

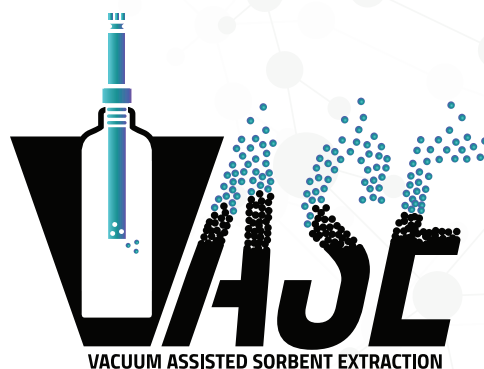


*See What's Really There™*

**Sorbent Pens™** (Pat. Pend.)  
For Next Generation  
Headspace Analysis



**SORBENT PENS™**  
**FOR NEXT GENERATION**  
**Headspace Analysis**



## Headspace Sorbent Pens™ The Ultimate Extraction Power

Introducing Entech's exciting new Sorbent Pen™ technology. The most versatile extraction and sample preconcentration technology available for GC and GCMS. Sorbent Pens™ combine the features of SPME and classical ¼" adsorbent traps in a design with far more flexibility and enhanced performance. Sorbent Pens™ are extremely durable and are designed to perform both active and diffusive sampling. Following sampling, the Sorbent Pen™ is desorbed directly onto the head of a GC column, eliminating losses associated with standard thermal desorption systems that must transport the desorbed sample through rotary valves, secondary traps, and a lengthy transfer line prior to delivery onto the GC column.

The Sorbent Pen uses a new approach for headspace extraction, termed Vacuum Assisted Sorbent Extraction, or VASE. The Sorbent Pen is inserted into the top of the sample vial and brought under reduced pressure. VASE allows the recovery of a far wider range of compounds than what was previously attainable. With Sorbent Pens™, both VOCs and SVOCs can be measured in wastewater, breath condensate, alcoholic beverages, and virtually all other matrices. VASE offers a tremendous advantage over other extraction techniques that perform extractions at atmospheric pressure where diffusion rates are suppressed. Sorbent Pens™ perform sample enrichment offline from a GCMS, allowing all samples to extract simultaneously and for longer periods of time. This approach results in high throughput while yielding a more complete and reproducible extraction for more sensitive and quantitative measurements. The low cost 5800 Sorbent Pen™ Desorption Unit (5800 SPDU) makes this exciting new technique both affordable and practical for virtually any laboratory's budget. Then move up to 120 sample automation with the SPR (Sample Preparation Rail) Autosampler for the ultimate in laboratory productivity. Join the Sorbent Pen™ movement and take advantage of the next generation in GCMS sample preparation.

### Improvements over SPME and Dynamic Headspace Trapping

- Highly reproducible.
- Minimal carryover without the need for a secondary bakeout/cleanup step.
- Durable - hundreds of injections.
- Operates at or near equilibrium to improve sensitivity and quantitative accuracy.
- Perform exhaustive vacuum extraction of VOCs through SVOCs.
- Unlike SPME, outer sheath minimizes exposure to aerosols formed during agitation.
- See taints, odors, additives, flavors & fragrances at levels below previously possible.
- Faster injection rates produces better chromatography and less thermal degradation.
- Rapid injections without cryogen or electronic cooling.
- Higher sensitivity and throughput via off-line extraction.
- Sample up to 2 weeks under vacuum for unsurpassed SVOC recovery.
- Sample at elevated or sub-ambient temperatures as needed.

### Applications include:

#### Water Analysis

- VOCs & SVOCs
- Emerging Contaminants
- Odor Agents
- EPA 8270

#### Flavors/Aromas

- Foods
- Beverages
- Alcoholic Beverages
- Taints/Off-Flavors

#### Cannabis

- Pesticide Screening
- Terpene Profiling
- Residual Solvents
- Cannabinoid Potency

#### Food Safety

- Nitrosamines
- Acrylamide
- Pesticides/Herbicides
- Carcinogens
- Preservatives

#### Clinical Markers/Drugs In

- Blood
- Urine
- Breath

#### Misc.

- Odors in Consumer Products
- Residue Drugs/Pharma
- PCBs, PBDEs

For a complete list of applications, visit [entechinst.com](http://entechinst.com)

## Headspace Sorbent Pens™

Description	Unit	Part #
<b>Headspace Sorbent Pens™</b>		
Tenax® TA (35/60)	EA	SP-HSP-T3560
Tenax® + Carboxen 1000	EA	SP-HSP-TCBXN
Tenax® + Carboxen™ X	EA	SP-HSP-TCPX
Empty Headspace Pen	EA	SP-HSP-0
Headspace Sorbent Pen Isolation Tray	EA	SP-HSP-TRAY30
Sorbent Pen Isolation Sleeve	EA	19-5800-192

