[ALLIANCE HPLC SYSTEM]

THE GOLD STANDARD IN HPLC ANALYSIS



Waters

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THE INDUSTRY-STANDARD HPLC PLATFORM WITH VERSATILE, DEPENDABLE PERFORMANCE TO SUPPORT THE ANALYTICAL NEEDS OF YOUR LABORATORY.

Inspired by input from our increasingly time-constrained users, industrybenchmark Waters[®] Alliance[®] HPLC Systems have been continually expanded and perfected over the years to accommodate an enormous range of real-world, problem-solving HPLC separation challenges. Synonymous with dependable performance, high quality and flexible operation, tens of thousands of these systems are being used every day, around the world. Alliance HPLC Systems meet the rigorous requirements of routine analyses in addition to the performance standards of new-product research and method development. Whether your lab operates in the pharmaceutical, chemistry, food safety, environmental, or quality control arenas, Alliance HPLC Systems offer you a proven solution for all of your HPLC requirements – today and in the future.



Welters 2998



Alliance HPLC Systems continue to provide the highest performance and superior technology demanded by scientists worldwide. Flexible system configurations and newly-optimized HPLC detectors have made Alliance the gold standard for liquid chromatography analysis.

AN HPLC SYSTEM THAT WORKS AS HARD AS YOU DO

Whether you require high performance, minimized downtime, ease-of-use operability, maximum productivity, or compliance with regulatory requirements, Alliance HPLC Systems are designed to work the way you do.

The proven technologies that make up the Alliance family of HPLC systems significantly reduce the possibility of unscheduled downtime and take reliability to a whole new level leaving you with the confidence that your system is running at optimal performance.

- Integrated fluidics results in a low-dispersion design providing consistent performance, enhanced reproducibility, and higher quality results.
- Up to four solvents are automatically conditioned and blended for isocratic, dial-a-mix, or gradient operation.
- An array of newly optimized detection choices, ranging from routine UV to MS/MS, delivers the lowest possible detection limits for the most stringent of applications.
- Easily manage your results with Waters platform of Informatics and data handling solutions.

With tens of thousands of systems in use today, Alliance HPLC Systems are the flexible, reliable workhorse able to meet all of your HPLC requirements.

Component	Precision of Retention Time (RSD of RT) N=100	Precision of Area (RSD of Area) N=100
Inosine	0.348%	0.166%
Adenosine	0.380%	0.246%



When coupled with Waters Intelligent Speed (ISTM) Column Chemistry, the Alliance HPLC System delivers excellent performance for fast chromatography without the need to change or modify existing hardware. Note the excellent retention time and area precision achieved for 100 consecutive injections.

Minimize risks

Fluidic design provides peace of mind by ensuring that accidental leaks and spills are safely managed and directed out of harm's way.

Ensure accuracy of results

The duration of the needle wash is user definable – helping you to effectively manage sample carryover concerns without using wash or rinse vials.

Manage the separation process

Optional Column Heater or Column Heater/Cooler utilizes built-in forced air recirculation providing an extremely stable column environment. Available integrated switching valves permit rapid

column selection,

enabling unattended HPLC method development.

Integrated fluidics

The integrated solvent and sample management functions ensure highly consistent system-to-system performance, bringing the highest reproducibility to your laboratory processes.

Simple start-up, robust data management

With a large and intuitive LCD-based user interface, analysts can take advantage of rapid system set-up with SystemPREP, designed to streamline daily startups.

Tool-free maintenance

The system's design helps maximize uptime by providing easy, tool-free access to pistons, seals, and seal-wash seals, as well as the lower needle-wash seal of the Sample Manager.

Manage sample workload

Up to 120 industry-standard vials can be accommodated in five individual sample carousels. Sample queues are quickly set up – whether you need to run just one sample or a sequence of multiple methods from different analysts. The sample environment can be temperature-controlled and is compatible with light-sensitive samples.

