



ENTECH
INSTRUMENTS

See What's Really There™



2022 CATALOG

Solutions for Chemical Monitoring & Analysis

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President's Letter



Entech Instruments is continuing its tradition of providing the most advanced and accurate sample preparations systems available for headspace and gas sample analysis by GC and GCMS. Our new Multi-Capillary Column Trapping Systems (MCCTS) are transforming the way that gas phase sample preconcentration is performed prior to GC injection, all without the use of liquid nitrogen or even electronic cooling systems. These "fan cooled", extremely robust and reliable multi-stage capillary column traps manage water and CO2 hundreds of times better than any packed trap system. This means much faster release for better chromatography, supporting "faster" GC methods, while also demonstrating far better immunity to contamination when exposed to high concentration

samples. Our MCCTS traps have been implemented in a full cryogen free TO15 solution with much faster GC injections and shorter run times than other TO15 systems on the market. Other applications using this revolutionary capillary trapping technology will also soon be announced.

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Entech's patent pending Sorbent Pen™ technology takes SPME to the next level by providing enhanced sensitivity, improved quantitation, and greater robustness than its fiber-based predecessor. Sorbent Pens utilize a unique flow through cartridge that forms a seal on a vial allowing a vacuum to be created within the vial. This new technique called VASE (Vacuum Assisted Sorbent Extraction) has been demonstrated to cover the entire range of analytes from the lightest volatile compounds (Freon 12/Vinyl Chloride and others) to very heavy 5-6 ring PAH compounds, while remaining in the headspace to avoid actual contact with the sample matrix. With 50-150x higher phase loading and the use of traditional adsorbents with thousands of times more surface area than SPME, the Sorbent Pen™ can fully extract difficult compounds from complex matrices providing superior sensitivity and reproducibility. Sorbent Pens are also available for performing Diffusive and Active air monitoring, making the Sorbent Pen technique extremely versatile. Our newly released SPR40 -Sample Preparation Rail promises to be a game changer for headspace sample preparation and general thermal desorption methods. Rather than desorbing a TD tube into a completely different instrument with separate traps, transfer lines, and rotary valves to have to clean and maintain, the SPR40 allows thermal desorption of Sorbent Pens directly into a GC or GCMS to allow dramatically improved recovery, consistency, and easy of maintenance. Watch for a new wave of applications coming out in 2019-2020 using the SPR40 Robotic inlet.

Our unmatched Silonite™ surface coatings continue to be perfected, resulting in the most consistent, durable, and inert coatings available for GC inlet systems and for mercury vapor handling without surface interactions. Silonite™ surface treatments play a vital role in achieving our ultimate goal; to provide our customers with complete solutions for "analytical grade" VOC and SVOC handling and inlet systems that can sample, store, and recover virtually all GCMS compatible compounds.

Finally, for US EPA Method TO-15 and China HJ-759, Entech is proud to be the only supplier that manufacturers and supports the complete solution for sampling and analysis of airborne contaminants using Silonite™ coated stainless steel canisters. Entech has assembled an extraordinary and talented team of Chemists and Service Engineers with a combined knowledge of over 200 years of laboratory and field experience – to provide our clients with premier customer service and on-site support. To our valued customers we would like to say thank you for your patronage through the years and we look forward to servicing your analytical needs for many years to come.

Sincerely,
Daniel B. Cardin – President



Entech Instruments is a leading developer and manufacturer of analytical instrumentation that supports professionals around the world in the Environmental, Industrial Hygiene, Food & Beverage, Product Testing, Forensics, and Clinical Analysis markets.

To provide solutions for such a diverse set of industry applications, Entech has assembled an extraordinary and talented team – a combined knowledge of over 200 years of laboratory and field experience – to provide our clients with premier customer service and on-site support. We invite you to share your application challenges and requirements so we can create a customized solution just for you.

