



LC AND LC/MS

Your Essential Resource for Columns & Supplies



The Measure of Confidence



Agilent Technologies

LC AND LC/MS

Maximize system performance and produce quality results time after time

Agilent HPLC columns and supplies are designed, tested, and manufactured with the same attention to detail you expect from Agilent instruments. That means your LC or LC/MS system will deliver superior qualitative and quantitative results, consistent reproducibility and reliability, and ultra high-sensitivity detection.

LC and LC/MS supplies

- LC capillaries ensure tight, leak-free connections to protect the integrity of your LC flow path from raw sample to analytical results
- LC pumps include isocratic, binary, quaternary, capillary and preparative; All key components can be accessed by simply removing the front cover
- From small- and large-volume injection, to multi-phase sampling, Agilent autosamplers help you process samples more quickly and generate better data
- Fraction collectors allow you to collect only the peaks you want, and are ideal for applications such as prep HPLC and protein/peptide purification



The ZORBAX LC column family

From research... to leading-edge method development... to routine quality assurance... Agilent ZORBAX and Poroshell HPLC columns are optimized for high throughput analysis, and feature the sensitivity, accuracy, and reliability that demanding applications require. Other advantages include:

- A wide selection of chemistries, including Eclipse Plus, Eclipse XDB, StableBond, Extend, Bonus-RP, HILIC and more
- Superior flexibility and scalability with a wide range of particle sizes (1.8, 3.5, 5, and 7 μm) and column dimensions
- Individual column performance reports that document column-to-column and lot-to-lot reproducibility
- Superior particle strength, even with demanding high-pressure applications



Table of Contents

| | | | |
|--|------------|---|------------|
| Agilent Solutions, Services and Support | 2 | Columns for Small Molecule Separations | 204 |
| Featured Products | 6 | HPLC Column Selection | 206 |
| Agilent Parts and Supplies | | Fast Columns for Reversed-Phase HPLC/UHPLC | 227 |
| General LC Supplies | 11 | Columns for Reversed-Phase Analytical HPLC | 247 |
| LC Capillaries | 16 | Columns for Preparative HPLC | 311 |
| Fittings and Unions | 22 | Columns for Other HPLC Techniques | 323 |
| Pump Supplies | 47 | Agilent Specialty Particles | 347 |
| Autosampler Supplies | 61 | Appendices | 343 |
| Fraction Collector Supplies | 68 | Columns for Biomolecules | 350 |
| Valve Supplies | 72 | Biocolumn Selection Guidelines | 354 |
| Thermostatted Column Compartment Supplies | 82 | Biomolecule Separations | 353 |
| Detector Supplies | 89 | UHPLC/HPLC Techniques | 364 |
| Bio-inert Quaternary LC Supplies | 101 | Method Development | 444 |
| LC/MS Supplies | 103 | Capillary and Nano Columns | 452 |
| Agilent CrossLab LC Parts and Supplies | 112 | MicroBore Columns | 461 |
| Product Introductions | 112 | Purification – Prep HPLC | 464 |
| Supplies for Waters HPLC Systems | 137 | Appendices | 477 |
| Supplies for Shimadzu HPLC Systems | 150 | Columns and Standards for GPC/SEC | 488 |
| Supplies for Dionex HPLC Systems | 157 | GPC/SEC Columns | 490 |
| Supplies for CTC Analytics HPLC Autosamplers | 169 | Polymer Standards | 530 |
| CE and CE/MS | 170 | Applications | 552 |
| Solution Kits | 170 | BioPharmaceutical | 552 |
| Capillaries | 178 | Chemical/Industrial | 580 |
| Instrument Parts and Supplies | 191 | Environmental | 583 |
| Troubleshooting | 201 | Food and Consumer Products | 594 |
| | | Pharmaceutical | 611 |
| | | Indices | 644 |
| | | Ordering Information | 667 |

PUT MORE THAN 40 YEARS OF RELENTLESS INNOVATION BEHIND YOUR EVERY RESULT

By continually raising the standards for technologies that support your routine analyses, Agilent's R&D efforts have led to breakthroughs such as:

- **New GC columns** that help you achieve higher levels of inertness and column-to-column reproducibility
- **LC column choices** that deliver the sensitivity and reliability you need for demanding applications
- **Cutting-edge sample preparation products** that promote reliable extraction and concentration
- **Fresh atomic and molecular spectroscopy ideas** for identifying and confirming targets and unknowns

Longtime Agilent customers have experienced our commitment firsthand. And now, we look forward to demonstrating how Agilent's approach to relentless innovation can work to your advantage, too.

CHEMICAL ANALYSIS SOLUTIONS



Food

From high-volume screening of vegetables for large numbers of pesticides to rapid identification of pathogens, Agilent understands the analytical needs of food producers, shippers, and regulators. When a new toxin appears, we deploy substantial resources to quickly help customers develop robust and reliable methods. Agilent's leading separations, mass spectrometry, and spectroscopy solutions are emerging as valuable food testing techniques.



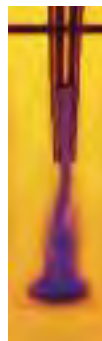
Environmental

Agilent offers more than 40 years of environmental testing and regulatory expertise. We help government and private labs with the full range of assays, from routine testing of soils for heavy metals to detection of pharmaceuticals in groundwater, in concentrations down to parts per trillion.



Energy and Fuels

Agilent collaborates closely with process industry customers to offer analytical systems that meet their needs for separation, detection, throughput, and support. We'll even preconfigure custom or standard analyzers so they arrive at the lab ready-to-go. Agilent's expertise in both chemical analysis and life science is a powerful combination for researching and producing biofuels, including a wide range of analytical techniques for fatty acid methyl esters (FAMES). Our newly-expanded portfolio also offers powerful tools for developing and producing photovoltaic films and solar panels.



Forensics

Because the careers of world class athletes and many other individuals hinge on drug testing, it's critical that those doing the testing have the highest level of confidence in the results. Forensics analysts worldwide have grown to depend on Agilent tools for accuracy, reliability, and speed in this high stakes, high-throughput field. Our best selling GC, GC/MS and popular LC and LC/MS are workhorses in forensics labs.



Traditional Lab Informatics

The ways labs generate and store data profoundly affect their efficiency. Agilent offers a rich, integrated suite of software products built on a set of customer-driven architectural values with the Agilent OpenLAB Laboratory Software Suite. OpenLAB delivers superior performance, open systems integration and investment protection. Our commitment is to deliver more value across each step in the life cycle of scientific data – from data collection and analysis to interpretation and management.



Materials Science

Agilent offers a newly expanded portfolio of instruments used for the research, manufacturing and testing of advanced materials, from precision optics to pulp, paper and polymers. Tools for chromatography, atomic absorption spectroscopy, molecular spectroscopy, X-ray crystallography, and nuclear magnetic resonance all support continuous progress in materials science.



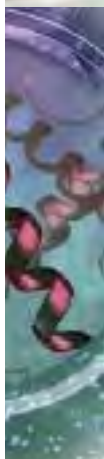
Biopharmaceutical

As “multi-omics” studies gain momentum in the search for new therapeutics, Agilent is uniquely positioned to provide the instruments, reagents, and powerful software needed for performing experiments in multiple disciplines and combining the massive amounts of data into biological insight.



Pharmaceutical

Drug manufacturing requires the accuracy, sensitivity and high throughput of other analytical applications, along with the demands of regulatory record-keeping and validation requirements. Agilent provides a potent combination of rugged, high-throughput tools and unmatched compliance services. Agilent now offers the market-leading family of dissolution apparatus and sampling systems that pair perfectly with our HPLC and UV systems.



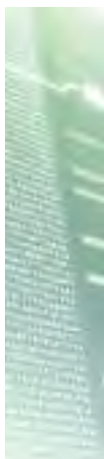
Proteomics

Research into how large sets of proteins affect the health of an organism requires special sets of analytical tools. Agilent has built a formidable arsenal of liquid chromatograph/mass spectrometers, bioinformatics systems, multiple affinity protein removal columns, and OFFGEL electrophoresis for protein identification and protein biomarker discovery. Accurate-Mass mass spectrometry and the microfluidic HPLC-Chip/MS are two Agilent innovations speeding the work of proteomics researchers around the globe.



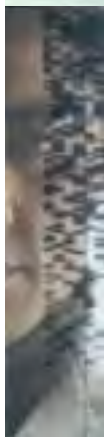
Metabolomics

Collections of small molecules are increasingly being seen as rich sources of biomarkers, but studying metabolites presents many challenges. The need for speed, accuracy, and powerful interpretation capabilities in looking at chemical profile snapshots is underscored because molecules are constantly entering, leaving or changing within the metabolome. Agilent’s GC, LC, NMR and MS portfolios, along with our excellent bioinformatics offerings, user-customizable METLIN metabolite database for LC/MS, and the industry’s first commercial GC/MS retention time locked metabolite library align well with needs of metabolomics researchers.



Genomics

Agilent is a global leader in microarrays, scanners, and reagents used in a wide variety of genomic-based disease research experiments. Our SureSelect Target Enrichment System dominates the category, streamlining next generation sequencing studies worldwide. Agilent offers a wide range of catalog microarrays and a highly-developed capability to produce custom arrays featuring ink jet-based SurePrint fabrication and the eArray on-line design tool. All Agilent microarrays feature highly sensitive, selective 60-mer probes. With as many as eight arrays printed on a standard 1 x 3 in slide, the cost per experiment becomes very affordable.



