Stratum

Purge and Trap Concentrator

TELEDYNE TEKMAR
A Teledyne Technologies Company

Accelerate Productivity with the Stratum

Purge & Trap Concentrator

Description

The Stratum Purge and Trap Concentrator (PTC) is a sample preparation instrument used to remove Volatile Organic Compounds (VOCs) out of aqueous and solid sample types using Helium or Nitrogen. The VOCs are deposited onto a sorbent trap which is then heated thus releasing the VOCs into a Gas Chromatograph (GC) system. This technique is standard for many EPA Methodologies as well as analytical options where concentration of VOCs is required. Teledyne Tekmar has been the leader in this technology since its first PTC was released in the 1980s. Tekmar has continued to improve on this technique through eight generations of systems including the Stratum PTC to meet the ever increasing analytical challenges faced by laboratories.

How It Works

Purge and Trap extracts VOCs from the sample matrix using a controlled flow and depositing the VOCs onto a sorbent trap, which is then heated and back flushed to a GC or GC/MS system. While this theory is simple, many factors affect the performance of the system. The Stratum PTC employs the latest technology in all of its components from a patented electronic Mass Flow Controller (MFC) to intuitive software control that monitors the entire system performance.

Modes and Requirements

Purge - The purge process is when the flow of inert gas through the sample matrix extracts and deposits VOCs onto the trap. The volume of gas (flow rate x time) determines the efficiency of the extraction. By employing an electronic MFC, users can automatically set the flow rates and times via the software allowing for easy input of the volumes required as opposed to manually setting them when using other systems.

Dry Purge - Since water is an unwanted VOC and in much greater availability than the compounds of interest, steps must be employed to minimize its transfer. Water can cause chromatographic interference as well as hinder the performance of the detection system. The dry purge feature allows for drying gas to pass through trap to remove excess water.

Desorb Preheat/Desorb - In this two step process, first the trap is heated with no flow to allow compounds to release from the trapping agents. Then GC carrier flow is introduced to transfer the compounds to the GC system. In addition any water not removed during the dry purge process is removed by a condensate trap in the preheat operation.

Bake - The trap and condensate trap are heated and the system gas flow is increased to prepare the system for the next run. By using an electronic mass flow controller the bake time is greatly reduced compared to other systems.

Options

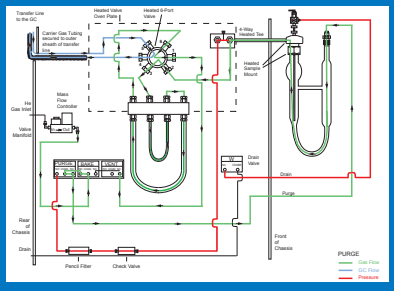
- **Guardian Foam Sensor** - The Guardian uses a photo sensor mounted on the outside of the sparger. When foaming occurs, the foam blocks the sensor, prompting the Stratum to shut off the purge flow and drain the sample.
- **Guardian and Eliminator** - When foam is sensed, the unit shuts off the purge gas. The purge clock is stopped and the foam transfer valve is activated to add antifoam agent for a specified period of time.
- **Autosampler** - A range of solid and liquid autosamples are available from Tekmar. Utilizing an autosampler reduces hands-on labor and improves data quality.
- **Cryofocusing Module** - This module is useful in improving your chromatographic resolution. Cryofocusing or cold trapping ensures efficient trapping and injection.

Applications and Industries

- Environmental
- Food and Beverage
- Forensics and Toxicology
- Pharmaceutical
- Petrochemical

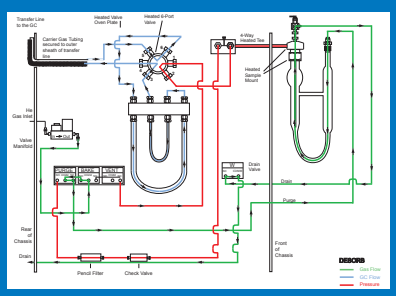
Methods

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



Purge Flow Diagram

The Purge Flow Diagram shows the pneumatic representation of the purging process in which the VOCs are extracted.

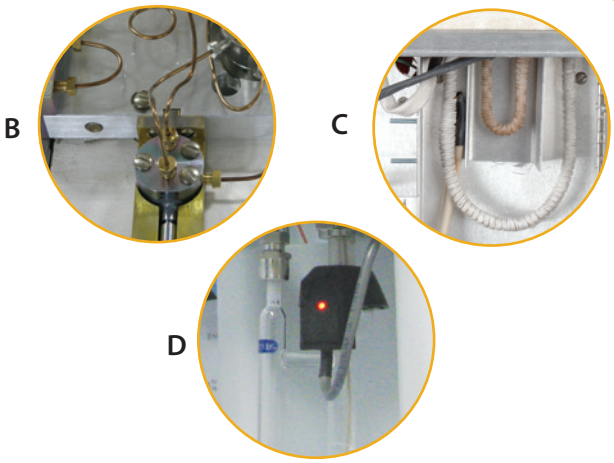


Desorb Flow Diagram

The Desorb Flow Diagram shows the desorption and transfer of VOCs to the GC/GC/MS.

