

Looking for a more intelligent way to overcome these challenges in analytical LC/MS/MS?

- Need for intelligently optimized systems
- Pressure to meet increasing throughput targets
- Requirement to rapidly cross-train analysts
- Demand for better sensitivity and quantification
- Mandate to operate in a 21 CFR Part 11-compliant environment
- Need for qualification of new systems and software

High performance LC/MS/MS to meet your demanding quantification needs

Specialized quantitative applications, including ADME screening, bioanalysis, clinical analysis, as well as food safety and environmental monitoring, require high sensitivity, high performance LC/MS/MS instrumentation. Compliance with stringent regulatory guidelines may also be necessary with these applications.

Now you can achieve high performance and low detection limits in a compact, easy-to-use system that includes the Waters® Micromass® Quattro Premier™ Tandem Quadrupole Mass Spectrometer, featuring T-Wave™ (Travelling Wave) technology. To ensure high quality, secure data—from method development to high throughput quantitative analyses—MassLynx™ 4.0 Software and its dedicated Application Managers make operating your system easier than ever before.



This Waters LC/MS/MS System integrates the Waters Micromass Quattro Premier Mass Spectrometer with the Alliance® HT 2795 Separations Module and MassLynx™ 4.0 Software.

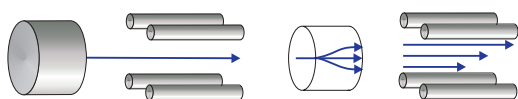
Why LC/MS/MS?

LC/MS/MS is the industry standard for dedicated quantitative analysis, with the tandem quadrupole mass spectrometer being the primary instrument for accurate, sensitive determination of compounds.

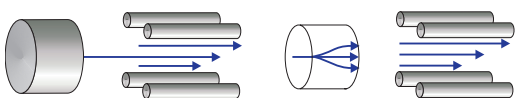
The flexibility of the tandem quadrupole configuration provides several distinct modes of analysis, enabling compound identification, structural elucidation, determination of characteristic compound classes and highly selective quantification.

- MS scan
- Selected Ion Recording (SIR)
- Product ion scan
- Constant neutral loss scan
- Precursor ion scan
- Multiple Reaction Monitoring (MRM)

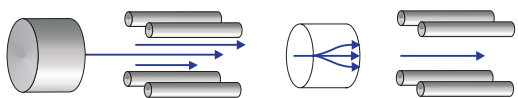
Product Ion Scan



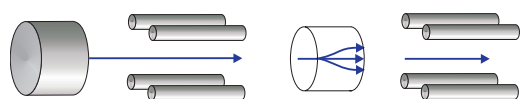
Constant Neutral Loss Scan



Precursor Ion Scan



MRM: Multiple Reaction Monitoring

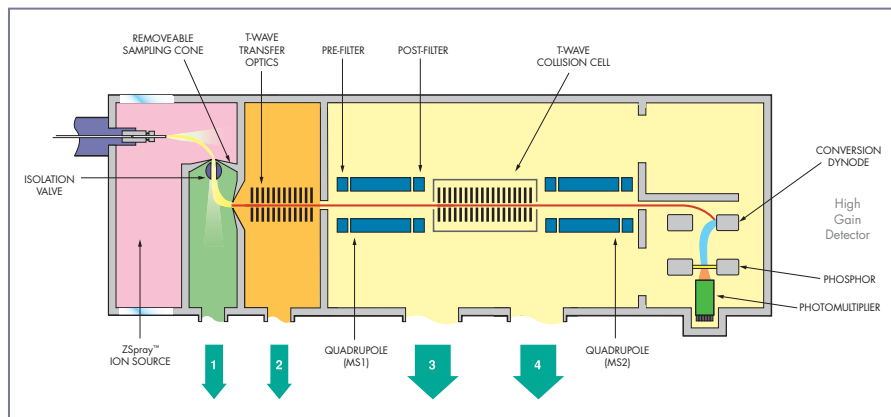


Multiple Reaction Monitoring (MRM)

The selectivity offered by monitoring a particular precursor ion, followed by selective detection of a single product ion provides the basis for very sensitive determination of compounds. With the analyzer quadrupoles operating in a static mode (rather than the traditional scanning mode), the duty cycle is maximized for the component(s) of interest, filtering out chemical interference. MRM is the method of choice for ensuring the lowest limits of quantitation.

Improve sensitivity, selectivity and speed of analysis

The Waters Micromass Quattro Premier is a high performance, benchtop tandem quadrupole instrument that improves sensitivity, selectivity and speed of analysis. Featured in the Quattro Premier is T-Wave (Travelling Wave) technology, which is a major advance in the technological development of tandem quadrupole instrumentation.



Schematic of the Quattro Premier Mass Spectrometer

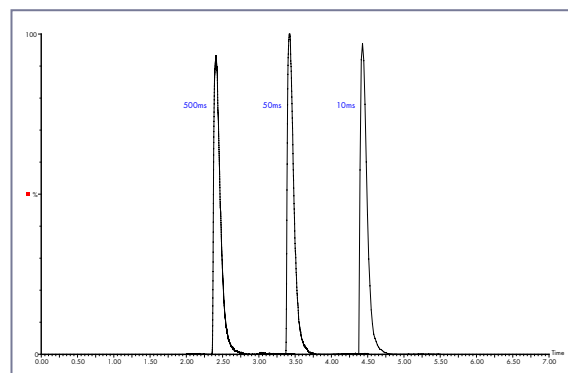
T-Wave technology

Continuing to lead the way in the development of advanced ion optics, Waters is introducing a technological advancement that maximizes analyte transmission from the API source to the mass analyzer. Our high efficiency ion guide transfer region now features T-Wave technology, providing rapid and efficient ion transport for high speed, high sensitivity analyses.

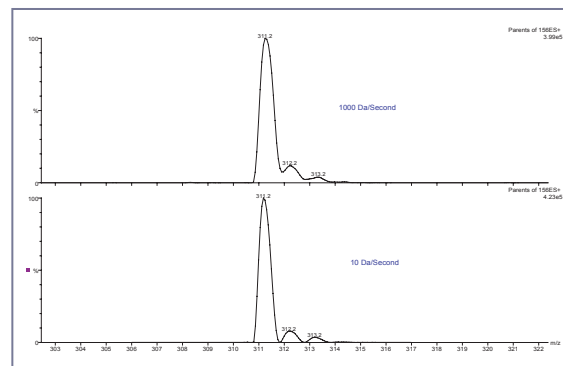
The T-Wave-enabled collision cell minimizes ion transit times and provides optimum performance for fast analyses.

Where short cycle times are required for narrow chromatographic peaks or multiple MRM transitions (e.g. in parallel analyses), the T-Wave cell maintains signal intensity and minimizes interchannel crosstalk—even at very short dwell times.

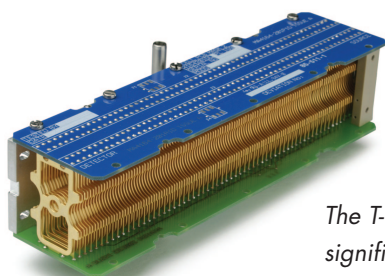
The T-Wave cell delivers enhanced sensitivity and resolution for class-specific monitoring, using precursor ion or neutral loss analysis, that is superior to standard multipole collision cells—even at higher scan speeds.



Signal intensities for the MRM analyses of reserpine performed over a range of dwell times (10 ms interchannel delay).



Precursors of 156 m/z (sulfadimethoxine). Resolution and peak intensity are maintained even at high scan speeds.



The T-Wave collision cell significantly improves MRM performance.

Powerful technology platform

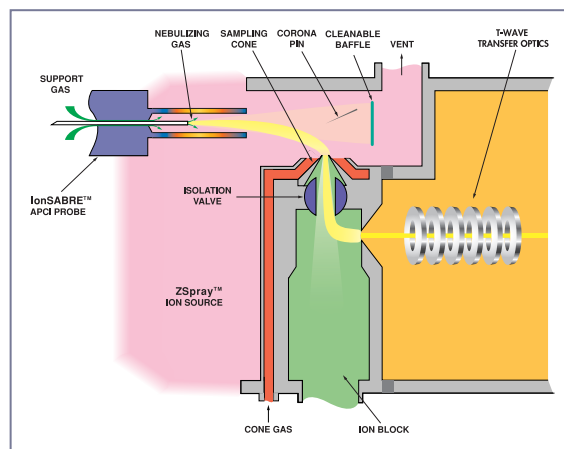
The Micromass Quattro Premier provides a powerful platform for MS analyses, upon which total system solutions may be designed to maximize performance for your application.

- **ZSpray™**—Premium API interface for sensitivity and robustness
- **Compact size**—Uses only 18.9" (48 cm) of linear bench space
- **Sensitivity**—Enhanced ion optics using T-Wave technology for high efficiency ion transmission
- **Fast analysis**—T-Wave collision cell for optimum performance at fast acquisition rates
- **Dynamic range**—up to 5 orders of magnitude for accurate determination across a wide concentration range
- **DDA™**—Data Directed Analysis for intelligent, automated MS to MS/MS switching within a single analytical run
- **Integrated syringe pump**—under MassLynx control
- **Gas flow control**—software regulation of source and collision gases

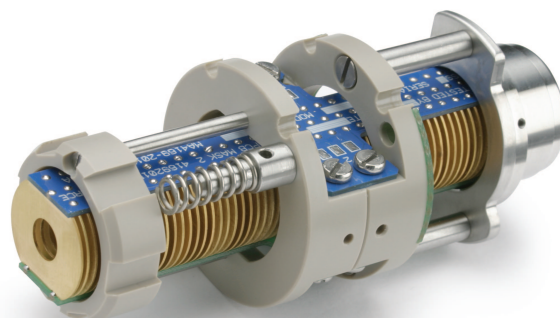
Options

- **IonSABRE™ APCI Probe**—High performance APCI probe for enhanced sensitivity at high flow rates
- **APPI™/APCI Dual Ionization Source**—Atmospheric pressure photo and chemical ionization in a single analysis for the comprehensive analysis of nonpolar compounds
- **ESCI™ Multi-Mode Ionization Source***—APCI and ESI in the same analysis for increased ionization coverage for a wide range of compound classes
- **MUX-technology™**—4-way electrospray ionization interface for high throughput parallel analyses

*Patent pending



Source robustness is a key factor in the productivity of high throughput laboratories. The patented, dual-orthogonal ZSpray is the industry standard API interface, where performance is maximized for complex biological or environmental matrices.



Waters T-Wave transfer optics maximize ion transmission from source to analyzer.

Systematic productivity

Whether you are performing high throughput compound screening or quantifying small molecules in complex matrices, Waters Mass Spectrometry Systems that incorporate the Quattro Premier Mass Spectrometer provide a total solution to maximize performance for your application. The fully integrated systems are controlled from a single data system, maximizing the efficiency of your data acquisition while allowing advanced analyses to be easily performed.



This Waters LC/MS/MS System integrates the Waters Micromass Quattro Premier Mass Spectrometer with the Waters 1525 μ Binary Pump, the 2777 Sample Manager and MassLynx 4.0 Software.

Regulated Bioanalysis

- Maximum sensitivity for detection of trace level components
- Enhanced selectivity for determination of components in complex biological samples
- 21 CFR Part 11-compatible MassLynx Security Manager
- QuanLynx™ Application Manager for automated batch quantitation with the advanced ApexTrack™ peak detection algorithm
- System qualification (IQ/OQ/PQ)
- Staggered chromatography to maximize sample throughput

ADME Screening

- Environmental control for large batches of samples
- Multi-pump control for staggered chromatography or parallel analysis with MUX-technology
- QuanOptimize™ and the QuanLynx Application Manager for automated methods development and quantification

Early Candidate Profiling

- High throughput determination of physicochemical properties
- Multi-pump control for parallel analysis using MUX-technology
- ProfileLynx™ Application Manager for the automated calculation of solubility, permeability and stability of drug candidates

Food/Environmental Analysis

- High sensitivity for trace contaminant monitoring
- Enhanced selectivity for complex matrices
- TargetLynx™ Application Manager for automated quality control checks of quantitative results

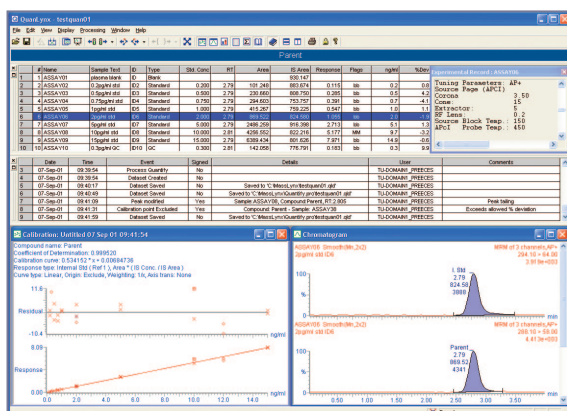
Clinical Analysis

- Optimum sensitivity for potent, low-dose therapeutic drug monitoring
- QuanLynx Application Manager for automated batch quantification with the advanced ApexTrack peak detection algorithm

High throughput made easy: automated method development

With the vast range of compounds now being screened, a major bottleneck in the process is the optimization of LC/MS/MS methods for each individual compound.

QuanOptimize enables you to automate method development for quantitative LC/MS/MS. Now there's no need to perform manual optimization of instruments for every individual compound. Whether your compounds are suited to ESI, APCI, positive or negative mode, QuanOptimize will automatically identify the best method for each compound, then run your batch of samples for quantitative analysis and report the results in the QuanLynx browser.

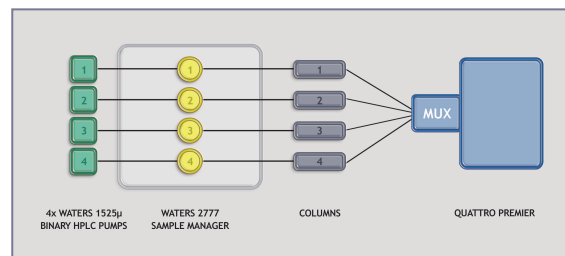


The QuanLynx browser enables intuitive, dynamic data review in a portable report file.

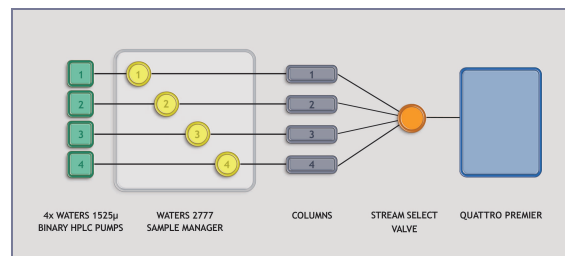
High throughput made easy: MUX and staggered chromatography

Restrictions on laboratory space, finances and lack of trained staff can place significant constraints on increasing your sample throughput. Waters systems provide intelligent control of multi-pump parallel analyses to maximize the throughput of a single mass spectrometer.

A simple system configuration wizard allows you to quickly and easily take control of multiple HPLC systems through MassLynx 4.0 Software for applications using either MUX-technology or staggered chromatography.



MUX-technology is a 4-way ESI source for true parallel analysis.



Staggered chromatography allows you to monitor only the elution zone of interest by selectively switching multiple streams to the standard single probe (ESI or APCI).

CGMP/GLP Compliance

Waters systems controlled by MassLynx Software are developed and produced under a certified system development life cycle process (SDLC) to ensure their readiness for use in regulated environments.

To assist owners in commissioning and maintaining their Quattro Premier systems in GxP regulated environments, Waters provides an extensive portfolio of Connections® Compliance Services.

Specially trained and certified Compliance Specialists are available to provide Connections Compliance Services that include:

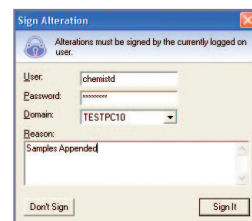
- Pre-use Qualification Services (IQ, OQ and PQ) for new systems
- Post-use Performance Maintenance and Qualification Services (PM, OQ and PQ) for existing installations

Tools for 21 CFR Part 11 Compliance

Operating in regulated environments places stringent demands on your system. The key to success is being able to maintain maximum levels of productivity without compromising data integrity.

MassLynx 4.0 Security Manager incorporates data security tools for file generation through processing, reporting, archival and retrieval—complete with audit trails.

Electronic signature capabilities are also supported. Waters engineers have experience with a wide range of customers for installation and support of validated systems.



Electronic signature capability

MassLynx Application Managers

MassLynx 4.0 Software can be enhanced with a range of optional Application Managers to supplement the capabilities of your system:

- **QuanLynx™ Application Manager**—Provides high performance, high throughput batch quantification as well as automated LC/MS/MS method development (QuanOptimize™) and tools to support 21 CFR Part 11 Compliance.
- **TargetLynx™ Application Manager**—Enables advanced quantification of target compounds with a full range of automatic quality control checks. Uses confirmatory ions for confident quantification of regulated compounds.
- **ProfileLynx™ Application Manager**—Automates the determination of physicochemical properties of early drug candidates.
- **OpenLynx™ Application Manager**—Provides walk-up LC/MS/MS capabilities and automated batch processing.
- **Metabolynx™ Application Manager**—Automates metabolite identification with an advanced control comparison.

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Chromatography columns and reagents

Speed and sensitivity can also be optimized by choosing the correct column and extraction products.

- **Symmetry® and Symmetry300™ Columns**—To meet your LC/MS method development needs, Symmetry columns provide the highest standard of "column-to-column" reproducibility with unmatched peak symmetry for maximum sensitivity and accurate quantification.
- **XTerra® MS and Intelligent Speed (IS™) Columns**—XTerra MS columns, based on a combination of our most inert particle and trifunctional reversed-phase bonding technology, are ideally suited for mass spectrometry applications. XTerra IS Columns can be run at higher flow rates and lower backpressures without sacrificing resolution, allowing older methods to be easily transferred and newer methods to be developed with run times of 5 minutes or less.
- **Atlantis™ Columns**—Atlantis columns are a difunctionally bonded, silica-based C₁₈ offering that combines superior polar compound retention with exceptional peak shape and full LC/MS compatibility.

Worldwide services and support

Waters Connections® provides the solutions you need to maintain uptime across your Waters systems.

- Analytical Instrumentation and Software Services include Total Assurance Plans and Warranties that extend and enhance the original warranty you receive when you buy a Waters product. These plans minimize the level of insurance investment and deliver the value you need to avoid costly and time-consuming system downtime.
- Connections Compliance Services provide you with timely and cost-efficient solutions for your regulatory compliance challenges. You can use Waters Compliance Services to verify proper equipment operation for CGMP/GLP compliance, significantly reducing operating costs.
- Connections University is the center of our Educational Services, providing extensive HPLC and MS training and education at your site, at our corporate headquarters or at our local offices around the world.
- Representatives of Waters Global Customer Assurance Organization, trained and certified in all Waters products and current in HPLC and MS applications, are available in person, on the phone, via FAX or at www.waters.com to answer questions and provide you with service, support and information.

Waters



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