



**Agilent 1260 Infinity  
Low-flow LC Systems**

# Infinitely better for capillary and nanoflow LC



The Measure of Confidence



**Agilent Technologies**

## Agilent 1260 Infinity Low-flow LC Systems

# Infinitely better low-flow performance.

Low-flow LC separation with high sensitivity detection and low sample consumption is a well-established and proven technology. The low-flow technique is used frequently for applications where limited amounts of sample are available, for analysis of trace level components in complex mixtures, or when an optimized LC/MS combination is required.

The Agilent 1260 Infinity Low-flow LC Systems offer unsurpassed low-flow performance and stability!

### A sound foundation

All Agilent low-flow LC systems are based on the industry-leading Agilent 1200 Infinity Series LC platform. Benefits of each system include:

- Integrated and robust LC solution
- Optimum injection flexibility from different sample containers, such as vials, microtiter plates and Eppendorf tubes
- Electronic Flow Control (EFC) with real-time adjustment of flow rate, delivering unprecedented flow stability for reliable and reproducible results
- Full compatibility with all Agilent 6000 Series mass spectrometers as well as many other MS platforms
- Highest sensitivity with mass selective detection
- Expandable to different application solutions such as HPLC Chip/MS or multidimensional LC for safe and future-proof investment
- Simple method setup through intuitive graphical user interfaces of Agilent ChemStation, Agilent MassHunter and Agilent 1200 Infinity Series Instant Pilot



The Agilent 1260 Infinity Nanoflow Pump uses unique solvent delivery technology that is optimized for nanoliter-per-minute flows and features EFC (Electronic Flow Control) with active feedback. The EFC comprises an electromagnetic proportioning valve (EMPV) and nanoflow sensor that provides real-time adjustment of the column flow rate.



The Agilent 1260 Infinity Capillary LC system is capable of delivering a wide flow range from 0.01 – 100  $\mu\text{L}/\text{min}$  and injection of sample volumes ranging from nL to  $\mu\text{L}$ . Bypassing the electronic flow control extends the flow range to 0.001 – 2.5 mL/min, giving you the flexibility to run the system in a standard LC operation mode.

The Agilent 1260 Infinity Nanoflow LC system caters for a wide flow range from 0.01 - 4  $\mu\text{L}/\text{min}$  and for injection of sample volumes ranging from nL to  $\mu\text{L}$ . This system is optimized for LC/MS applications and helps you attain ultrahigh sensitivity and reproducibility.



To learn more about the Agilent 1260 Infinity Low-flow LC systems, visit [www.agilent.com/chem/1200lowflowLC](http://www.agilent.com/chem/1200lowflowLC)

## Agilent 1260 Infinity Capillary LC System

# Highest sensitivity and robustness.

Using unique technology, the Agilent 1260 Infinity Capillary LC system is optimized for capillary LC. A wide range of flow rates expands laboratory flexibility, offering unparalleled sensitivity and reproducibility. This system is ideally suited for both UV and MS applications.

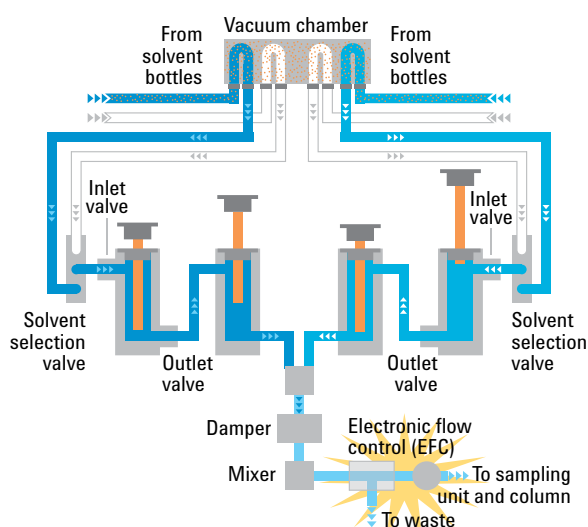
### A fully integrated system

Agilent provides everything you need for optimum LC performance. All Agilent 1200 Infinity Series modules are optimized to meet the special requirements of capillary LC.

