

**Thermo Scientific  
Dionex UltiMate 3000  
RSLC Systems**



# Rapid separation systems high-end performance

Speed • Resolution • Versatility

**UHPLC<sup>+</sup>**  
focused

**Thermo**  
SCIENTIFIC

# Rapid separation LC

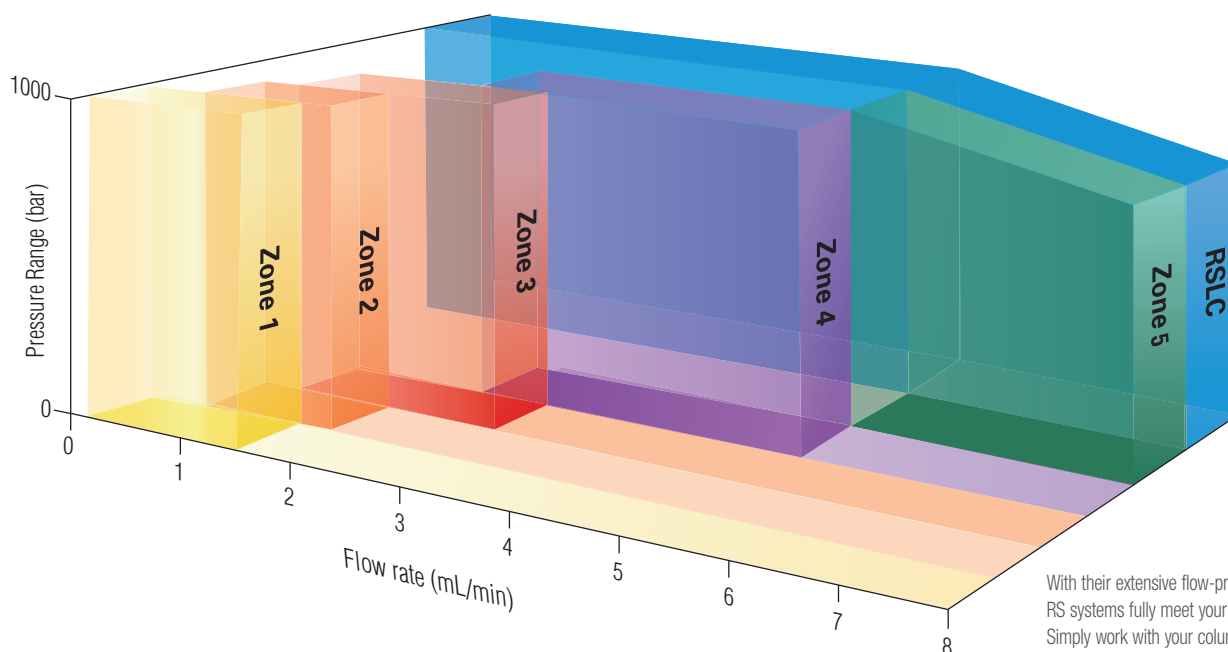
## accelerate your analysis

The Thermo Scientific Dionex UltiMate 3000 Rapid Separation LC (RSLC) systems accelerate HPLC for unrivaled performance and flexibility. Precision-engineered instrumentation, advanced data processing, and highly optimized chemistries meet all chromatographic performance challenges. With its binary, quaternary, and dual-gradient pumps, these industry-leading systems offer versatility covering the maximum range of HPLC, including conventional and ultrafast LC.

- Up to 50 times faster than conventional LC
- High resolution for maximum peak capacity
- Instant results with Thermo Scientific Dionex Chromeleon software
- Universal method transfer and speed-up
- Thermo Scientific Dionex Viper fingertight fitting system
- Dual-gradient pumps and switching valve options for advanced chromatographic techniques

Together, these characteristics make **RSLC the only available choice for highest resolution to maximum speed LC.**

UltiMate™ 3000 RS Flow-Pressure Footprint					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
	RSLC				
Resolution	Ultrahigh	Conventional	Very High	High	High
Speed	High	Conventional	Very High	Ultrahigh	Ultrahigh
Typical Flow (mL/min)	0.2–1.5	0.75–2.0	1.0–3.0	2.5–5.0	5.0–8.0
Column Length (mm)	≥100	≥150	≥50 ≤100	≤50	≥100
Column i.d. (mm)	≤3	≥4	≤3	≤3	≥4
Particle Size (µm)	≤3	≥3	≤3	≤3	≥2



With their extensive flow-pressure footprint, RS systems fully meet your chromatographic goals. Simply work with your column of choice and in the appropriate zone for your application.

## The Right Combination of Components and Data Management

The UltiMate 3000 RS systems deliver superior performance, excelling at pressures of 100 MPa (15,000 psi) and flow rates up to 8 mL/min. Detector and autosampler technologies, powerful software, and small particle columns contribute to RSLC capabilities.

Solution Component	Key Feature
Binary, Quaternary, or Dual Gradient RS Pump	Pressure up to 100 MPa (15,000 psi) at flow rates up to 8 mL/min
In-line Split Loop Well Plate Sampler	Cycle times of 15 s Injection volumes of up to 500 µL
Thermostatted RS Column Compartment	Temperature range of 5–110 °C Up to 12 columns
Widest Range of Detectors	Diode array, variable wavelength, fluorescence, charged aerosol, electrochemical detectors with up to 200 Hz data collection rate, industry leading MS portfolio
Complete Range of UHPLC Columns	Thermo Scientific Accucore, Hypersil Gold, Syncronis and Acclaim RSLC columns
Viper™ Fingertight Fitting System	Zero-dead-volume connections, robust performance, and unparalleled ease-of-use
Chromeleon™ Chromatography Data System	Dynamic data processing that produces results instantly