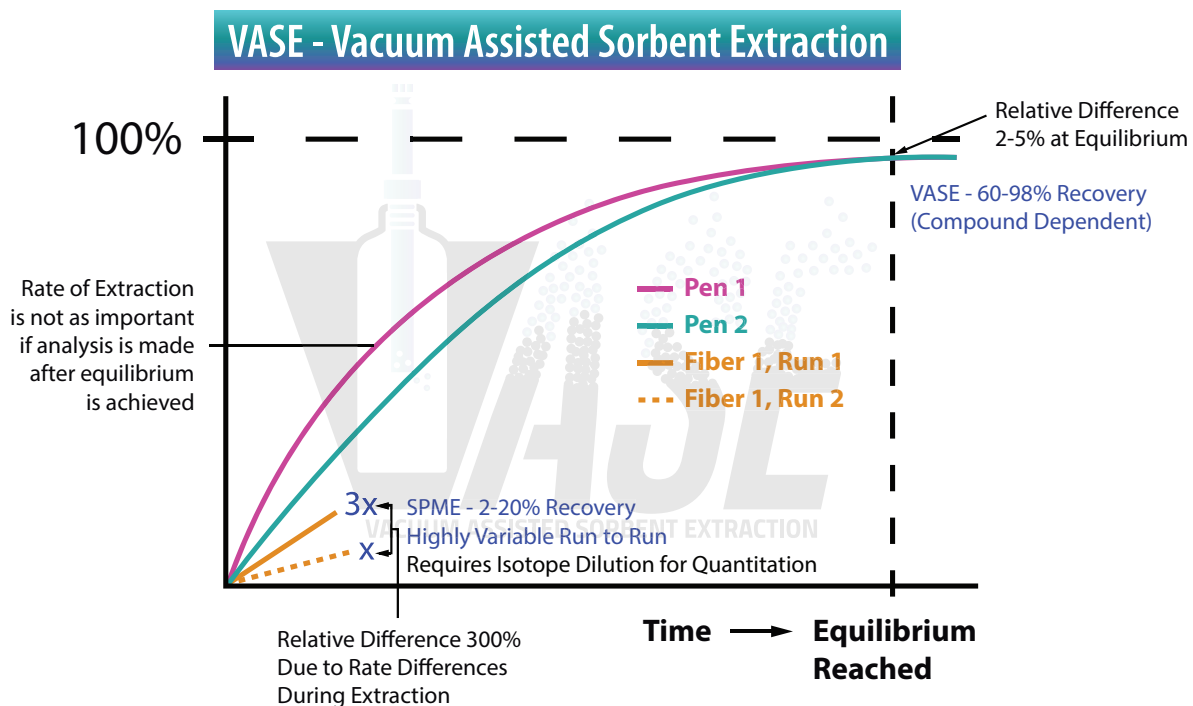
**Durable, Reuseable, and Cost Effective!**



## COMPETITIVE ADVANTAGES OF VASE

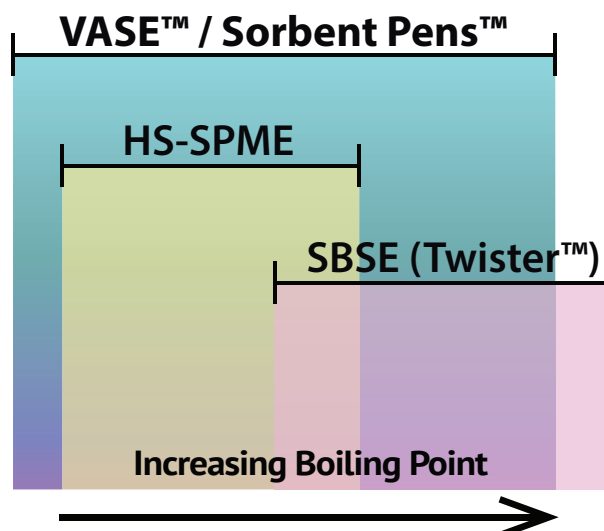
### VASE, utilizing Sorbent Pens™, Operates at or Near Equilibrium to Improve Sensitivity and Reproducibility.

- Operating at or near equilibrium increases sensitivity and reduces run to run variability.
- Small changes in VASE extraction conditions result in inconsequential differences in the ultimate recovery at equilibrium, resulting in excellent reproducibility..

