

WITH THE  
BEST TECHNOLOGY,  
SAFE WATER CAN  
BE A REALITY



**Waters**  
THE SCIENCE OF WHAT'S POSSIBLE.®





# The global pursuit of water quality

**The world's fresh water supply is under constant threat from industrial growth, agricultural processes, and municipal waste.**

Providing access to safe water has become more challenging than ever before. In the struggle to preserve the environment and protect human health, governments and businesses must seek out the most effective analytical innovations.

## SAFE WATER THROUGH ADVANCED TECHNOLOGY

By providing technologies that are truly unique to the industry, Waters Corporation is helping organizations ensure that the water they distribute is safe for consumption. The unparalleled performance of the ACQUITY UPLC® System, in combination with advanced mass spectrometry, and a wide spectrum of consumables is dramatically enhancing water testing capabilities.

With fewer bottlenecks, less waste, lower costs, and more information in less time, Waters' system solutions are streamlining analytical workflows, improving business performance, and transforming lives.

Waters systems address the specialized needs of water testing laboratories.

Whatever the challenge – sample throughput, trace detection, complex matrices, data management, or system usability – we have the solution.



# SAMPLE PREPARATION

## Water sample concentration and cleanup

### Oasis Sample Extraction Products

Analysis of water samples often requires concentration and cleanup of “dirty” or complex matrices. Oasis® Solid-Phase Extraction (SPE) Products allow for simple and rapid method development. With the Oasis product line, you can expect robust SPE methods that provide reproducible results and high recoveries, without having to be concerned with sorbent drying or pH limitations.

#### KEY FEATURES/BENEFITS

- Greater capacity.
- Excellent stability over entire pH range.
- Cleanest extracts.
- Elimination of matrix effects.
- Reduction of ion suppression.
- Superior recovery, reproducibility, retention, and selectivity for a wide variety of compounds.
- For high throughput, 96-well plates.



Oasis Sample Extraction Products.

## Certified cleanliness for ultra-trace level analysis

### Vials

Waters® Certified Vials are manufactured to exacting standards, tested and certified to give you confidence that the peaks you observe are representative of your sample, not your vials.

#### KEY FEATURES/BENEFITS

- Prevent ghost peaks stemming from contaminants.
- Eliminate unexplained masses in MS.
- Eliminate potential of needle damage due to tight dimensional specifications.



Waters Certified Vials.

## Reduce interference and increase sensitivity for better quality results

### Certified Sep-Pak SPE Cartridges

Sep-Pak® SPE Cartridges are widely used by scientists for trace-level analysis in water samples. Manufactured using strict performance and cleanliness specifications and QC-tested for extractables and leachables, Certified Sep-Pak Sample Preparation Products reduce interference and increase sensitivity by eliminating contaminants introduced by the cartridge hardware and sorbents.

#### KEY FEATURES/BENEFITS

- Superior extracts for water sample residue analysis.
- Cleanliness and reproducibility needed for demanding sample preparation methods.
- Allows for accurate, high-quality water testing results.



Sep-Pak SPE Cartridges.



# LC COLUMNS AND CONSUMABLES

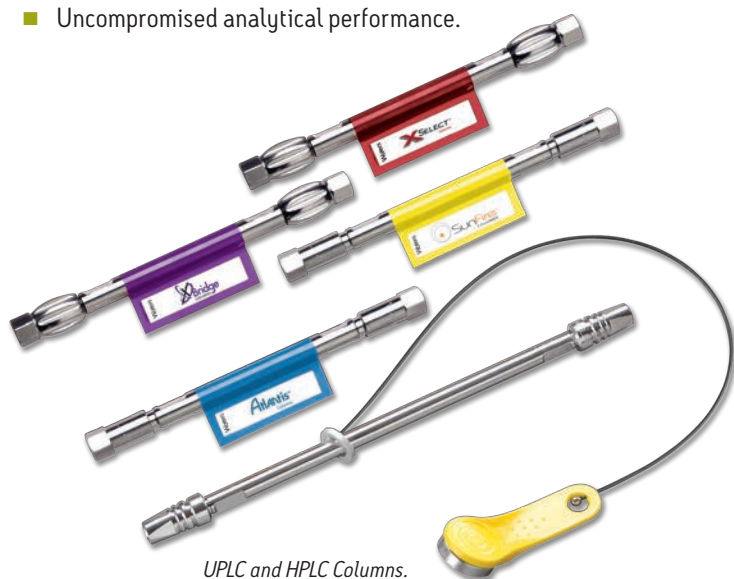
## Maximize efficiency, ruggedness, and throughput