~ The Entech Team

Sorbent Pens™ for Quantitative Air Monitoring

Sorbent Pens are Entech's high-tech version of classical thermal desorption tubes. Two different Sorbent Pen versions are used to either collect air samples via diffusion without the aid of a pump (Diffusive Sorbent Pens, or DSPs), or by utilizing a pump or vacuum sampling device to draw a known volume of air through the sorbent (Active Sampling Pens, or ASPs). Unlike the standard thermal desorption tubes that use the same geometry to do either diffusive or active sampling, Sorbent Pens have been optimized to improve performance for both sample collection approaches. In addition, Sorbent Pens have an integrated valve on one end and a tool-free sealing sleeve to seal the other end, which not only simplified their operation, but takes the guess work out of which side to sample into, and which side to desorb out of. With Sorbent Pens, there is no way to get this backwards!!

DSP - Diffusive Sorbent Pens™



1 hour to 2 weeks

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

When To Use?

- Use when sampling for 1 hour to 2 weeks
- When the boiling point range is not too large
example C4-C8
For compounds that are NOT bound to particles (under C16)
- When method calls for diffusive sampling

Benefits?

- Very easy use
- No pumps or vacuum source
- Uptake rate known for dozens of compounds
- Ideal for BTEX monitoring
- Both Environmental and Industrial Hygiene applications

ASP - Active Sorbent Pens™



5 minutes to 8 hours



When To Use?

- Use for faster sample collection: **5 min to 8 hours**
- For wider boiling point ranges:
(-40° C to >500° C)
- When method requires an active sampling

Benefits?

- Multiple adsorbent traps are available which substantially increases the range of recoverable compounds
- Accurate volume collection measurements made using Entech's Accu-Bottle vacuum sampler

Sorbent Pens™ for Diffusive Air Monitoring

Entech DSP Sorbent Pens™ represent an advancement in passive 'diffusive' sampling, incorporating many subtle but critical engineering design elements that ensure quantitative recovery, reproducibility, and cost effective long term use. Decades of research into volatile chemical sampling and analysis has resulted in a sampler with incredible accuracy and reproducibility.

Diffusive sampling is defined as unassisted, non-convective transfer of gaseous analytes through a diffusion region and onto an adsorbent. The DSP (Diffusive Sorbent Pen) does not require a pump and contains no moving parts. After sampling, the adsorbed analytes are desorbed directly into the GC or GCMS using the Entech 5800 Sorbent Pen Desorption Unit (5800 SPDU).

Benefits of passive/diffusive sampling:

- Compact, portable, unobtrusive, and inexpensive
- Can determine average chemical concentrations over time periods of 1 hour to several weeks
- Requires no supervision, no pumps, is noise-free, and can be used in hazardous environments
- Cost effective sampling at multiple locations for determining pollution hotspots, or determining long term data trends in a specific geographical area
- Amenable to personal monitoring (breathing zone), indoor air analysis, fenceline monitoring, and ambient air analysis



Name / Geometry	Adsorbent	Part #	Label Color	Label	Effective Range	Packing Diagram
Diffusive Sorbent Pen (1/4" OD)	Blank / Empty	SP-DSP-0	Yellow		NA	
Diffusive Sorbent Pen (1/4" OD)	Carboxen® 1000	SP-DSP-C1000	Green		-60°C to 80°C	
Diffusive Sorbent Pen (1/4" OD)	Carbopack™ C	SP-DSP-CPC	Purple		125°C to >400°C	
Diffusive Sorbent Pen (1/4" OD)	Carbopack™ X	SP-DSP-CPX	Blue		80°C to 145°C	
Diffusive Sorbent Pen (1/4" OD)	Carbopack™ Y	SP-DSP-CPY	Gray		150°C to >400°C	
Diffusive Sorbent Pen (1/4" OD)	Tenax® TA 35/60	SP-DSP-T3560	White		100°C to > 450°C	