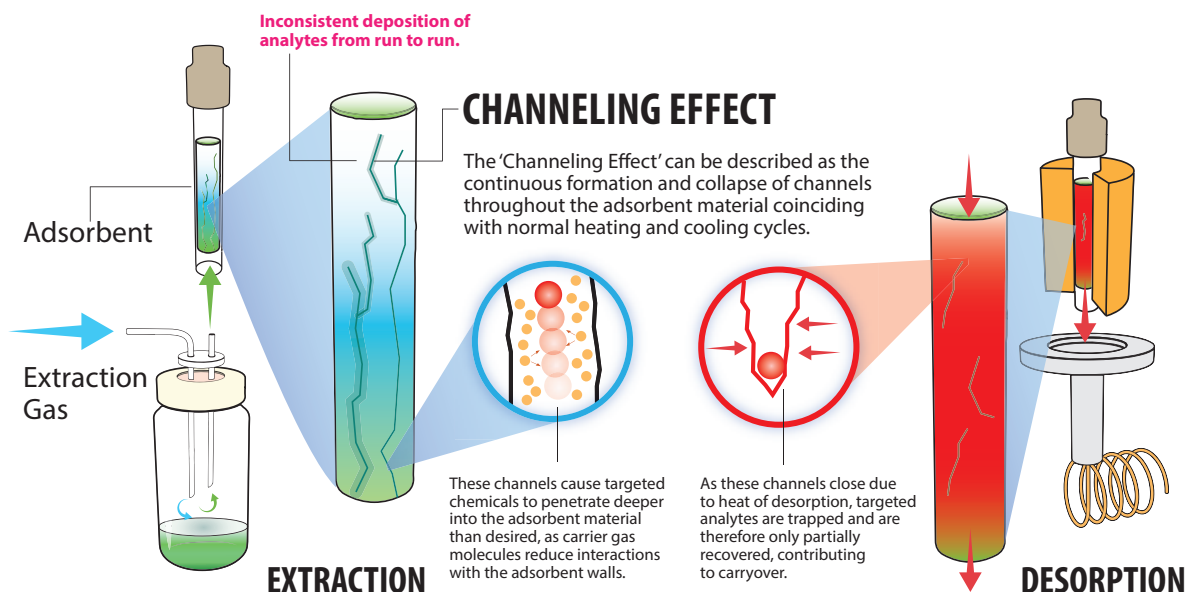


### VASE (Sorbent Pens™) vs SPME and SBSE (Twister™) Recovery Relative to Analyte Volatility.

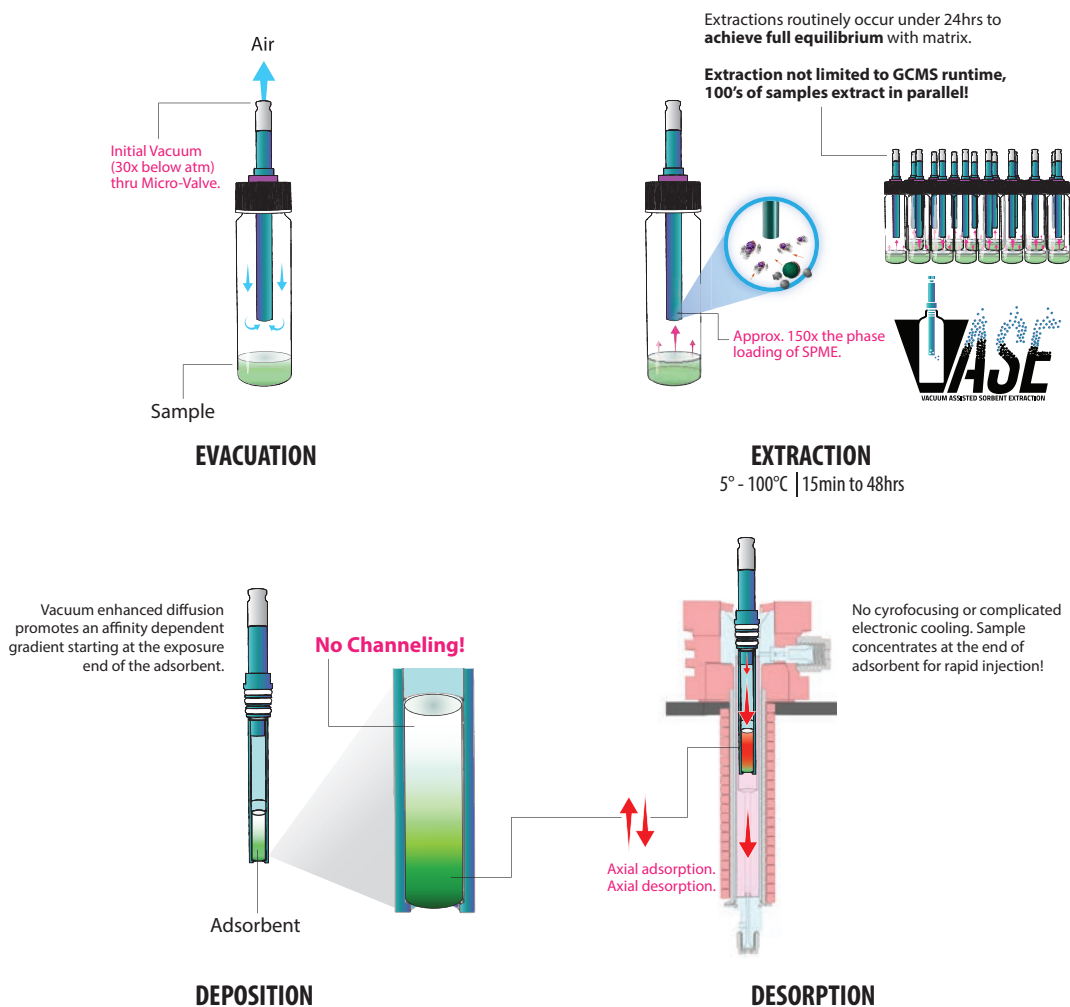
- Using Vacuum Assisted Sorbent Extraction (VASE), Sorbent Pens can be used to recover compounds over a much wider volatility range than both HS-SPME & SBSE.
- Most applications done by either SPME or SBSE can be done more easily and usually with higher sensitivity and accuracy with VASE using Sorbent Pens™



## CHANNELING: LIMITATIONS OF TECHNOLOGIES USING FLOW-THROUGH ADSORBENT BEDS



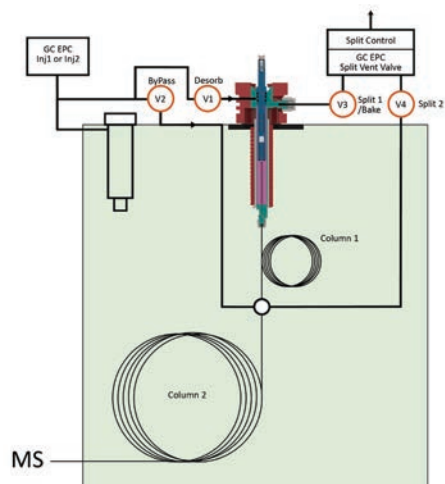
## VASE PROVIDES EXTRACTION EFFICIENCIES & PROMOTES REPRODUCIBLE ANALYTE DEPOSITION GRADIENTS.



