GERSTEL
a Velaris brand

TD 3.5+
THERMAL DESORBER

Advancing Automation Together

TD 3.5+
THERMAL DESORBER

Enhance efficiency, accuracy, and reproducibility in laboratory workflows


GERSTEL
TD
3.5+

Thermal Desorber TD 3.5+

Offering more for Flavor and Fragrance, Air, and Material Emissions analysis

The Thermal Desorber TD 3.5+ is a flexible automated system for thermal desorption and thermal extraction. The TD 3.5+ fits on top of any modern GC without the need for additional bench space and is perfectly suited for the analysis of solid materials and for thermal desorption of sorbent tubes used to sample whole air.

The TD 3.5+ handles standard 3.5" tubes, as prescribed in several standard methods, in addition to GERSTEL plus tubes, which hold up to 30 % more sorbent for improved recovery.

The TD 3.5+ incorporates the latest advances in thermal desorption technology. Intelligently designed and based on a "Liner-in-Liner" concept it has no valve or transfer line. The TD 3.5+ is connected directly to the GERSTEL Cooled Injection System (CIS), which serves both as cryofocusing trap and as temperature programmable GC inlet. Active sites are eliminated, reducing the risk of analyte loss, discrimination and memory effects to an absolute minimum.

The TD 3.5+ can be operated in single split, dual split or true splitless mode enabling it to cover the widest range of concentrations, to protect the column from water and contamination, and to achieve the lowest possible limits of detection. The low-flow split pneumatics provide improved flexibility and performance. For extreme sensitivity, multi-desorption mode can be selected in MAESTRO, whereby multiple sorbent tubes are desorbed and the analytes combined into a single GC/MS run.

Techniques supported by TD 3.5+:

- Thermal desorption of TD tubes used for air sampling
- Dynamic Headspace (DHS 3.5+) based on headspace vials
- DHS 3.5+ Large based on up to 1 L sample containers
- Direct thermal extraction of solids in fritted TD tubes
- Stir Bar Sorptive Extraction (SBSE, GERSTEL Twister®)
- Thermal extraction of liquids in µ-vials inside TD tubes

The TD 3.5+ supports manual operation and it can be removed in a few minutes to enable direct liquid sample introduction into the GERSTEL Cooled Injection System (CIS), a PTV-type universal GC inlet.

When configured with the GERSTEL MultiPurpose Sampler (MPS robotic), up to 40 samples are stored per tray in individually sealed sample positions with up to three trays per tray holder. The number of tray holders depends on the size and configuration of the MPS robotic.

Features

Sample Introduction System for a Wide Range of Applications

- Analysis of solids, liquids and gases
- Temperature programmed desorption ensures optimal transfer conditions for all analytes
- Ideal trapping of unknowns, no need to select individual adsorbent traps for specific compounds
- Split and true splitless analyte transfer covers a wide concentration range
- Multidesorption mode for extreme sensitivity
- Extremely low detection limits
- Complete and uniform tube heating during desorption, best possible SVOC recovery
- Flexible refocusing options; cryogen-free with adsorbent bed or cryogenic to -180 °C
- Small footprint, mounts on top of GC

Liner-in-Liner Design

- No transfer lineor valve, excellent analyte recovery
- No active sites, no memory effects, clean base line for your next sample
- Chromatography using advanced EPC of GC inlet
- Improved reliability and easy maintenance

Sealed Sample Storage

- Sample integrity ensured through individual, leaktight storage
- Reliable results achieved by eliminating analyte loss, contamination from laboratory air and cross contamination

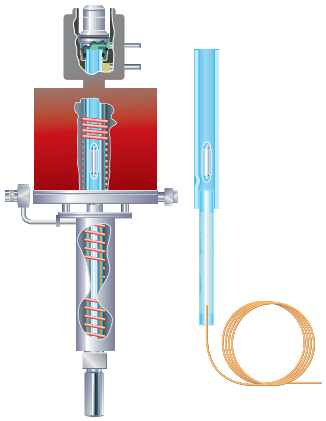
Highest Productivity and Throughput

- Automated desorption of up to 480 samples
- Adsorbent tubes, Twisters, solids, and liquids analyzed in one automated sequence
- Simultaneous desorption of multiple Twisters from sequential SBSE
- Automated addition of internal standard for improved quality and productivity

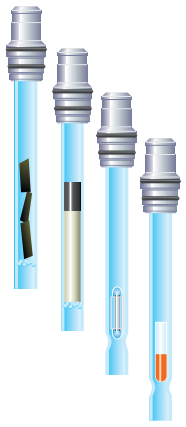
Dynamic Headspace (DHS and DHS L)

The industry standard GERSTEL MPS with Dynamic Headspace (DHS) option and TD 3.5$^+$ enable complete automation of the DHS technique. In the DHS station, VOCs are extracted from liquid or solid samples placed in standard head-space vials. The headspace above the sample is purged and analytes are concentrated on a user selectable sorbent filled trap (TD tube) at user defined sample and trap temperatures and flow. A dry purge step can be selected to purge humidity from the adsorbent bed. Analytes are subsequently introduced into GC/MS system by thermal desorption of the trap in the TD 3.5$^+$, resulting in maximum recovery, and lowest possible detection limits. Compared with the TDU tubes, the larger tubes used in, the DHS 3.5 contain up to four times more sorbent for improved recovery of VVOCs and VOCs.

The DHS option offers improved performance for a wide variety of sample types, such as food, beverages, polymers, personal care products and pharmaceutical packaging. The DHS Large option enables direct analysis of larger samples in 1 L containers. The DHS is a highly useful general thermal extraction tool for GC/MS analysis.



The TD 3.5$^+$ is coupled directly to the Cooled Injection System (CIS): The “Liner-in-Liner” design ensures best possible analyte transfer to the GC column without discrimination or cross contamination. The built in TD 3.5$^+$ alignment support simplifies liner replacement and mounting.



TD 3.5$^+$ tubes (drom left to right)

- with frit for thermal extraction of
- solid samples
- adsorbent packed
- for Twister® desorption
- for thermal extraction in micro-vials

Procedure

Automated microscale chamber

In the DHS L 3.5, samples are placed in individual inert chambers with a volume of up to 1 liter at defined temperature and air exchange rate. Analytes are automatically collected at user-defined intervals followed by thermal desorption in the TD 3.5+ and GC/MS determination. Emission profiles can be established automatically and automated spiking of standards onto sorbent tubes can be performed for calibration and qualification purposes using the TSS option for MPS robotic. GERSTEL plus tubes with up to 30 % more sorbent can be used for improved analyte recovery and larger sampling volumes.

Samples analyzed in one automated sequence using one or more methods. MAESTRO software integrated with the Agilent® Software controls the complete process from sample introduction through thermal desorption to GC/MS analysis with one method and one sequence table ensuring efficient and error-free operation.

Desorption of GERSTEL Twisters®

Stir Bar Sorptive Extraction (SBSE), based on the GERSTEL Twister®, is a solvent free technique for ultra-trace determination of organic compounds in aqueous matrices. The PDMS or EG-Silicone phase on the Twister efficiently extracts organic compounds while the sample is stirred. SBSE is up to 1000 times more sensitive than SPME. TD 3.5+ performs thermal desorption of one or more Twisters placed in a desorption tube.

Up to 480 Twisters in individual tubes can be desorbed in one sequence using the MPS for automation. Analytes are transferred to the CIS for cryofocusing and subsequently introduced to the GC/MS column in split, splitless, or multidesorption mode covering a wide concentration range.

Other available.....

Tube Spiking System TSS

The GERSTEL Tube Spiking System (TSS) enables automated generation of standard tubes for Thermal Desorption analysis. Adsorbent tubes are spiked with a user defined volume of liquid standard and the solvent purged with a defined flow of carrier gas as required for calibration and validation according to international standard methods. Multiple TSS units can be mounted on the MPS for higher throughput.

Sample Prep by Mouse-Click

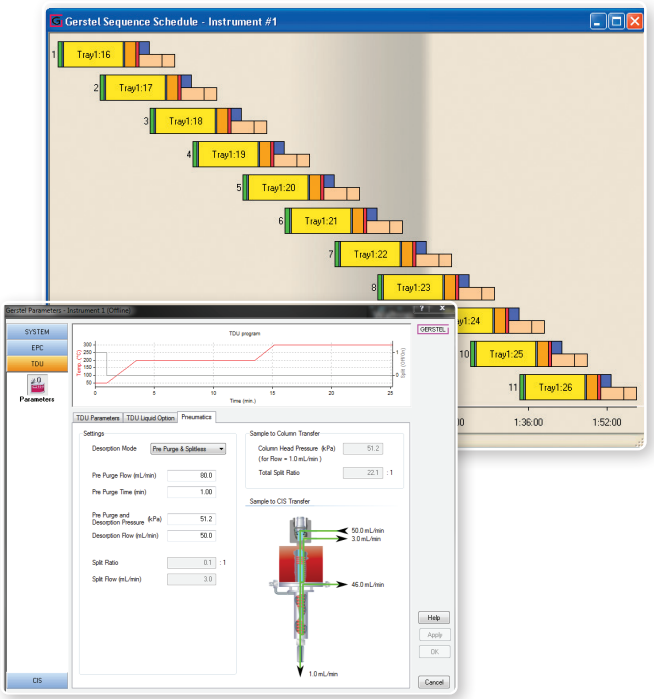
The MultiPurpose Sampler (MPS) is an autosampler and sample preparation robot for GC/MS and LC/MS. Sample preparation steps are performed during analysis of the preceding sample for best possible system utilization and highest sample throughput. Sample preparation steps are performed in a controlled, highly accurate and reproducible manner for best possible results. Every step is selected by mouse-click from a pull-down menu in the MAESTRO software and added to the overall GC/MS or LC/MS method. In addition to Thermal Desorption, the following techniques are available:

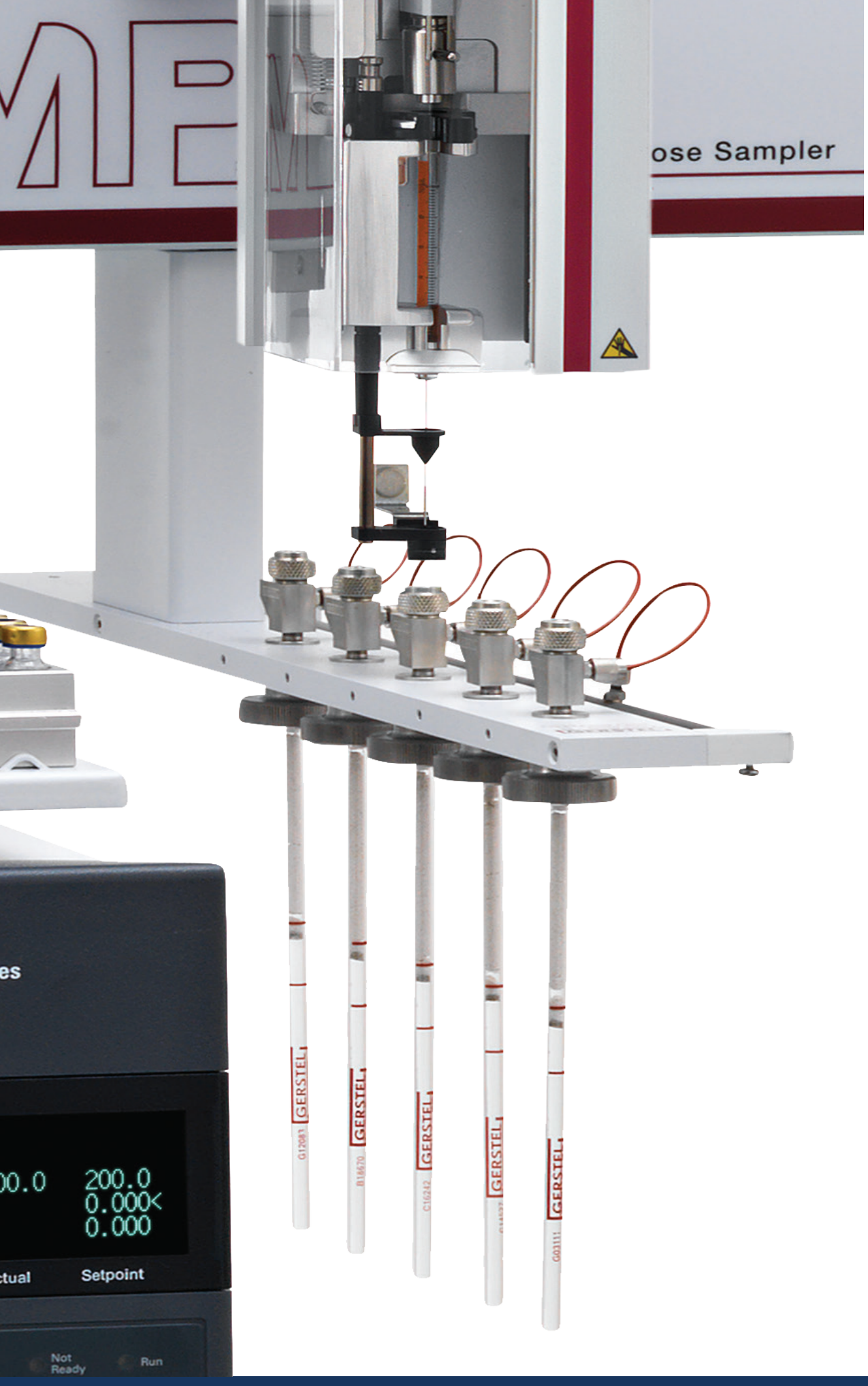
- Automated Liner EXchange (ALEX)
- SPME and SPME Fiber changer
- Solid Phase Extraction (SPE)
- Derivatization and addition of standards
- Extraction, dilution and filtration
- Weighing, sonication, centrifugation and evaporation (mVAP)
- Heating, conditioning and mixing
- Automated DNPH cartridge elution and LC determination

GERSTEL MAESTRO Software

MAESTRO optimizes performance and throughput:

- Stand-Alone operation, fully integrated in the Agilent Software, or integrated with the Thermo Scientific® Xcalibur™ sequence table
- Sample Prep by Mouse-Click using PrepBuilder functions
- Scheduler for easy planning of sequences and of laboratory work-flow
- PrepAhead / Multiple Sample Overlap: Automated overlapping of sample preparation and analysis for maximum throughput
- Priority samples can be added at any point in the analysis sequence
- LOG file and Service LOG file functions ensure traceability
- Automated E-mail notification if the sequence is stopped
- Real-time monitoring of all modules and parameters
- Interactive help function

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