Diffusive Sorbent Pens™ for Passive BTEX Monitoring



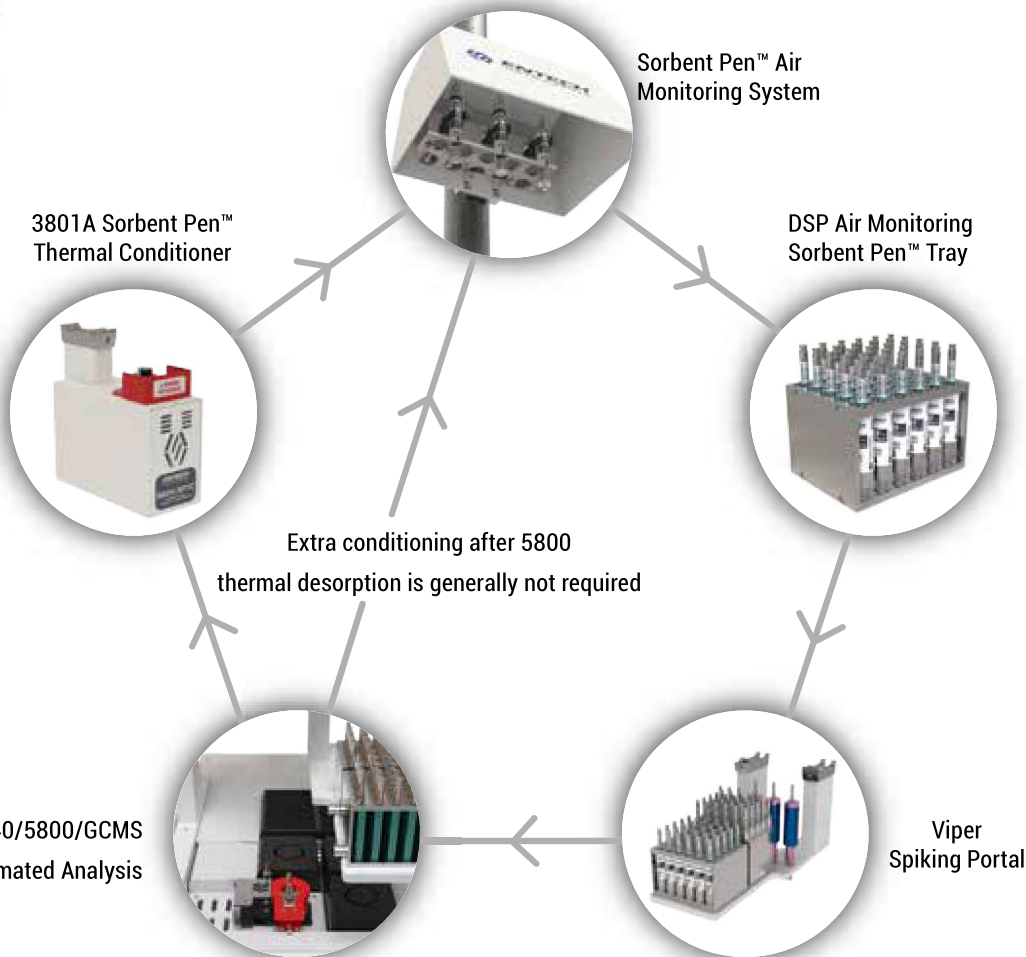
Passive BTEX Sampling for Fenceline or Community Monitoring



- 8 hr - 2 week passive sampling provides highly reproducible results for BTEX and similar boiling range VOCs when using DSP Sorbent Pens with CarboPack X sorbent
- More reproducible than radial samplers because sample is backflushed during thermal desorption rather than pushed through the entire adsorbent bed
- Carbon Tetrachloride is quantitatively recovered, so Global background of 70 ppt can be used to validate proper sampling for collections lasting 8 hours or more



An Affordable End-to-End Solution



DSP Sorbent Pen Air Monitoring Components



Isolated Sorbent Pen for storage and transportation from lab to field and back. No crushing of tops and bottoms of tubes, common with nuts and ferrules on 3.5" TD tubes, so sampling rates remain the same.

During sampling, bottom isolation caps are placed on top of the Sorbent Pens for safe keeping.

