Arc™ HPLC

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PERFORMANCE YOU NEED, RESULTS YOU CAN TRUST

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

ENSURE CONFIDENCE IN YOUR ROUTINE ANALYSIS

Ever-evolving regulations are impacting LC method approaches for product quality control and beyond. Count on the Arc™ HPLC System for high-efficiency separations to help meet your regulatory requirements with confidence. The system allows you to easily replicate and improve the performance of existing LC methods without compromising data quality, avoiding the burdens of older, less efficient LC systems.

The Arc HPLC System eliminates the need to redevelop and revalidate your method. Seamlessly receive transferred methods from the Alliance™ System or other HPLC platforms, preserving analyte retention time, while taking advantage of low analyte carryover, high injection precision, and high backpressure tolerance, to enhance existing HPLC methods and improve the repeatability and reproducibility of your analysis.

For over 60 years, laboratory-driven organizations have relied on the expertise of Waters to deliver reliable, robust, and reproducible solutions to ensure confidence in their analytical results. With over 100,000 LC systems installed worldwide, we understand the significant impact the right technology has on your business and the implications it has on characterizing the quality and safety of your products.

Whether you are working to ensure the safety of a new and innovative product or maintain the consistency and supply of a current one, in a pharmaceutical company, or contract research, development, or manufacturing organization, the Arc HPLC System gives you greater agility, robustness, and efficiency to help you reduce your regulatory burden, risk of failure, and costs with ease.

- Pressure envelope extends to 9500 psi at 5 mL/min
- Sample and column heating and cooling
- High performance analytical optical detectors, including photodiode array or UV/Vis
- Ease of operation with fully automated priming and automated system prep function in the Arc HPLC Console
- Fluidic path designed to reduce clogging associated with high salt content buffers
- Wide range of scalable column chemistries including CORTECS,™ XBridge,™ XSelect,™ Atlantis,™ and SunFire™
- Compatibility with compliance-ready Empower™ Software, delivering high data integrity
- Automated qualification tools to minimize compliance costs and time

RUGGED AND RELIABLE HPLC DESIGNED FOR ROUTINE QC

High sensitivity optical detectors

High performance analytical optical detectors, including photodiode array or UV/Vis, optimized to support detection for small molecule analytes, delivering exceptional sensitivity and linearity for your assays.

Gradient SmartStart

Adjust the injection relative to the gradient start to emulate other HPLC systems' dwell volumes, without the need to alter the gradient table. Successfully transfer most methods in just two injections.

Quaternary solvent management

Precise and accurate blending of up to four solvents with automated solvent compressibility compensation. Increase solvent flexibility with an optional, integrated solvent select valve, providing access to six additional solvents.

Negligible carryover

Advanced flow-through needle design minimizes carryover by continuously cleansing the needle during run. User-configurable wash settings provide capability to address even 'sticky' compounds to help ensure a clean analysis of the current target sample.

Column technology

Heating and cooling that supports columns up to 300 mm in a stable temperature environment for method repeatability from lab-to-lab. Optional and integrated column switching for up to three columns provides unattended column changeover. Simplify method screening and easily switch back and forth to support multiple methods on one system.

Auto•Blend™ Plus Technology

Program gradients directly in terms of pH and ionic strength to minimize manual mobile phase preparation and reduce potential for human error in routine analysis.

Designed for robustness

Integrated solvent degassing, seal wash, and fluidic path designed to reduce clogging associated with high salt content buffers for maximum uptime.

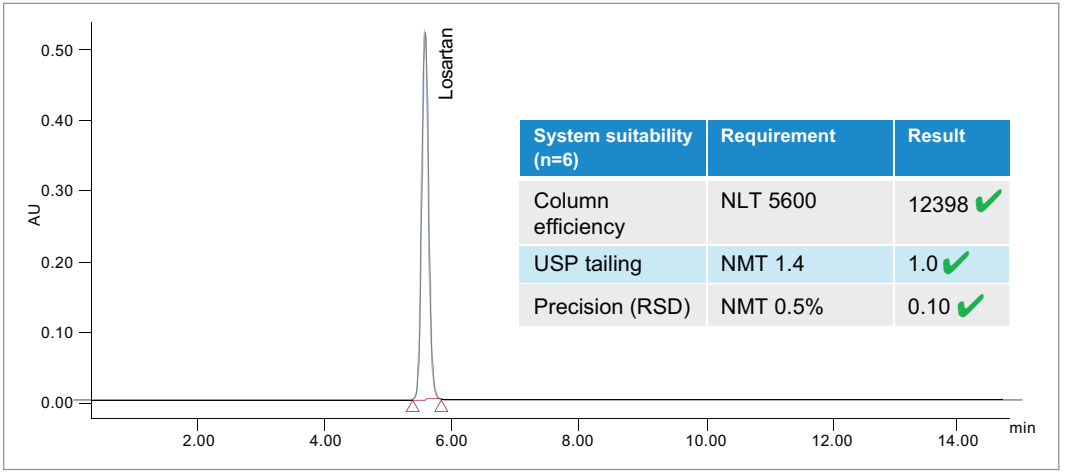
Holistic offerings

Benefit from an integrated offering of industry-leading columns, chemistry, and software solutions to meet the needs of virtually every HPLC application.