Life Science Informatics

Mirroring its extensive instrument portfolio, Agilent offers the industry’s most extensive suite of bioinformatics software, helping users derive knowledge from complex genomic, proteomic, metabolomic and other biological data. This includes DNA Analytics for analyzing CGH, ChIP and methylation microarray data. The GeneSpring suite includes informatics software for microarray-based gene expression data, genotyping data, and GeneSpring MS, which are useful for analyzing mass spec data from proteomics and metabolomics experiments and comparing complex datasets to explore biological questions from multiple perspectives.



Lab Automation

To meet the skyrocketing demand for more throughput and automation, Agilent has substantially expanded its lab automation offerings. The Agilent line of liquid handlers and microplate processors are designed to streamline high-volume life science workflows. Agilent is also continually upgrading its advanced autosamplers for LC, GC, LC/MS and GC/MS, adding functionality and speed to reflect the performance of its advanced instruments.



Vacuum Technology

Agilent works with customers to solve vacuum challenges from experiments in high-energy physics to developing systems for producing flat panel displays. Agilent manufactures vacuum systems used in its own mass spectrometry instruments as well as those of other manufacturers. Agilent's vacuum technology has been proven by the most powerful physics experiment ever built, CERN’s Large Hadron Collider machine, which was used in the discovery of the Higgs boson particle.



Get the Agilent Service Guarantee

Should your instrument require service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free.

No other company offers this level of commitment to keep your lab up and running at peak efficiency.



Laboratory decision makers and users ranked Agilent as their first choice for general laboratory compliance services.

Agilent Service and Support for Instrument Systems

Focus on what you do best

For over 40 years, Agilent has been building and maintaining the instruments you count on to stay competitive and successful. Trust us to protect your investment with a broad portfolio of services, backed by a global network of experienced service professionals dedicated to the productivity of your lab.

Agilent Advantage Service Plans

The best service available for your Agilent instruments

Agilent offers a flexible range of service plans so that you can choose the level of coverage that is best for your lab.

- **Agilent Advantage Gold** – Priority-one coverage for ultimate uptime and productivity
- **Agilent Advantage Silver** – Comprehensive coverage for dependable laboratory operations
- **Agilent Advantage Bronze** – Total repair coverage at a fixed annual price
- **Agilent Repair Service** – Basic coverage for reliable instrument repair

Agilent Advantage service plans include Agilent Remote Advisor for real-time remote monitoring and diagnostics. Through secure internet connections, you can interact with Agilent service professionals, receive detailed asset reports, and configure text or email alerts to notify you before problems occur – helping you to maximize instrument uptime and optimize laboratory workflows.

Agilent Compliance Services

Equipment qualification that meets the most stringent requirements

Enterprise Edition Compliance was developed to streamline compliance across your entire lab. Used globally in regulated labs, including standards organizations and regulatory agencies, Enterprise Edition enables you to:

- Improve qualification efficiency by automating protocols across platforms to ensure greater efficiency and minimize regulatory risk
- Standardize your entire compliance operation with robust test designs that work with all your instruments
- Add, remove or reconfigure tests based upon your unique user requirements
- Significantly reduce staff review time with consistently formatted, computer generated, tamper-proof reports

Agilent Education and Consulting Services

Our best minds, working for you

Make the most of your instrument with training and consulting from the same experts who designed the instruments, software and processes you use every day.

- Classroom and on-site training in instrument operation, troubleshooting and maintenance
- Customized consulting services to meet your lab's unique needs

The Agilent Value Promise – 10 Years of Guaranteed Value

In addition to continually evolving products, we offer something else unique to the industry – our 10-year value guarantee. The Agilent Value Promise guarantees you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of the system toward an upgraded model. Not only does Agilent ensure a reliable purchase now, but we also ensure that your investment is just as valuable in the future.

For more detailed information, please go to www.agilent.com/chem/services or contact your local Agilent Services and Support representative.

Technical Support at work for you

Have a hardware, software, application, instrument repair or troubleshooting question? Agilent's technical experts are available to answer your questions. With years of laboratory experience, our technical support specialists can provide in-depth knowledge and experience.

For questions pertaining to supplies found in this catalog, contact your local Agilent office or Authorized Agilent Distributor or visit www.agilent.com/chem/techsupport



Need more information?

Visit www.agilent.com/chem/contactus to:

- Locate your nearest Agilent office or distributor for expert technical support.
- Get fast sales and product assistance by phone. Simply use the scroll-down menu to select your country.
- Receive email assistance using our convenient online forms.

A Portfolio of Analytical LC Solutions to Match Any Application or Budget

Agilent offers a comprehensive portfolio of solutions for analytical LC that give you uncompromised chromatographic performance while remaining within the confines of your budget. Whatever your application requires – now or in the future – common technology across the portfolio helps you increase laboratory productivity and decrease operational costs. And because it's from Agilent, you get everything you expect from a chromatography leader with over 40 years of innovative contributions to LC and LC/MS technology.

Agilent 1290 Infinity LC – Infinitely more powerful

With binary and quaternary pump options, The Agilent 1290 Infinity LC is not only the most powerful but also the most adaptive UHPLC system available. No matter what your laboratory requires, the 1290 Infinity LC can handle the widest range of applications. And, with Agilent's Intelligent System Emulation Technology (ISET) built in, you can execute any legacy HPLC or latest UHPLC method for faster method development or instrument-to-instrument method transfer.



Agilent 1260 Infinity LC – Infinitely more confident

The Agilent 1260 Infinity LC raises the standard in HPLC – without raising the price. It offers new levels of productivity, data quality and robustness to give you highest confidence in your investment. With 600 bar standard pump pressure, 80 Hz standard detector speed and up to 10 times higher UV detection sensitivity, the 1260 Infinity LC prepares you for today's and tomorrow's challenges.

Agilent 1220 Infinity LC – Infinitely more affordable

The Agilent 1220 Infinity LC is a high quality, integrated system for routine HPLC and advanced UHPLC analysis, for maximum return on investment. Take advantage of the 600 bar power range up to 5 mL/min and 80 Hz detector speed and prepare your lab to take advantage of latest advances in LC column technology.



Low-flow LC Solutions with Unmatched Performance and Stability

Low-flow LC separation with high sensitivity detection and low sample consumption is a well-established and proven technology. The low-flow technique is used frequently for applications where limited amounts of sample are available, for analysis of trace level components in complex mixtures, or when an optimized LC/MS combination is required. The Agilent 1260 Infinity Low-flow LC systems offer unsurpassed low-flow performance and stability.

Agilent 1260 Infinity Capillary LC System

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



Agilent 1260 Infinity Nanoflow LC System for MS

Nanoflow LC is widely used for high resolution separations and high sensitivity MS detection. The Agilent 1260 Infinity Nanoflow LC System incorporates Agilent's unique Electronic Flow Control (EFC) with active feedback and real time flow adjustment for constant flow delivery to the column independent of system backpressure. After its first introduction with Agilent capillary and nanoflow pumps, EFC with real time flow control is the gold standard for reliable and robust nanoflow performance.

Agilent 1260 Infinity HPLC-Chip/MS System

The Agilent 1260 Infinity HPLC-Chip/MS System is a microfluidic chip-based technology for nanospray LC/MS. Combined with the high performance Agilent 6000 MS systems, the HPLC-Chip II for LC/MS offers even more overall robustness, reliability and ease-of-use. Applications include proteomics and small molecule analysis. A custom chip program delivers customized success.



Agilent 6000 Series LC/MS Solutions

A comprehensive portfolio of LC/MS instrumentation with exceptional MS performance, spectral quality, and productive data analysis tools to address a full range of qualitative and quantitative applications and match your budget.



Agilent 6100 Series Single Quadrupole LC/MS Systems

Unprecedented performance and reliability, day-after-day

The Agilent 6100 Series Single Quadrupole systems deliver superior MS data quality in an easy-to-use, space-saving package. With configurations to fit all budgets, the industry's most popular single-quad LC/MS complements your existing LC detectors and integrates seamlessly with Agilent's ChemStation LC control. The 6100 Series Single Quadrupole LC/MS provides complementary information to ultraviolet diode array detection (UV-DAD).

Agilent 6120 – Budget friendly and very easy to use – with Agilent's 1220 Infinity LC, a perfect workhorse addition for labs just getting into LC/MS.

Agilent 6130 – Flexible, high performance solution ideal for any quantitation application with 3,000 amu mass range and 1 pg sensitivity – now compatible with Agilent Jet Stream Technology.

Agilent 6150 – Unsurpassed data quality for UHPLC and high-throughput screening and qualitative applications, with faster scan speed (10K amu/s) and the power of Agilent Jet Stream Technology.

Agilent 6200 Series Accurate-Mass TOF LC/MS Systems

Unmatched confidence of Ultra High Definition
Time-of-Flight (TOF) technology

The Agilent 6200 Series TOF systems deliver unmatched speed, mass accuracy and resolution performance in a compact benchtop design. Superior data quality offers certainty for screening, identification and quantitative studies.

Agilent 6224 – Affordable and easy-to-use instrument with <2 mg/L mass accuracy and 20,000 resolution for routine analysis of a wide variety of molecules such as pesticides, pharmaceuticals, peptides and intact proteins.

Agilent 6230 with Agilent Jet Stream Technology – Offers 5-10x more sensitivity for confident screening of compounds at low concentration.



