



APPLICATION NOTE

HAPSITE® Portable GC/MS: Comparison of HAPSITE Accessories SituProbe™ and Headspace Sampling System

INTRODUCTION

The HAPSITE portable Gas Chromatograph/Mass Spectrometer (GC/MS) is designed for field detection, identification, and quantification of Volatile Organic Chemicals (VOCs). The primary accessory to the HAPSITE is a probe with heated transfer line that allows analysis of VOCs in a gas matrix. Two additional accessories are available for analysis of samples in a matrix other than gas: the SituProbe (SP) and the Headspace Sampling System (HSS). The flexibility of both accessories make them ideal for field sampling and analysis for a variety of applications. This application note compares the benefits of each of these two accessories when used in combination with the HAPSITE.

HEADSPACE SAMPLING SYSTEM

The Headspace Sampling System is a purge and trap sampling system, designed for use outdoors, that connects to the HAPSITE using a heated transfer line. The HSS is capable of processing samples in either a liquid or solid matrix. The HSS uses standard 40 mL Volatile Organic Analysis (VOA) sample vials. For liquid samples, up to 20 mL of sample is transferred to a clean 40 mL VOA vial. For solid samples, up to 10 grams of sample is transferred to a clean 40 mL VOA vial. The sample is placed in one of the four HSS sampling positions which heats the sample at a set temperature to force VOCs into the gas phase. Internal Standard chemicals can be injected into the sample to allow sample VOC quantification. After the sample is heated for up to 20 minutes, the system moves the gas phase of the sample vial through the internal lines of the HSS and transfer line to the HAPSITE Gas Chromatograph and Mass Spectrometer for analysis. The HSS requires nitrogen carrier gas, and either external power or a HAPSITE battery for operation.

The HSS can be cleaned using the Flush option, for instances when a high concentration sample is analyzed.

Detection limits using the HSS can be adjusted to the type of sample being analyzed, by using either the Sample Loop or

Tri-Bed Concentrator and adjusting the sampling time when using the concentrator. Detection limits for water analysis are in the mid PPT range, making it a good option for analysis of drinking water samples in the field.

Because the HSS is not capable of automated sample preparation, the HSS is not capable of unattended continuous monitoring.

SITUPROBE

The SituProbe in combination with the HAPSITE is a purge and trap sampling system, designed for use outdoors, that also connects to the HAPSITE using a heated transfer line. Additionally, the sampling probe also connects to the SP system via a heated transfer line. The SP is designed for analysis of liquid matrix samples. The SP can be set up in a variety of sampling configurations, or can be used with a specially designed SituProbe Sampling Vessel. When using the SituProbe Sampling Vessel, the sample size is typically 1 L. When using the SP in a water supply, the sample can be essentially unlimited. The sample is not heated, and Internal Standard is injected at the HAPSITE to allow quantification of VOCs. The SP requires nitrogen carrier gas, and either external power or a HAPSITE battery for operation.

The SP can also be cleaned using the Flush option, for instances when a high concentration sample is analyzed. The Flush option uses nitrogen and higher temperatures to clean out contamination in the system.

Detection limits using the SituProbe can also be adjusted by using either the Sample Loop or Tri-Bed concentrator and adjusting the sampling time when using the concentrator. Because the system can have essentially an unlimited sample supply, analytes can be detected down into the very low PPT range, making it ideal for analysis of drinking water samples. The system is also capable of being set up for unattended operation, making it ideal for continuous monitoring of drinking water.

Table 1: Comparisons between the Headspace Sampling System and SituProbe

Comment	HSS	SituProbe
Liquid or water analysis	Yes	Yes
Solid analysis	Yes	No
Sampling vessel	40 mL disposable vial	Fixed
Drinking water Detection Limit using concentrator	Mid PPT to Low PPM	Very Low PPT to Mid PPB
Liquid sample size	20 mL	500 mL to unlimited
Sample preparation	Manual	Not required
Internal Standard injection	Manual	Automated
Analyte calibration possible	Yes	Yes
Portable when used with HAPSITE battery	Yes	Yes
Time required for sample equilibration	Up to 20 minutes	Not required
Continuous long term unattended monitoring	No	Yes
Controlled sample temperature	Yes	No
Weatherproof and easily decontaminated	Yes	Yes
Uses high purity nitrogen for sampling	Yes	Yes
External connection for nitrogen	Yes	Yes
Integrated with HAPSITE data system	Yes	Yes
Confirmatory results through spectral matching against the National Institute of Standards and Technology (NIST) Library	Yes	Yes
Pre-programmed methods for ease of use	Yes	Yes
Flush function available for system contamination cleanout	Yes	Yes
Purge and trap analysis	Yes	Yes
Heated sample	Yes	No
Weight	26 lbs	30 lbs



www.inficon.com reachus@inficon.com

Due to our continuing program of product improvements, specifications are subject to change without notice. HAPSITE and SituProbe are trademarks of INFICON.

diad83a1 ©2007 INFICON