

HUMAN HEALTH

ENVIRONMENTAL HEALTH



THE BETTER YOUR  
**PRECISION**  
THE GREATER YOUR  
CONFIDENCE



**TurboMatrix**

Headspace and Headspace Trap Samplers for GC

  
**PerkinElmer**<sup>®</sup>  
*For the Better*

# SETTING THE STANDARD FOR VOLATILE ANALYSIS

Headspace Gas Chromatography—for applications involving the solvent-free extraction of volatile compounds, it's an unsurpassed technique, eliminating the time-consuming steps and risk of human error associated with other GC sample-preparation methods.

Engineered to deliver unparalleled precision, sensitivity and productivity in a broad range of specialized applications—including forensics, food and beverage, pharmaceuticals and environmental—TurboMatrix™ Headspace (HS) and Headspace Trap samplers are the clear choice for laboratories seeking outstanding throughput and precision.



Clarus SQ8 GC/MS System with a TurboMatrix HS-40.

**The best systems in the world.  
The best solutions for your lab.**

#### Boost productivity

- One-touch operation
- Exceptional ease-of-use
- 12-sample thermostating
- Touchscreen graphical interface
- Up to 110 vial capacity

#### Enhance precision

- Pressure-balanced technology minimizes carryover
- Inert sample flow path
- Reduced adsorption and dead volumes
- Highly consistent thermostating

#### Increase sensitivity

- Sharper peaks
- No gas dilution of sample vapor
- Optimal extraction and transfer of sample vapor into GC column
- Unique trapping technology

# A WHOLE NEW LEVEL OF PRODUCTIVITY



Designed for superior simplicity and throughput, TurboMatrix systems set the standard for productivity in the analysis of volatile compounds.

## Touchscreen graphical user interface

A clear, intuitive, multilingual touchscreen interface puts you in total control of every part of your sample path—from vial to column. With just a few touches, you can select and review methods, set parameters and initiate analyses.

## One-touch operation

Once you've established routine methods, running your analysis is as simple as loading samples and touching Start.

## 24-hour automated runs

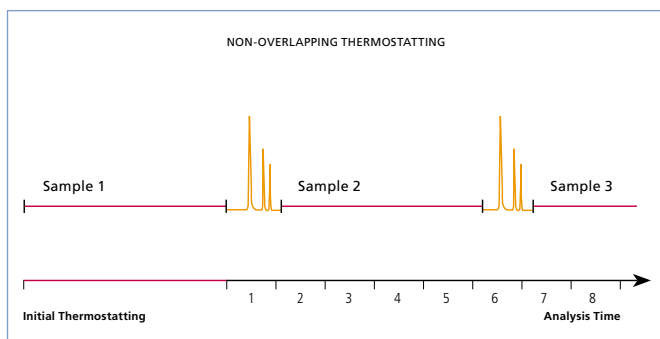
With fully automated headspace sampling and programmable shut down/wake up mode, TurboMatrix systems can process up to 110 vials completely unattended. That means your laboratory can remain operational even after hours and on weekends.

## Sample prioritization

When rush jobs become a priority, TurboMatrix samplers allow you to interrupt a run whenever necessary and insert an urgent sample for analysis.

## Overlapping thermostating

The vial ovens accommodate up to 12 samples simultaneously, allowing the next sample to be analyzed as soon as the previous one is complete. This substantially decreases overall run time while boosting productivity.



## Dynamic leak check

By giving you the option to constantly monitor pressures throughout the entire system, TurboMatrix samplers can verify the integrity of each vial's seal—giving you greater confidence in the accuracy of your results.