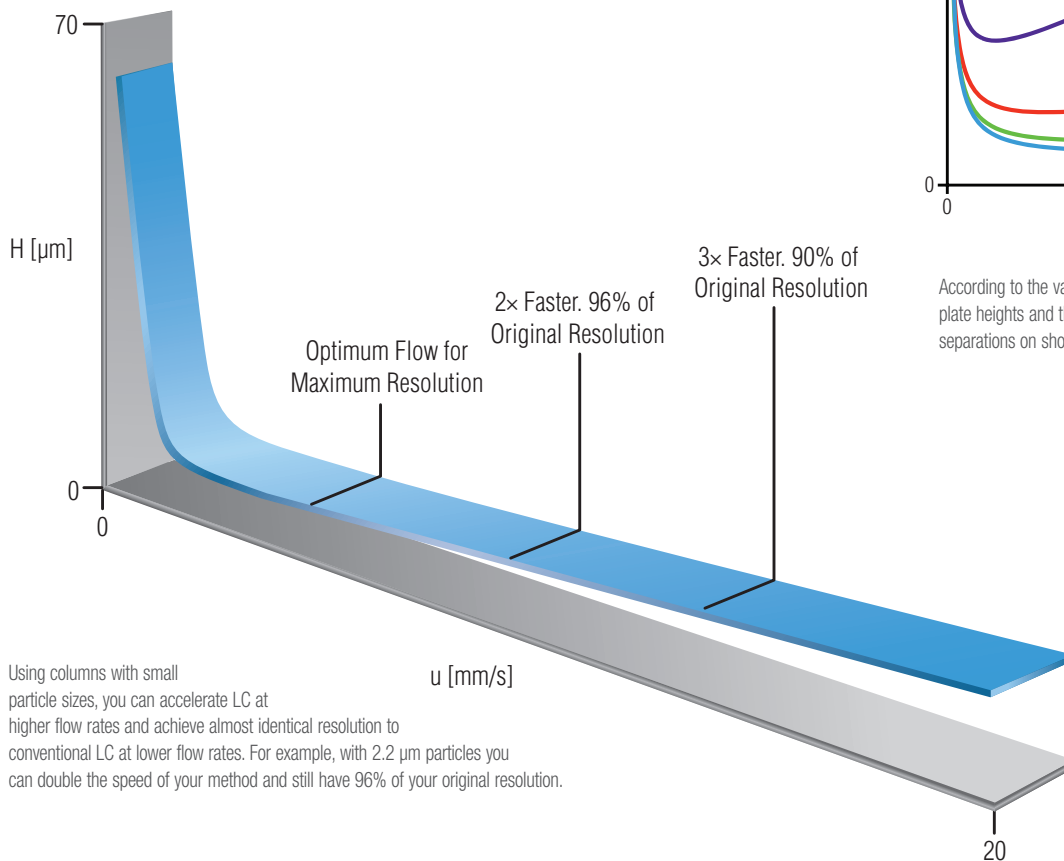
UltiMate 3000 RS system

# Ingredients for speed

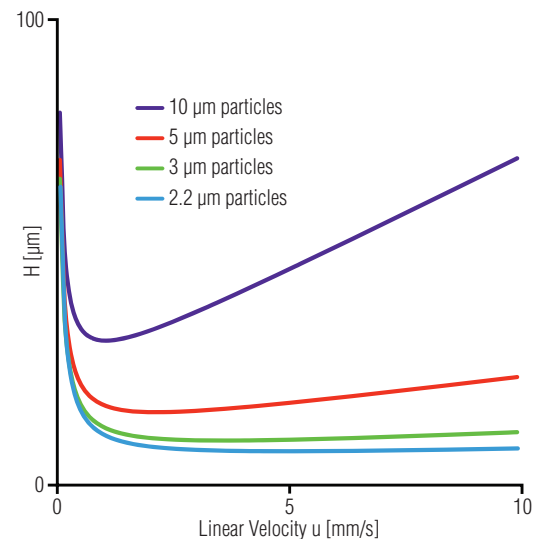
## exceptional application range

### A Complete Package for Performance Leadership

Engineered to the highest level of performance, the UltiMate 3000 RS systems deliver the key flow rate and pressure capabilities to meet all LC challenges. With its extensive flow-pressure footprint, short sampler cycle times, high column temperatures, ultrafast data collection and processing, and high-resolution columns, the system maximizes LC flexibility. This combination of features delivers optimal separations at ultrahigh speed while maintaining good resolution.



Using columns with small particle sizes, you can accelerate LC at higher flow rates and achieve almost identical resolution to conventional LC at lower flow rates. For example, with 2.2  $\mu\text{m}$  particles you can double the speed of your method and still have 96% of your original resolution.



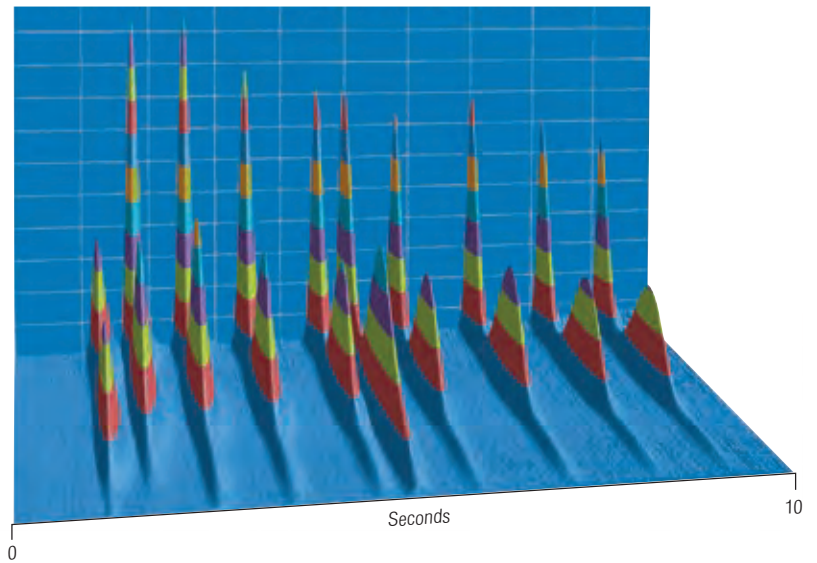
According to the van Deemter curve, smaller particle sizes give low plate heights and thus higher separation efficiency, ideal for fast separations on short columns.

## High Flow and Efficiency

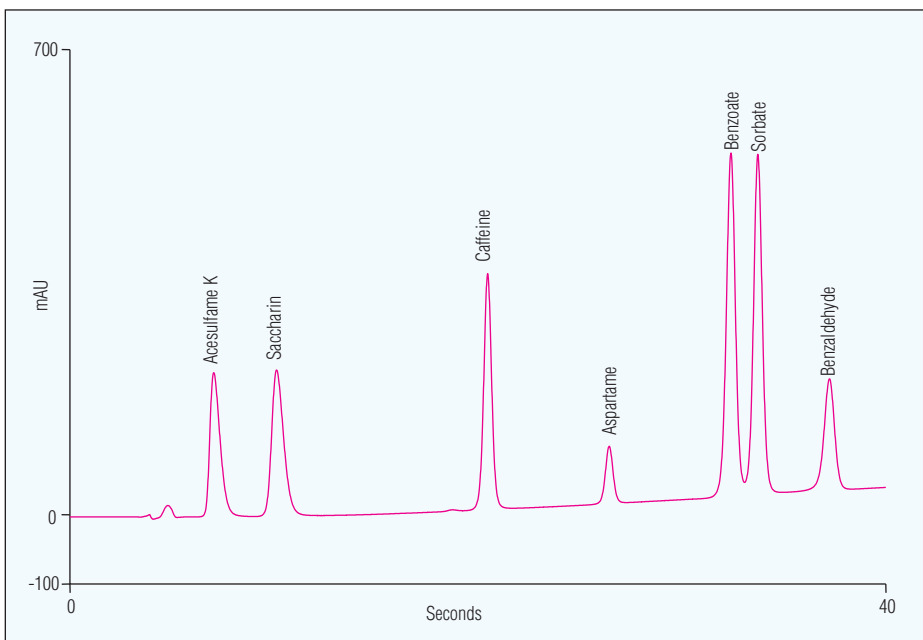
UltiMate 3000 RS systems are designed to deliver robust operation at high flow rates and high pressure.

