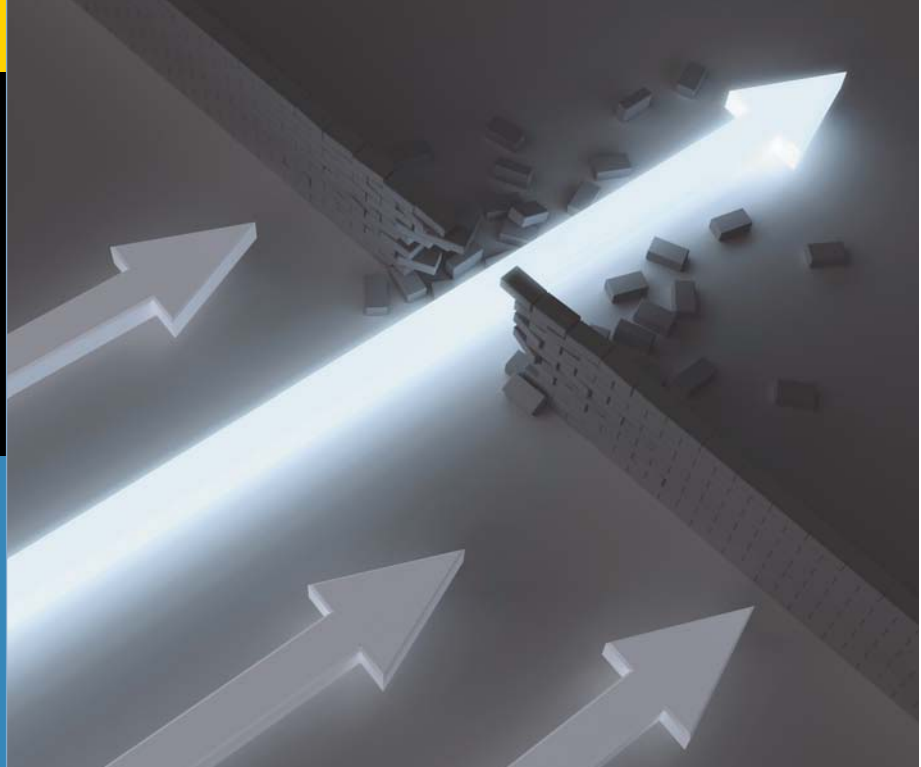


## TSQ Vantage™ – Smashing the Sensitivity Barrier



### *Inspired Innovation*

Generation two (G2) Ion Optics send more ions to the detector

Hyperbolic Quadrupoles for lower chemical noise

Heated electrospray (HESI-II) for higher flow rates

Easy to Use

# THE BENEFIT OF MORE SIGNAL AND LESS NOISE

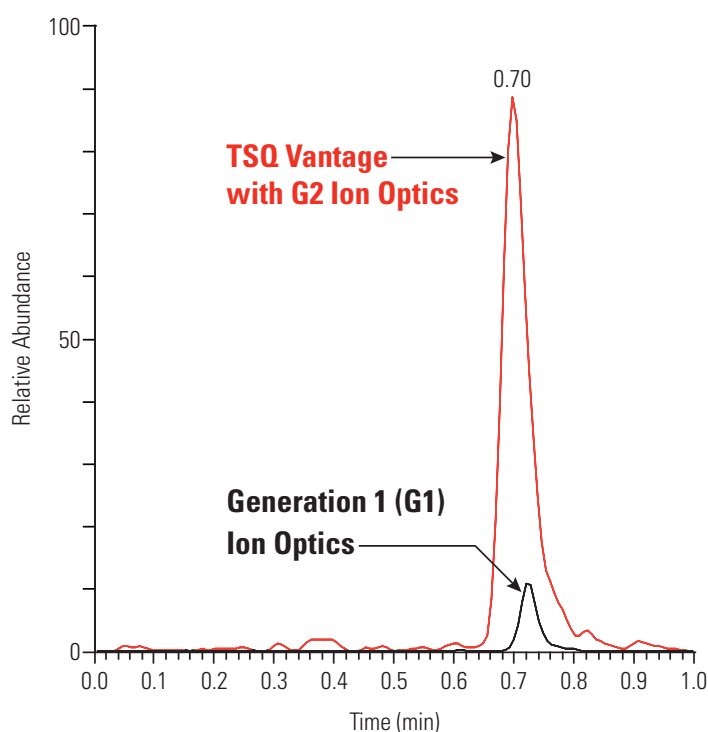
The direct benefit of more signal is better assay precision and accuracy. Combined with a robust new ion source, second generation (G2) ion optics and hyperbolic quadrupoles, the Thermo Scientific TSQ Vantage™ delivers the highest sensitivity with the lowest chemical noise.

Inspired innovation are two words that best describe the TSQ Vantage, a brand new triple quadrupole destined to challenge conventional thinking. Its patented G2 ion optics deliver more ions to the detector due to advances in the ion source and collision cell designs. Greater desolvation characteristics of the new HESI-II design provide

improved high flow performance (> 1mL/min) and the TSQ Vantage comes standard with HyperQuad™ quadrupole mass filters, which reduce chemical noise (H-SRM).

The benefit of more signal and less noise is assurance that your data will withstand the harshest scrutiny. The TSQ Vantage gives

you the confidence to run repeat analysis of incurred samples at any time, because you know you have sensitivity in reserve and a dependable robust interface that is easy to use.



The significant improvement in quantitative performance is shown for 10pg/mL of Alprazolam injected on Thermo Scientific Hypersil GOLD™ C-18 column (2.1x50mm, 3µm), using an isocratic solvent mixture of Acetonitrile:Water (0.1% formic acid, 65:35, v/v), at a flow rate of 400uL/min on the TSQ Vantage.



## G2 ION OPTICS – DELIVERING MORE IONS

### HESI-II

A design evolution, the HESI-II delivers greater desolvation and improved nozzle performance. The HESI-II can efficiently handle flow rates higher than 1mL/min while maintaining superior low flow rate characteristics with optional use of gas assisted thermal desolvation.

A cleaner nozzle profile improves electrostatic fields which results in a single position that works for most flow rates.

These improvements make the HESI-II the most versatile electrospray design on the market.

Contoured tip for stable low flow performance

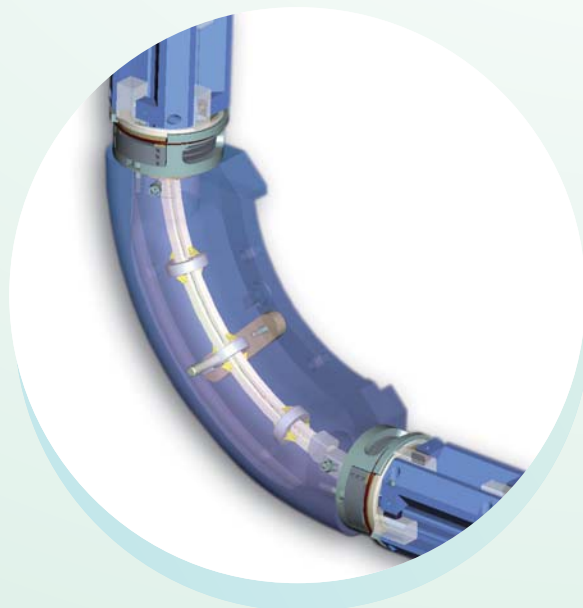


Improved heater design for better desolvation at higher flow rates

### High Speed Zero Cross-Talk G2 Collision Cell

A long standing tradition of TSQ collision cell design has been the fact that they have had zero cross-talk. Cross-talk usually occurs when the instrument is set to scan very fast, resulting in residual signal from the previous SRM transition appearing in the subsequent SRM channel when the product ion has

the same nominal mass. This leads to false positive responses. The G2 collision cell design allows the TSQ Vantage to perform SRM scans at the fastest possible scan speeds, while ensuring zero cross-talk by **accelerating** the removal of product ions from within the collision cell before the next precursor ion is delivered.



## A New Dimension in Ion Source Robustness

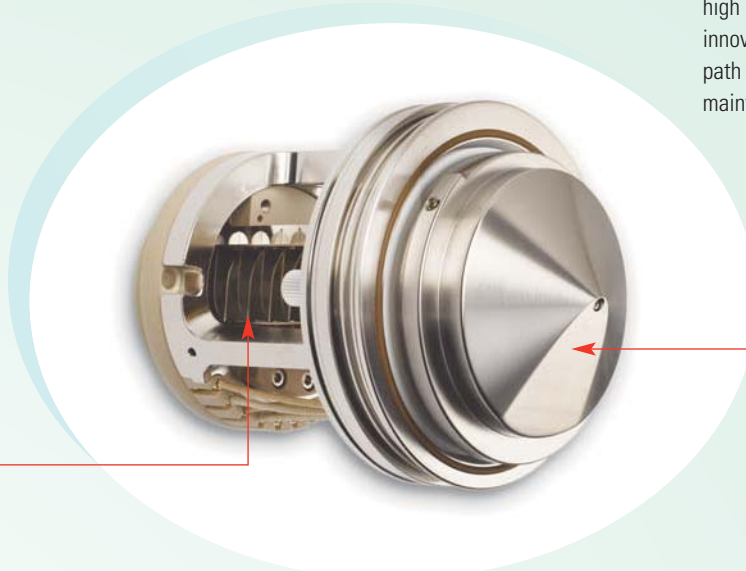
The S-Lens captures the expanding ion-rich gas plume and efficiently focuses the ions in a tight beam into the high vacuum region. Extraneous solvent-laden gas is proficiently pumped out from between the stacked rings before it has a chance to enter the first RF-only

multipole, ensuring the system remains significantly cleaner than designs not using this technology.

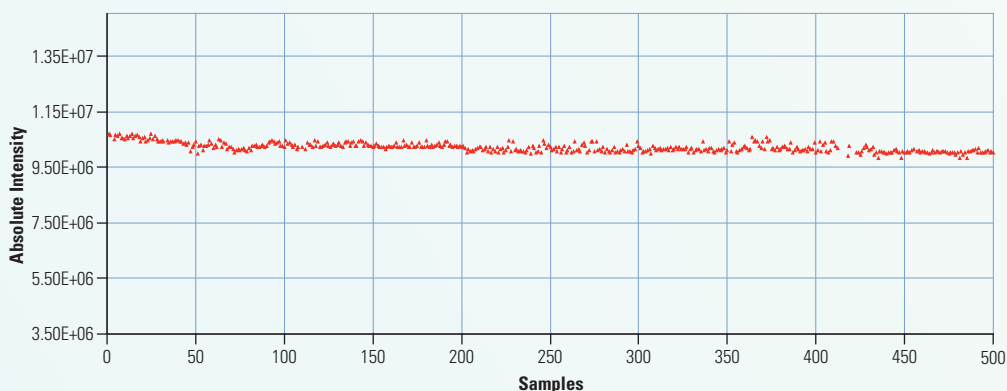
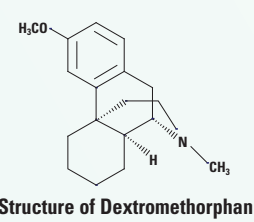
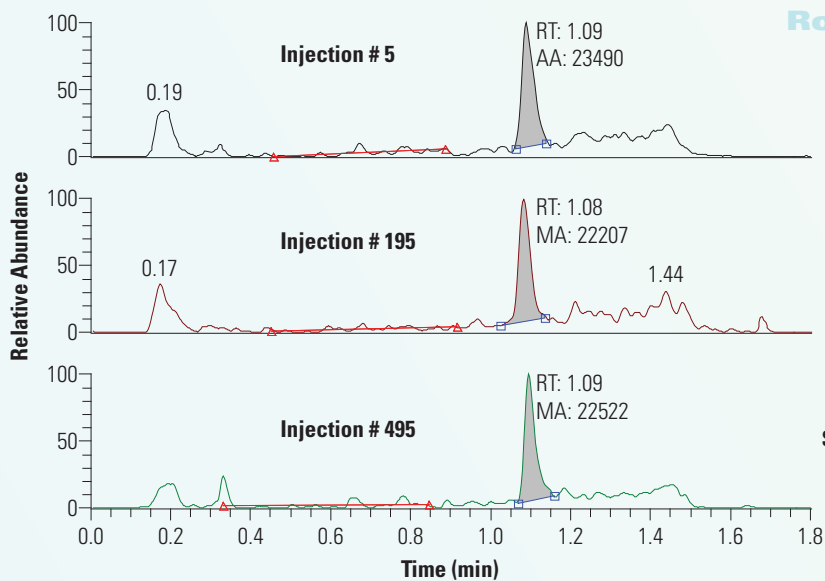
The S-Lens design is a significant advance over high pressure skimmer-based ion source

designs as it eliminates mass discrimination, and lowers the gas load on the expensive turbo-molecular pumps in the high vacuum stages. This innovation keeps the ion optical path cleaner, longer, while maintaining sensitivity.

S-Lens technology for maximum ion transmission



An asymmetrical "slice" design on Ion Sweep Gas Cap creates a zone of high robustness



The robustness of the TSQ Vantage is shown by injecting 500 shots of dextromethorphan in rat plasma. Top figure shows the actual chromatograms of injection number 5, 195, and 495, and the bottom figure shows the excellent precision of the response of the d-6 labeled internal standard over 500 injections. The rugged design ensures excellent reproducibility in high sensitivity assays.

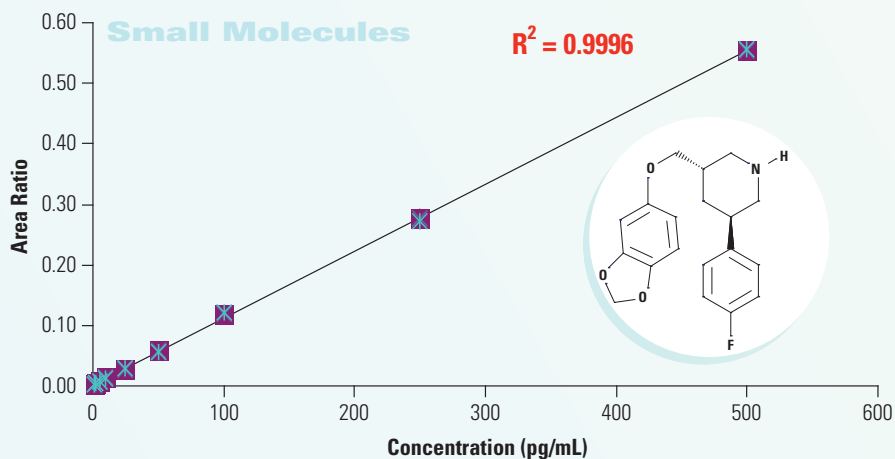
# ROBUST REPRODUCIBILITY

The TSQ Vantage meets the rigorous demands of supporting validated methods required for GLP. Whether you are analyzing small molecules or biomolecules, the TSQ Vantage gives you consistent, specific and reproducible results at amazingly low levels of quantitation.

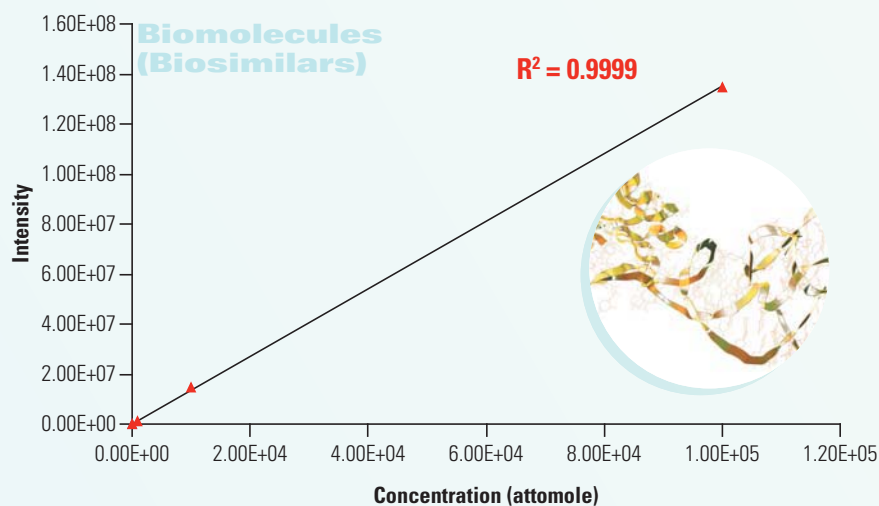
The high sensitivity of the TSQ Vantage delivers lower percent coefficients of variation (%CV) where they matter the most, that is, between the LLOQ and the low-QC level. This ensures

trouble-free compliance with inter-day and intra-day assay requirements for validated bioanalysis, allowing the user to run thousands of real samples. The robust S-Lens ion source

design extends the time between preventive maintenance schedules despite repeated exposure to biological matrices, resulting in higher productivity.



To illustrate robustness and reproducibility for high sensitivity bioanalysis, five standard curves are overlaid on top of each other over a five-day period. Despite repeated exposure to protein precipitated rat plasma (over 1000 samples), the analysis of paroxetine could be successfully performed with unwavering precision, excellent linearity, and exceptional reproducibility.



Linear dynamic range of four orders of magnitude for the peptide quantitation experiment. Horse heart myoglobin (0.01fmol-100fmol) was spiked into *E. Coli* tryptic digest. The TSQ Vantage successfully quantified horse heart myoglobin using the targeted SRM-triggered QED-MS/MS scan to simultaneously quantify and confirm the ALELFR tryptic fragment in this complex mixture.

# BENEFITS OF WORKING WITHIN A SECURE DIGITAL DATA DOMAIN

With a complete focus on future developments of the world's most advanced quantitative LC-MS/MS system comprising of **LCQUAN** and **Watson LIMS**, Thermo Fisher is committed to providing you with everything you need to be confident in the quality, security and efficiency of your GLP studies.

On August 20, 1997, 21 CFR Part 11, Electronic Records and Electronic Signatures, was instituted by the FDA. The purpose is to allow pharmaceutical companies to present their documents to the FDA in electronic form in place of paper. The requirements ensure the security and integrity of the electronic records and ensure the electronic signature is treated with the same level of importance as the handwritten signature.

Thermo Scientific LCQUAN™ is a complete, secure data system largely specified and designed by customer input.

In addition, the software enables the user to safely process data stored on network-based computing systems. LCQUAN and Thermo Scientific Watson LIMS™ provide a seamlessly integrated solution that facilitates confident data presentation for regulatory purposes. Synchronization of the bioanalytical workflow with Watson LIMS provides data management security.

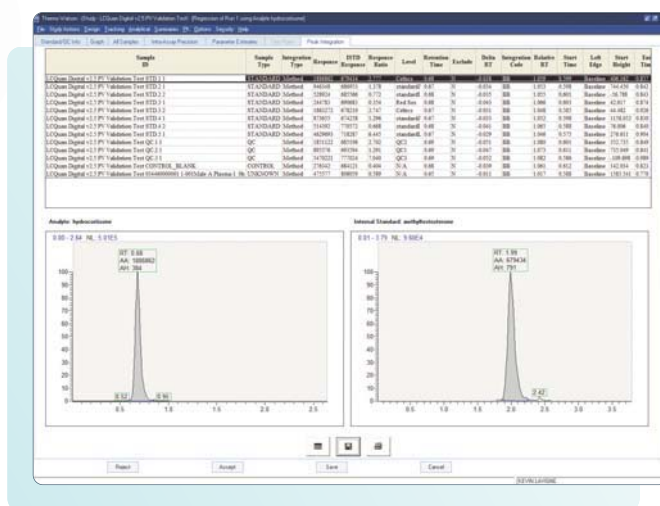
Watson is installed in 18 of the top 20 global pharmaceutical organizations, and is widely used in leading biotechnology and contract research organizations worldwide.

**With LCQUAN and Watson LIMS working seamlessly together, you can:**

- Meet the most stringent 21 CFR Part 11 and other compliance mandates
- Have secure transfer of worklist sequence and chromatographic results to and from Watson LIMS
- Ensure system security and audit traceability, with maximum flexibility and configurability, while preserving data integrity



LCQUAN gives the user the necessary resources for importing sequence information from external systems, method development, data review, data processing, data reporting, and exporting results to external systems, all within a 21 CFR Part 11 compliant environment. LCQUAN also provides multi-level security access, giving system administrators the freedom to modify user privileges from full system access to data review only.



For more information about Watson LIMS, go to [www.thermo.com/watson](http://www.thermo.com/watson)

In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

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