### LC Columns

Featured in methods to meet regulatory requirements throughout the world, Waters columns provide cutting edge performance. In addition to our complete selection of UPLC® and HPLC column chemistries, Waters also provides application-specific columns for optimal specificity.

#### KEY FEATURES/BENEFITS

- Industry leading reliability and reproducibility.
- Wide range of general purpose and application specific columns.
- Uncompromised analytical performance.



UPLC and HPLC Columns.

## Precise formulation, absolute traceability

### Waters Analytical Standards and Reagents

Waters understands that the quality of the standards and reagents you use directly correlates to the quality of your results. Our standards are precisely formulated to ensure data comparability and defensibility over time, and provide absolute traceability to meet your quality assurance requirements.

#### KEY FEATURES/BENEFITS

- Saves costly validation time of standards and reagents.
- Easy and convenient formulations and packaging ensures accuracy of LC and LC/MS results over time.
- Optimized kits to keep your system operating at peak performance.



Waters Analytical Standards and Reagents.



# ERA

## Certified clean

### Waters Certified Containers

Waters Certified Containers are individually tested and certified to be clean upon arrival. Each mobile phase container comes with a Certificate of Analysis (COA). The containers are designed for use with any LC system. Simplify laboratory workflow by pouring mobile phase directly into each container without rinsing prior to use.

#### KEY FEATURES/BENEFITS

- Eliminate contamination.
- Improve the accuracy and sensitivity of your measurements.
- Increase signal-to-noise.
- Reduce downtime, cut costs, and increase productivity.



Waters Certified Containers.

## Confidence through robust QC

### ERA

ERA®, a Waters Company provides ISO Guide 34 Accredited Certified Reference Materials (CRM's) and ISO 17043 accredited Proficiency Testing (PT) schemes for water analysis.

ERA delivers superior CRMs and PT schemes to help water testing laboratories provide decision makers with a greater measure of confidence by improving data quality through robust quality control. ERA products are manufactured using traceable standard reference materials. Each CRM is provided with a Certificate of Analysis (COA), including assigned values and acceptance criteria that are verified by our ISO 17025 accredited laboratory and validated through multi-laboratory PT schemes.

#### Proficiency Testing schemes

Over 50 conveniently scheduled PT schemes are available each year with study results provided in two business days. Quik™Response on-demand PT samples offer the convenience of participating in PT at any time.

A wide selection of matrices and analytes are available including:

- Clean water
- Organic contaminants
- Effluent
- Inorganic contaminants
- Drinking water
- Microbiology
- Wastewater
- Physical properties
- Soil
- Radiochemistry
- Air and emissions



A scientist in a white lab coat and blue gloves is holding a test tube containing a clear liquid. The scientist is looking towards the camera with a slight smile. The background is a plain, light color.

**WATERS IS COMMITTED TO  
ENHANCING THE QUALITY  
OF OUR GLOBAL WATER  
RESOURCES.**

**APPLICATIONS FOR  
WATERS SYSTEMS INCLUDE  
PESTICIDES, ENDOCRINE  
DISRUPTORS, PAHS,  
PHARMACEUTICALS,  
CARBAMATES, AND  
GLYPHOSATES AMONG  
MANY OTHERS.**



# UPLC AND UPLC DETECTORS

## Faster sample turnaround and lower costs for liquid chromatography separations

### ACQUITY UPLC H-Class System

The ACQUITY UPLC H-Class System offers the flexibility of a quaternary-based HPLC with the performance advantages of UPLC – this means greater sample throughput, reduced cost per analysis, and better quality results for environmental testing laboratories that use traditional HPLC.