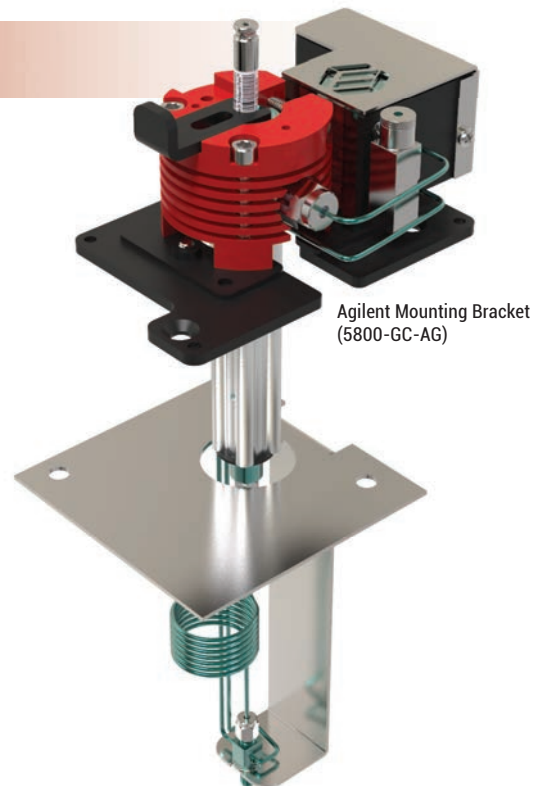


## 5800 SORBENT PEN™ DESORPTION UNIT

Sorbent Pens™ are analyzed using the 5800 SPDU. After sample enrichment, simply insert the Sorbent Pen™ into the 5800 SPDU, and press START on the 5800 SPDU Controller. The complete desorption process is performed automatically to transfer both volatile and semi-volatile compounds onto the GC-column for extremely sensitive and accurate headspace analysis. Control the extraction and desorption conditions to either limit or optimize the molecular weight range transferred onto the column. A unique desorber design utilizes a Silonite™ coated flow path, allowing simple liner replacement to maintain maximum inertness for optimum long-term performance. Methods are created and stored on the same PC operating the GCMS. Develop methods using this entry level solution and then add the SPR Autosampler when you are ready to fully automate the analysis of up to 120 Sorbent Pens™.



**5800 SPDU - Easily transfers volatile and semi-volatile compounds to a GCMS for extremely sensitive and accurate headspace analysis.**



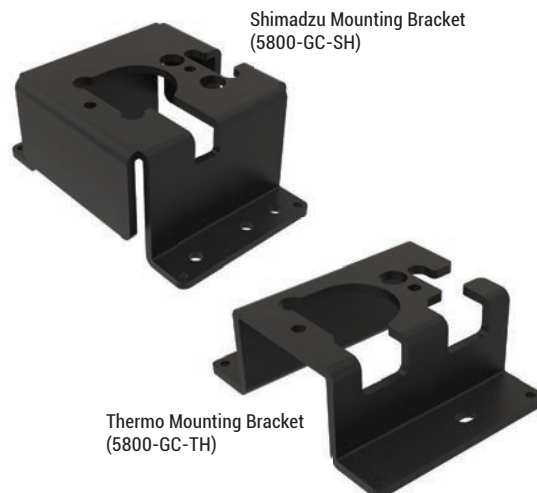
Agilent Mounting Bracket (5800-GC-AG)



## 5800 SPDU Ordering Information

DESCRIPTION	UNIT	PART #
Sorbent Pen™ Desorption Unit (120VAC)	EA	5800-SPDU
Sorbent Pen™ Desorption Unit High Volatge (230VAC)	EA	5800-SPDU-HV
5800 SPDU Liner for Headspace Sorbent Pen™*	EA	5800-LNR-HS
<b>GC Model Mounting Kits (Must select one)</b>		
Agilent 6890 / 7890(B)	EA	5800-GC-AG
Thermo 1300 / 1310 GC	EA	5800-GC-TH
Shimadzu 2010 GC	EA	5800-GC-SH

\* Required component

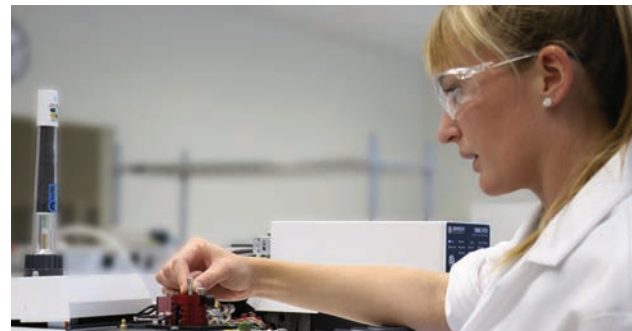


Shimadzu Mounting Bracket (5800-GC-SH)

Thermo Mounting Bracket (5800-GC-TH)

# HEADSPACE SORBENT PEN STARTER BUNDLE

Experience the power of Entech Sorbent Pens with a ready to order bundle that takes the guesswork out of getting started. The Starter Bundle comes equipped with everything you need to launch a successful research platform and perform method development. When success demands automation, the SPR (Sample Preparation Rail) will take your productivity to a whole new level.



## START HERE.

The Headspace Sorbent Pen Starter Bundle is available in low or high voltage.



## NOT INCLUDED IN BUNDLE.

You must also select a GC Mounting Kit with the bundle.

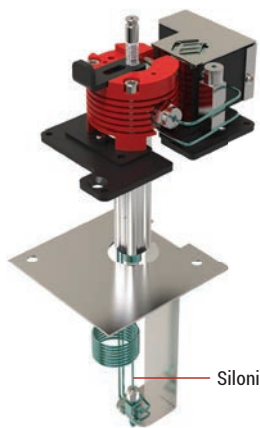


DESCRIPTION	QTY	UNIT	PART #
Headspace Sorbent Pen Starter Bundle (120VAC)	1	EA	SP-HSP-B01
Headspace Sorbent Pen Starter Bundle (230VAC)	1	EA	SP-HSP-B01-HV

Agilent 6890/7890	1	EA	5800-GC-AG
Thermo 1300/1310	1	EA	5800-GC-TH
Shimadzu QP2010	1	EA	5800-GC-SH

## PRODUCTS INCLUDED IN HEADSPACE SORBENT PEN STARTER BUNDLE

5800 SPDU Injector Unit

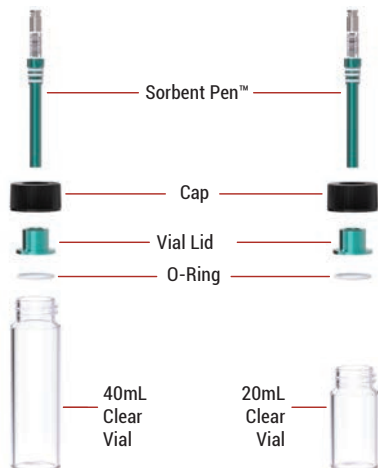


5800 Liner for Headspace Sorbent Pens™



5800 SPDU Controller

Silonite Coated Pre-Column



## DESORPTION SYSTEM & GC COMPONENTS

DESCRIPTION	UNIT	PART #
5800 Sorbent Pen Desorption Unit (120VAC)	EA	5800-SPDU
* 5800 Sorbent Pen Desorption Unit High-Voltage (230VAC)	EA	5800-SPDU-HV
Silonite Coated Pre-Column (0.6, 1mm ID, No film)	EA	56-11000-00

\* Included only with order of High Voltage version.