Agilent 6400 Series Triple Quadrupole LC/MS Systems

Clearly better sensitivity gives better results

The Agilent 6400 Series Triple Quadrupole systems offer unmatched sensitivity and reliability for trace analysis in food safety, environmental samples, biomarker validation, and ADME/DMPK studies for drug candidates. Powered by Agilent MassHunter software, with Optimizer to automatically fine tune parameters for ion transitions, the 6400 Series Triple Quadrupole systems offer simplified method development to achieve outstanding results.

Agilent 6420 – Economical, easy to use, with Agilent 1260 Infinity LC, a perfect workhorse instrument for labs with basic needs for quantitative capabilities.

Agilent 6430 – Offers added sensitivity to achieve outstanding performance for most assays.

Agilent 6460 with Agilent Jet Stream Technology – Provides dramatically improved sensitivity for your most demanding quantitative applications.

Agilent 6490 – Incorporates the revolutionary iFunnel technology to give ultimate sensitivity for the most challenging quantitative analyses in pharmaceutical, clinical, food safety, and environmental applications.



Agilent 6500 Series Accurate-Mass Q-TOF LC/MS Systems

Ultra high definition MS/MS, uncompromised performance

The Agilent 6500 Series Q-TOF systems deliver an unmatched combination of mass accuracy, mass resolution, sensitivity, dynamic range and speed. With best-in-class MS and MS/MS mass accuracy, they provide the capabilities you need to profile, identify, characterize, and even quantify samples as diverse as drug impurities, endogenous metabolites, and protein biomarkers.

Agilent 6520 – Easy-to-use instrument for routine analysis of a wide range of compounds day in and day out.

Agilent 6530 with Agilent Jet Stream Technology – Provides 5-10x more sensitivity for screening of low level compounds.

Agilent 6538 – Provides enhanced resolution in a bench top instrument for confident characterization of complex samples.

Agilent 6540 with Agilent Jet Stream Technology – Combines the highest levels of sensitivity with enhanced resolution to address the most challenging applications.





Agilent ZORBAX 300 StableBond Columns

ZORBAX 300 StableBond columns are an ideal choice for the reproducible separations of proteins and peptides. 300 StableBond columns are unmatched in their durability at low pH, such as with the TFA containing mobile phases typically used for protein and peptide separations. For LC/MS separations at low pH, 300 StableBond columns can also be used with formic acid and acetic acid mobile phase modifiers.

Turn to page 367.



Agilent Poroshell Columns

As new biopharmaceutical research and manufacturing practices focus more and more on peptides and proteins, and as time to market becomes increasingly critical, the rapid HPLC separation of biomolecules becomes increasingly valuable. The speed and resolution benefit shown here by Agilent Poroshell columns improve chances that the desired separation will be achieved while facilitating separation analysis times.

For Poroshell 120, turn to page 228.

For Poroshell 300, turn to page 380-381.

Agilent LC Capillaries

Agilent LC capillary starter kits contain the most often used capillaries and fittings. Our genuine flexible stainless steel capillaries make the best connection in your LC system, no matter the brand. The kits are for use with 3-4 or 1-2 mm id columns, as well as for Micro LC columns. The free Cybertool, which contains over 30 tools, is useful in every laboratory.

Turn to page 16.



Agilent ZORBAX RRHD HILIC Plus

HILIC can have distinct advantages over traditional RPLC in terms of LC/MS sensitivity, due to the use of highly organic mobile phases. These mobile phases have higher volatility than traditional RPLC mobile phases, making HILIC well suited for applications with mass spectrometers. Agilent ZORBAX RRHD HILIC Plus is the column to choose.

Turn to page 324.



General LC Supplies

Agilent offers a wide range of supplies for operation and maintenance of LC systems. These products have been carefully designed or selected by Agilent to work with your Agilent instruments for maximum performance and uptime.

LC Tools

Your Agilent LC system arrives with a full complement of tools needed to perform general maintenance and operation procedures. Should you need additional or replacement tools, Agilent offers a selection of high-precision, high-quality, stainless steel tools, to avoid any deformation of the screws or nuts.

LC Tools

| Description | Part No. |
|--|-------------|
| Tool kit hex keys, Rheotool Includes 3 hex keys, 4 mm, 1.5 mm, and 9/64 in, with straight or T-handle plus Rheotool | 5064-8211 |
| Torque wrench adapter Used with nanoliter flow cell for Diode Array Detector to mount capillaries of cell (P/N G1315-68714) | G1315-45003 |
| Insert tool (seal wash option) | 01018-23702 |
| Mounting tool for flangeless nut | 0100-1710 |
| Mounting clamp | 5021-1866 |
| Velocity regulator | 5062-2486 |
| USB memory stick | G4208-68700 |
| Compact flash card | 01100-68700 |
| HPLC system tool kit | G4203-68708 |
| Compact tool kit | G4296-68715 |
| Torque wrench, 2-25 Nm | G4220-20012 |
| Bit kit for torque wrench | 5023-0282 |
| PEEK Luer lok needle assembly | 5190-0924 |
| Plastic tubing cutter | 8710-1930 |
| Blades for plastic cutter, 5/pk | 8710-1931 |
| Tubing clip | 5042-9967 |
| Tubing clip | 5042-9954 |
| Open end wrench, 14 mm | 8710-1924 |



Hex keys, Rheotool 5064-8211



Mounting tool, 0100-1710



HPLC system tool kit, G4203-68708



Compact tool kit, G4296-68715



Torque wrench, 2-25 Nm, G4220-20012



Plastic tubing cutter, 8710-1930



Tubing clip, 5042-9967

HPLC In-Line Filters

Column inlet frit contamination can increase column backpressure and reduce efficiency. Microbore column blockages are a particular problem, due to the small diameter of the inlet frit. To prevent blockages, always use the appropriate filters in your LC system. Agilent offers two types of high pressure in-line filter kits for use with any HPLC system.

HPLC In-Line Filters

| Description | Frit Porosity (µm) | Frit Inlet ID (mm) | Comments | Part No. | Replacement Frits |
|---|--|--------------------|---------------|-------------|--|
| RRLC in-line filter 4.6 mm, 0.2 µm pore size filter, connecting capillary, max 600 bar | 0.2 | 4.6 | max 600 bar | 5067-1553 | 5067-1562, 10/pk |
| RRLC in-line filter 2.1 mm, 0.2 µm pore size filter, connecting capillary, max 600 bar | 0.2 | 2.1 | max 600 bar | 5067-1551 | 5067-1555, 10/pk |
| Low dispersion in-line filter Includes two frits, 2.1 mm, 2 µm pore size filter holder with inserts, 60 x 0.12 mm connecting capillary | 2 0.5 | 2.1 | < 1 mL/min | 01090-68702 | 280959-904, 10/pk 280959-907, 10/pk |
| Universal in-line filter Includes two frits, 4.8 mm, 2 µm pore size filter holder with inserts, 130 x 0.25 mm connecting capillary | 2 | 4.8 | 1-5 mL/min | 01090-68703 | 01090-27609, 2/pk |
| Semi-prep filter | 0.5 | 12.7 | 1-5 mL/min | 5064-8273 | 5022-2185 |
| High pressure semi-prep filter | 10 | 19 | 5-10 mL/min | 5022-2165 | 5022-2166, 10/pk |
| Prep filter | 10 | | 10-100 mL/min | 5065-4500 | 5065-9901 Replacement Glass Cartridge |
| In-line filter for G1311A | Recommended when high salt concentrations are used | | | G1311-60006 | |
| 1290 Infinity LC in-line filter (0.3 µm) | 0.3 | 2.0 | 1200 bar | 5067-4638 | 5023-0271, 5/pk |



RRLC in-line filter, 5067-1551



Low dispersion in-line filter, 01090-68702



Semi-prep filter, 5064-8273



High pressure semi-prep filter, 5022-2165



1290 Infinity LC in-line filter, 5067-4638

Solvent Filters/Degassers

An added benefit of filtering solvents is that degassing occurs at the same time. This is particularly beneficial if you do not have an on-line degasser in your system. The benefits of solvent filtration:

- Degasses eluents as particulates are removed
- Prevents the formation of spurious peaks within the detector due to solvent outgassing at the low-pressure end of the chromatograph
- Increases solvent inlet lifetime
- Eliminates pump downtime caused by air locks and particulates in check valves
- Decreases piston wear, while increasing column life

Solvent Filters/Degassers

| Description | Part No. |
|---|-----------|
| HPLC solvent filter/degasser assembly | 3150-0577 |
| Replacement Parts for 3150-0577 | |
| Glass funnel, 250 mL | 5188-2743 |
| PTFE coated sieve | 5188-2744 |
| PTFE seal | 5188-2745 |
| Funnel base, glass | 5188-2746 |
| Filter Membranes | |
| Regenerated cellulose filter membranes Diameter 47 mm, pore size 0.45 μm , 100/pk | 3150-0576 |
| Nylon filter membranes Diameter 47 mm, pore size 0.45 μm , 100/pk | 9301-0895 |
| PTFE filter membranes Diameter 47 mm, pore size 0.45 μm , 10/pk | 3150-0509 |