Stratum

Features and Benefits



Autosampler Connectivity
The Stratum PTC can be interfaced with a Teledyne Tekmar autosampler as well as most commercial autosamplers for handling multiple samples and automating the process.

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

B. **Inert Heated Sample Path** - When dealing with active, polar, and high boiling compounds, it is imperative to keep your sample contained in an inert sample pathway. The Stratum PTC utilizes Siltek® tubing and Siltek®-treated fittings throughout the sample path. This ensures resistance to corrosion and prevents loss of compounds.

C. **Analytical Trap** - The Stratum PTC ships with a #9 proprietary U-shaped trap installed and a U-shaped Vocarb 3000 trap. If a sample is not properly desorbed from the trap, the resolution in the chromatogram will suffer. The U-shaped trap provides superior peak shape by allowing a volume for the desorbing gas to refocus before proceeding to the GC. The result is a dramatic improvement in your chromatographic resolution.

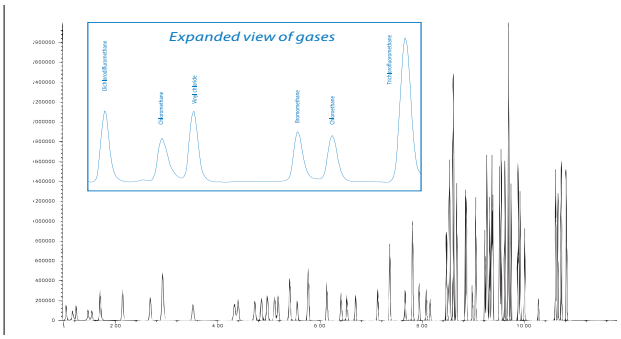
D. **Guardian Foam Sensor** - The sensor is mounted on the outside of the glassware thus never coming in contact with the sample.

Additional Features

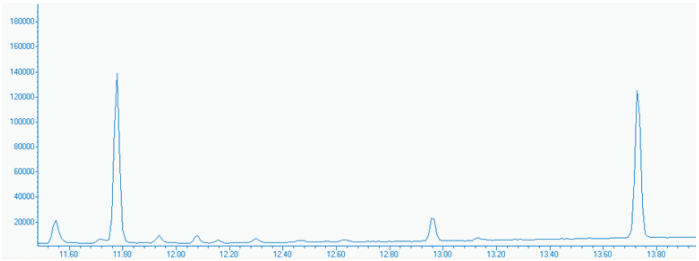
Mass Flow Controller (MFC) - The Stratum utilizes a patented digital MFC for independent programmable flow control allowing users to easily optimize performance based on needs for either water or soil.

Ease of Operation of Maintenance –The design of the Stratum permits easy installation, monitoring and maintenance of consumable parts. Sample and gas lines are color coded for rapid identification. Internal components are carefully laid out and as a result, down time and cost of operation is kept to a minimum.

Water Management - Only Teledyne Tekmar offers the most comprehensive water management solution. The exclusive U-shaped trap and dry purge mode parameters have been optimized to dramatically reduce the amount of water being transferred to the GC column.



Drinking Water Chromatogram showing 20ng/mL of standard drinking water. Inset chromatogram shows an expanded view of the gases.

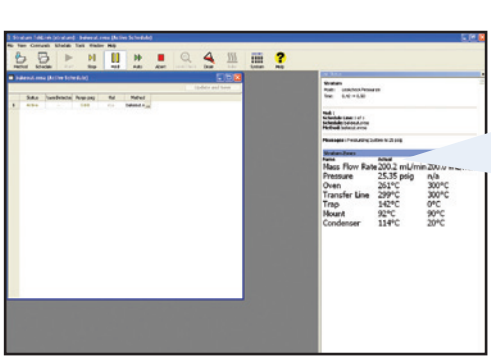


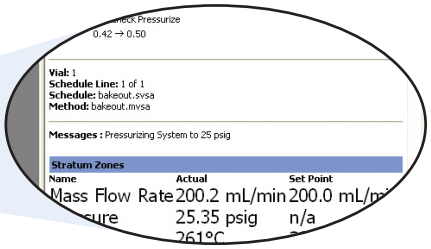
Total Ion Chromatogram of a 50ppt Geosmin and 2-Methylisoborneol Standard using Split/Splitless Inlet Injection.