## SORBENT PENS & VIALS

DESCRIPTION	QTY	UNIT	PART #
<b>Sorbent Pens™</b>			
HS Sorbent Pens - Tenax TA	3	EA	SP-HSP-T3560
Tenax® + Carboxen 1000	3	EA	SP-HSP-TCBXN
Tenax® + Carboxen™ X	3	EA	SP-HSP-TCPX
HS Sorbent Pens - Blank	1	EA	SP-HSP-0
<b>Vials, Caps, &amp; Liners</b>			
20mL Clear Vials (72 ct.)	1	Box	39-75020
40mL Clear Vials (72 ct.)	1	Box	39-75040
Caps for 20mL/40mL/60mL Vials (144 ct)	1	Pack	39-76044B
Vial Lid (Silonite Coated) for 20/40/60mL Vials	9	EA	SP-L024S
White Viton O-Rings for 20/40/60mL vials (10 ct) <small>Low Bleed</small>	1	Pack	SP-OR-L024
Sorbent Pen Removal Kit	1	EA	SP-PEN-EJECT-TOOL



5600 Sorbent Pen™  
Extraction System

30 pos tray for 20/40/60mL vials



30 Position Sorbent Pen™  
Isolation Tray

## SAMPLE PREPARATION & EXTRACTION

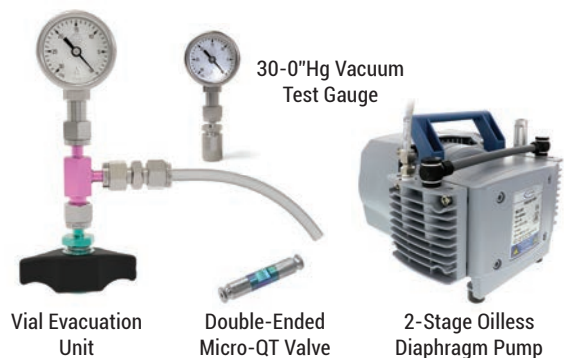
The Sorbent Pen™ Extraction System provides a convenient way to perform in-vial extractions using 30-position trays. Load the sample to be extracted into the vial, insert the Sorbent Pen™, create a vacuum through the Micro-QT™ seal at the top of the Pen, and then load the tray into the 5600 to start the vacuum extraction. The Sorbent Pen™ Extraction System agitates the samples at 30-300 RPM to speed up transfer of volatiles to the headspace, while optionally heating the sample from ambient +4°C to 70°C. Extractions are generally complete in 1–48 hours depending on the application.

DESCRIPTION	QTY	UNIT	PART #
<b>Sample Holding &amp; Extraction</b>			
30 Position Sorbent Pen Isolation Tray	1	EA	SP-HSP-TRAY30
30 Position Tray for 20mL/40mL/60mL Vials	1	EA	5600-040TRAY30
5600 Sorbent Pen Extraction System	1	EA	5600-SPES
*5600 Sorbent Pen Extraction System (230VAC)	1	EA	5600-SPES-HV

\* Included only with order of High Voltage version.

DESCRIPTION	QTY	UNIT	PART #
Vial Evacuation Unit	1	EA	SP-VIAL-EVAC
2-Stage Oilless Diaphragm Pump	1	EA	10-20030
*2-Stage Oilless Diaphragm Pump (230VAC)	1	EA	10-20034
Double-Ended Micro-QT Valve	1	EA	MQT-2S
30-0"Hg Vacuum Test Gauge (w/ Female Micro-QT)	1	EA	29-70010QT

\* Included only with order of High Voltage version.



Vial Evacuation  
Unit

Double-Ended  
Micro-QT Valve

2-Stage Oilless  
Diaphragm Pump



Sorbent Pen™  
Thermal Conditioner

The 3801 can be used to condition Sorbent Pens™ prior to use at temperatures up to 350°C. Use the 3801 for new Pens, Pens that were not isolated after desorption, and Pens that contained unusually high concentrations where complete removal of the residual sample did not occur during the previous analysis. Flow rate of thermal conditioning gas is controlled and monitored through a convenient front panel flow controller, while an internal valve starts and stops the flow of UHP Nitrogen at appropriate Sorbent Pen conditioning temperatures.

DESCRIPTION	QTY	UNIT	PART #
<b>Sorbent Pen Conditioning</b>			
3801 Sorbent Pen Thermal Conditioner	1	EA	3801-SPTC
*3801 Sorbent Pen Thermal Conditioner (230VAC)	1	EA	3801-SPTC-HV

\* Included only with order of High Voltage version.

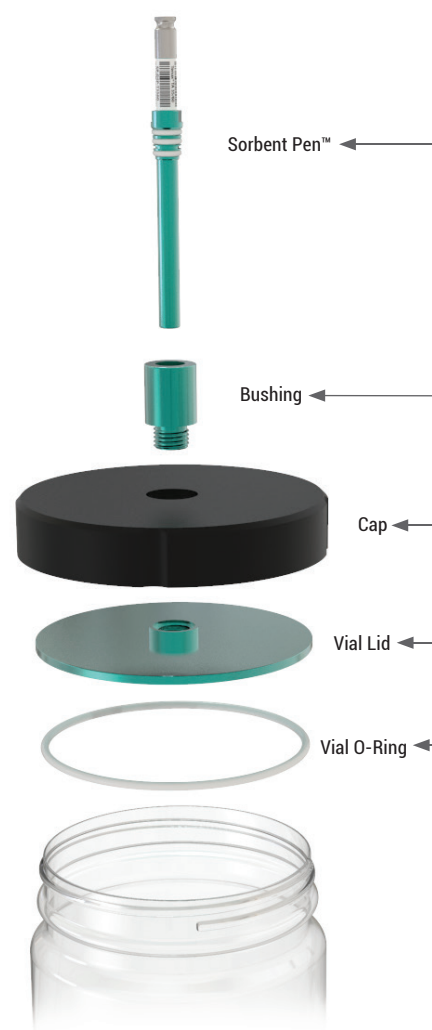


The Sorbent Pen Cold Tray condenses moisture to the bottom of the vial prior to sample injection.

