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Passion. Power. Productivity.

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

## UltiMate 3000 Liquid Chromatography Systems

**Giving you more.**



**DIONEX**

Passion. Power. Productivity.



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# UHPLC<sup>+</sup> focused



UHPLC delivers major benefits, we all know this—faster runs, better resolution, and lower running costs. The products available to serve UHPLC have become more sophisticated over the past five years and yet remain mostly expensive and therefore limited in their accessibility to the wider HPLC user community.

Thanks to Dionex this is no longer true. Dionex now offers UHPLC performance at standard HPLC costs. In fact Dionex is so focused on UHPLC for all HPLC users that it now only provides 'U' compatible instruments.

Dionex has not only added UHPLC compatibility to all of its standard and basic automated HPLC systems but it has also extended the UHPLC performance of the UltiMate<sup>®</sup> 3000 RSLC systems – giving you more opportunities to get the answers you are looking for; today, tomorrow and with confidence of future proofness too.

- Dionex offers the exceptional industry leading Chromeleon<sup>®</sup> software
- Dionex Corona<sup>®</sup> Charged Aerosol Detectors (CAD<sup>®</sup>), plus other detector options
- Dionex Applications D-Library. Never before has so much power and information been available in a single package and for such a low initial investment

Now everyone can have the confidence to move to UHPLC technology + everyone can have access to UHPLC technology for nearly all methods + everyone has access to the unique strength of Dionex UltiMate in combination with Chromeleon Software and Corona detectors.

**Dionex – the only HPLC company uniquely focused on making UHPLC technology available to all users, all laboratories, and for all analytes.**

# UltiMate 3000 Systems and Solutions

## The Most Versatile Choice for Your Analytical Needs

The UltiMate 3000 HPLC system offers UHPLC compatibility across all modules, ensuring maximum performance for all users and all laboratories. Covering flows from 20 nL/min to 10 mL/min and offering a wide range of pumping, sampling, and detection modules, the UltiMate 3000 series provides solutions for all your chromatography needs.

- UHPLC design philosophy throughout the whole range of nano, standard analytical, and RSLC
- 620 bar maximum pressure for basic and standard analytical systems sets a new benchmark in HPLC
- x2 Dual Systems form a unique platform for routine analysis, increased productivity solutions, and advanced chromatographic techniques
- Controlled using Chromeleon Chromatography Data System software—providing Intelligent Functionality and Operational Simplicity™
- Offered with Viper™ and nanoViper™ fitting systems—fingertight, zero-dead-volume connections even at UHPLC pressures



### RSLCnano Systems

- Widest nano/cap/micro flow range from 20 nL/min up to 50  $\mu$ L/min
- Column pressure up to 800 bar
- Continuous direct flow delivery
- Loading pump provides flows from 10  $\mu$ L/min to 2.5 mL/min



### RSLC Systems

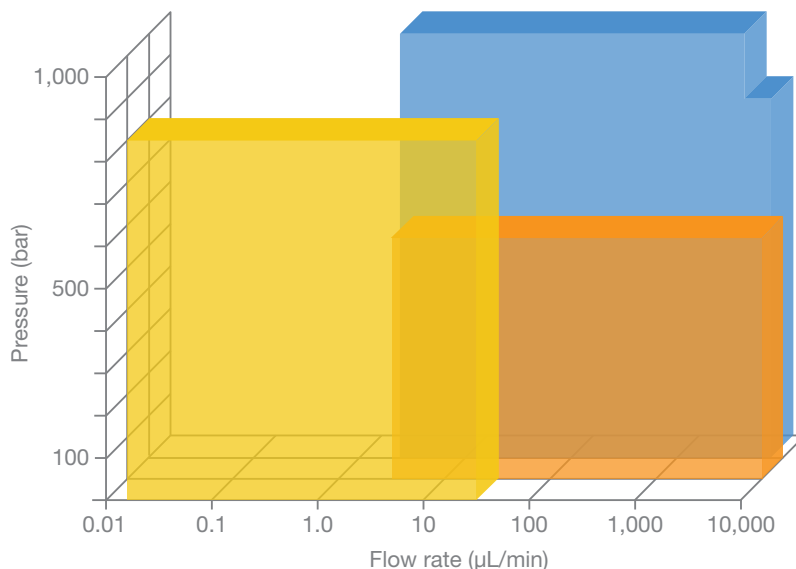
- Binary or quaternary systems for both UHPLC and conventional HPLC applications
- Extensive flow-pressure-footprint for ultrafast, ultrahigh-resolution separations
- Column pressure up to 1000 bar
- x2 Dual RSLC systems for ultimate productivity solutions



### Standard Systems

- Optimal performance and reliability for conventional LC applications
- 620 bar maximum pressure and 100 Hz data rate for UHPLC compatibility
- Widest range of system configurations for maximum application flexibility
- Flow rates up to 10 mL/min covering all application needs

The UltiMate 3000 systems are fully modular, allowing you to choose common system configurations or design the most suitable system for your application needs.



The extensive flow-pressure-footprint of the UltiMate 3000 family allows you to quickly identify the most suitable system for your needs.