Diffusers to prevent wind from affecting sampling rates



Field Blank (not sampling)



DSP/ASP Plug
PN: SP-DSPA-PLUG



DSP/ASP Retaining Cap
PN: SP-DSPA-CAP



DSP Isolation Sleeve
PN: SP-DSP-SLEEVE



Diffuser Cap
PN: 19-5800-138

Sampling Rates of Several Compounds into SP-DSP-CPX

Compound	Carbopack™ X
1, 1-Dichloroethene	0.57 ±0.14
3-Chloropropene	0.51 ±0.3
1, 1-Dichloroethane	0.57 ±0.1
1, 2-Dichloroethane	0.57 ±0.08
1,1,1-Trichloroethane	0.51 ±0.1
Benzene	0.67 ±0.06
Carbon tetrachloride	0.51 ±0.06
1, 2-Dichloropropane	0.52 ±0.1
Trichloroethene	0.5 ±0.05
1, 1, 2-Trichloroethane	0.49 ±0.13
Toluene	0.52 ±0.14
Tetrachloroethene	0.48 ±0.05
Chlorobenzene	0.51 ±0.06
Ethylbenzene	0.46 ±0.07
m, p-Xylene	0.46 ±0.09
Styrene	0.5 ±0.14
o-Xylene	0.46 ±0.12
p-Dichlorobenzene	0.45 ±0.05

Gaussian Peak Shape without LN2 Focusing. Back-flushing Eliminates Ghost Peaks and Reduces Run Times

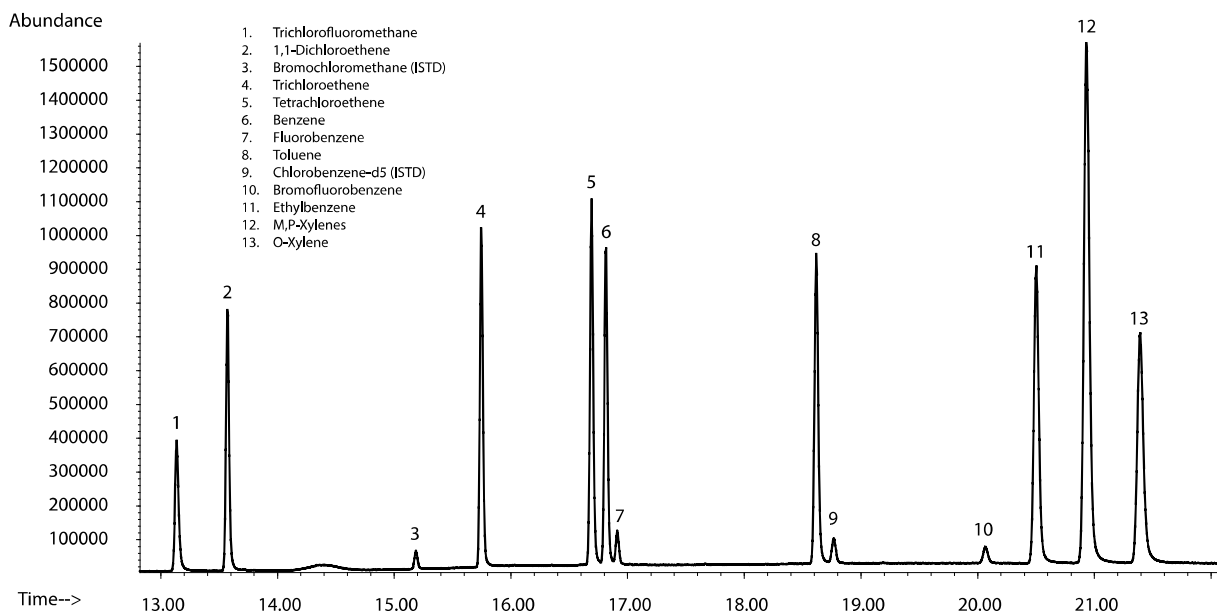


Figure 1 - BTEX Standard Corresponding to 6 PPBv for Benzene as sampled for 1 week.

