Dionex Product Selection Guide



DIONEX

Passion. Power. Productivity.

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UHPLC+ Solutions

Ultrahigh Performance LC (UHPLC) enables LC separations on columns with sub-3 um particles and therefore features shorter LC analysis times and higher resolution compared to conventional HPLC. It provides a higher return on investment at a low operating cost.

UHPLC+ Focused: UHPLC Compatibility for All Standard HPLC Users

Dionex now offers UHPLC performance to standard LC users at standard HPLC prices. the UltiMate 3000 Standard and Basic LC systems support pressures up to 62 MPa (9000 psi) providing full compatibility with UHPLC methods. Dionex has also extended the UHPLC performance of the UltiMate 3000 RSLC system to 103 MPa (15,000 psi) giving you more flexiblity for your chromatographic needs. In addition, the industry-leading RSLCnano systems offer UHPLC performance, supporting pressures as high as 80 MPa (11,600) psi) at flow rates from 20 nL/min to 50 µL/min.

UHPLC+ Solutions: Advanced Chromatographic Techniques for Increased Instrument Utilization Time

UltiMate 3000 UHPLC+ Solutions combine optimized Standard and RSLC system configurations, column chemistries, and software features to provide turnkey productivity suites for your toughest analytical challenges. Improved productivity, sensitivity, and/or resolution is achieved by combining UHPLC with advanced chromatographic techniques, such as parallel analysis, multidimensional separations, sample cleanup and analyte enrichment, method development, and proteomic workflows to enhance system utilization time compared to conventional LC. Freeing operator time, UHPLC+ solutions support LC applcations over a wide flow rate range—from nano to analytical—with sophisticated automation. UHPLC+ Solutions can significantly increase the return on your system investment.

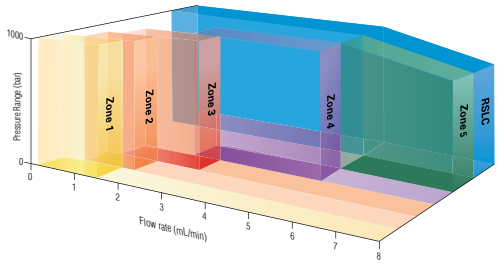
UHPLC+ Solutions Kits provide capillaries and comprehensive Quick Installation guides for fast, convenient kit implementaion and UltiMate 3000 Standard (SD) and Rapid Separation (RS) LC and RSLC system setup. They are available under Accessories in the Columns & Accessories section. Learn more about UHPLC+ Solutions at www.dionex.com under Products/ Liquid Chromatography/LC solutions. Contact your local representative for a UHPLC+ system configuration customized to your applications. For equipment specifications, see the LC Modules section.

Rapid Separation LC

The UltiMate 3000 UHPLC+ Solution for Rapid Separation Liquid Chromatography (RSLC) provides the means for ultra-fast separations and high resolution chromatography: Ultrahigh performance chromatography (UHPLC) at a maximum level of reliability and flexibility.

- Binary, Quaternary and ×2 Dual Rapid Separation LC systems available for the most complete UHPLC portfolio
- Accelerate your conventional LC method by up to a factor of 50
- Improve resolution for the analysis of complex samples by increasing peak capacity
- Accelerate and revalidate existing LC methods in less than one week
- Stay flexible with the Rapid Separation LC System in combination with Acclaim 1, 2.1, 3, and 4.6 mm ID columns with particle sizes of 2.2, 3, and 5 µm
- Enjoy Chromeleon data processing and reporting tools including 3-D data handling and revalidation tools for instant results

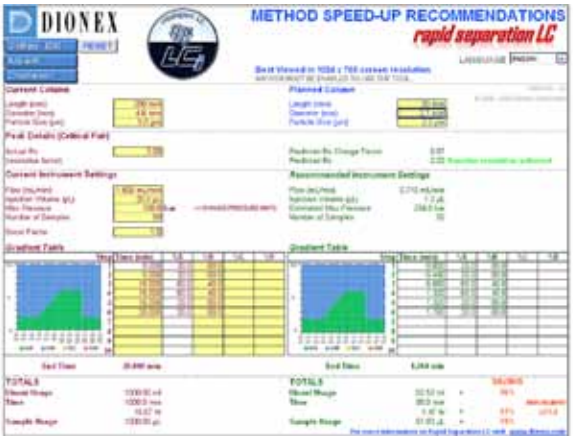
The extensive flow-pressure footprint of the UltiMate 3000 Rapid Separation LC system together with the binary, quaternary, and ×2 dual options and the comprehensive set of Acclaim column formats allow you to exploit the full range of LC applications up to 5 mL/min at a maximum pressure of 103 MPa (15,000 psi) and up to 8 mL /min at a maximum pressure of 80 MPa (1600 psi).



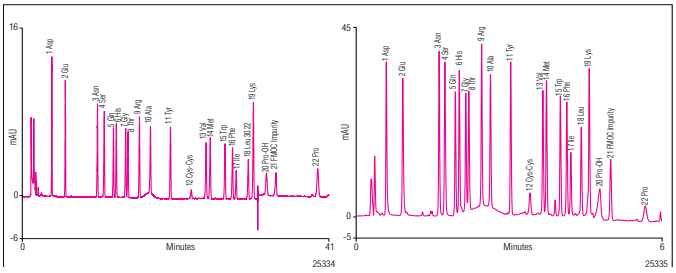
With its extensive flow-pressure footprint, RSLC fully meets your chromatographic goals. Simply work with your column of choice and in the appropriate zone for your application.

UltiMate 3000 RSLC 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

A method speed-up calculator is provided for quick and easy conversion of conventional LC to RSLC methods.



The UHPLC+ Solution for RSLC significantly increases sample throughput of LC applications such as amino acid analysis, without compromising resolution.



Accelerate your amino acid analysis: Conventional reversed-phase LC separation of 21 amino acids in 41 min (60 min total run time, left chromatogram) vs. baseline separation of 21 amino acids in less than 6 min (7 min total run time, right chromatogram) on the Acclaim RSLC 2.2 µm column.

Further increase your sample throughput by combining UHPLC and ×2 Dual technology with the ×2 Dual RSLC System. The UltiMate 3000 Binary, Quaternary, and ×2 Dual RSLC system configuration for RSLC analyses are equipped with the Viper capillary fingertight fitting systems for reliable zero-dead volume connections for optimal peak resolution.The configurations also support conventional LC applications.

Note: *For more information on the UltiMate 3000 Binary, Quaternary, and ×2 Dual RSLC Systems and Acclaim columns, refer to the corresponding sections of this catalog.*

Parallel Analyses

Increase sample throughput without the added time, effort, and cost of multiple LC instruments, method redevelopment, and revalidation. UltiMate 3000 ×2 Dual LC Systems provide the functionality of two systems in one footprint. Chromeleon provides the brains to automatically switch between applications—for the productivity of two systems in the time and effort of running one. Double your sample throughput with Parallel LC.

- Run two different or identical LC applications in parallel
- Increase throughput for new and existing methods
- No revalidation of methods required
- Supports isocratic and gradient separations
- Dedicated Viper Solution Kits for UltiMate 3000 SD and RS systems

In Parallel LC mode, one autosampler and one column compartment are shared between the two independent flow paths of the ×2 Dual LC system with Dual-Gradient Pump (Figure 1). Two detectors record the chromatograms of two LC applications simultaneously. Chromeleon Chromatography Data System software treats the system configuration as two completely independent systems, and manages seamless autosampler and column compartment sharing.

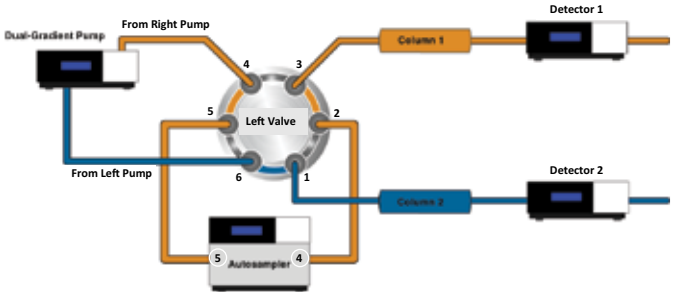


Figure 1. Flow scheme for Parallel Analyses.

The ×2 Dual LC System for Parallel Analyses costs significantly less than two separate LC systems, so you get double throughput without doubling costs.

The UltiMate 3000 ×2 Dual LC system for Parallel Analyses includes the SRD-3600 Solvent Rack and Degasser, the DGP-3600SD Dual-Gradient Standard Pump or DGP-3600RS Dual-Gradient Rapid Separation Pump, the WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-Line Split Loop Autosampler, the TCC-3000SD or TCC-3000RS Thermostatted Column Compartment with one 2-position 6-port switching valve, and a combination of two detectors, based on uv absorbance, fluorescence, or charged aerosol detection principle.

Tandem Analyses

Tandem Analysis provides another way to shorten your run times, utilizing the power of off-line column regeneration.

- Increase throughput for new and existing methods
- No revalidation of methods required
- Up to 50% shorter run times, with off-line column regeneration
- Tandem Analysis Solution kits for UltiMate 3000 SD and RS Systems include all required tubing and instructions

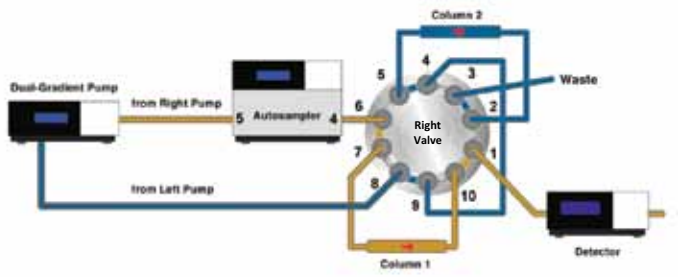


Figure 2. Flow scheme for Tandem Analyses.

In Tandem LC mode, two identical columns are switched between two flow paths—an analysis flow path and a regeneration flow path (Figure 2) to allow column washing and re-equilibration off-line. While one column is equilibrated, the system injects the next sample on the other. This solution saves the time required to wash and equilibrate a column for the next injection—typically 20–50% of total analysis time.

The UltiMate 3000 ×2 Dual LC system for Tandem Analyses includes the SRD-3600 Solvent Rack and Degasser, DGP-3600SD Dual-Gradient Standard Pump or DGP-3600RS Dual-Gradient Rapid Separation Pump, WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-Line Split Loop Autosampler, TCC-3000SD or TCC-3000RS Thermostatted Column Compartment with one 2-position 10-port switching valve, and DAD-3000 (RS) Diode Array Detector or MWD-3000(RS) Multiple Wavelength Detector or VWD-3×00(RS) Variable Wavelength Detector, FLD-3x00 Fluorescence Detector, Corona *ultra* or Corona CAD Charged Aerosol Detector.

Inverse Gradient Solution for Uniform Response CAD Analysis

CAD is a nebulizer-based, mass flow dependent technique enabling the universal detection of highly diverse analytes under isocratic conditions from one sample in one run. In gradient analyses, however, the nebulizer-based detection technique is subject to change in signal response with increasing content in organic mobile phase. This applies also for other nebulizer-based detectors like mass spectrometry with APCI and evaporative light scattering detectors. By providing the hardware- and software-related prerequisites the Inverse Gradient Solution provides an easy way to assure constant response with nebulizer-based detectors for gradient LC analysis .

Charged Aerosol Detection (CAD) provides the ability to measure virtually any non- or semivolatile analyte: lipids, proteins, DNA and oligonucleotides, amino acids, sugars, drugs, and ions (positive, negative, neutral, acidic or basic) with or without a chromophore. The unique Dual-Gradient Pump DGP-3600(RS) is used for running the separation gradient, and an inverse gradient from the same module is used for compensating the changing solvent composition in the detector during the run. The result is a constant CAD response allowing even the quantitation of unidentified impurities.

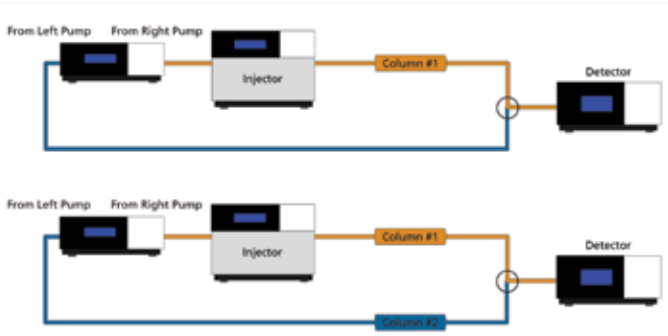


Figure 3. Flow scheme for Inverse Gradient Solution with CAD: single-column and dual-column variant.

In Inverse Gradient for uniform response with CAD mode, there are two flow paths—the analysis flow path and the compensation flow path. The analysis flow path includes the autosampler and the separation column, and is used for the separation of the sample, while the compensation flow path delivers the inverse gradient to compensate for the changing mobile phase composition in the detector. Both flow paths are combined by a mixing-T before the detector inlet. In order to gain a constant mobile phase composition in the detector, an isocratic hold must be programmed for the delay of the inverse gradient. The isocratic hold corresponds to the void volume difference of both flow paths.

Alternately, to account for the delay of the analysis and the compensation flow path, similar components in both flow paths can be included. Here, the outlet of the pump delivering the inverse gradient is fed to an identical column as installed in the analytical flow path (see lower flow path in Figure). The dual-column variant of the Inverse Gradient Solution with CAD allows setup of an automated gradient compensation without the need for accurate determination of gradient delays between compensation and analytical flow-paths.

Take advantage of the Inverse Gradient principle:

- Constant CAD response for best sensitivity and uniform detection of highly diverse chemical entities in gradient LC.
- Viper Inverse Gradient Solution Kits for Uniform Response with Nebulizer-based Detectors on UltiMate 3000 ×2 Dual RS and SD Systems for easy installation.

The UltiMate 3000 ×2 Dual LC System for Uniform Response Gradient with CAD and other Nebulizer-based Detectors includes the SRD-3600 Solvent Rack and Degasser, the DGP-3600SD Dual-Gradient Standard Pump or DGP-3600RS Dual-Gradient Rapid Separation Pump, the WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-line Split-Loop Autosampler, the TCC-3000SD or TCC-3000RS Thermostatted Column Compartment, and the Corona *ultra or* Corona CAD Charged Aerosol Detector.

Automated On-Line SPE-LC

Solid-phase extraction (SPE) is often used to isolate analytes of interest from a complex matrix. The UltiMate 3000 ×2 Dual LC System provides the technology for fully automated On-Line SPE.

- Direct injection of untreated samples (e.g., plasma, urine, serum, vegetable oils, and surface water)
- Automated sample cleanup and/or analyte enrichment for unattended sample processing
- Elimination of conventional manual sample pretreatment steps
- Less prone to errors leading to better results
- Reduced operator exposure to hazardous samples
- Increased workload per system for higher return on your equipment investment
- Dedicated Viper Automated On-Line SPE-LC Solution Kits for UltiMate 3000 x2 Dual RS and SD systems

In On-Line SPE, the sample is first injected on to the SPE column for sample fractionation and matrix elimination (Figure 4). Next, the analytes of interest are transferred from the SPE column to a reversed-phase column for separation, followed by detection. The two independent flow paths of the UltiMate 3000 ×2 Dual LC System ensure reliable SPE-LC operation.

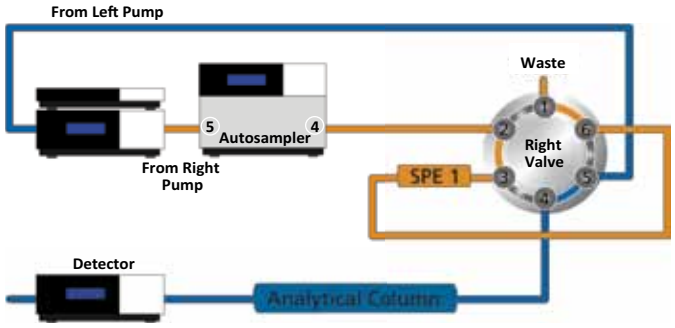


Figure 4. Flow scheme for on-line SPE-LC.

Chromeleon Chromatography Data System software provides an On-Line SPE-LC wizard to guide you through the steps to create and optimize an on-line SPE method. No special training is required—you can use these advanced features as soon as the UltiMate 3000 ×2 Dual LC System is installed in your laboratory.

The UltiMate 3000 ×2 Dual LC system for automated On-Line SPE-LC includes the SRD-3600 Solvent Rack and Degasser, DGP-3600SD Dual-Gradient Standard Pump or DGP-3600RS Dual-Gradient Rapid Separation Pump, WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-line Split-Loop Autosampler, TCC-3000SD or TCC-3000RS Thermostatted Column Compartment with one 2-position 6-port switching valve, and DAD-3000(RS) Diode Array Detector, or MWD-3000(RS) Multiple Wavelength Detector, or VWD-3×00(RS) Variable Wavelength Detector, or FLD-3x00 Fluorescenece Detector, or Corona *ultra* or Corona CAD Charged Aerosol Detector.

Automated Application Switching

The UltiMate 3000 ×2 Dual LC System makes it possible to automate the switchover between analytical methods, even when using different columns and mobile phases. This eliminates time spent changing mobile phase and columns, and flushing and equilibrating the system. The switch can be performed overnight or during the weekends, allowing maximum instrument utilization. The advanced ×2 Dual LC System with Chromeleon Software automates these steps and switches applications in minutes.

- Easily switch between applications by clicking on the Chromeleon control panel
- Two independent flow paths support the use of separate columns and mobile phases
- Tubing to and from the autosampler can be flushed before switching to another application
- Low standby flow rate prevents precipitation of eluent buffers, increasing instrument uptime

- Application switching can be scheduled for ultimate flexibility. Set method A to run over the weekend, and automatically switch to method B Sunday morning—both will be complete when you arrive in the laboratory on Monday
- Dedicated Viper Automated Application Switching Kits for UltiMate 3000 SD and RS systems

In this solution, after the operator sets up both LC methods, the system automatically starts and equilibrates. As the analysis on the first column completes, the system automatically switches to the second method and column without additional operator intervention (Figure 5). This approach frees operator time, increases system use time, and thus improves productivity.

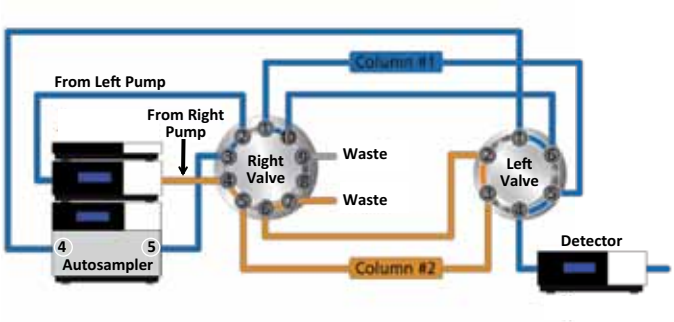


Figure 5. Flow scheme for Automated Application Switching.

The UltiMate 3000 ×2 Dual LC system for Automated Application Switching includes the SRD-3600 Solvent Rack and Degasser, DGP-3600SD Dual-Gradient Standard Pump or DGP-3600RS Dual-Gradient Rapid Separation Pump, WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-line Split-Loop Autosampler, TCC-3000SD or TCC-3000RS Thermostatted Column Compartment with one 2-position 10-port switching valve and one 2-position 6-port switching valve, and DAD-3000(RS) Diode Array Detector or MWD-3000(RS) Multiple Wavelength Detector or VWD-3x00(RS) Variable Wavelength Detector or CAD Charged Aerosol Detector.

Automated Method Scouting

The UltiMate 3000 UHPLC+ Solution for Automated Method Scouting provides a technique for fast method development by automatically testing method parameters, such as pH value of the mobile phase, solvent composition, stationary phase and column temperature.

- Optimized hardware design, with two 6-position 7-port valves in the column compartment
- Dedicated Viper Automated Method Scouting Kits for UltiMate 3000 SD and RS systems
- Fast and convenient instrument control and method setup
- Powerful queries and reporting tools for data processing and evaluation
- Chromeleon post processing tools find the optimal method in seconds, eliminating the need for manual data assessment
- Extension kit with solvent selection valve available for screening nine additional solvents

Two 6-position 7-port valves integrated into the TCC-3000 Thermostatted Column Compartment are used for column selection; up to six columns can be scouted automatically. The DAD-3000 Diode Array Detector is used for peak purity and identity tracking.

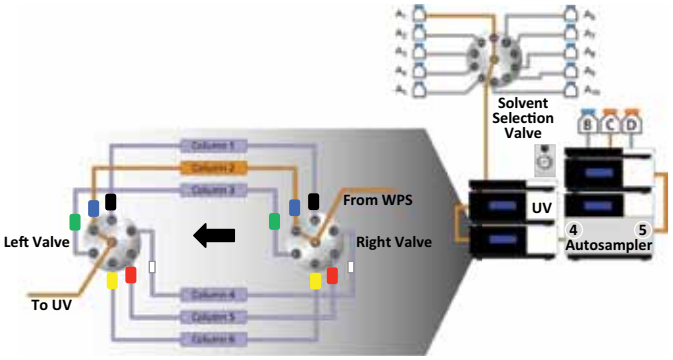


Figure 6. UltiMate 3000 LC system for Automated Method Scouting with extension kit for solvent selection.

Chromeleon Chromatography Data System software provides easy parameter permutation without the need for method changes. The data mining tools, such as automated SST and query functions, eliminate the need for manual data assessment and help to quickly identify the optimum set of parameters. Smart reports visualize results instantaneously.

The UltiMate 3000 LC system configuration for Automated Method Scouting includes the SRD-3000 Solvent Rack, LPG-3400SD Quaternary Standard Pump or LPG-3400RS Quaternary Rapid Separation Pump, WPS-3000(T)SL Analytical or WPS-3000(T)RS Rapid Separation In-Line Split-Loop Autosampler, TCC-3000SD or TCC-3000RS Thermostatted Column Compartment with two 6-position 7-port switching valves, and DAD-3000(RS) Diode Array Detector.

Proteomics Solutions

The RSLCnano Preconcentration Solution is ideally suited for the analysis of in-gel digested protein samples. A reversed-phase trap column is used for sample cleanup and preconcentration of the peptides. The preconcentration configuration has the advantage that, by concentrating the sample onto the trap column, conventional injection volumes can be made on nano LC columns. In addition, the low flow resistance of the trap column allows the use of high flow rates to inject large sample volumes in a short time.

- Fast injection of large samples in nano LC
- High detection sensitivity
- On-line cleanup and desalting of samples
- Preconcentration kits available for nano, capillary, and monolithic configurations
- Chromeleon Chromatography Data System software for easy system and application control

The typical workflow in a preconcentration experiment starts with sample injection onto a trap column. The sample is preconcentrated and desalted by flushing an aqueous solvent through the trap column. After sample cleanup, the 2-position valve is switched to place the trap column in series with the separation column. The solvent gradient is started to elute and separate the analytes. The analytes are then detected by UV and/or ESI-MS/MS or are spotted on-line onto a MALDI target (Figure 7).

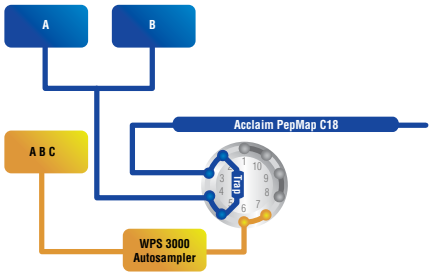


Figure 7. Flow scheme for proteomics preconcentration.

The UltiMate 3000 RSLCnano system for preconcentration and sample cleanup includes the SRD-3400 Solvent Rack, NCS 3500RS nano LC pump with Column Compartment, WPS-3000 TPLRS Nano/Cap Pulled-Loop Autosampler, and VWD-3400 UV/Vis Detector.

Proteomics Tandem nano LC

To maximize sample throughput and MS utilization of nano LC-MS/MS for peptide sequencing and protein identification, you can perform peptide preconcentration and separation using a tandem nano LC setup. This LC configuration includes two preconcentration nano LC setups (above) for on-line sample cleanup.

- Increased sample throughput for new and existing proteomic methods
- Shorter run times due to off-line column regeneration
- On-line peptide preconcentration, cleanup and separation

In RSLCnano /Tandem nano LC, protein digests are injected onto a trap column for sample cleanup and desalting. After sample cleanup, the gradient is started to elute the peptides from the trap column. After separation on the analytical column, the columns are washed and equilibrated. During this phase, the next sample is injected onto the second trap and separation column system to wash and separate the peptides. A dedicated nano valve in the WPS-3000 FC is used to switch the nano columns to the MS detector for peptide identification (Figure 8).

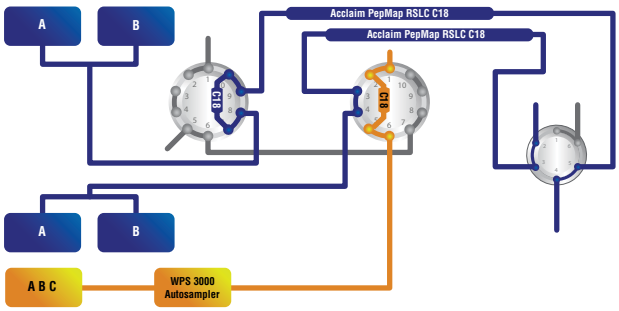


Figure 8. Flow scheme for proteomics Tandem nano LC.

The parallel LC setup allows simultaneous peptide separation and column equilibration, increasing sample throughput up to 100%.

The RSLC Tandem nano LC system includes the SRD-3400 Solvent Rack (NCS-3500RS) with two 10-port 2-position switching valves, NCP-3200RS, WPS-3000PL FC Pulled-Loop autosampler, and VWD-3100 UV/vis detector. The application kit contains the accessories required to equip the WPS-3000FC with a nano switching valve.

Proteomics MDLC Solutions

These UHPLC+Solutions employ the UltiMate 3000 RSLCnano system to address challenging proteomics applications.

- Combination of two orthogonal chromatographic techniques, for example, IEX and RP-HPLC
- Separation of complex samples
- High peak capacities
- Easy system control and easy visualization of 2D-LC data with Chromeleon software
- Simple method development and optimization
- High method flexibility

2D Salt Plugs

The 2D-LC salt step solution is the easy-to-use and flexible solution for moderately complex proteomics analyses. It allows 2D separations by using the autosampler and salt injections to transfer fractions from the first to the second dimension.

The RSLCnano Salt Plug Solution is based on injections of salt plugs onto an ion-exchange column. Typically, a protein digest is injected onto a strong cation-exchange column for separation in the first dimension. Peptides are eluted and separated as fractions by injecting salt plugs with increasing salt concentrations. Each fraction is subsequently separated on a reversed-phase column in the second, orthogonal dimension (Figure 9). The total number of salt plugs depends on the sample complexity. This method can be fully automated. The same fluidics also support RSLCnano Preconcentration.

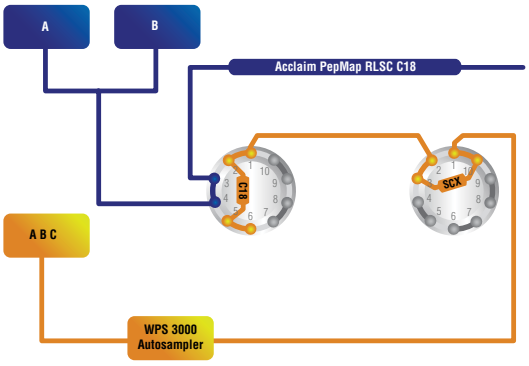


Figure 9. Flow scheme for 2D Salt Plugs.

Automated Off-Line 2D-LC

The automated off-line 2D-LC solutions support the separation of highly complex proteomic samples. The advantages of off-line MDLC techniques over on-line approaches include high flexibility in column dimensions and mobile-phase compositions, as well as the ability to re-analyze sample fractions. The micro fraction collection option of the WPS-3000PL Nano/Cap Pulled-Loop autosampler supports fully automated off-line 2D-LC, a unique solution for the analysis of complex proteomics samples.

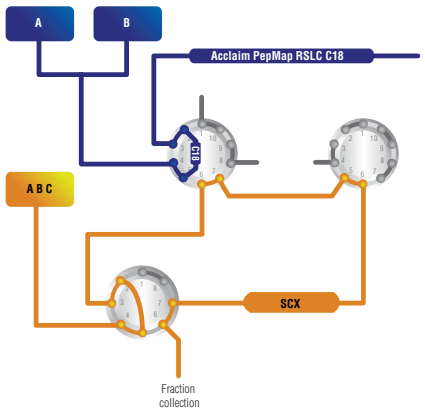


Figure 10. Flow scheme for automated off-line 2D-LC SCX-RP.

UltiMate 3000 UHPLC+ Systems

Best-in-class HPLC systems for all your chromatography needs

UltiMate 3000 UHPLC+ Systems provide excellent chromatographic performance while maintaining easy, reliable operation. The basic and standard analytical systems offer UHPLC compatibility across all modules, ensuring maximum performance for all users and all laboratories. Covering flow rates from 20 nL/min to 10 mL/min with an industry-leading range of pumping, sampling, and detection modules, UltiMate 3000 UHPLC+ Systems provide solutions from nano to semipreparative, from conventional LC to UHPLC.

- Superior chromatographic performance
- UHPLC design philosophy throughout nano, standard analytical, and RSLC
- 620 bar (9,000 psi) and 100 Hz data rate set a new benchmark for basic and standard analytical systems
- ×2 Dual System for increased productivity solutions in routine analysis
- Fully UHPLC compatibile advanced chromatographic techniques
- Viper and nanoViper–the first truly universal, fingertight fitting system even at UHPLC pressures

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



Rapid Separation LC Systems: The extended flow-pressure footprint of the RSLC system provides the performance for ultrafast high-resolution and conventinal LC applications.

RSLCnano Systems: The Dionex Rapid Separation nanoLC System (RSLCnano) provides the power for high resolution and fast chromatography in nano-, capillary, and micro LC.

Standard LC Systems: Choose from a wide variety of Standard LC systems for demanding LC applications at nano, capillary, micro, analytical, and semipreparative flow rates.

Basic LC Systems: UltiMate 3000 Basic LC Systems are UHPLC compatible and provide reliable and high-performing solutions to fit your bench space and your budget.

Rapid Separation LC Systems



The Rapid Separation (RSLC) System accelerates HPLC for unrivaled performance and flexibility. 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.

- 1034 bar (15,000 psi) maximum pressure and flow rates up to 8 mL/min
- Extensive flow-pressure-footprint for ultrafast, ultrahigh-resolution separations
- Binary or quaternary systems for both UHPLC and conventional HPLC
- ×2 Dual RSLC systems for ultimate productivity solutions
- In-line split-loop injections for 15 second, no-sample-loss injections
- Column compartment temperatures up to 110 °C for reduced system backpressure
- Data collection rates of up to 200 Hz for the detectors
- Wide range of UHPLC compatible detectors

Precision-engineered instrumentation, advanced data processing, and highly optimized chemistries meet all chromatographic performance challenges. The seamless integration of UHPLC with ×2 Dual RSLC technology and powerful Chromeleon software brings new possibilities to laboratories.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

UltiMate 3000 RSLC System Brochure

Binary Rapid Separation LC System

The Binary RSLC System offers an industry-leading flow-pressure footprint. With its superior performance, it is the best choice for any ultrahigh speed and ultrahigh resolution applications but perfectly suitable for conventional analytical applications as well.

- 1034 bar (15,000 psi) maximum pressure and flow rates up to 8 mL/min
- Automatic compressibility compensation, no manual solvent setting needed.
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- In-line split-loop injections for 15 second, no-sample-loss injections
- Inject up to 500 µL with the patented injection valve of the RSLC Autosampler
- Column compartment temperatures up to 110 °C for reduced system backpressure
- Wide range of UHPLC compatible detectors with a data collection rates of up to 200 Hz
- Zero-void-volume module connections using Viper fingertight fittings

Note: *For specifications, refer to the LC Modules section.*

Ordering Information

The following RSLC modules and accessories represent a typical UltiMate 3000 Binary RSLC system configuration. Due to its modular setup, this system can be upgraded easily by adding or exchanging modules For additional ordering information on LC modules and accessories, refer to the LC Modules section.

Hardware

SRD-3400 UltiMate 3000 Integrated Solvent and Degasser Rack, 4 Channels 5035.9245

HPG-3400RS UltiMate 3000 Binary Rapid Separation Pump with Solvent Selector Valves 5040.0046

WPS-3000TRS UltiMate 3000 Rapid Separation Thermostatted Autosampler 5840.0020

TCC-3000RS UltiMate 3000 Rapid Separation Thermostatted Column Compartment 5730.0000

DAD-3000RS UltiMate 3000 Rapid Separation Diode Array Detector (Without Flow Cell) 5082.0020

Accessories

Sample Loop, 25 µL WPS-3000RS and WPS-3000SL Analytical Samplers 6820.2415

Semi-Micro Flow Cell for DAD-3000 and MWD-3000 Series, SST, 2.5 µL Volume, 7 mm Path Length 6082.0300

Quaternary Rapid Separation LC System

The Quaternary RSLC System provides the highest degree of flexibility in solvent proportioning for UHPLC and conventional HPLC applications. The system is ideal for ultrahigh resolution and conventional columns with particles ranging from sub-2 µm to 10 µm particle size for fast routine applications, and method development.

- 1034 bar (15,000 psi) maximum pressure and flow rates up to 8 mL/min
- Low pressure gradient proportioning at superior accuracy and precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- In-line split-loop injections for 15 second, no-sample-loss injections
- Inject up to 500 µL with the patented injection valve of the RS Well Plate Autosampler
- Column compartment temperatures up to 110 °C for reduced system backpressure
- Wide range of UHPLC compatible detectors with a data collection rates of up to 200 Hz
- Zero-void-volume module connections using Viper fingertight fittings

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following modules and accessories represent an UltiMate 3000 Quaternary RSLC System for Automated Method Scouting

Hardware

SR-3000 UltiMate 3000 Solvent Rack without Degasser 5035.9200

LPG-3400RS UltiMate 3000 Quaternary Rapid Separation Pump 5040.0036

WPS-3000TRS UltiMate 3000 Rapid Separation Thermostatted Autosampler 5840.0020

TCC-3000RS UltiMate 3000 Rapid Separation Thermostatted Column Compartment 5730.0000

DAD-3000RS UltiMate 3000 Rapid Separation Diode Array Detector (Without Flow Cell) 5082.0020

Accessories

Sample Loop, 25 µL WPS-3000RS and WPS-3000SL Analytical Samplers 6820.2415

Semi-Analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 13 µL Volume, 10 mm Path Length 6082.0200

Valve Actuator Kit HT for right side of TCC-3000RS/SD, Pressure < 1034 bar (15,000 psi) 6730.0001
Required for Automated Method Scouting.

Valve Actuator Kit HT for left side of TCC-3000RS/SD, Pressure < 1034 bar (15,000 psi) 6730.0002
Required for Automated Method Scouting.

Pod for 6-Position 7-Port HT Valve, SST Variant, Pressure < 1034 bar (15,000 psi) 6730.0016
Two valve pods are required for Automated Method Scouting.

Viper UHPLC Fingertight Fitting and Capillary Kit for Automated Method Scouting on UltiMate 3000 ×2 Dual RSLC Systems 6040.2807
Required for Automated Method Scouting.

Extension Kit for Automated Method Scouting with 10-Position 11-Port Solvent Selection Valve for 1/8" OD Tubing 6040.0100

×2 Dual Rapid Separation LC System

The UltiMate 3000 ×2 Dual RSLC System offers unprecedented sample throughput and easy automation of advanced procedures. It provides highest selectivity and resolution with multi-dimensional LC and increased instrument use time by automatically switching between applications: UHPLC, HPLC, or both.

- 1034 bar (15,000 psi) maximum pressure and flow rates up to 8 mL/min
- Dual low pressure gradient proportioning at superior accuracy and precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- In-line split-loop injections for 15 second, no-sample-loss injections
- Inject up to 500 µL with the patented injection valve of the RS Well Plate sampler
- Column compartment temperatures up to 110 °C and freely-configurable switching valves
- Wide range of UHPLC compatible detectors with a data collection rates of up to 200 Hz
- Turnkey Viper kits for ease of use

Note: *For system specifications, please refer to the LC Modules section.*

Ordering Information

The following RSLC modules and accessories represent an UltiMate 3000 system for Tandem Analysis

Hardware

SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels 5035.9230

DGP-3600RS UltiMate 3000 Dual-Gradient Rapid Separation Pump System 5040.0066

WPS-3000TRS Rapid Separation Thermostatted Autosampler 5840.0020

TCC-3000RS UltiMate 3000 Rapid Separation Thermostatted Column Compartment 5730.0000

DAD-3000RS UltiMate 3000 Rapid Separation Diode Array Detector (Without Flow Cell) 5082.0020

Accessories

Sample Loop, 2.5 µL, WPS-3000RS and WPS-3000SL Analytical Samplers 6820.2415

Analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 13 µL Volume, 10 mm flow path 6082.0100

Semi-analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 5 µL vol, 7 mm flow path 6082.0200
Required for Tandem UHPLC

Pod for 2-Position 10-Port HT Valve, SST Variant, Pressure < 1034 bar (15,000 psi) 6730.0026
Required for Tandem UHPLC

Viper UHPLC Fingertight Fitting and Capillary Kit for Tandem Operation on UltiMate 3000 ×2 Dual RSLC Systems 6040.2803
Required for Tandem UHPLC

RSLCnano Systems

The UltiMate 3000 RSLCnano System is developed with sample throughput in mind. The robust, splitless flow delivery is designed for continuous, interruption-free analysis. The wide flow-pressure footprint allows nano-, capillary, and micro flow rates at column pressures up to 800 bar. The RSLCnano system offers better confidence; in performance, in results, and ease of operation.

- Flow delivery from 20 nL/min up to 50 µL/min at a maximum pressure of 800 bar
- Continuous direct flow
- Unparalleled gradient precision
- Small gradient delay volume of only 25 nL
- Up to two low-dispersion 2-position switching valves
- Nano, capillary, and micro LC applications
- Multidimensional separations
- Integrated ternary gradient pump, 10–2500 µL/min

The heart of the UltiMate 3000 RSLCnano System is the HPG nano pump. The HPG nano pump generates a continuous, splitless, and pulse free flow. Refill cycles are not required, therefore the system will run as long as there is mobile phase available. The unmatched flow-pressure footprint of 800 bar of column pressure is available from 20 nL/min to 50 µL/min and delivers the pump power required to drive any separation.

Tedious and troublesome nano LC application configuration is a thing of the past with the new nanoViper capillary fitting system. nanoViper fitting brings unparalleled ease of use to nano LC, providing fingertight, zero dead-volume connections to any module, valve, and column over the complete pressure range.



The UltiMate 3000 RSLCnano System.

The built-in column compartment features up to two micro switching valves capable of working at pressures up to 1000 bar. The valves can be pulled forward or taken out without tools, to maximize ease-of-use when setting up a new application.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

UltiMate 3000 RSLCnano System Brochure

Product Data Sheets

UltiMate 3000 RSLCnano Rapid Separation Nano LC System Data Sheet

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

Hardware

NCS-3500RS UltiMate 3000 Binary Rapid Separation Nano Flow Pump with Ternary Loading Pump and Column Compartment 5041.0010

NCS-3500RS UltiMate 3000 Binary Rapid Separation Capillary Flow Pump with Ternary Loading Pump and Column Compartment 5041.0020

NCP-3200RS UltiMate 3000 Binary Rapid Separation Nano Flow Pump 5041.0030

VWD-3400RS UltiMate 3000 Rapid Separation Four-Channel Variable Wavelength Detector (Without Flow Cell)..... 5074.0010

SRD-3400 UltiMate 3000 Integrated Solvent and Degasser Rack, Four Channels 5035.9245

WPS-3000TPLRS UltiMate 3000 Thermostatted Rapid Separation Pulled Loop Well Plate Sampler 5826.0020

Accessories

Low-Dispersion 2-Position 10-Port Snap-In Valve Pod with 10-32 Fittings, 0.15mm Bore, 900 bar/13,050 psi pressure limit, for UltiMate 3000 NCS-3x00RS 6041.0001

Flow Selector for Nano LC with flow range 50-1000 nL/min for NCS-3x00RS and NCP-3x00RS 6041.0002

Flow Selector for Capillary LC with low range 0.5-10 µL/min for NCS-3x00RS and NCP-3x00RS 6041.0003

Biocompatible (PEEK) Low-Dispersion 2-Position 10-Port Snap-In Valve Pod with 10-32 Fittings, 0.15 mm bore, 345 bar/5,000 psi pressure limit, for UltiMate 3000 NCS-3x00RS 6041.0012

Flow Selector for Micro LC with flow range 10-50 µL/min for NCS-3x00RS and NCP-3x00RS 6041.0014

Flow Cell VWD-3x00, nano, 3 nL, ... 6074.0270

Flow Cell VWD-3x00, nano, 45 nL 6074.0280

Flow Cell, VWD-3x00, nano, 180 nL..... ..... 6074.0290

Standard LC Systems



The UltiMate 3000 Standard LC Systems offer UHPLC compatibility across all modules, ensuring maximum performance for all users and all laboratories. The 620 bar maximum pressure sets a new benchmark in HPLC

- Optimal performance and reliability for conventional LC applications
- 620 bar (9000 psi) maximum pressure and 100 Hz data rate for UHPLC compatibility
- Flow rates up to 10 mL/min covering all application needs
- Widest range of system configurations for maximum application flexibility
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Active rear seal wash for increased piston seal lifetime
- Patented piston seal tightness monitoring
- System wellness and predictive performance indicators

Choose from a wide variety of Standard LC system configurations, or modify system setups to fit your specific demands and applications.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

UltiMate 3000 Liquid Chromatography Systems Brochure

Binary Standard LC Systems

The UltiMate 3000 Binary Analytical System has been carefully configured to meet the demands of fast LC analyses at pressures up to 620 bar. Two serial dual-piston pumps provide stable, accurate pulse-free flows—essential for optimal binary gradient mixing performance—for consistent gradient formation, rapid gradient response, and excellent retention time precision.

- SmartFlow technology for precise and accurate flow rates 0.1 to 10 mL/min
- 620 bar (9000 psi) maximum pressure and 100 Hz data rate for UHPLC compatibility
- High-pressure gradient proportioning at superior accuracy and precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- In-line split-loop injections for 15 second, no-sample-loss injections
- Ultralow carryover, high precision auto-injections
- Column compartment temperatures up to 80 °C for reduced system backpressure

The UltiMate 3000 Binary Analytical System provides fast cycle time, reliable mobile phase temperature conditioning, and high data rate detection to ensure optimal performance for the full range of binary analytical applications.

Note: *For specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules represent an UltiMate 3000 system configuration for Tandem Analysis.

Hardware

SRD-3200 UltiMate 3000 Integrated Solvent and Degasser Rack, 2 Channels 5035.9250

HPG-3200SD - UltiMate 3000 Binary Analytical Pump 5040.0021

WPS-3000TSL UltiMate 3000 Thermostatted Analytical Sampler 5822.0020

TCC-3000SD Thermostatted Column Compartment 5730.0010

MWD-3000UltiMate 3000 Multiple Wavelength Detector (Without Flow Cell) 5082.0030

Accessories

Analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 13 µL Volume, 10 mm Path Length 6082.0100

Quaternary Standard LC Systems

The UltiMate 3000 Quaternary Standard System offers full support of all HPLC applications and provide UHPLC compatibility.

- SmartFlow technology for precise and accurate flow rates 0.1 to 10 mL/min
- 620 bar (9000 psi) maximum pressure and 100 Hz data rate for UHPLC compatibility
- Low-pressure gradient proportioning at superior accuracy and precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35-1550 µL) to cover all application needs
- In-line split-loop injections for 15 second, no-sample-loss injections
- Ultralow carryover, high precision auto-injections
- Column compartment temperatures up to 80 °C for reduced system backpressure

The UltiMate 3000 Quaternary Standard System provides remarkable retention time precision, accurate and precise eluent selection and proportioning efficiency, and excellent mixing performance for quaternary analytical applications.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following RSLC modules and accessories represent a typical UltiMate 3000 Quaternary Standard system configuration. Due to its modular setup, this system can be upgraded easily by adding or exchanging modules. For additional ordering information on LC modules and accessories, refer to the LC Modules section.

Hardware

SR-3000 UltiMate 3000 Solvent Rack without Degasser 5035.9200
LPG-3400SD UltiMate 3000 Quaternary Analytical Pump 5040.0031
TCC-3000SD UltiMate 3000 Thermostatted Column Compartment 5730.0010
WPS-3000TSL UltiMate 3000 Thermostatted Analytical Sampler 5822.0020
DAD-3000 UltiMate 3000 Diode Array Detector (Without Flow Cell) ... 5082.0010

Accessories

Analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 13 µL Volume, 10 mm Path Length 6082.0100

x2 Dual Standard Systems

The UltiMate 3000 ×2 Dual LC System sets a new benchmark in flexibility, sample throughput, and automation of advanced procedures. The modular design is easily customized to your applications and sample preparation needs.

- SmartFlow technology for precise and accurate flow rates 0.1 to 10 mL/min
- 620 bar (9000 psi) maximum pressure and 100 Hz data rate for UHPLC compatibility
- Dual low-pressure gradient proportioning for superior accuracy and precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- In-line split-loop injections for 15 second, no-sample-loss injections
- Ultralow carryover, high-precision auto-injections
- Column compartment temperatures up to 80 °C for reduced system backpressure
- Turnkey Viper kits for ease of use

UHPLC+ solutions save time and effort. Parallel and tandem configurations increase sample throughput by up to 100%, by automating two applications in one run. Multidimensional separations provide resolutions impossible with single-column methods. On-line sample preparation saves time and reduces complexity, sample loss, and matrix interferences.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following RSLC modules and accessories represent a typical UltiMate 3000 x2 Dual Standard system configuration. The system can be easily upgraded by adding or exchanging modules. For additional ordering information on LC modules and accessories, refer to the LC Modules section

Hardware

SR-3600 UltiMate 3000 Integrated Solvent Rack and Degasser Rack, 6 Channels 5035.9230
DPG-3600SD UltiMate 3000 Dual-Gradient Analytical Pump 5040.0061
TCC-3000SD UltiMate 3000 Thermostatted Column Compartment 5730.0010
WPS-3000TSL Ultimate 3000 Thermostatted Analytical Sampler 5822.0020
DAD-3000 20 UltiMate 3000 Diode Array Detector (without Flow Cell) 5082.0010

Accessories

Analytical Flow Cell for DAD-3000 and MWD-3000 Series, SST, 13 µL Volume, 10 mm Path Length 6082.0100

Basic LC Systems



UltiMate 3000 Basic LC Systems are cost-effective solutions for conventional HPLC and UHPLC at pressures up to 62 MPa (9000 psi). The fully-scalable and modular design ensures the flexibility you need to meet future system demands. In addition, the UltiMate 3000 Basic LC Systems provide excellent reliability and performance, ensuring optimal return on investment.

- UHPLC compatible with pressures up to 62 MPa (9000 psi)
- SmartFlow pulsation-free flows even at high flow rates and pressures
- High-performance operation for consistent and reliable results at low cost of ownership
- Excellent retention time precision, detector sensitivity, linearity, and drift
- Rugged components ensure maximum instrument uptime
- System wellness and predictive performance indicators
- Modular design for easy module upgrade, addition, or replacement
- Optional ACC-3000 Autosampler Column Compartment for expanded automation
- Chromeleon Chromatography Data System software for ease of use and maintenance

The UltiMate 3000 Basic Automated Systems integrate straightforward automation using the innovative analytical autosampler with integrated column compartment ACC-3000(T). For more information on the availability of manual injectors, contact your sales representative.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

UltiMate 3000 Basic Automated System

Product Data Sheets

ACC-3000 Autosampler Column Compartment

Isocratic Basic Automated LC System

The UltiMate 3000 Isocratic Basic Automated System provides rugged, automated system performance in an economical yet flexible package. Each module of the system supports not only conventional isocratic HPLC applications, but also separations under UHPLC conditions with operating pressures up to 62 MPa (9000 psi).

- SmartFlow technology for precise and accurate flow rates from 50 µL/min to 10 mL/min
- Support of operating pressures of up to 62 MPa (9000 psi)
- Pulled-loop injection principle (full- and partial-loop injections) up to 200 µL
- Sample thermostatting from 8 to 40 °C or 15 ° below ambient temperature
- Fast and stable column thermostatting from 5 °C above ambient to 50 °C
- Variable UV wavelength detection up to 100 Hz
- Ultralow carryover, high precision auto-injections
- Column compartment temperatures up to 80 °C for reduced system backpressure

The UltiMate 3000 Isocratic Basic Automated System includes the ISO-3100SD Isocratic Analytical Pump and is best suited for detection techniques not compatible with gradient elution, such as refractive index detection.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Isocratic Basic Automated System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information for LC modules and accessories, refer to the LC Modules section

Hardware

SRD-3200 UltiMate 3000 Integrated Solvent and Degasser Rack, 2 Channels 5035.9250

ISO-3100SD UltiMate 3000 Isocratic Analytical Pump..... 5040.0011

ACC-3000T UltiMate 3000 Thermostatted Autosampler with Integrated Column Compartment 5830.0020

VWD-3100 UltiMate 3000 Single Channel Variable Wavelength Detector (without Flow Cell) 5074.0005

Accessories

Analytical Flow Cell for VWD-3000 Series, SST, 11 µL Volume, 10 mm Path length 6074.0250

Quaternary Basic Automated LC System

The UltiMate 3000 Quaternary Basic Automated System provides rugged, automated system performance with quaternary eluent proportioning. It combines the support of conventional isocratic and gradient HPLC and UHPLC applications with operating pressures up to 62 MPa (9000 psi) with the highest degree of choice in mobile phase selection and mixing.

- Wide operating flow-rate range from 200 µL/min to 10 mL/min with high flow-rate accuracy
- Support of operating pressures of up to 62 MPa (9000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Extensive mixer portfolio (35-1550 µL) to cover all application needs
- Pulled-loop injection principle (full- and partial-loop injections) up to 200 µL
- Sample thermostatting from 8 to 40 °C or 15 ° below ambient temperature
- Fast and stable column thermostatting from 5 °C above ambient to 50 °C
- Variable UV wavelength detection up to 100 Hz

The SpinFlow mixing design of the LPG-3400SD Quaternary Analytical Pump perfectly balances gradient delay volume against mixing efficiency.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following modules and accessories represent a typical UltiMate 3000 Quaternary Basic Automated System configuration. For additional information on modules and accessories, refer to the LC Modules section.

Hardware

SR-3000 UltiMate 3000 Solvent Rack without Degasser..... 5035.9200

LPG-3400SD - UltiMate 3000 Quaternary Analytical Pump 5040.0031

ACC-3000T UltiMate 3000 Thermostatted Autosampler with Integrated Column Compartment 5830.0020

VWD-3100 UltiMate 3000 Single Channel Variable Wavelength Detector (Without Flow Cell) 5074.0005

VWD-3100 20 Hz Single-Channel Variable Wavelength Detector (without Flow Cell) 5074.0005

Accessories

Analytical Flow Cell for VWD-3000 Series, SST, 11 µL Volume, 10 mm Path length 6074.0250

Binary Basic Automated LC System

The UltiMate 3000 Quaternary Basic Automated System provides rugged, automated system performance with binary eluent proportioning. It combines the support of fast LC and UHPLC applications with operating pressures up to 62 MPa (9000 psi).

- Wide operating flow rate range from 100 µL/min to 10 mL/min with high flow rate accuracy
- Support of operating pressures of up to 62 MPa (9000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Extensive mixer portfolio (35-1550 µL) to cover all application needs
- Pulled-loop injection principle (full- and partial-loop injections) up to 200 µL
- Sample thermostatting from 8 to 40 °C or 15 ° below ambient temperature
- Fast and stable column thermostatting from 5 °C above ambient to 50 °C
- Variable UV wavelength detection up to 100 Hz

The SpinFlow mixing design of the HPG-3400SD Binary Analytical Pump perfectly balances gradient delay volume against mixing efficiency

Note: *For additional ordering information on LC modules and accessories, refer to the LC Modules section.*

Ordering Information

The following modules and accessories represent a typical UltiMate 3000 Binary Basic Automated System configuration. Due to its modular setup, this system can be upgraded easily by adding or exchanging modules. For additional information on modules and accessories, refer to the LC Modules section.

Hardware	
SRD-3200 UltiMate 3000 Integrated Solvent and Degasser Rack, 2 Channels	5035.9250
HPG-3200SD UltiMate 3000 Binary Analytical Pump	5040.0021
ACC-3000T UltiMate 3000 Thermostatted Autosampler with I ntegrated Column Compartment	5830.0020
VWD-3100 UltiMate 3000 Single Channel Variable Wavelength Detector (Without Flow Cell)	5074.0005

Accessories	
Analytical Flow Cell for VWD-3000 Series, SST, 11 µL Volume, 10 mm Path length	6074.0250

UltiMate 3000 LC Systems

Modular flexibility for dedicated solutions

UltiMate 3000 LC systems provide excellent chromatographic performance while maintaining easy and reliable operation. With electrochemical, biocompatible, and semipreparative systems, Dionex offers dedicated solutions for a wide range of applications. With an industry-leading range of pumping, sampling, and detection modules, the UltiMate 3000 series always provides outstanding versatility.

- Superior chromatographic performance
- Biocompatible systems for nano, micro, and analytical flow ranges
- Biocompatible ×2 Dual Systems for advanced biochromatographic techniques
- Dedicated systems for ultrasensitive electrochemical detection
- Wide range of purification system solution
- Viper and nanoViper—the first truly universal, fingertight fitting system even at UHPLC pressures

Whichever UltiMate 3000 LC system configuration you choose, you will get a highly integrated solution combined with the power of Operational Simplicity through innovative hardware and the Chromeleon software.



Nano LC Systems: Biocompatible, split-flow nano LC systems

Electrochemical LC Systems: A turnkey LC solution for measurement of femtogram levels of oxidizable or reducible compounds by electrochemical detection

Biocompatible LC Systems: UltiMate 3000 Biocompatible Systems for high-performance analysis and purification of proteins from micro to analytical flow range

Semipreparative LC Systems: UltiMate 3000 Semipreparative System for robust, safe, and high-performance purifications

Nano LC Systems



The UltiMate 3000 nanoLC System provides excellent chromatographic performance while maintaining reliable operation. These systems allow ternary or quaternary gradients at nano LC flow rates and offer a fully biocompatible flow path. This provides the most flexible solution for nano, capillary, or micro flow.

- Superior chromatographic performance
- Biocompatible systems for nano, capillary, or micro flow ranges
- Biocompatible ×2 Dual Systems for advanced applications

The UltiMate 3000 nano LC Systems offer flexible solutions for labs working with nano, capillary, and micro LC.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

UltiMate 3000 Nano, Capillary, and Micro LC System Brochure

Biocompatible Quaternary Nano/Cap/Micro System

The UltiMate 3000 Biocompatible Quaternary Nano/Cap/Micro System offers precise flow rates (from 50 nL/min) and ultrahigh sensitivity. It is the perfect fit when working with limited sample volumes or performing low-flow LC/MS applications. In its standard configuration, it allows the reliable direct injection and 1D-separation of a minimum of 20 nL from a 1 µL sample.

- Biocompatible flow paths
- UltiFlow technology for precise and accurate flow rates as low as 50 nL/min
- High-precision sampling from well plates and microvials
- Exact temperature control for all critical flow path components protects labile samples
- Reliable injection reproducibility, down to 20 nL
- Excellent front end for MS detectors
- Includes system wellness and predictive performance indicators
- Seamless MS integration with single-point software control for most MS platforms

The UltiMate 3000 Biocompatible Nano/Cap/Micro Quaternary System features a unique Flow Manager. Its active flow splitter is responsible for nano/cap/micro flow delivery while thermostatting ensures superior retention time reproducibility. The system's UV detector with dedicated low-volume nano/cap/micro flow cells is ideal to monitor separation results prior to MS detection.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules represent a typical UltiMate 3000 Biocompatible Quaternary Nano/Cap/Micro System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information and key specifications for LC modules and accessories, refer to the LC Modules section.

Hardware

SRD-3000 without Degasser 5035.9200

LPG-3400MB UltiMate 3000 Biocompatible Low-Pressure Proportioning Micro pump 5037.0055

FLM-3300B Nano UltiMate 3000 Biocompatible Nano Flow Manager with one integrated motorized 2 -position 10 port switching valve..... 5721.0030

WPS-300TBPL Nano/Cap UltiMate 3000 Biocompatible Thermostatted Nano/Cap/Micro Pulled-Loop Well Plate Autosampler..... 5821.0020

VWD-3400RS UltiMate 3000 Four-Channel Variable Wavelength Detector (without Flow Cell) 5074.0010

Accessories

UZ-View Flow Cell, Nano for VWD-3000 Series, 3 nL volume, 10 mm Path Length 6074.0270

Biocompatible ×2 Dual Nano/Cap/Micro System

The UltiMate 3000 Biocompatible ×2 Dual Nano/Cap/Micro System is the essential tool for multidimensional LC separations of highly complex biological samples. The Dual-Gradient Nano/Cap/Micro pump with UltiFlow technology provides two independent, precise flows to 50 nL/min and 10 µL/min. The system is highly flexible, supporting a wide range of MDLC applications.

- Biocompatible flow paths
- Dual-Gradient pump with two independent ternary gradient pumps
- UltiFlow technology for constant flow independent of eluent composition and backpressure
- Wide flow rate range: 50 nL/min–2.5 mL/min
- Easily convertable between nano, capillary, and micro flow rates
- Low volume nano/cap/micro flow cells for UV-vis detector
- Supports key solutions such as off-line 2D-LC and 2D-LC salt plugs
- Microfraction collection option for fully automated off-line MDLC

The UltiMate 3000 Biocompatible ×2 Dual Nano/Cap/Micro System supports orthogonal separation techniques such as ion-exchange and reversed-phase chromatography in on-line and off-line 2D-LC mode. It is the ideal LC system for bioanalytical laboratories seeking to from automated sample preparation and higher sensitivity.

Note: *For specifications, refer to the LC Modules section.*

Ordering Information

Hardware

SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels 5035.9230

DGP-3600MB UltiMate 3000 Biocompatible Dual Ternary Low-Pressure Proportioning Micro Pump System..... 5037.0060

WPS-3000TBPL Nano/Cap UltiMate 3000 Biocompatible Thermostatted Nano/Cap/Micro Pulled-Loop Well Plate Autosampler..... 5821.0020

Micro Fraction Collection Option, Biocompatible, WPS-3000PL..... 6821.0051

FLM-3100B Nano UltiMate 3000 Biocompatible Nano Flow Manager with Two Integrated Motorized 2-Position 10-Port Switching Valves .. 5721.0010

VWD-3100 UltiMate 3000 Single Channel Variable Wavelength Detector (Without Flow Cell) 5074.0005

Accessories

UZ-View Flow Cell Nano for VWD-3000 Series, 3 nL Volume, 10 mm Path length 6074.0270

Electrochemical LC Systems

This system provides full capabilities for analysis of neurotransmitters, drugs, and metabolites

The UltiMate 3000 System for ED is optimized for the Coulochem III detector to provide the ultimate in sensitivity through minimizing background currents and pump noise, resulting in the best limits of detection. The most sensitive, sophisticated LC electrochemical detector available, the Coulochem III detector comes with a choice of cell designs and is ideal for use in methods development or for routine applications requiring high sensitivity detection

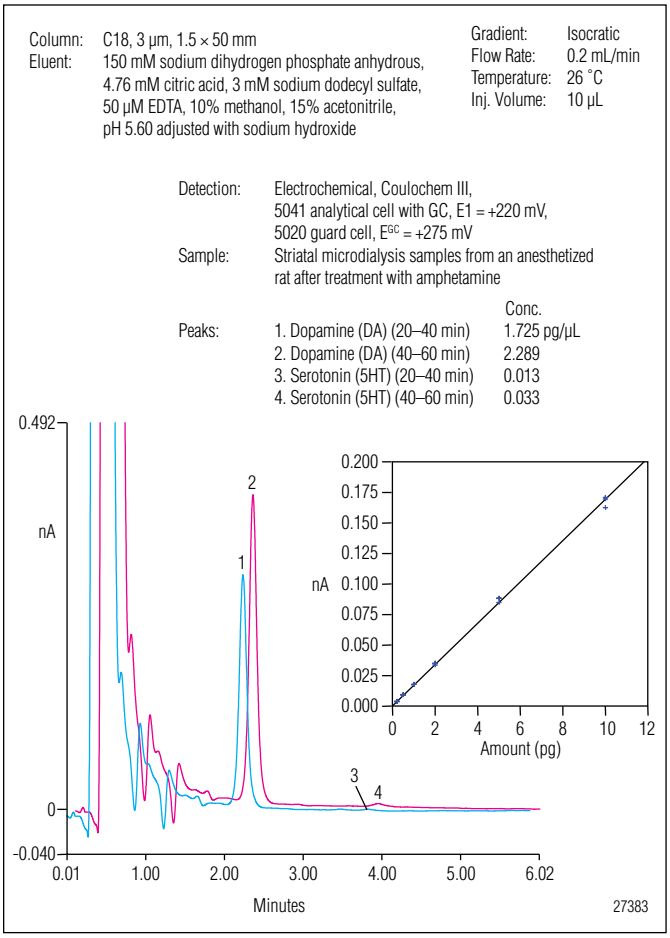
- The solution for analysis of neurotransmitters, thiols, and drug metabolites in biological systems
- Isocratic micro-pump with biocompatible flow path is ideally suited for use with electrochemical detection
- Dual micro-pump design incorporates isokinetic Smartflow technology to provide zero-pulsation delivery
- A completely biocompatible flow path minimizes interference and assures exceptionally low backgrounds
- Biocompatible Analytical Sampler delivers accurate sampling with zero sample carryover
- Low volume samples are thermostatted and handled with minimal waste
- The system is designed for reliable operation and increased system longevity
- Advanced system control and monitoring using Chromeleon Chromatography Data System software

Choosing an integrated system optimized for electrochemistry is important to achieve results with the highest level of sensitivity

This system provides full capabilities for analysis of many compounds including neurotransmitters, drugs and metabolites, natural products and genotoxins



UltiMate 3000 System for Electrochmical Detection.

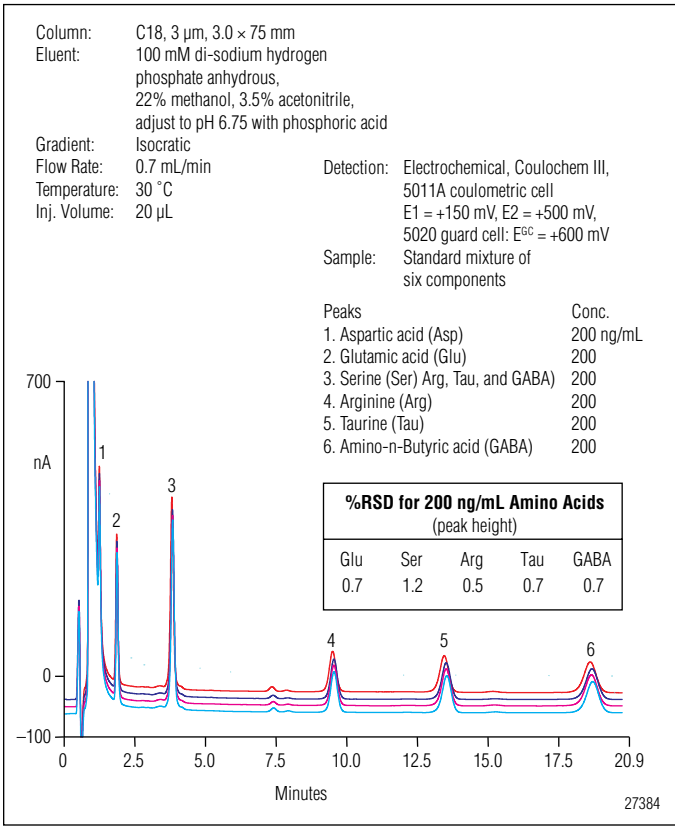


Analysis of microdialysis samples from 20–40 and 40–60 min collection after amphetamine treatment.

Electrochemical Detection

The Coulochem III detector is the standard in electrochemical detection, achieving the highest possible sensitivity from standard bore to microbore chromatography. The advanced features of the Coulochem III platform provide performance and reliability in a detector that is convenient to use.

Unsurpassed selectivity and ruggedness can be achieved using serial coulometric cells. Amperometric cells provide great flexibility for a wide range of analytes and for use with microbore chromatography. The widest variety of electrochemical cells are available; choose the optimum cell design that meets your assay needs.



Analysis of amino acid mixture after OPA/BME precolumn derivatization (200 ng/mL of Asp, Glu, Ser, Arg, Tau, and GABA)

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

Coulochem III Electrochemical Detector Brochure

Product Data Sheets

UltiMate 3000 for High Sensitivity Electrochemical Detection Data Sheet

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 System configuration for high-sensitivity electrochemcial detection. For additional order information and key specifications for LC modules and accessories, refer to the LC Modules section.

Hardware

ISO-3100BM UltiMate 3000 Biocompatible Isocratic Micro Pump..... 5042.0011

WPS-3000TBSL UltiMate 3000 Biocompatible Well Plate Autosampler 5827.0020

Coulochem III Electrochemical Detector for UltiMate with Pulse/Scan Mode (100-240V)..... 70-9138

Choose the detector configuration for your application

Coulochem III Electrochemical Detector for UltiMate with DC and Pulse/Scan Modes (100-240V) 70-9141

Coulochem III Electrochemical Detector for UltiMate with DC mode (100–240V)..... 70-9143

Recommended for use in analysis of microdialysates, thiols, and genotoxic impurites

HPLC Workstation with 1 Class 1 Timebase 5960.0067

Optional computer, monitor, and printer ordered separately

SR-3000 UltiMate 3000 Solvent Rack without Degasser..... 5035.9200

Accessories

Organizer Module with Temperature Control, for Coulochem III detector 70-9121TA

Choose a thermostatically controlled or ambient temperature organizer module.

Organizer Module, Non-Heated, for Coulochem III Detector 70-9208

SR-3000 UltiMate 3000 Solvent Rack without Degasser..... 5035.9200

Model 5041 Enhanced Amperometric Cell with Glassy Carbon Target.... 70-4131

Model 5011A Improved High Sensitivity Cell, Dual-Channel..... 70-5660

Model 5041B Microdialysis Cell, Dual-Channel 70-0520B

Model 5020 Guard Cell 55-0417

Model 5021A Conditioning Cell..... 70-6068

Model 5040 Cell with Platinum Target..... 70-1074

Model 5040 Cell with Boron Doped Diamond Electrode..... 70-7900

Note: For information on electrochemical cells, refer to the LC Modules section.

Biocompatible LC Systems



The UltiMate 3000 Biocompatible Systems provide the right solution for any biochromatographic demands from micro to analytical range. System components are perfectly matched to meet the requirements for high-performance analysis as well as purification. The wide range of solvent options allows easy implementation of different gradient profiles, essential for method development.

- Superior chromatographic performance
- Industry leading range of biocompatible pumps
- Titanium and PEEK flow-path for full biocompatibility
- Dual-gradient pump for true parallel, tandem, or multidimensional chromatography
- High precision auto-injections from 0.1 to 250 µL (default) with ultralow carryover
- Sample fractionation and re-injection with the WPS-3000TBFC Autosampler Fraction Collector

The UltiMate 3000 Biocompatible System ensures full bio-compatibility, critical to integrity of proteins during separation, while delivering high day-to-day reproducibility and robust operation even under harsh salt and pH conditions.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

Titanium System Data Sheet

UltiMate 3000 Data Sheet

Biocompatible Quaternary Analytical System

The UltiMate 3000 Biocompatible Quaternary Analytical System is fully biocompatible, designed for high performance analysis and purification of proteins at pressures up to 350 bar (5000 psi). The wide range of solvent options allows easy implementation of different gradient profiles, essential for method development.

- Titanium pumps and PEEK flow-path for full biocompatibility
- SmartFlow technology for precise and accurate flow rates from 0.2 to 10 mL/min
- Support of operating pressures of up to 350 bar (5000 psi)
- Quaternary low-pressure proportioning at superior accuracy and precision
- Quaternary solvent selection for mobile phase preparation, system and column flushing
- High precision auto-injections from 0.1 to 250 µL (default) with ultralow carryover

Titanium pumps and the all-PEEK flow-path of the UltiMate 3000 Titanium System ensure full biocompatibility, critical to the integrity of proteins during separation, while delivering high day-to-day reproducibility and robust operation, even under harsh salt and pH conditions

Note: *For specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Biocompatible Quaternary Analytical System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information for LC modules and accessories, please refer to the LC Modules section.

Hardware

SR-3000 UltiMate 3000 Solvent Rack without Degasser 5035.9200

LPG-3400AB UltiMate 3000 Biocompatible Quaternary Low-Pressure Proportioning Analytical Pump 5037.0015

WPS-3000TBPL Analytical UltiMate 3000 Biocompatible Thermostatted Analytical Pulled-Loop Well Plate Autosampler 5823.0020

TCC-3000SD Thermostatted Column Compartment 5730.0010

VWD-3400RS UltiMate 3000 Rapid Separation Four Channel Variable Wavelength Detector (Without Flow Cell) 5074.0010

Accessories

Analytical Flow Cell for VWD-3000 Series, PEEK, 11 µL Volume, 10 mm Path Length 6074.0200

Biocompatible ×2 Dual Analytical System

The UltiMate 3000 ×2 Dual Analytical System is fully biocompatible for advanced multidimensional (MD) protein analysis and purification. It supports advanced biochromatography such as application switching and automated MD chromatography; for example, purification and analysis of biotherapeutics like monoclonal antibodies in a single method.

- Titanium pumps and PEEK flow path for full biocompatibility
- SmartFlow technology for precise and accurate flow rates from 0.2 to 10 mL/min
- Support of operating pressures of up to 350 bar (5000 psi)
- Dual-ternary low-pressure proportioning at superior accuracy and precision
- Dual-gradient pump for true parallel, tandem or multidimensional chromatography
- Dual-ternary solvent selection for mobile phase preparation, system and column flushing
- High precision auto-injections from 0.1 to 250 µL (default) with ultralow carryover
- Sample fractionation and re-injection with the WPS-3000TBFC Autosampler Fraction Collector

The UltiMate 3000 Biocompatible ×2 Dual Analytical System combines the excellent features of the DGP-3600AB Biocompatible Analytical Dual-Gradient Pump and the WPS-3000TBFC Autosampler Fraction Collector to support parallel, tandem, and MD separations with automated sample fractionation and re-injection for the highest flexibility and productivity while saving money, time and space.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Biocompatible ×2 Dual Analytical System configuration. For additional order information and key specifications for LC modules and accessories, see the LC Modules section.

Hardware

SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels 5035.9230

DGP-3600AB UltiMate 3000 Biocompatible Dual Ternary Low-Pressure Proportioning Analytical Pump System 5037.0014

WPS-3000TBFC UltiMate 3000 Thermostatted Biocompatible Pulled-Loop Well Plate Autosampler with Integrated Fraction Collection 5825.0020

TCC-3000SD Thermostatted Column Compartment 5730.0010

VWD-3400RS UltiMate 3000 Rapid Separation Four-Channel Variable Wavelength Detector (Without Flow Cell) 5074.0010

Accessories

Analytical Flow Cell for VWD-3000 Series, PEEK, 11 µL Volume, 10 mm Path Length 6074.0200

Valve Actuator Kit HP for Right Side of TCC-3000RS/SD, Pressure < 413 bar (6000 psi) 6730.0003

Valve Actuator Kit HP for Left Side of TCC-3000RS/SD, Pressure < 413 bar (6000 psi) 6730.0004

Pod for 2-Position 10-Port HP Valve, Biocompatible, Pressure < 345 bar (5000 psi) 6723.9023

Biocompatible Quaternary Micro System

The UltiMate 3000 Biocompatible Quaternary Micro System is fully biocompatible designed for high performance analysis of proteins at pressures up to 350 bar (5000 psi). The wide range of solvent options allows easy implementation of different gradient profiles, essential for method development.

- Titanium pumps and PEEK flow-path for full biocompatibility
- SmartFlow technology for precise and accurate flow rates from 0.05 to 2.5 mL/min
- Support of operating pressures of up to 350 bar (5000 psi)
- Quaternary low-pressure proportioning at superior accuracy and precision
- Quaternary solvent selection for mobile phase preparation, system and column flushing
- High precision auto-injections from 0.1 to 250 µL (default) with ultralow carryover

Tiitanium pumps and the all-PEEK flow-path of the UltiMate 3000 Titanium Micro LC System ensure full biocompatibility, critical to the integrity of proteins during separation, while delivering high day-to-day reproducibilty and robust operation, even under harsh salt and pH conditions.

Note: *For specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Biocompatible Quaternary Micro System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information for LC modules and accessories, refer to the LC Modules section.

Hardware

SR-3000 UltiMate 3000 Solvent Rack without Degasser 5035.9200

LPG-3400BM UltiMate 3000 Biocompatibel Quaternary Micro Pump .. 5042.0036

WPS-3000TBPL Analytical UltiMate 3000 Biocompatible Thermostatted Analytical Pulled-Loop Well Plate Autosampler 5823.0020

TCC-3000SD UltiMate 3000 Thermostatted Column Compartment 5730.0010

VWD-3400RS UltiMate 3000 Rapid Separation Four Channel Variable Wavelength Detector (without flow cell) 5074.0010

Accessories

Semi-Micro Flow Cell for VWD-3000 Series, PEEK, 2.5 µL Volume, 7 mm Path Length..... 6074.0300

Biocompatible ×2 Dual Micro System

The UltiMate 3000 Biocompatible ×2 Dual Micro System is fully biocompatible for advanced multidimensional (MD) protein analysis and purification. It supports advanced bio-chromatography such as application switching and automated MD chromatography; for example, purification and analysis of biotherapeutics like monoclonal antibodies in a single method.

- Titanium pumps and PEEK flow path for full biocompatibility
- SmartFlow technology for precise and accurate flow rates from 0.2 to 10 mL/min
- Support of operating pressures of up to 350 bar (5000 psi)
- Dual-ternary low-pressure proportioning at superior accuracy and precision
- Dual-gradient pump for true parallel, tandem or multidimensional chromatography
- Dual-ternary solvent selection for mobile phase preparation, system and column flushing
- High precision auto-injections from 0.1 to 250 µL (default) with ultralow carryover
- Sample fractionation and re-injection with the WPS-3000TBFC Autosampler Fraction Collector

The UltiMate 3000 Biocompatible ×2 Dual Micro System combines the excellent features of the DGP-3600BM Biocompatible Micro Dual-Gradient Pump and the WPS-3000TBFC Autosampler Fraction Collector to support parallel, tandem, and MD separations with automated sample fractionation and re-injection for the highest flexibility and productivity while saving money, time, and space.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Biocompatible ×2 Dual Micro System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information and key specifications for LC modules and accessories, see the LC Modules section

Hardware

SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels 5035.9230

DGP-3600BM UltiMate 3000 Biocompatible Dual-Gradient Micro Pump..... 5042.0066

WPS-3000TBFC UltiMate 3000 Thermostatted Biocompatible Pulled-Loop Well Plate Autosampler with Integrated Fraction Collection 5825.0020

TCC-3000SD UltiMate 3000 Thermostatted Column Compartment 5730.0010

VWD-3400RS UltiMate 3000 Rapid Separation Four Channel Variable Wavelength Detector (Without Flow Cell) 5074.0010

Accessories

Semi-micro Flow Cell for VWD-3000 Series, PEEK, 2.5 µL Volume, 7 mm Path Length..... 6074.0300

Valve Actuator Kit HP for Right Side of TCC-3000RS/SD, Pressure < 413 bar (6000 psi)..... 6730.0003

Valve Actuator Kit HP for Left Side of TCC-3000RS/SD, Pressure <413 bar (6000 psi)..... 6730.0004

Pod for 2-Position 10-Port HP Valve, Biocompatible, Pressure < 345 bar (5000 psi) (two valve pods are required)..... 6723.9023

Semipreparative LC Systems

Modular system configurations for any purification tasks

The UltiMate 3000 Binary Semipreparative System is tailored for robust, safe, high-performance purifications. Based on the high-pressure proportioning principle, the system takes full advantage of UltiMate 3000 features such as SmartFlow pulse-free eluent delivery and wide linear range detection. The AFC-3000 Automated Fraction Collector collects fractions into an industry leading variety of vessels, such as 96 well plates, standard vial and tube sizes, and bottles.

- SmartFlow technology for precise, accurate flow rates from 0.5 to 50 mL/min
- Support of operating pressures of up to 100 bar (1450 psi)
- High-pressure gradient proportioning at superior accuracy and precision
- Variable mixing volumes for different flow and delay volume requirements
- Sample injections up to 2.5 mL with excellent injection linearity
- Large fractionation vessel capacity, holds up to 180 tubes or 4 × 96 well plates and other vessel types

Due to the optimized fluidic path design of the WPS-3000TSL Semipreparative Autosampler, the UltiMate 3000 Binary Semipreparative System supports high flow rates at low back-pressure. The system is the ideal platform for your purification of natural product extracts, isolation of impurities for structural elucidation, or other large scale LC processes.

Note: *For system specifications, refer to the LC Modules section.*

Ordering Information

The following LC modules and accessories represent a typical UltiMate 3000 Binary Semipreparative System configuration. Due to its modular setup, the system can be upgraded easily by adding or exchanging LC modules. For additional order information for LC modules and accessories, please refer to the LC Modules section

Hardware

HPG-3200P UltiMate 3000 Binary High-Pressure Proportioning Semipreparative Pump System	5035.0025
WPS-3000TSL UltiMate 3000 Thermostatted Semipreparative Autosampler	5822.0028
TCC-3000SD UltiMate 3000 Thermostatted Column Compartment	5730.0010
DAD-3000 UltiMate 3000 Diode Array Detector (without flow cell)	5082.0010
AFC-3000 UltiMate 3000 Automated Fraction Collector	5702.1000

Accessories

Semipreparative Flow Cell for DAD-3000 and MWD-3000 Series, PEEK, 0.7 µL Volume, 0.4 mm Path Length	6082.0600

LC Modules

The right LC modules for your application needs

UltiMate 3000 modules integrate innovation and intelligent features into a broad selection of autosampler, injector, pump, flow-control, thermostatted column compartment, and detector modules. Our quality designs and construction ensure reliable, precise, and accurate operation. Select the right modules to match your LC application, whether it requires a nano, capillary, microbore, analytical, or semipreparative flow configuration.

- Superior chromatographic performance
- Unique ×2 dual-gradient configurations
- Unsurpassed instrument reliability
- Ease of use through powerful Chromeleon software
- UHPLC+ Solutions for unparalleled productivity

Each UltiMate 3000 LC module provides a highly integrated solution with optimum fluidic connections, single-point control through Chromeleon software, and seamless intermodule communications.



Solvent Tray/Degasser: For high efficiency degassing and safe solvent bottle organization, a Dionex Solvent Rack is the ideal complement to every UltiMate 3000 pump.

LC Pumps: Dionex offers a variety of LC pumps and provides top solutions from nano to semipreparative scale and ultrahigh-performance applications (UHPLC).

LC Autosamplers: Select the right Dionex LC autosampler module to match your LC nano, capillary, micro, analytical, or semipreparative system needs.

LC Column Compartments: For optimal retention time precision at different temperatures, a Dionex Thermostatted Column Compartment is essential for your LC system.

LC Detectors: A wide selection of LC detectors to meet the selectivity and sensitivity needs of your LC applications.

Charged Aerosol Detectors: Near universal LC detection independent of chemical structure

Electrochemical Detectors: Electrochemical detectors offer advanced amperometric and coulometric detection optimized for rigorous, reliable, and reproducible results.

Fraction Collection: Offering fraction collection options for LC applications at different flows, Dionex provides the right solution for your needs.

LC Solvent Tray/Degasser



These online, chemically inert degassers provide unsurpassed performance and ensure stable baselines free of air bubble-related disturbances. From the two-degasser rack for a binary pump to the most flexible six-degasser rack for the powerful dual-ternary pump, the UltiMate 3000 Solvent Rack series has a solvent rack to fit your system.

- Teflon AF metal-free membranes
- Highest degassing efficiency and fastest degassing system equilibration times
- Neatly stacks onto the UltiMate 3000 LC system tower, conserving bench space
- User-friendly design with three LEDs (power, vacuum, and leak sensor status)
- Continuous vacuum level monitoring with UltiMate 3000 System Wellness functionality
- Easy connection of all fluidic lines

Related Literature

The following provides more information on this product and can be found in the Documents section at www.dionex.com. .

Product Data Sheets

UltiMate 3000 Solvent Racks

Solvent Rack without Degasser

The UtliMate 3000 Solvent Rack SR-3000 without degasser supports pumps with integrated degassers as a solvent organizer, and is therefore recommended in combination with UltiMate 3000 Quaternary Analytical and Micro Pumps with internal degassers (LPG-3400SD/RS/BM/AB).

- Securely organizes up to nine 1 L eluent bottles on top of your UltiMate 3000 system
- Conserves valuable bench space
- Offers optimum resistance to the most commonly used HPLC solvents and buffer solutions

Key Specifications

Solvent Reservoir Capacity: nine 1 L reservoirs, or four 2.5 L reservoirs, or two 5 L reservoirs and two 1 L reservoirs

Degassing Channels: none

Wetted Parts (Tubing and Inline Filter): PEEK, FEP, and Tefzel; Inline Filter Frit: SST or titanium

Dimensions (h × w × d): 10 × 42 × 51 cm (3.9 × 16.5 × 20 in.)

Ordering Information

Hardware	
SR-3000 Solvent Rack (without Degasser)	5035.9200

Solvent Racks with Degasser

The UltiMate 3000 Solvent Racks SRD-3200, SRD-3400, and SRD-3600 incorporate a low-volume (670 µL), chemically-inert degasser with two, four, or six channels. They support pumps without built-in degassers, such as the Dual-Gradient Analytical Pump with six channels, and high-pressure gradient pumps with two or four channels.

- Highest degassing efficiency, ensures stable baseline
- Securely organizes up to nine 1 L eluent bottles on top of your UltiMate 3000 system
- Conserves valuable bench space
- Optimum resistance to the most commonly used HPLC solvents and buffer solutions

Key Specifications

Solvent Reservoir Capacity: nine 1 L reservoirs, or four 2.5 L reservoirs, or two 5 L reservoirs and two 1 L reservoirs

Degassing Channels: two, four, or six analytical degasser channels

Degasser Membranes: Teflon AF

Channel Volume: 670 µL

Maximum Flow Rate per Channel: 14 mL/min

Control: controlled by the UltiMate 3000 system pump (with Chromeleon) or in stand alone operation

Communication: 15-pin D-Sub connector (through a pump of the UltiMate 3000 system)

Power Supply: 15-pin D-Sub connector (through a pump of the UltiMate 3000 system) or external power supply unit

User Input/Display: three LEDs (Power, Vacuum, and Status), standby button

Wetted Parts (Incl. Tubing and Inline Filter): Teflon AF, PEEK, FEP, and Tefzel; Inline Filter Frit: SST or titanium

Power Requirements: max. 30 VA

Dimensions (h × w × d): 10 × 42 × 51 cm (3.9 × 16.5 × 20 in.)

Ordering Information

Hardware

SRD-3200 Solvent Rack with 2 Degasser Channels 5035.9250
SRD-3400 Solvent Rack with 4 Degasser Channels 5035.9245
SRD-3600 Solvent Rack with 6 Degasser Channels 5035.9230

Accessories

Power Supply Unit 24V for SOR-100 and SRD-3x00 ..... 6510.0004
For use with other than UltiMate 3000 pumps

LC Pumps



The UltiMate 3000 pump family offers the most complete choice in the industry. From nano LC to Rapid Separation LC (RSLC) applications, from conventional applications to UHPLC, the UltiMate 3000 pumps always provide industry-leading flow rates, pressure, and precision.

- SmartFlow ensures optimal performance for any flow, pressure, or solvent composition
- Automatic compressibility compensation, no manual solvent setting needed
- Ultraprecise piston drive with 2 nL resolution for unrivaled flow precision
- Unique SpinFlow mixing design for exceptional mixing performance
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Reliable solvent changeover for robust, air bubble-free operation
- All pumps are equipped with an active rear-seal wash system
- Precise auto-alignment of the pistons ensure highest possible seal lifetime
- Easy access and smart software support for effortless maintenance
- Clean and intuitive fluidic design

The UltiMate 3000 Rapid Separation LC offers the most complete range of UHPLC pumps on the market.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

UltiMate 3000 Series Rapid Separation Pump Systems Data Sheet

UltiMate 3000 Series Standard and Biocompatible Pumps Data sheet

UltiMate 3000 RSLCnano Rapid Separation Nano LC System Data Sheet

Binary Rapid Separation Pump

The UltiMate 3000 Binary Rapid Separation Pump HPG-3x00RS is designed to operate at ultrahigh backpressures and high flow rates simultaneously. Achieve the highest separation efficiency in combination with UHPLC or conventional LC columns: The RS Pump is the most flexible UHPLC pump available.

- Serial dual-piston operating principle, high-pressure gradient proportioning
- Wide operating flow rate range; from 50 µL/min to 8 mL/min with high flow rate accuracy
- Support of operating pressures of up to 1034 bar (15,000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35-1550 µL) to cover all application needs
- Optional solvent selection valves support up to four different mobile phases (HPG-3400RS)
- Active rear-seal wash and floating pistons for maximum seal lifetime

The HPG-3x00RS is ideal for MS front-end configurations, microflow, analytical, and ultrafast, high-resolution separations in pharmaceutical, life science, and environmental laboratories. The gradient delay volume can be easily adjusted within seconds according to your application requirements (e.g., 35 µL for MS front end and 200 µL for analytical LC).

Key Specifications

Flow range (settable range):
0.050–8.000 mL/min (0.001–8.000 mL/min)

Flow accuracy: ±0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–103 MPa (15,000 psi) up to 5 mL/min, 2–80 MPa (11,600 psi) up to 8 mL/min

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ±0.2% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 200 µL (35–1550 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware

HPG-3200RS UltiMate 3000 Binary Rapid Separation Pump	5040.0026
HPG-3400RS UltiMate 3000 Binary Rapid Separation Pump System with Solvent Selector Valves	5040.0046
SRD-3200 UltiMate 3000 Integrated Solvent and Degasser Rack, 2 Channels	5035.9250
SRD-3400 UltiMate 3000 Integrated Solvent and Degasser Rack, 4 Channels	5035.9245

Accessories

Mixer Kit to 35 µL Mixing Volume	6040.5000
Mixer Kit to 100 µL Mixing Volume	6040.5100
Mixer Kit to 400 µL Mixing Volume	6040.5310
Mixer Kit to 800 µL Mixing Volume	6040.5750
Mixer Kit with to 1550 µL Mixing Volume	6040.5450
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Quaternary Rapid Separation Pump

The UltiMate 3000 Quaternary Rapid Separation Pump LPG-3400RS provides the highest degree of flexibility in solvent proportioning for UHPLC applications. This pump is recommended for a wide range of research and routine applications, and for method development.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Wide operating flow rate range; from 50 µL/min to 8 mL/min with high flow rate accuracy
- Support of operating pressures of up to 1034 bar (15,000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear-seal wash and floating pistons for maximum seal lifetime

The LPG-3400RS is recommended for any UHPLC and conventional LC applications in the pharmaceutical, food and beverage, and environmental industries.

Key Specifications

Flow Range (Settable Range): 0.100–8.000 mL/min (0.001–8.000 mL/min)

Flow Accuracy: ±0.1%

Flow Precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure Range: 2–103 MPa (15,000 psi) up to 5 mL/min, 2–80 MPa (11,600 psi) up to 8 mL/min

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ±0.5% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 690 µL (325–1840 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data System

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz
Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
LPG-3400RS UltiMate 3000 Quaternary Rapid Separation Pump	5040.0036
SR-3000 UltiMate 3000 Solvent Rack without Degasser	5035.9200

Accessories	
Mixer Kit to 35 µL Mixing Volume	6040.5000
Mixer Kit to 100 µL Mixing Volume	6040.5100
Mixer Kit to 200 µL Mixing Volume	6040.5110
Mixer Kit to 800 µL Mixing Volume	6040.5750
Mixer Kit to 1500 µL Mixing Volume	6040.5450
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Dual-Gradient Rapid Separation Pump

The UltiMate 3000 Dual-Gradient Rapid Separation Pump DGP-3600RS is the first pump that combines the ultrahigh speed and resolution of UHPLC with advanced chromatographic techniques such as tandem, parallel, and two-dimensional LC. It is particularly suitable for laboratories that require high sample throughput and chromatographic resolution.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Two ternary gradient pumps in a single housing
- Wide operating flow rate range from 50 µL/min to 8 mL/min with high flow rate accuracy
- Support of operating pressures of up to 1034 bar (15,000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Active rear-seal wash and floating pistons for maximum seal lifetime

Typical applications include the purification of side products and impurities for structure elucidation, purification of compounds from natural product extracts, and purification of compound libraries for pharmaceutical discovery.

Key Specifications

Flow range (settable range): 0.100–8.000 mL/min (0.001–8.000 mL/min)

Flow accuracy: ±0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2-103 MPa (15,000 psi) up to 5 mL/min, 2-80 MPa (11,600 psi) up to 8 mL/min

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ±0.5% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 690 µL (325–1, 840 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
DGP-3600RS UltiMate 3000 Dual-Gradient Rapid Separation Pump	5040.0066
SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels	5035.9230

Accessories	
Mixer Kit to 35 µL Mixing Volume	6040.5000
Mixer Kit to 100 µL Mixing Volume	6040.5100
Mixer Kit to 200 µL Mixing Volume	6040.5110
Mixer Kit to 800 µL Mixing Volume	6040.5750
Mixer Kit to 1500 µL Mixing Volume	6040.5450
UltiMate 3000 Pump Diagnostics Kit	6035.3000

RSLCnano Nano Pump with Column Compartment



The NCS-3500RS is the powerful combination of continuous direct flow, ultrahigh pressure pump operation and dual-gradient capabilities. It supports a wide flow range (20 nL/min to 50 µL/min) at pressures up to 800 bar, allowing you to tune your separation for the highest resolution or the fastest analysis time; all in one module.

- The HPG nano pump delivers flows from 20 nL/min to 50 µL/min at pressures up to 800 bar
- The dual-piston pump heads ensure splitless flow delivery that is interruption free
- The innovative flow meter provides a closed-loop flow control
- Nano, capillary, or micro flow ranges are selected by simply exchanging the flow selector
- The snap-in valves allows tool-free removal and installation
- Two high-pressure switching valves for applications up to 800 bar
- nanoViper connection system provides fingertight, zero-dead volume connections
- Ternary LPG µTi pump to accommodate preconcentration or advanced 2D workflows

The NCS-3500RS module provides a Dual-Gradient Pump and column compartment in one housing. The high-pressure gradient nano pump can perform nano applications at pressures up to 800 bar. This unique combination allows you to tune your separation for the highest resolution with long columns or the fastest analysis time to increase throughput.

Note: *The flow rate range of the binary HPG pump of the NCS-3500RS can be changed by exchanging the flow selector*

Key Specifications

Flow Rate Range Binary HPG pump: 20–1000 nL/min

Flow Rate Range Ternary LPG pump: 10–2500 µL/min

Pressure Range Binary HPG pump: 2–80 MPa (300–11,600 psi)

Pressure Range Ternary LPG pump: 2–50 MPa (300–7250 psi)

Retention Time RSD in Gradient Mode at 300 nL/min: <0.2% RSD or <0.1 min SD, whichever is greater

Gradient Delay Volume: <25 nL (pump) and <350 nL in preconcentration application)

Proportioning Accuracy: <1% of full scale

Proportioning Precision: Typically <0.1% SD

Temperature Range Column Compartment: RT + 10 °C–75 °C

Temperature Accuracy: ± 0.5 °C (at 50 °C setpoint)

Switching Valves: Up to two 10-port, 2-position low-dispersion valves

Column Capacity: Up to three columns, up to 100 cm length (coiled)

Ordering Information

Hardware

NCS-3500RS UltiMate 3000 Binary Rapid Separation Nano Flow Pump with Ternary Loading Pump and Column Compartment 5041.0010

Accessories

Flow Selector for Nano LC with Flow Range 50-1000 nL/min for NCS-3x00RS and NCP-3x00RS 6041.0002

Flow Selector for Capillary LC with Flow Range 0.5-10 µL/min for NCS-3x00RS and NCP-3x00RS 6041.0003

Flow Selector for Micro LC with Flow Range 0.5-10 µL/min for NCS-3x00RS and NCP-3x00RS 6041.0014

Low-Dispersion 2-Position 10-Port Snap-In Valve Pod with 10-32 Fittings, 0.15 mm Bore, 900 bar/13,050 psi Pressure Limit, for UltiMate 3000 NCS-3x00RS 6041.0001

Biocompatible (PEEK) Low-Dispersion 2-Position 10-Port Snap-In Valve Pod with 10-32 Fittings, 0.15 mm Bore, 345 bar/5000 psi Pressure Limit, for UltiMate 3000 NCS-3X00RS 6041.0012

RSLCnano Capillary Pump with Column Compartment

The NCS-3500RS is the powerful combination of continuous direct flow, ultrahigh pressure pump operation and dual-gradient capabilities. It supports a wide flow range (20 nL/min to 50 µL/min) at pressures up to 800 bar, allowing you to tune your separation for the highest resolution or the fastest analysis time—all in one module.

- The HPG nano pump delivers flows from 20 nL/min to 50 µL/min at pressures up to 800 bar
- The dual piston pump heads ensure splitless flow delivery that is interruption free
- The innovative flow meter provides a closed loop flow control
- Nano, capillary, or micro flow ranges are selected by simply exchanging the flow selector
- The snap-in valves allows tool-free removal and installation
- Two high pressure switching valves for applications up to 800 bar
- nanoViper connection system provides fingertight, zero-dead volume connections
- Ternary LPG µTi pump to accommodate preconcentration or advanced 2D workflows

The NCS-3500RS module provides a dual-gradient pump and column compartment in one housing. The continuous direct flow, high-pressure gradient pump for capillary flow delivery features continuous direct flow delivery from 20 nL/min to 50 µL/min at pressures up to 800 bar. It is combined with a ternary low-pressure gradient micro pump and a column compartment.

Note: *The flow rate range of the binary HPG pump of the NCS-3500RS can be changed by exchanging the flow selector*

Key Specifications

Flow Rate Range Binary HPG pump: 0.5–10 µL/min

Flow Rate Range Ternary LPG pump: 10–2500 µL/min

Pressure Range Binary HPG pump: 2–80 MPa (300–11,600 psi)

Pressure Range Ternary LPG pump: 2–50 MPa (300–7250 psi)

Retention Time RSD in Gradient Mode at 300 nL/min: <0.2% RSD or <0.1 min SD, whichever is greater

Gradient Delay Volume: <25 nL (pump) and <350 nL (system in preconcentration configuration)

Proportioning Accuracy: <1% of full scale

Proportioning Precision: Typically <0.1% SD

Temperature Range Column Compartment: RT + 10 °C–75 °C

Temperature Accuracy: ± 0.5 °C (at 50 °C setpoint)

Switching Valves: Up to two 10-port, 2-position low-dispersion valves

Column Capacity: Up to 3 columns, up to 100 cm length (coiled)

Ordering Information

Hardware

NCS-3500RS UltiMate 3000 Binary Rapid Separation Capillary Flow Pump with Ternary Loading Pump and Column Compartment	5041.0020
Flow Cell UVD-3000, Capillary LC, 45 nL	6073.0003
Flow Selector for NCS-3500RS and NCP-3200RS for Capillary LC with Flow Range 0.5 –10 µL/min	6041.0003

Accessories

Flow Selector for Nano LC with Flow Range 50–1000 nl/min for NCS-3x00RS and NCP-3x00RS	6041.0002
Flow Selector for Capillary LC with Flow Range 0.5–10 µl/min for NCS-3x00RS and NCP-3x00RS	6041.0003
Flow Selector for Micro LC with Flow Range 10–50 µl/min for NCS-3x00RS and NCP-3x00RS	6041.0014
Low-Dispersion 2-position 10-port Snap-In Valve Pod w/10/32" fittings, 0.15 mm Bore, 900 bar/13,050 psi Pressure Limit for UltiMate 3000 NCS-3x00RS	6041.0001
Biocvompatible (PEEK) Low-Dispersion 2-position 10-Port Snap-In Valve Pod w/10/32" fittings, 0.15 mm Bore, 345 bar/5000 psi Pressure Limit for UltiMate 3000 NCS-3x00RS	6041.0012

NCP-3200RS Nano Pump



The NCP-3200RS pump is a continuous direct flow, ultrahigh pressure nano- and capillary LC pump. It supports a wide flow rate range (20 nL/min to 50 µL/min) at pressures up to 800 bar, allowing you to tune your separation for the highest resolution or the fastest analysis time.

- The HPG nano- and capillary pump delivers flows from 20 nL/min to 50 µL/min
- The pressure limit of up to 800 bar allows for UHPLC applications
- The dual-piston pump heads ensure splitless flow delivery that is interruption free
- The innovative flow meter provides a closed loop flow control
- Nano, capillary, or micro flow ranges are selected by simply exchanging the flow selector

The NCP-3200RS can be used to configure a basic RSLCnano system or combined with the NCS-3500RS for advanced nano- and capillary LC workflows

Note: *The flow rate range of the NCP-3200RS can be changed by exchanging the flow selector*

Key Specifications

Flow Rate Range Binary HPG pump: 20 nL/min–50 µL/min

Pressure Range Binary HPG pump: 2–80 MPa (300–11,600 psi)

Retention Time RSD in Gradient Mode at 300 nL/min: <0.2% RSD or <0.1 min SD, whichever is greater

Gradient Delay Volume: <25 nL (pump)

Proportioning Accuracy: <1% of full scale

Proportioning Precision: Typically <0.1% SD

Ordering Information

Hardware

NCP-3200RS UltiMate 3000 Binary Rapid Separation Nano Flow Pump 5041.0030

Accessories

Flow Selector for Nano LC with Flow Range 50-1000 nL/min for NCS-3x00RS and NCP-3x00RS..... 6041.0002

Flow Selector for Capillary LC with Flow Range 0.5-10 µL/min for NCS-3x00RS and NCP-3x00RS..... 6041.0003

Flow Selector for Micro LC with Flow Range 10-50 µL/min for NCS-3x00RS and NCP-3x00RS..... 6041.0014

Isocratic Analytical Pump

The UltiMate 3000 Isocratic Analytical Pump ISO-3100SD is the pump of choice for isocratic applications. It offers robust, dependable operation to meet the demanding requirements of QA and QC laboratories while making the most of your equipment budget.

- Serial dual-piston operating principle
- Wide operating flow rate range from 50 µL/min to 10 mL/min with high flow rate accuracy
- Support of operating pressures of up to 620 bar (9000 psi)
- Robust, dependable performance with low operating and maintenance costs
- Patented piston seal leakage monitoring and System Wellness functions
- SmartFlow technology for high flow rate and retention time precision
- Active rear-seal wash and floating pistons for maximum seal lifetime

This pump is recommended for standard isocratic applications such as those commonly used in QA/QC laboratories. It is ideal in combination with detection techniques that do not support gradient elution, such as refractive index detection. The ISO-3100SD is also an excellent choice as an added pump for LC-MS systems.

Key Specifications

Flow range (settable range): 0.050–10.000 mL/min (0.001–10.000 mL/min)

Flow accuracy: ±0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2-62 MPa (9000 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data System

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
ISO-3100SD UltiMate 3000 Isocratic Analytical Pump	5040.0011
SRD-3200 UltiMate 3000 Integrated Solvent and Degasser Rack, 2 Channels	5035.9250

Accessories	
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Binary Analytical Pump



The UltiMate 3000 Binary Analytical Pump HPG-3×00SD is ideal for analytical LC separations on standard bore columns requiring highest gradient accuracy. In addition, it is also suitable for fast LC separations on narrow bore columns at pressures up to 620 bar. SmartFlow technology enables virtually pulse-free eluent delivery without a pulse damper.

- Serial dual-piston operating principle, high-pressure gradient proportioning
- Wide operating flow rate range from 100 µL/min to 10 mL/min with high flow rate accuracy
- Support of operating pressures of up to 620 bar (9000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Optional solvent selection valves support up to four different mobile phases
- Active rear-seal wash and floating pistons for maximum seal lifetime

Typical applications include the purification of side products and impurities for structure elucidation, purification of compounds from natural product extracts, and purification of compound libraries for pharmaceutical discovery.

Key Specifications

Flow range (settable range): 0.100–10.000 mL/min (0.001–10.000 mL/min)

Flow accuracy: ±0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–62 MPa (9000 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ±0.2% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 400 µL (35–1550 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data System

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware

HPG-3200SD UltiMate 3000 Binary Analytical Pump 5040.0021
HPG3400SD UltiMate 3000 Binary Analytical Pump with Solvent Selector Valves Pump 6040.0041
SRD-3200 Solvent Rack with 2 Degasser Channels 5035.9250
SRD-3400 Solvent Rack with 4 Degasser Channels 5035.9245

Accessories

Mixer Kit to 35 µL Mixing Volume 6040.5000
Mixer Kit to 100 µL Mixing Volume 6040.5100
Mixer Kit to 200 µL Mixing Volume 6040.5110
Mixer Kit to 800 µL Mixing Volume 6040.5750
Mixer Kit to 1500 µL Mixing Volume 6040.5450
UltiMate 3000 Pump Diagnostics Kit 6035.3000

Quaternary Analytical Pump

The UltiMate 3000 Quaternary Analytical Pump LPG-3400SD is the pump of choice for flexibility across a broad range of analytical LC applications, with the highest degree of choice in eluent proportioning and mixing. Up to four solvents may be used for convenient method development, system flushing, and eluent preparation.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Wide operating flow rate range; from 200 µL/min to 10 mL/min with high flow rate accuracy
- Support of operating pressures of up to 620 bar (9000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing design perfectly balance gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear-seal wash and floating pistons for maximum seal lifetime

The LPG-3400SD is ideally-suited for method development, as well as for analytical research and routine analysis in the pharmaceutical, food and beverage, and environmental industries.

Key Specifications

Flow range (settable range):
0.200–10.000 mL/min (0.001–10.000 mL/min)

Flow accuracy: ±0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–62 MPa (9000 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ± 0.5% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 690 µL (325–1840 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware

LPG-3400SD UltiMate 3000 Quaternary Analytical Pump 5040.0031
SR-3000 UltiMate 3000 Solvent Rack without Degasser 5035.9200

Accessories

Mixer Kit to 35 µL Mixing Volume 6040.5000
Mixer Kit to 100 µL Mixing Volume 6040.5100
Mixer Kit to 200 µL Mixing Volume 6040.5110
Mixer Kit to 800 µL Mixing Volume 6040.5750
Mixer Kit to 1500 µL Mixing Volume 6040.5450
UltiMate 3000 Pump Diagnostics Kit 6035.3000

Dual-Gradient Analytical Pump

The Ultimate 3000 Dual-Gradient Analytical Pump DGP-3600SD is the pump of choice for advanced analytical chromatographic techniques, It supports all standard LC applications and is ideal for increasing sample throughput, achieving higher chromatographic resolution, or automating sample preparations steps such as analyte enrichment or matrix elimination.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Two ternary pumps in a single housing
- Wide operating flow rate range: 200 µL/min to 10 mL /min with high flow rate accuracy
- Support of operating pressures up to 620 bar (9000 psi)
- SmartFlow technology for high flow rate, gradient, and retention time precision
- SpinFlow mixing desing perfectly balances gradient delay volume against mixing efficiency
- Extensive mixer portfolio (35–1550 µL) to cover all application needs
- Active rear-seal wash and floating pistons for maximum seal lifetime

The DGP-3600SD is recommended for research and other analytical laboratories that require a general-purpose LC pump capable of standard and advanced two-dimensional techniques.

Key Specifications

Flow range (settable range): 0.200–10.000 mL/min (0.001–10.000 mL/min)

Flow accuracy: ±0.1%

Flow precision:<0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–62 MPa (9000 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ± 0.5% (of full scale)

Proportioning precision: <0.15% SD

Gradient delay volume: 690 µL (325–1840 µL with optional mixer kits)

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data System

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
DGP-3600SD Dual-Gradient Analytical Pump	5040.0061
SR-3600 Solvent Rack with Six Degasser Channels	5035.9230

Accessories	
Mixer Kit, 35 µL Mixing Volume	6040.5000
Mixer Kit to 100 µL Mixing Volume	6040.5100
Mixer Kit to 200 µL Mixing Volume	6040.5110
Mixer Kit to 800 µL Mixing Volume	6040.5750
Mixer Kit with 1550 µL Mixing Volume	6040.5450
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Biocompatible Isocractic Micro Pump

The UltiMate 3000 Biocompatible Isocratic Micro Pump ISO-3100BM is developed for high sensitivity applications using electrochemical detection. The pump is optimized for ultralow pressure ripples to reduce baseline noise in electrochemical detection. The biocompatible flow path eliminates metallic interferences for unequaled low LODs.

- Serial dual-piston operating principle
- Flow rate range from 50 µL/min to 2.5 mL/min with high flow rate accuracy
- All wetted, flow path components are made of inert materials
- Optimized for ultralow pressure ripples
- Patented piston seal leakage monitoring and System Wellness functions
- SmartFlow technology for high flow rate and retention time precision
- Active rear-seal wash and floating pistons for maximum seal lifetime

The ISO-3100BM is suitable in highly sensitive ECD-LC systems for clinical and pharmaceutical analyses of neurotransmitters, drugs and metabolites, natural products, and genotoxins.

Key Specifications

Flow Rate Range: (settable)
0.050–2.500 mL/min (0.001–2.500 mL/min)

Flow Accuracy: ± 0.5%

Flow Precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–41 MPa (6000 psi)

Pulsation: Typically: <0.02 MPa or <0.1% whichever is greater

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon Chromatography Data system software

Power Requirements: 100–120V, 60 Hz; 200–240V, 50 Hz

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware

ISO-3100BM UltiMate 3000 Biocompatible Isocratic Micro Pump..... 5042.0011

SR-3000 UltiMate 3000 Solvent Rack without Degasser..... 5035.9200

Accessories

UltiMate 3000 Pump Diagnostics Kit 6035.3000

Biocompatible Quaternary Micro Pump

The Biocompatible Quaternary Micro Pump LPG-3400BM is the ideal choice for laboratories that need maximum flexibility for microbore LC and LC/MS analyses. The ability to select up to four solvents and quaternary gradient profiles accelerates method development and provides flexibility for automated system startup and shutdown.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Flow rate range from 50 µL/min to 2.5 mL/min with high flow rate accuracy
- All wetted flow path components are made of inert materials
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear-seal wash and floating pistons for maximum seal lifetime

The LPG-3400BM is ideally-suited for method development, as well as for research and routine analysis in the pharmaceutical, food and beverage, and environmental industries.

Key Specifications

Flow range (settable): 0.050–2.500 mL/min (0.001–2.500 mL/min)

Flow accuracy: ± 0.5%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–50 MPa (7250 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ± 1.0% (of full scale)

Proportioning precision: <0.3% SD

Gradient delay volume: 220 µL

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system software

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
LPG-3400BM UltiMate 3000 Biocompatible Quaternary Micro Pump	5042.0036
SR-3000 UltiMate 3000 Solvent Rack without Degasser	5035.9200

Accessories	
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Biocompatible Dual-Gradient Micro Pump

The UltiMate 3000 Biocompatible Dual-Gradient Micro Pump DGP-3600BM can be used in biocompatible analytical LC, narrowbore LC, and microbore LC systems for multidimensional (MD) protein analysis and purification. It supports advanced biochromatography schemes such as application switching and automated multidimensional chromatography.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Two ternary gradient pumps in a single housing
- Flow rate range from 50 µL/min to 2.5 mL/min with high flow rate accuracy
- All wetted, flow path components are made of inert materials
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear-seal wash and floating pistons for maximum seal lifetime

Key Specifications

Flow range (settable): 0.050–2.500 mL/min (0.001–2.500 mL/min)

Flow accuracy: ± 0.5%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–50 MPa (7250 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ±1.0% (of full scale)

Proportioning precision: <0.3% SD

Gradient delay volume: 220 µL

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Two digital inputs; two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance software

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data System

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions: (h × w × d) 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

Hardware	
DGP-3600BM UltiMate 3000 Biocompatible Dual-Gradient Micro Pump	5042.0066
SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack, 6 Channels	5035.9230

Accessories	
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Biocompatible Quaternary Analytical Pump

The UltiMate 3000 Biocompatible Quaternary Analytical Pump LPG-3400AB is the pump of choice for flexibility across a broad range of biochromatographic applications, with the highest degree of choice in eluent proportioning and mixing. Up to four solvents may be used for convenient method development, system flushing, and eluent preparation.

- Serial dual-piston operating principle, low-pressure gradient proportioning
- Wide operating flow rate range from 200 µL/min to 10 mL/min with high flow rate accuracy
- All wetted, flow path components are made of inert materials
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear-seal wash and floating pistons for maximum seal lifetime

The LPG-3400AB is ideally-suited for method development as well as analytical research and routine analysis of pharmaceuticals, foods and beverages, and environmental samples.

Key Specifications

Flow range (settable): 0.200–10.000 mL/min (0.001–10 mL/min)

Flow accuracy: ± 0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 2–50 MPa (7250 psi)

Pulsation: Typically: <0.2 MPa or <1% whichever is greater

Proportioning accuracy: ± 0.5% (of full scale)

Proportioning precision: <0.2% SD

Gradient delay volume: 690 µL

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: Three digital inputs; four programmable relays; one analog output for pressure monitoring

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

*GLP Features:*Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon Chromatography Data system software

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)

Ordering Information

Hardware

LPG-3400AB UltiMate 3000 Biocompatible Quaternary Low-Pressure Proportioning Analytical Pump..... 5037.0015

SR-3000 UltiMate 3000 Solvent Rack without Degasser..... 5035.9200

Accessories

1200 µL Mixer Extension for AB pumps 6037.1979

UltiMate 3000 Pump Diagnostics Kit 6035.3000

Biocompatible Dual-Gradient Analytical Pump

The UltiMate 3000 Biocompatible Dual-Gradient Analytical Pump DGP-3600AB is the pump of choice for advanced analytical biochromatographic techniques. It supports all standard LC applications and is ideal for increasing sample throughput, achieving higher chromatographic resolution, or automating sample preparation steps such as analyte enrichment and matrix elimination.

- Serial dual-piston operating principle, low pressure, gradient proportioning
- Two ternary gradient pumps in a single housing
- Wide operating flow rate range; 200 µL/min to 10 mL /min
- All wettted flow path components are made from inert materials
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Reliable in-line vacuum degassing (integrated degasser) and vacuum level monitoring
- Active rear seal wash and floating pistons for maximum seal lifetime

The DGP-3600 AB is recommended for research labs and other analytical laboratories that require a general-purpose LC pump capabale of standard as well as advanced two-dimensional techniques.

Key Specifications

Flow Rate (Settable): 0.200–10.000 mL/min

Flow Accuracy: ±0.1%

Flow Precision: <0.05% RSD or <0.01 min SD whichever is greater

Pressure Range: 2–50 MPa (7250 psi)

Pulsation: typically <0.2 MPa or <1%, whichever is greater

Proportioning Accuracy: ±0.5% of full scale

Proportioning precision: <0.2% SD

Gradient delay volume: 690 µL

PC Connection: All functions controllable via USB; integrated USB hub with three USB ports

I/O Interfaces: Three digital inputs, four programmable relays, one analog output for pressure monitoring

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), system wellness and qualification, monitoring with Chromeleon Chromatography Data System software

Power Requirements: 100–120V, 60 Hz; 200–240V, 50 Hz software

Dimensions (h × w × d): 19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)

Ordering Information

Hardware	
Biocompatible Dual-Gradient Analytical Pump DGP-3600AB	5037.0014
Solvent Rack with Six Degasser Channels	5035.9230

Accessories	
1200 µL Mixer Extension for AB Pumps	6037.1979
UltiMate 3000 Pump Diagnostics Kit	6035.3000

Quaternary Nano/Cap/Micro Pump



The UltiMate 3000 Quaternary Nano/Cap/Micro Pump is equipped with the Quaternary Micro Pump LPG-3400M(B) and a Nano/Cap/Micro Flow Manager FLM-3x00(B). It supports the accurate and precise delivery of quaternary gradients with a flow range of 50 nL/min to 2.5 mL/min with the UltiFlow eluent delivery system.

- Wide flow rate range from 50 nL/min up to 2.5 mL/min (depending on split ratio)
- Easily convertable between nano, capillary and micro flow rates
- UltiFlow technology for constant flow independent of eluent composition and backpressure
- Supports use of up to four solvents for gradient applications
- Active rear-seal wash system for increased pump uptime
- Superior gradient accuracy and precision
- Biocompatible option

The UltiMate 3000 Quaternary Nano Pump is used primarily as a front-end separation system for mass spectrometry in proteomic and bioanalytical analyses. The Cap/Micro pump variant is recommended for research and routine analyses of small sample amounts in drug discovery applications, particularly for drug metabolism and pharmakokinetic studies.

Key Specifications

Recommended Flow Rate Range: nano: 50–1,000 nL/min, cap: 0.5–10 µL/min, micro: 10–160 µL/min

Flow Rate Accuracy: nano: ±3% at 300 nL/min, cap: ±1.5% at 4 µL/min, micro: ±1% at 50 µL/min

Flow Rate Precision: <0.1% RSD

Pressure Range: 0.1–50 MPa (7250 psi)

Proportioning Accuracy: ±2% on column (typically ±1%)

Proportioning Precision: <0.5% SD on column

Effective Gradient Delay Volume: nano: 0.5 µL, cap: 3.3 µL, micro: 50 µL

PC Connection: All functions controllable via USB; integrated USB hub with three USB ports

I/O interfaces: three digital inputs, four programmable relays, one analog output for pressure monitoring

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon software

Power Requirements: 100–120V, 60 Hz; 200–240V, 50 Hz software

Dimensions: (h × w × d): 38 × 42 × 51 cm (15 × 16.5 × 20 in.)

Ordering Information

The UltiMate 3000 Quaternary Nano/Cap/Micro Pump consists of the LPG-3400M(B) Quaternary Micro Pump and FLM-3x00(B) Nano/Cap/Micro Flow Manager with the UltiFlow eluent delivery system delivering the appropriate flow rate. The pump can be easily converted between nano, capillary, and micro flow rates by exchanging the flow splitter of the FLM-3×00(B). For order information on the Flow Manager and Flow Splitter, refer to the Flow Managers section.

Hardware	
LPG-3400M UltiMate 3000 Quaternary Micro pump	5035.0045
LPG-3400MB 3000 Biocompatible Micro Pump	5037.0055
SR-3000 Solvent Rack (without Degasser)	5035.9200

Dual-Gradient Nano/Cap/Micro Pump

The UltiMate 3000 Dual-Gradient Nano/Cap/Micro Pump is equipped with the DGP-3600M(B) Dual-Gradient Micro Pump and a Nano/Cap/Micro Flow Manager FLM-3x00(B). It provides two independent ternary low-pressure gradients down to 50 nL/min and 10 µL/min with the UltiFlow eluent delivery system.

- Wide flow rate range; from 50 nL/min to 2.5 mL/min (Depending on split ratio)
- Dual-gradient pump with two independent ternary gradient pumps
- Easily convertable between nano, capillary, and micro flow rates
- UltiFlow technology for constant flow independent of eluent compostion and backpressure
- Active rear-seal wash system for increased pump uptime
- Superior gradient accuracy and precision
- Biocompatible option

The Dual-Gradient Nano/Cap/Micro Pump is used primarily for bioanalytical studies such as MS-based proteomics. It enables preconcentration, on-line and off-line multidimensional LC applications and supports complex proteomic workflows such as protein prefractionation, protein/peptide separation, and peptide mapping.

Key Specifications

Recommended Flow Rate Range: nano: 50–1000 nL/min, cap: 0.5–10 µL/min, micro: 10–160 µL/min

Flow Rate Accuracy: nano: ±3% at 300 nL/min, cap: ±1.5% at 4 µL/min, micro: ±1% at 50 µL/min

Flow Rate Precision: <0.1% RSD

Pressure Range: 0.1–50 MPa (7250 psi)

Proportioning Accuracy: ±2% on column (typically ±1%)

Proportioning Precision: <0.5% SD on column

Effective Gradient Delay Volume: nano: 0.5 µL, cap: 3.3 µL, micro: 50 µL

PC Connection: All functions controllable via USB; integrated USB hub with three USB ports

I/O Interfaces: Three digital inputs, four programmable relays, one analog output for pressure monitoring

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), system wellness and qualification, monitoring with Chromeleon software software

Power Requirements: 100–120V, 60 Hz; 200–240V, 50 Hz

Dimensions (h × w × d): 38 × 42 × 51 cm (15 × 16.5 × 20 in.)

Ordering Information

The Dual-Gradient Nano/Cap/Micro Pump consists of a DGP-3600M(B) Dual-Gradient Micro Pump and FLM-3x00 Nano/Cap/Micro Flow Manager with the UltiFlow eluent delivery system. The pump can be easily converted between nano, capillary, and micro flow rates by exchanging the Flow Splitter of the FLM-3x00(B). For order information on the Flow Manager and Flow Splitter, refer to the Flow Managers section.

Hardware	
DGP-3600M UltiMate 3000 Dual-Gradient Micro Pump	5035.0050
DGP-3600MB UltiMate 3000, Biocompatible Dual-Gradient Micro Pump	5037.0060
SRD-3600 UltiMate 3000 Integrated Solvent and Degasser Rack (6 Channels)	5035.9230

Binary Semipreparative Pump

The UltiMate 3000 Binary Semipreparative Pump HPG-3200P is the right choice for laboratories that need to purify compounds in the microgram to lower-milligram range. It is recommended for semipreparative separations on 4.6–21.2 mm i.d. columns.

- Serial dual-piston operating principle, high-pressure gradient proportioning
- Flow rate range from 0.5 to 50 mL/min with high flow rate accuracy
- SmartFlow technology for high flow rate, gradient, and retention time precision
- Support for operating pressures of up to 100 bar (1450 psi)
- Gradient delay volume of 1035 µL
- Mixing volume extension (+1200 µL) available
- Active rear-seal wash and floating pistons for maximum seal lifetime

Typical applications include the purification of side products and impurities for structure elucidation, purification of compounds from natural product extracts, and purification of compound libraries for pharmaceutical discovery.

Key Specifications

Flow range (settable):
0.5–50 mL/min (0.001–50 mL/min)

Flow accuracy: ± 0.1%

Flow precision: <0.05% RSD or <0.01 min SD, whichever is greater

Pressure range: 1–10 MPa (1450 psi)

Pulsation: Typically: <0.2 MPa or <1%, whichever is greater

Proportioning accuracy: ± 0.2% (of full scale)

Proportioning precision: <0.2% SD

Gradient delay volume: 1035 µL

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

I/O Interfaces: 3 digital inputs; 4 programmable relays; 1 analog output for pressure monitoring

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with the Chromeleon Chromatography Data system

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)

Ordering Information

Hardware

HPG-3200P UltiMate 3000 Binary High-Pressure Proportioning Semipreparative Pump System 5035.0025

Accessories

Mixing Chamber Extension for UltiMate 3000 Pump Systems, 1200 µL 6035.1979

UltiMate 3000 Pump Diagnostics Kit 6035.3000

LC Autosamplers



The UltiMate 3000 Autosampler Series features innovative and carefully designed modules that ensure reliable, precise, and accurate injection for nL to mL sample volumes. Select the right autosampler module to match your LC application, whether it requires a nano, capillary, micro, analytical, or semipreparative column and system configuration.

- Fast injection cycles (<15 s at 5 µL injection volume)
- Supports simultaneous use of up to four different sample formats, including well plates
- Patented sample compartment temperature control to protect thermally sensitive samples
- Easy access to all fluidic components through the flip-up front door panel
- Precision mechanical syringe drives for injection volume accuracies of ±0.5%
- Automated validation procedures with Chromeleon software
- Predefined diagnostic tests to help identify and resolve operational interruptions
- Autosamplers available with either pulled-loop or in-line split-loop injection principle
- Very low extracolumn volume contribution

Each UltiMate 3000 autosampler provides a highly-integrated solution with optimum fluidic connections, single-point control through the Chromeleon Chromatography Data System, and seamless intermodule communication. The WPS-3000FC Autosampler and Fraction Collector provides unmatched flexibility and workflow automation possibilities. The ACC-3000 Autosampler Column Compartment features an integrated column oven and provides a cost-effective solution for routine analyses.

Related Literature

The following provides more information on this product and can be found in the Documents section at www.dionex.com. .

Product Data Sheets

UltiMate 3000 Well Plate Autosampler Series

ACC-3000 Autosampler Column Compartment

RSLC Autosampler

The UltiMate 3000 Rapid Separation Autosampler injects sample volumes up to 100 µL at pressures up to 1034 bar (15,000 psi). The in-line, split-loop (flow-through) injection principle provides highly accurate, precise delivery of the sample with ultralow carryover. The wide injection volume range makes the module suitable for both UHPLC and conventional HPLC applications.

- Peak area precision is typically <0.15% RSD for 5 µL injections
- Superior injector linearity of r^2 >0.9999 (5-90 µL) due to high-precision drive mechanism
- Wide injection volume range from 1–100 µL (default configuration) for maximum injection flexibility
- Optional injection volume ranges of 0.2–25 µL, 1.5–250 µL, and 1.5–500 µL available
- Low gradient delay volume of 140 µL (default configuration) or 50 µL (with 25 µL sample loop)
- Volumetric accuracy better than ±0.5% for 20 µL injections for easy method transfer
- Supports well plates and short injection cycle times for high-throughput applications
- Sample thermostatting for optimal protection of thermally sensitive analytes (WPS-3000TRS)

The UltiMate 3000 Rapid Separation Autosampler offers minimal gradient delay and low extracolumn volume for high efficiency separations and short chromatographic run times. It is strongly recommended for ultrahigh pressure, high-throughput and high-resolution applications, and is available in non-thermostatted (WPS-3000RS) and thermostatted versions (WPS-3000TRS).

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 24 deep, 96, and/or 384 normal and deep well plates, 3 × 384 low well PCR plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: in-line split-loop (flow-through) injections, bypass mode, user-defined programs

Injection Volume Range (Recommended): 0.01–100 µL (1–100 µL)

Minimum Sample Required: 1 µL out of 5 µL (250 µL conical vial)

Injection Volume Accuracy: ±0.5% at 20 µL

Injection Volume Precison: <0.25% RSD at 5 µL (typically <0.15% RSD), caffeine in water

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water

Needle Wash: active external

Carryover: <0.004% for caffeine with external wash at 20 MPa

Injection Cycle Time: <15 s for 5 µL

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Sample Thermostatting Accuracy: ±2 °C

PC Connection: all functions controllable via USB; integrated USB hub with three USB 1.1 ports

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000RS Rapid Separation In-Line Split-Loop Autosampler	5840.0010
WPS-3000TRS Rapid Separation Thermostatted Autosampler	5840.0020

Accessories

Sample Loop, 25 µL, WPS-3000RS and WPS-3000SL Analytical Samplers	6820.2415
Sample Tray for 72 Cylindrical 0.3 mL Vials	6820.4091
Sample Tray for 40 Conical 1.1 mL Vials	6820.4087
Sample Tray for 72 Cylindrical 1.2 mL Vials	6820.4090
Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials	6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials	6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials	6820.4086
Sample Support Rack for Deep Well Plates, 34-46 mm	6820.4079
Sample Support Rack for Deep Well Plates, 30-36 mm	6820.4083
Support Rack (Adapter) for Low Well PCR Plates, 8-12 mm	6820.4088
Sample Tray for 0.5 mL Eppendorf Tubes	6820.4096
Sample Tray for1.5 MI Eppendorf Tubes	6820.4094
Vial Pusher Adapter *(Required for 24 Deep Well Plates)*	6820.2402
Transparent Front Cover	6820.1419

Analytical Autosampler

The UltiMate 3000 Analytical Autosampler WPS-3000(T)SL is highly versatile in sample format and injection volume. It performs rapid, accurate, and precise injections for analytical LC and UHPLC applications at pressures up to 62 MPa (9000 psi). The in-line, split-loop (flow-through) injection principle and external needle wash options virtually eliminate carryover.

- Peak area precision typically <0.15% RSD for 5 µL injections
- Superior injector linearity of r^2=0.999 (5–90 µL) due to a high-precision drive mechanism
- Low gradient delay volume of 140 µL (default configuration) or 50 µL (with 25 µL sample loop)
- Superior volumetric accuracy: better than ±0.5% for consistent results
- Supports an injection volume range from 1 to 100 µL, suitable for most analytical applications
- Optional injection volume ranges of 0.2–25 µL, 1.5–250 µL, and 1.5–500 µL are available

- Supports well plates and short injection cycle times for high-throughput applications
- Sample thermostatting for optimal protection of thermally sensitive analytes (WPS-3000TSL)

The UltiMate 3000 Analytical Autosampler offers robust, dependable performance as well as high flexibility with low operating and maintenance costs. It is ideally suited for routine analyses in pharmaceutical, food and beverage, and environmental laboratories, and is available in a non-thermostatted (WPS-3000SL) and thermostatted versions (WPS-3000TSL).

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 24 deep, 96 and/or 384 normal and deep well plates, 3 × 384 low well PCR plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: in-line split-loop (flow-through) injections, bypass mode, user-defined programs

Injection Volume Range (Recommended): 0.01–100 µL (1–100 µL)

Minimum Sample Required: 1 µL out of 5 µL (250 µL conical vial)

Injection Volume Accuracy: ±0.5% at 50 and 90 µL

Injection Volume Precision: <0.25% RSD at 5 µL (typically <0.15% RSD), caffeine in water

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water

Needle Wash: active external

Carryover: <0.004% for caffeine with external wash at 7.5 MPa

Injection Cycle Time: <15 s for 5 µL

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Sample Temperature Accuracy: ±2 °C

PC Connection: all functions controllable via USB; integrated USB hub with three USB 1.1 ports

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000SL Analytical In-Line, Split-Loop Autosampler	5822.0010
WPS-3000TSL Analytical In-Line, Split-Loop Autosampler	5822.0020

Accessories

Sample Loop, 25 µL, WPS-3000RS and WPS-3000SL Analytical Samplers	6820.2415
Injection Volume Kit, 250 µL, WPS-3000RS and WPS-3000SL Analytical Samplers	6822.2432
Injection Volume Kit, 500 µL, WPS-3000RS and WPS-3000SL Analytical Samplers	6822.2433
Sample Tray for 72 Cylindrical 0.3 mL Vials	6820.4091
Sample Tray for 40 Conical 1.1 mL Vials	6820.4087
Sample Tray for 72 Cylindrical 1.2 mL Vials	6820.4090
Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials	6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials	6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials	6820.4086
Sample Support Rack for Deep Well Plates,	6820.4079
Sample Support Rack for Deep Well Plates, 30-36 mm	6820.4083
Sample Support Rack (Adapter) for Low Well PCR plates, 8-12 mm	6820.4088
Sample Tray for 0.5 mL Eppendorf Tubes	6820.4096
Sample Tray for1.5 Ml Eppendorf Tubes	6820.4094
Vial Pusher Adapter *(Required for 24 Deep Well Plates)*	6820.2402
Transparent Front Cover	6820.1419

Autosampler for Electrochemical Detection

The UltiMate 3000 Analytical Autosampler WPS-3000TBSL is based on the in-line-split-loop (flow-through) injection principle and features PEEK injection valves and fluidics. It is therefore perfectly suited for high-sensitivity electrochemical detection.