RSLCnano
  Standard and Basic
  RSLC



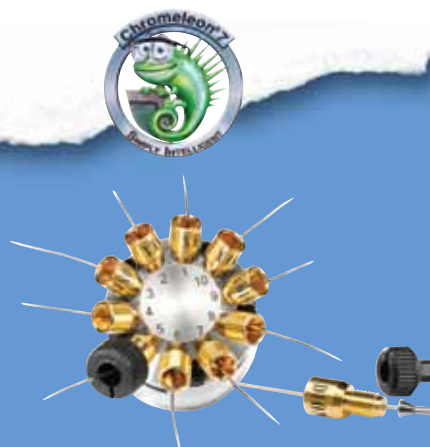
### Basic Systems

- Cost-effective system for routine applications
- Robust operation for consistent, reliable results
- 620 bar maximum pressure and 100 Hz data rate for UHPLC compatibility
- Optional Autosampler Column Compartment with integrated sampling and column temperature control



### Detection Options

- Wide range of optical detectors—UV-vis, fluorescence, and refractive index
- Unique Corona universal Charged Aerosol Detection
- High sensitivity electrochemical detectors
- Supported by MS detectors from AB/MDS Sciex, Bruker Daltonics, and Thermo Fisher Scientific



### Software and Consumables

- Chromeleon software for intuitive instrument control and streamlined data handling
- D-Library for application searching
- Viper and nanoViper fingertight fitting systems for easy configuration
- Extensive range of columns including monolithic technology and advanced multi-mode phases

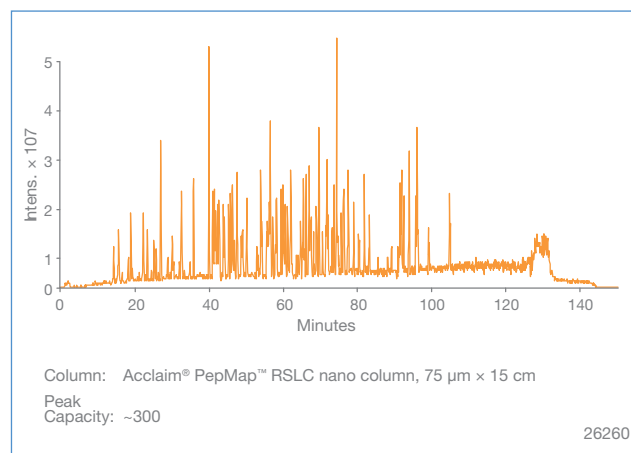
# Rapid Separation LC

Widest Flow-Pressure Footprint for Ultimate Performance and Versatility

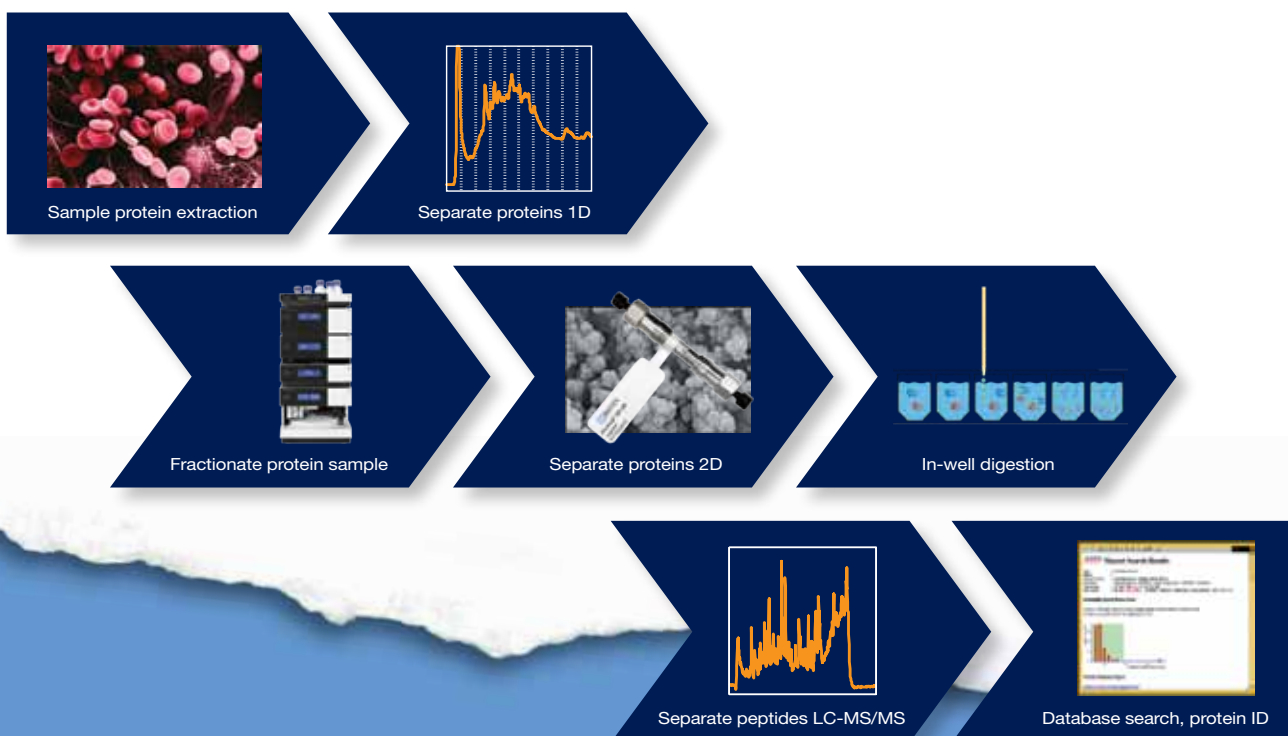
## UltiMate 3000 RSLCnano Systems

The RSLCnano system was developed with throughput in mind. The robust, continuous direct-flow delivery is designed for interruption-free analysis. The wide flow-pressure-footprint enables the application of UHPLC to the nano scale, allowing analysts to tune for the highest resolution or the fastest analysis time, even for tryptic peptide samples of utmost complexity. Configurable for speed, separation power, or sensitivity, the UltiMate 3000 RSLCnano is the only system to deliver all.

Operation at nano, capillary, and micro flow rates and the powerful dual-gradient availability provide application flexibility. The UltiMate 3000 RSLCnano supports advanced workflows, for example automated off-line 2D-LC, with ease. Using both pumps, two switching valves, and the microfractionation option of the autosampler, this set-up demonstrates the full flexibility of the system.



Base peak chromatogram of a complex tryptic peptide sample.