DESCRIPTION	QTY	UNIT	PART #
30-Position Cold Tray for 20/40/ 60 mL Vials	1	EA	SP-HSCOLDTRAY30

## GLASSWARE, CAPS, LIDS, & MISC PARTS

Description	Unit	Qty. Incl.	Part #
<b>Headspace Vials</b> (vial caps and lids sold separately)			
20mL Clear Vials	Pack	72	39-75020
20mL Amber Vials	Pack	72	39-75020A
40mL Clear Vials	Pack	72	39-75040
40mL Amber Vials	Pack	72	39-75040A
60mL Clear Vials	Pack	72	39-75060
60mL Amber Vials	Pack	72	39-75060A
125mL LVSH Vials	Pack	12	39-75125BW
250mL LVSH Vials	Pack	24	39-75250BW
500mL LVSH Vials	Pack	12	39-75500W
1L LVSH Vials	Pack	12	39-75L1W
<b>Headspace Bottles</b>			
125mL Amber Bottles, deactivated*	Pack	24	39-75125AD
250mL Amber Bottles, deactivated*	Pack	12	39-75250AD
500mL Amber Bottles, deactivated*	Pack	12	39-75500AD
<b>Sorbent Pen Bushing for 125/250/500/1L Vials</b>			
Bushing	EA	1	SP-L100S
<b>Vial Caps</b>			
Plastic Vial Caps for 20/40/60mL Vials	Pack	144	39-76044B
High Temp Vial Cap for 125mL Vials	EA	1	39-76812HS
High Temp Vial Cap for 250mL Vials	EA	1	39-76825HS
High Temp Vial Cap for 500mL Vials	EA	1	39-76850HS
High Temp Vial Cap for 1L Vials	EA	1	39-76894HS
<b>Vial Lids</b>			
Silonite Coated Sorbent Pen Receiver Lid for 20/40/60mL Vials + All Bottle-Vac Sizes	EA	1	SP-L024S
125mL Silonite™ Lid for Micro-QT Valve	EA	1	HS-760125
250mL Silonite™ Lid for Micro-QT Valve	EA	1	HS-760250
500mL Silonite™ Lid for Micro-QT Valve	EA	1	HS-760500
1L Silonite™ Lid for Micro-QT Valve	EA	1	HS-761000
<b>Individual O-Rings</b>			
White Viton O-Rings for 20/40/60mL Vials (10 ct)	Pack	1	SP-OR-L024
Viton O-Rings for 125mL Vials	EA	1	39-20629
Viton O-Rings for 250mL Vials	EA	1	39-26M02-48
Viton O-Rings for 500mL Vials	EA	1	39-76508V
Viton O-Rings for 1L Vials	EA	1	39-26151
Viton O-Rings for Sorbent Pen Bushing	EA	1	39-26012





# SPR

## Sample Preparation Rail

### VASE™ & SORBENT PEN AUTOMATION

Take productivity to a whole new level by combining the award winning VASE & Sorbent Pen™ extraction solution with Entech's new Sample Preparation Rail (SPR). The SPR delivers unattended sample prep options and unattended desorption of up to 120 pre-extracted Sorbent Pens.



#### START HERE.

#### Sample Preparation Rail Bundle



#### NOT INCLUDED IN BUNDLE.

You must also select a GC Rail Mounting Kit with the bundle.



Description	Unit	Part #
Sample Preparation Rail Bundle (100-250VAC, 50-60Hz)	EA	SPR-H01
- Base Sample Preparation Rail	EA	SPR-01
- SPR Controller with Rail Platform	EA	SPR-PF-CTRL1
- 30 Position Sorbent Pen Isolation Tray	EA	SP-HSP-TRAY30
- SPRINT Control Software		

#### SPR GC Mounting Kits

Rail Mounting Kit for Agilent® GC	EA	SPR-MNT-AG
Rail Mounting Kit for Thermo® GC	EA	SPR-MNT-TH
Rail Mounting Kit for Shimadzu® GC	EA	SPR-MNT-SH