- Backpressures up to 100 MPa (15,000 psi)
- Flow rates up to 8 mL/min
- Oven temperatures up to 110 °C
- Data collection rates up to 200 Hz

## RSLC Provides Unrivaled Speed: 10 Peaks in 10 Seconds



Separation of uracil and nine alkylphenones in 10 s, with a full 100 Hz DAD spectral scan. The run was performed using a flow rate of 3.7 mL/min, a backpressure of 730 bar, an oven temperature of 100 °C, and a 30 × 2.1 mm C18 column with 1.8 µm particle size.



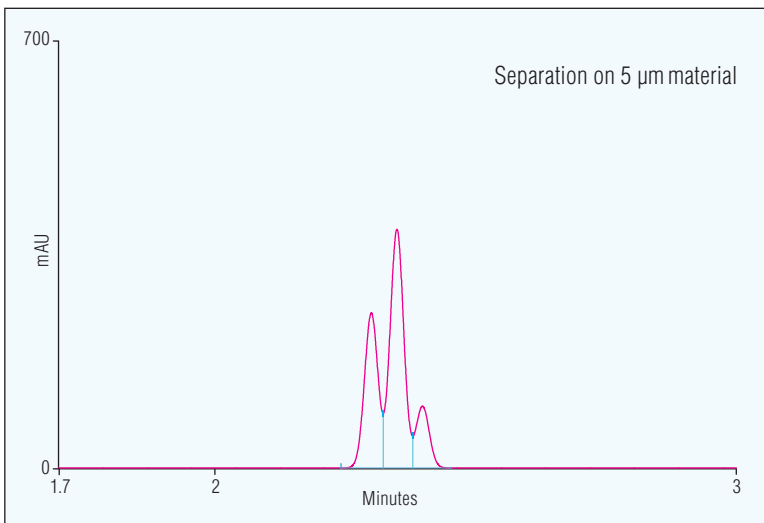
Analysis of seven key compounds in soft drinks in less than 40 s on the Thermo Scientific Acclaim RSLC 2.2 µm column

# High-resolution RSLC

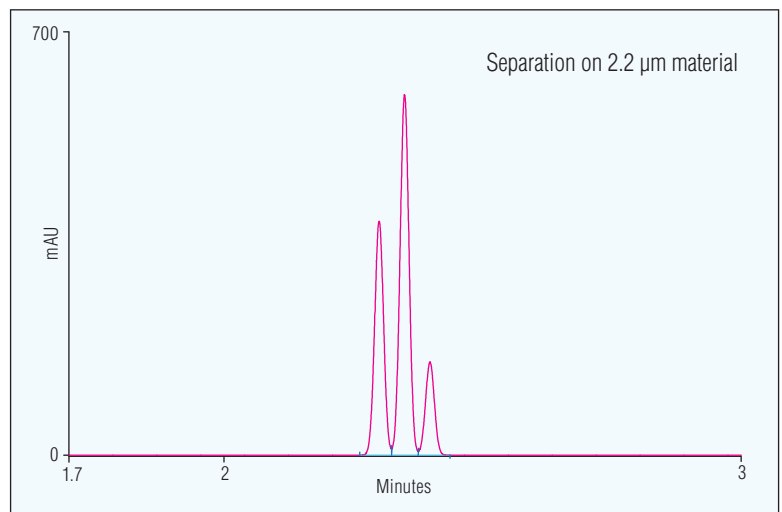
## boost speed and productivity

### Resolution and Speed: Meeting the Challenge for Superior LC

Achieving the highest resolution in the fastest run times takes more than a great LC system. High resolution also requires low extracolumn volumes and long columns with small particle sizes. Achieve high-resolution UHPLC by improving efficiency and reducing band broadening. Small particle sizes significantly increase efficiency; lower extracolumn volumes ensure that this increase is not lost again due to band broadening.



Reducing particle size increases separation of compounds, provides optimal peak resolution, and increases peak height for improved sensitivity.

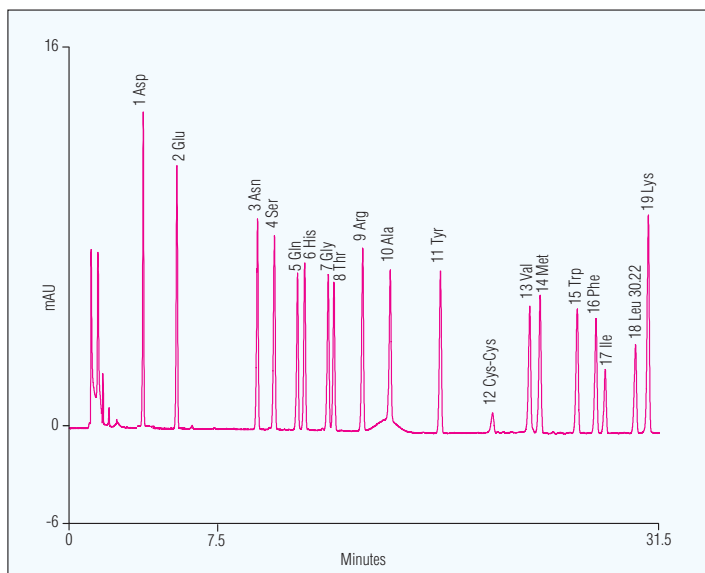




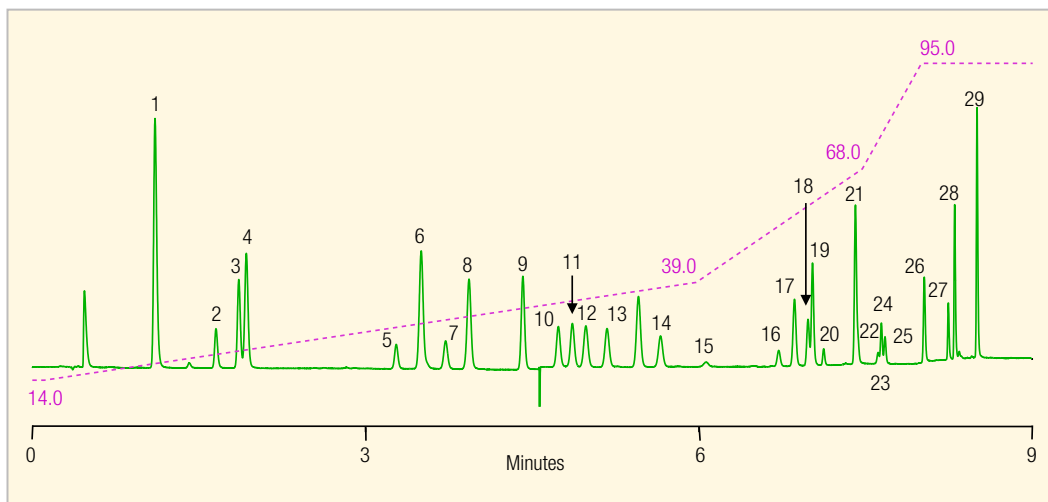
## Small Particle Size Columns Provide the Highest Efficiency

To optimize your fast separations, the UltiMate 3000 RS systems deliver the lowest extracolumn volumes and highest efficiency with small particle size columns.