Manage LC solvents

The system degasses and blends up to four chromatographic solvents in precise proportions for smooth, pulse-free solvent delivery, while the latest PerformancePLUS[™] check-valve technology ensures minimal downtime.

INTEGRATED FLUIDIC DESIGN FOR RELIABLE OPERATION

Solvent management

Waters Alliance HPLC Systems employ a simplified fluidic pathway that utilizes a serial flow path with only two check valves. This results in reduced complexity and enhanced overall ruggedness across a flow range that covers two orders of magnitude.

- Automatic solvent compressibility for worry-free solvent delivery and highly reproducible retention times – with any solvents.
- Fixed gradient volume ensures consistent, predictable chromatography – regardless of system back pressure.
- Flexible flow rate is programmable without hardware modifications, across a flow range of 0.05 mL to 5 mL per minute.
- Improved uptime with standard equipment, including an automated, active plunger seal wash.





The exceptional flow characteristics of the e2695 Separations Module, as shown by this overlay of 3 consecutive injections, reduce system noise, providing smoother baselines, resulting in higher sensitivity detection. This example demonstrates a TFA gradient for analysis of peptides (MassPREP Peptide Standard). Low-level components in the MassPREP Peptide Mixture are detected due to the low compositional ripple achieved by the Alliance e2695 when utilizing TFA gradients.

Sample management

Injector linearity

The Alliance HPLC System's sample management design ensures precise sampling – delivering predictable peak areas, and thus more consistent results – thanks to:

- Five independent carousels Run samples in one carousel while prepping the sequence in the next; new samples/carousels can be added without disturbing the ongoing queue
- Sampling routines For automated reference, peak addition, or automated pre-column derivitization procedures
- Reproducible injections Select from one to hundreds of microliters, compatible with any analytical-scale HPLC column chemistry
- Variable volume injections No need to change loops for analytical methods

- Programmable needle injection Adjustable height accommodates various vial geometries (such as different vial bottom thicknesses)
- Programmable syringe draw-rate Optimizes sampling performance with various solvent viscosities
- Carryover management Controlled via a programmable needle wash cycle and an active needle wash solution
- Consistent sample environment Samples are kept at a constant temperature and shielded from exposure to ambient light
- Simplified routine maintenance The seal wash frit and injection syringe are easy to access and change without tools



Exceptional injector linearity ensures accurate performance of your analysis and can minimize sample preparation time by replacing dilution or concentration routines.

Injector reproducibility



Superior reproducibility gives you confidence that any analysis variability is not a result of your system.

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Low carryover performance is a defining characteristic in a well designed HPLC. Alliance's PerformancePLUS needle and programmable needle wash virtually eliminate carryover, even under difficult conditions. As shown in this caffeine analysis example, the first blank injection demonstrates that the carryover is much less than the specification at 0.0030%.

Automated system start-up

The Alliance HPLC System features SystemPREP – a programmable, automated system preparation routine for fast, one-touch, walk-up operations. The SystemPREP function performs a series of automated steps, putting the separations module in a condition of complete system readiness for running samples. SystemPREP is useful when you are changing solvents or after extended periods of system inactivity and is a simple-to-use alternative to running the individual functions of Wet Prime, Purge Injector, Equilibrate, and Condition Column.



Morning start-ups are easy with the system's one-touch, wet prime SystemPREP function.

SUPPORT AT YOUR FINGERTIPS

The Alliance HPLC Interactive System Support CD ships with every system and contains basic troubleshooting and maintenance information to help keep your Alliance HPLC System running at its best.

The CD contains 70 minutes of video clips showing you:

- Step-by-step and easy-tofollow maintenance procedures
- Detailed troubleshooting information
- Tools to help you document your methods or system set-up
- Guidelines for optimum performance
- Links to the Waters website for fast access to additional information, support, and training courses



SYSTEM FLEXIBILITY ADDRESSES YOUR LABORATORY'S NEEDS

Whether your application is pharmaceutical, environmental, food safety, or chemical analysis, the flexible system configurations of the Alliance HPLC Systems are perfectly suited to address the needs and tasks of multiple applications, while its consistent performance delivers timely, predictable results you can rely on.