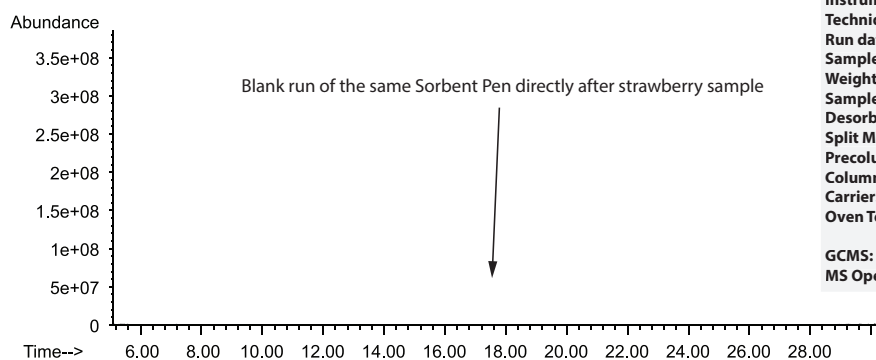
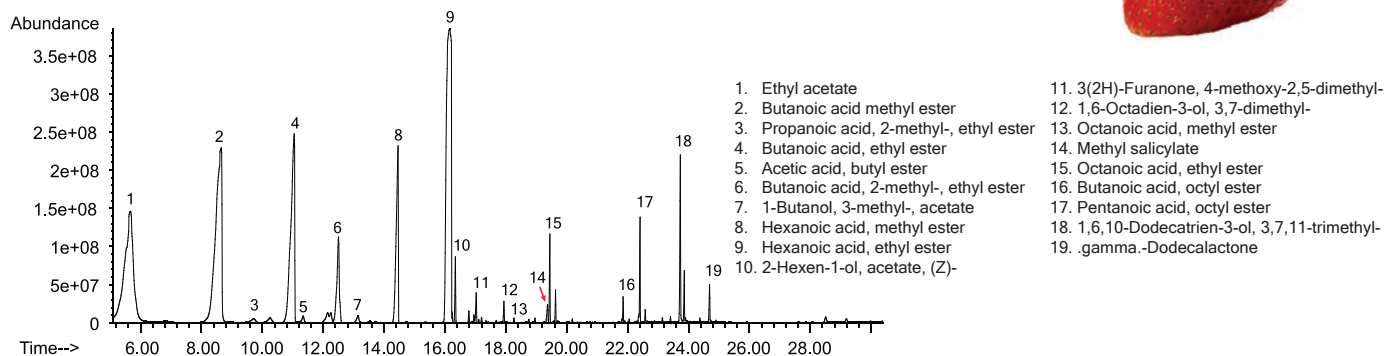
### SOLUTIONS & ACCESSORIES

Description	Unit	Part #
<b>Rail Mounted Components</b>		
Dual Sorbent Pen Isolation Tray Platform w/Legs & Magnetic Sensing Rail Clamps	EA	SPR-PF-TR2

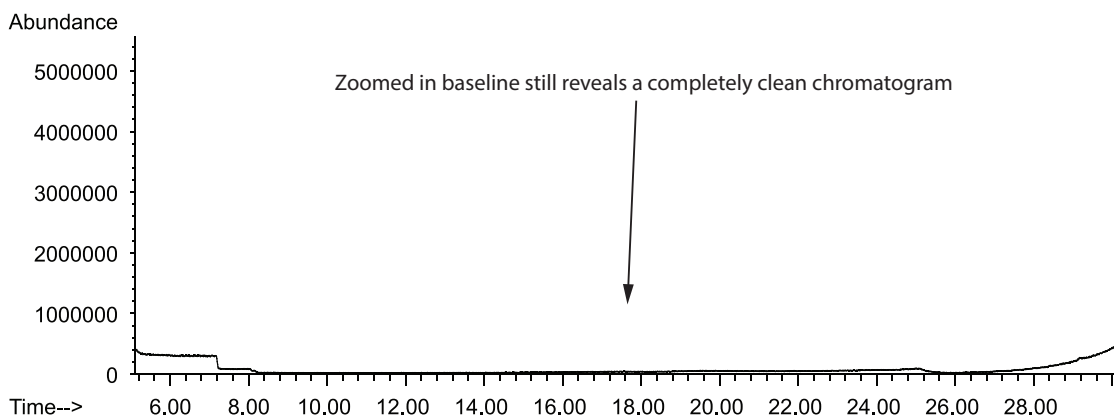
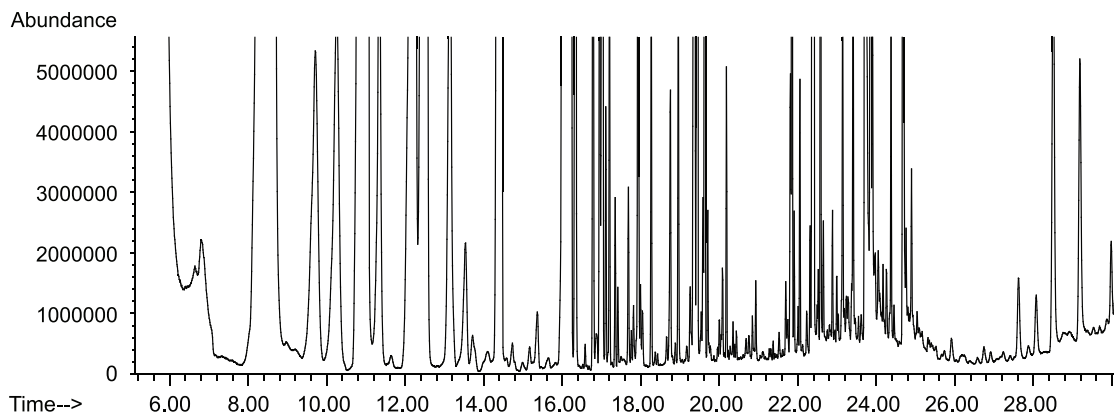


