



# Atomx

Automated VOC Sample Prep System

# Automated Productivity with the Atomx

## Automated VOC Sample Prep System

### Description

The Atomx combines an Autosampler and Purge and Trap into a single instrument for the analysis of VOCs in soils and waters. This is the first of its kind and only system that employs a unique methanol extraction automation feature for high level soils in accordance with USEPA Method 5035.

Extractasol clean-up step (patent pending) in the Atomx reduces carryover or cross contamination normally associated with high-level water or soil analysis. Three new independent injection systems for internal standards, surrogates, and matrix spikes provide the ability to select variable volumes without generating waste.

The Atomx features Tekmar's proven carousel drive capable of holding 80-vials for optimal throughput therefore reducing downtime. While priced competitively, this system offers unique features that cannot be found on other sample prep systems on the market today.

### How It Works

Atomx is a Purge and Trap (P&T) system, combining automation and concentration into one system for the analysis of solid and liquid samples. The system prepares P&T samples, including drinking water, waste water, soils, and sludges. Atomx completely automates sample preparation and P&T steps including vial handling, sample volume measurement, standard injections, dilutions, rinsing, purging, desorption and baking.

The Atomx single needle design transfers liquid sample aliquots from the vial to the sparger. Low-level solid samples are purged directly in the vial, transferring analytes to the trap. High-level solid samples can be automatically extracted via Methanol and diluted prior to transfer to the sparger for analysis. In addition, surrogate can be added either pre or post extraction.

Atomx offers all the capabilities you need for compliance with EPA Method 5035 for the analysis of volatile organics in soil samples, including a true closed-system technique for sample handling. The closed-system sampling technique ensures the integrity of the sample during the sample preparation process, greatly minimizing volatile organics loss.

### Options

- **Vial Chiller** – The Vial Chiller allows the samples to be held at temperatures as low as 4°C until sampling.
- **Guardian Foam Sensor** - The Guardian uses a photo sensor mounted on the outside of the sparger. When foaming occurs, the foam blocks the sensor, prompting the Atomx to shut off the purge flow and drain the sample.
- **Guardian and Eliminator** - When foam is sensed, the unit shuts off the purge gas. The purge clock is stopped and the Foam Transfer Valve is activated to add antifoam agent for a specified period of time.
- **Cryofocusing Module** – If your analysis requires secondary cold trapping, the Atomx can be configured with our cryofocusing module for temperature as low as -180°C using liquid nitrogen.

## Applications and Industries

VOC sampling and analysis are used in a wide range of applications in the following industries:

- Pharmaceutical
- Flavor, Fragrance, and Packaging
- Petrochemical
- Blood Alcohol and Forensic Toxicology
- Environmental

## Methods

USEPA 502.1, 502.2, 524.2, 503.1, 601, 602, 603, 624, 5035, 8010, 8015, 8020, 8021, 8030, 8240, 8260  
ASTM and Standard Methods  
Massachusetts VPH and GRO Methods

