

CONSTANT DEADLINES...  
CHALLENGING SAMPLES...  
COMPLEX QUESTIONS...

COMPLETE ANSWERS,  
FASTER THAN EVER BEFORE.  
WATERS TECHNOLOGIES.



Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

## **GROWING CHALLENGES FOR CHEMICAL MANUFACTURERS**

In today's global chemicals market, manufacturers are under increasing pressure to produce high quality, competitively differentiated products while carefully controlling costs. To ensure profitability and growth, Research, Development, and Manufacturing groups must employ the latest laboratory technologies to overcome a diversity of complex challenges – from the expansion of product portfolios to meeting regulatory standards, from the implementation of new production processes to the rapid delivery of customer support.

## **ANALYTICAL SERVICE LABORATORIES SERVE A CRITICAL SUPPORT ROLE**

To ensure successful product introduction and sustainability, the Analytical Service laboratory serves as the quintessential collaborator within the chemical organization. Continually leveraging their expert knowledge of applications and scientific instrumentation, they provide critical support to Research, Development, Manufacturing, and Customer Service. Whether identifying new compounds or deformulating competitive products, whether monitoring the effects of production modifications or troubleshooting customer applications – to maximize effectiveness, Analytical Services require technologies that provide superior speed, accuracy, flexibility, and robustness.

## **WATERS TECHNOLOGIES IMPROVE LABORATORY EFFECTIVENESS**

Waters comprehensive solutions, which include sample preparation, chromatography, mass spectrometry, and data management software, allow Analytical Services laboratories to accelerate the acquisition, interpretation, and reporting of results, improve the efficiency of manufacturing processes, and ensure final product quality. Our LC/MS, LC/MS/MS, GC/MS, and GC/MS/MS systems provide the compound verification and specificity required to help laboratories analyze a wide variety of analytes, including those found in very complex sample matrices.



## OVER 50 YEARS OF EXPERIENCE IN THE CHEMICAL INDUSTRY

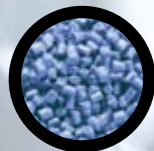
Since 1958, Waters Corporation has helped chemical producers explore new scientific frontiers with industry-leading technology, global reach, and a determination to expand the impact of laboratory science. Waters strives to enable R&D, analytical, and quality control laboratories to make new discoveries, improve laboratory workflow, and facilitate the delivery of new products to market.



**RESEARCH**



**DEVELOPMENT**



**MANUFACTURING**



**PRODUCT SUPPORT**





## RESEARCH

### THE OBJECTIVE

The Research Group is tasked with gaining a better understanding of current products – both in terms of production and performance. Even more critically, this group must continually feed the product development pipeline to secure the long-term success of the organization.

### THE CHALLENGES

- Accelerating product innovation.
- Developing the in-house science base and knowledge of fundamental product behavior.
- Increasing product differentiation by expanding applications or enhancing efficacy.
- Accessing of applicable technologies, including walk-up/open access capabilities.
- Doing more with less – understanding how to more efficiently utilize resources including analysts and instrumentation.

### ANALYTICAL SERVICE SUPPORT

- Structural Elucidation – identifying chemical structures and/or composition
- Profiling of Samples – determining what is present and how much of it is present
- Comparison of Samples – determining what is the same and what is different
- Isolation of Compounds – performing fractionation and prep scale work

# THE WATERS *solution*

RAISE YOUR UNDERSTANDING OF SAMPLES TO NEW LEVELS  
WITH A REVOLUTIONARY MS TECHNOLOGY

The SYNAPT™ G2 from Waters combines breakthrough Quantitative ToF and enhanced High Definition MS™ technologies to provide intuitive operation, application flexibility, and a totally new level of performance. SYNAPT enables you to optimize laboratory productivity, generate results that advance scientific understanding, and adapt to changing needs.

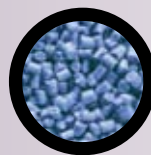


**Size, shape, charge, and mass** – Waters® High Definition Mass Spectrometry™ (HDMS™) enables you to differentiate samples by size, shape, charge, and mass. Separate isomers, conformers, and compound classes. Increase peak capacity and detection limits.

**Qualitative and quantitative** – Benefit from highly selective detection in complex samples and confident structural confirmation. SYNAPT G2's QuanTof™ Technology provides qualitative AND quantitative MS with MS/MS performance that is fully compatible with UPLC.

