DANI

A Scent Of Future

HSS 86.50

Head Space Sampler

RENOWNED TECHNIQUE

EXCEPTIONAL SIMPLICITY

INCREASED AUTOMATION AND PRECISION

COST-EFFECTIVE AND CLEAN APPROACH

HSS 86.50

HEAD SPACE SAMPLER

Static Headspace Sampling:
Excellent Precision and Extreme Simplicity

The DANI HSS 86.50 Head Space Sampler is the ideal system for efficient extraction and introduction of volatile compounds from any non-volatile matrix directly into the gas chromatograph.

Liquid or solid samples are placed in sealed vials and thermostatted in a temperature controlled oven. Vial shaking is also available to speed up phase equilibration time and increase efficiency. The vial is pressurized and the volatiles are then swept from the sample headspace into the fixed volume sampling loop. The use of the carrier gas flow through the loop enables the transfer of the volatiles into the gas chromatographic column.

The HSS 86.50, combined with the MASTER GC, is the technique of choice for the determination of volatile compounds in solid and liquid matrices, supporting a wide range of applications such as pharmaceutical, forensics, food and beverage, flavor and fragrance, packaging, water, and soil.

Excellent analytical precision and accuracy are achieved with complete automation and extreme simplicity. The reliable Valve & Loop configuration delivers high sensitivity and outstanding analytical performance, meeting and exceeding the specifications given in an array of regulatory standards.
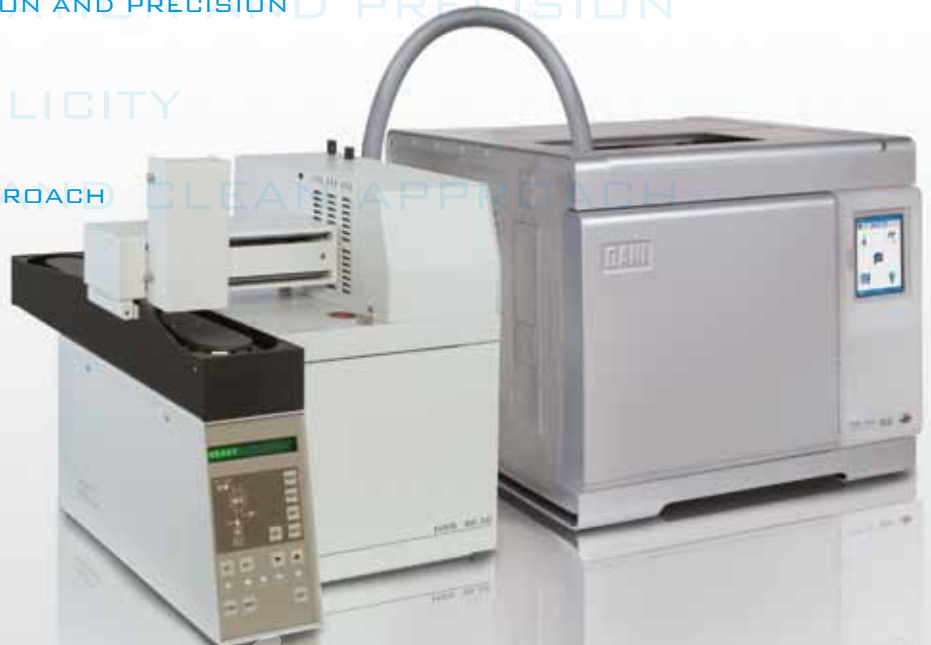
Moreover, the HSS 86.50 offers an easy and flexible management of all operating parameters and analytical conditions permitting the unattended analysis of up to 44 samples.

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Renowned Technique

DANI is a leading Head Space Sampler manufacturer with over 30 years of expertise in the design, manufacturing, and marketing of such systems.

HSS 86.50 Head Space Sampler applies the Valve & Loop technique, which is a renowned and proven headspace sampling technique able to merge robustness with reliability. In addition, the accurate temperature and pressure controls of the headspace unit guarantee outstanding repeatability.

The HSS 86.50 Head Space Sampler is the ideal choice to extract volatile compounds, meeting the requirements of a wide range of applications.
Optimal sensitivity is achieved by using the HSS 86.50 hyphenated to the MASTER GC equipped with selective and specific detection systems, such as Electron Capture Detector (ECD), Photoionisation Detector (PID), Nitrogen-Phosphorus Detector (NPD), Flame Photometric Detector (FPD), and Mass Spectrometers (MS).