## Injection to injection (PII) optimization

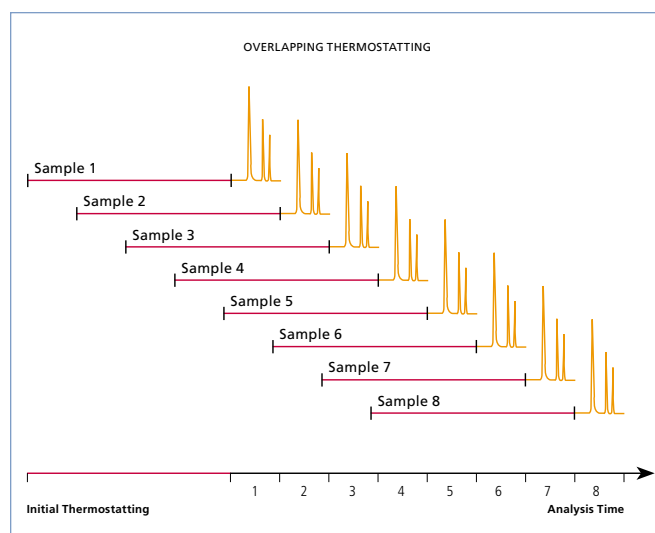
The time between injections is automatically calculated for ideal sample throughput, keeping your analyses flowing smoothly and efficiently.

## Shut down/wake up mode

The system can be pre-programmed to save carrier gas and time, shutting down when not in use and waking up on schedule, ready for use precisely when needed.

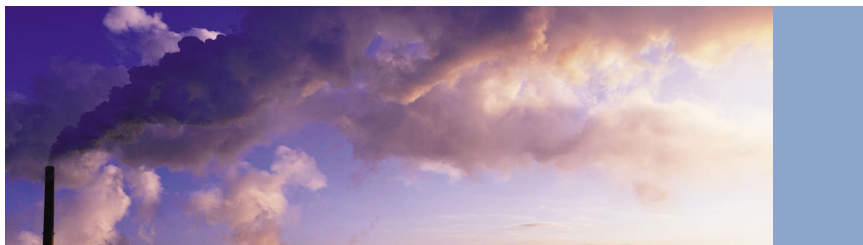
## Optional vial shaker

All 12 samples in the heated zone are agitated to reduce thermostating times required to achieve equilibration, significantly increasing throughput.



Overlapping thermostating eliminates wasted time between samples, reducing total analysis time.

# PROVEN TECHNOLOGY THAT DELIVERS PEERLESS PRECISION



TurboMatrix Headspace samplers utilize an array of proven technologies to ensure they deliver outstanding precision in any application. The result is superior repeatability for every sample in every run.

## Ultra-stable, uniform thermostating

Featured in the TurboMatrix HS-40 and HS-110, a 12-position oven delivers the ultimate in precision thermostating. Built around a substantial 2-kilogram aluminum alloy block, the oven distributes heat with exceptional uniformity. This block rotates within a stationary heater sleeve, eliminating temperature variation and providing highly consistent vapor equilibration that ultimately ensures reliable, repeatable results.

## Unique Pressure-Balanced Technology (PBT)

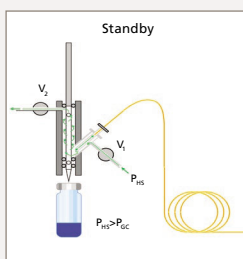
Innovative pressure-balanced time-based sampling avoids the use of multiport valves, minimizing the number of components that come into contact with the sample. Peak distortion from adsorption and dead volumes is virtually eliminated. Carryover is also avoided, allowing you to enjoy true precision without the need to run blanks to purge the system.

## Inert sample flow path

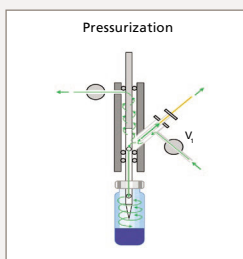
A deactivated fused silica transfer line or analytical column connects directly to the sampling head to achieve truly inert analyte passage. This minimizes cross contamination and reduces analyte loss to ensure maximum sample integrity in any application.

## A closer look at Pressure-Balanced Technology

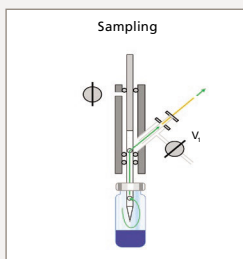
A PerkinElmer exclusive, this technology allows samples to be introduced into the column without using a gas syringe or multiport valves. Instead, carrier gas pressures are precisely regulated to manage transfer, eliminating many of the sources of variability and contamination found in other systems.