- Unique, easily scalable Thermo Scientific SpinFlow mixer technology
- Comprehensive mixer portfolio from 35  $\mu\text{L}$  to 1550  $\mu\text{L}$  for a wide application range
- Revolutionary Viper fingertight fitting system for performance without compromise
- Dedicated range of 1, 2.1, and 3 mm i.d. high-resolution columns
- Compatible with all commercially available stationary phases



Conventional reversed-phase LC separation of 19 amino acids in 31.5 min (60 min total run time)



Baseline separation of 29 pesticides in less than 9 min (total run time 12.5 min)

**More results  
in less time**

# Beyond UHPLC

## unique solutions

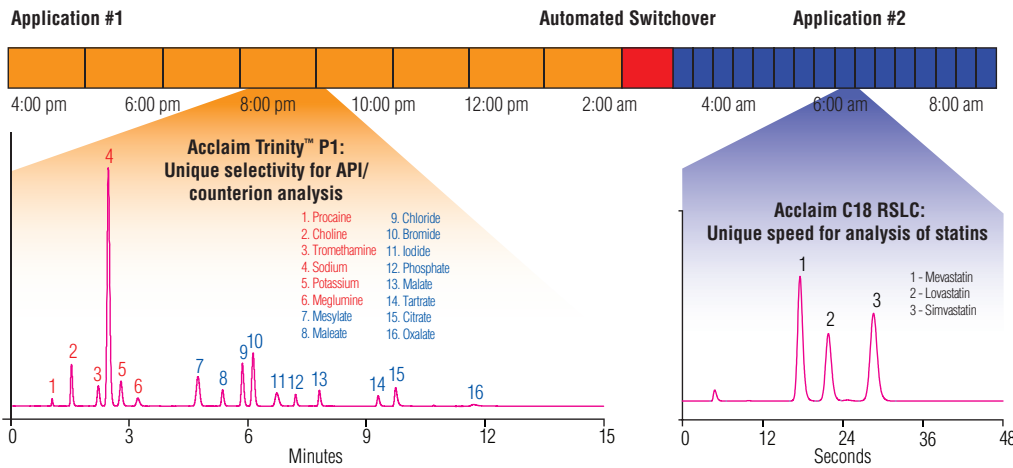
### UHPLC Reaches a New Level of Flexibility and Performance

UltiMate 3000 x2 Dual RS systems offer laboratories unprecedented sample throughput and easy automation of advanced procedures. Seamless integration of UHPLC with x2 Dual RSLC technology and powerful Chromeleon software brings laboratories new possibilities:

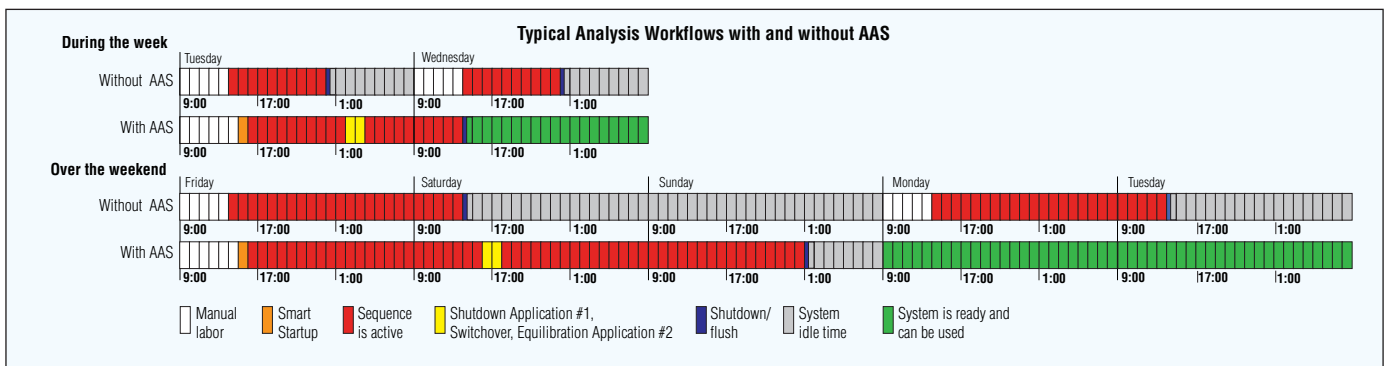
- Doubled sample throughput with parallel and tandem LC
- Increased use time by automatically switching between applications
- Highest selectivity and resolution with multidimensional LC



The DGP-3600RS combines two UHPLC pumps in a single housing.

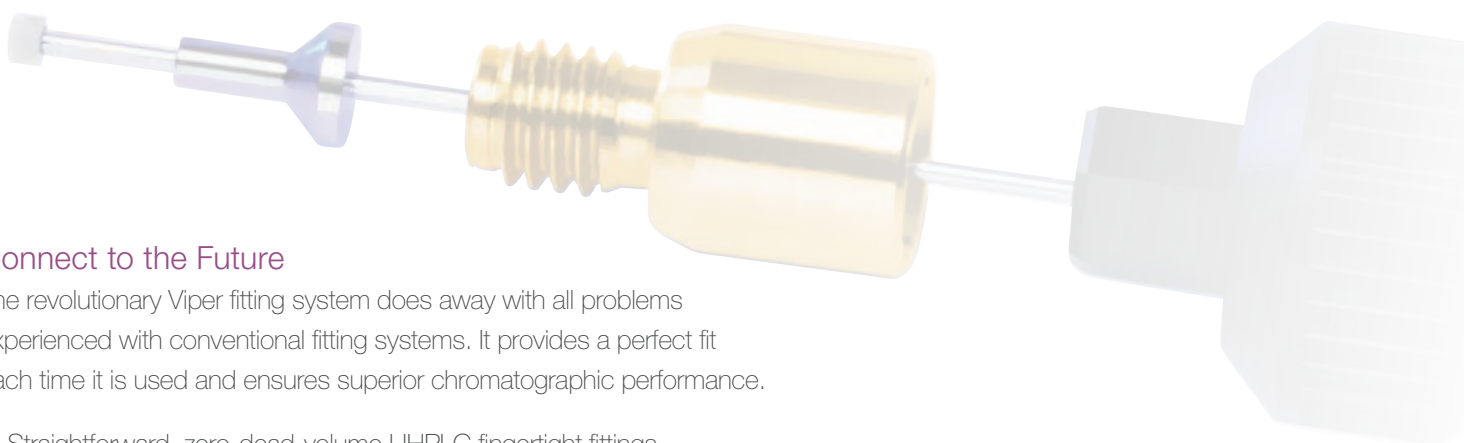


Automatic switching between a conventional and a UHPLC method.



Automated application switching increases productivity by using nights and weekends, when the instrument would otherwise sit idle.