Glass solvent filter degasser, 3150-0577

Agilent Rack for LC Systems

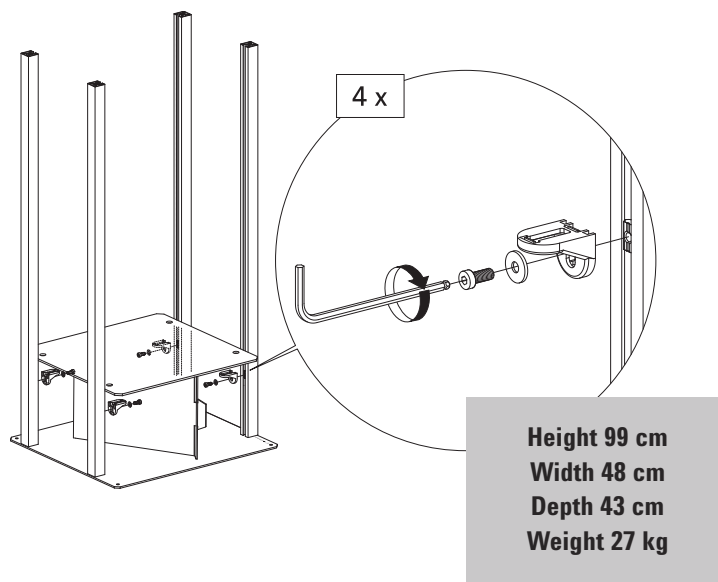
Reclaim critical bench space with the stable, robust rack for LC systems. The sturdy and open design offers complete protection for your sensitive LC system and easy maintenance for fast, safe access to instruments and cables. It is designed for all Agilent LC modules stacks and features:

- Easy assembly saves time and expense (see diagram)
- Adjustable shelves allow full customization for all Agilent LC modules
- Open design ensures proper airflow management and distribution of equipment and cabling



Agilent rack for LC systems, 5001-3726

| Description | Part No. |
|-----------------------------|-----------|
| Agilent rack for LC systems | 5001-3726 |



Height 99 cm
Width 48 cm
Depth 43 cm
Weight 27 kg

TIPS & TOOLS



The Agilent rack can be used to optimize your 1290 Infinity LC for ultra-low dispersion, which can enhance performance of high-efficiency columns. Further information can be found in application note 5990-9502EN at www.agilent.com/chem/library

LC Standards

LC Standards

| Description | Part No. |
|--|-------------|
| Caffeine standards kit for LC OQ/PV Includes one 10 mL ampoule: 125.0 µg/mL; four 5 mL ampoules: 5.0, 25.0, 250.0 and 500.0 µg/mL caffeine in water | 8500-6762 |
| Caffeine standards kit for capillary OQ/PV Includes 5 ampoules, 5 mL: 2.0, 4.0, 20.0, 100.0, 200.0 µg/mL caffeine in water | 5065-4420 |
| Caffeine OQ/PV sample for dissolution test, 150 mg/L caffeine in water, 500 mL | 5042-6476 |
| Caffeine standard, 250 µg/mL | G4218-85000 |
| Enterprise Edition caffeine standard kit | 5190-0488 |
| Fluorescence detector calibration sample, 1 g glycogen | 5063-6597 |
| RI detector OQ/PV test sample Includes 5 ampoules, 5 mL: 5, 10, 15, 25, and 50 mg/mL glycerin in water | 5064-8220 |
| Isocratic and gradient standards Contains 0.15% diethylphthalate, 0.01% biphenyl, and 0.03% terphenyl in MeOH (w/w). Gradient standard includes 0.32% dioctyl phthalate as well. Two 0.5 mL ampoules of each. | 01080-68702 |
| Isocratic standard, 0.5 mL ampoule | 01080-68704 |
| RRLC Check out sample, 1 mL ampoule | 5188-6529 |
| Chip cube high mass reference (HP-1221), 0.5 mL | G1982-85001 |
| Chip cube high mass solvent (FC-70), 25 mL Fluorinert | G1982-85002 |
| Chip cube low mass reference sample, 1 g Methyl stearate | G1982-85003 |
| ESI+APCI LC demo sample Contains 5 x 1 mL ampoules with 33 ng/µL crystal violet, 77 ng/µL carbazole, 300 ng/µL 9-phenanthrol, 1 ng/µL 1-hexanesulfonic acid sodium salt in water/methanol 60:40 | G1978-85000 |
| ES-TOF biopolymer reference standard kit Contains 7 x 2 mL ampoules with 5 mM purine, 1 M ammonium formate, 0.5 mM HP-0285, 0.1 mM HP-0321, 0.2 mM HP-1221, 0.2 mM HP-1821, 0.5 mM HP-2421 | G1969-85003 |
| HSA peptide standard mix kit 2 vials with 6 lyophilized peptides | G2455-85001 |



Caffeine OQ/PV sample for dissolution test, 5042-6476



Agilent's unique laser welding process ensures that the capillary ends are absolutely flat, eliminating any chance of capillary-induced dead volume.

LC Capillaries

Your LC system's components are only as reliable as the connections between them

Think of your LC system as a chain from analyte... to pump... to column... to detector... to waste. Every link must operate at maximum efficiency, or the whole chain risks failure – compromising your results.

Agilent LC capillaries: Your link to analytical success

At Agilent, we invest heavily in the quality of our capillary connections. All are engineered and manufactured to the same quality standards as our columns and instruments, so you can protect the integrity of your results at every step of your LC flow path.

Using our flexible stainless steel and polymer capillaries and fittings can provide:

- Tight, leak-free connections
- Zero dead volume connections
- An inert surface (when using polymer or PEEK/stainless steel bio-inert capillaries)
- High flexibility without sacrificing durability
- Easy cutting to the exact length you need (PEEK tubing)
- Predefined lengths for specific flow path locations (capillaries)

In addition, all Agilent capillaries are precision cut with square ends, are burr-free, have no inner-diameter distortion, and come in a variety of materials to suit your needs.



Engineering of Agilent Capillaries

The same professional engineers in our LC manufacturing facility in Germany who design our industry-leading LC instruments, also play a critical role in developing capillaries and fittings for your instrument. Their attention to detail helps you to get the best performance possible for your applications.

Our LC manufacturing tools – like high-end, special laser-cutting machines – result in completely tight, smooth and perfect-cut capillaries. Our broad selection of capillaries is made only from the highest-quality materials and will meet any of your application needs.

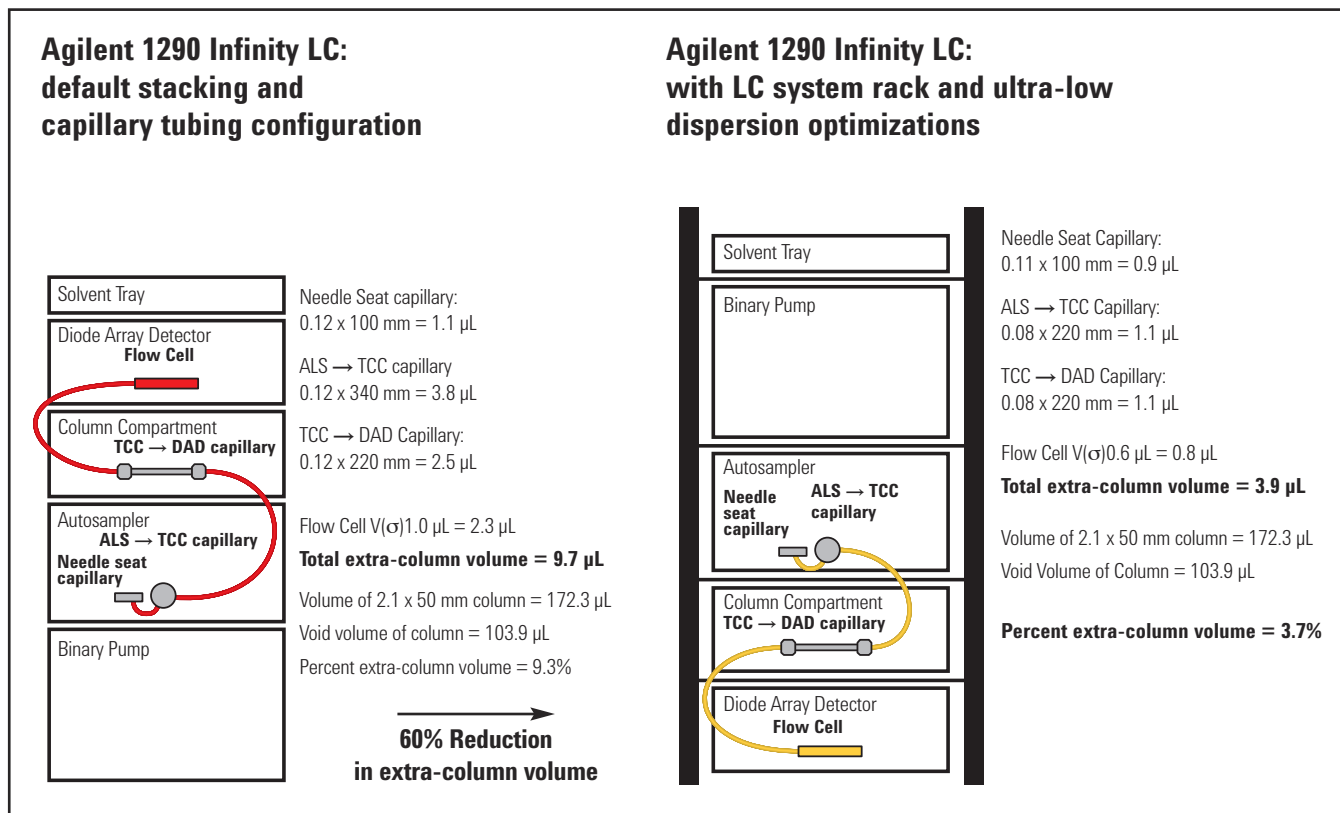
Avoid chromatographic issues – like peak broadening and system leaks – by choosing Agilent’s selection of premium capillaries. Agilent is committed to Fast LC and high-productivity performance, together with accurate quantitation.