Capillary LC is frequently used for the analysis of drugs and their metabolites to gain sensitivity, especially when sample volume is limited. A robust and reliable instrument is important for low flow rate ranges. It provides a stable flow rate throughout the analysis, making capillary LC as easy as standard LC.

### Agilent 1260 Infinity Capillary Pump

- Reliable and reproducible results – Electronic Flow Control (EFC) provides real-time adjustment of the flow rate throughout the analysis, offering accurate flow rates even with solvent mixtures
- Highest flexibility – in capillary mode optimized flow rates from 1  $\mu\text{L}/\text{min}$  up to 100  $\mu\text{L}/\text{min}$  (in normal mode up to 2.5 mL/min with additional hardware changes)
- Maximum performance – retention time (RT) stability irrespective of column back pressure
- Enhanced flexibility of solvent selection – built-in solvent selection valve combines two-out-of-four solvents for binary gradient formation, or selects a different solvent for flushing the column
- Reduced delay volume – facilitated by micro volume components
- Low detector baseline noise and long-term stability – regulated by micro degasser



The Agilent 1260 Infinity Binary Pump, which is well known for its excellent performance, serves as the basis for Agilent's capillary pump. The pump incorporates a unique Electronic Flow Control (EFC), allowing you to measure and control the flow rate throughout an analysis.



1260 Infinity  
Capillary Pump



1260 Infinity  
Micro Degasser

## Agilent 1260 Infinity High Performance Micro Autosampler

- Minimized dispersion through Micro Rheodyne valve and optimized design of needle seat, loop and seat capillaries
- Ten times better resolution in comparison to standard autosampler enabled by a high-resolution metering device
- Minimal delay volumes for rapid gradients and fast equilibration when bypassing the autosampler after sample injection
- Increased sample injection speed for high sample throughput
- No sample waste (especially with limited sample volume) through variable injection volume and flow-through design (compared to fixed-loop approaches)
- Flexible and convenient sample handling with different types of sample containers such as microtiter plates, vials and Eppendorf tubes – using 384-well microtiter plates facilitates unattended processing of up to 768 samples



1260 Infinity  
High Performance  
Micro Autosampler



1260 Infinity  
Thermostatted  
Column Compartment



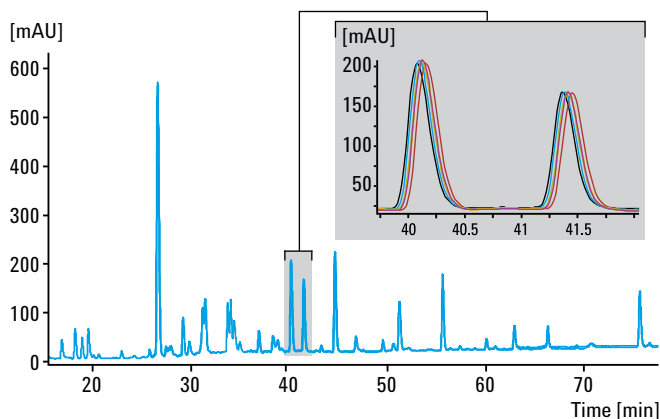
1260 Infinity Diode  
Array Detector

## Agilent 1260 Infinity Thermostatted Column Compartment

- Peltier temperature control provides for fast cooling and heating from 10 degrees below ambient up to 80 °C for maximum application flexibility and stability
- Two heat exchangers can be set independently for applications that require different temperature zones
- Optional Rheodyne micro column switching valve for 2D-LC separations or column regeneration

## Agilent 1260 Infinity Diode Array Detector

- Optimized geometry and novel fitting design minimize dispersion
- Low RI sensitivity for flat baselines at low flow gradients enabled by optical reference wavelength
- High sensitivity through long path length and high light throughput



Precise flow control at low flow rates provides highly reproducible analyses. RSD for retention time below 0.15% was achieved, using a gradient from 1 to 61% B in 120 minutes of degassed acetonitrile/water/TFA. Column: ZORBAX 300SB-C18, 250 mm x 300  $\mu$ m, 5  $\mu$ m Flow rate: 5.5  $\mu$ L/min

## Agilent 1260 Infinity Nanoflow LC System

# Unsurpassed performance and stability.

### Superior separations

The Agilent 1260 Infinity Nanoflow LC System is supplied with high-efficiency nanocolumns for sample cleanup, concentration, and separation. The system can be configured for one-dimensional separation; one-dimensional separation with sample cleanup and concentration; or full two-dimensional separation, as appropriate for your samples. The 1260 Infinity Nanoflow Pump uses a unique solvent delivery technology, which is optimized for nanoliter-per-minute flows and features EFC (Electronic Flow Control) with active feedback.

