



**TELEDYNE TEKMAR**  
Everywhere you look™



Simplicity



Reliability



Performance



# Stratum

Automated VOC Sample Prep System

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.

## Applications and Industries

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



## 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 autosamplers are compatible with the Purge & Trap as well as liquid vial autosamplers directly purchased Tekmar. Increase your throughput by coupling with Tekmar's AQUATek 100 autosampler. 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.

### Glassware

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



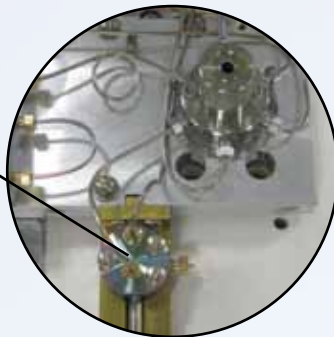
## Additional Features

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



### 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 Inertium® tubing and SilcoNert® 2000-treated fittings throughout the sample path. This ensures resistance to corrosion and prevents loss of compounds.

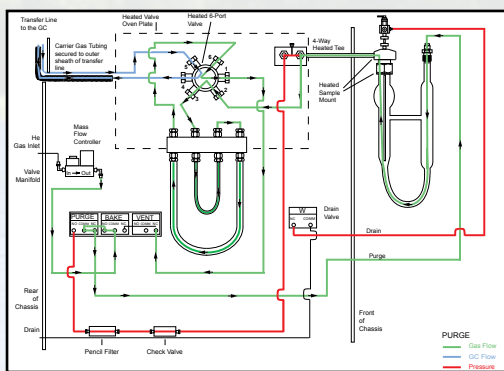
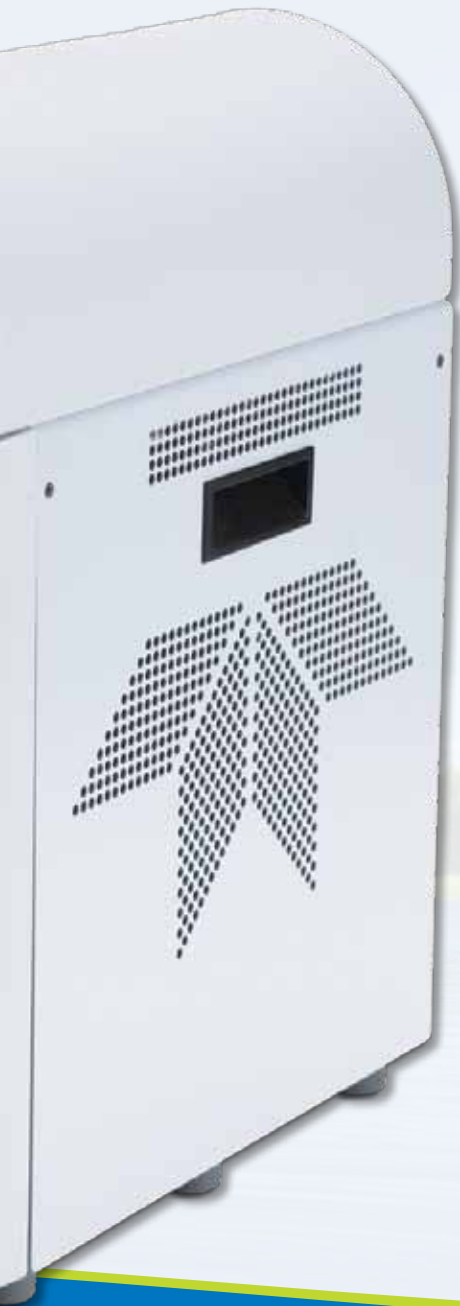


### Guardian Foam Sensor

The sensor is mounted on the outside of the glassware thus never coming in contact with the sample.

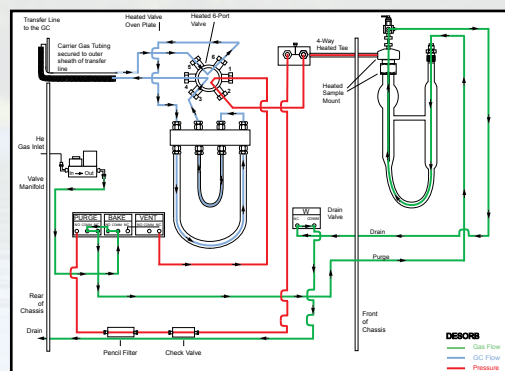
### Analytical Trap

The Stratum PTC ships with a #9 proprietary U-shaped trap installed and a U-shaped Vocabarb 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 reflow before proceeding to the GC. The result is a dramatic improvement in your chromatographic resolution.



### Purge Flow Diagram

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



### Desorb Flow Diagram

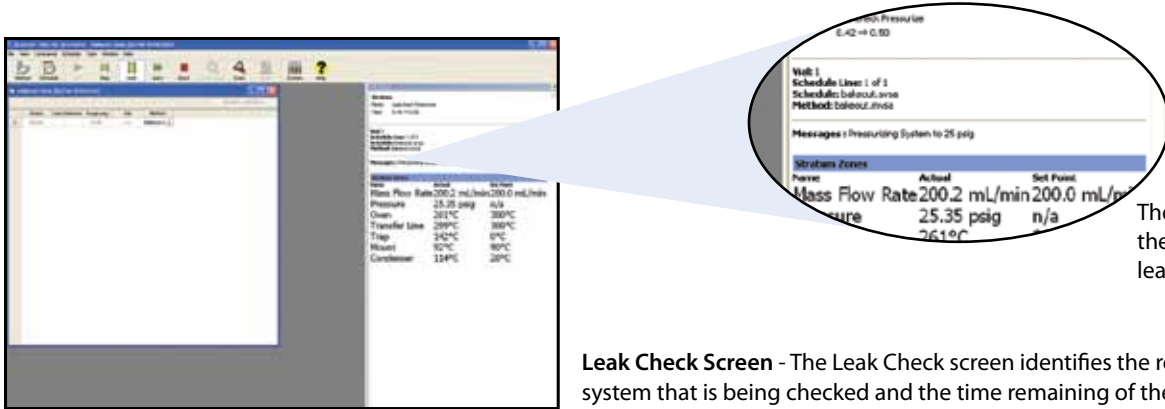
The Desorb Flow Diagram shows the desorption and transfer of VOCs to the GC/GC/MS.