The heated needle area is constantly flushed with carrier gas to remove contamination. Because the column or transfer line is inserted all the way to the needle, maximum inertness and minimal dead volume are maintained.



All vials are pressurized to the exact same degree. Optimal reproducibility and precision are achieved regardless of equilibration pressure in the vial.



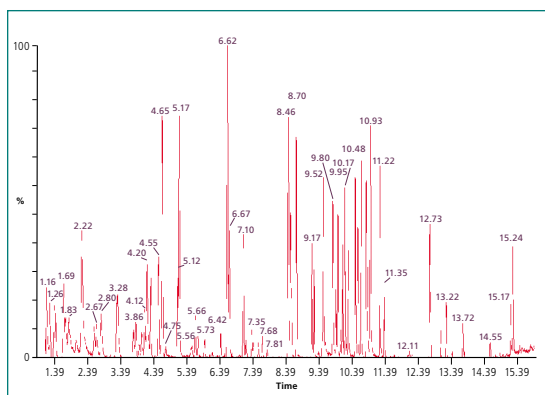
A solenoid valve interrupts the carrier gas flow and the vial acts as a reservoir of carrier gas. During injection, as the pressure decays, sample volume is transferred to the column. This prevents carrier gas from diluting the sample and avoids expansion of the sample before injection.

# RAISING THE BAR AND LOWERING THE LIMITS ON SENSITIVITY



Thanks to pressure-balanced technology, TurboMatrix Headspace samplers deliver exceptional performance in the analysis of your samples. Greater sensitivity can be achieved because the system offers an array of unique features and benefits:

- Zero dilution liner ensures sample gas passes undiluted from the transfer line into the column
- No fractionation due to pressure and temperature changes experienced with syringe-based systems
- Sample is introduced rapidly and as a sharp band to the GC, resulting in sharper peaks
- Minimal number of hardware components come into contact with the sample, keeping contamination low



Analysis of volatile organics in water by Headspace Trap, demonstrating outstanding performance across a wide range of analyte types and volatility.

## TurboMatrix Headspace Trap systems

The TurboMatrix HS-40 Trap and HS-110 Trap feature built-in analyte-trapping technology that provides a potential 100-fold increase in sensitivity. Samples are repeatedly pressure cycled to extract as much sample vapor as possible. Once extraction is complete, the sample is dried and desorbed analytes are carried into the GC. The result is detection limits that are up to 100 times lower than those enabled by standard Headspace sampling. Yet, the process itself is surprisingly simple:

**Step 1:** Sample is heated to equilibrium.

**Step 2:** Vial contents are pressurized and allowed to decay through the cooled adsorbent trap. This pressurization/decay cycle may be repeated up to four times for maximum vapor extraction.

**Step 3:** Once vapor extraction is complete, a flow of dry carrier gas is passed through the trap to remove moisture from the sample.

**Step 4:** The trap is rapidly heated and the desorbed analytes are carried, via an optional split, into the GC column for separation and quantification.

## Additional benefits of Headspace Trap

**Dry-purge design**—Efficiently removes water from analytes, eliminating the need for long bake-out periods and reducing sample-handling time by 25%.

**Column isolation**—To ensure GC/MS stability, column isolation allows carrier gas flow into the GC to be maintained during servicing, even when the Headspace unit is turned off.

**Internal standard**—An automated internal standard can be added to allow the instrument's responses to be standardized. This provides better long-term precision and performance.



# IDEALLY SUITED TO ANY HEADSPACE APPLICATION

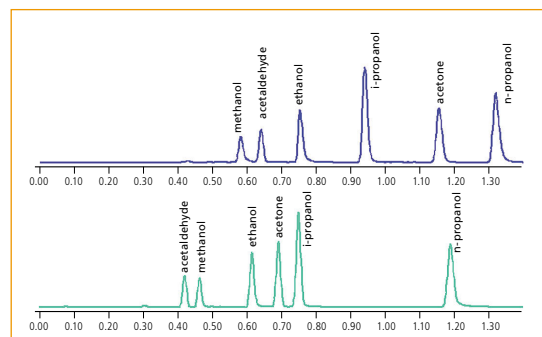


No matter what you're focused on analyzing, the TurboMatrix line of Headspace samplers will ensure that you get the data you need—quickly, easily and accurately.

