

HUMAN HEALTH

ENVIRONMENTAL HEALTH



**SUCCESS**  
IS A MATTER OF  
PERFORMANCE  
AND PRECISION



**TurboMatrix**

Thermal Desorption Solutions

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

# GET FASTER, BETTER RESULTS WITH THERMAL DESORPTION.



For laboratories analyzing everything from air quality to flavors and fragrances, thermal desorption offers a faster, easier, more cost-efficient way to prepare samples for GC or GC/MS analysis.

Ideal for the trace-level measurement of volatile organic compounds (VOCs)—as well as most semi-volatile chemicals—thermal desorption lets you avoid time-consuming, manual, solvent-based sample preparation in favor of a simple, streamlined, automated approach. It also delivers the added benefits of superior throughput and enhanced sensitivity.

## The most reliable technology from the most trusted name

As a world leader in thermal desorption (TD), PerkinElmer offers a broad range of cutting-edge TurboMatrix™ technologies including manual PPC, as well as single or multi-table configurations. Each delivers unrivaled precision and can be integrated with GC systems from virtually any manufacturer.

With a full line of GC and GC/MS instrumentation, advanced sample preparation tools, and complete selection of consumables and accessories, PerkinElmer is the only true single-source provider of complete, fully integrated, world-class GC solutions.

## Precisely the right solution.

Available in a wide variety of models, TurboMatrix Thermal Desorbers deliver the ideal level of performance for virtually any laboratory or application.

### Manual pneumatics

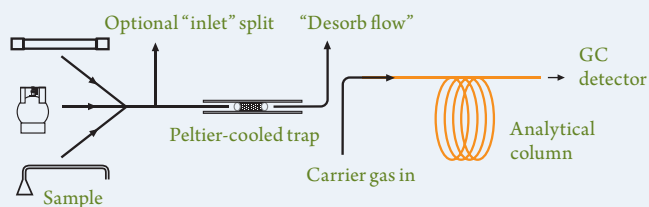
- TurboMatrix 100 TD—single-tube
- TurboMatrix 150 ATD—50-tube autosampler

### Programmable pneumatics

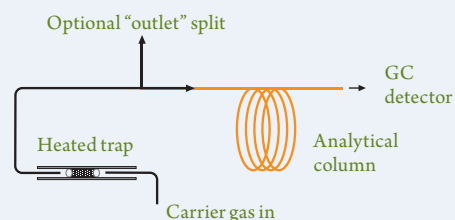
- TurboMatrix 300 TD—single-tube
- TurboMatrix 350 ATD—50-tube autosampler
- TurboMatrix 650 ATD—50-tube autosampler with a wide range of accessories for greater flexibility

## Two-Stage Thermal Desorption

### Stage 1: Tube desorption or air sample transfer



### Stage 2: Trap desorption



For superior resolution and sensitivity, PerkinElmer instruments feature a two-stage thermal desorption process that concentrates analytes before they are introduced into the gas chromatograph.

# TURNING POWER AND PERFORMANCE INTO PRODUCTIVITY



Productivity is everything in today's economic environment. Which is why every TurboMatrix Thermal Desorber is engineered to streamline your analyses, maximize throughput and optimize efficiency. Remarkably easy to use without compromising analytical performance, TurboMatrix solutions offer:

- **One-touch operation** for routine analysis.
- **An intuitive touch-screen interface** (available in eight languages) that puts full control at your fingertips.
- **Convenient remote control software** providing complete instrument control and full access to methods and sequences.

TurboMatrix instruments also give you a series of advanced capabilities designed to enhance performance and productivity at every stage of your analysis:

## **Simultaneous TD and GC operation**

With TurboMatrix Thermal Desorbers, you can enhance throughput—and increase productivity—by starting your TD run while your GC processes the previous analysis.