The EFC comprises an electromagnetic proportioning valve (EMPV) and nanoflow sensor which provides real-time adjustment of the column flow rate. The entire flow path has been designed to maximize and maintain separation efficiency. The injection valves, fittings, connectors, and PEEK-coated, fused silica tubing have all been carefully selected to minimize dead volumes.

The 1260 Infinity Nanoflow LC System can be configured using the whole range of low-flow LC modules such as the 1260 Infinity High Performance Micro Autosampler, 1260 Infinity Thermostatted Column Compartment and 1260 Infinity Diode Array Detector.

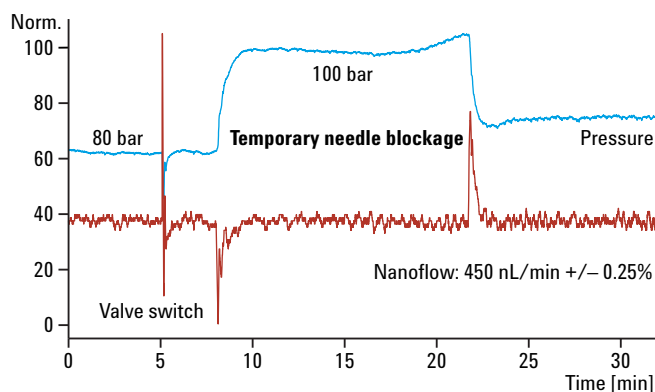
Proteomics is a typical application area for the 1260 Infinity Nanoflow Pump. The 1260 Infinity Nanoflow LC System is used for multidimensional chromatography and LC/MS/MS for protein identification (online and offline 2D LC).

### Agilent 1260 Infinity Nanoflow Pump

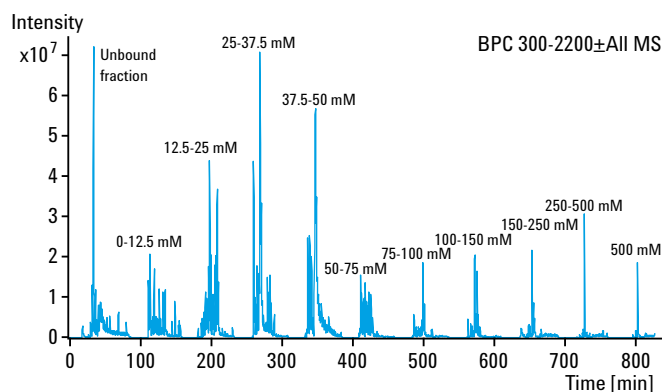
- The extremely stable and accurate flow provided by Electronic Flow Control (EFC) achieves greater MS sensitivity, resulting from stable ion generation
- 1260 Infinity Micro Degasser with very low internal volume per channel (1 mL) allows fast changeover of mobile phase and quick purge
- Second generation flow sensors ensure robustness and high instrument uptime



1260 Infinity  
Nanoflow Pump



Independence of column flow rate from system backpressure fluctuation.

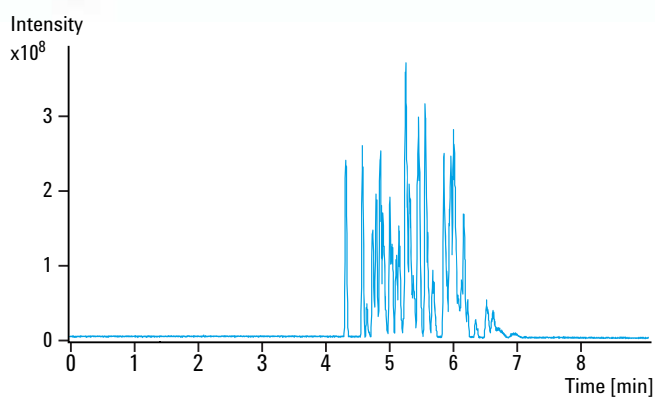


Base peak chromatogram obtained from separation of a yeast proteome digest with online 2D LC working with semi-continuous salt gradient and subsequent nano reversed phase chromatography.