- PEEK injection valve and fluidics for reduced ECD baseline noise
- Peak area precision typically, 0.15% RSD for 5 µL injections
- Low gradient delay volume of 140 µL
- Superior volumetric accuracy of ±0.5% for consistent results
- Supports an injection range of 1 to 100 µL, suitable for analytical applications
- Supports well plates and short injection cycle times for high-throughput applications
- Sample thermostatting for optimal protection of thermally sensitive analytes

The UltiMate 3000 Analytical Autosampler offers robust, dependable performance plus high flexibility with low operating and maintenance costs. It is ideally suited for routine analyses in clinical pharmaceutical, food and beverage, and environmental laboratories.

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others : 3 × 24 deep, 96 and/or 384 normal and deep well plates, 3 × 384 low well PCR plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: in-line split-loop (flow-through) injections, bypass mode, user-defined programs

Injection Volume Range (Recommended): 0.01–100 µL (1–100 µL)

Minimum Sample Required: 1 µL out of 5 µL (250 µL conical vial)

Injection Volume Accuracy: ±0.5% at 50 and 90 µL

Injection Volume Precision: <0.25% RSD at 5 µL (typically <0.15% RSD), caffeine in water

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, (caffeine in water)

Needle Wash: active external

Carryover: <0.004% for caffeine with external wash at 7.5 MPa

Injection Cycle Time: <15 s for 5 µL

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Sample Temperature Accuracy: ±2 °C

PC Connection: all functions controllable via USB; integrated USB hub with three USB 1.1 ports

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000TBSL Thermostatted Analytical Autosampler 5822.0010

Accessories

Sample Tray for 72 Cylindrical 0.3 mL Vials 6820.4091
Sample Tray for 40 Conical 1.1 mL Vials 6820.4087
Sample Tray for 72 Cylindrical 1.2 mL Vials 6820.4090
Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials..... 6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials 6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials 6820.4086
Sample Support Rack for Deep Well Plates,..... 6820.4079
Sample Support Rack for Deep Well Plates, 30-36 mm 6820.4083
Sample Support Rack (Adapter) for Low Well PCR plates, 8-12 mm.... 6820.4088
Sample Tray for 0.5 mL Eppendorf Tubes 6820.4096
Sample Tray for1.5 MI Eppendorf Tubes 6820.4094
Vial Pusher Adapter..... 6820.2402
(Required for 24 Deep Well Plates)
Transparent Front Cover 6820.1419

Analytical Autosampler for Fraction Collection

The UltiMate 3000 Autosampler and Fraction Collector WPS-3000T(B)FC features a diverter valve to allow injection fractionation, and re-injection at micro and analytical flow rates and pressures up to 35 MPa (5000 psi.) The autosampler extends the flexibility of 2D workflows and allows fraction collection in combination with Dual-Gradient Pumps.

- Analytical scale injector and fraction collector
- Heating and cooling of samples and fractions
- Automation of multistep and multidimensional LC analyses
- Sample derivatization
- Based on WPS-3000PL, with the same performance specifications
- Inert PEEK flow path (biocompatible version)
- Up to 1100 sample and fraction positions
- A 90 MPa/13,050 psi valve for the WPS-3000TFC supports UHPLC applications

Combined with the Extended Fraction Collection capabilities of the Chromeleon Chromatography Data Management software, setup, system control, reviewing, and data reporting are straightforward and simple.

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 24 deep, 96 and/or 384 normal and deep well plates, 3 × 384 low well PCR plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: Full-loop and partial-loop injections, low-dispersion mode, Microliter Pickup, user-defined programs

Injection Volume Range (Recommended): 0.01–250 µL (0.01–250 µL)

Minimum Sample Required: 1 µL out of 1 µL (Microliter Pickup)

Injection Volume Precision: <0.25% RSD at 5 µL in full-loop mode, 0.3% RSD at 5µL and 20 µL partial-loop, (caffeine in water)

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–30 µL, (caffeine in water)

Needle Wash: active external

Carryover: <0.02% for caffeine with external wash

Injection Cycle Time: <60 s for 5 µL, (full-loop injection < 90 s for 5 µL (partial-loop injection)

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Thermostatting Temperature Accuracy: ±2 °C

PC Connection: all functions controllable via USB

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000TFC Thermostatted Well Plate Autosampler with Integrated Fraction Collection 5822.0010

WPS-3000TBFC Thermostattted Biocompatible Well Plate Autosampler with Integrated Fraction Collection 5825.0020

Accessories

Needle, 15 µL,Fused Silica, WPS-3000PL and WPS-3000FC 6820.3115

Sample Loop, 1 µL, PEEKsil, WPS-3000PL and WPS-3000FC 6820.0015

Sample Loop, 5 µL, PEEKsil, WPS-3000PL and WPS-3000FC 6820.0016

Sample Loop, 10 µL, PEEKsil, WPS-3000PL and WPS-3000FC 6820.0017

Sample Loop, 5 µL, Biocompatible, PEEK, WPS-3000PL and WPS-3000FC 6823.0016

Sample Loop, 10 µL, Biocompatible, PEEK, WPS-3000PL and WPS-3000FC 6823.0017

Sample Loop, 20 µL, Biocompatible, PEEK, WPS-3000PL and WPS-3000FC 6823.0018

Sample Tray for 72 Cylindrical 0.3 mL mL Vials 6820.4091

Sample Tray for 40 Conical 1.1 mL Vials 6820.4087

Sample Tray for 72 Cylindrical Vials 6820.4090

Sample Tray for 40 Eppendorf Tubes, 0.5 mL 6820.4096

Sample Tray for 40 Eppendorf Tubes, 1.5 mL 6820.4094

Sample Tray for 40 Cylindrical 1.8 mL/2.0 Vials 6820.4070

Sample Tray for 22 Cylindrical 4 mL Vials 6820.4084

Sample Tray for 10 Cylindrical 10 mL Vials 6820.4086

Sample Support Rack for Deep Well Plates, 34-46 mm 6820.4079

Sample Support Rack for Deep Well Plates, 30-36 mm 6820.4083

Support Rack (Adapter) for Low Well Plates, 8-12 mm 6820.4088

Vial Pusher Adapter 6820.2402
(Required for Deep Well plates)

Transparent Front Cover 6820.1419

RSLC Nano/Cap Autosampler

The RSLC Nano Well Plate Autosampler is the perfect autosampler for UHPLC in proteomics analyses with no sample loss at presssures up to 900 bar (13,050 psi). Thermotsatting to 4° C ensures the stability of thermolabile samples.

- Pulled-loop injection principle, full, partial-loop, and Microliter Pickup as standard injections or completely user-programmable by UDP
- Handles up to three 96- or 384 well plates or sample vial trays, or combination thereof
- Supports a wide injection volume range 20 nL to 25 µL for maximum flexibility
- Microliter Pickup routine allows for injection with virtually zero sample loss
- Micro Fraction option allows for automated off-line multidimensional LC (MDLC)

The WPS-3000(T)PL RS Well Plate Autosampler was specifically designed to provide unattended sample throughput combined with superior reproducible injections, even with the smallest volumes. It is the ideal solution for customers seeking the highest injection precision at nano/cap/micro flow rates for UHPLC applications

Note: *For more information on the Micro Fraction option, refer to the Fraction Collection section under LC Modules.*

Key Specifications

Sample Capacity, For Sample Capacity Vials and Sample Capacity, Others, see RSLC Autosampler section, p. 57

Injection Methods: Full-loop and partial-loop injections; low dispersion mode, Microliter Pickup; user-defined programs

Injection Volume (Settable): 0.001-20 µL (20 nL-20 µL)

Injection Volume Precision: <0.4% RSD for 1 µL full-loop injections; <1% RSD for 200 nL partial-loop injections (caffeine in water)

Linearity: corr. coeff. >0.9995, from 100 nL to 500 nL partial-loop injections (caffeine in water)

Needle Wash: active external

Carryover: <0.02% for caffeine with external wash

Injection Cycle Time: <30 s for 1 µL (full-loop injection)

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Thermostatting Temperature Accuracy: ±2 °C

PC Connection: USB; USB hub with three sockets integrated

Dimensions (h × w × d): 40 × 42 × 51 cm (16 × 16.5 × 20 in.)

Ordering Information

Hardware	
WPS-3000TPLRS Thermostatted Rapid Separation Pulled-Loop Well Plate Autosampler	5826.0020
WPS-3000PLRS Rapid Separation Pulled-Loop Nano/Cap Autosampler	5826.0010

Accessories	
Needle, 15 µL,Fused Silica nanoViper	6820.3115
Sample Loop, 5 µL, nanoViper, WPS PL (RS) Samplers	6826.2405
Sample Loop, 20 µL, nanoViper, WPS PL (RS)	6826.2420
Buffer Tubing, 500 µL	6820.0020
Syringe, 100 µL, WPS-3000 Samplers	6822.0002
Injection Volume Kit, 125 µL	6820.0031
Sample Tray for 72 Cylindrical 0.3 mL mL Vials	6820.4091
Sample Tray for 40 Conical 1.1 mL Vials	6820.4087
Sample Tray for 72 Cylindrical Vials	6820.4090
Sample Tray for 40 Eppendorf Tubes, 0.5 mL	6820.4096
Sample Tray for 40 Eppendorf Tubes, 1.5 mL	6820.4094
Sample Tray for 40 Cylindrical 1.8 mL/2.0 Vials	6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials	6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials	6820.4086
Sample Support Rack for Deep Well Plates, 34-46 mm	6820.4079
Sample Support Rack for Deep Well Plates, 30-36 mm	6820.4083
Support Rack (adapter) for Low Well Plates, 8-12 mm	6820.4088
Vial Pusher Adapter *(Required for deep well plates)*	6820.2402
Transparent Front Cover	6820.1419

Nano/Cap/Autosampler

The UltiMate 3000 Nano/Cap Autosamplers WPS-3000(T)PL and WPS-3000TBPL (biocompatible) have been specifically designed to provide reliable unattended sample throughput and handling of nL sample volumes. They are ideal for LC applications at nano, capillary, and micro flow rates providing the highest injection precision and zero sample loss.

- Pulled-loop injection principle, full-loop and low dispersion partial-loop injections
- Needle-in-Needle injection technique for robust operation with different sample formats
- Handles up to three 96- or 384-well plates or sample vial trays, or combination thereof
- Injection volume range from 0.02 to 20 µL (default), 0.02–10 µL, or 0.1–125 µL
- Sample tray thermostatting and cover for injection of thermolabile and UV-labile samples
- External needle wash for lowest carryover of typically <0.01%
- Microliter Pickup routine for injections with virtually zero sample loss
- Micro Fraction Collection option for automated off-line multidimensional LC (MDLC)

The UltiMate 3000 Nano/Cap Autosampler is ideally suited for LC/MS applications. Biocompatibility and sample thermostatting qualify the instrument for all small-scale bioanalytical applications. It is available in non-thermostatted (WPS-3000PL), thermostatted (WPS-3000TPL) and thermostatted biocompatible (WPS-3000TBPL) versions.

Note: *For more informationon the Micro Fraction option, refer to the Fraction collection section under LC Modules.*

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 24 deep, 96 and/or 384 normal and deep well plates, 3 × 384 low well PCR plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: Full-loop and partial-loop injections, low dispersion mode, Microliter Pickup, user-defined programs

Injection Volume Range (Recommended): 0.001–20 µL (20 nL–20 µL)

Minimum Sample Required: 1 µL out of 1 µL (Microliter Pickup)

Injection Volume Precision: "<0.4% RSD for 1 µL in full-loop and <1% for 200 nL in partial-loop injection mode, caffeine in water"

Linearity: corr. coeff. >0.9995, from 100 nL to 500 nL partial-loop injections, caffeine in water

Needle Wash: active external

Carryover: <0.02% for caffeine with external wash

Injection Cycle Time: <30 s for 1 µL, full-loop injection

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Thermostatting Temperature Accuracy: ±2 °C

PC Connection: All functions controllable via USB; integrated USB hub with three USB 1.1 ports"

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

For an injection volume range up to 20 µL, the 20 µL sample loop in combination with a 100 µL syringe and 500 µL buffer-tubing is recommended.

Hardware

WPS-3000PL Nano/Cap Pulled-Loop Autosampler	5820.0010
WPS-3000TPL Nano/Cap Pulled-Loop Thermostatted Autosampler	5820.0020
WPS-3000TBFC Thermostattted Biocompatible Well Plate Autosampler with Integrated Fraction Collection	5821.0020

Accessories

Needle, 15 µL, Fused Silica nanoViper	6820.3115
Needle, 15 µL, PEEK, Viper	6820.3025
Sample Loop, 20 µL, PEEK	6820.0018
Sample Loop, 20 µL, Biocompatible, PEEKsil,	6821.0018
Buffer Tubing, 500 µL	6820.0020
Buffer Tubing, 500 µL, Biocompatible	6821.0020
Syringe, 100 µL, WPS-3000	6822.0002
Injection Volume Kit, 125 µL	6820.0031
Injection Volume Kit, Biocompatible, 125 µL,	6821.0031
Sample Tray for 72 Cylindrical 0.3 mL mL Vials	6820.4091
Sample Tray for 40 Conical 1.1 mL Vials	6820.4087
Sample Tray for 72 Cylindrical Vials	6820.4090
Sample Tray for 40 Eppendorf tubes, 0.5 mL	6820.4096
Sample Tray for 40 Eppendorf tubes, 1.5 mL	6820.4094
Sample Tray for 40 Cylindrical 1.8 mL/2.0 Vials	6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials	6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials	6820.4086
Support Rack for Deep Well Plates, 34–46 mm	6820.4079
Sample Support Rack for Deep Well Plates, 30–36 mm	6820.4083
Support Rack for Low Well PCR Plates, 8–12 mm	6820.4088
Vial Pusher Adapter (required for 24 Deep Well Plates)	6820.2402
(required for 24 Deep Well Plates)	
Transparent Front Cover	6820.1419

Biocompatible Analytical Autosampler

The UltiMate 3000 Biocompatible Analytical Autosampler has been specifically designed to provide rapid, accurate, and precise injections of complex samples containing biomolecules. It features low gradient delay volume and low carryover.

- Pulled-loop injection principle, full- and partial-loop injections possible
- Dual-needle injection technique for robust operation with different sample formats
- Inert PEEK flow paths
- Supports up to three 96 or 384 well plates or sample vial trays, or a combination thereof
- Wide injection volume ranges from 0.1–50 µL or 0.25–250 µL for maximum flexibility
- Sample tray thermostatting and cover for injection of thermo- and UV-labile samples
- Low gradient delay volume

The UltiMate 3000 Analytical Autosampler is ideally suited for analytical LC applications requiring biocompatibility. As part of the UltiMate 3000 Titanium System, this autosampler helps to support the analysis of proteins.

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 120 × 0.5/1.5 mL Eppendorf tubes, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 24 96 and/or 384 normal or deep well plates, 3 × 384 low well plates 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Methods: Full-loop and partial-loop injections low-dispersion, Microliter Pickup, user-defined programs

Injection Volume Range (Recommended): 0.01–250 µL (0.1–250 µL)

Minimum Sample Required: 1 µL out of 1 µL (Microliter Pickup)

Injection Volume Precision: <0.25% RSD at 5 µL in full-loop and <0.3% RSD at 5 µL and 20 µL in partial-loop mode

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–30 µL (partial-loop mode), caffeine in water

Needle Wash: active external

Carryover: <0.02% for caffeine with external wash

Injection Cycle Time: <60 s for 5 µL full-loop injection, <90 s for 5 µL partial-loop injection

Sample Thermostatting: 4–45 °C, or 22 °C below ambient

Sample Temperature Accuracy: ± 2 °C

PC Connection: all functions controllable via USB

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000TBPL Biocompatible Analytical Pulled-Loop Thermostatted Autosampler 5823.0020

Accessories

Needle, 15 µL, PEEK, Viper, WPS-3000PL and WPS-3000FC 6821.3115
Sample Loop, 5 µL, Biocompatible, PEEK, WPS-3000TBPL Analytical.. 6823.0016
Sample Loop, 10 µL, Biocompatible, PEEK, WPS-3000TBPL Analytical 6823.0017
Sample Loop, 20 µL, Biocompatible, PEEK, WPS-3000TBPL Analytical 6823.0018
Sample Tray for 72 Cylindrical 0.3 mL Vials 6820.4091
Sample Tray for 40 Conical 1.1 mL Vials 6820.4087
Sample Tray for 72 Cylindrical 1.2 mL Vials 6820.4090
Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials..... 6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials 6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials 6820.4086
Sample Support Rack for Deep Well Plates, 34-46 mm 6820.4079
Sample Support Rack for Deep Well Plates, 30-36 mm 6820.4083
Support Rack (Adapter) for Low Well PCR Plates, 8-12 mm 6820.4088
Sample Tray for 0.5 mL Eppendorf tubes..... 6820.4096
Sample Tray for 1.5 Ml Eppendorf tubes..... 6820.4094
Vial Pusher Adapter (required for well plates) 6820.2402
(Required for well plates)
Transparent Front Cover 6820.1419

Autosampler Column Compartment



The UltiMate 3000 Autosampler Column Compartment ACC-3000(T) provides a cost-effective solution for conventio-anl LC and UHPLC applications at up to 62 MPa (9,000 psi). It integrates an autosampler and column oven in a single module and offers performance and flexibility that exceed most analytical method requirements. In addition, it reduces height and cost of your LC system.

- Pulled-loop injection principle (full- and partial-loop injections possible)
- Wide injection volume ranges from 1 to 10 µL in partial-loop and 20 µL in full-loop mode or 10 to 100 µL and 200 µL, respectively
- Low sample carryover
- Patented temperature control to protect thermally sensitive samples
- Accurate, precise column temperature control for reliable chromatographic results
- Built-in eluent preheating for increased chromatographic reliability at high temperatures
- Easy front access to all fluidic components
- Trouble-free operation due to minimized number of wear parts

The UltiMate 3000 Autosampler Column Compartment is recommended for research and other analytical laboratories dealing in a cost-sensitive environment. It is available in non-thermostatted (ACC-3000) and thermostatted (ACC-3000T) versions and is an essential part of the UltiMate 3000 Basic Automated System.

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Others: 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: pulled-loop injections (full-loop and partial-loop mode)

Full-Loop Injection Volume: 20, 50, and 200 µL

Injection Volume Range (Recommended): 0–50% (10–50%) of installed sample loop in partial-loop mode

Injection Volume Precision: <0.25% RSD at 20 µL in full-loop mode, typically <0.3% at 5 µL in partial-loop mode (20 µL sample loop)

Linearity (20 µL Sample Loop): corr. coeff. >0.9995, RSD <1% for 1–10 µL injections in partial-loop mode

Linearity (200 µL Sample Loop): corr. coeff. >0.9995, RSD <0.5% for 10–100 µL injections in partial loop mode

Needle Wash: active external

Carryover: <0.02% (with caffeine)

Injection Cycle Time: typically <45 seconds with 5 µL injections

Sample Thermostatting: 8–45 °C or 15 °C below ambient

Column Temperature Range: 5 °C above ambient to 50 °C

PC Connection: all functions controllable via USB ports

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

ACC-3000 Autosampler Column Compartment	5830.0010
ACC-3000T Autosampler Column Compartment with Sample Thermostatting	5830.0020

Accessories

Sample Loop, 50 µL, ACC-3000 Autosampler Column Compartment	6830.2442
Syringe, 1000 µL, WPS-3000 and ACC-3000 Series	6822.0005
Sample Tray for 72 Cylindrical 0.3 mL Vials	6820.4091
Sample Tray for 40 Conical 1.1 mL Vials	6820.4087
Sample Tray for 72 Cylindrical 1.2 mL Vials	6820.4090
Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials	6820.4070
Sample Tray for 22 Cylindrical 4 mL Vials	6820.4084
Sample Tray for 10 Cylindrical 10 mL Vials	6820.4086
Sample Tray for 1.5 mL Eppendorf Tubes	6820.4094
Sample Tray for 0.5 mL Eppendorf Tubes	6820.4096
Transparent Front Cover	6820.1419

Semipreparative Autosampler

The UltiMate 3000 Semipreparative Autosampler WPS-3000(T)SL performs reliable, accurate, and precise injections in semipreparative LC applications at backpressures up to 62 MPa (9,000 psi). It is designed to deliver mL injection volumes while minimizing backpressure contributions. The in-line, split-loop injection principle and needle wash options virtually eliminate carryover.

- Robust, dependable performance with low operating and maintenance costs
- Injection volume range from 100–2500 µL (default) or 10–1000 µL (optional)
- Superior flow path design for flow rates up to 50 mL/min at low backpressures
- 66 × 4 mL or 45 × 10 mL vial formats for multiple large volume injections of the same sample
- Sample thermostatting for optimal protection of thermally sensitive analytes (WPS-3000TSL)

The Ultimate 3000 Semipreparative Autosampler is recommended for all semipreparative LC instrument configurations and is available in a non-thermostatted (WPS-3000SL) and thermostatted version (WPS-3000TSL).

Key Specifications

Sample Capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Well Plates: 3 × 24 deep, 96 and/or 384 normal or deep well plates, 3 × 384 low well plates 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes

Injection Method: in-line split-loop injections, bypass mode, user-defined programs

Injection Volume Range (Recommended): 0.01–2500 µL (100–2500 µL)

Injection Volume Accuracy: ±1% at 2000 µL

Injection Volume Precision: <0.3% RSD at 100 µL (typically <0.15% RSD), caffeine in water

Linearity: corr. coeff. >0.9995, RSD <1% at 100–2000 µL, caffeine in water

Needle Wash: active external

Carryover: <0.004% for caffeine with external wash at 7.5 MPa

Injection Cycle Time: <20 s for 100 µL

Sample Thermostatting: 4–45 °C or 22 °C below ambient

Sample Thermostatting Accuracy: ±2 °C

PC Connection: all functions controllable via USB; integrated USB hub with three USB 1.1 ports

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware

WPS-3000SL Semipreparative In-Line Split-Loop Autosampler 5822.0018

WPS-3000TSL Semipreparative In-Line Split-Loop Thermostatted Autosampler 5822.0028

Accessories

Injection Volume Kit, 1000 µL, WPS-3000SL Semipreparative 6820.2436

Sample Tray for 72 Cylindrical 0.3 mL Vials 6820.4091

Sample Tray for 40 Conical 1.1 mL Vials 6820.4087

Sample Tray for 72 Cylindrical 1.2 mL Vials 6820.4090

Sample Tray for 40 Cylindrical 1.8 mL/2.0 mL Vials 6820.4070

Sample Tray for 22 Cylindrical 4 mL Vials 6820.4084

Sample Tray for 10 Cylindrical 10 mL Vials 6820.4086

Sample Support Rack for Deep Well Plates 6820.4079

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Sample Support Rack for Deep Well Plates, 30-36 mm 6820.4083

Support Rack (Adapter) for Low Well PCR Plates, 8-12 mm 6820.4088

Sample Tray for 0.5 mL Eppendorf Tubes 6820.4096

Sample Tray for 1.5 Ml Eppendorf Tubes 6820.4094

Vial Pusher Adapter 6820.2402
(required for well plates)

Transparent Front Cover 6820.1419

LC Column Compartments



The UltiMate 3000 Thermostatted Column Compartment (TCC) offers precise temperature control under varying ambient conditions for standard as well as UHPLC applications. Easily accessible valves with operating pressure up to 1034 bar (15,000 psi) extend flexibility, and enable tandem and parallel operation, on-line sample preparation, and multidimensional chromatography.

- Column thermostatting for reliable LC at elevated, ambient, and subambient temperatures
- Freely-configurable switching valves for advanced column switching techniques
- User-interchangeable high-pressure switching valves for UHPLC compatiblity
- Capacity for up to 12 columns to facilitate automated method development
- Accomodates columns up to 30 cm length
- Short equilibration times for temperature step gradients and fast application switching
- Low-dispersion precolumn eluent heater for better peak shapes at elevated temperatures
- Homogeneous temperature distribution using a fan-based forced-air design
- AutoQ instrument qualification for method documentation and regulatory compliance

The UltiMate 3000 Thermostatted Column Compartment meets the requirements of any laboratory with a need to increase performance and productivity with temperature-sensitive applications. Run methods at temperatures from 5 up to 110 °C and pessures up to 1034 bar (15,000 psi), using x2 dual technology.

Note: *For more information on advanced column switching techniques, refer to the UHPLC+ Solutions section.*

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

UltiMate-3000 Thermostatted Column Compartment Data Sheet

ACC-3000 Autosampler Column Compartment Data Sheet

RSLC Thermostatted Column Compartment

The UltiMate 3000 Rapid Separation Thermostatted Column Compartment TCC-3000RS operates at temperatures up top 110° C precisely and accurately. Advantages of high column temperatures are reduced system backpressures and typically sharper peaks. Efficient precolumn heating and postcolumn cooling technology ensures the best chromatography under these challenging conditions.

- Wide temperature range; 5–110° C with excellent accuracy and precision
- Precise temperature control, even under varying ambient conditions
- Optional column switching valves in SST and PEEK
- Fast and easy installation of precolumn heater and postcolumn coolers using Viper fittings
- Postcolumn cooling assures lowest detector noise at high temperatures
- Fast heat up and cool down times
- Increase your laboratory performance and productivity with x2 Dual technology
- Column identification system for up to four columns

The TCC RS is highly flexible and supports up to 12 LC columns (depending on column dimensions) to lengths up to 30 cm. It can easily be upgraded with up to two integrated column switching valves, providing access to advanced column switching techniques. The TCS-3000RS meets the demands of ultrafast conventional LC applications even at high column temperatures

Note: *For more information on how you can benefit from advaanced column switching techniques, refer to the UHPLC+ Solutions section*

Key Specifications

Compartment Temperature Range: 5–110 °C or 18 °C below ambient

Compartment Temperature Accuracy: ±0.5 °C

Compartment Temperature Stability and Precision: ±0.1 °C

Compartment Heat-up and Cool-down Time: typically 12 min from 20 °C to 50 °C, typically 15 min from 50 °C to 20 °C

Postcolumn Cooler Temperature Range: 5–110 °C (settable)

Postcolumn Cooler Capacity: 40 °C below column chamber temperature, at 100 °C with water at 3 mL/min

Switching Valves (optional): one or two switching valves: 2-position 6-port, 2-position 10-port, or 6-position 7-port valves

Column Capacity: up to 12 columns (depending on column dimension), maximum column length 30 cm

PC Connection: all functions controlled via USB

I/O Interfaces: two digital inputs, two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Column Identification System, Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)

Additional Specifications: See data sheet

Ordering Information

The TCC-3000RS comes without preinstalled column switching valves. To add a switching valve to the TCC, a valve drive and a valve pod must be ordered separately depending on left- or right-side valve installation. A 2 µL pre-heater and a 2.2 µL postcolumn cooler insert are shipped with the TCC-3000RS.

Hardware

TCC-3000RS UltiMate 3000 Rapid Separation Thermostatted Column Compartment	5730.0000

Accessories

Valve Actuation Kit, HT Right Side, <1034 bar (15,000 psi)	6730.0001
Valve Actuation Kit, HT Left Side, <1034 bar (15,000 psi)	6730.0002
Valve Actuation Kit, HP Right Side, <413 bar (6000 psi)	6730.0003
Valve Actuation Kit, HP Left Side, <413 bar (6000 psi)	6730.0004
2-Position 6-Port HT Valve Pod, <1034 bar (15,000 psi)	6730.0006
2-Position 10-Port HT Valve Pod, <1034 bar (15,000)	6730.0026
2-Position 7-Port HT Valve Pod,<1034 bar (15,000 psi)	6730.0016
2-Position 6-Port HP Valve Pod,<413 bar (6000 psi)	6722.9013
2-Position 10-Port HP Valve Pod, <413 bar (6000 psi)	6722.9023
6-Position 7-Port HP Valve Pod, <413 bar (6000 psi)	6722.9035
2-Position 6-Port HP Valve Pod, Biocompatible, PEEK, <345 bar (5000 psi)	6723.9013
2-position 10-port HP Valve, Biocompatible, PEEK, <345 bar (5000 psi)	6723.9023
Precolumn Heater, 2 µL, Stainless Steel, with Viper fittings	6722.0530
Precolumn Heater 7 µL Stainless Steel, with Viper fittings	6722.0540
Precolumn Heater 11 µL, Stainless Steel, with Viper fittings	6722.0550
Precolumn Heater 2 µL, Biocompatible	6723.0232
Precolumn Heater, 7 µL, Biocompatible	6723.0242
Precolumn Heater 11 µL, Biocompatible	6723.0252
Postcolumn Cooler Insert with Viper Fittings, 2 µL	6730.0008
Column Identification Chip Cards, 5 pcs	6710.1505

Thermostatted Column Compartment

The UltiMate 3000 Thermostatted Column Compartment TCC-3000SD offers precise temperatures control up to 80 °C. A variety of optional installable switching valves operating at up to 1034 bar (15,000 psi) provides full UHPLC compatibility and access to advanced column switching techniques.

- Wide temperature range from 5 to 80 °C with excellent accuracy and precision
- Precise temperature control even under varying ambient conditions
- Fast heat-up/cool-down times
- Optional column switching valves in SST or PEEK
- Optional precolumn eluent heaters ensure optimal eluent thermostatting for better resolution
- Fast and easy installation of precolumn heaters with Viper fittings
- Increases laboratory productivity with advanced column switching techniques
- Column identification system for up to four columns

Very similar to the TCC-3000RS but with a temperature range of 5 to 80 °C, the TCC-3000SD Column Compartment is a cost effective choice for performing conventional HPLC and biochromatography separations, and provides access to ×2 Dual technology.

Note: For more information on ×2 Dual technology, refer to the UHPLC+ Solutions section.

Key Specifications

Compartment Temperature Range: 5–80 °C or 18 °C below ambient temperature

Compartment Temperature Accuracy: ±0.5 °C

Compartment Temperature Stability and Precision: ±0.1 °C

Compartment Heat-up and Cool-down Time: typically 12 min from 20 °C to 50 °C, typically 15 min from 50 °C to 20 °C

Switching Valves (optional): one or two switching valves: 2-position 6-port, 2-position 10-port, or 6-position 7-port valves

Column Capacity: up to 12 columns (depending on column dimension), maximum column length 30 cm

PC Connection: all functions controlled via USB

I/O Interfaces: two digital inputs, two relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

GLP Features: Column Identification System, Automatic Instrument Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon

Power Requirements: 100–120 V, 60 Hz; 200–240 V, 50 Hz

Dimensions (h × w × d): 19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)

Additional Specifications: See data sheet

Ordering Information

The TCC-3000SD comes without preinstalled column switching valves. To add a switching valve to the TCC, a valve drive and a valve pod must be ordered separately depending on left- or right-hand valve installation.

Hardware

TCC-3000 SD UltiMate 3000 Thermostatted Column Compartment	5730.0000

Accessories

Valve Actuation Kit, HT Right Side, <1034 bar (15,000 psi)	6730.0001
Valve Actuation Kit, HT Left Side, <1034 bar (15,000 psi)	6730.0002
Valve Actuation Kit HP, Right Side, <413 bar (6000 psi)	6730.0003
Valve Actuation Kit, HP Left Side, <413 bar (6000 psi)	6730.0004
2-Position 6-Port HT Valve Pod, <1034 bar (15,000 psi)	6730.0006
2-Position 10-Port HT Valve Pod, <1034 bar (15,000 psi)	6730.0026
6-Position 7-Port HT Valve Pod, <1034 bar (15,000 psi)	6730.0016
2-Position 6-Port HP Valve Pod, <413 bar (6000 psi),	6723.9013
2-Position 10-Port HP Valve Pod, <413 bar (6000 psi)	6722.9023
6-Position 7-Port HP Valve Pod, <413 bar (,000 psi)	6722.9035
2-Position 6-Port HP Valve, Biocompatible, PEEK <345 bar (5000 psi)	6722.9013
2-Position 10-Port HP Valve, Biocompatible, PEEK <345 bar (5000 psi)	6723.9023
Precolumn Heater, 2 µL Stainless Steel with Viper fittings	6722.0530
Precolumn Heater, 7 µL Stainless Steel with Viper fittings	6722.0540
Precolumn Heater, 11 µL Stainless Steel with Viper fittings	6722.0550
Precolumn Heater, 2 µL Biocompatible	6723.0232
Precolumn Heater, 7 µL Biocompatible	6723.0242
Precolumn Heater, 11 µL Biocompatible	6723.0252
Column Identification Chip Cards, 5 pcs.	6710.1505

Related Literature

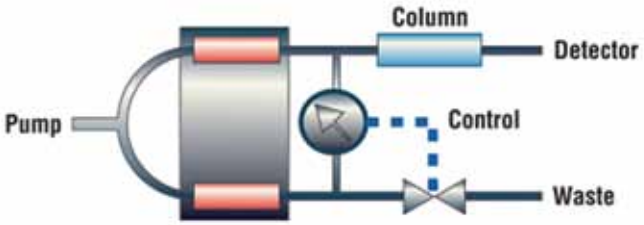
The following provides more information on this product and can be found in the Documents section at www.dionex.com.

Product Data Sheets

UltiMate 3000 Thermostatted Column Compartment Series

Ordering Information

LC Flow Managers



The UltiMate 3000 Flow Manager FLM-3000 series features UltiFlow active splitting technology for nano, capillary, and micro flow rates, and also integrates column thermostatting. It includes up to two low-dispersion switching valves for automated sample preparation and multidimensional LC applications and supports the use of up to three columns.

- Column thermostatting from 5 to 70 °C, (max. 15 °C below ambient temperature)
- Short warm-up/cool-down times for fast temperature stabilization
- Column capacity of up to three microcolumns (max length: 30 cm)
- UltiFlow technology for nano, capillary, and micro flow rates (50 nL/min-200 µL/min)
- Easy change of flow rate range (nano, cap, or micro) by exchanging the splitter cartridge
- Column thermostatting for reliable LC at nano, capillary, and micro flow rates
- Thermostatted microswitching valves for maximum application flexibility
- Biocompatible versions for high salt applications and/or delicate biomolecule analyses enables Proteomics MDLC solutions

UltiFlow splitting technology integrates proportioning and mixing of up to three eluents from a Quaternary or Dual-Gradient Micro Pump with actively controlled flow splitting to nano, capillary, or micro flow rates. This results in accurate and precise gradient formation, short gradient delay times, and smooth baselines.

Note: *For more details on the Quaternary or Dual-Gradient Micro Pumps, see the LC pump section.*

UltiMate 3000 Flow Manager FLM-3000 Series

The UltiMate 3000 Flow Manager FLM-3x00 includes up to two 2-position 10-port switching valves, which enable precon-centration 2D Salt Plug and Off-line 2D-LC. The Flow Manager features the UltiFlow eluent delivery system for nano, capillary, and micro flow rates, and is also available in a biocompatible version (FLM-3x00B).

- Column thermostatting from 5 to 70 °C
- Short warm-up/cool-down times for fast temperature stabilization
- Column capacity of up to three microcolumns (max length: 30 cm)
- UltiFlow technology for nano, capillary, and micro flow rates (50 nL/min–160 µL/min)

The UltiMate 3000 Flow Manager FLM-3x00(B) can be easily converted between nano, capillary, and micro flow rates by exchanging the flow splitter cartridge.

Note: *For more details on Proteomics MDLC 2-D Salt Plug and Proteomics MDLC Off-line 2D-LC, refer to the UHPLC+ Solutions section.*

Key Specifications

Temperature Range: 5 °C to 70 °C (max. 15 °C below ambient)

Temperature Accuracy: ±0.5 °C

Temperature Stability and Precision: ±0.1 °C

Heat-Up and Cool-Down Time: from 20 °C to 50 °C in <25 min, from 50 °C to 20 °C in <35 min

Switching Valves: up to two low-dispersion thermostatted 2-position/10-port micro valves; optional: 10-port biocompatible and 6-port nano valves

Column Capacity: Up to three columns, max. 30 cm length

Flow Splitter/Control: nano, capillary, or micro thermostatted splitter with splitter identification system

Flow Range Selection: 50–1000 nL/min (nano), 0.5–10 µL/min (capillary), 10 µL/min–200 µL/min (micro flow splitter)

Gradient Delay Time: Typically <1.5 min at 200 nL/min to splitter outlet

Maximum Column Pressure: 35 MPa (4900 psi)

I/O Interfaces: two digital inputs, two programmable relay outputs

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring (Power, Connected, Status), four soft keys

GLP Features: electronic identification system for three columns, automatic equipment qualification (AutoQ), system wellness monitoring with Chromeleon software

Power Requirements: 162 VA, automatic voltage selection

Dimensions (h × w × d): 17 × 42 × 51 cm (6.7 × 16.5 × 20 in)

Ordering Information

Hardware

FLM-3100 Nano UltiMate 3000 Nano Flow Manager with Two Integrated Motorized 2-Position 10-Port Switching Valves 5720.0010

FLM-3100 Cap UltiMate 3000 Cap Flow Manager with Two Integrated Motorized 2-Position 10-Port Switching Valves 5720.0015

FLM-3100 Micro UltiMate 3000 Micro Flow Manager with Two Integrated Motorized 2-Position 10-Port Switching Valves 5720.0018

FLM-3100B Nano UltiMate 3000 Biocompatible Nano Flow Manager with Two Integrated Motorized 2-Position 10-Port Switching Valves .. 5721.0010

FLM-3200 Nano UltiMate 3000 Nano Flow Manager with Two Integrated Motorized Switching Valves, 1x 2 Position, 10 Port, 1x 2 Position-6 Port 5720.0020

FLM-3200B Nano UltiMate 3000 Biocompatible Nano Flow Manager with One 2-Position 10-Port and One 2-Position 6-Port Integrated Motorized Swtiching Valve 5721.0020

FLM-3300 Nano UltiMate 3000 Nano Flow Manager with One Intergated Motorized 2-Position 10-Port Swtiching Valve 5720.0030

FLM-3300 Cap UltiMate 3000 Cap Flow Manager with One Intergated Motorized 2-Position 10-Port Swtiching Valve 5720.0035

FLM-3300 Micro UltiMate 3000 Micro Flow Manager with One Intergated Motorized 2-Position 10-Port Swtiching Valve 5720.0038

FLM-3300B Cap UltiMate 3000 Biocompatible Cap Flow Manager with One Intergated Motorized 2-Position 10-Port Swtiching Valve 5721.0035

Column Identification System with Chip Cards, 5 pcs 6710.1505

Optical LC Detectors



A full range of optical detectors is available for the UltiMate 3000 LC and LC/MS systems. Choose from diode array, multiple and variable wavelength UV-vis, fluorescence, or refractive index detectors according to your LC application needs. All data generated can be easily processed and reported using the powerful tools in the Chromeleon Chromatography Data Management System.

- Diode array detectors for peak characterization and aquistion of several UV-vis channels
- Multiple wavelength detectors for simultaneous detection of up to eight UV-vis wavelengths
- Multiple wavelength detectors can be upgraded to full DAD functionality
- Variable wavelength detectors offer flexibility for UV-vis applications in any laboratory
- Fluorescence detectors provide sensitive detection of fluorescing trace-level analytes
- The refractive index detector supports detection of analytes with limited UV absorption

High quality detector components, intelligent mechanical and electronic detector design, and rigorous quality assurance testing guarantee durable and reliable operation. AutoQ equipment qualification tests and predictive performance indicators simplify installation, qualification, and performance verification.

Related Literature

The following provides more information on this product and can be found in the Documents section at www.dionex.com.

Product Data Sheets

UltiMate 3000 Diode Array Detector

UltiMate 3000 Variable Wavelength Detectors

UltiMate 3000 Fluorescence Detectors

RI-101 Refractive Index Detectors

RSLC Diode Array Detector



The UltiMate 3000 Rapid Separation Diode Array Detector DAD-3000RS is the detector of choice if you need maximum flexibility in your laboratory. Data collection rates up to 200 Hz (8 channels plus 3D field simultaneously) and a wide choice of flow cells make the detector fully compatible with UHPLC, conventional HPLC, and semipreparative applications.

- Up to 200 Hz data rate on each channel for perfect integration of the narrowest peaks
- Low noise, wide slit (± 8 µAU and drift) (<1 mAU/h) for the lowest LODs and LOQs
- Full UV-vis spectra data aquisition even for 10 peaks separated in ten seconds
- Stainless steel and PEEK flow cells provide maximum application flexibility
- Front access to prealigned cells and lamps simplifies routine maintenance
- ID chips for tracking of lamp and cell parameters in audit trails

The UltiMate 3000 Rapid Separation Diode Array Detector DAD-3000RS features eight channels of single-wavelength data acquisition, a 1024 element diode array, and excellent noise and drift performance close to that of forward-optic detectors. The comprehensive set of 3D data tools in the Chromeleon Chromatography Data Management system makes it easy to process and report your data.

Note: *The DAD-3000RS is also available in a non-RS version (DAD-3000) with a data rate of up to 100 Hz for conventional LC methods.*

Key Specifications

Detection Type: Single-beam, reverse optics design with concave holographic grating

Maximum Data Collection Rate: 200 Hz: DAD-3000RS: (including 3-D aqusition under Chromeleon 7.1 software control; 100 Hz, DAD-3000: (including 3-D aquisistion)

Wavelength Range: 190–800 nm

Noise: Wide slit: <±8 µAU at 254 nm; Narrow slit:<±10 µAU at 254 nm; Response time: 2 s according to ASTM constant app. 1 s, 4 nm bandwidth, water at 1.0 mL/min

Drift: <1 mAU/h (typically <0.5 mAU/h) at 254 nm and 520 nm with water at 1.0 mL/min

Linearity: <3% RSD and corr. coeff. >0.9995 up to 1.5 AU, typically <2.5% RSD and corr. coeff. >0.999 up to 1.8 AU

Light Source: deuterium lamp, tungsten lamp, temperature control for both lamps

Wavelength Accuracy: ±1.0 nm, self-calibration with D-alpha line, verification with holmium oxide filter

Pixel Resolution: <1 nm

Slit Width: narrow or wide slit settable for the DAD-3000RS

PC Connection: All functions controllable via USB 2.0; integrated USB hub with three USB 2.0 ports

GLP Features: Automatic Equipment Qualification (AutoQ), System Wellness, and Qualification Monitoring with Chromeleon software, lamp, and cell ID chips

User Input/Display: LCD indicating system parameters, standby button, three LEDs for status monitoring, four function keys for initial operation and maintenance

Power Requirements: 85–260 V AC, 50/60 Hz, max. 150 W

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

The Diode Array Detector DAD-3000RS and DAD-3000 are shipped without flow cells. Flow cells must be ordered separately and according to your LC application requirements.

Hardware

DAD-3000RS Diode Array Detector (without flow cell)	5082.0020
DAD-3000 Diode Array Detector (without flow cell)	5082.0010

Accessories

D2-Lamp	6074.1110
VIS-Lamp (Tungsten)	6074.2000
Analytical flow cell SST, 13 µL volume, 10 mm path length	6082.0100
Semi-analytical flow cell SST, 5 µL volume, 7 mm path length	6082.0200
Semi-micro flow cell SST, 2.5 µL volume, 7 mm path length	6082.0300
Analytical flow cell, PEEK 13 µL volume, 10 mm path length	6082.0400
Semi-micro flow cell 2.5 µL volume, 7 mm path length	6082.0500
Semipreparative flow cell 0.7 µL volume, 0.4 mm path length	6082.0600

RSLC Multiple Wavelength Detector



The UltiMate 3000 Rapid Separation Multiple Wavelength Detector MWD-3000RS can operate up to eight UV-vis channels at up to 200 Hz simultaneously. A wide choice of flow cells is available for UHPLC, conventional HPLC, and semi-preparative applications. The detector is based on diode array technology and can be upgraded to acquire 3D UV-vis spectra.

- Up to 200 Hz data rate on each channel for perfect integration of the narrowest peaks
- Low noise, wide slit (<±8 µAU) and drift (<1 mAU/h) for the lowest LODs and LOQs
- Stainless steel and PEEK flow cells provide maximum application flexibility
- Front access to cells and lamps simplifies routine maintnenance
- ID chips for tracking lamp and cell parameters
- Upgrade to full DAD functionality available

Note: The Multiple Wavelength Detector is also available in a non-RS variant (MWD-3000) with a data rate of up to 100 Hz for optimum support of Ultimate 3000 Standard systems.

Key Specifications

Detection Type: Single-beam, reverse optics design with concave holographic grating

Maximum Data Collection Rate: MWD-3000RS: 200 Hz, (under Chromeleon 7 software control MWD-3000: 100 Hz

Wavelength Range: 190–800 nm

Noise: Wide slit: <+/-8 µAU at 254 nm, Narrow slit: <+/-10 µAU at 254 nm; Response time: 2s (according to ASTM rime constant app. 1 s.) 4 nm bandwidth (water at 1.0 mL/min)

Drift: <1 mAU/h (typically <0.5 mAU/h) at 254 nm, deionized water at 1.0 mL/min

Linearity: <3% RSD and corr. coeff. >0.9995 up to 1.5 AU, typically <2.5% RSD and corr. coeff. >0.999 up to 1 .8 AU

Light Source: deuterium lamp, tungsten lamp, temperature control for both lamps

Wavelength Accuracy: ±1.0 nm, self calibration with D-alpha line, verification with holmium oxide filter

Pixel Resolution: <1 nm

Slit Width: Narrow or wide slit, settable for the MWD-3000RS

PC Connection: All functions controllable by USB 2.0; integrated USB hub with three USB 2.0 ports

GLP Features: Automatic Equipment Qualification (AutoQ), System Wellness Monitoring with Chromeleon software, lamp and cell ID chips

User Input Display: LCD indicating system parameters, standby button LEDs for status monitoring four function keys for initial operation and maintenance

Power Requirements: 85–260 V AC, 50/60 Hz, max. 150 W

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)

Ordering Information

The Multiple Wavelength Detector MWD-3000RS and MWD-3000 are shipped without flow cells. Flow cells must be ordered separately and according to your LC application requirements.

Hardware

MWD-3000RS Rapid Separation Multiple Wavelength Detector (without Flow Cell)	5082.0040
MWD-3000 Multiple Wavelength Detector (without Flow Cell)	5082.0030

Accessories

Deuterium lamp	6074.1110
Tungsten lamp	6074.2000
Analytical flow cell SST, 13 µL volume, 10 mm path length	6082.0100
Semi-analytical flow cell SST, 5 µL volume, 7 mm path length	6082.0200
Semi-micro flow cell SST, 2.5 µL volume, 7 mm path length	6082.0300
Analytical flow cell, PEEK 13 µL volume, 10 mm path length	6082.0400
Semi-micro flow cell, PEEK, 2.5 µL volume, 7 mm path length	6082.0500
Semipreparative flow cell, PEEK, 0.7 µL volume, 0.4 mm path length	6082.0600

RSLC Variable Wavelength Detector



The UltiMate 3000 Rapid Separation Variable Wavelength Detector VWD-3400RS offers the best noise and linearity specifications, providing data collection rates up to 200 Hz for optimal support of today's UHPLC separations. A wide range of flow cells cover nano to semipreparative flow rate requirements.

- Superior detection of trace analyties with low noise (±3.5 µAU) and drift (<0.1 mAU/h)
- Large linearity range (up to 2.5 AU) ideal for widely varying analyte concentrations
- Up to four absorption channels (VWD-3400RS only) and spectral scans for method development
- Quick and easy exchange of lamps and flow cells by ergonomic front panel access

The VWD-3400RS Rapid Separation Variable Wavelength Detector is ideal for any single UV-vis detection challenge. Various flow cell sizes are available in SST, PEEK, and fused silica. Full regulatory compliance is achieved with detailed information tracking and automated qualification monitoring.

Note: *The VWD-3400RS is also available in a non-RS version (VWD-3100) with up to 100 Hz data collection rate for optimum support of UltiMate 3000 Standard systems.*

Key Specifications

Data Collection Rate: single wavelength up to 100 Hz *(VWD-3100)*; single wavelength up to 200 Hz *(VWD-3400RS)*; multiple wavelength up to 5 Hz

Noise, Single Wavelength: < ±3.5 µAU (typical ±2.5 µAU) at 254 nm, time constant 1s, dry analytical flow cell

Noise, Multiple Wavelength: ±10 µAU (typical ±7 µAU) at 254 and 280 nm, time constant 1s, dry analytical flow cell

Drift: <1 × 10-4 AU/Hr; dry analytical cell

Linearity: <5% RSD (typically <3% RSD) at 2.5 AU (caffeine), wavelength: 272 nm based on ASTM

Light Source: deuterium lamp, tungsten lamp, (tungsten lamp optional on VWD-3100); temperature control for both lamps

Wavelength Range: 190 nm; tungsten lamp is recommened for wavelengths >600 nm

Wavelength Accuracy: ±1 nm at over lifetime of the detector

Wavelength Repeatability: ±1 nm

Optical Bandwidth: 6 nm at 254 nm

I/O Interfaces: four digital inputs and outputs

Analog Output: Two analog outputs available as a option with DAC plug-in module. Software selectable absorbance, 20-bit resolution, 0-1V (full range and 0-10 V full range with adjustable mAU ranges

Power Requirements: 85-260 V, 50/60 Hz, max 150 W Wide range (automatic voltage selection)

Dimensions (h × w × d): 16 × 42 × 51 cm (6.3 × 16.3 × 20 in.)

Ordering Information

The Variable Wavelength Detectors VWD-3400RS and VWD-3100 are shipped without flow cells, which must be ordered separately based on your LC application. For multiple wavelength detection in routine analysis, consider the multiple wavelength detector MWD-3000(RS) or diode array detector DAD-3000(RS).

Hardware

VWD-3400RS Rapid Separation Variable Wavelength Detector (without Flow Cell) 5074.0010
VWD-3100 Variable Wavelength Detector (without Flow Cell) 5074.0005

Accessories

Deuterium Lamp 6074.1110
Tungsten Lamp 6074.2000
Analytical Flow Cell, PEEK, 11 µL Volume, 10 mm Path Length 6074.0200
Analytical Flow Cell, SST, 11 µL Volume, 10 mm Path Length 6074.0250
Semi-micro flow cell, SST, 2.5 µL volume, 7 mm Path Length 6074.0360
Analytical flow cell, PEEK, 11 µL Volume, 10 mm Path Length 6074.0200
Semi-micro flow cell, PEEK, 2.5 µL Volume, 7 mm Path Length 6074.0300
Semipreparative flow cell PEEK, 0.7 µL Volume, 0.4 mm Path Length .. 6074.0320
UZ-View flow cell, Nano 3 nL Volume, 10 mm Path Length 6074.0270
UZ-View flow cell Cap 45 nL Volume, 10 mm Path Length 6074.0280
UZ-View flow cell, Micro, 180 nL Volume, 10 mm Path Length, ... 6074.0290
Analog Output Board 6074.0305

Fluorescence Detector



The multi-channel UltiMate 3000 Rapid Separation Fluorescence Detector FLD-3400RS offers unrivaled performance, reliability, and ease of use. With data collection rates up to 200 Hz in single-channel mode, the detector is ideal for RSLC applications. The detector is also available as a 100 Hz, single-channel version (FLD-3100).

- Unique optical design for extra low light scatter and superior signal-to-noise performance
- Data collection rates of up to 200 Hz allow detection of even the sharpest peaks
- Single or multi-signal detection of up to four different excitation and emission wavelengths (FLD-3400RS)
- Thermostatted Flow Cell for extraordinary baseline stability and reproducibility
- Unique Dual-PMT option for extended wavelength range without sacrifice sensitivity in the UV wavelength range
- Spectrum scanning functionality for analyte characterization
- Variable emmision filter for compound-related sensitivity optimization (FLD-3400RS only)
- Cost-effective accessory for performing off-line measurements

Two flow cell sizes are available for easy optimization of application requirements. The 8 µL flow cell is ideal for trace analysis, while the 2 µL cell offers the best peak resolution with narrowbore HPLC and UHPLC columns

Key Specifications

Light Source: Xenon flash lamp

Lamp Pulse Frequency: High (~300 Hz); Standard (~100 Hz); Long life (~20 Hz)

Data Collection Rate: single wavelength: up to 200 Hz (FLD-3400RS under Chromeleon 7.1 control) up to 100 Hz (FLD-3100) multiple wavelength: Up to 4 Hz (FLD-3400RS)

Spectral Scanning Modes: Permanent spectra acquisition, stop/continuous-flow excitation/emission synchronous scans

Wavelength Range (Single PMT): Excitation 200-630 nm, emission 220–650 (FLD-3400RS) or 265–650 nm (FLD-3100)

Wavelength Range (Dual PMT): Excitation 200-880 nm, emission 200–900 nm (FLD-3400RS) or 265–900 (FLD-3100)

Emission Filter: Variable, 5 positions (FLD-3400RS) Fixed; 280 nm (FLD-3100)

Spectral Bandwidth: excitation: 20 nm, emission: 20 nm

Number of Fluorescence Channels: (FLD-3400RS) Up to four (FLD-3100): One

Excitiation/Emmision Wavelength Switching Time: <250 ms

Wavelength Accuracy: ±2 nm

Wavelength Repeatability: ±2 nm

Sensitivity: Raman S/N: >550 ASTM over the entire lifetime of the lamp (>2100 using dark signal as noise reference)

Flow Cell Thermostatting: Ambient + 15 °C to 50 °C

Flow Cells : Analytical Flow Cell: volume: 8 µL, maximum cell presure: 20 bar (290 psi), Micro Cell: volume: 2 µL, maximum cell presure: 40 bar (580 psi)

Ordering Information

Hardware	
FLD-3100 UltiMate 3000 Fluorescence Detector (without Flow Cell)	5078.0010
FLD-3100 UltiMate 3000 Fluorescence Detector with Dual-PMT (without Flow Cell)	5078.0015
FLD-3400RS UltiMate 3000 Rapid Separation Fluorescence Detector (without Flow Cell)	5078.0020
FLD-3400RS UltiMate 3000 Rapid Separation Fluorescence Detector with Dual-PMT (without Flow Cell)	5078.0025

Accessories	
Analytical Flow Cell, 8 µL, SST	6078.4230
Micro Flow Cell , 2 µL, SST	6078.4330
Dual PMT option	6078.5360
Flow Cell Syringe Injection kit	6078.4200

Refractive Index Detector



The Refractive Index Detector RI-101 is a simple detector for isocratically eluted analytes with limited or no UV absorption such as alcohols, sugars, carbohydrates, fatty acids, and polymers. Good trace detection performance is assured, with noise below 2.5 nRIU. An optimized temperature control system ensures fast baseline stabilization after system startup.

- Innovative, sophisticated temperature control for fast startup (less than 40 min)
- Built-in startup sequence with automated purging and control of baseline stability and noise
- AutoQ validation functions for time savings and easy validation
- Operation with Chromeleon software for maximum productivity

The Refractive Index Detector provides ease of use with a start-up sequence that automates purging, equilibration, autozero, and control of baseline stability and noise. In addition, a full-color, liquid-crystal display provides fast access to instrument settings and performance parameters, and shows an on-line signal.

Key Specifications

Measuring Method: deflection type

Refractive Index Range: 1.00–1.75

Measuring Range: 1/4–512 µRIU

Linearity Range: 600 µRIU

Noise Level: less than 2.5 nRIU, response: 1.5 s

Flow Cell: 8 µL; 0.05 MPa (7.5 psi) pressure maximum

Dead Volume: less than 600 µL

Maximum Flow Rate: 10 mL/min with water

Temperature Control: 30–50 °C in 1 °C steps

Analog Outputs: integrator, 0–1 V; recorder, 0–10 mV

Contact Closure Inputs: Autozero, Marker, Polarity, Purge on/off

Contact Closure Outputs: Ready, Solvent leak, Error

PC Communication: RS-232

Power Consumption: 150 VA Max.

Dimensions (h × w × d): 26 × 20 × 40 cm (10.1 × 7.8 × 15.6 in.)

Ordering Information

Hardware	
RI-101 Refractive Index Detector including Flow Cell (8 µL)	5060.0030

Charged Aerosol Detectors



Charged Aerosol Detection (CAD) provides near universal detection independent of chemical structure for non- or semi-volatile analytes. The Corona Charged Aerosol detectors is ideal as a primary detector for providing data complementary to UV or MS. No other detector available today can match the performance of CAD.

- High sensitivity
- Response independent of chemical structure
- Wide dynamic range
- Ease of use
- Easy integration with any HPLC and UHPLC system

The Corona family has the flexibility and performance required for analytical R&D and the simplicity and reproducibility needed for manufacturing QC/QA. It can be used for almost any analysis in pharmaceuticals, biofuels, food and beverages, specialty chemicals, and counterions; and for a range of applications from basic research to quality control.

Corona *ultra* Detector



The Corona *ultra* brings Charged Aerosol Detection to UHPLC, delivering the speed and resolution of UHPLC to any nonvolatile or semivolatile analyte—with or without a chromophore—for performance no other detector can provide:

- Nanogram to picogram sensitivity
- Response independent of chemical structure
- Wide dynamic range
- Ease of use
- Compatibility with UHPLC/RSLC
- Easily integrates with any HPLC system

The Corona *ultra* Detector has the flexibility to operate with standard HPLC or UHPLC, with no modifications necessary. From analytical development to production, the Corona *ultra* Detector brings a high level of reliability to any analysis.

Note: *A nitrogen generator (70-6003) is recommended with every Corona detector.*

Key Specifications

Operating Mode: Charged Aerosol Detection

Mobile Phase Flow Rate: 0.2 mL/min to 2 mL/min

Full Scale Output Range: 1 pA to 500 pA in 1-2-5 sequence

Noise Specification: <750 fA peak to peak (20% methanol/ 80% water)

Signal Output: 0 V to 1 V DC

Output Resolution: 0.12 µV at 1 V full scale

Maximum Sampling Rate: 100 Hz

Nebulizer Settable Temperature Range: 5 °C to 35 °C

Temperature Stability: < ± 0.5 °C

Interface: Integrated touch screen

Power: 100–120 V, 60 Hz; 230–240 V, 50 Hz; 100 VA

Gas: air or nitrogen; must not contain volatile hydrocarbons (e.g. compressor oil), particulates, or water vapor

Input Gas Pressure: 60 psi (4.14 bar)

Operating Gas Flow: approximately 4 L/min

Dimensions and Weight: 43 × 36 × 20 cm (17 × 14 × 8 in); 11.4 kg (25 lbs)

Ordering Information

The Corona *ultra* Detector comes complete with accessories.

Hardware

Corona *ultra* Charged Aerosol Detector with UHPLC capability—includes: detector module, accessory kit, signal cable, I/O control cable, fittings, filters, drain/vent tubing, waste bottle and cap, exhaust hose, test standard, and manual 70-9298

Accessories

Nitrogen Generator for Corona Detectors benchtop. Provides high-purity nitrogen (+99%) from 60-125 psig with maximum flow of 4 L/min. Installation kit included. Requires compressed air inlet (95-145 psig) 70-6003

Corona CAD Detector



The Corona CAD detects any nonvolatile or semivolatile analyte, with or without a chromophore. Based on a unique, innovative detection technology, the Corona CAD Detector offers performance that refractive index (RI), low-wavelength UV, evaporative light scattering (ELS) detectors simply cannot match.

- Nanogram sensitivity
- Gradient compatibility
- Wide dynamic range: a range that exceeds four orders of magnitude
- Consistent, reproducible performance with excellent precision
- Complementary and orthogonal data to that of UV and MS
- More consistent response: less dependant on chemical structure than other detectors
- Broad applicability: measure virtually any nonvolatile or semivolatile analyte

The Corona CAD is highly versatile, allowing easy integration with existing instrumentation to support a wide range of information-rich applications from pharmaceuticals, lipids, proteins, carbohydrates, counterions, oligosaccharides to polymers, and surfactants.

Key Specifications

Operating Mode: charged aerosol detection

Mobile Phase Flow Rate: 0.2 mL/min to 2 mL/min

Full Scale Output Range: 1 pA to 470 pA

Filter Time Constants: none, low, medium, high

Signal Output: 0–1 V DC

Output Resolution: 0.12 V at 1 V full scale (24 bit bipolar)

Function Keys: Autozero, Event marker, Gas On/Off

Remote Control: via USB or RS232

Method Storage: Up to 25 methods

Programmable Events: Gas (on/off), Set Output Contact Closures (4), Autozero, Filter, Marker, Current Range, Hold, Loop, Reset Parameters

Power: 100–20 V, 60 Hz; 230–240 V, 50Hz, 100 VA

Gas: air or nitrogen (nitrogen is recomended)

Operating Gas Pressure: 35 psi (2.4 bar)

Operating Gas Flow: Up to 5 L/min

Dimensions and Weight: 52.5 × 23 × 28.6 cm (20.5 × 9 × 11.25 in): 10 kg (22 lbs)

Ordering Information

The Corona CAD comes complete with accessories.

Hardware

Corona CAD Charged Aerosol Detector with Accessories
(100/240 VAC — Includes: Detector module, signal cable, I/O control cable, fittings, filters, drain/vent tubing, waste bottle and cap, exhaust hose, test standard kit and instruction manual..... 70-9116

Accessories

Nitrogen Generator for Corona CAD detector, benchtop. Provides high-purity nitrogen (+99%) from 60 to 125 psig with maximum flow of 4 L/min. Installation kit included. Requires compressed air inlet (95-145 psig) 70-6003

Note: The nitrogen generator (70-6003) is recommended for the Corona CAD detector. For more information please contact your local sales representative.

Gas Conditioning Module, in-line, for use at pressure inlet to Corona CAD detector — Includes: in-line high precision gas pressure regulator, particle filter (0.01 um) and moisture trap..... 70-8285

The gas conditioning module (70-8285) is an option for the Corona CAD detector.

Electrochemical Detectors



Electrochemical detection is the most sensitive, selective mode of HPLC detection for the measurement of oxidizable or reducible compounds. Dionex high-performance Electrochemical detectors offer the widest range of advanced amperometric and coulometric detection optimized to ensure robust, reliable, and reproducible results.

- Sensitive
- Selective
- Stable
- Flexible
- Unique cell designs

Coulochem III Electrochemical Detector



The Coulochem III Detector is ideally suited for high-sensitivity analyses in coulometric or amperometric mode. This HPLC/UHPLC detector is the Gold Standard for neuroscience applications.

- Sensitivity: routinely to femtogram levels
- Stability: temperature control option ensures reproducible measurements day after day
- Reliable trouble-free operation: easy to implement, easy to learn, easy to use

The most sensitive, sophisticated HPLC electrochemical detector available, the Coulochem III comes with a choice of cell designs and is ideal for use in methods development or for routine applications requiring high sensitivity detection.

Note: *Choose from a wide selection of cells for your specific application.*

Key Specifications

Detector Configuration: DC potentiostat for 1 or 2 electrodes and/or Scan Mode/Pulse Mode; potentiostat for guard cell

Operating Modes: DC, Pulse, Scan

Potential Range: ± 2000 mV in 1 mV steps

Full Scale Current Range: 10 pA to 1 mA in 1-2-5 sequence (DC mode)

Filter Time Constants: 0.2 to 10 seconds in 1-2-5 sequence (DC mode)

Output Noise: <750 fA (0.75 pA) with a 500 MΩ, 0.47 µF test load and a 2 second filter (DC Mode)

Signal Output: ± 100 mV; ± 1 V

Function Keys: Autozero, Event Marker, Cell On/Off, Run/Stop

USB, RS-232C Interface Capability: full parametric instrument control of DC and Pulse

Method Storage: up to 25 methods (any combination of DC, Scan, Pulse, and Time line)

Output Resolution: 24 bit bipolar

Guard Cell Potentials: ± 200 mV in 1 mV steps

Coulochem Module: Dimensions and Weight: 28.6 × 23 × 49.5 cm (11.25 × 9 × 19.5 in); 6.7 kg (14.8 lbs) Detector only

Power: 100–120 V, 60 Hz; 230–240 V, 50 Hz

Certifications: UL, CSA, CE

Ordering Information

Dionex has the most extensive selection of unique electrochemical cells optimized for a variety of applications.

Hardware

Coulochem III DC Detector — Includes: Detector with dual-channel DC module, two analog output cables, guard/conditioning cell cable, guard cell test load, analytical cell test load, logic module-to-accessory cable and accessory kit. 70-9143

Coulochem III Pulse/Scan Detector — Includes: Detector with pulse/scan module, analog output cable, guard/conditioning cell cable, guard cell test load, analytical cell test load, logic module-to-accessory cable and accessory kit. 70-9138

Coulochem III DC and Pulse/Scan Detector — Includes: Detector with DC and Pulse/Scan modules, two analog output cables, guard/conditioning cell cable, guard cell test load, analytical cell test load, logic module-to-accessory cable and accessory kit. 70-9141

Accessories

Coulochem III Organizer Module; designed to fit securely on top of the detector or sit on the bench. Pulse damper and manual injector can be conveniently mounted in the organizer. 70-9208

Enclosed protection for EC cells, tubing, filters injector, columns, and in-line filters.

Thermal Organizer Module with Accessories 70-9121TA

Model 5010A Improved Standard Analytical Cell, Dual-Channel 70-5560

Model 5011A High Sensitivity Analytical Cell 70-5561

Model 5014B Microdialysis Cell, Dual-Channel 70-0520B

Model 5125 Synthesis Cell; for analytical scale electrochemical synthesis of ng to µg quantitites 70-7700

Model 5020 Guard Cell; for pre-injector location only 55-0417

Model 5021A Conditioning Cell 70-6068

Model 5030 Electrochemical Cell — Includes cell, cable, PEEK microfilter assembly and high-voltage ground decoupler kit. 70-6069

Model 5150 Synthesis Cell — For semipreparative scale electrochemical synthesis of µg quantitites 70-7701

Model 5040 Cell with Boron-Doped Diamond electrode — For Coulochem III. 70-7900

Model 5041 Amperometric Analytical Cell with Accessories, no Target .. 70-1985

Model 5041 Enhanced Amperometric Cell Kit for Coulochem 70-4131

Model 5040 Cell with Gold Target and Accessories 55-0185

Model 5040 Cell with Platinum Target and Accessories 70-1074

Model 5040 Cell with Silver Target and Accessories 70-1076

Model 6011 *ultra* Coulometric Analytical cell for UHPLC 70-8711

CoulArray Multi-Channel EC Detector



Multi-array electrochemical detection produces qualitative information for compound identification, resolves coeluting peaks, determines peak purity; simplifies sample preparation, and measures multiple analytes per sample.

- Unparalleled selectivity to femtomole levels
- Simultaneously analyze multiple analytes or a single analyte in a very complex sample
- Software provides analysis and identification of single or multiple analytes and patterns
- Widest dynamic range of any commercial electrochemical detector
- Measurers analytes from femtomole to micromole levels with autoranging
- The only high sensitivity ECD that can be used with the most aggressive gradients
- Multiple system configurations (upgradeable 4, 8, 12, or 16 channel options)
- Easy to implement, easy to learn, easy to operate, easy to maintain

The only practical multi-channel electrochemical detector that allows you to measure multiple analytes simultaneously, including those that are chromatographically unresolved. The CoulArray Detector delivers unmatched selectivity for detection of trace components in complex matrixes, even in the presence of coeluting molecules.

Note: *The CoulArray Detector comes complete with a 6210 Array cell for every 4-channel increment*

Key Specifications

Number of Electrodes: Choice of 4, 8, 12, or 16 coulometric electrodes

Potential Range: Independent potential control for each electrode from -1V to +2V in 1mV increments

Current Ranges: ± 50 nA, ± 5 µA, ± 100 µA autoranged; full scale for each electrode, displayed from 10 pA to 100 µA

Acquisition Rate: Selectable: 2 or 10 Hz

Autozero: Up to 6 µA on the 50 µA and 5 µA scale and 100 µA on the 100 µA scale

Output Noise: < 5 pA peak to peak (10 MΩ, 2 µF, low filter setting)

Output Resolution: 30 fA on 50 nA gain range: 3 pA on 5 µA gain range, and 47 pA on 100 µA gain range

Power: 100–120 V, 60 Hz; 230–240 V, 50 Hz; 36 VA

External Start Inputs: 2

Operating Temperature Range (Instrument): -10 °C to 35 °C

Operating Temperature Range (Cells): -10 °C to 45 °C

Dimensions and Weight: Detector: 44.5 × 26 × 46.2 cm (17.5 × 10.25 × 18.3 in); 12 kg (26 lbs)

Dimensions and Weight: Organizer: 44.5 × 26 × 44.2 cm (17.5 × 10.25 × 17.4 in); 6.8 kg (15 lbs)

Certifications: UL, CSA, CE

Ordering Information

Choose a thermostatically controlled or ambient temperature organizer module.

Hardware

Model 5600A CoulArray Detector, 4-channel — Includes: Detector control module, 4-ch Array Cell, Windows Computer System, LCD Monitor and Color Ink Jet Printer, CoulArray for Windows software, CoulArray to PC cable and CoulArray Accessory Kit..... 70-4320

Model 5600 CoulArray Detector, 8-Channel — Includes: Detector control module, 2- 4-channel Array Cells, Windows Computer System, LCD Monitor & Color Ink Jet Printer, CoulArray for Windows software, CoulArray to PC cable & CoulArray Accessory Kit, PEEK prefilter kits and PEEK tubing for inert connection to an HPLC system. 70-4325

CoulArray Detector, 12-channel..... 70-4330

Model 5600 CoulArray Detector, 16-Channel — Includes: Detector control module, (4) 4-channel Array Cells, Windows Computer System, LCD Monitor & Color Ink Jet Printer, CoulArray for Windows software, CoulArray to PC cable & CoulArray Accessory Kit, PEEK prefilter kits and PEEK tubing for inert connection to an HPLC system. 70-4335

Includes computer, printer and CoulArray for Windows software

Accessories

CoulArray Organizer Module: Enclosure with integrated drip control system for organizing coulometric array cells*, pre-filters, columns*, manual injection valve*, PEEK pulse damper* and biocompatible gradient mixer* (*items not included)..... 70-4340

CoulArray Thermal Organizer Module — Temperature controlled enclosure for organizing and maintaining constant temperature (range: ambient +5 to 45C) for coulometric array cells*, pre-filters, columns*, manual injection valve*, PEEK pulse damper,* and biocompatible gradient mixer* (*items not included)..... 70-4340T

Model 6210 4-Channel Cell for 5500/5600 Series Detectors 55-0685E

Included for each 4-channel increment purchased with CoulArray detector

The CoulArray detector includes detector module, computer, CoulArray for Windows software and color printer

Electrochemical Cells



From coulometric to amperometric, to specialty cells (synthesis, boron-doped diamond, UHPLC), Dionex has electrochemical cells for a variety of applications.

- Application specific cells
- Coulometric cells
- Amperometric cells
- Solid-state reference electrode
- Unrivaled stability and performance
- Cells appropriate for HPLC and UHPLC
- Select the appropriate cell for your detector and application.

Key Specifications

Amperometric Analytical Cells: Available working electrodes include: glassy carbon, gold, silver, platinum, and boron-doped diamond

Coulometric Analytical Cells: Available in dual- or multi-channel array with porous graphite working electodes and solid-state reference.

Application-Specific Cells: 5014B cell is designed for analysis of in-vivo microdialysis perfusates in neuroscience research

Special Use Coulometric Cells: 5020 Guard Cell removes mobile phase impurities, 5021A Conditioning Cell enhances redox capabilities

Synthesis Cells: These reactor cells may be used with (EC-MS) for assisted ionization, compound stability studies, metabolic prediction and micro-synthesis.

Ordering Information

Accessories	
Model 6011 *ultra* Coulometric Analytical Cell for UHPLC	70-8711
Model 5010A Improved Standard Analytical Cell, Dual-Channel	70-5560
Model 5011A High Sensitivity Analytical Cell	70-5561
Model 5014B Microdialysis Cell, Dual-Channel	70-0520B
ESA Model 5020 Guard Cell — for pre-injector location only	55-0417
Model 5021A Conditioning Cell	70-6068
Model 5030 Electrochemical Cell (Includes cell, cable, PEEK microfilter assembly and high-voltage ground decoupler kit)	70-6069
Model 5125 Synthesis Cell-for analytical-scale electrochemical synthesis of µg to ng levels *minimizes over-oxidation reactions*	70-7700
Model 5150 Synthesis Cell — for semipreparative scale electrochemical synthesis of µg quantities	70-7701
Model 5041 Enhanced Amperometric Cell Kit for Coulochem	70-4131
Model 5040 Cell with Gold Target and Accessories	55-0185
Model 5040 Cell with Silver Target and Accessories	70-1076
Model 5041 Amperometric Analytical Cell with Accessories, (no Target)	70-1985
Model 5040 Cell with BDD Kit for CoulArray	70-8055
Model 5040 Cell with Boron-Doped Diamond Electrode (for Coulochem 3)	70-7900
Glassy Electrode Carbon/Ceramic Target for 5040 or 5041 cell	70-2000
Target Electrode Gold/Ceramic for 5040 or 5041 cell	70-2134
Target Electrode Platinum/Ceramic for 5040 or 5041 cell	70-2135
Target Electrode Silver/Ceramic for 5040 or 5041 celll	70-0096
Target Electrode Polishing Kit for Model 5040/5041 cells	55-0181

Fraction Collection

Dionex provides the right solution for your fraction collection needs with easy-to-use fraction collection devices for a wide variety of LC applications, such as multidimensional LC, MALDI target spotting for MALDI-MS analyses, as well as analytical or semipreparative LC separations.

- WPS-3000 microfraction collection option for automated off-line multidimensional LC
- Probot MALDI spotter for on-line µL to nL fraction collection
- The AFC-3000 Automated Fraction Collector for preparative reversed-phase or normal-phase HPLC
- Flexibility with comprehensive Chromeleon fraction collection capabilities

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Probot Microfraction Collector Brochure

Product Data Sheets

UltiMate 3000 Autosampler Series

Application Notes

AN 530: Proteome Analysis Involving Off-Line 2D-LC of Intact Proteins, Proteolytic Digestion, and Capillary RP-LC-MS/MS Analysis Using Monolithic PS-DVB Columns

AN 526: PS-DVB Monolithic Columns Applied in an Off-Line 2D-LC/ESI-MS Bottom-Up Study for the Identification of Platelet Proteins

Autosampler and Fraction Collector



The UltiMate 3000 Autosampler and Fraction Collector WPS-3000FC features a diverter valve to allow injection, fractionation, and re-injection at micro and analytical flow rates. This autosampler extends the flexibility of 2D workflows and allows fraction collection in combination with ×2 Dual pumps.

- Analytical-scale injector and fraction collector
- Heating and cooling of samples and fractions
- Automation of multistep and multidimensional LC analysis
- Sample derivatization
- Based on WPS-3000PL, same injection performance specifications
- Inert PEEK flow path (biocompatible version)
- Up to 1100 sample and fraction positions

Combined with the Extended Fraction Collection capabilities of the Chromeleon Chromatography Data Management system, setup, system control, reviewing, and data reporting are straightforward and easily performed.

Note: *For more details on the µFC option and the UltiMate 3000 Proteomics MDLC system, refer to the UHPLC+Solutions section.*

Key Specifications

Sample capacity, Vials: 216 × 0.3 mL, 120 × 1.1 mL (conical), 216 × 1.2 mL, 120 × 1.8 mL/2.0 mL or Eppendorf tubes, 66 × 4 mL, and/or 30 × 10 mL + 15 × 10 mL

Sample Capacity, Well Plates: 3 × 96 and/or 384 normal or deep well plates

Injection Methods: pulled-loop injections (full-loop and partial loop mode), low-dispersion mode, Microliter Pickup, user-defined programs

Injection Volume Range (Recommended): 0.01–250 µL (0.1–250 µL)

Minimum Sample Required: 1 µL out of 1 µL (microliter pickup)

Injection Volume Precision: <0.25% RSD at 5 µL in full-loop and <0.3% RSD at 5 and 20 µL in partial-loop mode

Linearity: corr. coeff. >0.9999, RSD <0.5% at 5–30 µL (partial loop mode), caffeine in water

Needle Wash: active external

Carryover: <0.02% for caffeine with external wash

Injection Cycle Time: <60 s for 5 µL full-loop injection, <90 s for 5 µL partial-loop injection

Sample and Fraction Thermostatting: 4–45 °C, or 22 °C below ambient temperature

Thermostating Temperature Accuracy: ± 2 °C

PC Connection: all functions controllable via USB

Dimensions (h × w × d): 36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)

Ordering Information

Hardware parts listed below are needed to upgrade the WPS-3000(T)PL Autosamplers in exisiting UltiMate 3000 Nano/Capillary/Micro system configurations. For information on fraction collection control and automation features in Chromeleon Chromatography Software, contact your local Dionex representative.

Hardware

WPS-3000TFC, UltiMate 3000 Thermostatted Pulled-Loop Well Plate Autosampler with Integrated Fraction Collection 5824.0020

WPS-3000TBFC- UltiMate 3000 Thermostatted Biocompatible Pulled-Loop Well Plate Autosampler with Integrated Fraction Collection 5825.0020

WPS-3000PL Micro Fraction Collection Option, Biocompatible 6821.0051

Accessories

15 µL Needle, Stainless Steel 6820.3115

1 µL Sample Loop, PEEKsil, WPS-3000PL 6820.0015

WPS-3000PL Micro Fraction Collection Option, Biocompatible 6821.0051

Automated Fraction Collector



The AFC-3000 Automated Fraction Collector, a rugged and flexible fraction collector, is ideal for preparative reversed-phase or normal-phase HPLC as well as purification of proteins, peptides, and nucleotides. It collects fractions into an industry-leading variety of vessels, such as 96 well plates, standard vial and tube sizes, and bottles.

- Rugged and easy-to-use design with very fast tube changes
- Resistant against a broad range of solvents, buffers, acids, and bases
- Flow rates up to 150 mL/min and optional kit for improved performance at low flow rates
- Smallest possible carryover through minimized delay volume between valve and drop former
- Large capacity, holds up to 180 tubes or 4 × 96 well plates and wide variety of collection vessels
- Ideally suited for working with sophisticated Chromeleon software fraction collection features

The AFC 3000 manages analytical and semipreparative to preparative flow rates. A funnel rack directs virtually unlimited volumes into any bottle or reactor.

Key Specifications

Maximum Flow Rate: 150 mL/min

Carryover volume: 15 µL (standard), 1.3 µL (with optional low-flow kit)

Tube Change Time: typically 0.2–0.4 s, depending on collection mode and rack type

Wetted Parts: Tefzel, Simriz, PFA, and PEEK (with standard and low-flow drop former)

Dimensions (h × w × d): 43 × 34 × 46 cm (16.5 × 13.4 × 18.1 in.)

Weight: 8.0 kg (17.7 lbs)

System Control: RS-232 or USB, requires Chromeleon Chromatography Data System

Ordering Information

Hardware

AFC-3000 UltiMate 3000 Automated Fraction Collector 5702.1000

Accessories

Eluent Bottle, 0.25 L, Including Screw Cap for Tubing Guides 2270.0026

Collection Rack with 21 Positions for Tubes with 33 mm o.d., 50 mL Volume, for AFC-3000 ..... 6702.0021

Collection Rack with 24 Positions for Tubes with 26 mm o.d., 30 mL Volume, for AFC-3000 ..... 6702.0024

Collection Rack with 40 Positions for Tubes with 21 mm o.d., 20 mL Volume, for AFC-3000 ..... 6702.0040

Collection Rack with 60 Positions for Tubes with 16 mm o.d., 14 mL Volume, for AFC-3000 ..... 6702.0060

Collection Rack with 90 Positions for Tubes with 13 mm o.d., 8 mL Volume, for AFC-3000 ..... 6702.0090

Adapter for 4 WPS-3000 Sample Trays for AFC-3000 ..... 6702.0100

Adapter for 4 96 Well Plates for AFC-3000 ..... 6702.0200

Kit for Low Flow Rates with 0.4 mm ID PEEK Drop Former for AFC-3000 ..... 6702.0300

Kit for Normal Phase LC with SST Drop Former, for AFC-3000 ..... 6702.0400

Vial Tray Compl, WPS 6820.4070

Sample Tray for 22 Cylindrical Vials 4 mL, WPS-3000 and WPS-3000 SL Series 6820.4084

Sample Tray for 10 Cylindrical Vials 10 mL, WPS-3000 and WPS-3000 SL Series 6820.4086

Microfraction Collection Option for WPS



The Microfraction Collection (µFC) option for the WPS-3000(T)PL(RS) Nano/Cap/Micro Autosampler enables fully automated injection, fractionation, and re-injection on a single, integrated system. Taking full advantage of the three well plate capacity, the system is capable of fractionating and reinjecting more than 1000 samples without the need for any manual handling.

- Highest flexibility with respect to column dimensions and mobile phase selections
- Easy method development
- Dedicated optimization of each separation dimension
- Multiple analyses of the fractionated sample, even with different methods

The µFC option can be used only with the pulled-loop WPS-3000(T)PL, WPS-3000TBPL, and WPS-3000TPLRS autosamplers. This option is an essential component of the UltiMate 3000 nanoLC and UltiMate 3000 RSLCnano systems, which offers fully-automated off-line multidimensional (MD) LC for a variety of methods and flow rate ranges.

For more details on the µFC option and the UltiMate 3000 RSLCnano system, refer to the UHPLC+ Solutions section. For key specifications, refer to the Nan/Cap Autiosampler section

Ordering Information

Hardware parts listed below are needed to upgrade the WPS-3000(T)PL Autosamplers in exisiting UltiMate 3000 system configurations. For information on fraction collection control and automation features in Chromeleon Chromatography Software, contact your local Dionex representative.

Hardware

Micro Fraction Collection Option, WPS-3000PL 6820.0051

Micro Fraction Collection Option, Biocompatible, WPS-3000PL 6821.0051

Probot MALDI Spotter



The Probot MALDI spotter is designed for on-line collection of µL- and nL-fractions eluting from nano and capillary LC systems on different types of sample carriers such as MALDI targets, PVDF membranes, 96, 384, or 1536 well plates, or microchip structures. The X,Y, Z-moving table and fixed needle design allow nL-spotting with excellent precision and minimal dead volume.

- Robotic system for MALDI spotting (and fraction collection)
- Supports MALDI targets and sample carriers from every vendor
- Small nL-volumes collection with zero chromatographic dispersion maintaining LC resolution
- Two well plate (or six AB4700) capacity for collection of more than 4000 spots
- Integrated reagent (matrix) addition for easy MALDI-spotting
- Dual-collection mode for fraction splitting over two different sample carriers

Typical Probot applications include on-line MALDI target preparation. Due to its accuracy and flexibility, the Probot is the ideal nano-LC/MALDI-MS interface, integrating the high-sensitivity separation power of nano-LC and high resolving power of MALDI-MS.

Key Specifications

Table Dimensions (w × d): 210 × 135 mm (8.27 × 5.31 in.)

Table Movement: X = 195 mm, speed 0.250–20 mm/s; Y = 130 mm, speed 0.125–10 mm/s; Z = 95 mm, speed 0.125–10 mm/s

Precision of Table Positioning: better than 20 µm

Spotting Frequency: user-selectable down to 5 s with minimal volumes of 5 nL

Lifting Force: >2 kp

Carryover: in pipetting mode, less than 0.02% (with additional needle wash)

Dimensions (h × w × d): 30 × 48 × 50 cm (12 × 19 × 20 in.)

Software: Fully controlled by µCarrier Software. Supported by Chromeleon software.

Collection Modes: time-based collection and peak collection

Ordering Information

Hardware

Probot Microfraction Collector with Dosage Unit	5713.0200

Accessories

Probot Table Adapter for 2 x Bruker MALDI Target (Micro Titer Plate Type)	5713.6307
Universal Table for ABI 4700 Proteomics Analyzer for 6 Targets	5713.6402
Probot Table Adapter for 2 x Shimadzu/Kratos Axima QIT Targets	5713.6319
Probot Table Adapter for 6 Micromass Rectangular Targets	5713.6328
Probot Demonstration Table Adapter with Adjustable Strips	5713.6338
Probot Table Adapter for 6 × ABI-4700 Proteomics Analyzer	5713.6348
Probot Table Adapter AB 4800	6713.0022
Probot Table Adapter for Thermo Scientic Maldi	6713.0025
Probot Table Adapter for 2 × Micro Titer Plates	5713.6348

Ion Chromatography Hardware

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Reagent-Free IC with Eluent Generation 90

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- ICS Series Photodiode Array Detector 120

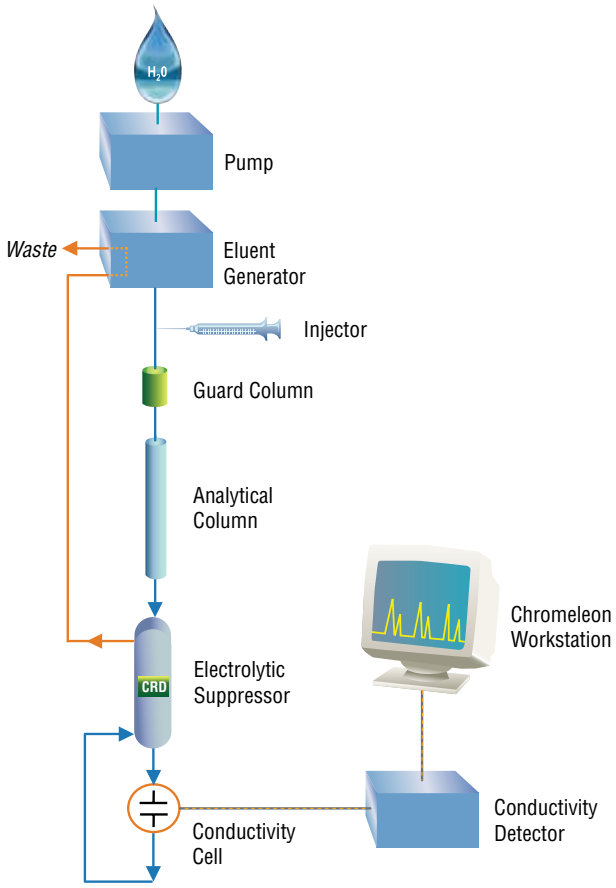
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RFIC Solutions

Reagent-Free IC with Eluent Generation

Outstanding consistency for gradient and isocratic applications

Reagent-Free IC (RFIC) systems with eluent generation include the ICS-5000 and ICS-2100. These RFIC-EG systems combine automated eluent generators and Self-Regenerating Suppressors to electrolytically create the eluents and regenerants needed for IC applications. Plumb in a clean source of deionized water, and the RFIC-EG system takes care of the rest.



RFIC-EG System

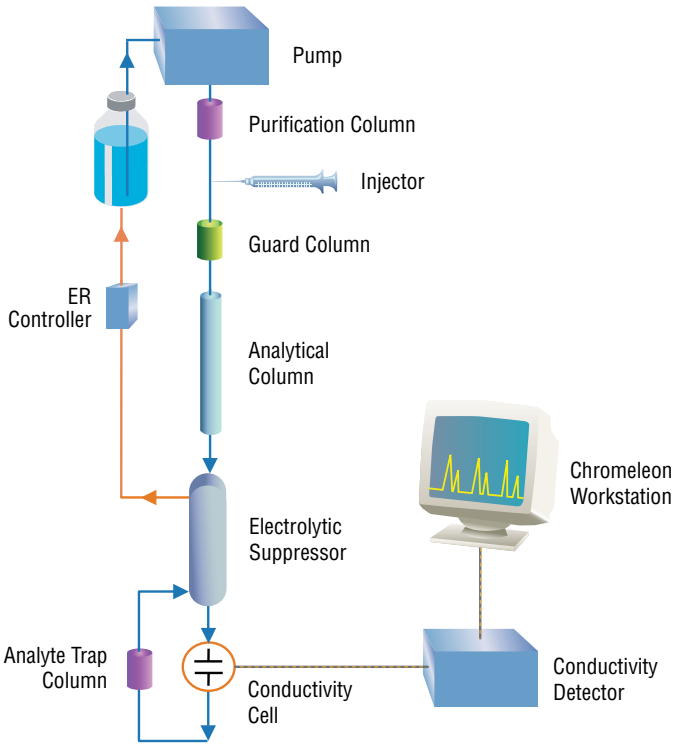
Eluent generators increase accuracy and reproducibility and simplify operation. Eluent generation is an important reason why RFIC-EG systems are superseding traditional IC systems.

Reagent-Free IC with Eluent Regeneration

Always On, Always Ready

RFIC-ER systems (available option for ICS-1100, -1600, -2100, and -5000 systems) are designed for routine isocratic separations. The systems use the Self-Regenerating Suppressor and patented trap and purification columns to electrolytically regenerate suppressed eluent. A single 4 L bottle of eluent can be recirculated for up to four weeks.

When left on, an RFIC-ER system remains equilibrated and calibrated between eluent changes. Time that would have been used maintaining the system can now be used for running additional samples, increasing productivity.



RFIC-ER System

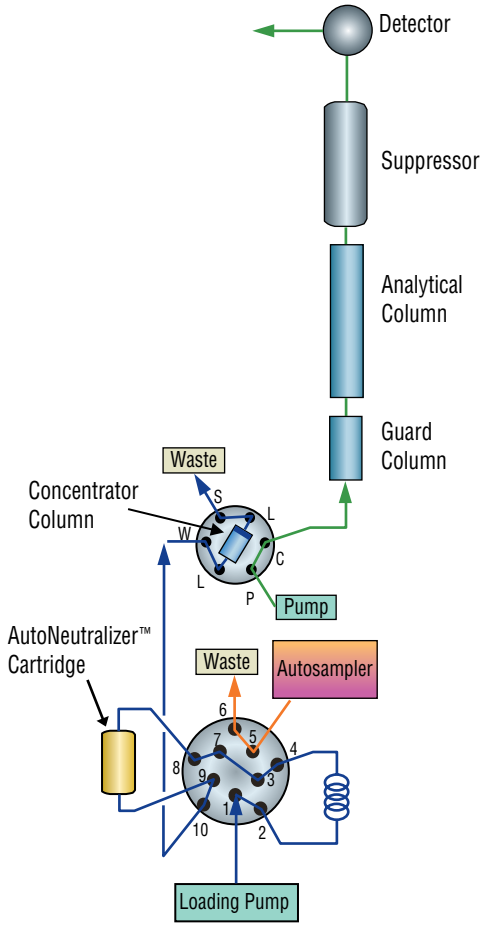
Eluent regeneration saves time and reduces cost for frequent-use isocratic analyses. Always On, Always Ready, the RFIC-ER system is ideal for municipalities and contract labs that monitor water quality.

Reagent-Free IC with Electrolytic Sample Preparation

Automated sample preparation for reduced costs and improved accuracy

RFIC-ESP technology on the ICS-5000 and ICS-2100 systems combine automation solutions for sample preparation with the power of electrolytic devices. These automated Electrolytic Sample Preparation solutions save time and money in sample processing, improve processing accuracy and reproducibility, and enable easy methods transfer.

Devices such as the Electrolytic Water Purifier, AutoNeutralization cartridge, and Continuously Regenerated Trap Columns are available.



RFIC-ESP Sample

Electrolytic devices increase sensitivity by reducing loading water background, and reduce complexity by replacing pumps with devices with no moving parts.

IC & RFIC Systems

A complete range of ion chromatography solutions for all customer performance and price requirements

For ion analysis, nothing compares to a Dionex ion chromatography system. Whether you have just a few samples or a heavy workload, whether your analytical task is simple or challenging, we have a solution to match your needs and budget. And with your IC purchase, you get more than just an instrument—you get a complete solution based on the modern technology and world-class support of Dionex, the leader in IC for over 30 years.

- ICS-5000: The world's first capillary IC system
- ICS-2100: Award-winning integrated reagent-free IC system
- ICS-1600: Standard integrated IC system
- ICS-1100: Basic integrated IC system
- ICS-900: Starter line IC system

Ranging from the ICS-900 to the ICS-5000, Dionex IC systems cover the entire range of IC needs and budgets. Dionex systems come with superior support and service worldwide.

Note: *See also the Supplies and Accessories section for RFIC-EG and RFIC-ER accessory ordering information.*



ICS-5000: Developed with flexibility, modularity, and ease-of-use in mind, the ICS-5000 combines the highest sensitivity with convenience

ICS-2100: An integrated RFIC-EG system for electrolytically generated isocratic and gradient separations with conductivity detection, now with RFIC-ESP.

ICS-1600: The ICS-1600 combines high sensitivity with convenience. RFIC-ER ready, with available dual valve configuration for automated sample preparation.

ICS-1100: With dual-piston pumping and electrolytic suppression. Now RFIC-ER ready, with available dual valve configuration for automated sample preparation.

ICS-900: Can routinely analyze multiple anions and cations in 10–15 min—fully automated with DCR Displacement Chemical Regeneration.

ICS-5000

The world's first capillary IC system developed for flexibility, modularity, and ease-of-use

Dionex introduces capillary IC to the world with the ICS-5000 Reagent-Free IC (RFIC) system with Eluent Generation; the world's first capillary IC system. Developed with flexibility, modularity in mind, the ICS-5000 combines the highest sensitivity with convenience. We have taken sensitivity and ease of use to a new level, simplifying ion chromatography while simultaneously increasing the power and reproducibility of ion analysis.

- ICS-5000 SP and DP Pumps for highest performance separations
- ICS-5000 EG Eluent Generator for the benefits of Reagent-Free IC
- ICS-5000 DC Detector/Chromatography module, a high-performance environmental chamber
- IC Cube module contains all capillary-based consumables in one convenient location
- ICS-5000 TC Thermal Compartment for precise temperature control from 5 to 85 °C
- Wide range of detectors: Electrochemical, Conductivity, ICS-Series VWD, and Photodiode Array detectors
- Highly versatile, modular design
- Dual-RFIC system configurations for high-throughput and complex applications

Capillary RFIC systems redefine the way IC is performed. The ICS-5000 represents the next step in the evolution of IC. With the ability to analyze samples at capillary, microbore or standard flow rates (or any combination of two, in a dual system) the system is always ready. The wide variety of ICS-5000 modules allows you to configure an IC system designed specifically to provide the solutions you need.

Significant performance enhancements make the ICS-5000 the most sensitive, stable, and easy-to-use ion chromatography system available today. Dramatic improvements in flow rate accuracy, eluent generator electronics stability, and conductivity cell temperature control increase baseline stability and enhance sensitivity.

Note: *See the IC Modules section for equipment specifications.*



The ICS-5000 system; the world's first capillary ion chromtography system.

Innovative Reagent-Free and Dual IC

With your IC purchase, you get more than just an instrument—you get a complete solution based on the modern technology and the world-class support of Dionex, the leader in IC for more than 30 years.

The system can be easily upgraded from a single- to dual-system configuration—boosting productivity without taking up more valuable laboratory bench space. Dual detection and simultaneous and sequential injection deliver increased productivity—more information from one injection. Dual analysis provides more flexibility, more application choices, and more information.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

ICS-5000 System Brochure

Environmental Analysis Using the ICS-3000 Ion Chromatography System

ICS-3000 Solutions for the Power Industry

ICS-3000 Solutions for the Semiconductor and Electronics Industries

Product Data Sheets

ICS-5000 Reagent-Free Ion Chromatography System

Ordering Information

Contact your local Dionex representative for an ICS-5000 system customized to your application needs. See Dionex Locations in the Global Subsidiaries and Distributors section on our website for contact information.

Hardware	
Single Channel RFIC system (Analytical)	072241
Single Channel RFIC System (Capillary)	072243
Note: Add consumables, PC and Chromeleon, and autosampler	
Dual Channel RFIC system (SB and MB)	072249
Dual Channel RFIC system (SB and Cap)	072250
Dual Channel RFIC system (Cap and Cap)	072248
Dual Channel RFIC system (SB and Cap ED)	072253

ICS-2100

Powerful RFIC-ESP technology fully integrated with RFIC-EG technology in an easy to use system.

The ICS-2100 is an integrated, single-channel RFIC-EG system that performs isocratic and gradient IC separations. With the built-in suppressor control for SRS and Atlas suppressors, the system includes AutoSuppression for high performance with unparalleled ease of use. Eluent Generation provides isocratic and gradient electrolytic eluent concentrations, adding simplicity and day-to-day consistency. The standard ICS-2100 system includes:

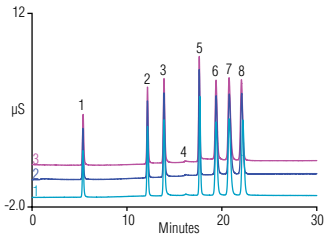
- Integrated electolytic eluent generation; just add water
- Dual-piston, isocratic, serial pump that supports 2, 3, and 4 mm ID columns
- Reliable electric PEEK Rheodyne injection valve
- Column heater
- Electrolytic suppression
- Advanced digital conductivity detector with thermal control capabilities
- Inert, nonmetallic PEEK flowpath
- Touchscreen LCD display

RFIC-EG systems produce consistent eluent concentrations day-to-day and lab-to-lab for highly reproducible retention times and peak areas. The ICS-2100 comes standard with integrated eluent generation, and can be equipped with optional eluent regeneration.

Available auxiliary valves and electrolytic sample preparation devices provide fully integrated solutions for matrix elimination, filtration, and ultratrace analysis.



ICS-2100 ion chromatography system



Column: IonPac® AG15 (4 × 50 mm), IonPac AS15 (4 × 250 mm)
Eluent: 8 mM KOH from 0–6 min, 8–55 mM from 6–18 min
Eluent Source: ICS-2000 with CR-ATC
Flow Rate: 1.6 mL/min
Inj. Volume: 25 µL
Temperature: 30 °C
Detection: ASRS® ULTRA (4 mm) AutoSuppression® recycle mode 220 mA

Peaks:

1. Fluoride	2	mg/L
2. Chloride	5	
3. Nitrite	10	
4. Carbonate	-	
5. Sulfate	10	
6. Bromide	20	
7. Nitrate	20	
8. Phosphate	30	

Component	System 1 Retention Time (%RSD)	System 2 Retention Time (%RSD)	System 3 Retention Time (%RSD)
Fluoride	5.367 (0.062)	5.361 (0.031)	5.384 (0.017)
Chloride	12.166 (0.026)	12.163 (0.022)	12.165 (0.020)
Nitrite	13.908 (0.022)	13.906 (0.019)	13.904 (0.021)
Sulfate	17.685 (0.027)	17.623 (0.025)	17.618 (0.021)
Bromide	19.382 (0.031)	19.404 (0.018)	19.385 (0.018)
Nitrate	20.759 (0.036)	20.783 (0.014)	20.760 (0.017)
Phosphate	22.219 (0.049)	22.089 (0.043)	22.066 (0.018)

(%RSD) n=20

19133

RFIC-EG produces consistent concentrations for highly reproducible retention times and peak areas, day-to-day, system-to-system, and lab-to-lab.



All components are easily accessed through the front panel on the ICS-2100.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

ICS-2100/1600/1100 Brochure

Product Data Sheets

ICS-2100 Ion Chromatography System Data Sheet

Ordering Information

Hardware

ICS-2100 (Pump, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit, Chromeleon and PC 069656

ICS-2100 (Pump, Degasser, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit, Chromeleon and PC 069657

ICS-2100 (Pump, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit, Chromeleon 069658

ICS-2100 (Pump, Degasser, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit, Chromeleon 069659

ICS-2100 (Pump, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit 069573

ICS-2100 (Pump, Degasser, Eluent Generator, Injection Valve, Column Heater, Conductivity Detector, Touchscreen Display), shipkit 069576

Accessories

Spare Parts Kit, ICS-1100/1600/2100, also for ICS-1000/1500/2000 061304

Heat Exchanger Assembly (0.01" i.d.) 059979

Heat Exchanger Assembly (0.005" i.d.) 060943

Preventative Maintenance Kit 057954

Microbore Tubing Kit 052324

Electrolytic Water Purifier with Installation Kit, for Anion Analysis 072629

Electrolytic Water Purifier with Installation Kit, for Cation Analysis 072630

Training Course, ICS-1100/1600/2100 Basic Operation and Troubleshooting. Also for ICS-1000/1500/2000 065230

Training Course ICS-1100, 1600, 2100, Advanced Troubleshooting and Maintenance 065231

OQ/PQ Service, Ion Chromatograph 061529

See the RFIC-ER and RFIC-EG sections under Supplies and Accessories for kits and accessories.

ICS-1600

IC system ready for Eluent Regeneration, integrating high pressure valves for automated sample preparation

The ICS-1600 system has all PEEK components throughout, providing a contamination-free polymeric flow path. The ICS-1600 has a column heater to provide day-to-day thermal stability for high-performance applications, and eluent Degas capability for outstanding eluent consistency. The standard ICS-1600 system includes:

- Optional 6 or 10-port high-pressure valve for automated sample preparation
- Dual-piston, isocratic, serial pump that supports 2, 3, and 4 mm i.d. columns
- Reliable electric PEEK Rheodyne injection valve
- Column heater
- Electrolytic suppression
- Advanced digital conductivity detector with thermal control capabilities
- Touchscreen LCD display

Vacuum degas and column heater options further improve baseline stability and yield lower detection limits. Compact and easy to operate, the ICS-1600 delivers solid performance at an attractive price.

Note: *See the RFIC-ER section under Chromatography Accessories for ER kits and accessories.*



ICS-1600 Ion Chromatography System

Eluent Regeneration

Add an Eluent Regeneration installation kit to create an RFIC-ER system capable of continuous operation for routine isocratic applications for up to 4 weeks without requiring new eluent. When left on, the system remains equilibrated and calibrated. Just load samples and collect results!

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

ICS-2100/1600/1100 Brochure

Product Data Sheets

ICS-1600 Ion Chromatography System Data Sheet

Ordering Information

Hardware

ICS-1600 (Pump, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display) with shipkit, Chromeleon and PC 069652

ICS-1600 (Pump, Degasser, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display) with shipkit, Chromeleon CHM-1 and PC 069653

ICS-1600 (Pump, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display), Chromeleon CHM-1 and shipkit 069654

ICS-1600 (Pump, Degasser, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display) with shipkit and Chromeleon CHM-1 069655

ICS-1600 (Pump, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display) with shipkit 069572

ICS-1600 (Pump, Degasser, Injection Valve, Conductivity Detector, Column Oven, Touchscreen Display) with shipkit 069575

Accessories

Spare Parts Kit, ICS-1100/1600/2100, (also for ICS-1000/1500/2000) 061304

Eluent Regeneration Startup Kit, Anion, for ICS-1100 and ICS-1600 069569

Eluent Regeneration Startup Kit, Anion, for ICS-1100 and ICS-1600 069570

Auxiliary 6-Port Valve Kit for ICS-1100/1600/2100, cable, installation manual 069472

Auxiliary 10-Port Valve Kit for ICS-1100/1600/2100, cable, installation manual 069473

Auxiliary 10-Port Valve (0.02 inch ports) for ICS-1100, -1600, and -2100 systems 071589

Heat Exchanger Assembly (0.005" i.d.) 060943

Preventative Maintenance Kit 057954

Microbore Tubing Kit 052324

OQ/PQ Service, Ion Chromatograph 061529

ICS-1100

Reliable operation and RFIC-ER ready, taking up small space on your bench and in your budget.

The ICS-1100 has all PEEK components throughout the system, providing a contamination-free polymeric flow path. The ICS-1100 has an optional column heater to provide day-to-day thermal stability for high-performance applications and eluent degas capability for excellent eluent consistency. Automate the system with an AS-DV or AS autosampler for fully-automated analysis. The standard ICS-1100 system includes:

- Optional 6 or 10-port high-pressure valve for automated sample preparation
- Dual-piston, isocratic, serial pump that supports 2, 3, and 4 mm i.d. columns
- Reliable electric PEEK Rheodyne injection valve
- Optional column heater
- Electrolytic suppression
- Advanced digital conductivity detector with thermal control capabilities
- Informative front LED panel for system status monitoring

Vacuum degas and column heater options further improve baseline stability and yield lower detection limits. Compact and easy to operate, the ICS-1100 delivers solid performance at an attractive price. The ICS-1100 is available with Chromeleon SE, which allows affordable control of a single ICS-1100 with autosampler.

Note: *See the RFIC-ER section under Chromatography Accessories for ER kits and accessories.*



ICS-1100 Ion Chromatography System

Eluent Regeneration

Add an Eluent Regeneration installation kit to create an RFIC-ER system, capable of continuous operation for routine isocratic applications for up to four weeks without the need to create new eluent. When left on, the system remains equilibrated and calibrated. Just load samples and collect results!

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

ICS-2100/1600/1100 Brochure

Product Data Sheets

ICS-1100 Ion Chromatography System Data Sheet

Ordering Information

Hardware

ICS-1100 (Pump, Injection Valve, Conductivity Detector) with Chromeleon SE and shipkit 069648

ICS-1100 (Pump, Degasser, Injection Valve, Conductivity Detector) with Chromeleon SE, PC and shipkit 069649

ICS-1100 (Pump, Injection Valve, Conductivity Detector) with CM SE and shipkit 069650

ICS-1100 (Pump, Degasser, Injection Valve, Conductivity Detector) with Chromeleon SE and shipkit 069651

ICS-1100 (Pump, Injection Valve, Conductivity Detector) with shipkit 069571

ICS-1100 (Pump, Degasser, Injection Valve, Conductivity Detector) with shipkit 069574

Accessories

Column Heater Assembly, ICS-1100, -1600, -2100 070063

Microbore Heat Exchanger Assembly (0.005" i.d.) for ICS-1100/1600/2100 060943

Spare Parts Kit, ICS-1100/1600/2100, (also for ICS-1000/1500/2000) 061304

Preventative Maintenance Kit, ICS-900/1100/1600/2100, (also for ICS-1000/1500/2000) 057954

Eluent Regeneration Startup Kit, Anion, for ICS-1100 and ICS-1600 069569

Eluent Regeneration Startup Kit, Anion, for ICS-1100 and ICS-1600 069570

Microbore Tubing Kit 052324

Auxiliary 6-Port Valve Kit for ICS-1100/1600/2100, cable, installation manual 069472

Auxiliary 10-Port Valve Kit for ICS-1100/1600/2100, cable, installation manual 069473

Auxiliary 10-port valve kit, (0.02 inch ports) for ICS-1100, 1600, and -2100 systems 071589

ICS-900

ICS-900 integrated starter line ion chromatography system

The ICS-900 is an integrated single-channel ion chromatography system designed to run specific isocratic anion and cation applications. The system uses MMS 300 suppression with Displacement Chemical Regeneration (DCR) technology for low noise and stable baselines. Each ICS-900 system has an all polymeric flow path with a reliable dual-piston pump, high-pressure pulse damper, electrically-actuated PEEK Rheodyne valve, and a temperature-controlled conductivity cell.

- Starter line IC designed specifically for routine analysis
- MMS suppression with DCR technology for low baseline noise and fast startup
- DCR elminates regenerant pumps for reduced cost, higher reliability.
- Contamination-free with inert material throughout the fluidic flow path
- High-performance digital, thermally controlled conductivity detection
- Supports 2 mm, 3 mm, and 4 mm i.d. columns

The ICS-900 can be ordered with Chromeleon SE, which allows control of a single ICS-900 with autosampler at an attractive price.

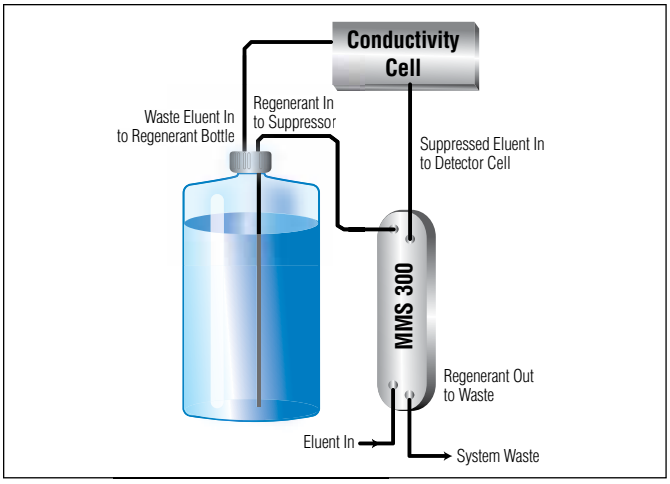
Note: *See the Chromatography Accessories section for ICS-900 consumables kits.*



ICS-900 Ion Chromatography System



Easily access ICS-900 system components



Schematic of the ICS-900 DCR flow path

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

ICS-900 Brochure

Product Datasheets

ICS-900 Ion Chromatography System Data Sheet

Ordering Information

ICS-900 Systems

ICS-900 Ion Chromatography System with Chromeleon 6.8 SE and Windows XP Workstation 067552

ICS-900 Ion Chromatography System with Chromeleon 6.8 SE 067551

ICS-900 Ion Chromatography System Expansion Unit, (requires existing ICS-900 and software) 067550

Adds a second system to an existing ICS-900

ICS-900 Accessories

Preventative Maintenance Kit, ICS-900/1100/1600/2100, also for ICS-1000/1500/2000 057954

Microbore Tubing Kit 052324

ICS-900 Installation Service. 060124

Includes system setup and testing. Extends warranty coverage on hardware and software to one year.

IC & RFIC Modules

From basic autosampling to ultrasensitive detection, Dionex IC module offerings are unmatched

The IC product family includes an extensive set of fully inert, PEEK-based modules engineered for high performance, ease of use, and reliability. We offer a wide variety of autosamplers, injectors, pumps, thermostatted column compartments, and detectors with reliable, precise, and accurate operation. Whether you require a dedicated system or modularity for flexible applications, all components are integrated and single-point controlled through Chromeleon software or easy-to-use TTL control.

- Automated eluent generation for simplicity and reliability
- Single and dual isocratic and gradient pumps
- Autosamplers from basic to state-of-the-art automation and high-volume sample preparation
- Column and detector compartments that integrate thermal control with sample prepartion and injection
- High performance detectors, including conductivity, electrochemical, optical, and MS

Note: *See the Mass Spectrometry section for MS detectors.*



Eluent Generation: Eluent Generation is a part of RFIC and empowers laboratories to automatically generate high-purity eluents.

IC & RFIC Pumps: Completely inert, robust pump design capable of incredible accuracy and precision.

IC & RFIC Injectors & Autosamplers: State-of-the-art automation and sample care with the all-inert AS, high-volume AS-HV, and economical AS-DV autosamplers.

IC & RFIC Column Compartments: IC and RFIC column compartments and column thermostats for high retention time stability.

IC & RFIC Detectors: Conductivity, electrochemical, and optical absorbance detectors (single-wavelength, multiple-wavelength, and photodiode array).

Postcolumn Reaction Systems & Accessories: Postcolumn derivatization can be used to improve the detection limits of ions that may otherwise exhibit limited sensitivity.

Eluent Generation



Eluent Generation is an essential part of RFIC systems, empowering users to generate high-purity eluents with a mouse click and to perform electrolytically generated gradient analysis with our isocratic pump.

Note: *See also RFIC-Eluent Regeneration under Chromatography Accessories for EluGen eluent generation cartridges and CR-TC trap columns.*

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Reagent-Free Ion Chromatography

ICS-5000 System Brochure

Product Data Sheets

Reagent-Free Ion Chromatography Systems with Eluent Generation for IC Without Manually Prepared Eluents

Reagent-Free Controller for Ion Chromatography

ICS-5000 Reagent-Free Ion Chromatography System

ICS-5000 EG Eluent Generator

The ICS-5000 Eluent Generator (EG) takes the guesswork and complexity out of ion chromatography. The EG module provides the benefits of a Reagent-Free IC (RFIC) system with eluent generation (RFIC-EG) to produce eluent automatically from deionized water. Stable, robust electronics provide an extremely stable baseline and generate high-purity eluents (up to 200 mM in capillary formats) on-line, making gradient separations as easy as isocratic; with a click of the mouse.

- EG Module supports analytical and capillary cartridges
- New chip-based technology improves ease of use and eliminates errors
- Generates high-purity, carbonate-free hydroxide eluent from deionized water
- Minimizes baseline drift
- Improves retention time stability and resolution
- Provides excellent run-to-run reproducibility
- Extends the lifetime of pistons and pump seals by pumping only water
- Built-in leak sensor and operator alert for maximum system safety

Reagent-Free IC (RFIC) systems are compatible with most applications by providing carbonate/bicarbonate, hydroxide and methanesulfonic acid eluents including gradients. The EG's slide-out tray provides easy access to the cartridges, CR-TC and fluidic connections, making IC more convenient than ever. Just add water to generate the perfect eluent for your application automatically.

Key Specifications

Minimum and Maximum Eluent Concentrations: 0.01 up to 100 mM (Analytical), 0.01 to 200 mM (Capillary)

Eluent Flow Rates: 0.100–3.000 mL/min

Eluent Types: KOH, LiOH, NaOH, Carbonate, Carbonate/Bicarbonate, Carbonate with pH modifier, MSA (Analytical), KOH, MSA (Capillary)

Maximum Operating Pressure: 21 MPa, 3000 psi

Maximum Solvent Concentration: Cations: None; Anions: 25% methanol

Operating Temperature Range: 4–40 °C

Operating Humidity Range: 5–95% relative, noncondensing

Dimensions (h × w × d): 41 × 23 × 56 cm (16 × 8.75 × 21.5 in.)

Weight: 25 kg (40 lb)

Power Requirements: 90–265 V AC, 47–63 Hz

Ordering Information

Hardware	
EG Eluent Generator Module, order EG degasser separately	072045
Analytical EG degasser module	074218
Capillary EG degasser module	072051

Note: EGC III cartridges required. See consumables section for complete list.

RFC-30 Reagent-Free Controller



The RFC-30 Reagent-Free Controller enables you to experience the ease of use, cost savings and simplicity that Reagent-Free IC offers. Reagent-Free IC is the powerful combination of Dionex Just Add Water eluent-generation technology, plus electrolytic suppression, and the Continuously Regenerated Trap Column (CR-TC). Standard RFC-30 System includes:

- RFC-30 Reagent-Free Controller with EGC-KOH Cartridge AND
- CR-ATC Continuously Regenerated Anion Trap *or*
- RFC-30 with EGC-MSA Cartridge *and*
- CR-CTC Continuously Regenerated Cation Trap

Reagent-Free IC eliminates variability and potential contamination, providing a stable baseline, higher sensitivity, resolution, and maximum reproducibility. Reagent-Free IC greatly reduces the complexity of an IC system, allowing you to focus on what matters—your application and results. Reagent-Free IC is available exclusively from Dionex.\

Note: *For use with DX-120, DX-320, DX-500, DX-600, or ICS-2500 ion chromatography systems. DX-120 bundle includes a column temperature stabilizer.*

Ordering Information

Hardware	
RFC-30 Reagent-Free Controller (EGC-KOH, CR-ATC)	060667
Use with EGC II KOH cartridge, CR-ATC.	
RFC-30 Reagent-Free Controller (EGC-MSA, CR-CTC)	060668

Accessories	
DX-120 Adapter Cable	057861

RFC-10 Reagent-Free Controller

The RFC-10 Reagent-Free Controller can be ordered to provide continuously variable current (with 1 mA resolution) to the Atlas and SRS suppressors when using DX-600 or DX-500 systems configured with an ED40/50 or CD20/25 detector; the DX-320 with an IC25 detector; or the DX-120. The DX-120 requires an adapter cable (P/N 057861) for the RFC-10.

Ordering Information

Hardware	
RFC-10 Reagent-Free Controller	060335

Accessories	
DX-120 Adapter Cable	057861

An adapter cable is required to connect the RFC-10 or RFC-30 to the DX-120.

IC & RFIC Pumps



The ICS-5000 pumps are dual-piston, serial design pumps that support micro- and standard bore formats. The ICS-5000 pump comes in either a Single (SP) or Dual (DP) format in the same benchtop footprint. The pump is upgradeable from a single to a dual pump to meet your needs now and in the future. Analytical low-pressure quaternary gradients are available for linear and curved gradients.

ICS-5000 DP Dual Pumps

The ICS-5000 DP Dual Pump is available in multiple configurations including analytical, capillary or hybrid (analytical and capillary) versions to support capillary, microbore, standard bore, semipreparative and IC × IC (2D-IC) applications. Various flow rates are available to support capillary, microbore, standard bore or semipreparative applications. Analytical pumps offer the option of mechanical gradients (proportioning valve) yielding linear, concave and convex gradients. Dual independent seal wash prolongs seal lifetimes and removes cross-contamination in dual-channel systems.

- Hybrid pump with analytical and capillary option makes IC × IC (2D-IC) analysis easy to configure and perform
- Integrated piston seal wash, dual independent wash system option to eliminate crosstalk
- Easy access to all fluidics
- Built-in vacuum degas
- User selectable upper and lower pressure limits for pump shutdown

Benefits of Dual Pump configurations: Dual analysis, (e.g. anions and cations from a single injection). Sample preconcentration or matrix elimination. Postcolumn reagent delivery. External water or chemical regenerant delivery. A backup pump for your primary application. Consumables cleanup or startup preparation, preventing primary system downtime.

Key Specifications

Flow Rate Range: 0.000 to 10.000 mL/min (Analytical); 0.000 to 3.000 mL/min (Capillary)

Flow Rate Accuracy: <0.1%

Flow Rate Precision: <0.1%

Gradient Proportioning Accuracy and Precision: ±0.5% at 2 mL/min (Analytical only)

Pressure Range: 0–35 MPa (0–5000 psi) (Analytical); 0–41 MPa (0–6000 psi) (Capillary)

Dimensions (h × w × d): 36 × 21 × 48 cm (14 × 8.25 × 19 in.)

Weight: 24.1 kg (55 lb.)

Power Requirements:: 90–265 V AC, 47–63 Hz

Additional Specifications: Refer to ICS-5000 Reagent-Free Ion Chromatography System Data Sheet

Ordering Information

Hardware	
DP Analytical-Isocratic Analytical Isocratic with Degas	072030
DP Analytical-Gradient Analytical Isocratic with Degas	072032
DP Analytical-Gradient Analytical Gradient with Degas	072034
Analytical Isocratic-Capillary Isocratic	072104
Analytical Gradient-Capillary Isocratic	072106
Capillary Isocratic-Capillary Isocratic	072108

ICS-5000 SP Single Pumps

The ICS-5000 SP Single Pump can be configured with either capillary or analytical pump heads to support capillary, microbore, standard bore or semipreparative applications. The pump is upgradeable from a single to a dual pump yielding either a dual capillary, dual analytical or hybrid (capillary and analytical) pump to meet your application needs. Analytical pumps offer the option of mechanical gradients (proportioning valve) yielding linear, concave and convex gradients.

- Inert, PEEK pump heads, mixing chamber, and flow paths
- Integrated piston seal wash
- Easy access to all fluidics
- Built-in vacuum degas
- User selectable upper and lower pressure limits for pump shut down
- Field upgradeable to DP Dual Pump configuration

Key Specifications

Flow Rate Range: 0.000 to 10.000 mL/min (Analytical); 0.000 to 3.000 mL/min (Capillary)

Flow Rate Accuracy: <0.1%

Flow Rate Precision: <0.1%

Gradient Proportioning Accuracy and Precision: ±0.5% at 2 mL/min (Analytical only)

Pressure Range: 0–35 MPa (0–5000 psi) (Analytical); 0–41 MPa (0–6000 psi) (Capillary)

Dimensions (h × w × d): 36 × 21 × 48 cm (14 × 8.25 × 19 in.)

Weight: 20.4 kg (45 lb)

Power Requirements: 90–265 V AC, 47–63 Hz

Additional Specifications: Refer to ICS-5000 Reagent-Free Ion Chromatography System Data Sheet

Ordering Information

Hardware	
SP Analytical-Gradient with Degas	072028
SP Analytical-Isocratic with Degas	072026
SP Capillary-Isocratic with Degas	072102

EO Eluent Organizer and Accessories



The EO Eluent Organizer, constructed of corrosion-proof polypropylene, is designed to hold eluent containers and organize eluent tubing and air lines.

- Holds four 1 or 2 L plastic, two 1 L glass or one 2 L glass bottles
- Up to two EO organizers stack on top of a DC or TC module
- Translucent liner contains spills and allows view of liquid levels
- Constructed of corrosion-proof polypropylene and epoxy
- Pressure regulator option is available

Ordering Information

Hardware	
EO Eluent Organizer with two 2 L Plastic Bottles	072057
EO Eluent Organizer with four 2 L Bottles	072058

Accessories	
EO Regulator Accessory and Stand (for mounting on the DC)	074423
EO Regulator Accessory and Stand (for mounting on the TC/VWD/PDA)	074424
Bottle, 1 L, Plastic, ea.	063291
Bottle, 2 L, Plastic, ea.	062510
Bottle, 4 L, Plastic, ea.	067796
Bottle, 1 L, Glass, ea.	062595
Bottle, 2 L, Glass, ea.	061729

AXP Auxiliary Pump



The AXP Auxiliary Pump is a single-piston, isocratic metering pump ideal for ion chromatography sample and reagent delivery. The chemically inert, metal-free, PEEK-based flow path eliminates corrosion and contamination problems when using acidic or alkaline reagents, or common water-miscible solvent.

- Digital control and status
- Wide flow rate range
- Internal pulse damper
- Compatible with IC and bio applications
- Standard positive seal washing
- Easy maintenance
- Flexible, advanced Chromeleon control
- Convenient size

Key Specifications

Pressure Range: 0.35–17.5 psi (50–2500 psi)

Flow Rates: 0.01–9.99 mL/min

Flow Accuracy: 3% throughout flow range

Pressure Pulsation: 2% peak-to-peak at 100 psi, 1 mL/min with in-line pulse damper

Flow Rate Precision: 0.5% at calibration pressure

Dimensions (h × w × d): 16.5 × 16.5 × 25.4 cm (6.5 × 6.5 × 10 in)

Weight: 6.8 kg (15 lbs)

Power Requirements: 120–230 V ac; 50–60 Hz

Materials: PEEK, ceramic, and inert polymers

Control: Chromeleon (USB), front panel, and relay control

Ordering Information

Hardware	
AXP Auxiliary Pump	063973

IC and RFIC Injectors and Autosamplers



Dionex injectors and autosamplers feature completely metal-free flow paths, including the injection loop and autosampler needle. A selection of autosamplers is available to fit your automation needs.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

IC Autosamplers: AS, AS-DV, and AS-HV

Product Data Sheets

AS-DV Autosampler Data Sheet

Simultaneous Injection AS Autosampler

ICS-5000 Reagent-Free Ion Chromatography System

AS Autosampler

The Dionex AS Autosampler is designed for high precision, flexibility, reliability, and ease of use. The AS can be used with the entire ICS product family. The AS Autosampler is a high performance, metal-free automated sample loading device designed especially for ion chromatography applications.

- Capable of simultaneous injection without cross-contamination of chemistries
- Consistent operation at RSDs less than 0.3% for reproducible and accurate results
- 10 mL polystyrene sample vials with wide openings for large-volume injections and trace analysis
- All-PEEK flow paths, compatible with aqueous and reversed-phase eluents, safe from metal contamination
- Moving-needle design to guarantee reliable sampling from a variety of vial sizes
- Easy syringe priming
- Sample Prep option to automate sample and standard preparations, saving time and labor
- Well Plate capabilities, optional sample tray cooling

The AS features can be controlled through either Chromeleon Chromatography Data System (CDS) Software or the module front panel.

Key Specifications

Sample Capacity (Vials): 49 ea. 10 mL; 100 ea. 1.5 mL

Sample Capacity (Well Plates): 2 ea. 2 mL 96 deep well plate or 2 ea. 0.5 mL 96 well plate

Injections per Vial: 1–99

Minimum Sample Volume: 10 µL can be sampled from a 300 µL microvial; 20 µL can be ampled from a 500 µL microvial

Variable Volume Range: 1–100 µL in 0.1 µL increments; 100–8000 µL in 1 µL increments

Injection Precision Fixed loop <0.3% RSD at 20 µL; Partial loop <0.5% RSD at 20 µL

Dilution Precision: <1.0% RSD for a 1:100 dilution

Dispensing Precision: <0.2% RSD (by weighing)

Carryover: <0.01% with 500 µL flush volume

Operating Temperature Range: 4–40 °C (40–104 °F)

Power Requirements: 90–265 V AC, 47–63 Hz

Ordering Information

Hardware

AS Autosampler, Base Configuration 063102
AS Autosampler, with Sample Preparation Option..... 063103
AS Autosampler, Simultaneous Injection Configuration without Valves... 063104
AS Autosampler, Simultaneous Injection with Sample Prep Option 063105
AS Autosampler, with Sample Tray Temperature Control Option 063106
AS Autosampler, with Sample Prep and Tray Temp Control Options..... 063107
AS Autosampler, Simultaneous Injection Configuration with Internal Valves..... 063101
AS Autosampler, with Injection Valve 061786
AS Autosampler, with Injection Valve and Sample Tray Temperature Control 061788

Kits

Sample Prep Syringe Kit for AS/AS50..... 063916
Inject Port Line Extension Kit for Second AS 062578
AS Diverter Valve Kit for Sequential Injection 063294
Upgrade Kit to Simultaneous for AS/AS50 (USB)..... 063742
Valve Rebuild Kit 057896
Rheodyne 10-Port Valve Rebuild Kit 061759
Preventive Maintenance Kit for AS50 (USB) and AS..... 060581
AS Autosampler Spare Parts Kit..... 064762

Well Plate and Vial Trays

AS 10 mL Vial Plastic Tray, 49 Vial Capacity 062374
AS 2 mL Vial Cast Tray, 99 Vial Capacity..... 062481
AS 2.0 mL Vial Insulated Cast Tray with Covers, 99 Vial Capacity..... 063442
Micro-Well Plate Tray, Includes Two Well Plates with Round (U) Shaped 0.5 mL Wells and Covers..... 066324
Micro-Well Plate Tray. Includes Two Well Plates with Conical (V) Shaped 0.45 mL Wells and Covers. 066331
Deep-Well Plate Tray. Includes Two, 2 mL Well Plates and Covers..... 066325

Vial Kits

Vial Kit, 10 mL Polystyrene with Caps and Septa, 100 Each..... 055058
Vial Kit 1.5 mL Glass with Caps and Septa, 100 Each..... 055427
Vial Kit, 0.3 mL Polypropylene with Caps and Septa, 100 Each..... 055428
Vial Kit, 1.5 mL Polypropylene with Caps and Septa, Pkg of 100..... 061696

Well Plates and Well Plates Covers

Well Plates, 96 Micro-well, 0.5 mL Round (U) Wells, Pkg of 10 066332
Well Plates, 96 Micro-well, 0.45 mL Conical (V) Shaped Wells (Pkg of 20). (Not suitable for IC)..... 066333
Well Plates, 96 Deep-Well, 2 mL Wells (Pkg of 5). (Suitable for IC where concentration of ions is above 1 ppm)..... 066334
Well Plate Covers (Pkg. of 10) for 0.45 mL and 0.5 mL Well Plates..... 066335
Well Plate Covers (Pkg. of 10) for 2 mL Well Plates 066330

Syringes

Sample Syringe, 100 µL..... 055064
Sample Syringe, 250 µL..... 053916
Sample Syringe, 500 µL..... 055065
Sample Syringe, 1.0 mL..... 055066
Sample Prep Syringe, 2.5 mL 055067
Sample Prep Syringe, 5.0 mL 053915
Sample Prep Syringe, 10.0 mL 055068

AS-DV Autosampler



The AS-DV autosampler provides high performance automated sample processing for ion chromatography applications. Constructed from acid and base-resistant materials, the AS-DV uses precise mechanics to accurately control dispense speed and volume, yielding highly reproducible results.