Advantages for Bio Capillaries

- Laser-welded capillary tip for precise capillary cut
- Metal-free connection for all HPLC applications
- PEEK and stainless steel design allows you to exceed typical pressure limit reached with conventional polymer

Recommended HPLC Stack Configuration



Syntax for capillary description

The tables below will be your guide to identifying the proper specifications for your capillary. On all capillaries, dimensions are noted in id (mm), length (mm) and where applicable, volume (µL). When you receive your capillary, these abbreviations are printed on the packaging.

Using the guide: This fitting is coded as "SPF", for Swagelok, PEEK, Finger-tight.

Type

| Key | Description |
|----------------|--------------------------|
| Capillary | Connection capillaries |
| Loop | Loop capillaries |
| Seat | Autosampler needle seats |
| Tube | Tubing |
| Heat exchanger | Heat exchanger |

Material

| Key | Description |
|-------|-------------------------------|
| SS | Stainless steel |
| Ti | Titanium |
| PK | PEEK |
| FS/PK | PEEK-coated fused silica* |
| PK/SS | Stainless steel-coated PEEK** |
| PTFE | PTFE |
| FS | Fused silica |

*Fused silica in contact with solvent

**PEEK in contact with solvent

Fitting Left/Fitting Right

| Key | Description |
|-----|----------------------------|
| W | Swagelok + 0.8 mm Port id |
| S | Swagelok + 1.6 mm Port id |
| M | Metric M4 + 0.8 mm Port id |
| E | Metric M3 + 1.6 mm Port id |
| U | Swagelok union |
| L | Long |
| X | Extra long |
| H | Long head |
| G | Small head SW 4 mm |
| N | Small head SW 5 mm |
| F | Finger-tight |
| V | 1200 bar |
| B | Bio |
| P | PEEK |

The **type** gives some indication on the primary function, like a loop or a connection capillary.

The **material** indicates which raw material is used.

The **fitting** left/right indicate which fitting is used on both ends of the capillary.

At-a-glance color-coding keys

The color of your capillary will help you quickly identify the capillary id – see the chart to the right for reference.

Color-coding key for Agilent capillary tubing

| Internal Diameter in mm | Color code |
|-------------------------|------------|
| 0.015 | Orange |
| 0.025 | Yellow |
| 0.05 | Beige |
| 0.075 | Black |
| 0.1 | Purple |
| 0.12 | Red |
| 0.17 | Green |
| 0.20/0.25 | Blue |
| 0.3 | Grey |
| 0.50 | Bone White |

Tip: As you move to smaller-volume, high efficiency columns, you'll want to use narrow id tubing, as opposed to the wider id tubing used for conventional HPLC instruments.

Agilent capillary supplies are made from a variety of top-quality materials to suit your lab's every need

Stainless Steel: good resistance to pitting corrosion

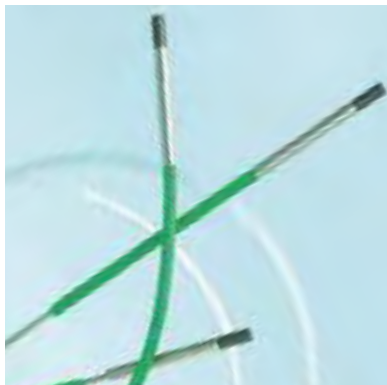
Stainless steel is ideal for most standard applications – except where bio-inertness is required, in which case we recommend PEEK-lined or Bio-inert titanium capillaries. Agilent's 0.6 mm od flexible grade 316L stainless steel capillaries (chrome/nickel/molybdenum bearing grade) are also much easier to handle than conventional, rigid 1.6 mm od capillaries.



Titanium: high inertness for biological applications

Analyzing metal-sensitive proteins and biotherapeutics presents challenging solvent conditions for LC instruments. In addition, bio-molecules tend to bind non-specifically to surfaces. For these reasons, bio-inert titanium is the best choice for these applications. Titanium is biocompatible, making Bio-inert Titan capillaries perfect for applications where bio-inertness is paramount.





Stainless Steel-coated PEEK: high-pressure bio-inertness and robustness

In bio-chromatography, capillaries and connectors should be inert to ensure the lowest interaction with protein samples. They must also be highly robust to withstand harsh cleaning procedures.

Unfortunately, metal-free PEEK capillaries can only withstand pressures of up to 200 bar in a thermostatically controlled cabinet with acetonitrile; even then, flexibility is compromised. To meet the growing need for bio-inertness, robustness, and higher operating pressures, Agilent has engineered a bio-inert PEEK liner clad with high-strength stainless steel to withstand pressures of at least 600 bar. This same technology is used in Agilent capillary fittings – giving you a strong, metal-free, capillary/ connector flow path for bio-inert applications.



PEEK-coated fused silica: rugged and pliable

Since their introduction in the early 1980s, fused silica capillaries have become the industry standard for many GC and LC applications – as well as capillary electrophoresis. Agilent fused-silica capillaries are made from high-purity silicon dioxide, and coated with PEEK for strength, durability, and pliability.



PEEK: durable and abrasion-resistant

Agilent PEEK capillaries are best for standard and bio-inert applications. PEEK (polyetheretherketone) is a thermoplastic polymer that resists mechanical and solvent damage, even at high temperatures. Because it is less vulnerable to corrosion than stainless steel, PEEK can be used in place of stainless steel when the capillary's external diameter is 1/16 in or less. It also resists abrasion, making it an excellent coating for fused silica capillaries. **Tip:** Use our color-coded PEEK fittings to track inlets and outlets of valves, columns, and detectors.

To learn more about Agilent LC capillary supplies, or to order now, visit www.agilent.com/chem/LCcapillaries

Agilent capillaries for routine applications

| Category | Applications | Internal diameter (mm) | Pressure limit (bar) | pH range | Comments |
|-----------------------------|---|------------------------|----------------------|----------|--|
| Stainless steel | <ul style="list-style-type: none"> All capillary applications, except where bio-inertness is required 1/32 in od designed for Agilent 1100 systems 1/16 in and 1/8 in od for most applications | 0.075 | 1200 | 1-14 | <ul style="list-style-type: none"> Flexible for easy routing Ready to use: cleaned and passivated to a high standard Pre-cut capillaries are optimized for the lowest internal volume Use pre-cut lengths to maintain zero-dead-volume performance |
| | | 0.12 | | | |
| | | 0.17 | | | |
| | | 0.25 | | | |
| | | 0.3 | | | |
| | | 0.5 | | | |
| 0.61 | | | | | |
| 0.93 | | | | | |
| Titanium | <ul style="list-style-type: none"> Where ultimate bio-inertness is essential | 0.17 0.61 | 600 | 1-14 | |
| Stainless-steel-coated PEEK | <ul style="list-style-type: none"> Universal for standard and bio-inert applications UHPLC bio-inert applications | 0.17 | 600 | 1-14 | <ul style="list-style-type: none"> Metal-free flow path Robust Flexible Resists corrosion better than stainless steel |
| PEEK-coated fused silica | <ul style="list-style-type: none"> Industry standard for most LC applications | 0.025 | 690 | 1-10 | <ul style="list-style-type: none"> Mechanically strong Consistent, rigid flow path Ideal replacement for stainless steel To avoid permanent tube damage, always use pre-cut lengths |
| | | 0.050 | | | |
| | | 0.075 | | | |
| | | 0.100 | | | |
| | | 0.125 | | | |
| PEEK | <ul style="list-style-type: none"> Most HPLC applications | 0.13 | 480* | 1-14 | <ul style="list-style-type: none"> Smooth internal surface minimizes turbulence for improved resolution Flexible, easily cut to length Use with PEEK or stainless steel fittings Excellent solvent compatibility |
| | | 0.18 | | | |
| | | 0.25 | | | |
| | | 0.50 | | | |
| | | | 200** | | |

*At ambient temperature with water

**With acetonitrile at non-ambient temperature



Fittings for a strong, capillary flow path

Agilent offers more than 20 fitting varieties for Swagelok-type or metric M4/M3-type connections. Depending on your application, different materials must be used:

- Stainless steel or PEEK delivers permanent high-pressure sealing performance for connections such as valves, heaters, and columns
- Stainless steel ensures permanent high-pressure sealing and optimal performance throughout your LC system up to 1200 bar
- Finger-tight fittings (polymeric for 400 bar and polyketone for 600 bar) are a convenient option; They allow easy end fitting adjustment, so you can seat the capillary into the column properly, preventing extra-column voids and leaks
- High-pressure fittings, which can be used with pressures up to 1200 bar, can be removed and replaced
- It's a good idea to use stainless steel nuts and ferrules for instrument connections, and PEEK nuts and ferrules for column and guard column connections, since these are changed most frequently