## **Flexibility within runs**

Since you can automate your sequence with different flows and pressures, you have the power to simplify and expedite method development. At the same time, pressure-pulsed trap desorption lets you increase or decrease carrier-gas pressure during desorption for improved recoveries and peak shapes.



## **Automatic leak check**

Powerful diagnostics—including automatic leak check—provide early indication of any system errors. This allows you to resolve any issues before they disrupt your entire analysis and helps keep your system running at optimal capacity.

## **Fast setup times**

The ability to instantly adjust gas flows and pressures lets you set up a method and obtain the same results run after run—with exceptional speed and efficiency.

## **Sample recollection**

With the TurboMatrix 650 ATD's ability to perform sample recollection on the same or different tubes, you'll have the capability to quickly and efficiently review samples and perform confirmatory analysis and repeat analysis under a different set of conditions.

## **Programmable Pneumatic Control for unsurpassed performance**

TurboMatrix Thermal Desorbers utilize an innovative Programmable Pneumatic Control (PPC) to provide the best analytical performance. The PPC ensures that the carrier gas pressure applied to the transfer line or column inlet is no longer affected by the impedance of the trap and associated plumbing—even with high split flows. This means that peak shape and retention time are not dependent on the set split-flow rate.

# HIGHER PERFORMANCE MEETS LOWER COSTS



When you invest in a TurboMatrix Thermal Desorber, you're selecting an instrument that will provide world-class performance across a broad range of applications. In your laboratory, that enhanced performance translates into uncompromising precision, consistent reproducibility and reduced operating costs.

## Uncompromising precision

With a TurboMatrix Thermal Desorber, you can have absolute confidence in your analyses. That's because PerkinElmer engineers have designed the entire TurboMatrix line to truly set the standard for precision.

- **High temperature desorption** capability allows the determination of analytes up to n-C<sub>44</sub> hydrocarbons.
- **Automatic addition of standard mixture** to the tube both before sampling and before analysis aids in monitoring sample integrity and improving analytical quantification.
- **Tube sample stacking** technique provides improved detection limits.
- **Electronic cooling** of the trap to -30°C eliminates the use of liquid cryogen, enabling the trapping of gases like ethane, ethylene and acetone with the added benefit of reduced operating costs.

## Consistent reproducibility

Reproducible results are essential for any application. Every model in the TurboMatrix line employs proprietary technologies to help deliver consistent results run after run.

- **Optimized dry purge** of both the tube (TurboMatrix 650 ATD only) and the trap eliminates sample moisture.
- **Tube and trap flow impedance testing** allows you to monitor packing integrity for greater consistency (TurboMatrix 650 ATD only).

- **MS mode** ensures that a low flow of carrier gas continuously sweeps internal valving and pneumatics to minimize the buildup of contaminants.
- **Inert sample path** virtually eliminates cross-contamination and helps ensure analyte integrity.

## Reduced operating costs

TurboMatrix Thermal Desorbers are built to conserve consumables and minimize waste. The result is a total cost of ownership that is remarkably low.

- **Gas conservation/economy mode** reduces the use of carrier gasses while the instrument is inactive.
- **Automatic tube cleaning and conditioning** during runs optimizes operational performance and efficiency.
- **Separate trap-clean and test function** to condition a trap eliminates column exposure and the need to check for cleanliness after a run.
- **Reusable tubes** allow sample tubes to be reused with a minimum of effort.
- **Solvent-free operation** reduces the costs associated with the use and disposal of solvents.



### Consumables Highlight—SVI™ Tubes

Our patent-pending, multi-bed construction SVI Tubes extend the hydrocarbon range past naphthalene while retaining lighter compounds. This unique construction enables larger sample volumes to be analyzed and enhances detection limits. The multi-bed design meets the challenges presented by today's industry regulations, including current EPA standards for air monitoring.



