

## Gas Chromatography Mass Spectrometry (GC/MS)

### KEY FEATURES

- Superior sensitivity (signal-to-noise)
- Longer operational lifetime
- Sophisticated ion optics and electron amplification design
- Supports most challenging samples for GC/MS

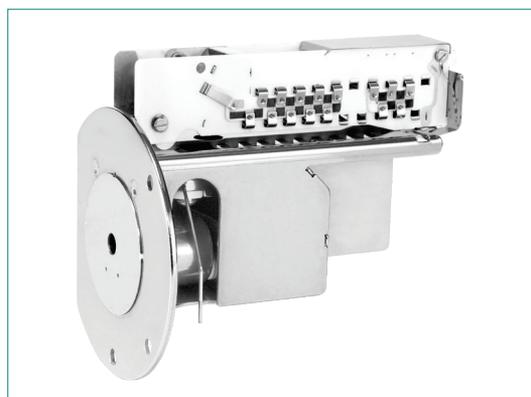
## Clearer Results with the MS 2400 SQ System Clarifi Detector

### Introduction

PerkinElmer MS 2400™ SQ System features the cutting-edge Clarifi™

Detector. Engineered using the latest electron multiplier technology, the Clarifi Detector provides superior sensitivity (signal-to-noise) and longer operational lifetime. Ions are efficiently converted into an electronic signal that is then processed by the PerkinElmer SimplicityChrom™ Chromatography Data System (CDS) Software to generate mass spectra. The unique design of the detector helps eliminate extraneous meta-stable and electrical noise while amplifying the analyte signal.

The efficiency of an electron multiplier in detecting virtually every ion passed through the mass filter (the quadrupole) helps determine an instrument's overall sensitivity. The performance of the detector is therefore critical in determining the performance of the system as a whole and its analytical usability. The Clarifi Detector employs sophisticated ion optics and electron amplification designs to achieve best-in-class sensitivity for the PerkinElmer GCMS 2400™ System, supporting the most challenging samples for GC/MS analysis.



PerkinElmer Clarifi™ Detector.

The outstanding sensitivity is attributable to its unique ion optics. As the ions exit the quadrupole of the mass spectrometer, they enter a series of lenses that further focuses the ion beam and acts as the first step of meta-stable noise removal. After exiting the lenses of the detector, the ions are pulled through the ion deflector, a 270° curve that eliminates all remaining meta-stable particles. The combination of lenses and ion deflector reduces background noise to a minimum, allowing even the most trace analytes to be detected.

## Converting Ions to Electrons

Ions are finally converted to electrons by a high-voltage conversion dynode that guides the beam into the detector's dynode system for further amplification. As these electrons are accelerated towards the array of discrete dynodes, several electron emission events occur resulting in electron amplification.

The dynode system of the Clarifi Detector has been designed for use in the MS 2400 SQ System with the voltages and surface geometries optimized for maximum performance. This ensures not only the greatest signal gain, it also maintains outstanding dynamic range, with linear response of up to  $1 \times 10^6$  dependant on the system's acquisition rate. The Clarifi Detector uses a proprietary dynode material that exhibits a very high secondary electron emission providing the highest levels of signal amplification. In addition, this material is very stable in air, giving users added peace-of-mind when the MS system is vented for cleaning and/or storage, and enabling spares to be stored in case of emergency for up to two years. Ideal for the most demanding applications, the advanced technology of the Clarifi Detector provides customers with the sensitivity needed for ultra-trace detection and the dynamic range required for unexpectedly concentrated samples.

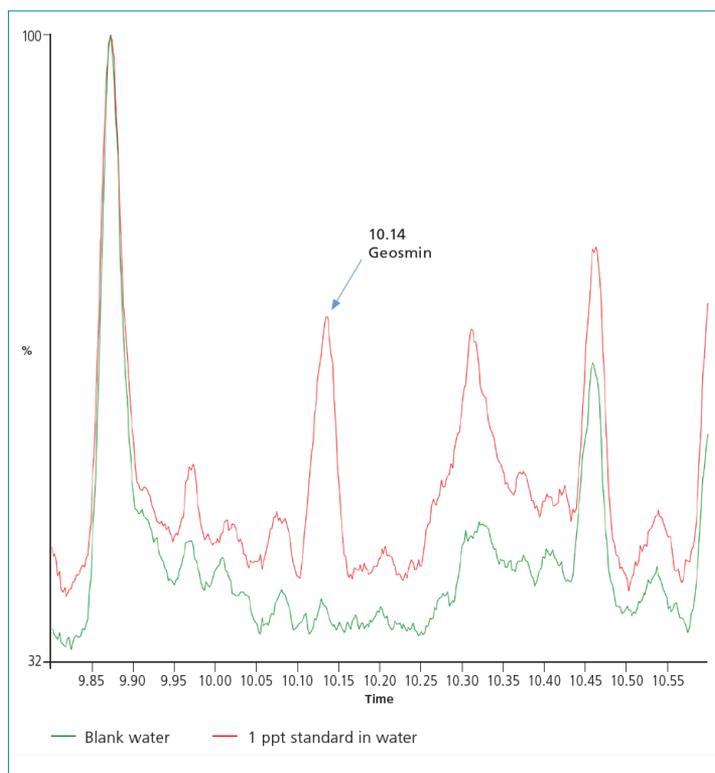


Figure 1: Determination of off odor compounds at 1 ppt in water to demonstrate the high sensitivity of the GCMS 2400 System.