

[ACQUITY uPLC H-CLASS SYSTEM]



PERFORMANCE THAT
ADVANCES YOUR LAB

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

If you are performing routine analyses or developing methods, or just prefer the flexibility of multi-solvent capabilities in a quaternary-based system, the only choice has been HPLC.

Until now.

ACQUITY UPLC® H-Class from Waters. Now your laboratory can access the market leading performance of Waters UltraPerformance LC®, known as UPLC®. Choosing the ACQUITY UPLC H-Class System enables you to continue running your existing HPLC methods on a forward looking LC platform that allows you to confidently and seamlessly transition to UPLC separations, when you're ready, using integrated system tools and reliable column kits that simplify migration.

Waters ACQUITY UPLC Systems have been revolutionizing laboratories for more than seven years. Scientists all over the world rely on UPLC because it provides the ultimate in chromatographic resolution and sensitivity and the best analytical throughput, accelerating laboratory workflow and delivering business benefits that continue to drive productivity.

[ACQUITY UPLC H-CLASS SYSTEM]



In addition to superior performance, UPLC uses less bench space, less energy, and up to 95% less solvent. It's been proven to do the work of three HPLC instruments, and to dramatically improve LC/MS experiments.

**You can see why thousands of laboratories have adopted UPLC.
And now you can adopt it yourself.**

Acquity 
UPLC® CLASS

HPLC principles, but UPLC performance

When we created ACQUITY UPLC, we created a new category of performance. While UPLC applies the same principles of separation science as HPLC, the difference is our use of sub-2- μ m particle columns in a system holistically designed to maximize the advantages of these columns, creating a powerful, robust, and reliable solution that only Waters provides.

After more than seven years of scientific success with our ACQUITY UPLC System, Waters has redefined the category again. The ACQUITY UPLC H-Class System is the direct result of understanding the needs of customers who wanted a streamlined system that offers the flexibility of a quaternary-based HPLC, yet delivers the same performance advantages that customers have come to expect with ACQUITY UPLC – best-in-class chromatographic results.

The principles are the same. The performance is not.

Get UPLC-quality separations without changing the way you work. The familiar design of the ACQUITY UPLC H-Class's Quaternary Solvent Manager (QSM) and Sample Manager (SM-FTN), with flow-through needle design, gives you all the flexibility and usability of your current HPLC while still achieving the highly efficient separations that only UPLC can provide.

HPLC to UPLC: We've made the move even easier!

With the ACQUITY UPLC H-Class System, you won't have to think twice about transferring methods to and from any LC instrument. You can upgrade your chromatographic capabilities without risking your validated methods. Whether you are new to UPLC or a veteran user, our method transfer kits make scaling from HPLC to UPLC, and back, a straightforward process.

A breadth and depth of columns that no one else can offer.

With three UPLC particle substrates in 11 chemistries, Waters has the necessary selectivities to support your application needs. Our versatile, four-pack method development kits offer the column choices you need to develop methods efficiently and effectively. And Waters' state-of-the-art manufacturing process assures consistency of your results through batch-to-batch and column-to-column reproducibility.

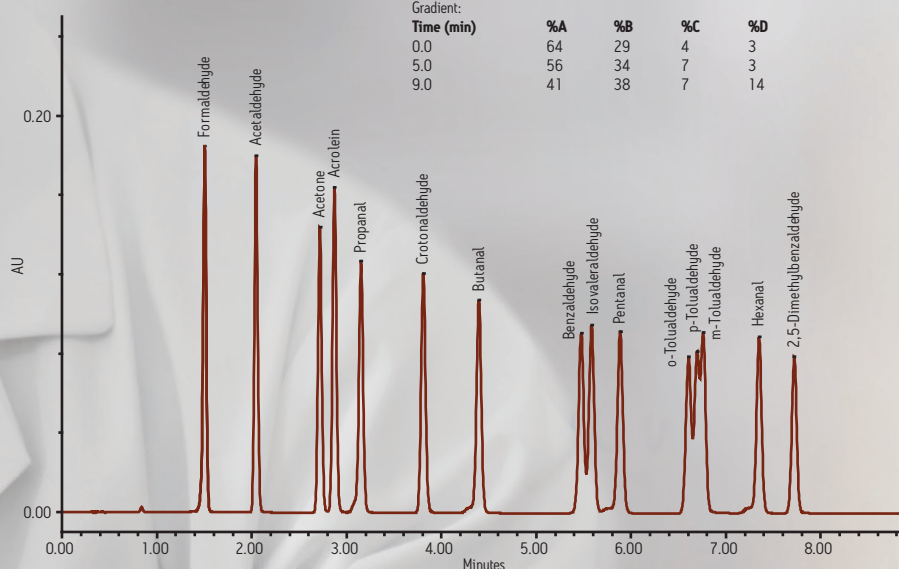
[ACQUITY UPLC H-CLASS SYSTEM]

Whether you're developing a pharmacopeial method or implementing an environmental or food safety testing method, you'll be working with a familiar quaternary-based system founded on the principles of UPLC, the best separation technology available.