# A PERFECT FIT FOR YOUR NEEDS TODAY AND TOMORROW



Designed for optimum long-term flexibility and functionality, TurboMatrix Thermal Desorbers can be easily upgraded as your business demands or operational requirements change. Keep capital expenses contained by choosing from an array of specially designed accessories that make it easy and cost-effective to get even more out of your TurboMatrix instrument.

## Direct on-line air sampling

With the on-line air-sampling accessory, your TurboMatrix Thermal Desorber can monitor volatile compounds directly from atmospheric air, canisters or other air-sampling devices. This gives you the flexibility and convenience of being able to remotely monitor unattended samples and air-streaming devices 24 hours a day.

## Using an internal standard during runs

TurboMatrix Thermal Desorbers let you automatically introduce a fixed amount of a gas standard into the sample tube prior to desorption. This ensures accurate calibration, greater precision, and complete confidence in the validity of your sample processing and results.

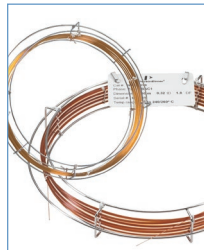


## Longer sample collection times

If you need to profile site data over periods of 24 hours or longer, the STS sequential tube sampler allows the fully programmable, sequential collection of aliquots of the air into a series of absorbent tubes. By enabling longer sampling times, TurboMatrix systems equipped with the STS offer greater versatility as well as more precise and accurate results.

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

TurboMatrix Thermal Desorbers 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 Thermal Desorbers 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.

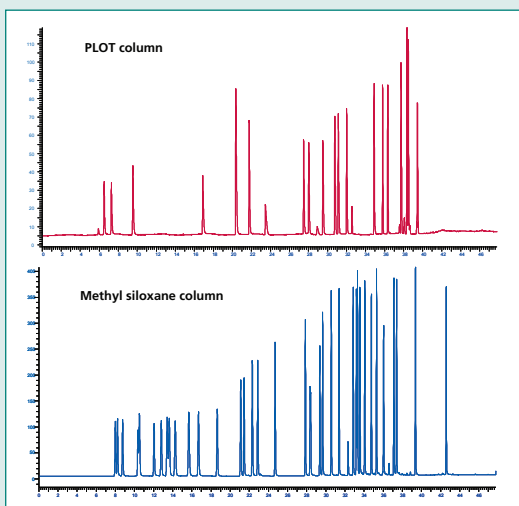


## Consumables Highlight—Elite™ MS Columns

PerkinElmer's specialty phase GC/MS Columns offer exceptionally low bleed in a variety of lengths and film thicknesses. Tested with the tightest QC specifications in the industry for column bleed, selectivity and efficiency, Elite MS columns provide utmost confidence in your qualitative and quantitative results. Our extensive line includes Elite-5MS, 17MS, 35MS, 624MS and VMS columns, so you can be sure of getting the ideal solution no matter what your application.

# PUT THE POWER OF THERMAL DESORPTION TO WORK FOR YOU

The TurboMatrix line of Thermal Desorbers is a perfect fit for any laboratory seeking better precision, higher productivity and greater cost savings. From environmental to pharmaceutical to food and beverage analysis, you'll get the results your lab demands across a wide range of applications.



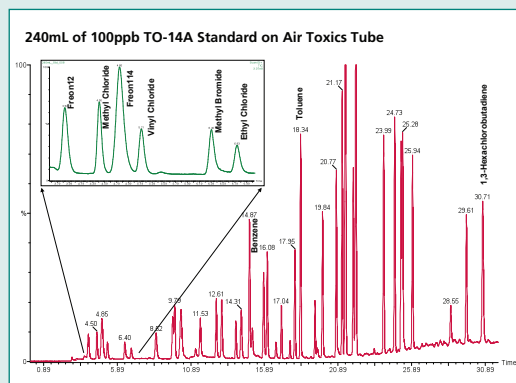
Demonstration of complete separation without sub-ambient oven temperatures, highly volatile analytes are fore-flushed onto a PLOT column, while less volatile analytes are separated on the methyl siloxane column. Each column is connected to its own detector so the two chromatograms are produced simultaneously.