**Application adaptability – ASAP and MALDI** – Customize the system to your needs with multiple ionization options and application-specific system solutions. The Atmospheric Solids Analysis Probe (ASAP) provides direct analysis of volatile and semi-volatile, solid and liquid samples, while SYNAPT G2 MALDI reveals true ion distribution without interference from background ions.

**Decisions made easy** – SYNAPT G2 is designed to deliver the highest performance and simplicity throughout your analytical workflow. Experienced and novice users alike can generate high-quality results, consistently.



## DEVELOPMENT

### THE OBJECTIVE

Developing protocols for large-scale product development and methods for manufacturing are a key focus for the Development Group. In addition, this team proves and documents corporate scientific activities in support of product performance claims and regulatory filings.

### THE CHALLENGES

- Ensuring that products are brought to market in timely manner to maximize profitability and secure or expand market share.
- Completing requisite product testing cycles for registration and regulatory compliance.
- Developing robust test methods for manufacturing processes.

### ANALYTICAL SERVICES SUPPORT

- Developing effective methods that will be transferred to manufacturing
- Purity assays and impurity identification
- Structural confirmation

# THE WATERS *solution*

## FASTER METHOD DEVELOPMENT WITH ACQUITY UPLC H-CLASS AND MASS SPECTROMETRY DETECTION

Waters ACQUITY UPLC H-Class offers the flexibility of a quaternary-based HPLC with the performance advantages of UPLC - reduce the time and cost per sample while improving the quality of results. The ACQUITY® TQD is a smaller, easier-to-use, enhanced capability tandem quadrupole mass detector designed as an affordable, fast MS/MS system. Combine with Waters NuGenesis® Scientific Data Management System (SDMS) to improve data accessibility and facilitate regulatory compliance.



**Greater throughput, more information** – UPLC runs are up to ten times faster, and provide more resolution and sensitivity than traditional HPLC.

**Lower analysis costs** – Reduce solvent consumption by up to 95%, saving on both acquisition and disposal costs.

**Trace detection** – The TQD is ideal for trace analysis where target compounds are present at low levels. In complex matrices, it will enable accurate, reproducible low-level quantitative analysis with reduced matrix interference.

**Simplified operation** – IntelliStart™ Software automates mass spec setup (mass resolution, mass calibration, and ion source optimization) and the development of fully-optimized multiple reaction monitoring (MRM) – even inexperienced chemists can obtain superior results quickly and easily.

**Streamlined data analysis** – Waters Empower™ 2 Chromatography Software's customizable data reports, integrated custom calculations, and specialized software options allow laboratories to streamline workflow – Focus on producing meaningful results, not managing data collection.

**Centralized information** – NuGenesis SDMS allows laboratories to automatically capture, secure, access, and disseminate data files and printed reports from almost any analytical technology – more readily support product registration processes.



## MANUFACTURING

### THE OBJECTIVE

Quality Assurance (QA) and Quality Control (QC) are the primary focus of laboratory activities associated with chemicals manufacturing. Supporting methods transferred from R&D, measurements of product control and process control, and developing protocols for QA/QC analysis are the predominant activities.

### THE CHALLENGES

- Employing analytical technologies that are easy-to-use for non-experts in order to minimize training and maximize efficiency.
- Implementing robust methods.
- Rapid access to high quality data to troubleshoot production related issues.

### ANALYTICAL SERVICES SUPPORT

- Quantitative analysis
- Support the methods transferred to manufacturing – determine if those methods are working properly



# THE WATERS *solution*

## RAPIDLY ANALYZE COMPLEX MANUFACTURING SAMPLES ON OR OFF THE PRODUCTION FLOOR

By reducing LC run times by up to a factor of ten, the ACQUITY UPLC System brings dramatic efficiency improvements to QC testing and support. For those manufacturers requiring atline sample analyses, Waters offers the PATROL™ UPLC Process Analyzer, a real-time Process Analytical Technology (PAT) System that detects and quantifies complex, multiple component manufacturing samples on the production floor.

**Greater productivity** – PATROL UPLC moves existing liquid chromatography analysis from off-line Quality Control laboratories directly to the manufacturing process – the result is significant improvements in production efficiency.