Triplicate Sampling of Diffusive Sorbent Pen Virtually perfect overlap of BTEX Compounds

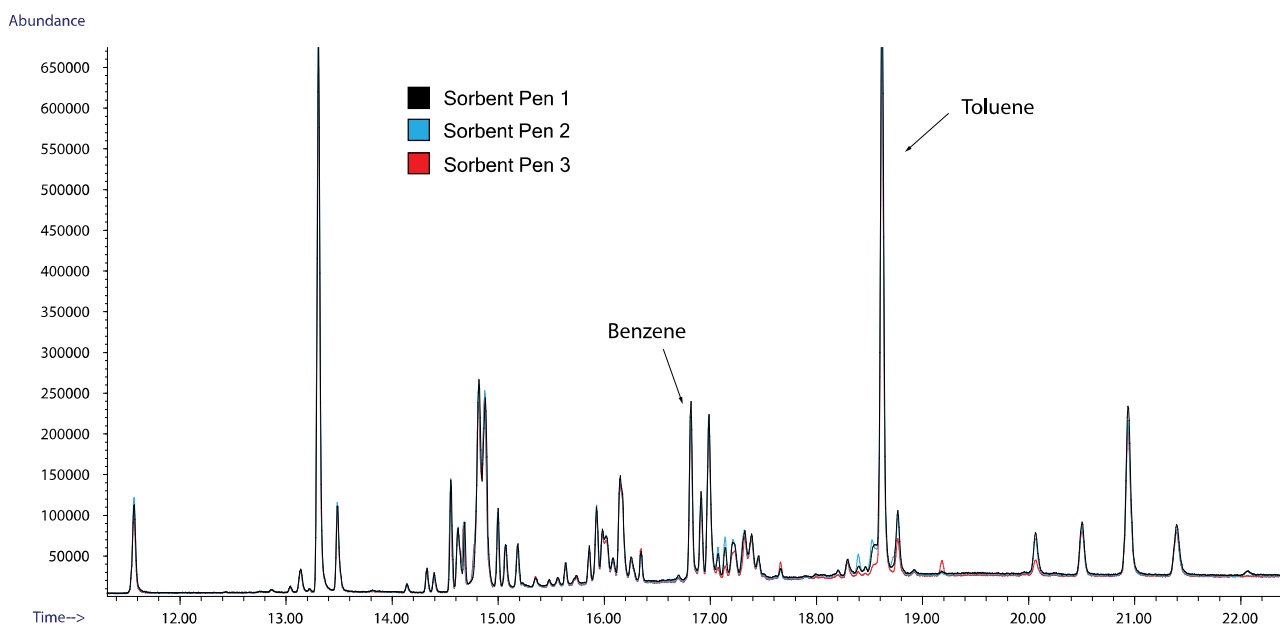


Figure 2 - Triplicate tubes placed in parking lot near parked vehicles to increase BTEX Concentrations. Sampling was performed over a 1 week period. Overlap of BTEX is virtually perfect.

Diffusive Sorbent Pens™ for Personal Monitoring



DSP Badge Samplers

More Reliable and Sensitive than Solvent Extraction Badges



- Diffusive sampler that collects a wide range of compounds
- Several adsorbents available depending on compounds to be collected
- The DSP Badge has several advantages
 - Higher sensitivity due to much greater percentage of sample reaching the detector during analysis (thermal desorption rather than solvent extraction)
 - 20-60 times lower sampling rates, so far less likely to "starve" during sampling (common problem with other badges)
- Easier Analysis. Just spike and desorb



DSP Badge Samplers

Dual Sampler also Available

- Allows DSP Badges with different adsorbents to be used together to increase range of chemicals to be monitored
- Perfect when duplicates are needed
- Uses diffusers on the Pen inlets to prevent convective transfer, so diffusion is the only transport mechanism onto the adsorbent
- Just like badges, chemicals will have different diffusion rates, but the Diffusive Sorbent Pens have adopted the same inlet geometry used by 3.5" diffusion TD Tubes, so sampling rates for a large number of compounds are already known