- New interactive Chromeleon panels help to visualize advanced sample preparation methods.
- Programmable dispense speed: 0.1 mL/min to 5.0 mL/min
- Programmable dispense volume: 0.1 mL to 5.0 mL
- Accomodates disposable PolyVial sample vials in both 5.0 mL and 0.5 mL sizes
- Automatic sample preparation with variable filter caps and optional injection valves
- Chemically inert fluid paths and vials
- Rinses or regenerates between samples
- Sample displacement–no pump required

The AS-DV holds 50 vials. Vials can be sampled in any order and multiple samples can be taken from each vial. The AS-DV remembers the vial size and volume delivered for each vial position, allowing multiple samples to be taken from a vial non-sequentially. Sample can be delivered to a sample loop or a concentrator column with backpressures up to 690 kPa (100 psi).

Key Specifications

Sample Delivery Method: Positive displacement against backpressure of up to 690 kPa (100 psi)

Capacity: 50 PolyVials: 5 mL, 0.5 mL, or combination

Vial Size: 0.5 or 5 mL

Filter Pore Size: 20 µm

Volume Delivered: 0.1 mL to 5.0 mL in 0.1 mL increments

Speed Control: 0.1 mL/min to 5.0 mL/min in 0.1 mL/min increments

Injections Per Vial: Multiple injections

Valves (optional): High-pressure switching valve: 6- or 10-port; Bleed valve; Injection valve; Matrix elimination; Concentration

Concentrator (optional): Delivers sample against backpressure of up to 690 kPa (100 psi). Recommended values are ~0.4 mL/min (0.5 mL vials) or 1 mL/min (5 mL vials)

Software Control: Chromeleon and random access

External Control: USB and TTL relay

Power Supply: 100 to 240 V AC, 50 to 60 Hz, 45 W (autosensing power supply; no manual voltage or frequency adjustments required)

Dimensions (h × w × d): Width: 44.45 cm (17.5 in); Height: 23 cm (9 in); Depth: 56 cm (22 in)

Weight: 8.9 kg (19.5 lb)

Ordering Information

Hardware	
AS-DV Automated Sampler	068907
AS-DV Automated Sampler w/ 0.5 mL vial adaptors	068908

Accessories	
Optional 6-Port Valve Kit for AS-DV Autosampler	068920
Optional 10-port valve kit	068921
PolyVials and Filter Caps (20 µm), 250 each, for 5.0 mL vials	038141
PolyVials and Filter Caps (20 µm), 250 each, for 0.5 mL vials	038142
PolyVials and Plain Caps, 250 each, for 5.0 mL vials	038008
PolyVials and Plain Caps, 250 each, for 0.5 mL vials	038010
Sample Tip Kit	040835
Cap Removal Tool	068925
Poly Vials and Plain Caps without Filters, 5.0 mL, 250 each	039532
Poly Vials and Plain Caps, 0.5 mL, 250 each	042014
Filter Caps, 5.0 mL, Pkg. of 250	038009

Accessories (Continued)	
Filter Caps, 0.5 mL, Pkg. of 250	038011
Plain Caps without Filters, 5.0 mL, Pkg. of 250	039528
Plain Caps without Filters, 5.0 mL, Pkg. of 250	039528
Plain Caps, 0.5 mL, Pkg. of 250	042154

AS-HV Autosampler



The AS-HV is a large-volume autosampler that can be programmed to execute a series liquid handling steps. It has a sample capacity of up to 250 mL and through the use of either a syringe pump, peristaltic pump, or piston pump, can deliver sample to an injection valve loop or a concentrator column.

- Non-metallic (all-PEEK) flow path
- Volumes up to 250 mL with extremely pure tissue culture flasks or poly bottles
- Rapid, precise arm motion speeds up sampling time to maximize efficiency
- Supports push or pull sample loading
- Multiple loading pumps to suit your budget and your application
- Fully Supported under Chromelon 6.8 Data system software or greater

Note: *See also the AXP Auxiliary Pump and Peristaltic Pump under IC & RFIC Pumps.*

Key Specifications

Sampler Capacity: 24 with 250 mL tissue culture flask; 15 with 250 mL narrow mouth Nalgene bottle; 63 with 50 mL centrifuge tube

Sample Capacity: 63 with 40 mL or 60 mL ASE collection vials; 72 with 26 mL tube; 120 with 15 mL centrifuge tube; 180 with 10 mL centrifuge tube

Sample Protection: Pre-split septum with cap and/or Plexiglas Protective Cover for the entire AS-HV

Vial Size: 250 mL

Maximum Injection Volume: Application dependent (up to 250 mL)

Minimum Sample Volume: Sample loop dependent

Number of Injections per Vial: Variable

Injection Type: Full-loop/concentrator

Injection Valve: None, AS-HV relies on a valve in the IC system

Injection Precision—Sample Loop: <0.3%

Injection Precision—Concentrator: <2%

Injection Valve Carryover—Sample Loop: <0.1%

Injection Valve Carryover—Concentrator: <0.2%

Sample Loading: Push or pull

Software: Control: Program and Sequence Wizard; Compatibility: Chromeleon 6.8 or greater

Ordering Information

Hardware	
AS-HV with Integrated Wash Station	064051
AS-HV Syringe Pump with 10 mL Syringe	064506
AS-HV AXP Pump	064507
Peristaltic Pump	064508

Accessories	
Bottles, Caps, and Septa for 250 mL Tissue Culture Flasks, Box of 50	064235
250 mL Nalgene Poly Bottles with Caps and Septa, Pkg. of 72	064232
Trace Analysis Cover	064052
Sample Rack for 250 mL Nalgene Bottles. 15 Position	064234
Sample Probe PTFE Lined and Sleeved for AS-HV	064056
PEEK Probe	064254
Standards Rack Kit, Six Position	064252
10 mL Syringe for AS-HV	064224
USB to RS-232 Cable	064261
Rheodyne, 6-Port, Automated Injection Valve	063573
Relay Cable for Externally Controlled Pump	064350

Racks

Sample rack for 50 mL vials (30 mm o.d.) 21 position 074050
Sample rack for 26 mL vials (24 mm o.d.) 24 position 074049
Sample rack for 15 mL vials (20 mm o.d.) 40 position 074048
Sample rack for 10 mL vials (16 mm o.d.) 60 position 074047
Sample rack for 60/40 mL ASE collection vials 21 position 072733
22 mm Septa Crosscut for 250 mL Nalgene Bottle..... 064256

AS-HV Vials

50 mL centrifuge tube, 28 × 114, PP, 250/case 074050
26 mL tube, 87 × 23.5 mm, PS, 500/case 074049
15 mL centrifuge tube, 76 × 20 mm, PP, 500/case 074048
10 mL centrifuge tube, 97 × 16 mm, PS, 100 pieces/bag 074047

Note: *The ASHV can accomodate up to three of the racks shown above (one type only).*

MX Six-Port Injection Valve



The Rheodyne MX Series II automated fluidic valve provides added flexibility where stand-alone injection is required. Easily combine the MX with the valves in your existing instrument to support complex fluid switching and sample injection needs.

Ordering Information

Hardware

Rheodyne, 6 Port, Automated Injection Valve..... 063573

IC & RFIC Column Compartments



Dionex offers a selection of column compartments to organize columns and achieve precise thermostatting for ultimate retention time reproducibility.

ICS-5000 Thermal Compartment



Get the benefits of better separations and reproducibility with precise temperature control. The ICS-5000 TC Thermal Compartment—for use with optical or MS detection—enhances performance by integrating column temperature regulation with injection valves. This maximizes thermal stability and minimizes extracolumn volumes.

- Wide temperature range of 5–85 °C
- Precise temperature control
- Fast heat up and cool down times
- Single-zone oven minimizes tubing lengths for less delay volume and better peak efficiency
- Single and dual valve configurations
- Column ID chip system for monitoring column properties and usage
- Optional heat exchangers for optimal eluent temperature and improved reproducibility

Key Specifications

Temperature Range: 5–85 °C (maximum cooling 18 °C below ambient)

Temperature Accuracy: ±0.5 °C

Temperature Stability: ±0.1 °C

Temperature Precision: ±0.1 °C

Column Capacity: three columns; max. 30 cm in length

Heat-Up/Cool-Down Time: Typically 15 min from 20 °C to 50 °C; typically 15 min from 50 °C to 20 °C

Inputs/Outputs: Two digital inputs/outputs, two relay outputs

Dimensions (h × w × d): 17.4 × 44.4 × 50.3 cm (6.8 × 17.5 × 20 in.)

Power Requirements: 90–265 V AC, 47–63 Hz

Operating Temperature Range: 10–35 °C (50–95 °F)

Operating Humidity Range: <80% relative, noncondensing

Ordering Information

Hardware	
Thermal Compartment, no valves	074108
Thermal Compartment, one 6-port valve, PEEK	074109
Thermal Compartment, two 6-port valves, PEEK	074112
Thermal Compartment, 6-port valve, 10-port valve, PEEK	070239
Thermal compartment, two 10-port valves, PEEK	074113

Detector/Chromatography Compartment



This compartment houses the detector, suppressor control, column thermal controller, and the preparation module. This combination provides complete tubing thermal stability and short connections between components. The CD and ED detectors are easy to install for immediate use.

- Innovative electrochemical detection technology
- Conductivity Detector (CD) features improved electronics for superior detection
- Dual conductivity and electrochemical detection provides increased flexibility and utility
- Optional Automation Manager (AM) with extra valves for eluent addition and sample handling
- Supports AutoPrep, preconcentration, AutoNeutralization, matrix elimination, and postcolumn reagent addition
- Valve control integral to software, eliminating complicated TTL or relay programming

With the DC's flexible configuration and Chromeleon control, your possibilities have more than doubled. Configure your system for simultaneous injection and perform both anion and cation analysis with one injection. Perform two different anion applications. Or eliminate dilutions of unknown samples by running the same application with large loop/small loop injections.

Key Specifications

Temperature Range: Upper zone: 10–40 °C; Lower zone: 10–70 °C

Temperature Accuracy: ±0.5 °C

Temperature Stability: ±0.2 °C

Temperature Precision: ±0.2 °C

Lower Column Section: injection valves: 1 or 2 ea., 6- or 10-port, standard bore (SB) or microbore (MB)

Column Capacity: up to two column sets, 1–9 mm; maximum column length: 250 mm plus 50 mm guard column; precolumn heat exchangers: 2

Automation Manager (Option): Twn high-pressure injection valves, 6- or 10-port; 2 low-pressure valves, two or three way;

Reaction Coil Heater (Option): 5 °C above DC upper compartment temperature to 80 °C, 2 coils

Leak Detection: optical leak sensor

Power Requirements: 90–265 V AC, 47–63 Hz

Dimensions (h × w × d): 44.5 cm × 42 cm × 57 cm (17.5 in × 16.5 in × 22.5 in)

Ordering Information

DC Compartment	
DC with Dual Temperature Zones, no injection valves, capillary	072006
DC with Dual Temperature Zones, one injection valve, standard bore	072012
DC with Dual Temperature Zones, two injection valves, standard bore	072014
DC with Dual Temperature Zones, one injection valve, microbore	072020
DC with Dual Temperature Zones, two injection valves, microbore	072022

Automation Manager	
AM Automation Manager with One 6-Port high-pressure valve and one low-pressure 3-way valve	061740
AM Automation Manager with one 10-port high-pressure valve and one low-pressure 3-way valve	061736
AM Automation Manager with two 10-port high-pressure valves and two low-pressure 3-way valves	061738
RCH-1 Reaction Coil Heater	061746
Knitted Reaction Coil, 500 µL, Potted (PCH-2)	039349
Spooled Reaction Coil, 750 µL (PCH-2)	037859

ICS-5000 IC Cube



The IC Cube module, the latest innovation from Dionex, allows the use of capillary consumables on the ICS-5000. Any ICS-5000 analytical system can be converted to a capillary system by utilizing an ICS-5000 capillary pump and adding the IC Cube to the DC upper compartment. The IC Cube is used to conveniently house and configure the cartridges used in capillary IC, such as:

- Capillary EG degasser
- Injection valve (4-port, 2 position)
- Capillary separation and guard column
- Capillary electrolytic suppressor
- Capillary carbonate removal device
- Column ID chip system for monitoring column properties and usage
- Optional heat exchangers for optimal eluent temperature and improved reproducibility

The ICS-5000 system has adequate room for one or two IC Cube modules, both with independent temperature control of the separation column. In this way, dual-channel, capillary-based systems can actually perform analysis with columns running at two different temperatures (for example, 30 ºC on channel one and 60 ºC on channel two).

Key Specifications

Up to two independent IC Cubes, each containing:
High-Pressure Injection Valves, EG Degasser, Column and Guard, Carbonate Removal Device.

Injection Valves: Up to two (one per cube) high pressure valves, 4-port, 2 position

Capillary Column Heater: 15 to 85 °C

Note: IC Cubes and cartridges are customer installable with preformed tubing and color-coded labeling

More information on Capillary Suppressor: See the Suppressor section

Ordering Information

Hardware	
IC Cube Module, with 4-port valve (no consumables)	072000
ACES 300 Anion Capillary Electrolytic Suppressor	072052
CCES 300 Cation Capillary Electrolytic Suppressor	072053
CRD 200 Capillary	072054
Capillary IC Degas	072051

IC & RFIC Detectors



Dionex detectors are designed for high sensitivity and minimum peak dispersion with all PEEK flow paths making the detectors compatible with eluents of pH 0–14.

- ICS-5000 CD conductivity detector with integrated design and plug-and-play capability
- The ICS-5000 ED, the latest, most innovative electrochemical detector known
- VWD Variable Wavelength Detector in either single or four wavelength configuration
- 1024-element PDA Photodiode Array Detector for broad spectral range high-resolution 3-D absorbance detection

Also see the Mass Spectrometry section.

ICS-5000 CD Conductivity Detector



The CD Conductivity Detector handles any IC application, from single-column methods with high background signals to determination of trace contaminants in high purity water, without disruptive range change distortions.

- Microprocessor-controlled digital signal processing detects high and low concentrations
- Large dynamic range: up to 15,000 µS/cm
- Snap-in design, no cables or tools required for installation
- Minimizes noise while maximizing sensitivity
- Electronics integrated between the cell and detector for greater stability
- Independent temperature control, separate from the rest of the DC module

Key Specifications

Electronics Type: microprocessor-controlled digital signal processing

Detection Type: single and dual conductivity detection

Cell Drive: 8 kHz square wave

Linearity: 1% at 1000 µS/cm

Resolution: 0.00238 nS

Output Range: 0–15,000 µS, digital or analog

Electronic Noise, Wet: <0.2 nS at 23 µS/cm background, <0.1 nS at 1 µS/cm background

Filter: rise times of 0–10 s

Temperature Compensation: default at 1.7%; programmable at 0–3%

Autoranging: Autoranging digital conductivity signal monitoring with Chromeleon software

Ordering Information

Hardware	
CD Conductivity Detector (Analytical) and Integrated Cell	061716
Remote Detector Housing for CD	063725
CD Conductivity Detector (Capillary)	072041

ICS-5000 ED Electrochemical Detector



The ICS-5000 ED Electrochemical Detector features a new cell design along with a newly designed reference electrode. The rugged the new yoke-knob assembly provides consistent compression to the working electrode and cell gasket. Exciting innovations will create new opportunities for your laboratory.

- One-piece combination pH and Ag/AgCl reference electrode for consistency and reliability
- Yoke-knob design for reproducible installation of working electrode and cell gasket
- Microprocessor-controlled digital signal processing
- DC amperometry, cyclic voltammetry, and integrated amperometry including 3-D (current, voltage, retention)
- Multiple waveforms and integration times to optimize conditions for individual analytes
- 3-D display of raw integrated amperometry data similar to PDA data display
- Integrated amperometry mode with complete freedom to change waveform profile segments
- Dual-detection configurations (detectors in series or parallel)

Key Specifications

Electronics Type: microprocessor controlled digital signal processing

Electronic Noise: <80 pC; DC Amperometry <5 pA

Potential Range: -2 V to + 2 V in 0.001 V increments

Signal Range, Digital and Analog: DC amperometry: 5 pA to 74 µA; integrated amperometry: 50 pC to 200 µC

Filter: 0–10 s response time

Control Mode: local or remote using relay closures, TTL, or Chromeleon using DC module

Cell Body: titanium body and inlet tubing, compatible with 2 and 4 mm i.d. columns; pressure rating 120 psi when fully assembled

Working Electrodes: disposable gold, silver, and platinum; conventional gold, silver, platinum, and glassy carbon

Reference Electrode: pH-Ag/AgCl combination

Autoranging: autoranging digital amperometry with Chromeleon Data System software.

Analog Output: user-selectable full scale of 10, 100, or 1000 mV

Working Cell Volume: <0.5 µL

Maximum Operating Pressure: 0.7 MPa (100 psi)

Ordering Information

Hardware	
ED Electrochemical Detector (without cell)	072042
ED Cell (no working or reference electrode)	072044
Ag/AgCl pH Reference electrode	061879

ED Detector Conventional Working Electrodes	
ED Electrode, Au, with Gasket and Polishing Kit	061749
ED Electrode, *AAA*, with Gasket and Polishing Kit	063722
ED Electrode, Ag, with Gasket and Polishing Kit	061755
ED Electrode, Pt, with Gasket and Polishing Kit	061751
ED Electrode, GC, with Gasket and Polishing Kit	061753
3 mm Gold Working Electrode with Gasket and Polishing Kit	063723
AAA-Direct Installation Kit	059539

Disposable Working Electrode for ED, ED50A, ED50, and ED40 Amperometry Cells	
Disposable Electrodes for Amino Acids, Pkg. of 6 with 2 Gaskets	060082
Disposable Electrodes for Amino Acids, Pkg. of 24 with 8 Gaskets	060140
Disposable Electrodes for Carbohydrates, Pkg. of 6 with 2 Gaskets	060139
Disposable Electrodes, Gold on Polyester, Pkg. of 24 with 8 Gaskets	060216
Gasket for Disposable Electrode, Pkg. of 4	060141
Silver Disposable Electrodes, Pkg. of 6 with 2 0.002" Gaskets	063003
Platinum Disposable Electrodes, Pkg. of 6 with 2 0.002" Gaskets	064440
Carbohydrate Removal Accessory Kit for ICS-2500	063522
Carbohydrate Removal Accessory Kit for ICS-3000 DP	064418
Carbohydrate Removal Accessory Kit for ICS-3000 SP	070510
Carbon on PEEK Disposable Electrode, Pkg. of 6	069336
Gold on PTFE Disposable Electrode, Pkg. of 6	066480

ICS Series Variable Wavelength Detector



The high-performance ICS-5000 VWD dual lamp detector is available in either single or four wavelength capability with PEEK flow cells.

- High signal-to-noise ratio for maximum sensitivity
- Broad wavelength range from 190 to 900 nm
- Deuterium and tungsten lamps for low noise and high intensity over the full spectral range
- Full control and data collection through Chromeleon software via USB
- Digital data collection rates up to 100 Hz
- Built-in holmium oxide filter for easy verification of wavelength accuracy
- Low baseline drift for reliable results

Key Specifications

Noise: typically <±2.5 µAU at 254 nm

Drift: <0.1 mAU/hr at 254 nm

Wavelength Accuracy: ±1 nm

Wavelength Bandwidth: 6 nm at 254 nm

Linearity: up to 2.5 AU

Data Collection Rate: up to 100 Hz (multiple wavelength version); up to 10 Hz (single wavelength version)

Flow Cell: PEEK, 11 µL volume, 10 mm path length (Analytical); 2.5 µL, 7 mm path length (semimicro)

Lamps: simultaneous tungsten and deuterium

Analog Outputs: Two: absorbance, 20-bit resolution, 0–1 Volt and 0–10 Volt

Dimensions (h × w × d): 15.2 × 44.4 × 50.3 cm, (6.0 × 17.5 × 20 in.)

Power Requirements: 85–265 V AC, 47–63 Hz

Operating Temperature: 10–35 °C (50–95 °F)

Operating Humidity Range: <80% relative, noncondensing

Ordering Information

Hardware	
VWD Variable Wavelength Absorbance Detector, Single Wavelength	069116
VWD, 4 Wavelengths, No Flow Cell	069117
Digital/Analog Converter for VWD with Cables	066349
VWD Analytical Flow Cell, PEEK, 10 mm, 11 µL	066346
Semi-micro Flow Cell for VWD-3x00, SST, 2.5 µL	6074.0360

ICS Series Photodiode Array Detector



The ICS-5000 Series Photodiode Array Detector maximizes your optical absorbance information by providing full UV-Vis spectra in high resolution along with an ultra-quiet optical bench for excellent detection performance.

- 1024-element photodiode array for optimum wavelength resolution
- Broad wavelength range from 190 to 800 nm
- Deuterium and tungsten lamps for low noise and high intensity over the full spectral range
- Full control and data collection through Chromeleon Data System software with 3-D option
- USB-based digital data collection for simple installation
- Four analog outputs to support alternate data collection
- Built-in holmium oxide filter for easy verification of wavelength accuracy
- Low baseline drift for excellent reliability and reproducibility

Key Specifications

Noise: ±10 µAU at 254 nm (flowing water, 2-s rise time); ±15 µAU at 520 nm (flowing water, 2 s rise time)

Drift: < 500 µAU/h

Wavelength Accuracy: ±1 nm, self-calibration with deuterium lines, verification with built-in holmium oxide filter

Resolution: 1 nm

Linearity: <2 AU

Photodiode Array: 1024 element

Pixel Resolution: 0.7 nm

Optical Resolution: 1.0 nm

Lamps: tungsten and deuterium, simultaneous operation

Analog Outputs: four, 0–3 AU, 1000 mV range

Flow Cell Materials: PEEK, fused silica, SST

Flow Cell Pressure Limit: <2 MPa (300 psi) PEEK, <3 MPa (500 psi) SST

Dimensions (h × w × d): 17.4 × 44.4 × 50.3 cm, (6.8 × 17.5 × 20 in.)

Power Requirements: 90–265 V AC, 47–63 Hz

Operating Temperature and Humidity Range: 4–40 °C (40–104 °F); <95% relative, noncondensing

Ordering Information

Hardware	
PDA Photodiode Array Detector	074114
Absorbance Cell, PEEK, 13 µL	056346
Absorbance Cell, Semi Micro, PEEK, 3 µL, 9 mm Path Length	064169
Absorbance Cell, Semi Prep, PEEK, 0.7 µL, 0.4 mm Path Length	064167

Software	
Chromeleon option for PDA Full Spectrum Data Acquisition	060728

Postcolumn Reaction Systems



Postcolumn reagent chemistries, as delivered by the PC10 Postcolumn Pneumatic Delivery System, can often extend detection limits for ions that would otherwise exhibit detection sensitivity.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

PC10 Postcolumn Delivery System

PC10 Postcolumn Delivery System

The PC10 Postcolumn Pneumatic Delivery System ensures a constant, pulseless flow of reagent. It assures optimal flow by applying constant pressure, eliminating the need for a pump and its associated moving parts, labor, and expense.

The PC10 Automation Kit option supports automation of the PC10. The kit includes a two-way valve to shut off flow from the PC10 to the analytical system, and a solenoid for valve control. Do not use this kit if configuring an ICS-3000. Instead, use the solenoid valves with the DC.

Ordering Information

Accessories	
PC10 Postcolumn Pneumatic Delivery Pkg., 4 mm	050601
PC10 Postcolumn Pneumatic Delivery Pkg., 2 mm	053591
PC10 Pneumatic Controller	043903
Pressurizable Chamber	037460
PC10 Reagent Organizer	050602
Knitted Reaction Coil, 375 µL, Unpotted	043700
Knitted Reaction Coil, (For 2 mm system, 125 µL)	053640
PC10 Automation Kit	050603

Process Analytical Technology

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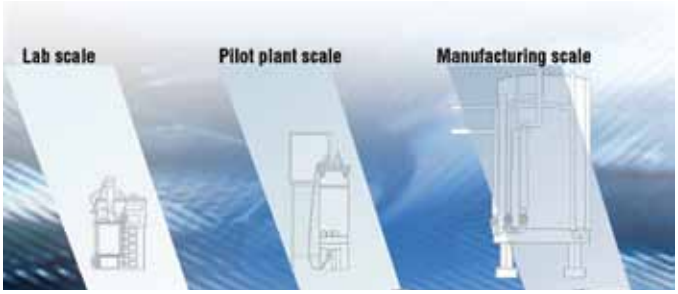
Process Analytical Systems and Software

Improve your process by improving your process monitoring with a Dionex on-line IC or HPLC system

Dionex process analytical systems provide timely results by moving liquid chromatography-based measurements on-line. Information from the Integral Process Analyzer can help reduce process variability, improve efficiency, and reduce downtime. These systems provide comprehensive, precise, accurate information faster than is possible with laboratory-based results. From the lab to the factory floor, your plant's performance will benefit from the information provided by on-line LC.

- Characterize your samples completely with multicomponent analysis
- Reduce sample collection time and resources with automated multipoint sampling
- Improve your process control with more timely results
- See more analytes with unique detection capabilities
- 25 years of experience providing on-line IC and HPLC capabilities to a wide range of industries.
- Integral Migration Path lets you choose the systems that best meets your needs

The Integral Migration Path approach enables on-line IC/HPLC to generate timely, high-resolution information when monitoring a small-scale reactor in a process R&D lab, in a pilot plant, or improving current a manufacturing plant. No matter what the application, Integral has the versatility to place a solution using on-line IC/HPLC, whenever and wherever it is needed.



Integral: Integral Migration Path: System solutions wherever you need them: lab, pilot plant, or manufacturing.

Chromeleon PA: Chromeleon PA software provides unique capabilities to support on-line IC or HPLC analysis

Integral



Integral systems provide a versatile and adaptable approach to process analytical LC systems. An unsurpassed range of IC and HPLC capabilities are combined with configurable sample systems and adaptable off-the-shelf industrial enclosures options. Configure solutions for R&D labs, pilot plants, or production environments.

- Configure sampling modules with ICS-5000 and ICS-2100 RFIC, or UltiMate 3000 HPLC systems
- Automated, multipoint sampling options
- Automated sample preparation
- Off-the-shelf enclosure options
- Chromeleon PA Process Analytical software for system control, data analysis, connectivity

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Integral Process Analytical Systems Brochure

Product Data Sheets

Application Notes

SS Stream Selector Module



The SS Stream Selector module automatically selects from up to 21 sample streams for analysis. The SS can be configured to deliver samples to up to four IC or HPLC systems running in parallel. Samples streams configurable to flow to waste, sample recovery systems, deadhead at the valve, or return to the process. Streams can be sampled in sequence or randomly.

- SS available with 1, 2, or 3 multiposition valves for 7, 14, or 21 stream capacity
- Multi-position valves available in PEEK or stainless steel
- Module equipped with liquid leak detection and ambient temperature sensors
- Module configurable with optional expansion electronics and accessories

Key Specifications

Enclosure options: Stand-alone for lab installations, internal for industrial enclosure, or mounted on a wall. Available in horizontal or vertical orientation.

Expandable: Add 1, 2, or 3 stream selection valves for 7, 14, or 21 sample streams

Stream Selection Valves: 17-port PEEK or stainless steel

Solenoid Valve Control: Connections available for up to 10 valves

Temperature Sensor: RTD sensor, +/- 1 °C

Leak Detection Sensor: Optical type sensor; no calibration required

Ordering Information

Ordering information is provided for your reference. Contact your local representative for assistance in choosing the appropriate standard SP module or to configure a custom configuration SP for your particular application.

Hardware	
SS Stream Selector, 1 Valve, Ext, PEEK	069090
SS Stream Selector, 1 Valve, Int, PEEK	069095
SS Sampling Valve and Tubing Kit, PEEK	068535
SS Stream Selector, 1 Valve, Ext, SST	069100
SS Stream Selector, 1 Valve, Int, SST	069105
SS Sampling Valve and Tubing Kit, SST	068540

SP Sample Preparer Module



The SP Sample Preparer provides versatile, automated sample preparation capabilities prior to chromatographic analysis. The SP module is designed for continuous, unattended operation. The SP can be configured with Dionex benchtop IC or HPLC systems or compbined with the AE and/or LE enclosure options for applications in industrial environments.

- Sample and standard selection
- Dilution of standards or samples
- Addition of reagents prior to analysis
- Analyte pre-concentration on selective resin columns
- Available in pre-defined or custom configurations.
- Sample mixing, heating, and standard cooling
- Sensors to monitor sample flow, pressure, and pH
- Module equipped with liquid leak detection and ambient temperature sensors

The SP Sample Preparer can be configured with multiple devices to perform a variety of sample preps prior to chromatographic analysis. Enclosure options are available for stand-alone operation in a lab or mounted internally or externally as part of the industrial enclosure in horizontal or vertical configurations.

Key Specifications

Dilution Pump: Variable speed, stepper motor drive

Loading Pump: Variable speed, stepper motor drive

Loading Pump: Peristaltic pump

Stream Diversion Valves*:* 3-way solenoid valves, PEEK

Metering (Dilution) Valve: 2-position, 6- or 10-port, PEEK or stainless steel

Dilution vessel: 50 mL heated PEEK or 200 mL unheated HDPE

Dilution Vessel Mixer: Variable speed, magnetic stirrer

Standard Vial Cooler: Peltier cooled block, designed for 20 mL scintillation vial

Flow Sensor: Thermal pulse type, PEEK, 0.1–5.0 mL/min

Liquid Level Sensors: Up to 4 capacitance type sensors for polymer bottles

Leak Detection Sensor: Optical type sensor; no calibration required

Pressure Sensor: 0–10 V output, up to 1,000 psi

Temperature Sensor: RTD sensor, +/- 1 C

TTL In / Relay Out: 8 TTL inputs, 9 relay outputs

Analog Inputs: 4 inputs, 0–10 V

Ordering Information

Hardware	
SP1 Sample Preparer; Conc. or Direct Inj., Ext., Vert	069076
SP1 Sample Preparer; Conc. or Direct Inj., Int., Horiz	069078
SP2 Sample Preparer; Dil. or Direct Inj., Ext., Vert	069079
SP2 Sample Preparer ; Dil. or Direct Inj., Int., Horiz	069081
Custom configurable version	
SPx Sample Preparer; Base, Int., Horiz	069084

AE Analyzer Enclosure



The AE Analyzer Enclosure provides an adaptable housing for a variety of IC or HPLC system configurations when installation is required in an industrial environment. The enclosure is designed to provide a suitable environment for the instrument inside.

- Stainless steel construction for a long-lasting and low-maintenance investment
- Open access to enable multiple IC or HPLC instrumentation options
- Slide-out shelves and tool-free access panels enable ready access to instrumentation
- Gasketed doors and openings prevent contamination
- Optional air conditioning unit for elevated ambient temperatures
- Purge options available for installation in explosive atmospheres
- On-board Windows-based controller and panel-mounted LCD display

Key Specifications

Mounting Options: Wall mount (with kit) or mount on LE for stand-alone or wheeled configuration.

Enclosure Rating: NEMA 12 / IP52

Explosion Hazard Purge Options: Z-purge for NEC C1/D2, EU Zone 2. X-purge for NEC C1/D1, EU Zone 1

Blower: Standard option for NEMA 12 / IP52 environment

Air Conditioner: Use when ambient temperature exceeds 35 ºC

Operating Temperature Range: 4–40 ºC (40–104 ºF)

Operating Humidity Range: 5–95% RH, noncondensing; 100% RH with air conditioner or air purge

Temperature Sensor: RTD sensor, +/- 1 C

Leak Detection Sensor: Optical type sensor; no calibration required

Dimensions (h × w × d): 113 cm × 76 cm × 69 cm (45 × 30 × 28 in) with blower on side

Weight: 70 kg (155 lb) empty

Ordering Information

Hardware	
AE Analyzer Enclosure	069070
AE Purge Unit, Z-Purge	068546
AE Purge Unit, X-Purge with Power Isolation and Keyed Bypass	070187
Dell Optiplex 780 Ultra Small Form Factor PC with Windows XP, 4G RAM, 320GB HD, 3.0 GHz Duo Core E8400 Processor, no keyboard, no mouse	071665
AE Display Kit and Controller Enclosure	069094
Logitech MK300 Wireless Keyboard And Mouse	071666
AE Ventilation Blower	068544
AE Air Conditioner, 120V AC, 50/60Hz	068545
AE Air Conditioner, 240V AC, 50/60Hz	069093

LE Liquid Enclosure



The LE Liquids Enclosure provides an optional base for the AE for stand-alone or wheeled installations. The LE provides a means of isolating and protecting liquid containers for eluent, reagents, or standards.

- Stand-alone or wheeled operation; provide means of transporting within a facility
- Tempered glass door for easy viewing of contents
- Slotted shelves provide protection of containers from leaks or spills
- Optical leak detection sensors
- Preconfigured with threaded drain for leak management
- Can be used as an expansion enclosure for additional IC or HPLC instrumentation
- Liquid and gas manifold between AE and LE; isolate or allow air flow between enclosures

Key Specifications

Enclosure Options: Use LE beneath AE for stand-alone or wheeled operation of analyzer

Fluidics I/O: Configured at fluidics I/O panels located between AE and LE and on side and bottom of LE.

Gas Controller: Panel mounted regulator to maintain head pressure on eluent, reagent, standard bottles

Leak Detection Sensor: Optical type sensor; no calibration required

Leak Management: Slotted shelves provide protection of containers from leaks or spills. Drain located on bottom I/O panel

Casters: Double wheel design for low profile and system stability

Dimensions (h × w × d): 75 cm × 64 cm × 68 cm (30 × 25 × 27 in.)

Weight: 75 kg (166 lb) empty

Ordering Information

Hardware	
LE Liquids Enclosure	069075
NOWPak 20-L PP Kit, with Pressurizable Dispenser Cap	068551

Chromeleon PA

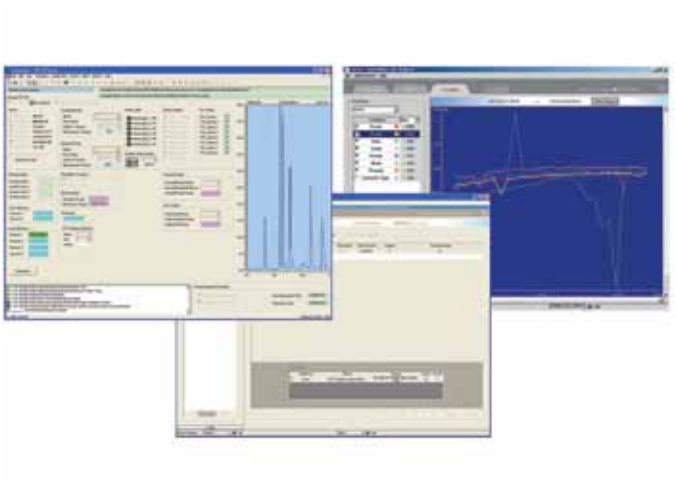
Designed for reliability, ease of operation, reproducibility, accuracy, and regulatory compliance

Chromeleon PA Process Analytical software is part of a total solution for continuous process monitoring using ion chromatography or HPLC. Chromeleon PA 6.8 is the latest generation of process analytical software from Dionex. This solution is based on Chromeleon 6.8 and incorporates a unique analyzer interface to expand the user's ability to configure, control, monitor, and report data from multiple IC or HPLC systems configured for continuous monitoring.

- Consistent user interface for laboratory and process systems; save on training costs
- Common platform enables electronic transfer of methods from the lab to the process
- Real-time display of current analyzer status and historical trending of results
- Supports remote monitoring and control of analyzer
- Analyzer security controlled through multi-level access linked to user logon ID
- Designed for pharmaceutical industry regulatory compliance (CFR21, Part 11)
- Built-in audit trail; date and time stamp all analyzer actions
- User defined alarms and alarm actions; link events to analyzer results

Chromeleon PA provides total control of the Integral on-line LC analyzer. It enables automated, unattended sampling, sample preparation, and analysis of your process. Chromeleon PA's Results Based Events enable the end-user to configure the software to automatically make decisions based on the analyzer's results. You define the alarm setpoints and the alarm actions. Change sampling sequences, analysis frequencies, sample preps, or analysis methods all automatically without operator intervention.

Chromeleon and Chromeleon PA were designed to meet the challenges of the regulated environment. It is fully validated, has multiple access levels linked to the user's log-on ID, and has capabilities for automated system suitability including the ability for the user to define the tests performed and the acceptance criteria.



Integrated process control software sets up and controls systems, monitors status, and reports process results.

Process Analyzer with Chromeleon PA

Achieve near real-time control of your process by integrating Integral with your process control system using industry–. standard OPC. The Chromeleon PA OPC server option enables bi-directional exchange of information with other OPC servers on your plant network. This enables the Integral analyzer to send process results to your control system for near real-time decisions. The OPC server can also be used to exchange analyzer operating information and control commands with your control system.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature at www.dionex.com.

Product Brochures

Integral Process Analytical Systems Brochure

Product Data Sheets

Integral Process Analytical Liquid Chromatography Systems

Ordering Information

Ordering information is provided for your reference. Contact your local representative for assistance in configuring Chromeleon PA software for your particular installation.

Software

Chromeleon PA 6.80 Base Server and Client Bundle 070182

Chromeleon PA 6.80 Analyzer Client License 070176

Chromeleon Class 1 Timebase 060722
Order 1 license for each system on the server

Chromleon Client Option—GLP 060731
Order for GLP or GMP applications

Chromeleon PA 6.80 OPC Server 070178
Order for systems requiring data transfer to external systems

Chromeleon Remote License Timebase 061366
Order for analyzer monitoring and/or control

Server Option: Multiple Network Control & Network Failure 060725
Order for data strorage on the remote server

Mass Spectrometry

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MS Instruments

Single-point control and automation for improved ease-of-use in LC/MS and IC/MS

Dionex provides advanced integrated IC/MS and LC/MS solutions with superior ease of use and modest price and space requirements. UltiMate 3000 System Wellness technology and automatic MS calibration allow continuous operation with minimal maintenance. The ICS-5000 instrument and the family of RFIC systems automatically remove mobile phase ions for effortless transition to MS detection.

- MSQ Plus, the smallest and most sensitive single quadrupole on the market for LC and IC
- Self-cleaning ion source for low-maintenance operation
- Chromeleon software for single-point method setup, instrument control, and data management
- Compatible with existing IC and LC methods
- The complete system includes the MSQ Plus, PC data system, ESI and APCI probe inlets, and vacuum system

You no longer need two software packages to operate your LC/MS system. Chromeleon LC/MS software provides single-software method setup and instrument control, powerful UV, conductivity, and MS data analysis, and fully integrated reporting.



MS Systems and Modules: MSQ Plus Mass Spectrometer; MSQ18LA Nitrogen Gas Generator; AXP-MS digital auxiliary pump

MS Systems and Modules



The MSQ Plus features a newly designed self-cleaning Atmospheric Pressure Ionization (API) source for outstanding sensitivity and noise reduction. Compatible with existing LC and IC methods, the MSQ Plus is more sensitive, rugged, powerful, easier to use, and smaller than any other instrument of its kind.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

MSQ Plus Mass Spectrometric Detector

MSQ18LA Nitrogen Gas Generator

AXP-MS Auxiliary Pump for Mass Spectrometry Data Sheet

MSQ Plus Mass Spectrometer



The MSQ Plus Mass Spectrometer can be used in a wide range of applications and methodologies in both HPLC and IC. Only 12 in. wide, the MSQ Plus is by far the most compact mass spectrometer on the market today. It provides universal detection and characterization of analytes in the 17–2000 m/z range.

- New M Path source design virtually eliminates neutral noise and background
- Unique FastLoc probes provide simple and rapid changes for both ESI and APCI modes
- All features fully supported in Chromeleon CDS
- Full scan and Selected Ion Monitoring allow rapid screen and target compound analysis
- Quadrupole analyzer maximizes resolution and provides high stability and minimal drift
- Enhanced low-mass response for analytes below 60 m/z
- All new Ion Bright detector system eliminates neutral noise, extending the dynamic range
- Advanced autotuning wizard includes full system optimization and mass scale calibration

The MSQ Plus features a high-sensitivity, self-cleaning ESI/APCI ionization source that requires no mechanical adjustment or electrostatic focusing for sample optimization. The compact source design is optimized for a wide range of flow rates and supports a wide range of chromatographic buffers.

Note: *Sensitivity specifications below are based on loop injections at a flow rate of 1 mL/min in SIM mode. Noise is RMS after appropriate smoothing.*

Key Specifications

Power Requirements: 230 V AC 13A power outlets (for rotary pump and MSQ Plus); 230 or 115 V ac (as required) for PC and monitor and additional hardware

Gas Requirements: MSQ Plus requires a supply of high-purity (>99%) nitrogen capable of supplying 12 L/min at 75 psi (5 bar).

Dimensions (h × w × d): 530 × 300 × 710 mm (21 × 12 × 28 in.)

Weight: 60 kg (132 lb)

Ionization Modes (supplied as standard): Electrospray (ESI), Atmospheric Pressure Chemical Ionization (APCI)

Range: 17–2000 m/z

Sensitivity, positive ion ESI: 50 pg injection (10 µL × 5 pg/µL) of erythromycin: 1000:1 S/N

Sensitivity, negative ion ESI: 20 pg loop injection (10 µL × 2 pg/µL) of p-nitrophenol: 500:1 S/N

Sensitivity, positive ion APCI: 50 pg injection (10 µL × 5 pg/µL) of erythromycin: 200:1 S/N

Sensitivty, negative ion APCI: 20 pg injection (10 µL × 2 pg/µL) of p-nitrophenol: 50:1 S/N

Ordering Information

Hardware

MSQ Plus Mass Spectrometric Detector, Computer, and Software 063116

Accessories

Odor Removal Filters (5) for MS Vacuum Pump Oil Trap..... 063142
Kit for MSQ PM and Annual Maintenance 061494
Kit for API Probe Maintenance 061495
Perchlorate O-18 Internal Standard, 1 mg/L, 10 mL 062923

Software

Chromeleon Mass Spec Software Control Option..... 060726

AXP-MS Auxiliary Pump for MS



The AXP-MS single-piston pump uses a digital stepper drive and rapid refill to deliver precise and accurate flow. An internal transducer provides pressure display and monitoring capability. The AXP-MS is a high-quality auxiliary pump for MS support or general metering applications. It is also useful as a flow source when other pumping is not available or may be inconvenient.

- Wide flow range
- Internal pulse damper
- Fully IC and biocompatible
- Positive seal-washing standard to extend seal life by removing salts and wetting the seal
- Easy maintenance
- Flexible, advanced Chromeleon software control (version 6.8 or later)
- Integrated injection valve with a purge/priming port for precise flow or loop injections

Key Specifications

Rated Pressure: 2500 psi

Flow Rates: 0.01–1.00 mL/min

Flow Accuracy: 3% throughout flow range

Pressure Pulsation: 2% peak-to-peak at 100 psi, 1 mL/min with in-line pulse damper

Flow Rate Precision: 0.5% at calibration pressure

Control: full serial/USB control with Chromeleon 6.8 system software or later; generic serial driver control (no status feedback); front panel and relay control

Dimensions (h × w × d): 6.5 × 6.5 × 10 in.

Weight: 15 lbs

Power: 120/230 V AC; 50/60 Hz

Materials: PEEK, ceramic, and inert polymers

Ordering Information

Hardware	
AXP-MS Auxiliary Pump	060684

MSQ18LA Nitrogen Gas Generator



With constant pressure, flow, and purity, the MSQ18LA gives you complete independence from cylinder changes, gas costs, and associated administration charges. In addition, you will realize the maximum safety, convenience, and productivity for your instrument.

- Constant gas supply
- Up to 15 times more economical than cylinders
- Simple installation
- Minimal servicing requirements
- Internal air compressor
- CE approved
- Energy efficient

The quiet-running MSQ18LA uses membrane technology to selectively remove moisture, oxygen, and other gasses for clean, dry, phthalate-free nitrogen at a maximum flow rate of 18 L/min. The internal oil-free air compressor ensures years of operation with no fall-off in purity or performance. Its PLC features a total-run hour count for the compressor, and tracks time until next service.

Note: *The MSQ18LA is for the operation of a single MSQ MS.*

Key Specifications

Flow Rate: 18 L/min

Outlet Pressure: 100 psi (7 bar)

Internal Air Compressor: yes

Particles >0.01 µm: none

Electrical Requirements: 220 V 50/60 Hz 4A

Outlet Port: 6 mm

Dimensions: 35 × 17 × 16 in./89 × 43 × 41 cms

Weight: 90 lbs (40 kg)

Product Certificate: CE approved; EN61010:1993; EN60204:1992; EN50116:1996

Ordering Information

Hardware	
MSQ18LA Nitrogen Generator for MS	068126
Filter Maintenance Kit for MSQ18LA	068349

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ASE Accelerated Solvent Extractors

Superior extractions using less time and solvent

- US EPA Methods 3545A, 6850, and 6860
- CLP SOW OLM 0.42
- ASTM Standard Practice D-7210 and D-7567
- Chinese Method GB/T 19649-2005
- German Method L00.00-34



ASE Systems: ASE uses solvents at elevated temperatures and pressure to extract organic and ionic compounds from solid samples.

ASE Systems

Two new solvent extraction systems with pH-hardened Dionium components

Dionex offers two solvent extraction systems. The ASE 150 is an entry-level system with a single extraction cell, for laboratories with modest throughput. The ASE 350 is a sequential extraction system capable of automated extraction of up to 24 samples. Both systems feature chemically-inert Dionium components that allow the extraction of acid- or base-pretreated samples.



The ASE 150 Accelerated Solvent Extractor.



The ASE 350 supports automated extraction of up to 24 samples with variable cell sizes.

Related Literature

For detailed specifications and applications, see the following PDF documents under Documents on www.dionex.com.

Product Brochures

ASE Series Accelerated Solvent Extractors Brochure

Product Datasheets

ASE 150 Accelerated Solvent Extractor

ASE 350 Accelerated Solvent Extractor

Application Notes

Note: The following is only a sample of the application notes available using ASE instrumentation and methodlogies. Visit www.dionex.com for more application notes

AN 356: Determination of Perchlorate in Vegetation Samples Using Accelerated Solvent Extraction (ASE) and Ion Chromatography

AN 357: Extraction of Phenolic Acids from Plant Tissue Using ASE

AN 358: Extraction and Cleanup of Acrylamide in Complex Matrices Using Accelerated Solvent Extraction (ASE) followed by Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

AN 359: Extraction of Contaminants, Pollutants, and Poisons from Animal Tissue Using Accelerated Solvent Extraction (ASE)

AN 361: Extraction of Total Fat from Food Samples After Acid Hydrolysis Using Accelerated Solvent Extraction (ASE) with GC-MS Analysis

Ordering Information

Hardware

ASE 150 Accelerated Solvent Extractor 066400

This system does not include extraction cells. Installation is not covered. Installation is P/N 057798.

ASE 350 Accelerated Solvent Extractor 066050

This system does not include extraction cells. Installation is included.

ASE Parts & Accessories

ASE accessories to improve productivity and reduce the need for sample handling

Dionex offers ASE part and accessories to maintain high productivity in sample extraction. All are designed to meet the unqiue specifications of ASE instrumentation, and manufactured to meet the quality requirements of modern analytical laboratories.



ASE Starter Kits: All parts and accessories needed to begin using ASE

ASE Heat Exchanger: Cools solvent prior to collection.

ASE Resins and Dispersants: Better extractions with ASE Prep DE dispersant and drying agent, or Prep CR Cation-Exchange resin to absorb strong mineral acids.

ASE Cells: Extraction cells and cell parts for ASE systems.

ASE Filters and Thimbles: Filters and thimbles for uses in ASE extraction cells.

ASE Vials and Bottles: Collection vials for ASE systems. (Includes lids and septa).

ASE Starter Kits

Everything you need to start using ASE

ASE Starter Kits are customized to match your instrument and cell size requirements include rinse tubes, funnels, filters, and vials designed to match various ASE cell sizes the 34 mL and small-volume kits for ASE 350 include 60 ml collection vial inserts. The kits also include PEEK seals and o-rings for cell maintenence.

ASE Prep CR is a Dionex-proprietary cation exchange resin (NA form) designed to absorb strong mineral acids. Mix with acid hydrolyzed samples for lipid determination using ASE 150 or 350 systems.

Note: *Contact your local Dionex sales representative to confirm part numbers.*

Ordering Information

ASE 150 and 350 Starter Kits	
ASE 150 Startup Kit, Small Volume	068250
ASE 150 Startup Kit, 34 mL	068251
ASE 150 Startup Kit, 66 mL	068252
ASE 150 Startup Kit, 100 mL	068253
ASE 350 Startup Kit, Small Volume	068254
ASE 350 Startup Kit, 34 mL	068255
ASE 350 Startup Kit, Large Volume	068256

ASE Heat Exchanger

The ASE Heat Exchanger uses a water jacket to cool solvent as it leaves the extraction cells. It is useful for high-temperature extractions (above 150 °C) to minimize solvent or volatile analyte loss.

Note: *Contact your local Dionex sales representative to confirm part numbers.*

Ordering Information

ASE Heat Exchanger	
Heat Exchanger for ASE 150 or 350	068247

ASE Cells



Replacement cells and cell parts for ASE systems are provided in stainless steel (all ASE systems) and Dionium (ASE 150 and 350 only). Use the Dionium cells for samples that require treatment with acid or base.

Dionium ASE Cells

Ordering Information

Dionium Cell Kits for ASE 150 and 350	
66 mL Dionium Extraction Cell Kit, 1 cell for ASE 150 or 350	068102
100 mL Dionium Extraction Cell Kit,1 cell for ASE 150 or 350	068103
66 mL Dionium Extraction Cell Kit, 3 cell for ASE 150 or 350	068104
100 mL Dionium Extraction Cell Kit, 3 cell for ASE 150 or 350	068105

Stainless Steel ASE Cells

Ordering Information

Stainless Steel Cell Kits for ASE 150 and 350	
1 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068095
5 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068096
10 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068097
22 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068098
34 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068099
66 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068100
100 mL Stainless Steel Extraction Cell Kit, Pkg. of 6	068101
1 mL Stainless Steel Extraction Cell Kit, 1 cell	068085
5 mL Stainless Steel Extraction Cell Kit, 1 cell	068086
10 mL Stainless Steel Extraction Cell Kit, 1 cell	068087
22 mL Stainless Steel Extraction Cell Kit, 1 cell	068088
34 mL Stainless Steel Extraction Cell Kit, 1 cell	068089
66 mL Stainless Steel Extraction Cell Kit, 1 cell	068090
100 mL Stainless Steel Extraction Cell Kit, 1 cell	068091

Stainless Steel Cell Kits for ASE 100 and ASE 300	
10 mL Extraction Cell Kit, Pkg. of 6	060074
34 mL Extraction Cell Kit, Pkg. of 6	060075
66 mL Extraction Cell Kit, Pkg. of 6	060076
100 mL Extraction Cell Kit, Pkg. of 6	060077
10 mL Extraction Cell, 1 cell	060070
34 mL Extraction Cell, 1 cell	060071
66 mL Extraction Cell, 1 cell	060072
100 mL Extraction Cell, 1 cell	060073

Stainless Steel Cell Kits for ASE 200	
11 mL Extraction Cell Kit, Pkg. of 6 for ASE 200	049560
22 mL Extraction Cell Kit, Pkg. of 6 for ASE 200	049561
33 mL Extraction Cell Kit, Pkg. of 6	049562
1 mL Extraction Cell, Pkg. of 6 for ASE 200	055421
5 mL Extraction Cell, Pkg. of 6 for ASE 200	055422
1 mL Extraction Cell, Single for ASE 200	055815
5 mL Extraction Cell, Single for ASE 200	055817
11 mL Extraction Cell, Single for ASE 200	048765
22 mL Extraction Cell, Single for ASE 200	048764
33 mL Extraction Cell, Single for ASE 200	048763

ASE Cell Parts

O-rings, PEEK seals and frits require periodic replacement to ensure a proper seal and maximize extraction efficiency.

Ordering Information

Cell Parts for ASE 100, 150, 300 or 350	
100 mL Extraction Cell Body	056693
66 mL Extraction Cell Body	056696
34 mL Extraction Cell Body	056646
Frits, 10 µm SST, ASE Cells, Pkg. of 50	056775
ASE 300/100 PEEK Seals, Pkg. of 50	061687
Vespel Seals for ASE 300/100 Cell Caps, Pkg. of 50	056776
Vespel Seals for ASE 300/100 Cell Caps, Pkg. of 10	056777
Snap Ring for ASE Cell Caps, Pkg. of 10	056778
O-Rings, Teflon, ASE Cell Cap, Pkg. of 50	049457
O-Rings, Viton, ASE Cell Caps, Pkg. of 50	056325

Cell Parts for ASE 150 or 350	
Short Rinse Tube for Use with ASE 150	060174
Medium Rinse Tube for Use with ASE 150	060175
Long Rinse Tube for Use with ASE 150	060176
Endcap, package of 2, Dionium, for ASE 350	068107

Cell Parts for ASE 200	
11 mL Extraction Cell Body for ASE 200	048820
22 mL Extraction Cell Body for ASE 200	048821
33 mL Extraction Cell Body for ASE 200	048822
1 mL Extraction Cell Body for ASE 200	054973
5 mL Extraction Cell Body for ASE 200	054974
Extraction Cell End Caps, Pkg. of 2, Includes Frits, Seals for ASE 200	049450
Frits, 10 µm SST, ASE Cells, Pkg. of 50 for ASE 200 cells	049453
ASE 200 PEEK Seals, Pkg. of 50	049454
Snap Ring, ASE 200 Cell Cap, Pkg of 10	049456

ASE Filters and Thimbles

Use filters and thimbles in the extraction cells when extracting complex matrices to prevent plugging and maximize separation of the solvent extract from the matrix.

ASE Filters

Cellulose and glass fiber filters for use on the ASE systems specified below.

Ordering Information

Filters for ASE 150 and 350

Glass Fiber Filters for 1, 5, 10, or 22 mL Cells, 27 mm Type D28, Pkg. of 100 068092
Cellulose Filters for 1, 5, 10, or 22 mL cells, 27 mm Type D28, Pkg. of 100 068093
Filter, ASE 100 060941

Filters for ASE 100, 150, 300, or 350

Filters, Cellulose for 34, 66, or 100 mL Cells, Pkg of 100, ASE 300/100 056780
Filters, Glass Fiber, 30 mm, for 34, 66, or 100 mL Cell, Pkg 0f 100 056781
Filter, ASE 100 060941
Filters, Cellulose, for 5 mL Extraction Cells, Pkg. of 100..... 055399

Filters for ASE 200 Only

Filters, Cellulose for 11, 22, or 33 mL Cell, Pkg. of 100, ASE 200 049458
Filters, Glass Fiber, for 11, 22, or 33 mL Cell, Pkg. of 100, ASE 200..... 047017
Filters, Cellulose, for 1 mL Extraction Cell, Pkg. of 100, ASE 200 055398
Filters, Cellulose for 5 mL Extraction Cell, Pkg. of 100, ASE 200 055399

ASE Thimbles

Thimbles for use on ASE 200 systems.

Ordering Information

Thimbles for ASE 200 Only

Thimbles, Cellulose, 11 mL Cell Bodies, Pkg. of 25, ASE 200 055708
Thimbles, Cellulose, 22 mL Cell Bodies, Pkg. of 25, ASE 200 055999

Vials and Bottles



Collection vessels for ASE systems are available in 40, 60, and 250 mL sizes. Collection vials and bottles come with lids and solvent resistant (TFE) septa. 40 mL and 60 mL graduated vials are only compatible with the ASE 200. 60 mL collection vials are not compatible with the ASE 100.

ASE Vials and Bottles

Ordering Information

Collection Bottles

250 mL Clear Collection Bottles for ASE 100, 150 or 350, Pkg. of 12, VOC Cert. 056284
Can be used with ASE 100, 150, 300, or 350.

Septa

Ultra Low Bleed Septa, Pkg. of 72 055395
Can be used with all ASE systems.

Collection Vials for ASE 150, 200, and 350

40 mL Clear Collection Vials for ASE 200, I, Pkg. of 72 048783
60 mL Clear Collection Vials for ASE 150, 200 or 350, Clear, Pkg. of 72 ... 048784
40 mL Amber Collection Vials for ASE 200, I, Pkg. of 72 048780
60 mL Clear Collection Vials for ASE 150, 200 or 350, Amber, Pkg. of 72 . 048781

Graduated Vials for ASE 150, 200, and 350

Conc.Vial with Spacer (Graduated), 40 mL, Pkg. of 6..... 055441
Conc.Vial (Graduated), 40 mL, Pkg. of 6 055442

ASE Resins and Dispersants

To aid extractions of wet samples, use ASE Prep DE. For lipid extractions involving acids hydrolysis. Use ASE Prep CR Na^+, and for lipid extractions using base hydrolysis, use ASE Prep CR H^+ resin.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

ASE Prep CR Na^+ Form Cation-Exchange Resin for use with ASE 150 or 350

ASE Prep CR H^+ Form Cation-Exchange Resin for use with ASE 150 or 350

ASE Prep DE

ASE Prep DE is pelletized diatomaceous earth used as a dispersant and drying agent with wet samples.

Ordering Information

Accessories	
Diatomaceous Earth Dispersant for ASE, 1 kg. Bottle	062819

ASE Prep CR Na^+

ASE Prep CR is a cation-exchange resin (Na^+ form) designed to absorb strong mineral acids. Mix with acid hydrolyzed samples for lipid determination using the ASE 150 or 350.

Ordering Information

Accessories	
ASE Prep CR, Na^+ Form, Mineral Acid Neutralizer, 500 g	080024

ASE Prep CR H^+



The ASE Prep CR H^+ is a cation-exchange resin consumable in the hydrogen form used with the new ASE 350/150 systems for determination of total lipids in foods after base hydrolysis (e.g. extraction of dairy products).

Ordering Information

Accessories	
ASE Prep CR H^+, Qty. 1 bottle, 400 g	071397

Solid-Phase Extraction Systems (SPE)

Faster, more reliable solid-phase extraction while using less solvent

The AutoTrace 280 unit can process six samples simultaneously with minimal intervention. The instrument uses powerful pumps and positive pressure with constant flow-rate technology. Current analytical methods that require SPE sample preparation include GC, GC-MS, LC, and LC-MS, IC and IC-MS. The AutoTrace 280 instrument is approved or adapted for US EPA clean water methods and safe drinking water methods (600 and 500 series) and can extract the following analytes:

- PCBs (polychlorinated biphenyls)
- OPPs (Organophosphorus pesticides), OCPs (Organochlorine pesticides), and chlorinated herbicides
- BNAs (base, neutral, acid semivolatiles)
- Dioxins and furans
- PAHs (polyaromatic hydrocarbons)
- Oil and Grease or hexane extractable material

With solid-phase extraction (SPE), large volumes of liquid sample are passed through the system and the compounds of interest are trapped on SPE adsorbents (cartridge or disk format) then eluted with strong solvents to generate an extract ready for analysis. Automated solid-phase extraction saves time, solvent, and labor for analytical laboratories.



AutoTrace Systems: The new AutoTrace 280 system provides fast and reliable automated solid phase extraction for organic pollutants from liquid samples.

AutoTrace Accessories: AutoTrace 280 high quality parts and accessories

AutoTrace Systems

Provides fast and reliable automated solid phase extraction of organic pollutants from samples

The AutoTrace 280 instrument provides reliable automated SPE for analytical chemists determining organic pollutants in large-volume liquid samples. Compared to liquid-liquid extraction, the AutoTrace 280 saves time, solvent, and labor, ensuring high reproducibility and productivity for analytical labs. The system uses powerful pumps (no check valves) and positive-pressure constant-flow technology to process the most difficult samples and can process up to six samples. Features include:

- SPE technology for liquid-liquid extraction: Reduces solvent usage and eliminates glassware.
- No technician involvement is required to maintain a liquid reservoir or to control the flow.
- Provides constant flow of liquids through SPE cartridges resulting in superior reproducibility.
- Closed systems with fan to vent solvent vapors: No hood required, conserves valuable hood space.
- The instrument can store 24 methods on board and the software used for editing methods is easy to use.
- USB cable connection to PC. Methods to run can be chosen from those stored in the instrument memory.
- Multi-port switching valve ensures the systems reliability.

Note: *Contact your local Dionex sales representative to confirm part numbers.*



The AutoTrace 280 instrument provides automated solid-phase extraction with a choice of cartridge or disk formatting.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

AutoTrace 280 SPE Instrument Brochure

Product Data Sheets

AutoTrace 280 Solid Phase Extraction Instrument Data Sheet

Application Notes

AN 817: US EPA Method 1664A; Extraction of Oil and Grease from Water Samples AutoTrace 280 Solid-Phase Extraction Cartridge Configuration

AN 818: US EPA Method 1664A; Extraction of Oil and Grease from Water Samples AutoTrace 280 Solid-Phase Extraction Disk Configuration

Ordering Information

The following AutoTrace 280 system configurations require a desktop or laptop computer for operation. It is not included with a system but can be purchased through Dionex. (LAPTOP, PC, DELL, E6400, 2 G,160G, WXP PN 069726)

Hardware	
AutoTrace Automated Large Volume SPE for Disks, 47 mm	071386
AutoTrace Automated Large Volume SPE for Cartridges, 6 mL	071385
AutoTrace Automated Large Volume SPE for Cartridges, 3 mL	072605
AutoTrace Automated Large Volume SPE for Cartridges, 1 mL	072604
AutoTrace Automated Large Volume SPE for Cartridges, 6 mL glass	072606

AutoTrace Accessories

The AutoTrace 280 parts and accessories are designed to be used specifically with the AutoTrace 280 solid-phase extraction system. Each part and accessory meets strict Dionex quality standards.

Plunger Assemblies

Ordering Information

Accessories	
Plunger Assembly for 1 mL Columns	071078
Plunger Assembly for 3 mL Columns	071079
Plunger Assembly for 6 mL Columns	071080
Plunger Assemby for 6 mL Glass Cartridges	071081

Elution Racks

Ordering Information

Accessories	
Elution Rack for 11 mm GC vials	071068
Elution Rack for 15 mL Conical Tubes	071069
Elution Rack for 16 x 100 mL Test Tubes	071070
Elution Rack for 17 x 60 mm Vials	071071
Elution Rack for 4 mL Vials	071072
15 mL Conical Tubes (Case of 12)	071056

Sample Rack

The AutoTrace 280 sample rack will hold six 60 mL vials, 250 mL bottles or 1 L bottles. The rack is angled to ensure all the sample is retrieved from the sample vessels.

Ordering Information

Accessories	
Sample Rack for 60, 250, and 1000 mL Bottles for AutoTrace 280	071333

Glass-Coated Solvent Bottle

Dionex offers glass-coated solvent bottles in 1 and 2 L sizes.

Ordering Information

Accessories	
Bottle, 1 L, Coated Glass	045900
Bottle, 2 L, Coated Glass, GL45	045901

PM kit for AutoTrace 280

The preventative maintenance kit contains new tubing, seals and rotors.

Ordering Information

Preventative Maintenance Kit	
AutoTrace 280 Preventative Manintenance Kit	072598

SolEx Cartridges



SolEx Silica-Based SPE catridges are designed for use in the Dionex AutoTrace 280 and other SPE apparatus, including vacuum manifolds and all older models of AutoTrace instruments. These cartridges come with C8, C18, silica gel and charcoal functionality packed in syringe type bodies for utilization in a wide variety of applications. Dionex also offers SPE disks in 47 mm size.

Key Specifications

Sorbent Media:: Irregular silica particles, 40–63 micron

Surface Area:: 470–530 m^2/g

Pore Volume:: 0.70–0.85 cm^3/g

Percent Organic Loading:: 10.5–11.7% (C8);
21.0–22.2% (C18)

Shelf Life: 24 months from date of shipment if stored in original unopened container

Ordering Information

Accessories	
SolEx C18 6 mL Cartridge; 1.0 g of Packing	074410
SolEx C18 6 mL Cartridge; 0.5 g of Packing	074417
SolEx C18 3 mL Cartridge; 0.5 g of Packing	074412
SolEx C18 1 mL Cartridge; 0.1 g of Packing	074623
SolEx C18 Unendcapped 6 mL Cartridge; 1.0 g of Packing	074416
SolEx C8 6 mL Cartridge; 1.0 g of Packing	074411
SolEx C8 3 mL Cartridge; 0.5 g of Packing	074413
SolEx C8 1 mL Cartridge; 0.1 g of Packing	074415

Software

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Virtual Column..... 162

Chromeleon Software

Innovative Solutions from the World Leader in Chromatography Software

Software is more than just an essential component of a modern chromatography system—it's often the most important factor affecting how much you get out of that system. With Chromeleon software, you'll get the most out of your chromatography system investment, with measurable productivity gains for your laboratory

- Controls more than 300 HPLC, LC, and IC instruments
- Controls all Dionex chromatographs, Agilent 1100/1200/6890, Waters Alliance, and many more
- Reduces data processing and reporting times by more than 70%
- Gets you quickly from data to knowledge with powerful query, trend, and reporting tools
- Provides complete set of tools for 21 CFR Part 11 compliance

Whether your needs are basic or complex—whether you use instruments from Dionex or other manufacturers, or both—there's a Chromeleon software solution that's right for you. Find out why Chromeleon has become the preferred chromatography data system in thousands of laboratories throughout the world.

Note: *For more information and ordering details, please contact your local Dionex representative.*



Chromeleon 7.0: Go from samples to results in the fastest time possible with Chromeleon 7—the Simply Intelligent data system.

Chromeleon 6.8: For the broadest multi-vendor control and the most extensive feature set available, choose Chromeleon 6—the world's most complete chromatography software.

DCMS^{Link}: Operate your Dionex instruments and your mass spectrometer from the same software platform by adding Chromeleon DCMS^{Link} plug-in to your MS software (ABI Analyst, Thermo XCaliber, or Bruker Hystar.

Virtual Column: Discover the fastest, easiest, and most economical way to optimize IC separations.

Chromeleon 7

The fastest way to get from samples to results.

Discover Chromeleon 7, the chromatography software that streamlines your path from samples to results. Get rich, intelligent functionality and outstanding usability at the same time with Chromeleon 7—the Simply Intelligent chromatography software.

- Enjoy a modern, intuitive user interface designed around the principle of Operational Simplicity.
- Streamlines laboratory processes and eliminate errors with eWorkflows, which enable anyone to perform a complete analysis perfectly with just a few clicks
- Access your instruments, data, and eWorkflows instantly in the Chromeleon Console
- Locate and collate results quickly and easily using powerful built-in database query features
- Interpret multiple chromatograms at a glance using Mini Plots
- Find everything you need to view, analyze, and report data in the Chromatography Studio
- Accelerate analyses and learn more from your data through dynamic, interactive displays
- Deliver customized reports using the built-in Excel-compatible speadsheet

Chromeleon 7 is a forward-looking solution to your long-term chromatography data needs . It is developed using the most modern software tools and technologies, and innovative features will continue to be added for many years to come.

The Cobra Integration Wizard uses an advanced mathematical algorithm to define peaks. This ensures that noise and shifting baselines are no longer a challenge in difficult chromatograms. When peaks are not fully resolved, the SmartPeaks Integration Assistant visually displays integration options. Once a treatment is selected, the appropriate parameters are automatically included in the processing method.

Chromeleon 7 ensures data integrity and reliability with a suite of compliance tools. Compliance Tools provide sophisticated user management, protected database structures, and a detailed interactive audit trail and versioning system.

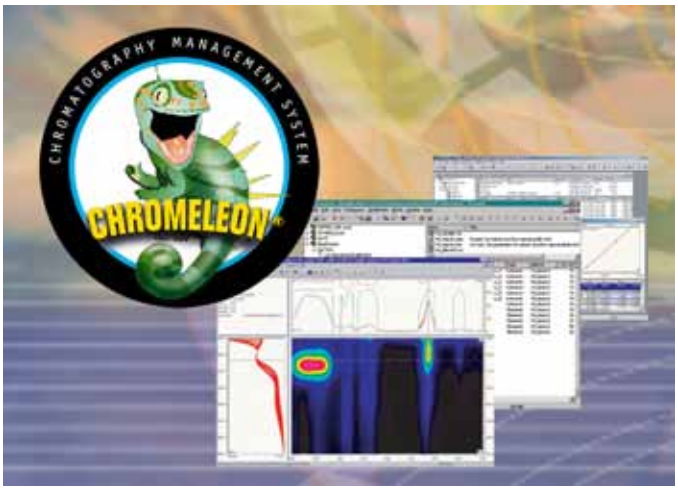
Product Brochures

Chromeleon 7 Chromatography Data System

Product Datasheets

Computer Requirements for Chromeleon 7.0 Chromatography Data System

Chromeleon 6.8



For the broadest multi-vendor instrument control and the most extensive set of software features, Chromeleon 6.8 is your best choice. whether you need a solution for HPLC, IC, or GC—whether your scope is a single instrument, a laboratory, a department, or an enterprise—Chromeleon 6.8 has what you need to accomplish the job.

- Controls more than 300 HPLC, LC, and IC instruments, including many legacy models) from more than 30 instrument manufacturers
- Navigate quickly and easily through your data using the Chromeleon browser
- Accelerate our analyses and learn more from your data through dynamic interactive displays
- Locate and collate results quickly and easily using powerful built-in database queries
- Deliver customized reports using built-in customizable Excel-compatible spreadsheets
- Ensure regulatory compliance with a comprehensive security system, validation tools, audit trails, and electronic signatures
- Performm special instrumental techniques like mass spectrometry, fraction collection, and Autodilution
- Scale up easily; from individual workstations to small workgroups to enterprise-wide installations

Chromeleon 6.8 has become the standard chromatography data system in thousands of laboratories worldwide. It meets the needs of any laboratory environment, and readily adapts to changing needs.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

Chromeleon 6—Chromatography Management System Brochure

Chromeleon Chromatography Management System for Ion Chromatography Brochure

Virtual Column Brochure

Product Data Sheets

Computer Requirements for Chromeleon 6.8 Software

Application Notes

AN 174: Calculating Instrument Utilization Using Chromeleon

Technnical Notes

TN 54: Using Chromeleon Chromatography Management Software to Comply with 21 CFR Part 11

TN 57: Automated System Suitability Testing with Chromeleon

TN 65: Using Chromeleon in a Networked Environment

TN 67: Instrument Control and Data Acquisition with Chromeleon

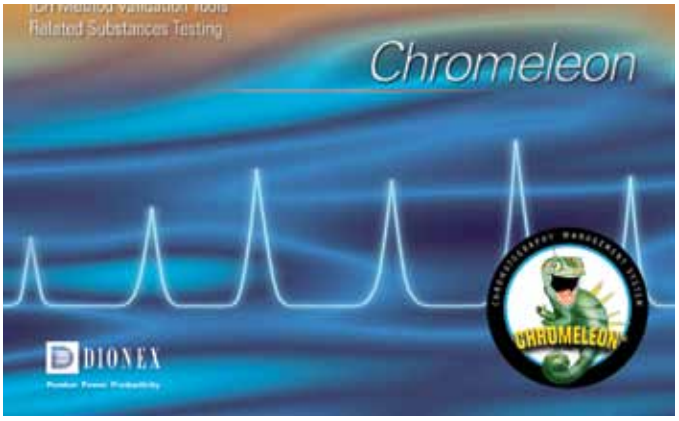
TN 70: Data Reporting in Chromeleon

TN: 81 Automatic Dilutions Using Chromeleon AutoDilution and the Partial Loop Injection Capability of the ICS-3000 AS Autosampler

TN: 83 Automatic Vial-to-Vial Dilutions Using Chromeleon AutoDilution and the ICS-3000 AS Autosampler with the Sample Prep Option

TN 84: Automatic Dilutions Using Chromeleon AutoDilution and Two Injection Loops

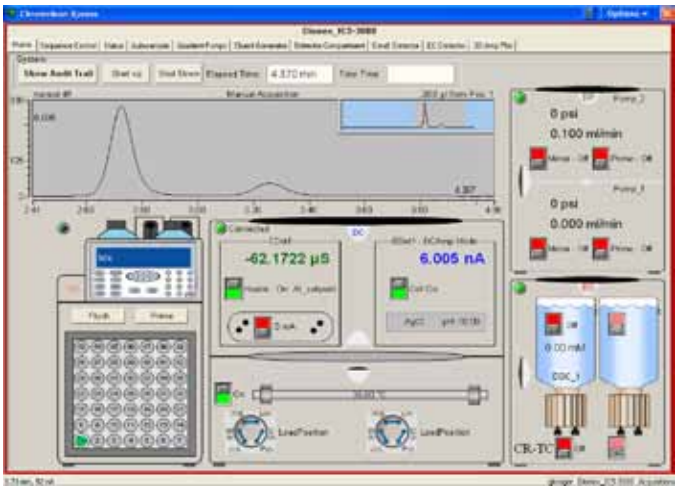
Chromeleon 6.8 Extension Pack



The Chromeleon 6.8 Extension Pack provides Sequence, Query, and Report templates that help you quickly and easily perform common analyses that would otherwise be slow and tedious. Supported analyses include:

- Size Exclusion Chromatography
- Content Uniformity Testing
- Dissolution Testing
- Related Substances Testing
- ICH Method Validation Tools

Chromeleon 6.8 Xpress



If you have to use a chromtoggraphy data system other than Chromeleon, you can still enjoy full control of Dionex instruments using Chromeleon Express Xpress. It provides Dionex instrument control and sequence management capabilities of Chromeleon, plus real-time displays of instrument status and chromatograms,and co-exists peacefully with your other chromatography software.

- Save effort and eleiminate errors by gaining full control and automation of all instrument functions
- Monitor and control all instrument components conveniently through a single intuitive graphical user interface
- Create instrument control programs and sample sequences quickly and easily with click-through wizards
- See real-tiime instrument status and developing chromtograms
- Protect system componenets from damages through automatic safety shutoffs in the event of leaks, blockages, empty reservoirs, and other anomalies
- Gain extra confidence in your results with audit trails that automatically track every event that happened during every analysis

DCMS[Link]

Direct control of Dionex instruments from MS software by ABI/Sciex, Thermo, and Bruker.

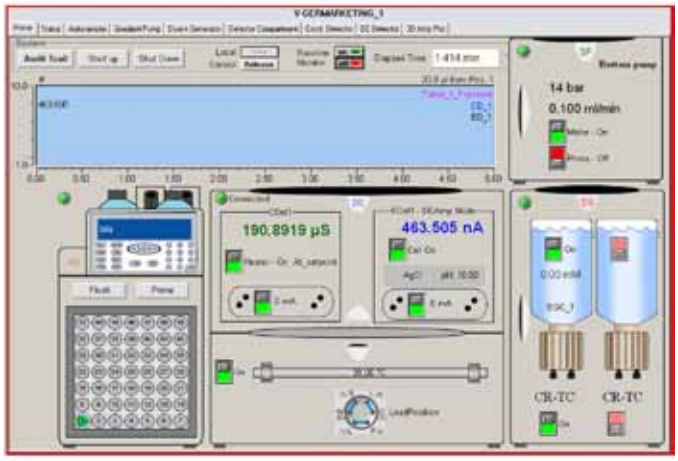
Now you can operate your Dionex instruments from the same platform you use to operate your mass spectrometer by adding Chromeleon DCMS[Link].

- DCMS[Link] for Analyst
- DCMS[Link] for HyStar
- DCMS[Link] for Xcalibur

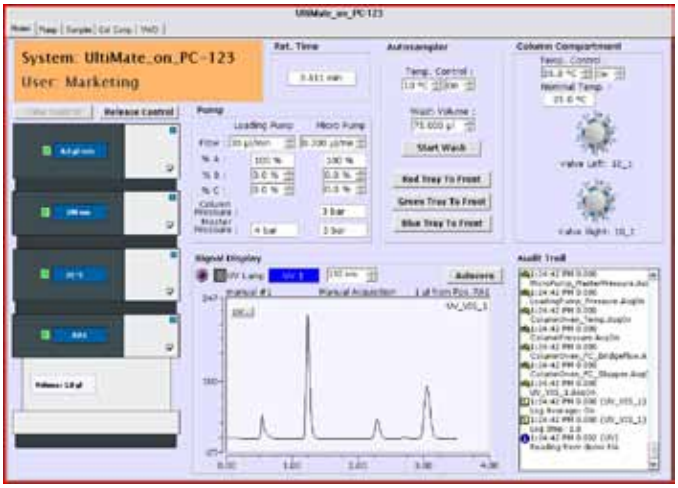
DCMS[Link] brings additional tools to other MS software, including graphical control interfaces for the Dionex instruments.



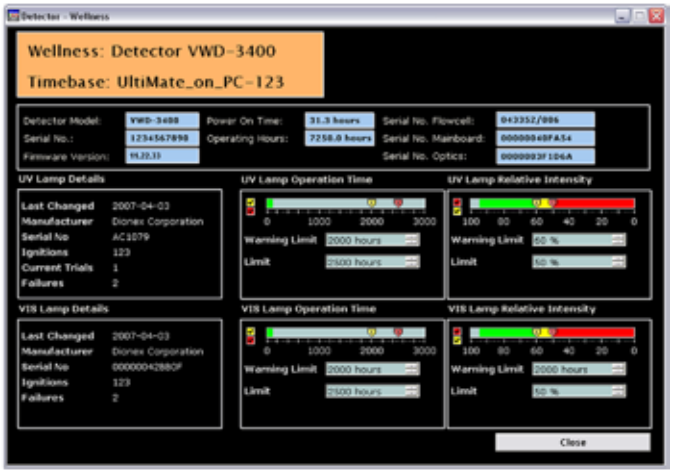
DCMS[Link] provides control of Dionex chromatography devices through MS software from ABI/Sciex, Thermo Fisher Scientifc, and Bruker Daltonics.



Control interface for the Dionex ICS-3000.

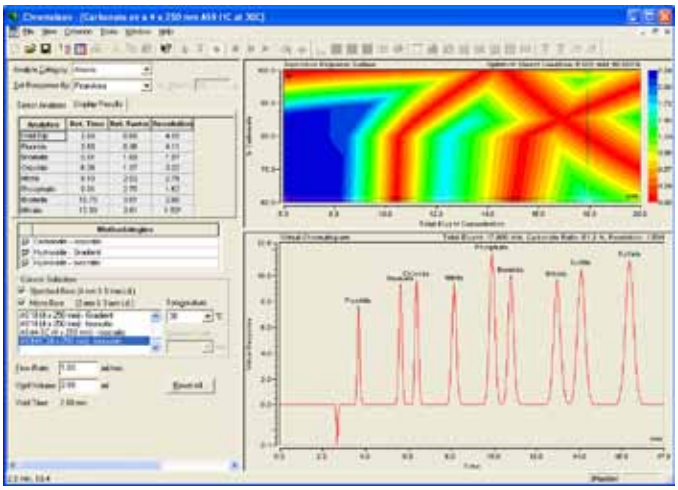


Control interface for the Dionex UltiMate 3000.



Easy access to system wellness counters.

Virtual Column



Now you can easily determine the best column and seaparation conditions for any IC applciation in just a few minutes, without even turning on your instrument! Virtual Column eliminates the risks and hassles of optimizing separations by modeling their behavior using pre-aquired Dionex-validated data.

- Find the best way to separate your specific analytes of interest and get better resolution in less time—without doing any laboratory work!
- Model sepations on different columns under various isocratic or gradient conditions and at different tempteratures
- See in advance how your chroamtograms will be affected by issues such as void volume changes, flow rate changes, variations in concentration/analyte ratio, and column over-loading
- Save days or weeks of trial-and-error experimentation by indentifying the best solution before you make the first injection

Virtual Column is available as an option for Chromeleon 6 and Chromeleon 7.

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Reversed-Phase LC Columns

Reversed-phase silica columns with high-efficiency and ideal selectivity

Acclaim columns are based on high-purity, porous silica particles, advanced column bonding and packing technologies, and controlled manufacturing processes. This provides complementary selectivity, high column efficiencies, and symmetrical peaks. Acclaim columns meet the high standards set by modern HPLC and LC/MS methods and are used in such applications as pharmaceutical, environmental, food and beverage, chemical, and consumer products.

- Ultrapure, porous, spherical silica
- Novel and proprietary surface chemistries for diversified selectivities
- Low silanol activity for good basic analyte peak shapes
- Reliable manufacturing process with thorough testing
- LC/MS compatible
- IonPac NS1 for determination of high molecular weight ionic analytes.

Acclaim columns are based on ultrahigh-purity, porous, spherical silica particles and include C18, C8, Polar Advantage (PA) and Polar Advantage II (PA2), available in three particle sizes (2.2 µm, 3 µm, and 5 µm) and various column formats.

Note: *See the Acclaim Library at http://www.dionex.com/en-us/documents/acclaim-library/lp-71591.html*



Acclaim 120 C18: High-density, monolayer C18 reversed-phase columns for exceptional resolution in a variety of applications.

Acclaim 120 C8: High-density monolayer C8 reversed-phase column.

Acclaim Phenyl-1: Acclaim Phenyl-1: A unique reversed-phase column for the superior separation of aromatic compounds with enhanced hydrolytic stability.

Acclaim PolarAdvantage: Sulfonamide-embedded column for separating a wide variety of polar and nonpolar analytes.

Acclaim PolarAdvantage II: Amide-embedded reversed-phase columns with enhanced hydrolytic stability.

Acclaim Rapid Separation LC: 2.2 µm and 3 µm columns of various surface chemistries for high-throughput, high-resolution analysis with reduced solvent consumption.

Acclaim 120 C18

High performance reversed-phase columns for the separation of small molecules

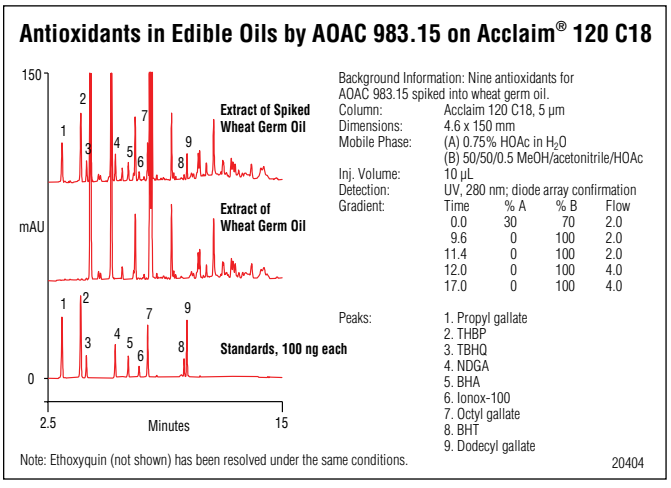
The Acclaim 120 columns are for high resolution reversed-phase separations. The very high surface coverage and very low metal content together result in columns with excellent efficiencies. These columns provide exceptional performance for a variety of applications in the pharmaceutical, chemical, environmental, and food separations areas.

- Low silanol activity for excellent peak shapes for basic analytes
- High hydrophobic retention
- Very high efficiencies for maximum resolution
- Reproducible manufacturing practices for reproducible column-to-column performance
- LC/MS compatible

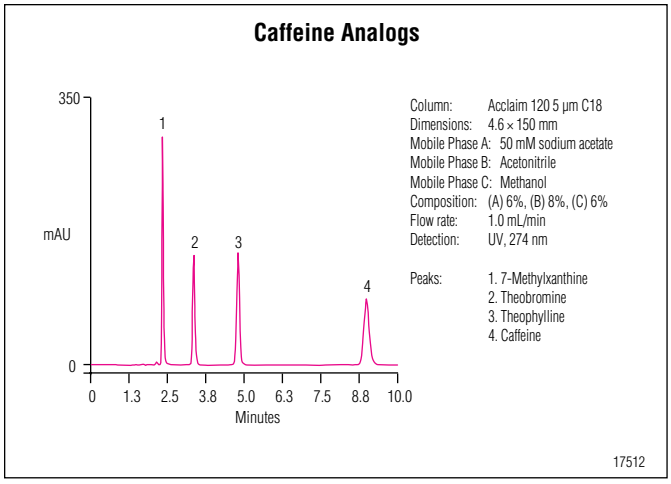
Acclaim 120 C18 columns have high surface coverage, resulting in high-capacity columns. They are stable between pH 2 and 8 and available in 2.2, 3 and 5 µm particles sizes, and 4.6, 3.0, and 2.1 mm-diameters, with an average pore diameter of 120 Å and surface area of 300 m^2/g. All phases are LC/MS compatible because of the low silica bleed that results from the stable bonding procedure. These columns are also available for fast UHPLC; please see the Acclaim Rapid Separation LC section.

Wide Range of Applications

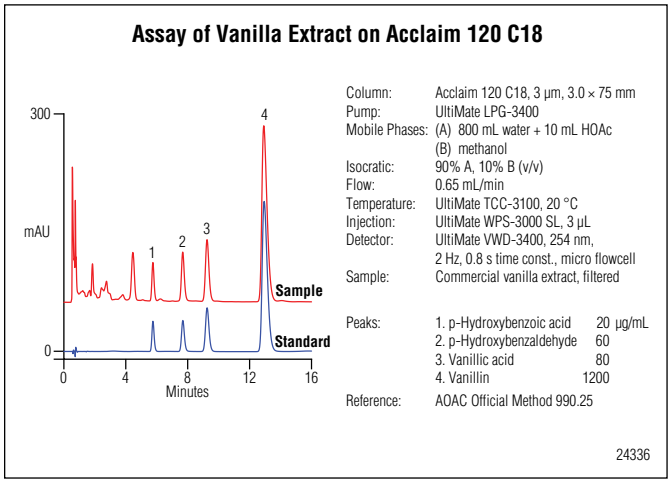
The Acclaim 120 C18 can be used for the many diverse reversed-phase C18 separations. Its rugged, reproducible, and reliable chromatographic performance make it appropriate for pharmaceutical, environmental, food, and other industrial chromatographic separations. The Acclaim Catalog has many examples of the use of this column.



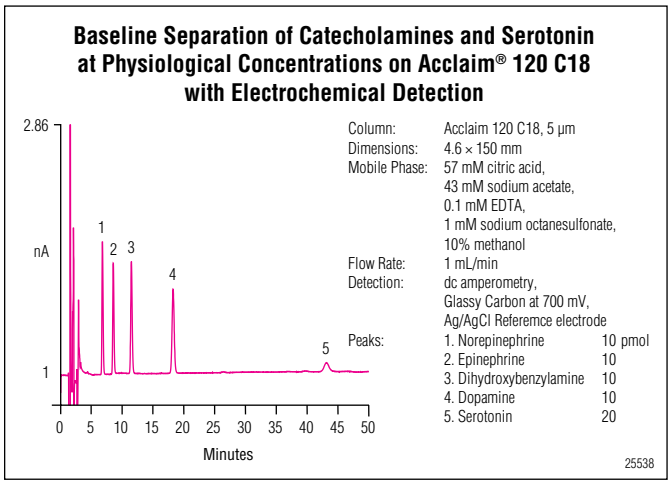
Antioxidants in edible oils using AOAC Method 983.15.



Caffeine analogs.



Assay of vanilla extract.



Separation of Catecholamines and Serotonin on Acclaim 120 C18.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Acclaim Bonded Silica-Based Columns for HPLC

Dionex MS Applications Guide

Product Data Sheets

Acclaim 120 HPLC Columns Data Sheet

Application Notes

AN 130: Identification of a Hydroxylysine-Containing Peptide Using *AAA-Direct*

AN 192: Rapid Analysis of Ginseng Using Accelerated Solvent Extraction and High Performance Liquid Chromatography

AN 207: Chromatographic Fingerprinting of Flos Chrysanthema Indici Using HPLC

AN 223: Determination of Ten Active Ingredients in Sunscreen-Containing Products in a Single Injection

AN 224: Determination of Melamine in Milk Powder by Reversed-Phase HPLC with UV Detection

AN 232: Determination of Anthraquinones and Stilbenes in Giant Knotweed Rhizome by HPLC with UV Detection

Application Updates

AU 156: Evaluation of Acclaim HPLC Columns Using the National Institute of Standards Standard Reference Material 870

Technical Notes

TN 701: Sub One-Minute, Nine-Component Gradient HPLC Separation for Increased Productivity Using an Acclaim 120 3-μm C18 Column

Ordering Information

Columns for fast LC (UHPLC) are listed in the RSLC section.

Analytical Columns

Acclaim 120, C18, 3 µm Analytical (2.1 x 50 mm)..... 059128
Acclaim 120, C18, 3 µm Analytical (2.1 x 100 mm)..... 059129
Acclaim 120, C18, 3 µm Analytical (2.1 x 150 mm)..... 059130
Acclaim 120 C18, 3 µm Analytical, (3.0 x 50 mm)..... 068971
Acclaim 120, C18, 3 µm Analyitcal (3.0 x 150 mm)..... 063691
Acclaim 120, C18, 3 µm, Analytical, (3.0 x 250 mm)..... 070077
Acclaim 120, C18, 3 µm Analytical (4.6 x 50 mm)..... 059131
Acclaim 120, C18, 3 µm Analytical (4.6 x 100 mm)..... 059132
Acclaim 120, C18, 3 µm Analytical (4.6 x 150 mm)..... 059133
Acclaim 120, C18, 5 µm Analytical (2.1 x 50 mm)..... 059142
Acclaim 120, C18, 5 µm Analytical (2.1 x 100 mm)..... 059143
Acclaim 120, C18, 5 µm Analytical (2.1 x 150 mm)..... 059144
Acclaim 120, C18, 5 µm Analytical (2.1 x 250 mm)..... 059145
Acclaim 120, C18, 5 µm Analytical (4.6 x 50 mm)..... 059146
Acclaim 120, C18, 5 µm Analytical (4.6 x 100 mm)..... 059147
Acclaim 120, C18, 5 µm Analytical (4.6 x 150 mm)..... 059148
Acclaim 120, C18, 5 µm Analytical (4.6 x 250 mm)..... 059149

Guard Columns

Acclaim 120, C18, 5 µm Guard Cartridges, (2.1 x 10 mm) 2 ea.; (Requires Holder 069580)..... 069689
Acclaim 120 C18, 5 µm Guard Cartridges (3 x 10 mm), 2 ea., (Requires Holder 069580)..... 071981
Acclaim 120, C18, 5 µm Guard Cartridges, (4.6 x 10 mm) (use V-2 holder)..... 069695
Acclaim SST Guard Cartridge Holder (V-2)..... 069580
Guard-to- Analytical Column Coupler (V-2)..... 074188
Acclaim Guard Kit (Holder and coupler) (V-2)..... 069707

Micro and Nano Columns

Acclaim 120, C18, 3 µm, 120 Å, 75 µm i.d. x 5 cm..... 162238
Acclaim 120, C18, 3 µm, 120 Å, 75 µm i.d. x 15 cm..... 162239
Acclaim 120, C18, 3 µm, 120 Å, 300 µm i.d. x 5 cm..... 162236
Acclaim 120, C18, 3 µm, 120 Å, 300 µm i.d. x 15 cm..... 162237
Acclaim 120, C18, 3 µm, 120 Å, 1.0 mm i.d. x 5 cm..... 162234
Acclaim 120, C18, 3 µm, 120 Å, 1.0 mm i.d. x 15 cm..... 162235
Acclaim 120, C18, 5 µm, 120 Å, 75 µm i.d. x 5 cm..... 161456
Acclaim 120, C18, 5 µm, 120 Å, 75 µm i.d. x 15 cm..... 161457
Acclaim 120, C18, 5 µm, 120 Å, 75 µm i.d. x 25 cm..... 161458
Acclaim 120, C18, 5 µm, 120 Å, 300 µm i.d. x 5 cm..... 161453
Acclaim 120, C18, 5 µm, 120 Å, 300 µm i.d. x 15 cm..... 161454
Acclaim 120, C18, 5 µm, 120 Å, 300 µm i.d. x 25 cm..... 161455
Acclaim 120, C18, 5 µm, 120 Å, 1.0 mm i.d. x 5 cm..... 161450
Acclaim 120, C18, 5 µm, 120 Å, 1.0 mm i.d. x 15 cm..... 161451
Acclaim 120, C18, 5 µm, 120 Å, 1.0 mm i.d. x 25 cm..... 161452

Micro and Nano Precolumns

Acclaim 120, C18, 5 µm, 120 Å, 300 µm i.d. x 5 mm, 5 Cartridges 162326
Acclaim 120, C18, 5 µm, 120 Å, 500 µm i.d. x 5 mm, 5 Cartridges 162324
Acclaim 120, C18, 5 µm, 120 Å, 1.0 mm i.d. x 5 mm, 5 Cartridges 162321
Acclaim 120, C18, 5 µm, 120 Å, 1.0 mm i.d. x 15 mm, 5 Cartridges 162322

These columns are designed for optimal performance using Dionex UltiMate 3000 and ICS-5000 chromatography instruments.

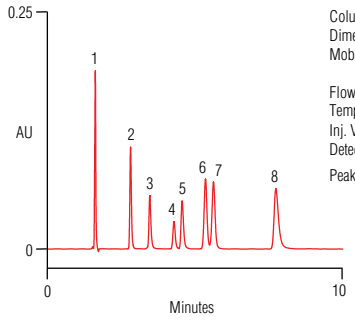
Acclaim 120 C8

High performance reversed-phase columns for the separation of small molecules

Acclaim 120 C8 reversed-phase columns feature a densely-bonded monolayer C8 ligands on a pure, spherical porous silica substrate. The columns are a well-characterized line of LC/MS-compatible C8 phases with very high surface coverage and extremely low silanol activity. These columns provide exceptional performance for a variety of applications in the pharmaceutical, environmental, food and many other industrial sectors.

- Low silanol activity for excellent peak shapes for basic analytes
- Excellent column efficiencies
- LC/MS compatible
- Reproducible manufacturing practices for reproducible column-to-column performance

Isocratic Separation of Six Cardiac Antiarrhythmic Drugs (Beta-Blockers) on Acclaim® 120 C8



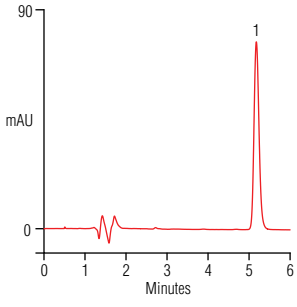
Column:	Acclaim 120 C8, 3 µm
Dimensions:	4.6 × 150 mm
Mobile Phase:	51/49 w/w MeOH/ 25 mM phosphate, pH 7.0
Flow Rate:	1.0 mL/min
Temperature:	40 °C
Inj. Volume:	5 µL
Detection:	UV, 214 nm

Peaks:		
1.	Maleic acid	—
2.	Acebutolol	50 mg/mL
3.	Metoprolol	50
4.	Timolol	100
5.	Oxprenolol	50
6, 7.	Labetalol diasteromers	50
8.	Propranolol	20

20397

Isocratic separation of six cardiac antiarrhythmic drugs (Beta-Blockers).

Loperamide in Anti-Diarrhea Tablet on Acclaim® 120 C8

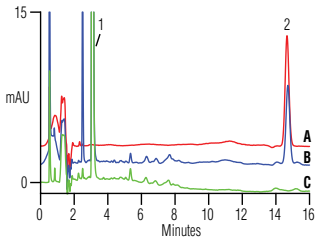


Column:	Acclaim 120 C8 3 µm, 4.6 × 150 mm
Pump:	Summit P680A DGP
Mobile Phases:	(A) Acetonitrile (B) 3.0 g Et_3N HCl + 1.0 mL H_3PO_4 in 550 mL water.
Isocratic:	45% A, 55% B
Flow:	1.2 mL/min
Temperature:	TCC-100 thermostat at 30 °C
Injection:	ASI-100 sampler at 20 µL
Detector:	UVD-340U, UV 214 nm
Sample Prep:	– Weigh and grind 20 tablets – Take an aliquot equivalent to 16 mg loperamide HCl – Add 40 mL of 5% H_3PO_4 and 200 mL of methanol – Make to 2000 mL with water – Filter
Reference:	USP, 29th Ed, p1290 (2006)
Peak:	1. Loperamide HCl

23628-01

Determination of loperamide in antidiarrheal tablets.

Fluticasone in Serum on Acclaim® 120 C8



Column:	Acclaim 120 C8 3 µm, 4.6 × 150 mm
Pump:	Summit P580 HPG/4
Mobile Phases:	(A) Ethanol:acetonitrile 2:30 (B) Water
Isocratic:	51% B
Flow Rate:	1.0 mL/min
Temperature:	30 °C
Injection:	ASI-100 autosampler; 10 µL
Detector:	UVD 340U; UV at 237 nm
Samples:	(A) Fluticasone propionate 10 µg/mL (B) Spiked bovine serum 5 µg/mL (C) Blank bovine serum
Peaks:	1. Corticosterone 2. Fluticasone propionate

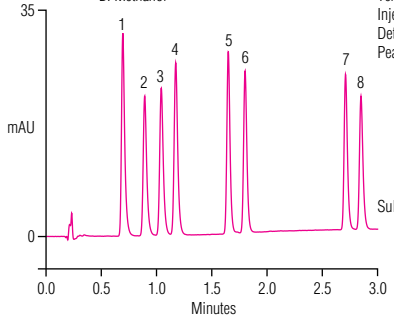
Sample Preparation:
– To 1.0 mL of serum add 50 µL of 1 mg/mL corticosterone in ethanol
– Extract with 1.0 mL of ethyl acetate
– Evaporate 0.40 mL of extract
– Redissolve in 0.20 mL of methanol

23655

Fluticasone in serum.

Sulfonamide Antibiotics on Acclaim® 120 C18 RSLC

Column:	Acclaim 120 C18 2.2 µm, 2.1 × 100 mm
System:	UltiMate® 3000 RS
Mobile Phase:	A. 30 mM acetic acid adjusted to pH 4.2 with NaOH B. Methanol



Gradient Times:	–3.0	0.0	0.40	2.2	3.1
%A:	88	88	88	60	60
%B:	12	12	12	40	40

Flow:	0.75 mL/min
Temperature:	35 °C
Injection:	15 µL
Detector:	UV at 265 nm
Peaks:	1. Sulfadiazine (SDZ) 2. Sulfathiazole (STZ) 3. Sulfapyridine (SPD) 4. Sulfamerazine (SMR) 5. Sulfamethazine (SMZ) 6. Sulfachloropyridazine (SCP) 7. Sulfadimethoxine (SDM) 8. Sulfaquinoxzline (SQX)

Sulfonamide standards, 1.0 µg/mL in water

25538

Assay of aspirin.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim 120 HPLC Columns Data Sheet

Application Updates

AU 156: Evaluation of Acclaim HPLC Columns Using the National Institute of Standards Standard Reference Material 870

Ordering Information

Analytical Columns

Acclaim 120, C8, 3 µm Analytical (2.1 x 50 mm)..... 059122
Acclaim 120, C8, 3 µm Analytical (3.0 x 150 mm)..... 068970
Acclaim 120,C8, 3 µm, Analytical (3.0 x 250 mm)..... 070078
Acclaim 120, C8, 3 µm Analytical (2.1 × 100 mm)..... 059123
Acclaim 120, C8, 3 µm Analytical (2.1 × 150 mm)..... 059124
Acclaim 120, C8, 3 µm Analytical (4.6 × 50 mm)..... 059125
Acclaim 120, C8, 3 µm Analytical (4.6 × 100 mm)..... 059126
Acclaim 120, C8, 3 µm Analytical (4.6 × 150 mm)..... 059127
Acclaim 120, C8, 5 µm Analytical (2.1 × 50 mm)..... 059134
Acclaim 120, C8, 5 µm Analytical (2.1 × 100 mm)..... 059135
Acclaim 120, C8, 5 µm Analytical (2.1 × 150 mm)..... 059136
Acclaim 120, C8, 5 µm Analytical (2.1 × 250 mm)..... 059137
Acclaim 120, C8, 5 µm Analytical (4.6 × 50 mm)..... 059138
Acclaim 120, C8, 5 µm Analytical (4.6 × 100 mm)..... 059139
Acclaim 120, C8, 5 µm Analytical (4.6 × 150 mm)..... 059140
Acclaim 120, C8, 5 µm Analytical (4.6 × 250 mm)..... 059141

Guard Columns

Acclaim 120, C8, 5 µm, Guard Cartridges, (2.1 x 10 mm), 2 ea.; (Requires Holder 069580)..... 069688
Acclaim 120 C8, 5 µm Guard Cartridges (3 x 10 mm), 2 ea., (Requires Holder 069580)..... 071979
Acclaim 120, C8, 5 µm Guard Cartridges, (4.6 x 10 mm), 2 ea., (use V-2 Holder)..... 069696
Guard to Analytical Column Coupler V-2..... 074188
Acclaim Guard Kit (Holder and coupler) V-2..... 069707
Acclaim SST Guard Cartridge Holder V-2..... 069580
SST Guard Cartridge Holder..... 059456

Micro and Nano Columns

Acclaim 120, C8, 3 µm, 120 Å, 75 µm i.d. x 5 cm..... 162208
Acclaim 120, C8, 3 µm, 120 Å, 75 µm i.d. x 15 cm..... 162209
Acclaim 120, C8, 3 µm, 120 Å, 300 µm i.d. x 15 cm..... 162207
Acclaim 120, C8, 3 µm, 120 Å, 300 µm i.d. x 5 cm..... 162206
Acclaim 120, C8, 3 µm, 120 Å, 1.0 mm i.d. x 5 cm..... 162204
Acclaim 120, C8, 3 µm, 120 Å, 1.0 mm i.d. x 15 cm..... 162205
Acclaim 120, C8, 5 µm, 120 Å, 75 µm i.d. x 5 cm..... 162216
Acclaim 120, C8, 5 µm, 120 Å, 75 µm i.d. x 15 cm..... 162217
Acclaim 120, C8, 5 µm, 120 Å, 75 µm i.d. x 25 cm..... 162218
Acclaim 120, C8, 5 µm, 120 Å, 300 µm i.d. x 5 cm..... 162213
Acclaim 120, C8, 5 µm, 120 Å, 300 µm i.d. x 25 cm..... 162215
Acclaim 120, C8, 5 µm, 120 Å, 1.0 mm i.d. x 5 cm..... 162210
Acclaim 120, C8, 5 µm, 120 Å, 1.0 mm i.d. x 15 cm..... 162211
Acclaim 120, C8, 5 µm, 120 Å, 1.0 mm i.d. x 25 cm..... 162212

Micro and Nano Precolumns

Acclaim 120, C8, 5 µm, 120 Å, 300 µm i.d. x 5 mm, 5 Cartridges 162266
Acclaim 120, C8, 5 µm, 120 Å, 500 µm i.d. x 5 mm, 5 Cartridges 162264
Acclaim 120, C8, 5 µm, 120 Å, 500 µm i.d. x 15 mm, 5 Cartridges 162265
Acclaim 120, C8, 5 µm, 120 Å, 800 µm i.d. x 5 mm, 5 Cartridges 162263
Acclaim 120, C8, 5 µm, 120 Å, 1.0 mm i.d. x 5 mm, 5 Cartridges 162261
Acclaim 120, C8, 5 µm, 120 Å, 1.0 mm i.d. x 15 mm, 5 Cartridges 162262

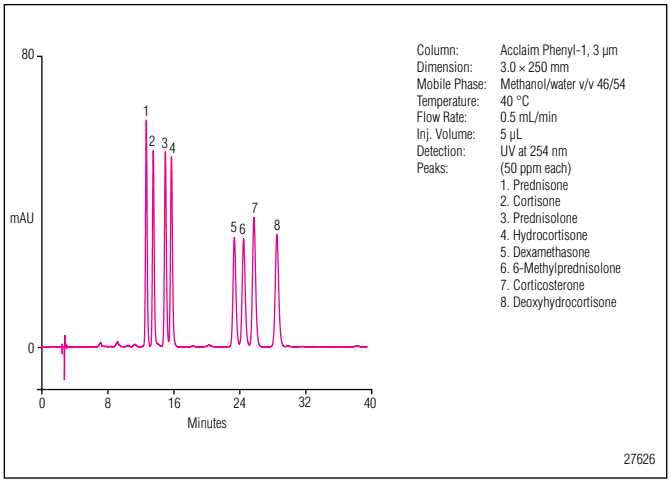
Acclaim Phenyl-1

A unique reversed-phase column with high aromatic selectivity

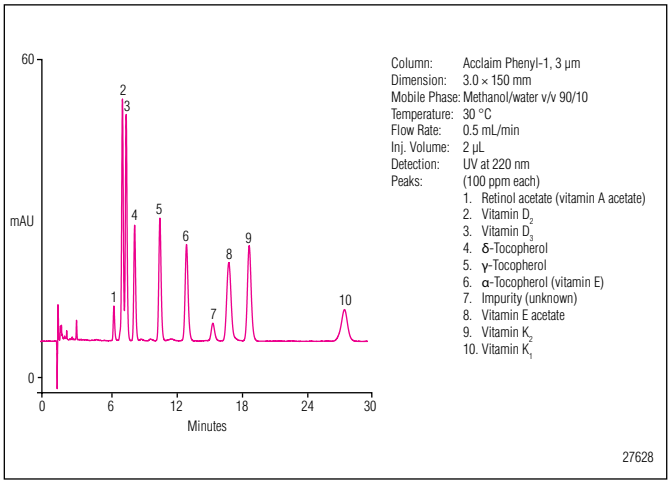
Acclaim Phenyl-1 columns provide unique selectivity of aromatic compounds for superior chromatographic performance. This column has higher π-π interaction than other phenyl phases, thus providing unique selectivity and greater separation options than other phenyl supports. The column is engineered to provide high hydrophobic retention, ideal for retaining a broad range of analytes. It is compatible with 100% aqueous conditions for good hydrolytic stability.

- High aromatic selectivity
- High hydrophobic retention
- Unique and complementary selectivity
- Compatibility with highly aqueous mobile phase
- High efficiency and rugged packing

The Acclaim Phenyl-1 column is based on covalent modification of high-purity, spherical, porous silica particles, with a specially designed silane ligand bearing proprietary alkyl aromatic functionality. This novel column chemistry results in the following benefits. Acclaim Phenyl columns are available in 3 µm particle sizes and 4.6, 3.0, and 2.1 mm diameters, with an average pore diameter of 120Å The Acclaim Phenyl-1 may be used for LC/MS applications



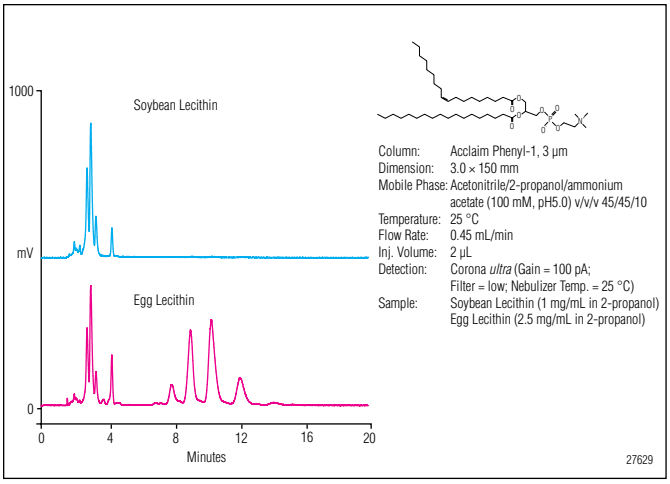
Separation of glucocorticosteroids.



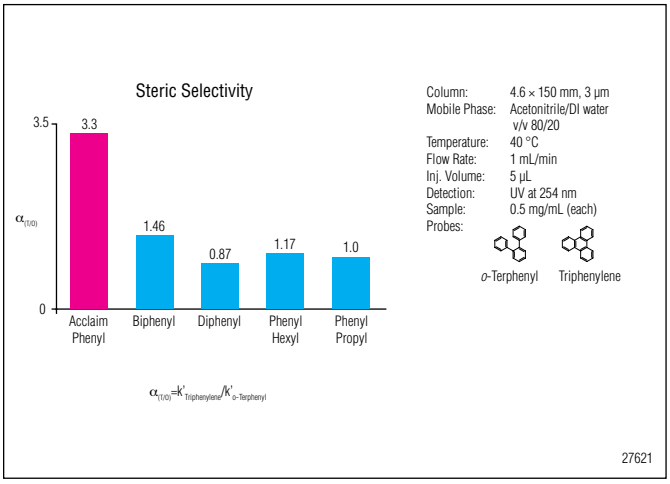
Separation of fat-soluble vitamins.

Applications

The Acclaim Phenyl-1 column can be used in a wide range of application in pharmaceutical, environmental, food testing and product-quality testing. This column is ideally suited for the analysis of aromatic analytes some examples include glucocorticosteroids, estrogens, fat-soluble vitamins and phospholipids.



Analysis of soybean lecithin and egg lecithin.



Aromatic selectivity comparison.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Acclaim Phenyl-1: A Reversed-Phase Column with High Aromatic Selectivity

Ordering Information

Analytical Columns

Acclaim Phenyl-1, 3µm, Analytical, (4.6 x 150mm)	071969
Acclaim Phenyl-1, 3µm, Analytical, (3.0 x 250 mm	074694
Acclaim Phenyl-1, 3µm, Analytical, (3.0 x 150 mm)	071970
Acclaim Phenyl-1, 3µm, Analytical, (3.0 x 100 mm)	074693
Acclaim Phenyl-1, 3µm, Analytical, (3.0 x 50 mm)	071972
Acclaim Phenyl-1, 3µm, Analytical, (2.1 x 150mm)	071971

Guard Columns

Acclaim Phenyl-1, 3µm, Guard (4.6 x 10 mm)	071973
Acclaim Phenyl-1, 3µm, Guard (3.0 x 10 mm)	071974
Acclaim Phenyl-1, 3µm Guard (2.1 x 10 mm)	071975
Guard to Analytical Column Coupler V-2	074188
Acclaim Guard Kit (Holder and coupler) V-2	069707
Acclaim SST Guard Cartridge Holder V-2	069580

Acclaim PolarAdvantage

Novel polar-embedded reversed-phase columns with unique selectivity

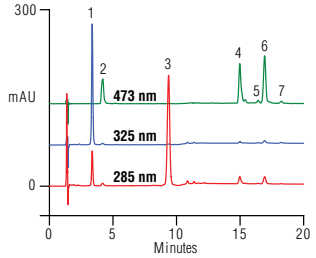
Acclaim Polar Advantage (PA) columns feature a patented bonding column chemistry that incorporates a polar sulfonamide group with an ether linkage near the silica surface. This unique chemistry provides low silanol activity, compatibility with 100% aqueous mobile phase, and different selectivity complementary to C18 column. The Acclaim PA column offers great separation power to resolve a wide variety of polar and nonpolar analytes and supports LC/MS analysis.

- Novel polar-embedded column chemistry
- Selectivity complementary to the C18 column
- Low silanol activity for excellent peak shape with basic compounds
- Compatible with mobile phases from 100% aqueous to 100% organic solvent
- High selectivity for hydrophobic aromatic molecules
- Wide range of applications

Conventional C18 phases are not compatible with highly aqueous mobile phases, due to dewetting. The Acclaim PA column by design has a mildly hydrophilic surface, which remains in contact with aqueous-only mobile phases, negating the problems of dewetting common with conventional reversed-phase columns.

Acclaim PA columns are available in 2.2, 3, and 5 µm particle sizes and 4.6, 3.0, and 2.1 mm diameters, with an average pore diameter of 120 Å. The Acclaim PA column is compatible with LC/MS applications. These columns are available for fast LC; see the RSLC section.

Fat-Soluble Vitamins and Carotenoids in a Vitamin Tablet



Column: Acclaim PA C16, 3 µm, 4.6 × 150 mm
Pump: Summit P680A DGP-6
Mobile Phase: (A) Water
(B) 54:44:2 methanol:acetonitrile: isopropanol

Gradient:

Times	0	8.0	8.1	25
%A	5	5	0	0
%B	95	95	100	100

Flow: 1.25 mL/min
Temperature: 30 °C
Injection: Summit ASI-100, 15 µL
Detector: Summit UVD 340U diode array, 473, 325 and 285 nm, and spectra 200–595 nm

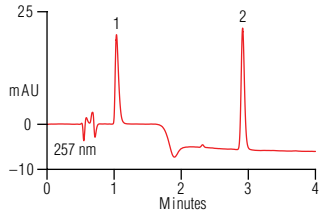
Peaks:
1. trans-Retinol acetate
2. trans-Lutein
3. α-Tocopherol acetate
4. trans-Lycopene
5. cis-Lycopene
6. trans-β-Carotene
7. cis-β-Carotene

Sample Preparation:
– Finely grind a weighed tablet.
– Weigh an aliquot of about 1/10 tablet (150 mg) into a screw-cap vial.
– Partition between 1.0 mL water and 5.0 mL ethyl acetate with vigorous shaking.
– Warm to 60 °C for 10 min.
– Shake vigorously again for 0.5 min.
– Centrifuge to separate phases.

21786

Analysis of fat-soluble vitamins and carotenoids in a vitamin tablet.

Loratidine and Pseudo-ephedrine in a Time-Release Tablet on Acclaim PA



Column: Acclaim PA C16, 5 µm, 4.6 × 50 mm
Pump: Summit P680A DGP-6
Mobile Phases: (A) 15:85:0.050 acetonitrile:water:TFA
(B) 40:60:0.050 acetonitrile:water:TFA
Flow: 1.25 mL/min
Temperature: 35 °C

Gradient:

Times	0.00	0.40	0.41	4.00
%A	100	100	0	0
%B	0	0	100	100

Injection: Summit ASI-100, 10 µL
Detector: Summit UVD 340U diode array, UV at 206, 240 and 257 nm

Peaks:
1. Pseudo-ephedrine 240 µg/mL
2. Loratidine 10

Sample Preparation:
– Finely grind a weighed tablet.
– Weigh an aliquot containing 1 mg loratidine (120 mg) into a dry 100 mL flask.
– Add 10 mL methanol and disperse.
– Add 3 mL of 1N HCl with mixing.
– Dilute to 100 mL with water.
– Filter through 0.45 µm membrane filter.

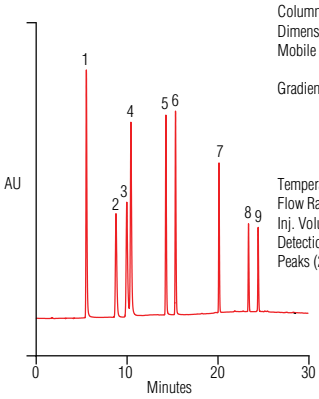
21785

Analysis of loratidine and pseudo-ephedrine in a time-release tablet.

Applications

The Acclaim PA column can be used in a wide range of applications. Compared to the C18 column, Acclaim PA columns provide unique selectivity, good peak shape for acidic, basic, and neutral analytes, and full compatibility with 100% aqueous conditions. Applications include pharmaceutical, environmental, life science, food testing, and product-quality testing.

LC Separation of Nitrosamines in EPA 8270 Using Acclaim® PA



Column: Acclaim PA, 5 µm
Dimensions: 4.6 × 250 mm
Mobile Phase: (A) D.I. H2O
(B) Acetonitrile

Gradient:

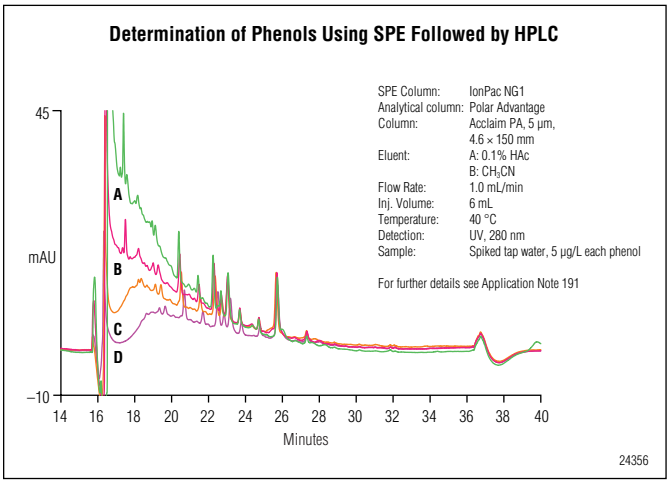
Time (min)	% B
0	1
5	1
25	90
30	90

Temperature: 30 °C
Flow Rate: 1 mL/min
Inj. Volume: 15 µL
Detection: UV, 230 nm
Peaks (20 mg/mL):
1. N-Nitroso-dimethylamine
2. N-Nitroso-morpholine
3. N-Nitroso-methylethylamine
4. N-Nitroso-pyrrolidine
5. N-Nitroso-diethylamine
6. N-Nitroso-piperidine
7. N-Nitroso-dipropylamine
8. N-Nitroso-dibutylamine
9. N-Nitroso-diphenylamine

Note: This gradient will also resolve benzidines.

20109a

LC separation of nitrosamines, as specified in EPA 8270.



Determination of phenols in drinking water.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

LC/MS Application Guide

Product Data Sheets

Acclaim PolarAdvantage HPLC Columns Data Sheet

Application Notes

AN 180: Determination of Nevirapine Using HPLC with UV Detection

AN 191: Determination of Phenols in Drinking and Bottled Mineral Waters Using Online Solid-Phase Extraction Followed by HPLC with UV Detection

AN 195: Determination of Verapamil Hydrochloride Purity Using the Acclaim PA Column

AB 102: Determination of Aucubin, Genipoide, and Pinoresinol Diglucoside in Cortex Eucommiae Using ASE and HPLC

Application Updates

AU 156: Evaluation of Acclaim HPLC Columns Using the National Institute of Standards Standard Reference Material 870

Ordering Information

Columns for fast LC (UHPLC) are listed in the RSLC section.

Analytical Columns

Acclaim PA, 3 µm Analytical (2.1 × 50 mm)	063174
Acclaim PA, 3 µm Analytical (2.1 × 100 mm)	061316
Acclaim PA, 3 µm Analytical (2.1 × 150 mm)	061317
Acclaim PA, 3 µm Analytical (3.0 × 50 mm)	068972
Acclaim PA, 3 µm Analyitcal (3.0 × 150 mm)	063693
Acclaim PA, 3 µm, Analytical (3.0 × 250 mm)	070079
Acclaim PA, 3 µm Analytical (4.6 × 150 mm)	061318
Acclaim PA, 5 µm Analytical (4.6 × 50 mm)	061319
Acclaim PA, 5 µm Analytical (4.6 × 150 mm)	061320
Acclaim PA, 5 µm Analytical (4.6 × 250 mm)	061321

Guard Columns

Acclaim PA, 5µm, Guard Cartridges (2.1 × 10 mm), 2 ea.	069691
Acclaim PA, 5µm Guard Cartridges (3 × 10 mm), 2 ea.	071983
Acclaim PA, 5 µm Guard Cartridges (4.6 × 10 mm), 2 ea.	069698
Acclaim SST Guard Cartridge Holder V2	069580
Guard Kit (Holder and Coupler)	069707
Guard to Analytical Column Coupler	074188

Micro and Nano Columns

Acclaim PA, 3 µm, 120 Å, 75 µm i.d. × 5 cm	162244
Acclaim PA, 3 µm, 120 Å, 300 µm i.d. × 5 cm	162242
Acclaim PA, 3 µm, 120 Å, 300 µm i.d. × 15 cm	162243
Acclaim PA, 3 µm, 120 Å, 1.0 mm i.d. × 5 cm	162240
Acclaim PA, 3 µm, 120 Å, 1.0 mm i.d. × 15 cm	162241
Acclaim PA, 5 µm, 120 Å, 75 µm i.d. × 5 cm	162252
Acclaim PA, 5 µm, 120 Å, 75 µm i.d. × 15 cm	162253
Acclaim PA, 5 µm, 120 Å, 75 µm i.d. × 25 cm	162254
Acclaim PA, 5 µm, 120 Å, 300 µm i.d. × 5 cm	162249
Acclaim PA, 5 µm, 120 Å, 300 µm i.d. × 15 cm	162250
Acclaim PA, 5 µm, 120 Å, 1.0 mm i.d. × 5 cm	162246
Acclaim PA, 5 µm, 120 Å, 1.0 mm i.d. × 15 cm	162247
Acclaim PA, 5 µm, 120 Å, 1.0 mm i.d. × 25 cm	162248

Micro and Nano Precolumns

Acclaim PA, 5 µm, 120 Å, 300 µm i.d. × 5 mm, 5 Cartridges	162302
Acclaim PA, 5 µm, 120 Å, 500 µm i.d. × 5 mm, 5 Cartridges	162336
Acclaim PA, 5 µm, 120 Å, 500 µm i.d. × 15 mm, 5 Cartridges	162337
Acclaim PA, 5 µm, 120 Å, 800 µm i.d. × 5 mm, 5 Cartridges	162335
Acclaim PA, 5 µm, 120 Å, 1.0 mm i.d. × 5 mm, 5 Cartridges	162333
Acclaim PA, 5 µm, 120 Å, 1.0 mm i.d. × 15 mm, 5 Cartridges	162334
Acclaim PA, 3 µm, 120 Å, 75 µm i.d. × 15 cm	162245

These columns are designed for optimal performance using Dionex UltiMate 3000 and ICS-5000 chromatography instruments.

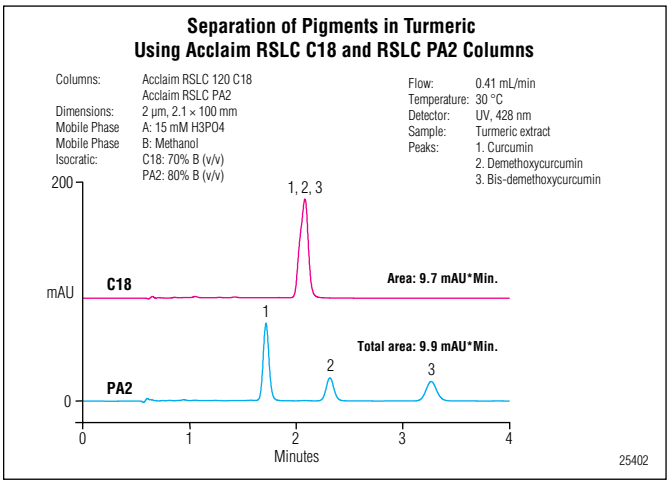
Acclaim PolarAdvantage II

Complementary selectivity and enhanced hydrolytic stability

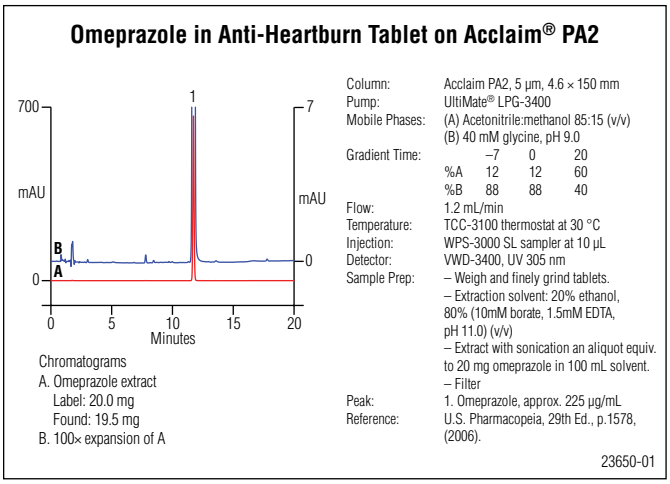
Acclaim Polar Advantage II (PA2) columns feature a patented surface chemistry that incorporates amide-embedded polar group and multi-point attachment between the ligands and the silica surface. This unique chemistry provides enhanced hydrolytic stability from pH 1.5–10 with 100% aqueous mobile phases and exhibits high reversed-phase capacity, with selectivity complementary to conventional C18 columns.

- Hydrolytic stability at both low pH and high pHs (pH 1.5–10)
- Good peak shape for both basic and acidic compounds
- Compatible with 100% aqueous mobile phases
- Selectivity complementary to C18 columns
- Compatible with MS detection

Acclaim PA2 columns are available in 2.2, 3, and 5 µm particle sizes and 4.6, 3.0, and 2.1 mm diameters, with an average pore diameter of 120 Å. These columns are available for fast LC; refer to the RSLC section.



The Acclaim PA2 column provides greater selectivity in this separation of turmeric.

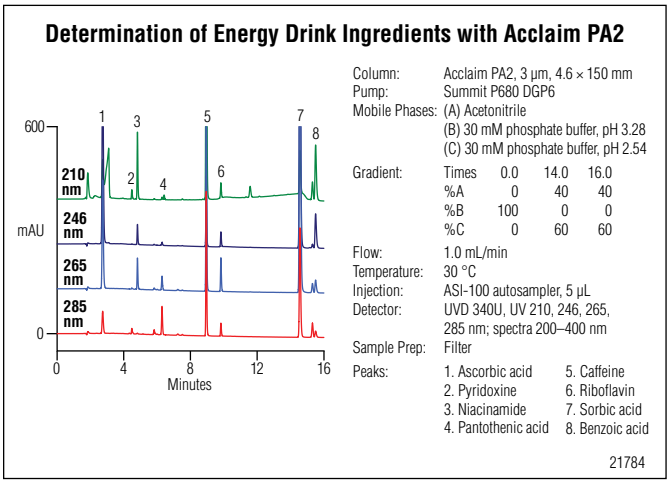


Determination of omeprazole in anti-heartburn tablet.