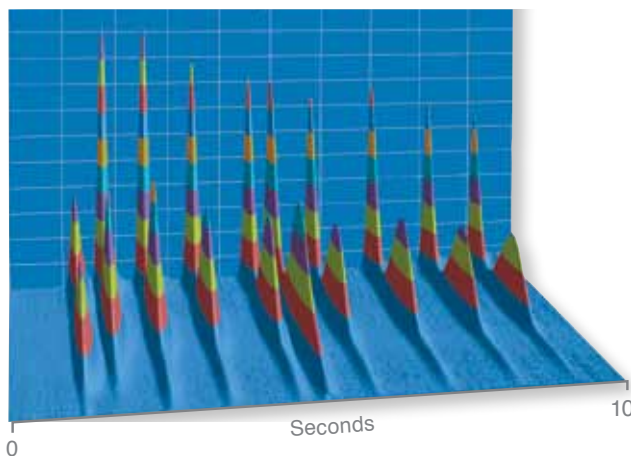


## UltiMate 3000 RSLC Systems

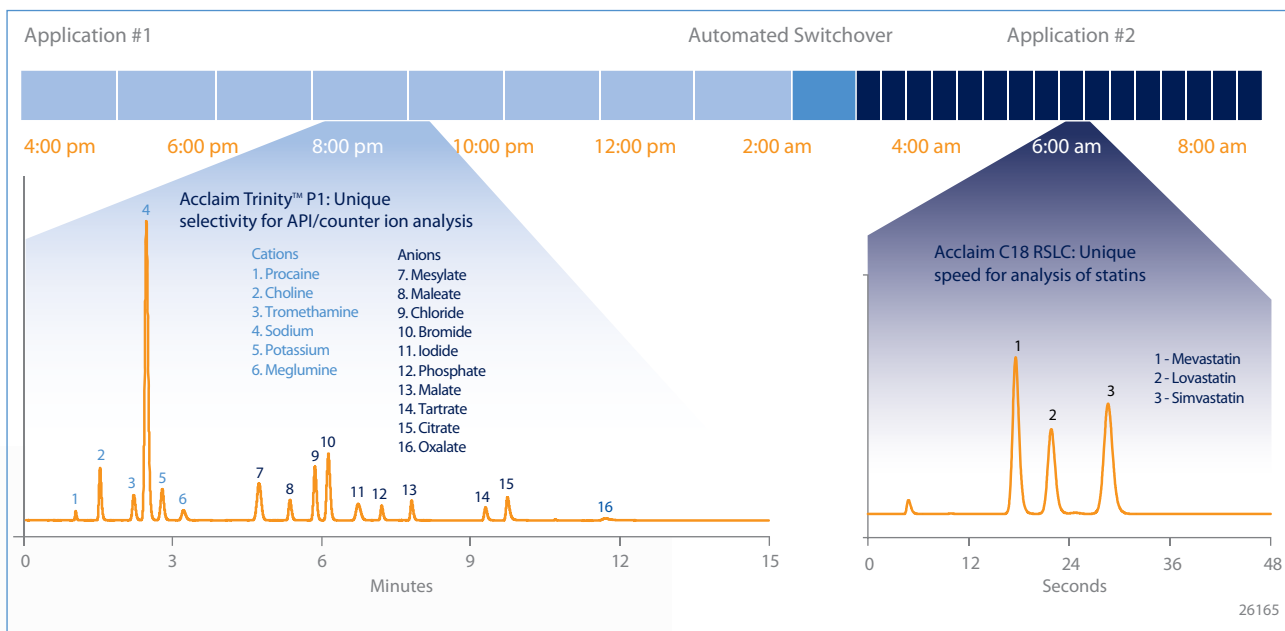
The RSLC system accelerates HPLC for unrivaled performance and flexibility. Precision-engineered instrumentation, advanced data processing, and highly optimized chemistries meet all chromatographic performance challenges. With binary, quaternary, or dual-gradient pumps, the RSLC system offers industry-leading versatility covering the maximum range of HPLC applications, including conventional and ultrafast LC.

The UltiMate 3000 x2 Dual RSLC systems offer unprecedented sample throughput and easy automation of advanced procedures. They provide highest selectivity and resolution with multidimensional LC and increased instrument use time by automatically switching between applications: UHPLC, HPLC, or both. Seamless integration of UHPLC with x2 Dual RSLC technology and powerful Chromeleon software brings new possibilities to laboratories.

Ten Peaks in Ten Seconds



Separation of uracil and 9 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 back pressure of 730 bar, and an oven temperature of 100 °C on a 30 × 2.1 mm C18 column with 1.8 μm particle size.



Automate two applications to run unattended overnight or over the weekend. The system will automatically flush columns and lines, switch to the other column, re-equilibrate the system with the new mobile phase, and start the second application. Applications can be standard HPLC, UHPLC, or both, as shown above. The Corona CAD detector enables simultaneous detection of API and counterions, and the 5 μL semi-analytical flow cell in the DAD ensures full compatibility with a wide variety of methods.



