GERSTEL
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Automated Sample Preparation

DYNAMIC HEADSPACE SYSTEM +

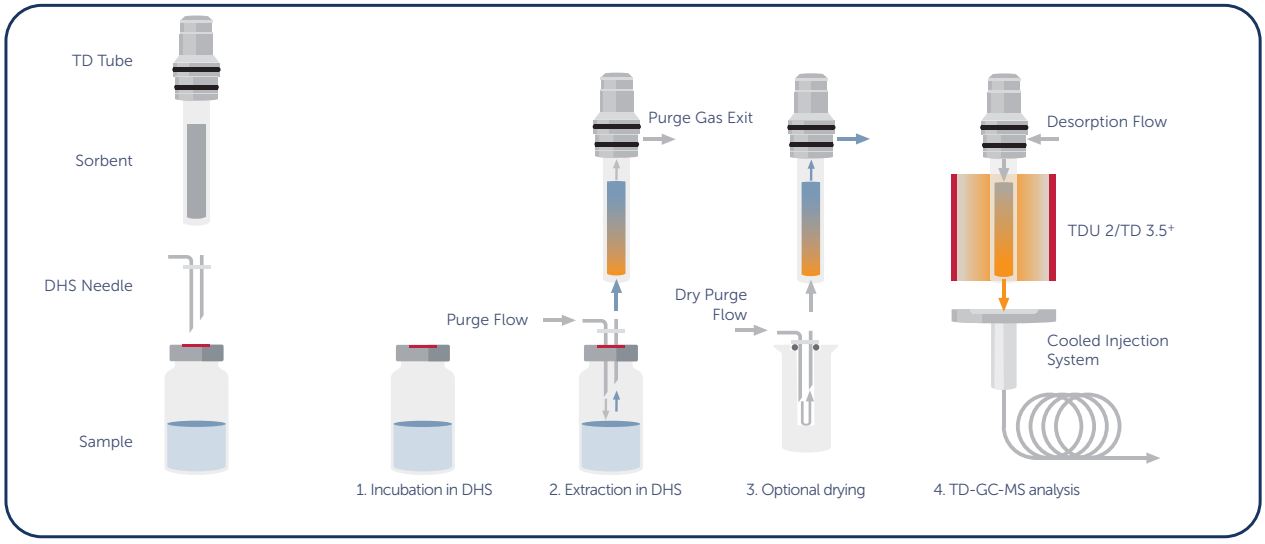
DHS+

Fully Automated VOC Extraction

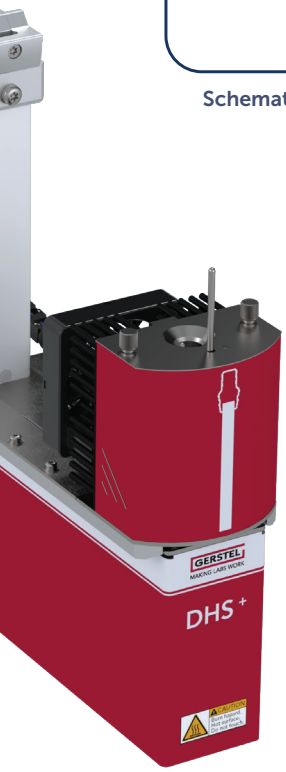
Dynamic enrichment for maximum sensitivity in GC-MS analysis

GERSTEL Dynamic Headspace+ (DHS+) is a fully automated, dynamic headspace technique for highly efficient enrichment of volatile and semi-volatile compounds from complex sample matrices – even at low extraction temperatures.

The sample is heated, agitated, or cooled in a sealed vial. Volatile compounds are continuously purged from the headspace, enriched on an adsorbent tube, and then automatically thermally desorbed, refocused, and transferred qualtitatively onto the GC column.



Schematic representation of the DHS+ workflow: Continuous extraction of the analytes from the headspace, enrichment on the adsorbent tube, thermal desorption and refocusing prior to GC-MS analysis.



Why dynamic headspace?

- High sensitivity even at low extraction temperatures
- Enrichment until complete sample depletion
- Very low detection limits and large linear range
- Wide extraction bandwidth: VVOC to SVOC and polar to nonpolar
- Independent of equilibrium settings