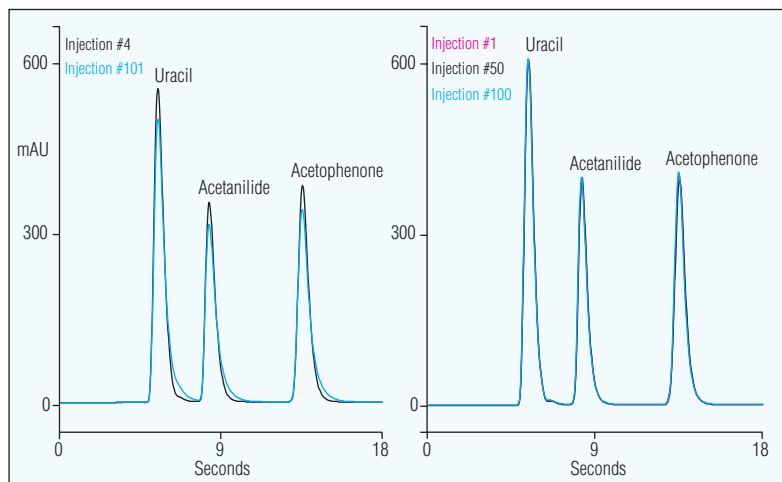


## Connect to the Future

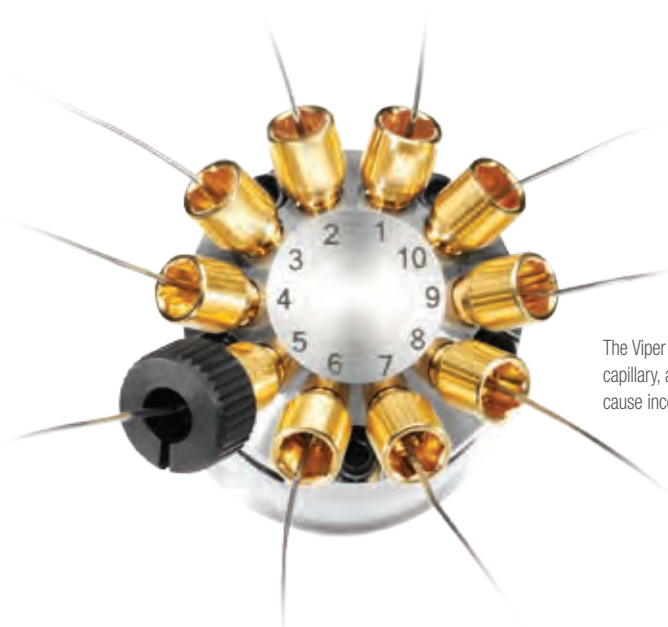
The revolutionary Viper fitting system does away with all problems experienced with conventional fitting systems. It provides a perfect fit each time it is used and ensures superior chromatographic performance.

- Straightforward, zero-dead-volume UHPLC fingertight fittings
- Compatible with virtually every type of valve and column hardware
- Tool-free, Viper-based kits for advanced LC solutions

All RSLC tubing kits and UHPLC+ solutions feature the unique Viper design, making the best UHPLC system even easier to use.



Slipping capillaries cause deteriorated peak shapes (left). Viper capillaries provide robust performance at UHPLC pressures (right).



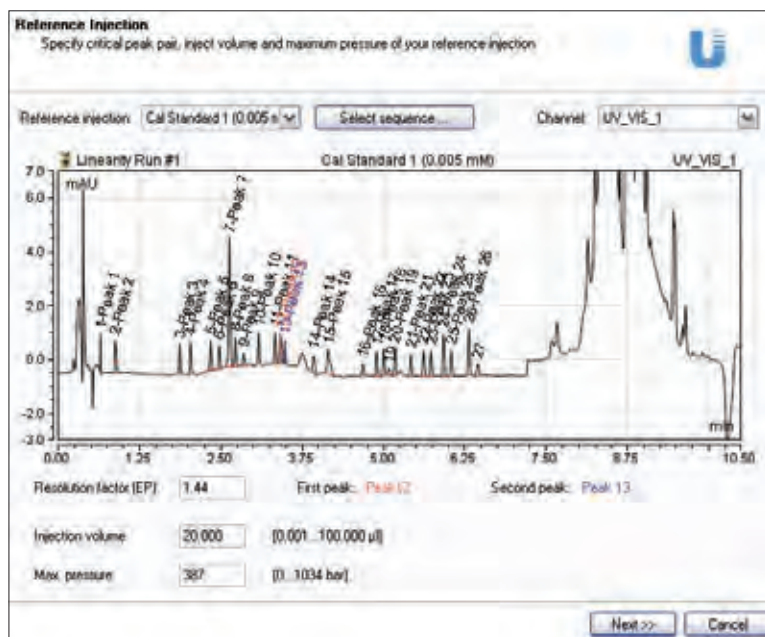
The Viper connector tightens at the tip of the capillary, and does not use ferrules that may cause incompatibility with the opposite holder.

# Instant results seamless integration

## Chromeleon Software Ensures that RSLC is Ultrafast

All UHPLC+ systems and solutions are powered by Chromeleon Chromatography Data System software that produces results instantly. The following features ensure increased productivity and a laboratory focus on results, not just data.

- Data processing times reduced by as much as 90%
- Instant calculation of results
- Integrated method transfer wizard for quick and easy conversion of conventional LC methods to RSLC methods
- Dedicated reports for method validation, related substances, EPA statistics, dissolution testing, content uniformity, and more



**Conversion Parameters**  
Please specify the dimensions of the current and new column  
To further accelerate separation, increase the boost factor or flow of the new column

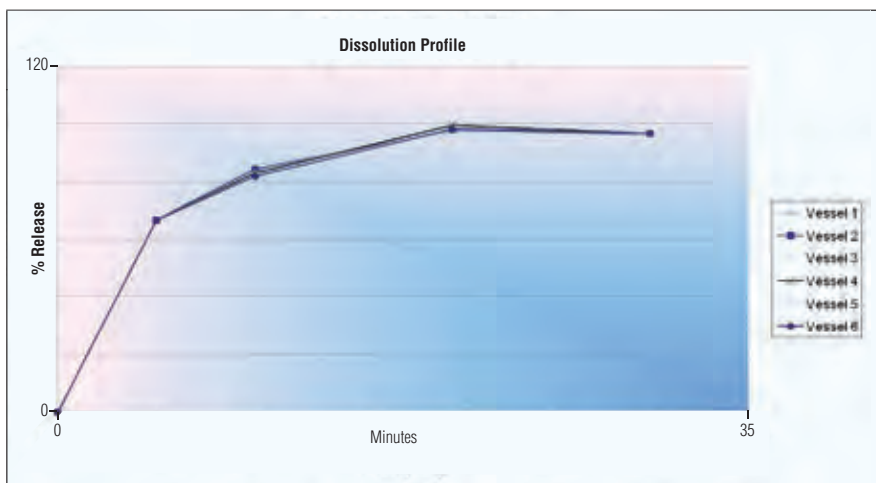
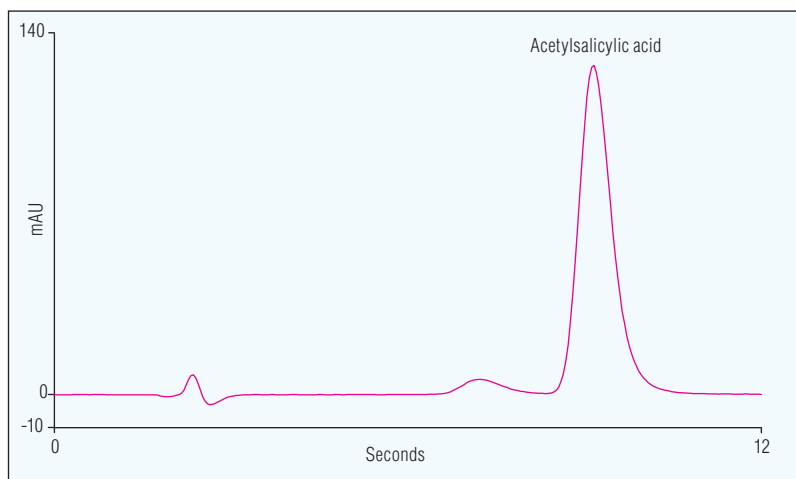
	Current Column	New Column	
Length	250.0	100.0	[10.0 - 1000.0 mm]
Diameter	4.6	2.1	[0.1 - 100.0 mm]
Particle size	3.0	2.2	[0.1 - 100.0 µm]
<input checked="" type="radio"/> Boost factor		1.00	
<input type="radio"/> Flow	1,000		[0.001 - 8,000 ml/min]
Pressure limit		600	[0 - 1034 bar]
<b>Results</b>	<b>Current Column</b>	<b>New Column</b>	<b>Saving</b>
Resolution factor (EP)	1.50	1.11	
Max. pressure	387 bar	393 bar	
Injection volume	20,000 µl	2,250 µl	89 %
Eluent usage	20,000 ml	1,667 ml	92 %
Run time	20,000 min	5,067 min	71 %
Throughput		x3.4	

Navigation: << Back | Next >> | Cancel

To use the calculator, simply enter your old method parameters and your new column details. The calculator immediately translates your method without the need for time-consuming lab work associated with method development. In addition, it automatically calculates how much time and solvent your new method will save.

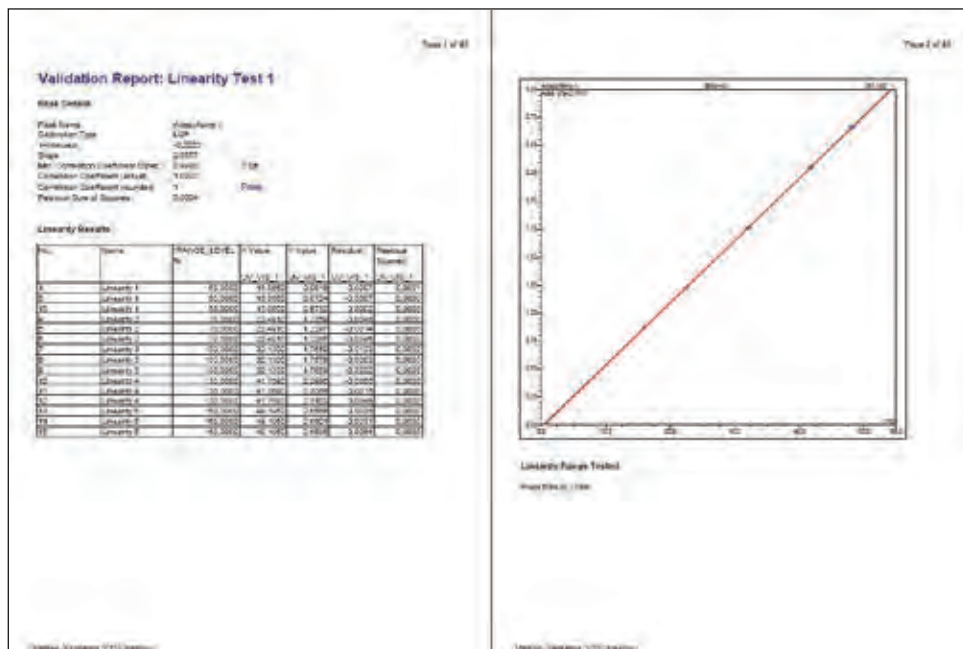
## RSLC Data Processing

UHPLC requires ultrafast data handling.  
 Chromeleon software delivers seamless data handling that ensures instant results.



Using a fast dissolution method with a total run time of 18 s allows the analysis of all dissolution samples in less than 30 min. After that, the dynamic processing tools of the Chromeleon software instantly calculate the dissolution profile and assess the results against specifications.

**From sample  
 to results  
 in fewer  
 clicks**



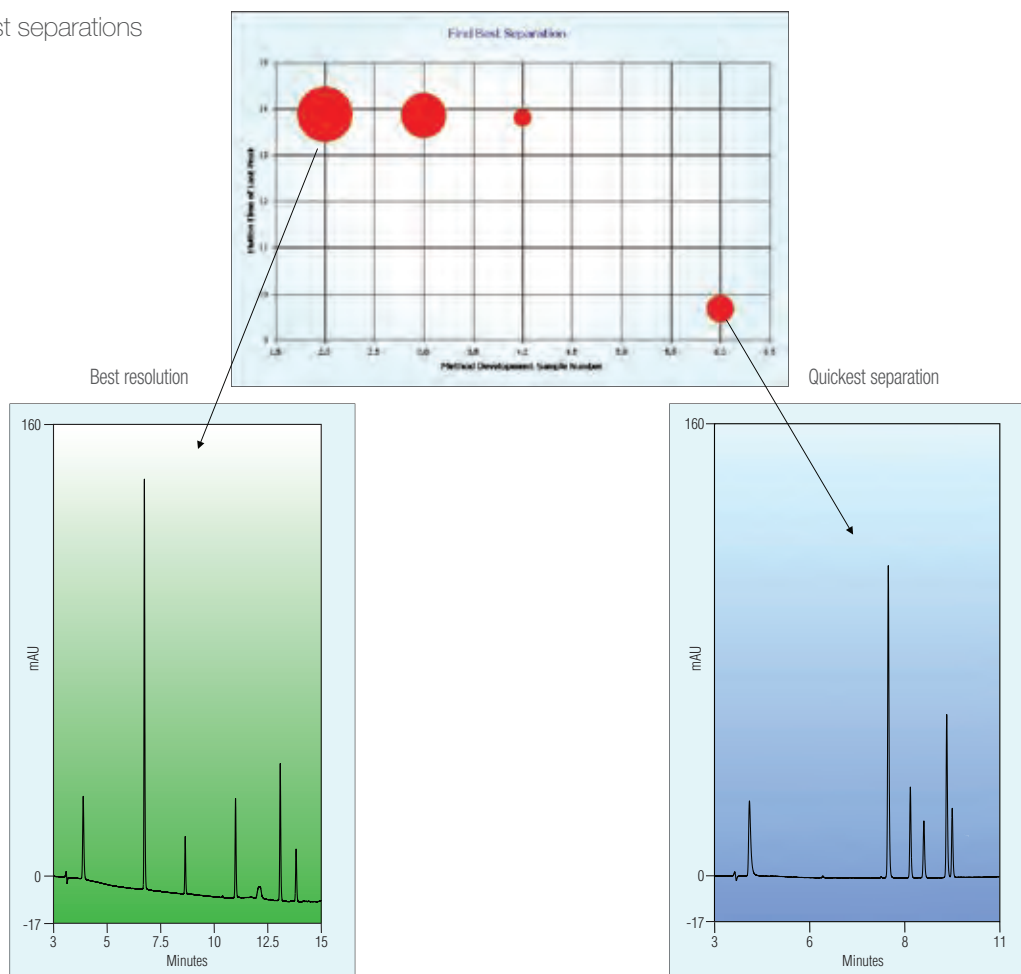
Using Chromeleon software, a 40 page validation report (based on ICH guidelines) is created in only 1 min.