**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.

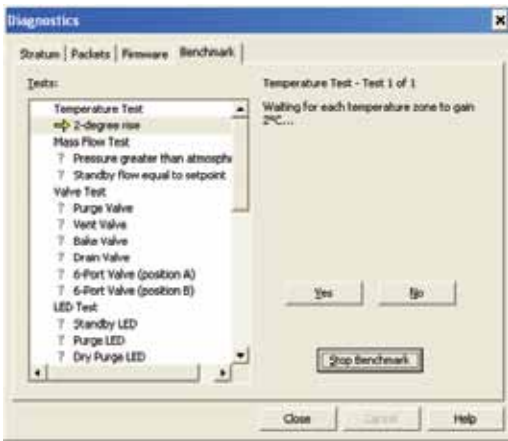
## Fully Optimized User Interface

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.

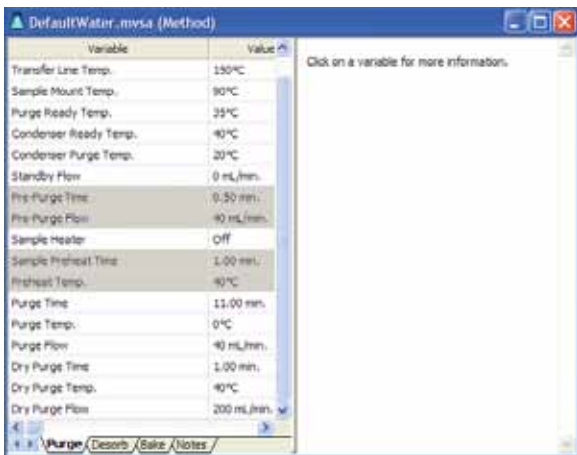


The Mode Details give you the status of the current leak check.

**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.

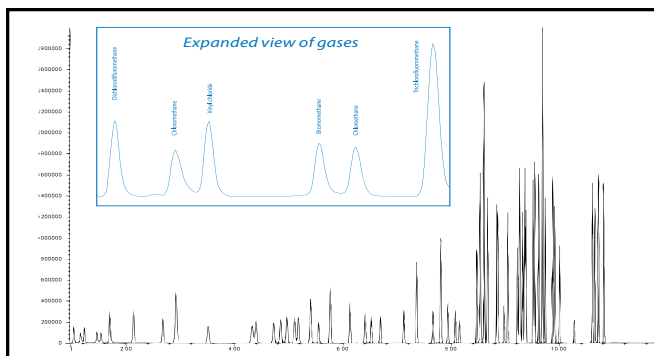


**Benchmark Screen** - The Benchmark screen contains an interactive program that tests heaters, LEDs, and the continuity of inputs and outputs on the CPU board. The results of the Benchmark Test are saved in the System History Log under the name entered before starting the benchmark.

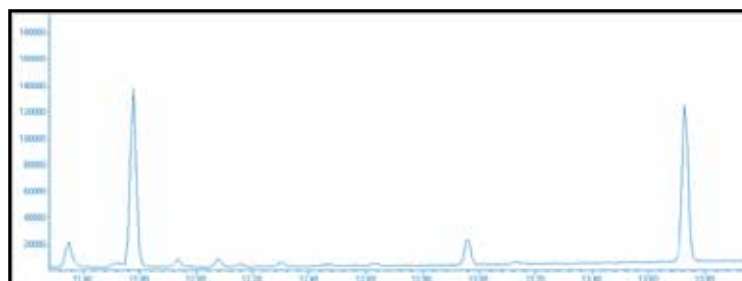


**Method Development Screen** - The VOC TekLink™ software comes pre-installed with methods for most applications. You can select one of these methods or if your application calls for a unique requirement, a customized method can be created to meet your analytical requirements for sample processing.

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.



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



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

## 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 has an Inertium® coating and related fittings are SilcoNert® 2000.
Gas Requirements	99.999% Helium or Nitrogen
Electronic Mass Flow Controller	Device is capable of controlling flow rates between 5 mL/min to 500 mL/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 (50.17 cm) Width: 8 inches (20.32 cm) Depth 18.5 inches (46.99 cm)
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	32 lbs (14.5 cm)

Teflon® is a registered trademark of Dupont, Windows® is a registered trademark of Microsoft, PEEK™ is a trademark of Victrex PLC, SilcoNert® 2000 is a registered trademark of SilcoTek, Inertium® is a registered trademark of ACMX. TekLink™ is a registered trademark of Teledyne Tekmar Company. Covered by one or more of the following patents: 7,651,866; 6,280,688 and other patent pending.

## System Control

<b>Instrument Control:</b>	VOC 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>	VOC 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" (67.3 cm) H x 32.7" (83.1 cm) W x 23.3" (59.2 cm) D
<b>Weight:</b>	Unit weight: 95 lbs (43.1 kg)
<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.