# Extremely Clean Blank After Strawberry Analysis

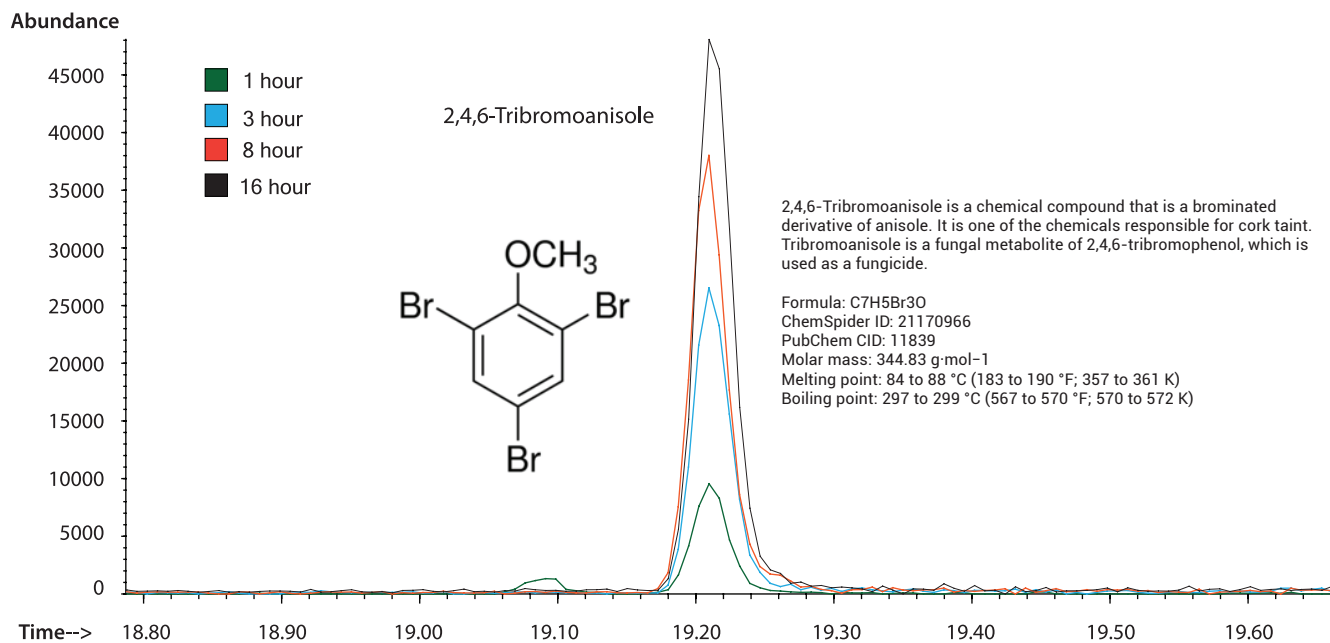
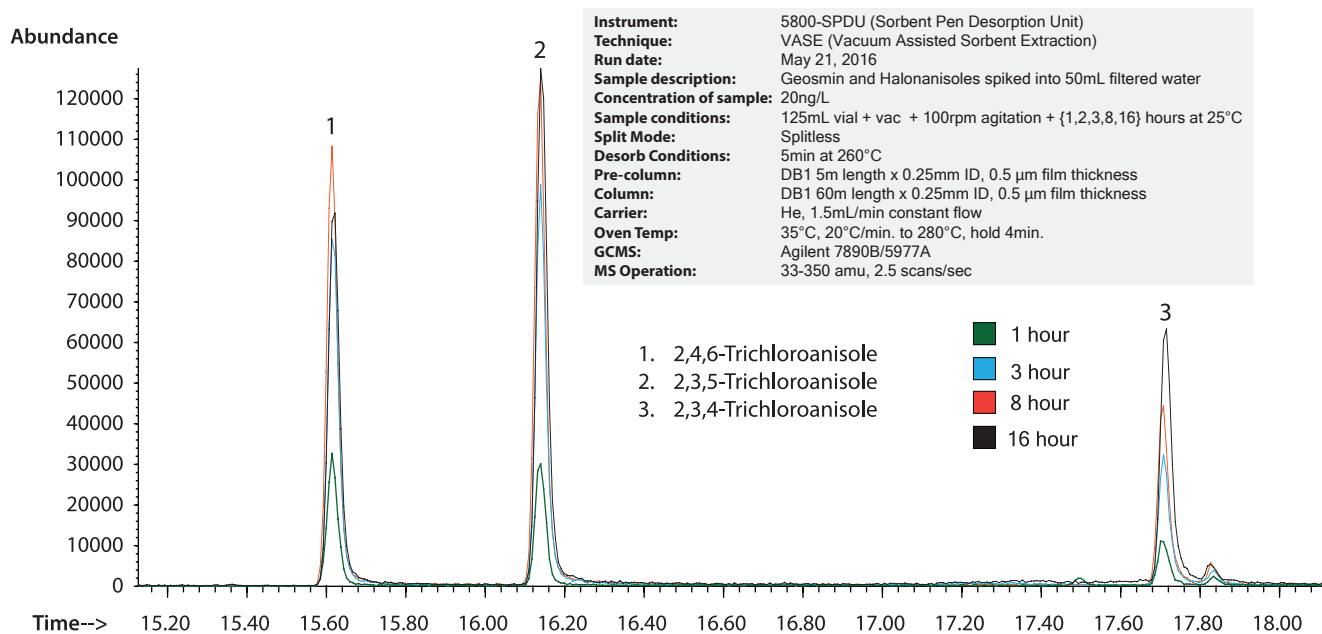
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**Instrument:** 5800-SPDU (Sorbent Pen Desorption Unit)  
**Technique:** VASE (Vacuum Assisted Sorbent Extraction)  
**Run date:** August 3, 2016  
**Sample description:** Fresh strawberries  
**Weight of sample (g):** 7.7425  
**Sample conditions:** vac(30sec) + 15hr equilibration  
**Desorb conditions:** 260°C for 5 min.  
**Split Mode:** Splitless  
**Precolumn:** DB1 5m length x 0.25mm ID, 0.25µm film  
**Column:** DB1 30m length x 0.25mm ID, 0.5µm film  
**Carrier:** He, 1.5cc/min. constant flow  
**Oven Temp:** 40°C hold 5min., 6°C/min. to 95°C, 10°C/min. to 140°C, 15°C/min. to 325 hold 5min.  
**GCMS:** Agilent 7890B/5977A  
**MS Operation:** 34-450 amu, 1.8 scans/sec



## Sorbent Pen™ Kinetic Study



**Figures 2, 3 (above)** – Relative responses for target compounds extracted from 20ng/L standards in 50cc filtered water at 25°C, no salt added, 100 rpm agitation, 1/30th atm vacuum, for 1,3,8, and 16 hours.



## *Sorbent Pens™ - A Revolutionary Extraction Technology That Is Quantitative By Design.*

For additional chromatography data,  
see the VASE Featured Chromatograms Booklet.

### Learn more about us:



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Sorbent Pens™ -191125 -12.7