- Columns: The perfect pairing for high quality separations
- Informatics: Get more from your data for more confident decisions
- Global Services: Committed to your success

THE PRECISION TO HANDLE YOUR MOST STRINGENT ASSAY REQUIREMENTS

With the Arc HPLC System, the USP assay for losartan potassium met all of the system suitability requirements, including injection precision <0.5%. Comparison of the Arc HPLC System to competitive HPLC systems demonstrates leading performance in USP efficiency, USP tailing, and injection precision.



System suitability (n=6)	Requirement	Result
Column efficiency	NLT 5600	12398 ✔
USP tailing	NMT 1.4	1.0 ✔
Precision (RSD)	NMT 0.5%	0.10 ✔

Figure 1. Analysis of a standard solution using the USP-NF assay for losartan potassium on the Arc HPLC System with an XSelect HSS T3 5 µm, 4.6 x 250 mm Column, demonstrating the performance of the Arc HPLC System compared to system suitability requirements.

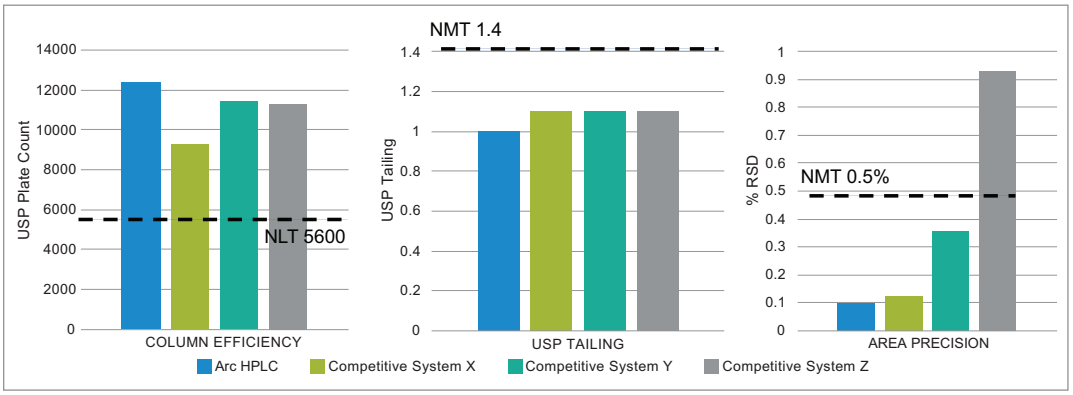
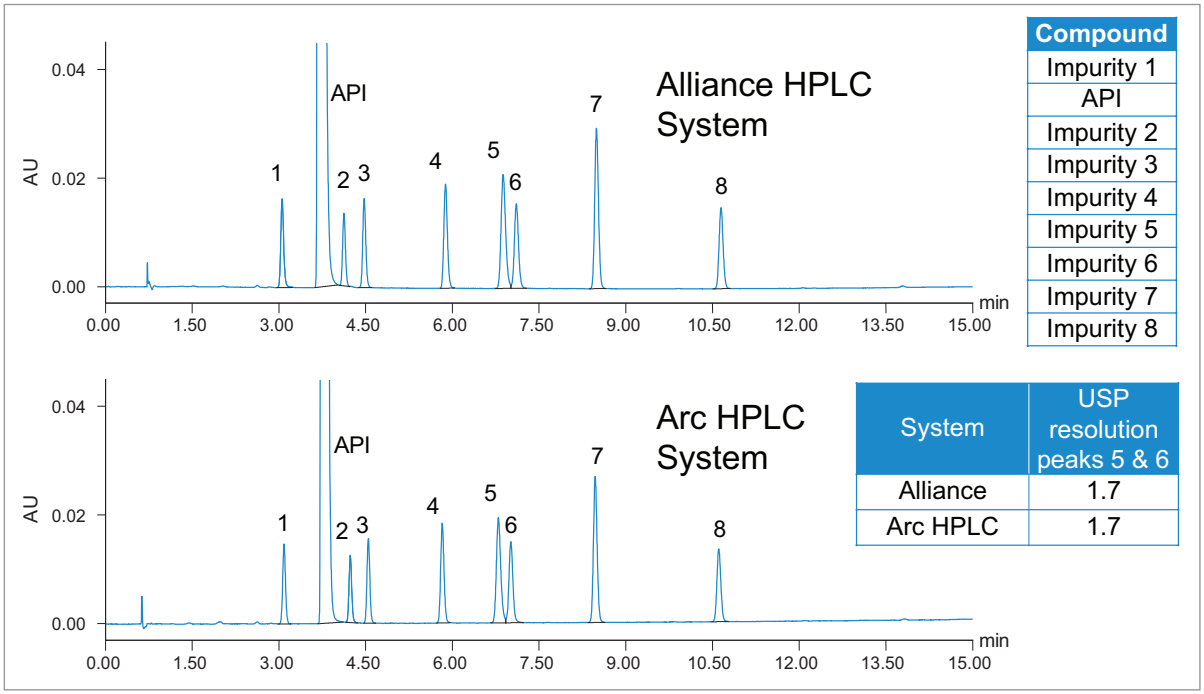