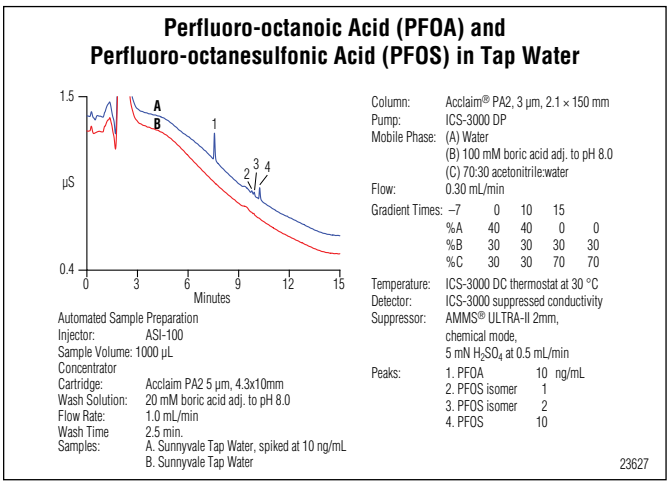
Highly Stable Under Wide pH Range

The proprietary bonding of the Acclaim PA2 column resists hydrolytic attack by protecting the bonded phase. Due to its enhanced hydrolytic stability and hydrophilic surface, these columns are ideal for applications requiring aggressive pHs (PFOS/PFOA or anionic surfactants by suppressed conductivity detection) or aqueous conditions (water-soluble vitamins). The Acclaim PA2 column can also be used for any application of conventional reversed-phase C18 columns with complementary selectivity.

In addition to low pH stability, although it is common to analyze basic compounds under high-pH conditions to reduce peak tailing, most polar-embedded phases are even less hydrolytically stable than conventional C18 columns. The Acclaim PA2 column is specifically designed to withstand high pH conditions, making it a good choice for the separation of both basic and acidic analytes.



Determination of ingredients in energy drinks.



Analysis of perfluoro-octanoic acid (PFOA) and perfluoro-octanesulfonic (PFOS) acid in tap water.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Polar Advantage II (PA2) HPLC Columns Data Sheet

Application Notes

AN 213: Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Tap Water Using On-Line Solid-Phase Extraction Followed by HPLC with UV and Fluorescence Detections

AN 216: Determination of Water- and Fat-Soluble Vitamins in Functional Waters by HPLC with UV-PDA Detection

Application Updates

AU 156: Evaluation of Acclaim HPLC Columns Using the National Institute of Standards Standard Reference Material

Technical Notes

TN 85: Automated Two-Dimensional Separation of Peptides by Ion-Pair Reversed-Phase High-Performance Liquid Chromatography-Electrospray Ionization-Mass Spectrometry at High and Low pH

Ordering Information

Columns for fast LC are listed in the Acclaim RSLC section.

Analytical Columns

Acclaim PA2, 3 µm Analytical (4.6 × 150 mm)	063191
Acclaim PA2, 3 µm Analytical (4.6 × 50 mm)	063189
Acclaim PA2, 3 µm, Analytical (3.0 × 250 mm)	070080
Acclaim PA2, 3 µm Analyitcal (3.0 × 150 mm)	063705
Acclaim PA2, 2.2 µm Analytical (3.0 × 50mm)	068973
Acclaim PA2, 3 µm Analytical (2.1 × 150 mm)	063187
Acclaim PA2, 5 µm Analytical (4.6 × 150 mm)	063197
Acclaim PA2, 5 µm Analytical (4.6 × 250 mm)	063199

Guard Columns

Acclaim PA2, 5µm Guard Cartridges, (2.1 × 10 mm), 2 ea.; (use V2 Holder)	069692
Acclaim PA2, 5µm Guard Cartridges (3 × 10 mm), 2 ea., (use V2 Holder)	071985
Acclaim PA2, 5 µm Guard Cartridges, (4.6 × 10 mm), 2 ea (use V-2 Holder)	069699
Acclaim SST Guard Cartridge Holder V2	069580
Acclaim Guard to Analytical Column Coupler V2	074188
Guard Kit (Holder and Coupler) V2	069707

Acclaim Rapid Separation RSLC

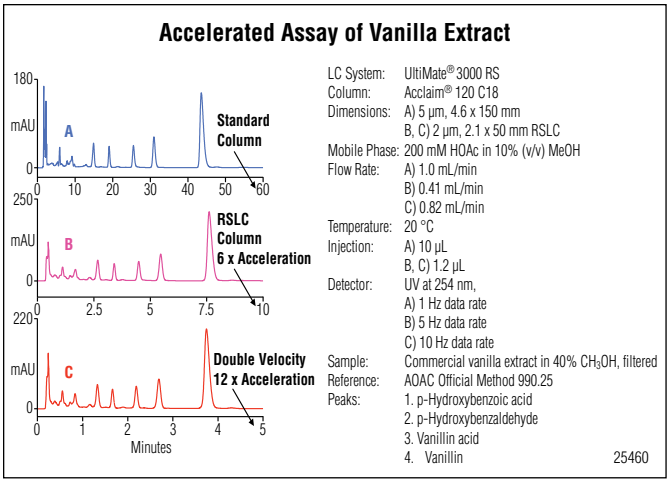
High-throughput, cost-effective and environment-friendly HPLC solution

Acclaim Rapid Separation Liquid Chromatography (RSLC) columns provide high-throughput HPLC solutions in a cost-effective and environmentally friendly way, without sacrificing chromatographic performance. The Acclaim RSLC columns, together with the UltiMate RSLC system, provide ultrafast, high-efficiency LC separations.

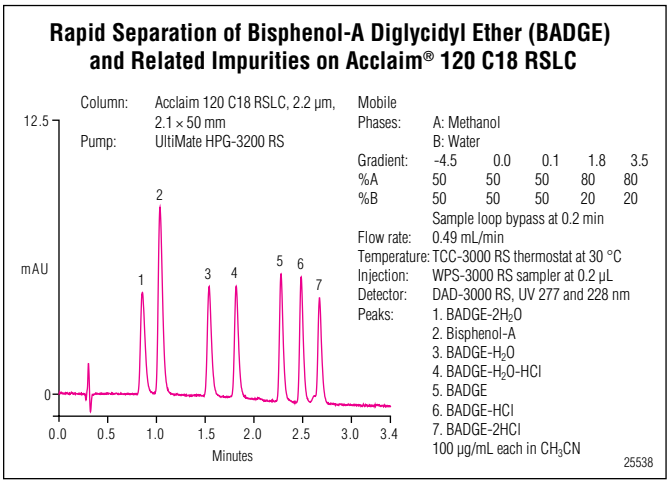
- High throughput with uncompromised chromatographic performance and reduced solvent consumption
- Accelerate separations up to fifteen-fold compared to conventional LC
- Save up to 85% of solvent with 3 µm columns and 92% of solvent with 2 µm columns
- Use as little as 15–40% of sample volume traditionally required for LC
- More resistant to column fouling compared to sub-2 µm particle columns
- Reduced backpressure and compatible with both standard HPLC (400 bar) and UHPLC (800 bar) systems
- Ease of operation ensures optimal, fast separations

Acclaim RSLC columns are based on high-purity spherical porous silica gel in 2.2 µm and 3 µm particle sizes and 2.1 and 3.0 mm column inner diameters. They are available in four column chemistries: C18, C8, Polar Advantage (PA), and Polar Advantage II (PA2). This range offers different and complementary selectivities, making these columns ideal for applications where fast analysis, reduced solvent consumption, and ease of use are required.

The Acclaim RSLC 2.2 µm C18 and C8 material feature high-density monomeric C18 chemistry with exhaustive endcapping. This provides the selectivity of a standard reversed phase and extremely low silanol activity. The PA columns have excellent hydrolytic stability and are compatible with 100% aqueous mobile phases. The PA2 material features amide-embedded chemistry with excellent hydrolytic stability (pH 1.5 to 10). In addition, it provides selectivity complementary to its C18 counterpart.



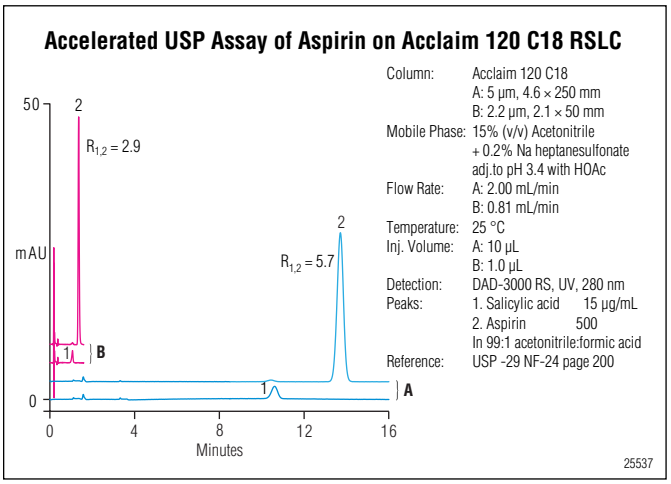
Validated methods can be accelerated without changing the principle of the analysis by using RSLC columns and simple geometric rules.



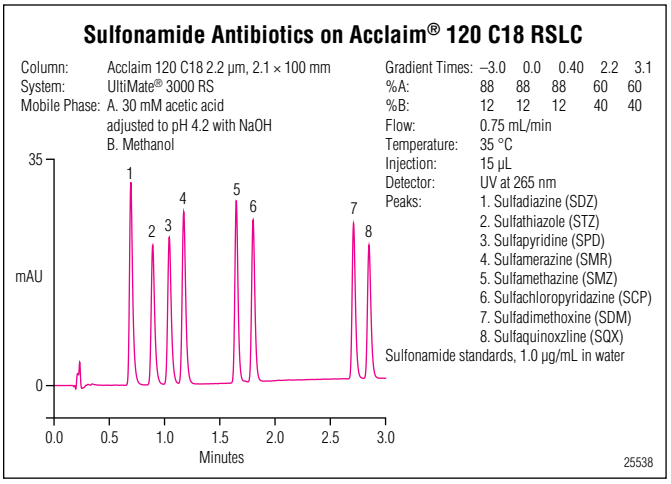
Rapid separation of bisphenol-A diglycidyl ether.

Acclaim RSLC 3 µm columns are available in three stationary phases: Acclaim 120 C18, Polar Advantage (PA), and Polar Advantage II (PA2). The columns are packed in 3 mm i.d. with 33 mm or 75 mm length. The inner diameter of 3 mm makes these columns fully compatible with standard analytical LC instrumentation, and saves up to 85% solvent compared to a 4.6 mm column of otherwise identical features.

Acclaim RSLC columns complement the Dionex UltiMate 3000 RSLC system to provide superior speed, reliability, and ease-of-use. Using RSLC with Dionex Intelligent LC solutions for tandem LC, parallel LC, or other techniques further increases sample throughput up to 30-fold. See the UltiMate RSLC section for more information.



Accelerated assay of aspirin.



Determination of sulfonamide antibiotics using the Acclaim 120 C18 RSLC column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Acclaim Rapid Separation LC 3 µm Columns Data Sheet

Application Notes

AN 242: Robust and Fast Analysis of Tobacco-Specific Nitrosamines by LC-MS/MS

Application Updates

AU 170: Fast Determination of Vanillin and its Synthesis Precursor by HPLC

Technical Notes

TN 701: Sub One-Minute, Nine-Component Gradient HPLC Separation for Increased Productivity Using an Acclaim 120 3 µm C18 Column

TN 75: Easy Method Transfer from HPLC to RSLC with the Dionex Method Speed-Up Calculator

Ordering Information

Acclaim RSLC 120 C18 2.2 µm Analytical Columns

Acclaim RSLC 120, C18, 2.2 µm Analytical (2.1 x 30 mm)	071400
Acclaim RSLC 120, C18, 2.2 µm Analytical (2.1 x 50 mm)	068981
Acclaim RSLC 120, C18, 2.2 µm Analytical (2.1 x 100 mm)	068982
Acclaim RSLC 120, C18, 2.2 µm Analytical (2.1 x 150 mm)	071399
Acclaim RSLC 120, C18, 2.2 µm Analytical (2.1 x 150 mm)	074812
Acclaim RSLC 120, C18, 2.2 µm Analytical, (3.0 x 30 mm)	071606
Acclaim RSLC 120, C18, 2.2 µm Analytical (3.0 x 50 mm)	071605
Acclaim RSLC 120, C18, 2.2 µm Analytical (3.0 x 100 mm)	071604

Acclaim RSLC 120 C18 3 µm Analytical Columns

Acclaim RSLC 120, C18, 3 µm Analytical (3.0 x 33 mm)	066272
Acclaim RSLC 120, C18, 3 µm Analytical (3.0 x 50 mm)	068971
Acclaim RSLC 120, C18, 3 µm Analytical (3.0 x 75 mm)	066273
	063691

Acclaim RSLC 120 C8 Analytical Columns

Acclaim RSLC 120, C8, 2.2 µm Analytical (2.1 x 30 mm)	072614
Acclaim RSLC 120, C8, 2.2 µm (2.1 x 50 mm)	072615
Acclaim RSLC 120, C8, 2.2 µm (2.1 x 100 mm)	072616
Acclaim RSLC 120, C8, 2.2 µm (2.1 x 150 mm)	072617
Acclaim RSLC 120, C18, 2.2 µm (3.0 x 150 mm)	063691
Acclaim RSLC 120, C8, 2.2 µm (3 x 30 mm)	072618
Acclaim RSLC 120, C8, 2.2 µm (3 x 50 mm)	072619
Acclaim RSLC 120, C8, 2.2 µm (3 x 100 mm)	072620
Acclaim RSLC 120, C8, 2.2 µm (2.1x 250 mm)	074811

Acclaim RSLC PA Analytical Columns

Acclaim RSLC PA, 2.2 µm (2.1 x 30 mm)	072621
Acclaim RSLC PA, 2.2 µm (2.1 x 50 mm)	072622
Acclaim RSLC PA, 2.2 µm (2.1 x 100 mm)	072623
Acclaim RSLC PA, 2. 2µm (2.1 x 150 mm)	072624

Acclaim RSLC PA, C8, 2.2 µm (2.1 x 250 mm) 074813
Acclaim RSLC PA, 2. 2µm (3 x 30 mm) 072625
Acclaim RSLC PA, 2.2 µm (3 x 50 mm) 072626
Acclaim RSLC PA, 2.2 µm (3 x 100 mm) 072627
Acclaim RSLC PA, 3 µm Analytical (3.0 x 33 mm) 066274
Acclaim RSLC PA, 3 µm Analytical (3.0 x 75 mm) 066275

Acclaim RLSC PA2 Analytical Columns

Acclaim RSLC PA2, 2.2 µm Analytical (2.1 x 30 mm) 071402
Acclaim RSLC PA2, 2.2 µm Analytical (2.1 x 50 mm) 068989
Acclaim RSLC PA2, 2.2 µm Analytical (2.1 x 100 mm) 068990
Acclaim RSLC PA2, 2.2 µm Analytical (2.1 x 150 mm) 071401
Acclaim RSLC PA2, 2.2 µm, Analytical (2.1 x 250 mm) 074814
Acclaim RSLC PA2, 2.2 µm Analytical (3.0 x 30 mm) 071609
Acclaim RSLC PA2, 2.2 µm Analytical (3.0 x 50 mm) 071608
Acclaim RSLC PA2, 2.2 µm Analytical (3.0 x 100 mm) 071607
Acclaim RSLC PA2, 3 µm Analytical (3 × 33 mm) 066276
Acclaim PA2, 3 µm Analytical (3.0 x 50 mm) 068973
Acclaim RSLC PA2, 3 µm Analytical (3.0 x 75 mm) 066277
Acclaim PA2, 3 µm Analyitcal (3.0 x 150 mm) 063705

HILIC Columns

Separates highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography

The Acclaim HILIC-10 column separates highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography (HILIC). This new column is suited for use in a broad range of applications including separation of hydrophilic drugs and drug metabolites.

- Designed for the chromatographic separation of highly polar molecules
- Unique selectivity
- Rugged column packing
- Broad application range

HILIC is a complementary technique to Reversed-Phase Liquid Chromatography (RPLC) with several benefits. The Acclaim HILIC-10 column can retain and separate polar analytes that cannot be retained using RP columns.

Note: *See the Acclaim Library at http://www.dionex.com/en-us/documents/acclaim-library/lp-71591.html. Acclaim Mixed-Mode HILIC-1 columns are described in the Mixed-Mode section.*



Acclaim HILIC-10: The Acclaim HILIC-10 column is designed for separating highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography (HILIC).

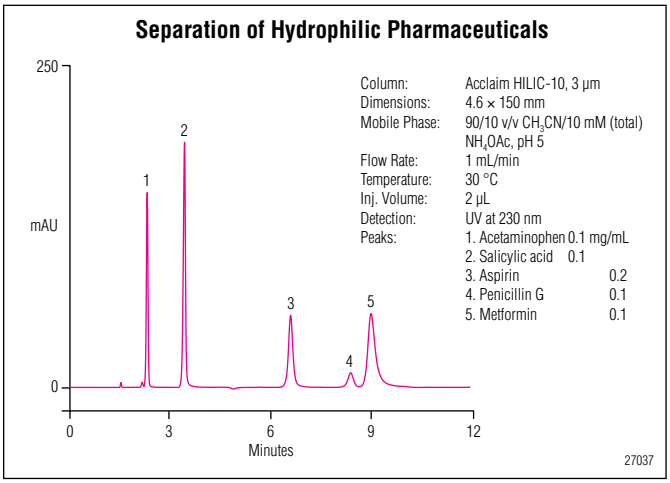
Acclaim HILIC-10

For the separation of hydrophilic drugs and drug metabolites

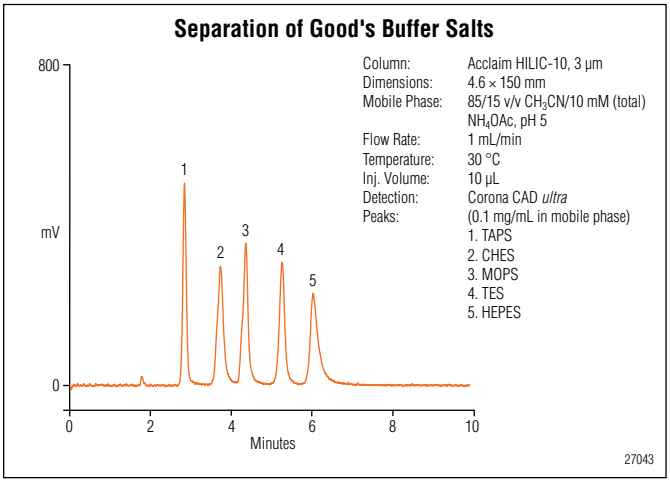
The Acclaim HILIC-10 column is designed for separating highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography (HILIC). This column is based on high-purity spherical porous silica covalently modified with a proprietary hydrophilic layer.

- Retains highly polar molecules that are not retained by reversed-phase chromatography
- Unique selectivity, complementary to reversed-phase columns
- Hydrolytically stable
- Rugged column packing
- Broad application range

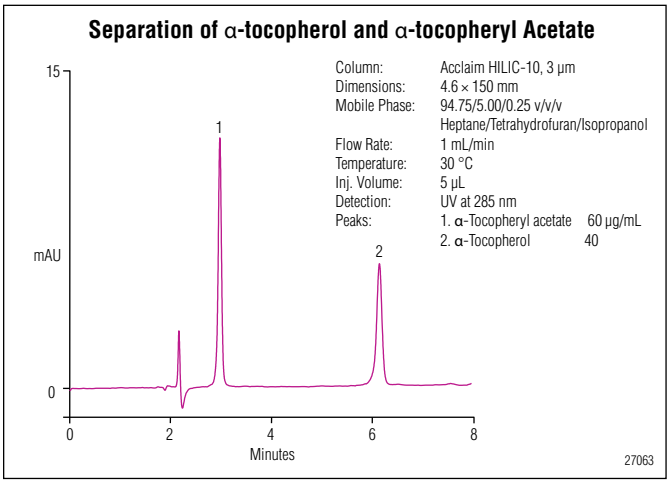
The advantage of the Acclaim HILIC-10 phase is its compatibility with up to 20% aqueous mobile phase, while maintaining affinity for polar analytes. Acclaim HILIC-10 columns are available in 3 µm particle size. A variety of column formats are available: 4.6 × 150 mm for high-throughput routine analysis; 3.0 × 150 mm for high-throughput analysis with reduced solvent consumption; and 2.1 × 150 mm for LC-MS analysis.



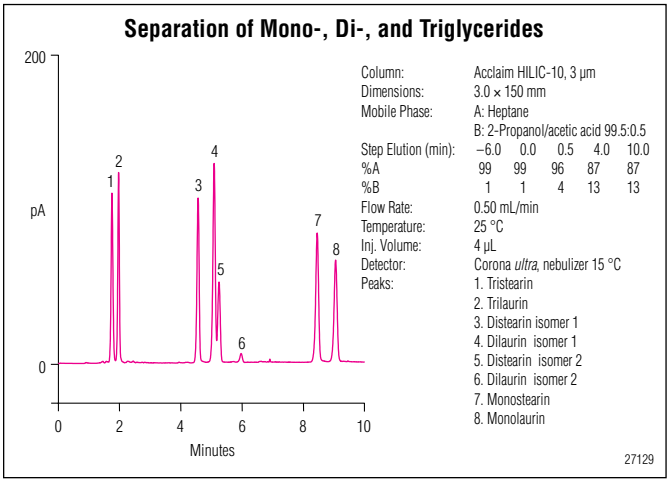
Isocratic separation of hydrophilic pharmaceuticals.



Separation of Good's buffer salts.



Seapration ovf vitamin E (alpha tocopherol and its acetate form).



Separation of mono-, di-, and triglycerides.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Acclaim HILIC-10 Column for Separating Highly Hydrophilic Molecules

Ordering Information

Analytical Columns

Acclaim HILIC-10, 3 µm, Analytical (4.6 x 150 mm) 074257
Acclaim HILIC-10, 3 µm, Analytical (3.0 x 150 mm) 074258
Acclaim HILIC-10, 3 µm, Analytical (2.1 x1 50 mm) 074259

Guard Columns

Acclaim HILIC-10, 5 µm, Guard (4.6 x10 mm) 2 ea. (Use Holder V-2)..... 074262
Acclaim HILIC-10, 5 µm, Guard (3.0x10 mm) 2 ea. (Use Holder V-2)..... 074261
Acclaim HILIC-10, 5 µm, Guard (2.1 x10 mm) 2 ea. (Use Holder V-2)..... 074263
Guard cartridges require holder.
Acclaim SST Guard Cartridge Holder V-2..... 069580
Acclaim Guard Kit (Holder and coupler) V-2..... 069707
Guard to Analytical Column Coupler V-2..... 074188

Specialty LC Columns

Columns for organic acids, surfactants, explosives residues, and carbamate analysis.

Dionex specialty columns include: Acclaim OA (for hydrophilic organic acids), Surfactant (for anionic, nonionic, and cationic surfactants), Explosives (separates all 14 explosives targeted by EPA Method 8330), and Carbamate columns.

- Acclaim OA column for fast organic acid analysis
- Acclaim Surfactant column for separation of surfactants
- Acclaim Explosives column for separation of explosive residues
- Acclaim Carbamate column for the separation of carbamates.
- Combination reversed-phase and ion-exchange specialty phase columns
- Unique mixed-mode selectivity complementary to RP columns

The novel and unique chemistries of these columns provide superior resolution and ease-of-use.

Note: *See the Acclaim Library of applications at www.dionex.com under Documents, Acclaim Library.*



Acclaim Organic Acid: Acclaim OA reversed-phase silica columns are designed for separation of hydrophilic, aliphatic, and aromatic organic acids.

Acclaim Surfactant: The Acclaim Surfactant column is the most versatile commercially-available column specifically for the separation of all classes of surfactants.

Acclaim Explosives: Acclaim Explosives columns baseline separate all 14 explosives in EPA Method 8330, with complementary selectivity.

*Acclaim Carbamate:*A Specialty column for the separation of carbamate pesticide specfied in US EPA Method 531.2.

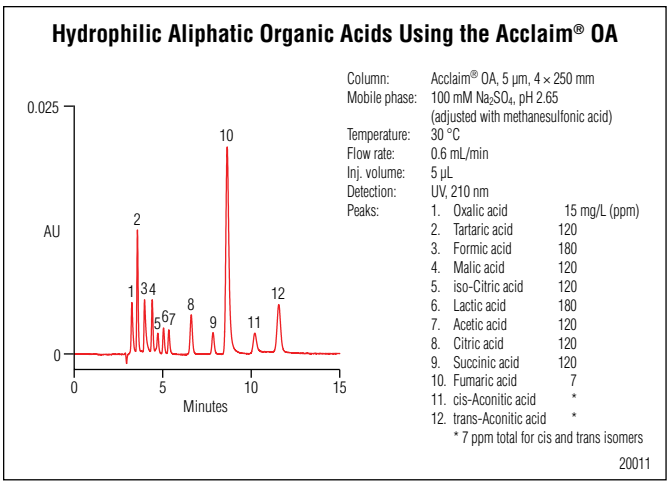
Acclaim Organic Acid

Optimized and application-tested for the analysis of hydrophilic organic acids

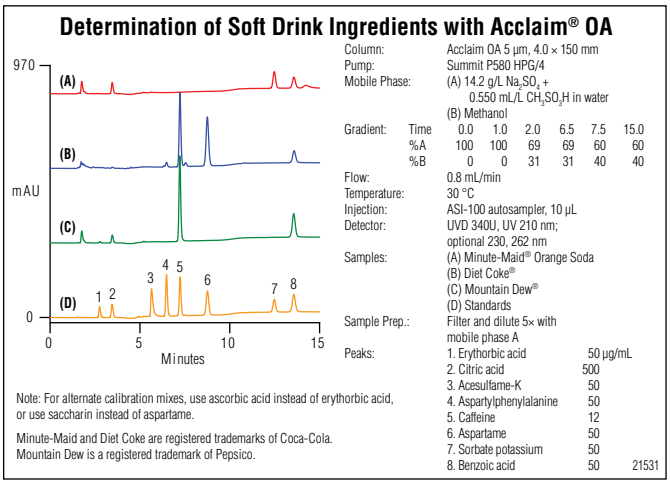
The Acclaim Organic Acid (OA) is a silica-based reversed-phase column designed for high-efficiency, high-throughput organic acids analysis. It offers unparalleled performance for separating hydroxyl aliphatic and aromatic organic acids.

- Use-tested to guarantee consistent hydrophilic organic acid separations
- Compatible with 100% aqueous mobile phases
- Hydrolytic stability at low-pH conditions, optimum for reversed-phase retention of organic acids
- Ideal selectivity for separating a wide spectrum of organic acids
- Excellent column efficiency and peak shapes for organic acids

The Acclaim OA columns are ideal for retaining and separating a wide spectrum of organic acids and are available in 3 and 5 µm particle sizes and 4.0, 3.0, and 2.1 mm column i.d. The 3.0 and 4.0 mm i.d. columns are packed in metal-free PEEK column bodies to eliminate unwanted interaction between the analytes and the column body. The Acclaim OA columns undergo extensive testing to ensure column-to-column reproducibility and are shipped with certificates of analysis.



Isocratic separation of hydrophilic organic acids.

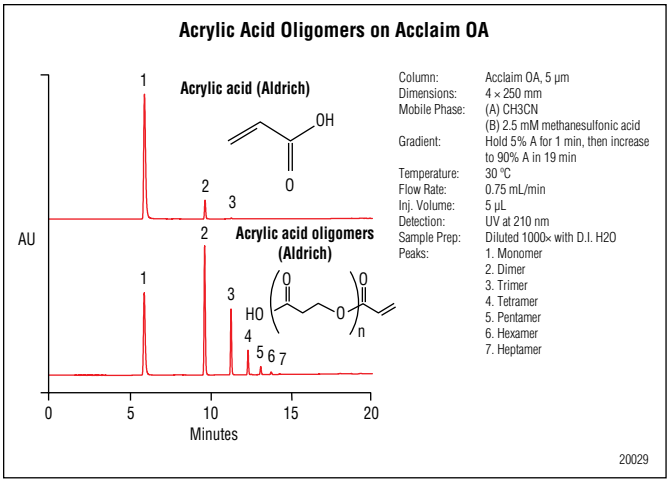


Determination of soft drink ingredients.

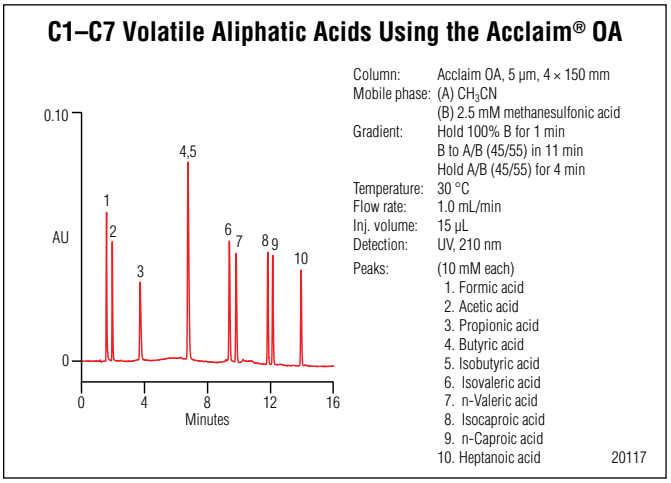
Acclaim OA Column Applications

The Acclaim OA is the recommended column for determining small hydrophilic organic acids, C1 to C7 aliphatic acids, and hydrophilic aromatic acid and is also valuable for the analysis and quality assurance of food and beverage products, pharmaceutical preparations, plating baths, and manufacturing chemicals, chemical intermediates, and environmental samples.

Example applications: aliphatic organic acids in foods (juice, wine, drinks), organic acids in drug preparations, acrylic acid and its oligomers, hydroxybenzoic acids, hydroxyphenylacetic acids, arylacetic acids, benzenpolycarboxylic acids, and selected amino acids.



Analysis of organic acids in orange juice.



Separation of C1 to C7 volatile aliphatic acids.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Organic Acid (OA) HPLC Column Data Sheet

Ordering Information

Analytical Columns

Acclaim OA, 3 µm Analytical (2.1 x 150 mm)	070087
Acclaim OA, 3 µm Analytical (3.0 x 150 mm)	070086
Acclaim OA, 5 µm Analytical (4 x 250 mm)	062902
Acclaim OA, 5 µm Analytical (4 x 150 mm)	062903

Guard Columns

Acclaim OA, 5 µm Guard Cartridges (3 x 10 mm), 2 ea, (requires holder 069580)	071987
Acclaim OA, 5 µm Guard Cartridge (4.6 x 10 mm), 2 ea (use V-2 Holder)	069700
Acclaim SST Guard Cartridge Holder V-2	069580
Guard to Analytical Column Coupler V-2	074188
Acclaim Guard Kit (Holder and coupler) V-2	069707

Acclaim Surfactant

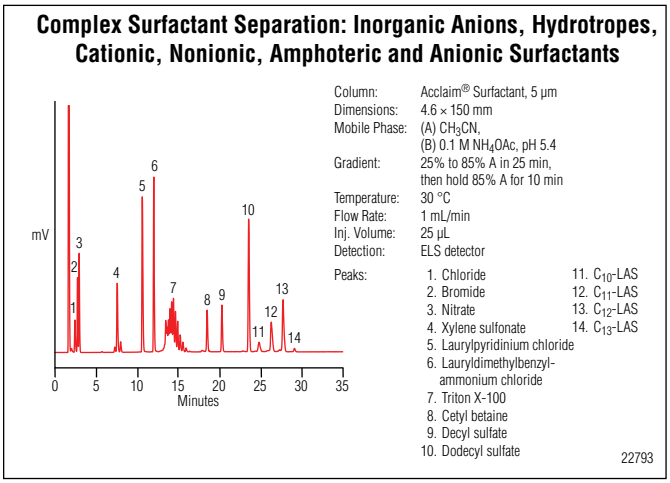
Unmatched Performance for separating all classes of surfactants

The Acclaim Surfactant column is a high-efficiency, silica-based column designed specifically for separating a wide variety of surfactants, including anionic, cationic, nonionic, and amphoteric surfactants. As a consequence of its novel chemistry, this column exhibits a unique polarity that provides significantly improved resolution for individual oligomers of ethoxylated surfactants compared with conventional C18 columns.

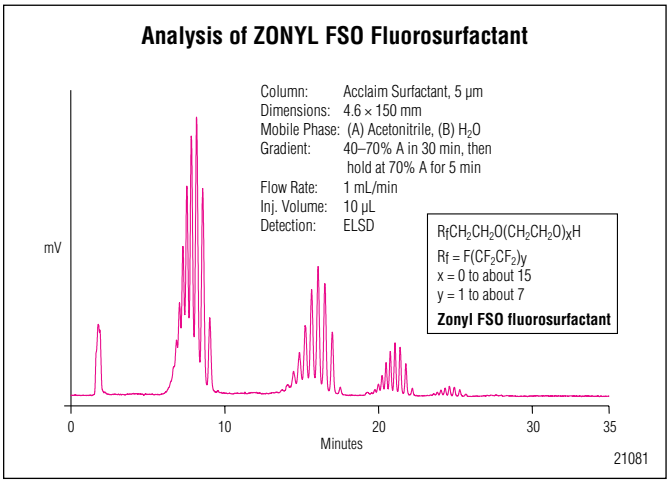
- Ideal selectivity for separation of anionic, nonionic, cationic and amphoteric surfactants
- Excellent peak shapes, especially for cationic surfactants
- Compatible with highly aqueous mobile phases
- Improved resolution for ethoxylated surfactants
- Rugged separations under a variety of conditions
- Methods compatible with various detectors

The Acclaim Surfactant columns are ideal for separating various surfactants in a variety of sample matrices. Each column undergoes extensive testing to ensure column-to-column reproducibility, and is shipped with certificates of analysis detailing these tests. Acclaim Surfactant columns are available in 3 and 5 µm particle sizes and 4.6, 3.0, and 2.1 mm column inner diameters.

The Acclaim Surfactant is also resistant to dewetting under highly aqueous mobile phase conditions, and thus can be used to provide excellent resolution between strongly hydrophilic compounds, such as isomers of xylene sulfonate.



Inorganic anion, hydrotropes, cationic, nonionic, amphoteric, and anionic surfactants.

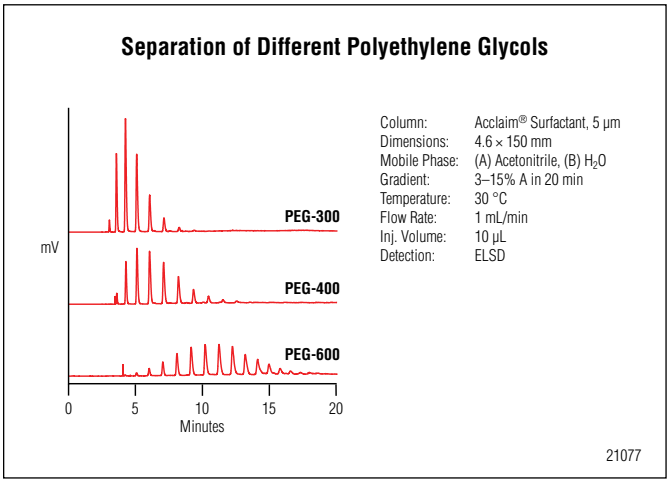


Analysis of ZONYL FSO fluorosurfactant.

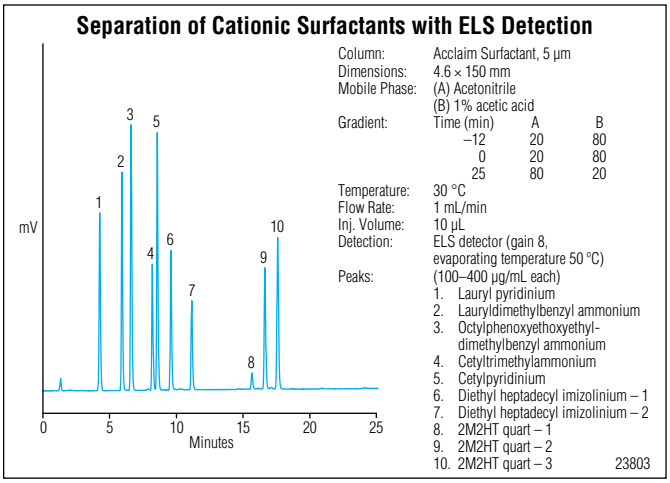
Broad Range of Applications

Surfactants are widely used in industrial, agricultural, and pharmaceutical markets, in products as diverse as pesticides, detergents powders, petroleum products, cosmetics, and pharmaceuticals. The Acclaim Surfactant column was designed specifically for HPLC separation of these surfactants.

The Acclaim Surfactant column can be used for the HPLC separation of anionic surfactants (alkylbenzenesulfonates, alkyl sulfates, alkylether sulfates) and cationic surfactants (alkyl quaternary ammonium salts, benzylalkylammonium salts, pyridinium salts, and quaternary imidazolium compounds) nonionic surfactants, and polyethylene glycols (PEGs).



Separation of different polyethylene glycols.



Separation of cationic surfactants.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Surfactant Column Data Sheet

Application Notes

AN 219: Determination of Linear Alkylbenzene Sulphonate in Treatment Plant Wastewater Streams Using On-Line Solid-Phase Extraction Followed by HPLC with Fluorescence Detection

AN 237: Analysis of Benzalkonium Chloride on the Acclaim Surfactant Column by High-Performance Liquid Chromatography

Ordering Information

Analytical Columns

Acclaim Surfactant, 3 µm Analytical (2.1 x 150 mm) 070085
Acclaim Surfactant, 3 µm Analytical (3.0 x 150 mm) 070084
Acclaim Surfactant, 5 µm, Analytical (2.1 x 150 mm) 068123
Acclaim Surfactant, 5 µm Analytical (4.6 x 150 mm) 063201
Acclaim Surfactant, 5 µm Analytical (4.6 x 250 mm) 063203

Guard Columns

Acclaim Surfactant, 5 µm, Guard Cartridges (2.1 x 10 mm), 2 ea., requires holder 069580 069693
Acclaim Surfactant, 5 µm Guard Cartridges (3 x 10 mm), 2 ea., requires holder 069580 071991
Acclaim Surfactant, 5 µm Guard Cartridges (4.6 x 10 mm), 2 ea., (use V-2 Holder) 069701
Guard cartridges require holder.
Acclaim SST Guard Cartridge Holder V-2 069580
Guard to Analytical Column Coupler V-2 074188
Acclaim Guard Kit (Holder and coupler) V-2 069707

Acclaim Explosives

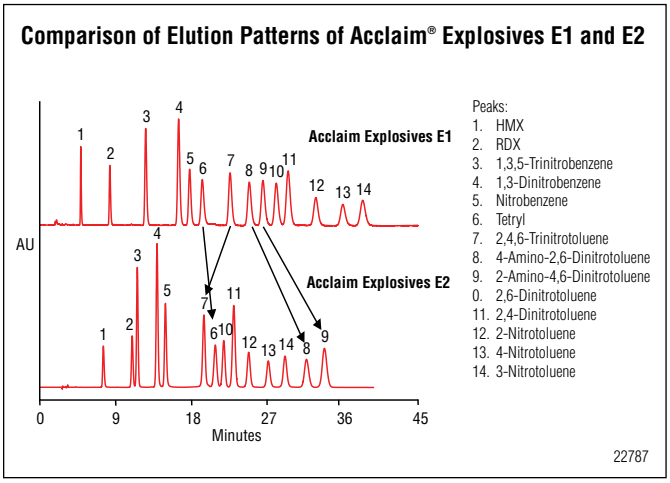
Acclaim Explosives columns: a total solution for explosives analysis (EPA Method 8330)

The Acclaim Explosives E1 and E2 columns are specifically designed to resolve all 14 explosives listed in EPA SW-846 Method 8330: Nitroaromatics and Nitramines by HPLC. The novel and unique chemistries of these columns provide superior resolution with complementary selectivities.

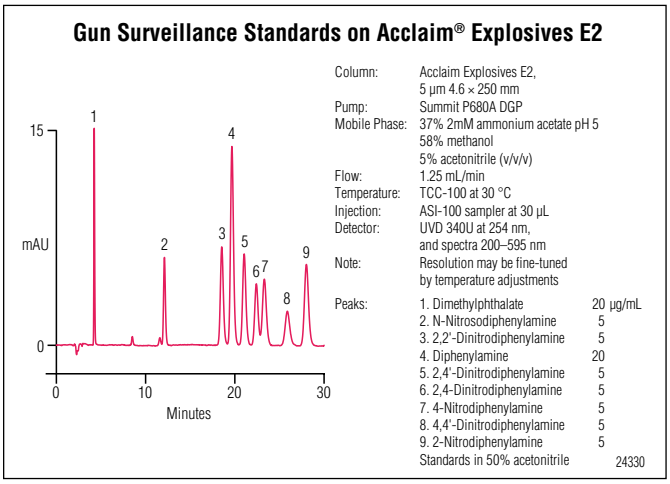
- Both Acclaim E1 and E2 columns provide baseline resolution of all 14 compounds targeted by EPA Method 8330
- The E1 and E2 columns have mutually complementary selectivity
- Simple isocratic elution conditions
- Rugged columns with good lot-to-lot reproducibility
- Unique selectivities for separating other nitro-aromatic molecules

The Acclaim Explosives E1 is recommended for use as a direct replacement for ODS columns for the primary analysis. The Acclaim Explosives E2 may be used as either a primary or a confirmatory column. The unique selectivity and versatility of Acclaim Explosives E2 column provides a wider application range, including the analysis of explosives beyond U.S. EPA Method 8330 (ISO22478), gun surveillance, and carbonyl compounds from vehicle exhaust (CARB 1004).

All Acclaim Explosives E2, 3 µm column can be used with pressures up to 800 bar, allowing for high-throughput and high-resolution separations supported by the UltiMate 3000 RS instrument.

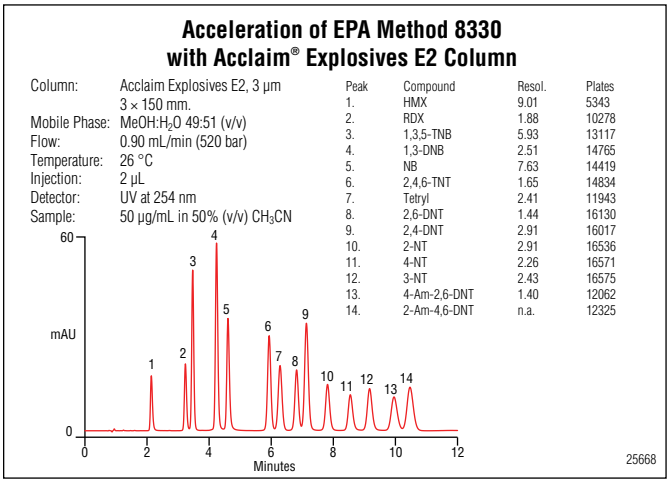


Complimentary baseline separation of 14 target compounds listed in EPA SW-846 Method 8330.

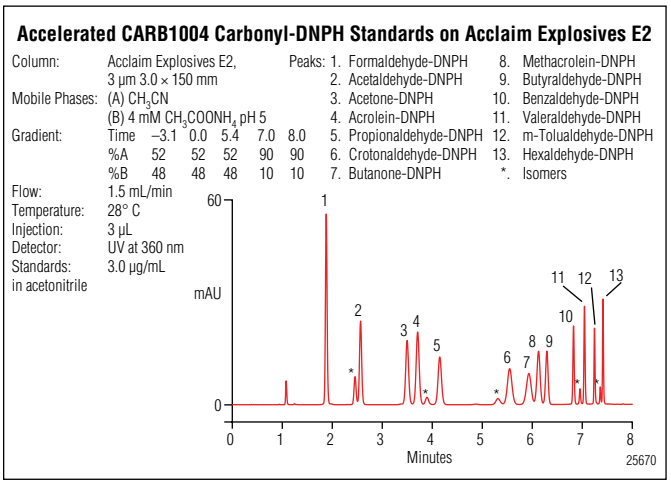


Gun surveillance standards using the Acclaim Explosives E2 column.

The Acclaim Explosives E1 and E2 columns are available in 4.6 x 250 mm column format with 5 µm bonded silica particles. The Acclaim Explosives E2 column is also available in 3 µm particle size in both 3.0 and 2.1 mm column i.d. The 3 µm, 3 x 150 mm format is ideal for high-throughput analysis. The 3 µm, 2.1 x 150 mm format is good for LC/MS applications.



ISO22478 explosives on Acclaim Explosives E2 column.



CARB1004 carboxyl-DNPH standards.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Explosives Columns: A Total Solution for Explosives Analysis

Application Notes

AN 189: Determination of Explosive Compounds in Drinking Water Using Parallel-HPLC with UV Detection

Ordering Information

Analytical Columns

Acclaim Explosive E2, 3 µm, Analytical (2.1 x 150 mm) 070083
Acclaim Explosive E2, 3 µm, Analytical (3.0 x 150 mm) 070082
Acclaim Explosive E2, 3 µm, Analytical (3.0 x 250 mm) 070081
Acclaim Explosives E1, 5 µm, Analytical (4.6 x 250 mm) 064305
Acclaim Explosives E2 , 5 µm, Analytical (4.6 x 250 mm) 064309
Acclaim Explosives Kit (includes 064305, 064309, 064303, 064307; requires holder 059456) 064312

Guard Columns

Acclaim E2, 5 µm Guard Cartridges (3 x 10 mm) 2 ea., (requires holder 069580) 071989
Acclaim Explosives E1, 5 µm Guard Cartridges, (4.6 x 10 mm) 2 ea., (use V-2 Holder) 069702
Acclaim Explosives E2, 5 µm Guard Cartridges, (4.6 x 10 mm) 2 ea., (use V-2 Holder) 069703
Acclaim Explosive E1 Guard (4.3 x 10 mm), 2 ea. (use V-1 holder) 064303
Guard cartridges require holder.
Acclaim Explosive E2 Guard (4.3 × 10 mm), 2 ea. (use V-1 holder) 064307
Guard cartridges require holder.
SST Guard Cartridge Holder V-1 059456
Guard to Analytical Column Coupler V-1 059457
Guard Kit (Holder and Coupler) V-1 059526
Acclaim SST Guard Cartridge Holder V-2 069580
Guard to Analytical Column Coupler V-2 074188
Acclaim Guard Kit (Holder and coupler) V-2 069707
Acclaim Guard Holder V-2 069580

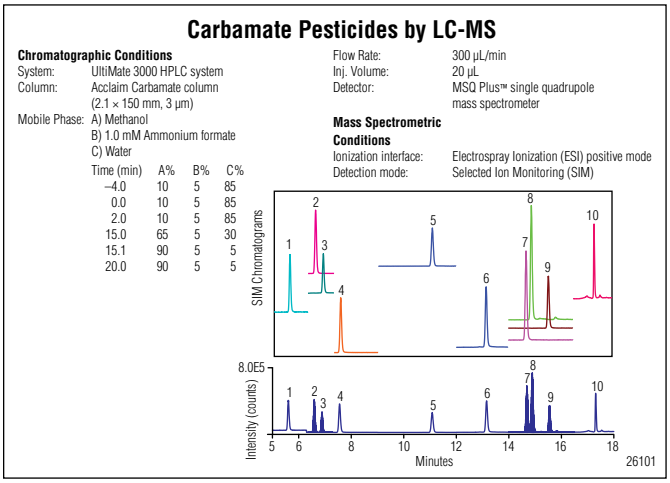
Acclaim Carbamate

Designed for baseline separation of carbamate pesticides specified in US EPA Method 531.2

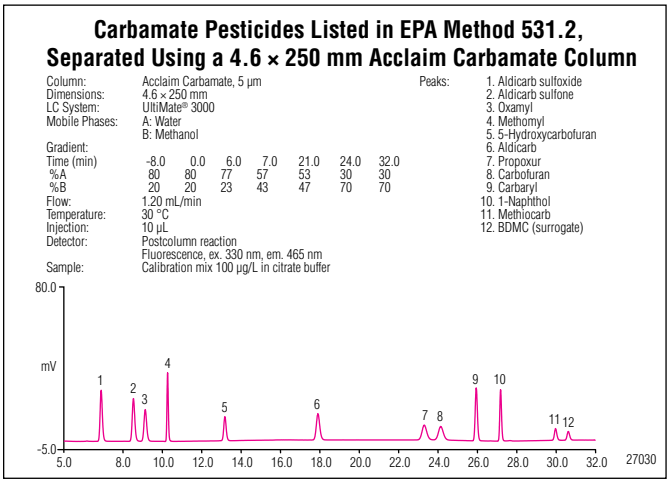
The Acclaim Carbamate column is designed for baseline separation of carbamates (N-methylcarbamate and N-methylcarbamoyloxime pesticides) specified in US EPA Method 531.2. Carbamate pesticides are widely used throughout the world. Drinking water and raw surface water is monitored for the presence of carbamate pesticides and related compounds using an established EPA Method 531.2 that uses HPLC with post-column derivatization. LC-MS is the method of choice for the ultimate sensitivity.

- Baseline separation of carbamate pesticides specified in US EPA Method 531.2
- Use with either LC/postcolumn derivatization/fluorescence or LC/MS detection
- Compatible with both binary (methanol/water) and ternary (acetonitrile/methanol/water) mobile phase gradients
- High-efficiency, extremely low column bleed, and rugged column packing
- Excellent column efficiency and peak shapes for organic acids

Acclaim Carbamate columns are available in a variety of column formats: The 5 µm, 4.6 × 250 mm column sets the standard for the highest resolution with postcolumn reaction (PCR) and fluorescence detection (FLD); the 3 µm, 4.6 × 150 mm column saves time and increases sample throughput; the 3 µm, 3.0 × 150 mm column saves time and reduces solvent consumption; and the 3 µm, 2.1 × 150 mm column is for LC/MS to achieve the lowest possible detection limits.



Carbamate pesticides by LC-MS.



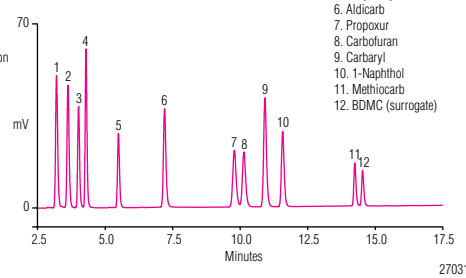
Carbamate pesticide analysis.

Carbamate Pesticides Listed in EPA Method 531.2, Separated Using a 3.0 × 150 mm Acclaim Carbamate Column

Column:	Acclaim Carbamate, 3 µm
Dimensions:	3.0 × 150 mm
LC System:	UltiMate 3000
Mobile Phases:	A: Water B: Methanol
Flow Rate:	0.90 mL/min
Temperature:	50 °C
Injection:	10 µL
Detector:	Postcolumn reaction Fluorescence, ex. 330 nm, em. 465 nm
Sample:	Calibration mix 100 µg/L in citrate buffer

Gradient: Time (min)	-4.0	0.0	2.0	2.5	8.0	13.6	16.0
%A	85	85	80	62	60	30	30
%B	15	15	20	38	40	70	70

Peaks:
1. Aldicarb sulfoxide
2. Aldicarb sulfone
3. Oxamyl
4. Methomyl
5. 5-Hydroxycarbofuran
6. Aldicarb
7. Propoxur
8. Carbofuran
9. Carbaryl
10. 1-Naphthol
11. Methiocarb
12. BDMC (surrogate)



27031

Carbamate pesticide analysis.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

The Acclaim Carbamate Column—A Superior Solution to Carbamate Pesticide Analysis (US EPA Method 531.2)

Ordering Information

Analytical Columns

Acclaim Carbamate, 5 µm Analytical (4.6 x 250 mm) 072924
Acclaim Carbamate, 3 µm Analytical (4.6 x 150 mm) 072925
Acclaim Carbamate, 3 µm Analytical (3.0 x 150 mm) 072926
Acclaim Carbamate, 3 µm Analytical (2.1 x 150 mm) 072927

Guard Columns

Acclaim Carbamate, 3 µm Guard (4.6 x 10 mm) 2 ea. (Use Holder V-2)..... 072928
Acclaim Carbamate, 3 µm Guard (3.0 x 10 mm) 2 ea. (Use Holder V-2)..... 072929
Acclaim Carbamate, 3µm Guard (2.1 x 10 mm) 2 ea. (Use Holder V-2)..... 072930
Acclaim SST Guard Cartridge Holder V-2..... 069580
Guard to Analytical Column Coupler V-2..... 074188
Acclaim Guard Kit (Holder and coupler) V-2..... 069707

Mixed-Mode LC Columns

Mixed-mode columns for greater separation power

Mixed-mode columns are designed for multimode separations. The surface chemistry of these columns provides combinations of reversed-phase, HILIC, cation-exchange, and/or anion-exchange simultaneously. The advantage is that complex analytes interact with multiple mechanisms, and this extra interaction provides a greater opportunity for separation. Dionex offers silica-based and polymer-based columns with multimode capabilities.

- Greater power to simplify the chromatography of complex samples
- Multiple retention mechanisms: anion-exchange, cation-exchange, reversed-phase, and HILIC
- Adjustable selectivity by mobile phase ionic strength, pH, and organic solvents
- Selectivity orthogonal to reversed-phase columns
- Silica and Polymer based mixed-mode columns available
- Bi-mode or tri-mode columns are available

Dionex offers the Trinity P1, the first tri-mode column which combines anion-exchange, cation-exchange, and reversed-phase mechanisms for the most powerful separation capabilities available in HPLC. The WCX-1, WAX-1, and HILIC-1 are silica-based bi-mode columns. The OmniPac is a polymer-based mixed-mode column combining the ion-exchange mechanism with reversed-phase separation.

Note: *See the Acclaim Library of applications at www.dionex.com under Documents, Acclaim Library.*



Acclaim Trinity P1: Simultaneous reversed-phase, anion- and cation-exchange functionality on a single support.

Acclaim Mixed-Mode HILIC-1: The Acclaim Mixed-Mode HILIC-1 column combines both reversed-phase and hydrophilic interaction liquid chromatography (HILIC) properties.

Acclaim Mixed-Mode WAX-1: Acclaim Mixed-Mode WAX columns use a silica-based stationary phase that incorporates both reversed-phase and weak anion-exchange properties.

Acclaim Mixed-Mode WCX-1: Reversed-phase and cation-exchange combined on a single column.

OmniPac: OmniPac columns combine ion-exchange and reversed-phase characteristics in a single column, and are available in anion- and cation-exchange formats.

Acclaim Trinity P1

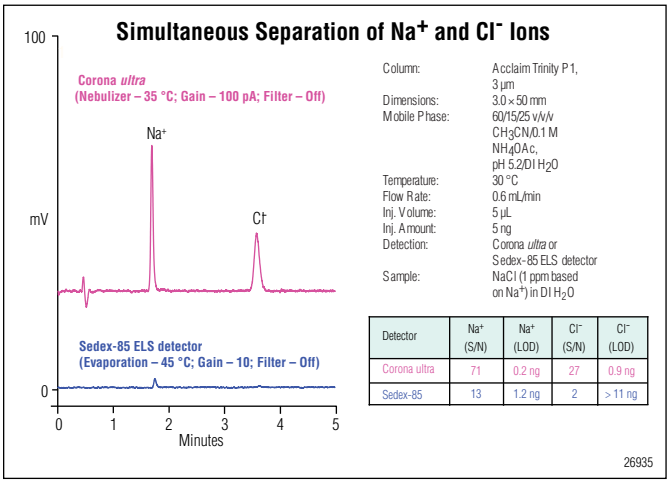
Simultaneous reversed-phase, anion- and cation-exchange functionality on a single support

The Acclaim Trinity P1 HPLC column is designed with unique multimode surface chemistry ideal for the simultaneous separation of drugs and their counterions. The surface chemistry concurrently provides reversed-phase, cation-exchange, and anion-exchange functionalities. The result is maximum flexibility in method development. Separations can be optimized easily by adjusting the chromatographic parameters (mobile phase pH, ionic strength, and organic strength).

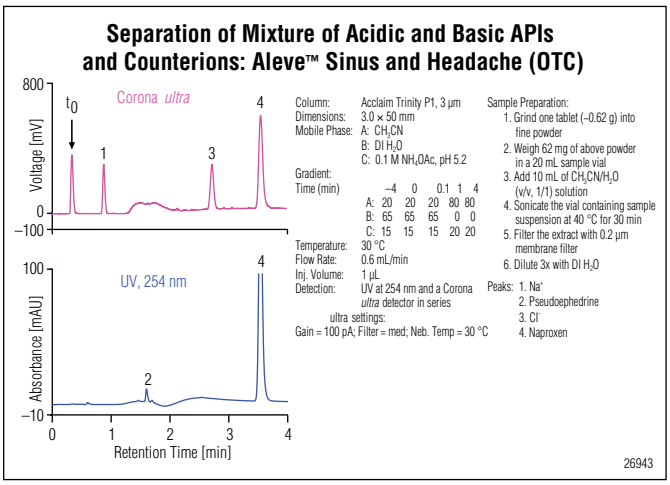
- Multiple retention mechanisms: anion-exchange, and cation-exchange, reversed-phase, and HILIC.
- Selectivity adjustable by mobile phase ionic strength, electrolyte type, pH, and organic solvent
- Ideal selectivity for simultaneous separation of basic, neutral, and acidic analytes
- Simultaneous retention and separation of hydrophobic (drugs) and highly hydrophilic (Na^+ and Cl^-) analytes
- Selectivity orthogonal to reversed-phase columns
- Retention of ionic and ionizable analytes without ion-pairing reagents
- Great flexibility in method development: each retention mechanisms can be controlled independently
- Highly hydrophilic molecules can be retained by running in HILIC mode

The Acclaim Trinity P1 stationary phase, based on this Nanopolymer Silica Hybrid (NSH) technology (patent pending), consists of high-purity porous, spherical 3 µm silica particles, coated with charged nanopolymer beads.

The unique surface chemistry includes an inner-pore area modified with an organic layer that provides both reversed-phase and anion-exchange properties. The outer-pore surface, conversely, is modified with cation-exchange functionality. The NSH technology ensures distinctive spatial separation of the anion-exchange region (inner-pore area) and the cation-exchange region (outer-pore area), resulting in all retention mechanisms functioning simultaneously and with independent control.



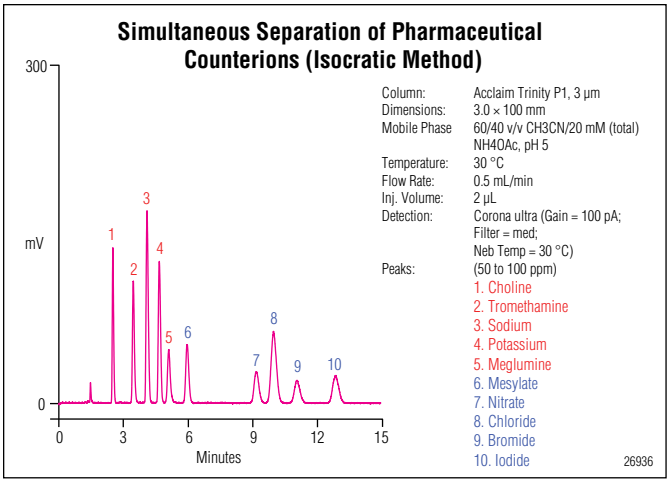
Simultaneous separation of Na+ and Cl- ions.



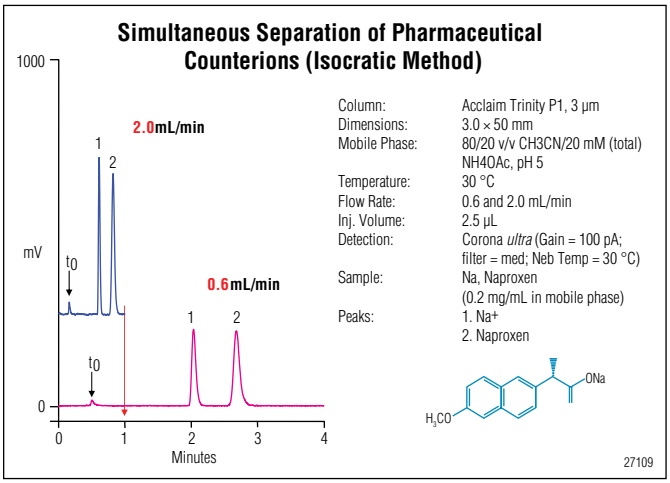
Separation of mixture of acidic and basic APIs and counterions.

Separates Drugs and Counterions

The Acclaim Trinity P1 retains both cations and anions at the same time. In pharmaceutical formulations, the Na^+ ion is the most used counterion for acidic drugs, or Cl^- ion for basic drugs. Neither of these ions can be retained on any reversed-phase column, while the Acclaim Trinity P1 can baseline separate both these ions and the drug. The adjustable selectivity also allows for separation optimization with increased resolution. This can result in faster separations and higher throughput.



Simultaneous separation of pharmaceutical counterions.



Increased resolution allows for faster separations.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Trinity P1 Column Data Sheet

Application Notes

AN 51: Method for Determination of Anions in Sodium Hydroxide

Ordering Information

Analytical Columns

Acclaim Trinity P1, 3 µm Analytical (2.1 x 100 mm) 071389

Acclaim Trinity P1, 3 µm Analytical (3.0 x 50 mm) 071388

Acclaim Trinity P1, 3 µm Analytical (3.0 x 100 mm) 071387

Guard Columns

Acclaim Trinity P1, 3 µm Guard Cartridges, (2.1 x 10 mm), 2 ea. (Use Holder V-2) 071391

Requires V-2 Holder, P/N 069580

Acclaim Trinity P1, 3 µm Guard Cartridges, (3.0 x 10 mm), 2 ea. (Use Holder V-2) 071390

Requires V-2 Holder, P/N 069580

SST Guard Cartridge Holder (V-2) 069580

Guard to Analytical Column Coupler (V-2) 074188

Guard Kit (Holder and Coupler) (V-2) 069707

Acclaim Mixed-Mode HILIC-1

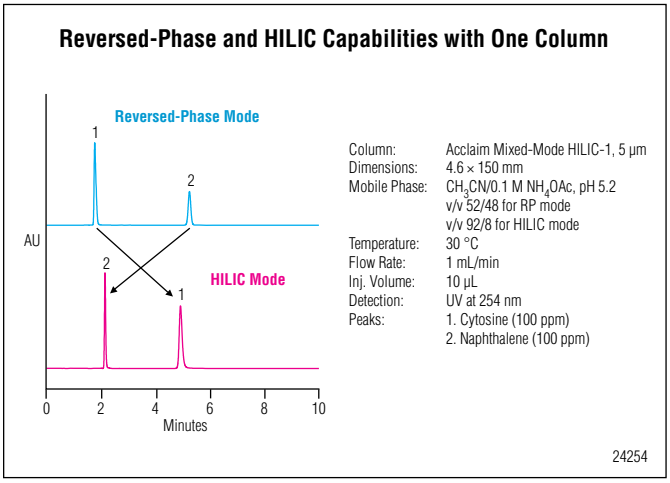
Reversed-phase and hydrophilic interaction phases combined on a single column

The Acclaim Mixed-Mode HILIC-1 column features a patented, high-efficiency, silica-based HPLC mixed-mode stationary phase that combines both reversed-phase (RP) and hydrophilic interaction liquid chromatography (HILIC) properties. This combination allows both hydrophobic interaction and hydrophilic interaction to be utilized to optimize separations.

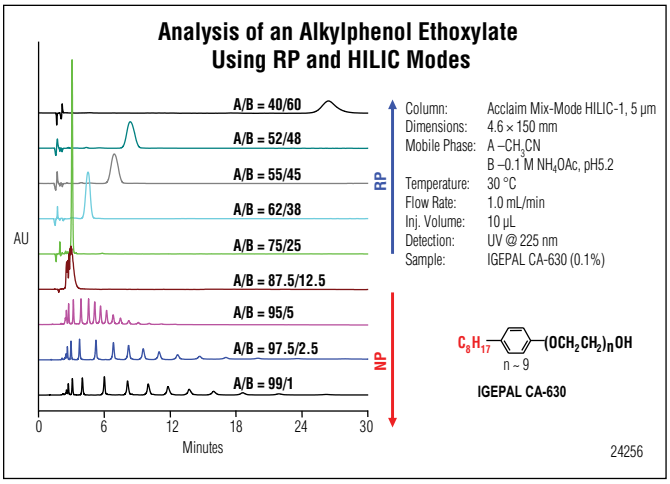
- Operates in both RP and HILIC modes
- Retains highly polar molecules
- Unique selectivity complementary to RP columns
- Broader application range compared to conventional diol-based columns
- High-efficiency column for high-resolution separations

The Acclaim Mixed-Mode HILIC-1 stationary phase consists of a hydrophobic alkyl chain with a diol group at the terminus. The hydrophobic moiety provides reversed-phase retention and the terminal diol group facilitates hydrophilic interactions. This unique combination results in the adjustable selectivity, making Acclaim Mixed-Mode HILIC-1 separate mixtures that would be impossible for a C18 column.

Acclaim Mixed-Mode HILIC-1 columns are available in two particle sizes (3 and 5 µm), three inner diameters (4.6, 3.0, and 2.1 mm) and three lengths (250, 150, and 50 mm). Guard cartridges are also available in 5 µm and three formats: 4.6 × 10, 3.0 × 10 and 2.1 × 10 mm.



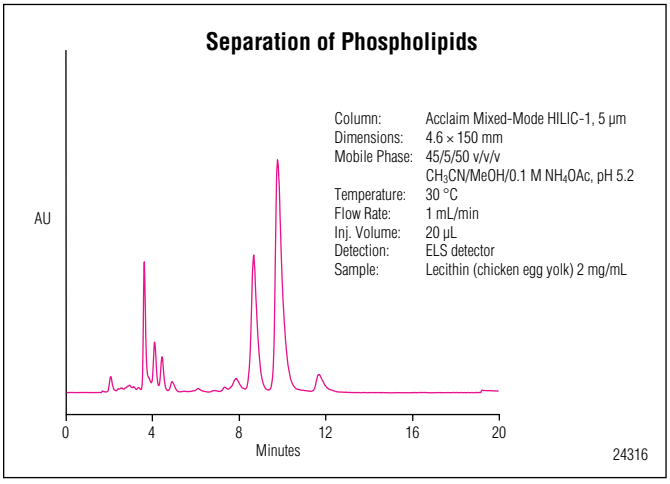
All the advantages of reversed-phase and HILIC compatibilities in one column.



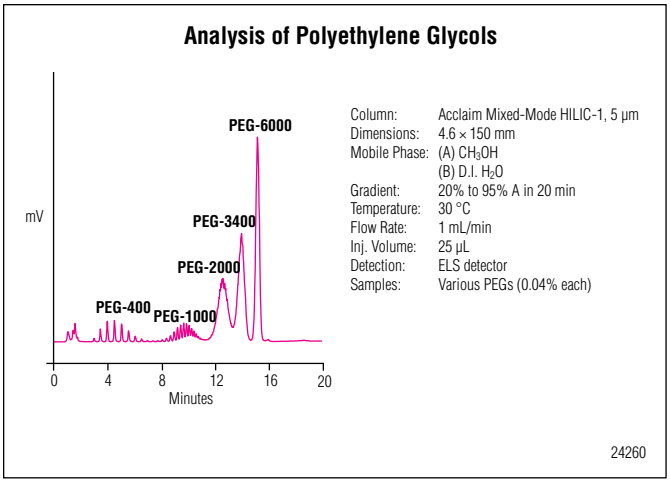
Note the advantages for reversed-phase and normal-phase modes on a single column.

Wide Range of Applications

The Acclaim Mixed-Mode HILIC-1 column separates both polar and nonpolar molecules with selectivity complementary to RP columns and is suitable for a broad range of applications, including nonionic ethoxylated surfactants, drug metabolites, lipids, polyethylene glycols (PEGs), ethoxylated surfactants, and more.



Separation of phospholipids (lecithin from chicken egg yolk).



Analysis of polyethylene glycols.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Mixed-Mode HILIC-1 Column Datasheet

Application Notes

AN 198: Determination of Urea and Allantoin in Cosmetics Using the Acclaim Mixed-Mode HILIC Column

Ordering Information

Analytical Columns

Acclaim Mixed-Mode HILIC-1, 3 µm Analytical (2.1 x 150 mm) 070091
Acclaim Mixed-Mode HILIC-1, 3 µm Analytical (3.0 x 50 mm) 071912
Acclaim Mixed-Mode HILIC-1, 3 µm Analytical (3.0 x 150 mm) 070090
Acclaim Mixed-Mode HILIC-1, 5 µm (2.1 x 150 mm) 066847
Acclaim Mixed-Mode HILIC-1, 5 µm (4.6 x 150 mm) 066843
Acclaim Mixed-Mode HILIC-1, 5 µm (4.6 x 250 mm) 066844

Guard Columns

Acclaim Mixed-Mode HILIC-1, 5 µm, Guards (2.1 x 10 mm), 2 ea., (requires holder 069580) 069694
Acclaim Mixed-Mode HILIC-1, 5 µm Guards (3 x 10 mm), 2 ea., (requires holder 069580) 071913
Acclaim Mixed-Mode HILIC-1, 5 µm Guard Cartrdiges, (4.6 x 10 mm), 2 ea. (use V-2 Holder) 069706
Acclaim SST Guard Cartridge Holder V-2 069580
Guard to Analytical Column Coupler V-2 074188
Acclaim Guard Kit (Holder and coupler) V-2 069707

Acclaim Mixed-Mode WAX-1

Reversed-phase and weak anion-exchange properties on a single column

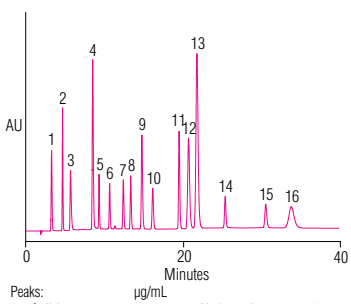
The Acclaim Mixed-Mode WAX-1 is a novel, high-efficiency silica HPLC column that combines hydrophobic and weak anion-exchange characteristics. Its unique chemistry results in a multimode separation mechanism that includes reversed-phase, anion-exchange, cation-exclusion, and HILIC interactions. Selectivity can be adjusted by changing ionic strength, pH, or organic solvent content.

- Adjustable selectivity
- Selectivity orthogonal to reversed-phase (RP) columns
- Ideal selectivity for anionic molecules
- Simultaneous separation of acidic, basic, and neutral molecules
- Excellent column efficiency and peak asymmetry
- Multimode retention mechanisms: reversed-phase, weak anion-exchange, cation-exclusion, and HILIC modes

The Acclaim Mixed-Mode WAX-1 surface consists of a hydrophobic alkyl chain with a tertiary amine group at the terminus. The hydrophobic moiety provides reversed-phase retention and the terminal amino group facilitates electro-static interactions. Acclaim Mixed-Mode WAX-1 columns are available in two particle sizes (3 and 5 µm), three inner diameters (4.6, 3.0, and 2.1 mm) and three lengths (250, 150, and 50 mm). Guard cartridges are also available.

The unique surface characteristics allow for adjustable selectivity, ideal for separating complex mixtures. Hydrophilic organic acids are often difficult to separate with common RP columns. This can be overcome using the bi-functional Acclaim Mixed-Mode WAX-1 column; it provides sufficient retention, and ideal selectivity for a variety of anionic molecules, even those with weak charges.

Gradient Separation of Basic, Neutral, and Acidic Pharmaceuticals



Column: Acclaim Mixed-Mode WAX-1, 5 µm
Dimension: 4.6 × 150 mm
Mobile Phase: (A) Acetonitrile; (B) D.I. water; (C) 150 mM phosphate buffer, pH 6.0

Gradient:	Time	%A	%B	%C
	-15	10	80	10
	0	10	80	10
	10	50	40	10
	12	50	40	10
	25	50	0	50
	40	50	0	50

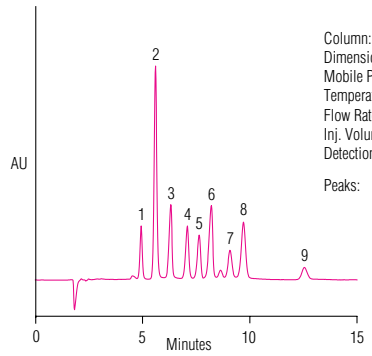
Temperature: 30 °C
Flow Rate: 1 mL/min
Inj. Volume: 15 µL
Detection: UV, 220 nm

Peaks:	µg/mL				
1. Caffeine	50	6. Hydrocortisone	100	11. Salicylic acid	50
2. Acetaminophen	100	7. Dexamethasone	100	12. Ketoprofen	100
3. Dextromethorphan	100	8. Acetyl salicylic acid	50	13. Naproxen, Na salt	100
4. Amitriptyline	100	9. Sorbate, potassium	100	14. Aconitic acid, *cis-*	50
5. Prednisone	100	10. Benzoic acid	100	15. Aconitic acid, *trans-*	50
				16. Ibuprofen	100

23716

Separation of acids, bases, and neutral molecules in a single run.

Separation of Monocarboxylic Acids



Column: Acclaim Mixed-Mode WAX-1, 5 µm
Dimensions: 4.6 × 150 mm
Mobile Phase: 25 mM phosphate buffer, pH 6
Temperature: 30 °C
Flow Rate: 0.8 mL/min
Inj. Volume: 10 µL
Detection: UV, 210 nm

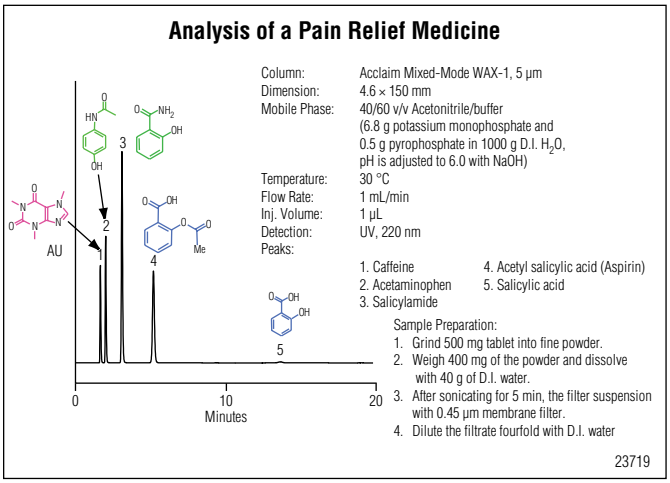
Peaks:
1. Quinic acid
2. Shikimic acid
3. Glycolic acid
4. Lactic acid
5. Acetic acid
6. Formic acid
7. Ascorbic acid (Vitamin C)
8. *Iso*-ascorbic acid
9. Propionic acid

23712

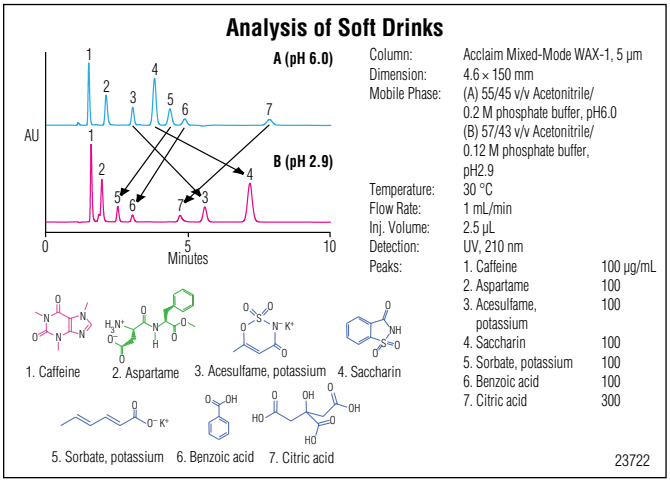
Separation of monocarboxylic acids.

Applications

The unique chemistry of the Acclaim Mixed-Mode WAX-1 offers a simpler analytical solution to the C18 reversed-phase columns by providing complimentary selectivity to the C18 column. As a result, this column can be used to separate a wide range of samples in the pharmaceutical, food and beverage, and chemical industries. Separation of basic active ingredients can be determined, as well as separation of substances with basic, neutral, and acidic ingredients.



Analysis of a pain relief medicine.



Analysis of soft drinks.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Acclaim Mixed-Mode WAX-1 Column: Total Control of Selectivity

Application Notes

AN 193: Determination of Additives in Carbonated Beverages

AN 204: An Improved Method for Determination of Corrosion Inhibitors in Engine Coolants

AN 234: Simultaneous Determination of Pharmaceutical Peptides and Acetate by HPLC with UV Detection Using the Acclaim Mixed-Mode WAX-1 Column

AN: 236: Determination of Iodide and Iodate in Seawater and Iodized Table Salt by HPLC with UV Detection

AN 241: Determination of Steviol Glycosides by HPLC with UV and ELS Detections

Ordering Information

Analytical Columns

Acclaim Mixed-Mode WAX-1, 3 µm Analytical (2.1 x 150 mm)..... 070089
Acclaim Mixed-Mode WAX-1, 3 µm Analytical (3.0 x 50 mm)..... 071908
Acclaim Mixed-Mode WAX-1, 3 µm Analytical (3.0 x 150 mm)..... 070088
Acclaim Mixed-Mode WAX-1, 5 µm (4.6 x 250 mm) 064985
Acclaim Mixed-Mode WAX-1, 5 µm (4.6 x 150 mm) 064984
Acclaim Mixed-Mode WAX-1, 5 µm (2.1 x 150 mm) 067084

Guard Columns

Acclaim Mixed-Mode WAX-1, 5 µm, Guards (2.1 x 10 mm), 2 ea., (requires holder 069580) 069686
Acclaim Mixed-Mode WAX-1, 5 µm Guards (3 x 10 mm), 2 ea., (requires holder 069580) 071909
Acclaim Mixed-Mode WAX-1, 5 µm Guard Cartridges (4.6 x 10 mm), 2 ea. (use V-2 Holder)..... 069704
Acclaim SST Guard Cartridge Holder V-2..... 069580
Guard to Analytical Column Coupler V-2..... 074188
Acclaim Guard Kit (Holder and coupler) V-2..... 069707

Acclaim Mixed-Mode WCX-1

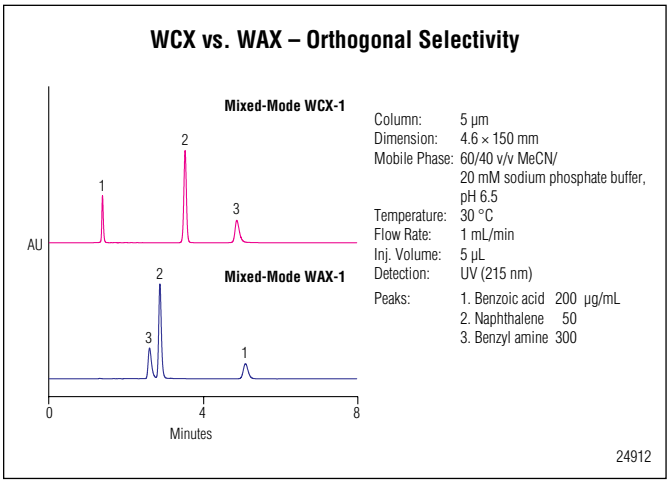
Reversed-phase and weak cation-exchange on a single column

The Acclaim Mixed-Mode WCX-1 is a novel, high-efficiency, silica-based column, manufactured by bonding a specially designed proprietary ligand with both hydrophobic and weak cation-exchange properties. Selectivity of ionizable and neutral compounds can be controlled independently or simultaneously by tuning mobile phase ionic strength, pH or organic modifier. This column therefore can separate using multiple separation modes: reversed-phase, cation-exchange, and normal-phase/HILIC.

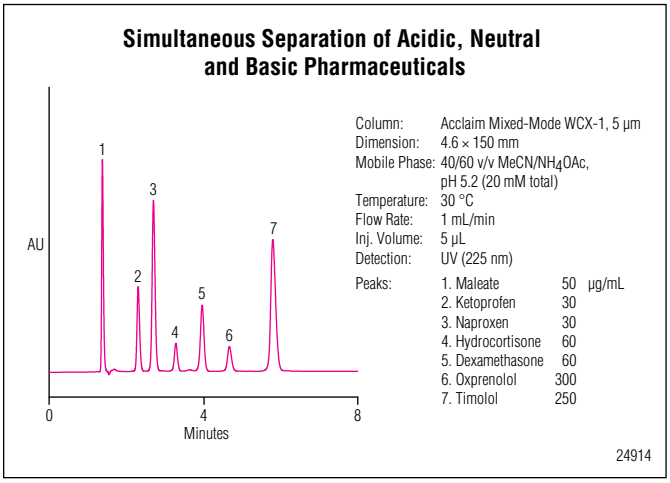
- Adjustable selectivity
- Ideal selectivity for separating basic molecules
- Selectivity complemenatry to C18 RP columns
- Multimode separation mechanism: reversed-phase, weak cation-exchange, anion-exclusion and HILIC
- Capable of separating a mixture of neutral and basic compounds

The Acclaim Mixed-Mode WCX-1 stationary phase consists of a hydrophobic alkyl chain with a carboxylic group at the terminus. The hydrophobic moiety provides reversed-phase retention and the carboxylic group facilitates electro-static interactions. This unique combination results in the adjustable selectivity, making Acclaim Mixed-Mode WCX-1 separate mixtures that would be impossible for a C18 column.

Acclaim Mixed-Mode WCX-1 columns are available in two particle sizes (3 and 5 µm), three inner diameters (4.6, 3.0, and 2.1 mm) and three lengths (250, 150, and 50 mm). Guard cartridges are also available in 5 µm and three formats: 4.6 × 10, 3.0 × 10, and 2.1 × 10 mm.



Orthogonol selectivity.

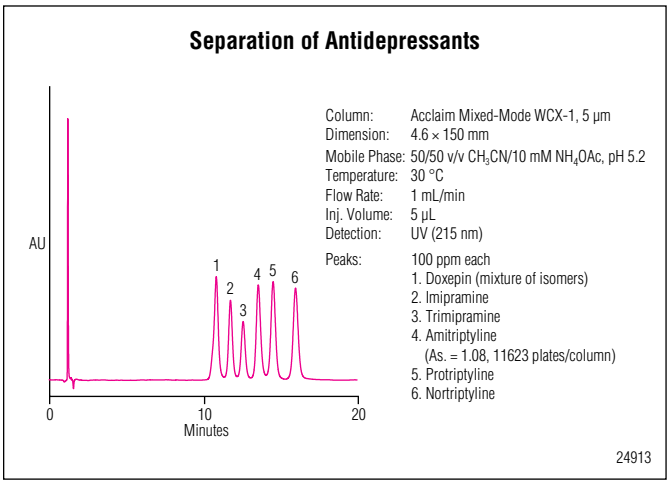


Simultaneous separation of acidic, neutral and basic pharmaceuticals.

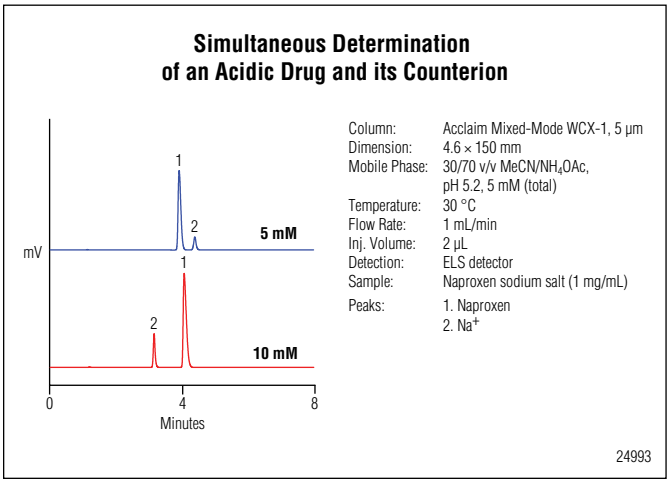
Broad Range of Applications

Basic compounds are important in a variety of industrial applications, including pharmaceutical, chemical, consumer products, foods and beverages, and more. However, analyses of these compounds are often challenging when using reversed-phase silica columns. The Acclaim Mixed-Mode WCX-1 provides a remedy to these difficulties: not only does it retain basic molecules (from highly hydrophilic to highly hydrophobic), but also separates them with symmetrical peak shapes and excellent efficiency.

The Acclaim Mixed-Mode WCX-1 column can serve as a primary column for a variety of basic analytes containing samples as well as a secondary column that provides selectivity orthogonal to that of reversed-phase columns.



Separation of antidepressants.



Analysis of naproxen sodium salt.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Mixed-Mode WCX-1 for Separating Basic Molecules Data Sheet

Application Notes

AN 221: Rapid Determination of Melamine in Liquid Milk and Milk Powder by HPLC on the Acclaim Mixed-Mode WCX-1 Column with UV Detection

Ordering Information

Analytical Columns

Acclaim Mixed-Mode WCX-1, 3 µm Analytical (2.1 x 150 mm)	070093
Acclaim Mixed-Mode WCX-1, 3 µm Analytical (3.0 x 50 mm)	071910
Acclaim Mixed-Mode WCX-1, 3 µm Analytical (3.0 x 150 mm)	070092
Acclaim Mixed-Mode WCX-1, 5 µm Analytical (2.1 x 150 mm)	068371
Acclaim Mixed-Mode WCX, 5 µm Analytical (4.6 x 150 mm)	068353
Acclaim Mixed-Mode WCX, 5 µm Analytical (4.6 x 250 mm)	068352

Guard Column

Acclaim Mixed-Mode WCX-1, 5 µm Guards (3 x 10 mm), 2 ea., (requires holder 069580)	071911
Acclaim Mixed-Mode WCX-1 Guard, 5 µm (4.6 x 10 mm), 2 ea. (use V-2 Holder)	069705
Acclaim SST Guard Cartridge Holder V-2	069580
Guard to Analytical Column Coupler V-2	074188
Acclaim Guard Kit (Holder and coupler) V-2	069707

OmniPac

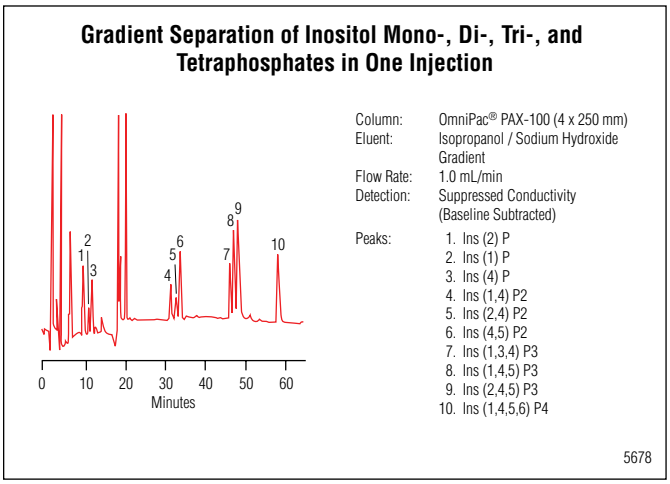
DBV polymer columns for combined ion-exchange and reversed-phase separations

The OmniPac PAX-100 column is used to separate hydrophobic anionic analytes such as larger organic acids. The OmniPac PAX-500 column simultaneously separates anionic and neutral species. The OmniPac PCX-100 column separates low-molecular-weight hydrophobic cations. The OmniPac PCX-500 column simultaneously separates cationic and neutral species in a single run.

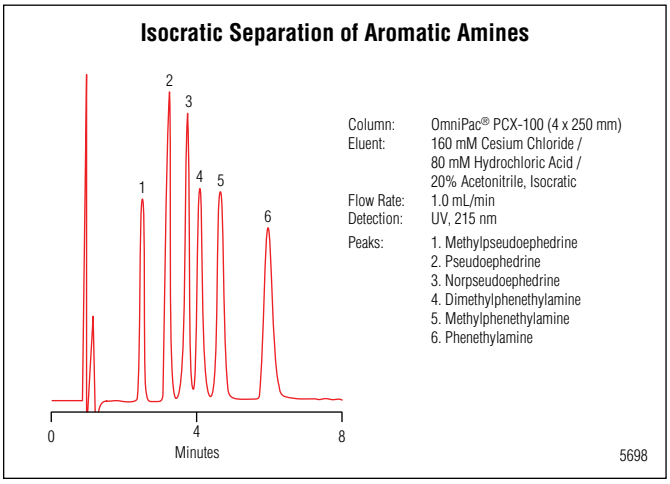
- Acid-, base-, and solvent-compatible, pH 0–14
- Ideal for the separation of high-molecular-weight organic acids
- Delivers optimal separation of very hydrophobic anions
- Delivers optimal separation of halogenated anions
- Provides simultaneous separation of neutral and ionic species
- Unique selectivity for polar and ionic organic analytes
- Delivers optimal separation of organic, hydrophobic, and halogenated cations

The OmniPac PAX- and PCX-100 and 500 are latex-based columns. Both PAX columns have an ion-exchange capacity of about 40 µeq per column, providing equivalent anion-exchange separations. The PCX columns have a capacity of approximately 120 µeq per column. The PAX- and PCX-500 columns separate analytes through both ion-exchange and reversed-phase mechanisms, due to their higher reversed-phase capacity relative to the PAX- and PCX-100 columns.

The OmniPac PAX-100 column was one of the first 100% solvent-compatible, anion-exchange columns developed for the separation of inorganic and organic anions, providing acid and base-compatibility over the entire pH range. Because the OmniPac PAX-100 column is solvent-compatible, solvents can be used to modify the ion-exchange selectivity.



Gradient separation of inositol mono-, di-, tri-, and tetraphosphates.

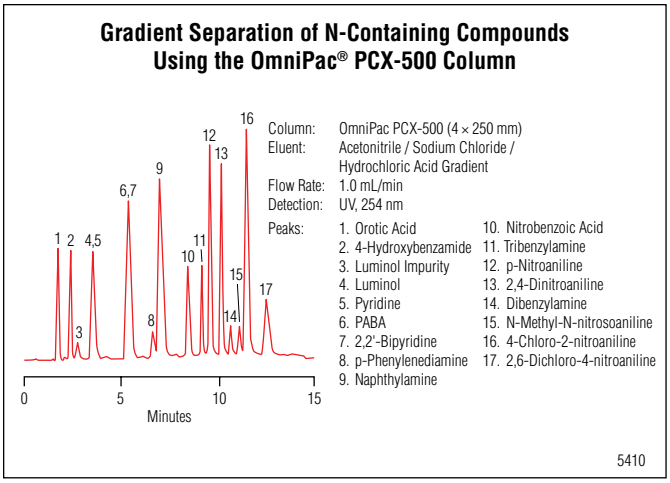


Isocratic separation of aromatic amines.

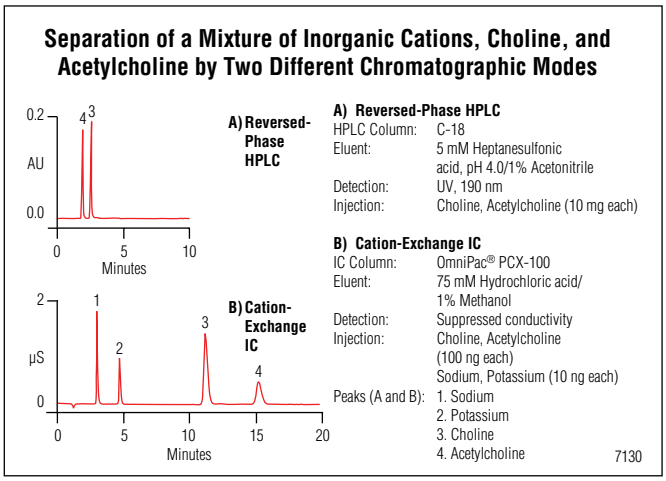
Wide Range of Applications

Use the OmniPac PAX-100 column for analysis of larger organic acids, including alkylbenzene sulfonates, aromatic acids, polyphosphates, and inositol phosphates. Use the OmniPac PAX-500 column for separation of alcohols, alkanolamines, antihistamines, anti-inflammatory agents, aromatic acids, inorganic acids, peptides, purines and pyrimidines, and sulfonamides.

The OmniPac PCX-100 column can be used to separate hydrophobic cationic analytes such as amines, anilines, antidepressants, drugs, and metabolites. The OmniPac PCX-500 column may be used for the separation of adrenergics, alcohols, anilines, antidepressants, anti-inflammatory agents, plating bath brighteners, cephalosporins, stains and dyes, herbicides, nucleotides, and nucleosides.



Gradient separation of N-containing compounds.



Comparison of OmniPac and a reversed-phase column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Brochures

Catalog: Acclaim Bonded Silica-Based Columns for HPLC

Product Data Sheets

Acclaim Organic Acid (OA) HPLC Column Data Sheet

Application Notes

AN 106: Ion Chromatography in the Pharmaceutical Industry

AN 65: Analysis of Inositol Phosphates

AN 70: Choline and Acetylcholine

Application Updates

AU 126: Determination of Diethanolamine and Triethanolamine in Surface Finishing, Wastewater and Scrubber Solutions

AU 133: Saccharin in Electrolytic Nickel Sulfate Baths

Ordering Information

Analytical Columns

OmniPac PAX-100 Analytical Column (4 × 250 mm)	042150
OmniPac PAX-500 Analytical Column (4 × 250 mm)	042152
OmniPac PCX-100 Analytical Column (4 × 250 mm)	042189
OmniPac PCX-500 Analytical Column (4 × 250 mm)	042191

Guard Columns

OmniPac PAX-100 Guard Column (4 × 50 mm)	042151
OmniPac PAX-500 Guard Column (4 × 50 mm)	042153
OmniPac PCX-100 Guard Column (4 × 50 mm)	042193
OmniPac PCX-500 Guard Column (4 × 50 mm)	042195

IC & RFIC Columns

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Hydroxide-Selective Anion-Exchange Monolithic Columns

Columns for fast separation of organic acids and inorganic anions

The new IonSwif anion-exchange columns provide high-speed, high-resolution separations of small molecules including inorganic anions and organic acids. These columns were developed using monolith technology, and allow the use of high flow rates for faster analyte separations. Hydroxide eluents for gradient elution are very convenient with Reagent-Free Ion Chromatography (RFIC) systems using electrolytic generation of the eluent.

RFIC systems simplify method development for hydroxide-gradient elution; the electrolytic eluent generator provides gradient methods that are simpler to use and more precise than manually-prepared isocratic eluents. Modern continuous-eluent-suppression systems are designed to suppress hydroxide eluents, even at high concentrations.



IonSwift MAX-100: A new generation of unique separation media engineered for fast separation of organic acids and inorganic anions.

IonSwift MAX-100

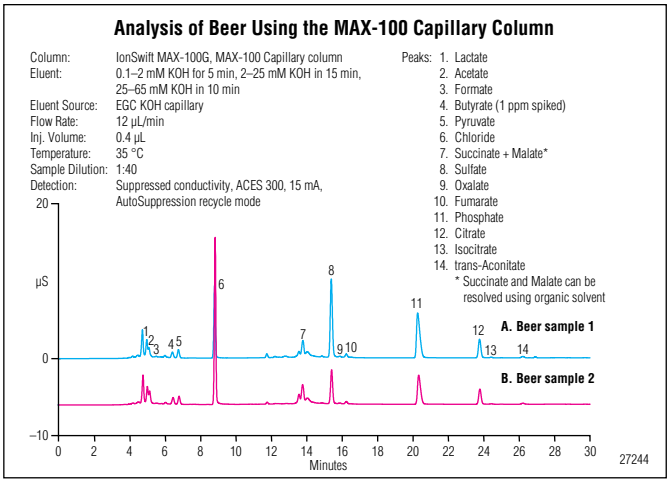
A new generation of unique separation media engineered to separate small molecules.

The IonSwift MAX-100 anion-exchange column is a new generation of unique separation media, engineered to separate small molecules including organic acids and inorganic anions, with fast analysis completed in approximately 25 minutes. The IonSwift MAX-100 is the first of a series of columns developed using monolith technology, designed to provide high-speed, high-resolution separations of organic acids and inorganic anions using a hydroxide gradient delivered by an Eluent Generator.

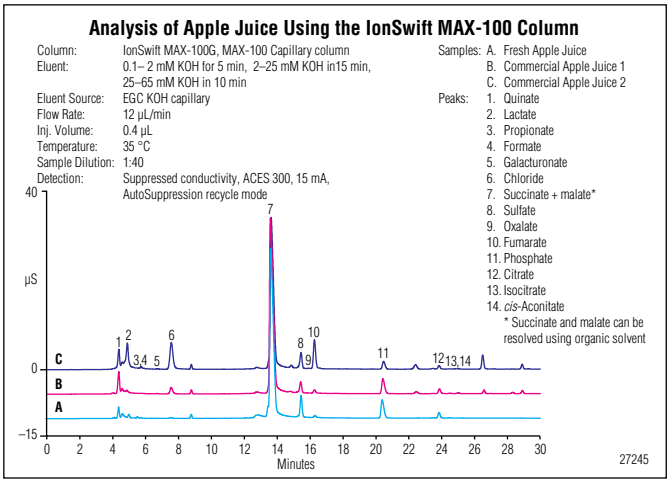
- Fast gradient separation of organic acids and inorganic anions in 25 minutes
- Ideal alternative for most AS11-HC applications
- High capacity: 12 µeq per column (1 × 250 mm column)
- Unique monolith design provides fast mass transfer and fast separations
- High throughput and improved productivity
- Outstanding reproducibility

The IonSwift MAX-100 is an ideal alternative to the AS11-HC column for most organic acid and inorganic anion applications. For highest resolution and capacity, the AS11-HC column is recommended.

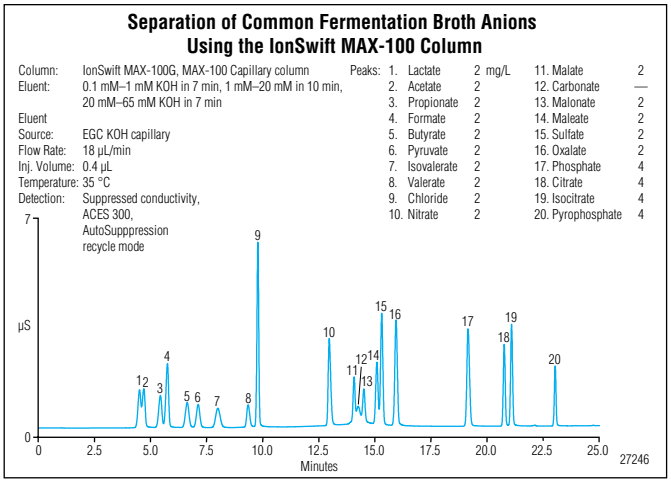
The IonSwift MAX-100 column is available in 2 formats: 1.0 × 250 mm microbore and 0.25 × 250 mm capillary formats. These formats offer the advantage of reduced eluent consumption, providing reduced operating costs. High mass sensitivity can be achieved with both formats, providing lower MDLS.



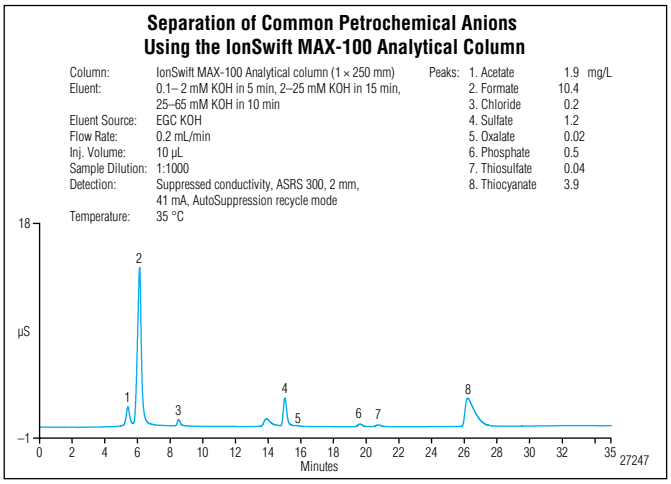
Analysis of beer using the IonSwift MAX-100 capillary column.



Analysis of apple juice using the IonSwift MAX-100 capillary column.



Separation of common fermentation broth anions using the IonSwift MAX-100 capillary column.



Separation of common petrochemical anions using the IonSwift MAX-100 capillary column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonSwift MAX-100 Anion-Exchange Column

Ordering Information

Analytical Columns

IonSwift MAX-100 Analytical Column (1 x 250 mm) 071279
IonSwift MAX-100 Analytical Column (0.25 x 250 mm) 074246

Guard Columns

IonSwift MAX-100G Guard Column (1 x 50 mm) 071280
IonSwift MAX-100G Guard Column (0.25 x 50 mm) 074247

Hydroxide-Selective Anion-Exchange Packed Columns

Hydroxide-selective anion-exchange columns optimized for use with hydroxide eluent

Choose a hydroxide eluent column for use with an eluent generator for isocratic and gradient analysis. Hydroxide eluents for isocratic or gradient elution are very convenient with Reagent-Free Ion Chromatography (RFIC) systems with electrolytic eluent generation. Hydroxide-selective anion-exchange columns are available in a wide range of capacities and hydrophobicities.

RFIC technology simplifies method development for hydroxide-gradient systems; the electrolytic eluent generator provides gradient methods that are simpler to use than manually-prepared isocratic eluents. Modern continuous-eluent-suppression systems are designed to suppress hydroxide eluents, even at high concentrations.



IonPac AS24: High-capacity anion-exchange column for separation of haloacetic acids and bromate in drinking water prior to MS or MS/MS detection or 2-D analysis.

IonPac Fast Anion IIIA: Hydroxide-selective anion-exchange column designed for the rapid determination of phosphoric and citric acids in cola soft drink samples

IonPac AS21: Hydroxide-selective anion-exchange column for fast analysis of trace perchlorate in drinking water prior to detection with MS/MS

IonPac AS20: High-capacity anion-exchange column for determination of trace perchlorate using suppressed conductivity detection

IonPac AS19: High-capacity hydroxide-selective column for determination of oxyhalides and inorganic anions

IonPac AS18: Hydroxide-selective anion-exchange column for determination of inorganic anions and low-molecular-weight organic acids

IonPac AS17-C: Hydroxide-selective anion-exchange column for fast gradient separation of inorganic anions in high-purity water matrices

IonPac AS16: High-capacity hydroxide-selective anion-exchange column optimized for the determination of highly polarizable anions

IonPac AS15: High-capacity anion-exchange column for determination of trace-level concentrations of inorganic anions and low molecular weight organic acids

IonPac AS11-HC: High-capacity anion-exchange column designed to resolve a large number of organic acids and inorganic anion in complex matrices

IonPac AS11: Anion-exchange column for fast profiling of inorganic anions and organic acid anions.

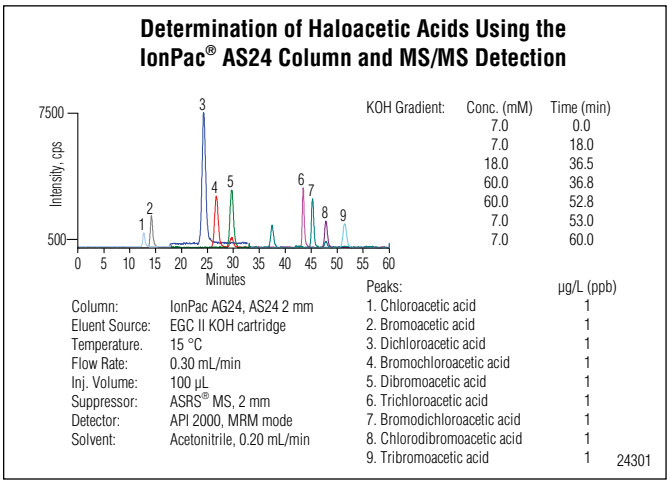
IonPac AS10: High-capacity hydroxide-selective, anion-exchange column designed for the isocratic and gradient separation of inorganic anions and organic acids

IonPac AS24

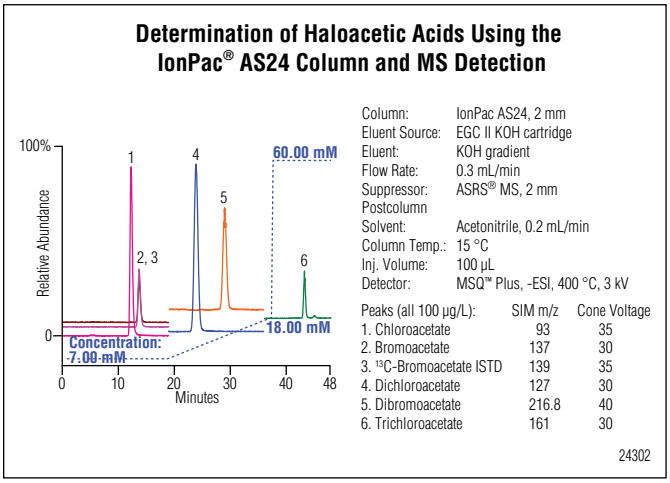
For separation of haloacetic acids and bromate in drinking water prior to MS or MS/MS detection

The IonPac AS24 hydroxide-selective anion-exchange column is specifically designed for haloacetic acids in drinking water prior to MS or MS/MS detection. The capacity and selectivity enables analysis of haloacetic acids in drinking water at low-µg/L concentrations. The AS24 column is the specified column in US EPA Method 553.

- Specified column for US EPA Method 553
- High capacity: 140 µeq per column (2 × 250 mm)
- Determine HAAs in high-ionic strength matrices without sample pretreatment
- Column selectivity is optimized for a 15 °C operating temperature
- Compatible with HPLC organic solvents
- Used as second dimension column in 2-D method for bromate in US EPA Method 302.0

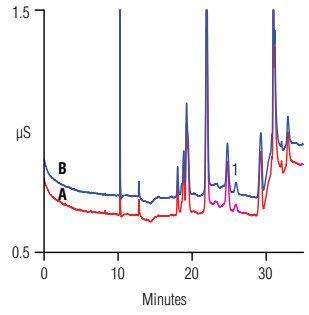


Determination of haloacetic acids using the IonPac AS24 column and MS/MS detection.



Determination of haloacetic acids using the IonPac AS24 column and MS detection.

Determination of Trace Concentrations of Bromate Using the IonPac® AS24 Column with Two-Dimensional Ion Chromatography



Second-Dimension Conditions

Column:	IonPac AG24, AS24, 2 mm
Eluent Source:	EGC II KOH cartridge
Eluent:	Potassium hydroxide, 10 mM KOH from 0 to 24 min, 65 mM KOH from 12.1 to 35 min
Flow Rate:	0.25 mL/min
Detection:	Suppressed conductivity, ASRS® ULTRA II 2 mm, AutoSuppression® external water mode
Current:	41 mA
Conc. Column:	IonPac TAC-ULP1 (5 × 35 mm)
Cut Volume:	2 mL
Temperature:	30 °C
Sample:	A) Unfortified Drinking Water B B) Fortified Drinking Water B

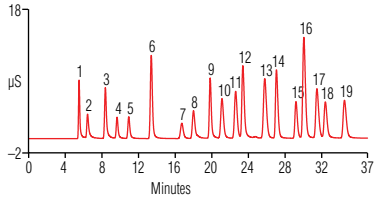
Peaks:		A	B
	1. Bromate	1.19	1.69 µg/L

24220

Determination of trace concentrations of bromate using the IonPac AS24 column with two-dimensional ion chromatography.

Anion Separation Including Inorganic Anions, Organic Acids, Oxyanions, and Oxyhalides on an IonPac® AS24 Column Using a Potassium Hydroxide Eluent Delivered by an Eluent Generator

Column:	IonPac AG24, AS24 2 mm
Eluent Source:	EGC II KOH Cartridge
Eluent:	Potassium hydroxide, 5 mM to 15 mM KOH from 0 to 10 min, 15 mM to 30 mM KOH from 10 to 20 min, 30 mM to 60 mM KOH from 20 to 38 min
Temperature:	15 °C
Flow Rate:	0.3 mL/min
Inj. Volume:	5 µL
Detection:	Suppressed conductivity, ASRS ULTRA II 2 mm, AutoSuppression® recycle mode



Peaks:	mg/L (ppm)				
1. Fluoride	5	8. Nitrite	15	14. Phosphate	40
2. Acetate	15	9. Sulfate	15	15. Arsenate	40
3. Formate	15	10. Chlorate	25	16. Thiosulfate	40
4. Chlorite	15	11. Bromide	25	17. Chromate	40
5. Bromate	15	12. Oxalate	25	18. Citrate	40
6. Chloride	15	13. Nitrate	25	19. Isocitrate	40
7. Trifluoroacetate	15				

24303

Separation of various anions on an IonPac AS24 column using potassium hydroxide eluent delivered by an Eluent Generator.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS24 Anion-Exchange Column

Application Notes

AN 187: Determination of Sub-µg/L Bromate in Municipal and Natural Mineral Waters Using Preconcentration with Two-Dimensional Ion Chromatography and Suppressed Conductivity Detection

Ordering Information

Analytical Columns

IonPac AS24 Analytical Column (2 × 250 mm) 064153

Guard Columns

IonPac AG24 Guard Column (2 × 50 mm) 064151

IonPac Fast Anion IIIA

Rugged reliable, rapid determination of phosphoric and citric acids in colas

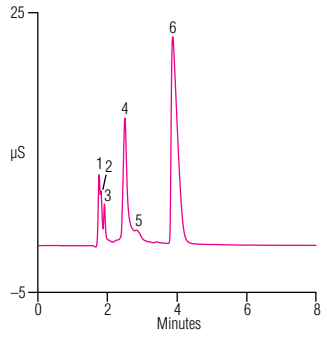
This hydroxide-selective anion-exchange column is specifically designed for the determination of phosphoric and citric acids in cola soft drinks. Its capacity and selectivity allows rapid analysis of these acids in less than 7 minutes.

- Use with the Eluent Generator for simplified Reagent-Free IC operation.
- The 3 mm i.d. configuration provides economical operation.
- Combine with the ASRS 300 suppressor for low background and enhanced sensitivity.
- Compatible with organic solvents.

The Fast Anion IIIA is optimized for a 30 °C operating temperature to ensure reproducible retention times in all environmental conditions. It is compatible with organic solvents to enhance analyte solubility, modify column selectivity, or allow effective column cleanup. The Fast Anion IIIA column is recommended for use with the Eluent Generator, requiring only a deionized water source to produce potassium hydroxide eluent.

The cola samples may require sample pretreatment with sonication to remove carbonation. Sample dilution of cola syrups is recommended prior to analysis to ensure optimum column life. These acids can be analyzed in less than 7 minutes using an isocratic potassium hydroxide eluent delivered by an Eluent Generator in combination with suppressed conductivity detection.

Determination of Phosphoric Acid in a Cola Soft Drink Using the Fast Anion IIIA Column

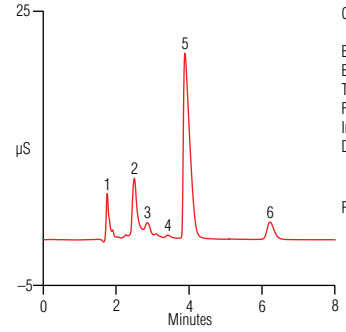


Column:	IonPac® Fast Anion IIIA guard and analytical, 3 mm
Eluent:	22 mM potassium hydroxide
Eluent Source:	EGC II KOH cartridge with CR-ATC
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	1.3 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm AutoSuppression® recycle mode
Peaks:	1. Unknown — mg/L (ppm)
	2. Unknown —
	3. Unknown —
	4. Unknown —
	5. Unknown —
	6. Phosphate 498

23286

Determination of phosphoric acid in a cola soft drink using the Fast Anion IIIA column.

Determination of Phosphoric and Citric Acid in a Cola Soft Drink Using the Fast Anion IIIA Column

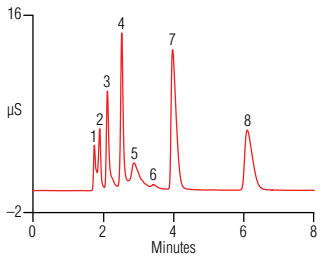


Column:	IonPac® Fast Anion IIIA Guard and Analytical, 3 mm
Eluent:	22 mM potassium hydroxide
Eluent Source:	EGC II KOH cartridge with CR-ATC
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	1.3 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm AutoSuppression recycle mode
Peaks:	1. Unknown — mg/L (ppm)
	2. Unknown —
	3. Unknown —
	4. Unknown —
	5. Phosphate 435
	6. Citrate 53

23287

Determination of phosphoric and citric acid in a cola soft drink using the Fast Anion IIIA column.

Determination of Phosphoric and Citric Acid in a Diet Cola Soft Drink Using the Fast Anion IIIA Column



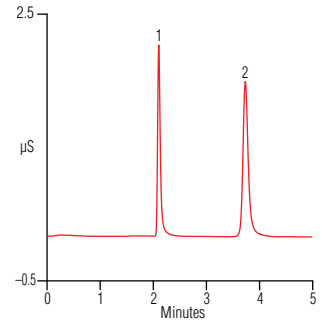
Column:	IonPac® Fast Anion IIIA Guard and Analytical, 3 mm
Eluent:	22 mM potassium hydroxide
Eluent Source:	EGC II KOH cartridge with CR-ATC
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	1.3 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm AutoSuppression® recycle mode

Peaks:		
1. Unknown	—	
2. Unknown	—	
3. Unknown	—	
4. Unknown	—	
5. Unknown	—	
6. Unknown	—	
7. Phosphate	228	mg/L (ppm)
8. Citrate	175	

23288

Determination of phosphoric and citric acid in a diet cola soft drink using the Fast Anion IIIA column.

Rapid Analysis of Chloride and Sulfate on an IonPac® Fast Anion IIIA Column



Column:	IonPac Fast Anion IIIA guard and analytical, 3 mm
Eluent:	15 mM potassium hydroxide
Eluent Source:	EGC II KOH cartridge with CR-ATC
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	1.3 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm AutoSuppression® recycle mode

Peaks:		
1. Chloride	5	mg/L (ppm)
2. Sulfate	10	

23291

Rapid analysis of chloride and sulfate on an IonPac Fast Anion IIIA column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac Fast Anion IIIA Anion-Exchange Column

Application Updates

AU 153: Fast Determinations of Phosphate and Citrate in Carbonated Beverages Using On-Line Degassing with the Carbonate Removal Device (CRD) and a Reagent-Free Ion Chromatography System

Ordering Information

Analytical Columns

IonPac Fast Anion IIIA Analytical Column (3 × 250 mm)..... 062964

Guard Columns

IonPac Fast Anion IIIA Guard Column (3 × 50 mm) 062966

IonPac AS21

For fast analysis of trace perchlorate in drinking water prior to detection with MS/MS

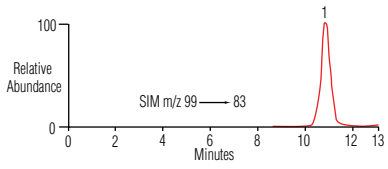
The AS21 hydroxide-selective anion-exchange column is specifically designed for determination of trace perchlorate in drinking water prior to MS/MS detection. The capacity and selectivity enable fast analysis of perchlorate at low µg/L concentrations. The AS21 is the specified column in US EPA Method 331.0.

- Fast separation of perchlorate prior to MS/MS detection
- Optimized for methylamine or hydroxide mobile phases
- Specified column for US EPA Method 331.0
- Optimum capacity: 45 µeq per column (2 × 250 mm)
- Operates at ambient or elevated temperatures
- Compatible with organic solvents

The AS21 2 × 250 mm column format was specifically developed for MS/MS compatibility to allow use of volatile mobile phases such as methylamine.

Determination of Perchlorate Using the IonPac® AS21 and MS/MS Detection

Column:	IonPac AS21, 2 mm
Eluent:	200 mM methylamine
Temperature:	30 °C
Flow Rate:	0.35 mL/min
Inj. Volume:	100 µL
Diversion:	Eluent divert valve before detector to send common anions (e.g., chloride, bicarbonate, sulfate) to waste (open until 2 min prior to elution of perchlorate)
Detector:	Finnigan LCQ Deca Ion Trap MS
Peaks:	1. Perchlorate 2.0 µg/L (ppb)

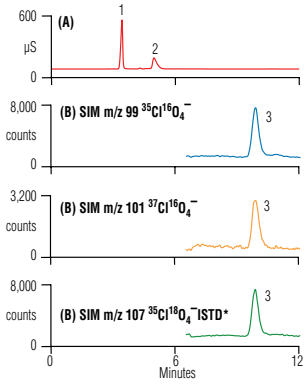


Parameter	LC-MS/MS
Ion Source	Electrospray
Polarity	Negative
Sheath Gas (N_2)	80
Aux Gas (N_2)	20
Capillary Voltage	–23 V
Capillary Temp	275 °C
Spray Voltage	6.00 KV
Tube Lens	–35 V
Multipole1 Offset	9.00 V
Lens Voltage	68 V
Multipole2 Offset	12.50 V
Multipole RF Amp	120
Entrance Lens Voltage	44.00 V
Coarse Trap dc Offset	10.17 V
Fine Trap dc Offset	10.15 V
Analyzer Temp	26 °C
Multiplier Voltage	–930 V
Mass Range	Low
Injection RF	m/z 50
Collision Energy	52%

21060

Determination of perchlorate using the IonPac AS21 and MS/MS detection.

IC/MS Determination of Perchlorate in Drinking Water Using the IonPac® AS21 Column



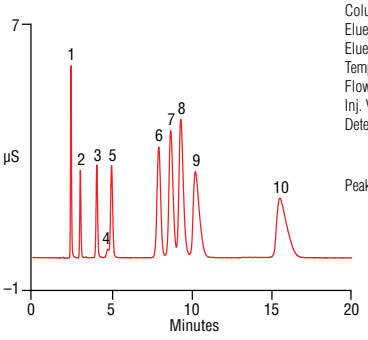
Column:	IonPac® AG21, AS21, 2 mm
Eluent:	15 mM potassium hydroxide
Eluent Source:	EGC II KOH with CR-ATC
Flow Rate:	0.35 mL/min
Temperature:	30 °C
Inj. Volume:	100 µL
Matrix Diversion:	0–6.5 min.
Auxiliary Pump Solvent:	50/50 acetonitrile/water
Auxiliary Pump Flow Rate:	0.3 mL/min
Detection:	**(A)** Suppressed conductivity, ASRS® MS, AutoSuppression®, external water mode **(B)** Mass spectrometry
MS Instrument:	MSQ™ Plus
MS Conditions:	–ESI, 70 V, 550 °C
Matrix:	Drinking Water
Internal Standard:	Perchlorate-^{18}O, 1 µg/L (ppb)
Peaks:	1. Chloride –
	2. Sulfate –
	3. Perchlorate 1

*ISTD = Internal Standard

21061

IC/MS determination of perchlorate in drinking water using the IonPac AS21 column.

Analysis of Environmental Anions Using the IonPac® AS21 Column



Column:	IonPac AG21, AS21, 2 mm
Eluent:	15 mM potassium hydroxide
Eluent Source:	EGC II KOH cartridge with CR-ATC
Temperature:	30 °C
Flow Rate:	0.35 mL/min
Inj. Volume:	2.5 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm, AutoSuppression® recycle mode

Peaks:		
1.	Fluoride	2 mg/L (ppm)
2.	Chloride	2
3.	Nitrate	5
4.	Carbonate	–
5.	Sulfate	5
6.	Tungstate	30
7.	Chromate	30
8.	Perchlorate	30
9.	Phosphate	30
10.	Arsenate	30

21062

Analysis of environmental anions using the IonPac AS21 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS21 Anion-Exchange Column Data Sheet

Ordering Information

Analytical Columns

IonPac AS21 Analytical Column (2 × 250 mm) 063009

Guard Columns

IonPac AG21 Guard Column (2 × 50 mm) 063071

IonPac AS20

For determination of trace perchlorate using suppressed conductivity detection

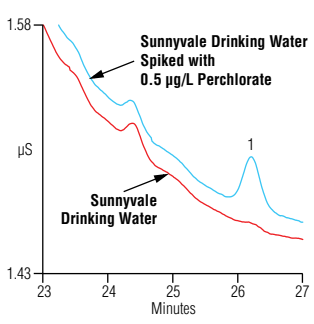
The AS20 hydroxide-selective anion-exchange column is specifically designed for the determination of trace concentrations of perchlorate in drinking water, surface water, and groundwater matrices. The capacity and selectivity of the AS20 ensures that perchlorate can be quantified at low µg/L concentrations using suppressed conductivity detection even in the presence of very high concentrations of chloride, carbonate, and sulfate.

- Recommended for US EPA Method 314.1 (Confirmatory Method)
- High capacity: 310 µeq per column. (4 × 250 mm)
- Use the Cryptand C1 Concentrator Column for sample preconcentration
- Simplified Reagent-Free IC operation provided by the Eluent Generator
- ASRS 300 provides RFIC operation with low background and enhanced analyte sensitivity
- Column selectivity is optimized for 30 °C operating temperature
- Compatible with organic solvents

The AS20 is the specified column in US EPA Method 314.1 (Confirmatory Method). The Cryptand C1 Concentrator Column is the specified concentrator column for sample preconcentration in that method.

The AS20 column is ideally used with an RFIC system for best detection limits. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS20 column for eluent suppression.

Determination of Trace Perchlorate in Drinking Water Using the AS20 Column Following Concentration on a Cryptand C1 Concentrator Column

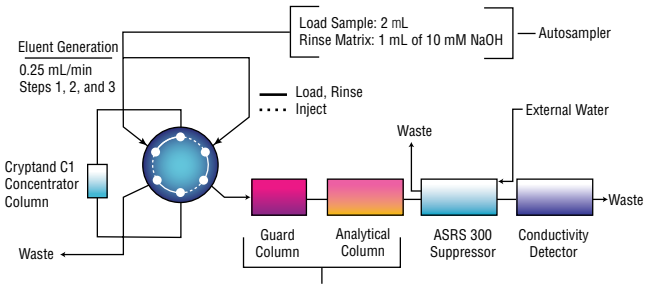


Column:	IonPac® AG20, AS20, 2 mm
Conc. Column:	IonPac Cryptand C1, 4 × 35 mm
Eluent:	Sodium hydroxide: 0.5 mM from 0–12 min, 65 mM from 12.1–28 min, 100 mM from 28.1–30 min
Eluent Source:	EGC II NaOH cartridge with CR-ATC
Temperature	35 °C
Flow Rate:	0.25 mL/min
Inj. Volume:	2 mL
Rinse Volume:	1 mL (10 mM NaOH)
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm, AutoSuppression®, external water mode, 100 mA
Peak:	1. Perchlorate 0.5 µg/L (ppb) Recovery 107.8%

21089

Determination of trace perchlorate in drinking water using the AS20 column following concentration on a Cryptand C1 Concentrator column.

System Flow Path for Trace Perchlorate in Drinking Water



NaOH Eluent Generation			
Step	Function	Conc.	Time
1	Perchlorate Transfer	0.5 mM	12 min
2	Analysis	65 mM	16 min
3	Column Cleanup	100 mM	2 min

Primary Method—AG16, AS16 (2 × 250 mm)
Confirmatory Method—AG20, AS20 (2 × 250 mm)

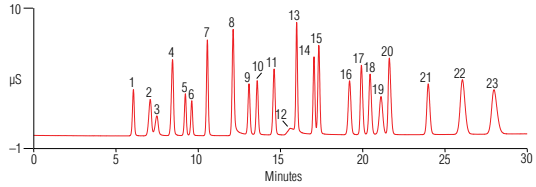
20590

System flow path for trace perchlorate in drinking water.

Gradient Separation of a Variety of Environmental Anions Using the AS20 Column

Column:	IonPac® AG20, AS20, 4 mm
Eluent:	Potassium hydroxide: 5 mM from 0 to 5 min, 5–30 mM from 5 to 15 min, 30–55 mM from 15 to 30 min
Eluent Source:	EGC II KOH with CR-ATC
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	10 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 4 mm, AutoSuppression® recycle mode

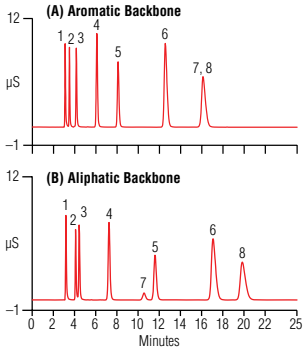
Peaks: mg/L (ppm)					
1.	Fluoride	2	12.	Carbonate	20
2.	Acetate	10	13.	Sulfate	10
3.	Butyrate	10	14.	Selenate	10
4.	Formate	10	15.	Oxalate	10
5.	Chlorite	10	16.	Phthalate	20
6.	Bromate	10	17.	Phosphate	20
7.	Chloride	5	18.	Chromate	20
8.	Nitrite	10	19.	Iodide	20
9.	Chlorate	10	20.	Arsenate	20
10.	Bromide	10	21.	Citrate	20
11.	Nitrate	10	22.	Thiocyanate	20
			23.	Perchlorate	30



21114

Gradient separation of a variety of environmental anions using the AS20 column.

Comparison of the AS16 and AS20 Columns for Separation of Common Anions, Hydrophobic Anions and 4-Chlorobenzene Sulfonate



Columns:	(A) IonPac® AG16, AS16, 2 mm (B) IonPac AG20, AS20, 2 mm
Eluent:	35 mM sodium hydroxide
Eluent Source:	EGC II NaOH cartridge with CR-ATC
Flow Rate:	0.25 mL/min
Temperature:	30 °C
Inj. Volume:	2.5 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II, 2 mm, AutoSuppression® recycle mode

Peaks:		mg/L (ppm)
1.	Fluoride	2
2.	Chloride	3
3.	Sulfate	5
4.	Thiosulfate	10
5.	Iodide	20
6.	Thiocyanate	20
7.	4-Chlorobenzene sulfonate	5
8.	Perchlorate	30

21090

Comparison of the AS16 and AS20 columns for separation of common anions, hydrophobic anions and 4-chlorobenzene sulfonate.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS20 Anion-Exchange Column Data Sheet

Application Notes

AN 176: Determining Sub-ppb Perchlorate in Drinking Water Using Preconcentration/Matrix Elimination IC with Suppressed Conductivity Detection by U.S. EPA Method 314.1

AN 178: Improved Determination of Trace Concentrations of Perchlorate in Drinking Water Using Preconcentration with Two-Dimensional Ion Chromatography and Suppressed Conductivity Detection

Ordering Information

Analytical Columns

IonPac AS20 Analytical Column (2 × 250 mm) 063065
IonPac AS20 Analytical Column (4 × 250 mm) 063148

Guard Columns

IonPac AG20 Guard Column (2 × 50 mm) 063066
IonPac AG20 Guard Column (4 × 50 mm) 063154

IonPac AS19

For determination of oxyhalides and inorganic anions

The IonPac AS19 hydroxide-selective anion-exchange column is specifically designed for trace bromate in drinking water. Its high capacity and selectivity allow the determination of bromate in drinking water at the low-µg/L level. The AS19 meets the performance requirements of US EPA Methods 300.0 and 300.1.