Why settle for anything less?

System: ACQUITY UPLC H-Class
Column: ACQUITY UPLC BEH Phenyl 1.7 μ m, 2.1 x 100 mm
Sample: AccuStandard DNPH Option 2 Mix diluted 5:1 in 60:40 Acetonitrile/Water
Injection vol.: 3 μ L
Flow rate: 750 μ L/min
Eluent A: Water
Eluent B: Acetonitrile
Eluent C: Tetrahydrofuran
Eluent D: Methanol
Temp.: 50 $^{\circ}$ C
Detection: 360 nm @ 5 Hz normal
Needlewash: Default with 50:50 Water/Acetonitrile

Gradient:				
Time (min)	%A	%B	%C	%D
0.0	64	29	4	3
5.0	56	34	7	3
9.0	41	38	7	14



The ability to form a quaternary gradient on the ACQUITY UPLC H-Class System improves the critical resolution for EPA Method 8315 Option 2, for the analysis of 15 aldehydes and ketones as 2,4 dinitrophenylhydrazine (DNPH) derivatives, with a UPLC separation in less than 10 minutes.

Easy Method Transfer

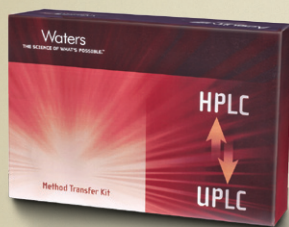
Select an ACQUITY UPLC Column that is comparable to your HPLC column, using our Reversed-Phase Column Selectivity Chart.

Enter your existing HPLC conditions into the ACQUITY UPLC Columns Calculator.

The tool will guide you step-by-step to either scale your gradient, or to choose a separation that is optimized for speed or resolution. Then select the best column dimensions from the menu, and enter the suggested method conditions.

Run.

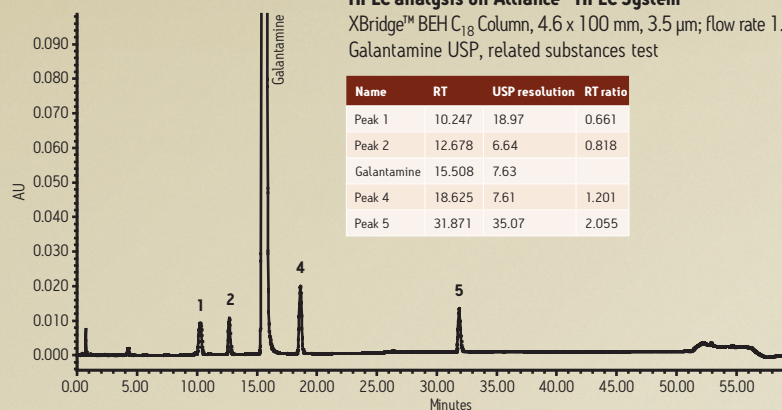
With unprecedented selectivity and reproducibility across batches and particle sizes, Waters Method Transfer Kits preserve the integrity of a separation as it is transferred between HPLC and UPLC platforms. And choosing the right UPLC columns and conditions couldn't be easier with the method transfer guidelines provided by the ACQUITY UPLC Columns Calculator.



Method Transfer Kit.

