view the latest sample data and time-series trends, as well as view the threshold warnings. Sample data are acquired through the Aqualog software Sample Q interface.

The Admin interface not only allows all of the above, but also is meant for the plant manager to select parameters, set parameter thresholds and maximum contaminant level (MCLs), and delete data points.

### **Is Datastream Dashboard suitable for water researchers?**

The primary purpose of Datastream Dashboard is to assist water treatment plants in monitoring the quality of water at various stages of the treatment process, from sourcing to distribution and serves as a prompt and aid in implementing remedial interventions.

### **What is a Datastream Dashboard model calibration?**

Aqualog is a unique A-TEEM™ spectrometer that collects absorbance-corrected 3D fluorescence excitation and emission matrices (EEM), and also absorbance/transmission spectra. These matrices (so-called molecular fingerprints) can be evaluated with multivariate analysis such as Parallel Factor Analysis (PARAFAC), to determine the constituent components in an A-TEEM fingerprint. However, the data are qualitative. Datastream Dashboard requires independent data to calibrate the multivariate results garnered from Aqualog EEM data. The process of creating such a quantitative analytical solution is realized by creating a calibrated model.

### **Can Datastream Dashboard handle multiple models simultaneously?**

No. At this time, it cannot be used at a central facility to monitor different WTPs that use different models. However, this is under consideration for future software development.

**What lab supplies are needed to begin using an Aqualog at a drinking water treatment plant?**

The customer should have available 1cm quartz cuvettes, stir bars, a stirred-temperature controlled sample chamber, all of which are now standard with new Aqualog-UV-800 units. The user should also have materials to prepare and possibly store DOC/SUVA-TOC samples according to USEPA Method 415.3. In general, this requires acid-washed glass vials, 0.45 micron Nylon low-UV extractable syringe filters and suitable apparatus.

**Does HORIBA offer a maintenance contract to provide guaranteed uptime for industrial customers?**

On a case-by-case basis, HORIBA may offer such a contract in certain regions.

**What are the advantages of the Aqualog Sipper accessory and how long can it run continuously without maintenance?**

The Sipper automates sample extraction, sample cell rinsing, cleaning, and draining. The included flow cell prevents air bubbles and organic fouling.

The Sipper provides excellent absorbance and fluorescence stability for an extended period of time without replacement of the flow cell. Although it is recommended that the flow cell be cleaned every three months, some DWTPs have run a sipper continuously for over a year without compromising performance.

**Is Aqualog certified to be used for reporting to USEPA or other regulatory agencies?**

There are no current requirements for the use of Aqualog for compliance reporting. However, Aqualog continues to be used in many water treatment plants as an early warning sentinel and for cost reduction through the prevention of chemical overdosing.

**Are reagents required for Aqualog when used in a drinking water treatment plant?**

No reagents/solvents, sample extractions or phase separations are required for sample measurement. Filters are needed to remove particulates in water. If a sipper is used for automatic sample extraction, cleaning fluid is required for flow cell maintenance.

**What reference materials are available to support Aqualog customers?**

The following materials are provided with every instrument and software renewal:

- Aqualog User Manual;
- Datastream Dashboard User Guide;

The following document is provided when you purchase the sipper accessory:

- Sipper Sample Changer User Guide

**What are the patents that protect Aqualog?**

“System and Method for Fluorescence and Absorbance Analysis” (Patent No. US 8901513 B2) and “Determination of Water Treatment Parameters based on Absorbance and Fluorescence” (Patent No. US 9670072 B2)

**Does Aqualog measure lead?**

Aqualog with Datastream does not measure and report lead or other heavy metals. However, there are commercial reagent assays that are based on absorbance that could be used with an Aqualog to determine lead content.

## What conventional organic analytical methods does Aqualog complement?

Parameters for Monitoring DBPs	Patented Aqualog A-TEEM Method	Conventional Methods
Dissolved Organic Carbon (DOC)	Provides DOC composition information not available from TOC	TOC Analyzer Single parameter, no information on organic composition or contaminations
UVA@ 254 nm (UV254)	Aqualog measures both DOC and UV254, thus also providing SUVA DOC (Patented method)	UV-Vis Spectrometer UV254 only
Disinfection By-products (DBPs)	No sample prep, less expensive, real-time analysis	GC/GC-MS Lots of sample prep, much more expensive, not suitable for real-time
Natural Organic Matter (NOM) Precursors to DBPs	Aqualog measures DOC, DBPs, and organic foulants Less expensive, fast, and real-time analysis	LC-OCD For research and chemical optimization More expensive, slow (~2hrs/sample) and not suitable for real-time

## What inorganic analytical instruments are commonly used at a drinking water treatment plant's laboratory?

Atomic Absorption (AA) for measuring dissolved metals;

Inductively Coupled Plasma (ICP), ICPMS for measuring metals and trace metals; and

Wet Chemistry, such as pH, alkalinity, chlorine, turbidity, etc.

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