Agilent fittings for leak-free connections

| Fitting type | Advantages/Tips |
|--|---|
| Swagelok-type fittings | <ul style="list-style-type: none"> • Suitable for most connections • Available in a variety of combinations: <ul style="list-style-type: none"> • One piece or multiple pieces with nut + front and back ferrules • Stainless steel, PEEK, polyketone, or a stainless steel/PEEK combination |
| Metric M4/Metric M3 | <ul style="list-style-type: none"> • For micro valve connections |
| Stainless steel | <ul style="list-style-type: none"> • At least 1200 bar • Most popular material for permanent, high-pressure sealing • Use our slitted socket wrench (Part No. 8710-2391 or 5023-0240) for optimal tightness |
| 1200 bar removable fittings for 1290 Infinity LC | <ul style="list-style-type: none"> • 1200 bar • Available in standard, long, and extra-long sizes for compatibility with columns that have different sized nuts • Removable and replaceable • Use our slotted socket wrench (Part No. 8710-2391 or 5023-0240) for optimal tightness |
| PEEK | <ul style="list-style-type: none"> • Up to 400 bar (at ambient temperature with water) • Easy, finger-tight column connections • Ideal for frequently changed connections, such as column connections • Pressure is less critical |
| Polyketone | <ul style="list-style-type: none"> • <600 bar (600 bar pressure rating) • Easy, finger-tight column connections • Fits stainless steel tubing |

Agilent 1260/1200/1100 Infinity Series LC

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Part No. |
|--|-------------|-----------|---------|-------------|-------------------|-----------------|---|-------------|
| Pump | Autosampler | SS | 0.17 | 900 | S | S | Pre-swaged on A | G1329-87300 |
| Pump | Autosampler | SS | 0.17 | 700 | S | S | Pre-swaged on A and B | G1312-87304 |
| Pump | Autosampler | SS | 0.17 | 500 | S | S | Pre-swaged on A | G1312-67305 |
| Pump | Autosampler | SS | 0.17 | 400 | S | S | Pre-swaged on A and B | G1312-87303 |
| Pump | Autosampler | SS | 0.17 | 380 | S | S | Pre-swaged on A and B | 01090-87306 |
| Manual Injector | Column | SS | 0.17 | 180 | S | S | Pre-swaged on A | G1313-87305 |
| Manual Injector | TCC | SS | 0.17 | 500 | SH | S | | G1328-87600 |
| Heater | Column | SS | 0.17 | 90 | S | S | | G1316-87300 |
| Column | Detector | SS | 0.17 | 380 | S | S | Pre-swaged on A; thermal isolation | G1315-87311 |
| TCC\WVD | MS | SS | 0.12 | 500 | S | S | Pre-swaged on A | G1316-87309 |
| Column | WVD | PK | 0.17 | 600 | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-8522 |
| Pump Purge Valve | Waste | PK | 1.3 | 5000* | | | No fitting needed | 5062-2461 |
| Detector | Waste | PTFE | 0.8 | 5000* | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-2462 |
| WVD | Waste | PK | 0.25 | 500 | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-8535 |
| Autosampler | TCC | SS | 0.12 | 180 | S | S | Pre-swaged on A; can also be connected to low dispersion heat exchanger | G1313-87304 |
| Thermostatted Autosampler | TCC | SS | 0.12 | 280 | S | S | Pre-swaged on A; can also be connected to low dispersion heat exchanger | 01090-87610 |
| TCC | Column | SS | 0.12 | 105 | S | S | Pre-swaged on A | 01090-87611 |
| Column | DAD | SS | 0.12 | 150 | S | S | Pre-swaged on A | G1315-87312 |
| Female adapter for connecting long columns | | SS | 0.17 | 150 | S | | | G1315-87303 |
| Purge Valve** | Waste | SS and FS | 0.17 | 150 | S | U | | G1312-67500 |

*Capillary is intended to be cut to the right length for your need.

**Calibration capillary assembly

Material

| Key | Description |
|------|------------------------------------|
| SS | Stainless steel |
| PK | PEEK |
| PTFE | PTFE |
| FS | Fused silica |
| S | Swagelok 1.6 mm port id |
| SH | Swagelok 1.6 mm port id, long head |
| U | Swagelok union |

Agilent 1290 Infinity Series LC

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Part No. |
|-----------------|---------------------------|----------|---------|-------------|-------------------|-----------------|--|-----------|
| Pump | Autosampler | SS | 0.17 | 300 | S | S | Pre-swaged on A and B | 5067-4657 |
| Pump | Thermostatted Autosampler | SS | 0.17 | 450 | S | S | Pre-swaged on A and B | 5067-4658 |
| Autosampler | TCC | SS | 0.12 | 340 | S | S | Pre-swaged on A | 5067-4659 |
| Column | DAD | SS | 0.12 | 220 | S | S | Pre-swaged on A | 5067-4660 |
| 1290 System | CTC Autosampler | SS | 0.17 | 600 | S | SH | Pre-swaged on A | 5067-4670 |
| CTC Autosampler | Column | SS | 0.12 | 600 | S | S | | 5067-4669 |
| Detector | Waste | PTFE | 0.8 | 5000* | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-2462 |

*Capillary is intended to be cut to the right length for your need.



Stainless steel fittings (S), 5062-2418



Finger-tight PEEK fitting (SPF), 0100-1516



Stainless steel back ferrule, 5180-4114

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Agilent 1290 Valve Head

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Valve Information | Part No. |
|--------------------------------|--------------------------------|----------|---------|-------------|-------------------|-----------------|-----------------------|---|-----------|
| Autosampler | Valve with Swagelok port | SS | 0.12 | 340 | S | SX | Pre-swaged on A | | 5067-4684 |
| Autosampler | Valve with Swagelok port | SS | 0.12 | 340 | S | SX | Pre-swaged on B | G4231A/B 2 Position/6 Port valve head, 600/1200 bar | 5067-4647 |
| Autosampler | Valve with M4 port | SS | 0.12 | 340 | SLV | M | | G4232A 2 Position/10 Port micro valve head, 600 bar | 5067-4744 |
| Autosampler | Valve with M4 port | SS | 0.12 | 500 | SLV | M | | G4234A/B 6 column selector valve, 600/1200 bar | 5067-4745 |
| Valve with 10/32 Swagelok port | Heat exchanger | SS | 0.12 | 90 | SX | S | Pre-swaged on A and B | G4231A/B 2 Position/6 Port valve head, 600/1200 bar | 5067-4649 |
| Valve with M4 port | Heat exchanger | SS | 0.12 | 90 | M | SL | Pre-swaged on B | G4232A 2 Position/10 Port micro valve head, 600 bar | 5067-5106 |
| Short column | Valve with M4 port | SS | 0.12 | 130 | SV | M | | G4234A/B 6 column selector valve, 600/1200 bar | 5067-4735 |
| Short column | Valve with M4 port | SS | 0.12 | 150 | SV | M | | G4232A 2 Position/10 Port micro valve head, 600 bar | 5067-5104 |
| Long column | Valve with M4 port | SS | 0.12 | 280 | SV | M | | G4232A 2 Position/10 Port micro valve head, 600 bar | 5067-5107 |
| Short column | Valve with Swagelok port | SS | 0.12 | 150 | SL | SX | Pre-swaged on B | G4231A/B 2 Position/6 Port valve head, 600/1200 bar | 5067-4650 |
| Short column | Valve with 10/32 Swagelok port | SS | 0.12 | 150 | SL | SX | | G4232B 2 Position/10 Port valve head, 1200 bar | 5067-4686 |
| Long column | Valve with Swagelok port | SS | 0.12 | 280 | SL | SX | Pre-swaged on B | G4231A/B 2 Position/6 Port valve head, 600/1200 bar | 5067-4651 |
| Long column | Valve with Swagelok port | SS | 0.12 | 280 | SL | SX | | G4232B 2 Position/10 Port valve head, 1200 bar | 5067-4687 |

Material

(Continued)

| Key | Description |
|-----|---|
| SS | Stainless steel |
| S | Swagelok 1.6 mm port id |
| SH | Swagelok 1.6 mm port id, long head |
| SL | Swagelok 1.6 mm port id, long |
| SLV | Swagelok 1.6 mm port id, long, 1200 bar |
| SX | Swagelok 1.6 mm port id, extra-long |
| M | Metric M4 0.8 mm port id |

Agilent 1290 Valve Head

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Valve Information | Part No. |
|--|--------------------|----------|---------|-------------|-------------------|-----------------|-----------------------|---|-----------|
| Valve Swagelok port | Detector | SS | 0.12 | 200 | SX | S | Pre-swaged on A and B | G4231A/B 2 Position/6 Port valve head, 600/1200 bar | 5067-4653 |
| Valve with Swagelok port | Detector | SS | 0.12 | 200 | SX | S | Pre-swaged on A | G4232B 2 Position/10 Port valve head, 1200 bar | 5067-4689 |
| Valve with M4 port | Detector | SS | 0.12 | 250 | M | SLV | | G4232A 2 Position/10 Port micro valve head, 600 bar | 5067-4746 |
| Heat exchanger | Valve with M4 port | SS | 0.17 | 90 | SL | M | Pre-swaged on A | G4232A 2 positions/10 ports valve head, 1200 bar | 5067-5109 |
| Column | Valve with M4 port | SS | 0.17 | 90 | SV | M | | G4232A 2 positions/10 ports valve head, 1200 bar | 5067-5110 |
| Column | Valve with M4 port | SS | 0.17 | 150 | SV | M | | G4232A 2 positions/10 ports valve head, 1200 bar | 5067-5111 |
| Column | Valve with M4 port | SS | 0.17 | 280 | SV | M | | G4232A 2 positions/10 ports valve head, 1200 bar | 5067-5112 |
| G4232A 2 positions/10 ports valve head, 1200 bar | | SS | 0.17 | 250 | SL | M | Pre-swaged on A | G4232A 2 positions/10 ports valve head, 1200 bar | 5067-5113 |