VOC TekLink™

Fully Optimized User Interface

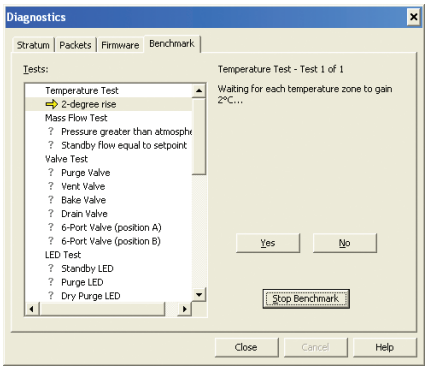
VOC TekLink™ software allows the user to enter all analysis parameters and then once actuated, will continuously monitor the system ensuring operating limits are not exceeded. VOC TekLink™ is capable of performing useful diagnostics such as leak and benchmark tests for validation. All instrument parameters, method scheduling, and editing can be programmed. VOC TekLink™ provides pre-developed methods, allowing startup with little or no modifications.



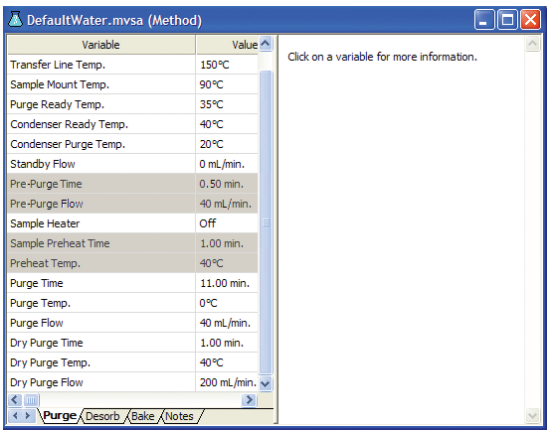


The Mode Details give you the status of the current leak check.

Leak Check Screen - The Leak Check screen identifies the region of the system that is being checked and the time remaining of the leak check.



Benchmark Screen - The Benchmark screen contains an interactive program that tests heaters, LEDs, and the continuity of inputs and outputs on the CPU board. The results of the Benchmark Test are saved in the System History Log under the name entered before starting the benchmark.



Method Development Screen - The VOC TekLink™ software comes pre-installed with methods for most applications. You can select one of these methods or if your application calls for a unique requirement, a customized method can be created to meet your analytical requirements for sample processing.

The Method Editor is broken into several tabs showing parameters that effect specific areas of a sample analysis: Purge, Desorb, and Bake. After creating customized methods, method schedules can be defined that specify samples, operating sequences, and the order in which they run.

Stratum Specifications

Automation

Cycle Time:	The cycle time for the unit is 17 minutes when using an 11 minute purge time. This time also includes desorb, bake, and cool down for the Stratum PTC only and assumes ambient lab temperature. (20-22°C).
Trap Furnace:	Ambient to 350°C cools from 250°C to 40°C in 90 seconds or less at ambient lab temperatures (20-22°C).
6-port switching valve	Ambient to 300°C actuated at 24 Volts (D.C.).
External Transfer Line	Ambient to 300°C.
Sample Mount	Ambient to 100°C.
Condenser	Ambient to 250°C.
Sample Heater (optional)	Ambient to 90°C.
Sample Pathway	All tubing and related fittings use Siltek® coating.
Gas Requirements	99.999% Helium or Nitrogen
Electronic Mass Flow Controller	Device is capable of controlling flow rates between 5mL/min to 500mL/min. Each mode is independently controlled. Device also capable of recording pressures for sample logging and automatic leak checking
Unit Dimensions	Height: 19.75 inches (50.17cm) Width: 8 inches (20.32cm) Depth 18.5 inches (46.99cm)
Operating System	PC using Windows® XP or greater
Software	VOC TekLink™ interfaced via an RS-232 connection.
Operating Conditions	The system is capable of operating in Lab Temperatures between 10-30°C and humidity levels between 10-90%
Corrosion	The front cover is corrosion resistant to waters within a pH range of 1-10
Voltages	100/115VAC 50/60Hz 10 amps, 1150 watts 220/240VAC 50/60Hz, 5 amps, 1150 watts
Weight	32lbs (14.5cm)

Service and Support You Can Count On

Teledyne Tekmar can help with your instrument installation. Our team of trained service professionals can provide extended on site 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.

CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2008 ANAB DNV

TELEDYNE TEKMAR
A Teledyne Technologies Company

www.tekmar.com