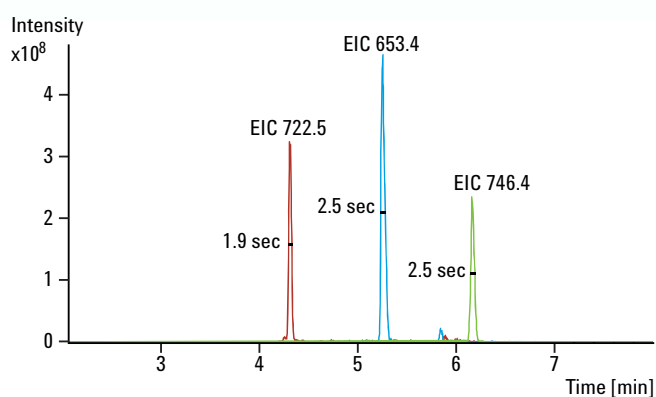
## Agilent 1260 Infinity HPLC-Chip/MS System

Take advantage of HPLC-Chip/MS technology and make nanoflow LC/MS the workhorse for your high sensitivity LC/MS analysis needs. Combining the Agilent 1260 Infinity HPLC-Chip/MS with the Agilent 1260 Infinity Series Nanoflow

LC and Agilent 6000 Series mass spectrometers will offer you the best possible performance for nanospray applications where sensitivity, reproducibility, reliability, robustness and ease of use are essential.



Performance of the Protein ID chip using a rapid gradient at 600 nL/min for the analysis of a BSA tryptic digest. Separation was achieved with a solvent gradient from 3% Acetonitrile (ACN), 0.1% Formic acid (FA) to 80% ACN, 0.1% FA in 7 min.



The total ion chromatogram (TIC) is shown left and an extracted ion chromatogram (EIC) is shown right.

To learn more about the Agilent 1260 Infinity Nanoflow LC System, visit [www.agilent.com/chem/1200nanoflowLC](http://www.agilent.com/chem/1200nanoflowLC)



# Agilent 1200 Infinity Series Valve Solutions

## Infinitely more capabilities.

### Agilent 1200 Infinity Series Micro Valves

The valve solutions extend the capabilities of the 1200 Infinity Series LC platform. These solutions include a variety of valve types for various flow rates and application needs. Micro valves with small internal volumes for minimum peak broadening are ideal for low flow rates in the nL/min and  $\mu$ L/min flow ranges. Application possibilities include:

- Sample preparation (desalting, enrichment)
- High throughput (parallel sample clean-up)
- Multidimensional separation
- Smallest internal volumes for minimum peak broadening
- Column compartment integration for temperature control
- External micro valves for shortest capillary connections



### Further information

For full details of the Agilent 1200 Infinity Series LC systems and application-based LC solutions, ask for a brochure or visit our web site at [www.agilent.com/chem/1200](http://www.agilent.com/chem/1200)



#### Agilent 1200 Infinity Series Selection Guide

Publication Number  
5990-4333EN

#### Agilent 1200 Infinity Series Portfolio

Publication Number  
5990-3333EN

#### Agilent 1260 Infinity HPLC-Chip/MS System

Publication Number  
5990-6221EN

#### Learn more:

[www.agilent.com/chem/1200lowflowLC](http://www.agilent.com/chem/1200lowflowLC)

#### Buy online:

[www.agilent.com/chem/store](http://www.agilent.com/chem/store)

#### Find an Agilent customer center in your country:

[www.agilent.com/chem/contactus](http://www.agilent.com/chem/contactus)

#### U.S. and Canada

1-800-227-9770, [agilent\\_inquiries@agilent.com](mailto:agilent_inquiries@agilent.com)

#### Europe

[info\\_agilent@agilent.com](mailto:info_agilent@agilent.com)

#### Asia Pacific

[inquiry\\_Isca@agilent.com](mailto:inquiry_Isca@agilent.com)

© Agilent Technologies, Inc. 2010  
Published in USA, November 1, 2010  
Publication Number 5990-6222EN



**Agilent Technologies**