Valve & Loop: Superior Precision and Repeatability

Unlike gas-tight syringe headspace systems, in the HSS 86.50 the entire sample path is uniformly thermostatted preserving sample integrity. Moreover, during injection the robust Valve & Loop technique permits the sample to flow continuously from the vial to the GC column, without any connections or path interruptions.

In the Valve & Loop system the carrier gas flow rate is uninterruptedly maintained, keeping the initial part of the chromatogram unaffected. The HSS 86.50 effectively overcomes sample quantitation issues. The transfer of a known and accurate sample volume is enabled without the need to monitor vial pressurization and sample transfer time achieving superior repeatability and precision.
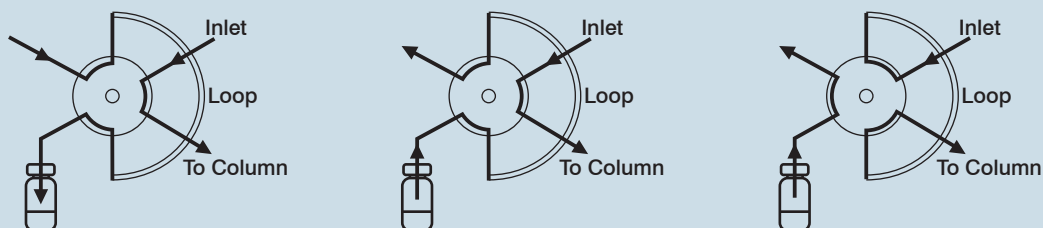
Exceptional Simplicity

Minimal operator experience is needed: the negligible sample handling and the complete automation of all process steps offer increased sample throughput and ensure highly reliable results.

Operating parameters can be easily set up and stored through the easy-to-use keypad. Up to four methods can be linked, expanding system flexibility. In addition, the oven temperature and the vial equilibration time can be automatically incremented to determine the best sampling parameters and to assist method development.

An intuitive and easy control of all parameters and the highly precise regulation of gas flow rate, time, and temperature provide an unsurpassed repeatability and accuracy of the analytical results.

No time-consuming glassware cleaning is requested. The sample is placed in a disposable 10-mL or 20-mL headspace vials thus eliminating any risk of carry-over effects.

The HSS 86.50 unit can be easily hyphenated to the MASTER GC - MASTER GC TOF Time of Flight MS as well as to the most common commercially available GC and GC/MS systems.

Increased Automation and Precision

The HSS 86.50 allows to process up to 44 vials sequentially and unattended with enhanced precision and accuracy, providing increased sample throughput and decreased cost per sample.

The incubation oven equipped with a built-in programmable shaker not only speeds up the sample's gas-liquid equilibration time but also reduces analytical cycle run times. Superior repeatability is guaranteed by the uniform and constant heating and shaking.

The constant incubation time allows time saving sample overlapping and increased laboratory productivity: the system automatically controls that the next sample is thermostatted during the GC analysis of the previous one.

Furthermore, the inert material of the entire sample flow path prevents carry-over effects, corrosion, and sample degradation or loss caused by adsorption or reactivity. The oven, manifold, and transfer line temperatures are also controlled to avoid sample condensation and increase the sensitivity of the method.

System robustness and internal design simplicity are combined to ideally perform routine and research laboratory workload providing fast, reliable, and accurate headspace analysis.

The automatic Multiple Headspace Extraction (MHE) is a necessary tool to compensate matrix effects when the use of external standards is not applicable. This absolute and widely accepted quantitative approach deals with successive analyte extraction followed by headspace equilibration in each step. The system provides up to ten successive samplings from the same vial using single or multiple septum punctures. During the series of extraction steps the analyte concentration in the headspace decreases exponentially and the use of semi-logarithmic plots of MHE raw data enables to quantify the total amount of analyte present in the original sample.
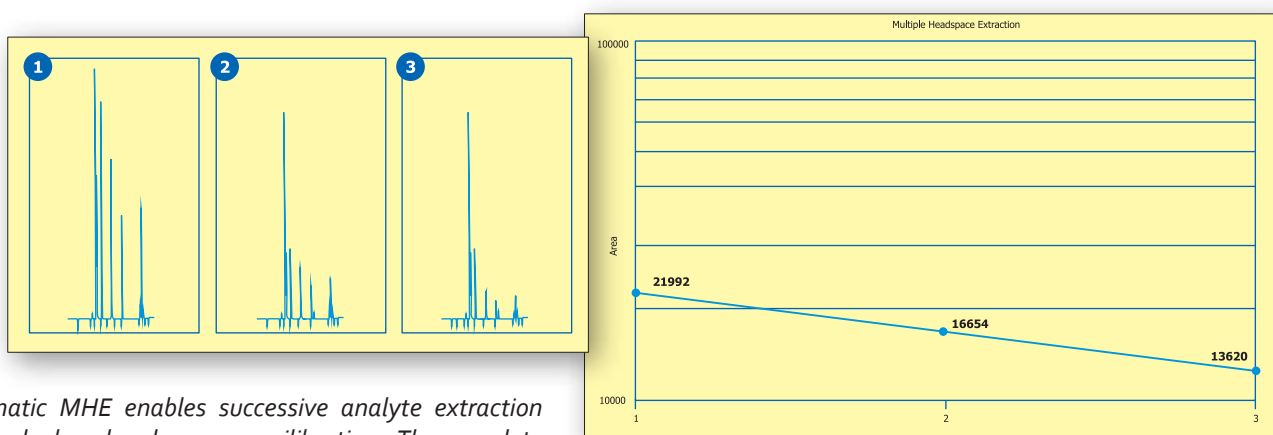
Automatic MHE enables successive analyte extraction followed by headspace equilibration. The analyte concentration in the headspace decreases exponentially during the series of extraction steps; semi-logarithmic plots of MHE raw data permit to quantify the analyte concentration in the original sample.

Cost-Effective and Clean Approach

The headspace technique is based on the injection of gas vapors only, therefore ensuring a totally clean procedure and a long analytical column life-time, effectively reducing laboratory costs.

In contrast to other extraction techniques, headspace sampling does not use solvents, avoiding the possible masking of peaks of interest by the solvent peak and the introduction of impurities into the GC system. Moreover, hazardous effects on the environment are prevented, operators' health is protected, and considerable solvent disposal costs are eliminated.

The installation of the HSS 86.50 does not require a specific GC injector type or any GC hardware modification. The transfer line can be easily connected leaving the injector free for direct syringe injection.

In addition, maintenance procedures are scarcely required, reducing drastically the need for DANI service staff interventions.

HSS 86.50

Superior Repeatability and Reliability for a Broad Range of Applications

Biodiesel Quality Determination

The determination of residual methanol in pure biodiesel can be successfully performed using the HSS 86.50 combined with the MASTER GC in compliance with the European Biodiesel Standard DIN EN 14110. The automated and unattended processing of a large number of samples is enabled and the high sample throughput is ensured by the unattended processing of up to 44 vials.
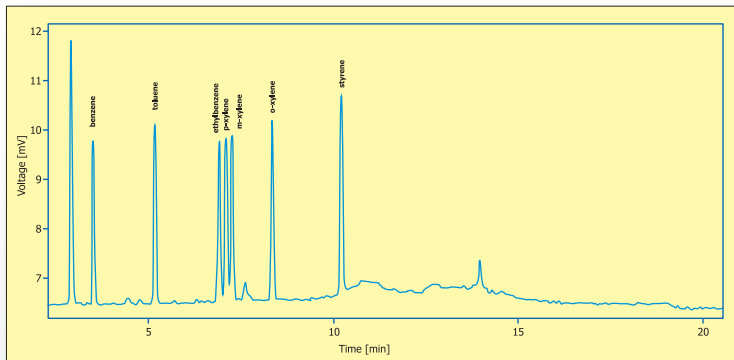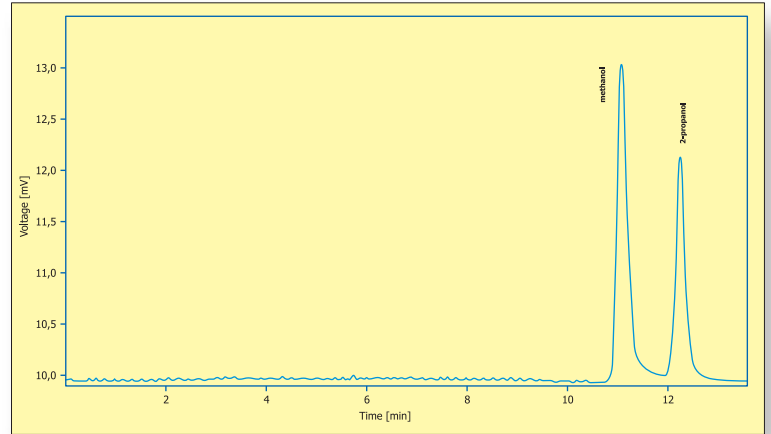
Straightforward Detection of VOCs in Water

Headspace sampling is the ideal approach for modern laboratories to handle the increasing demand for the detection of Volatile Organic Compounds (VOCs) in drinking and raw source water. The detection of BTEX (benzene, toluene, ethylbenzene, and xylene) and other substituted benzenes at ppb levels is achieved. The HSS 86.50 system features superior sensitivity with ease of use and robustness.