Agilent 1200 and 1100 Prep LC Systems

| From | To | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Part No. |
|----------------|-------------|----------|---------|-------------|-------------------|-----------------|-----------------------|-------------|
| Prep Isocratic | Autosampler | ST | 0.6 | 400 | S | S | Pre-swaged on A and B | G1361-67302 |
| Autosampler | Column | ST | 0.5 | 600 | S | S/SX | | G2260-87300 |
| Autosampler | Column | ST | 0.5 | 400 | S | SH | | G2260-87301 |



Stainless steel fittings (S), 5062-2418



Stainless steel extra long fitting (SX), 5065-9967



1200 bar removable long fitting (SLV), 5067-4738



1200 bar removable fitting (SV), 5067-4733



PEEK fittings, plugs (MP), 5065-4410

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Miscellaneous Capillaries

| Material | ID (mm) | Length (mm) | Fitting Type From (A) | Fitting Type To (B) | OD (mm) A* | OD (mm) B* | Notes | Part No. |
|----------|---------|-------------|-----------------------|---------------------|------------|------------|---------------------------|-------------|
| SS | 0.12 | 70 | S | S | 1.6 | 1.6 | | G1316-87303 |
| SS | 0.12 | 2000 | U | U | | | Restriction Capillary | 5022-2159 |
| SS | 0.12 | 105 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1820 |
| SS | 0.12 | 400 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1823 |
| SS | 0.12 | 150 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1821 |
| SS | 0.12 | 280 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1822 |
| SS | 0.12 | 500 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9964 |
| SS | 0.12 | 200 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9935 |
| SS | 0.12 | 50 | S | U | 1.6 | | | G1316-87312 |
| SS | 0.12 | 340 | S | S | 1.6 | 1.6 | | G1316-87319 |
| SS | 0.12 | 170 | S | S | 1.6 | 1.6 | | G1316-87316 |
| SS | 0.12 | 300 | S | S | 1.6 | 1.6 | | G1316-87318 |
| SS | 0.12 | 210 | S | S | 1.6 | 1.6 | | G1316-87317 |
| SS | 0.12 | 70 | S | U | 1.6 | | | G1316-87313 |
| SS | 0.12 | 90 | S | U | 1.6 | | | G1316-87314 |
| SS | 0.12 | 60 | S | S | | | Pre-swaged on A and B | 79841-87610 |
| SS | 0.12 | 340 | S | M | | 0.8 | Pre-swaged on A | G1316-87305 |

*1.6 mm = 1/16 in

(Continued)

Material

| Key | Description |
|-----|---|
| SS | Stainless steel |
| S | Swagelok 1.6 mm port id |
| U | Swagelok union |
| SL | Swagelok 1.6 mm port id, long |
| SLV | Swagelok 1.6 mm port id, long, 1200 bar |
| SX | Swagelok 1.6 mm port id, extra-long |
| M | Metric M4 0.8 mm port id |



Stainless steel fittings (S), 5062-2418

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Miscellaneous Capillaries

| Material | ID (mm) | Length (mm) | Fitting Type From (A) | Fitting Type To (B) | OD (mm) A* | OD (mm) B* | Notes | Part No. |
|----------|---------|-------------|-----------------------|---------------------|------------|------------|---------------------------|-------------|
| SS | 0.12 | 100 | M | M | 0.8 | 0.8 | | G1316-27301 |
| SS | 0.12 | 75 | S | M | 1.6 | 0.8 | | G1316-87306 |
| SS | 0.12 | 90 | S | SX | 1.6 | 1.6 | | 5067-4685 |
| SS | 0.12 | 120 | SX | SX | 1.6 | 1.6 | | 5067-4688 |
| SS | 0.17 | 105 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1816 |
| SS | 0.17 | 400 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1819 |
| SS | 0.17 | 150 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1817 |
| SS | 0.17 | 280 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1818 |
| SS | 0.17 | 280 | S | S | 1.6 | 1.6 | Pre-swaged on A | 01090-87304 |
| SS | 0.17 | 200 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9931 |
| SS | 0.17 | 600 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9933 |
| SS | 0.17 | 800 | S | S | 1.6 | 1.6 | Pre-swaged on A | 01048-87302 |
| SS | 0.17 | 900 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9963 |
| SS | 0.17 | 105 | S | S | 1.6 | 1.6 | | G1316-87321 |
| SS | 0.17 | 700 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9932 |
| SS | 0.17 | 170 | S | S | 1.6 | 1.6 | | G1316-87323 |
| SS | 0.17 | 250 | S | S | 1.6 | 1.6 | Pre-swaged on A and B | G1367-87304 |
| SS | 0.17 | 150 | S | S | 1.6 | 1.6 | Pre-swaged on A and B | G1312-87305 |
| SS | 0.17 | 800 | SL | S | 1.6 | 1.6 | Pre-swaged on A | 01078-87305 |
| SS | 0.17 | 105 | S | S | 1.6 | 1.6 | Pre-swaged on A and B | G1312-87306 |
| SS | 0.17 | 280 | SX | S | 1.6 | 1.6 | Pre-swaged on A and B | 5067-4608 |
| SS | 0.17 | 700 | S | SX | 1.6 | 1.6 | Pre-swaged on A and B | 5067-4648 |
| SS | 0.17 | 150 | M | M | 0.8 | 0.8 | | 5067-4737 |
| SS | 0.17 | 700 | SL | M | 1.6 | 0.8 | Pre-swaged on A | 5067-5120 |

*1.6 mm = 1/16 in

(Continued)



Stainless steel extra long fitting (SX), 5065-9967



Stainless steel ferrule (M), 5067-1557

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Miscellaneous Capillaries

| Material | ID (mm) | Length (mm) | Fitting Type From (A) | Fitting Type To (B) | OD (mm) A* | OD (mm) B* | Notes | Part No. |
|----------|---------|-------------|-----------------------|---------------------|------------|------------|---------------------------|-------------|
| SS | 0.17 | 280 | SX | SX | 1.6 | 1.6 | Pre-swaged on A and B | 5067-4607 |
| SS | 0.17 | 280 | SX | S | 1.6 | 1.6 | Pre-swaged on A and B | 5067-4608 |
| SS | 0.17 | 400 | | | 1.6 | 1.6 | Capillary without fitting | 5021-1819 |
| SS | 0.17 | 500 | SX | Nut (P/N 0100-2086) | 1.6 | 1.6 | Pre-swaged on A | 5067-4609 |
| SS | 0.17 | 600 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9933 |
| PK/SS | 0.17 | 100 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4777 |
| PK/SS | 0.17 | 150 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4778 |
| PK/SS | 0.17 | 200 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4779 |
| PK/SS | 0.17 | 300 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4780 |
| PK/SS | 0.17 | 400 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4781 |
| PK/SS | 0.17 | 500 | | | 1.6 | 1.6 | Capillary without fitting | 5067-4782 |
| SS | 0.25 | 320 | S | S | 1.6 | 1.6 | Pre-swaged on A and B | 79835-87638 |
| SS | 0.5 | 105 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9927 |
| SS | 0.5 | 150 | | | 1.6 | 1.6 | Capillary without fitting | 5022-6509 |
| SS | 0.5 | 200 | | | 1.6 | 1.6 | Capillary without fitting | 5022-6510 |
| SS | 0.5 | 800 | | | 1.6 | 1.6 | Capillary without fitting | 5065-9926 |

*1.6 mm = 1/16 in

Material

| Key | Description |
|-------|---|
| SS | Stainless steel |
| PK | PEEK |
| PK/SS | PEEK and Stainless steel |
| Ti | Titanium |
| S | Swagelok 1.6 mm port id |
| U | Swagelok union |
| SL | Swagelok 1.6 mm port id, long |
| SLB | Swagelok 1.6 mm port id, long bio |
| SV | Swagelok 1.6 mm port id, 1200 bar |
| SLV | Swagelok 1.6 mm port id, long, 1200 bar |
| SX | Swagelok 1.6 mm port id, extra-long |



Stainless steel fittings (S), 5062-2418



Stainless steel extra long fitting (SX), 5065-9967



Stainless steel ferrule (M), 5067-1557

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Supplies for the Agilent Infinity 1260 Bio-inert LC System

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Part No. |
|-----------------------------|-----------------------------|----------|---------|-------------|-------------------|-----------------|---|-------------|
| Pump | Thermostatted autosampler | Ti | 0.17 | 700 | SLB | SLV | Pre-swaged on A | G5611-60501 |
| Pump | Manual injection valve | Ti | 0.17 | 900 | SLB | SLV | Pre-swaged on A | G5611-60502 |
| Pump | Injector | Ti | 0.17 | 400 | SLB | SLV | Pre-swaged on A | G5611-60500 |
| Injector | Detector | PK/SS | 0.17 | 400 | SV | SV | | G5667-60500 |
| Manual injector | Detector | PK/SS | 0.17 | 500 | SV | SV | | G5667-60501 |
| Autosampler injection valve | Autosampler analytical head | Ti | 0.17 | 160 | SLB | SV | Pre-swagged on A | G5611-60503 |
| Damper | Pump head | Ti | 0.6 | 234 | SLB | SLB | For pump only. Pre-swaged on A and B | G5611-67301 |
| Outlet ball valve | Damper | Ti | 0.6 | 248 | SLB | SLB | For pump only. Pre-swaged on A and B | G5611-67300 |
| Autosampler injection valve | Column | PK/SS | 0.17 | 100 | SV | SV | Included in the Bio Capillary starter kit; used for 2 position/6 port and 4 column selector valve | G5667-60502 |
| Autosampler injection valve | Column | PK/SS | 0.17 | 150 | SV | SV | Included in the Bio Capillary starter kit | G5667-60503 |
| Autosampler injection valve | Column | PK/SS | 0.17 | 200 | SV | SV | Included in the Bio Capillary starter kit | G5667-60504 |
| Autosampler injection valve | Column | PK/SS | 0.17 | 300 | SV | SV | Included in the Bio Capillary starter kit; used for 2 position/6 port and 4 column selector valve | G5667-60505 |
| Autosampler injection valve | Column | PK/SS | 0.17 | | SV | SV | Bio-inert Low Dispersion Heat exchanger | G5616-60050 |



1200 bar removable fitting (SV),
5067-4733



1200 bar removable long fitting (SLV),
5067-4738



Titanium fitting (SLB),
G5611-60502



Bio-inert Low Dispersion
Heat Exchanger, G5616-60050

Images shown are capillary fittings. For complete information on fittings, turn to page 40.