Figure 2. Comparison of the performance of the Arc HPLC System and several competitive HPLC systems relative to the system suitability requirements for the USP-NF assay for losartan potassium. All data used in this comparison was generated concurrently in the same laboratory to ensure evaluation integrity.

SEAMLESS TRANSFER WITHOUT CHANGING YOUR METHODS

With the Arc HPLC System, easily transfer existing methods independent of the instrument, laboratory, or resources that were used to develop the original method. Achieve equivalent test results without compromising method integrity or changing validated gradient tables.

The Arc HPLC System was used to transfer an HPLC method for impurities analysis from an Alliance System, successfully replicating the quality of chromatographic separation. The relative retention times are comparable, eliminating the need to make manual dwell volume adjustments for effective method transfer.



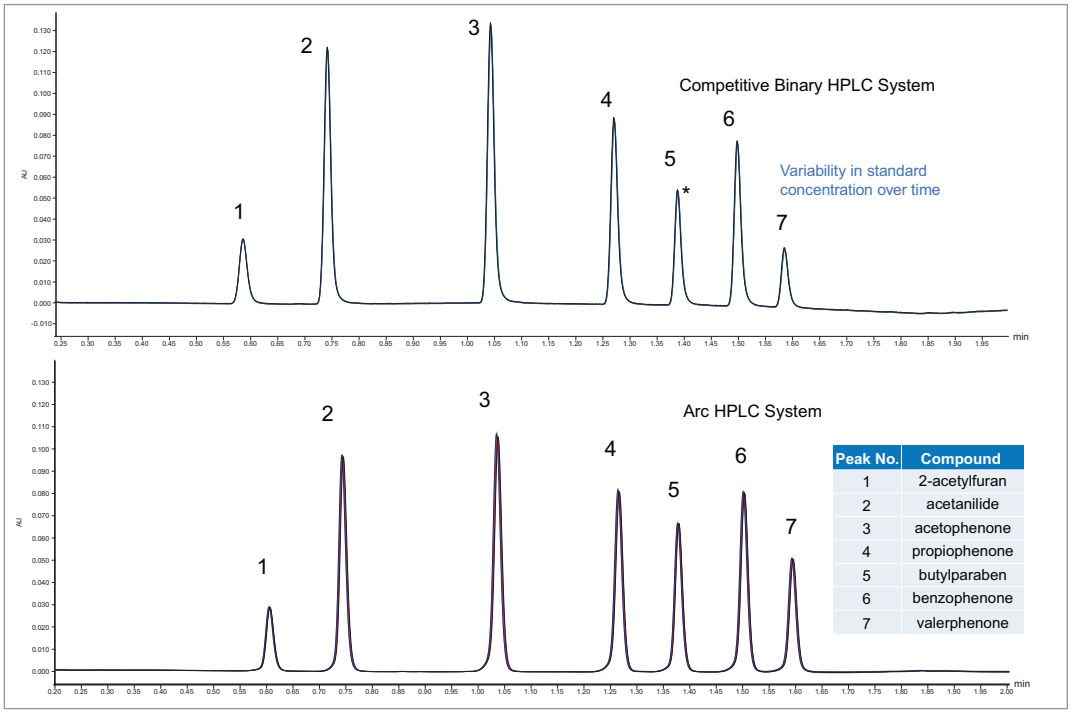
Compound
Impurity 1
API
Impurity 2
Impurity 3
Impurity 4
Impurity 5
Impurity 6
Impurity 7
Impurity 8

System	USP resolution peaks 5 & 6
Alliance	1.7
Arc HPLC	1.7

Figure 3. Comparison of chromatographic data for the analysis of an API and its impurities, demonstrating effective method transfer from an Alliance System to an Arc HPLC System. Analyses were performed using a CSH C_{18} Column (5 µm, 4.6 x 150 mm). Mobile phase: 0.1% formic acid in water (A) and in methanol (B), at 2.9 mL/min; 10-µL injection volume and passive pre-heater installed in both systems.