#### KEY FEATURES/BENEFITS

- Runtimes are up to 10 times faster.
- Seamlessly transition to UPLC separations.
- Maximize chromatographic resolution.
- Solvent consumption reduced by up to 95%.
- Significant reduction in method development times.
- Appropriate for all EPA-prescribed HPLC methods.



ACQUITY UPLC  
H-Class System.

## Single-class and compound-specific analyses with high performance detectors

### ACQUITY UPLC Detectors

ACQUITY UPLC optical and mass detectors enhance high efficiency UPLC separations, allowing you to analyze a wide variety of environmental contaminants. The ACQUITY UPLC TUV, PDA, and fluorescence detectors provide fast data acquisition capabilities for rapid analyses and the sensitivity required for trace impurity detection and quantification. And with the ACQUITY QDa<sup>®</sup> Detector, any analytical scientist can consistently generate the highest quality mass spectral data routinely – no special training or expertise required.

#### KEY FEATURES/BENEFITS

- Ideal for single-class or compound-specific detection, including: aldehydes and ketones, PAHs, explosives, carbamates, glyphosates, diquat/paraquat, and pesticides.
- Apply the performance of UPLC to high-volume, routine testing.
- Reduce instrument training time.
- Easily meet or exceed regulatory detection limits.
- Improve analytical workflow with Empower<sup>®</sup> Chromatography Data Software (CDS).
- Quantify compounds with no UV response at levels not amenable to or accessible by optical detection with the ACQUITY QDa Detector – compatible with all of Waters ACQUITY UPLC, ACQUITY UPC<sup>2</sup><sup>™</sup> Alliance<sup>®</sup> HPLC, and purification LC and SFC systems.



ACQUITY QDa Detector.



## UPLC WITH 2D TECHNOLOGY

### Expand the dynamic range of your analysis with 2D separations

#### ACQUITY UPLC Systems with 2D Technologies

Waters ACQUITY UPLC Systems with 2D Technologies employ solvent managers, a sample manager, a column manager, optical devices, mass spectrometers, and a wide range of separation chemistries to facilitate multi-dimensional analyses.

#### KEY FEATURES/BENEFITS

- Eliminate matrix effects.
- Improve peak capacities (gain selectivity and sensitivity).
- Improve ruggedness (cleaner MS source, extended column lifetime).
- Trap and back-flush elution method.
- Increase the amount of analytes reaching the detector.
- Prevents hydrophobic interferences and contaminants from entering column and detector.
- Applications include endocrine disruptors, fungicides, pesticides, personal care products, and pharmaceuticals.



ACQUITY UPLC System with 2D Technology.

# UPLC/MS/MS

## Drinking water testing with direct injection UPLC/MS/MS

### ACQUITY UPLC I-Class System with Xevo TQ-S

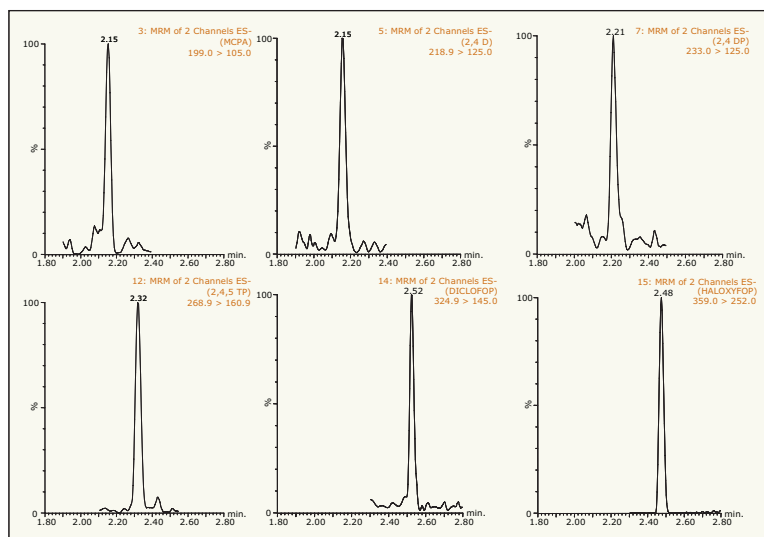
Provides the ultimate in quantitative capabilities, allowing for the direct injection of drinking water samples with no sample preparation. The system is designed to enable uncomplicated access to superior UPLC/MS/MS performance, delivering the highest levels of sensitivity, selectivity, robustness, speed, and accuracy.



ACQUITY UPLC I-Class System with the Xevo TQ-S.

#### KEY FEATURES/BENEFITS

- Improves laboratory productivity by eliminating sample prep.
- Meet required limits of quantitation (LOQ) without sample pre-concentration.
- Minimize sample runtime and maximize the number of compounds assayed in a single method.
- Ensure the integrity of results with automated data quality monitoring.
- Improve analytical workflow by rapidly creating complete LC/MS/MS data acquisition and processing methods.
- StepWave™ off-axis ion source technology allows for the robust detection of target compounds at very low concentrations, dilution of samples to reduce matrix effects, and the use of smaller sample volumes.
- ScanWave™ Technology allows scientists to get both the very best quantitative data as well as superior spectral MS/MS information.
- Automated instrument optimization with IntelliStart™ Technology.
- Manage and automatically optimize methods with MassLynx® workflow software tools including Quanpedia™



Analysis of phenoxyacetic herbicides in drinking water by direct injection using an ACQUITY UPLC BEH C<sub>18</sub> Column, 1.7 μm, 2.1 x 100 mm, and the ACQUITY UPLC I-Class System with the Xevo TQ-S. MRM chromatograms at 2.5 ppt for selected phenoxyacetic acids.

## Routine quantitative analyses that are robust, rapid, and reliable

### ACQUITY UPLC H-Class System with Xevo TQD

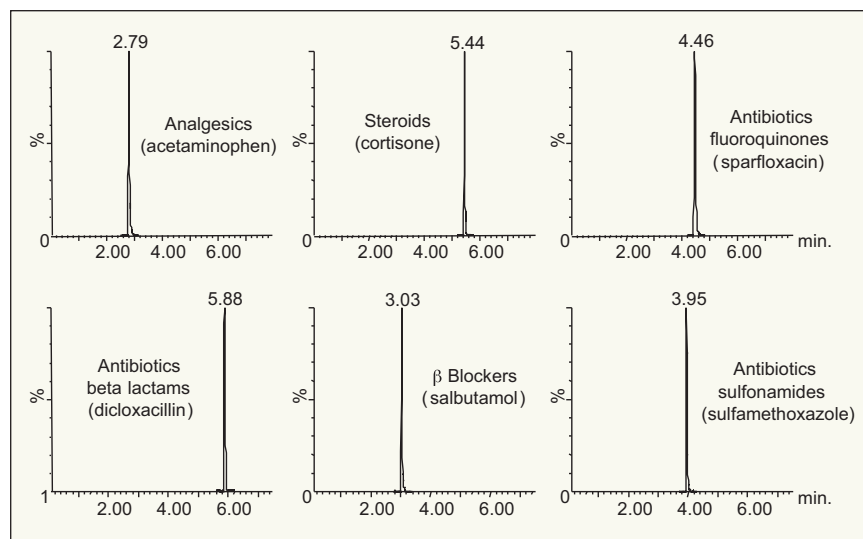
Created to reduce complexity in mass spectrometry, the Waters Xevo® TQD ensures maximum productivity with minimum effort. The advanced technology of the ACQUITY UPLC H-Class System and the robust universal ion source architecture available with the Xevo TQD ensure dependability, while providing a flexible platform to accommodate a wide variety of sample types. A cost-effective solution that everyone in the lab can use.



Xevo TQD with the ACQUITY UPLC H-Class System.

#### KEY FEATURES/BENEFITS

- The only system in its class that enables simultaneous acquisition of high quality quantitative and qualitative data from the widest range of experiments.
- IntelliStart Software simplifies MS setup and routine operation with automated quantification workflow tools that minimize variability between different operators, departments, and laboratories.
- Use built-in RADAR™ Technology to observe MRM (multiple reaction monitoring) data and full scan background data simultaneously for faster, more robust method development.
- RADAR provides the sensitivity and selectivity to monitor for matrix interferences, metabolites, impurities, and degradants in samples while accurately quantifying target compounds.



Separation and detection of 78 pharmaceutical and personal care products (PPCPs) including acidic, basic, and neutral compounds in well and surface water samples with the ACQUITY H-Class System, equipped with an ACQUITY UPLC BEH C<sub>18</sub> Column, 1.7 μm, 2.1 × 100 mm, and Xevo TQD. Shown here are example MRM chromatograms for compounds from the different classes of PPCPs.





# UPLC/QTOF MS

## A comprehensive, fit-for-purpose screening solution

### Screening Platform Solution with UNIFI®

This solution integrates unsurpassed chromatography and mass spectrometry instrumentation with next-generation informatics. Target, identify, quantify, and review using a streamlined analytical workflow that enables more accurate results across a wide range of water testing applications including pesticides and pharmaceuticals.



Screening Platform Solution with UNIFI.

#### KEY FEATURES/BENEFITS

##### ACQUITY UPLC I-Class System

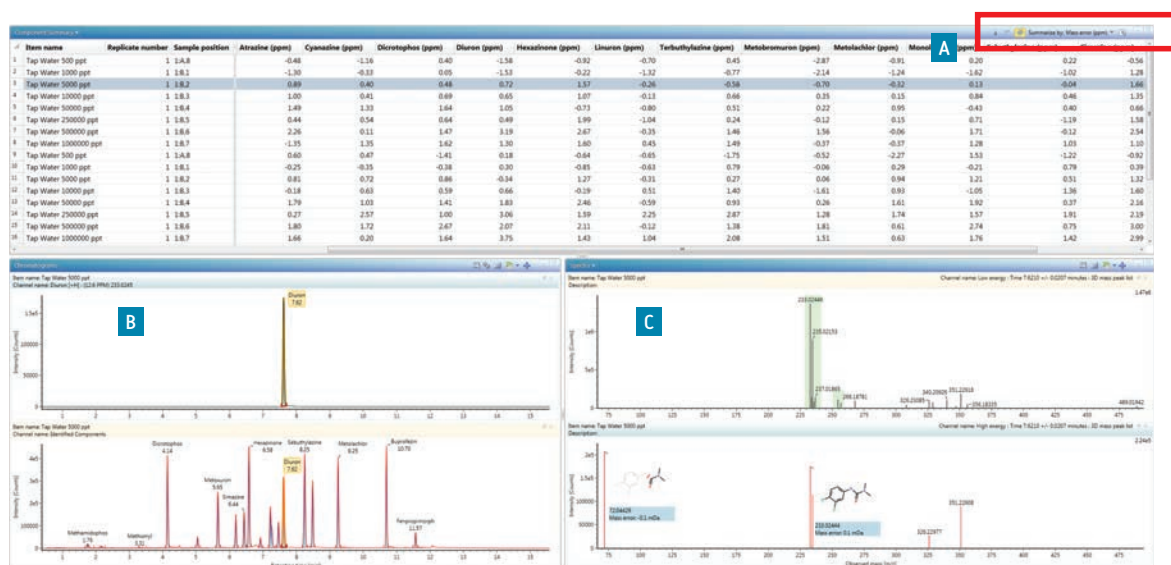
- Rapid, high-resolution separations help resolve components of interest from complex matrix interference peaks faster than ever before.
- Maximizes peak signal-to-noise to enhance mass spec sensitivity.
- Provides the lowest carryover.

##### Xevo G2-S QToF

- Analyze the broadest range of compounds in the most complex samples.
- StepWave ion optics allow for unsurpassed levels of robust sensitivity.
- MS<sup>E</sup> technology simplifies and deconvolutes spectra, associating fragment ions with their specific precursor.
- Meet rigorous regulatory requirements by reducing false positives and false negatives.

##### UNIFI Scientific Information System

- Data acquisition, processing, and reporting functionality within a single easy-to-use informatics platform.
- Facilitates data standardization so that information can be exchanged among departments and third-party partners.
- The scientific library allows you to make use of your prior work, as well as the data of colleagues.



Results from injection of increasing concentrations of the Waters Pesticide Screening Mix (PSM) spiked in locally filtered tap water. The component summary section (A) shows table displaying mass accuracy (ppm) of 15 compounds over replicate injections of nine calibration levels. The parameter displayed can easily be changed to another parameter (e.g., observed retention time) by clicking in the area highlighted in the red box. Chromatogram section (B) shows XIC for all compounds identified from the PSM as well as XIC for the highlighted compound diuron. Low energy and high energy spectra for selected component are displayed in the spectra window (C).

## APGC/MS

### No compromise GC-MS

#### Atmospheric Pressure GC

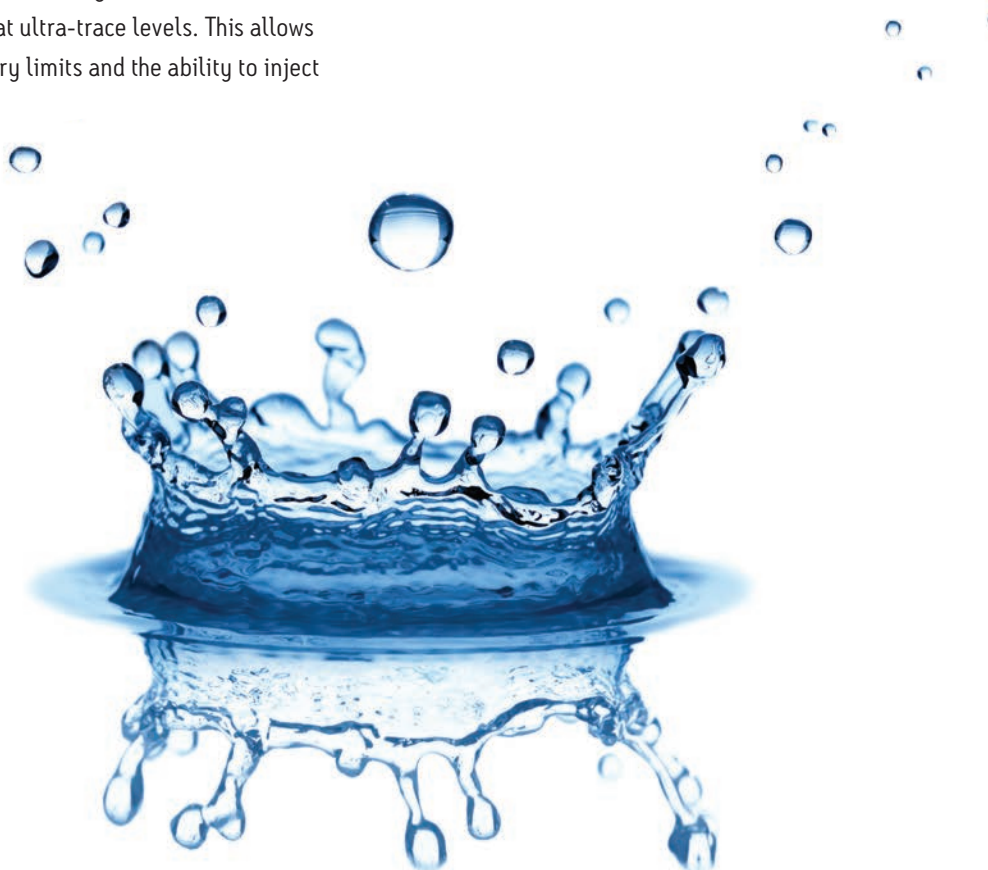
Waters Atmospheric Pressure GC (APGC) adds GC capability to today's advanced MS technologies. This provides users with access to ultra-trace quantification, comprehensive qualitative MS and MS/MS, and high resolution, ion-mobility separations.