PEEK Coated Fused Silica Capillaries for Nano LC

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Part No. |
|-----------------|------------------------------|----------|---------|-------------|-------------------|-----------------|-------------|
| Switching valve | Column | FS/PK | 25 | 100 | MP | WPF | G1375-87320 |
| EMPV | Flow sensor | FS/PK | 25 | 220 | WG | MP/WG | G1375-87321 |
| Flow sensor | Injection valve | FS/PK | 25 | 350 | MP/WG | MP | G1375-87322 |
| Switching valve | Column | FS/PK | 25 | 550 | MP | WPF | G1375-87323 |
| Switching valve | Column | FS/PK | 25 | 550 | MP | WPF | G1375-87323 |
| Switching valve | Column | FS/PK | 25 | 700 | MP | WPF | G1375-87324 |
| Switching valve | Column | FS/PK | 50 | 100 | MP | WPF | G1375-87325 |
| Injection valve | Injector seat or to 2nd pump | FS/PK | 75 | 650 | MP | WG/WPF | G1375-87327 |

PEEK Coated Fused Silica Capillaries – 20 µL/min Flow

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Part No. |
|-------------------|-----------------|----------|---------|-------------|-------------------|-----------------|-------------|
| EMPV | Flow sensor | FS/PK | 50 | 220 | WG | WG | G1375-87301 |
| Flow sensor | Injection valve | FS/PK | 50 | 550 | WG | MP | G1375-87310 |
| Injection valve | Metering device | FS/PK | 50 | 200 | MP | WG | G1375-87302 |
| Injection valve | Column | FS/PK | 50 | 500 | MP | WPF | G1375-87304 |
| Column | Detector | FS/PK | 50 | 400 | WPF | | G1315-68703 |
| Detector | Waste | FS/PK | 75 | 700 | | | G1315-68708 |
| µ-switching valve | Column | FS/PK | 50 | 280 | MP | WPF | G1375-87309 |



Stainless steel fittings, male (G), 5063-6593



Ferrule and stainless steel lock ring (W), 5065-4423



PEEK fittings, plugs (MP), 5065-4410



Double winged PEEK nut & ferrule (WPF), 5065-4422



Images shown are capillary fittings. For complete information on fittings, turn to page 40.

PEEK Coated Fused Silica Capillaries – 100 µL/min Flow

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Part No. |
|-------------------|-----------------|----------|---------|-------------|-------------------|-----------------|-------------|
| EMPV | Flow sensor | FS/PK | 100 | 220 | WG | WG | G1375-87305 |
| Flow sensor | Injection valve | FS/PK | 100 | 550 | WG | MP | G1375-87306 |
| Injection valve | Metering device | FS/PK | 100 | 200 | MP | WG | G1375-87312 |
| Injection valve | Column | FS/PK | 75 | 500 | MP | WPF | G1375-87311 |
| Column | Detector | FS/PK | 75 | 400 | WPF | | G1375-87308 |
| Detector | Waste | FS/PK | 75 | 700 | | | G1315-68708 |
| µ-switching valve | Column | FS/PK | 50 | 280 | MP | WPF | G1375-87309 |

Loop Capillaries

| Volume (µL) | Agilent Autosampler | Part No. |
|-------------|--|-------------|
| 8 | G1389A | G1375-87303 |
| | G1377A | G1375-87315 |
| 20 | G1367E, G4226A | G4226-60310 |
| 40 | G1367D | G1377-87310 |
| | G1367E, G4226A | 5067-4703 |
| | G1377A | G1377-87300 |
| | G1389A | G1329-87302 |
| 100 | G1313A, G1329A/B, 1120, 1220 Infinity LC | 01078-87302 |
| | G1367A/B/C | G1367-87300 |
| | G1367E, G4226A | 5067-4710 |
| | G5667A | G5667-60310 |
| 900 | G1329A/B, G2260A | G1313-87303 |
| 5000 | G2260A | G2260-68711 |

Material

| Key | Description |
|-------|---|
| FS/PK | Fused silica/PEEK |
| W | Swagelok 0.8 mm port id |
| WG | Swagelok 0.8 mm port id, small head SW 4 mm |
| MP | Metric M4 0.8 mm port id, PEEK |
| WPF | Swagelok 0.8 mm port id, PEEK, finger-tight |



Agilent 1220/1120 Infinity Series LC

| From (A) | To (B) | Material | ID (mm) | Length (mm) | Fitting Type From | Fitting Type To | Notes | Part No. |
|-----------------|-------------|----------|---------|-------------|-------------------|-----------------|--|-------------|
| Pump | Autosampler | SS | 0.17 | 380 | S | S | Pre-swaged on A and B | 01090-87306 |
| Manual injector | Column | SS | 0.17 | 180 | S | S | Pre-swaged on A | G1313-87305 |
| Heater | Column | SS | 0.17 | 90 | S | S | | G1316-87300 |
| Column | Detector | SS | 0.17 | 380 | S | S | Pre-swaged on A; thermal isolation | G1315-87311 |
| VWD | Waste | PK | 0.25 | 500 | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-8535 |
| Detector | Waste | PTFE | 0.8 | 500 | | | Finger-tight fittings not included (0100-1516, 2/pk) | 5062-2462 |

Material

| Key | Description |
|------|-------------------------|
| SS | Stainless steel |
| S | Swagelok 1.6 mm port id |
| PK | PEEK |
| PTFE | PTFE |



Stainless steel fittings (S), 5062-2418



Finger-tight PEEK fitting (SPF), 0100-1516



Images shown are capillary fittings. For complete information on fittings, turn to page 40.

Tubing

PEEK Tubing

- Flexible and easy to cut to desired lengths
- Color coded for easy tracking
- Accepts both stainless steel and PEEK fittings
- 1/16 in od

PEEK Tubing

| ID (mm) | Length (m) | Color Code | Part No. |
|---------|------------|------------|-----------|
| 0.50 | 1.5 | Orange | 0890-1761 |
| 0.25 | 1.5 | Blue | 0890-1762 |
| 0.25 | 5 | Blue | 5042-6463 |
| 0.18 | 1.5 | Yellow | 0890-1763 |
| 0.18 | 5 | Yellow | 5042-6462 |
| 0.13 | 1.5 | Red | 0890-1915 |
| 0.13 | 5 | Red | 5042-6461 |

Other Tubing

| Description | Length (m) | ID (mm) | OD (mm) | Part No. |
|---|------------|---------|---------|-------------|
| PTFE tubing, FEP, primary use for valve solutions | 5 | 0.7 | 1.6 | 5062-2462 |
| PTFE solvent tubing, primary use for flow path from solvent bottle to degasser, to pump | 5 | 1.5 | 3.1 | 5062-2483 |
| Corrugated tubing, polypropylene | 5 | 6.5 | | 5062-2463 |
| Silicone tubing | 5 | 1 | 3 | 5065-9978 |
| Clamps and micro clamps, 10/pk | | | | 5065-9976 |
| Barbed Y-Connector PP for 3/16 in id tube, 10/pk | | | | 5065-9971 |
| For G2258A 1100/1200 Series Dual Loop Autosampler | | | | |
| Front seat tube, SS | 0.1 | 0.5 | | G2258-87316 |
| Back seat tube, SS | 0.12 | 0.5 | | G2258-87315 |
| Front seat tube, PTFE | 0.1 | 0.2 | | G2258-87312 |
| Back seat tube, PTFE | 0.12 | 0.25 | | G2258-87313 |
| Waste tube | 0.15 | 0.8 | | G2258-87310 |
| Waste tube | 0.1 | 0.8 | | G2258-87311 |
| Drawing tube assembly for flush solvent | | | | G2258-87307 |
| Tubing assembly, solvent flush | | | | G2258-87314 |
| For G1313/27/29A 1100/1200 Series Autosampler | | | | |
| Waste tube | | | | G1313-87300 |
| Corrugated tubing, polypropylene | 5 | 6.5 | | 5062-2463 |
| For G1387A 1100/1200 Series Micro Autosampler | | | | |
| Waste tube, FEP | | 0.8 | 1.6 | G1375-87326 |

Accessories

| Description | Part No. |
|---|-------------|
| Plastic tubing cutter | 8710-1930 |
| Blades for plastic cutter, 5/pk | 8710-1931 |
| