Automated Tube EXchange (ATEX)

Automated Tube EXchange (ATEX) has been introduced for the GERSTEL MultiPurpose Sampler (MPS) in combination with the GERSTEL Thermal Desorption Unit (TDU). The ATEX option enables the introduction of liquid samples directly into micro-vial inserts used for thermal desorption / thermal extraction in the TDU. Extracted analytes are refocused and concentrated in a Cooled Injection System (CIS) inlet prior to introduction to the GC/MS system. The efficient extraction and concentration ensures highest possible sensitivity and lowest detection limits. The analysis system is kept free of high-boiling contaminants and matrix residue ensuring best possible stability and system uptime.

The ATEX micro-vials can be used for liquid or solid samples. Up to 196 samples can be processed automatically for determination of VOC / SVOC in heavy or involatile matrices. Following the analysis, the sample cup with the remaining high-boiling or solid residue is automatically removed. ATEX helps to ensure maximum uptime and best possible analysis results by keeping involatile or complex matrix material out of the GC/MS system. Standard addition and other liquid phase sample preparation steps can be performed automatically by the MPS. The complete system is controlled directly from the GERSTEL MAESTRO software or integrated with the Agilent ChemStation. Just one method and one sequence table controls the complete process from Sample Introduction through thermal desorption to GC/MS analysis ensuring the simplest possible operation.

Suggested Applications

Determination of VOC or SVOC in high-boiling or involatile matrices by thermal extraction, also referred to as dynamic headspace analysis or stripping. Examples are: gasoline in engine oil, plasticizers from packaging material in foods and edible oils, and fragrance compounds used in household products or personal care products. ■

Highlights

PittCon 2007

At the Pittsburgh Conference 2007, held in Chicago, Illinois, GERSTEL presented new products and applications. The main focus was on automated sample preparation and sample introduction for GC and LC. The main news briefs are presented here.

Automated SPE

GERSTEL has introduced automated Solid Phase Extraction (SPE) for the MultiPurpose Sampler (MPS). The system is based on standard cartridges, using disposable needles for liquid transfer to eliminate carry-over. Users can work on a variety of sample types due to the flexible rinse and elution capabilities offered by the MPS. It is possible to combine automated SPE with sample prep steps and with introduction to LC/MS or GC/MS systems. By performing SPE and chromatography in parallel, productivity can be optimized. The complete system is controlled by the GERSTEL MAESTRO software or integrated with the Agilent Technologies ChemStation. ■

Liquid introduction (LC)

High Throughput

Automated Sample Preparation

Heated or cooled sample trays

Automated Solid Phase Extraction (SPE)

GC PrepStation

The GERSTEL MPS Prep-Station automates a wide range of GC sample preparation and sample introduction techniques. Liquid sample preparation, such as standard addition, derivatization and extraction, is combined with liquid, headspace or SPME sample introduction. Sample preparation is performed during GC analysis of the preceding sample for maximum throughput. The PrepStation is controlled from the Agilent Technologies ChemStation software using GERSTEL MAESTRO software PrepBuilder functions. One method and one sequence table operate the complete system – from sample preparation and sample introduction to GC and GC/MS analysis. The PrepStation and GERSTEL MAESTRO software operate conveniently with any standard GC system. ■

Automated Dynamic Headspace Option

An automated Dynamic Headspace (DHS) option has been introduced for the GERSTEL MultiPurpose Sampler (MPS) based on newly developed technology.

A DHS station is used to efficiently extract and concentrate VOCs from liquid or solid samples placed in standard headspace vials. The DHS station provides thermostating and agitation as well as purging of the sample headspace with inert gas. Sample temperatures can be selected from 200 °C to as low as 10 °C, enabling control of the amount of water vapor released and ultimately retrapped. The DHS station additionally holds a replaceable adsorbent- or sorbent filled tube used for analyte concentration. The temperature of the adsorbent tube during the DHS process can be varied from 20 °C to 70 °C for optimal trapping of the analytes of interest.

Adsorbent tubes used are standard GERSTEL Thermal Desorption Unit (TDU) tubes. Following analyte concentration, the tube is automatically transferred to the TDU for thermal desorption and analyte transfer to the GC. Tubes are fitted with individual adapters enabling both automated movement and leak-free sealing during the DHS and thermal desorption steps and during storage in the auto-sampler tray.

Automated liquid handling in the MPS can be used for additional sample preparation steps. As part of the sample preparation procedure, standard addition can be performed automatically for best possible analytical results. Automated DHS combined with sample introduction to a GC or GC/MS system is performed by the MPS and TDU. Up to 98 samples can be processed automatically in one sequence.

Parallel processing of samples enable the DHS process to be performed during the chromatographic run of the preceding sample for optimal productivity and for highest system utilization. Sample prep steps are selected by mouse-click from a pull-down menu using the PrepBuilder function of the GERSTEL MAESTRO software.

A graphical scheduler display for the DHS process provides an overview of the time required for each individual step and for the complete sequence of samples for easier planning. Just one method and one sequence table controls the complete process from DHS through sample prep and sample introduction to GC/MS analysis. Integrated control ensures a more efficient operation with less risk of error. The GERSTEL MAESTRO software operates stand-alone or fully integrated with the Agilent Technologies ChemStation software. ■

Twister
Back
Extraction
(TBE)

PrepAhead –
Saving time by
overlapping sample prep
and GC or LC analysis

Membrane
Assisted Solvent
Extraction
(MASE)

Modular
design, easily
upgradeable

Dynamic
Headspace
System (DHS)

Modular
Accelerated
Column Heater
(MACH)

Solid Phase
Micro
Extraction
(SPME)

Automated
Twister
Option

Headspace
(HS)

Liquid
introduction
(GC)