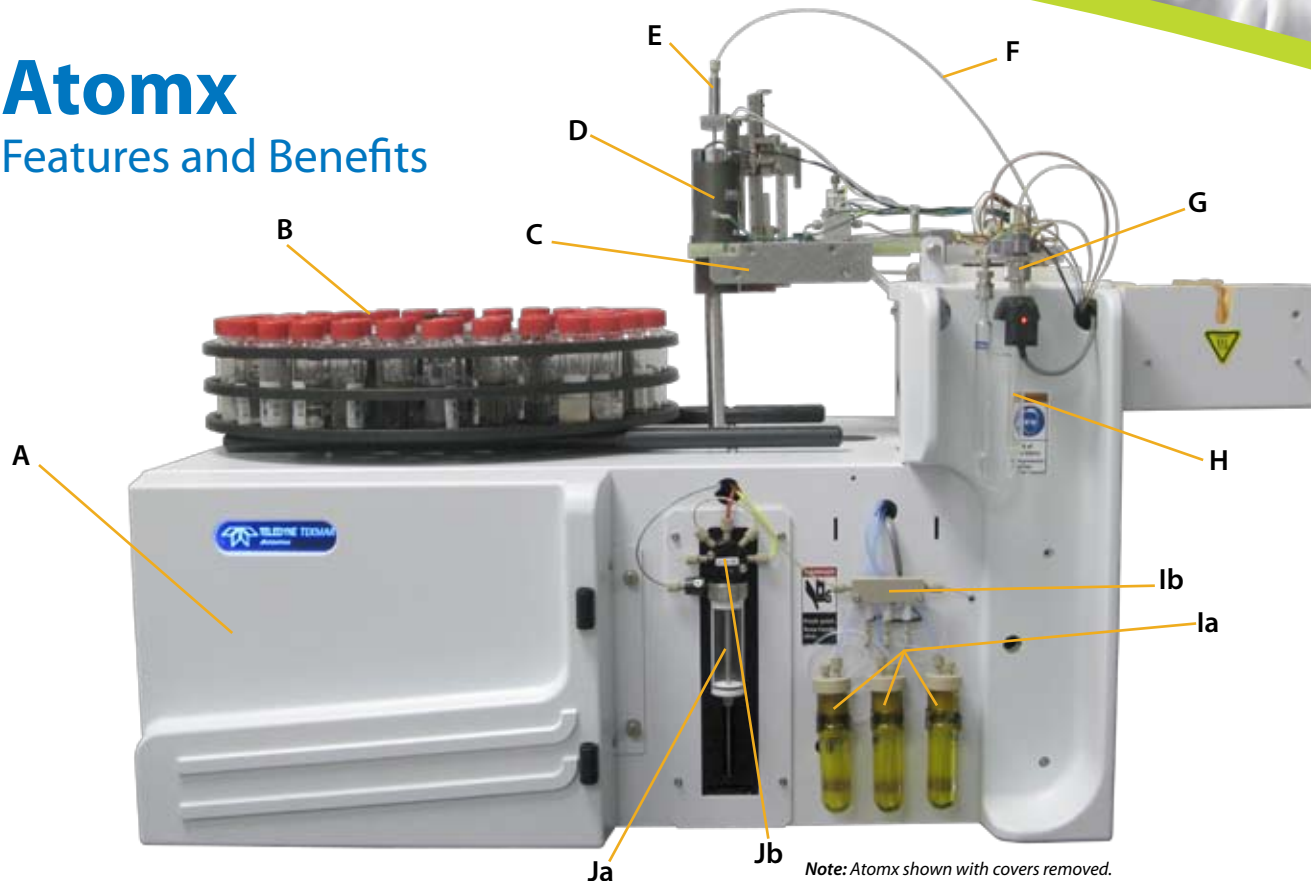
## Automated Methanol Extraction (ME) Saves Time



Spend more time analyzing results and less preparing samples with the Atomx Automated Methanol Extraction (ME) feature. When compared side-by-side, the Atomx Automated ME results match that to manual ME demonstrating the reliability and labor savings of this automated feature.

# Atomx

## Features and Benefits



Note: Atomx shown with covers removed.

**A. Single Platform System** - Installation, benchspace and method development are reduced with the Atomx, a single system that combines an autosampler and a purge and trap concentrator capable of handling all water and soil matrices including drinking water and wastewater.

**B. 80-position carousel design for optimal throughput** - The carousel drive is an electronically controlled mechanism that positions sample vials for sampling. The carousel positions the sample vials by rotating the carousel and indexing. The carousel tray is removable from the drive assembly for easy vial loading.

**C. Mixer Assembly** - This assembly allows for a magnetic stir bar to be added to the sample vial of a solid sample. The Atomx has the ability to spin or agitate the vial when it is in the sampling station to mix the soil during the purge process, or to mix a soil for Methanol Extraction.

**D. Vial Heating Chamber** - Ensures soil sample is heated if required by method.

**E. Sample Needle** - A patented 3-Stage Sample Needle is used to displace sample from the vial, purge in the vial and complete Methanol Extractions.