Full spectrum of detection options

Waters offers a full spectrum of high-sensitivity detection options that help you to analyze a wide variety of compounds. Use them alone, or in combination, to obtain more information per run, fulfilling multiple detection strategy requirements.

3100 Mass Detector

Designed for ease-of-use with IntelliStart[™] Technology, the Waters 3100 Single Quadrupole Mass Detector delivers on simplicity, sensitivity, selectivity, and high-throughput for HPLC/MS.



SIR for method development – Alliance HPLC systems, with optional column selection capabilities and multiple detection techniques, results in a powerful methods development tool. Go ahead and run at both high and low pH; the selectivity of the 3100 mass spectrometer yields more reliable peak tracking capabilities, ensuring accuracy of your data, as shown in this analysis of an over-the-counter (OTC) pain reliever.

2489 UV/Visible Detector

The most sensitive and versatile dual-wavelength absorbance detector for HPLC.



Trace impurity analysis – If high sensitivity analysis is of importance to you, the Alliance HPLC with 2489 UV/Visible Detector is the gold standard. Have confidence that your system will detect the smallest trace impurities while still providing accurate quantitative analysis on your peak of interest.

2465 Electrochemical Detector

Fully automated, reliable electro-chemical detection provides sensitivity and usability suitable to a wide range of compounds.

432 Conductivity Detector

Superior sensitivity and stability for ion chromatography based analyses.

2998 Photodiode Array (PDA) Detector

Offers advanced optical detection delivering high chromatographic and spectral sensitivity.



Exploring extreme conditions – Alliance HPLC Systems with PDA Detector deliver no-compromise performance that allows you to get the most out of your column chemistries. Waters XBridge Columns are unique in their ability to withstand aggressive conditions (even at pH 12) allowing complete method development flexibility, while maintaining the highest efficiency values associated with silica columns.

2414 Refractive Index Detector

Unsurpassed sensitivity, stability, and reproducibility for HPLC and GPC analyses.

2475 Multi-Fluorescence Detector

Designed for applications where both high sensitivity and selectivity are required.



Improving the environment – Confidence in your Polycylic Aromatic Hydrocarbons (PAH) results will increase after you combine the unwavering gradient reproducibility of the Alliance HPLC System with our high-sensitivity, 3D scanning 2475 Fluorescence Detector.

2424 Evaporative Light Scattering (ELS) Detector

The ideal solution for the analysis of components with limited or no UV chromophores.



Ensuring product quality – Be confident about the quality of your raw materials and finished product. With the Alliance HPLC System and the 2424 ELS Detector, you can test for adulterated materials earlier in your process, such as vegetable oil origin and purity, in a single run.



Alliance HPLC System with the 3100 Mass Detector

QUALIFICATION MADE EASY WITH SystemsQT

SystemsQT[™] is a patented technology that enhances the qualification testing and data management of the Alliance HPLC System, its software, and additional devices. Using the advanced systems control, data acquisition, and custom reporting features of Empower software, SystemsQT provides documentation to meet GxP and 21 CFR Part 11 requirements. **Oualification Services can** be delivered by trained and certified Waters Compliance Specialists, or Waters can provide you with the workbooks and training necessary to perform your own system and software qualifications.

BE ASSURED. CHOOSE WATERS GLOBAL SERVICES.

With 94 offices in more than 50 countries, only the Waters Global Services team has the most in-depth and up-to-date knowledge of the advanced science and technologies that provide the foundation for Alliance HPLC Systems. Maximize system uptime, increase laboratory productivity, and meet stringent compliance requirements with the expertise and responsiveness you need.