THE PERFORMANCE YOU EXPECT, THE FLEXIBILITY YOU WANT

Although the Arc HPLC System uses quaternary gradient formation, it performs as well as many binary HPLC systems. In a side-by-side comparison for a challenging separation at high flow rates, the system delivered similar retention time stability and superior peak area repeatability compared to a competitive binary HPLC system.



Peak No.	Compound
1	2-acetylfuran
2	acetanilide
3	acetophenone
4	propiophenone
5	butylparaben
6	benzophenone
7	valerphenone

Figure 4. Comparison of chromatographic data demonstrating repeatability of six replicate injections of a fast separation on an Arc HPLC System versus a competitive binary HPLC system. Analyses were performed using an XBridge C_{18} Column (3.5 µm, 4.6 x 50 mm). Mobile phase: water (A) and acetonitrile (B), from 10–80% B in 1.5 min, at 3.5 mL/min; 20-µL injection volume. Dwell volume adjustments were made using Gradient SmartStart.

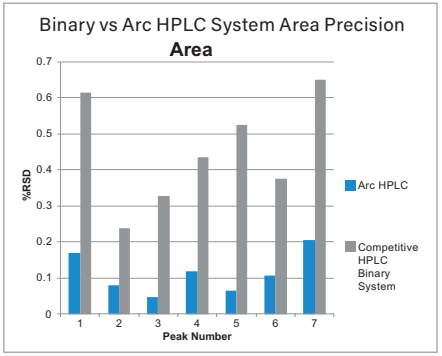
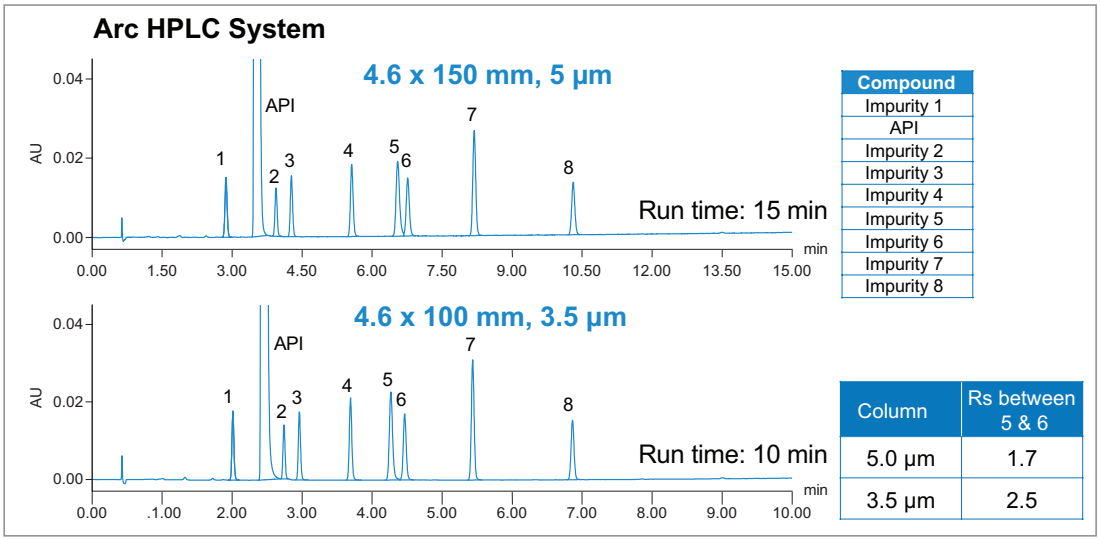


Figure 5. Comparison of peak area repeatability for each of the seven chromatographic peaks in the analysis shown in Figure 4.

IMPROVE YOUR PRODUCTIVITY AND EFFICIENCY

When methods are scaled to smaller particles (e.g., from 5 µm to 3.5 µm), the resulting backpressure typically increases and the resolution improves. The high pressure limit of the Arc HPLC System allows the use of high flow rates with smaller particle columns to gain efficiency, reducing the analytical run time and mobile phase consumption. As shown below, the resolution of a critical pair of analytes (peaks 5 and 6) improved as a result of method scaling on the Arc HPLC System.



Compound
Impurity 1
API
Impurity 2
Impurity 3
Impurity 4
Impurity 5
Impurity 6
Impurity 7
Impurity 8

Column	Rs between 5 & 6
5.0 µm	1.7
3.5 µm	2.5

Figure 6. Comparison of chromatographic data for the analysis of an API and its impurities demonstrating successful scaling of the original method from a CSH C_{18} Column (5 µm, 4.6 x 150 mm) at 2.9 mL/min with a 10-µL injection to a CSH C_{18} Column (3.5 µm, 4.6 x 100 mm) at 2.3 mL/min with a 6.7-µL injection. Analysis condition: mobile phase, 0.1% formic acid in water (A) and in methanol (B).

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