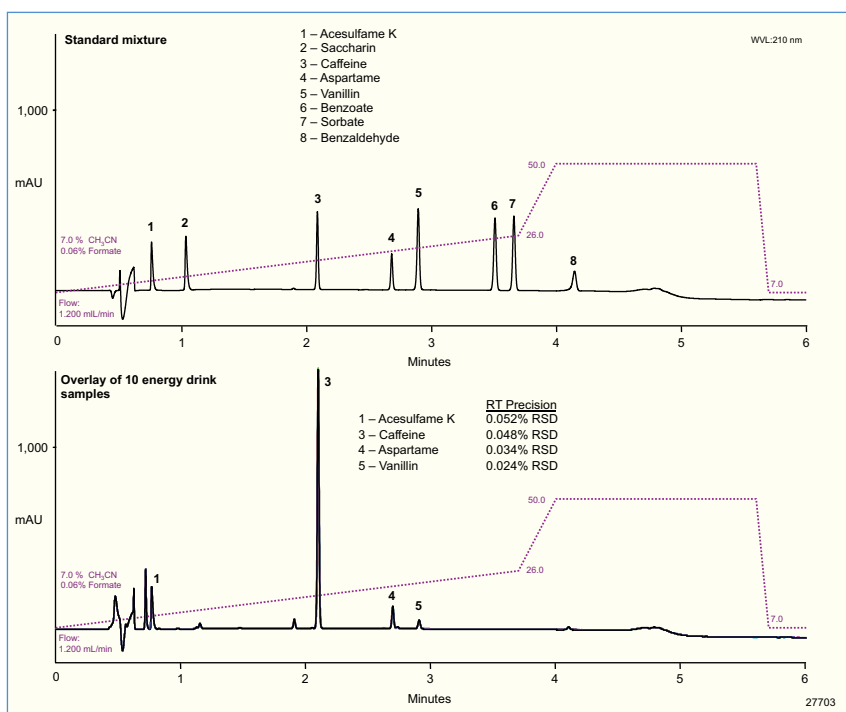
# Best In Class HPLC Systems

## Fully UHPLC Compatible – Covering All Application Needs

### Standard Systems

HPLC is a primary tool for many chromatography laboratories, but specific system requirements vary greatly from one application to another. The UltiMate 3000 Standard Analytical systems are designed to meet today's requirements and future challenges. They offer full support of all HPLC applications and provide UHPLC compatibility – allowing you to move to UHPLC whenever you are ready.

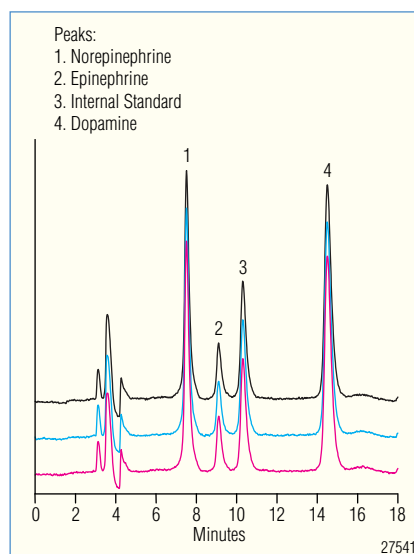
If you need even more throughput or are looking to run automated techniques such as on-line sample preparation, the UltiMate 3000 x2 Dual LC systems provide the perfect solution.



Fast analysis of soft drink additives at 515 bar. The standard mixture shows baseline separation of all analytes in only 6 minutes. The overlay of 10 consecutive injections of the sugar free energy drink shows excellent retention time and area precision.

UltiMate 3000 x2 Dual LC systems offer unprecedented levels of flexibility, significantly increased sample throughput, and automation of advanced procedures:

- Double sample throughput with Parallel and Tandem LC
- Switch between two applications easily and unattended
- Automate sample preparation and analysis of complex samples by on-line SPE-LC
- Full UHPLC compatibility for decreased run times, and better separations

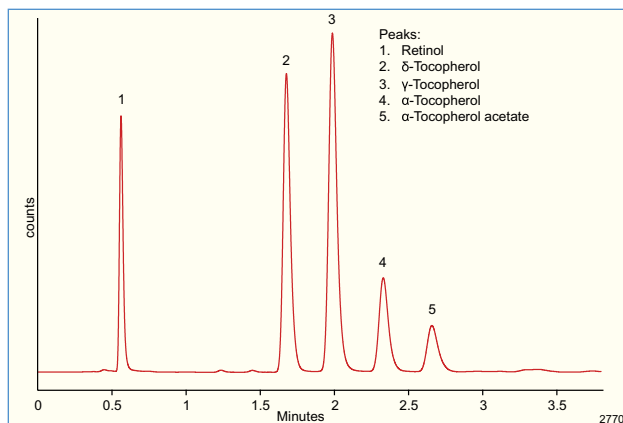


On-line SPE-LC analysis of drugs in biological fluids.

## Basic Automated Systems

The Basic Automated LC system is optimized for reliability and ease-of-use with routine LC applications, and also offers full UHPLC compatibility. The ACC-3000 Autosampler Column Compartment is at the heart of the system. Its unique instrument design combines a rugged sample injection principle with a powerful column oven.

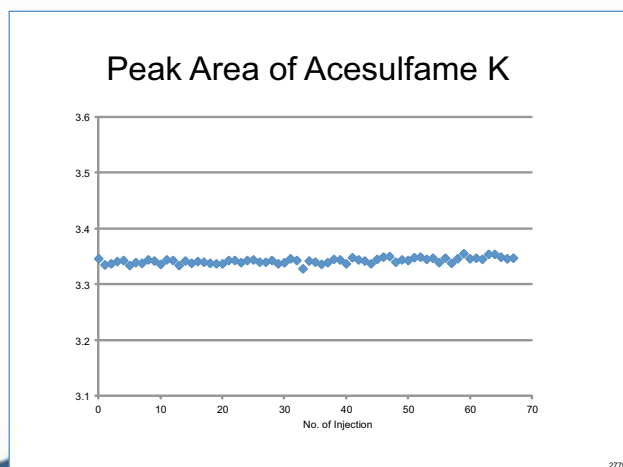
- Future proof yet cost-effective alternative to standard systems
- 620 bar maximum pressure and 100 Hz data rate for UHPLC compatibility
- Minimum number of wear parts and critical connections
- Industry leading range of detectors
- Modular versatility at compact system size



Fast isocratic separation of tocopherols in less than 4 min at 460 bar (6700 psi) using fluorescence detection.

The Basic Automated system provides extremely reliable and robust chromatography. This ensures that you get precise and accurate results, every day, and every application.

- Optimized design for routine analysis
- High levels of precision for consistent results
- Integrated sampler and column compartment



Peak areas for Acesulfame K over 68 consecutive injections of a soft drinks analysis, all ran under UHPLC conditions. The RSD is only 0.151% demonstrating excellent precision.

# Pumps

## Delivering Powerful and Precise Flows

The UltiMate 3000 pump family offers the most complete choice in the industry. From nano LC to rapid separation applications, from conventional applications to UHPLC, the UltiMate 3000 pumps always provide industry-leading flow, pressure, and precision.



### Isocratic

Analytical



### Binary

RSLCnano  
Analytical  
RSLC



### Quaternary

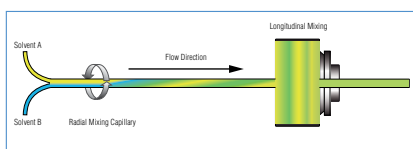
Micro  
Analytical  
RSLC



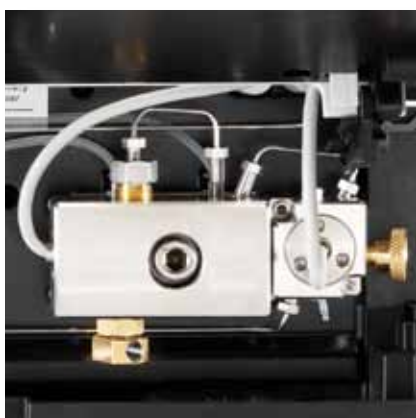
### Dual-Gradient

Micro  
Analytical  
RSLC

- Extensive mixer portfolio to cover all application needs
- Adapt the mixing volume within seconds



Unique SpinFlow™ mixing design for exceptional mixing performance



- Clean and intuitive fluidic design
- Easy access and smart software support for effortless maintenance
- Ultra precise and robust pump drives with near-zero acoustic noise
- SmartFlow® technology automatically ensures optimal chromatographic performance for any operating conditions

# Samplers and Column Compartments

## Advanced Automation Techniques

The UltiMate 3000 autosamplers ensure reliable, precise, and accurate injections of nL to mL sample volumes, with extremely low carryovers. Fraction collectors range from simple collection to advanced collection-reinjection workflows such as automated off-line 2D-LC.



### Autosamplers

Split-Loop,  
Pulled-Loop  
With integrated column compartment



### Fraction Collectors

Fraction Collector  
Autosampler/Fraction Collector  
MALDI Spotter



### Column Compartments

Integrated Switching Valves



- High robustness injection valves for maximum reliability
- Easily change syringe for maximum injection volume flexibility



- Choose from a wide range of sample storage formats



- Freely configurable and user-interchangeable high-pressure switching valves
- Precise temperature control, even under varying ambient conditions

# Detectors

## Detection Options to Fit Your Application

### Optical Detectors

The UltiMate 3000 optical detectors are available for UV-vis absorbance, fluorescence, and refractive-index detection of a wide variety of analytes. High data collection rates, multiple wavelength detection, and 3D UV spectra provide the UHPLC compatibility and the versatility to match your analyte and separation technique.



Detector Type	Maximum Data Rate	Details
DAD-3000 Diode Array Detector	200 Hz or 100 Hz	3D UV spectra, accurate library searches, peak purity analysis, multiple channel acquisition
MWD-3000 Multiple Wavelength Detector	200 Hz or 100 Hz	Simultaneous data acquisition of up to 8 data channels, upgradable to DAD
VWD-3000 Variable Wavelength Detector	200 Hz or 100 Hz	Single-channel detection with widest linear range and lowest noise
FLD-3000 Fluorescence Detector	200 Hz or 100 Hz	Trace analysis of fluorescent compounds, ultrafast switching between different excitation / emission wavelengths
RI-101	10 Hz	Universal detection of main compounds under isocratic elution conditions



### Charged Aerosol Detectors

Corona charged aerosol detectors (CAD) provide universal detection for any non-volatile and some semi-volatile analytes and are compatible with gradients. The Corona *ultra*<sup>™</sup> offers up to 100 Hz output rate for full compatibility with UHPLC applications. The Corona CAD is ideal for conventional HPLC applications.

### Electrochemical Detectors

The Coulochem<sup>®</sup> III is an electrochemical detector (ECD) for easily oxidized or reduced analytes. It offers outstanding performance for amperometric, coulometric, and pulsed amperometric detection. The coulometric dual electrode 6011 ultra Analytical cell offers full UHPLC compatibility in coulometric mode along with the high sensitivity and selectivity of ECD.

### Mass Spectrometry

The MSQ Plus<sup>™</sup> is one of the smallest and most sensitive quadrupole mass spectrometers on the market and is fully supported by the Chromeleon software. In addition, fully integrated, single-point control for any Dionex LC system through Xcalibur<sup>®</sup> (Thermo Fisher Scientific), Analyst<sup>®</sup> (AB/MDS Sciex), and HyStar<sup>™</sup> (Bruker Daltonics) is provided by DCMS<sup>Link™</sup>, a free control plug-in.

# Viper Fitting System

## Connect to the Future

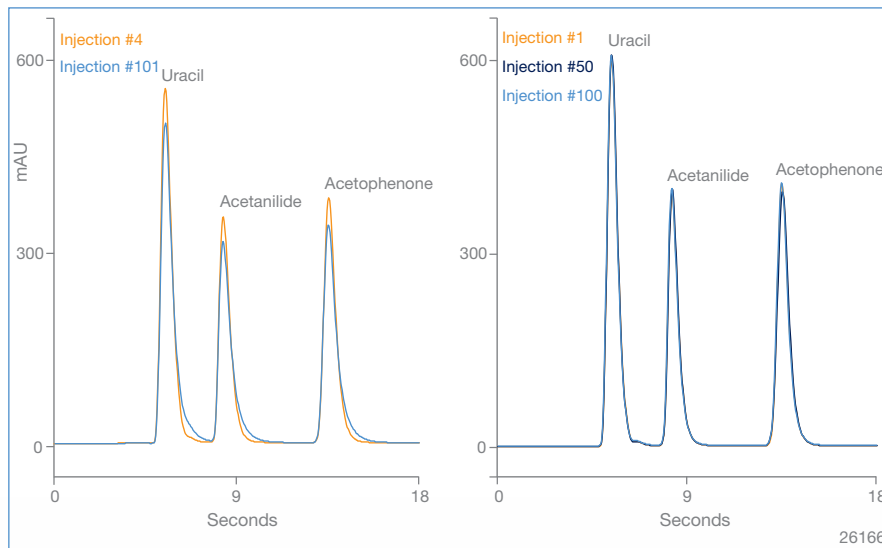
### The First Universal Fitting System

The Viper and nanoViper fitting systems do away with problems experienced with conventional fitting systems. They provide a perfect fit each time and ensure superior chromatographic performance.

- Zero-dead-volume UHPLC fingertight fittings for nano/cap, micro, and analytical LC

- Compatible with virtually every type of valve and column hardware
- Flexible stainless steel or fused silica capillaries

All RSLC and x2 Dual system tubing kits feature the unique Viper design, making the best HPLC systems even easier to use. The nanoViper connections are standard on RSLCnano accessories and Acclaim PepMap RSLC nano columns.



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.



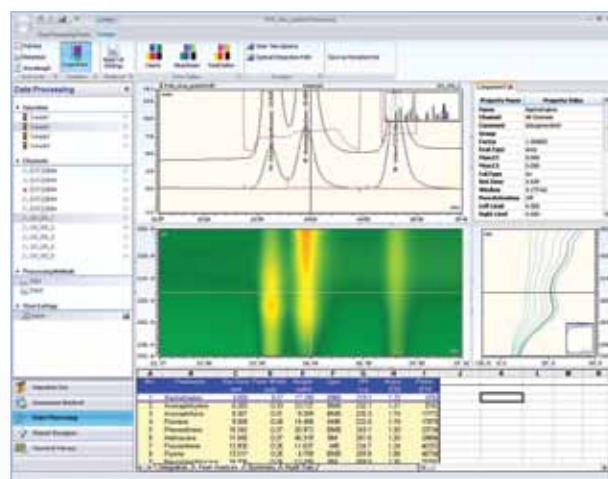
# Chromeleon Software

## Bring the Power of Operational Simplicity to Your Laboratory

The Dionex Chromeleon 7 Chromatography Data System delivers rich, intelligent functionality with Operational Simplicity, providing everything you need within easy reach. The features you need most often are kept in view, and the thoughtfully designed user interface guides you effectively through instrument setup, sequence programming, and data analysis. Innovative eWorkflows enable anyone to start chromatographic analyses and get good results with just a few selections. Powerful data analysis tools ensure that data can be displayed, interpreted, and reported efficiently and accurately. Chromeleon 7 software gets you from samples to results quickly and easily—boosting your overall lab productivity.



Intuitive ePanels provide direct access to all main instrument control features (for example, flow rate, temperature, detector wavelengths), plus easy access to advanced options. Instrument control has never been easier.



Take advantage of the Chromeleon software's extensive diode-array options to confirm peak purity, positively identify compounds, and optimize methods.



## eWorkflow Takes You from Samples to Results, Quickly and Easily

Aspirin - Content Uniformity				
Description: Regulatory Analysis of Aspirin Content Uniformity according to USP AC20063823		Type: Regulatory Analysis		
		Status: Approved for Use		
NCP.AC20063823.rpt				
#	Instance Name	Instance Status	Sequence Status	Queue Data
1	IS_UMMac000_05P	idle		
2	IS_UMMac000_1	idle		
3	IS_UMMac000_2	idle		Pending sequence 1
4	IS_UMMac000_P1	Running	200810_23_14_00_00011_1129086 (fraction 31 of 40)	

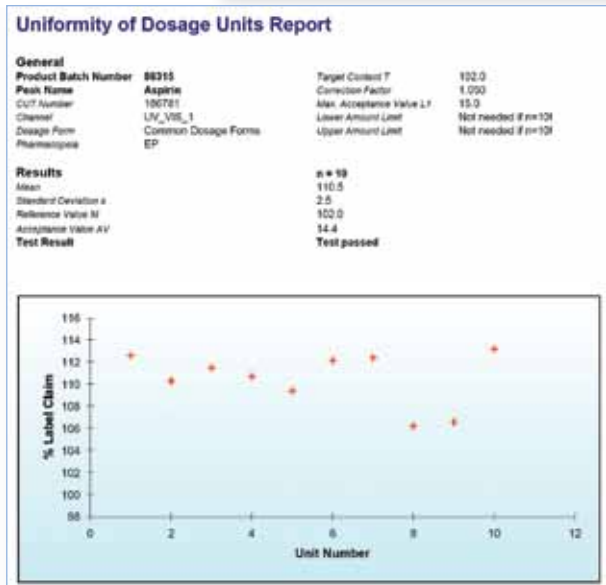
Sample Wizard

Define the desired number of samples and the corresponding start position

Number of Samples: 1 (1 - 10)

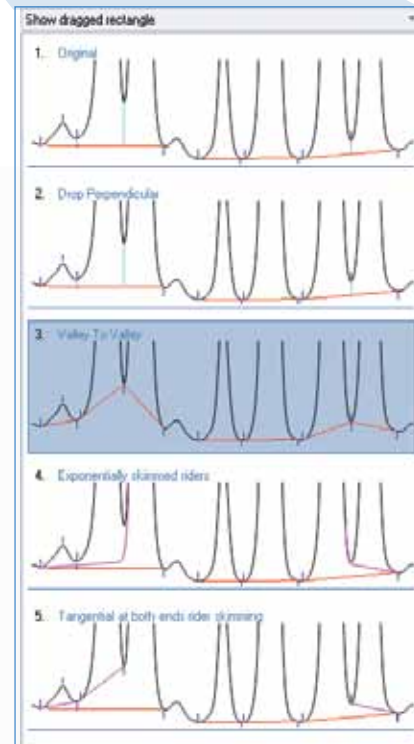
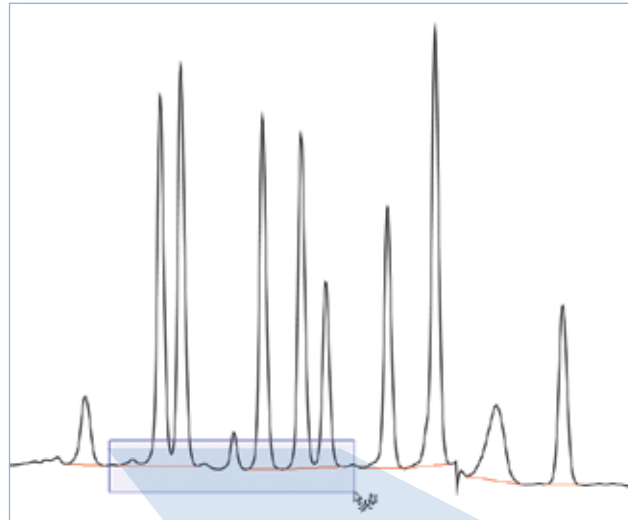
Sample Start Position: 141 (141 - 363)

Cancel Finish



The eWorkflows feature provides the simplest possible operation of instruments. They automatically create sequences containing the correct instrument conditions, data processing parameters, and reporting templates. Samples are run automatically, immediately processed, and the resultant data instantly reported, ensuring the fastest possible time from samples to results.

## SmartPeaks for Fast Integration



The unique data processing tools SmartPeaks™ and Cobra™ make peak detection and integration easy and straightforward.

# D-Library

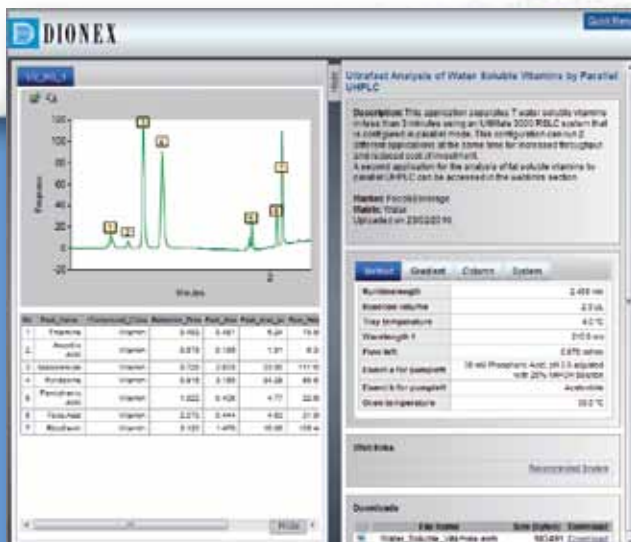
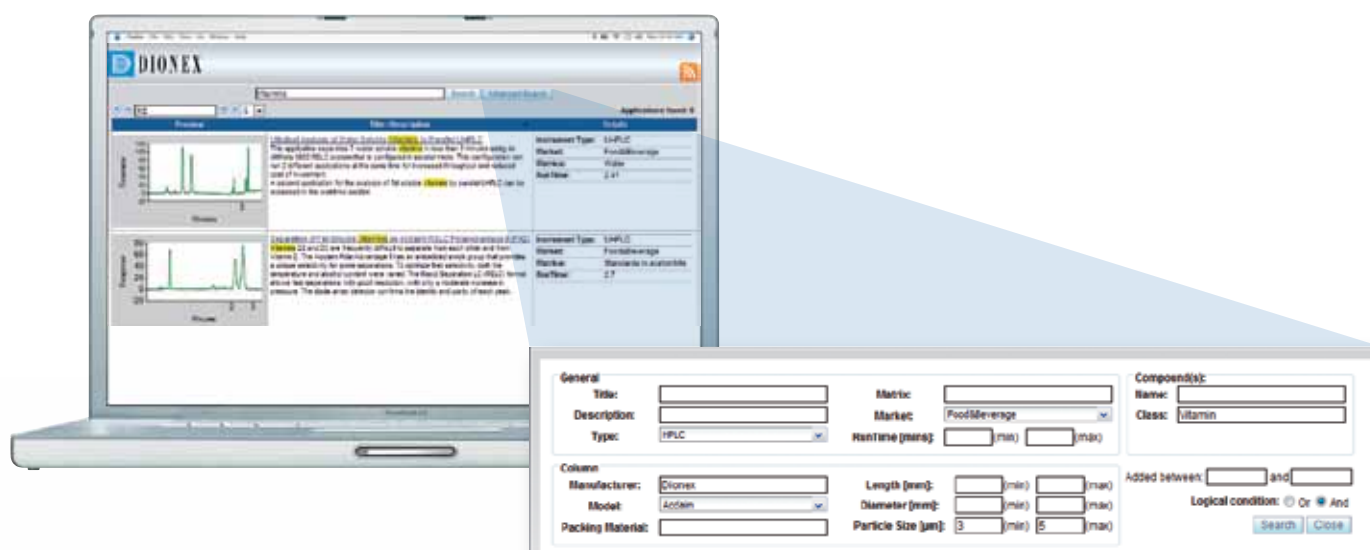
## The Easiest Way to Find Applications

D-Library is an exciting application library that uses web 2.0 technologies to achieve maximum accessibility. With its web user interface, customers can quickly find LC and IC applications based on various search criteria such as analyte, matrix, market, column type, instrument type, or run time.

Users get instantly notified about new applications by the built-in RSS feed.