## Rapid blood-alcohol analysis

TurboMatrix Headspace systems are the perfect choice for detecting volatiles in biological fluids.

- Industry standard for the determination of alcohol levels in blood
- Delivers confirmatory results within 90 seconds for ethanol and other required analytes for blood analysis
- TurboMatrix HS-110 enables a full magazine of 110 vials to be processed in just 3 hours

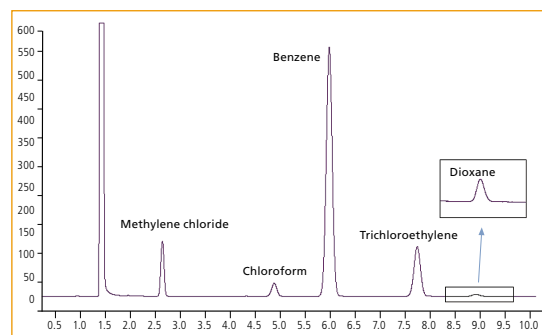


Blood alcohol analysis with dual-channel confirmation.

## Residual solvents in pharmaceuticals

Static headspace is the ideal sample-preparation instrument for the determination of residual solvents in pharmaceuticals as prescribed by U.S. Pharmacopeia Chapter <467>, Method IV.

- Static Headspace sampler provides outstanding performance for Class I, II, and III solvents
- Pressure balanced design achieves outstanding precision and virtually no carryover across the analyte range
- Compatible with all of the commonly used diluents

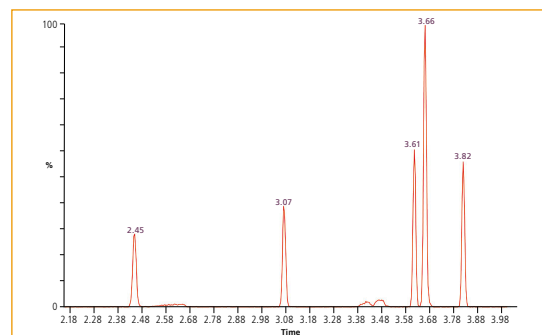


Determination of residual solvents in pharmaceuticals.

## BTEX in water samples

TurboMatrix Headspace systems yield outstanding results when determining contamination in environmental samples.

- Quick and easy method for screening complex environmental samples
- Ideal for identifying petroleum contaminants like benzene, toluene, ethyl benzene, xylenes (BTEX) and methyl tertiary-butyl ether (MTBE)

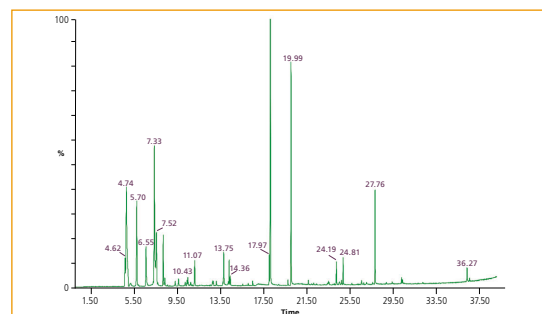


Trace static headspace determination of BTEX in water at 1 ppb.

## Food and beverage applications

Food and beverage manufacturers use TurboMatrix Headspace systems to ensure the purity, safety and quality of their products with uncompromising accuracy.

- Characterize aroma and flavors
- Detect residual solvents and preservatives
- Assess fermentation characteristics of samples such as beer and wine



Volatile flavors and fragrances in fresh tomatoes.

# WHATEVER YOUR NEEDS, THERE'S A TURBOMATRIX SOLUTION



No two laboratories have identical demands. That's why the TurboMatrix line offers a range of configurations, all engineered to deliver the highest standards of performance. No matter which system you choose, you can count on complete compatibility with the entire PerkinElmer Clarus family of gas chromatographs, as well as GC instruments from every other major manufacturer. So you can enhance your laboratory's analytical capabilities without replacing existing systems.

## TurboMatrix HS-16

A Headspace sampler designed to meet your needs and exceed your expectations. Holding up to 16 sample vials, the unit heats and equilibrates quickly and efficiently to keep your lab running productively.

## TurboMatrix HS-40

The HS-40 holds up to 40 sample vials and thermostats up to 12 vials simultaneously for greater throughput.



## TurboMatrix HS-110

This high-capacity Headspace sampler is the perfect choice. With a 110-vial capacity, and overlapping thermostating functionality, the HS-110 can truly redefine your lab's productivity.

## TurboMatrix HS-40 Trap

This model incorporates all the features of the HS-40, along with a built-in trap for far lower detection limits.



## TurboMatrix HS-110 Trap

Delivers all the advantages of the HS-110, along with built-in trapping capabilities to increase sensitivity.

## Easily control, collect, and access data across your entire lab

TurboMatrix Headspace samplers are seamlessly integrated with Waters® Empower® 3 software. This allows you to take advantage of the performance of the TurboMatrix line in conjunction with all of the analytical features of the industry's most widely used chromatography data software system (CDS). Empower® 3 software is a single CDS solution that integrates TurboMatrix Headspace samplers with multi-vendor instrumentation for greater efficiency.

Empower® 3 software makes it simpler and easier to run your samples and achieve meaningful and precise results, time after time. Its customizable interface options are designed for the unique needs of every user – that means tailored functionality regardless of their skill level. Plus, regulatory compliance and audit traceability are built right in, for more confidence in your results, and a lot less risk.

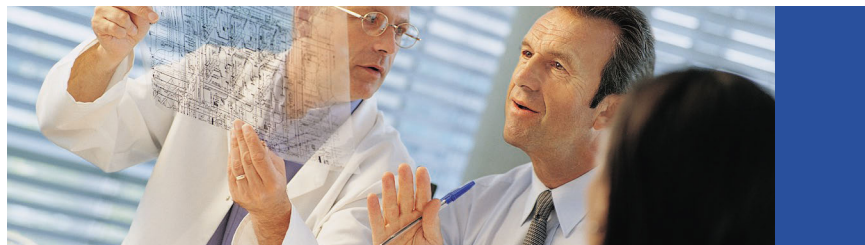
## Consumables Highlight

**Vials**—Chemically inert and manufactured for exceptionally high temperature tolerance, our vials are tested to meet the most stringent application requirements.

**Caps and crimp caps**—A variety of chemically inert screw caps, snap caps and crimp-tops offer easy identification within the lab.

**Zero dilution liner**—Allows you to connect and disconnect the transfer line and enhance performance using splitless transfer with low dispersion.

# THE NUMBER ONE NAME IN SERVICE AND SUPPORT



Nothing has a greater impact on productivity or return on investment than instrument uptime. And no one does more to ensure your chromatography systems perform day in and day out than PerkinElmer.

With OneSource Laboratory Services, you have the world's largest and most respected global service and support network at your disposal. We go beyond just maintenance and repair of instrumentation. We incorporate laboratory asset management as part of our customers' business equation—a partner with proven results in improving efficiencies, optimizing operations and providing cost certainty across the globe. No matter what you need, our team of certified, factory-trained Customer Support Engineers is just a phone call away, 24 hours a day, seven days a week.

Operating in more than 150 countries with more than 400,000 assets currently under care, OneSource offers the most comprehensive portfolio of professional laboratory services in the industry, including complete care programs for virtually every technology and manufacturer. By allowing you to consolidate all your service contracts under a single supplier, and by providing responsive, expert technical advice and support at a moment's notice, we ensure your instrumentation—and your lab—is running at optimum levels at all times.

Whether it's care and repair, validation and compliance, assets management and laboratory relocation, software and hardware upgrades or education and training, OneSource is... the ONE you can count on.



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