**F. PEEK™** - Inert Siltek® coating on heated pathway maintains sample integrity.

**G Heated Sample Mount** - The Heated Sample Mount on the Atomx is programmable up to 90°C.

**H. Glassware** - Glassware can be ordered in 5 and 25mL with or without frit.

**I. Internal Standards** - Internal Standards are stored in three 15mL amber glass vessels to prevent transmission of UV radiation (Ia). Vessels are sealed with a PEEK™ cap to prevent adsorption and contamination of the standard solution. Each standard vessel is pressurized to 7 psi and can deliver spikes of 1, 2, 5, 10, or 20µL to each sample (Ib). A maximum of 60µL can be added to each sample if all three standards are used. You can use any combination of the three standards.

**J. Syringe Drive** - The Syringe Drive (Ja) is capable of accurately dispensing 1 to 27mL of liquid at 1mL increments (±1%). The syringe has a pressurized gas source connected to a sweep port via an inline check valve (Jb). This sweep port allows the syringe to be swept between samples to improve precision and accuracy of the delivery volume and to prevent contamination.

## Additional Features

**Automated Methanol Extraction (ME)**- Only system capable of sampling low and high level soil samples (>200ppb) and automating ME, therefore eliminating labor intensive work.

**Mass Flow Controller (MFC)** - The Atomx utilizes a digital MFC for independent programmable flow control (*patent pending*) allowing users to easily optimize performance based on needs for either water or soil.

**Extractasol (*patent pending*)**- Potential carryover can be reduced by as much as 50% with the dedicated methanol port for rinsing needle, sample lines, and glassware.

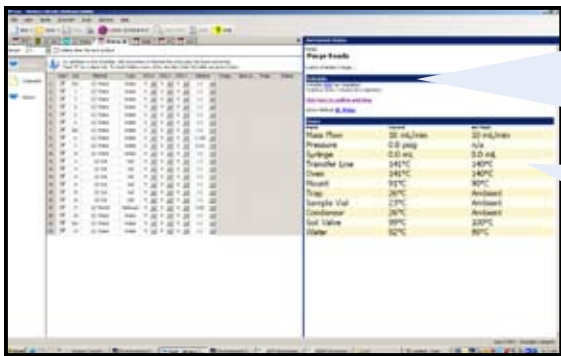
**Autodilution** - The autodilution feature is capable of diluting sample volume ranges up to 100 times (based on 5 and 25mL sample volumes). This feature also has the ability to extract 50 or 100µL volumes for ME requirements.



# Teklink™

## Applications and Industries

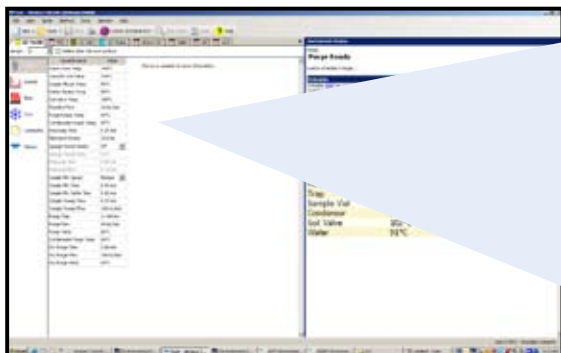
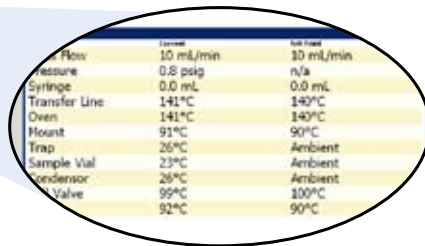
Tekmar's TekLink™ software allows the user to enter all analysis parameters and once activated, it will continuously monitor the system ensuring operating limits are not exceeded. TekLink™ software is capable of performing useful diagnostics such as leak and benchmark tests for instrument validation. All instrument parameters, method scheduling and editing can be programmed. Teklink™ provides pre-developed methods, allowing startup with little or no modifications and also contains an optional 21 CFR Part 11 compliant installation.



**Schedule Screen** - Schedule screen shows multiple methods, multiple internal standards and various dilutions that can all be run on a single schedule. In addition, schedules can be updated in real-time.



The Status section shows the active mode and the time remaining for that mode.



**Methanol Screen** - The methanol screen highlights key variables such as methanol addition volume, required mixing time, settling time as well as defining if surrogate is to be added prior or post extraction.



The Zone section monitors actual values compared to method driven set points.

Other parameters that are common to all methods are seen here and are user selectable with recommended default values and an intuitive prompt that indicates min and max allowable values as well as the variable description.