All details of the application are available in a rich interactive view.

Once a suitable application has been found D-Library can provide users with ready-to-run Chromeleon software files

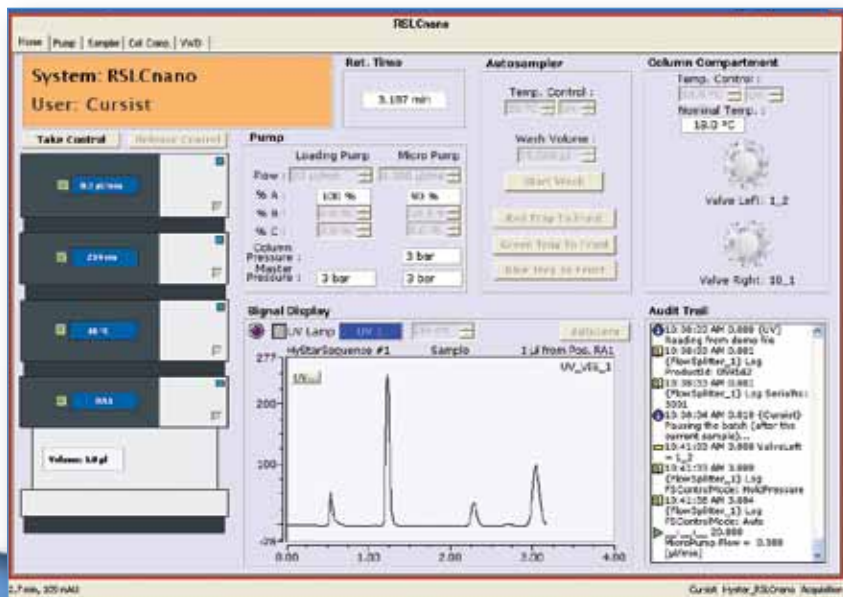


Quickly search for applications, easily review them, and download for immediate use.

# Mass Spectrometry

## DCMS<sup>Link</sup> Software for LC and Mass Spectrometer Control

DCMS<sup>Link</sup>, a free control-only software package, provides fully integrated, single-point control of any Dionex LC system through Xcalibur (Thermo Fisher Scientific), Analyst (AB/MDS Sciex), and HyStar (Bruker Daltonics). The MS workstation sets up the sample sequences, processes the mass spectrometry data, and uses DCMS<sup>Link</sup> to control all LC modules. Learning new software is held to a minimum, but the full benefit of the UltiMate 3000 single and dual pump systems are ready to support your MS applications.



Unique and intuitive instrument control through comprehensive and customizable graphical user interface within the MS workstation.



DCMS<sup>Link</sup> software provides single-point LC-MS control for Applied Biosystems, Bruker Daltonics, and Thermo Fisher MS instruments.

# LC Columns

## Wide Selection of Flow Rate Ranges and Selectivities

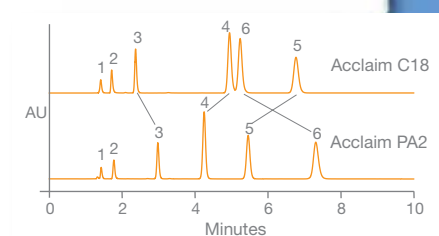
### Nano Columns

A wide range of dedicated Acclaim PepMap nano columns with particle sizes down to 2  $\mu\text{m}$ , lengths up to 50 cm, and zero-dead-volume connections.



### Standard Columns

The Acclaim column family features innovative bonding technology for a wide range of different selectivities, and highly efficient packings in all common column formats.



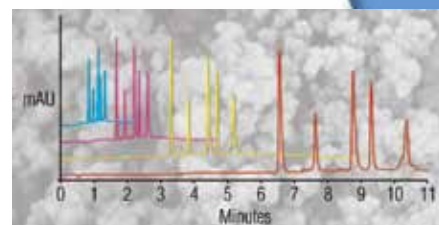
### Rapid Separation LC Columns

The Acclaim RSLC columns provide ultimate speed and resolution at low back pressures for straightforward method speed-up.



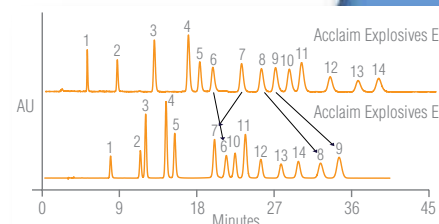
### Bio Columns

Numerous column chemistries including a unique monolith technology for ultrafast high resolution separations of biomolecules.



### Specialty Columns

Customized selectivities for dedicated application requirements. The Acclaim specialty columns are the best choice for separating surfactants, organic acids, or explosives.



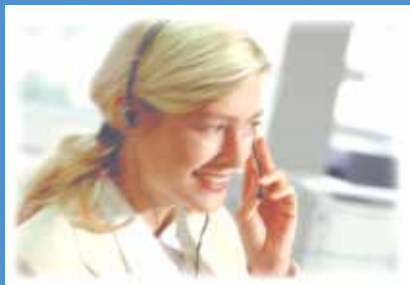
### Mixed-Mode Columns

Innovative columns with tunable selectivities, allowing simultaneous separations of ionic and hydrophobic and/or hydrophilic organic analytes.



## Dionex Training & Support Facilities

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Dionex measures success by enabling customers to succeed. This level of success relies on training and support that empower our customers worldwide. To reach customers in every region, Dionex manages service and application facilities or "Customer Support Centers," located in the United States, Europe, and Asia.

These state-of-the-art laboratories are equipped with the full line of Dionex HPLC and ion chromatography instrumentation, as well as updated software capabilities.

Dionex Customer Support Centers provide the worldwide scientific community with accessible locations for advanced training and enhanced application development capabilities. Chemists can attend these laboratories to learn new skills in addressing challenging applications, receive training and support, and discover new, innovative HPLC and IC solutions.