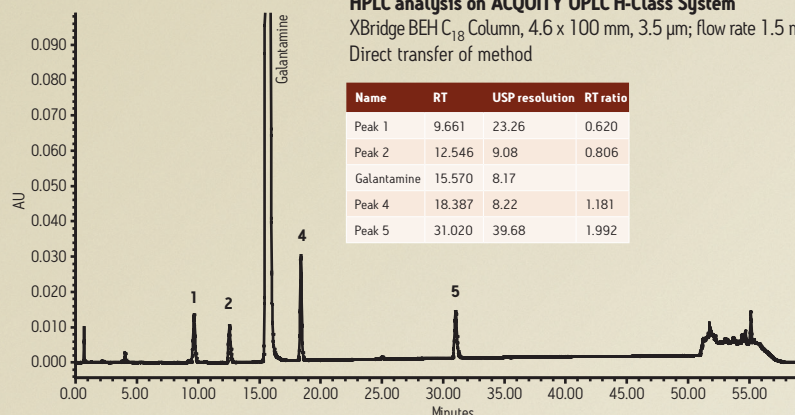
HPLC analysis on Alliance® HPLC System

XBridge™ BEH C₁₈ Column, 4.6 x 100 mm, 3.5 µm; flow rate 1.5 mL/min
Galantamine USP, related substances test



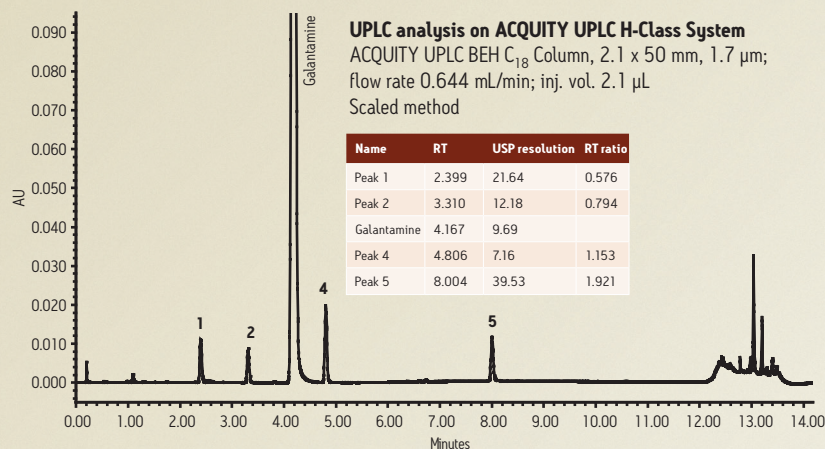
HPLC analysis on ACQUITY UPLC H-Class System

XBridge BEH C₁₈ Column, 4.6 x 100 mm, 3.5 µm; flow rate 1.5 mL/min
Direct transfer of method



UPLC analysis on ACQUITY UPLC H-Class System

ACQUITY UPLC BEH C₁₈ Column, 2.1 x 50 mm, 1.7 µm;
flow rate 0.644 mL/min; inj. vol. 2.1 µL
Scaled method



In this method transfer example using the related substances test for galantamine, used in the treatment of Alzheimer's disease, the USP method (monograph: USP32-NF27 Supplement: No. 2, Page 4245) is demonstrated first using an HPLC system. The method is directly transferred to the ACQUITY UPLC H-Class System using an HPLC column, maintaining selectivity and resolution, then scaled to UPLC using the Columns Calculator and optimized for the shortest analysis time at equal peak capacity.

Transform standard procedures into extreme performance

Extended Sample Capacity

When throughput is what you need, the ACQUITY UPLC Sample Organizer (SO) increases the level of automation and sample processing throughput of the ACQUITY UPLC H-Class System. The SO supports a wide range of plates and vial holders, and depending on the types of plates/holders used, it can extend the capacity of the system by more than tenfold.

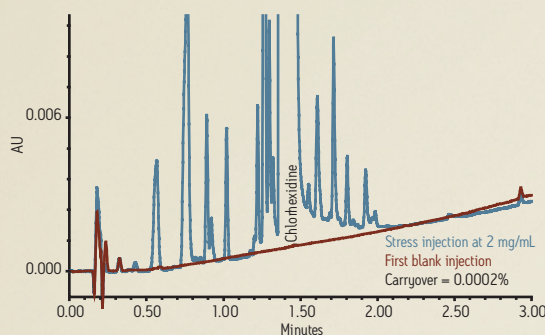
Next-generation column compartments

Our new low volume column heaters and managers are designed to promote accurate thermal fidelity resulting in the same efficiency system to system.

- Active solvent pre-heating ensures consistent thermal performance from system to system, further enabling seamless method transfer and accurate results
- Stackable column modules offer up to 6 column flexibility, independent thermal zones for each column, and have an extended temperature range of 4 to 90 °C for optimal method development performance
- Extended support for columns up to 300 mm in length is also available

Intuitive and precise sampling

The flow-through needle design of the new Sample Manager (SM-FTN) delivers high-precision injections with excellent sample recovery. Innovative, patent-pending Smart Seal Optimization technology ensures an accurate needle seal, even at the highest UPLC pressures.