#### KEY FEATURES/BENEFITS

- 'Soft' ionization means less fragmentation for many compounds compared with techniques such as EI. This can yield higher sensitivity and specificity, simplifying precursor ion selection.
- Maximize uptime and asset utilization – Changeover from UPLC to GC is fast and easy and since APGC is not a vacuum technique, equilibration time between modes of operation is kept to a minimum.
- APGC tandem quadrupole MS, using Waters Xevo TQ-S, enables detection limits at ultra-trace levels. This allows compliance with regulatory limits and the ability to inject less sample matrix.
- APGC with Xevo G2-S QToF enables complete screening of samples using both ACQUITY UPLC and GC separations.
- High-resolution, ion mobility separations with APGC and the SYNAPT® G2-Si allow you to use the collision cross section (CCS) of a molecule to provide significant enhancements in sensitivity, separation, specificity, and structural insight.
- Application areas include the detection of multi-residue pesticides, dioxins, and PCBs.



*SYNAPT G2-Si with the APGC Source.*





## INFORMATICS

**Effective data management  
for water testing analyses**

Waters Laboratory Informatics Software



**Empower 3 Chromatography Data Software** makes it easier than ever to run samples and produce meaningful results. Empower 3's interface is designed to maximize your productivity, improving how you collect, process, and print chromatography data.

Grow seamlessly from a single workstation to an enterprise-wide system with Empower 3's scalable, modular architecture, which fits into the most modern, secure, HA (high availability) corporate architecture.





**NuGenesis® Lab Management System** uniquely combines synergistic data, workflow, and sample management capabilities to support the entire product lifecycle from discovery through manufacturing. The user-centric platform encompasses NuGenesis SDMS, a compliant-ready data repository, NuGenesis ELN, a flexible analytical electronic laboratory notebook, and NuGenesis Sample Management.

NuGenesis seamlessly links data such as sample submission and results review, stability testing, scientific search, multi-vendor software connection, laboratory inventories, data retention and legal hold, and laboratory execution methods. With NuGenesis Lab Management System, the lab and business have never been more connected.



**MassLynx Software** acquires, analyzes, and distributes Waters mass spectrometry information for comprehensive instrument control and data processing.

To assist with both data acquisition and the transformation of data into usable results, MassLynx Software offers easy-to-use application managers that allow you to focus the power of MS on your laboratory's specific tasks.



**Paradigm Scientific Search** is the next-generation of search technology for science-driven organizations – Paradigm™ offers a solution for accessing scientifically relevant information (chemical structures, methods, chemical reactions, chromatograms, spectra, *etc.*), across an organization.

Paradigm spans information silos, performing searches based on science objects, adding structure to unstructured data.

## WATERS GLOBAL SERVICES

### **Be assured. Choose Waters Global Services.**

**Waters Global Services** focuses on optimizing Waters products with superior service, support, upgrades, training, and Waters Quality Parts.®

### **Proven satisfaction**

For thirteen consecutive years, an independent quality auditing firm ranked **Waters Global Services** best-in-class in providing expert technical knowledge, quick resolution of system issues, and process support.<sup>1</sup>

<sup>1</sup> Achievement in Customer Excellence Award, CustomerSat, Inc., 2007-2013; NorthFace ScoreBoard Award,™ Omega Management Group Corporation, 2001-2006.

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# Waters

THE SCIENCE OF WHAT'S POSSIBLE.®

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