## Ozone precursor analysis

In the United States, the Clean Air Act of 1970 gave the Environmental Protection Agency (EPA) responsibility for maintaining clean air. Six parameters are measured routinely in ambient air:  $\text{SO}_x$ ,  $\text{NO}_x$ ,  $\text{PM}_{10}$ , Pb, CO and ozone. In the 1990s, the Clean Air Act was expanded to include volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone. These measurements are implemented through Photochemical Assessment Monitoring Stations (PAMS). Similar recommendations have also been made in Europe following the 1992 Ozone Directive and United Nations Economic Commission for European protocol on controlling VOC emissions. PerkinElmer is recognized throughout the industry as a market leader and preferred vendor of ozone precursor analysis solutions.

## Air toxics analysis

PerkinElmer Air Toxics Analyzers combine several analytical techniques into a single, unified system, performing tube-based sampling in accordance with established methodologies such as U.S. EPA Method T0-17. Tube-based sampling offers greater convenience as well as analytical advantages over traditional canister-based analysis. Comprising a TurboMatrix Thermal Desorber, Clarus<sup>®</sup> Gas Chromatograph and Clarus Mass Spectrometer, the systems provide outstanding analytical performance as well as several unique features to simplify and speed analysis. Thermal desorbers with PPC incorporate a powerful dry-purge technique that allows for analysis under extreme levels of humidity/moisture, while a unique capability of the Clarus SQ 8 GC/MS offers the benefits of both full-scan and single-ion monitoring simultaneously within a single analytical run.



Sample analysis of an air toxics reference material demonstrating separation, detection, identification and quantification of a wide range of volatiles from freon through hexachlorobutadiene.



### Materials testing

The release of volatile compounds can signify quality issues in a host of products such as disc drives and wafers in semiconductor manufacturing, automobile and household upholstery manufacturing and in a variety of packaging and building materials. TurboMatrix Thermal Desorbers can be used to characterize volatiles for QA/QC of many solid-matrix materials. Materials releasing lower volatility and higher molecular weight compounds require higher thermal-desorption temperatures. For example, TurboMatrix Thermal Desorbers can desorb up to C<sub>44</sub> hydrocarbons.

### Occupational health and safety

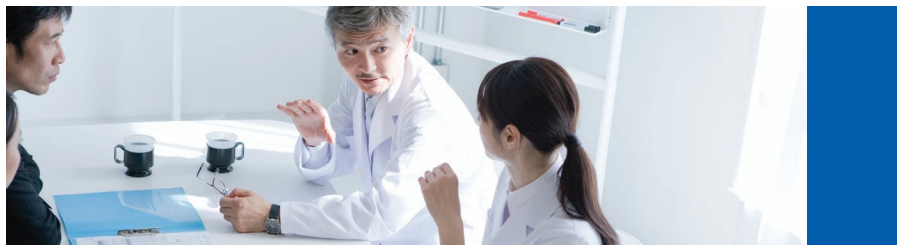
Thermal desorption, coupled with GC or GC/MS, has gained worldwide recognition for occupational health and safety monitoring. Worker exposure to trace levels of toxic airborne compounds can be monitored either by diffusive sample collection or pumped sampling onto a thermal-desorption tube at the worker's breathing zone level. Key benefits of thermal desorption include cost advantages of automation, high sensitivity, high desorption efficiencies and no solvent interferences with the analysis.



### Flavors and fragrances

Determining a flavor/aroma profile can be critical in the beverage, food and cosmetics industries, both in the R&D of new fragrances and flavors and in QA/QC roles to assure uniformity and consistency. Thermal desorption, in conjunction with GC/MS, permits analysis of volatile and semi-volatile organics directly from small sample sizes without the need for solvent extraction or other steps of sample preparation.

# 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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