# UHPLC method development ultrafast and automated

## Dedicated UHPLC Hardware Setup and the Intelligent Simplicity of Chromeleon Software

RSLC facilitates the acceleration of your existing methods and also speeds the development of new methods. The RSLC-based Automated Method Scouting solution enables you to screen a defined set of UHPLC columns combined with a set of buffers, solvents, and temperatures in the shortest possible time.

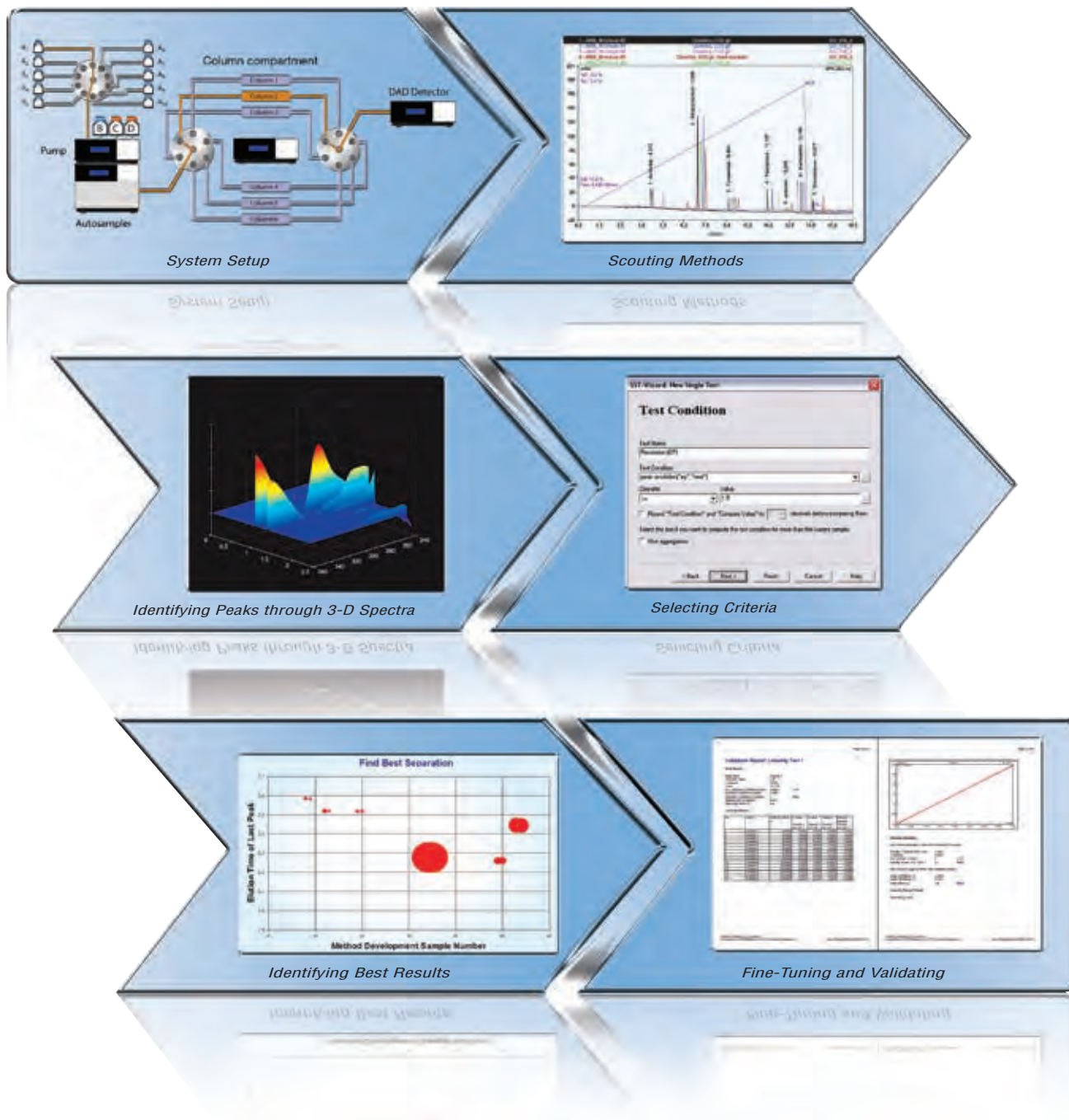
- Optimized hardware design with integrated multi-position buffer elector and ultrahigh-pressure, multi-position column selector valves
- Intuitive instrument control and method setup with Chromeleon software
- Powerful queries and automated processing to find all methods that meet user criteria
- Visualization tools make the best separations obvious at a glance



The bubble chart makes finding the most promising separations easy. The lower the bubble on the y-axis, the faster the separation. The size of the bubble represents the resolution between the critical peak pairs.

## Method Scouting Workflow

RSLC-based Automated Method Scouting enables screening with ultrafast generic gradient methods, easily set up in the Chromeleon software. Execution, evaluation, and validation are fully automated.



**Immediate display  
of the best separation**



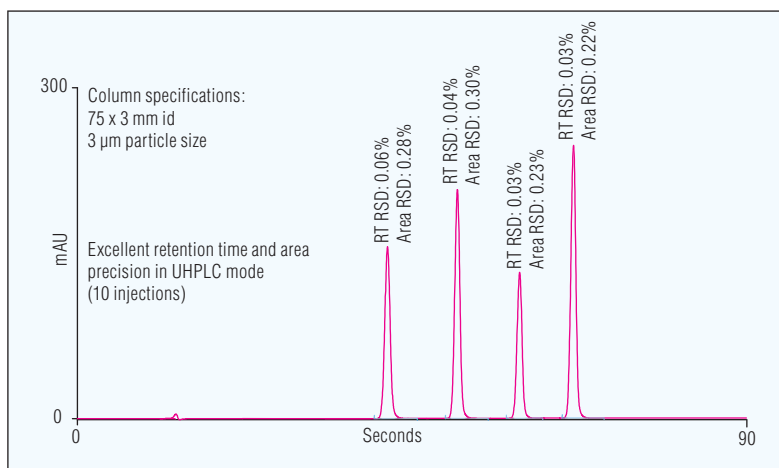
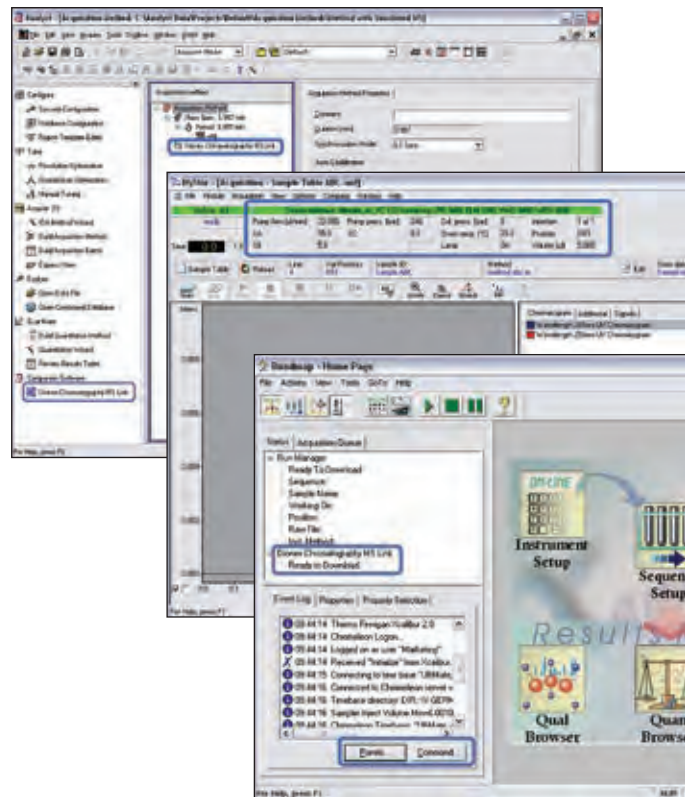
# UHPLC for all exceptional application range