The tabs on this screen show features that can be controlled from the diagnostic menu. (i.e.: motor movement and value control)

**Diagnostics Screen** - This screen demonstrates full control diagnostics, which allows for manipulation of all hardware components.

# Atomx Specifications

## Automation

<b>Sample Capacity:</b>	80-positions for 40mL VOA vials.
<b>Vial Size:</b>	Nominal 40mL capacity, single hole cap with Teflon®-faced silicone septum, per EPA specifications; 3 3/4" high without cap and septum; 1 1/16" OD; 24mm ID cap for water sampling.

## Liquid Handling

<b>Sample Liquid Handling:</b>	Sample syringe (27mL) dispenses variable volumes of water from 1 - 25mL in 1mL increments.
<b>Sample Precision:</b>	< 1% RSD (n=7 @ 5mL delivery volume measured by weight)
<b>Sample Gas Pathway:</b>	Glass, PEEK™ and Teflon® for syringe handling. 1/16" OD PEEK™ tubing for liquid transfer
<b>Cleaning:</b>	The entire liquid pathway can be rinsed using a combination of the Extractasol and the High Temperature OptiRinse ( <i>patented</i> ) cleaning techniques. The Extractasol allows for the entire liquid pathway to be rinsed with Methanol prior to the High Temperature OptiRinse ( <i>patented</i> ), which uses a patented dual internal reservoir to heat blank water up to 90°C. User-defined rinse volume and number of rinses for the needle and glassware.

## Gas Handling

<b>Electronic Mass Flow Controller:</b>	System is capable of controlling flow rates between 5mL/min to 500mL/min variable between each mode of operation (patent pending).
<b>Electronic Pressure Monitoring:</b>	Ability to record purge and bake pressure for each sample.
<b>Gas Supply:</b>	Ultra-high purity (99.999%) Helium or Nitrogen; Incoming Pressure: 65 - 100 psig, (100 psig max)

## Standard Injection

<b>Standard Injection System:</b>	Three standard injection systems utilizing 2-way dosing valves mounted on a 3-position valve manifold.
<b>Capacity:</b>	1, 2, 5, 10, and 20µL increments.
<b>Precision:</b>	< 10% RSD measured by GC/FID for Fluorobenzene and Bromofluorobenzene, (n=7).
<b>Accuracy:</b>	1µL ± 0.1µL
<b>Consumption:</b>	1µL per 1µL injection
<b>Standard Vessels:</b>	Three 15mL standard vessels, UV-protected for added standard stability; Standard vessels sealed under pressure for standard concentration integrity.

**Liquid Samples** - includes drinking water and wastewater; Liquid samples containing up to 15mm of sediment when measured from the bottom of an upright 40mL vial.

<b>Sample Glassware:</b>	The system is capable of operation with 5mL or 25mL frit or fritless U-shaped sparge vessels. Ships standard with 5mL fritted glassware.
<b>Sample Dilutions:</b>	Programmable automatic aqueous sample dilutions of 1:100, 1:50, 1:25, 1:10, 1:5, 1:2.
<b>Blanks:</b>	Automatic blanks can be pulled from the blank water reservoir and spiked with standard allowing all autosampler positions to be used for samples.
<b>Cycle Time:</b>	Total Purge & Trap cycle time of less than 20 minutes.

**Low-Level Solid Samples** - includes all types of natural soils and sediments. Sampled: Direct purge in the vial per USEPA 5035 low-level soil methodology.

<b>Sample Needle:</b>	A patented 3-stage needle allows for DI water and standards to be directly added to the vial where the solid sample will subsequently be purged.
<b>Vial Heater:</b>	Variable heat control from 35°C to 100°C.
<b>Mixing:</b>	The solid sample can be mixed via a stir bar using three variable speeds.

**High-Level Solid Samples** - includes all types of soils and sediments. Sampled: Automated Methanol Extraction and subsequent dilution per USEPA 5035 high-level soil methodology.