The SM-FTN provides excellent carryover performance, shown here at 0.0002% for chlorhexidine, a chemical antiseptic that is basic and difficult to remove.

Informatics solutions that adapt to your lab's needs

The ACQUITY UPLC H-Class System is fully compatible with Empower™ Software, our industry-leading chromatography data software platform, as well as MassLynx™ Software and its suite of data processing Application Managers. Waters' own unique eCord™ Technology records the usage and history of your UPLC columns.



[ACQUITY UPLC H-CLASS SYSTEM]



Multi-solvent blending

The Quaternary Solvent Manager on the ACQUITY UPLC H-Class System dynamically blends four solvents in any combination or proportion saving you time previously spend on pre-blending. What's more you can expand to up to nine solvent choices with the system's optional internal solvent-select valve for infinite method flexibility.

- New Auto•Blend Plus™ Technology (patent pending): Maximize separation selectivity by enabling Auto•Blend Plus to automatically blend desired pH and ionic strength gradients, on-demand, from pure solvents and concentrated stock buffers.
- SmartStart Technology (patent pending): Intelligent software algorithms manage system overhead determining when the gradient needs to start, while simultaneously managing pre-injection steps in parallel. By overlapping these typically serial processes, SmartStart minimizes cycle time to maximize sample throughput.

The most comprehensive line of UPLC detectors available

The efficient separations achieved by UPLC require innovative ultra-low-dispersion detectors that maintain peak integrity. Only Waters can offer the widest range of UPLC-optimized detectors on the market, delivering the highest sensitivity to your applications.

- Photodiode array (PDA), extended wavelength PDA (PDA eλ), tunable ultra-violet (TUV), evaporative light scattering (ELS), and fluorescence (FLR)
- Single (SQ) and tandem (TQ) quadrupole mass detectors

Superior installations and services you can rely on

Our dedicated system experts will get you up and running quickly – for a 100% seamless transition to ACQUITY UPLC H-Class. As your laboratory grows and expands, so does ACQUITY UPLC H-Class.

Method development that's robust, reliable – and predictable

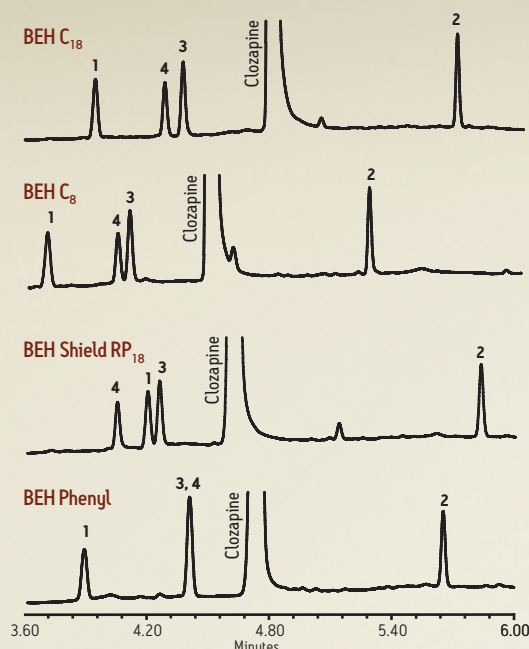
With the ACQUITY UPLC H-Class System, method development turns from a tedious and time-consuming process with HPLC, to a versatile and productive workflow with UPLC. The system features a variety of components to improve data quality, increase sample throughput, and reduce cost per analysis for timely and predictable results.

Separation of clozapine from four structurally-related impurities using BEH Column Technology

These columns can be quickly screened over a wide range of temperature, mobile phase pH, and pressure to maximize selectivity and produce a successful result.

System: ACQUITY UPLC H-Class with PDA
Columns: ACQUITY UPLC 2.1 x 50 mm (all)
Injection vol.: 5 µL
Flow rate: 0.5 mL/min
Temp.: 30 °C
Detection: UV 257 nm, 20 Hz, Tc = 0.1 s

Eluent A: Water
Eluent B: Acetonitrile or Methanol
Eluent C: 200 mM NH₄COOH, pH 3 with HCOOH
Eluent D: 200 mM NH₄COOH, pH 10 with NH₄OH
Needle, Purge, and Seal wash lines in 50:50 ACN/H₂O
Gradient from 5 to 90% MeOH in 5 min (10 mM, pH 10 buffer)



ACQUITY UPLC Method Development Kits offer combinations of different column chemistries to accommodate your method development approach, enabling methods to be developed efficiently and effectively.