Residual Solvents in Food Packaging Material

Residual solvents have become a concern both in food products and in food packaging materials and their monitoring is therefore of utmost importance.

The advantageous HSS 86.50 permits consistent and automated sampling and, when combined to the MASTER GC, permits to achieve minimum detectable levels below currently recommended limits (EN 13628-2: 2002 norm).
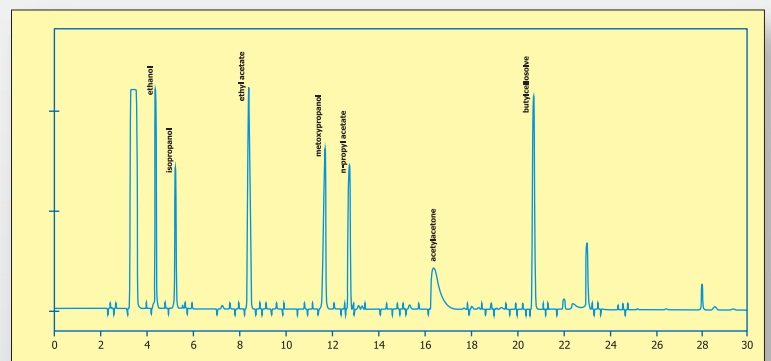
Transformer Oil Gas Analysis

Care and maintenance of expensive transformers is facilitated by monitoring the fluctuations in the concentration of gases dissolved in the transformer oil.

The efficient HSS 86.50 combined with the MASTER GC equipped with a Micro Thermal Conductivity Detector (μTCD) and a Flame Ionization Detector (FID) with methanizer is an outstanding solution for transformer oil gas analysis providing easy and reliable quantification.

The headspace solution complies with most standard test methods such as the ASTM D-3612 (Method C).
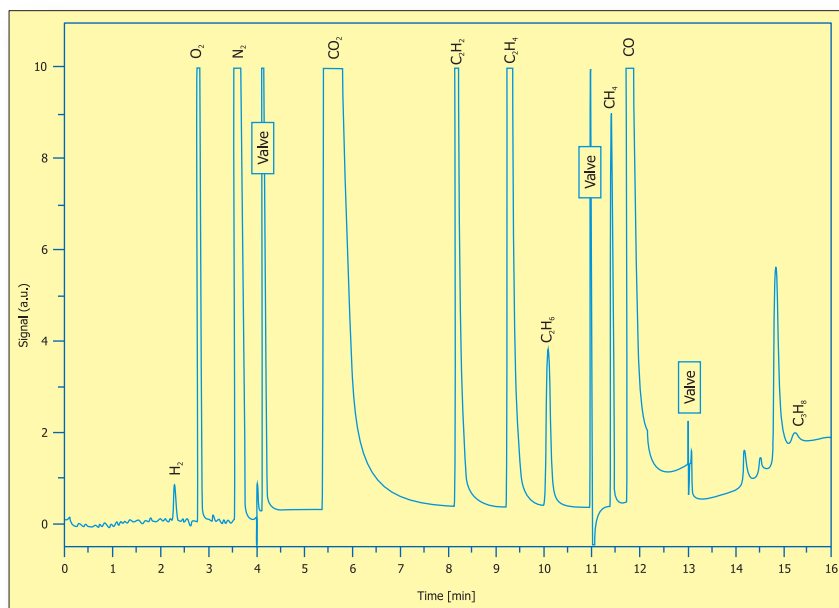
Complete HSS 86.50 Control

The HSS 86.50 Head Space Sampler control offers a straightforward method and sequence set up enabling automated analysis. Methods and sequences can be easily edited and stored.

A remote communication between HSS 86.50 and MASTER GC enables high synchronization for safe and fast working cycles increasing laboratory productivity and profitability.

KEY TECHNICAL POINTS
HSS 86.50
The unit is equipped with a 44 vial sample tray
Standard 10-mL or 20-mL vials with crimped cap
Incubation oven with 6-vial capacity and vial shaking capability
Sample overlapping with constant incubation time
Several sample loop volumes available
High temperature oven, valve, and transfer line
Inert sample flow path
MHE with up to ten successive samplings from each vial
Compatibility with most of the commercially available GC and GC/MS systems

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