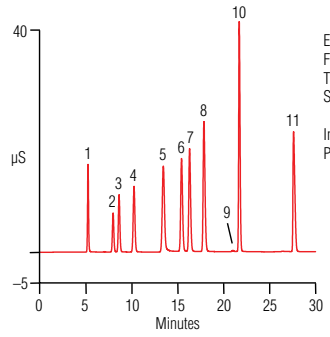
- Recommended hydroxide-selective column for trace bromate in drinking water matrices
- High capacity: 240 µeq per column (4 × 250 mm)
- Meets or exceeds performance requirements of US EPA Methods 300.0 and 300.1
- Column selectivity is optimized for a 30 °C operating temperature
- Compatible with organic solvents
- Low backgrounds and enhanced analyte sensitivity with the ASRS 300 and an RFIC system

The AS19 is designed for the analysis of oxyhalides and common inorganic anions including fluoride, chlorite, bromate, chloride, nitrite, bromide, chlorate, nitrate, phosphate, and sulfate in drinking water, groundwater, wastewater, and other diverse sample matrices. The AS19 allows analysis of most drinking water without the use of sample pretreatment or preconcentration. The AS19 column is ideally used with an RFIC system for automatic eluent generation.

The key application for the AS19 is the determination of trace bromate in drinking water matrices using a potassium hydroxide gradient with suppressed conductivity detection. The selectivity of the AS19 ensures that bromate, a toxic byproduct of ozone disinfection, can be quantified at low-µg/L concentrations using suppressed conductivity detection even in the presence of very high concentrations of chloride, sulfate, and carbonate.

Note: *Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS19 column for eluent suppression.*

Separation of Oxyhalides and Common Inorganic Anions



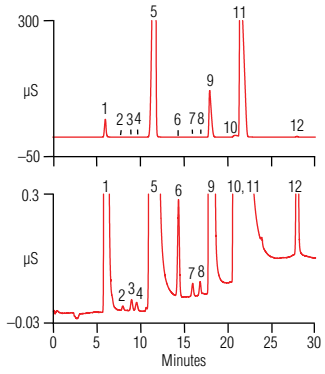
Column:	IonPac® AG19, AS19, 4 × 250 mm
Eluent:	10 mM potassium hydroxide from 0 to10 min, 10 to 55 mM from 10 to 25 min
Eluent source:	EGC-KOH cartridge with CR-ATC
Flow rate:	1.0 mL/min
Temperature:	30 °C
Suppressor:	ASRS® ULTRA, 4 mm, External water mode, 300 mA
Inj. volume:	25 µL

Peaks:		
1.	Fluoride	1 mg/L (ppm)
2.	Chlorite	10
3.	Bromate	20
4.	Chloride	6
5.	Nitrite	15
6.	Chlorate	25
7.	Bromide	25
8.	Nitrate	25
9.	Carbonate	—
10.	Sulfate	25
11.	Phosphate	30

20283

Determination of oxyhalides and common inorganic anions using the AS19 column.

Determination of ppb Bromate in Drinking Water



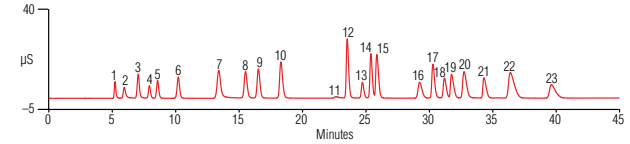
Column:	IonPac® AS19, 4 × 250 mm
Eluent:	Potassium hydroxide: 10 mM from 0 to 10 min, 10 to 45 mM from 10 to 25 min,
Eluent source:	EGC II KOH cartridge with CR-ATC
Flow rate:	1.0 mL/min
Temperature:	30 °C
Suppressor:	ASRS® ULTRA II, 4 mm, AutoSuppression external water mode, 300 mA
Inj. volume:	500 µL

Peaks:		
1.	Fluoride	1 mg/L (ppm)
2.	Formate	–
3.	Chlorite	0.005
4.	Bromate	0.005
5.	Chloride	50
6.	Nitrite	0.005
7.	Chlorate	0.005
8.	Bromide	0.005
9.	Nitrate	10
10.	Carbonate	25
11.	Sulfate	50
12.	Phosphate	0.2

20282-a

Determination of trace concentration of bromate in a simulated drinking water sample using the AS19 column with a large-loop injection.

Determination of Inorganic Anions, Oxyhalides, Organic Acids, and Oxyanions on an IonPac® AS19 Column Using a Potassium Hydroxide Gradient Delivered by an EG50 Eluent Generator



Column:	IonPac AG19, AS19, 4 mm	Peaks:	1. Fluoride	2 mg/L (ppm)	12. Sulfate 25
Eluent:	Potassium hydroxide:		2. Acetate	10	13. Malonate 25
	10 mM from 0 to 10 min,		3. Formate	10	14. Selenate 25
	10–58 mM from 10 to 40 min		4. Chlorite	10	15. Oxalate 25
Eluent source:	EGC II KOH with CR-ATC		5. Bromate	20	16. Iodide 30
Flow rate:	1.0 mL/min		6. Chloride	6	17. Thiosulfate 25
Temperature:	30 °C		7. Nitrite	15	18. Chromate 25
Suppressor:	ASRS® ULTRA II, 4 mm,		8. Chlorate	25	19. Phosphate 30
	AutoSuppression recycle mode,		9. Bromide	25	20. Fumarate 30
	300 mA		10. Nitrate	25	21. Arsenate 30
Inj. volume:	25 µL		11. Carbonate	25	22. Thiocyanate 30
					23. Perchlorate 30

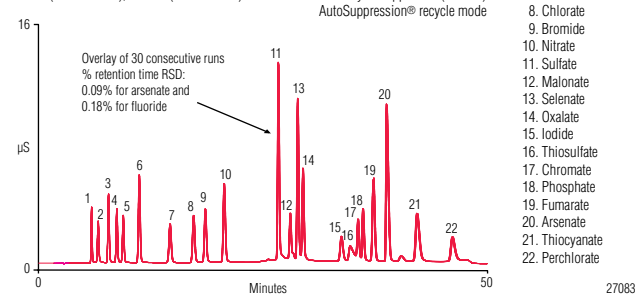
20284

Determination of inorganic anions, oxyhalides, organic acids and oxyanions on an IonPac AS19 column using a hydroxide gradient delivered by an Eluent Generator

Separation of 22 Anions on an IonPac AS19 Capillary Column

Column:	IonPac AS19 capillary column (0.4 mm × 250 mm)	Eluent Source:	EGC-KOH capillary cartridge
Eluent:	10 mM KOH (0 to 10 min), 10 to 52 mM KOH (10 to 42 min), 52 to 70 mM (42 to 45 min), 10 mM (45 to 50 min)	Temperature:	30 °C
		Flow Rate:	10 µL/min
		Inj. Volume:	1.0 µL
		Suppressor:	Suppressed conductivity Anion Capillary Electrolytic Suppressor (ACES™) AutoSuppression® recycle mode

Peaks:
1. Fluoride
2. Acetate
3. Formate
4. Chlorite
5. Bromate
6. Chloride
7. Nitrite
8. Chlorate
9. Bromide
10. Nitrate
11. Sulfate
12. Malonate
13. Selenate
14. Oxalate
15. Iodide
16. Thiosulfate
17. Chromate
18. Phosphate
19. Fumarate
20. Arsenate
21. Thiocyanate
22. Perchlorate



27083

Separation of 22 anions on an IonPac AS19 capillary column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS19 Anion-Exchange Column Data Sheet

Application Notes

AN 93: Determination of Trace Anions in Concentrated Bases Using AutoNeutralization Pretreatment/Ion Chromatography

AN 167: Determination of Trace Concentrations of Oxyhalides and Bromide in Municipal and Bottled Waters Using a Hydroxide-Selective Column with a Reagent-Free Ion Chromatography System

AN 168: Determination of Trace Concentrations of Disinfection By-Product Anions and Bromide in Drinking Water Using Reagent-Free™ Ion Chromatography Followed by Postcolumn Addition of o-Dianisidine for Trace Bromate Analysis

AN 171: Determination of Disinfection By-Product Anions and Bromide in Drinking Water Using a Reagent-Free Ion Chromatography System Followed by Postcolumn Addition of an Acidified On-Line Generated Reagent for Trace Bromate Analysis

AN 184: Determination of Trace Concentrations of Chlorite, Bromate, and Chlorate in Bottled Natural Mineral Waters

AN 187: Determination of Sub-µg/L Bromate in Municipal and Natural Mineral Waters Using Preconcentration with Two-Dimensional Ion Chromatography and Suppressed Conductivity Detection

Application Updates

AU 154: Determination of Bromate in Drinking and Mineral Water by Isocratic Ion Chromatography with a Hydroxide Eluent

AU 159: Determination of Volcanic Gases as Anions in Caustic Solutions Using AutoNeutralization, Automated Dilutions, and a Reagent-Free Ion Chromatography System

Ordering Information

Analytical Columns

IonPac AS19 Analytical Column (4 x 250 mm) 062885

IonPac AS19 Analytical Column (2 x 250 mm) 062886

Guard Columns

IonPac AG19 Guard Column (4 x 50 mm)..... 062887

IonPac AG19 Guard Column (2 x 50 mm)..... 062888

IonPac AS18

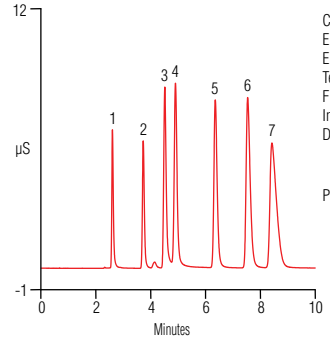
For determination of inorganic anions and low-molecular-weight organic acids

The IonPac AS18 column is the hydroxide-selective column of choice for compliance monitoring of inorganic anions in drinking water and wastewater samples in accordance with US EPA Methods 300.0 (A) and 300.1. The new IonPacAS18-Fast Capillary column offers the same selectivity as the AS18 analytical scale column, and offers reduced eluent consumption, thereby lowering operating costs. With a reduced length of 150 mm, this column separates common inorganic anions in significantly less time.

- Fast separation of the common inorganic anions in 4 minutes using the AS18-Fast capillary column
- Recommended hydroxide-selective column for inorganic anions in diverse sample matrices
- Fast isocratic separation of common inorganic anions in 9 minutes
- Inorganic anion and low-molecular weight organic acids in complex sample matrices
- Superior retention and quantification of fluoride, acetate, and formate
- Meets performance requirements specified in US EPA Method 300.0 (A)

The AS18 can determine inorganic anions and low-molecular-weight organic acids in a variety of sample matrices. This column has excellent retention of fluoride from the water dip. It is approved for compliance monitoring of inorganic anions in drinking water and wastewater samples in accordance with US EPA Methods 300.0 and 300.1.

Fast Isocratic Anion Standard Separation Using the IonPac® AS18 Column



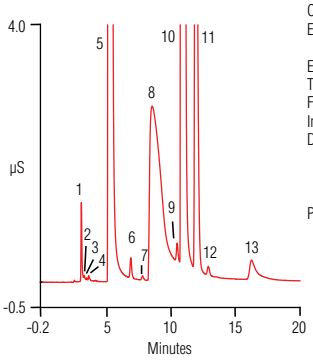
Column: IonPac AS18 4 mm
Eluent: 39 mM Potassium hydroxide
Eluent Source: EGC-KOH with CR-ATC
Temperature: 30 °C
Flow Rate: 1.0 mL/min
Inj. Volume: 25 µL
Detection: Suppressed conductivity, ASRS® ULTRA 4 mm, 150 mA, AutoSuppression® recycle mode

Peaks:		
	1. Fluoride	1 mg/L (ppm)
	2. Chloride	2
	3. Nitrite	5
	4. Sulfate	6
	5. Bromide	10
	6. Nitrate	10
	7. Phosphate	20

19081

Fast isocratic separation of the common inorganic anions on an IonPac AS18.

Determination of Anions in Drinking Water Using the IonPac® AS18 Column

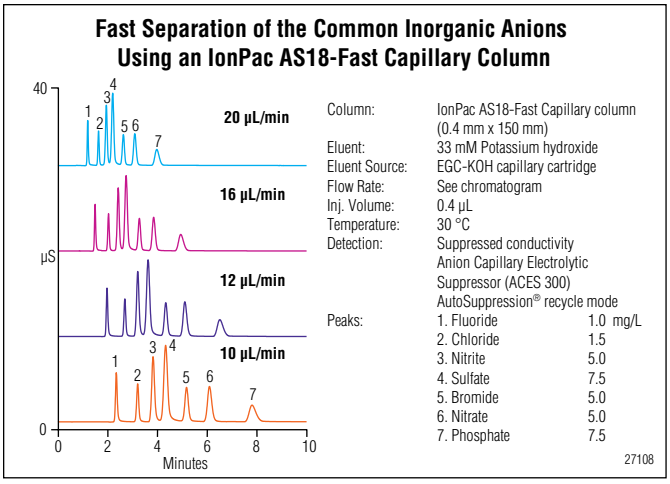


Column: IonPac AS18, 4 × 250 mm
Eluent: Potassium hydroxide, 22 to 40 mM at 7–8 min
Eluent Source: EGC-KOH with CR-ATC
Temperature: 30 °C
Flow Rate: 1.0 mL/min
Inj. Volume: 100 µL
Detection: Suppressed conductivity, ASRS® ULTRA 4-mm, 100 mA AutoSuppression® recycle mode

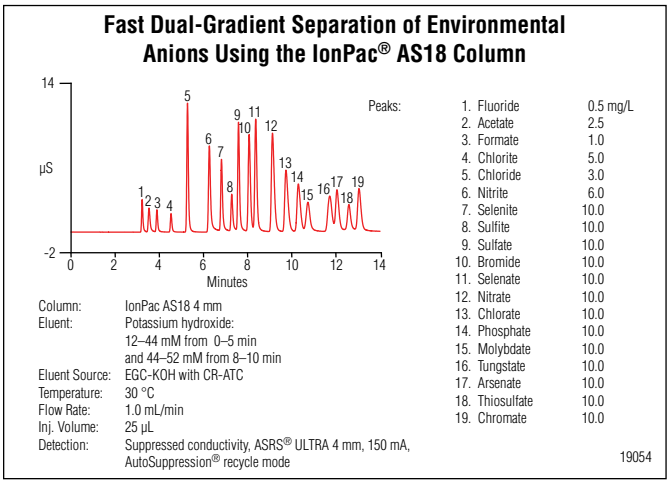
Peaks:		
1.	Fluoride	8. Carbonate
2.	Acetate	9. Bromide
3.	Unknown	10. Sulfate
4.	Formate	11. Nitrate
5.	Chloride	12. Chlorate
6.	Nitrite	13. Phosphate
7.	Unknown	

18903

Determination of inorganic anions in a drinking water sample on an IonPac AS18 column using a potassium hydroxide gradient delivered by an Eluent Generator.



Fast separation of the common inorganic anions using an IonPac AS18-Fast capillary column.



Fast dual-gradient separation of environmental anions using the IonPac AS18 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS18 Anion-Exchange Columns Data Sheet

Application Notes

AN 154: Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column

AN 156: Determination of Anions in Toothpaste by Ion Chromatography

AN 165: Determination of Benzoate in Liquid Food Products by Reagent-Free™ Ion Chromatography

Application Updates

AU 146: Determination of Anions in Acid Rain by Ion Chromatography

Ordering Information

Analytical Columns

IonPac AS18 4 mm Analytical Column (4 x 250 mm) 060549
IonPac AS18 2 mm Analytical Column (2 x 250 mm) 060553
IonPac AS18-Fast Capillary Column (0.4 x 150 mm) 072062

Guard Columns

IonPac AG18 4 mm Guard Column (4 x 50 mm) 060551
IonPac AG18 2 mm Guard Column (2 x 50 mm) 060555
IonPac AG18-Fast Capillary Guard Column (0.4 x 35 mm) 072063

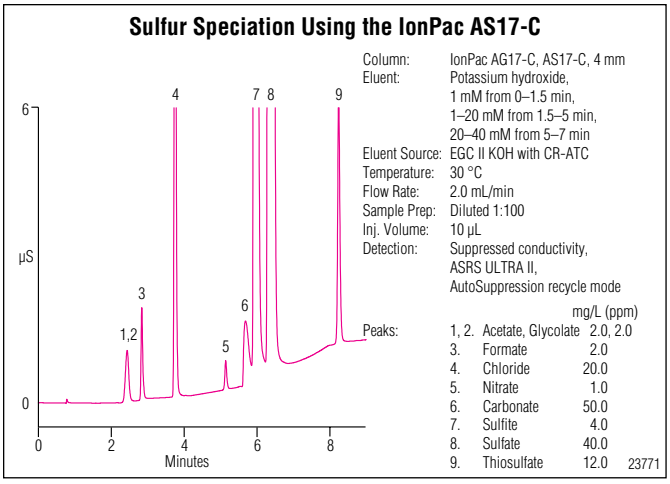
IonPac AS17-C

For fast gradient separation of inorganic anions in high-purity water matrices

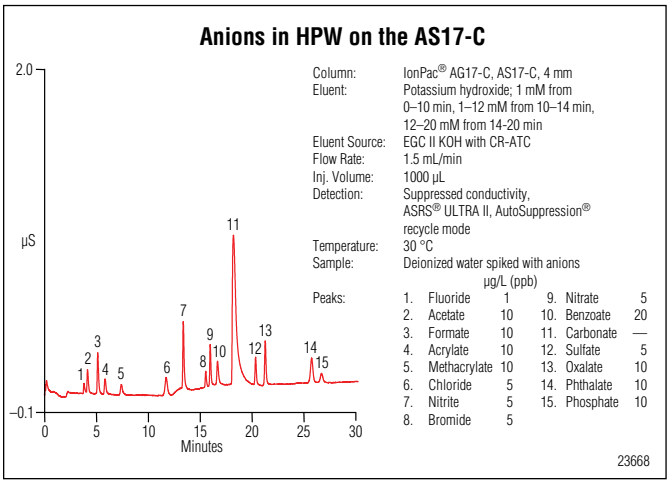
The IonPac AS17-C column is a low-capacity column for fast, gradient separation of inorganic anions. Its key application is the determination of common inorganic anions in high-purity water matrices. The AS17-C provides low sulfate blanks and fast equilibration time. It is recommended for use with RFIC systems using the Eluent Generator for automatic eluent generation. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS17-C column.

- Recommended replacement for all AS17 anion applications
- Optimized for common inorganic anions in simple sample matrices
- Fast gradient separation of inorganic anions in high-purity water matrices
- Fast, gradient separation of sulfur species including sulfite, sulfate, and thiosulfate
- Compatible with RFIC systems and the Eluent Generator for automatic eluent generation

Note: *The IonPac AS18 column is the recommended hydroxide-selective column for determination of common anions in diverse sample matrices.*

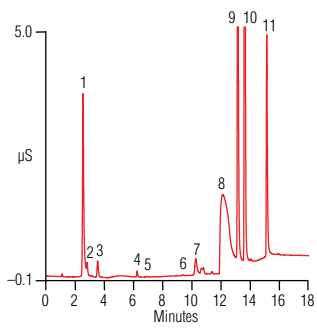


Determination of sulfur species in a simulated industrial wastewater sample using an IonPac AS17-C Column



Determination of anions and organic acids in high-purity water using a large loop injection with potassium hydroxide gradient on a 4 mm IonPac AS17-C column.

Anions in Toothpaste on the AS17-C



Column: IonPac® AG17-C, AS17-C, 4 mm
Eluent: Potassium hydroxide; 1 mM from 0–3 min, 1–12 mM from 3–11 min, 12–35 mM from 11–14 min
Eluent Source: EGC II KOH with CR-ATC
Flow Rate: 1.5 mL/min
Inj. Volume: 10 µL
Detection: Suppressed conductivity, ASRS® ULTRA II, AutoSuppression® recycle mode
Temperature: 30 °C
Sample: Toothpaste diluted 200× (w/w) with deionized water and filtered

Peaks:
1. Fluoride
2. Acetate
3. Formate
4. Chloride
5. Nitrite
6. Bromide
7. Benzoate
8. Carbonate
9. Monofluorophosphate
10. Sulfate
11. Phosphate

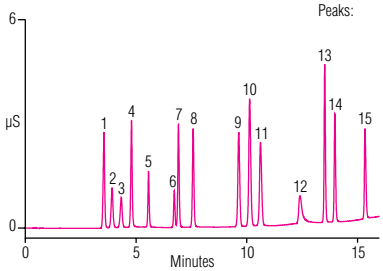
23669

Determination of anionic additives in toothpaste on an IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

Separation of Environmental Anions Using the IonPac AS17-C

Column: IonPac AG17-C, AS17-C, 4 mm
Eluent: Potassium hydroxide, 1 mM from 0 to 3 min, 1–12 mM from 3 to 10 min, 12–35 mM from 10 to 14 min
Eluent Source: EGC II KOH with CR-ATC
Temperature: 30 °C
Flow Rate: 1.5 mL/min
Inj. Volume: 10 µL
Detection: Suppressed conductivity, ASRS ULTRA II, AutoSuppression recycle mode

Peaks:	mg/L (ppm)		
1. Fluoride	2.0	9. Bromide	10.0
2. Acetate	5.0	10. Nitrate	10.0
3. Propionate	5.0	11. Chlorate	10.0
4. Formate	5.0	12. Carbonate	20.0
5. Chlorite	5.0	13. Sulfate	5.0
6. Bromate	5.0	14. Oxalate	5.0
7. Chloride	3.0	15. Phosphate	10.0
8. Nitrite	5.0		



23769

Anion separation including oxyhalides on an IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS17-C Anion Exchange Column Data Sheet

Ordering Information

Analytical Columns

IonPac AS17-C Analytical Column (4 × 250 mm) 066294
IonPac AS17-C Analytical Column (2 × 250 mm) 066296

Guard Columns

IonPac AG17-C Guard Column (4 × 50 mm)..... 066295
IonPac AG17-C Guard Column (2 × 50 mm)..... 066297

IonPac AS16

High-capacity column optimized for determination of polarizable anions

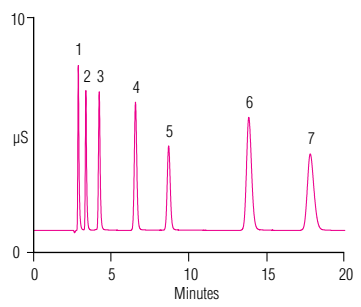
The IonPac AS16 column is ideally suited for trace perchlorate in drinking water in accordance with US EPA Methods 314.0 and 314.1 (Primary Method). The AS16 column simplifies the determination of polarizable anions, including thiosulfate, iodide, thiocyanate, and perchlorate using an isocratic hydroxide eluent.

- Separate hydrophobic anions (iodide, thiocyanate, and thiosulfate) in less than 20 min
- Can be used for trace perchlorate in drinking water matrices
- Ideal for polyvalent anions, including polyphosphates and polycarboxylates
- Ultralow hydrophobicity allows fast analysis of polarizable anions

The AS16 is a high-capacity, hydroxide-selective column for the determination of polarizable anions in a variety of sample matrices. Trace concentrations of perchlorate in drinking water, surface water, and groundwater matrices can easily be determined using a large-loop injection.

Note: *Also see the IonPac AS20, with complementary selectivity for confirmation of perchlorate identification when using EPA Method 314.1*

Isocratic Separation of Polarizable Anions and Inorganic Anions Using a Sodium Hydroxide Eluent



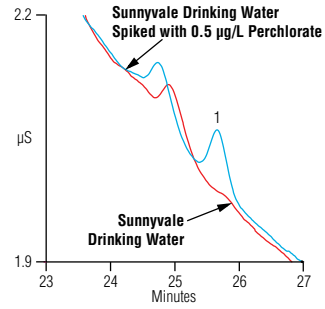
Column: IonPac AG16, AS16, 4 mm
Eluent: 35 mM sodium hydroxide
Temperature: 30 °C
Flow Rate: 1 mL/min
Inj. Volume: 10 µL
Detection: Suppressed conductivity, ASRS ULTRA II, 4 mm, AutoSuppression recycle mode

Peaks:		
	1. Fluoride	2.0 mg/L (ppm)
	2. Chloride	3.0
	3. Sulfate	5.0
	4. Thiosulfate	20.0
	5. Iodide	20.0
	6. Thiocyanate	20.0
	7. Perchlorate	20.0

14228-01

Isocratic separation of polarizable anions and inorganic anions using a sodium hydroxide eluent on the 4 mm IonPac AS16 column.

Determination of Trace Perchlorate in Drinking Water Using the AS16 Column Following Concentration on a Cryptand C1 Concentrator Column



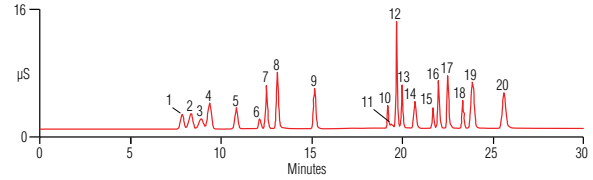
Column: IonPac® AG16, AS16, 2 mm
Conc. Column: IonPac Cryptand C1, 4 × 35 mm
Eluent: Sodium hydroxide: 0.5 mM from 0–12 min, 65 mM from 12.1–28 min, 100 mM from 28.1–30 min
Eluent Source: EGC II NaOH cartridge with CR-ATC
Temperature: 35 °C
Flow Rate: 0.25 mL/min
Inj. Volume: 2 mL
Rinse Volume: 1 mL (10 mM NaOH)
Detection: Suppressed conductivity, ASRS® ULTRA II, 2 mm, AutoSuppression®, external water mode, 100 mA

Peaks:		
	1. Perchlorate	0.5 µg/L (ppb)
	Recovery	116.5%

21088

Determination of trace perchlorate in drinking water using the AS16 column.

Gradient Separation of Polarizable Anions and Inorganic Anions Using the IonPac® AS16 and EG50 Eluent Generator



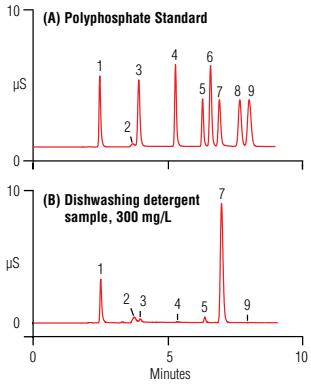
Column:	IonPac AG16, AS16, 4 mm
Eluent:	Potassium hydroxide, 1.5 mM from 0 to 7 min to 10 mM at 13 min
Eluent Source:	EGC-KOH
Temperature:	30 °C
Flow Rate:	1.5 mL/min
Inj. Volume:	10 µL
Detection:	Suppressed conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® recycle mode

Peaks:		mg/L (ppm)		
1.	Fluoride	2.0	11. Carbonate	20.0
2.	Acetate	10.0	12. Sulfate	10.0
3.	Propionate	10.0	13. Selenate	10.0
4.	Formate	10.0	14. Iodide	20.0
5.	Chlorite	10.0	15. Thiosulfate	20.0
6.	Bromate	10.0	16. Chromate	20.0
7.	Chloride	5.0	17. Phosphate	20.0
8.	Nitrite	10.0	18. Arsenate	20.0
9.	Nitrate	10.0	19. Thiocyanate	20.0
10.	Selenite	10.0	20. Perchlorate	20.0

14230-01

Determination of polarizable anions and inorganic anions using a potassium hydroxide gradient delivered with an EG using the 4 mm IonPac AS16 column.

Separation of Polyphosphates in Detergent Using the IonPac® AS16 Column



Column:	IonPac AG16, AS16, 4 mm
Eluent:	25 mM potassium hydroxide for 1.7 min to 65 mM in 2.5 min
Eluent Source:	EG40
Temperature:	30 °C
Flow Rate:	1.5 mL/min
Inj. Volume:	10 µL
Detection:	Suppressed Conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® recycle mode

Peaks:		A 3 mg/L (ppm)
1.	Chloride	-
2.	Carbonate	5
3.	Sulfate	10
4.	Phosphate	10
5.	Pyrophosphate	10
6.	Trimetaphosphate	10
7.	Tripolyphosphate	10
8.	Tetrametaphosphate	10
9.	Tetrapolyphosphate	10

14238

Separation of polyphosphates on the 4 mm IonPac AS16 column using a potassium hydroxide gradient delivered with an Eluent Generator.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS16 Anion-Exchange Column Data Sheet

Application Notes

AN 134: Determination of Low Concentrations of Perchlorate in Drinking and Ground Waters Using Ion Chromatography

AN 138: Determination of Thiosulfate in Refinery and Other Wastewaters

AN 144: Determination of Perchlorate in High Ionic Strength Fertilizer Extracts By Ion Chromatography

AN 151: Determination of Perchlorate in Environmental Waters by Ion Chromatography Coupled with Electrospray Mass Spectrometry (IC-MS)

AN 176: Determining Sub-ppb Perchlorate in Drinking Water Using Preconcentration/Matrix Elimination IC with Suppressed Conductivity Detection by U.S. EPA Method 314.1

AN 178: Improved Determination of Trace Concentrations of Perchlorate in Drinking Water Using Preconcentration with Two-Dimensional Ion Chromatography and Suppressed Conductivity Detection

Application Updates

AU 145: Determination of Perchlorate in Drinking Water by Ion Chromatography

AU 148: Determination of Perchlorate in Drinking Water Using Reagent-Free™ Ion Chromatography

Ordering Information

Analytical Columns

IonPac AS16 Analytical Column (4 × 250 mm) 055376

IonPac AS16 Analytical Column (2 × 250 mm) 055378

Guard Columns

IonPac AG16 Guard Column (4 × 50 mm) 055377

IonPac AG16 Guard Column (2 × 50 mm) 055379

IonPac AS15

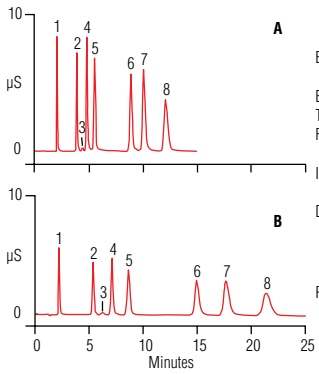
For trace-level concentrations of inorganic anions and low-molecular weight organic acids

The IonPac AS15 column was designed specifically for analysis of trace anions in high-purity water matrices, for the semiconductor and power generation industries. Its high capacity and selectivity enable the determination of trace-level concentrations of inorganic anions and low-molecular-weight organic acids in high-purity water matrices.

- AS15-5 μm (3 × 150 mm) column for high efficiency, fast analysis (15 min)
- AS15-9 μm (2 × 250 and 4 × 250 mm) columns for higher-capacity applications
- Column selectivity optimized for 30 °C operating temperature
- Superior resolution of early-eluting anions (fluoride, glycolate, acetate, and formate)

This column is ideal for use with large-loop injections. Use the AC15 concentration column for ultratrace (ppt) analyses. Use with the Eluent Generator for simplified eluent preparation. Use the Anion Self-Regenerating Suppressor (ASRS 300) with this column.

Comparison of IonPac® AS15-5µm and AS15-9µm Columns for Isocratic Separation of Common Anions



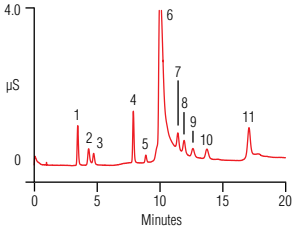
Column: (A) IonPac AG15, AS15-5mm (3 × 150 mm)
(B) IonPac AG15, AS15-9mm (4 × 250 mm)
Eluent: (A) 42 mM potassium hydroxide
(B) 40 mM potassium hydroxide
Eluent Source: EG40
Temperature: 30 °C
Flow Rate: (A) 0.5 mL/min
(B) 1.2 mL/min
Inj. Volume: (A) 5 µL
(B) 10 µL
Detection: Suppressed conductivity, ASRS® ULTRA, AutoSuppression® recycle mode

Peaks:		mg/L		
1. Fluoride	2	5. Sulfate	10
2. Chloride	5	6. Bromide	20
3. Carbonate	–	7. Nitrate	20
4. Nitrite	10	8. Phosphate	30

16122

Comparison of the AS15-5µm (3 × 150 mm) and AS15-9µm (4 × 250 mm) for the separation of inorganic anions.

Determination of Inorganic Anions and Low-Molecular-Weight Organic Acids with Sample Preconcentration Using the IonPac® AS15 Column



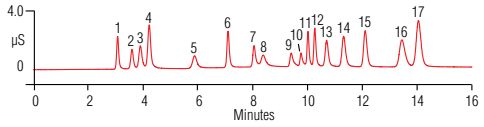
Column: Concentrator IonPac AG15, AS15, 2 mm
Column: IonPac AC15
Eluent: Potassium hydroxide, 10 mM from 0 to 4 min, 10–40 mM from 4 min to 14 min, 40–60 mM from 14 to 18 min
Eluent Source: EG40
Temperature: 30 °C
Flow Rate: 0.5 mL/min
Sample Volume: 20 mL, preconcentrated
Detection: Suppressed conductivity, ASRS® ULTRA, 2 mm, AutoSuppression® recycle mode

Peaks:	µg/L (ppb)		
1. Fluoride	0.1	7. Sulfate	0.1
2. Acetate	0.1	8. Oxalate	0.1
3. Formate	0.1	9. Bromide	0.1
4. Chloride	0.1	10. Nitrate	0.1
5. Nitrite	0.1	11. Phosphate	0.1
6. Carbonate	–		

14871

Determination of inorganic anions and low-molecular-weight organic acids with sample preconcentration using the IonPac AS15 column.

Separation of Weakly Retained Organic Acids Using the IonPac® AS15-5µm (3 x 150 mm) Column



			mg/L (ppm)		
Column:	IonPac AG15, AS15-5mm (3 × 150 mm)	Peaks:	1. Fluoride	1	10. Sulfite 2
Eluent:	10 mM Potassium hydroxide for 4 min to 60 mM at 9 min		2. Glycolate	5	11. Sulfate 2
Eluent Source:	EG40		3. Acetate	5	12. Oxalate 3
Temperature:	30 °C		4. Formate	5	13. Bromide 5
Flow Rate:	0.7 mL/min		5. Propionate	5	14. Nitrate 5
Inj. Volume:	5 µL		6. Chloride	2	15. Phosphate 10
Detection:	Suppressed conductivity, ASRS® ULTRA, 2 mm, AutoSuppression® recycle mode		7. Nitrite	2	16. Chlorate 10
			8. Butyrate	5	17. Thiosulfate 10
			9. Carbonate	30	

16393

Separation of weakly-retained organic acids using a potassium hydroxide gradient on the IonPac AS15-5 µm (3 × 150 mm) column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS15 Anion-Exchange Column Data Sheet

Application Notes

AN 137: Determination of Trace Anions in High-Nitrate Matrices by Ion Chromatography

AN 171: Determination of Disinfection By-Product Anions and Bromide in Drinking Water Using a Reagent-Free Ion Chromatography System Followed by Postcolumn Addition of an Acidified On-Line Generated Reagent for Trace Bromate Analysis

AN 173: Direct Determination of Cyanide in Drinking Water by Ion Chromatography with Pulsed Amperometric Detection (PAD)

AN 179: Carbohydrate and Amino Acid Analysis Using 3-D Amperometry

Application Updates

AU 142: Improved Determination of Trace Anions in High Purity Waters by High-Volume Direct Injection with the EG40

AU 143: Determination of Chloride in Acid Copper Plating Bath

Technical Notes

TN 48: Determination of Trace Anions in High-Purity Water by High-Volume Direct Injection with the EG40

Ordering Information

Analytical Columns

IonPac AS15 Analytical Column (4 × 250 mm) 053940
IonPac AS15 Analytical Column (2 × 250 mm) 053941
IonPac AS15-5 µm Analytical Column (3 × 150 mm) 057594

Guard Columns

IonPac AG15 Guard Column (4 × 50 mm) 053942
IonPac AG15 Guard Column (2 × 50 mm) 053943
IonPac AG15-5 µm Guard Column (3 × 30 mm) 057597

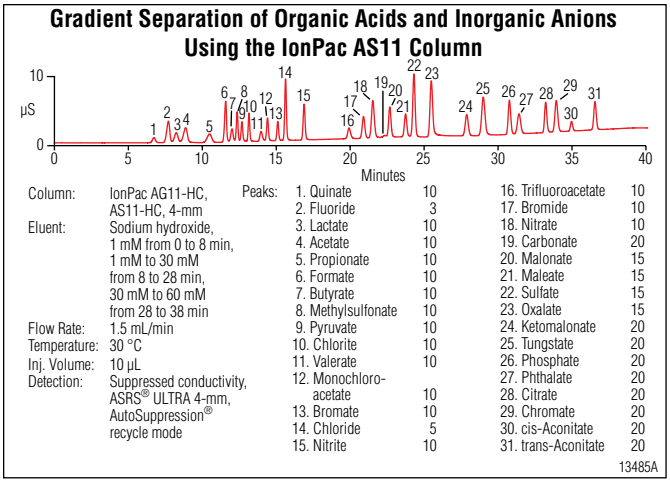
IonPac AS11-HC

For resolving a large number of inorganic anions and organic acid anions in complex matrices

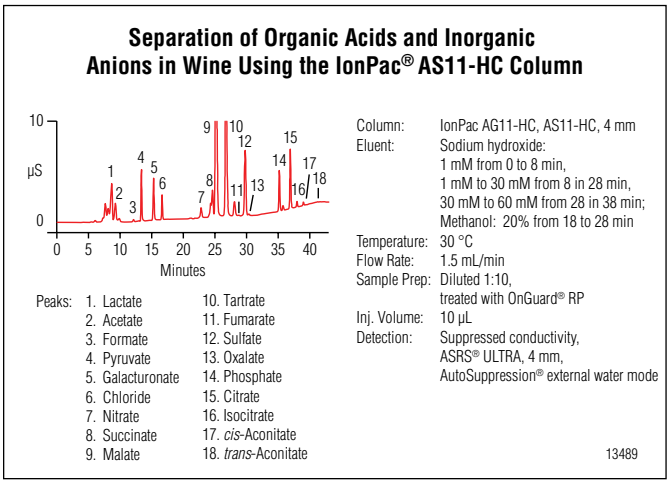
Complex sample matrices such as chemical wastewater effluents and fermentation broth solutions contain a variety of inorganic anions and organic acids. The IonPac AS11-HC was specifically designed to resolve a large number of inorganic anions and organic acid anions in a single run using a hydroxide gradient.

- Use for organic acids and anions in complex sample matrices or uncharacterized samples.
- Recommended for monovalent and divalent organic acids.
- Use the AS11 for fast analysis of organic acids and anions in well-characterized samples.
- Use the ICE-AS1 or ICE-AS6 columns for organic acids in high-ionic-strength samples.
- High capacity translates into longer retention times, but with higher resolution.

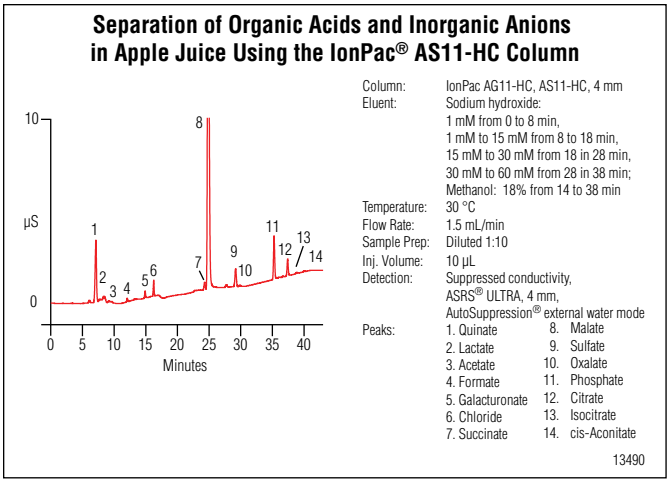
The high-capacity AS11-HC column allows the injection of more concentrated samples without overloading or peak broadening, and provides improved separation over the AS11 column for monovalent carboxylic acids, including quinate, lactate, acetate, propionate, formate, and butyrate.



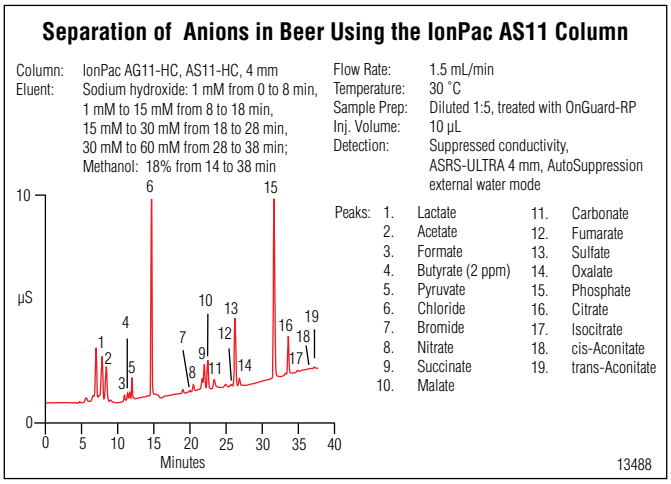
Determination of organic acids and inorganic anions using the IonPac AS11-HC column.



Separation of organic acids and inorganic anions in wine using the IonPac AS11-HC column.



Separation of organic acids and inorganic anions in apple juice using the IonPac AS11-HC column.



IonPac AS11-HC column used for the analysis of beer spiked with 2 mg/L (ppm) butyrate.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS11 and AS11-HC Anion-Exchange Columns Data Sheet

Application Notes

AN 123: The Determination of Inorganic Anions and Organic Acids in Fermentation Broths

AN 143: Determination of Organic Acids in Fruit Juices

Technical Notes

TN 44: The Determination of Trace Anions in Concentrated Phosphoric Acid

TN 46: Determination of Trace Anions in Concentrated Glycolic Acid

Ordering Information

Analytical Columns

IonPac AS11-HC Analytical Column (4 × 250 mm) 052960
IonPac AS11-HC Analytical Column (2 × 250 mm) 052961

Guard Columns

IonPac AG11-HC Guard Column (4 × 50 mm) 052962
IonPac AG11-HC Guard Column (2 × 50 mm) 052963

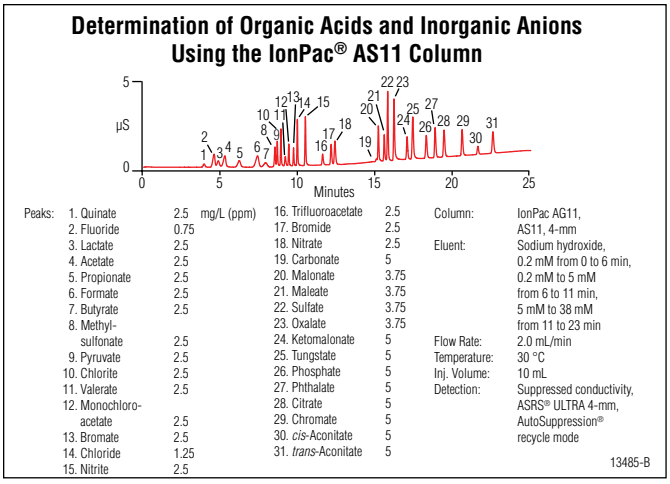
IonPac AS11

For fast profiling of inorganic anions and organic acid anions

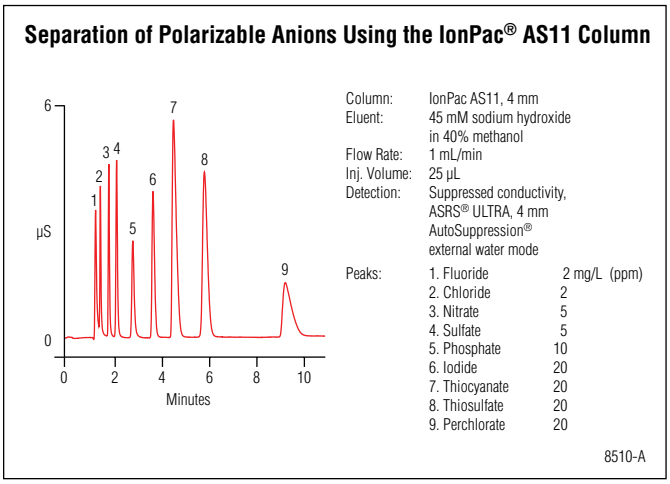
The AS11 is a relatively low-capacity column designed for fast, gradient screening of inorganic anions and organic acid anions in simple sample matrices.

- Fast analysis of organic acids and inorganic anions in well-characterized samples
- Ideal for highly charged anions, including polyphosphates and polycarboxylates
- For organic acids and inorganic anions in complex sample matrices
- Low capacity translates into fast analysis times and high throughput

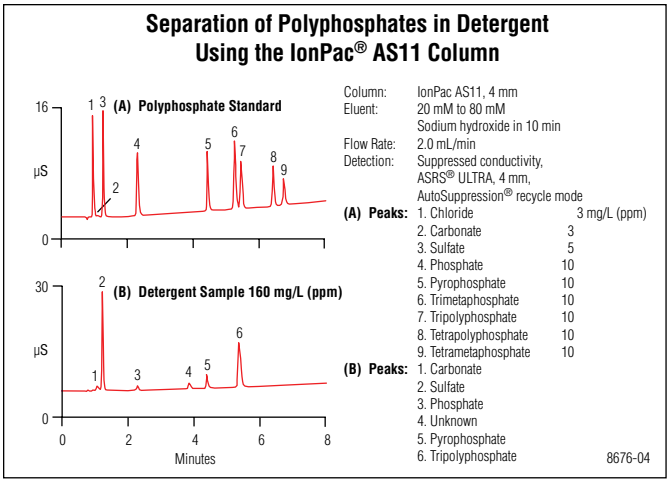
The AS11 is designed for fast profiling of inorganic anions and organic acid anions in foods, beverages, chemical process solutions, wastewater, brines, and power plant waters. The AS11 column can resolve a large number of inorganic anions and organic acids in approximately 15 minutes.



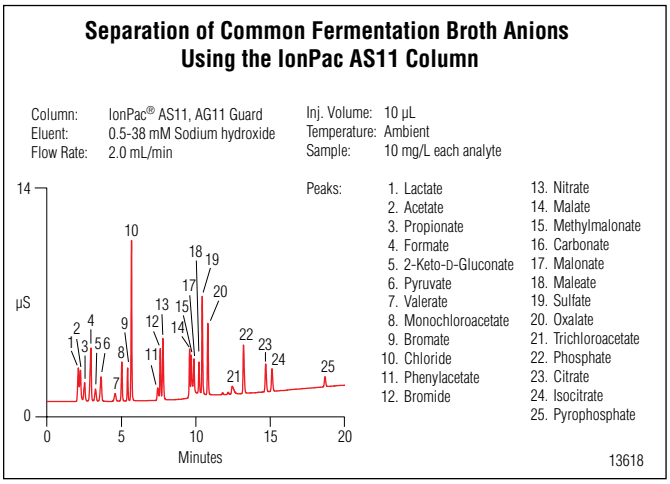
Determination of organic acids and inorganic anions using the IonPac AS11 column.



Separation of polarizable anions using the IonPac AS11 column.



Separation of polarizable anions in detergent using the IonPac AS11 column.



Yeast fermentation broth culture (10-fold dilution) analyzed using the IonPac AS11.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS11 and AS11-HC Anion-Exchange Columns Data Sheet

Application Notes

AN 37: The Determination of Iodide in Milk Products

AN 71: Determination of Polyphosphates Using Ion Chromatography with Suppressed Conductivity Detection

AN 93: Determination of Trace Anions in Concentrated Bases Using AutoNeutralization Pretreatment/Ion Chromatography

AN 104: Analysis of Personal Care Products by Ion Chromatography

AN 107: Ions In Physiological Fluids

AN 112: Determination of Nitrate and Nitrite in Meat Using High-Performance Anion-Exchange Chromatography

AN 113: Determination of Trace Anions in High Purity Waters by High Volume/Direct Injection Ion Chromatography

AN 114: Determination of Trace Anions in High-Purity Waters Using Direct Injection and Two-Step Isocratic Ion Chromatography

AN 116: Quantification of Anions in Pharmaceuticals

AN 121: Analysis of Low Concentrations of Perchlorate in Drinking Water and Ground Water by Ion Chromatography

AN 123: The Determination of Inorganic Anions and Organic Acids in Fermentation Broths

AN 161: Determination of Metal Cyanide Complexes by Ion Chromatography with On-Line Sample Preconcentration and UV Absorbance Detection

AN 164: Assay for Citrate and Phosphate in Pharmaceutical Formulations

Application Updates

AU 122: The Determination of Iodide in Brine

AU 140: The Determination of Iodide in Urine

AU 147: Direct Determination of Metal Cyanides by Ion Chromatography with UV Absorbance Detection

AU 149: Determination of Metal Cyanide Complexes in Solid Wastes by Anion-Exchange Chromatography with UV Absorbance Detection

Technical Notes

TN 48: Determination of Trace Anions in High-Purity Water by High-Volume Direct Injection with the EG40

Ordering Information

Analytical Columns	
IonPac AS11 Analytical Column (4 × 250 mm)	044076
IonPac AS11 Analytical Column (2 × 250 mm)	044077

Guard Columns	
IonPac AG11 Guard Column (4 × 50 mm)	044078
IonPac AG11 Guard Column (2 × 50 mm)	044079

IonPac AS10

For isocratic and gradient separation of inorganic anions and organic acids

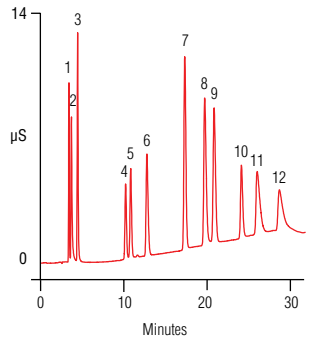
The IonPac AS10 is a high-capacity hydroxide-selective, anion-exchange column designed for isocratic and gradient separation of inorganic anions and organic acids. The column provides excellent resolution of weakly retained low-molecular-weight aliphatic acids. The high capacity of the AS10 permits the analysis of trace-level analytes in high-ionic-strength matrices.

- Use the AS10 column for analysis of inorganic anions in high nitrate samples

The column provides excellent resolution of weakly retained low-molecular-weight aliphatic acids. The selectivity and high capacity of the AS10 permits the analysis of trace-level analytes in high-ionic-strength matrices. The AS10 resin strongly retains nitrate, which makes this column well suited for the analysis of trace anions in nitric acid and nitrate salts.

Use with the Eluent Generator for simplified eluent preparation for applications using less than 100 mN hydroxide. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS10 column.

Gradient Separation of Organic Acids and Inorganic Anions



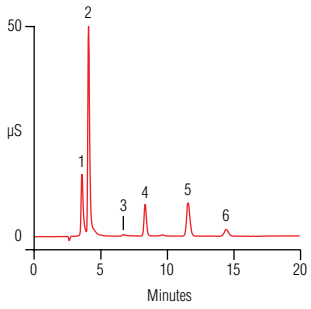
Column: IonPac® AS10, 4-mm
Eluent: 50–124 mM Sodium hydroxide in 30 min
Flow Rate: 1.0 mL/min
Inj. Volume: 20 µL
Detection: Suppressed conductivity

Peaks:		
	1. Fluoride	1.2 mg/L (ppm)
	2. Acetate	30
	3. Formate	5
	4. Selenite	10
	5. Chloride	1.8
	6. Nitrite	9
	7. Sulfate	10
	8. Oxalate	10
	9. Selenate	10
	10. Phosphate	9
	11. Bromide	10
	12. Nitrate	6

7438

Separation of common organic and inorganic anions on the IonPac AS10 using a hydroxide gradient.

Analysis of Methyldiethanolamine for Corrosive Anions

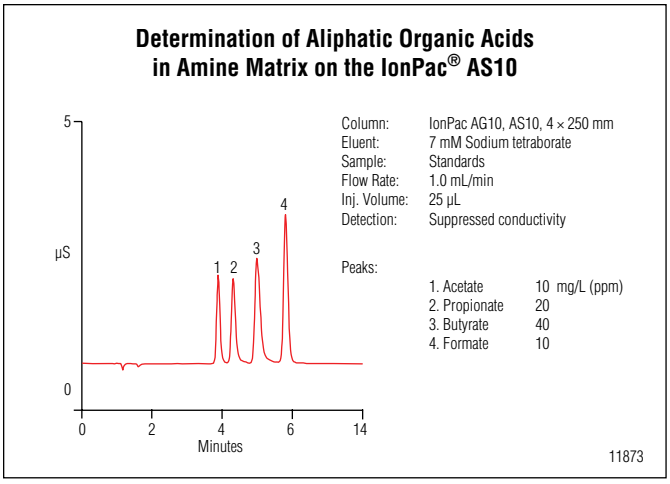


Column: IonPac® AG10, AS10, 4-mm
Eluent: 100 mM Sodium hydroxide
Flow Rate: 1.0 mL/min
Detection: Suppressed conductivity
Inj. Volume: 25 µL
Sample: Lean MDEA, 1:10 dilution

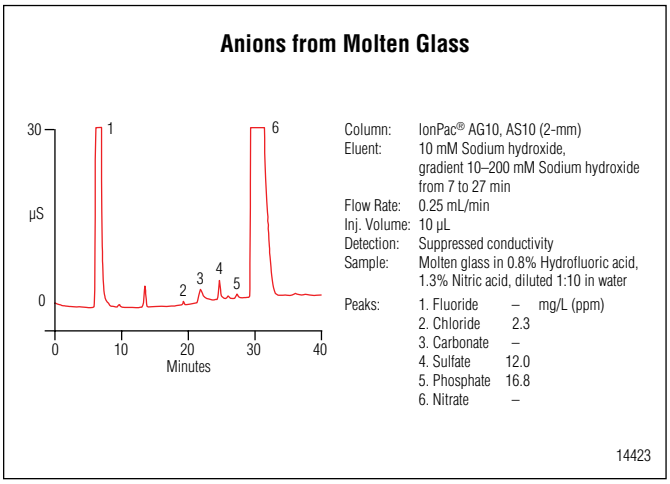
Peaks:		
	1. Acetate	48.0 mg/L (ppm)
	2. Formate	54.0
	3. Carbonate	–
	4. Chloride	5.9
	5. Sulfate	12.0
	6. Oxalate	3.5

12370-01

Analysis of methyldiethanolamine for corrosive anions using the IonPac AS10 column.



Determination of aliphatic organic acids in amine matrix on the IonPac AS10.



Anions in molten glass using the IonPac AS10 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS10 Anion-Exchange Column and the IonPac AC10 Concentrator Column Data Sheet

Application Notes

AN 78: Determination of Trace Anions in Concentrated Hydrofluoric Acid

AN 85: Determination of Trace Anions in Organic Solvents

Technical Notes

TN 46: Determination of Trace Anions in Concentrated Glycolic Acid

Ordering Information

Analytical Columns

IonPac AS10 Analytical Column (4 × 250 mm) 043118
IonPac AS10 Analytical Column (2 × 250 mm) 043123

Guard Columns

IonPac AG10 Guard Column (4 × 50 mm) 043119
IonPac AG10 Guard Column (2 × 50 mm) 043124

Carbonate Eluent Anion-Exchange Packed Columns

Anion-exchange columns optimized for use with carbonate/bicarbonate eluent

Dionex carbonate eluent columns provide well-characterized isocratic separations, including regulated methods for drinking and wastewater. Carbonate eluent columns are available in a wide range of capacities and are compatible with RFIC-EG and RFIC-ER systems.



IonPac AS23: High-capacity, carbonate eluent anion-exchange column for the analysis of oxyhalides and the common inorganic anions.

IonPac AS22-Fast: The IonPac AS22-Fast is the product of more than 20 years of column development, and is a key complement to our award-winning Reagent-Free IC system.

IonPac AS22: High capacity and resolution, carbonate eluent anion-exchange column recommended for the fast, isocratic separation of inorganic anions.

IonPac AS14: Moderate-capacity, carbonate eluent anion-exchange column designed for the fast, isocratic separation of inorganic anions.

IonPac AS14A: High-capacity, carbonate eluent anion-exchange column designed for the fast, isocratic separation of inorganic anions.

IonPac AS12A: Carbonate eluent anion-exchange column designed for the fast separation of inorganic anions offering excellent retention of fluoride

IonPac AS9-HC: High-capacity carbonate eluent anion-exchange column for the analysis of inorganic anions and oxyhalides.

IonPac AS9-SC: Carbonate eluent anion-exchange column designed for the fast, isocratic separation of inorganic anions and oxyhalides.

IonPac AS4A-SC: Carbonate eluent anion exchange column for the fast, isocratic separation of inorganic anions in drinking water and wastewater.

IonPac AS23

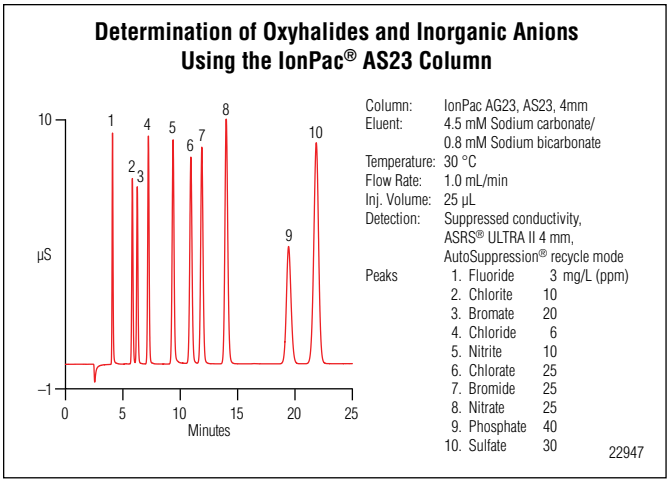
Precise, isocratic analysis of trace oxyhalides and the common inorganic anions

The AS23 carbonate eluent anion-exchange column is specifically designed for trace bromate in drinking water. Its high capacity and selectivity enables determination of bromate in drinking water at the low µg/L level. The AS23 meets the performance requirements of US EPA Methods 300.0 and 300.1.

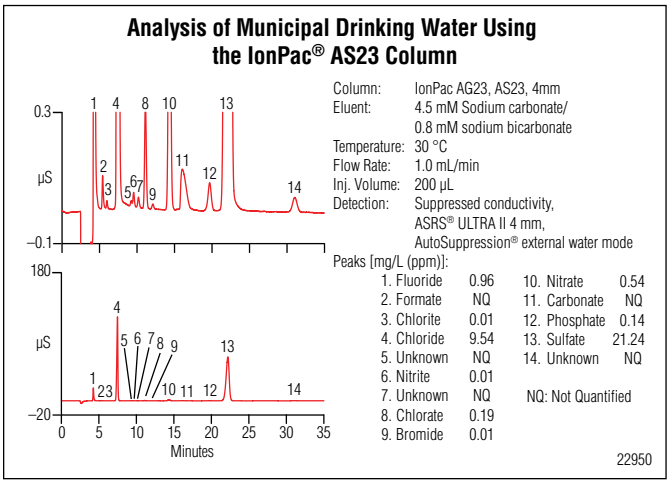
- Optimized for isocratic carbonate/bicarbonate eluent
- Recommended column for trace bromate in drinking water matrices
- Meets performance requirements specified in US EPA Methods 300.0 and 300.1
- Ideal alternative for AS9-HC oxyhalide and inorganic anion applications
- Simple, accurate eluent preparation with the AS23 Eluent Concentrate
- Optimized for a 30 °C operating temperature to ensure reproducible retention times
- Compatible with organic solvents to enhance analyte solubility

The AS23 is designed for the analysis of oxyhalides and the common inorganic anions including fluoride, chlorite, bromate, chloride, nitrite, bromide, chlorate, nitrate, phosphate, and sulfate in drinking water, ground water, wastewater, and other diverse sample matrices.

The AS23 is the newest carbonate eluent column recommended for the analysis of oxyhalides including bromate. It can be used in combination with the Eluent Generator and the Electrolytic pH Modifier (EPM) which automatically produces potassium carbonate/bicarbonate eluents from water. The AS23 is an ideal alternative, using carbonate-bicarbonate eluents, for AS9-HC applications.

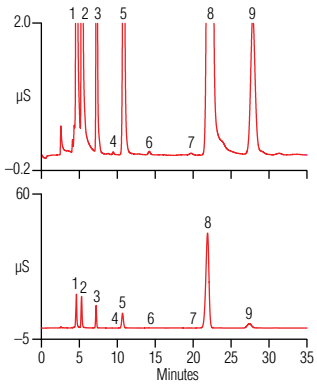


Determination of oxyhalides and inorganic anions using an IonPac AS23 column.



Determination of oxyhalides and inorganic anions in a municipal drinking water sample using an IonPac AS23 column.

Analysis of a Chemical Plant Wastewater Sample Using the IonPac® AS23 Column



Column:	IonPac AG23, AS23, 4mm
Eluent:	4.5 mM Sodium carbonate/ 0.8 mM sodium bicarbonate
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	2.5 µL
Detection:	Suppressed conductivity, ASRS® ULTRA II 4 mm, AutoSuppression® recycle mode

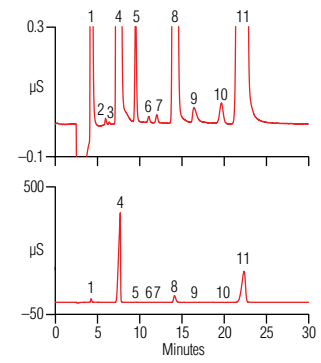
Peaks:		mg/L (ppm)
1.	Acetate	877.8
2.	Formate	183.2
3.	Chloride	61.8
4.	Nitrite	0.6
5.	Chlorate	213.8
6.	Nitrate	1.5
7.	Phosphate	1.4
8.	Sulfate	1211.1
9.	Unknown	NQ

NQ: Not Quantified

22948

Separation of inorganic anions, oxyhalides, and organic acids in a chemical wastewater sample using an IonPac AS23 column.

Determination of Trace Concentrations of Bromate Using the IonPac® AS23 Column



Column:	IonPac AG23, AS23, 4mm
Eluent:	4.5 mM Sodium carbonate/ 0.8 mM sodium bicarbonate
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Inj. Volume:	200 µL
Detection:	Suppressed Conductivity, ASRS® ULTRA II 4 mm, AutoSuppression® external water mode

Peaks:		mg/L (ppm)
1.	Fluoride	1.0
2.	Chlorite	0.01
3.	Bromate	0.005
4.	Chloride	50
5.	Nitrite	0.1
6.	Chlorate	0.01
7.	Bromide	0.01
8.	Nitrate	10
9.	Carbonate	50
10.	Phosphate	0.1
11.	Sulfate	50

22949

Determination of trace concentrations of bromate using the IonPac AS23 column with a large-loop injection.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS23 Datasheet

Application Notes

AN 184: Determination of Trace Concentrations of Chlorite, Bromate, and Chlorate in Bottled Natural Mineral Waters

Ordering Information

Analytical Columns

IonPac AS23 Analytical Column (2 × 250 mm) 064145

IonPac AS23 Analytical Column (4 × 250 mm) 064149

Guard Columns

IonPac AG23 Guard Column (2 × 50 mm) 064143

IonPac AG23 Guard Column (4 × 50 mm) 064147

IonPac AS22-Fast

Designed for compliance to US EPA Method 300.0 (A) and 300.1 in the monitoring of inorganic anions

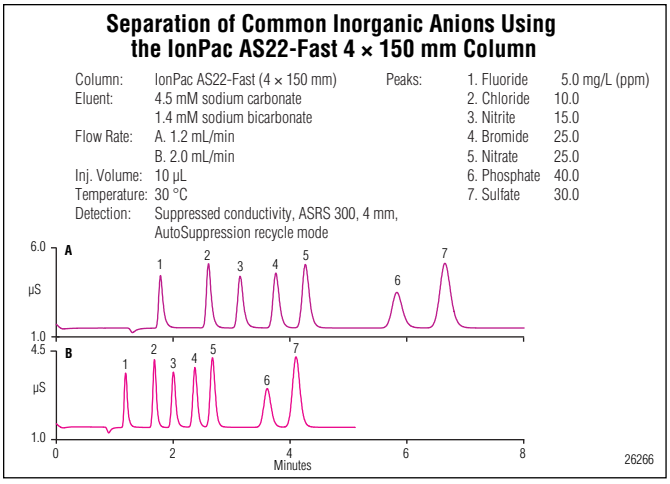
Designed specifically for compliance monitoring of inorganic anions in accordance with US EPA Method 300.0 (A) and 300.1, the IonPac AS22-Fast represents the culmination of more than 20 years of column development, and is a key complement to our award-winning Reagent-Free IC system.

- Super-Fast isocratic separation of the common inorganic anions in under 5 minutes
- Carbonate peak well-resolved from the common inorganic anions
- Same selectivity as AS22 column
- Meets performance requirements specified in US EPA Method 300.0 (A)
- Fast alternative for AS4A-SC, AS12A, AS14, AS14A, and AS22 inorganic anion applications
- Simple, accurate eluent preparation with the AS22 Eluent Concentrate
- Optimized for a 30 °C operating temperature to ensure reproducible retention times

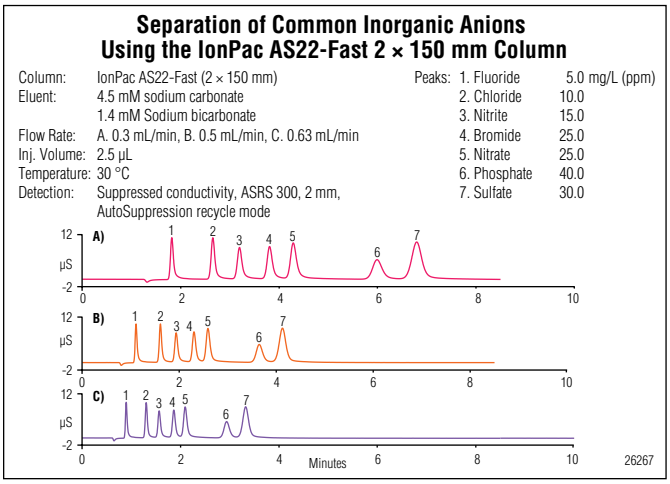
The IonPac AS22-Fast is designed for the fast determination of inorganic anions and low molecular weight organic acids including fluoride, acetate, formate, chloride, nitrite, bromide, nitrate, phosphate, and sulfate. The IonPac AS22-Fast can be used with isocratic carbonate/bicarbonate eluents and suppressed conductivity detection. Common inorganic anions can easily be separated in a variety of sample matrices including drinking water, wastewater, process streams, and scrubber solutions.

The IonPac AS22-Fast can be used in combination with the Eluent Generator and the Electrolytic pH Modifier (EPM) which automatically produce potassium carbonate/bicarbonate eluents from water. The IonPac AS22-Fast column is the newest carbonate eluent column recommended for super fast analysis of inorganic anions and is a faster alternative, using carbonate-bicarbonate eluents, for AS4A-SC, AS12A, AS14, AS14A, and AS22 inorganic anion applications.

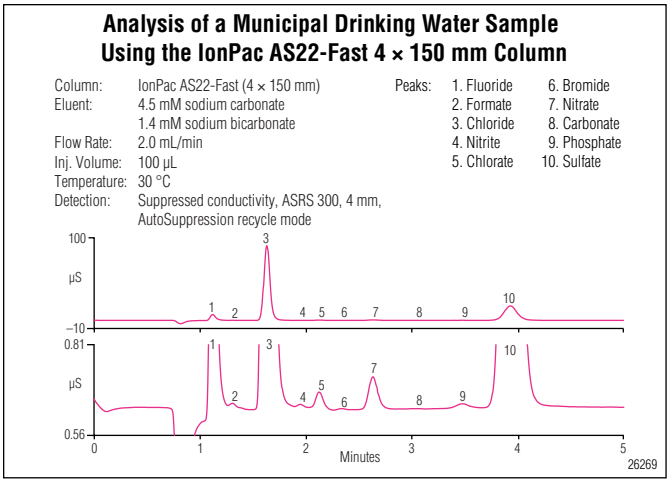
Note: *Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS22-Fast column for eluent suppression.*



Determination of oxyhalides and inorganic anions using an IonPac AS23 column.



Determination of oxyhalides and inorganic anions in a municipal drinking water sample using an IonPac AS23 column.



Separation of inorganic anions, oxyhalides, and organic acids in a chemical wastewater sample using an IonPac AS23 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac AS22 Datasheet

Ordering Information

Analytical Columns

IonPac AS22-Fast Analytical Column (4 × 150 mm) 072782
IonPac AS22-Fast Analytical Column (2 × 150 mm) 072783

Guard Columns

IonPac AG22-Fast Guard Column (2 × 30 mm) 072785
IonPac AG22-Fast Guard Column (4 × 30 mm) 072784

Anion Eluent Concentrates

AS22 Eluent Concentrate (100 x), 250 mL 063965

IonPac AS22

Fast analysis of common inorganic anions

Designed specifically for compliance monitoring of inorganic anions in accordance with US EPA Method 300.0 (A) and 300.1, the IonPac AS22 represents the culmination of more than 20 years of column development, and is a key complement to our award-winning Reagent-Free IC system.

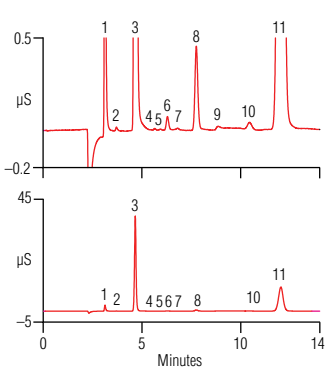
- Fast isocratic separation of the common inorganic anions in 8 minutes
- Isocratic separation of inorganic anions in complex sample matrices in 12 minutes
- Carbonate peak well-resolved from the common inorgainc anions
- Meets performance requirements specified in US EPA Method 300.0 (A)
- Ideal alternative for AS4A-SC, AS12A, AS14, and AS14A inorganic anion applications
- Simple, accurate eluent preparation with the AS22 Eluent Concentrate
- Optimized for a 30 °C operating temperature to ensure reproducible retention times

The AS22 is designed for the determination of inorganic anions and low molecular weight organic acids including fluoride, acetate, formate, chloride, nitrite, bromide, nitrate, phosphate, and sulfate. The AS22 can be used with isocratic carbonate/bicarbonate eluents and suppressed conductivity detection. Common inorganic anions can easily be separated in a variety of sample matrices including drinking water, wastewater, process streams, and scrubber solutions.

The AS22 can be used in combination with the Eluent Generator and the Electrolytic pH Modifier (EPM) which automatically produce potassium carbonate/bicarbonate eluents from water. The AS22 column is the newest carbonate eluent column recommended for fast analysis of inorganic anions and is an ideal alternative, using carbonate-bicarbonate eluents, for AS4A-SC, AS12A, AS14, and AS14A inorganic anion applications.

Note: *Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS22 column for eluent suppression.*

Determination of Inorganic Anions in a Municipal Drinking Water Sample Using the IonPac® AS22 Column



Column: IonPac AG22, AS22, 4 mm
Eluent: 4.5 mM Sodium carbonate/ 1.4 mM sodium bicarbonate
Temperature: 30 °C
Flow Rate: 1.2 mL/min
Inj. Volume: 25 µL
Detection: Suppressed conductivity, ASRS® ULTRA II 4 mm, AutoSuppression® recycle mode

Peaks:

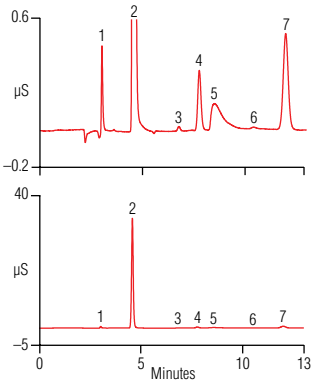
1.	Fluoride	0.84	mg/L (ppm)
2.	Formate	0.03	
3.	Chloride	15.59	
4.	Nitrite	0.01	
5.	Unknown	NQ	
6.	Chlorate	0.18	
7.	Bromide	0.02	
8.	Nitrate	0.89	
9.	Carbonate	NQ	
10.	Phosphate	0.22	
11.	Sulfate	20.45	

NQ: Not Quantified

22941

Common inorganic anions in a municipal drinking water sample can be separated in approximately 12 minutes.

Determination of Inorganic Anions in Carbonated Drinking Water Using the IonPac® AS22 Column



Column: IonPac AG22, AS22, 4 mm
Eluent: 4.5 mM Sodium carbonate/ 1.4 mM sodium bicarbonate
Temperature: 30 °C
Flow Rate: 1.2 mL/min
Inj. Volume: 10 µL
Detection: Suppressed conductivity, ASRS® ULTRA II 4 mm, AutoSuppression® recycle mode

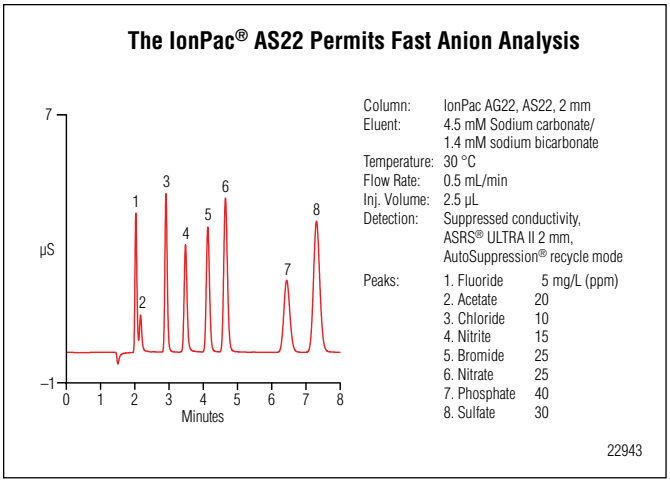
Peaks:

1.	Fluoride	0.49	mg/L (ppm)
2.	Chloride	61.38	
3.	Bromide	0.19	
4.	Nitrate	2.53	
5.	Carbonate	NQ	
6.	Phosphate	0.17	
7.	Sulfate	4.4	

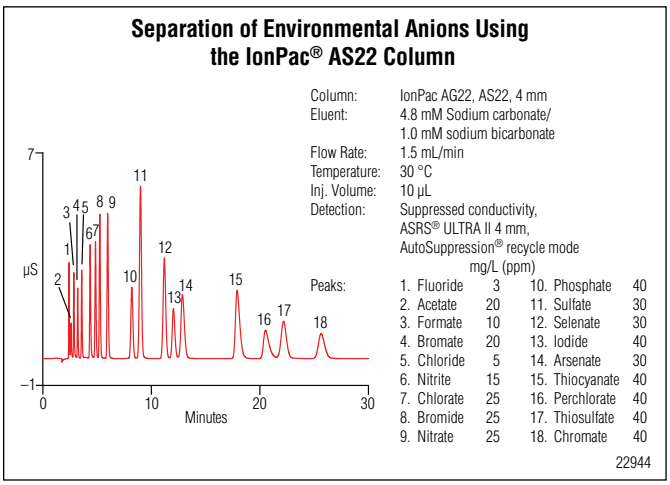
NQ: Not Quantified

22942

The unique selectivity of the AS22 column positions carbonate well away from the common inorganic anions.



The IonPac AS22 resin packing supports fast anion analysis.



Separation of 18 environmental anions is completed in under 30 minutes using the IonPac AS22 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS22 Datasheet

Application Updates

AU 161: Determination of Sulfate and Chloride in Ethanol Using Ion Chromatography

Ordering Information

Analytical Columns

IonPac AS22 Analytical Column (2 × 250 mm) 064137
IonPac AS22 Analytical Column (4 × 250 mm) 064141

Guard Columns

IonPac AG22 Guard Column (2 × 50 mm) 064135
IonPac AG22 Guard Column (4 × 50 mm) 064139

IonPac AS14

For the analysis of fluoride and other inorganic anions

The IonPac AS14 is designed for fast analysis of the common inorganic anions in diverse sample matrices.

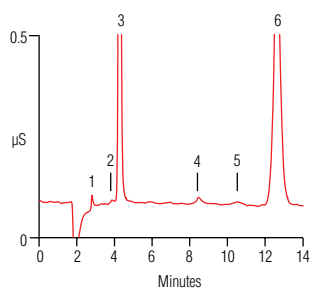
- Common inorganic anions are resolved in 13 minutes using an isocratic carbonate/bicarbonate eluent.
- Sodium tetraborate gradient optimizes difficult separations.
- The AS14 column meets or exceeds US EPA Method 300.0 (A) performance requirements.

The AS14 supports the separation of inorganic anions, including fluoride, chloride, nitrite, bromide, nitrate, phosphate, and sulfate using a carbonate/bicarbonate eluent coupled with suppressed conductivity detection. With the AS14, inorganic anions can be determined easily in drinking water, wastewater, foods and beverages, scrubber solutions, and other diverse sample matrices.

For simplified operation, use the AS14 Eluent Concentrate and the Combined Seven Anion Standard. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS14 column for low-noise operation.

Note: *See also the IonPac AS22 and AS22-Fast, the latest columns recommended for fast analysis of inorganic anions.*

Analysis of Municipal Drinking Water Using the IonPac® AS14



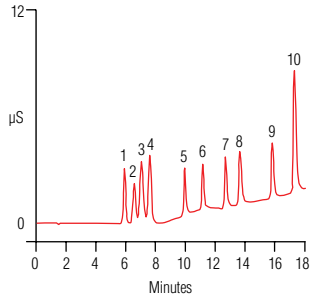
Column:	IonPac AG14, AS14, 4 mm
Eluent:	3.5 mM Sodium carbonate 1.0 mM Sodium bicarbonate
Flow Rate:	1.2 mL/min
Inj. Volume:	10 µL
Detection:	Suppressed conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® recycle mode
Sample:	Drinking water from Milpitas, CA

Peaks:		
	1. Fluoride	0.03 mg/L (ppm)
	2. Bicarbonate	-
	3. Chloride	3.12
	4. Nitrate	0.15
	5. Phosphate	0.04
	6. Sulfate	4.45

12125

The IonPac AS14 column is ideal for interference-free determination of inorganic anions, including fluoride, in drinking water.

Sodium Tetraborate Gradient Separation of Anions Using the IonPac® AS14 Column

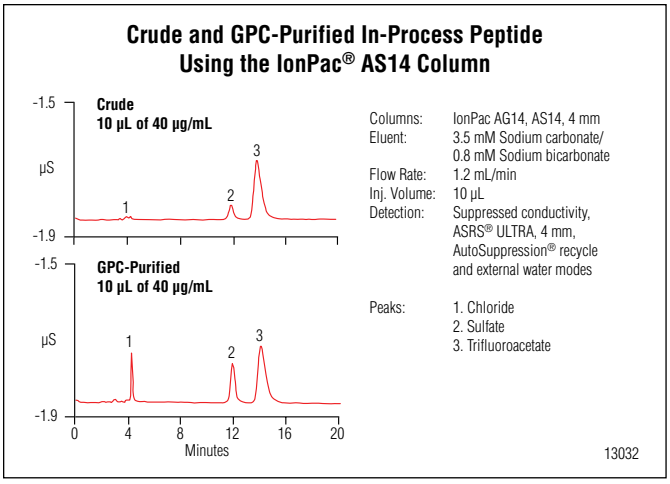


Column:	IonPac AG14, AS14, 4 mm
Eluent:	2 mM Sodium tetraborate for 6 min; 10-min gradient to 17.5 mM Sodium tetraborate
Flow Rate:	1.5 mL/min
Inj. Volume:	25 µL
Detection:	Suppressed conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® external water mode

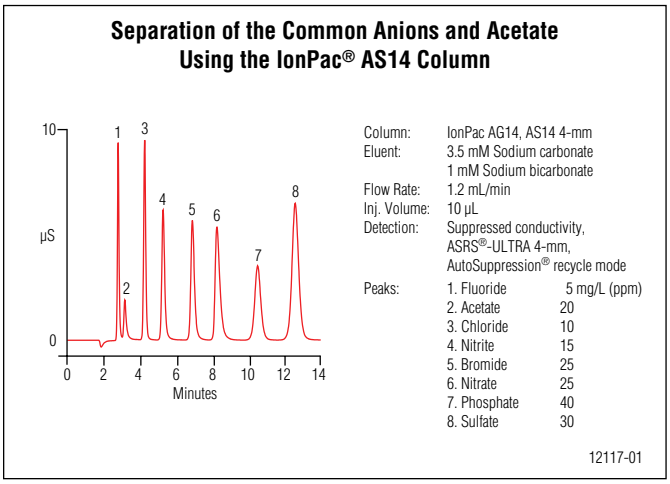
Peaks:		
	1. Fluoride	5 mg/L (ppm)
	2. Glycolate	10
	3. Acetate	20
	4. Formate	10
	5. Chloride	3
	6. Nitrite	10
	7. Bromide	10
	8. Nitrate	10
	9. Phosphate	15
	10. Sulfate	15

12123-01

Separation of weakly retained anions using a sodium tetraborate gradient elution.



Determination of anionic counterions present in a gel permeation purified peptide.



Isocratic separation of inorganic anions on an IonPac AS14 column in less than 13 minutes.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS14 Anion-Exchange Column Data Sheet

Application Notes

AN 115: Determination of Trifluoroacetic Acid (TFA) in Peptides

AN 116: Quantification of Anions in Pharmaceuticals

AN 133: Determination of Inorganic Anions in Drinking Water by Ion Chromatography

AN 135: Determination of Inorganic Anions in Wastewater by Ion Chromatography

AN 166: Application of Eluent Generation for Trace Anion Analysis of Borated Waters

AN 2: Determination of Nitrate and Sulfate Collected on Air Filters

AN 2: Determination of Nitrate and Sulfate Collected on Air Filters

Technical Notes

TN 47: Achieving Low Baseline Noise for Anion Determination by Suppressed Conductivity Using Carbonate Eluents

Ordering Information

Analytical Columns

IonPac AS14 Analytical Column (4 × 250 mm) 046124
IonPac AS14 Analytical Column (2 × 250 mm) 046129

Guard Columns

IonPac AG14 Guard Column (4 × 50 mm) 046134
IonPac AG14 Guard Column (2 × 50 mm) 046138

IonPac AS14A

Fast analysis of the common inorganic anions in diverse sample matrices

The IonPac AS14A anion-exchange column is a carbonate-based column for fast analysis of the common inorganic anions in diverse sample matrices. The AS14A meets the performance requirements specified in US EPA Method 300.0 (A).

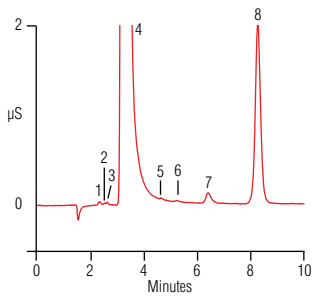
- High-efficiency and fast analysis (8 minutes)
- High-capacity applications (13 minute run time)
- Improved peak shape, efficiency, and pH stability
- Meets or exceeds US EPA Method 300.0 (A) performance requirements
- Simplified operation with AS14A Eluent Concentrate and Combined Seven Anion Standard

The AS14A is designed for the separation of inorganic anions, including fluoride, chloride, nitrite, bromide, nitrate, phosphate, and sulfate, using a carbonate/bicarbonate eluent coupled with suppressed conductivity detection. The inorganic anions can easily be determined in drinking water, wastewater, foods and beverages, scrubber solutions, and other diverse sample matrices.

For simplified operation use the AS14A with AS14A Eluent Concentrate and the Combined Seven Anion Standard. Use the ASRS 300 suppressor with the AS14A column for low-noise operation.

Note: *See also the IonPac AS22 and AS22-Fast, the newest carbonate eluent columns recommended for fast analysis of inorganic anions.*

Analysis of a Wastewater Sample for Anions Using the IonPac® AS14A Column

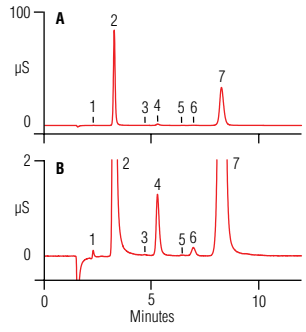


Column:	IonPac AG14A, AS14A-5µm (3 × 150 mm)
Eluent:	8.0 mM Sodium carbonate 1.0 mM Sodium bicarbonate
Temperature:	30 °C
Flow Rate:	0.5 mL/min
Inj. Volume:	5 µL
Detection:	Suppressed conductivity, ASRS® ULTRA, 2 mm, AutoSuppression® recycle mode
Sample Prep:	Diluted 1:100
Peaks:	1. Unknown 2. Acetate 3. Formate 4. Chloride 5. Bromide 6. Nitrate 7. Phosphate 8. Sulfate

15969

Determination of inorganic anions in a wastewater sample from a chemical manufacturer using an IonPac AS14A-5µm (3 × 150 mm) column.

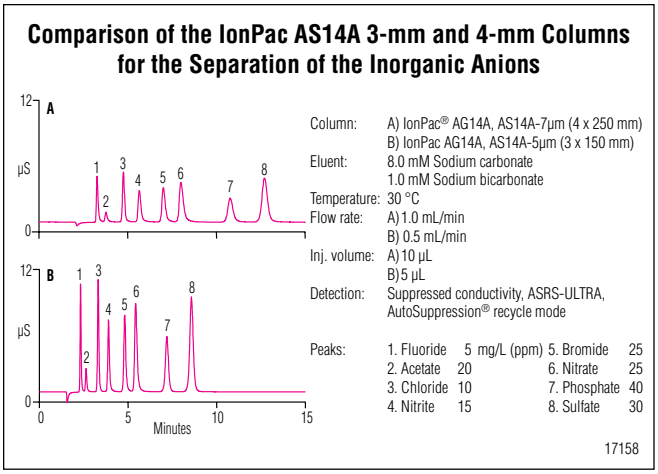
Analysis of Municipal Drinking Water on the IonPac® AS14A



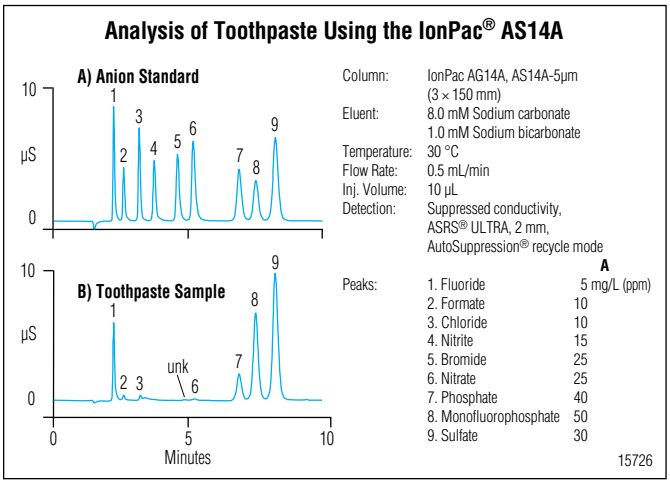
Column:	IonPac AG14A, AS14A-5µm (3 × 150 mm)	
Eluent:	8.0 mM Sodium carbonate 1.0 mM Sodium bicarbonate	
Temperature:	30 °C	
Flow Rate:	0.5 mL/min	
Inj. Volume:	12.5 µL	
Detection:	Suppressed conductivity, ASRS®, AutoSuppression® recycle mode	
Sample:	Drinking water from Sunnyvale,CA	
Peaks:	1. Fluoride	0.06 mg/L (ppm)
	2. Chloride	42.0
	3. Bromide	0.03
	4. Nitrate	3.2
	5. Chlorate	0.14
	6. o-Phosphate	1.05
	7. Sulfate	61.0

15724

Determination of inorganic anions in municipal drinking water using the IonPac AS14A-5µm (3 × 150 mm) column.



Comparison of the separation of inorganic anions using 3 mm and 4 mm IonPac AS14A columns.



Determination of anionic additives in toothpaste using an IonPac AS14A-5µm (3 × 150 mm) column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS14A Anion-Exchange Column Data Sheet

Application Notes

AN 140: Fast Analysis of Anions in Drinking Water by Ion Chromatography

Ordering Information

Analytical Columns

IonPac AS14A-7µm Analytical Column (4 × 250 mm) 056904
IonPac AS14A-5µm Analytical Column (3 × 150 mm) 056901

Guard Columns

IonPac AG14A-7µm Guard Column (4 × 50 mm) 056897
IonPac AG14A-5µm Guard Column (3 × 30 mm) 056899

IonPac AS12A

Fast separation of inorganic anions, with excellent retention of fluoride

The IonPac AS12A anion-exchange column provides fast analysis of common inorganic anions and oxyhalides, such as chlorite and bromate, in environmental waters. This column is also useful for trace chloride and sulfate in high-carbonate matrices.

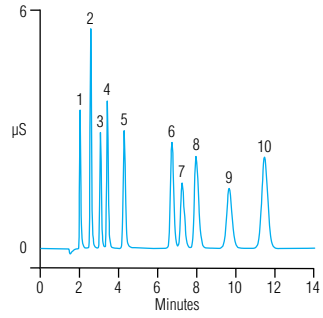
- Provides fast analysis of inorganic anions and oxyhalides at similar concentrations
- Resolves trace chloride and sulfate high-carbonate samples

The AS12A is a moderate-capacity, carbonate eluent anion-exchange column designed for the fast, isocratic separation of inorganic anions and oxyhalides, including fluoride, chlorite, bromate, chloride, nitrite, bromide, chlorate, nitrate, phosphate, and sulfate in drinking water, wastewater, groundwater, and other diverse sample matrices.

The common inorganic anions and oxyhalides can be determined in less than 12 min using an isocratic carbonate/bicarbonate eluent coupled with suppressed conductivity detection. It resolves chloride from high concentrations of carbonate. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS12A column.

Note: *For trace bromate in ozonated drinking water, use the high-capacity IonPac AS23, recommended for determination of oxyhalides and inorganic anions.*

Separation of Oxyhalides Using the IonPac® AS12A Column



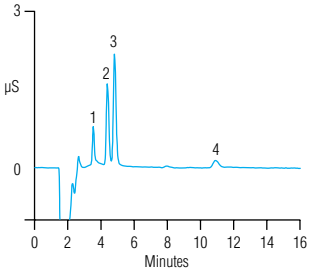
Column:	IonPac AG12A, AS12A 4-mm
Eluent:	2.7 mM Sodium carbonate 0.3 mM Sodium bicarbonate
Flow Rate:	1.5 mL/min
Inj. Volume:	10 µL
Detection:	Suppressed conductivity, ASRS-ULTRA 4-mm, AutoSuppression recycle mode

Peaks:		
1.	Fluoride	3.0 mg/L (ppm)
2.	Chlorite	20.0
3.	Bromate	20.0
4.	Chloride	5.0
5.	Nitrite	10.0
6.	Bromide	20.0
7.	Chlorate	20.0
8.	Nitrate	20.0
9.	Phosphate	30.0
10.	Sulfate	20.0

10191

Isocratic separation of inorganic anions and oxyhalides using the IonPac AS12A column.

Determination of Anions in High Purity Solvent

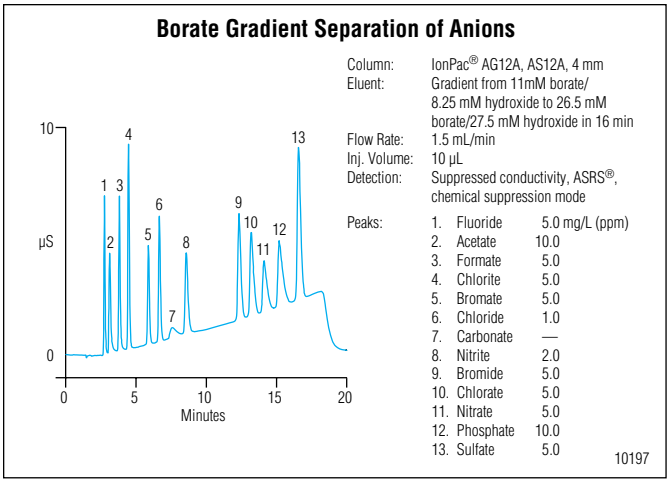


Column:	IonPac® AS12A and AG12A
Eluent:	2.7 mM Sodium carbonate 0.3 mM Sodium bicarbonate
Flow Rate:	1.5 mL/min
Detection:	Suppressed conductivity, AutoSuppression® recycle mode
Sample:	4.5 mL Electronics grade Isopropanol concentrated on TAC-LP1 1.1 mL DI water wash

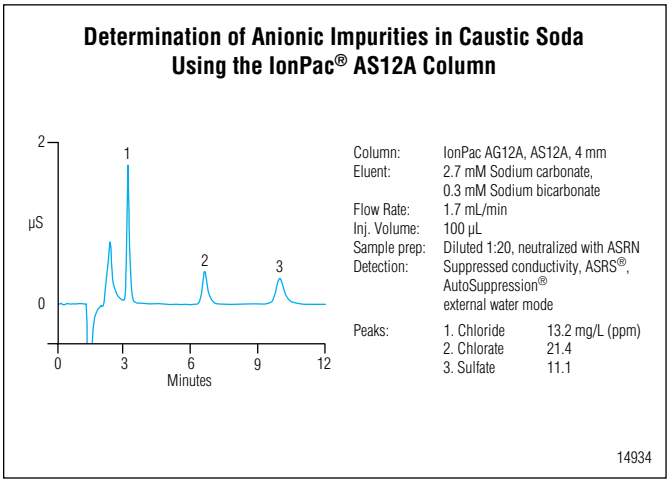
Peaks:		
1.	Chloride	4 µg/L (ppb)
2.	Unidentified	—
3.	Unidentified	—
4.	Sulfate	5

10198

Isocratic separation of anions in high-purity solvents using the IonPac AS12A column.



Borate gradient separation of anions using the IonPac AS12A column.



Determination of anionic impurities in caustic soda using the IonPac AS12A column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS12A Anion-Exchange Column Data Sheet

Ordering Information

Analytical Columns

IonPac AS12A Analytical Column (4 × 200 mm) 046034
IonPac AS12A Analytical Column (2 × 200 mm) 046055

Guard Columns

IonPac AG12A Guard Column (4 × 50 mm)..... 046035
IonPac AG12A Guard Column (2 × 50 mm)..... 046056

IonPac AS9-HC

High-capacity column for the analysis of inorganic anions and oxyhalides including bromate.

Specifically designed for trace bromate in drinking water, the AS9-HC is the specified column for U.S EPA Methods 300.1 and 317.0.

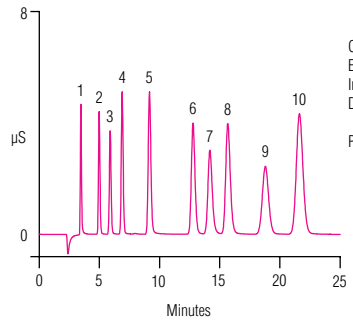
- For the analysis of oxyhalides and inorganic anions in complex sample matrices
- Simple, isocratic method for trace bromate (5 µg/L) in ozonated drinking water matrices
- Ideal for difficult applications, such as trace nitrite in complex sample matrices
- Improved separation of bromate/chloride, chloride/nitrite, chlorate/nitrate analyte pairs

The AS9-HC is a high-capacity carbonate eluent anion-exchange column with selectivity similar to the AS9-SC column. The AS9-HC also supports the analysis of oxyhalides and inorganic anions, including fluoride, chlorite, bromate, chloride, nitrite, bromide, chlorate, nitrate, phosphate, and sulfate. The AS9-HC is specified in validated methods such as US EPA Method 300.1 and 317.0 and meets or exceeds the performance requirements of these methods.

This column separates trace bromate in drinking water matrices using an isocratic carbonate eluent and a large-loop injection. The AS9-HC also offers good retention of fluoride out of the water dip. The column's high capacity (190 µeq for 4 × 250 mm) increases retention time to approximately 22 min. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS9-HC column.

Note: *The AS23 is the newest carbonate eluent column recommended for the analysis of oxyhalides including bromate.*

Separation of Inorganic Anions and Oxyhalides Using the AS9-HC Column



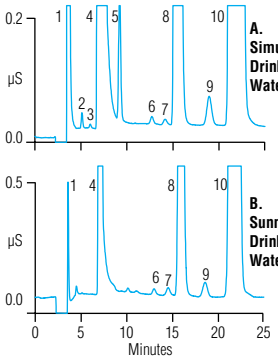
Column: IonPac AG9-HC, AS9-HC 4 mm
Eluent: 9.0 mM Sodium carbonate
Inj. Volume: 25 µL
Detection: Suppressed conductivity, ASRS-II, AutoSuppression, recycle mode

Peaks:		
1.	Fluoride	3 mg/L
2.	Chlorite	10
3.	Bromate	20
4.	Chloride	6
5.	Nitrite	15
6.	Bromide	25
7.	Chlorate	25
8.	Nitrate	25
9.	Phosphate	40
10.	Sulfate	30

12966

Separation of inorganic anions and oxyhalides using the AS9-HC column.

Determination of Trace Levels of Oxyhalides and Bromide in Simulated Drinking Water Using the AS9-HC Column



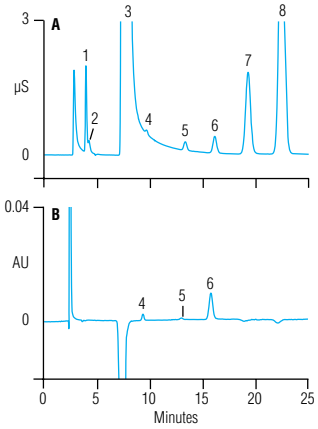
Column: IonPac AG9-HC, AS9-HC
Eluent: 9.0 mM Sodium bicarbonate/
Flow Rate: 1.0 mL/min
Injection: 200 µL
Detection: Suppressed conductivity ASRS-II, AutoSuppression® recycle mode

Peaks:		A	B
1.	Fluoride	1.0	0.04 mg/L (ppm)
2.	Chlorite	0.01	
3.	Bromate	0.005	
4.	Chloride	50.0	16.2
5.	Nitrite	0.1	
6.	Bromide	0.01	0.03
7.	Chlorate	0.01	0.04
8.	Nitrate	10.0	3.9
9.	Phosphate	0.1	0.15
10.	Sulfate	50	18.3

12967-01

Determination of trace bromate in drinking water using the AS9-HC column.

Analysis of Wastewater for Anions Using the IonPac® AS9-HC Column



Column: IonPac AG9-HC, AS9-HC, 4-mm
Eluent: 9.0 mM Sodium carbonate
Flow Rate: 1.0 mL/min
Inj. Volume: 25 µL
Detection A: Suppressed conductivity, ASRS®, AutoSuppression® recycle mode
Detection B: UV at 214 nm

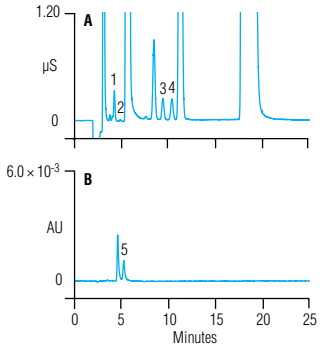
Peaks:		A	B	
	1. Fluoride	1.14	—	mg/L (ppm)
	2. Acetate	—	—	
	3. Chloride	—	—	
	4. Nitrite	0.14	0.18	
	5. Bromide	0.82	0.79	
	6. Nitrate	1.47	1.58	
	7. Phosphate	21.1	—	
	8. Sulfate	30.3	—	

Sample: Synthetic wastewater containing 2000 mg/L chloride

14928

Analysis of wastewater for anions using the IonPac AS9-HC column.

Analysis of Spiked Tap Water Using EPA Method 317.0



Column: IonPac® AG9-HC, AS9-HC, 4 mm
Eluent: 9.0 mM Sodium carbonate
Flow Rate: 1.3 mL/min
Inj. Volume: 225 µL
Detector: **A)** Suppressed conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® external water
B) Absorbance, 450 nm
Postcolumn Reagent: *o*-Dianisidine
PCR Flow Rate: 0.7 mL/min
Postcolumn Heater: 60 °C

Peaks:		
A		
	1. Chlorite	109.4 µg/L (ppb)
	2. Bromate	11.92
	3. Bromide	135.0
	4. Chlorate	168.8
B		
	5. Bromate-UV	11.54

15696

Analysis of spiked tap water using EPA Method 317.0.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS9-SC and AS9-HC Anion-Exchange Columns Data Sheet

Application Notes

AN 135: Determination of Inorganic Anions in Wastewater by Ion Chromatography

AN 136: Determination of Inorganic Oxyhalide Disinfection Byproduct Anions and Bromide in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis

AN 149: Determination of Chlorite, Bromate, Bromide, and Chlorate in Drinking Water by Ion Chromatography with an On-Line-Generated Postcolumn Reagent for Sub-µg/L Bromate Analysis

AN 81: Ion Chromatographic Determination of Oxyhalides and Bromide at Trace Level Concentrations in Drinking Water Using Direct Injection

AN 85: Determination of Trace Anions in Organic Solvents

Technical Notes

TN 45: Determination of Trace Anions in Concentrated Hydrofluoric Acid

TN 46: Determination of Trace Anions in Concentrated Glycolic Acid

Ordering Information

Analytical Columns

IonPac AS9-HC Analytical Column (4 × 250 mm) 051786
IonPac AS9-HC Analytical Column (2 × 250 mm) 052244

Guard Columns

IonPac AG9-HC Guard Column (4 × 50 mm) 051791
IonPac AG9-HC Guard Column (2 × 50 mm) 052248

IonPac AS9-SC

For the fast isocratic separation of inorganic anions and oxyhalides

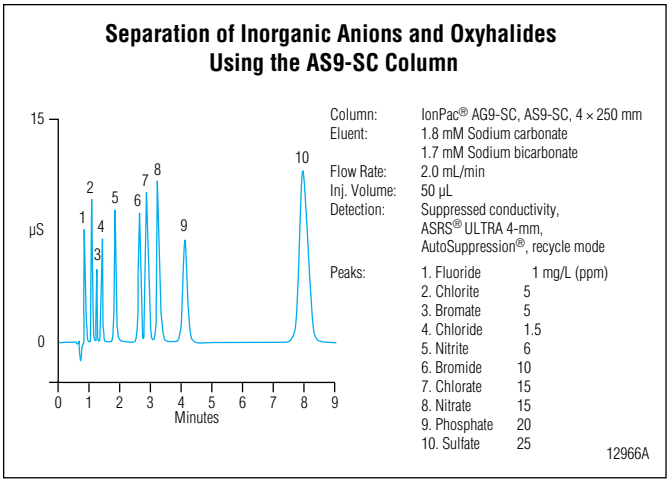
The AS9-SC is designed for the isocratic separation of oxyhalides and inorganic anions, including fluoride, chlorite, bromate, chloride, nitrite, bromide, chlorate, nitrate, phosphate, and sulfate in drinking water, wastewater, groundwater, and other diverse sample matrices.

- For fast analysis of oxyhalides and inorganic anions at similar concentrations
- Ideal for simple sample matrices

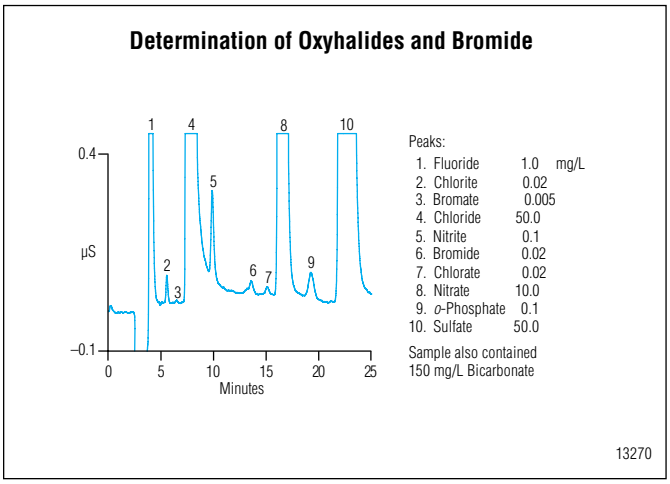
Common inorganic anions and oxyhalides can be determined in less than 10 minutes using an isocratic carbonate/bicarbonate eluent coupled with suppressed conductivity detection.

The AS9-SC column is specified in US EPA Method 300.0 (B), and meets or exceeds the performance requirements of this method. Use the Anion Self-Regenerating Suppressor (ASRS 300) with the AS9-SC column.

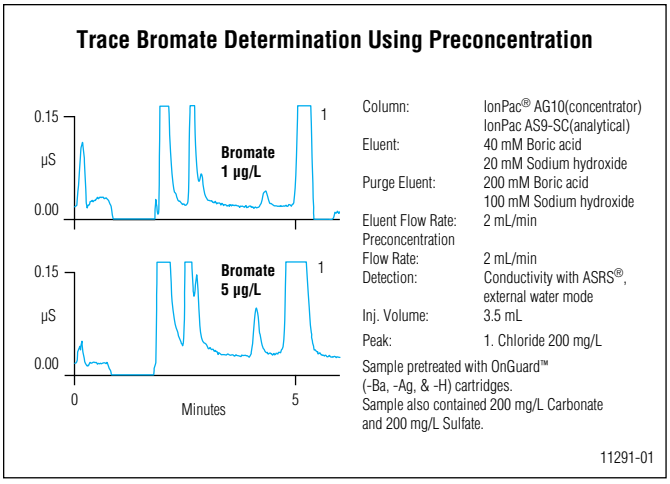
Note: *See also the AS23, the recommended column for the analysis of oxyhalides, including bromate.*



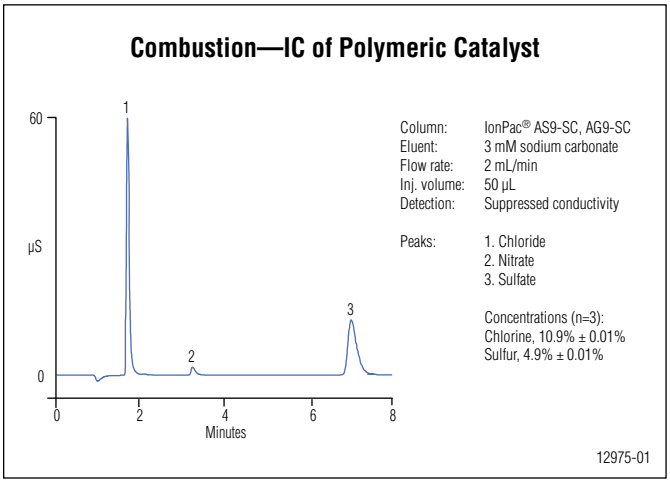
Separation of inorganic inions and oxyhaldies using the AS9-SC column.



Determination of oxyhalides and bromide in simulated drinking water.



Trace bromate determination using preconcentration.



Determination of chloride and sulfate in a polymeric catalyst using the AS9-SC column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS9-SC and AS9-HC Anion-Exchange Columns Data Sheet

Application Notes

AN 101: Trace Level Determination of Bromate in Ozonated Drinking Water Using Ion Chromatography

AN 51: Method for Determination of Anions in Sodium Hydroxide

Application Updates

AU 131: Determination of Nitrite and Nitrate in Drinking Water Using Chemically Suppressed Ion Chromatography

AU 132: Determination of Nitrite and Nitrate in Drinking Water Using Ion Chromatography with Direct UV Detection

Ordering Information

Analytical Columns

IonPac AS9-SC Analytical Column (4 × 250 mm) 043185

Guard Columns

IonPac AG9-SC Guard Column (4 × 50 mm)..... 043186

IonPac AS4A-SC

For the fast isocratic separation of inorganic anions in drinking water and wastewater

The IonPac AS4A-SC 2 mm and 4 mm anion-exchange columns are designed for the fast analysis of inorganic anions in environmental waters. The AS4A-SC was introduced in 1984 and has been the preferred column for inorganic anion analysis for many years. It is the specified column in US EPA Method 300.0 (A).

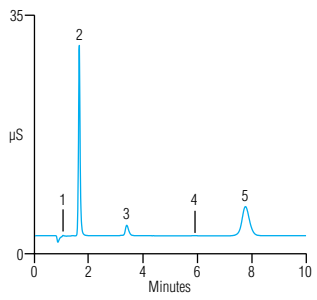
- Resolves inorganic anions in 8 min using an isocratic carbonate/bicarbonate eluent.
- Sodium tetraborate gradient optimizes difficult separations.
- Meets or exceeds US EPA Method 300.0 (A) performance requirements.
- Provides excellent performance for fast analysis of inorganic anions.

The IonPac AS4A-SC (solvent-compatible) is a low-capacity carbonate eluent anion-exchange column for the fast, isocratic separation of inorganic anions such as nitrate or sulfate, using a carbonate/bicarbonate eluent coupled with suppressed conductivity detection. Inorganic anions are easily determined in any liquid, including water, foods, and other diverse sample matrices.

Separation of the common inorganic anions can be achieved in less than 10 min using an isocratic carbonate/bicarbonate eluent. For simplified operation, use the AS4A-SC Eluent Concentrate and the Combined Seven Anion Standard. The Anion Self-Regenerating Suppressor (ASRS 300) is recommended for use with the AS4A-SC column.

Note: *The AS22 is the newest carbonate eluent column recommended for fast analysis of inorganic anions.*

Determination of Anions in Drinking Water Using the IonPac® AS4A-SC Column

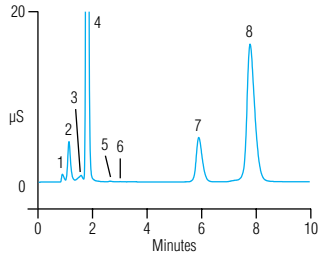


Column:	IonPac AG4A-SC, AS4A-SC, 4 mm
Eluent:	1.7 mM Sodium bicarbonate/ 1.8 mM Sodium carbonate
Flow Rate:	2.0 mL/min
Injection:	50 µL
Detection:	Suppressed conductivity, ASRS® ULTRA, 4 mm, AutoSuppression® recycle mode
Peaks:	1. Fluoride 0.03 mg/L (ppm) 2. Chloride 9.30 3. Nitrate 2.51 4. Phosphate 0.10 5. Sulfate 10.9
Sample:	Drinking water from Sunnyvale, CA

14579

Determination of inorganic anions in a drinking water sample using an IonPac AS4A-SC column.

Determination of Inorganic Anions in Wastewater Using the IonPac® AS4A-SC Column

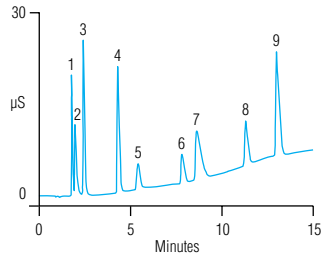


Column:	IonPac AG4A-SC, AS4A-SC, 4 mm
Eluent:	1.7 mM Sodium bicarbonate/ 1.8 mM Sodium carbonate
Flow Rate:	2.0 mL/min
Injection:	50 µL
Detection:	Suppressed conductivity ASRS® ULTRA, 4 mm, AutoSuppression® recycle mode
Peaks:	1. Unknown — 2. Fluoride 2.1 mg/L (ppm) 3. Carbonate — 4. Chloride 49 5. Bromide .037 6. Nitrate .034 7. Phosphate 28 8. Sulfate 35

14254

Determination of inorganic anions in a wastewater sample using an IonPac AS4A-SC column.

Tetraborate Gradient Separation of Anions Using the IonPac® AS4A-SC Column



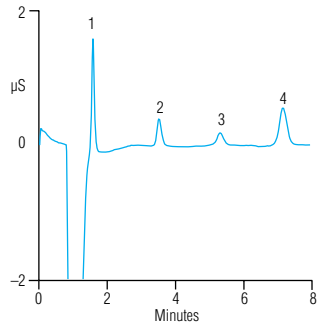
Column:	IonPac AS4A-SC, 2-mm
Flow Rate:	0.5 mL/min
Eluent:	1. DI H_2O
	2. 50 mM Sodium tetraborate
Gradient:	5 mM $Na_2B_4O_7$ to 28 mM $Na_2B_4O_7$ in 10 min
Sample Loop:	15 µL
Detector:	Suppressed Conductivity

Peaks:		5 mg/L (ppm)
	1. Fluoride	
	2. Acetate	18
	3. Formate	18
	4. Chloride	10
	5. Nitrite	5
	6. Bromide	10
	7. Nitrate	20
	8. Phosphate	20
	9. Sulfate	20

8236

Tetraborate gradient separation of anions using the IonPac AS4A-SC 2 mm column.

Trace Anions in Solvents Using the IonPac® AS4A Column



Column:	IonPac AS4A-SC 4-mm
Eluent:	1.7 mM Sodium bicarbonate / 1.8 mM Sodium carbonate
Flow Rate:	2 mL/min
Sample Loop:	250 µL
Detection:	Suppressed Conductivity
Sample:	50-ppb anions in 80% isopropanol
Peaks:	1. Chloride
	2. Nitrate
	3. Phosphate
	4. Sulfate

8238

Direct injection of anions in a solvent extract using the IonPac AS4A-SC column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS4A-SC Anion-Exchange Column Data Sheet

Application Notes

AN 133: Determination of Inorganic Anions in Drinking Water by Ion Chromatography

AN 135: Determination of Inorganic Anions in Wastewater by Ion Chromatography

AN 31: Determination of Anions in Acid Rain by Ion Chromatography

AN 36: Determination of Oxalate in Urine by Ion Chromatography

Ordering Information

Analytical Columns

IonPac AS4A-SC Analytical Column (2 × 250 mm)..... 043125

IonPac AS4A-SC Analytical Column (4 × 250 mm)..... 043174

Guard Columns

IonPac AG4A-SC Guard Column (4 × 50 mm)..... 043175

IonPac AG4A-SC Guard Column (2 × 50 mm)..... 043126

Specialty Anion-Exchange Packed Columns

Anion-exchange columns for special applications

These anion-exchange columns support special applications, such as non-suppressible eluents, in combination with a variety of detection modes, including amperometric and UV-VIS detection.



IonPac AS7: High-capacity, high-efficiency, hydrophobic anion-exchange column designed for the separation of a wide range of polyvalent anions.

IonPac AS5: Low-capacity, hydroxide-selective anion-exchange column for separating higher-valence anions

IonPac AS7

For the separation of a wide range of polyvalent anions

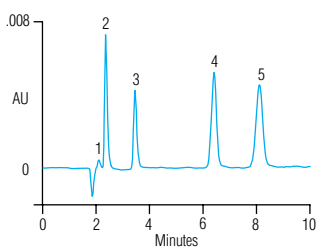
The IonPac AS7 separates a wide variety of polyvalent anions, including polyphosphates, polyphosphonates, and other polyvalent complexing agents such as EDTA and NTA using acidic elution (eliminating metal interferences) with postcolumn derivatization and UV-Vis detection.

- For polyvalent anions and chelating agents in complex sample matrices
- Determines cyanide and sulfide using amperometric detection
- Useful for hexavalent chromium in environmental matrices

The AS7 column has a unique polymer packing that provides superior performance for separating ionic and polar compounds. The patented packing offers high-speed, high-efficiency, and high-loading capacity at moderate backpressures.

Note: *The newer IonPac AS16 or AS20 column is recommended for polyphosphates.*

Separation of Polyphosphonate Scale Inhibitors Using the IonPac® AS7 Column



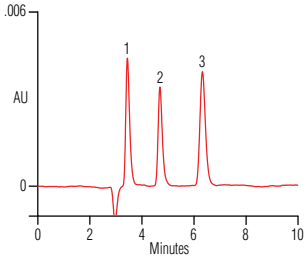
Column:	IonPac AS7 4-mm
Eluent:	30 mN Nitric acid
Flow Rate:	0.8 mL/min
Postcolumn Reagent:	1 g/L $Fe(NO_3)_3$ • 9 H_2O 2% (v/v) $HClO_4$ 0.8 mL/min
Inj. Volume:	25 µL
Detection:	UV, 330 nm

Peaks:		
1. Phosphate	-	
2. Dequest®	2010 50	mg/L (ppm)
3. Dequest	2051 50	
4. Dequest	2000 50	
5. Dequest	2041 50	

11784

Determination of polyphosphonate scale inhibitors using the IonPac AS7 4 mm column.

Determination of Chelating Agents Using the AS7 Column with Postcolumn Addition of Ferric Nitrate Coupled with UV Detection

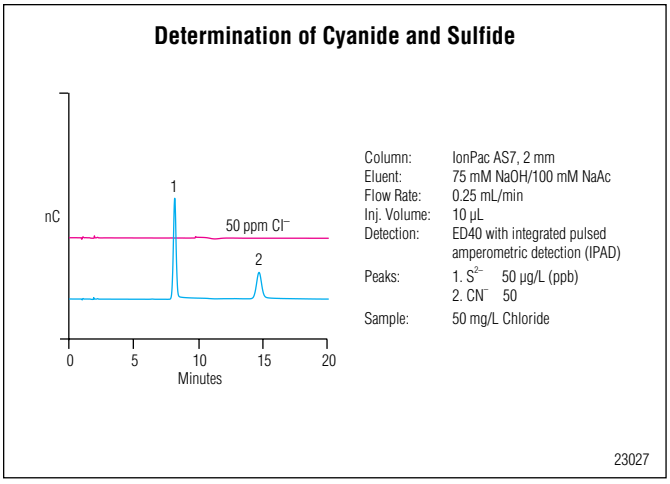


Column:	IonPac® AG7, AS7, 4 mm
Eluent:	24 mM Nitric acid
Flow Rate:	0.5 mL/min
Postcolumn Reagent:	1 g/L $Fe(NO_3)_3$ • 9 H_2O 2% (v/v) $HClO_4$ 0.5 mL/min
Inj. Volume:	25 µL
Detection:	UV at 330 nm

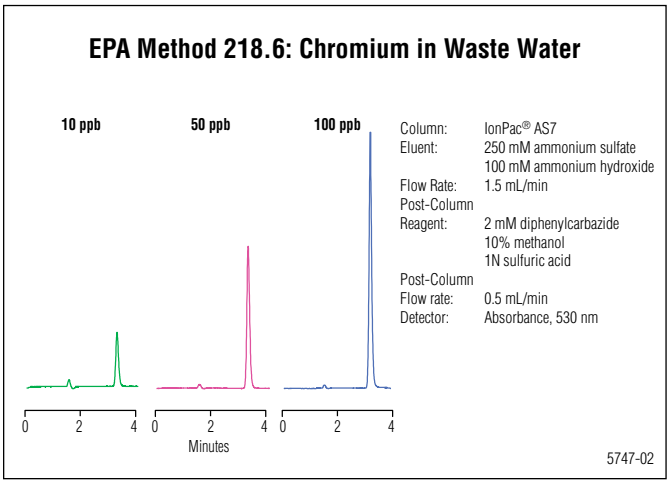
Peaks:		
1. Phosphate	100	mg/L (ppm)
2. NTA	20	
3. EDTA	10	

11785

Chelating agents by UV detection with postcolumn ferric nitrate.



Determination of cyanide and sulfide using the IonPac AS7 2 mm column with amperometric detection and a disposable silver electrode.



Determination of hexavalent chromium using the IonPac AS7 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS7 Anion Exchange Column Data Sheet

Application Notes

AN 80: Determination of Dissolved Hexavalent Chromium in Drinking Water, Groundwater and Industrial Waste Water Effluents by Ion Chromatography

Application Updates

AU 107: Determination of Cyanide in Strongly Alkaline Solutions

AU 144: Determination of Hexavalent Chromium in Drinking Water Using Ion Chromatography

Technical Notes

TN 26: Determination of Cr(VI) in Water, Waste Water, and Solid Waste Extracts

Ordering Information

Analytical Columns

IonPac AS7 Analytical Column (4 × 250 mm) 035393
IonPac AS7 Analytical Column (2 × 250 mm) 063097

Guard Columns

IonPac AG7 Guard Column (4 × 50 mm) 035394
IonPac AG7 Guard Column (2 × 50 mm) 063099

IonPac AS5

For separating higher-valence anions

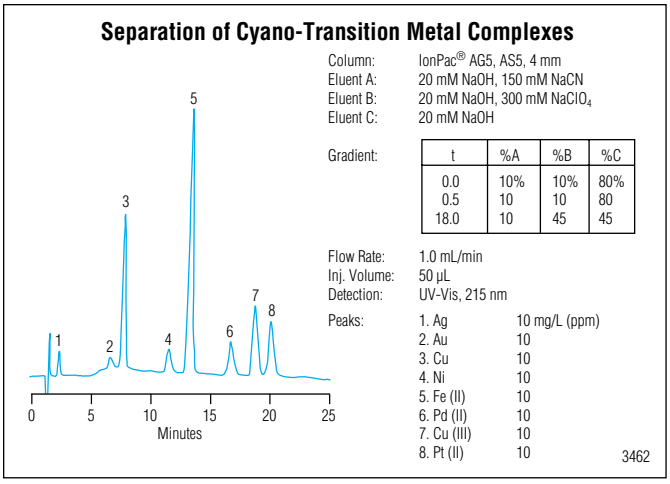
The IonPac AS5 separates higher-valence anions, including polyphosphates, oxyanions, EDTA complexes, metal cyanide complexes, and hydrophobic anions such as iodide, thiosulfate, and thiocyanate.

- For metal-EDTA complexes
- For cyano-transition metal complexes
- For hydrophobic anions, including iodide, thiocyanate, and thiosulfate
- AS16 or AS20 columns are recommended for hydrophobic anions and highly charged anions

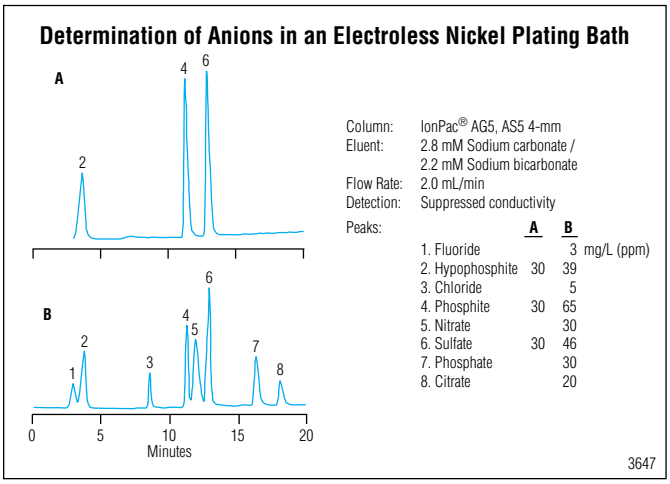
The AS5's compatibility with weak eluents simplifies the determination of strongly-retained species, since these eluents are compatible with a suppressor. Furthermore, the rapid elution of stronly-retained species greatly improves peak shapes, lowers minimum detection limits, and increases sample throughput potential.

The selectivity of the AS5 makes it possible to rapidly elute strongly-retained species such a iodide and thiocyanate in brines without interference from the large chloride peak typical of such samples.

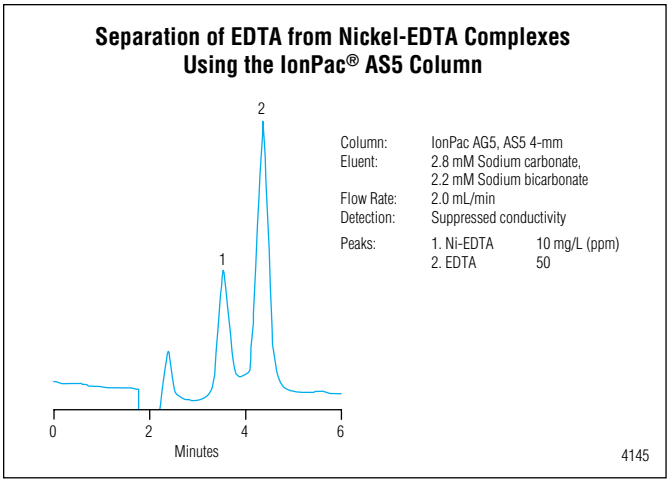
Note: *IonPac AS16 or AS20 columns are recommended for hydrophobic anions and highly-charged anions.*



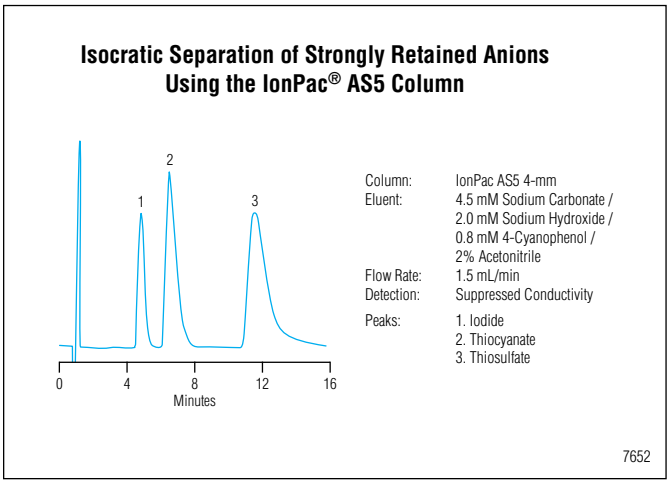
Separation of cyano-transition metal complexes.



Determination of anions in an electroless nickel plating bath.



Separation of EDTA from nickel-EDTA complexes using the IonPac AS5 column.



Isocratic separataion of strongly-retained anions using the IonPac AS5 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac AS5 Data Sheet

Application Notes

AN 51: Method for Determination of Anions in Sodium Hydroxide

AN 55: Determination of Metal Cyanides

Ordering Information

Analytical Columns

IonPac AS5 Analytical Column (4 × 250 mm) 035395

Guard Columns

IonPac AG5 Guard Column (4 × 50 mm) 035396

Cation-Exchange Packed Columns

A complete family of columns for separation of inorganic cations, ammonium, and amines

Dionex cation-exchange columns provide high-resolution separations of inorganic cations, ammonium, and amines. They provide an excellent approach to separations of alkali metals, alkaline earth metals, alkylamines, alkanolamines and biogenic amines. The carboxylate-functionalized cation-exchange columns are available in a wide range of capacities and hydrophobicities. They are hydronium-selective and are compatible with RFIC-EG and RFIC-ER systems.



IonPac CS18: Low-capacity carboxylate-functionalized cation-exchange column for the separation of polar amines such as ethanolamines.

IonPac CS17: Low-capacity carboxylate-functionalized cation-exchange column for gradient profiling and amine determination.

IonPac CS16: High-capacity carboxylate-functionalized cation-exchange column for disparate concentration ratios of adjacent cations such as sodium and ammonium.

IonPac CS15: Medium-capacity carboxylate-functionalized cation-exchange column with unique selectivity for disparate concentration ratios of sodium and ammonium.

IonPac CS14: Medium low-capacity carboxylate-functionalized cation exchange column for aliphatic and aromatic amines and polyamines.

IonPac CS12A: Medium-capacity carboxylate-functionalized column for fast, isocratic separation of inorganic cations.

IonPac CS11: Sulfonate-functionalized cation-exchange column for isocratic separations using HCl and diaminopropionic acid eluents.

IonPac CS10: Sulfonate-functionalized cation-exchange column for isocratic separations using HCl and diaminopropionic acid eluents.

IonPac CS18

Low-capacity cation-exchange column for the separation of polar amines

The IonPac CS18 carboxylate-functionalized cation-exchange column is tailored for the separation of polar amines including alkanolamines and methylamines, and moderately hydrophobic and polyvalent amines including biogenic amines and alkyl diamines, using simple aqueous eluents and elevated temperature. The CS18 is ideally used with RFIC systems for automatic methanesulfonic acid eluent generation.