**Rapid analyses** – UPLC's fast resolving power quickly quantifies related and unrelated compounds.

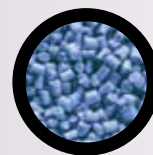
**Continuous uptime** – On-board diagnostics and 24-hour remote monitoring ensure that PATROL UPLC is running at peak efficiency.

**Better asset utilization** – Reduce process cycle times so that more product can be produced with existing resources.

**Reduce costs** – Allows manufacturers to meet or exceed product specifications, minimizing the risk and costs associated with failed batches.

**Brand protection** – Helps assure final product quality and customer satisfaction.





## PRODUCT SUPPORT

### THE OBJECTIVE

For the chemical manufacturer, there is no greater laboratory priority than product related customer issues. A comprehensive understanding of the sample is paramount to the timely resolution of inquiries questioning product performance - whether those customer observations are due to sub-optimal specifications or a mis-application of product.

### THE CHALLENGES

- With numerous applications possible for any given product, laboratories may face a wide range of performance related questions.
- The need for powerful analytical tools to probe the composition and structure of customer samples.

### ANALYTICAL SERVICES SUPPORT

- Comparison of samples – understanding what is the same and what is different.
- Structural elucidation – identifying chemical structures and/or composition.
- Profiling of samples – determining the identity and quantity of chemical compounds or analytes.
- Impurity identification – are unintended compounds changing the characteristics of final product.
- Address chemical diversity - address the wide chemical diversity found in final products and formulations.

# THE WATERS *solution*

## COMPREHENSIVE ANALYTE CHARACTERIZATION AND STREAMLINED WORKFLOW

Waters Xevo™ QToF MS, a novel, exact mass MS/MS System, has been engineered to handle the most complex applications and add simplicity throughout an analytical workflow.

**Better data** – High performance, full scan and exact mass capability ensure the generation of high quality, information-rich, reproducible data.

**Greater speed** – Fast data acquisition rates maximize the benefits of ACQUITY UPLC, including the highest chromatographic resolution, speed, and sensitivity.

**Simplified access** – IntelliStart™ Technology automates system set up to ensure that both highly experienced and novice scientists can operate the instrument quickly and confidently under optimal system operating conditions.

**Fast Interpretation** – MassLynx™ Mass Spectrometry Software delivers simple and rapid compound identification and interpretation, while allowing you to compile clear and accessible reports. Optional Application Managers assist with the acquisition of complex, application-specific data and the conversion of that data to useful information – ensuring faster, better quality decision making.

**LC/MS or GC/MS - one system** – Waters Atmospheric Pressure GC (APGC) Source makes analytical instrumentation more universally applicable by incorporating the ability to perform AP GC/MS on a single MS platform. Analyze volatile and semi-volatile compounds of low and intermediate polarity.



## WATERS TECHNOLOGIES

*Enhancing analytical capabilities..*

### ULTRAPERFORMANCE LIQUID CHROMATOGRAPHY

ACQUITY UPLC H-Class and PATROL UPLC

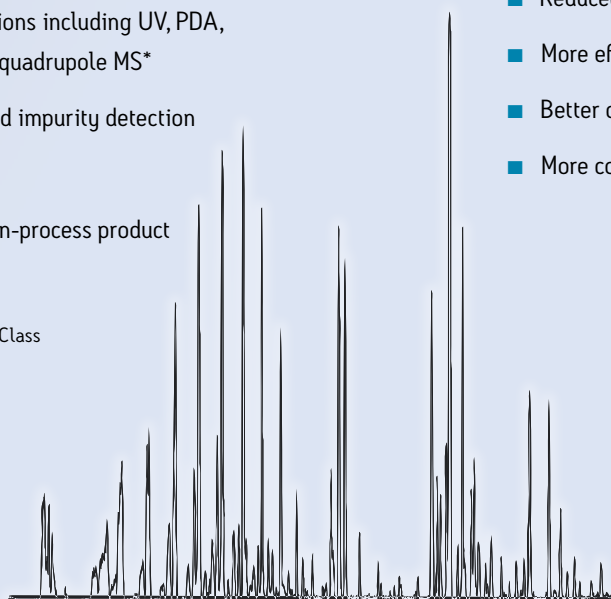
#### KEY BENEFITS

- Seamlessly transition to UPLC separations - run existing HPLC methods on the ACQUITY UPLC H-Class
- Faster separation speeds and better analytical resolution translate to rapid sample turnaround
- A variety of detection options including UV, PDA, ELSD, and single/tandem quadrupole MS\*
- Better sample profiling and impurity detection
- Reduced solvent usage
- Easy atline evaluation of in-process product