<b>Extraction:</b>	Methanol can added directly to the vial containing a solid sample where it is mixed and allowed to settle. The methanolic extract is then pulled from the vial and diluted for automated Purge & Trap analysis on the system. If high-level solids were sampled in the field with the extraction solvent and standards added the sample can be mixed and allowed to settle prior to the methanol being pulled and diluted. The extraction method offered complies with USEPA Method 5035 for high-level soil samples.
<b>Matrix Spike:</b>	The system is configured to allow a standard spike to be added directly to the solid sample when the methanol is added for the extraction.
<b>Extraction Dilutions:</b>	Programmable automatic dilutions of methanolic extract of 1:100 or 1:50 for 5mL sample volumes.

## System Control

<b>Instrument Control:</b>	TekLink™ software in a Windows® XP or greater environment. Via RS-232 or USB converter (optional).
<b>Method Scheduling:</b>	All method types can be run from any position in the sample sequence. Up to three standards can be added to any user-specified position. Multiple runs can be made from the same vial (not recommended).
<b>System History:</b>	The system records a complete history of all sample, schedule and method information.
<b>21 CFR Part 11 Compliance Tools:</b>	TekLink™ can be configured to allow for full 21 CFR Part 11 compliance tools to be available to the end user.

## Service

<b>Electronic Leak Check:</b>	Ability to leak check the entire sample pathway of the system via the automated Identileak System Check, which has built-in diagnostics that once a leak has been identified, the system will check 3 independent sub-systems for leaks.
<b>Benchmark Test:</b>	The system has a mode that will allow for full electromechanical testing including; valving, heaters, vial handling systems, liquid delivery system, inputs and outputs.
<b>Diagnostics:</b>	The system offers independent control of all valves, vial handling mechanisms and syringe drive for troubleshooting.
<b>Email Alert:</b>	The system can be configured to send an email to alert the user of schedule completion or stoppage.
<b>Warranty:</b>	The standard system is covered by a 1-year warranty on all parts excluding consumables.

## General Specifications

<b>Dimensions:</b>	26.5" (67.3cm) H x 32.7" (83.1cm) W x 23.3" (59.2cm) D
<b>Weight:</b>	Unit weight: 95lbs (43.1kg)
<b>Power Requirements:</b>	100/120/240 VAC (±10%) factory configured, 50/60 Hz, 10.0/5.0 A, 1200VA
<b>Environmental Specifications:</b>	Operating Temperature: 10° to 30°C; Storage Temperature: -20° to 60°C; Relative Humidity: 10% to 90%.
<b>Corrosion Resistance:</b>	The front cover and carousel tray are corrosion resistant to waters with a pH range of 1 to 10.
<b>Certifications:</b>	CE, CETL, CSA, ETL

## System Accessories

<b>Cryofocusing:</b>	The system can be configured with an optional Cryofocusing Module and will allow for reconcentration of the sample at the head of the column to improve peak shape. The Cryofocusing Module is capable of trap temperatures down to -190°C (based on 75 psig of liquid nitrogen).
<b>Spurge Vessel Heater:</b>	The system can have an optional spurge vessel heater added that will allow liquid samples to be heated during the purge mode to temperatures between 35°C and 90°C.
<b>Vial Cooling:</b>	Optional vial chilling allows for sample vials to be held at 4°C until they are sampled.
<b>Foam Eliminator:</b>	The system can be equipped with an optical foam sensor that will sense any foaming during purge. The sensor can be configured to add anti-foam agent to the sample so that the sample can be completed, if these attempts to control the foaming do not work the sample will be aborted and drained to minimize the risk of physical damage to the system.

## Service and Support You Can Count On

Teledyne Tekmar can help with your instrument installation. Our team of trained service professionals can provide extended onsite training for successful operation and instrument maintenance. For those needing documentation on analytical performance and operating procedures, Tekmar offers validation packages. These packages come complete with Installation Qualification (IQ), Operational Qualification (OQ), and Operating guidelines. Our validation packages are ideal to help you comply with your specific methodology. We also provide on-site validation packages performed by factory trained and certified engineers.

Our experience in state-of-the-art instrument design translates to the most capable support available. From a fully staffed Applications Laboratory to our worldwide network of technical professionals, we are ready to be your partner and assure that you achieve the maximum productivity from your instrument. Our outstanding customer service is a natural extension of our world class, ISO 9001 Certified Quality System.



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