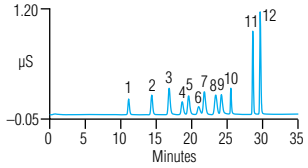
- For amines including alkanolamines and methylamines in diverse sample matrices
- For moderately-hydrophobic amines incl. biogenic amines, alkyl diamines, and polyvalent amines
- Optimized for simple acidic gradient separations with minimal baseline shift
- Ideal Reagent-Free electrolytic suppression with the Cation Self-Regenerating Suppressor CSRS 300
- Compatible with moderate amounts of organic solvents, excluding alcohols
- Requires only a modest acid concentration to elute polyvalent cations

The IonPac CS18 cation-exchange column supports isocratic and gradient separations of polar amines, moderately hydrophobic amines, and polyvalent cations using suppressed conductivity detection. The CS18 column with nonsuppressed conductivity detection is recommended when extended calibration linearity for ammonium or weak bases is required. The CS18 can be used for many of the nonsuppressed applications supported by the IonPac SCS-1 column but with much greater column stability.

The IonPac CS18 is targeted for analysis of power plant waters treated with ammonium, morpholine, or ethanolamine; chemical additives; chemical process solutions; scrubber solutions; personal care products; and food samples.

Note: *Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS18 column.*

Gradient Separation of Alkanolamines, Methylamines, and the Common Inorganic Cations on the IonPac® CS18 Column



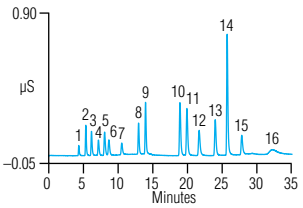
Peaks:			0.1 mg/L (ppm)
	1.	Lithium	
	2.	Sodium	0.4
	3.	Ammonium	0.5
	4.	Ethanolamine	1.0
	5.	Methylamine	1.0
	6.	Diethanolamine	2.0
	7.	Potassium	1.0
	8.	Dimethylamine	0.8
	9.	Triethanolamine	9.0
	10.	Trimethylamine	3.0
	11.	Magnesium	0.5
	12.	Calcium	1.0

Column:	IonPac CS18, 2 mm
Eluent:	0.5 mM MSA, gradient to 1 mM at 20 min, gradient to 6 mM at 22.4 min, gradient to 8 mM at 28 min, back to 0.5 mM at 28.1 min
Eluent Source:	EGC II MSA
Flow Rate:	0.3 mL/min
Temperature:	35 °C
Inj. Volume:	5 µL
Detection:	Suppressed conductivity, CSRS® ULTRA II 2 mm, AutoSuppression® recycle mode

20289

The CS18 column can separate small, hydrophilic amines, including alkanolamines and methylamines, in a single run using a modest acidic gradient.

Biogenic Amines, Methylamines, and the Common Six Cations on the IonPac® CS18 Column



Peaks [mg/L (ppm)]:					
1.	Lithium	0.02	9.	Calcium	0.2
2.	Sodium	0.08	10.	Putrescine	1.1
3.	Ammonium	0.10	11.	Cadaverine	1.1
4.	Methylamine	0.25	12.	Histamine	1.6
5.	Potassium	0.20	13.	Agmatine	1.4
6.	Dimethylamine	0.20	14.	Spermidine	4.0
7.	Trimethylamine	0.75	15.	Spermine	0.4
8.	Magnesium	0.1	16.	Phenethylamine	1.5

Column:	IonPac CS18, 2 mm
Eluent:	3 mM MSA, isocratic to 5 min, gradient to 18 mM at 20 min, gradient to 45 mM at 25 min, isocratic to 35 min, back to 3 mM at 35.1 min
Eluent Source:	EGC II MSA
Flow Rate:	0.25 mL/min
Temperature:	40 °C
Inj. Volume:	5 µL
Detection:	Suppressed conductivity, CSRS® ULTRA II 2 mm, AutoSuppression® recycle mode

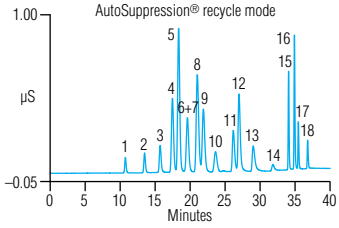
22798

The IonPac CS18 column can easily separate biogenic amines, methylamines, and Group I and II cations using an aqueous eluent without organic solvent.

Amines of Interest in the Petrochemical Industry on IonPac® CS18

Column: IonPac CS18, 2 mm
Eluent: 0.5 mM MSA, gradient to 1 mM at 20 min, gradient to 4 mM at 28 min, gradient to 11 mM at 34 min,isocratic to 40 min, back to 0.5 mM at 40.1 min
Eluent Source: EGC II MSA
Flow Rate: 0.30 mL/min
Temperature: 50 °C
Inj. Volume: 5 µL
Detection: Suppressed conductivity, CSRS® ULTRA II 2 mm, AutoSuppression® recycle mode

Peaks:		
1.	Lithium	0.05 mg/L (ppm)
2.	Sodium	0.2
3.	Ammonium	0.25
4.	Ethanolamine	3.0
5.	Methylamine	3.6
6.	Diethanolamine	3.6
7.	Potassium	0.5
8.	Ethylamine	3.0
9.	Dimethylamine	1.4
10.	*N*-methyl diethanolamine	3.0
11.	Morpholine	3.2
12.	1-dimethylamino-2-propanol	3.7
13.	*N*-methyl morpholine	7.5
14.	Butylamine	1.5
15.	Magnesium	0.25
16.	Calcium	0.5
17.	Strontium	0.5
18.	Barium	0.5



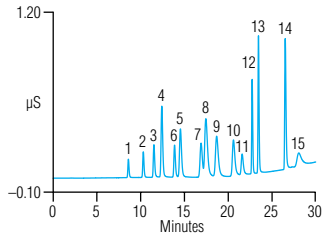
22808

Separation of a variety of amines and the extended Group I and II inorganic cations that are monitored in the petrochemical industry.

Power Amines and the Six Common Cations on the IonPac® CS18

Column: IonPac CS18, 2 mm
Eluent: 0.5 mM MSA, gradient to 3 mM at 16 min, gradient to 25 mM at 30 min, back to 0.5 mM at 30.1 min
Eluent Source: EGC II MSA
Flow Rate: 0.30 mL/min
Temperature: 40 °C
Inj. Volume: 5 µL
Detection: Suppressed conductivity, CSRS® ULTRA II 2 mm, AutoSuppression® recycle mode

Peaks:		
1.	Lithium	0.05 mg/L (ppm)
2.	Sodium	0.20
3.	Ammonium	0.25
4.	Ethanolamine	2.0
5.	Potassium	0.50
6.	2(2-aminoethoxy)ethanol	3.0
7.	5-amino-1-pentanol	3.0
8.	Morpholine	3.0
9.	3-methoxypropylamine	3.0
10.	2-diethylaminoethanol	3.0
11.	3-quinuclidinol	2.0
12.	Magnesium	0.25
13.	Calcium	0.50
14.	Ethylenediamine	2.0
15.	Cyclohexylamine	3.0



22911

Separation of a variety of amines used in the power industry with the IonPac CS18 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac CS18 Datasheet

Application Notes

AN 182: Determination of Biogenic Amines in Alcoholic Beverages by Ion Chromatography with Suppressed Conductivity and Integrated Pulsed Amperometric Detections

AN 183: Determination of Biogenic Amines in Fermented and Non-Fermented Foods Using Ion Chromatography with Suppressed Conductivity and Integrated Pulsed Amperometric Detection

Application Updates

AU 162: Determination of Biogenic Amines in Fruit, Vegetables, and Chocolate Using Ion Chromatography with Suppressed Conductivity and Integrated Pulsed Amperometric

Ordering Information

Analytical Columns

IonPac CS18 Analytical Column (2 × 250 mm) 062878

Guard Columns

IonPac CG18 Guard Column (2 × 50 mm)..... 062880

IonPac CS17

Low-capacity cation-exchange column for gradient profiling and amine determination

The IonPac CS17 carboxylate-functionalized cation-exchange column is tailored for gradient separation of polyvalent and moderately hydrophobic amines, including biogenic amines and diamines, using simple aqueous eluents and elevated temperature (40 °C). The CS17 is an excellent column for use with Reagent-Free IC systems using Eluent Generation, which require only a deionized water source to produce methanesulfonic acid eluent.

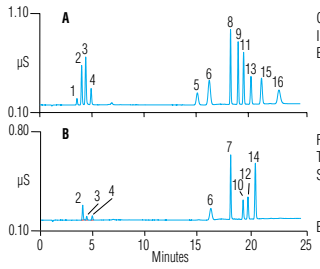
- For polyvalent and moderately hydrophobic amines including diamines and biogenic amines
- Optimized for simple acidic gradient applications with minimal baseline shift
- Ideal alternative for IonPac CS14 amine applications
- Improved peak shape without adding organic solvent to the eluents
- Compatible with organic solvents

The CS17 column is recommended for polar amines including alkanolamines and methylamines. It can also be used for moderately hydrophobic amines, including biogenic amines, alkyldiamines, and polyamines. Sample matrices include environmental waters, power plant waters treated with ammonium, morpholine or ethanolamine, chemical additives, chemical process solutions, scrubber solutions, plating baths, and industrial solvents. The CS17 is also used extensively in the food industry.

The CS17 column offers improved peak shapes and efficiencies for IonPac CS14 amine applications. Solvent compatibility permits solvent use for elution of more hydrophobic amines and easy column cleanup after the analysis of complex sample matrices. Use the CS17 with Eluent Generation for simplified methanesulfonic acid eluent preparation.

Note: *Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS17 column.*

Gradient Separation of Diamines Using the IonPac® CS17



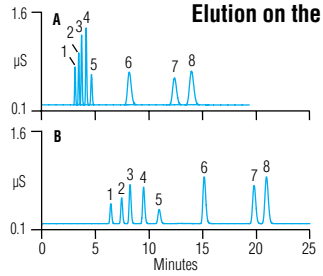
Column: IonPac CS17, CG17, 2 mm
Inj. Volume: 25 µL
Eluent: 3 mM MSA isocratic to 3.5 min; 3 mM to 6 mM MSA gradient at 12 min; isocratic to 15 min; gradient to 40 mM MSA at 20 min, isocratic to 24 min; step change back to 3 mM MSA at 24.1 min; equilibration time is 2 min
Flow Rate: 0.40 mL/min
Temperature: 40 °C
Suppressor: CSRS® ULTRA 2-mm Cation Self-Regenerating Suppressor, AutoSuppression® recycle mode, 100 mA
Background: <0.2 µS throughout the chromatogram

Peaks:	A	B	µg/L (ppb)
1. Lithium	5	–	
2. Sodium	65	16	
3. Ammonium	89	4	
4. Potassium	47	8	
5. Magnesium	24	–	
6. Calcium	56	18	
7. Ethylenediamine	–	200	
8. 1,2-propanediamine	500	–	
9. 1,6-hexanediamine	250	–	
10. N,N-diethylenediamine	–	200	
11. 1,7-heptanediamine	125	–	
12. N,N,N,N-tetramethyl ethylenediamine	–	200	
13 1,8-octanediamine	250	–	
14. 3,3-diaminopropylamine	–	200	
15. 1,9-nonanediamine	375	–	
16. 1,10-decanediamine	375	–	

18572

The IonPac CS17 column demonstrates excellent selectivity for diamines.

Comparison of Isocratic and Gradient Elution on the IonPac® CS17



Column: IonPac CS17, 4-mm
Inj. Volume: 25 µL
Eluent: A. 6 mM Methanesulfonic acid (MSA)
Eluent: B. 2 mM MSA isocratic to 11.0 min; step change to 7 mM MSA at 11.1 min; isocratic to 22 min; step change back to 2 mM MSA at 22.1 min; equilibration time is 2 min
Flow Rate: 1.0 mL/min
Temperature: 30 °C
Suppressor: Cation Atlas® Electrolytic Suppressor in AutoSuppression® recycle mode, 24 mA
Background: < 0.2 µS

Peaks:	0.1 mg/L (ppm)
1. Lithium	0.4
2. Sodium	0.5
3. Ammonium	1.0
4. Potassium	1.0
5. Dimethylamine	7.0
6. Triethylamine	0.5
7. Magnesium	1.0
8. Calcium	

18569

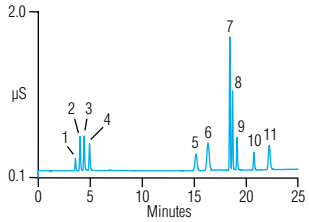
Gradient elution improves resolution of cations and amines without causing a baseline shift.

Determination of Biogenic Amines Using the IonPac® CS17

Column: IonPac CS17, CG17, 2-mm
Inj. Volume: 25 µL
Eluent: 3 mM MSA isocratic to 3.5 min; 3 mM to 6 mM MSA gradient at 12 min; isocratic to 15 min; gradient to 40 mM MSA at 20 min, isocratic to 24 min; step change back to 3 mM MSA at 24.1 min; equilibration time is 2 min
Flow Rate: 0.40 mL/min
Temperature: 40 °C
Suppressor: CSRS® ULTRA 2-mm Cation Self-Regenerating Suppressor, AutoSuppression® recycle mode, 100 mA
Background: < 0.2 µS throughout the chromatogram

Peaks:

1.	Lithium	10 µg/L (ppb)
2.	Sodium	40
3.	Ammonium	50
4.	Potassium	100
5.	Magnesium	50
6.	Calcium	100
7.	Putrescine	1000
8.	Cadaverine	600
9.	Histamine	600
10.	Spermidine	200
11.	Spermine	400



18570

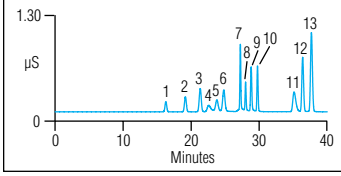
The IonPac CS17 column can easily separate biogenic amines and Group I and II cations using an aqueous eluent without added organic solvent.

Determination of Power Plant Amine Additives Using the IonPac® CS17 Column

Column: IonPac CG17, CS17, 2-mm
Inj. Volume: 25 µL
Eluent: 0.5 mM to 0.7 mM MSA gradient at 25 min; step change to 4 mM MSA at 25.1 min; isocratic to 27 min; step change to 6.5 mM MSA at 27.1 min;isocratic to 37 min; step change back to 0.5 mM MSA at 37.1 min; equilibration time is 2 min
Flow Rate: 0.35 mL/min
Temperature: 30 °C
Suppressor: Cation Atlas® Electrolytic Suppressor AutoSuppression® Recycle Mode, 8 mA

Peaks:

1.	Lithium	25 µg/L (ppb)
2.	Sodium	100
3.	Ammonium	125
4.	Hydrazine	1000
5.	Ethanolamine	250
6.	Potassium	250
7.	2-(2-aminoethoxy) ethanol	1000
8.	5-amino-1-pentanol	500
9.	Morpholine	1000
10.	2-diethylamino ethanol	1000
11.	Cyclohexylamine	1000
12.	Magnesium	125
13.	Calcium	250



18575

The moderate capacity, hydrophilic IonPac CS17 column solves the difficult resolution problem of separating hydrazine from ammonium and ethanolamine.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac CS17 Cation-Exchange Column

Application Updates

AU 155: Determination of Cations and Amines in Hydrogen Peroxide by Ion Chromatography Using a RFIC (Reagent-Free) System

AU 160: Determination of N,N-Dimethyl-o-Toluidine and N,N-Diethyl-o-Toluidine in Ethylene Gas Samples

Ordering Information

Analytical Columns

IonPac CS17 Analytical Column (4 × 250 mm) 060557
IonPac CS17 Analytical Column (2 × 250 mm) 060561
IonPac CS17 Analytical Column (2 × 250 mm) 060561

Guard Columns

IonPac CG17 Guard Column (4 × 50 mm)..... 060560
IonPac CG17 Guard Column (2 × 50 mm)..... 060563
IonPac CG17 Guard Column (2 × 50 mm)..... 060563

IonPac CS16

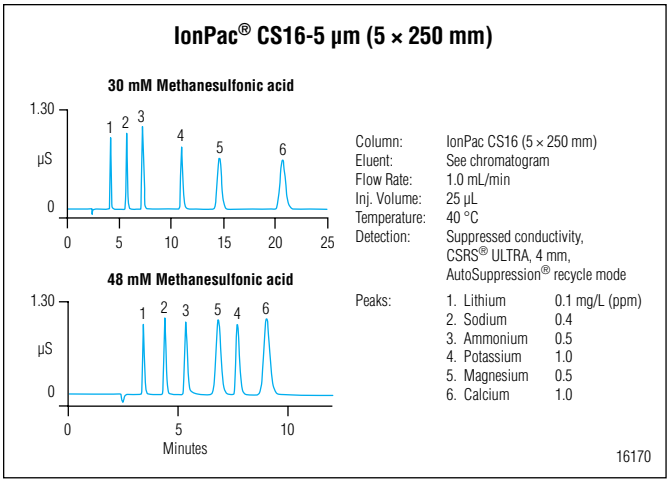
High-capacity carboxylate-functionalized column for disparate sodium and ammonium concentrations

The IonPac CS16 is the column of choice for disparate concentration ratios of adjacent eluting cations such as sodium and ammonium in diverse sample matrices. The high-capacity, high-resolution CS16 column can be used for short-chained amines, including alkylamines and alkanolamines, in diverse sample matrices.

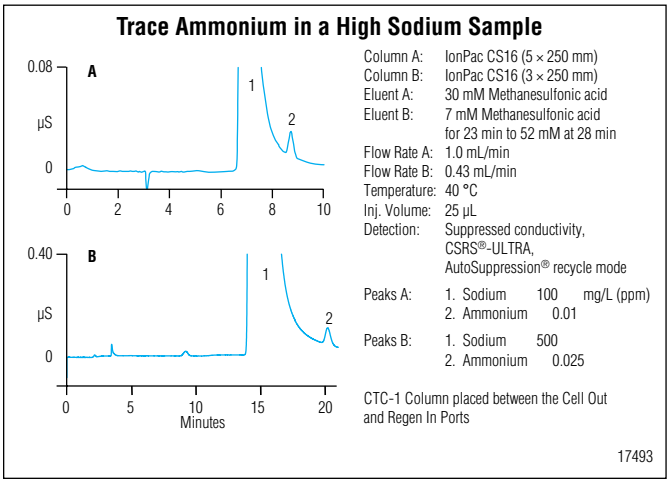
- For disparate concentration ratios of close-eluting cations such as ammonium and sodium in complex matrices
- Ideal for trace-level ammonium in high concentrations of sodium
- Ideal for trace-level sodium in high concentrations of ammonium or amines
- Best carboxylate-functionalized column to tolerate samples with low pH
- Isocratic acid eluent and elevated temperature (40 °C) required for sodium:ammonium ratios to 1:10,000
- Gradient MSA eluent and elevated temperature required for sodium:ammonium ratios up to 1:20,000
- Useful for short-chained amines, including alkylamines and alkanolamines
- Compatible with organic solvents excluding alcohols

Using an isocratic acid eluent and elevated temperature (40 °C) coupled with suppressed conductivity, ratios up to 10,000:1 of sodium and ammonium can be resolved in less than 20 min. Sample matrices include environmental waters; power plant waters treated with ammonium, morpholine or ethanolamine; chemical additives; chemical process solutions; scrubber solutions; plating baths; and industrial solvents. The CS16 is designed for use in most IonPac CS15 applications.

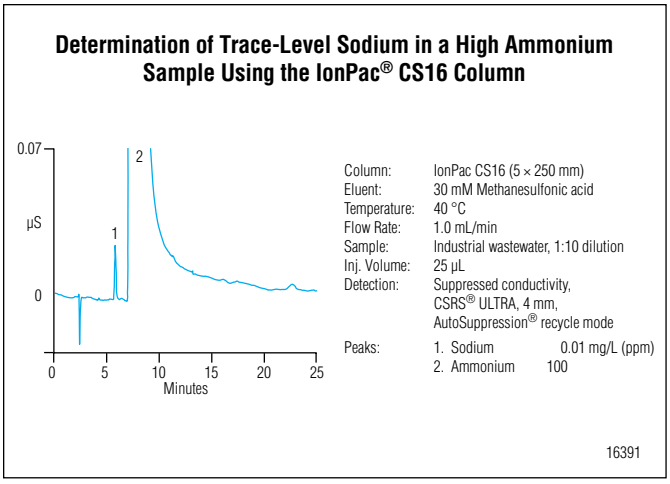
The CS16 column has the highest capacity among Dionex carboxylate-based cation columns, resulting in improved loadability and resolution. Use the CS16 with the Eluent Generator for simplified, consistent methanesulfonic acid eluent preparation. Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS16 column.



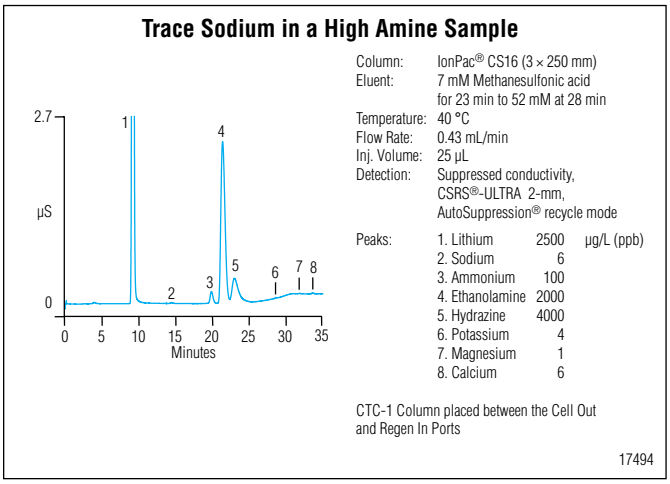
Isocratic separation of common inorganic cations and ammonium. Note that magnesium elutes before potassium at the higher eluent concentration.



Isocratic versus gradient determination of trace level ammonium in a high sodium sample.



Isocratic determination of a 1:10,000 sodium to ammonium concentration ratio.



Determination of trace level sodium in a high amine sample.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac CS16 Cation-Exchange Column Data Sheet

Application Notes

AN 94: Determination of Trace Cations in Concentrated Acids Using AutoNeutralization Pretreatment/Ion Chromatography

AN 141: Determination of Inorganic Cations and Ammonium in Environmental Waters by Ion Chromatography Using the IonPac CS16 Column

AN 152: Determination of Sodium at the Parts-Per-Trillion Level in the Presence of High Concentrations of Ethanolamine in Power Plant Waters

AN 157: Comparison of suppressed to nonsuppressed conductivity detection for the determination of common inorganic cations

Ordering Information

Analytical Columns

IonPac CS16 Analytical Column (5 × 250 mm) 057573

IonPac CS16 Analytical Column (3 × 250 mm) 059596

Guard Columns

IonPac CG16 Guard Column (5 × 50 mm)..... 057574

IonPac CG16 Guard Column (3 × 50 mm)..... 059595

IonPac CS15

Medium-capacity cation-exchange column for disparate concentration ratios of sodium and ammonium

The IonPac CS15 is a medium-capacity carboxylate-functionalized cation-exchange column with crown ether moiety for the determination of disparate concentration ratios of sodium and ammonium in diverse sample matrices.

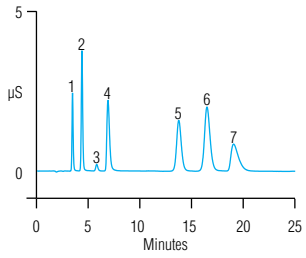
- Solvent and elevated temperature required for more efficient ammonium and potassium peaks
- Use the CS16 column for separating disparate concentrations of sodium and ammonium without an organic solvent
- Useful for determination of trace ethanolamine in high-ammonium or high-potassium concentrations
- Useful for separating alkanolamines and other small amines
- The crown ether moiety gives it unique selectivity, and may offer an advantage for certain types of matrices
- Compatible with organic solvent

The IonPac CS15 has unique selectivity, and is the only carboxylic acid based cation column from Dionex in which ethanolamines elute before ammonium. Thus, for samples with high ammonium to low ethanolamine ratios, the CS15 is the column of choice. Using an isocratic acid or solvent eluent and elevated temperature (40 °C), coupled with suppressed conductivity detection, ratios of up to 8000:1 of sodium and ammonium can also be determined.

Sample matrices include environmental waters; power plant waters treated with ammonium, morpholine or ethanolamine; chemical additives; chemical process solutions; scrubber solutions; plating baths; industrial solvents; and soil matrices. The CS15 is also particularly useful for matrices with high potassium concentrations. Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS15 column.

Note: *See the IonPac CS16 for improved performance without using solvent.*

Isocratic Separation of Ethanolamine Using the IonPac® CS15 Column



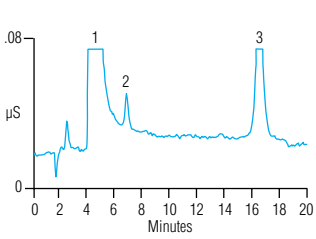
Column: IonPac CG15, CS15 4-mm
Eluent: 10 mN Sulfuric acid / 9% Acetonitrile
Flow Rate: 1.2 mL/min
Temperature: 40 °C
Inj. Volume: 25 µL
Detection: Suppressed conductivity, ASRS® ULTRA 4-mm, AutoSuppression® external water mode

Peaks:		
1.	Lithium	1.0 mg/L (ppm)
2.	Sodium	4.0
3.	Ethanolamine	3.0
4.	Ammonium	5.0
5.	Magnesium	5.0
6.	Calcium	10.0
7.	Potassium	10.0

12829

The unique selectivity of the IonPac CS15 column causes ethanolamine to elute before ammonium, and potassium to elute after the divalent magnesium and calcium cations.

Isocratic Determination of Ammonium in the Presence of High Sodium (1:4000 ratio) with the IonPac® CS15 Column

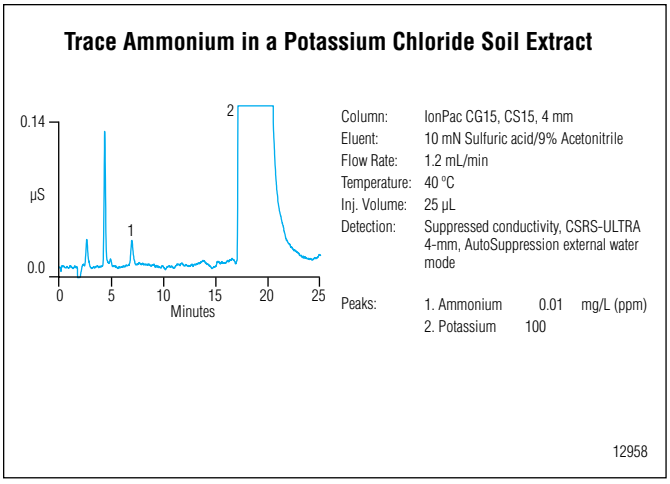


Column: IonPac CG15, CS15, 4 mm
Eluent: 10 mN Sulfuric acid/ 9% Acetonitrile
Flow Rate: 1.2 mL/min
Temperature: 40 °C
Inj. Volume: 25 µL
Detection: Suppressed conductivity, CSRS® ULTRA, 4 mm, AutoSuppression® external water mode

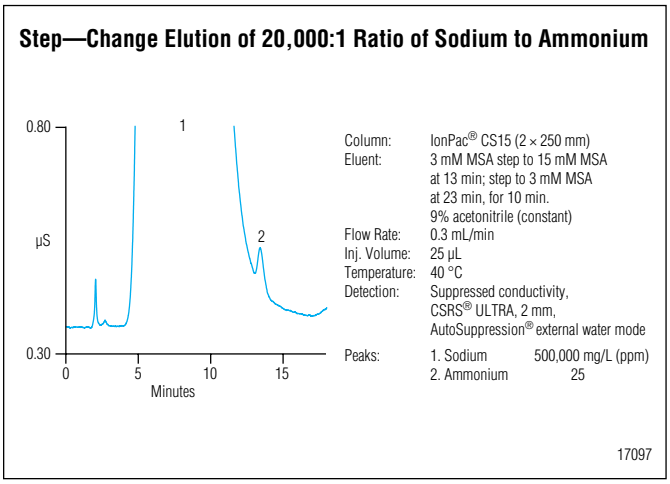
Peaks:		
1.	Sodium	100 µg/L (ppm)
2.	Ammonium	0.025
3.	Calcium	-

12826

Isocratic determination of trace-level ammonium in environmental wastewater containing a high sodium concentration.



Determination of trace-level ammonium in a potassium chloride soil extract.



Step change elution of 20,000:1 ratio of sodium to ammonium.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac CS15 Cation-Exchange Column Data Sheet

Ordering Information

Analytical Columns

IonPac CS15 Analytical Column (4 × 250 mm) 051795
IonPac CS15 Analytical Column (2 × 250 mm) 052252

Guard Columns

IonPac CG15 Guard Column (4 × 50 mm)..... 052200
IonPac CG15 Guard Column (2 × 50 mm)..... 052256

IonPac CS14

Medium low-capacity column for aliphatic and aromatic amines and polyamines

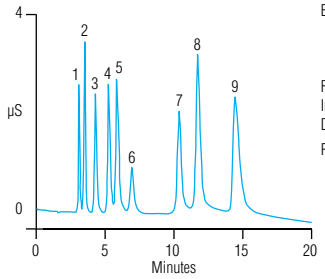
The IonPac CS14 is a medium low-capacity carboxylate-functionalized cation-exchange column for the determination of aliphatic, aromatic, and polyvalent amines. Sample matrices include environmental waters; power plant waters treated with ammonium, morpholine or ethanolamine; chemical additives; chemical process solutions; scrubber solutions; plating baths; industrial solvents; and wastewater.

- For amine separations, including aliphatic amines, aromatic amines, and polyamines
- For hydrophobic and polyvalent amines
- For polar amines including alkanolamines and alkylamines
- For moderately hydrophobic amines
- Compatible with organic solvents

The CS14 column can be used with isocratic or gradient methanesulfonic acid or sulfuric acid eluents to resolve a variety of amines from the Group I and II cations. Solvent and elevated temperature may be required for efficient elution of hydrophobic amines. Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS14 column.

The CS18 and CS17 are recommended replacement columns for most CS14 applications. The CS17 is recommended replacement column for hydrophobic and polyvalent amines, including biogenic amines and diamines. The CS18 is recommended for polar amines, including alkanolamines and methylamines; and moderately hydrophobic and polyvalent amines, including biogenic amines and alkyldiamines.

Step Change Separation of Ethyl, Diethyl, and Triethylamine Plus the Group I & II Cations Using the IonPac® CS14 Column



Column: IonPac CS14
Eluent: 9 mM Methanesulfonic acid + 0.5% Acetonitrile; step change at 6 min to 11 mM Methanesulfonic acid + 1.5% Acetonitrile
Flow Rate: 1 mL/min
Inj. Volume: 18 µL
Detection: Suppressed conductivity

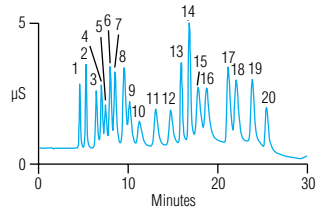
Peaks:		0.5 mg/L (ppm)
1.	Lithium	0.5
2.	Sodium	2
3.	Ammonium	2.5
4.	Ethylamine	10
5.	Potassium	5
6.	Diethylamine	10
7.	Magnesium	2.5
8.	Calcium	5
9.	Triethylamine	50

8921

Acetonitrile can be used to optimize the resolution of ethylamines from Group I and Group II cations.

Gradient Elution of Alkylamines and the Group I and II Cations on IonPac CS14

Column: IonPac® CS14 4 mm
Eluent: Methanesulfonic acid/ Acetonitrile gradient
Flow Rate: 1 mL/min
Inj. Volume: 25 µL
Detection: Suppressed conductivity, CSRS® ULTRA, 4 mm, AutoSuppression® external water mode



Peaks:		0.5 mg/L (ppm)
1.	Lithium	0.5
2.	Sodium	2
3.	Ammonium	2.5
4.	Methylamine	5
5.	Ethylamine	5
6.	Dimethylamine	10
7.	Potassium	0.5
8.	Trimethylamine	20
9.	Propylamine	5
10.	Morpholine	25
11.	*sec*- Butylamine	10
12.	*iso*-Butylamine	10
13.	Magnesium	2.5
14.	Calcium	5
15.	2-Methylpiperidine	20
16.	Di-*n*-propylamine	20
17.	3-Methylpiperidine	20
18.	Cyclohexylamine	20
19.	*N*-Methylcyclohexylamine	20
20.	Tripropylamine	20

9102-01

The unique selectivity of the IonPac CS14 allows a large number of aliphatic amines and Group I and Group II cations to be resolved.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac CS14 Cation Exchange Column Data Sheet

Application Notes

AN 86: Determination of Trace Cations in Power Plant Waters Containing Morpholine

AN 148: Determination of Bethanechol by Ion Chromatography

Ordering Information

Analytical Columns

IonPac CS14 Analytical Column (2 × 250 mm) 044121
IonPac CS14 Analytical Column (4 × 250 mm) 044123

Guard Columns

IonPac CG14 Guard Column (2 × 50 mm)..... 044122
IonPac CG14 Guard Column (4 × 50 mm)..... 044124

IonPac CS12A

Medium capacity column for fast, isocratic separation of cations using MSA or sulfuric acid

The IonPac CS12A is a medium-capacity, carboxylate-functionalized cation-exchange column recommended for fast, isocratic separation of lithium, sodium, ammonium, potassium, magnesium, and calcium using methanesulfonic or sulfuric acid eluents in diverse sample matrices. The new CS12A-8µm and CS12A-5µm Capillary Columns offer the same selectivity as their analytical-scale counterparts, but offer the advantage of reduced eluent consumption, thereby lowering operating costs.

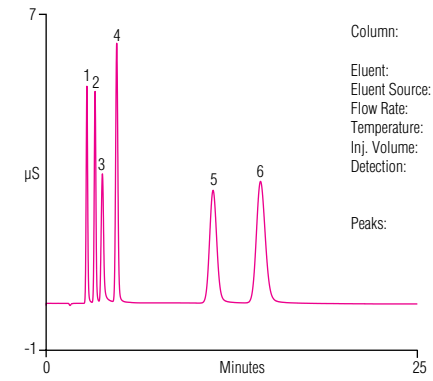
- Robust, reliable column for group I and II cations plus ammonium
- Recommended for manganese and morpholine
- Recommended for inorganic cations in complex matrices
- Simplified Reagent-Free IC operation provided by the EG or eluent regeneration
- Compatible with organic solvents (excluding alcohols), high temperatures, and high acid concentrations
- Analysis time for common six cations as short as 3 min (CS12A-5µm) to 15 min (CS12A-8µm)
- CS12A-MS IC-MS screening column for fast elution and low flow rates required for IC-MS
- For disparate concentration ratios of adjacent-eluting cations, the high-capacity IonPac CS16 is recommended

The medium-capacity IonPac CS12A cation-exchange column supports fast, isocratic separation with suppressed conductivity detection. Sample matrices include environmental and drinking waters; soil extracts; acid digests; power plant waters treated with ammonium or morpholine; chemical additives; chemical process solutions; scrubber solutions; plating baths; and industrial solvents.

Use the CS12A-5µm column for high efficiency and fast analysis (3 min). The smaller-diameter resin technology and reduced column length provide faster analysis time, reduced eluent consumption, and increased sensitivity. The CS12A column is the recommended replacement for all CS12 applications. Use the CS12A with the Eluent Generator for simplified methanesulfonic acid eluent preparation.

Note: *Use the Cation Self-Regenerating Suppressor (CSRS 300) with the CS12A column.*

Separation of Common Cations Using the IonPac CS12A Capillary Column

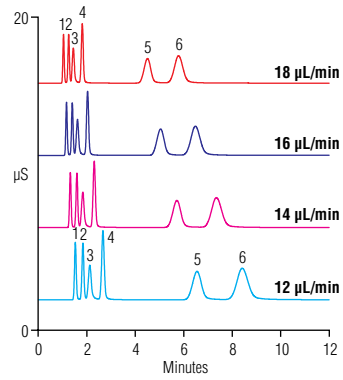


Column:	IonPac CS12A-8µm Capillary (0.4 × 250 mm)
Eluent:	20 mM MSA
Eluent Source:	EGC-MSA Capillary cartridge
Flow Rate:	10 µL/min
Temperature:	30 °C
Inj. Volume:	0.4 µL
Detection:	Suppressed Conductivity, CCES™ 300, AutoSuppression recycle mode
Peaks:	1. Lithium 0.5 mg/L 2. Sodium 2.0 3. Ammonium 2.5 4. Potassium 5.0 5. Magnesium 2.5 6. Calcium 5.0

27241

The IonPac CS12A-8mm capillary column for the separation of the common cations. The capillary format uses 100-fold less water and produces only one hundredth of waste.

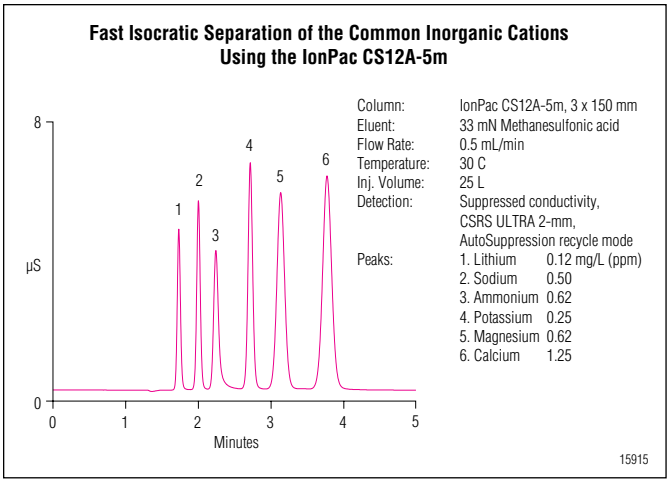
Fast Isocratic Separation of the Common Inorganic Cations at Increasing Flow Rates on a Capillary IonPac CS12A-5µm Column



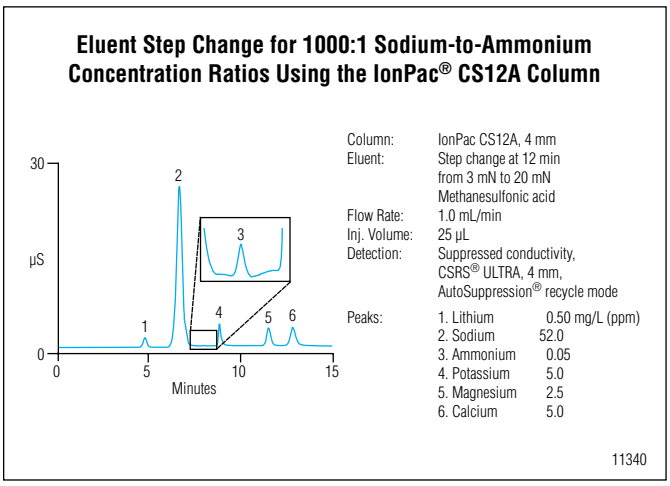
Column:	IonPac CS12A-5µm Capillary (0.4 mm × 150 mm)
Eluent:	20 mM MSA
Eluent Source:	EGC-MSA Capillary cartridge
Flow Rate:	See chromatograms
Temperature:	30 °C
Detection:	Suppressed conductivity, CCES 300, AutoSuppression recycle mode
Peaks:	1. Lithium 0.5 mg/L 2. Sodium 2.0 3. Ammonium 2.5 4. Potassium 5.0 5. Magnesium 2.5 6. Calcium 5.0

27167

Fast isocratic separation on the common inorganic cations at increasing flow rates on the the IonPac CS12A-5µm capillary column.



Fast isocratic separation of the common inorganic cations.



Trace-level quantification of ammonium in brine (1000:1 ratio) using the IonPac CS12A coupled with cation AutoSuppression.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac CS12A Cation-Exchange Column Data Sheet

Application Notes

AN 106: Ion Chromatography in the Pharmaceutical Industry

AN 107: Ions In Physiological Fluids

AN 120: Determination of Calcium and Magnesium in Brine

AN 124: Determination of Choline in Dry Milk and Infant Formula

Application Updates

AU 137: Determination of Trace Lithium in Industrial Process Waters

AU 158: Determingation of Manganese in Brine

Ordering Information

Analytical Columns

IonPac CS12A-5 µm Analytical Column (3 x 150 mm)..... 057185
IonPac CS12A Analytical Column (4 x 250 mm)..... 046073
IonPac CS12A Analytical Column (2 x 250 mm)..... 046075
IonPac CS12A-8µm Capillary Column (0.4 x 250 mm)..... 072066
IonPac CS12A-5µm Capillary Column (0.4 x 150 mm)..... 072068
IonPac CS12A-MS Analytical Column (2 × 100 mm) 059960

Guard Columns

IonPac CG12A-5 µm Guard Column (3 x 30 mm)..... 057184
IonPac CG12A Guard Column (2 x 50 mm) 046076
IonPac CG12A Guard Column (4 x 50 mm) 046074
IonPac CG12A-8µm Capillary Guard Column (0.4 x 50 mm) 072067
IonPac CG12A-5µm Capillary Guard Column (0.4 x 50 mm) 072069

IonPac CS11

Sulfonate-functionalized cation-exchange column for isocratic separations using HCl and DAP.

The IonPac CS11 is designed for the isocratic separation of inorganic cations using hydrochloric acid with diaminopropionic (DAP) acid eluents.

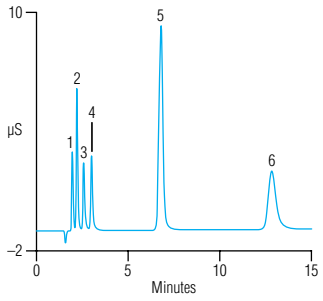
- The CS11 can be used for analysis of common inorganic cations and aliphatic, cyclic, and aromatic amines.
- Compatible with organic solvents
- The CS12A improves performance for fast analysis of inorganic cations and ammonium.
- The CS17 column is recommended for hydrophobic and polyvalent amines.
- The CS18 column is recommended for polar amines including alkanolamines and methylamines.
- The CS18 is also recommended for moderately hydrophobic amines and polyvalent amines.

The CS11 is useful in determining common inorganic cations and aliphatic and aromatic amines in diverse sample matrices, including environmental and drinking waters, power plant waters treated with ammonium, soil extracts, acid digests, chemical additives, chemical process solutions, scrubber solutions, plating baths, and industrial solvents.

The CS11 has selectvitiy similar to the CS10 column, with improved sensitivity and lower eluent consumption due to its smaller 2 mm i.d. format.

Note: *Use the Cation MicroMembrane Suppressor (CMMS 300) with the CS11 column. Electrolytic suppression is not recommended with HCl and DAP eluents.*

Isocratic Separation of Alkali Metal, Alkaline Earth, and Ammonium Cations Using the IonPac® CS11 Column



Common inorganic cations can be separated using the IonPac CS11 with a HCl/DAP acid eluent.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Application Updates

AU 138: Determination of Ethanolamines in Industrial Waters by Cation-Exchange Chromatography

Ordering Information

Analytical Columns

IonPac CS11 Analytical Column (2 × 250 mm) 043127

Guard Columns

IonPac CG11 Guard Column (2 × 50 mm)..... 043128

IonPac CS10

Sulfonate-functionalized cation-exchange column for isocratic separations using HCl and DAP.

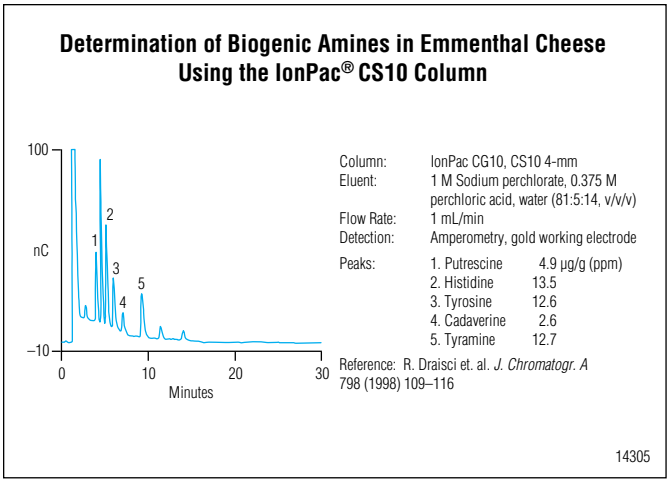
The IonPac CS10 is a sulfonate-functionalized cation-exchange column for the isocratic separation of inorganic cations using hydrochloric acid with diaminopropionic (DAP) acid eluents. The CS12A is the recommended column for the fast analysis of inorganic cations; the CS17, for hydrophobic and polyvalent amines; and the CS18, for polar amines. The CS18 is also recommended for moderately hydrophobic and polyvalent amines.

- The CS10 can be used for analysis of the common inorganic cations and aliphatic, cyclic, and aromatic amines.
- Compatible with organic solvents.
- The CS12A provides improved performance for fast analysis of inorganic cations and ammonium.
- The CS17 column is recommended for hydrophobic and polyvalent amines.
- The CS18 column is recommended for polar amines including alkanolamines and methylamines.
- The CS18 is also recommended for moderately hydrophobic amines and polyvalent amines.

The IonPac CS10 is designed for the isocratic separation of lithium, sodium, ammonium, potassium, magnesium, and calcium using hydrochloric acid with diaminopropionic acid eluents with suppressed conductivity detection. Sample matrices for the CS10 include environmental waters; power plant waters treated wtih ammonium, morpholine, or ethanolamine; chemical additives; chemical process solutions; scrubber solutions; plating baths; and industrial solvents.

The CS11 has selectvitity similar to the CS10 column, with improved sensitivity due to its smaller 2 mm i.d. format.

Note: *Use the Cation MicroMembrane Suppressor (CMMS 300) with the CS10 column. Electrolytic suppression is not recommended with HCl and DAP eluents.*



Biogenic amines can be separated rapidly using the IonPac CS10 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac CS10 Cation Exchange Column Data Sheet

Ordering Information

Analytical Columns

IonPac CS10 Analytical Column (4 × 250 mm) 043015

Guard Columns

IonPac CG10 Guard Column (4 × 50 mm)..... 043016

Transition Metal Packed Columns

For determination of metals in diverse sample matrices.

Cation-exchange chromatography is ideal for determination of transition and lanthanide metals in a variety of sample matrices. Because most transition and lanthanide metals are incompatible with suppressed conductivity detection, postcolumn reagent absorbance detection is typically used. Dionex transition metal columns are optimized for this mode of operation.



IonPac CS5A: High-resolution, ion-exchange column for determination of transition and lanthanide metals in diverse sample matrices.

IonPac CS5A

High-resolution, ion-exchange column for transition and lanthanide metals in diverse sample matrices

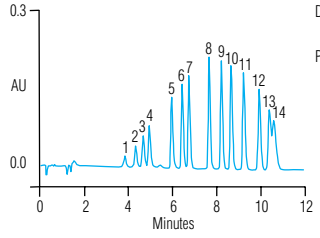
The IonPac CS5A is a high-resolution, ion-exchange column designed for determination of transition and lanthanide metals in a variety of sample matrices. The CS5A column, in combination with postcolumn derivitization and visible detection at 530 nm, provides a sensitive and selective method for transition metal analysis.

- Recommended for the separation of transition and lanthanide metals
- Also useful for aluminum analysis

The CS5A column provides simultaneous determination of common transition metals in less than 11 min using a unique bifunctional resin. The transition metals are detected following complexation with 4-(2-pyridylazo) resorcinol (PAR). The PAR derivative is detected at 520–530 nm. This method is both sensitive and selective for transition metals.

The CS5A provides improved selectivity and higher efficiencies than its predecessor, the CS5 column. Use the MetPac PDCA and Oxalic Acid Eluent Concentrates and PAR Postcolumn Reagent Diluent for simplified operation.

Anion Exchange Separation of Lanthanides Using the IonPac® CS5A Column



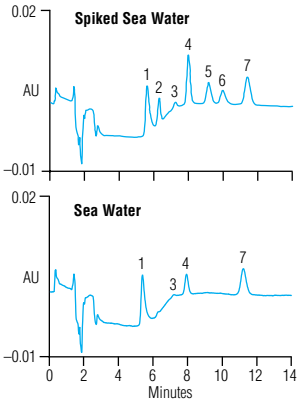
Column:	IonPac CG5A, CS5A 4-mm
Eluent:	Oxalic acid, diglycolic acid gradient
Flow Rate:	1.2 mL/min
Inj. Volume:	50 µL
Detection:	Absorbance, 520 nm with PAR in MetPac™ Postcolumn Reagent Diluent

Peaks:		
1.	Lanthanum	5 mg/L (ppm)
2.	Cerium	5
3.	Praseodymium	5
4.	Neodymium	5
5.	Samarium	5
6.	Europium	5
7.	Gadolinium	5
8.	Terbium	5
9.	Dysprosium	5
10.	Holmium	5
11.	Erbium	5
12.	Thulium	5
13.	Ytterbium	5
14.	Lutetium	5

12159

Separation of lanthanide metals using oxalic acid/diglycolic acid as the complexing agent.

Determination of Transition Metals in Sea Water Using Chelation Ion Chromatography and the IonPac® CS5A Column



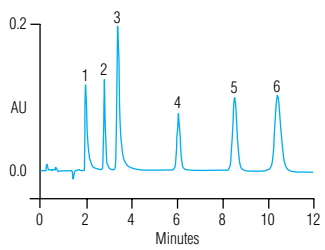
Columns:	IonPac CG5A, CS5A, 4 mm, MetPac™ TMC-1
Eluent:	PDCA, isocratic
Flow Rate:	1.2 mL/min
Preconc. Vol.:	2.5 mL
Detection:	Visible, 530 nm
Postcolumn Reagent:	PAR at 0.6 mL/min

Peaks:	*Sea Water*	*Spike Amt.*	*Spiked Sea Water*
1. Iron	10.8 mg/L	10.0 mg/L	21.6 mg/L (ppb)
2. Copper	-	2.50	2.42
3. Nickel	1.60	5.00	5.85
4. Zinc	1.88	5.00	6.78
5. Cobalt	-	2.50	2.57
6. Cadmium	-	12.5	12.5
7. Manganese	7.16	7.50	14.3

12427

Determination of transition metals in seawater.

Separation of Transition Metals Using Oxalic Acid with the IonPac® CS5A



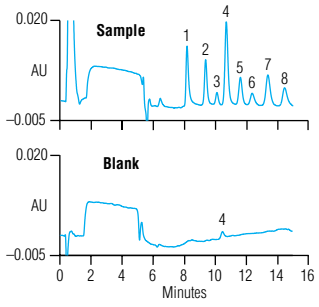
Column:	IonPac CS5A, CG5A 4-mm
Eluent:	MetPac™ Oxalic Acid eluent
Flow Rate:	1.2 mL/min
Inj. Volume:	50 µL
Detection:	Absorbance, 530 nm with PAR in MetPac Postcolumn Reagent Diluent

Peaks		
	1. Lead	5.0 mg/L (ppm)
	2. Copper	0.70
	3. Cadmium	3.3
	4. Cobalt	0.70
	5. Zinc	1.3
	6. Nickel	2.0

11871

Separation of transition metals by a mixed-mode mechanism using oxalate as a complexing agent.

Large Sample Loop Injection of µg/L Levels of Transition Metals Using the IonPac® CS5A Column



Columns:	IonPac CG5A, CS5A, 2-mm
Eluent:	MetPac™ PDCA
Flow Rate:	0.3 mL/min
Post Column Reagent:	PAR in MetPac Postcolumn Reagent Diluent
PCR Flow Rate:	0.15 mL/min
Detection:	530 nm, 10 mm cell
Temp:	30 °C
Inj Volume:	1000 µL

Peaks:		
	1. Iron	2 µg/L (ppb)
	2. Copper	1
	3. Nickel	2
	4. Zinc	>2
	5. Cobalt	1
	6. Cadmium	5
	7. Manganese	3
	8. Iron	2

13775

Large sample loop injection of µg/L levels of transition metals on a 2 mm system with PC10 pneumatic postcolumn delivery.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac CS5A Column and MetPac Reagents Data Sheet

Application Notes

AN 131: Determination of Transition Metals at PPT Levels in High-Purity Water and SC2 (D-clean) Baths

AN 108: Determination of Transition Metals in Serum and Whole Blood by Ion Chromatography

Technical Notes

TN 10: Determination of Transition Metals by Ion Chromatography

Ordering Information

Analytical Columns

IonPac CS5A Analytical Column (4 × 250 mm) 046100
IonPac CS5A Analytical Column (2 × 250 mm) 052576

Guard Columns

IonPac CG5A Guard Column (4 × 50 mm) 046104
IonPac CG5A Guard Column (2 × 50 mm) 052836

Ion-Exclusion Packed Columns

Ion-exclustion for organic acid separations

In ion-exclusion separations. Donnan exclusion causes strong acids to elute in the void volume of the column. Weak acids that are protonated in the acidic eluent are not subject to Donnan exclusion and penetrate into the pores of the resin. Separation is accomplished by differences in pKa, size, and hydrophobicity.



IonPac ICE-AS1: Ion-exclusion column for fast analysis of aliphatic organic acids and alcohols in complex samples.

IonPac ICE-AS6: Ion-exclusion column for aliphatic organic acids, including hydroxy-substituted organic acids, and alcohols in complex samples

IonPac ICE-Borate: Ion-exclusion column ideal for monitoring trace levels of borate in high-purity water.

IonPac ICE-AS1

Ion-exclusion column for fast analysis of aliphatic organic acids and alcohols in complex samples

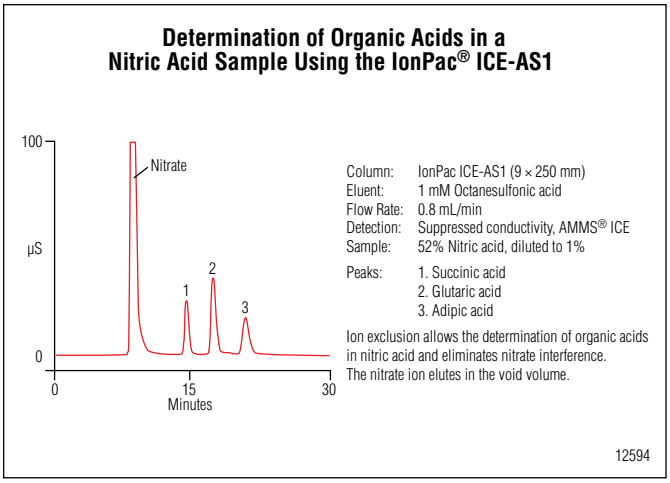
The IonPac ICE-AS1 ion-exclusion column supports fast analysis of aliphatic organic acids and alcohols in complex or high-ionic-strength samples, including foods and beverages, biological samples, fermentation processes, industrial process liquors, and wastewaters.

- Fast separation of organic acids
- Ideal for electroactive ions such as cyanide and sulfite
- Useful for organic acids and alcohols in complex sample matrices

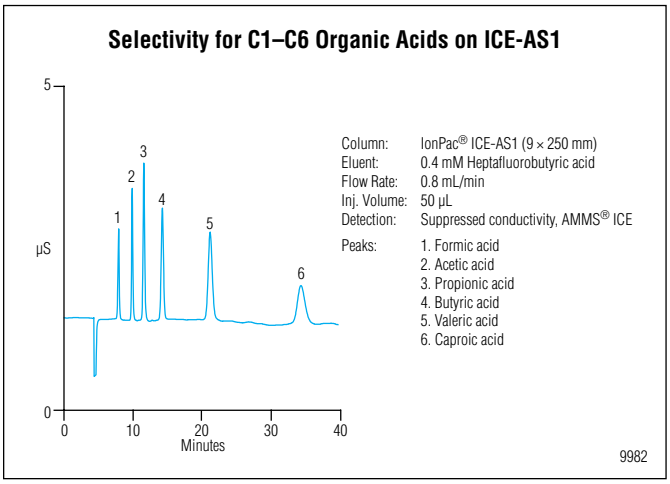
The IonPac AS11 is recommended for fast analysis of organic acids and inorganic anions in well-characterized samples. Use the high-capacity AS11-HC for organic acids and inorganic anions in complex sample matrices.

With the IonPac ICE-AS1 column, weakly ionized acids are separated by pKa differences, size, and hydrophobicity. Strong acid anions such as chloride, oxalate, and sulfate elute in the void and do not interfere with quantification of the organic acids. The ICE-AS1 column can be used with any typical strong acid eluent and a wide variety of detectors, including conductivity, amperometry, photometry, and refractive index, to determine aliphatic organic acids.

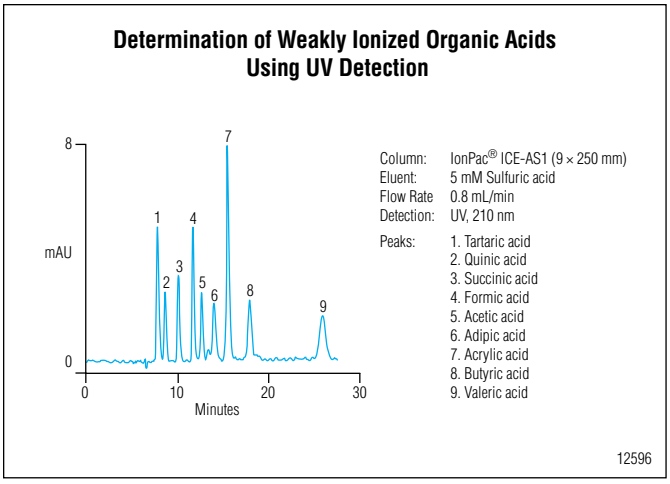
Note: *Use the Anion MicroMembrane Ion-Exclusion Suppressor (AMMS ICE 300) with the ICE-AS1 column.*



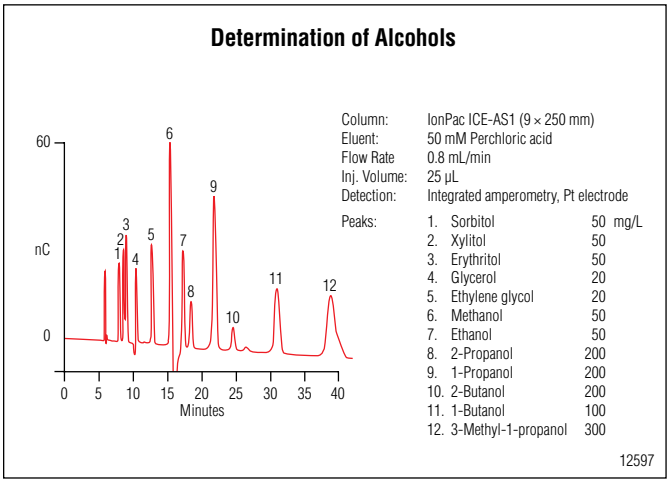
Determination of organic acids in a nitric acid sample using the IonPac ICE-AS1.



Selectivity of ICE-AS1 for C1-C6 organic acids.



Determination of organic acids using the IonPac ICE-AS1 column.



Determination of alcohols using the IonPac ICE-AS1 with pulsed amperometric detection.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac ICE-AS1 Ion-Exclusion Column Data Sheet

Application Notes

AN 21: Organic Acids in Wine

AN 54: Determination of Sulfite in Food and Beverages by Ion Exclusion Chromatography with Pulsed Amperometric Detection

AN 116: Quantification of Anions in Pharmaceuticals

AN 117: Quantification of Carbohydrates and Glycols in Pharmaceuticals

AN 188: Determination of Glycols and Alcohols in Fermentation Broths Using Ion-Exclusion Chromatography and Pulsed Amperometric Detection

Ordering Information

IonPac ICE-AS1	
IonPac ICE-AS1 Analytical Column (9 × 250 mm)	043197
IonPac ICE-AS1 Analytical Column (4 × 250 mm)	064198
IonPac ICE-AS1 Guard Column (4 × 50 mm)	067842

IonPac ICE-AS6

Ion-exclusion column for aliphatic organic acids and alcohols in complex samples

The IonPac ICE-AS6 ion-exclusion column is designed for the fast analysis of aliphatic organic acids (including hydroxy-substituted organic acids) and alcohols in complex or high-ionic-strength samples, including foods and beverages, biological samples, fermentation processes, industrial process liquors, and wastewaters. The ICE-AS6 column is ideally suited for most applications performed on the ICE-AS1 column.

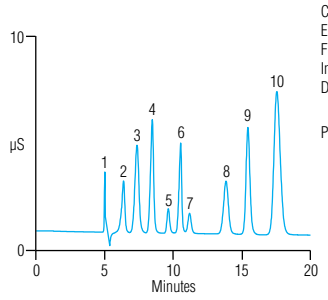
- Use the ICE-AS6 column for organic acids in complex sample matrices.
- Use the ICE-AS1 column for the fast separation of organic acids.

The ICE-AS6 column provides improved peak efficiencies and selectivity for carboxylic acids and alcohols. The weakly ionized acids are separated by pKa differences, size, and hydrophobicity. Strong acid anions such as chloride, oxalate, and sulfate elute in the void and do not interfere with the quantification of the organic acids.

The ICE-AS6 column can be used with any typical strong acid eluent and a wide range of detectors, including conductivity, amperometry, photometry, and refractive index to determine aliphatic organic acids. Use the AS11 for fast analysis of organic acids and inorganic anions in well-characterized samples. Use the high-capacity AS11-HC column for organic acids and inorganic anions in complex sample matrices or uncharacterized samples.

Note: *Use the Anion MicroMembrane Ion-Exclusion Suppressor (AMMS ICE 300) with the ICE-AS6 column.*

Separation of Low-Molecular-Weight Organic Acids Using the IonPac® ICE-AS6 Column



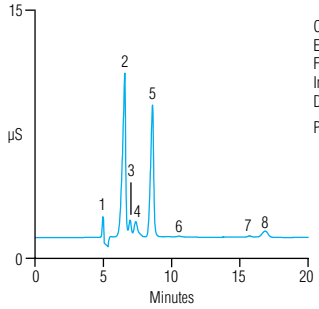
Column:	IonPac ICE-AS6
Eluent:	0.4 mM heptafluorobutyric acid
Flow Rate:	1.0 mL/min
Inj. Volume:	50 µL
Detection:	Suppressed conductivity, AMMS® ICE

Peaks:		
	1. Oxalic	5.0 mg/L (ppm)
	2. Tartaric	10.0
	3. Citric	15.0
	4. Malic	20.0
	5. Glycolic	10.0
	6. Formic	10.0
	7. Lactic	10.0
	8. HIBA	30.0
	9. Acetic	25.0
	10. Succinic	25.0

14427

Separation of low-molecular-weight organic acids using the IonPac ICE-AS6 column.

Determination of Trace Organic Acids in Grape Juice Using The IonPac® ICE-AS6 Column

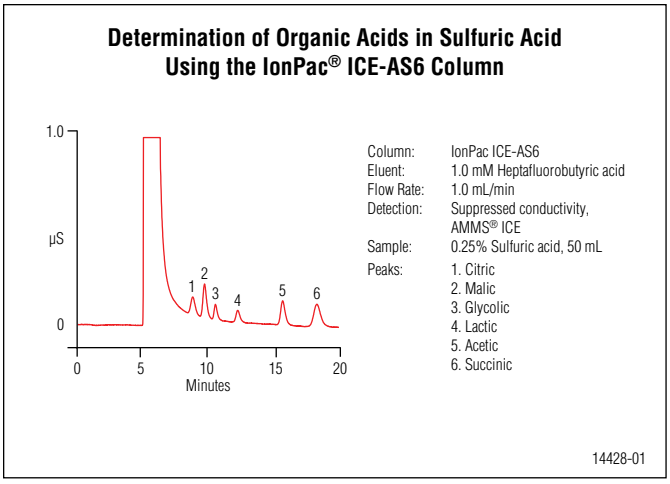


Column:	IonPac ICE-AS6
Eluent:	0.4 mM Heptafluorobutyric acid
Flow Rate:	1.0 mL/min
Inj. Volume:	50 µL
Detection:	Suppressed conductivity, AMMS® ICE

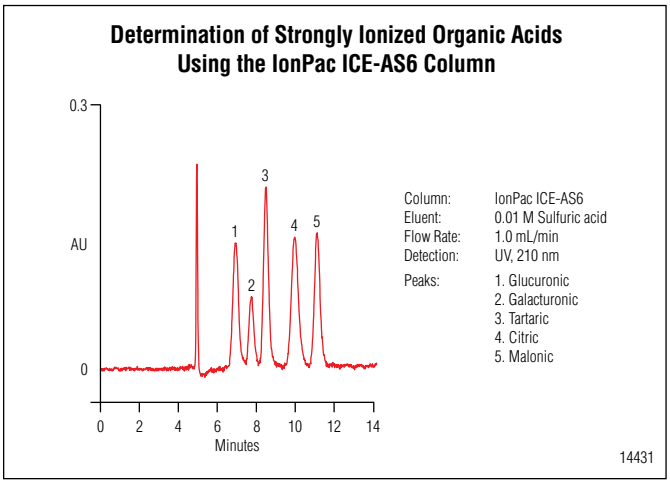
Peaks:	
	1. Inorganics
	2. Tartaric
	3. Galacturonic
	4. Citric
	5. Malic
	6. Formic
	7. Acetic
	8. Unknown

14430

Determination of trace organic acids in grape juice using suppressed conductivity detection.



Ion exclusion allows the determination of organic acids in sulfuric acid and eliminates sulfate interference.



Determination of strongly ionized organic acids using UV detection.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac ICE-AS6 Ion-Exclusion Column Data Sheet

Application Notes

AN 46: Ion Chromatography: A Versatile Technique for the Analysis of Beer

AN 104: Analysis of Personal Care Products by Ion Chromatography

AN 106: Ion Chromatography in the Pharmaceutical Industry

Technical Notes

TN 44: The Determination of Trace Anions in Concentrated Phosphoric Acid

TN 46: Determination of Trace Anions in Concentrated Glycolic Acid

Ordering Information

IonPac ICE-AS6	
IonPac ICE-AS6 Analytical Column (9 × 250 mm)	046023

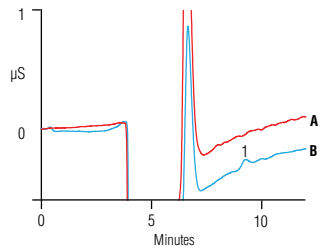
IonPac ICE-Borate

Ion-exclusion column ideal for monitoring trace levels of borate in high-purity water

The IonPac ICE-Borate ion-exclusion column is designed for monitoring trace levels of borate in high-purity water.

Used with the TBC-1 Borate Concentrator column and conductivity detection, the ICE-Borate ion-exclusion column supports the determination of borate at ng/L (ppt) concentrations. Borate is separated and detected as the mannitol complex. Use the Anion MicroMembrane Ion-Exclusion Suppressor (AMMS-ICE 300) with the ICE-Borate column.

Preconcentration of ng/L Levels of Borate Using the IonPac® TBC-1 Column

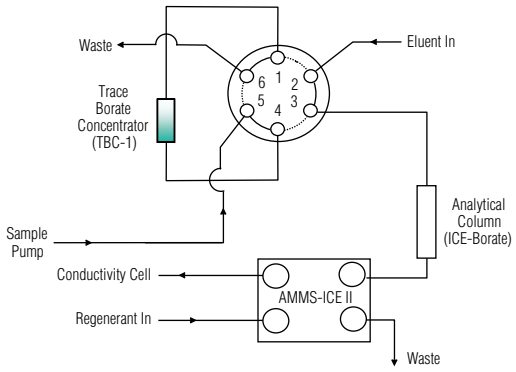


Column: Concentrator	IonPac ICE-Borate
Column:	IonPac TBC-1 Borate
Eluent:	2.5 mM MSA 60 mM mannitol
Flow Rate:	1 mL/min
Detection	Suppressed conductivity, AMMS® ICE II
Regenerant:	25 mM TMAOH 15 mM Mannitol
Sample concentrated:	160 mL at 8 mL/min
Matrix:	5 ppb carbonate
Trace A:	House deionized water
Trace B:	Borate (from boric acid) as boron, 100 ng/L (ppt)
Peaks:	1. Borate

13533

Determination of ng/L concentrations of borate using sample preconcentration.

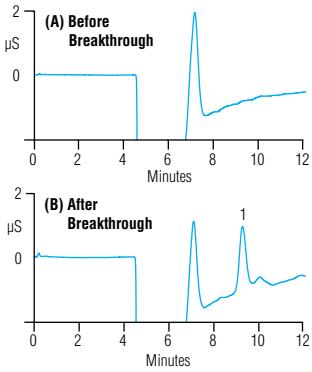
Preconcentration System for Trace Borate Analysis



13778

IC preconcentration system for trace-level borate determination.

Use of Trace-Borate Analysis System for Monitoring Breakdown of Deionization Cartridges



Separator Column:	IonPac® ICE-Borate	
Concentrator Column:	IonPac TBC-1 Concentrator	
Eluent:	2.5 mM MSA, 60 mM mannitol	
Flow Rate:	1 mL/min	
Detection:	Suppressed conductivity, AMMS® ICE II	
Regenerant:	25 mM TMAOH 15 mM mannitol	
Regenerant Flow Rate:	3 mL/min	
Sample Pump Flow Rate:	8 mL/min	
Sample Volume:	160 mL	
Peaks:	1. Boron	700 ng/L (ppt)

13809

IC preconcentration system for trace-level borate determination.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IonPac TBC-1 Borate Concentrator Column and IonPac ICE-Borate Column Data Sheet

Ordering Information

IonPac ICE-Borate	
IonPac ICE-Borate Analytical Column (9 × 250 mm)	053945

Specialty IC Columns

Ideally suited for ion-pair and ion-suppresion reversed-phase chromatography

The NS1 Column is ideal for Mobile Phase Ion Chromatography (MPIC), which combines ion-pair chromatography with suppressed conductivity detection. This combination can be used to determine high molecular weight ionic analytes that are difficult to separate using ion-exchange chromatography

- Ideally suited for ion-pair and ion-suppression of hydrophobic ionizable compounds
- Can also be used for reversed-phase separations
- Polymeric nature permits the use of acids, bases, and solvents in the eluent
- Stable over a wide pH range of 0–14

Suppressed conductivity detection improves the detection limits for acids or bases by reducing the eluent conductance and maximizing analyte conductance. Alternatively, the NS1 can easily be coupled with UV detection for aromatic molecules.



IonPac NS1: Polymeric based, reversed-phase column ideal for ion-pair or ion-suppression separations of hydrophobic, ionizable compounds.

IonPac NS1

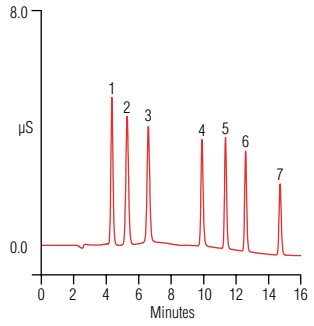
Polymeric reversed-phase column for ion-pair or ion suppression chromatography

The IonPac NS1 column 10 µm and NS-1 5 µm are packed with a neutral, macropouroius high surface area ethylvinylbenzene polymere crosslinked with 55% divinylbenzene. This resin makes the NS-1 column resistant to solvents, acids, and bases, and permits the use of eluents from pH 0-14

- Ideal for seapartion of large molecules that carry localized charges such as surfactants
- Compatible with acids, bases, and solvents
- Can also be used for traditional polymeric reversed-phase applications
- Use ion-pair chromatography for difficult separations

The IonPac NS1 column is the column of choice for routine ion-pair chromatography or ion-suppression separations using the AMMS-ICS suppressor. The NS-1 column is also used for mobile-phase ion chromatography (MPIC), a technique especially suited for large molecules with local charges (e.g. surfactants) as well as other ions that are not amenable to separation by ion exchange chromatography

Separation of Aliphatic Sulfonic Acids Using Tetrabutylammonium Ion as the Ion-Pair Reagent



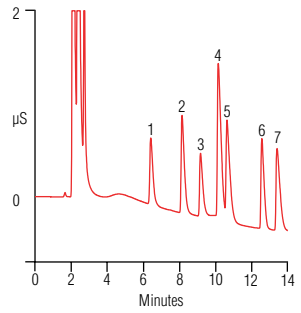
Column: IonPac® NS1 (10 mm)
Eluent: 2 mM Tetrabutylammonium hydroxide, 24% to 48% Acetonitrile in 10 min
Flow Rate: 1.0 mL/min
Inj. Volume: 50 µL
Detection: Suppressed conductivity, ASRS®-ULTRA, AutoSuppression® coupled with chemical regenerant mode
Regenerant: 10 mN Sulfuric acid

Peaks:		
1.	Methanesulfonic acid	5.0 mg/L (ppm)
2.	1-Propanesulfonic acid	8.6
3.	1-Butanesulfonic acid	8.7
4.	1-Hexanesulfonic acid	8.8
5.	1-Heptanesulfonic acid	8.9
6.	1-Octanesulfonic acid	8.9
7.	1-Decanesulfonic acid	9.1

11140

Separation of aliphatic sulfonic acids using tetrabutylammonium ion as the ion-pair reagent.

Determination of Aliphatic Quaternary Ammonium Ions Using Nonafluoropentanoate Ion as the Ion-Pair Reagent with an Acetonitrile Gradient



Column: IonPac® NS1 (10 mm)
Eluent: 2 mM nonafluoropentanoic acid, 20% to 80% acetonitrile in 10 min
Flow Rate: 1.0 mL/min
Inj. Volume: 25 µL
Detection: Suppressed conductivity, CSRS® ULTRA, AutoSuppression® external water mode

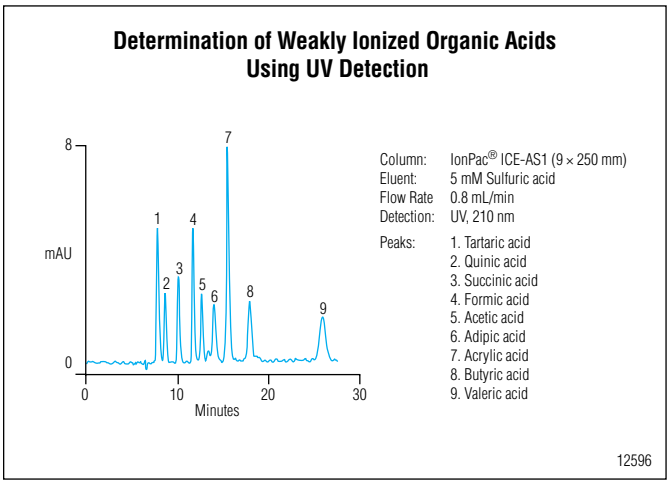
Peaks: (as the chloride salts)		
1.	Tetrapropylammonium	25 mg/L (ppm)
2.	Tributylmethylammonium	50
3.	Decyltrimethylammonium	25
4.	Tetrabutylammonium	5
5.	Dodecyltrimethylammonium	50
6.	Tetrapentylammonium	100
7.	Hexadecyltrimethylammonium	100

11143

Determination of aliphatic quaternary ammonium ions using nonafluoropentanoate ion as the ion-pair reagent with an acetonitrile gradient.

Key Applications

The IonPac NS1 column can be used for the separation of high MW aliphatic carboxylic acids, alkyl and aromatic sulfates and sulfonates, quaternary ammonium ions, water-soluble vitamins, sulfur oxides, metal cyanide complexes, phenols, and alkanolamines.



Determination of aliphatic carboxylic acids.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

IonPac NS1 Reversed Phase Polymeric Column Data Sheet

Application Notes

AN 139: Determination of Additives and Byproducts in an Acid Copper Plating Bath by Liquid Chromatography

AN 145: Determination of the Suppressor Additive in Acid Copper Plating Bath

AN 45: Fatty Acid Analysis

Technical Notes

TN 12: Methods Development Using Ion-Pair Chromatography with Suppressed Conductivity Detection

Ordering Information

Analytical Columns

IonPac NS1-10 µm Analytical Column (4 x 250 mm)..... 035321
IonPac NS1-5 µm Analytical Column (4 x 150 mm)..... 039568
IonPac NS1 10 µm Analytical Column (2 x 250 mm)..... SP4354

Guard Columns

IonPac NG1-10 µm Guard Column (4 x 35 mm)..... 039567
IonPac NG1-10 µm Guard Column (2 x 50 mm)..... SP4356

IC Trap Columns

Columns to purify eluent or polish samples

Trap columns are short columns installed in the system to prevent unwanted analytes from interfering with the separation of your analytes of interest. IonPac trap columns contain high-capacity, low-efficiency, ion-exchange resin. The columns strip trace contaminants from the eluent and prevent them from reaching the guard and analytical columns. Polisher columns are specialized columns that remove unwanted counterions from the sample, and are installed between the sampler and injector.



Anion Trap Columns: Anion trap columns prevent anionic contaminants from causing spurious peaks

Cation Trap Columns: Cation trap columns prevent cationic contaminants from causing spurious peaks

Cation Polisher: For removal of metallic contaminants and other cations such as calcium and magnesium from the sample stream during anion analysis.

MFC-1 Metal-Free: Designed to remove transition metals from high-pH eluents.

Anion Trap Columns

IonPac Anion Trap Columns contain high-capacity, anion-exchange resin in the hydroxide form. The anion trap column is installed in the eluent line prior to the injection valve to prevent eluent contaminants from causing spurious peaks during gradient chromatography.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

ATC-3 Anion Trap Column

The IonPac ATC-3 Anion Trap Column contains a high-capacity, low-efficiency, anion-exchange resin used to remove trace anion contamination from eluents.

Ordering Information

Accessories	
Trap Column/Suppressor Cleanup Kit	059659
ATC-3 4 mm Anion Trap Column (9 × 24 mm)	059660
ATC-3 2 mm Anion Trap Column (4 × 35 mm)	059661

ATC-HC Anion Trap Column

The IonPac ATC-HC Anion Trap Column is a high-capacity, anion-exchange trap column designed for use with hydroxide eluents.

For RFIC, EGC-KOH applications, use the CR-ATC.

Ordering Information

Accessories	
ATC-HC Anion Trap Column (9 × 75 mm)	059604
Trap Column/Suppressor Cleanup Kit	059659

ATC-HC Borate Form Anion Trap Column

The ATC-HC Borate Form Anion Trap Column is a high capacity anion-exchange trap column designed for use with borate eluents.

The ATC-HC Borate Form is placed between the pump outlet and the inlet of the EGC-KOH cartridge to strip anionic contaminants from the deionized water and prevent them from reaching the guard and analytical columns.

Ordering Information

Accessories	
Trap Column/Suppressor Cleanup Kit	059659
ATC-HC Anion Trap Column - Borate Form (9 × 75 mm)	064755

Cation Trap Columns

IonPac Cation Trap Columns contain high-capacity, cation-exchange resin in the hydronium form. The cation trap column is installed in the eluent line prior to the injection valve to prevent eluent contaminants from causing spurious peaks during gradient chromatography.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

CTC Cation Trap

The IonPac CTC Cation Trap Column contains high-capacity, low-efficiency, cation-exchange resin in the hydronium ion form, to remove trace cation contaminants from eluents. The trap is installed in the eluent line prior to the injection valve to prevent spurious peaks and reduce baseline shifts during gradient chromatography. For RFIC-EGC MSA applications, use the CR-CTC.

Ordering Information

Accessories	
IonPac CTC-1 Cation Trap Column	040192
IonPac CTC Cation Trap Column 2 mm	043132

Cation Polisher

IonPac CP1 Na^+ Form and CP2 H^+ Form Cation Polishers are designed for removal of metallic contaminants and other cations such as calcium and magnesium from the sample stream during anion analysis. They prevent high levels of metals or cations in samples from collecting on columns or suppressors, which can cause performance issues such as poor peak shapes or anion recoveries.

- Helps extend column and suppressor lifetimes
- Suited to phosphate analysis with metallic contaminants
- CP1 Na^+ form: specifically designed for autosampler operation
- CP2 H^+ form: recommended for large-volume sample preconcentration applications using an external pump

Dionex Cation Polisher Columns can aid removal of matrix cations during anion analysis with sample preconcentration. Matrix cations can elute species of interest from the concentrator column leading to poor peak shapes and recovery. Removing the matrix cations using the Cation Polisher Column enables improved chromatographic performance.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

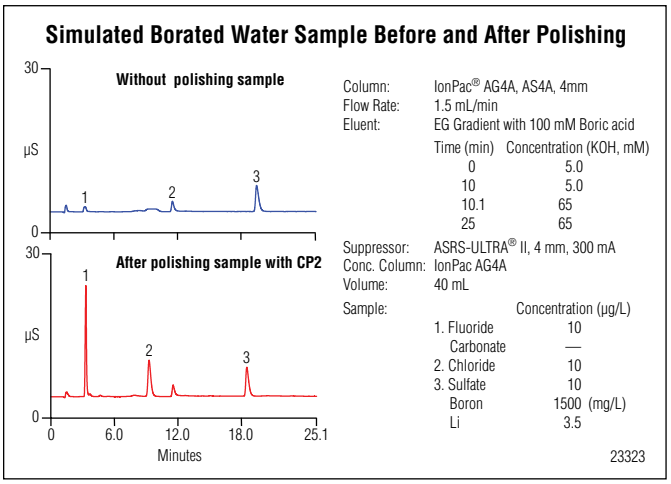
Cation Polisher Na^+ for Anion Analysis

The CP1 Na+ Form (6 × 16 mm) column is a cation exchange column in the sodium form, packed in a low pressure format. It is specifically designed for autosampler operation. The void volume of this column is approximately 250 μL.

Ordering Information

Cation Polisher Na+	
IonPac CP1 Na+ Form Cation Polisher Column (6 × 16 mm)	064930

Cation Polisher H+ for Anion Analysis



The CP2 H+ Form (9 × 24 mm) column is a higher-capacity version in the hydronium form, with a void volume of approximately 825 µL. The CP2 is recommended for large-volume sample preconcentration applications using an external pump. The Cation Polisher Columns can be regenerated off-line approximately every 2-3 months (depending on the level of contamination and usage).

Ordering Information

Cation Polisher H+	
IonPac CP2 H+ Form Cation Polisher Column (9 × 24 mm)	064931

MFC-1 Metal-Free

The IonPac MFC-1 metal-free column contains a special chelating resin that strips trace transition metal contaminants from high-pH eluents.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

MFC-1 Metal Free Column

The IonPac MFC-1 metal-free column is installed in the eluent line prior to the injection valve to clear trace transition metal contaminants from high-pH eluents.

Ordering Information

Accessories	
MFC-1 Metal-Free Column (3 × 27 mm)	037017

IC Concentrator Columns

Columns to capture and concentrate sample ions from large injection volumes

IonPac concentrator columns are designed primarily for high purity water analysis. A concentrator column retains ions from a measured volume of aqueous sample matrix, concentrating the analyte species and lowering detection limits. Concentrator columns typically have internal volumes of hundreds of microliters, but can concentrate the ions from tens of milliliters, increasing sensitivity by 2–5 orders of magnitude compared to standard sample loops.



Anion Concentrator Columns: Retains anions from a measured volume of sample matrix, concentrating the analyte species.

Cation Concentrator Columns: Retains cations from a measured volume of aqueous sample matrix, concentrating the analyte species.

Transition Metal: High-capacity, cation-concentrator column for coupling the MetPac CC-1 chelating column to the IonPac CS5A analytical column.

Anion Concentrator Columns

IonPac anion concentrator columns are designed primarily for high-purity water analysis. The concentrator retains ions from a measured volume of aqueous sample matrix, concentrating the analyte species and lowering detection limits by 2–5 orders of magnitude.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Data Sheets

Concentrator and Trap Columns Data Sheet

UTAC-LP2

The IonPac UTAC-LP2 is an anion-exchange concentrator column with low void volume. Designed primarily for high-purity water analysis, this ultraclean (low sulfate) concentrator column strips ions from a measured volume of aqueous sample matrix, concentrating the analyte species and lowering detection limits.

- Low void volume (approximately 145 µL)
- Low-backpressure
- Compatible with the AS-DV Autosampler, and Loading Pumps
- Ultraclean (low sulfate)
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

Improved backpressure resilience eliminates the need for a pulse damper on the loading pump, and improved matrix resilience allows direct injection of samples containing polyacrylic acid additives.

Key Specifications

Dimensions: 4 × 35 mm

Void Volume: approximately 145 µL

Capacity: 25.0 µeq/col

Backpressure<60 psi at 2.0 mL/min

Ordering Information

UTAC-LP2	
UTAC-LP2 Ultra Trace Anion Concentrator- Low Pressure (4 x 35 mm)	072779

UTAC-ULP2

The IonPac UTAC-ULP2 Ultratrace Anion Concentrator Column is an anion-exchange concentrator column with low void volume. Designed primarily for high-purity water analysis, this ultraclean (low sulfate) concentrator column strips ions from a measured volume of aqueous sample matrix, concentrating the analyte species and lowering detection limits.

- Low void volume of approximately 145 µL
- Ultra-Low backpressure column
- Compatible with the AS, AS-HV and AS-DV Autosamplers, and Loading Pumps
- Ultraclean (low sulfate) concentrator column
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

Improved backpressure resilience eliminates the need for a pulse dampener on the loading pump, and improved matrix resilience allows direct injection of samples containing polyacrylic acid additives.

Key Specifications

Dimensions: 5 × 23 mm

Capacity: 25 µeq/col

Void Volume: approximately 145 µL

Backpressure: <30 psi at 2.0 mL/min

Ordering Information

UTAC-ULP2	
UTAC-ULP2 Ultra Trace Anion Concentrator- Ultralow Pressure (5 x 23mm)	072780

UTAC-XLP2

The IonPac UTAC-XLP2 Ultra Trace Anion Concentrator Column is a general purpose anion-exchange concentrator column. The UTAC-XLP2 can be used with a single-piston loading pump (AXP) syringe pump, or autosampler (AS, AS-HV, or AS-DV).

- Low void volume approximately 145 µL
- Extremely low-backpressure column
- Compatible with AS, AS-HV and AS-DV Autosamplers and Loading Pumps
- Ultraclean (low sulfate) concentrator column
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

Improved backpressure resilience eliminates the need for a pulse damper on the loading pump, and improved matrix resilience allows direct injection of samples containing polyacrylic acid additives.

Key Specifications

Dimensions: 6 × 16 mm

Capacity: 25 µeq/col

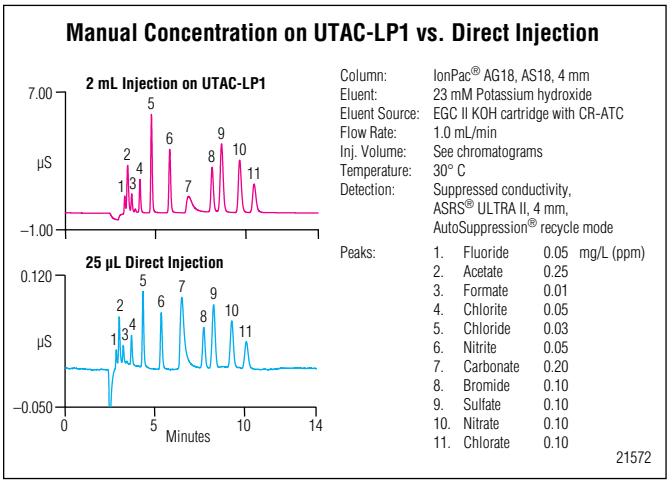
Void Volume: approximately 145 µL

Backpressure: <15 psi at 2.0 mL/min

Ordering Information

UTAC-XLP2	
UTAC-XLP2 Ultra Trace Anion Concentrator- Extremely Low Pressure (6 x 16mm)	072781

UTAC-LP1



The UTAC-LP1 Ultra Trace Anion Concentrator Column is a pellicular anion-exchange concentrator with low void volume. The ultraclean (low sulfate) UTAC-LP1 is a general purpose concentrator column for use with syringe or autosampler loading.

- Low-backpressure column
- Compatible with the AS-DV Autosampler
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

Key Specifications

Format: 4 × 35 mm

Capacity: 25.0 µeq/column

Void Volume: approximately 145 µL

Backpressure: <60 psi at 2.0 mL/min.

Ordering Information

UTAC-LP1	
UTAC-LP1 Ultra Trace Anion Concentrator Low Pressure (4 x 35 mm)	063079

UTAC-ULP1

The UTAC-ULP1 Ultra Trace Anion Concentrator Column is a pellicular anion-exchange concentrator column with low void volume of approximately 145 µL.

- Ultraclean (low sulfate) concentrator column
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

The UTAC-ULP1 is a general purpose concentrator for use with syringe or autosampler loading. This ultralow backpressure concentrator can be used with the AS-DV, AS-HV, or AS Autosamplers, and with single piston sample delivery pumps including the AXP. It is compatible with carbonate/bicarbonate, borate, and hydroxide eluents.

Key Specifications

Format: 5 × 23 mm

Capacity: 25.0 µeq/column

Void Volume: approximately 145 µL

Backpressure: <30 psi at 2.0 mL/min.

Ordering Information

UTAC-ULP1	
UTAC-ULP1 Ultra Trace Anion Concentrator Ultralow Pressure (5 x 23 mm)	063475

UTAC-XLP1

The UTAC-XLP1 Ultra Trace Anion Concentrator Column is a pellicular anion-exchange concentrator column with low void volume (approximately 145 µL).

- Ultraclean (low sulfate) concentrator column
- Supports carbonate/bicarbonate, borate, and hydroxide eluents

The UTAC-XLP1 is a general purpose concentrator for use with syringe or autosampler loading. This low-backpressure column can be used with the AS-DV, AS-HV, or AS Autosamplers, and with single piston sample delivery pumps including the AXP.

Note: *Not solvent compatible.*

Key Specifications

Format: 6 × 16 mm

Capacity: 25.0 µeq/column

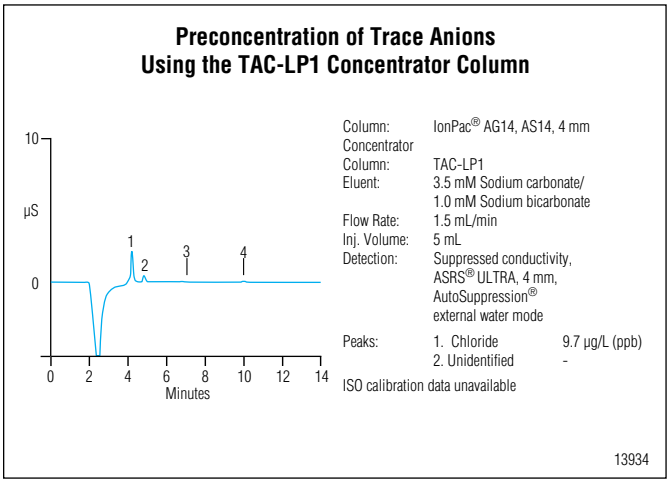
Void Volume: approximately 145 µL.

Backpressure: <10 psi at 2.0 mL/min.

Ordering Information

UTAC-XLP1	
UTAC-XLP1 Ultra Trace Anion Concentrator Extremely Low Pressure (6 x 16 mm)	063459

TAC-LP1



The IonPac TAC-LP1 Trace Anion Concentrator Column is a pellicular anion-exchange concentrator.

- Supports carbonate/bicarbonate, borate, and hydroxide eluents

The TAC-LP1 is a general purpose, low-pressure concentrator for use with syringe or autosampler loading with void volume of approximately 145 µL. The TAC-LP1 is also designed for use as the concentrator column in the SP10 AutoNeutralization module for anions.

Key Specifications

Format: 4 × 35 mm

Capacity: 25 µeq/column

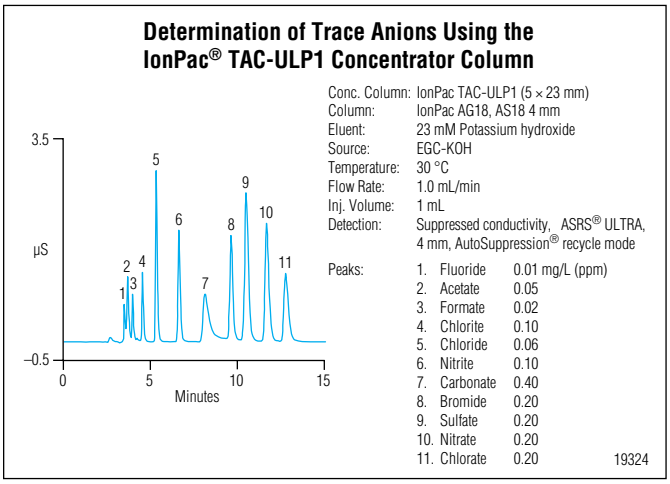
Void Volume: approximately 145 µL

Backpressure: <60 psi at 2.0 mL/min

Ordering Information

TAC-LP1	
IonPac TAC-LP1 Low Pressure Anion Concentrator	046026

TAC-ULP1



The IonPac TAC-ULP1 Trace Anion Concentrator Column is a pellicular anion-exchange concentrator with moderately low void volume. It is an ultralow pressure concentrator for use with syringe or autosampler loading (AS-DV and AS-HV Autosamplers). It can be used with single-piston sample delivery pumps (e.g., AXP). Compatible with carbonate, borate, or hydroxide eluents.

Key Specifications

Format: 5 × 23 mm

Capacity: 25.0 µeq/column

Void Volume: approximately 145 µL

Backpressure: <30 psi at 2.0 mL/min

Ordering Information

TAC-ULP1	
TAC-ULP1 Ultralow Pressure Trace Anion Concentrator (5 x 23 mm)	061400

TAC-2

The IonPac TAC-2 Trace Anion Concentrator Column is a pellicular anion-exchange concentrator column with moderately low void volume (~50 µL).

- Can be used with carbonate/bicarbonate and borate eluents

Note: *Not solvent compatible.*

Key Specifications

Format: 4 × 50 and 2 × 50 mm

Capacity: 9 µeq/column (4mm); 2.2 µeq/column (2 mm)

Void volume: 150 µL (4 mm); 53 µL (2 mm)

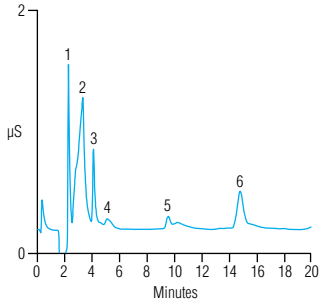
Backpressure: <140 psi at 1.0 mL/min; <160 psi at 0.42 mL/min

Ordering Information

TAC-2	
IonPac TAC-2 Trace Anion Concentrator	043101
IonPac TAC-2 Trace Anion Concentrator, Pkg. of 4	043102

AMC-1

Determination of Trace-Level Fluoride, Chloride, and Sulfate Standard Using an AMC-1 Anion Microconcentrator Column and the AS12A Column



Column:	IonPac® AG12A, AS12A, 2 mm
Concentrator Column:	AMC-1
Eluent:	2.1 mM sodium carbonate 0.8 mM sodium bicarbonate
Flow Rate:	0.38 mL/min
Inj. Volume:	36 mL
Detection:	Suppressed conductivity, ASRS® ULTRA, 2 mm, AutoSuppression® external water mode

Peaks:		
	1. Fluoride	0.36 µg/L (ppb)
	2. Carbonate	-
	3. Chloride	0.34
	4. Unidentified	-
	5. Unidentified	-
	6. Sulfate	0.70

13138

The AMC-1 is a very low void volume microconcentrator column designed for the concentration of inorganic anions and low-molecular-weight organic anions from ultrapure water. A unique, solvent-compatible resin technology ensures a low sulfate background and ruggedness during the concentration step.

The AMC-1 can be loaded with either a loop or sample loading pump. The low void volume (approximately 15 µL) ensures accurate determination of early-eluting anions such as fluoride, glycolate, acetate, and formate. The AMC-1 can be used with carbonate/bicarbonate or borate eluents.

Key Specifications

Format: 2 × 15 mm

Capacity: 3 mequiv/column

Void volume: 15 µL

Backpressure: 60–110 psi at 0.5 mL/min

Ordering Information

AMC-1	
IonPac AMC-1 Anion Micro Concentrator (2 x 15 mm)	051760

AC10

The IonPac AC10 is an anion-exchange concentrator column designed for use with the IonPac AS10 column.

Key Specifications

Format: 4 × 50 and 2 × 50 mm

Capacity: 4.0 µeq/column (4 mm); 0.8 µeq/column (2 mm)

Void Volume: 207 µL (4 mm); 52 µL (2 mm)

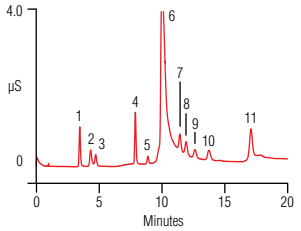
Backpressure: <300 psi at 1.0 mL /min (4 mm); <300 psi at 0.25 mL/min (2 mm)

Ordering Information

AC10	
IonPac AC10 Concentrator Column (4 x 50 mm)	043133
IonPac AC10 Concentrator Column (2 x 50 mm)	043134

AC15

Determination of Inorganic Anions and Low-Molecular-Weight Organic Acids with Sample Preconcentration Using the IonPac® AS15 Column



Column: Concentrator — IonPac AG15, AS15, 2 mm
Column: — IonPac AC15
Eluent: — Potassium hydroxide, 10 mM from 0 to 4 min, 10–40 mM from 4 min to 14 min, 40–60 mM from 14 to 18 min
Eluent Source: — EG40
Temperature: — 30 °C
Flow Rate: — 0.5 mL/min
Sample Volume: — 20 mL, preconcentrated
Detection: — Suppressed conductivity, ASRS® ULTRA, 2 mm, AutoSuppression® recycle mode

Peaks:

	µg/L (ppb)		µg/L (ppb)
1. Fluoride	0.1	7. Sulfate	0.1
2. Acetate	0.1	8. Oxalate	0.1
3. Formate	0.1	9. Bromide	0.1
4. Chloride	0.1	10. Nitrate	0.1
5. Nitrite	0.1	11. Phosphate	0.1
6. Carbonate	–		

14871

The IonPac AC15 is an anion-exchange concentrator column designed for use with the IonPac AS15 column. Use the AC15 2 × 50 mm format for 2 and 3 mm applications.

Key Specifications

Format: 4 × 50 and 2 × 50 mm

Capacity: 9 µeq/column (4mm); 2.2 µeq/column (2 mm)

Void volume: 150 µL (4 mm); 53 µL (2 mm)

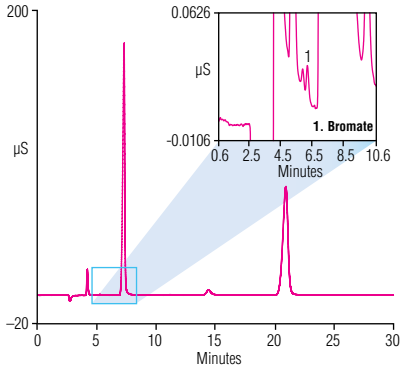
Backpressure: <140 psi at 1.0 mL/min; <160 psi at 0.42 mL/min

Ordering Information

AC15	
IonPac AC15 Concentrator Column (4 x 50 mm)	055694
IonPac AC15 Concentrator Column (2 x 50 mm)	055695

AC-ER

Determination of Bromate in a Municipal Water Sample Using a Reagent-Free™ IC System with EG and an AC-ER Concentrator Column



Column: Conc. — IonPac AG23, AS23, 4 mm
Column: — IonPac AC-ER (4 × 16 mm)
Eluent: — 4.5 mM Sodium carbonate/ 0.8 mM Sodium bicarbonate
Flow Rate: — 1 mL/min
Inj. Volume: — 500 µL, preconcentrated
Detection: — Suppressed conductivity, ASRS 300, 4 mm, AutoSuppression recycle mode

Peaks: 1. Bromate

26696

The AC-ER Anion Concentrator Column is a general-purpose, low dead volume, extremely low pressure anion concentrator column with similar features to the UTAC 2, but with reduced dead volume and capacity. The AC-ER is housed in a 4 x 16 mm column body for low dead volume, maximizing the number of injections that can be made on a RFIC-ER system between eluent exchanges.

- Extremely low backpressure
- Very low dead volume
- AC-ER column has a capacity of 12.0 µeq/column and a void volume of approximately 70 µL
- 266 injections can be performed before the eluent needs to be replaced regardless of the sample load
- Compatible with AS, AS-HV and AS-DV Autosamplers
- Ultraclean (low sulfate)
- Supports carbonate/bicarbonate eluents

With an AC-ER column installed in an RFIC-ER system, each injection only adds 75 µL of sample matrix into the eluent regardless of the sample volume (70 µL + 5 µL for connecting tubing). By using a matrix elimination step with the AC-ER in place, solvents can be directly injected onto the AC-ER then flushed off before injection into the RFIC-ER system.

Key Specifications

Dimensions: 4 × 16 mm

Mobile Phase Compatibility: Carbonate/Bicarbonate eluents; 0–100% HPLC solvents

Substrate Characteristics: Bead Diameter: 20 µm; Crosslinking (%DVB): 55%; Functional Group: Alkanol quaternary ammonium

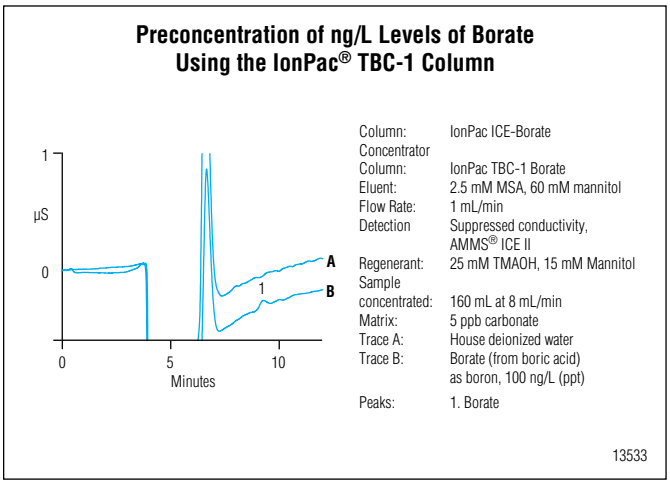
Capacity: 12 µeq/col

Void Volume: 70 µL

Ordering Information

AC-ER	
AC-ER Anion Concentrator for RFIC-ER	072778

Cryptand C1



The IonPac Cryptand C1 Concentrator Column is recommended for the analysis of trace perchlorate in drinking water. This adjustable-capacity column contains a macroporous, 17.5-µm resin grafted with the macrocyclic 2,2,2 cryptand compound. The column's functional capacity depends on eluent concentration and the type of cation bound within the cryptand molecule.

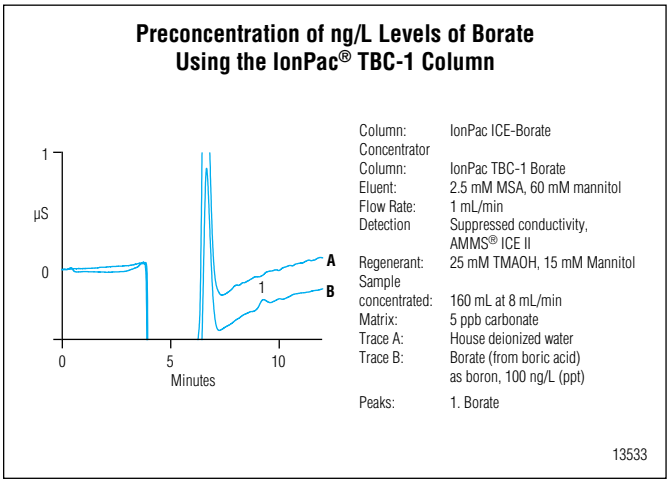
- Approximately 30 µeq/col of cryptand capacity available for use
- Capacity adjustable from fixed amount to zero by via eluent concentration or cation type

The adjustable capacity makes the Cryptand C1 a powerful tool for determining trace perchlorate in drinking water and high-ionic-strength water. Methods using the C1 can quantify 140 ng/L of perchlorate in a background of total dissolved solids with concentrations as high as 3000 mg/L. The Cryptand C1 is specified for sample preconcentration in US EPA Method 314.1.

Ordering Information

Cryptand C1	
IonPac Cryptand C1 Concentrator Column (4 x 35 mm)	062893
IonPac TBC-1 Trace Borate Concentrator	053944

IonPac TBC-1



The IonPac TBC-1 Trace Borate Concentrator Column is optimized for trace analysis of borate. The TBC-1 has a low void volume and is packed with a unique resin surface grafted with highly selective polyol groups. The TBC-1 is coupled to a specially designed ICE-Borate column for the determination of borate at ng/L (ppt) concentrations.

Mannitol eluent quantitatively elutes borate from the TBC-1 concentrator column.

Ordering Information

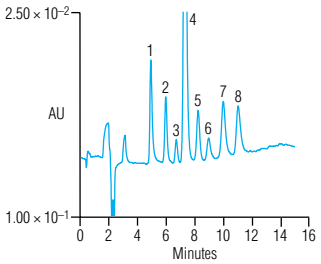
TBC-1	
IonPac TBC-1 Trace Borate Concentrator	053944

Cation Concentrator Columns

IonPac cation concentrator columns are designed primarily for high-purity water analysis. The concentrator strips ions from a measured volume of aqueous sample matrix, concentrating the analyte species and lowering detection limits by 2–5 orders of magnitude.

TCC-2

Preconcentration of ng/L Levels of Transition Metals Using the IonPac® CS5A Column



Note: Zn contamination present.

Columns:	IonPac CG5A, CS5A, 2 mm
Concentrator Column:	IonPac TCC-2
Eluent:	MetPac™ PDCA
Flow Rate:	0.3 mL/min
Postcolumn Reagent:	PAR in MetPac Postcolumn Reagent Diluent
PCR Flow Rate:	0.15 mL/min
Detection:	530 nm, 10 mm cell
Temp:	30 °C
Preconcentrated Vol.:	4.0 mL

Peaks:		
	1. Iron	500 ng/L (ppt)
	2. Copper	250
	3. Nickel	500
	4. Zinc	>500
	5. Cobalt	250
	6. Cadmium	1250
	7. Manganese	750
	8. Iron	500

13774

The IonPac TCC-2 Trace Cation Concentrator Column is a pellicular cation-exchange concentrator with moderately low void volume (approximately 50 µL).

The TCC-2 is a surface-sulfonated, cation-exchange concentrator column that is ideal for use with sulfonated columns such as the CS3, CS10, and CS11. It can also be used as a concentrator column for transition metals. The TCC-2 can be used with hydrochloric acid or diaminopropionic acid eluent.

Key Specifications

Format: 3 × 35 mm

Capacity: 10 µeq/column

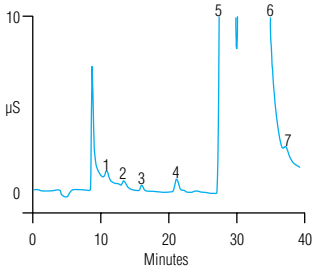
Void volume: 50 µL

Ordering Information

Accessories	
IonPac TCC-2 Trace Cation Concentrator	043103
IonPac TCC-2 Trace Cation Concentrator, Pkg of 4	043104

TCC-LP1

Column Switching for Trace Cations in Ethanolamine-Treated Water



Columns:	IonPac® CG12A, CS12A, 2 mm CG11, CS11, 2 mm
Trap Column:	CTC-1
Concentrator:	TCC-LP1, 4 mm
Eluent:	22.5 mM methanesulfonic acid
Flow Rate:	0.23 mL/min
Sample Vol.:	14.5 mL
Detection :	Suppressed conductivity, CSRS® ULTRA, 4 mm, AutoSuppression® recycle mode

Peaks:		
	1. Magnesium	0.6 µg/L (ppb)
	2. Calcium	1.2
	3. Lithium	0.15
	4. Sodium	0.3
	5. Ammonium	1000
	6. Ethanolamine	5000
	7. Potassium	3.0

11543

The IonPac TCC-LP1 Trace Cation Concentrator Column is a pellicular cation-exchange concentrator with moderately low void volume (approximately 145 µL).

The TCC-LP1 is a general purpose, very low-pressure concentrator for use with syringe or autosampler loading. It is also designed for use as the concentrator column in the SP10 AutoNeutralization module for cations. The TCC-LP1 can be used with sulfuric acid, methanesulfonic acid, and hydrochloric acid eluents.

Note: *The TCC-LP1 is recommended for use with carboxylated columns such as the CS12, CS12A, CS14, CS15, CS16, CS17, and CS18.*

Key Specifications

Format: 4 × 35 mm

Capacity: 260 µeq/column

Void volume: 145 µL

Backpressure: 70 psi at 1.0 mL/min

Ordering Information

Accessories	
IonPac TCC-LP1 Low Pressure Cation Concentrator	046027

TCC-ULP1

The IonPac TCC-ULP1 Trace Cation Concentrator Column is a pellicular cation-exchange concentrator column with moderately low void volume (approximately 145 µL). It is designed primarily for high purity water analysis. The column strips ions from a measured volume of aqueous sample matrix, concentrating the analyte species, thereby lowering detection limits.

The TCC-ULP1 Ultralow Pressure Trace Cation Concentrator Column is a general purpose, ultralow-pressure concentrator for use with syringe or autosampler loading (AS-DV, AS-HV, or AS autosamplers) and with single-piston sample delivery pump including the AXP. The TCC-ULP1 can be used with sulfuric acid, methanesulfonic acid, and hydrochloric acid eluents.

Note: *The TCC-ULP1 is recommended for use with carboxylated columns such as the IonPac CS12, CS12A, CS14, CS15, CS16, CS17, and CS18 columns.*

Key Specifications

Format: 5 × 23 mm

Capacity: 260 µeq/column

Void Volume: approximately 145 µL

Backpressure: 45 psi at 1.0 ml/min

Ordering Information

Accessories	
TCC-ULP1 Ultralow Pressure Trace Cation Concentrator (5 x 23 mm)	063783

TCC-XLP1

The IonPac TCC-XLP1 Extremely-Low Pressure Trace Cation Concentrator Column is a pellicular cation-exchange concentrator with moderately low void volume.

The IonPac TCC-XLP1 is compatible with a syringe or autosampler (AS-DV, AS-HV or AS Autosamplers) and with single-piston sample delivery pump including the AXP. It is recommended for use with carboxylated columns such as the IonPac CS12, CS12A, CS14, CS15, CS16, CS17, and CS18. The column is used with sulfuric acid, methanesulfonic acid, and hydrochloric acid eluents.

Key Specifications

Format: 6 × 16 mm

Capacity: 260 µeq/column

Void volume: approximately 145 µL

Backpressure: 30 psi at 1.0 mL/min

Ordering Information

Accessories	
TCC-XLP1 Extremely Low Pressure Trace Cation Concentrator (6 x 16 mm)	063889

Transition Metal Concentrator Columns

Dionex provides a trace metal concentrator for use in chelation ion chromatography.

Related Literature

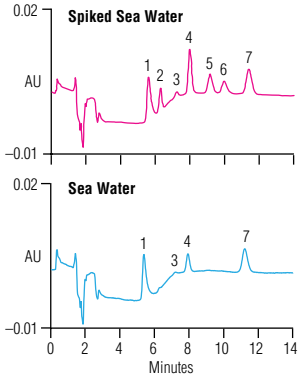
For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

TMC-1

Determination of Transition Metals in Sea Water Using Chelation Ion Chromatography and the IonPac® CS5A Column



Columns:	IonPac CG5A, CS5A, 4 mm, MetPac™ TMC-1
Eluent:	PDCA, isocratic
Flow Rate:	1.2 mL/min
Preconc. Vol.:	2.5 mL
Detection:	Visible, 530 nm Postcolumn
Reagent:	PAR at 0.6 mL/min

Peaks:	*Sea Water*	*Spike Amt.*	*Spiked Sea Water*
1. Iron	10.8 mg/L	10.0 mg/L	21.6 mg/L (ppb)
2. Copper	—	2.50	2.42
3. Nickel	1.60	5.00	5.85
4. Zinc	1.88	5.00	6.78
5. Cobalt	—	2.50	2.57
6. Cadmium	—	12.5	12.5
7. Manganese	7.16	7.50	14.3

12427

The IonPac TMC-1 Trace Metal Concentrator is a high-capacity cation concentration column used for coupling the MetPac CC-1 to the IonPac CS5 and CS5A analytical columns when performing chelation IC.

Key Specifications

Format: 3 × 25 mm

Capacity: 6.3 µeq/column

Ordering Information

TMC-1	
IonPac TMC-1 Trace Metal Concentrator (3 × 25 mm)	049000

Bio Columns

Protein and Peptide Columns *309*

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Protein and Peptide Columns

HPLC analysis of proteins and peptides

The Bio column line offers a complete selection of ion-exchange and reversed-phase columns for the analysis and purification of proteins and peptides. Stationary phases include polymer bead and monolith ion-exchange phases, and polymer and silica-based reversed-phase. Dionex also supports SEC, IMAC and HIC applications with specialty columns.

- ProPac ion exchange for protein, glycoprotein analysis and monoclonal antibody analysis.
- Acclaim PepMap reversed-phase columns for peptide analysis
- ProSwift and PepSwift monoliths for fast high-resolution separation and purification of proteins and peptides
- Specialty columns for SEC, IMAC, and HIC separations

ProPac ion-exchange columns separate protein variants and monoclonal antibodies, resolving isoforms that differ by as little as one charged residue. Applications include analysis of monoclonal antibodies, blood and dairy proteins. Acclaim silica-based columns provide both traditional and capillary formats for peptide mapping and high-efficiency protein separations.



MAbPac SEC-1: MAbPac SEC-1 is a size exclusion chromatography (SEC) column for monoclonal antibodies (Mab) aggregate and fragment analysis.

MAbPac SCX-10: Strong cation-exchange nonporous column for the exceptionally high-resolution separation and analysis of monoclonal antibody variants

ProPac SCX and WCX: Nonporous, strong and weak cation-exchange columns for the separation of proteins and their variants.

ProPac SAX and WAX: Strong and weak anion exchangers with quaternary ammonium and tertiary amine functional groups, respectively, attached to a nonporous core.

ProPac PA1: Strong anion-exchange column for the analysis of hydrophilic anionic proteins and peptides with pI values from 3 to 11; offers base stability.

ProPac HIC: Silica-based high-resolution, high-capacity HPLC column for the separation of proteins by hydrophobic interaction chromatography.

ProPac IMAC: High-resolution HPLC column for gradient separations in Immobilized Metal Affinity Chromatography mode.

ProSwift ConA: The ProSwift ConA-1S affinity monolith column is for fast, highly efficient enrichment and purification of Con A binding glycans and glycoconjugates.

ProSwift RP: Unique, reversed-phase monolith columns for high-speed, high-resolution separations of proteins and other biomolecules.

ProSwift IEX: Unique, high-capacity monolith columns for high-resolution, fast separations of proteins and other biomolecules.

Acclaim 300 C18: Reversed-phase column for the separation of peptides, proteins, and other biological macromolecules.

Acclaim PepMap: Silica-based reversed-phase columns for superior protein and peptide separations.PepSwift: Monolithic columns for fast analysis of peptides and proteins using nano and capillary LC coupled to MS.

MAbPac SEC-1

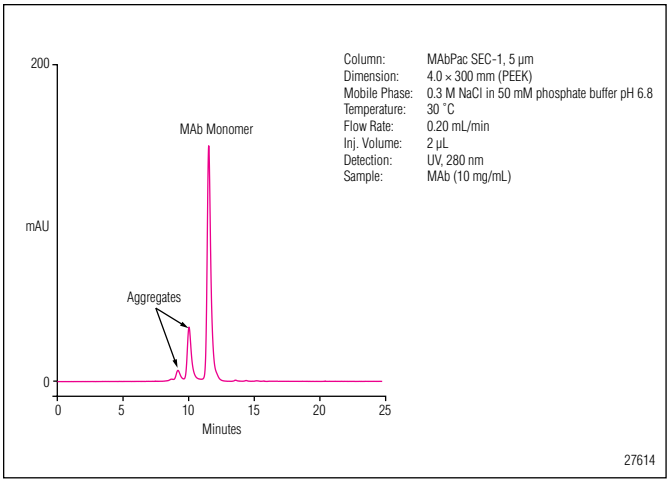
Size exclusion chromatography column for monoclonal antibodies aggregate and fragment analysis.

MAbPac SEC-1 is a size exclusion chromatography (SEC) column specifically designed for separation and characterization of monoclonal antibodies (MAb) and their aggregates, as well as the analysis of Fab and Fc fragments resulting from proteolysis. The stationary phase is designed for different eluent conditions containing both high and low concentration of salt mobile phases, as well as operate in mass spectrometry friendly volatile eluents.

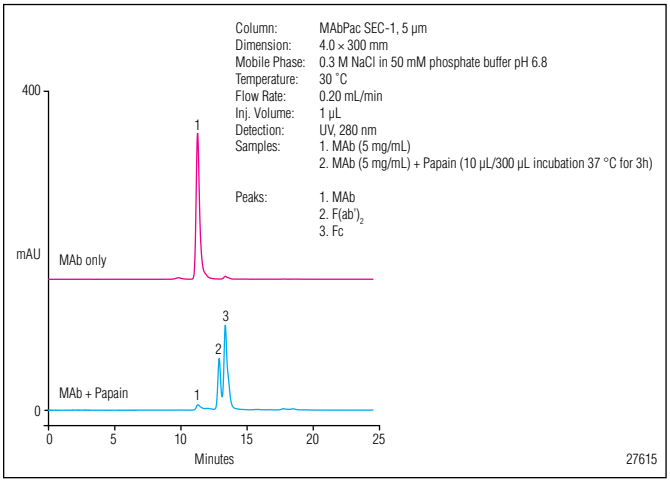
- Hydrophilic bonded layer for minimal nondesired interactions between the biomolecules and the stationary phase
- Nonmetallic and Biocompatible PEEK housing eliminates metal contamination from the column hardware
- Stable surface bonding leads to low column bleed and compatibility with MS, ELSD and Corona CAD detection
- Reproducibile and rugged
- Superior performance for the analysis of monoclonal antibodies, even using low-salt concentrations

The MAbPac SEC-1 is based on high-purity, spherical, porous (300 Å), 5 µm silica particles that are covalently modified with a proprietary diol hydrophilic layer. Combined with the use of the nonmetallic, biocompatible, PEEK housing, it is ideal for separating monoclonal antibodies, by providing excellent peak shapes and efficiencies under both high- and low salt conditions. The stability of the bonded layer makes this column fully compatible with MS, Corona CAD or ELSD detection.

SEC provides a method for separating dimers, trimers and aggregates that are not easily distinguished by other chromatographic means. On the MAbPac SEC-1 column, very large analytes (> 1000 kDa) are excluded by the pores thus eluting in the void, whereas smaller molecules (<1000 kDa) pass through the pores and elute according to their size. MAb fragments are also well resolved from the parent MAb peak and distinguished from each other.



Size exclusion chromatography column for monoclonal antibodies and aggregates

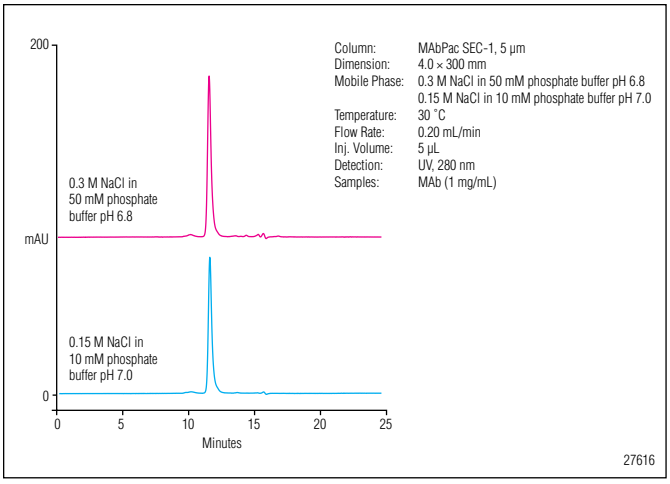


Monoclonal Antibody (MAb) fragment analysis

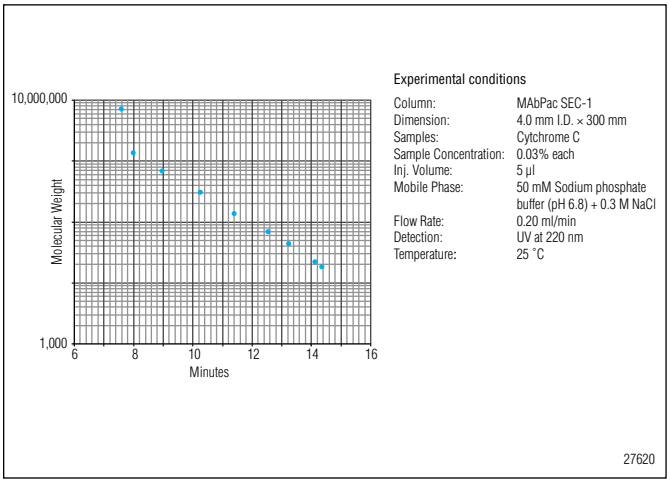
Applications

The MAbPac SEC-1 column separates MAbs and their aggregates. MAbs produced from cell cultures may contain significant amounts of dimers, trimers and other aggregates. The formation of aggregates may originate from elevated temperature, shear strain, surface adsorption, high protein concentration or other unknown reasons. Aggregates present in drug products can cause severe immunogenic and anaphylactic reactions, and therefore be characterized and monitored to ensure efficacy and safety.

The MAbPac SEC-1 column can be used to monitor the MAb fragmentation process upon proteolysis. Papain is a nonspecific sulfhydryl protease that hydrolzes specific peptide bonds. Papain treatment of MAb generates Fab and Fc fragments. Under cysteine-free conditions. F(ab')2 (100kDa) and 2 Fc fragments (each 25 kDa) are formed and are well resolved from the parent MAb peak (see chromatogram).



Mab Analysis in high-salt and low-salt conditions



Calibration curve

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

The MAbPac SEC-1 Column for Monoclonal Antibody (MAb) Analysis

Ordering Information

Analytical Columns

MAbPac SEC-1, 5 µm, 300 Å, Analytical column PEEK (4.0 x 300 mm) 074696

Guard Columns

MAbPac SEC-1, 5 µm, 300 Å, Guard column PEEK (4.0 x 50 mm)..... 074697

MAbPac SCX-10

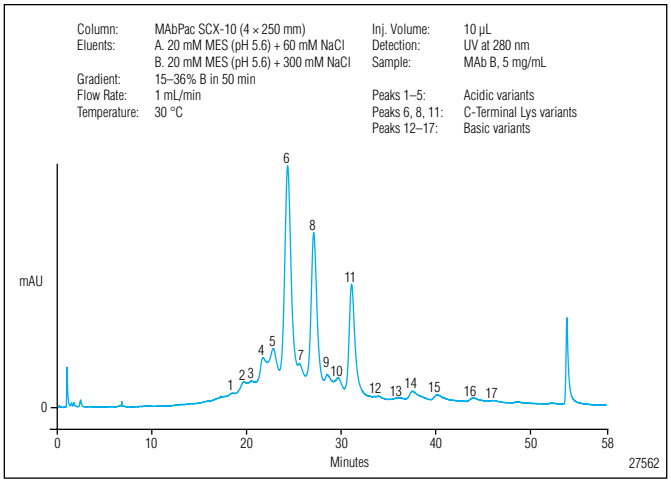
For the exceptionally high-resolution separation and analysis of monoclonal antibody variants

The MAbPac SCX-10 column is a strong cation-exchange column designed specifically for the high-resolution, high-efficiency analysis of monoclonal antibodies and associated variants. The unique nonporous pellicular resin provides exceptionally high resolving power, permitting the separation of monoclonal antibody variants that differ by as little as one charged residue. Hydrophobic interactions with the resin are essentially eliminated for very efficient peaks.

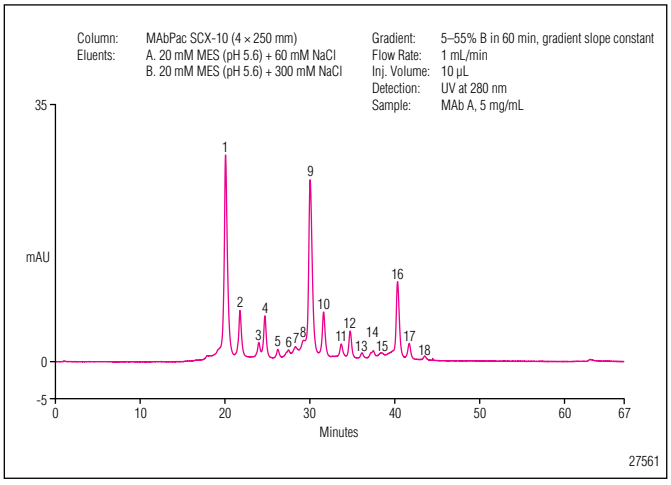
- Exceptionally high resolution for monoclonal antibody variants
- High efficiency
- Ideal for characterization and quality control assessment of monoclonal antibodies.
- Unmatched column to column and lot to lot reproducibility
- Hydrophobic interactions essentially eliminated
- Ideal for stability studies
- Meets the regulatory requirements for biopharmaceutical characterization.

The MAbPac SCX-10 resin technology is the basis for the superior performance of monoclonal antibody variant analysis. The nonporous core particle provides high rates of mass transfer which results in high efficiency separations. A hydrophilic layer surrounds the polymeric beads, eliminating hydrophobic interactions between proteins and the resin while contributing to high efficiency peaks. A grafted cation exchange surface provides pH selectivity control resulting in high resolution separations.

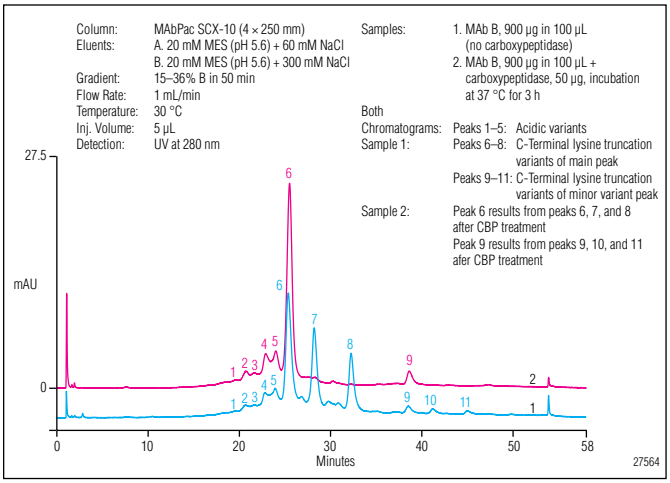
MAbPac SCX-10 columns address the regulatory requirements for biopharmaceutical characterization, and are manufactured and tested under the strictest specifications. The consistent manufacturing processes ensures column to column and lot to lot reproducibility for methods development and data analysis.