\*MS detectors for ACQUITY UPLC H-Class

#### BUSINESS IMPACT

- Faster product development
- Improved product support
- Reduced operational costs
- Reduced environmental impact
- More efficient manufacturing processes
- Better quality control
- More consistent, better quality products



*Faster data*

*Less Training*

*Lower analysis costs*



## MASS SPECTROMETRY DETECTION

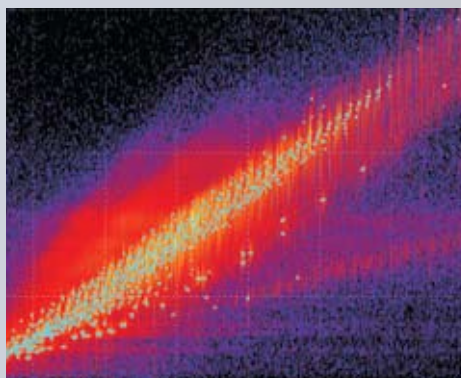
Xevo QTof, Xevo TQ, ACQUITY SQD, ACQUITY TQD, and SYNAPT G2

### KEY BENEFITS

- Xevo QTof, in MS/MS or GC/MS mode, provides more data, faster analyses, and simplified workflow.
- Xevo TQ, a highly advanced tandem quadrupole system, delivers the highest levels of sensitivity, selectivity, robustness, speed, and accuracy.
- ACQUITY SQD's single quadrupole detection offers a simple solution for fast-paced laboratories with robust and reliable performance, and walk up operation.
- ACQUITY TQD provides ultimate quantitative performance for demanding trace-level analysis.
- SYNAPT G2 allows for a more comprehensive understanding of samples by differentiating based on size, shape, charge, and mass.
- IntelliStart Software facilitates walk-up use and adoption by inexperienced users.

### BUSINESS IMPACT

- More readily troubleshoot customer application challenges
- Support regulatory compliance
- Facilitate new product innovation
- Deeper understanding of product functional characteristics



*interpretation*

*Higher sample throughput*

## WATERS TECHNOLOGIES

*...and delivering business impact*

### DATA MANAGEMENT SOFTWARE

Empower 2, MassLynx, ChromaLynx, and NuGenesis SDMS

#### KEY BENEFITS

- Empower 2 Chromatography Software provides advanced data collection, processing, and reporting with scalability for a single workstation, small group, or network.
- Empower 2 can control chromatography systems from multiple vendors as well as the ACQUITY TQD and SQD MS detectors.
- MassLynx Mass Spectrometry Software allows you to efficiently acquire, analyze, and distribute mass spectrometry information.
- ChromaLynx™ Application Manager automates the processing of LC/MS/MS datasets so you can easily detect, identify, and semi-quantitatively determine all components in a complex mixture.
- NuGenesis SDMS Software serves as a central repository for key information as it captures all analytical data from any instrument – information is automatically archived, instantly accessible, and easily searched.

#### BUSINESS IMPACT

- Maximize the value of instrument investments while reducing the time and costs required to implement, validate, and train analysts on multiple software packages.
- Accelerate the interpretation and reporting of results while simplifying data management – make better decisions, faster.
- Facilitate scientific collaboration – unite laboratories, scientists, and instrumentation
- React to customer support related inquiries with greater agility.
- Get products to market faster.

*Rapid product release*



## SERVICE & SUPPORT

### KEY BENEFITS

- Waters Global Services has the most in-depth and up-to-date knowledge of the science and technologies that provide the foundation for Waters systems.
- Worldwide coverage with 94 offices in 50 countries.
- Portfolio includes Instrument & Software Services, Education & Training, GxP Compliance, Asset Management, and Relocation.
- Remote monitoring and diagnostics for increased uptime with Connections INSIGHT®
- On-call expertise for minimum downtime.
- On-line support for rapid response and convenience.
- Flexible training options for convenience and savings.

### BUSINESS IMPACT

- Increase laboratory productivity
- Maintain peak performance
- Meet stringent compliance requirements
- Control costs

**2008 ACE Award**  
*Achievement in Customer Excellence*

*Satisfied customers*

*Stronger brand protection*

*Better product quality*



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