Employ Empower Method Validation Manager (MVM) to perform chromatographic method validation, from protocol planning to final reporting, in one application.

Increase efficiency, reduce costs and improve analytical performance from development to QA/QC with ACQUITY UPLC H-Class and Fusion Quality-by-Design (QbD) based method development software.

Simultaneous method development for morphine-related compounds using reversed-phase and HILIC chromatography

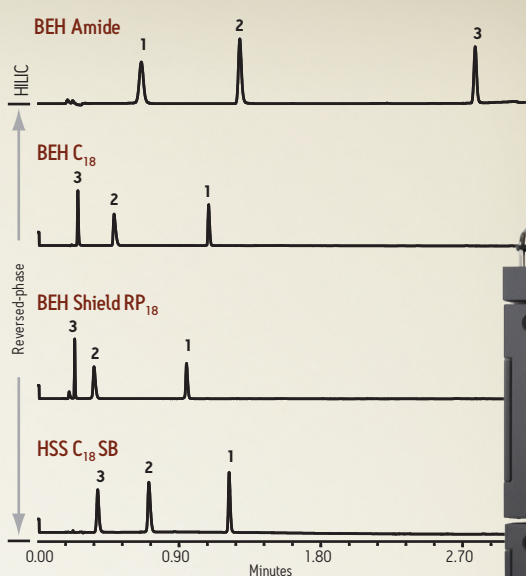
New system capabilities inherent to the ACQUITY UPLC H-Class enable the sequential development of methods for compounds with a broad range of polarity and chemical properties.

Compounds:

(1) 6-acetylmorphine, (2) morphine, (3) morphine-3β-D-glucuronide

System: ACQUITY UPLC H-Class with PDA
Columns: ACQUITY UPLC 2.1 x 50 mm (all)
Injection vol.: 5 µL
Flow rate: 0.6 mL/min
Temp.: 30 °C
Detection: UV 280 nm, 20 Hz, Tc = 0.1 s

Eluent A: Water
Eluent B: Acetonitrile
Eluent C: 200 mM NH₄COOH, with 2.5% HCOOH, pH 3
Eluent D: 200 mM NH₄COOH, with 0.8% NH₄OH, pH 9
Needle, Purge, and Seal wash lines in 50:50 ACN/H₂O
Gradient: HILIC: 95 to 50% ACN in 5 min (10 mM pH 3 buffer)
RP: 5 to 95% ACN in 5 min (10 mM pH 3 buffer)



SALES OFFICES:

Austria 43 1 877 18 07

Australia 61 2 9933 1777

Belgium and Luxembourg 32 2 726 1000

Brazil 55 11 4134 3788

Canada 1 800 252 4752

China 86 21 6156 2666

Czech Republic 420 2 617 11384

Denmark 45 46 59 8080

Finland 358 9 5659 6288

France 33 1 30 48 72 00

Germany 49 6196 400 600

Hong Kong 852 2964 1800

Hungary 36 1 350 5086

India 91 80 2837 1900

Ireland 353 1 448 1500

Italy 39 02 265 0983

Japan 81 3 3471 7191

Korea 82 2 6300 4800

Mexico 52 55 52 00 1860

The Netherlands 31 76 508 7200

Norway 47 6 384 6050

Poland 48 22 833 4400

Puerto Rico 1 787 747 8445

Russia/CIS 7 495 727 4490 / 290 9737

Singapore 65 6593 7100

Spain 34 93 600 9300

Sweden 46 8 555 115 00

Switzerland 41 56 676 7000

Taiwan 886 2 2501 9928

UK 44 208 238 6100

US 1 800 252 4752

Waters Corporation

34 Maple Street

Milford, MA 01757 U.S.A.

T: 508 478 2000

F: 508 872 1990

www.waters.com

www.waters.com/hclass

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

Waters, Alliance, ACQUITY UPLC, UltraPerformance LC, and UPLC are registered trademarks of Waters Corporation. The Science of What's Possible, Auto•Blend Plus, Empower, MassLynx, XBridge, and eCord are trademarks of Waters Corporation. All other trademarks are the property of their respective owners.

©2011 Waters Corporation. Printed in the U.S.A.

May 2011 720003268EN LB-CP

