



Torion Portable GCMS - Analyze Anywhere, Anytime



Take the Torion® T-9 portable GC/MS to your samples... wherever they are. PerkinElmer's Torion T-9 portable gas chromatograph/mass spectrometer (GC/MS) brings new meaning to portability. At a total weight of only 32 pounds, this one-of-a-kind GC/MS is also fast, reliable and easy to use.

Torion technology integrates a high speed low thermal mass (LTM) capillary gas chromatograph (GC) with a miniaturized toroidal iontrap mass spectrometer to provide a fast, reliable and easy-to-operate GC/MS. The portable Torion T-9 GC/MS is designed to carry in the field and ideal for rapid screening of chemicals such as environmental volatiles and semivolatiles (VOCs/SVOCs), explosives, chemical threat and hazardous substances.



PORTABLE

A portable GCMS is used for field application. The system can be carried to the field and on spot sampling can be done followed by on spot, instant GCMS analysis. It is a perfect tool for field screening.

- Lightest person portable GC- MS in the world with weight of only 32lbs, including battery and carrier gas cartridge field screening.
- Operates on battery power for up to 2.5 hours, and has an on-board disposable helium carrier gas cartridge capable of up to 150 sample runs.



EASY

- Color touch screen user interface for operation of the system.
- On-board library automates target compound deconvolution and identification. Results are displayed on-screen for quick and easy data interpretation.



RELIABLE

- Ruggedized GC-TMS design allows the TORION T-9 GC/MS to operate under harsh conditions.
- An automated performance validation routine calibrates the instrument to provide reproducible, reliable performance.



FAST

- The system is ready for sample analysis in under five min. from a "cold start". Using a high speed GC temperature ramp rate of ~2 °C/sec, run-to-run cycle times are typically ~5 min., allowing for analyses of ~12 samples per hour.

Low Thermal Mass (LTM) GC

- Fast gradient temperature ramp at a rate up to 2.5°C per sec provides high analytical speed.
- Small diameter LTM capillary GC.
- Analysis is done within three min.

Toroidal Ion Trap Mass Spectrometer

- Mass range of 45 to 500 amu.
- Large trapping volumes.
- Increased sensitivity.

Automated Advanced TMS Functions

- Automated Tuning.
- Autocalibration for Mass and GC retention scales.
- Autoion to adjust the ionization time based on the concentration of analyte in the TMS.

Major Application Areas

- Broad range of Chemicals, Contaminants, Explosives, Chemical threat, Hazardous substances, VOCs, SMOCs and Pollutants in different environmental samples like soil, water, air and other sample matrixes.
- **Routine Monitoring:** Fence line, BTEX, MBTE, TICs, water and air quality.
- **Regulatory/Enforcement:** Air, water and soil quality, Indoor air, Industrial hygiene, Vapor Intrusion.
- **Emergency Response:** Response to natural or man-made events: Spills, threats, industrial accidents, Clandestine drug labs.
- **Enforcement:** Enforcement situations, Border control, port control, narcotics, banned substances, dangerous chemicals.

Volatile Organic Compound Identification in Water by Portable SPME-GC/MS

Introduction

Groundwater water sources are routinely tested for volatile organic compounds (VOCs) of environmental concern. The current standard of practice is to collect water samples in specified containers and transport them under refrigeration to a fixed laboratory for analysis. These laboratories can be far from the sample site, and thus such practice may pose important challenges because volatile target analytes may be lost during sample storage and transport.

Additionally, volatile compounds such as benzene, toluene and ethylbenzene are susceptible to biological degradation under environmental conditions where refrigeration alone may not be adequate to preserve these compounds in water samples for more than seven days.

Safeguarding sample integrity can be achieved by performing the sample collection, extraction and analysis on-site. The solid phase microextraction (SPME)-Torion T-9 portable GC/MS technology provides the capability to perform on-site, near real-time chemical analysis for accurate and positive detection of analytes subject to degradation in complex samples.

Experimental (Example)

- For this application, a 65 μm SPME fiber with Divinylbenzene/ Polydimethylsiloxane (DVB/PDMS) phase was used to extract VOCs from a water sample spiked with 25 environmental contaminants.
- A culinary water sample was spiked with a mixture of 25 target VOCs in methanol (Restek, Bellefonte, PA), with each compound at a concentration of $\sim 0.04 \mu\text{g}/\mu\text{L}$ in the final sample solution. The Custodion SPME fiber was immersed in the water sample for five sec., which was adequate for VOC adsorption onto the SPME fiber.

Conclusion

Volatile organic compounds (VOCs) were rapidly sampled and concentrated from water in five seconds using a Custodion™ SPME syringe. Compounds were analyzed using the TORION T-9 portable GC/MS. The SPME-GC/MS technique can be used to effectively extract, concentrate, separate and identify complex mixtures of VOCs quickly and reliably in less than four minutes.

Method Parameters and Result

Table 1. Method Parameters.

Sampling	Solid phase microextraction (SPME)
SPME Phase	Divinylbenzene/Polydimethylsiloxane (DVB/PDMS, 65 μm)
GC Inj. Temp	270 °C
GC Column	MXT-5, 5 m x 0.1 mm, 0.4 μm df
GC Carrier Gas	Helium, 0.2 ml/min., constant pressure
GC Column Temp	40-270 °C, 2 °C/s
Transfer Line	270 °C
Injection Split Ratio	20:1
Mass Analyzer	Toroidal ion trap (TMS)
TMS Mass Range	41-500 Da
Ionization Mode	In-trap electron impact
Detector	Electron multiplier
Vacuum	Roughing and turbo molecular pumps
Resolution	Less than unit mass to 230 amu, nominal unit mass to 500 amu

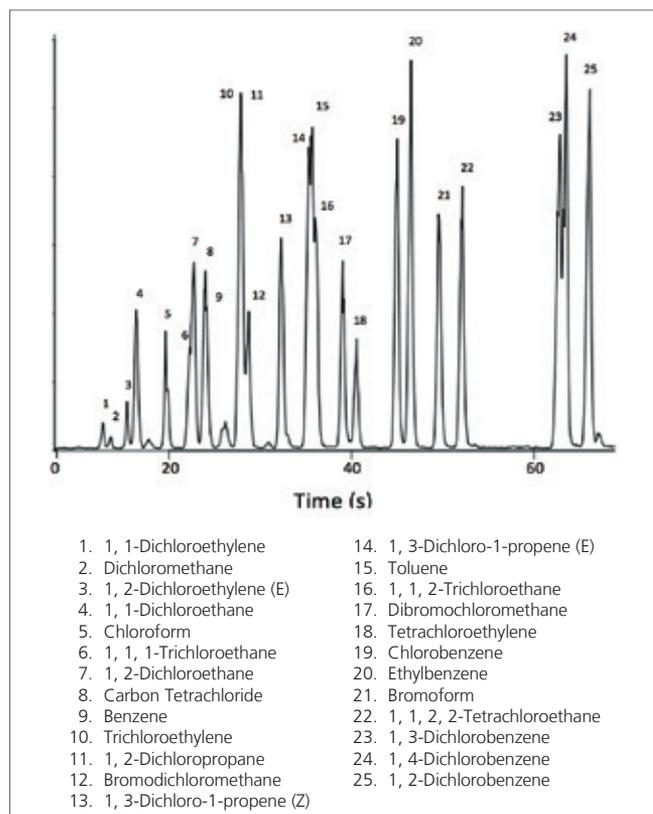


Figure 1. The chromatogram with positive identification of the 25 VOCs.