## A Powerful Combination of Capabilities and Specifications

Flexible and reliable ultrafast LC has three main requirements: the ability to run ultrafast and conventional LC on one system; superior robustness to maximize productivity; and full compatibility with your detector of choice for optimal front-end separations. The data below demonstrate the UltiMate 3000 RS systems' flexibility, handling both conventional LC and UHPLC with excellent performance.

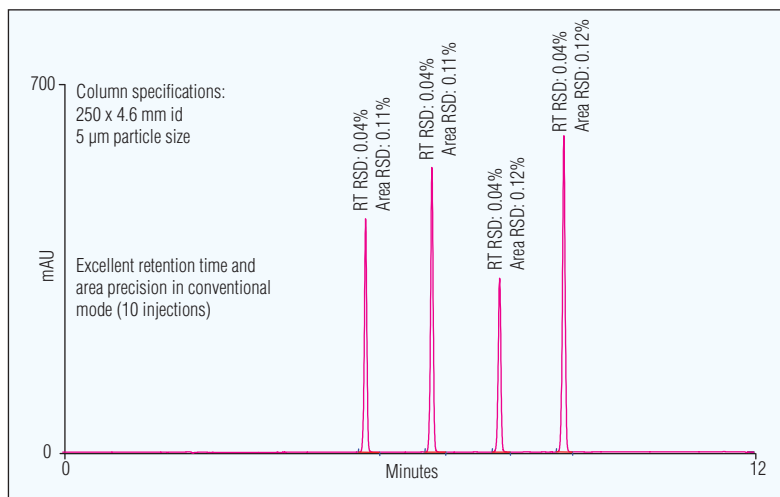
## Reliability—a Must for Liquid Chromatography

Capable of running both conventional and ultrafast LC methods, the UltiMate 3000 RS systems deliver unrivaled reliability. RSLC ensures reproducibility and uptime for injections day after day, week after week, and year after year.



The chromatograms show a UHPLC method (above) and a conventional LC method (right), demonstrating industry-leading performance in both operational modes.

Thermo Scientific Dionex DCMS<sup>Link</sup> is a free, control-only software package providing fully integrated single-point control of any of our LC systems through Thermo Scientific Xcalibur software, and mass spectrometry control software from other leading manufacturers.

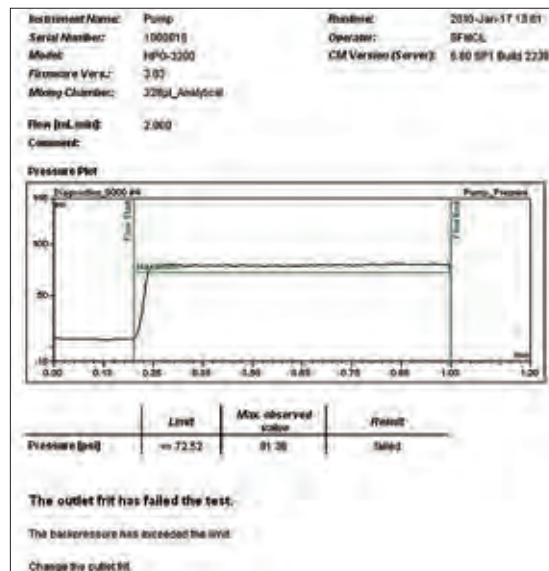


## Maximum Flexibility

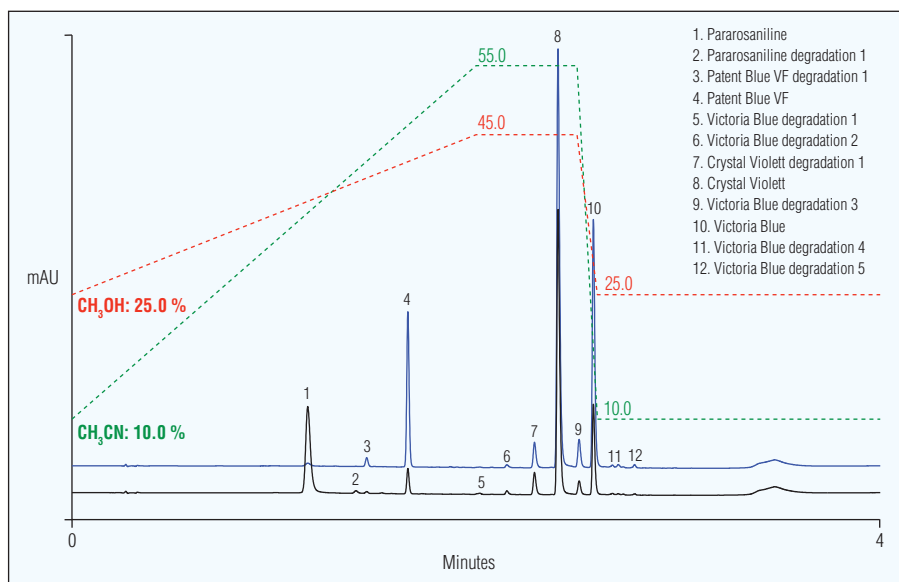
- Run conventional LC and UHPLC methods on the same instrument
- Take advantage of the powerful alternative quaternary and dual-gradient RS pumps for highest flexibility in analysis and method development at the UHPLC level
- Industry-leading range of detectors

## Maximum Reliability

- Precision engineered instruments provide robust operation and maximum uptime, even with advanced x2 Dual configurations
- Patented injection valve design ensures long-term operation at 100 MPa and up to 500  $\mu$ L injection volume
- Easy-to-use diagnostic tests allow immediate assessment of instrument performance



Easy-to-use tests provide instant assessment of instrument performance.



UHPLC analysis of ink using ternary gradient elution. The UltiMate 3000 Quaternary RS systems can easily accelerate non-binary gradient methods.

# LC and UHPLC in one system without compromises



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