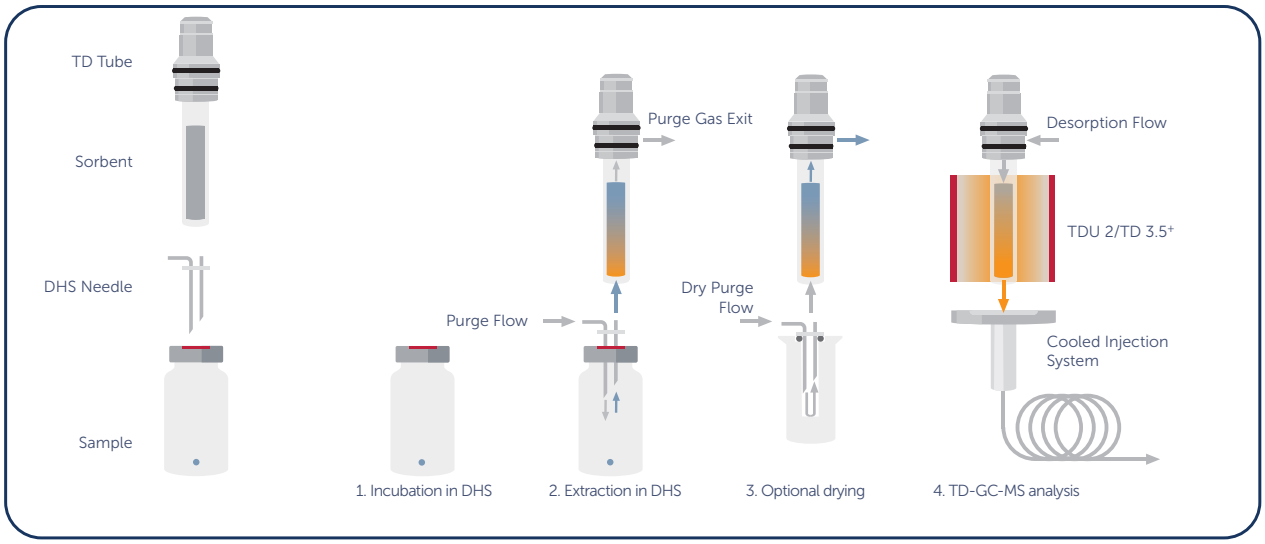
What makes DHS+ spacial

- Continuous extraction with controlled inert gas flow
- Multi-sorbent trapping for maximum analyte coverage
- Fractionated DHS, multiple extractions from one sample
- Desorption of multiple traps / extracts into one GC run
- Optional: Cryogen-free focusing via dynamic focusing
- Automatically exchangeable traps to prevent carryover
- Automated monitoring of flow stability
- Ensured reproducible recoveries through controlled extraction integrity

Result: reproducible quantification even for challenging matrices – from foods and fragrances to environmental and polymer samples.

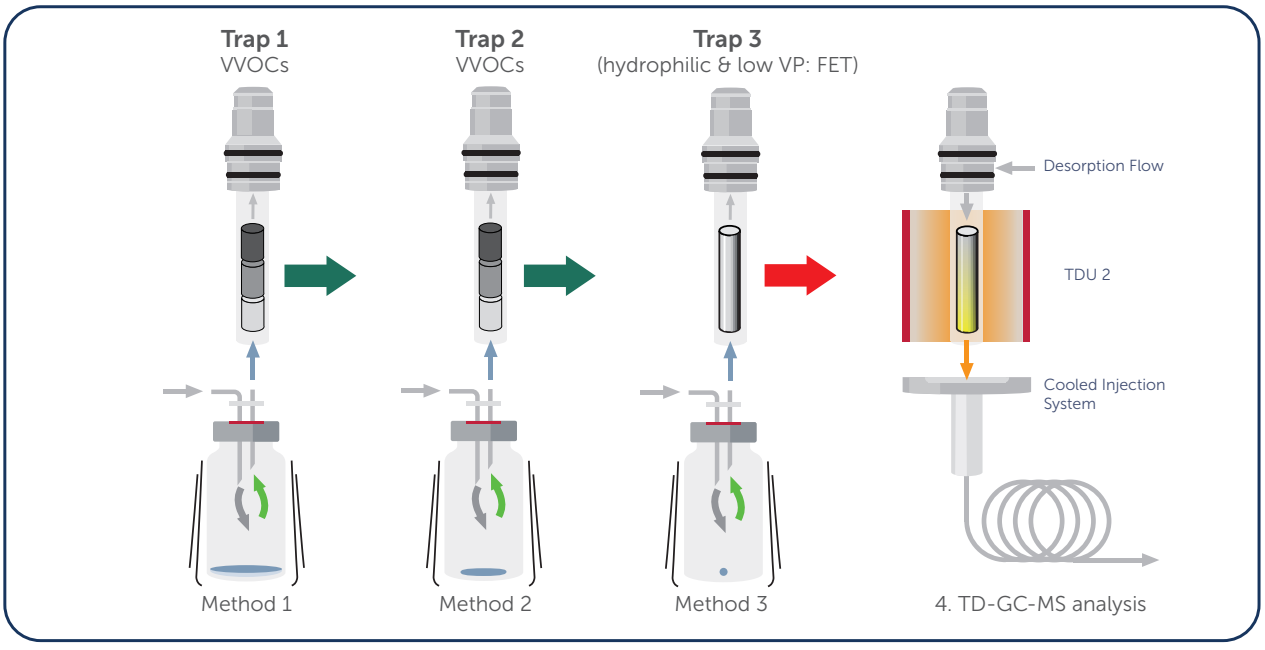
Matrix-independent VOC analysis with FET and MVM

In the **Full Evaporation Technique (FET)**, the paramters are optimized to completely evaporate analytes using rather gentle temperatures and a large gas volume to resolve matrix effects and enrich analysis-regardless of matrix effects or distribution coefficients.



Schematic representation of the Full Evaporation Technique (FET)

The **Multi Volatiles Method (MVM)** is based on the concept of fractionated DHS, where multiple dynamic headspace extracts can be combined to detect compounds with varying volatility. By combining optimized extraction conditions with multi-sorbent trapping, MVM enables the reproducible and matrix-independent analysis of a broad volatility spectrum within a chromatography run. It is ideal for non-target analyses like Beverages or cosmetic products.



Schematic representation of the Multi Volatile Method (MVM) workflow

Applications & Benefits

Typical applications

- Aroma and flavor profiling
- Off-flavor and odor analysis
- Fragrance and market sample analysis
- Extractables & Leachables (E&L)
- Packaging analysis
- Emission analysis of polymers and textile fibers
- Environmental VOC analysis
- Target and non-target screening

Your benefits in everyday laboratory work

- Ultra-trace VOC analysis with high sensitivity
- Matrix-independent quantification using FET (Full Evaporation Technique) and MVM (Multi Volatiles Method)
- Fully automated workflows – ideal for routine analysis and screening
- Solvent-free, sustainable microextraction technique
- High sample throughput with minimal operator effort
- Flexible quantification strategies via intgrated sample preparation e.g. Standard addition

DHS+ extends the proven DHS principle with additional automation, monitoring, and control functions for increased process reliability, reproducible recoveries, and robust quantification – particularly for demanding and regulated applications.

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Version 1.1