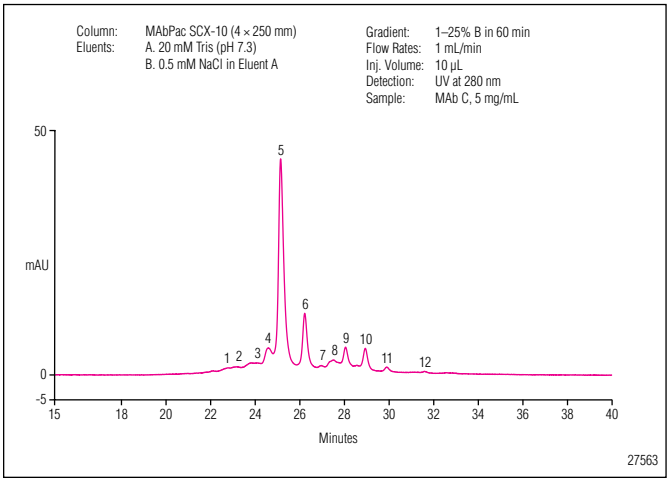
Analysis of monoclonal antibody variants using the MAbPac SCX-10 column.



The MAbPac SCX-10 column provides high resolution separations of monoclonal antibody variants.



Baseline Resolution of C-terminal lysine variants of a monoclonal antibody sample is verified by a second chromatogram after treatment with Carboxypeptidase B.



Another example of the high resolution and peak efficiencies of monoclonal antibody acidic and basic variants on the MAbPac SCX-10 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

MAbPac SCX-10 Column for Monoclonal Antibody Variant Analysis

Ordering Information

Analytical Column

MAbPac SCX-10 Analytical Column (4 x 250 mm)..... 074625

ProPac SCX and WCX

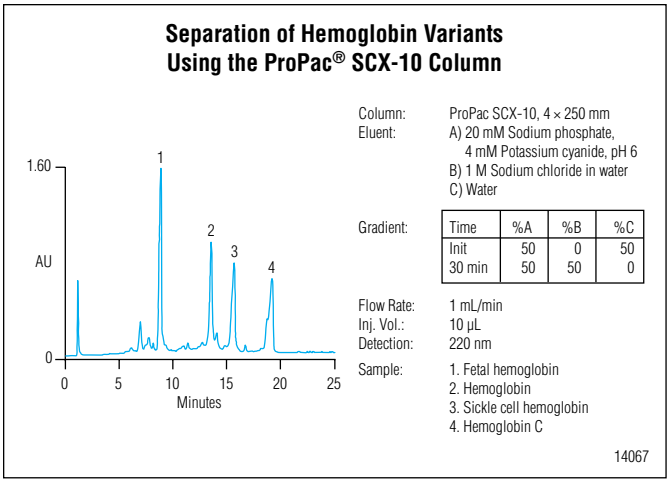
Strong and weak cation-exchange columns for the high-resolution separation of proteins and MAbs

ProPac SCX-10 and WCX-10 strong and weak cation-exchange columns are based on a nonporous core particle providing exceptionally high resolution and efficiency for separations of protein variants. ProPac SCX-10 and WCX-10 columns can resolve isoforms that differ by a single charged residue. A hydrophilic layer prevents unwanted secondary interactions, and a grafted cation-exchange surface provides pH-based selectivity control and fast mass transfer for high-efficiency separation and moderate capacity.

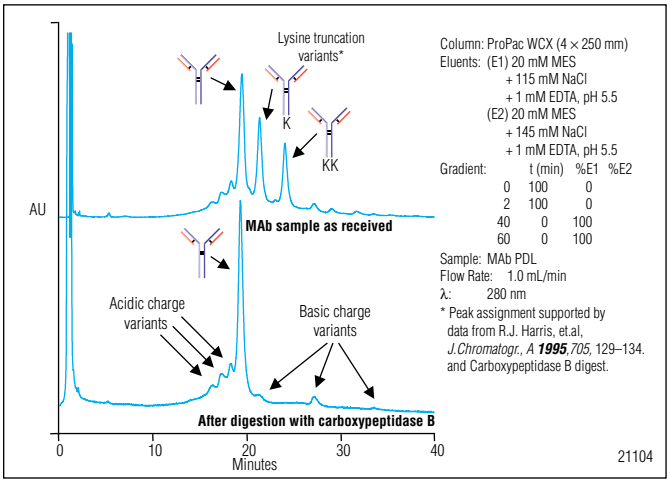
- Characterization and quality control assessment of monoclonal antibodies and other proteins
- Unequalled resolution
- High-efficiency separations with excellent sample recovery
- Unmatched column-to-column and lot-to-lot reproducibility
- Useful for characterization of related protein variants (e.g., deamidation and MAb lysine truncation variants)
- Highly-efficient peaks with excellent sample recovery
- Available in different dimensions and formats for flexibility in method development

The ProPac SCX-10 is a strong cation exchange column with sulfonate functional groups. The ProPac WCX-10 is a weak cation exchanger with a carboxylate functional group. Both are based on 10 µm nonporous, polymeric beads and coated with a proprietary hydrophilic layer.

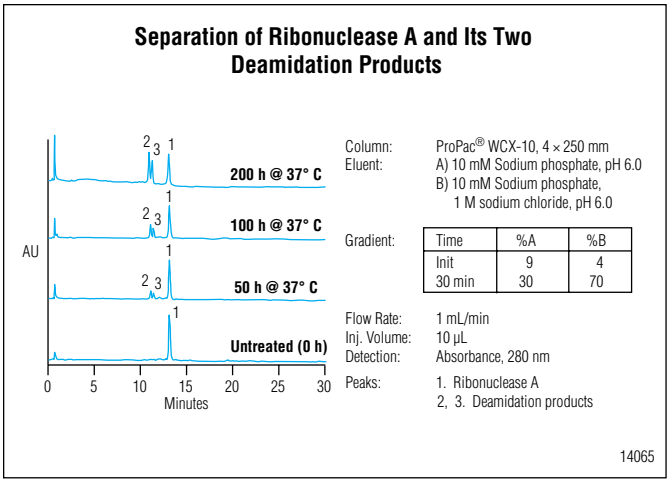
All ProPac columns are manufactured and tested under the strictest specifications, resulting in unmatched column-to-column and lot-to-lot reproducibility. Dionex also offers ProPac columns as a lot select package: either three columns from one lot or three columns from thre different lots, to assist quality control scientists in method validation.



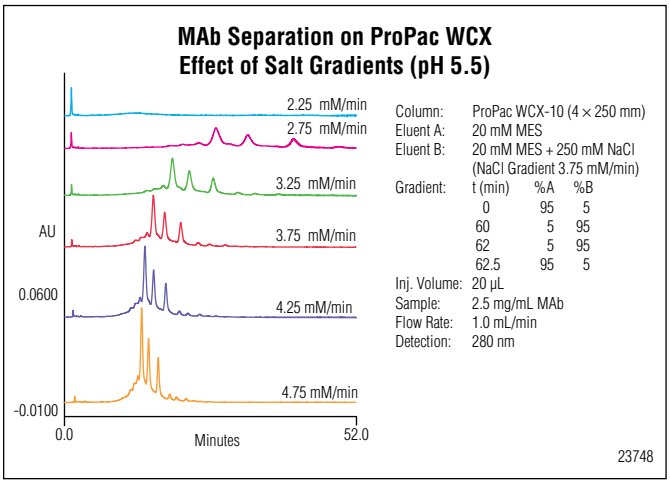
Separation of hemoglobin variants.



MAb separation on ProPac WCS column: characterization of lysine truncation variants.



Separation of ribonuclease A and its two deamidation products during the course of forced deamidation.



MAb separation on ProPac WCX column: effect of salt gradients at pH 5.5.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProPac Ion-Exchange Columns for Protein Analysis

Application Notes

AN 125: Monitoring Protein Deamidation by Cation-Exchange Chromatography

AN 126: Determination of Hemoglobin Variants by Cation-Exchange Chromatography

AN 127: Analysis of Monoclonal Antibody Heterogeneity by Cation-Exchange Chromatography: Separation of C-Terminal Lysine Variants

AN 128: Monitoring Stability of Monoclonal Antibodies by Cation-Exchange Chromatography

AN 129: Separation of Tryptophan and Methionine Oxidized Peptides from Their Unoxidized Forms

AN 177: Separation of an Intact Monoclonal Antibody and Fractionation of Monoclonal Antibody Papain Digest Fragments Using Immobilized Metal Affinity Chromatography (IMAC)

Ordering Information

SCX Analytical Columns

ProPac SCX-10 Analytical Column (4 x 250 mm)	054995
ProPac SCX-10 Analytical Column (2 x 250 mm)	063456
ProPac SCX-10 Semipreparative Column (9 x 250 mm)	063700
ProPac SCX-10 Semipreparative Column (22 x 250 mm)	SP5522
ProPac SCX-10 Lot Select Column Set (4 x 250 mm) (1 Lot of Resin)	SP5727
ProPac SCX-10 Lot Select Column Set (4 x 250 mm) (3 Lots of Resin)	SP5728

SCX Guard Columns

ProPac SCX-10G Guard Column (4 x 50 mm)	054996
ProPac SCX-10G Guard Column (2 x 50 mm)	063462

WCX Analytical Columns

ProPac WCX-10 Analytical Column (2 x 250 mm)	063472
ProPac WCX-10 Analytical Column (4 x 100 mm)	SP5829
ProPac WCX-10 Analytical Column (4 x 250 mm)	054993
ProPac WCX-10 Lot Select 3 Column Set (4 x 250 mm) (1 Lot of Resin)	SP5512
ProPac WCX-10 Lot Select 3 Column Set (4 x 250 mm) (3 Lots of Resin)	SP5513
ProPac WCX-10 Semipreparative Column (9 × 250 mm)	063474
ProPac WCX-10 Semipreparative Column (22 × 250 mm)	SP5482

WCX Guard Columns

ProPac WCX-10G Guard Column (2 x 50 mm)	063480
ProPac WCX-10G Guard Column (4 x 50 mm)	054994

ProPac SAX and WAX

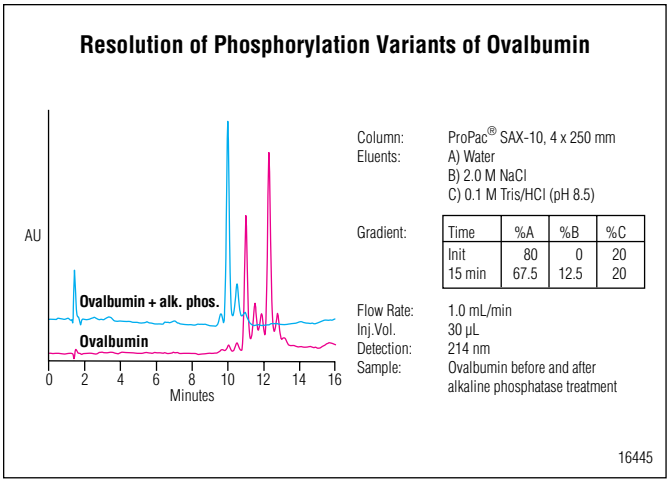
High-resolution, strong and weak anion-exchange columns for the separation of proteins

The ProPac SAX-10 and WAX-10 strong and weak cation-exchange columns are based on a nonporous core particle providing unequalled high resolution and efficiency in the separations of protein variants. These columns can resolve protein isoforms that differ by as little as one charged residue. A hydrophilic layer prevents unwanted secondary interactions and a grafted anion-exchange surface provides pH control, selectivity, and fast mass transfer for high- efficiency separation, as well as moderate capacity.

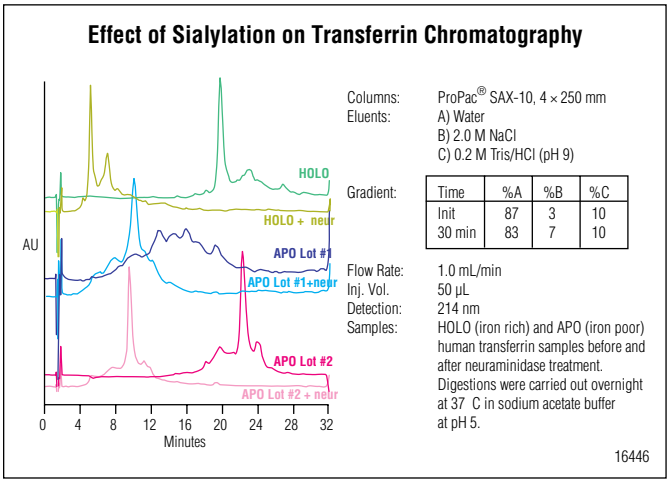
- Unequalled resolution
- High-efficiency peaks with excellent recovery
- Higher capacity than other columns based on nonporous particles
- Useful for characterization and quality control assessment of closely-related protein variants
- Supports separation of proteins that differ by as little as one amino acid residue
- Neutral hydrophilic coat that eliminates protein-resin hydrophobic interactions
- Superior lot-to-lot and column-to-column reproducibility

The ProPac SAX-10 is a strong anion-exchange column with quaternary amine functional group. The ProPac WAX-10 column is a weak anion exchanger with a tertiary amine functional group. Both are based on 10 µm nonporous, polymeric beads and coated with a proprietary hydrophilic layer. Differences in selectivity between the WAX-10 and SAX-10 provide flexibility in maximizing resolution of closely related species.

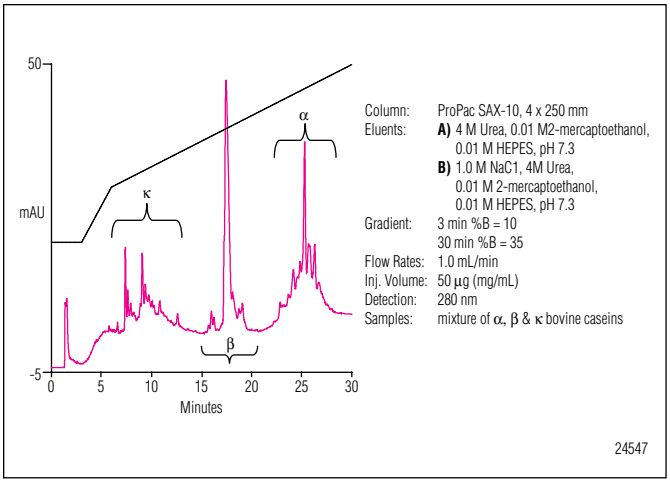
All ProPac columns are manufactured and tested under the strictest specifications, resulting in unmatched column-to-column and lot-to-lot reproducibility. Dionex also offers these columns as a lot-select package: three columns from one lot or three columns from three different lots, to assist quality control scientists in method validation.



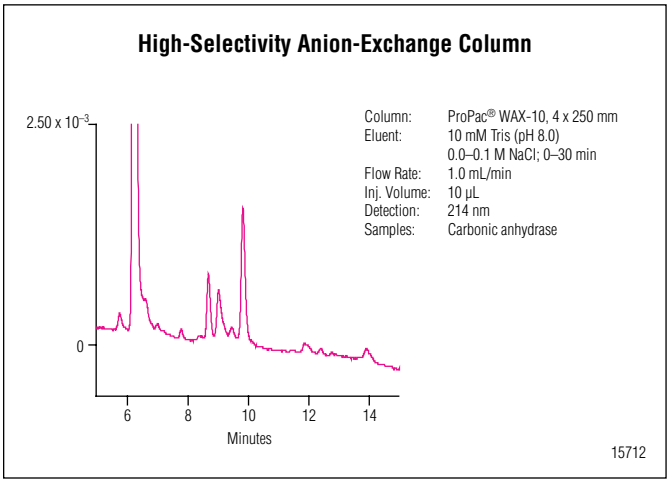
Resolution of phosphorylation variants of ovalbumin.



Effect of sialylation on transferrin chromatography.



Profiling dairy milk caseins.



The ProPac WAX shows high selectivity for proteins in this separation of carbonic anhydrase.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProPac Ion-Exchange Columns for Protein Analysis

Application Notes

AN 214: Separation of Protein Phosphoisoforms Using Strong Anion-Exchange Chromatography

Ordering Information

SAX Analytical Columns

ProPac SAX-10 Analytical Column (2 × 250 mm)	063448
ProPac SAX-10 Analytical Column (4 × 250 mm)	054997
ProPac SAX-10 Lot Select Column Set (4 × 250 mm) (1 Lot of Resin)	SP5729
ProPac SAX-10 Lot Select Column Set (4 × 250 mm) (3 Lots of Resin)	SP5730
ProPac SAX-10 Semipreparative Column (9 × 250 mm)	063703
ProPac SAX-10 Semipreparative Column (22 × 250 mm)	SP5594

WAX Analytical Columns

ProPac WAX-10 Analytical Column (2 × 250 mm)	063464
ProPac WAX-10 Analytical Column (4 × 250 mm)	054999
ProPac WAX-10 Lot Select Column Set (4 × 250 mm) (1 Lot of Resin)	SP5731
ProPac WAX-10 Lot Select Column Set (4 × 250 mm) (3 Lots of Resin)	SP5732
ProPac WAX-10 Semipreparative Column (9 × 250 mm)	063707
ProPac WAX-10 Semipreparative Column (22 × 250 mm)	SP5598

WAX Guard Columns

ProPac WAX-10G Guard Column (2 × 50 mm)	063470
ProPac WAX-10G Guard Column (4 × 50 mm)	055150

SAX Guard Columns

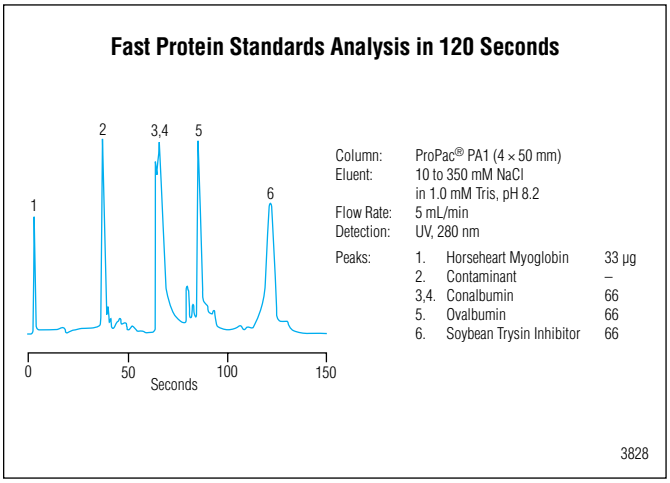
ProPac SAX-10G Guard Column (2 × 50 mm)	063454
ProPac SAX-10G Guard Column (4 × 50 mm)	054998

ProPac PA1

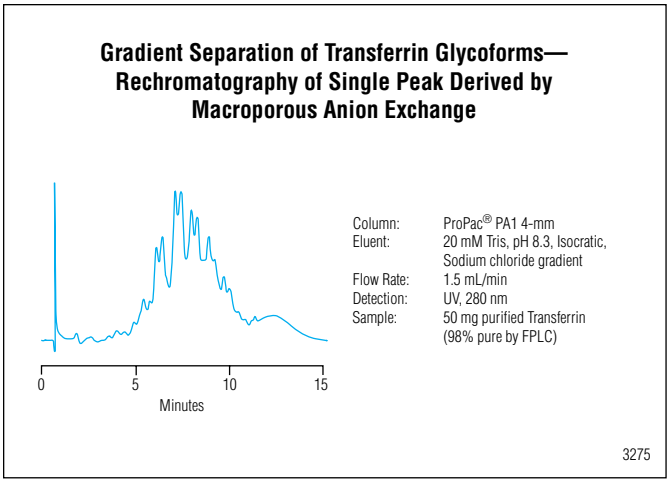
For hydrophilic anionic protein separations

The ProPac PA1 column supports the analysis and purification of hydrophilic anionic proteins and peptides. Proteins and peptides that are highly cationic (e.g., those with very high isoelectric points) may be resolved on this column, but some may exhibit substantial binding to the column.

- Good for hydrophilic anionic proteins and peptides
- Ideal for high-resolution separations of proteins with pI values from 3 to 11
- Available in semipreparative format
- Pellicular packing ensures high-efficiency and fast mass transport



Gradient separation of protein standards.



Gradient separation of transferrin glycoforms.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProPac Ion-Exchange Columns for Protein Analysis

Ordering Information

Analytical Columns

ProPac PA1 Analytical Column (4 × 250 mm) 039658
ProPac PA1 Semipreparative Column (9 × 250 mm)..... 040137

Guard Columns

ProPac PA1 High Speed Column (4 × 50 mm)..... 039657

ProPac HIC

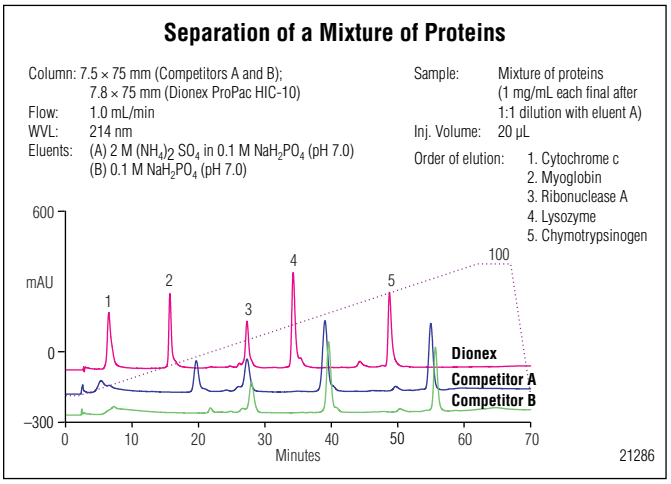
Hydrophobic Interaction Chromatography columns for the separation of proteins and peptides

The ProPac HIC-10 column is a high-resolution, high-capacity, silica-based HIC column that provides excellent separations of proteins and variants for analytical and preparative applications. ProPac HIC columns provide exceptional hydrolytic stability under the highly aqueous conditions used in HIC.

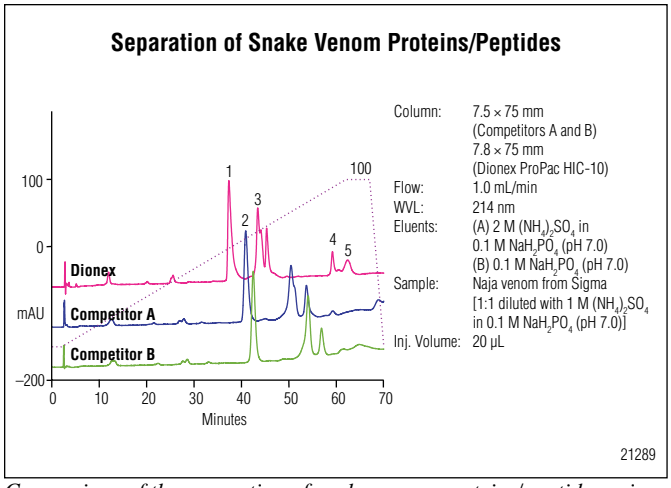
- High-resolution HPLC separation of proteins, protein variants and peptides
- Proteins are separated under non-denaturing conditions
- High protein loading capacity for protein purification applications
- Wide range of applications
- Based on 5 µm ultrahigh purity spherical silica gel particles with 300 Å pores

Hydrophobic interaction chromatography separates biomolecules in a decreasing salt gradient, based on differences in surface hydrophobicity. The HIC separation mechanism is complementary to those of ion-exchange and gel filtration chromatography. This method preserves the biological activity of proteins. The HIC separating mechanism is complementary to those ion-exchange and gel filtration chromatography.

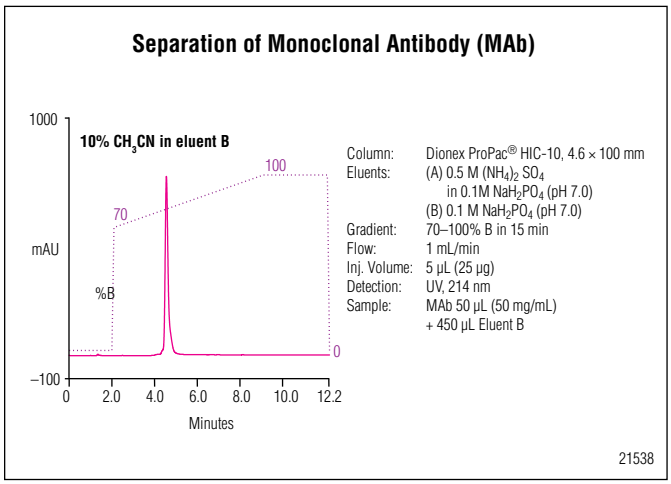
The ProPac HIC column is based on 5 µm ultrahigh-purity spherical silica gel particles with 300 Å pores. This column provides excellent separation of proteins and variants. Examples include separation of monoclonal antibodies and their variants, bovine serum proteins, snake venom proteins, enzymes, human skeletal muscle protein (HSMP), pancreatin, thrombin, and peptide applications including tryptic digests of proteins.



Separation of a mixture of proteins using the ProPac HIC-10, compared to the same separation on two competitor columns.



Comparison of the separation of snake venom proteins/peptides using the ProPac HIC-10 and two competitor columns.



Gradient separation of a monoclonal antibody using the ProPac HIC-10.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProPac HIC-10 Column Solutions for Protein Analysis

Application Notes

AN 211: Hydrophobic Interaction Chromatography for Separation of Tryptophan and Methionine Oxidized Peptides from Their Native Forms

Ordering Information

Analytical Columns	
ProPac HIC-10 Column (2.1 × 100 mm)	063653
ProPac HIC-10 Column (4.6 × 100 mm)	063655
ProPac HIC-10 Column (7.8 × 75 mm)	063665

ProPac IMAC

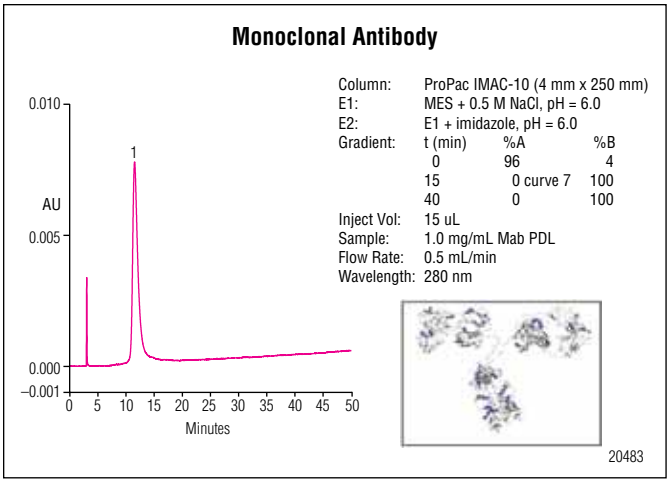
IMAC column for analytical and semipreparative applications

The ProPac IMAC-10 is a high-resolution analytical and semi-preparative column for separation of proteins and peptides by immobilized metal affinity chromatography. It is packed with 10 µm, nonporous, polymeric beads coated with a hydrophilic layer, then grafted with poly(IDA) chains. The poly(IDA) grafts are converted to metal-containing nanoparticles when the column is charged with metal. These nanoparticles act as IMAC interaction sites for individual proteins and provide the ProPac IMAC-10 with its high resolving power.

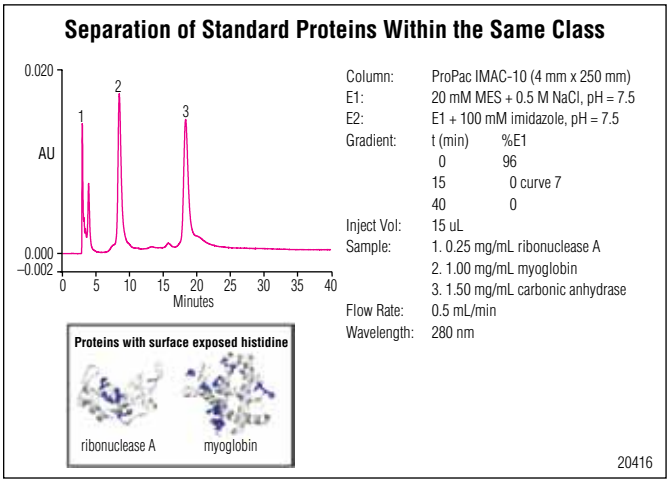
- State-of-the-art technology for reusable columns with metal tailored specificity
- Resolve target proteins using a single column in a high-resolution gradient run
- Retention control by imidazole concentration or pH gradient
- High-purity separations of metal-binding proteins
- High loading capacity for protein purification applications
- Wide range of metal-specific applications

The ProPac IMAC-10 is shipped free from any metal and ready to be charged with the metal of your choice. It can be operated between pH 2–12, and is compatible with most reagents commonly used in protein purifications (such as denaturants, non-ionic detergents, reducing agents). It can be used under native or denaturing HPLC conditions..

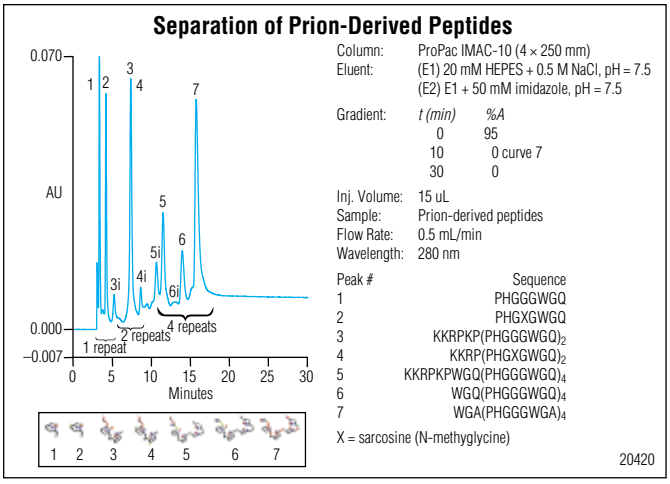
The ProPac IMAC-10 is an analytical HPLC column. Its design maximizes the number of sterically accessible ligands for binding to proteins, thereby ensuring that the proteins remain tightly bound during separation.



Separation of monoclonal antibodies using the ProPac IMAC.



Separation of standard proteins with surface-exposed histidines.



Separation of prion-related peptides using the ProPac IMAC-10.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProPac IMAC-10 Column Solutions for Protein and Peptide Analysis

Application Notes

AN 177: Separation of an Intact Monoclonal Antibody and Fractionation of Monoclonal Antibody Papain Digest Fragments Using Immobilized Metal Affinity Chromatography (IMAC)

Ordering Information

Accessories

IMAC Loading Column (4 x 50 mm) 063667
IMAC Loading Column (9 x 50 mm) 063710
IMAC Loading Column (9 x 250 mm) 063718

Analytical Columns

ProPac IMAC-10 Column (1 x 50 mm)..... 063617
ProPac IMAC-10 Column (2 x 50 mm)..... 063272
ProPac IMAC-10 Column (4 x 50 mm)..... 063276
ProPac IMAC-10 Column (9 x 50 mm)..... 063615
ProPac IMAC-10 Column (2 x 250 mm)..... 063274
ProPac IMAC-10 Column (4 x 250 mm)..... 063278
ProPac IMAC-10 Column (9 x 250 mm)..... 063280
ProPac IMAC-10 Column (22 x 250 mm)..... 063282

ProSwift ConA-1S

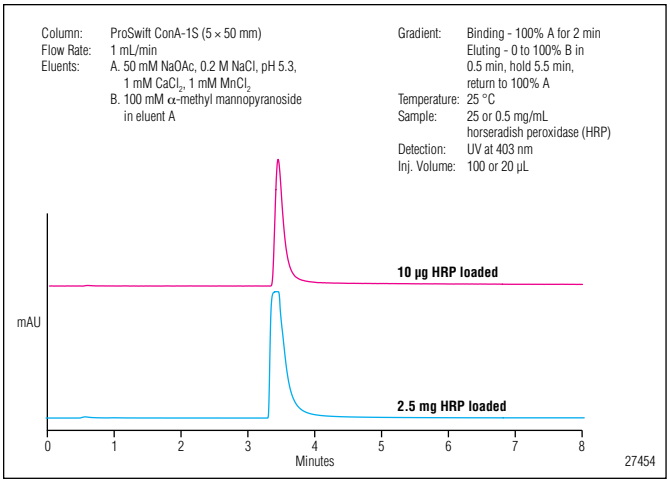
For the highly efficient enrichment and purification of Con A binding Glycans and Glycoconjugates

The ProSwift ConA-1S affinity monolith column is unsurpassed for fast, highly efficient enrichment and purification of Concanavalin A (Con A) binding glycans, glycopeptides, and glycoproteins. The high capacity and ligand density of the Con A affinity column facilitates the highly efficient enrichment of samples. The high peak efficiency of the column produces sharp peaks resulting in low elution volumes. The HPLC column is reusable, and over a hundred enrichments and purifications are possible.

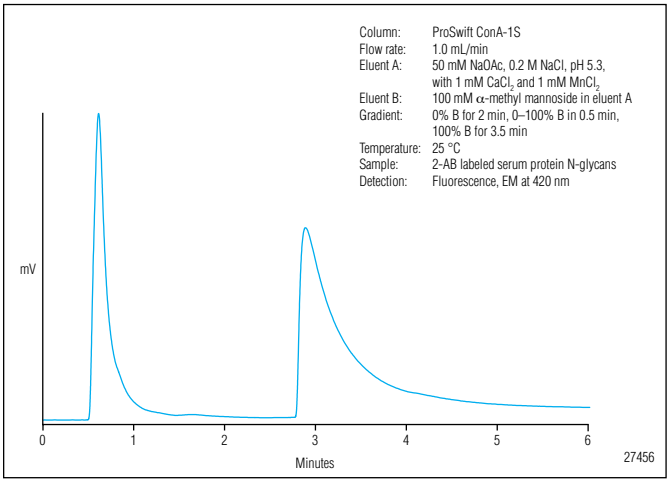
- Highly efficient enrichment and purification
- Highly purified glycan and glycoconjugate products
- High capacity and ligand density
- High sample recovery
- Low elution volumes
- Fast separations
- HPLC compatible
- Reusable for over one hundred purifications

The ProSwift ConA-1S column is a polymeric monolith functionalized with the lectin Con A. The monolith is a cylindrical rod containing uninterrupted interconnected flow through pores and smooth surfaces. The monolith morphology provides high ligand density and fast mass transfer. The high ligand density gives the column its high capacity and facilitates highly efficient enrichment. The fast mass transfer enables high peak efficiency resulting in highly enriched products in low elution volumes.

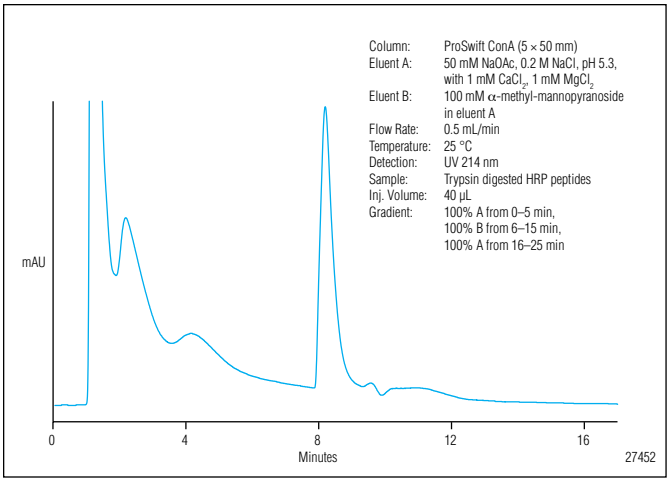
The ProSwift ConA-1S column, designed for and used in HPLC systems, provides many advantages compared to standard manual methods. These include faster separations, better enrichment and sample recovery, efficient washing capabilities, high peak efficiency and small elution volumes. Other advantages of the ProSwift ConA-1S column used with HPLC systems include automation, reusability, high-throughput capability and more accurate analysis with on-line monitoring.



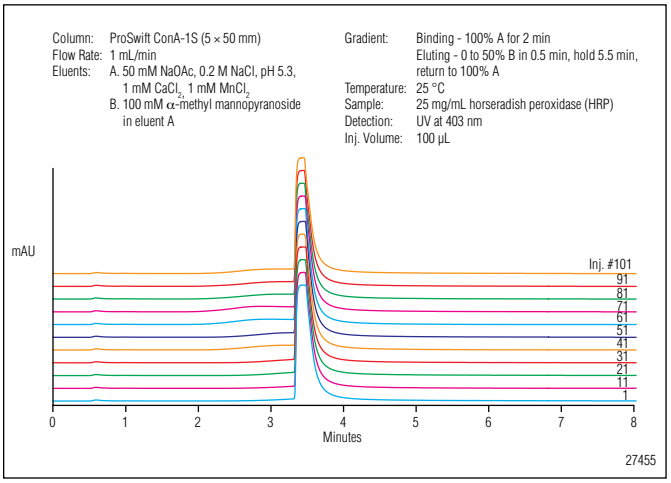
Horseradish peroxidase (HRP) injected at high (2 mg) and low (10 µg) loading on the ProSwift ConA-1S column



Fast, highly efficient enrichment and purification of a group of fluorescently labeled glycans in under 6 min using the ProSwift ConA-1S column.



Glycopeptide enrichment using the ProSwift ConA-1S column.



High reusability by maintaining good capacity after 100 injections on the ProSwift ConA-1S column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProSwift ConA-1S Affinity Column for the Enrichment of Glycans and Glycoconjugates

Ordering Information

Analytical Columns

ProSwift ConA-1S Affinity Column (5 x 50 mm)..... 074148

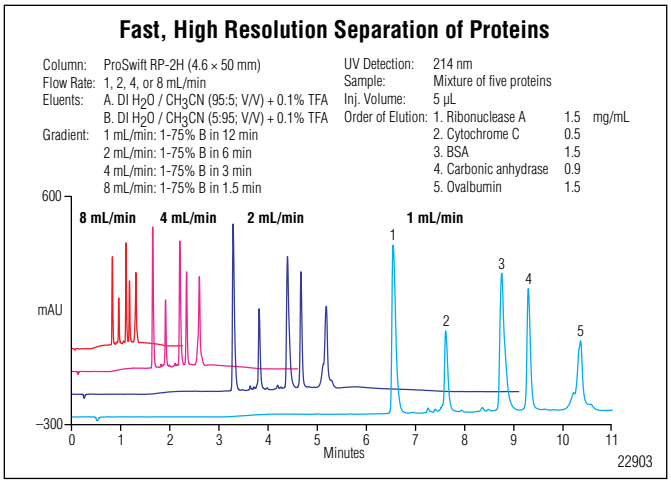
ProSwift RP

Monolith reversed-phase columns for high-resolution protein separations at high flow rates

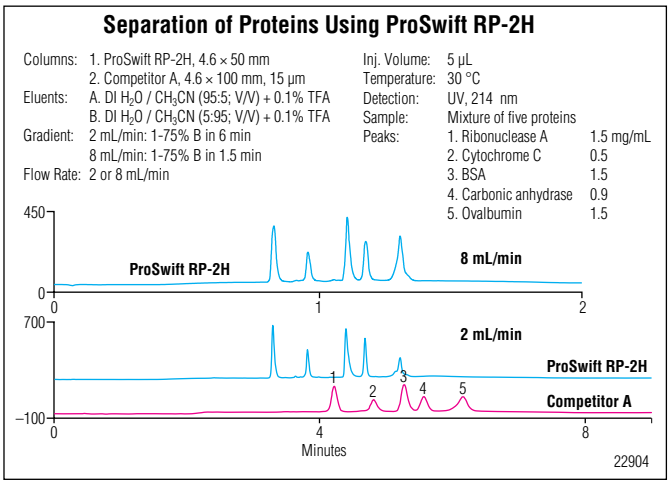
ProSwift reversed-phase monolith columns uniquely provide the advantages of high resolution at exceptionally high flow rates for protein separations. They deliver the outstanding resolving power of nonporous analytical media combined with faster separations than any bead based columns available. ProSwift polymer monolith columns achieve provide long column lifetime, exhibit reproducibility even after hundreds of runs, and have broad pH stability, providing high stringent wash capability.

- High resolution at high speed
- Highest operational flow rates available
- High throughput and improved productivity
- Optimal performance in a broad range of applications
- Excellent stability over a wide pH range of 1 to 14
- Outstanding reproducibility and ruggedness
- High stringent wash compatible, for example, 1 M NaOH
- High loading capacity

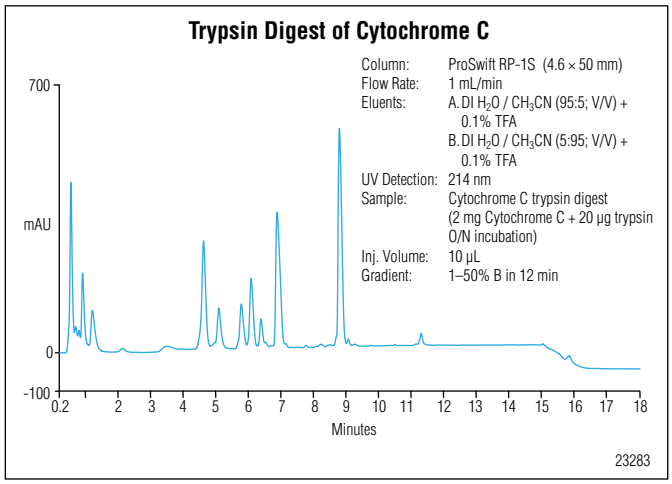
ProSwift polymer monolith media are uniquely suited for the separation of proteins. Each monolith is a single cylindrical polymer rod containing an uninterrupted, interconnected network of flow-through channels of a specific pore size. These large channels and the monolith's nonporous surfaces result in fast mass transfer for high-resolution and fast protein separations. The channels also produce low backpressure, allowing the use of higher linear velocities with minimal loss of resolution.



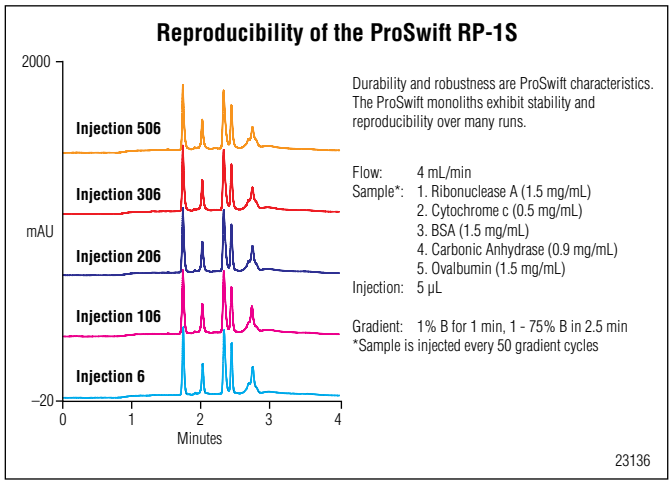
Separation of proteins at a variety of flow rates.



Comparison of ProSwift RP-2H with porous bead-based column of leading competitor A.



Separation of cytochrome c digest on ProSwift RP-1S.



Reproducibility and ruggedness of the ProSwift RP-1S ensure long column lifetime.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProSwift and PepSwift Monolith Columns for Biomolecule Analysis

Ordering Information

Analytical Columns

ProSwift RP-2H Monolith Column (4.6 × 50 mm) 064296
ProSwift RP-1S Monolith Column (4.6 × 50 mm) 064297
ProSwift RP-3U Monolith Column (4.6 × 50 mm) 064298
ProSwift RP-4H Monolith Column (1.0 × 250 mm) 066640
ProSwift RP-4H Monolith Column (1.0 × 50 mm) 069477
ProSwift RP-10R Monolith Column (1.0 × 50 mm) 164397

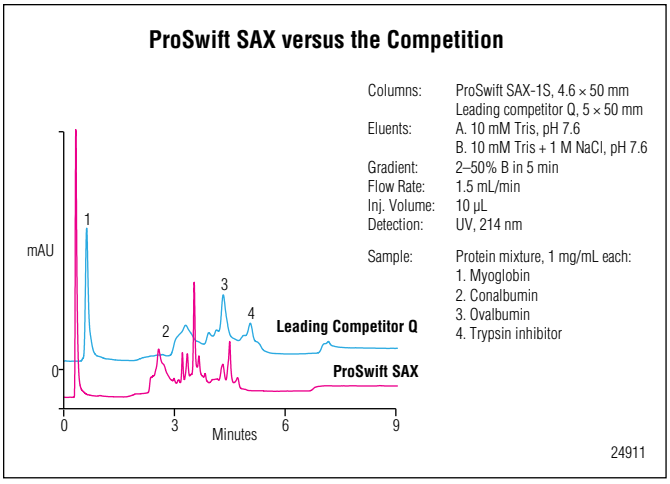
ProSwift IEX

Monolith IEX columns for superior high-resolution analytical and preparative protein separations

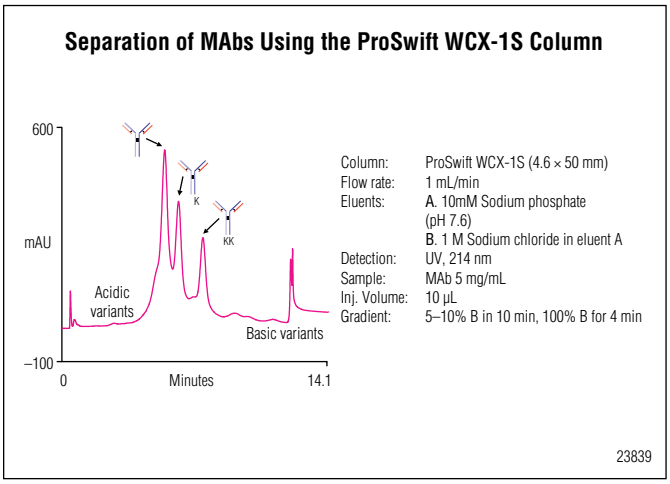
ProSwift IEX monoliths are the column of choice when high resolution and capacity are required for protein separations. They deliver higher resolution than porous bead-based columns while providing high capacity. ProSwift IEX monoliths provide the outstanding resolving power of nonporous analytical media combined with fast separation performance. ProSwift polymer monolith columns achieve long column lifetime and exhibit reproducibility even after hundreds of runs.

- High resolution
- High loading capacity
- Fast separations
- Wide range of operational flow rates
- Excellent stability over a wide pH range
- Outstanding reproducibility and ruggedness
- Optimal performance in a broad variety of applications
- High throughput and improved productivity

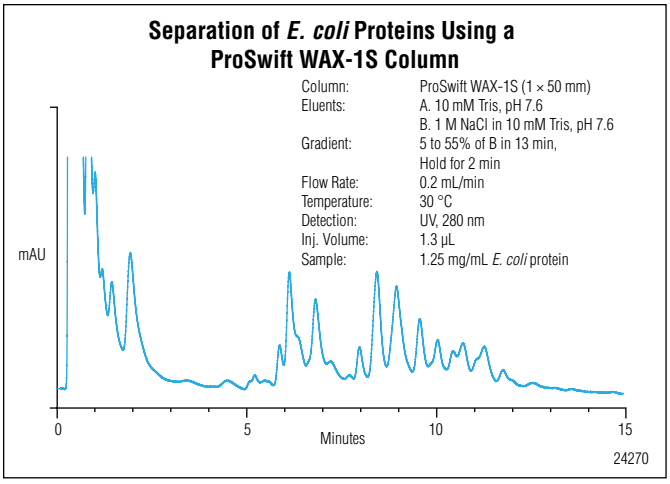
ProSwift polymer monolith media are uniquely suited for the separation of proteins. Each monolith is a single cylindrical, sponge-like polymer rod containing an uninterrupted, interconnected network of flow-through channels of a specific pore size. These large channels and the monolith's nonporous surfaces result in fast mass-transfer, for high-resolution and fast protein separations. The unique globular morphology of the polymer medium provides its high capacity.



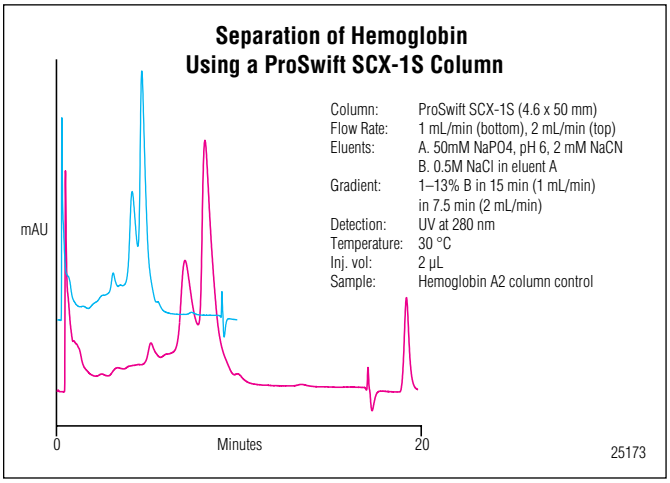
Comparison of the separation of a protein mixture on the ProSwift SAX-1S and a leading competitor's column.



Separation of monoclonal antibody variants.



Protein separation on the ProSwift WAX-1S column.



Separation of hemoglobin at different flow rates using a ProSwift SCX column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

ProSwift Ion-Exchange Monolith Columns for Biomolecule Analysis Data Sheet

Technical Notes

TN 79: Two-Dimensional LC Protein Separation on Monolithic Columns in a Fully Automated Workflow

Ordering Information

Analytical Columns

ProSwift SAX-1S Monolith Column (4.6 × 50 mm)	064293
ProSwift SCX-1S Monolith Column (4.6 × 50 mm)	066765
ProSwift SAX-1S Monolith Column (1.0 × 50 mm)	068459
ProSwift WAX-1S Monolith Column (4.6 × 50 mm)	064294
ProSwift WCX-1S Monolith Column (4.6 × 50 mm)	064295
ProSwift WAX-1S Monolith Column (1.0 × 50 mm)	066642
ProSwift WCX-1S Monolith Column (1.0 × 50 mm)	066643
ProSwift SCX-1S Monolith Column (1.0 × 50 mm)	071977

Acclaim 300 C18

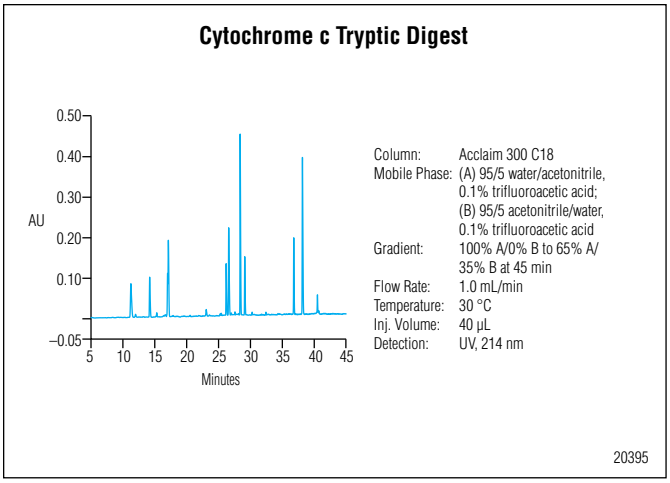
High-resolution separation of proteins and peptides

The Acclaim 300 features 3 µm silica particles for rapid analysis of complex protein digests. Because of the Acclaim 300 column's stable bonding, only insignificant bleeding occurs, making these columns compatible with LC/MS applications.

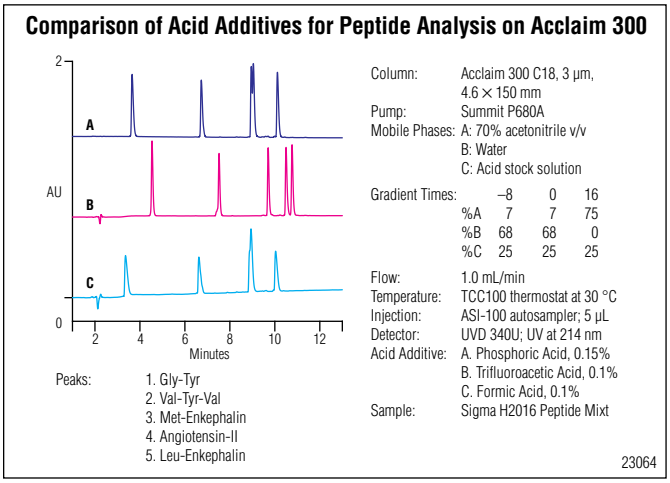
- Designed for high-resolution peptide mapping and protein separations
- High-efficiency 3 µm spherical silica substrate
- High-performance bonding chemistry on 300 Å pore silica
- Application tested for suitablility in peptide mapping
- Reproducible for dependable results
- LC/MS compatible

Manufacture of these columns starts with ultrapure silica that contains minimal concentrations of metal contaminants, minimizing the tailing effects of residual, exposed silanol groups. Exhaustive bonding and endcapping techniques result in stable bonding and columns that exhibit predictable reversed-phase separations with minimal secondary interactions.

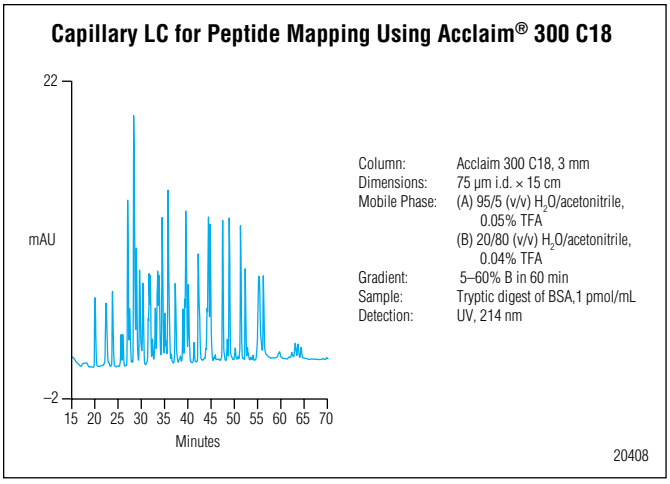
The use of a 3 µm silica particle reduces limits for diffusion of the analytes into the stationary phase, resulting in fast, high-resolution separations. Compared to 5 µm column packings, the smaller particles support increased flow rates and shallower gradients on shorter columns, for faster separations. Dionex tests each bonded silica lot for peptide selectivity to ensure reproducible performance.



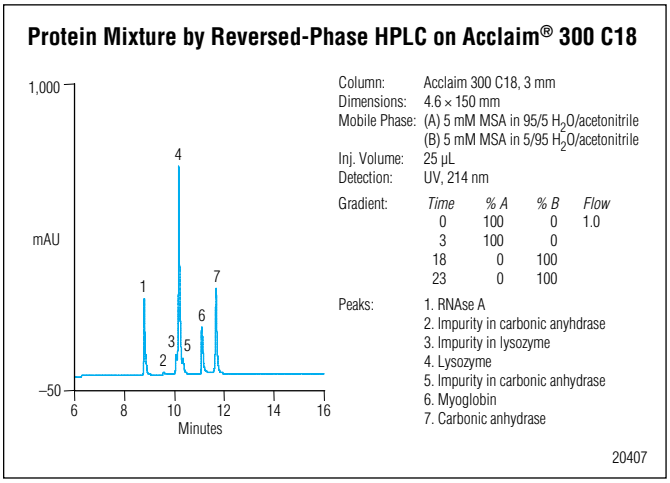
Cytochrome c tryptic digest.



Comparison of acid additives for peptide analysis.



Capillary LC for peptide mapping.



Protein mixture separated using reversed-phase HPLC.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Acclaim 300 HPLC Columns Data Sheet

Application Notes

AN 205: Determination of Cefepime and Cefepime-Related Substances Using HPLC and UV Detection

Application Updates

AU 156: Evaluation of Acclaim HPLC Columns Using the National Institute of Standards Standard Reference Material 870

Technical Notes

TN 705: Automated Enrichment and Determination of Phosphopeptides Using Immobilized Metal Affinity and Reversed-Phase Chromatography with Column Switching

Ordering Information

The standard particle size is nominally 3 µm. Analytical columns are available in 2.1, 3.0, and 4.6 mm dimeters; standard lengths are 50 and 150 mm. Capillary formats are available in 75 and 300 µm, 1.0 mm, and custom diameters, and in 50, 150, or 250 mm lengths. Guard columns in both 2.0 and 4.3 mm sizes are recommended to protect analytical columns.

Analytical Columns

Acclaim 300, C18, 3 µm Analytical (2.1 × 50 mm) 060263
Acclaim 300, C18, 3 µm Analytical (2.1 × 150 mm) 060264
Acclaim 300, C18, 3 µm Analytical (3 × 150 mm) 063684
Acclaim 300, C18, 3 µm Analytical (4.6 × 50 mm) 060265
Acclaim 300, C18, 3 µm Analytical (4.6 × 150 mm) 060266

Guard Columns

Acclaim 300,C18, 3µm, Guard Cartridges, (2.1 × 10 mm), 2 ea; (requires holder 069580) 069690
Acclaim 300 Guard Cartridges (4.3 × 10 mm), 2 ea; (requires holder 059456) 060393

Hardware

Acclaim SST Guard Cartridge Holder V-1 059456
Guard to Analytical Column Coupler 059457
Guard Kit (Holder and Coupler) 059526

Micro and Nano Columns

Acclaim 300, C18, 3 µm, 300 Å, 75 µm i.d. × 5 cm 162223
Acclaim 300, C18, 3 µm, 300 Å, 75 µm i.d. × 15 cm 162224
Acclaim 300, C18, 3 µm, 300 Å, 300 µm i.d. × 5 cm 162221
Acclaim 300, C18, 3 µm, 300 Å, 300 µm i.d. × 15 cm 162222
Acclaim 120, C18, 3 µm, 120 Å, 1.0 mm i.d. × 5 cm 162219
Acclaim 300, C18, 3 µm, 300 Å, 1.0 mm i.d. × 15 cm 162220

These columns are designed for optimal performance using Dionex UltiMate 3000 and ICS-3000 chromatography instruments.

Acclaim PepMap

The members of the Acclaim PepMap family are designed to separate peptides and proteins efficiently. These silica-based stationary phases have virtually zero silanophilic activity, resulting in minimal peak tailing. The Acclaim PepMap columns can be operated TFA-free, making them ideal for LC-MS based biomolecular analysis.

- Zero silanophilic interactions
- Peptide separations: C18 and C8 100 Å with 3 µm or 5 µm particles
- Protein separations: C18 and C4 300 Å with 5 μm particles
- TFA-Free LC/MS, for enhanced MS sensitivity
- Outstanding separation efficiency
- Superior resolution and recovery

Acclaim PepMap Trap and Nano-Trap columns are available for preconcentration of diluted samples, large-volume injections, or various column-switching techniques. Allowing substantially shorter loading times results in reduced overall analysis time. Desalting or SDS removal prior to MS analysis, phosphopeptide enrichment, and MDLC (2-D, 3-D) are other applications.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Application Notes

AN 521: Automated 2-D LC Coupled to ESI-MS/MS for the Analysis of Complex Peptide Samples

AN 524: Parallel Nano and Capillary LC for High-Throughput MS Proteomics

AN 527: Comprehensive 2-D Nano LC/MS for Human Tissue Proteomics

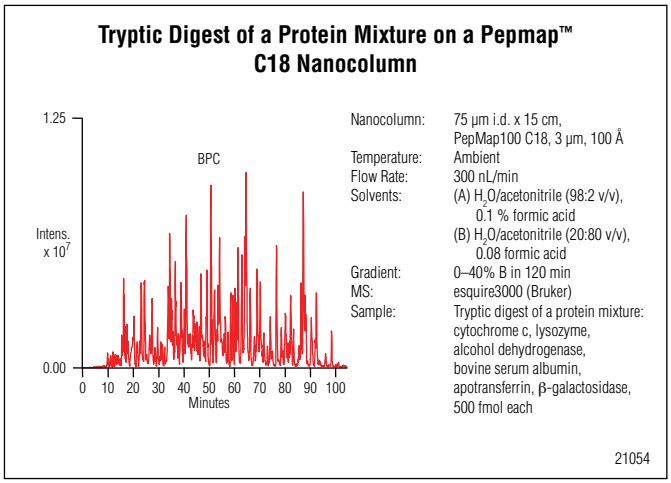
AN 531: Phosphopeptide Enrichment using a TiO_2 Nano Precolumn

Technnical Notes

TN 60: UltiMate 3000: Direct Sample Injection onto a 75 µm i.d. PepMap100 (C18) Column

TN 61: UltiMate 300: Preconcentration on a 75 µm i.d. × 15 cm PepMap100 (C18) Nanocolumn

Acclaim PepMap100 C18



The Acclaim PepMap100 C18 column sets the benchmark in peptide separation. PepMap100 C18 is available in 3 or 5 µm particle sizes, with 100 Å pore sizes, and in nano, capillary, and micro formats.

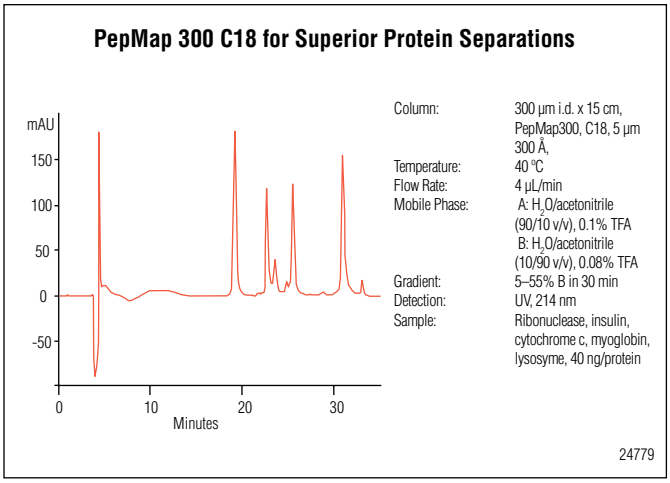
Ordering Information

Nano LC Columns	
75 µm i.d. × 5 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160316
75 µm i.d. × 15 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160321
75 µm i.d. × 25 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	164261
75 µm i.d. × 5 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160318
75 µm i.d. × 15 cm, Acclaim PepMap100 C18, 5 µm, 100Å	160323
75 µm i.d. × 25 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160326

Capillary LC Columns	
300 µm i.d. × 5 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160290
300 µm i.d. × 15 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160295
300 µm i.d. × 5 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160292
300 µm i.d. × 15 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160297
300 µm i.d. × 25 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160300

Micro LC Columns	
1.0 mm i.d. × 5 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160277
1.0 mm i.d. × 15 cm, Acclaim PepMap100 C18, 3 µm, 100 Å	160282
1.0 mm i.d. × 5 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160279
1.0 mm i.d. × 15 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160284
1.0 mm i.d. × 25 cm, Acclaim PepMap100 C18, 5 µm, 100 Å	160287

Acclaim PepMap300 C18



The Acclaim PepMap300 C18 column is used for the separation of larger peptides and proteins. It is available in 5 µm particle sizes, with 300 Å pore sizes, and in nano, capillary, and micro formats.

Ordering Information

Nano LC Columns

75 µm × 5 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163577
75 µm × 15 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163574

Capillary LC Columns

300 µm × 5 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163580
300 µm × 15 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163581

Micro LC Columns

1.0 mm × 5 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163584
1.0 mm × 15 cm, Acclaim PepMap300 C18, 5 µm, 300 Å wide pore 163585

Acclaim PepMap100 C8

Acclaim PepMap100 C8 is a excellent alternative for the Acclaim PepMap100 C18, when separating very hydrophobic peptides (e.g., non-tryptic peptides). It is available with 3 or 5 µm particles, with 100 Å pore sizes, and in capillary and micro formats.

Ordering Information

Nano LC Columns

75 µm i.d. × 5 cm, Acclaim PepMap100 C8, 3 µm, 100Å.....161184
75 µm i.d. × 15 cm, Acclaim PepMap100 C8, 3 µm, 100Å.....161185
75 µm i.d. × 5 cm, Acclaim PepMap100 C8, 5 µm, 100Å.....161555
75 µm i.d. × 15 cm, Acclaim PepMap100 C8, 5 µm, 100Å.....161553
75 µm i.d. × 25 cm, Acclaim PepMap100 C8, 5 µm, 100Å.....161186

Capillary LC Columns

300 µm i.d. × 5 cm, Acclaim PepMap100 C8, 3 µm, 100 Å.....161181
300 µm i.d. × 15 cm, Acclaim PepMap100 C8, 3 µm, 100 Å.....161182
300 µm i.d. × 5 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161547
300 µm i.d. × 15 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161545
300 µm i.d. × 25 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161183

Micro LC Columns

1.0 mm i.d. × 5 cm, Acclaim PepMap100 C8, 3 µm, 100 Å.....160240
1.0 mm i.d. × 15 cm, Acclaim PepMap100 C8, 3 µm, 100 Å.....161179
1.0 mm i.d. × 5 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161539
1.0 mm i.d. × 15 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161537
1.0 mm i.d. × 25 cm, Acclaim PepMap100 C8, 5 µm, 100 Å.....161180

Acclaim PepMap300 C4

Acclaim PepMap300 C4 is used for the separation of hydrophobic peptides and proteins, providing higher recoveries. It is available in 5 μm particle size, with 100 Å pore size, and in nano, capillary, and micro formats.

Ordering Information

Capilary LC Columns

180 µm i.d. × 5 cm, Acclaim PepMap300 C4, 5 µm, 300 Å.....163947
180 µm i.d. × 15 cm, Acclaim PepMap300 C4, 5 µm, 300 Å.....163948
300 µm × 5 cm, Acclaim PepMap300 C4, 5 µm, 300 Å 163582
300 µm × 15 cm, Acclaim PepMap300 C4, 5 µm, 300 Å.....163583

Micro LC Columns

1.0 mm × 5 cm, Acclaim PepMap300 C4, 5 µm, 300 Å.....163586
1.0 mm × 15 cm, Acclaim PepMap300 C4, 5 µm, 300 Å.....163587

Acclaim PepMap µ-Precolumns

Acclaim PepMap µ-Precolumns are very short microcolumns–available in 5 and 15 mm lengths–consisting of a cartridge holder and a set of disposable cartridges. µ-Precolumns are used for sample pre-concentration, sample cleanup, or in various column-switching techniques.

Ordering Information

µ-Precolumns	
µ-Precolumn holder, 5 mm, with universal fitting	160431
µ-Precolumn holder, 15 mm, with universal fitting	160432
300 µm i.d. × 5 mm, Acclaim PepMap100 C18, 5 µm, 100 Å (set of 5 cartridges)	160454
300 µm × 5 mm, Acclaim PepMap300 C18, 5 µm, 300 Å (set of 5 cartridges)	163589
300 µm i.d. × 5 mm, Acclaim PepMap100 C8, 5 µm, 100 Å (set of 5 cartridges)	161194
300 µm × 5 mm, Acclaim PepMap300 C4, 5 µm, 300 Å (set of 5 cartridges)	163591
500 µm i.d. × 5 mm, Acclaim PepMap100 C18, 5 µm, 100 Å (set of 5 cartridges)	160446
500 µm i.d. × 15 mm, Acclaim PepMap100 C18, 5 µm, 100 Å (set of 5 cartridges)	160450
500 µm i.d. × 15 mm, Acclaim PepMap300 C18, 5 µm, 300 Å (set of 5 cartridges)	163946
500 µm i.d. × 5 mm, Acclaim PepMap100 C8, 5 µm, 100 Å (set of 5 cartridges)	161192
500 µm i.d. × 15 mm, Acclaim PepMap100 C8, 5 µm, 100 Å (set of 5 cartridges)	161193
500 µm i.d. × 5 mm, Acclaim PepMap300 C4, 5 µm, 300 Å (set of 5 cartridges)	163943
500 µm i.d. × 15 mm, Acclaim PepMap300 C4, 5 µm, 300 Å (set of 5 cartridges)	163945
1.0 mm i.d. × 5 mm, Acclaim PepMap100 C18, 5 µm, 100 Å (set of 5 cartridges)	160434
1.0 mm i.d. × 15 mm, Acclaim PepMap100 C18, 5 µm, 100 Å (set of 5 cartridges)	160438
1.0 mm × 5 mm, Acclaim PepMap300 C18, 5 µm, 300 Å (set of 5 cartridges)	163592
1.0 mm × 15 mm, Acclaim PepMap300 C18, 5 µm, 300 Å (set of 5 cartridges)	163593
1.0 mm i.d. × 5 mm, Acclaim PepMap100 C8, 5 µm, 100 Å (set of 5 cartridges)	161189
1.0 mm i.d. × 15 mm, Acclaim PepMap100 C8, 5 µm, 100 Å (set of 5 cartridges)	161190
1.0 mm × 5 mm, Acclaim PepMap300 C4, 5 µm, 300 Å (set of 5 cartridges)	163594
1.0 mm × 15 mm, Acclaim PepMap300 C4, 5 µm, 300 Å (set of 5 cartridges)	163595

Acclaim PepMap µ-Guard Columns

Acclaim PepMap µ-Guard columns are short microcolumns that can be coupled directly to the front of the capillary or micro LC column to avoid column contamination.

Ordering Information

µ-Guard Columns	
300 µm i.d. × 1 mm, Acclaim PepMap100 C18, 5 µm, 100 Å	160428
300 µm i.d. × 1 mm, Acclaim PepMap300 C18, 5 µm, 300 Å	163938
300 µm i.d. × 1 mm, Acclaim PepMap100 C8, 5 µm, 100 Å	161188
300 µm i.d. × 1 mm, Acclaim PepMap300 C4, 5 µm, 300 Å	163937
800 µm i.d. × 2 mm, Acclaim PepMap100 C18, 5 µm, 100 Å	160424
800 µm i.d. × 2 mm, Acclaim PepMap300 C18, 5 µm, 300 Å	163942
800 µm i.d. × 2 mm, Acclaim PepMap100 C8, 5 µm, 100 Å	161187
800 µm i.d. × 2 mm, Acclaim PepMap300 C4, 5 µm, 300 Å	163941

Acclaim PepMap100 C18 Nano-Trap Columns

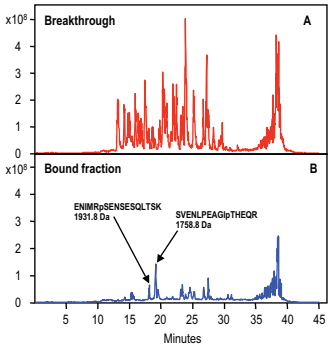
The Acclaim PepMap100 Nano-Trap columns are available in 100 µm and 200 µm i.d. fused silica, and are packed with 5 µm particle size and 300 Å pore size.

Ordering Information

Nano-Trap Columns	
Nano Trap Column, 100 µm i.d. × 1 cm, packed with Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2)	164197
Nano Trap Column, 100 µm i.d. × 2 cm, packed with Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2)	164199
Nano Trap Column, 200 µm i.d. × 1 cm, packed with Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2)	164212
Nano Trap Column, 200 µm i.d. × 2 cm, packed with Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2)	164213

Titanium-Dioxide Nano-Trap Columns

Isolation of Two Synthethic Phosphopeptides from a BSA Tryptic Digest on a TiO_2 Column



Column:	200 µm i.d. x 1 cm, packed with TiO_2, 5 µm 100 µm I.d. x 1 cm, packed with Acclaim® PepMap C18 PM100, 5 µm
Analytical Column:	Acclaim PepMap C18 PM100, 3 µm
Dimensions:	75 µm x 15 cm
Loading Solvent:	0.05% HFBA in DI H_2O
Wash Solvent:	0.01% HFBA in DI H_2O
Mobile Phases:	(A) 0.05% TFA in DI H_2O (B) 0.04% TFA in acetronitrile/ DI H_2O (80:20 v/v)
Gradient:	3–40% acetronitrile in 30 min
TiO_2 Trap Eluent:	250 mM NH_4HCO_3 in DI H_2O, pH 9.0
Flow Rate:	300 nL/min
Loading Flow:	8 µL/min
Inj. Volume:	5 µL
Detection:	MS

23731

Titanium-Dioxide Nano-Trap columns support the enrichment of phosphopeptides. They are available in 100 µm and 200 µm i.d. format, and are packed with 5 µm particle size. In addition, a combination of Titanium-Dioxide and Acclaim PepMap100 C18 is also available.

Note: *For more information see* Application Note 531: Phosphopeptide Enrichment Using a TiO_2 Nano Precolumn

Ordering Information

Nano-Trap Columns

Nano Trap Column, 100 µm i.d. × 1 cm,TiO_2, 5 µm (set of 2) 164205

Nano Trap Column, 100 µm i.d. × 2 cm,TiO_2, 5 µm (set of 2) 164214

Nano Trap Column, 200 µm i.d. × 1 cm,TiO_2, 5 µm (set of 2) 164215

Nano Trap Column, 200 µm i.d. × 2 cm,TiO_2, 5 µm (set of 2) 164206

Nano Trap Column, 100 µm i.d. × 2 cm, packed with 1 cm TiO_2, 5 µm and 1 cm Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2) 164216

Nano Trap Column, 200 µm i.d. × 2 cm, packed with 1 cm TiO_2, 5 µm and 1 cm Acclaim PepMap100 C18, 5 µm, 100 Å (set of 2) 164217

PepSwift

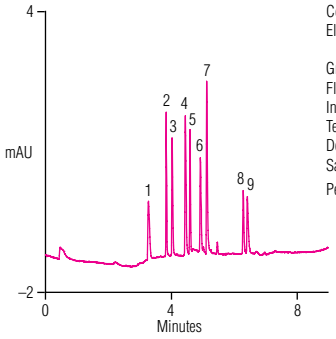
Monolithic columns for fast, high-resolution protein and peptide analysis

PepSwift monolithic columns are specially designed for fast separation and identification of proteins and peptides using nano and capillary LC coupled to MS. Pepswift columns are based on a polystyrene divinylbenzene copolymer bed. The bed structure of the column offers a high-quality alternative to traditional microparticulate sorbents, providing important advantages for high-sensitivity proteomics applications.

- Polymeric monolithic stationary phases
- High-speed protein/peptide separations (<10 min)
- High separation efficiency (>200.000 plates/m)
- High column-to-column reproducibility
- High sensitivity in LC/MS
- Superior lifetime
- Available in 100 µm, 200 µm and 500 µm i.d.

PepSwift Precolumns can be used for preconcentration and desalting of samples consisting of peptides and proteins without negative impact on the chromatographic performance or recovery of the compounds. Various ion-pairing agents can be used in the loading solvent and/or mobile phases to change the selectivity of the separation or improve the trapping efficiency.

Separation of a Peptide Test Mixture Using the PepSwift Capillary Column



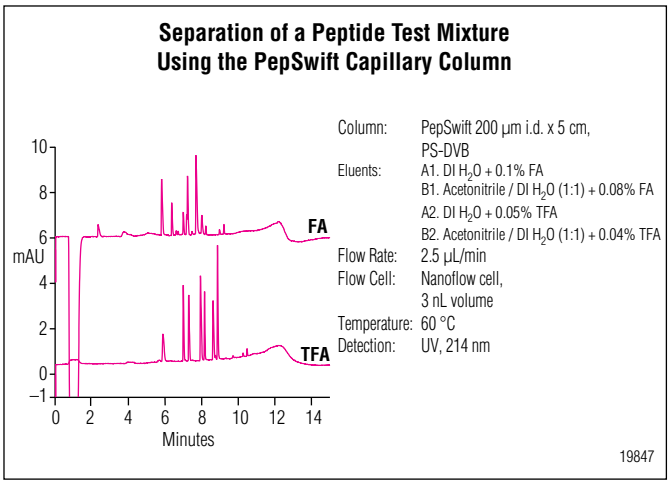
Column:	PepSwift Capillary RP, 200 µm × 50 mm
Eluents:	A. DI H_2O + 0.05% TFA B. Acetonitrile / DI H_2O (1:1) + 0.04% TFA
Gradient:	0–50% B in 7.5 min
Flow Rate:	2.5 µL/min
Inj. Volume:	100 nL
Temperature:	60 °C
Detection:	UV, 214 nm
Sample:	Mixture of Peptides
Peaks:	1. Bradykinin fragments 1–5 2. Vasopressin [Arg⁸] 3. Methionine enkephalin 4. Leucin enkephalin 5. Oxytocin 6. Bradykinin 7. LHRH 8. Bombesin 9. Substance P

19846

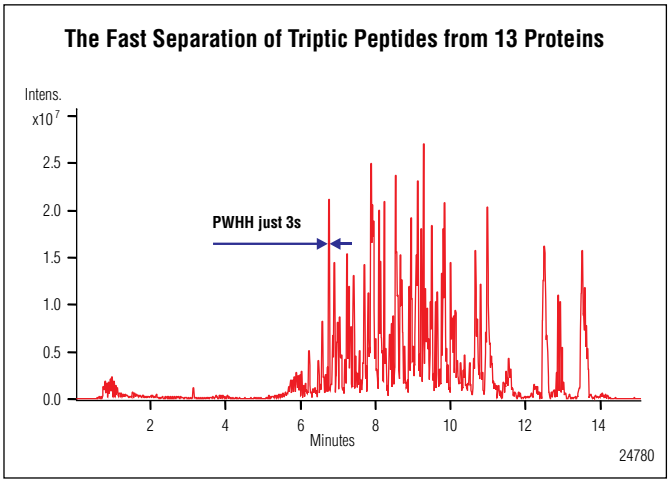
Separation of a peptide test mixture.

Peak Width at Half Height (PWHH) for Peptides Separated on a Monolithic Columns		
Peptide Number	**Retention Time Minutes**	**PWHH Seconds**
1. Bradykinin fragment 1–5	3.3	3.5
2. Vasopressin [Arg^8]	3.8	1.6
3. Methionine enkephalin	4.0	1.9
4. Leucine enkephalin	4.4	2.3
5. Oxytocin	4.6	1.6
6. Bradykinin	4.9	2.5
7. LHRH	5.1	1.9
8. Bombesin	5.1	1.9
9. Substance P	6.4	2.6

Peak Width at Half Height (PWHH) for peptide separation.



Comparison of the influence of FA and TFA on separation of a peptide mixture.



Fast separation of tryptic peptides from 13 proteins. Peak capacities of up to 150 peaks in less than 15 minutes are routinely observed.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Application Notes

AN 522: Monolithic Capillary Columns in LC-MS Proteomics

AN 523: Fast Protein and Peptide Separations Using Monolithic Nanocolumns and Capillary Columns

AN 525: LC-MALDI MS Using Monolithic Capillary Columns

AN 526: PS-DVB Monolithic Columns Applied in an Off-Line 2-D LC/ESI-MS Bottom-Up Study for the Identification of Platelet Proteins

AN 528: Parallel LC with Capillary PS-DVB Monolithic Columns for High-Throughput Proteomics

AN 529: Capillary PS-DVB Monolithic Column of 500-µm i.d. for Peptide and Protein Separations in Top-Down Proteomics Studies

AN 530: Proteome Analysis Involving Off-Line 2-D LC of Intact Proteins, Proteolytic Digestion, and Capillary RP-LC-MS/MS Analysis Using Monolithic PS-DVB Columns

Ordering Information

Analytical Columns

Monolithic Nano Column, 100 µm i.d. × 5 cm (PS-DVB) 162348
Monolithic Capillary Column, 200 µm i.d. × 5 cm (PS-DVB) 161409
Monolithic Capillary Column, 500 µm i.d. × 5 cm (PS-DVB) 164087

Micro and Nano Precolumns

Monolithic Trap Column, 200 µm i.d. × 5 mm (PS-DVB) set of 2 163972

Nucleic Acid Columns

HPLC analysis of nucleic acids

The DNAPac PA100 and PA200 are anion-exchange polymer-based columns which set the standard for oligonucleotide purity analysis, fast screening, and purification.The DNAPac columns provide the highest resolution of oligonucleotides including full-length from n-1, n+1, and other failure sequences, and support screening of synthetic oligonucleotides for production yield and failure sequences. The DNAPac PA200 column offers improved efficiency and enhanced stability under alkaline conditions.

- High resolution separation of oligonucleotides and nucleic acids
- Capable of n, n-1 resolution for oligonucleotides
- Compatible with solvent, high pH, and high temperatures
- Provides easy scale-up

The DNASwift semipreparative column is a strong anion-exchange monolith column that provides exceptionally high purity and yields of oligonucleotides. This column combines DNAPac and monolith technology to provide exceptionally high resolution and capacity for oligonucleotide purification, making it the ideal column for therapeutic and diagnostic research.



DNAPac PA100: Anion-exchange column for n, n-1 resolution of single-stranded oligonucleotides.

DNAPac PA200: Polymer-based, anion-exchange column for oligonucleotide purity check, screening, and purification.

DNASwift: The DNASwift SAX-1S is a unique, porous, polymer-based strong anion-exchange monolith column designed for oligonucleotide purification.

DNAPac PA100

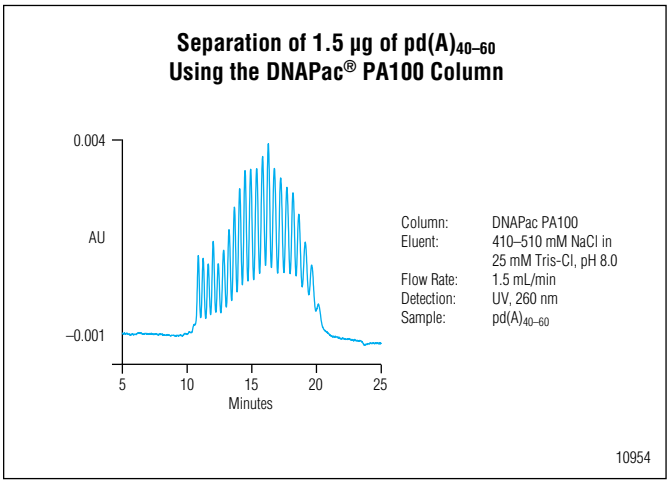
For n, n-1 resolution of single-stranded oligonucleotides

The DNAPac PA100 is a high-resolution anion-exchange column that provides single-base resolution. It is stable under denaturing conditions, rugged, reliable, and can be readily scaled up. The DNAPac PA100 is a 13 µm pellicular, nonporous polymeric resin with bound quaternary amine-functionalized MicroBeads. The rapid mass-transport characteristics of this resin result in very high-resolution oligonucleotide separations.

- Capable of n, n-1 resolution for oligonucleotides
- Resolves oligonucleotides with secondary structures
- Compatible with solvent, high pH, and high temperatures
- Analyzes phosphorothioate-based clinical samples
- Provides easy scale-up

The MicroBead resin used in DNAPac columns provides high-resolution separations to ensure maximum peak purity, and makes linear scale-up of your separation easy. For more complex separations, the polymeric properties of the DNAPac PA100 column allows great flexibility to select ideal conditions, including high pH, high temperature, or chaotropic agents.

Synthetic oligonucleotides can be screened for production yield and failure sequences using the DNAPac PA100. Unit-base resolution of synthetic oligonucleotides to 60 bases and beyond has been demonstrated. The DNAPac PA100 can even be operated under denaturing conditions. Either high temperature (up to 90 °C) or high-pH eluents (up to pH 12.5) can be used to eliminate hydrogen bonding, allowing resolution of problem sequences such as self-complementary sequences or poly-G stretches.



Separation of oligonucleotides using the DNAPac PA100 column.

Separates RNA/Double-Stranded DNA

The DNAPac PA100 is ideally suited for the purification and analysis of synthetic RNA. Failure sequences are easily separated from the full-length product. Double-stranded DNA, such as plasmids, or restriction fragments are also separated.

Analytical separations on the 4 mm diameter column can be scaled directly to larger diameter columns so preparative methods can be conveniently developed using small samples. The loading capacity of the DNAPac PA100 (4 × 250 mm) column is from 1 to 100 µg. Scaling the flow rate and sample size up for the 9 × 250 mm and 22 × 250 mm column yields essentially identical chromatography.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

DNAPac PA100 Data Sheet

Application Notes

AN 100: High-Resolution Analysis and Purification of Oligonucleotides with the DNAPac PA100 Column

Ordering Information

Analytical Columns	
DNAPac PA100 Analytical Column (4 × 250 mm)	043010
DNAPac PA100 Semipreparative Column (9 × 250 mm)	043011
DNAPac PA100 Semipreparative Column (22 × 250 mm)	SP2091
FAST Cartridge, DNAPac PA100 (2 × 10 mm), Pkg./150	SP4008
FAST Cartridge, DNAPac PA100 (2 × 10 mm), Pkg./600	SP3229

Guard Columns	
DNAPac PA100 Guard Column (2 × 50 mm)	SP4016
DNAPac PA100 Guard Column (4 × 50 mm)	043018

DNAPac PA200

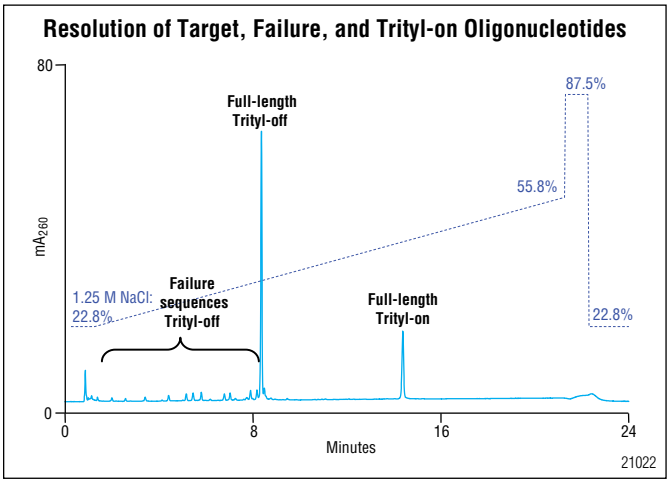
Ultrahigh-resolution separations of oligonucleotides

The DNAPac PA200 is a strong anion-exchange column developed to provide unsurpassed high-resolution analysis and purification of synthetic oligonucleotides. DNAPac PA200 can resolve full length from n–1, n+1, and other failure sequences not possible with other columns. Retention times and selectivity can be controlled by the choice of salt, pH, and solvent. Therefore, the separation can be tailored to the requirements of many different oligonucleotide analysis challenges.

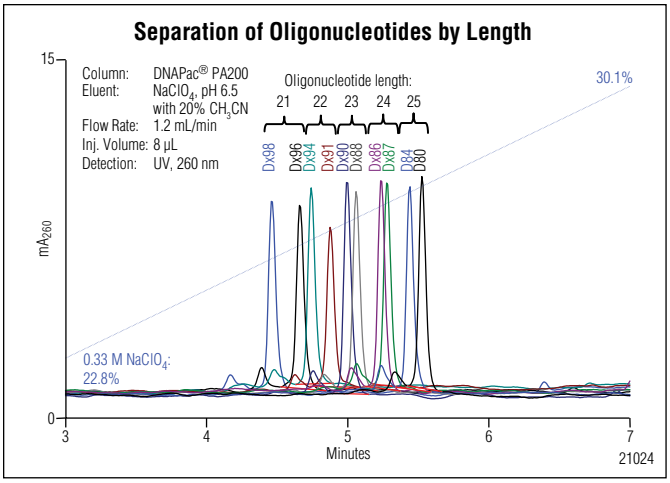
- Achieve n, n-1 resolution for oligonucleotides
- Resolve oligonucleotides with secondary structures
- Assay phosphorothioate purity
- Selectivity control with eluent pH, salt, and solvent
- Resolve RNA with aberrant (2 in.–5 in.) links from normal SS-RNA

The DNAPac PA200 is packed with a pellicular anion-exchange resin composed of an 8-µm-diameter nonporous polymeric substrate, to which is bound quaternary amine-functionalized MicroBeads. The rapid mass transport characteristics of this resin result in high-resolution oligonucleotide separations. The DNAPac PA200 column can be operated under denaturing conditions, such as high temperature (up to 85 °C), or high-pH eluents (up to pH 12.5), or by the inclusion of chaotropic agents (such as urea).

The DNAPac PA200 offers the highest quality phase stability over a broad pH range, delivers exceptional resolution and supports high-throughput separations. DNAPac PA200 columns support resolution of normal-length oligonucleotides (8- to 30-mer), extended-length oligonucleotides (30- to 70-mer), linear double-stranded DNA, and supercoiled versus nicked/linear DNA.



Resolution of oligonucleotides.



Separation of oligonucleotides by length.

Analytical separations on the 4 mm diameter column can be scaled directly to larger diameter columns so preparative methods can be conveniently developed using small samples. Scaling the flow rate and sample size up for the 9 × 250 mm and 22 × 250 mm column yields essentially identical chromatography.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

DNAPac PA200 Column Data Sheet

Ordering Information

Analytical Columns

DNAPac PA200 Analytical (2 × 250 mm)	063425
DNAPac PA200 Analytical Column (4 × 250 mm)	063000
DNAPac PA200 Analytical (9 × 250 mm)	063421
DNAPac PA200 Semipreparative (22 × 250 mm)	SP6734

Guard Columns

DNAPac PA200 Guard (2 × 50 mm)	063423
DNAPac PA200 Guard Column (4 × 50 mm)	062998
DNAPac PA200 Guard (9 × 50 mm)	063419
DNAPac PA200 Guard (22 × 50 mm)	SP6731

DNASwift

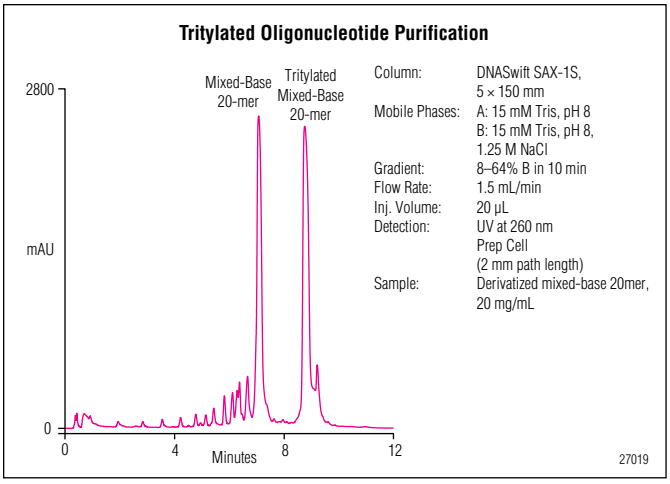
A semipreparative column providing exceptionally high purity and yield for oligonucleotides

The DNASwift SAX-1S is a strong anion-exchange monolith column that provides exceptionally high purity and yield of oligonucleotides. This semipreparative column incorporates the high resolution and selectivity of the DNAPac column, providing unsurpassed purity and yields. The DNASwift SAX-1S column is ideal for therapeutic and diagnostic research, which have high purity and yield requirements.

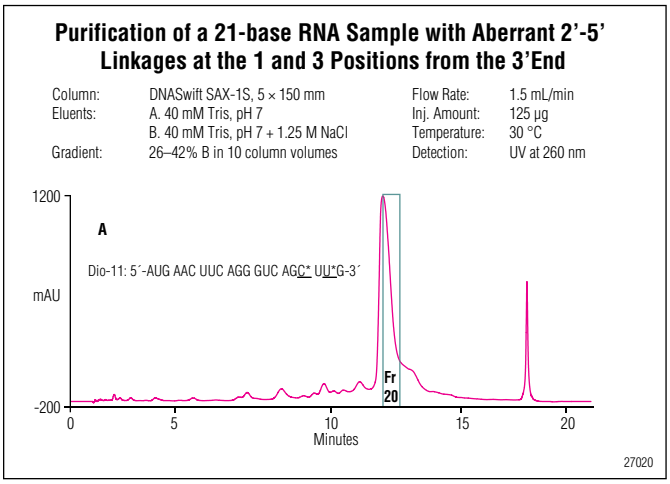
- Highest resolution for oligonucleotide purification available, providing high purity and yields
- Exceptionally high capacity
- Refined selectivity, as with the DNAPac column, for high resolution
- Compatible with high pH mobile phases, solvents, and high temperatures
- Ideal for therapeutic and diagnostic research
- Purify difficult oligonucleotide products

The DNASwift SAX-1S is a unique porous polymer monolith column designed for oligonucleotide purification. The column incorporates a pressure- and chemically-stable substrate coated with functionalized latex nanobeads. These nanobeads, with strong anion-exchange functional groups optimized for oligonucleotide separations, are similar to those of the industry-leading DNAPac columns. Similarly, the nanobeads contribute to the DNASwift's exceptional high resolution and selectivity control.

The monolith is a polymeric cylinder with interconnected flow-through channels which provides fast mass transfer that contributes to the exceptionally high resolution of the DNASwift column. The porous monolith also offers low backpressure, allowing increased flow rates with minimal loss of resolution. The combination of functionalized latex nanobeads and monolith technology results in the DNASwift column having very high capacity, exceptionally high resolution, and refined selectivity control.

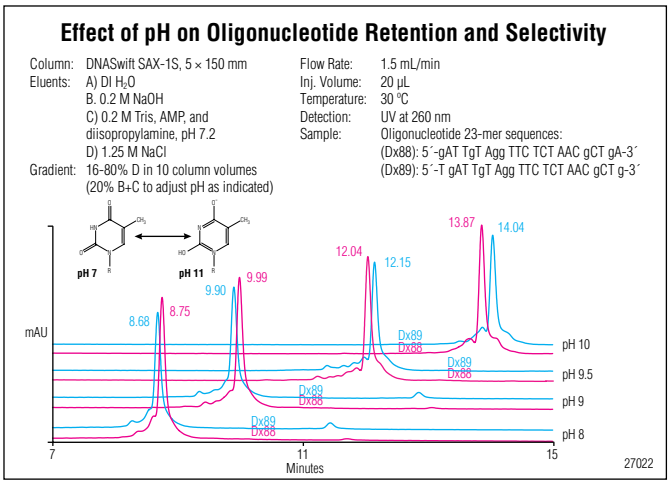


Purification of tritylated oligonucleotide using the DNASwift SAX-1S column.

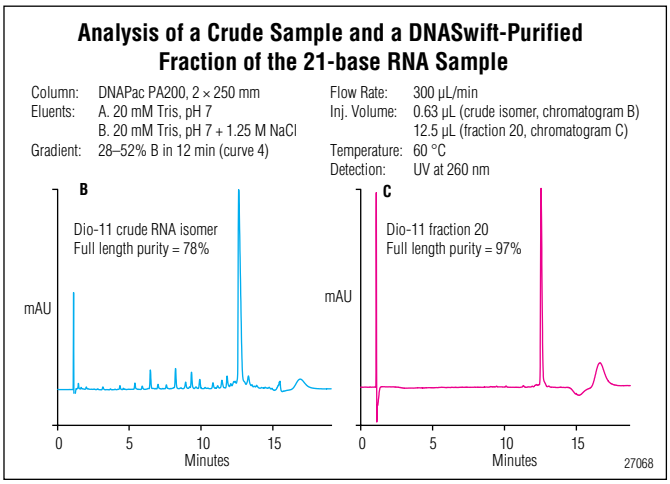


Effect of pH on oligonucleotide retention and selectivity using the DNASwift SAX-1S column.

Analytical separations on the 4 mm diameter column can be scaled directly to larger diameter columns so preparative methods can be conveniently developed using small samples. Scaling the flow rate and sample size up for the 9 × 250 mm and 22 × 250 mm column yields essentially identical chromatography.



Effect of pH on oligonucleotide retention and selectivity.



Analysis of crude sample and DNASwift-purified RNA sample.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

DNASwift Monolith Column for Oligonucleotide Purification Data Sheet

Ordering Information

DNASwift	
DNASwift SAX-1S Monolith Column (5 x 150 mm)	066766

Amino Acid Columns

HPLC analysis of amino acids

The AminoPac PA10 column provides solutions for the two primary approaches of amino acid analysis: (1) anion-exchange separation by *AAA-Direct* in which amino acids are detected directly, without the need for derivatization, or (2) anion-exchange separation with postcolumn derivatization. The AminoPac PA10 is the recommended column for both *AAA-Direct* system and postcolumn derivatization.

- Separate free amino acids without derivatization
- Separate free amino acids with derivatization
- Compatible with solvent, high pH, and high temperatures
- Provides easy scale-up

AminoPac columns are used for high-resolution separations of free amino acids as well as for separation and detection of a wide range of sugars, phosphorylated amino acids, and common oxidation products of sulfur-containing amino acids.



AminoPac PA10: Hydrophobic, polymeric column stable from pH 0–14, recommended for use with the Dionex *AAA-Direct* system.

AminoPac PA10

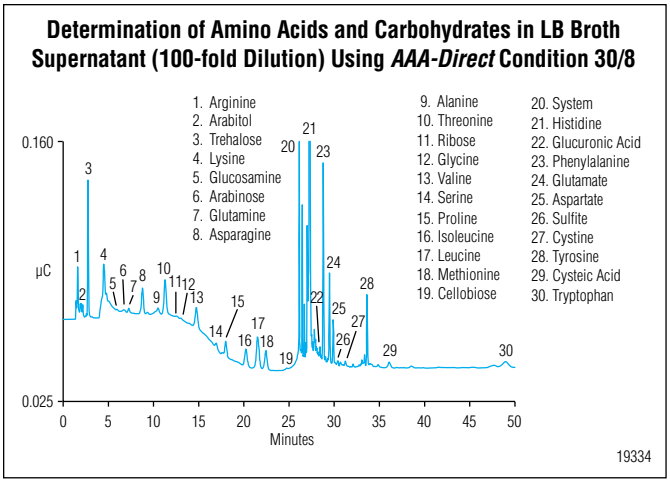
For high-resolution separations of free amino acids by AAA-Direct

The AminoPac PA10 column is packed with a hydrophobic, polymeric, pellicular, anion-exchange resin that is stable over the range of pH 0–14. The unique pH stability allows the use of eluents that are conducive to anodic oxidation of amino acids at gold electrodes. This column is recommended for use with the *AAA-Direct* Amino Acid Analyzer, allowing direct detection of primary and secondary amino acids by IPAD, with no need for pre- or postcolumn derivatization.

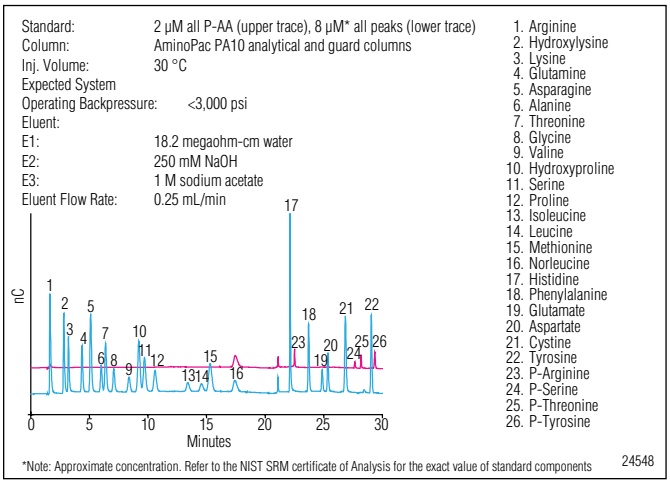
- Derivatization not required
- Carbohydrates and amino acids separated and detected simultaneously
- Mid-femtomole to low-picomole detection limits
- Compatible with all commonly used hydrolysis procedures
- Can be configured for on-line analysis
- Separates free amino acids with derivatization

AAA-Direct is a technique that eliminates the need for any form of derivatization, and is therefore compatible with on-line monitoring of cell cultures and fermentation broths.

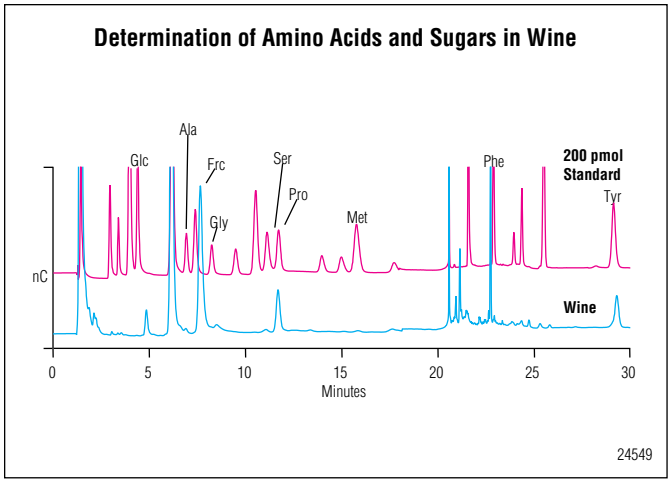
The AminoPac PA10 column is optimized for separations of free amino acids by *AAA-Direct*. Vitamins, amino sugars, and carbohydrates can be detected simultaneously with amino acids. Additional capabilities include separation of a wide range of sugars, phosphorylated amino acids, and common oxidation products of sulfur-containing amino acids, such as cysteic acid, methionine sulfone, and methionine sulfoxide.



Determination of amino acids and carbohydrates in LB broth supernatant.



Analysis of phospho-amino acids.



Analysis of amino acids and sugars in red wine.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Application Notes

AN 130: Identification of a Hydroxylysine-Containing Peptide Using *AAA-Direct*

AN 142: Determination of Tryptophan Using *AAA-Direct*

AN 150: Determination of Amino Acids in Cell Cultures and Fermentation Broths

AN 179: Carbohydrate and Amino Acid Analysis Using 3-D Amperometry

Application Updates

AU 152: An Improved Gradient Method for the *AAA-Direct* Separation of Amino Acids and Carbohydrates in Complex Sample Matrices

Technical Notes

TN 50: Determination of the Amino Acid Content of Peptides by *AAA-Direct*

TN 55: Screening of Sample Matrices and Individual Matrix Ingredients for Suitability in *AAA-Direct*

Ordering Information

AminoPac PA10 - Analytical Columns

AminoPac PA10 Analytical Column (2 × 250 mm).....055406
AminoPac PA10 (22 × 250 mm).....SP5488
AminoPac PA10 (9 × 250 mm).....SP5490
AminoPac PA10 Analytical Column (4 × 250 mm).....SP5678

Guard Columns

AminoPac PA10 Guard Column (2 × 250 mm).....055407
AminoPac PA10 Guard Column (4 × 50 mm).....SP5680

Accessories

AAA-Direct Installation Kit.....059539
Carbohydrate Removal Accessory Kit for ICS-3000 SP, including the CRA column, an external pump and the required plumbing 070510
Carbohydrate Removal Accessory Kit for the ICS-3000 DP, including CRA column and all plumbing.....064418
Carbohydrate Removal Cartridge (CRC) (2 × 15 mm).....068598

Carbohydrate Columns

HPLC analysis of carbohydrates

The CarboPac family of columns provide high resolution separations of saccharides. Combined with pulsed amperometric detection (PAD), these columns provide high sensitivity without the need for derivatization. CarboPac columns support simple, reliable techniques to separate sugars.

- Sugar alcohols
- Mono- and disaccharides
- Poly- and oligosaccharides

The CarboPac family of columns offers a selection of columns, each optimized for a different class of compounds. The Carbopac MA1 column provides high resolution of reduced sugars. The CarboPac PA10 and PA20 columns provide high-resolution separation of mono- and disacharides. The CarboPac PA100 and PA200 columns provide high resolution of oligonucleotides for analysis and mapping.



CarboPac MA1: High-capacity, sensitive, rugged and reliable strong anion-exchange column for separations of reduced sugars, without the need for derivatization.

CarboPac PA1: Durable column for carbohydrate separations. Use for analysis of monosaccharides, disaccharides, and for linear polysaccharide profiling.

CarboPac PA10: Anion-exchange column designed for isocratic separations of mono- and disaccharides with pulsed amperometric detection.

CarboPac PA20: Fast mono- and disaccharide column. The six common glycoprotein monosaccharides can be baseline resolved in less than 10 min.

CarboPac PA100: Strong anion-exchange column for separation of oligosaccharides based on size, charge, branching, and linkage.

CarboPac PA200: Recommended for high resolution separations of neutral and charged oligosaccharides. The column is used with pulsed amperometric detection.

CarboPac MA1

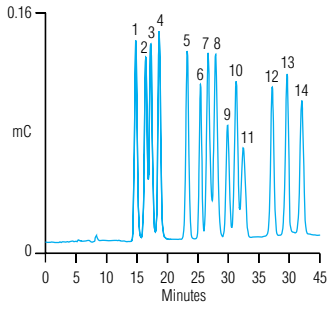
CarboPac MA1 column for carbohydrate, alditol, and aldose analysis

The CarboPac MA1 column is a high-capacity, strong anion-exchange column that delivers sensitive, rugged, and reliable separations of reduced sugars without derivatization. The MA1 column consists of a macroporous resin fully functionalized wth a tertiary amine.

- Recommended for the separation of reduced mono- and disaccharides
- No derivatization needed
- Separations using a simple hydroxide eluent
- Alditols and aldoses separated from one another in a single run

Designed for reduced mono- and disaccharide alditol analyses, the CarboPac MA1 is also well suited for analysis of exoglycosidase-released neutral monosaccharides. Monosaccharides are moved away from the column void, enabling immediate evaluation of contaminating exoglycosidase activities. The MA1 can provide baseline resolution of fucose, *N*-acetyl-(D)-glucosamine, *N*-acetyl-galactosamine, mannose, glucose, and galactose, as well as neutral oligosaccharides in the same separation.

Gradient Separation of Alditols and Aldoses Potentially Released by Hydrolysis of ß-Eliminated Oligosaccharides Using the CarboPac™ MA1 Column



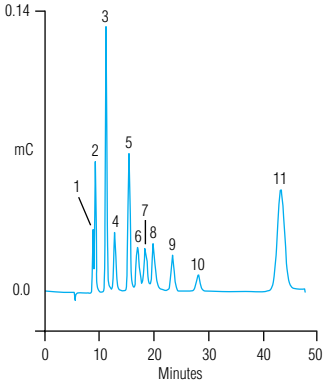
Column: CarboPac MA1 (4 × 250 mm)
Eluent: 100 to 850 mM Sodium hydroxide nonlinear gradient
Flow Rate: 0.4 mL/min
Detection: ED40, pulsed electrochemical
Electrode: Gold

Peaks:
1. Fucitol
2. GalNAcol
3. GlcNAcol
4. Xylitol
5. Arabitol
6. Fructose
7. Sorbitol
8. Dulcitol
9. GlcNAc
10. Mannitol
11. GalNAc
12. Mannose
13. Glucose
14. Galactose

10261

Gradient separation of alditols and aldoses potentially released by hydrolysis of beta eliminated oligosaccharides. Arabitol serves as an internal standard.

HPAE Separation of Sugars and Sugar Alcohols Using the CarboPac™ MA1 Column

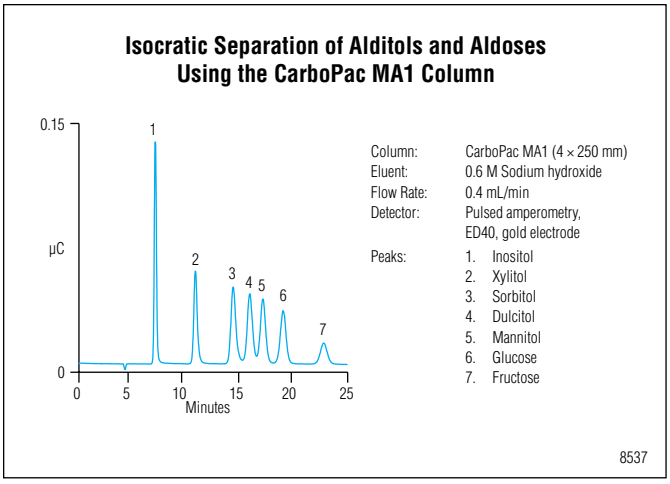


Column: CarboPac MA1 (4 × 250 mm)
Eluent: 500 mM Sodium hydroxide
Flow Rate: 0.4 mL/min
Inj. Volume: 10 µL
Detection: ED40, pulsed electrochemical
Electrode: Gold

Peaks:
1. *myo*-Inositol
2. Glycerol
3. *i*-Erythritol
4. Xylitol
5. Arabitol
6. Sorbitol
7. Dulcitol
8. Mannitol
9. Glucose
10. Fructose
11. Sucrose

10744

HPAE separation of sugars and sugar alcohols without derivatization.



Isocratic separation of a representative set of alditols and aldoses ensures lot-to-lot reproducibility in the manufacturing of the CarboPac MA1 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac MA1 Column for Carbohydrate Alditol and Aldose Analysis Data Sheet

Application Notes

AN 87: Determination of Sugar Alcohols in Confections and Fruit Juices by HPAE-PAD

AN 117: Quantification of Carbohydrates and Glycols in Pharmaceuticals

AN 122: The Determination of Carbohydrates, Alcohols, and Glycols in Fermentation Broths

Technical Notes

TN 20: Analysis of Carbohydrates by High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

TN 21: Optimal Settings for Pulsed Amperometric Detection of Carbohydrates Using the Dionex ED40 Electrochemical Detector

Ordering Information

Analytical Columns

CarboPac MA1 Analytical Column (4 × 250 mm) 044066

Guard Columns

CarboPac MA1 Guard Column (4 × 50 mm) 044067

CarboPac PA1

For the separation of monosaccharides, disaccharides, and linear polysaccharides

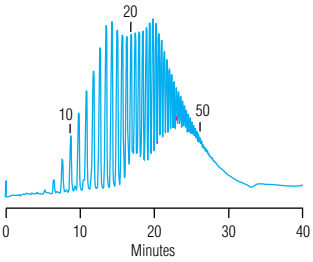
The CarboPac PA1 is an anion-exchange column for the separation of mono-, disaccharides, and specific oligosaccharides using an isocratic eluent. Sialic acid analysis has also been demonstrated on this column.

- General-purpose column for isocratic determination of monosaccharides and disaccharides
- Detection by pulsed amperometric detection; no derivatization needed
- Approved for use in a variety of official methods for the analysis of foods
- High resolution of linear polysaccharides

The unique MicroBead pellicular structure of the CarboPac PA1 resin gives it stability from pH 0–14 at all concentrations of buffer salts. The pellicular resin structure allows excellent mass transfer resulting in fast gradient reequilibration.

The CarboPac PA1 column is used with pulsed amperometric detection; no derivatization is required. Sensitivity on the CarboPac PA1 column is not as high as with the CarboPac PA20 or PA10 columns for monosaccharide analysis. Thus, the CarboPac PA1 is well suited for the analysis of foods for nutritional labeling. The CarboPac PA1 column has been approved for use in a number of official methods.

Chromatographic Analysis of Purified Inulin Using the CarboPac PA1 Column



Column:	CarboPac PA1
Eluent:	A) 0.1 M NaOH B) 0.1 M NaOH, 1.0 M NaOAc
Gradient:	20–60% B in 40 min
Flow Rate:	1 mL/min
Detection:	Pulsed amperometry, PAD, gold electrode
Range:	3000 nA
Sample:	0.3% Water-washed Inulin (Polyfructose) in 0.1 M NaOH

Sample Courtesy of Dr. C. Mitchell
California Natural Products, Manteca, CA

3073-01

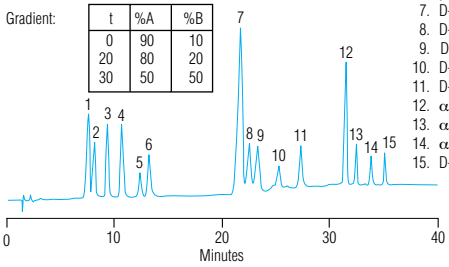
Chromatographic analysis of purified inulin.

Analysis of Mono- and Diphosphorylated Monosaccharides on the CarboPac PA1

Column:	CarboPac PA1
Flow Rate:	1.0 mL/min
Detector:	Pulsed amperometry, PAD, gold electrode
Range:	10,000 nA
Eluent A:	100 mM NaOH
Eluent B:	100 mM NaOH, 1.0 M NaOAc

Gradient:

t	%A	%B
0	90	10
20	80	20
30	50	50



Peaks:

1.	α-D-Galactosamine -1-P	1.13 µg
2.	α-D-Glucosamine-1-P	0.45
3.	α-D-Galactose-1-P	1.75
4.	α-D-Glucose-1-P	1.75
5.	α-D-Ribose-1-P	1.46
6.	β- D-Glucose-1-P	1.75
7.	D-Glucosamine-6-p	3.75
8.	D-Galactose-6-P	2.04
9.	D-Glucose-6-P	1.25
10.	D-Fructose-1-P	0.96
11.	D-Fructose-6-P	0.42
12.	α-D-Glucuronic acid-1-P	3.08
13.	α-D-Glucose-1,6-Di P	1.06
14.	α-D-Fructose-2,6-Di P	0.92
15.	D-Fructose-1,6-Di P	0.92

3169

Analysis of mono- and diphosphorylated monosaccharides on the CarboPac PA1 column.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac PA1 and PA10 Columns for Mono- and Disaccharide Analysis Data Sheet

Application Notes

AN 61: Determination of Tobramycin and Impurities Using HPAE-PAD

AN 66: Determination of Neomycin B and Impurities Using HPAE-PAD

AN 67: Determination of Plant-Derived Neutral Oligo- and Polysaccharides

AN 82: Analysis of Fruit Juice Adulterated with Medium Invert Sugar from Beets

AN 92: Determination of Sugars in Molasses by High Performance Anion Exchange with Pulsed Amperometric Detection

AN 122: The Determination of Carbohydrates, Alcohols, and Glycols in Fermentation Broths

AN 147: Determination of Polydextrose in Foods by AOAC Method 2000.11

AN 155: Determination of Trans-Galactooligosaccharides in Foods by AOAC Method 2001.02

AN 181: Determination of Streptomycin and Impurities Using HPAE-PAD

AN 186: Analysis of Paromomycin by HPAE-IPAD

AN 225: Rapid Method for the Estimation of Total Free Monosaccharide Content of Corn Stover Hydrolysate Using HPAE-PAD

Application Updates

AU 150: Determination of Plant-Derived Neutral Oligo- and Polysaccharides Using the CarboPac PA200

AU 167: Determination of Tobramycin in Crude and In-Process Production Samples During Manufacturing Using HPAE-IPAD

Technical Notes

TN 20: Analysis of Carbohydrates by High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

TN 30: Monosaccharide and Oligosaccharide Analysis of Glycoproteins Electrotransferred onto Polyvinylidene Fluoride (PVDF) Membranes

TN 36: Analysis of Exoglycosidase Digestions of N-Linked Oligosaccharides Using HPAE-PAD

Ordering Information

Analytical Columns

CarboPac PA1 Analytical Column (2 × 250 mm)	057178
CarboPac PA1 Analytical Column (4 × 250 mm)	035391
CarboPac PA1 Semipreparative Column (9 × 250 mm)	039686
CarboPac PA1 Semipreparative Column (22 × 250 mm)	SP2866

Guard Columns

CarboPac PA1 Guard Column (2 × 50 mm)	057179
CarboPac PA1 Guard Column (4 × 50 mm)	043096
CarboPac PA1 Guard (9 × 50 mm)	063501

CarboPac PA10

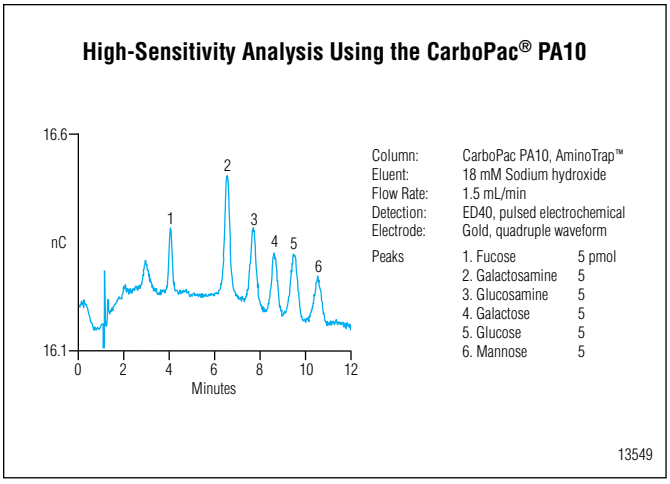
For sensitive, high-resolution analysis of mono- and disaccharides

The CarboPac PA10 is a anion-exchange column designed specifically for high-resolution separations and high sensitivity detection of mono- and disaccharides without the need for derivatization. High resolution and high sensitivity detection is accomplished using a simple isocratic eluent and pulsed amperometric detection (PAD) with no derivatization required.

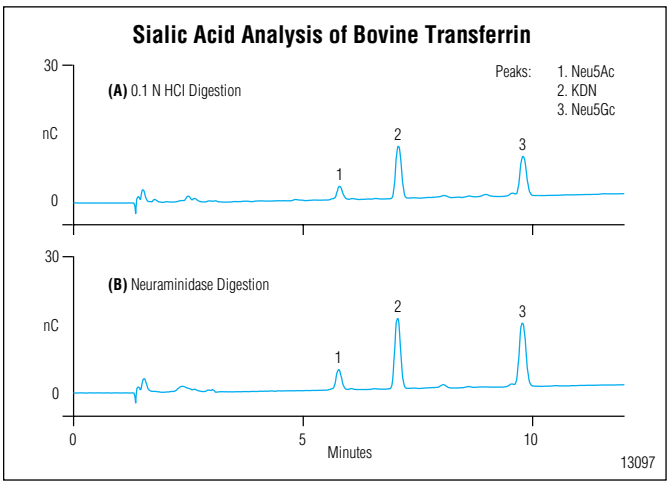
- For the quantification of acidic, neutral, and aminomonosaccharides
- Simple, isocratic separations
- Superior selectivity for common monosaccharides compared to the CarboPac PA1
- No derivatization required
- Gradient compatible

The CarboPac PA10 column is ideal for the analysis of mono- and disaccharides in foods, drugs, and plants. Fucose is well resolved from the system void and from protein hydrolysate interferents. The CarboPac PA10 column allows oxygen to elute after mannose, eliminating interference with monosaccharides. This column also separates sialic acids with the addition of sodium acetate to the eluent.

The CarboPac PA10 column consists of 10-µm-diameter nonporous beads covered with a fine latex of functionalized MicroBead resin. This pellicular resin structure permits excellent mass transfer, resulting in high-resolution chromatography and rapid reequilibration. The performance of each column is verified with a Dionex MonoStandard.

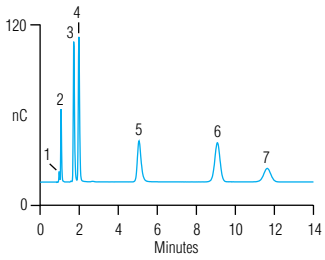


High-sensitivity analysis using the CarboPac PA10 column.



Sialic acid analysis of bovine transferrin on the CarboPac PA10 column.

Determination of Glycols, Sugar Alcohols, and Carbohydrates Using the CarboPac PA10 Column



Column: CarboPac PA10, PA10 guard
Eluent: 18 mM Sodium hydroxide
Flow Rate: 1.5 mL/min
Inj Volume: 10 µL
Detection: Pulsed amperometry, ED40, gold electrode

Peaks:
1. Propylene glycol
2. Glycerol
3. Sorbitol
4. Mannitol
5. Maltitol
6. Glucose
7. Sucrose

13155

The CarboPac PA10 column resolves mixtures of glycols, sugar alcohols, and carbohydrates in a pharmaceutical formulation.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac PA1 and PA10 Columns for Mono- and Disaccharide Analysis Data Sheet

Application Notes

AN 117: Quantification of Carbohydrates and Glycols in Pharmaceuticals

Application Updates

AU 141: Improved Long-Term Stability of N-Acetylneuraminic Acid and N-Glycolylneuraminic Acid Peak Area Responses Using Waveform A, a Quadruple Potential Waveform

Technical Notes

TN 20: Analysis of Carbohydrates by High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

TN 40: Glycoprotein Monosaccharide Analysis Using High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

TN 41: Analysis of Sialic Acids Using High-Performance Anion-Exchange Chromatography

TN 71: Eluent Preparation for High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection

Ordering Information

Analytical Columns

CarboPac PA10 Analytical Column (2 × 250 mm)..... 057180
CarboPac PA10 Analytical Column (4 × 250 mm)..... 046110
CarboPac PA10 Semipreparative (9 × 250 mm)..... SP4216

Guard Columns

CarboPac PA10 Guard Column (2 × 50 mm)..... 057181
AminoTrap Column (2 × 50 mm)..... SP5578
(Use as a guard column with the CarboPac PA10 when analyzing samples containing amino acids.)

CarboPac PA10 Guard Column (4 × 50 mm)..... 046115
Amino Trap Column (4 × 50 mm)..... 046122
(Use as a guard column with the CarboPac PA10 when analyzing samples containing amino acids.)

Borate Trap Column..... 047078
(Use as an eluent trap column with the CarboPac PA10 for removal of borate contamination from the eluent.)

Amino Trap Column (3 × 30 mm)..... 060146
(Use as a guard column with the CarboPac PA10 when analyzing samples containing amino acids.)

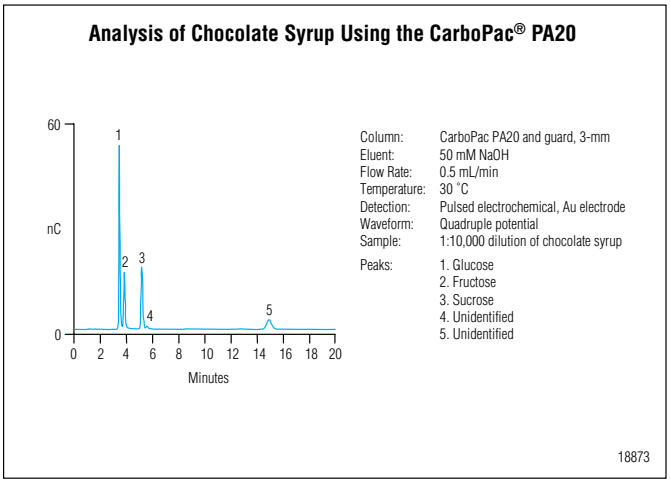
CarboPac PA20

Highest resolution analysis of sensitive mono- and disaccharides

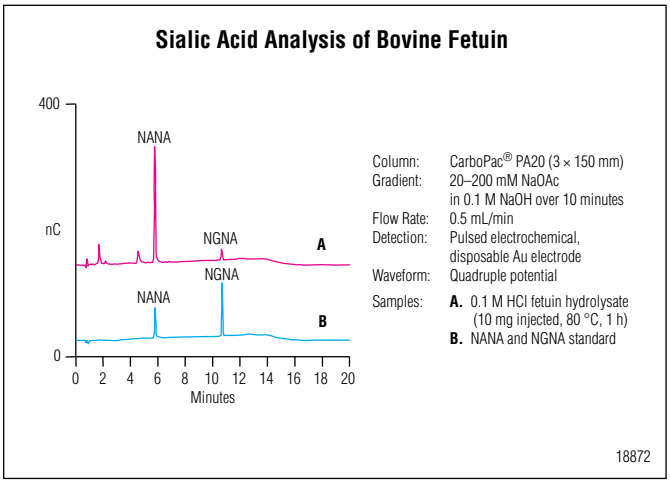
The CarboPac PA20 is a strong anion-exchange column that provides the highest-resolution separations of mono- and disaccharides with no need for derivatization. This column provides baseline resolution between the six monosaccharides commonly found in mammalian glycoproteins over a wide range of eluent concentrations. The CarboPac PA20 column provides superior selectivity over the CarboPac PA1 or PA10 columns, making it an attractive choice for separating difficult peak pairs.

- The column of choice for high resolution and high-sensitivity monosaccharide and disaccharide analyses
- Highly efficient separations with good resolution between neighboring peaks
- Fast analysis—<10 min
- Optimized resolution of glucosamine/galactose and glucose/mannose peak pairs
- Lower eluent consumption
- Does not require derivatization

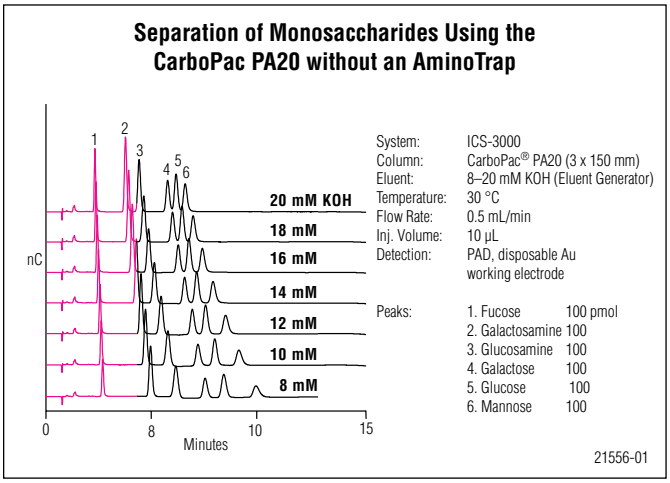
The CarboPac PA20 consists of 6.5-µm-diameter nonporous beads covered with a fine latex of functionalized MicroBead resin. This pellicular resin structure permits excellent mass transfer, resulting in high-resolution chromatography and rapid reequilibration. The performance of each column is verified with a Dionex MonoStandard.



Analysis of chocolate syrup using the CarboPac PA20 column.



Sialic acid analysis of bovine fetuin.



Effect of hydroxide concentration on elution times.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac PA20 Column Data Sheet

Application Notes

AN 159: Determination of Sucralose Using HPAE-PAD

AN 197: Determination of Glucosamine in Dietary Supplements Using HPAE-PAD

AN 202: High Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD) Analysis of Mannose-6-Phosphate

AN 233: Determination of Galactosamine Containing Organic Impurities in Heparin by HPAE-PAD Using the CarboPac PA20 Column

Application Updates

AU 164: Determination of Glucosamine in Chondroitin Sulfate-Containing Dietary Supplements Using HPAE-PAD

AU 151: Determination of Sucralose in Reduced- Carbohydrate Colas using High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection

Technical Notes

TN 40: Glycoprotein Monosaccharide Analysis Using High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

Ordering Information

Analytical Columns

CarboPac PA20 Analytical Column (3 × 150 mm)..... 060142

Guard Columns

CarboPac PA20 Guard Column (3 × 30 mm)..... 060144

CarboPac PA100

High resolution and low-picomolar oligosaccharide analysis

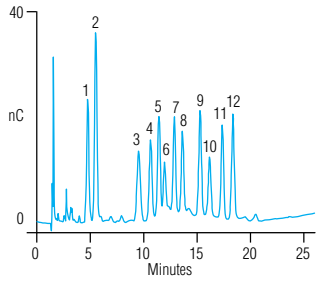
The CarboPac PA 100 column is a high-resolution, strong anion-exchange column for enhanced chromatography of oligosaccharides. With no time-consuming derivatization, you can separate complex mixtures of neutral and charged oligosaccharides based on size, charge, degree of branching, anomericity, and linkage isomerism.

- Separation of closely related oligosaccharides—even isomers—at picomole levels
- Separation of neutral and charged oligosaccharides in the same run
- No sample derivatization required for detection

Oligosaccharides released from therapeutic glycoproteins can differ in size, charge, branching, and linkage. Oligosaccharides with these features can be resolved using the CarboPac PA100. It provides the flexibility to separate oligosaccharides into broad classes depending upon the degree of sialylation, while maintaining the resolution needed for routine analysis based on linkage isomerism. Coupled with pulsed amperometric detection, the PA100 supports detection at low-picomole levels.

The Carbohydrate Membrane Desalter can be used on-line prior to fraction collection.