LEADING HPLC CONSUMABLES

Waters offers a variety of consumable products that are ideally matched to your application needs. Our wide range of columns, sample preparation, and accessories give you a powerful advantage no matter what analysis challenges you face.

HPLC columns

Waters line of HPLC columns are designed to facilitate efficient methods development and eliminate significant time and cost per sample from your analytical process – while improving the quality of laboratory results.



Sample vials

Waters vials and plates are manufactured and tested to ensure the delivery of problem-free products. HPLC and LC/MS Certified vials are proven to be the cleanest vials in the industry and ensure that your test results are not compromised by ghost peaks, dislodged septa, or damaged needles.

DO MORE WITH YOUR RESULTS

Waters software solutions enable you to capitalize on the results generated by the Alliance HPLC System. The Waters Laboratory Informatics Suite includes proven information management solutions that integrate all your lab resources in a consistent, scalable, and seamless application environment.

EmpowerTH Software provides control of the Alliance HPLC System, including data acquisition, management, processing, and reporting, all in the market-leading chromatography data software (CDS) platform. Empower Software is scalable from a single workstation to an enterprise-wide CDS solution, and offers advanced features for method development, reporting, and custom calculations, as well as Enterprise Options for advanced data management and automated method validation management.



Sample preparation

Waters has a comprehensive solution for numerous sample preparation challenges, regardless of your preferred sample preparation technique.



MassLynx[™] Software, for advanced mass spectrometry applications, enables researchers to acquire, analyze, manage, and distribute information. MassLynx Software offers flexible control over complex instrument configurations, and Application Managers that are tailored for specific MS analyses.

NuGenesis® SDMS is a customizable scientific information management platform that automatically captures and stores data in a centralized data warehouse. SDMS makes information easier to access, facilitates regulatory compliance, and aids in the administration of intellectual property. SDMS converts scientific results into accessible and valuable corporate knowledge.

Alliance HPLC Systems. Any HPLC application. All the time.

Alliance HPLC Dissolution System	An online HPLC platform for automated, high-throughput dissolution and drug release testing.
Alliance HPLC High Throughput (HT) System	Its integrated sample and solvent management system is automated, and optimized, for high efficiency separations specifically for HPLC/MS or HPLC/MS/MS to produce high quality data.
Alliance HPLC Bioseparations (Bio) System	A high-precision, high-resolution HPLC system for the fractionation and analysis of complex biomolecule mixtures.

FOR MORE INFORMATION GO TO WWW.WATERS.COM/ALLIANCE

"To determine peimine, peiminine, and zhebeinine in *Fritillaria thunbergii* simultaneously by RP-HPLC-ELSD... with an XTerra RP18 Column...The average recovery rates (n=5)...were 98.2% (RSD 1.7%), 98.2% (RSD 2.2%), 96.5% (RSD 1.3%) respectively. The method is simple, sensitive and reliable. It can be used for quantitative determination of *F. thunbergii*."

Xue Y, Wang F.

Simultaneous determination of peimine, peiminine and zhebeinine in *Fritillaria thunbergii* from different habitat by HPLC-ELSD. *Zhongguo Zhong Yao Za Zhi*. Chinese. 2007 Aug;32(16):1628-30.

"We have developed and validated a method for the measurement of urinary cotinine using reversed phase high-performance liquid chromatography (HPLC) coupled to tandem mass spectrometry (LC-MS/MS)...performed using a Waters Alliance HT LC System...We have developed a robust and rapid assay for measuring and analysing urine cotinine by LC-MS/MS, by utilizing a technique, which has reduced ion suppression effects. Ultimately, the method will facilitate the assessment of lung transplant patients' smoking status."

Chadwick CA, Keevil B. Measurement of cotinine in urine by liquid chromatography tandem mass spectrometry. *Ann Clin Biochem*. 2007 Sep;44(Pt 5):455-62.

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