Separation of Neutral Oligosaccharide Standards



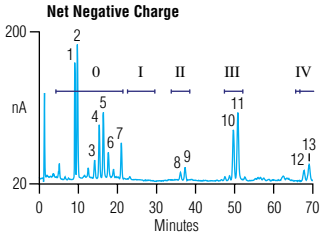
Column: CarboPac® PA100 + Guard
Eluent: 0 to 80 mM Sodium acetate gradient in 250 mM Sodium hydroxide
Flow Rate: 1 mL/min
Inj. Volume: 25 µL
Detection: PAD (Gold)

Peaks:
1. fucosylated $Man_3GlcNAc_2$
2. $Man_3GlcNAc2$
3. asialo agalacto bi, core fuc
4. asialo agalacto bi
5. $Man_5GlcNAc_2$
6. asialo agalacto tri
7. asialo bi, core fuc
8. asialo bi
9. asialo tri
10. bisected hybrid
11. asialo tetra
12. $Man_9GlcNAc_2$

9908-01

Separation of neutral oligosaccharide standards. Twelve commonly occurring N-linked neutral oligosaccharides are easily resolved within 20 minutes.

Separation of Neutral and Sialylated Oligosaccharide Standards Using the CarboPac® PA100 Column



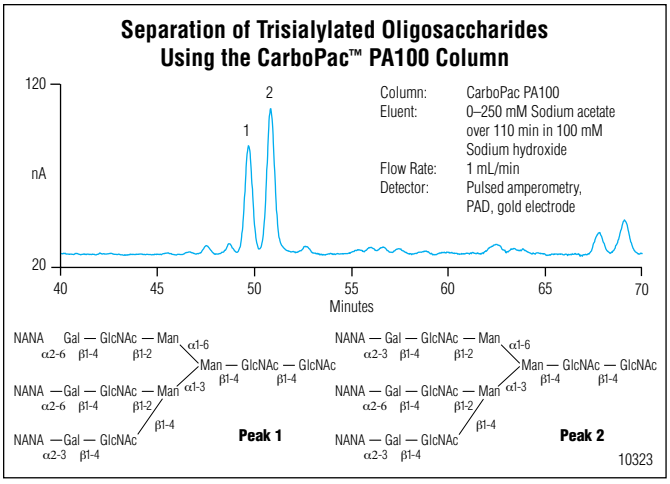
Column: CarboPac PA100
Eluent: 0–250 mM Sodium acetate over 110 min in 100 mM Sodium hydroxide
Flow Rate: 1 mL/min
Detection: Pulsed amperometry, PAD, gold electrode

Peaks:
1. Fucosylated $Man_3GlcNAc_2$
2. $Man_3GlcNAc_2$
3. Asialo agalacto bi, core fuc
4. Asialo agalacto bi
5. Asialo bi, core fuc
6. Asialo bi
7. $Man_9GlcNAc_2$

8, 9. Disialylated tri (reduced)
10, 11. Trisialylated tri (reduced)
12, 13. Tetrasialylated tri (reduced)

10318

Separation of neutral and sialylated oligosaccharide standards.



Separation of trisialylated oligosaccharides.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac PA100 Column for Oligosaccharide Analysis Data Sheet

Application Notes

AN 46: Ion Chromatography: A Versatile Technique for the Analysis of Beer

AN 67: Determination of Plant-Derived Neutral Oligo- and Polysaccharides

AN 82: Analysis of Fruit Juice Adulterated with Medium Invert Sugar from Beets

AN 105: Glycosylation Analysis of Human Serum Transferrin Glycoforms Using Pellicular Anion-Exchange Chromatography

Technical Notes

TN 20: Analysis of Carbohydrates by High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAE-PAD)

TN 30: Monosaccharide and Oligosaccharide Analysis of Glycoproteins Electrotransferred onto Polyvinylidene Fluoride (PVDF) Membranes

TN 36: Analysis of Exoglycosidase Digestions of N-Linked Oligosaccharides Using HPAE-PAD

TN 42: Glycoprotein Oligosaccharide Analysis Using High-Performance Anion-Exchange Chromatography

Ordering Information

Analytical Columns

CarboPac PA100 Analytical Column (2 × 250 mm)	057182
CarboPac PA100 Analytical Column (4 × 250 mm)	043055
CarboPac PA100 Column (9 × 250 mm)	SP2089
CarboPac PA100 Column (22 × 250 mm)	SP2667

Guard Columns

CarboPac PA100 Guard Column (2 × 50 mm)	057183
CarboPac PA100 Guard Column (4 × 50 mm)	043054

CarboPac PA200

Highest resolution separations of oligosaccharides

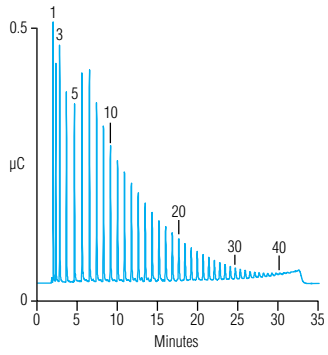
The CarboPac PA 200 column is a high-efficiency, strong anion-exchange column that provides the highest resolution available for oligosaccharide analysis and mapping. With no time-consuming derivatization, you can separate complex mixtures of neutral and charged oligosaccharides based on size, charge, degree of branching, anomericity, and linkage isomerism. The CarboPac PA 200 column also provides the separation of closely related oligosaccharides—even isomers—at picomole levels.

- Sensitive, direct detection with no derivatization, using pulsed amperometric detection
- Very high-efficiency separations
- Separations based on size, charge, degree of branching, and linkage isomerism
- Low flow rate saves on eluent consumption
- Does not require derivatization

A variety of HPLC approaches are proposed for characterizing oligosaccharides, but many prove inadequate for separating complex mixtures and are limited by a lack of specificity and high limits of detection. Dionex has developed an improved HPLC technique for carbohydrate analysis based on anion-exchange chromatography coupled with pulsed amperometric detection. This technique provides high-resolution separations with sensitive and specific detection, without derivatization.

Oligosaccharides released from therapeutic glycoproteins can differ in size, charge, branching, and linkage. Oligosaccharides with these features can be resolved using the CarboPac PA200. It provides the flexibility to separate oligosaccharides into broad classes depending upon the degree of sialylation, while maintaining the resolution needed for routine analysis based on linkage isomerism. Coupled with pulsed amperometric detection, the PA200 supports detection at low-picomole levels.

Faster Separation of Maltodextrins with the CarboPac® PA200 Column



Column:	CarboPac PA200 + guard
Eluent:	0 min: 100 mM NaOH/ 70 mM sodium acetate, 30 min: 100 mM NaOH/ 300 mM sodium acetate, curve 4
Temperature:	30 °C
Flow Rate:	0.5 mL/min
Inj. Volume:	5 µL
Detection:	PAD (Au), waveform A (TN21)
Sample:	Maltrin M040 5 mg/mL in water
Peaks:	3. Maltotriose —

22682

Separation of maltodextrins with the CarboPacPA200 column.

CarboPac PA200 columns are packed with a hydrophobic, polymeric, pellicular anion-exchange resin stable over the range of pH 0–14. The unique pH-stability of the packing material allows the use of eluent compositions that are conducive to anodic oxidation of carbohydrates at gold electrodes.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

CarboPac PA200 Column Solutions for Oligosaccharide Analysis Data Sheet

Application Notes

AN 215: Separation of Asparagine-Linked (N-Linked) Oligosaccharides from Human Polyclonal IgG Using the CarboPac PA200 Column

Application Updates

AU 150: Determination of Plant-Derived Neutral Oligo- and Polysaccharides Using the CarboPac PA200

Ordering Information

Guard Columns

CarboPac PA200 Guard Column (3 × 50 mm) 062895

Analytical Columns

CarboPac PA200 Analytical Column (3 × 250 mm)..... 062896

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Chemical Suppressors

Improving sensitivity by reducing eluent conductivity and enhancing analyte response

Suppression works two ways to achieve the absolute best sensitivity and corresponding lowest detection limits for inorganic analyses; it increases analyte signal while simultaneously decreasing background signal and noise. Dionex was the first company to commercialize chemical suppression in 1975, and has continued to expand the capabilities of suppression technology by inventing electrolytic suppression in 1992. Today we offer a full line of choices tailored to meet the needs of our customers.

- SRS 300 Self-Regenerating Suppressor
- CES 300 Capillary Electrolytic Suppressor
- AES Atlas Electolytic Supressor
- MMS 300 MicroMembrane Suppressor, AMMS-ICE 300 MicroMembrane Suppressor for Ion Exclusion Chromatography
- SC-CSRS 300 Salt Converter Cation Self-Regenerating Suppressor
- CMD 300 Carbohydrate Membrane Desalter

Electrolytic suppression based on Reagent-Free Ion Chromatography (RFIC) with AutoSuppression is available only from Dionex.



SRS 300 300 Self-Regenerating Suppressor: The latest electrolytic suppressor. This suppressor is a true workhorse, serving virtually all IC applications.

MMS 300 Micromembrane Suppressor: High-capacity, solvent-compatible, chemically-regenerated suppressor.

CES 300 Capillary Electrolytic Suppressor: CES 300 Capillary Electrolytic Suppressors are optimized for eluent flow rates typically seen in capillary systems.

AES Atlas Electrolytic Suppressor: Continuous electrolytically regenerated suppressor based on Dionex MonoDisc and AutoSuppression products.

AMMS-ICE 300 MicroMembrane Suppressor: Ideally suited to ion-exclusion chromatography of organic acids and alcohols in complex or high-ionic-strength samples.

SC-CSRS 300 Salt Converter Cation Self-Regenerating Suppressor: Suppressor optimized to convert analytes to their fully dissociated methanesulfonic acid species.

CMD 300 Carbohydrate Membrane Desalter: Designed to remove eluent salts from high-pH eluents.

SRS 300 Self-Regenerating Suppressor

High-capacity electrolytically-regenerated suppressor for use with IC eluents

The SRS 300 serves virtually all ion chromatography applications for both anions and cations. For anions, the preferred eluent is hydroxide. With RFIC systems, the sample is determined using conductivity detection in the lowest possible background of high-purity water. AutoSuppression means ease of use; you don't need to make regenerant because the suppressor is constantly regenerated by the continuous electrolysis of water. The SRS 300 offers:

- Low background noise levels
- Fast startup equilibration times
- Trace anion and cation determinations
- Compatible with mass spectrometry detection
- Compatible with all Dionex ICS and DX chromatography modules*
- A three-fold increase in backpressure tolerance compared to previous generations

The SRS 300 delivers low backgrounds and low noise levels for the full range of Dionex ion-exchange IonPac columns and eluents, even under high concentration gradient conditions.

When combined with the revolutionary Eluent Generator, it delivers truly automated, minimal-maintenance Reagent Free Ion Chromatography (RFIC).

Note: **Chemical suppression mode only with the ICS-90 and ICS-900 systems. Older systems may require the RFC-10 or RFC-30 controller.*



Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Eluent Suppressors for Ion Chromatography Data Sheet

Ordering Information

The SRS 300 is compatible with Dionex IC systems equipped with a suppressor power supply. The new SRS 300 products directly replace the SRS ULTRA II. Simply install the new SRS 300 into your current Dionex IC system.

Accessories	
Anion Self-Regenerating Suppressor ASRS 300 (4 mm)	064554
Anion Self-Regenerating Suppressor ASRS 300 (2 mm)	064555
Cation Self-Regenerating Suppressor CSRS 300 (4 mm)	064556
Cation Self-Regenerating Suppressor CSRS 300 (2 mm)	064557

MMS 300 MicroMembrane Suppressor

High-capacity, solvent-compatible, chemically-regenerated suppressor

The MMS 300 is a chemically-regenerated suppressor and therefore has very low noise and quick startup time. With the new Displacement Chemical Regeneration (DCR) Kit, this classic suppressor provides easier operation. MMS Suppressor advantages include:

- High-capacity and solvent-compatible design capable of handling samples with complex matrices
- Very low signal-to-noise and excellent baseline stability
- Low method detection limits
- Fast startup and equilibration
- Easy to use, maintenance-free operation with the DCR kit

The MMS 300 has high capacity and can be used with all Dionex ion-exchange columns. For lowest noise and longest life, the MMS is recommended for anion and cation separations using eluents containing HPLC solvents. The MMS 300 suppressor is available in both 2- and 4 mm formats; 3 mm columns should be used with 2 mm suppressors.

The MMS produces the lowest noise because it uses nonelectrolytic chemical regeneration. Low noise levels translate into lower method detection limits.



Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Eluent Suppressors for Ion Chromatography Data Sheet

Ordering Information

Accessories	
Anion MicroMembrane Suppressor AMMS 300 (4 mm)	064558
Anion MicroMembrane Suppressor AMMS 300 (2 mm)	064559
Cation MicroMembrane Suppressor CMMS 300 (4 mm)	064560
Cation MicroMembrane Suppressor CMMS 300 (2 mm)	064561

CES 300 Capillary Electrolytic Suppressor

Optimized for eluent flow rates typically seen in capillary systems

CES 300 Capillary Electrolytic Suppressors are optimized for eluent flow rates typically seen in capillary systems (0.005–0.030 mL/min). The ACES 300, used for anion analysis, converts highly conductive hydroxide-based eluents into pure water, reducing the baseline conductivity. The ACES 300 also converts the analytes into a more conductive hydronium (acid) form, simultaneously suppressing the eluent, increasing sensitivity under conductivity detection.

- High-capacity and solvent-compatible design capable of handling samples with complex matrices
- Very low signal-to-noise and excellent baseline stability
- Low method detection limits
- Fast startup and equilibration
- Easy to use, maintenance-free operation with the DCR kit

The CCES 300, used for cation analysis, converts highly conductive methanesulfonic acid (MSA) eluents into pure water simultaneously converting analytes to a more conductive hydroxide form, increasing sensitivity.

The CES suppressor uses a three-chamber design to minimize dead volume while maximizing suppression capacity and reducing noise. The eluent chamber comprises an ion-exchange capillary membrane that facilitates the efficient exchange of the eluent counterions for regenerant ions.



Anion Capillary Electrolytic Suppressor (ACES 300).

The unique design of the CES 300 simplifies software and hardware control options. The ICS-5000 includes software and hardware to control the CES 300 suppressor. Chromeleon 6.8 or 7.x is required.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Eluent Suppressors for Ion Chromatography Data Sheet

Ordering Information

Accessories	
ACES 300 Anion Capillary Electrolytic Suppressor	072052
CCES 300 Cation Capillary Electrolytic Suppressor	072053

Atlas Electrolytic Suppressor

Low noise electrolytically regenerated suppressor for use with IC eluents

The Atlas Electrolytic Suppressor (AES) is a continuous electrolytically-regenerated suppressor based on the MonoDisc and AutoSuppression products developed by Dionex. The unique design of the Atlas enables very fast startup times and an extremely-low noise level, particularly for carbonate eluents. The benefits of the Atlas include:

- High performance and very low noise for carbonate eluents
- Low background conductivity, and excellent baseline stability
- Easy to use maintenance-free operation
- Fast startup and equilibration
- Will suppress eluents up to 25 µeq/min

The MonoDisc suppression bed of the AES is composed of ion-exchange monolith and flow distribution disks. This configuration facilitates efficient exchange of the eluent counterions for regenerant ions, resulting in eluent suppression and analyte response enhancement.



Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Eluent Suppressors for Ion Chromatography Data Sheet

Ordering Information

The Atlas suppressor is fully compatible with the ICS-5000, ICS-2100, ICS-1600, and ICS-1100 chromatography systems. It is not compatible with the ICS-90 or ICS-900. When ordering an Atlas suppressor for older systems, the DX-600, BioLC, or DX-320 systems must be configured with an ED50A, CD25A, or IC25A detector. The RFC-30 or RFC-10 Suppressor Controller must be ordered to use the Atlas with the earlier versions of detectors.

Accessories	
Anion Atlas Electrolytic Suppressor	056116
Cation Atlas Electrolytic Suppressor	056118

AMMS-ICE 300 MicroMembrane Suppressor

Chemically-regenerated suppressor optimized for ion-exclusion chromatography

The Anion-ICE MicroMembrane Suppressor AMMS-ICE 300 is designed for the analysis of organic acids and alcohols in complex or high-ionic strength samples, including food and beverage products, biological samples, fermentation processes, industrial process liquors, and treated wastewaters. This suppressor is ideally suited to ion-exclusion chromatography of organic acids and alcohols in complex or high-ionic strength samples. It provides the following advantages:

- High-capacity and solvent-compatible design
- Optimized for organic acid and alcohol analysis in complex or high-ionic-strength samples
- Low detection limits as a result of high signal-to-noise ratio and excellent baseline stability
- Fast startup and equilibration

The AMMS-ICE 300 suppressor is used in chemical suppression mode with a tetrabutylammonium hydroxide (TBAOH) regenerant. Standard ion suppression converts analytes into their acid or base forms. The AMMS-300 suppressor increases analyte conductivity by forming the TBA salt of the weak acid analyte, which is more conductive than the partially ionized acid form of the analyte.

The AMMS-ICE 300 removes the hydronium ion and any counterions of the analytes from the eluent stream and replaces them with tetrabutylammonium ion. This removal greatly reduces background conductivity. In addition, this mechanism forces the ionization of weak acid analytes, increasing sensitivity.



Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Eluent Suppressors for Ion Chromatography Data Sheet

Ordering Information

Accessories	
Anion-ICE MicroMembrane Suppressor AMMS-ICE 300 (4 mm)	067527

SC-CSRS Salt Converter

Converts analytes to their fully-dissociated methanesulfonic acid species

With the SC-CSRS 300, nonlinear response of ammonia and certain amines can be overcome by converting the weak base analyte to a fully ionized form, thus extending the linear response. The SC-CSRS 300 suppressor is designed to make this conversion and provide linearity across as much as three orders of magnitude.

- Increased linearity for ammonium and amines
- Increased sensitivity for ammonium and amines
- Low background and noise
- Conversion to and detection as fully dissociated methanesulfonic acid

The SC-CSRS should be used in industries where regulated methods require a linear response. A linear response increases accuracy at higher concentrations, and so requires fewer calibration check standards over the calibration curve. Reduced calibration requirements increase sample throughput for industries with high sample workloads such as the power generation industry.

Method detection limits for Group I and II cations, ammonium, and amines using the SC-CSRS are equivalent to or better than those achieved using the CSRS 300.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Salt Converter-Cation Self-Regenerating Suppressor 300

Ordering Information

Accessories	
SC-CSRS 300 Salt Converter-Cation Self-Regenerating Suppressor (4 mm)	067530
SC-CSRS 300 Salt Converter-Cation Self-Regenerating Suppressor (2 mm)	067529

CMD 300 Carbohydrate Membrane Desalter

On-line device for users of HPAE-PAD to collect and further analyze carbohydrate samples

High-pH HPAE-PAD has become the method of choice for oligosaccharide purification because it permits very high resolution of neutral and charged oligosaccharide isomers. Subsequent characterization of purified oligosaccharides often requires removal of eluent salts. Manual desalting methods are available; the CMD 300 provides an easier, automated method.

- Reduces the pH of the effluent from pH ~13 to between pH 2–6
- Supports lyophilization of collected fractions without dialysis
- Provides minimal dispersion of the sample exiting the detector cell
- Low dispersion for accurate fraction collection
- >99% sodium ions removed from eluents that contain up to 0.35 M sodium ions

The CMD 300 exchanges sodium ions in the eluent for hydronium ions. This process converts sodium hydroxide and sodium acetate eluents to water and acetic acid, lowering sample pH after samples leave the detector cell. Because acetic acid is volatile, fractions can then be lyophilized without dialysis, leaving the purified carbohydrate sample ready for further manipulation.

The CMD 300 reliably desalts up to 0.35 M Na at an eluent flow of 1.0 mL/min. Oligosaccharides eluting in up to 0.35 M Na, collected after on-line desalting and evaporated in a centrifugal vacuum evaporator, exhibit residual [Na+] below 200 μM after resuspension to original volume in deionized water. This represents a desalting efficiency of >99.9%.

Ordering Information

Accessories	
CMD 300, 4 mm	067528
CMD-1 Startup Package	059091

Chromatography Accessories

Column hardware, RFIC accessories, standards, reagents, and cartridges



RFIC-Eluent Generation: Eluent generator cartridges for the electrolytic production of high-purity eluents for isocratic and gradient runs.

RFIC-Eluent Regeneration: Allows nonstop operation of a carbonate or methanesulfonic-acid eluent applications for up to four weeks at a time.

AMMS-ICE 300 MicroMembrane Suppressor: Continuously Regenerated Trap Columns (CR-TC) for Reagent-Free Ion Chromatography (RFIC-EG).

CRD Carbonate Removal Device: The CRD causes carbon dioxide to diffuse through the walls of a permeable membrane, removing it prior to detection or injection.

InGuard Cartridges: For removal of matrix interferences including anions, cations transition metals, or hydrophobic substances.

OnGuard II Cartridges: Remove matrix interferences such as phenolics, metals, cations, anions, or hydrophobic substances, for better performance in many IC applications.

Standards, Reagents, and Eluent Concentrates: A complete line of standards, reagents, and eluent concentrates for ion chromatography applications.

ICS-900 Consumables Packages: Bundled kits with matched columns, suppressor, and application-specific supplies recommended for the ICS-900 and similar systems.

ICS-5000 and ICS-2100 Consumables Bundles: These kits are appropriate for RFIC-EG systems, such as the ICS-5000, and ICS-2100.

LCi Solutions Kits: Preconfigured capillary kits and comprehensive quick installation guides for fast and convenient implementation of UltiMate 3000 LCi Solutions.

Viper Fingertight Fittings: The Viper fingertight fitting system provides ease of use and dead-volume free plumbing of every conventional HPLC and modern UHPLC system.

nanoViper Fingertight Fittings: nanoViper is the new, fingertight connection system for nano LC connections which eliminates the assembly of PEEK sleeve connections.

RFIC-Eluent Generation

Eluent Generation—a major component of Reagent-Free IC

Eluent generation prevents baseline shift, increases sensitivity, improves resolution, and ensures consistent peak integration. Dionex offers a range of EGC cartridges for the production of hydroxide, carbonate and methanesulfonic acid eluents. Eluent generation eliminates the need to handle acids and bases traditionally required for the preparation of IC eluents, and allows chromatographers to run a full range of gradient and isocratic separations more effectively than hand-made eluents.

- Automatic production of high-purity eluents for isocratic and gradient runs on ICS-5000 and ICS-2100 systems
- Outstanding run-to-run reproducibility week after week
- Elimination of acid and base handling
- Longer lasting pumps because they encounter only deionized water
- Available for analytical scale as well as capillary scale systems

EGC III cartridges support a concentration range of 0.1–100 mM (0.1–80 mM EGC-LiOH) at 1.0 mL/min. EGC Capillary Cartridges support a concentration orange of 0.1-200 mM at 0.010 mL/min. KOH, NaOH and LiOH cartridges support a maximum of 25%; methanol. The potassium carbonate and MSA cartridges are not solvent-compatible.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

Reagent-Free Ion Chromatography

Product Data Sheets

Reagent-Free Ion Chromatography Systems with Eluent Generation for IC Without Manually Prepared Eluents

Ordering Information

Accessories	
ECG III KOH (replaces 058900)	074532
EGC III NaOH (replaces 058908)	074533
EGC III LiOH (replaces 058904)	074534
EGC III K_2CO_3 (replaces 058904)	074536
EPM III (replaces 063175)	080135
EGC III MSA (replaces 058902)	074535
EGC-KOH (Capillary)	072076
EGC-MSA (Capillary)	072077

RFIC-Eluent Regeneration

Allows nonstop operation of an IC system for up to four weeks at a time

RFIC-ER is a low-cost alternative to RFIC-EG systems. Rather than generate eluent electrolytically using deionized water, RFIC-ER uses the electrolytic suppressor to regenerate the starting eluent. Eluent is prepared in the normal manner. After use and regeneration, the eluent is passed through a series of eluent purifier columns to produce pure eluent. The purified eluent is returned to the eluent bottle. One batch of original eluent can provide up to four weeks of non-stop operation.

- Always on, Always Ready capability for ICS-1100, 1600, 2100, and 5000 systems
- System remains fully equilibrated and calibrated for long periods of time
- Simple plumbing and easy-to-understand schematic diagram
- Low cost of ownership
- Ideal for the analysis of common anions and cations in drinking, surface and ground water samples
- Operator errors are significantly reduced or eliminated

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com

Product Brochures

Reagent-Free Ion Chromatography

Product Data Sheets

Reagent-Free Ion Chromatography Systems with Eluent Regeneration Data Sheet

Ordering Information

Startup kits include the tubing, controllers, and software needed to upgrade an ICS-1100, 1600, 2100, or 5000 to an RFIC-ER system. The startup kit also includes one complete set of consumables.

RFIC-ER

RFIC-ER Anion Startup Kit 067797
Includes one Anion Consumables Kit

RFIC-ER Cation Startup Kit 067798
Includes one Cation Consumables Kit

Eluent Regeneration Startup Kit, Anion, for ICS-1100 and ICS-1600 069570

Eluent Regeneration Startup Kit, Cation, for ICS-1100 and ICS-1600 069569

AC-ER Anion Concentrator for RFIC-ER 072778

Accessories

RFIC-ER Anion Consumables Kit 067791

RFIC-ER Cation Consumables Kit 067792

CR-TC Continuously Regenerated Trap Columns

Reduce baseline drift by removing contaminants

Designed for eluent generators in RFIC systems, CR-TCs remove all anionic or cationic contaminants in the eluent continuously and provide very low baseline drift during gradient operations. The CR-TC offers:

- Contaminant-free deionized source water and eluent
- Time savings—no need to perform the regeneration off-line
- Very low baseline drift for improved integration and increased sensitivity
- Increased productivity; quality data soon after startup
- Sample pretreatment with the CR-CTC II
- Compatibility with Capillary RFIC-EG systems
- Removal of ammonium contaminants from source water

Plumb the CR-TC after the EG Cartridge (EGC) to remove eluent contaminants continuously and achieve very low baseline drift during gradient operations.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Concentrator and Trap Columns Data Sheet

Ordering Information

The CR-TC column is compatible with all Dionex Eluent Generators including the RFC-30, ICS-2100 and ICS-5000 EG. EG40 customers must first order the CR-TC Add-on Kit (P/N 060476). A single format is used with 2, 3, 4, and 5 mm i.d. separator column applications, while a second format is available for capillary column applications.

CR-TC	
CR-ATC Continuously Regenerated Anion Trap Column	060477
CR-CTC II Continuously Regenerated Cation Trap Column	066262
CR-ATC Continuously Regenerated Anion Trap Column (Capillary) (For use with Capillary Anions Columns)	072078
CR-CTC Continuously Regenerated Cation Trap Column (Capillary) (For use with Capillary Cation Columns)	072079

CRD Carbonate Removal Device

Reduces carbonate for improved sensitivity

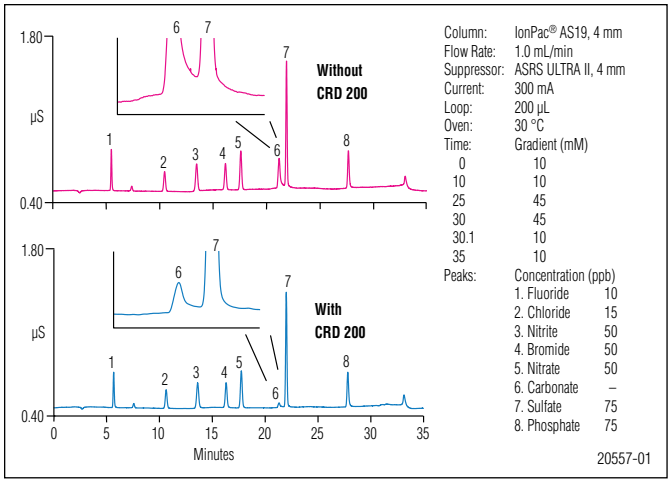
The Carbonate Removal Device (CRD 200) removes carbon dioxide from the suppressed eluent stream by diffusion through the walls of a gas permeable membrane. The result is a reduction in the response from carbonate. It therefore removes the carbonate peak in hydroxide eluent RFIC-EG systems or reduces the background to near hydroxide-like levels in carbonate eluent systems. Plumbed after the suppressor, the carbon dioxide transfer is aided by a countercurrent flow of basic solution.

- The CRD 200 is optimized for the removal of the carbonate in hydroxide eluent systems.
- Minimizing carbonate using the CRD 200 can improve quantification.
- The increased membrane length of the CRD 300 is optimized for carbonate eluent systems.
- Reducing the baseline with a CRD 300 results in higher sensitivity.
- Elimination of the carbonic acid matrix with a CRD 300 increases the linearity range.

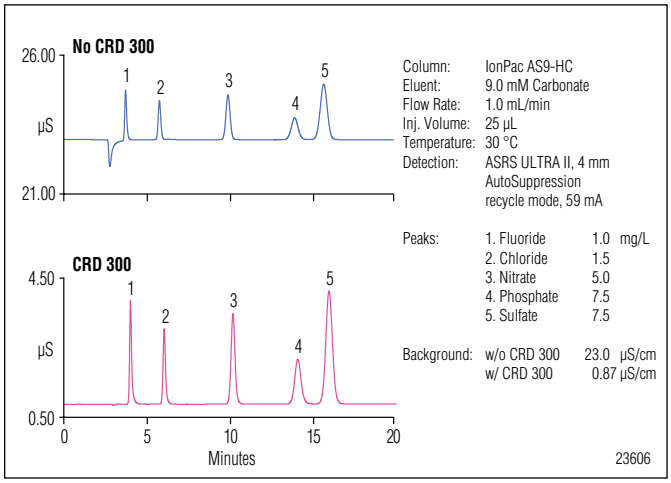
By simply being exposed to carbon dioxide in the air, samples can become contaminated with carbonate. In some samples, depending on the column and separation conditions, the presence of high levels of carbonate originating from dissolved carbon dioxide interferes with the accurate determination of analytes of interest, such as sulfate and nitrite.

The CRD 200 requires no reagents or software control, and can be installed easily in any Dionex IC system equipped with an eluent generator, CR-ATC, and ASRS 300 or ACES 300 suppressor. The CRD 200 is a low-dispersion device specifically for use with hydroxide-based and borate-based chemistries using Dionex columns. The CRD 200 is available in three formats: The CRD 200 (4 mm) supports carbonate removal from standard bore systems, the CRD 200 (2 mm) supports carbonate removal from microbore systems, and the CRD 200 (Capillary) supports carbonate removal from capillary-scale systems at flow rates of 5–30 µL/min.

Note: *The CRD 300 is not recommended for use with the ASRS ULTRA II suppressor.*



A significant amount of carbonate is removed using the CRD.



Background noise is significantly reduced using the CRD 300.

The CRD 300 is easily installed in any Dionex IC system equipped with an ASRS 300 suppressor. It requires either a constant flow of basic solution from a peristaltic pump or evacuation by a vacuum pump. It is a low-dispersion device designed for use with carbonate-based chemistries using Dionex columns. The CRD 300 is available in two formats. The CRD 300 (4 mm) supports carbonate removal from standard bore systems, while the CRD 300 (2 mm) supports carbonate removal from microbore systems.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Carbonate Removal Device 200 (CRD 200) for RFIC Systems

Carbonate Removal Device 300 (CRD 300) for Carbonate Eluents

Ordering Information

CRD 200

Carbonate Removal Device CRD 200 (4 mm) 062983
Carbonate Removal Device CRD 200 (2 mm) 062986
Carbonate Removal Device CRD 200 (Capillary) 072054

CRD 300

Carbonate Removal Device CRD 300 (4 mm) 064637
Carbonate Removal Device CRD 300 (2 mm) 064638
CRD 300 (4 mm) with Peristaltic Pump 064905
CRD 300 (2 mm) with Peristaltic Pump 064906
Santoprene Tubing for Peristaltic Pump 068518
Peristaltic Pump / CRD 300 Ship Kit 064911
For configuring two CRD 300s with one peristaltic pump
CRD 300 (4 mm) with VP Vacuum Pump 068475
CRD 300 (2 mm) with VP Vacuum Pump 068474

InGuard Cartridges



The InGuard line of sample pretreatment cartridges is designed to remove matrix interferences such as anions, cations, transition metals, or hydrophobic substances encountered in many ion chromatography (IC) applications. The InGuard cartridge is installed inline between the autosampler and the IC injection valve facilitating immediate, automated sample pretreatment.

- Eliminates manual sample pretreatment steps
- Facilitates better separations
- Increases lifetimes of analytical columns
- Solves major matrix problems
- Achieves reproducible ppm-level determinations in concentrated matrices
- Convenient and easy to use

The InGuard cartridge is optimized for the best performance in matrix removal applications and can be used singly or in series. Designed to eliminate leaks and channeling, the cartridges use standard 10–32 fittings for easy installation into an IC system. The unique sample distribution frit maximizes complete resin bed usage.

Note: *Depending on the chemistry and samples treated, some cartridges can be regenerated.*

Related Literature

For detailed product specifications and applications, see the following, available under Literature on www.dionex.com.

Product Datasheets

InGuard In-Line Sample Pretreatment Cartridges Data Sheet

InGuard Ag Cartidge

The InGuard Ag cartridge removes chloride, bromide, and iodide from concentrated sample matrices such as brines. The InGuard Ag resin is a styrene-based sulfonic acid resin in the silver form, the same material used in OnGuard II Ag cartridges. For the removal of any residual silver ions, an InGuard H or InGuard Na cartridge should be placed after the InGuard Ag cartridge.

Note: *The InGuard H or InGuard Na cartridge should be placed after the InGuard Ag cartridge to remove any residual silver ions.*

Key Specifications

Functionality: Cation-exchange, silver form

Capacity: 5–5.5 meq

Solvents: 0–100% HPLC

pH: 0–14

Mode: Removal of halides by precipitation

Ordering Information

Accessories	
InGuard Ag, pkg. of 4	074038

InGuard H Cartridge

The InGuard H cartridge is ideal for the removal of high levels of alkaline earth metals and transition metals from sample matrices. It is also used for the neutralization of highly alkaline samples such as sodium hydroxide or sodium carbonate. Carbonate can be reduced to very low levels following this pH reduction by passing the sample through a CRD 200.

The InGuard H cartridge contains styrene-based, sulfonic acid resin in the hydronium form, the same as that used in OnGuard II H cartridges. This resin is designed to have very high selectivity for polyvalent cations, such as calcium and transition metals.

Key Specifications

Functionality: Cation-exchange, hydronium form

Capacity: 5–5.5 meq

Solvents: 0–100% HPLC

pH: 0–14

Mode: Removal of alkaline earth and transition metals; pH adjustment of basic samples

Ordering Information

Accessories	
InGuard H, pkg. of 4	074037

InGuard Na

The InGuard Na cartridge is used for the removal of high levels of alkaline earths and transition metals from sample matrices without acidifying the sample, ensuring good recovery of acid-labile analytes such as nitrite. The InGuard Na cartridge contains styrene-based, sulfonic acid in the sodium form, designed to have high selectivity for multivalent cations.

Key Specifications

Functionality: Cation-exchange, sodium form

Capacity: 5–5.5 meq

Solvents: 0–100% HPLC

pH: 0–14

Mode: Removal of alkaline earth and transition metals

Ordering Information

Accessories	
InGuard Na, pkg. of 4	074036

InGuard HRP Cartridge

The InGuard HRP cartridge can be used to remove organic matrix material over a wide range of hydrophobicity, including fats from whole milk. The InGuard HRP cartridge contains a hydrophilic reversed-phase resin based on divinylbenzene. The material is water-wettable, thus 100% aqueous samples can be pretreated without disruption of the column bed.

Key Specifications

Functionality: Hydrophilic divinylbenzene

Capacity: 2 g

Solvents: 0–100% HPLC

pH: 0–14

Mode: Adsorption, π-π bonding. Removal of hydrophobic species, azo-, and cyano-containing species

Ordering Information

Accessories	
InGuard HRP, pkg. of 4	074034

InGuard Na/HRP

The InGuard Na/HRP cartridge is designed to provide general purpose cleanup of samples, such as foods, for anion analysis. This cartridge contains a blend of sulfonated resin in the sodium form and HRP resin to provide the dual functionality of removing both organic contaminants and cations, including metals, from a sample.

Key Specifications

Functionality: Dual Functionality

Capacity: 50% Na/50% HRP

Solvents: 0–100% HPLC

pH: 0–14

Mode: Ion-exchange (Na) and adsorption remove Ca^{2+} (Na^{+}) and lipids (HRP) from dairy

Ordering Information

Accessories	
InGuard Na/HRP, pkg. of 4	074035

OnGuard II Cartridges

OnGuard II Cartridges remove matrix interferences such as phenolics compounds, metals, cations, anions, or hydrophobic substances encountered in many ion chromatography applications. Cartridges are available in 1 cc and 2.5 cc high-capacity formats.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

OnGuard II Sample Pretreatment Cartridges and Workstation

Application Notes

AN 101: Trace Level Determination of Bromate in Ozonated Drinking Water Using Ion Chromatography

AN 136: Determination of Inorganic Oxyhalide Disinfection Byproduct Anions and Bromide in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis

AN 37: The Determination of Iodide in Milk Products

Application Updates

AU 140: The Determination of Iodide in Urine

OnGuard II A

The OnGuard II A is used in the removal of anionic contaminants from sample matrices and for the neutralization of highly acidic samples. These cartridges contain styrene-based, anion-exchange resin in the bicarbonate form.

Key Specifications

Functionality: anion-exchange, bicarbonate form

Capacity (µeq/cartridge): 0.7 (1 cc cartridge); 1.75 (2.5-cc cartridge)

Solvents: 0–100% HPLC

pH stability: 0–14

Mode: removal of anions; pH adjustments of acidic samples

Ordering Information

Accessories	
OnGuard II A Cartridges, 1 cc, pkg. of 48	057091
OnGuard II A Cartridges, 2.5 cc, pkg. of 48	057092

OnGuard II Ag

The OnGuard II Ag contains a silver-form, high-capacity, sulfonated, cation-exchange resin similar to the OnGuard II H packing. These cartridges remove chloride, bromide, and iodide from sample matrices. An OnGuard II H cartridge should be used after the OnGuard II Ag cartridge to remove dissolved Ag^+.

Key Specifications

Functionality: cation-exchange, silver form

Capacity (µeq/cartridge): 2.0–2.2 (1 cc); 5.0–5.5 (2.5 cc)

Solvents: 0–100% HPLC

pH Stability: 0–14

Mode: removal of chloride, bromide, iodide by precipitation

Ordering Information

Accessories	
OnGuard II Ag Cartridges, 1 cc, Pkg. of 48	057089
OnGuard II Ag Cartridges, 2.5 cc, Pkg. of 48	057090

OnGuard II Ag/H

The OnGuard II Ag/H is a layered cartridge that contains both OnGuard II Ag and OnGuard II H resins.

- Easily removes chloride, bromide, and iodide from concentrated matrices such as brines
- Traps soluble silver and other cations
- Removes high levels of alkaline earth and transition metals
- Neutralizes caustic samples
- Removes carbonate

This two-layer cartridge replaces two cartridges in series, and provides greater silver capacity.

Ordering Information

Accessories	
OnGuard II Ag-H Cartridge, 2.5 cc, Pkg. of 48	057410

OnGuard II Ba

The OnGuard II Ba resin is a styrene-based, sulfonic acid resin in the barium form, designed for the removal of high concentrations of sulfate from sample matrices. For reproducible, quantitative determinations in low-ionic strength samples, activate these cartridges by adding sodium chloride or other sodium salt.

Samples treated with NaCl should be passed through an OnGuard II Ag cartridge to remove the added chloride, followed by the OnGuard II H cartridge or MetPacTM CC-1 chelating column to remove residual silver counterions.

Key Specifications

Functionality: cation-exchange, barium form

Capacity (µeq/cartridge): 2.0–2.2 (1 cc); 5.0–5.5 (2.5 cc)

Solvents: 0–100% HPLC

pH Stability: 0–14

Mode: removal of sulfate by precipitation

Ordering Information

Accessories	
OnGuard II Ba Cartridges, 1 cc, pkg. of 48	057093
OnGuard II Ba Cartridges, 2.5 cc, pkg.. of 48	057094

OnGuard II Ba/Ag/H

The OnGuard II Ba/Ag/H is a layered cartridge containing OnGuard II Ba, Ag, and H styrene-based, sulfonic acid resins.

- The Ba resin removes high concentrations of sulfate from sample matrices.
- The Ag form easily removes chloride, bromide, and iodide from concentrated matrices.
- The H form is highly selective for polyvalent cations such as calcium and transition metals.

This cartridge is ideal for the removal of high levels of alkaline earth and transition metals from sample matrices, neutralization of caustic samples, and removal of carbonate. This three-layer cartridge can be used in place of three single cartridges in series and has the added advantage of higher silver capacity.

Ordering Information

Accessories	
OnGuard II Ba/Ag/H Cartridges, 2.5 cc, pkg of 48	063955

OnGuard II H

The OnGuard II H removes high levels of alkaline earth and transition metals from sample matrices and neutralizes highly alkaline samples such as sodium hydroxide or sodium carbonate. Carbonate can then be removed by sparging the sample.

These cartridges contain 16% crosslinked, styrene-based, sulfonic acid resin in the hydrogen form. This resin is designed to have very high selectivity for multivalent cations such as calcium and transition metals.

Key Specifications

Functionality: cation-exchange hydronium form

Capacity (µeq/cartridge): 2.0–2.2 (1 cc); 5.0–5.5 (2.5 cc)

Solvents: 0–100% HPLC

pH Stability: 0–14

Mode: removal of alkaline earth and transition metals; pH adjustment of basic samples

Ordering Information

Accessories	
OnGuard II H Cartridges, 1 cc, pkg. of 48	057085
OnGuard II H Cartridges, 2.5 cc, pkg. of 48	057086

OnGuard II M

The OnGuard II M is used for the removal of transition metals and for matrix elimination of alkali and alkaline earth metals. These cartridges contain an iminodiacetate resin in the ammonium form, ready to use with no lengthy preparation required.

Key Specifications

Functionality: iminodiacetate, ammonium form

Capacity (µeq/cartridge): 0.4 (1 cc); 1.0 (2.5 cc)

Solvents: 0–100% HPLC

pH Stability: 0–14 (resin shrinks in acid form)

Mode: concentration of transition metals by chelation (2.5 cc format); removal of transition metals (1 cc format)

Ordering Information

Accessories	
OnGuard II M Cartridges, 1 cc, pkg. of 48	057137
OnGuard II M Cartridges, 2.5 cc, pkg. of 48	057095

OnGuard II Na

The OnGuard II Na removes high levels of alkaline earth and transition metals from sample matrices without acidifying the sample. This ensures good recovery of acid-labile analytes such as nitrite. These cartridges contain 16% crosslinked, styrene-based, sulfonic acid resin in the sodium form.

This resin has very high selectivity for multivalent cations such as calcium, magnesium and transition metals.

Key Specifications

Functionality: cation-exchange, sodium form

Capacity (µeq/cartridge) : 2.0–2.2 (1 cc); 5.0–5.5 (2.5 cc)

Solvents: 0–100% HPLC

pH Stability: 0–14

Mode: removal of alkaline earth and transition metals without acidifying the sample

Ordering Information

Accessories	
OnGuard II Na Cartridges, 1 cc, pkg. of 48	062948
OnGuard II Na Cartridges, 2.5 cc, pkg. of 48	062962

OnGuard II P

The OnGuard II P is recommended for removing the phenolic fraction of humic acids, tannic acids, lignins, anthocyanins, and azodyes from samples prior to analysis by anion or cation exchange.

These cartridges contain polyvinylpyrrolidone (PVP) polymer with very high selectivity for phenolics, azo-containing compounds, aromatic carboxylic acids, aromatic aldehydes, and iodine as the triiodide complex.

Key Specifications

Functionality: polyvinylpyrrolidone

Capacity (µeq/cartridge) : 6.0 (1 cc); 2.5 cc format not available

Solvents: 0–100% HPLC

pH Stability: 1–10

Mode: removal of phenols, azo dyes, humic acids by complexation

Ordering Information

Accessories	
OnGuard II P Cartridges, 1 cc, pkg. of 48	057087

OnGuard II RP

The OnGuard II RP cartridge is recommended for removing hydrophobic substances such as aromatic dyes, some aromatic carboxylic acids, hydrocarbons, and surfactants from sample matrices. These cartridges contain a macroporous divinylbenzene resin that has a very high selectivity for hydrophobic substances, especially unsaturated or aromatic organic substances.

Contains 0.3 g resin/1 cc cartridge, 0.75 g resin 2.5 cc cartridge.

Key Specifications

Functionality: polydivinylbenzene

Capacity (µeq/cartridge) : 0.3 g resin (1 cc); 0.75 g resin (2.5-cc)

Solvents: 0–100% HPLC

pH Stability: 0–14

Mode: removal of surfactants, high-molecular weight carboxylic acids, aromatic dyes by adsorption

Ordering Information

Accessories	
OnGuard II RP Cartridges, 1 cc, Pkg. of 48	057083
OnGuard II RP Cartridges, 2.5 cc, Pkg. of 48	057084

OnGuard Accessories

The OnGuard Sample Prep Station enables simultaneous pretreatment of multiple samples with OnGuard sample pretreatment cartridges. When used with Dionex 0.5 mL PolyVials and a vacuum source, the OnGuard Sample Prep Station supports semi-automatic pretreatment of up to 12 samples. Samples may also be treated manually using standard Luer tip syringes.

The OnGuard Sample Prep Station has individual stopcock valves on each sample tube to allow control of individual flow rates. The station will also hold six 10 mL volumetric flasks.

Ordering Information

Accessories	
OnGuard Sample Prep Workstation	039599
OnGuard Needle, 18 Gauge, 1.25/Luer	039996
OnGuard Valve, Stopcock Luer	040896

Standards, Reagents, and Eluent Concentrates

To simplify your workflow, Dionex has developed all the reagents and standards you need, including anion and cation standards, eluent concentrates, and AutoRegen concentrates. Dionex offers high-purity chemicals and standards for transition metal analysis, including ultrapure chelation chromatography reagents for trace and ultratrace transition and lanthanide metal analysis.

Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

IC Standards and Reagents Data Sheet

Ion Standard Concentrates

The IonPac ready-to-use ion standards are designed for routine anion or cation determinations.

Ordering Information

Ion Standard Concentrates	
5-Anion Standard, 100 mL	037157
Contains: F, 20 mg/L; Cl, 30 mg/L; NO_2, 100 mg/L; PO_4, 150 mg/L; SO_4, 150 mg/L	
7-Anion Standard, 50 mL	056933
Contains: F, 20 mg/L; Cl, 30 mg/L; NO_2, 100 mg/L; Br, 100 mg/L; NO_3, 100 mg/L; PO_4, 150 mg/L; SO_4, 150 mg/L	
7-Anion Standard II, 100 mL	057590
Contains: F, 20 mg/L; Cl, 30 mg/L; NO_2, 100 mg/L; Br, 100 mg/L; NO_3, 100 mg/L; PO_4, 150 mg/L; SO_4, 150 mg/L	
Fluoride Standard (1000 mg/L), 100 mL	037158
Chloride Standard (1000 mg/L), 100 mL	037159
Sulfate Standard (1000 mg/L), 100 mL	037160
6-Cation Standard-I, 50 mL	040187
Contains: Li, 50 mg/L; Na, 200 mg/L; NH_4, 400 mg/L; K, 200 mg/L; Mg, 200 mg/L; Ca, 1000 mg/L	
6-Cation Standard-II, 50 mL	046070
Contains: Li, 50 mg/L; Na, 200 mg/L; NH_4, 250 mg/L; K, 500 mg/L; Mg, 250 mg/L; Ca, 500 mg/L	

MS Standard Concentrates

For the quantification of perchlorate at low parts-per-trillion levels using mass spectrometric detection. Contains stable-labeled perchlorate (1 mg/L).

Ordering Information

MS Standard Concentrates	
Kit of Standards for OQ/PQ Measurements (FM104284)	061496
Calibrant for MSQ ELMO and PLUS	062917
Mass Calibration Solution Mixture MSQ Std Only (FM104285)	060758
Perchlorate O-18 Internal Standard, 1 mg/L, 10 mL	062923

Haloacetic Acid Internal Standards

Ready-to-use internal standards for haloacetic acid analysis using electrospray-mass spectrometric detection. Stable-labeled internal standards prepared in MTBE (methyl-t-butyl ether), 1 mL ampule plus empty vial

Ordering Information

Haloacetic Acid Internal Standards	
Monochloroacetic Acid -2-13C Internal Standard, 1000 mg/L in MtBE, 1 mL	069406
Monobromoacetic Acid -1-13C Internal Standard, 1000 mg/L in MtBE, 1 mL	069407
Dichloroacetic Acid -2-13C Internal Standard, 1000 mg/L in MtBE, 1 mL	069408
Trichloroacetic Acid -2-13C Internal Standard, 1000 mg/L in MtBE, 1 mL	069409
Calibrant for MSQ ELMO and Plus, 250 mL (60111-01001)	062917

OQ/PQ Standards

Ordering Information

OQ/PQ Standards	
Custom Caffeine Standards Kit, 10 mL Ampoules	060253
Custom Nitrate Standards Kit, 10 mL Ampoules	060254
Threonine Standards Kit, Set of Six Standards, 1 mL each	063542

Anion Eluent Concentrates

Ordering Information

Anion Eluent Concentrates	
AS23 Eluent Concentrate (100x), 250 mL	064161
AS22 Eluent Concentrate (100x), 250 mL	063965
AS14A Eluent Concentrate (100x), 250 mL	056937
AS14A Eluent Concentrate (20x), 100 mL	057560
AS14A Eluent Concentrate (20x), 100 mL, Pkg. of 4	057557
AS14 Eluent Concentrate (100x), 250 mL	053560
AS4A Eluent Concentrate (100x), 500 mL	039513
AS4 Eluent Concentrate (100x), 500 mL	037161
Carbonate Concentrate, 0.5M, 500 mL	037162
Bicarbonate Concentrate, 0.5 M, 500 mL	037163

Cation Eluent Concentrates and Reagents

Ordering Information

Cation Eluent Concentrates and Reagents	
Methanesulfonic Acid, 500 mL	033478
For IonPac CS12, CS12A, CS14, CS15, CS17, and CS18 cation-exchange column eluents.	
CS12A Eluent Concentrate (20x), 100 mL	057562
CS12A Eluent Concentrate (20x), 100 mL, Pkg. of 4	057558
DAP-HCl (DL-2,3-Diaminopropionic Acid-HCl), 5 g	039670
For IonPac CS3, CS10, and CS11 cation-exchange column eluents	

Displacement Chemical Regenerant Reagents

Ordering Information

Displacement Chemical Regeneration Reagents	
Anion Regenerant Concentrate (2.0 N H_2SO_4), 75 mL	057559
Anion Regenerant Concentrate (2.0 N H_2SO_4), 75 mL, Pkg. of 4	057555
Cation Regenerant Solution (2.06 M TBAOH), 100 mL	057561
Cation Regenerant Solution (2.06 M TBAOH), 100 mL, Pkg. of 4	057556

MMS Regenerant Concentrates

Ordering Information

MMS Regenerant Concentrates	
Anion Regenerant Concentrate (10x), 50 mL	039601
Anion Regenerant Concentrate (20x), 200 mL	039203
Anion Regenerant Concentrate (20x), 200 mL, Pkg. of 4	037164
Cation Regenerant Solution, 500 mL	039602

Ion Pairing Reagents

Highly purified ion-pairing reagents are used in mobile phase ion chromatography (MPIC), combining reversed-phase ion-pair chromatography with chemical suppression.

Ordering Information

Ion Pairing Reagents	
Tetrabutylammonium Hydroxide (TBAOH), 500 mL	035360
Tetrapropylammonium Hydroxide (TPAOH), 500 mL	035363
Hexanesulfonic Acid (HSA), 500 mL	035361
Octanesulfonic Acid (OSA), 500 mL	035362

Transition Metal Analysis Reagents

The MetPac PDCA Eluent Concentrate uses pyridine-2,6-dicarboxylic acid for the separation of iron (II) and iron (III), copper, nickel, zinc, cobalt, cadmium, and manganese on the IonPac CS5A column. The MetPac Oxalic Acid Eluent Concentrate uses oxalic acid for the separation of lead, copper, cadmium, cobalt, zinc, and nickel on the IonPac CS5A column.

The MetPac PAR Postcolumn Reagent Diluent is a ready-to-use diluent for 4-(2-pyridylazo) resorcinol for postcolumn derivatization of transition metals separated using the IonPac CS5A column.

Ordering Information

Transition Metal Analysis Reagents	
MetPac Oxalic Acid Eluent Concentrate (10x), 500 mL	046091
MetPac PDCA Eluent Concentrate (5x), 1000 mL	046088
PDCA (Pyridine-2,6-dicarboxylic Acid), 20 g	039671
MetPac PAR Post Column Diluent, 1000 mL	046094
Ready-to-use diluent for 4-(2-Pyridylazo) Resorcinol	
PAR (4-(2-Pyridylazo) Resorcinol Monosodium Salt), 5 g	039672
Required for transition metal and lanthanide postcolumn derivitization using the IonPac CS5 or CS5A columns	

Chelation Chromatography Reagents

Chelation IC reagents are designed specifically for use with the Dionex Chelation Concentration System coupled with IC, or ICAP for the determination of transition and lanthanide metals at trace and ultratrace levels. A Certificate of Analysis is provided with each product.

Ordering Information

Chelation Chromatography Reagents	
2.0 M Nitric Acid, 1 L	033442
2.0 M Nitric Acid, 1 L, Pkg. of 6	033443
2.0 M Ammonium Acetate, 1 L	033440
2.0 M Ammonium Acetate, 1 L, Pkg. of 6	033441
0.1 M Ammonium Nitrate, 1 L	033444
0.1 M Ammonium Nitrate, 1 L, Pkg of 6	033445

Carbohydrate Standards

Dionex Carbohydrate Standards are ready-made standards for performance verification. These standards are for qualitative use only, and should be used to verify the performance of your BioLC system or CarboPac carbohydrate column. Simply reconstitute the vial contents and inject.

The Dionex MonoStandard Mix of Six carbohydrate standard is prepared from reference-grade monosaccharides. Each vial of Dionex MonoStandard Mix of Six contains 100 nmol of fucose, galactosamine hydrochloride, glucosamine hydrochloride, galactose, glucose, and mannose. Prior to use, dilute the contents of the vial to yield a solution containing 0.1 mM (100 pmol/µL) of each monosaccharide.

The sialylated fetuin N-linked alditol standard is purified from bovine fetuin. Each vial contains 25 nmol oligosaccharides. Prior to use, reconstitute the contents of the vial in a known volume of water (e.g., 250 mL) depending upon your application.

Ordering Information

Carbohydrate Standards	
MonoStandard, Mixture of Six, 100 nmol Each	043162
Oligo Standard, Sialylated N-Linked Alditols, 25 nmol	043064

AAA-Direct Reagents

Dionex *AAA-Direct* grade sodium acetate is preweighed; just add water to produce the correct concentration.

- Prequalified sodium acetate for *AAA-Direct* that is guaranteed not to contaminate your *AAA-Direct* system
- Preweighed sodium acetate for ease of use
- 2-pack of sodium acetate sufficient for one month of continuous operation

The quality of sodium acetate used for *AAA-Direct* is crucial. When *AAA-Direct* was first introduced, Dionex recommended that customers purchase certain high grades of sodium acetate from particular vendors. However, different lots of these recommended high grades were found to contain contaminants that adversely affected the performance of *AAA-Direct*. In response, Dionex has introduced its own prequalified *AAA-Direct* grade sodium acetate, which has been tested and is guaranteed not to contaminate your system. Dionex recommends that *AAA-Direct* users purchase only the prequalified Dionex sodium acetate to guarantee trouble-free use of their system.

Ordering Information

AAA-Direct Reagents	
Sodium Acetate Salt (Pre-Weighed Reagent), Pkg. of 2	059326
Histidine Standard, *AAA-Direct* System Installation	059540

ICS-900 Consumables Packages

These bundled packages include: analytical and guard columns, appropriate MMS II suppressor, application-specific DCR bottle, eluent, and regenerant concentrates. These kits are appropriate for the ICS-900, ICS-90, ICS-90A, and previous Displacement Chemical Regeneration systems.

AS4A 4 mm Bundled Package

This package includes:

- IonPac AS4A-SC 4 mm, P/N 043174
- IonPac AG4A-SC 4 mm, P/N 043175
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS4A-SC Eluent Concentrate, P/N 039513

Ordering Information

ICS-900 - AS4A 4 mm - Bundled Package

ICS-900, AS4A 4 mm, Consumables Bundled Package 060133

AS9-HC 4 mm Bundled Package

This package includes:

- IonPac AS9-HC 4 mm, P/N 051786
- IonPac AG9-HC 4 mm, P/N 051791
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-90 DCR Anion Regenerant 2 L Bottle, P/N 057712
- Sodium Carbonate Concentrate (0.5 M), 500 mL, P/N 037162
- Sodium Bicarbonate Concentrate (0.5 M), 500 mL, P/N 037163

Ordering Information

ICS-900 - AS9-HC 4 mm - Bundled Package

ICS-900, AS9-HC 4 mm, Consumables Bundled Package..... 060134

AS12A 4 mm Bundled Package

This package includes:

- IonPac AS12A 4 mm, P/N 046034
- IonPac AG12A 4 mm, P/N 046035
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- Sodium Carbonate Concentrate (0.5 Molar), 500 mL, P/N 037162
- Sodium Bicarbonate Concentrate (0.5 Molar), 500 mL, P/N 037163

Ordering Information

ICS-900 - AS12A 4 mm - Bundled Package

ICS-900, AS12A 4 mm, Consumables Bundled Package 060135

AS14 4 mm Bundled Package

This package includes:

- IonPac AS14 4 mm, P/N 046124
- IonPac AG14 4 mm, P/N 046134
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS14 Eluent Concentrate, P/N 053560

Ordering Information

ICS-900 - AS14 4 mm - Bundled Package

ICS-900, AS14 4 mm, Consumables Bundled Package..... 060136

AS14A 4 mm Bundled Package

This package includes:

- IonPac AS14A 4 mm, P/N 056904
- IonPac AG14A 4 mm, P/N 056897
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS14A Eluent Concentrate, P/N 056937

Ordering Information

ICS-900 - AS14A 4 mm Bundled Package

ICS-900, AS14A 4 mm, Consumables Bundled Package 060137

AS14A 3 mm Bundled Package

This package includes:

- IonPac AS14A 3 mm, P/N 056901
- IonPac AG14A 3 mm, P/N 056899
- AMMS III 2 mm, P/N 056751
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS14A Eluent Concentrate, P/N 056937

Ordering Information

ICS-900 - AS14A 3 mm - Bundled Package

ICS-900, AS14A 3 mm, Consumables Bundled Package 060138

AS22 4 mm Bundled Package

This package includes:

- IonPac AS22 4 mm, P/N 064141
- IonPac AG22 4 mm, P/N 064139
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS22 Eluent Concentrate, P/N 067078

Ordering Information

ICS-900 - AS22 4 mm - Bundled Package

ICS-900, AS22 4 mm, Consumable Bundled Package 067078

AS23 4 mm Bundled Package

This package includes:

- IonPac AS23 4 mm, P/N 064149
- IonPac AG23 4 mm, P/N 064147
- AMMS III 4 mm, P/N 056750
- AMMS III Regenerant Concentrate, 4 pack, P/N 057555
- ICS-900 DCR Anion Regenerant 2 L Bottle, P/N 057712
- AS23 Eluent Concentrate, P/N 064161

Ordering Information

ICS-900 - AS23 4 mm - Bundled Package

ICS-900, AS23 4 mm, Consumable Bundled Package 067079

CS12A 4 mm Bundled Package

This package includes:

- IonPac CS12A 4 mm, P/N 046073
- IonPac CG12A 4 mm, P/N 046074
- CMMS III 4 mm, P/N 056752
- CMMS III Regenerant Concentrate, 4 pack, P/N 057556
- ICS-900 DCR Cation Regenerant 2 L Bottle, P/N 057713
- CS12A Eluent Concentrate, P/N 057562

Ordering Information

ICS-900 - CS12A 4 mm - Bundled Package

ICS-900, CS12A 4 mm, Consumables Bundled Package 060132

CS12A 3 mm Bundled Package

This package includes:

- IonPac CS12A 3 mm, P/N 057185
- IonPac CG12A 3 mm, P/N 057184
- CMMS III 2 mm, P/N 056753
- CMMS III Regenerant Concentrate, 4 pack, P/N 057556
- ICS-900 DCR Cation Regenerant 2 L Bottle, P/N 057713
- CS12A Eluent Concentrate, P/N 057562

Ordering Information

ICS-900 - CS12A 3 mm - Bundled Package

ICS-900, CS12A 3 mm, Consumables Bundled Package 060131

CS16 5 mm Bundled Package

This package includes:

- IonPac CS16 5 mm, P/N 057573
- IonPac CG16 5 mm, P/N 057574
- CMMS III 4 mm, P/N 056752
- CMMS III Regenerant Concentrate, 4 pack, P/N 057556
- ICS-900 DCR Cation Regenerant 2 L Bottle, P/N 057713
- Methanesulfonic Acid, 500 mL, P/N 033478

Ordering Information

ICS-900 - CS16 5 mm - Bundled Package

ICS-900, CS16 5 mm, Consumables Bundled Package 060129

CS16 3 mm Bundled Package

This package includes:

- IonPac CS16 3 mm, P/N 059596
- IonPac CG16 3 mm, P/N 059595
- CMMS III 2 mm, P/N 056753
- CMMS III Regenerant Concentrate, 4 pack, P/N 057556
- ICS-900 DCR Cation Regenerant 2 L Bottle, P/N 057713
- Methanesulfonic Acid, 500 mL, P/N 033478

Ordering Information

ICS-900 - CS16 3 mm - Bundled Package

ICS-900, CS16 3 mm, Consumables Bundled Package 060130

LC Solutions Kits

LC Solutions Kits comprise all items needed to plumb an UltiMate 3000 System with Viper or nanoViper capillaries for LC solutions. All analytical kits are available for SD and RS systems.

- Parallel analysis
- Tandem analysis
- 2-D LC analysis
- On-line SPE analysis
- Inverse gradient for uniform response with nebulizer-based detectors
- Automated method scouting
- Proteomics preconcentration, parallel LC, and MDLC

With the use of Viper, the revolutionary new fingertight fitting system, installation is as easy and fast as never before. The Viper system improves chromatographic results and allows connection of LC modules, valves, and columns quickly and efficiently without tools.

General LC Solutions Kits

Ordering Information

Automated Application Switching Kits

Viper Application Switching Solution Kit, RS system 6040.2805
Viper Application Switching Solution Kit, SD system 6040.2806

Automated Method Scouting Kits

Viper Method Scouting Solution Kit, RS systems 6040.2807
Viper Method Scouting Solution Kit, SD systems 6040.2808
Extension Kit for Viper Method Scouting Capillary Kit 6040.0100

On-Line SPE Kits

Viper On-line SPE Solution Kit, RS system 6040.2801
Viper On-line SPE Solution Kit, SD system 6040.2802

Parallel LC Kits

Viper Parallel Analyses Solution Kit, RS system 6040.2809
Viper Parallel Analyses Solution Kit, SD system 6040.2810

Tandem LC Kits

Viper Tandem Analyses Solution Kit, RS system 6040.2803
Viper Tandem Analyses Solution Kit, SD system 6040.2804
Viper Inverse Analyses Solution Kit, SD systems 6040.2819
Viper Inverse Analyses Solution Kit, RS systems 6040.2820

LC Solutions Kits for Proteomics

Ordering Information

Direct Injection Kits

UltiMate 3000 RSLCnano Direct Injection nano LC kit 6720.0300
UltiMate 3000 RSLCnano Direct Injection Capillary LC kit..... 6720.0305

Preconcentration Kits

UltiMate 3000 RSLCnano Preconcentration nano LC kit 6720.0310
UltiMate 3000 RSLCnano Preconcentration Capillary LC kit..... 6720.0315
UltiMate 3000 RSLCnano Preconcentration Monolithic LC kit..... 6720.0320

2-D Salt Plug Application Kits

UltiMate 3000 RSLC nano 2-D Salt Plug kit..... 6720.0325

Automated Off-Line 2D-LC Kits

UltiMate 3000 RSLCnano Automated off-line SCXxRP Peptides kit..... 6720.0330
UltiMate 3000 RSLCnano Automated off-line RPxRP Peptides kit 6720.0340

Tandem nano LC Kits

UltiMate 3000 RSLCnano Tandem nano LC Kit..... 6720.0335

ICS-5000 and ICS-2100 RFIC-EG Consumables Bundles

These bundled packages include:

- Eluent Generator Cartridge
- Continuously Regenerated Trap Column
- Suppressor (SRS 300 or CES 300)
- CRD 200 (anion bundles only)

These kits are appropriate for RFIC-EG systems, such as the ICS-5000 and ICS-2100. Capillary (0.4 mm) bundles are only appropriate for the ICS-5000 with capillary pump and IC Cube option. Separator and Guard Columns must be ordered separately.

Anion RFIC-EG Consumables Bundle (4 mm)

This package includes:

- EGC III KOH
- CR-ATC
- ASRS 300 (4 mm)
- CRD 200 (4 mm)

Ordering Information

Anion RFIC-EG Consumables Bundle (4 mm)	
Anion RFIC-EG Consumables Bundle (4 mm)	072255

Anion RFIC-EG Consumables Bundle (2 mm)

This package includes:

- EGC III KOH
- CR-ATC
- ASRS 300 (2 mm)
- CRD 200 (2 mm)

Ordering Information

Anion RFIC-EG Consumables Bundle (2 mm)	
Anion RFIC-EG Consumables Bundle (2 mm)	072256

Anion RFIC-EG Consumables Bundle (0.4 mm)

This package includes:

- EGC-KOH (Capillary)
- CR-ATC (Capillary)
- ACES 300
- CRD 200 (Capillary)

Note: *This bundle is only appropriate for the ICS-5000 with capillary pump and IC Cube option.*

Ordering Information

Anion RFIC-EG Consumables Bundle (0.4 mm)	
Anion RFIC-EG Bundle (0.4 mm)	072257

Cation RFIC-EG Consumables Bundle (4 mm)

This package includes:

- EGC III MSA
- CR-CTC II
- CSRS 300 (4 mm)

Ordering Information

Cation RFIC-EG Consumables Bundle (4 mm)	
Cation RFIC-EG Consumables Bundle (4 mm)	072258

Cation RFIC-EG Consumables Bundle (2 mm)

This package includes:

- EGC III MSA
- CR-CTC II
- CSRS 300 (2 mm)

Ordering Information

Cation RFIC-EG Consumables Bundle (2 mm)	
Cation RFIC-EG Consumables Bundle (2 mm)	072259

Cation RFIC-EG Consumables Bundle (0.4 mm)

This package includes:

- EGC-MSA (Capillary)
- CR-CTC (Capillary)
- CCES 300

Note: *This bundle is only appropriate for the ICS-5000 with capillary pump and IC Cube option.*

Ordering Information

Cation RFIC-EG Consumables Bundle (0.4 mm)	
Cation RFIC-EG Consumables Bundle (0.4 mm)	072260

Viper Fingertight Fittings

Provides ease of use and dead-volume free plumbing of every conventional HPLC and UHPLC system

The Viper fingertight fitting system provides ease of use and dead-volume free plumbing of every conventional HPLC and modern UHPLC system. Together with flexible stainless steel capillaries, it opens a new dimension in liquid chromatography. The Viper system improves chromatographic results, independent of various different connection geometries and system backpressures. Connecting LC modules, valves, and columns quickly and easily without tools is simple with the Viper system.

- Provides zero-dead volume fingertight connections
- Supports operating pressures up to 1200 bar (17,400 psi)
- Available in different lengths: 65 mm and from 150 to 950 mm in 100 mm steps
- Available in different inner diameters: 0.13 mm (0.005") or 0.18 mm (0.007")
- Easy to use due to stainless steel capillaries (1/32" o.d.) and fingertight design
- Works with virtually any valve and column from any manufacturer
- Fits narrow connections such as 10-port valves and enables mixed use with different designs

Extracolumn volumes in HPLC have the most detrimental effects on the separational performance of an LC system and must be minimized. Conventional fittings tightened by hand or using tools have considerable drawbacks which can compromise efficiency. The Viper fitting system design overcomes these drawbacks, working without ferrules to reduce the dead volume of any fluidic connection to zero. The Viper system unifies robust performance, ease of use, acceptable lifetime, and universal compatibility with virtually all different valves and columns for HPLC system users..



Related Literature

For detailed specifications and applications, see the following PDF documents under Literature on www.dionex.com.

Product Data Sheets

Viper Capillaries and Fingertight Fittings Data Sheet

Technical Notes

TN 80: Reduce Eluent Consumption by Optimizing UltiMate 3000 Quaternary Analytical Systems for Small Column Volumes

Ordering Information

Viper is included in shipments of the UltiMate 3000 RSLC System, but must be ordered separately for UltiMate 3000 Standard Systems. For more information on Viper Solution kits, see the LC Solutions section under Chromatography Accessories.

Individual Viper Capillaries, RS/Micro

Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 65 mm, SST 6040.2307
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 150 mm, SST 6040.2315
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 250 mm, SST 6040.2325
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d.0.13 mm/0.005", Length 350 mm, SST 6040.2335
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 450 mm, SST 6040.2345
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 550 mm, SST 6040.2305
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 650 mm, SST 6040.2310
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 750 mm, SST 6040.2320
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 850 mm, SST 6040.2330
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.13 mm/0.005", Length 950 mm, SST 6040.2340

Individual Viper Capillaries, SD/Analytical

Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 65 mm, SST 6040.2357
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 150 mm, SST 6040.2360
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 250 mm, SST 6040.2385
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 350 mm, SST 6040.2375
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 450 mm, SST 6040.2365
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 550 mm, SST 6040.2355
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 650 mm, SST 6040.2395
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 750 mm, SST 6040.2370
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 850 mm, SST 6040.2380
Viper UHPLC Fingertight Fitting incl. Capillary for 10-32 Fitting, i.d. 0.18 mm/0.007", Length 950 mm, SST 6040.2390

Viper Capillary Kits

Viper Capillary Kit for UltiMate 3000 RSLC Systems, SST 6040.2301
Viper Capillary Kit for UltiMate 3000 SD Systems, SST 6040.2302
Viper On-line SPE Solution kit, RS System 6040.2801
Viper Tandem Analyses Solution kit, RS Systems 6040.2803
Viper Parallel Analyses Solution kit, RS Systems 6040.2809
Viper Application Switching Solution kit, RS Systems 6040.2805
Viper Method Scouting Solution kit, RS Systems 6040.2807
Viper On-line SPE Analyses Solution kit, SD Systems 6040.2802
Viper Tandem Analyses Solution kit SD Systems 6040.2804
Viper Parallel Analyses Solution kit, SD Systems 6040.2810
Viper Application Switching Solution kit, SD Systems 6040.2806
Viper Automated Method Scouting Solution kit, SD Systems 6040.2808
Viper Inverse Gradient Solution kit, RS Systems 6040.2820
Viper Automated Method Scouting Capillary kit, SD Systems 6040.2808
Viper Inverse Gradient Solution kit, SD Systems 6040.2819

Viper Accessoriess

Viper Union 6040.2304
Viper Plug 6040.2303

nanoViper Fingertight Fittings

nano LC Made Easy

The nanoViper Fingertight Fitting System is the easiest connection system for nano LC applications. It comes preassembled and therefore overcomes the difficulties associated with assembling PEEK sleeve connections. The nanoViper fitting is capable of withstanding pressures up to 1034 bar, and is compatible with third-party valves and unions.

- Zero-dead-volume UHPLC fingertight nano LC connections
- Allows for a complete tool free set up of your nano LC application
- Nano LC column exchange in seconds
- Supports pressures up to 1034 bar (15,000 psi)
- Compatible with third party 1/16" connection material
- Available in lengths up to 750 mm and different inner diameters (20 µm, 50 µm, or 70 µm)
- Standard on RSLCnano Accessories and Acclaim PepMAP RSLC nano columns
- Removable knurl for easy 10-port valve connection

The preassembled nanoViper fittings allow fast, easy and reliable connections of capillaries, loops and columns. Eliminating the use of a loose nut, ferrule and PEEK sleeve prevents dead volumes and damage by overtightening. Retention time shifts and peak distortions due to improperly connected tubing and handled conventional fitting systems belong to the past.



Ordering Information

nanoViper connections are standard on RSLCnano accessories and Acclaim PepMap RSLC nano columns. See the Acclaim PepMap product page for ordering information.

Accessories	
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 20 µm, Length 350 mm	6041.5240
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 20 µm, Length 550 mm	6041.5260
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 20 µm, Length 650 mm	6041.5275
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 20 µm, Length 750 mm	6041.5280
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 50 µm, Length 350 mm	6041.5540
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 50 µm, Length 550 mm	6041.5560
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 50 µm, Length 650 mm	6041.5575
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 50 µm, Length 750 mm	6041.5880
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 75 µm, Length 250 mm	6041.5730
nanoViper UHPLC Fingertight Fitting incl. Fused Silica Capillary with PEEK Sheath for 10-32 Fitting, i.d. 75 µm, Length 350 mm	6041.5735

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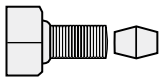
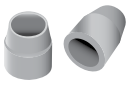
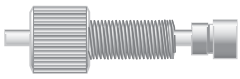
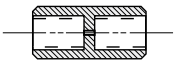
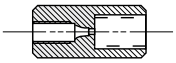
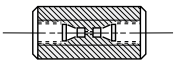
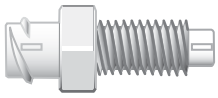
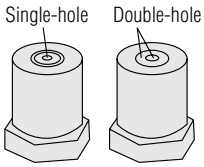
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Dionex Quick Guide: Accessory List for Ion Chromatography

Part	Description	Part Number		Common Uses
Bolt	Double cone ferrule bolt, 10-32, 5/16 in. hex head	043275		High-pressure connections to 1/16 in. tubing (columns, suppressors, etc.).
Ferrule	Double cone ferrule, 10-32	043276		
	Double cone ferrule, 10-32; Pack of 10	043225		
Plug	10-32	042772		Plug columns, eluent connections on CR-TC, suppressors, and so on.
Plug	1/4-28	037628		Plug regen side of suppressors, CR-TC, and so on.
Cap	1/4-28	045597		Cap 1/8 in. tubing for eluent supply and regen lines.
Bolt	1/4-28 for 1/8 in. tubing, Flangeless, Natural PEEK™	052267		Connect eluent supply and waste lines.
Bolt	1/4-28 for 1/8 in. tubing, Flangeless, Natural PEEK, short length	057934		Regen IN tubing connection on CR-TC.
Ferrule	1/8 in., Flangeless (yellow, reverse type, for 2 bolts above)	048949		
Bolt	1/4-28 for flat fitting, 1/16 in. tubing	052230		Connect 1/16 in. tubing to regen circuit of CR-TC, suppressor (use Green PEEK tubing only).
Ferrule	Flat type reverse, 1/16 in. (for bolt above)	052231		
Union	1/4-28 to 1/4-28, 0.06 in. through hole (female threaded for male connectors)	039056		Connect 1/8 in. tubing pieces together.
Union	1/4-28 to 10-32 (female threaded for male connectors)	042806		Join 1/8 in. and 1/16 in. tubing together.
Union	10-32 to 10-32 (female threaded for male connectors)	042627		Join 1/16 in. and 1/16 in. tubing together.
Syringe Adapter	Female Luer to male thread 1/4-28	024305		Connect syringe to 1/8 in. tubing (with 1/4-28 to 1/4-28 union and male fittings, not included).
Syringe Adapter	Female Luer to male thread 10-32	046888		
Check Valve	ICS-900, -1000, -1100, -1500, -1600, -2000, -2100, -3000			
Inlet	Cartridge only	045994		
	Cartridge and Housing	045722		
Outlet	Cartridge only	045994		
	Cartridge and Housing	045721		
Injection Valve Rebuild Kit	ICS-900, -1000, -1100, -1500, -1600, -2000, -2100, -3000	057896		Rebuild 6-port injection valve on instruments listed.
Pump Seal	ICS-900, -1000, -1100, -1500, -1600, -2000, -2100	055870		Replace pump seal on instruments listed.
Backup Pump Seal	ICS-900, -1000, -1100, -1500, -1600, -2000, -2100	063382		Replace seal wash seal on instruments listed.
Pump Seal	ICS-3000	064946		Replace pump seal on ICS-3000.
Piston Wash Seal	ICS-3000	063382		Replace seal wash seal on ICS-3000.

PEEK tubing, 1/16 inch O.D.

Yellow	0.003 in. (0.075 mm)	5 ft	052301	Backpressure coils only.
		20 ft	052300	
Red	0.005 in. (0.125 mm)	5 ft	052310	Microbore (2 mm column) plumbing.
		20 ft	052311	
Black	0.010 in. (0.25 mm)	5 ft	052306	Standard (4 mm column) plumbing.
		20 ft	052307	
Orange	0.020 in. (0.50 mm)	5 ft	052309	
		20 ft	052308	
Green	0.030 in. (0.75 mm)	5 ft	052305	Tubing for high flow rates or where very low backpressure is needed. Regen lines to suppressors etc..
		20 ft	052304	
1/8 in. tubing	PTFE Tubing 1/8 inch OD	5 ft	066046	Eluent supply and waste lines.

Sample Loops

10 µL	PEEK Loop	036104	Backpressure coils only.
25 µL	PEEK Loop	036105	
50 µL	PEEK Loop	036106	Microbore (2 mm column) plumbing.
100 µL	PEEK Loop	030391	
200 µL	PEEK Loop	036107	Standard (4 mm column) plumbing.
500 µL	PEEK Loop	030393	
1000 µL	PEEK Loop	036108	

Standards

Five Anion	100 mL	037157	**F^-**, 20; **Cl^-**, 30; **NO_2^-**, 100; **PO_4^{3-}**, 150; **SO_4^{2-}**, 150 (mg/L)
Seven Anion I	50 mL	056933	**F^-**, 20; **Cl^-**, 30; **NO_2^-**, 100; **Br^-**, 100; **NO_3^-**, 100; **PO_4^{3-}**, 150; **SO_4^{2-}**, 150 (mg/L)
Seven Anion II	100 mL	057590	**F^-**, 20; **Cl^-**, 100; **NO_2^-**, 100; **Br^-**, 100; **NO_3^-**, 100; **PO_4^{3-}**, 200; **SO_4^{2-}**, 100 (mg/L)
Six Cation I	50 mL	040187	**Li^+**, 50; **Na^+**, 200; **NH_4^+**, 400; **K^+**, 200; **Mg^{2+}**, 200; **Ca^{2+}**, 1000 (mg/L)
Six Cation II	50 mL	046070	**Li^+**, 50; **Na^+**, 200; **NH_4^+**, 250; **K^+**, 500; **Mg^{2+}**, 250; **Ca^{2+}**, 500 (mg/L)

Ordering Information

United States	1-800-346-6390
Asia Pacific	http://www.dionex.com/en-us/address/global-region/lp5480.html
Europe	http://www.dionex.com/en-us/address/global-region/lp5479.html
Latin/South America	http://www.dionex.com/en-us/address/global-region/lp4829.html
Middle East/Africa	http://www.dionex.com/en-us/address/global-region/lp5220.html

Column Selection Guide

Silica Columns

			Reversed-Phase (RP)						Mixed-Mode			HILIC		Application-Specific					
			Acclaim 120 C18	Acclaim 120 C8	Acclaim 300 C18	Acclaim Polar Advantage (PA)	Acclaim Polar Advantage II (PA2)	Acclaim Phenyl-1	Acclaim Trinity P1	Acclaim Mixed-Mode WAX-1	Acclaim Mixed-Mode WCX-1	Acclaim Mixed-Mode HILIC-1	Acclaim HILIC-10	Acclaim Organic Acid	Acclaim Surfactant	Acclaim Explosives E1	Acclaim Explosives E2	Acclaim Carbamate	Example Applications
General Applications	Neutral Molecules	High hydrophobicity	√	√	√	√	√	√	√	√	√	√	√						Fat-soluble vitamins, PAHs, glycerides
		Intermediate hydrophobicity	√	√	√	√	√	√	√	√	√	√							Steroids, phthalates, phenolics
		Low hydrophobicity	√			√	√					√	√						Acetaminophen, urea, polyethylene glycols
	Anionic Molecules	High hydrophobicity	√	√	√	√	√	√	√	√	√	√							NSAIDs, phospholipids
		Intermediate hydrophobicity	√	√	√	√	√	√	√	√		√							Asprin, alkyl acids, aromatic acids
		Low hydrophobicity				√			√	√		√	√						Small organic acids, e.g. acetic acids
	Cationic Molecules	High hydrophobicity	√	√	√	√	√	√		√	√	√							Antidepressants
		Intermediate hydrophobicity	√	√	√	√	√	√	√		√	√							Beta blockers, benzidines, alkaloids
		Low hydrophobicity	√			√			√		√	√	√						Antacids, pseudoephedrine, amino sugars
	Amphoteric/ Zwitterionic Molecules	High hydrophobicity	√	√	√	√	√	√	√	√	√	√							Phospholipids
		Intermediate hydrophobicity	√	√	√	√	√	√			√								Amphoteric surfactants, peptides
		Low hydrophobicity				√	√		√	√	√	√	√						Amino acids, aspartame, small peptides
	Mixtures of Neutral, Anionic, Cationic Molecules	Neutrals and acids	√			√	√		√	√									Artificial sweeteners
		Neutrals and bases	√			√	√		√		√								Cough syrup
		Acids and bases				√			√										Drug active ingredient with counterion
		Neutrals, acids, and bases				√			√										Combination pain relievers
Specific Applications	Surfactants	Anionic	√	√	√	√	√								√				SDS, LAS, laureth sulfates
		Cationic													√				Quats, benzylalkonium in medicines
		Nonionic	√	√	√	√	√					√			√				Triton X-100 in washing tank
		Amphoteric	√	√	√	√	√								√				Cocoamidopropyl betaine
		Hydrotropes													√				Xylenesulfonates in handsoap
		Surfactant blends													√				Noionic and anionic surfactants
	Organic Acids	Hydrophobic							√	√				√					Aromatic acids, fatty acids
		Hydrophilic							√	√				√					Organic acids in soft drinks, pharmaceuticals
	Environmental Contaminants	Explosives														√	√		U.S. EPA Method 8330, 8330B
		Carbonyl compounds															√		U.S. EPA 1667, 555, OT-11; CA CARB 1004
		Phenols	√			√													Compounds regulated by U.S. EPA 604
		Chlorinated/Phenoxy acids				√													U.S. EPA Method 555
		Triazines	√			√													Compounds regulated by U.S. EPA 619
		Nitrosamines				√													Compounds regulated by U.S. EPA 8270
		Benzidines	√			√													U.S. EPA Method 605
		Perfluorinated acids				√													Dionex TN73
		Microcystins	√																ISO 20179
		Isocyanates					√					√							U.S. OSHA Methods 42, 47
		Carbamate insecticides																√	U.S. EPA Method 531.2
	Vitamins	Water-soluble vitamins				√	√		√										Vitamins in dietary supplements
		Fat-soluble vitamins	√	√	√	√	√	√		√									Vitamin pills
	Pharmaceutical Counterions	Anions							√	√									Inorgaic anions and organic acids in drugs
		Cations							√		√								Inorgaic cations and organic bases in drugs
		Mixture of Anions and Cations							√										Screening of pharmaceutical counterions
		API and counterions							√										Naproxen Na^+ salt, metformin Cl^- salt, etc.

For more information, visit the Acclaim Library of related applications at www.dionex.com under Literature/Application Notes (right side of the page).

Polymer Columns

		IonPac AS23	IonPac AS22	IonPac AS22-Fast	IonPac AS14/A	IonPac AS12A	IonPac AS9/HC/SC	IonPac AS4A/SC	IonSwift MAX-100	IonPac AS24	IonPac AS21	IonPac AS20	IonPac AS19	IonPac AS18	IonPac AS18-Fast	IonPac AS17-C	IonPac AS16	IonPac AS15	IonPac AS11(-HC)	IonPac AS10	IonPac AS7	IonPac AS5	IonPac Fast Anion IIIA	OmniPac PAX-100	OmniPac PAX-500
ANIONS	Inorganic Anions	√	√	√	√	√	√	√	√	√		√	√	√	√	√		√	√	√					
	Oxyhalides	√				√	√			√			√												
	Bromate	√					√			√			√												
	Perchlorate										√	√					√								
	Organic Acids								√							√		√	√	√					
	Phosphoric/Citric Acids																						√		
	Poly/High-Valence Anions								√			√					√		√		√	√			
	Hydrophobic Anions								√			√					√		√						
	Hydrophobic/Halogenated Anions								√			√							√					√	
	Anionic Neutral Molecules									√	√	√	√												√
CATIONS	Inorganic Cations																								
	Sodium/Ammonium																								
	Amines/Polyvalent Amines																								
	Aliphatic/Aromatic Amines																								
	Alkanol/Ethhanolamines																								
	Biogenic Amines																								
	Transition/Lanthanide Metals																								
	Hydrophobic Cations																								
	Cationic Neutral Molecules																								
BIO-MOLECULES	Amino Acids																								
	Phosphorylated Amino Acids																								
	Amino Sugars																								
	Oligosccharides																								
	Mono-/Di-Saccharides																								
	Glycoproteins																								
	Alditols/Aldoses mono/di Saccharides																								
	ds Nucleic Acids																								
	Single-Stranded Oligonucleotides																								
	Peptides																								
	Proteins																								
	Metal-binding Proteins																								
	Monoclonal antibodies																								
ORGANIC MOLECULES	Aliphatic Organic Acids																								
	Alcohols																								
	Borate																								
	Large Molecules, Anions																								
	Small Molecules																								
	Small Molecules/LC-MS																								
	Polar/Non-Polar Small Molecules																								
	Hydrophobic/Aliphatic Organic Acids																								
	Surfactant Formulations																								
	Explosives/EPA 8330																								
MODE	Anion Exchange / Carbonate	√	√	√	√	√	√	√																	
	Anion Exchange / Hydroxide								√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		
	Cation Exchange																								
	Multi-Mode																							√	√
	Affinity																								
	Ion Exclusion																								
	Reversed Phase																								
	Anion Exchange/Other																								

IonPac CS18	IonPac CS17	IonPac CS16	IonPac CS15	IonPac CS14	IonPac CS12A	IonPac CS11	IonPac CS10	IonPac CS5A	OmniPac PCX-100	OmniPac PCX-500	AminoPac PA10	AminoPac PA1	CarboPac PA200	CarboPac PA100	CarboPac PA20	CarboPac PA10	CarboPac PA1	CarboPac MA1	DNAPac PA200	DNAPac PA100	ProPac WAX/SAX	ProPac WCX/SCX	ProPac IMAC	ProPac HIC	ProPac PA1	ProSwift	IonPac ICE-AS6	IonPac ICE-AS1	IonPac ICE-Borate	IonPac NS1
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Column Specifications

IC Anion Columns

Column	Format	Primary Eluent	Application	Particle Diameter	Substrate Crosslinking	Latex Diameter	Latex Crosslinking	Capacity (per column)	Functional Group	Hydrophobicity
IonPac AS24	2 × 250 mm	Hydroxide	Recommended column for haloacetic acids prior to MS or MS/MS detection	7 µm	55%	-	-	140 µeq	Alkanol quaternary ammonium	Ultralow
IonPac AS23	2 × 250 mm 4 × 250 mm	Carbonate	Recommended column for inorganic anions and oxyhalides. Trace bromate in drinking water.	6 µm	55%	-	-	80 µeq 320 µeq	Alkyl quaternary ammonium	Ultralow
IonPac AS22	2 × 250 mm 4 × 250 mm	Carbonate	Recommended column for fast analysis of common inorganic anions.	6.5 µm	55%	-	-	52.5 µeq 210 µeq	Alkyl quaternary ammonium	Ultralow
IonPac AS21	2 × 250 mm	Hydroxide	Recommended column for trace perchlorate prior to MS or MS/MS detection	7.0 µm	55%	-	-	45 µeq	Alkanol quaternary ammonium	Ultralow
IonPac AS20	2 × 250 mm 4 × 250 mm	Hydroxide	Recommended column for trace perchlorate prior to suppressed conductivity detection.	7.5 µm	55%	-	-	77.5 µeq 310 µeq	Alkanol quaternary ammonium	Ultralow
IonPac AS19	2 × 250 mm 4 × 250 mm	Hydroxide	Recommended column for inorganic anions and oxyhalides. Trace bromate in drinking water.	7.5 µm	55%	-	-	60 µeq 350 µeq	Alkanol quaternary ammonium	Low
IonPac AS18	2 × 250 mm 4 × 250 mm	Hydroxide	Recommended column for the analysis of common inorganic anions.	7.5 µm	55%	65 nm	8%	75 µeq 285 µeq	Alkanol quaternary ammonium	Low
IonPac AS17-C	2 × 250 mm 4 × 250 mm	Hydroxide	Trace anions in HPW matrices. Carboxylated resin, no sulfate blank. Low capacity for fast analysis of common inorganic anions using gradient elution with the Eluent Generator.	10.5 µm	55%	75 nm	6%	7.5 µeq 30 µeq	Alkanol quaternary ammonium	Low
IonPac AS16	2 × 250 mm 4 × 250 mm	Hydroxide	High capacity for hydrophobic anions including iodide, thiocyanate, thiosulfate, and perchlorate. Polyvalent anions including: polyphosphates and polycarboxylates	9 µm	55%	80 nm	1%	42.5 µeq 170 µeq	Alkanol quaternary ammonium	Ultralow
IonPac AS15	2 × 250 mm 4 × 250 mm	Hydroxide	High capacity for trace analysis of inorganic anions and low molecular weight organic acids in high purity water matrices.	9 µm	55%	-	-	56.25 µeq 225 µeq	Alkanol quaternary ammonium	Medium-High
IonPac AS15-5mm	3 × 150 mm	Hydroxide	Fast run, high capacity for trace analysis of inorganic anions and low molecular weight organic acids in high purity water matrices.	5 µm	55%	-	-	70 µeq	Alkanol quaternary ammonium	Medium-High
IonPac AS14A-5 µm	3 × 150 mm	Carbonate	Recommended column for fast analysis of common inorganic anions.	5 µm	55%	-	-	40 ueq	Alkyl quaternary ammonium	Medium
IonPac AS14A	4 × 250 mm	Carbonate	For analysis of common inorganic anions.	7 µm	55%	-	-	120 µeq	Alkyl quaternary ammonium	Medium
IonPac AS14	2 × 250 mm 4 × 250 mm	Carbonate	Moderate capacity for fast analysis of common inorganic anions.	9 µm	55%	-	-	16 µeq 65 µeq	Alkyl quaternary ammonium	Medium-High

Column	Format	Primary Eluent	Application	Particle Diameter	Substrate Crosslinking	Latex Diameter	Latex Crosslinking	Capacity (per column)	Functional Group	Hydrophobicity
IonPac AS12A	2 × 200 mm 4 × 200 mm	Carbonate	Moderate capacity for analysis of inorganic anions and oxyhalides. Trace chloride and sulfate in high carbonate matrices.	9 µm	55%	140 nm	0.20%	13 µeq 52 µeq	Alkyl quaternary ammonium	Medium
IonPac AS11-HC	2 × 250 mm 4 × 250 mm	Hydroxide	High capacity for the determination of organic acids and inorganic anions in uncharacterized samples.	9 µm	55%	70 nm	6%	72.5 µeq 290 µeq	Alkanol quaternary ammonium	Medium-Low
IonPac AS11	2 × 250 mm 4 × 250 mm	Hydroxide	Low capacity for fast profiling of organic acids and inorganic anions in well-characterized samples.	13 µm	55%	85 nm	6%	11 µeq 45 µeq	Alkanol quaternary ammonium	Very Low
IonPac AS10	2 × 250 mm 4 × 250 mm	Hydroxide	High capacity for the analysis of inorganic anions and organic acids in high nitrate samples.	8.5 µm	55%	65 nm	5%	42.5 µeq 170 µeq	Alkyl quaternary ammonium	Low
IonPac AS9-HC	2 × 250 mm 4 × 250 mm	Carbonate	High-capacity column for inorganic anions and oxyhalides. Trace bromate in drinking water.	9 µm	55%	90 nm	18%	48 µeq 190 µeq	Alkyl quaternary ammonium	Medium-Low
IonPac AS9-SC	4 × 250 mm	Carbonate	Low capacity for fast analysis of inorganic anions and oxyhalides. Specified column in US EPA Method 300.0 (B).	13 µm	55%	110 nm	20%	30-35 µeq	Alkyl quaternary ammonium	Medium-Low
IonPac AS4A-SC	2 × 250 mm 4 × 250 mm	Carbonate	Low capacity for fast analysis of common inorganic anions. Specified column in U.S. EPA Method 300.0 (A).	13 µm	55%	160 nm	0.50%	5 µeq 20 µeq	Alkanol quaternary ammonium	Medium-Low
IonPac Fast Anion IIIA	3 × 250 mm	Hydroxide	Recommended column for phosphoric and citric acids in cola soft drinks.	7.5 µm	55%	-	-	55 µeq	Alkanol quaternary ammonium	Ultralow
IonPac AS7	4 × 250 mm	Specialty Eluents	Polyvalent anions including chelating agents, polyphosphates and polyphosphonates. Cyanide, sulfide, hexavalent chromium, and arsenic speciation.	10 µm	2%	530 nm	5%	100 µeq	Alkyl quaternary ammonium	Medium-High
IonPac AS5A	4 × 150 mm	Hydroxide	Low capacity for fast profiling of organic acids and inorganic anions in well-characterized samples.	5 µm	2%	60 nm	4%	35 µeq	Alkanol quaternary ammonium	Low
IonPac AS5	4 × 250 mm	Hydroxide	Metal-EDTA complexes, metal-cyanide complexes, and oxyanions.	15 µm	2%	120 nm	1%	20 µeq	Alkanol quaternary ammonium	Low

IC Cation Columns

Column	Format	Primary Eluent	Application	Particle Diameter	Substrate Crosslinking	Latex Diameter	Latex Crosslinking	Capacity (per column)	Functional Group	Hydrophobicity
IonPac CS18	2 × 250 mm	MSA	Recommended column for polar amines (alkanolamines and methylamines) and moderately hydrophobic and polyvalent amines (biogenic and diamines). Nonsuppressed mode when extended calibration linearity for ammonium and weak bases is required	6 µm	55%	-	-	0.29 µeq	Carboxylic acid	Medium
IonPac CS17	2 × 250 mm 4 × 250 mm	MSA	Recommended column for hydrophobic and polyvalent amines (biogenic amines and diamines)	7 µm	55%	-	-	0.363 µeq 1.45 µeq	Carboxylic acid	Very Low
IonPac CS16	3 × 250 mm 5 × 250 mm	MSA	Recommended column for disparate concentration ratios of adjacent-eluting cations such as sodium and ammonium. Can be used for alkylamines and alkanolamines.	5 µm	55%	-	-	3.0 µeq 8.4 µeq	Carboxylic acid	Medium
IonPac CS15	2 × 250 mm 4 × 250 mm	MSA	Disparate concentration ratios of ammonium and sodium. Trace ethanolamine in high-ammonium or high- potassium concentrations. Alkanolamines.	8.5 µm	55%	-	-	0.7 µeq 2.8 µeq	Carboxylic acid/ phosphonic acid/ crown ether	Medium
IonPac CS14	2 × 250 mm 4 × 250 mm	MSA	Aliphatic amines, aromatic amines, and polyamines plus mono- and divalent cations.	8.5 µm	55%	-	-	0.325 µeq 1.3 µeq	Carboxylic acid	Low
IonPac CS12A-MS	2 × 100 mm	MSA	IC-MS screening column for fast elution and low flow rates required for interfacing with IC-MS	8.5 µm	55%	-	-	0.28 µeq	Carboxylic acid/ phosphonic acid	Medium
IonPac CS12A-5 µm	3 × 150 mm	MSA	Recommended column for high efficiency and fast analysis (3 min) of mono- and divalent cations.	5 µm	55%	-	-	0.94 µeq	Carboxylic acid/ phosphonic acid	Medium
IonPac CS12A	2 × 250 mm 4 × 250 mm	MSA	Recommended column for the separation of mono- and divalent cations. Manganese morpholine, alkylamines, and aromatic amines.	8.5 µm	55%	-	-	0.7 µeq 2.8 µeq	Carboxylic acid/ phosphonic acid	Medium
IonPac CS11	2 × 250 mm	HCl + DAP	Separation of mono- and divalent cations. Ethanolamines if divalent cations are not present.	8 µm	55%	200 nm	5%	0.035 µeq	Sulfonic acid	Medium
IonPac CS10	4 × 250 mm	HCl + DAP	Separation of mono- and divalent cations.	8.5 µm	55%	200 nm	5%	0.08 µeq	Sulfonic acid	Medium
IonPac CS5A	2 × 250 mm 4 × 250 mm	Pyridine dicarboxylic acid	Recommended column for transition and lanthanide metals analysis. Aluminum analysis.	9 µm	55%	140 nm 75 nm	10% 20%	0.02 µeq/ 0.005 µeq 0.04 µeq/ 0.01 µeq	Sulfonic acid/ alkanol quaternary ammonium	-

Ion-Exclusion Columns

Column	Format	Primary Eluent	Application	Particle Diameter	Substrate Crosslinking	Latex Diameter	Latex Crosslinking	Capacity (per column)	Functional Group	Hydro-phobicity
IonPac ICE-AS1	4 × 250 mm 9 × 250 mm	Heptafluorobutyric acid	Organic acids in high ionic strength matrices. Fast separation of organic acids.	7.5 µm	8%	-	-	5.3 µeq 27 µeq	Sulfonic acid	Ultra Low
IonPac ICE-AS6	9 × 250 mm	Heptafluorobutyric acid	Organic acids in complex or high ionic strength matrices.	8 µm	8%	-	-	27 µeq	Sulfonic and carboxylic acid	Moderate
IonPac ICE-Borate	9 × 250 mm	MSA/ Mannitol	Trace concentrations of borate	7.5 µm	8%	-	-	27 µeq	Sulfonic acid	Ultra Low

Acclaim General and Specialty Columns

Column	Bonded Phase	USP Type	Endcapped	Substrate	Particle Shape	Particle Size	Metal Impurity (ppm) Na, Fe, AL	Average Pore Diameter	Surface Area (m^2/g)	Total Carbon Content
Mixed-Mode WAX	Proprietary alkyl amine	na	Proprietary	Ultrapure silica	Spherical	5 µm	<10 ppm	120 Å	300	na
Mixed-Mode HILIC	Proprietary alkyl diol	na	Proprietary			5 µm		120 Å	300	na
Mixed-Mode WCX	Proprietary alkyl carboxyl	na	Proprietary			5 µm		120 Å	300	na
Organic Acid (OA)	Proprietary	na	Yes			5 µm		120 Å	300	17%
Surfactant and Explosives E1/2	Proprietary	na	Yes			5 µm		120 Å	300	na
120 C18	C18	L1	Yes			2, 3 and 5 µm		120 Å	300	18%
120 C8	C8	L7	Yes			3 and 5 µm		120 Å	300	11%
300 C18	C18	L1	Yes			3 µm		300 Å	100	7%
Polar Advantage	Sulfamido C16	na	Yes			3 and 5 µm		120 Å	300	17%
Polar Advantage II	Amide C18	na	Yes			2, 3 and 5 µm		120 Å	300	17%
HILIC	Proprietary hydrophilic		Yes			3 µm		120 Å	300	
Phenyl-1	Proprietary alkyl phenyl		Yes			3 µm		120 Å	300	
Carbamate	Proprietary alkyl group		Yes			3 and 5 µm		120 Å	300	
Trinity			Yes					120 Å	300	

Bio Columns

Protein

Column	Phase	Target Applications	Base Matrix Material	Substrate Crosslinking	Capacity	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
MAbPac SEC-1									
MAbPac SCX-10									
ProPac WCX-10	Weak Cation Exchange	High resolution and high efficiency separations of proteins and glycoproteins, pI =3-10, MW>10,000 units	10-µm diameter nonporous substrate to which is grafted a polymer chain bearing carboxylate groups.	55%	6 mg/ mL lysozyme	0.2–2 mL/min	80% ACN, acetone. Incompatable with alcohols and MeOH	3000 psi (21 MPa)	2–12.0
ProPac SCX-10	Strong Cation Exchange	High resolution and high efficiency separations of proteins and glycoproteins, pI =3-10, MW>10,000 units	10 µm diameter nonporous substrate to which is grafted a polymer chain bearing sulfonate groups.	55%	3 mg/ mL lysozyme	0.2–2.0 mL/min	80% ACN, acetone, MeOH	3000 psi (21 MPa)	2–12.0
ProPac SCX-20									
ProPac WAX-10	Weak Anion Exchange	High resolution and high efficiency separations of proteins and glycoproteins, pI =3-10, MW>10,000 units	10 µm diameter non-porous substrate to which is grafted a polymer chain bearing tertiary amine groups.	55%	5 mg/ mL BSA/ mL	0.2–2.0 mL/min	80% ACN, acetone, MeOH,	3000 psi (21 MPa)	2–12.0
ProPac SAX-10	Strong Anion Exchange	High resolution and high efficiency separations of proteins and glycoproteins, pI =3-10, MW>10,000 units	10 µm diameter non-porous substrate with grafted polymer chain bearing quaternary ammonium groups.	55%	15 mg/ mL BSA	0.2–2.0 mL/min	80% ACN, acetone, MeOH	3000 psi (21 MPa)	2–12.0
ProSwift RP-1S	Reversed-Phase	Fast protein separation with high capacity using Reversed Phase	Monolith; polystyrene-divinylbenzene with phenyl functional group	Monolith Standard permeability	5.5 mg/mL Insulin	2–4 mL/min	Most common organic solvents	2800 psi (19.2 Mpa)	1–14
ProSwift RP-2H	Reversed-Phase	Fast protein separation with high capacity using Reversed Phase	Monolith; polystyrene-divinylbenzene with phenyl functional group	Monolith High permeability	1.0 mg/mL Lysozyme	1–10 mL/min	Most common organic solvents	2800 psi (19.3 Mpa)	1–14
ProSwift RP-4H									
ProSwift RP-3U	Reversed-Phase	Fast protein separation with high capacity using Reversed Phase	Monolith; polystyrene-divinylbenzene with phenyl functional group	Monolith Ultrahigh permeability	0.5 mg/mL Lysozyme	1– 16 mL/min	Most common organic solvents	2800 psi (19.3 Mpa)	1–14
ProSwift SAX-1S	Strong Anion Exchange	Fast protein separation with good resolution using Anion Exchange	Monolith; polymethac-rylate with quaternary amine functional group	Monolith Standard permeability	18 mg/mL BSA	0.5–1.5 (4.6 mm), 0.05–.25 (1.0 mm)	Most common organic solvents	1000 psi (4.6 mm) 2000 psi (1.0 mm)	2–12.0

Column	Phase	Target Applications	Base Matrix Material	Substrate Crosslinking	Capacity	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
ProSwift SCX-1S	Strong Cation Exchange	Fast protein separation with good resolution using Cation Exchange	Monolith; polymethacrylate with sulfonic acid fuctional group	Monolith Standard permeability	30 mg/mL Lysozyme	0.5–1.5 mL/min (4.6 mm)	Most common organic solvents	1000 psi (4.6 mm)	2–12.0
ProSwift WAX-1S	Weak Anion Exchange	Fast protein separation with good resolution using Anion Exchange	Monolith; polymethacrylate with tertiary amine (DEAE) functional group	Monolith Standard permeability	18 mg/mL BSA	0.5–1.5 mL/min (4.6 mm), 0.05–.25 (1.0 mm)	Most common organic solvents	1000 psi (4.6 mm) 2000 psi (1.0 mm)	2–12.0
ProSwift WCX-1S	Weak Cation Exchange	Fast protein separation with good resolution using Cation Exchange	Monolith; polymethacrylate with carboxylic acid (CM) functional group	Monolith Standard permeability	23 mg/mL Lysozyme	0.5–1.5 mL/min (4.6 mm), 0.05–.20 (1.0 mm)	Most common organic solvents	1000 psi (4.6 mm) 2000 psi (1.0 mm)	2–12.0
ProPac IMAC-10	Immobilized Metal Affinity	High resolution separation of certain metal-binding proteins and peptides	10 µm diameter non-porous polystyrene divinylbenzene substrate with poly (IDA) grafts.	55%	>60 mg lysozyme/ mL gel (4 x 250 mm)	1.0 mL/min	EtOH, urea, NaCl, non- ionic detergents, glycerol, acetic acid, guanidine HCl	3000 psi (21MPa)	2–12
ProSwift ConA-1S									
ProPac HIC-10	Reversed-Phase	Protein separation using hydrophobic interaction with salt gradient elution	Spherical 5 µm, ultrapure silica, 300 A, surface area 100 m^2/ g,	n/a	340 mg lysozyme per 7.8 x 75 mm column	1.0 mL/ min	2M Ammonium sulfate/ phosphate salts, organic solvent for cleanup	4,000 psi	2.5–7.5

Carbohydrate

Column	Target Applications	Base Matrix Material	Substrate Crosslinking	Latex Crosslinking	Capacity	Recommended Eluents	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
CarboPac MA1	Reduced mono- and disaccharide analysis.	7.5 µm diameter macroporous substrate fully functionalized with an alkyl quaternary ammonium group	15%	No latex	1450 µeq (4 × 250 mm)	Hydroxide	0.4 mL/min	0%	2000 psi (14 MPa)	0–14
CarboPac PA1	General purpose mono-, di-, and oligosaccharide analysis	10 µm diameter nonporous substrate agglomerted with a 500 nm MicroBead quaternary ammonium functionalized latex	2%	5%	100 µeq (4 × 250 mm)	Hydroxide, acetate/ hydroxide	1.0 mL/min	0–5%	4000 psi (28 MPa)	0–14
CarboPac PA10	Monosaccharide compositonal anaylysis	10 µm diameter nonporous substrate agglomerated with a 460 nm MicroBead di-functionalized latex	55%	5%	100 µeq (4 × 250 mm)	Hydroxide, acetate/ hydroxide	1.0 mL/min	0–90%	3500 psi (24.5 MPa)	0–14
CarboPac PA20	Fast mono-, and disaccharide analysis	6.5 µm diameter nonporous substrate agglomerated with a 130 nm MicroBead quaternary ammonium functionalized latex	55%	5%	65 µeq (3 × 150 mm)	Hydroxide, acetate/ hydroxide	0.5 mL/min	0–100%	3000 psi (21 MPa)	0–14
CarboPac PA100	Oligosaccharide mapping and analysis	8.5 µm diameter nonporous substrate agglomerated with a 275 nm MicroBead di-functionalized latex	55%	6%	90 µeq (4 × 250 mm)	Hydroxide, acetate/ hydroxide	1.0 mL/min	0–90%	4000 psi (28 MPa)	0–14
CarboPac PA200	High resolution oligosaccharide mapping and analysis	5.5 µm diameter nonporous substrate agglomerated with a 43 nm MicroBead quaternary ammonium functionalized latex	55%	6%	35 µeq (3 × 250 mm)	Hydroxide, acetate/ hydroxide	0.5 mL/min	0–100%	4000 psi (28 MPa)	0–14

DNA

Column	Target Applications	Base Matrix Material	Substrate Crosslinking	Latex Crosslinking	Capacity	Recommended Eluents	Recommended Flow Rate	Solvent Compatibility	Max. Backpressure	pH Range
DNAPac PA100	Single stranded DNA or RNA oligonucleotides, restriction fragments, glycoprotein isoforms.	13-µm diameter nonporous substrate agglomerated with a 100-nm MicroBead alkyl quaternary ammonium functionalized latex.	55%	5%	40 µeq	Chloride, acetate, bromide, perchlorate: in lithium sodium or ammonium forms	1.5 mL/min	0–100%	4000psi (28MPa)	2–12.5
DNAPac PA200	High resolution single stranded DNA or RNA oligonucleotides, restriction fragments, glycoprotein isoforms.	8-µm diameter nonporous substrate agglomerated with a 130-nm MicroBead alkyl quaternary ammonium functionalized latex.	55%	5%	40 µeq	Chloride, acetate, bromide, perchlorate: in lithium sodium or ammonium forms	1.2 mL/min	0–100%	4000psi (28MPa)	2–12.5
DNASwift										

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The following literature is available in Adobe PDF format on www.dionex.com, by product category under Literature or by searching for the literature number shown below.

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Service & Technical Support

From instrument service to validation and performance testing, we're here to help

From instrument servicing to validation, Dionex provides the tools and expertise you need to set up your system, keep it performing expertly, and pass method validation and audits. Several Service Plans, Performance Kits, and Validation Kits are available.

Visit our Support pages on www.dionex.com to find:

- Answers to Frequently-Asked Questions
- Offices
- Service Contracts
- Service Products

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When you purchase a Dionex Support Plan, you are investing in a world-class support organization. Dionex will dedicate the required resources to ensure that long after purchase, your system performs the way you need it to.

Dionex offers varied levels of comprehensive service plans to meet the most stringent laboratory requirements for uptime and maintenance.

Service plans vary by region; contact your local office for details. See "Dionex Locations" in the Ordering Information section for local contact information.

Validation Services

Dionex offers a full range of validation services and kits. Trained field service representatives are available to perform installation, operation, and performance qualification on your HPLC or IC system.

Performance validation kits are also available that contain all the tools, worksheets, methods, certificates, and validation tags necessary to validate individual system components.



Automating the Validation Process

Dionex data systems, Chromeleon 6 and PeakNet 6, were designed to make all aspects of validation as easy as possible for the user. Validating the software installation is as simple as choosing a menu option and printing out the results.

To help automate the instrument validation process, OQ/PQ procedures and pass/fail criteria are built into the software. Validation "wizards" walk you through the creation of methods to validate your specific HPLC or IC configuration.

Peak Performance Kits

Dionex Peak Performance Kits are designed to meet the preventative maintenance needs of your Dionex hardware. Each maintenance kit includes the required spare parts to perform the recommended annual maintenance on the specified module.

Dionex will perform this maintenance for you, or you can follow the included instructions and perform the maintenance yourself.

Contact Information

For service and technical support, contact our Technical Support Department:

e-mail: techsupport@dionex.com

phone: 1-800-DIONEX-0 (zero), within U.S. from 8:00 a.m. EST to 5:00 p.m. PST.

or fill out our Technical Support Request Form online:

http://www1.dionex.com/forms/dnex_tech_support_request.html

See also "Dionex Locations" in the Ordering Information section for local contact information to inquire about local service offerings.

Training

Complete solutions for your analytical needs

Dionex's ultimate goal is to provide you with an end-to-end solution to your analytical needs. To meet this goal, we offer a complete line of services, including a training program to help you get the most out of your instrumentation and results.

Contact your local Dionex representative to find out about specific training offerings in your area. (See "Dionex Locations" in the Ordering Information section.)

Visit us on the web at:

www1.dionex.com/en-us/training/lp2514.html

for details about training offered in your region.

Course Offerings

Instrumentation

These courses provide the skills to operate your chromatography system and optimize its analytical and automation capabilities. Example courses include:

Ion Chromatography Systems: Instrument-specific courses in basic operation and troubleshooting, and advanced maintenance and troubleshooting

HPLC Systems: Instrument operation, maintenance and troubleshooting

MSQ Detector Family

IC Method Development

Analyte-Specific Analysis

Software

Take advantage of the benefits you obtain when participating in a Dionex Chromatography Software training course. As you become more familiar with Dionex Chromatography Software, you will appreciate the power and capabilities this software provides. Courses include:

Chromeleon Level 1: An Introduction to Chromeleon

Chromeleon Level 2: Next Steps in Chromeleon

Chromeleon Level 3: Chromeleon Advanced Operator Training

Chromeleon System Administrator Training



Training Options

Specialized

Designed specifically to your application and instrumentation requirements. Assist the chromatographer in maximizing the capabilities of their system (e.g., IC, ICS, ASE, UltiMate, Summit). Example courses include:

An Introduction to the Principles and Practices of HPLC

Accelerated Solvent Extraction (ASE) Training

Carbohydrate Determination by HPAE-PAD

In Search of Resolution: A Practical Approach to Reversed-phase HPLC Method Development

Basic Mass Spectrometery, MSQ

Method Development in Ion Chromatography

Customized Training

Do you need a training session customized to your individual needs? Perhaps you need training geared towards a specific application or need advanced training on a particular topic. Whatever your needs, contact the Dionex Training group and we will put together a course to suit your needs.

On-Site Training

Do you have a larger group to train? Or perhaps you would like to have training on your own instruments. Whatever the reason, we can come to you and train you at your facility. Your on-site training session can include any combination of our standard courses and/or customized courses to meet individual needs.

Web-Based Training

Interactive training sessions advance your knowledge of Chromeleon Software. These sessions use live online meeting technology with desktop sharing to answer your questions and guide you through solutions.

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A

AAA-Direct™ Amino Acid Analysis System

AAA-Direct™ Certified

AAA-Certified™

ACES™ Anion Capillary Electrolytic Suppressor

Acclaim® columns, Acclaim® PolarAdvantage (PA) column, Acclaim® PepMap™ column

ACQUITY® (Waters Corporation)

ACQUITY UltraPerformance LC® (Waters Corporation)

ACQUITY UPLC® (Waters Corporation)

Acrodisc® (Gelman Sciences, Inc.)

Acurate™ Flow Splitter

AES® Atlas Electrolytic Suppressor

Alliance® (Waters Corporation)

Aminex® (Bio-Rad Laboratories, Inc.)

AminoPac® columns

AminoTrap™ columns

AMMS®, AMMS® ICE, AMMS® ICE II Anion MicroMembrane Suppressor

Analyst® (Applied Biosystems)

AnchorChips™ (Bruker Daltonics)

Anion Self-Regenerating Suppressor®

Anion Trap Columns (IonPac®)

Anotop® (Whatman)

apex-ultra® (Bruker Daltonics)

API 2000™, API 3000™, API 3200™, API 4000™, API 5000™, (AB SCIEX)

Applera™ (Applera Corporation)

AQA™ Mass Spectrometer (Thermo Fisher Scientific, Inc.)

Aqua™ column (Phenomenex, Inc.)

ARC™ Automated Run Completion

Aroclor™ (Monsanto Corp.)

ASE® 150 or 350 Accelerated Solvent Extractor

ASE® Prep CR

ASE® Prep DE

ASE® Solvent Controller

ASI-100™, ASI-100P™, ASI-100PT™, or

ASI-100T™ Automated Sample Injector

ASPEC™ (Gilson, Inc.)

ASRN™ Anion Self-Regenerating Neutralizer, ASRN I, ASRN II

ASRS®, ASRS® II, ASRS® ULTRA II, or ASRS® 300 Anion Self-Regenerating Suppressor

Atlantis® columns (Waters Corporation)

Atlas® Suppressor

Auto OnGuard™ [without Auto it is OnGuard®]

AutoASE® software

autoflex™ (Bruker Daltonics)

AutoNeutralization™ system

AutoPrep

AutoPurification® (Waters Corporation)

AutoQ™ instrument qualification

AutoRegen® system

AutoSelect™

AutoSuppression® device

AutoTrace® 280 Solid-Phase Extraction instrument

AXIMA-QIT™ (Shimadzu Biotech)

B

Bacto™ YPD Broth (BD Diagnostics)

BAKER INSTRA-ANALYZED® Acids (J. T. Baker)

Baker Analyzed® Reagents (J. T. Baker)

BioAnalyst™ (AB SCIEX)

Biodialyser™ (AmiKa, Inc.)

BioLC® (Use ® when written with a column name, but not when used with System)

BioPlus™ columns

BioSelect™ (The Separations Group)

Biospectrometry™ (AB SCIEX)

BorateTrap™ columns

C

CAD® Charged Aerosol Detector

CapLC® (Waters Corporation)

CarboPac® MA1, PA1, PA10, PA100, PA20, PA200 columns

Cat-A-Phase® mobile phase

Cation Atlas® Electrolytic Suppressor

Cation MicroMembrane Suppressor®

Cation Self-Regenerating Suppressor®

Cation Trap Columns (IonPac®)

CCES™ Cation Capillary Electrolytic Suppressor

CD Builder™ (AppletWare Inc.)

Chemraz® (Greene, Tweed & Co.)

Chromachem® Evaporative Light Scattering Detector

Chrome™ browser (Google Inc.)

Chromeleon® Chromatography Data System (patent pending);

Chromeleon® PA; Chromeleon® Xpress [or CM Xpress or CMX]

Chromeleon® Purification Suite™

ChromSword® Auto (Dr. Sergey Galushko Software Entwicklung)

Clarus® (Perkin Elmer, Inc.)

CMD™ Carbohydrate Membrane Desalter
CMMS® Cation MicroMembrane Suppressor
Cobra™ peak detection algorithm
Corona® Charged Aerosol Detector
Corona® ultra™ Charged Aerosol Detector
CoulArray® Coulometric Array Detector, or multi-electrode array detector
Coulochem® III Electrochemical Detector
Coulometric® detector
Couloscan™
CSRN™ Cation Self-Regenerating Neutralizer
CSRS®, CSRS® II, CSRS® ULTRA II, or CSRS® 300 Cation Self-Regenerating Suppressor
CMMS® II Cation MicroMembrane Suppressor
Curtain Gas™ (AB SCIEX)

D

Data Explorer® (AB SCIEX)
DataDetective™ (AppletWare Inc.)
dBASE® (Borland International, Inc.)
DCMSLink™
Delayed Extraction® (AB SCIEX)
Dequest® (Monsanto Corp.)
Dionex®
DNAPac® column [replaces NucleoPac]
DNAPhor™ SB1.5 kB Sieving Buffer Kit
DNASwift™ column
Dowex® (Dow Chemical Company)
Dionium™ components or pathway
DuoSpray™ (AB SCIEX)
DX-LAN Instrument Interface

E

eLab Notebook ™ (Waters Corporation)
EluGen (no longer trademarked)
Eppendorf® (Eppendorf-Netheler-Hinz GmbH)
ESA®
ESA Plus Design®
esquire2000™ (Bruker Daltonics)
Explorer™ (AB SCIEX)

F

FAMOS™ Fully Automated Micro Autosampler
Fast IC™ column
FastLoc™ (Thermo Fisher Scientific, Inc.)
Firefox® (Mozilla Foundation)
Flavoscan™
Florisil® (U.S. Silica Co.)
Foxy® (Teledyne Isco, Inc.)
FPLC® (GE Healthcare)
FractionLynx™ (Waters Corporation)
Freon® (E.I. du Pont de Nemours & Co.)

G

Google® (Google Inc.)

H

Halo® (Advanced Materials Technology, Inc.)
HCTultra™ (Bruker Daltonics)
Hydromatrix™ (Varian Associates, Inc.)
Hypersil® (Agilent Technologies)
Hypercarb™ (Thermo Fisher Scientific, Inc.)
HyStar™ (Bruker Daltonics)

I

IC Cube™ module
ICAT® (University of Washington, Seattle, USA)
Inertsil® (GL Sciences, Inc.)
InGuard™ Automated Sample Pretreatment Cartridges (InGuard™ cartridges, for short)
InkJet® (Hewlett-Packard)
Integral™
Integral Migration Path™
Internet Explorer® (Microsoft Corporation)
Interrogator™ (AB SCIEX)
Ion Bright™ (Thermo Fisher Scientific, Inc.)
IonPac® columns
IonPhor™ Electrolyte Buffers
iScience™ (Applera Corporation)
IonSpray™ (AB SCIEX)
IonSwift™ MAX-100 columns
iTRAQ™ (Applera Corporation
Irganox® (Ciba)

J

K

Kalrez® (E.I. du Pont de Nemours & Co.)
Kel-F® (3M Corporation)
Kynar® (Arkema, Inc.)

L

LabPRO® (Rheodyne LLC)
LaChromUltra® (Hitachi)
LANtastic® (Artisoft, Inc.)

LaserJet® (Hewlett-Packard)
LichroCART® (Merck KGaA, Darmstadt, Germany)
LiChrospher® ADS (Merck KGaA, Darmstadt, Germany)
LINAC® (AB SCIEX)
Luna® columns (Phenomenex, Inc.)

M

MALDI TOF/TOF™ [for instrument] (AB SCIEX)
MALDI TOF/TOF® [for ion source for mass spectrometer] (AB SCIEX)
MarkerView™ (AB SCIEX)
Mascot® (Matrix Science Ltd.)
MassChrom™ (AB SCIEX)
MassLynx™ (Waters Corp.)
Metexchange®
MetPac™ reagents
MICRO® (International Products Corp.)
Micro BCA™ (Pierce Biotechnology, Inc.)
MicroBead™ resin
MICRO DIST® (Lachat Instruments)
MicrolonSpray® (AB SCIEX)
MicroMass® (Waters Corporation)
MicroMembrane™ Suppressor
Microsoft® (Microsoft Corporation)
Millennium® (Waters Corporation)
Milli-Q® (Millipore Corporation)
MMS™ MicroMembrane™ Suppressor
MonoDisk™
Mono Q™ (GE Healthcare)
MonoStandard™
Mozilla® (Mozilla Foundation)
M Path™ (Thermo Fisher Scientific, Inc.)
MPIC® Mobile Phase IC
MSQ Plus™ Mass Spectrometer (Thermo Fisher Scientific, Inc.)

N

Nalgene® (Nalge Nunc International)
TriVersa NanoMate® (Advion Biosciences, Inc.)
NanoSpray® (AB SCIEX)
nanoViper™ fingertight fitting system
N-EVAP® (Organomation Associates, Inc.)
NovaPak® (Waters Corp.)

O

OligoStandards™
oMALDI™ (AB SCIEX)
OmniFLEX™ (Bruker Daltonics)
OmniPac® columns
OnGuard®, OnGuard® II Sample Prep Station [but Auto OnGuard™]
Opera® (Opera Software ASA)
Opera Software™ (Opera Software ASA)
Operational Simplicity™
OptiBeam™ (AB SCIEX)
Opti-TOF™ (AB SCIEX)
Optima™ (Thermo Fisher Scientific, Inc.)
ORBO™ (Supelco, Inc.)
Oxscan™ HPLC electrochemical array detection method

P

PaintJet® (Hewlett-Packard)
PEEK™ (Victrex PLC)
PEEKsil™ (SGE Analytical Science)
Pentium® (Intel Corporation)
PepMap™ for Acclaim® PepMap™ columns
PepSwift™ columns
PhotoSpray® (AB SCIEX)
PicoView™ (New Objective, Inc.)
Pittcon® (The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy)
Plexiglass® (ATOFINA)
PolyVial™
Poros® (Applied Biosystems)
PowerPoint® (Microsoft)
PrepStar™ (Varian, Inc.)
Prevail™ (Alltech Associates, Inc.)
Probot™ Microfraction Collector
ProPac® columns
ProStar (Varian, Inc.)
ProteinChips® (Ciphergen)
ProSwift® columns
Purification Suite™ [use Chromeleon® Purification Suite™]
Purospher® STAR (Merck KGaA, Darmstadt, Germany)
PWA™ Purification Workflow Automation

Q

Q TRAP® (AB SCIEX)
QSTAR® (AB SCIEX)
QuanTIS™ (AB SCIEX)
QJet™ (AB SCIEX)

R

RDA™ (AB SCIEX)
Reacti-Block™ (Pierce Chemical Company)
Reacti-Therm™ (Pierce Chemical Company)

Reagent-Free™ systems, columns

RF 2000 Fluorescence Detector

RFIC™ [as adjective only, follow RFIC with a product (e.g., system, instruments, column, suppressor, eluent generator, etc.)]

RFIC-EG™ systems or Reagent-Free™ IC systems with eluent generation

RFIC-ER™ systems or Reagent-Free™ IC systems with eluent regeneration

RFIC-ESP™ systems or Reagent-Free™ IC systems with electrolytic sample preparation

S

Santoprene® (Advanced Elastomer Systems, L.P.)

SC-CSRS™

SELDI ProteinChips® (Ciphergen)

SelectaPore™ columns (The Separations Group)

SEQUEST® (University of Washington, Seattle, USA)

SFM™ Sample and Fraction Manager

Simply Intelligent™ chromatography software

Simriz® Freudenberg-NOK General Partnership

SmartFlow®

SmartPeaks™ integration assistant

SmartRun™ system

SolEx™ SPE cartridges

SP10 AutoNeutralization™ system

SpectraSYSTEM® (Thermo Fisher Scientific, Inc.)

SpeedVac® (Thermo Fisher Scientific, Inc.)

Spherisorb® (Waters Corporation)

SRN™ Self-Regenerating Neutralizer

SRS® Self-Regenerating Suppressor

strata™ (Phenomenex)

Summit HPLC System (NOT registered)

Summit x2 Dual-Gradient System (NOT registered)

SUPELCOSIL™, Supelguard™ (Supelco, Inc.)

Hyflo Super Cel® (Manville Corp.)

Superose® (GE Healthcare)

Supor® (Pall Corporation)

SupraPur® (EM Industries, Inc.)

Switchos™ Microcolumn Switching Module

SymBiot® (AB SCIEX)

Symmetry® columns (Waters Corporation)

T

Taper-cell® (Waters Corporation)

Teflon®, Tefzel® (E.I. du Pont de Nemours)

ThermoFlare™

TOF/TOF™ (AB SCIEX)

TotalChrom® (Perkin Elmer Inc.)

Trace GC Ultra™ (Thermo Fisher Scientific, Inc.)

Trinity™ for Acclaim® Trinity™ columns

Triton® X-100 (Rohm & Haas)

TSQ Quantum Access™ (Thermo Fisher Scientific, Inc.)

TurboIonSpray®, TurboIonTrap® (AB SCIEX)

TurboMatrix™ (Perkin Elmer Inc.)

Turbo V™ (AB SCIEX)

TurboVap® (Caliper Life Sciences)

Tween® 20 (Atlas Chemical Co.)

U

UltiChrom™ software

UltiFlow™

UltiMate® 3000 Intelligent LC series

ultra™ (with Corona)

Ultrex® (J. T. Baker)

UPLC® (Waters Corporation)

UZ-View™ Capillary Flow Cell

V

VALVEMATE® (Gilson, Inc.)

Vespel® (E.I. du Pont de Nemours & Co.)

VHP™ (The Separations Group, Inc.)

Viper™ fingertight fitting system

Virtual Column™ Separation Simulator

Vitascan™ analytical method

Vortex-Genie® (Scientific Industries, Inc)

Voyager™, Voyager-DE™ (AB SCIEX)

Vydac® columns (The Separations Group, Inc.)

W

Windows® 98, Windows® 2000, Windows® XP, Windows® Vista (Microsoft Corporation)

Windows NT® (Microsoft Corporation)

Wonderware InTouch® (Wonderware Corp.)

X,Y,Z

Xcalibur® (Thermo Fisher Scientific, Inc.)

XTerra® (Waters Corporation)

ZIC®-HILIC and ZIC®-pHILIC columns (Merck Sequant AB)

Zitex® (Norton Chemplast)

Zorbax® (E.I. du Pont de Nemours & Co.)

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LPN 2002-03 PDF 01/11 Printed in U.S.A.

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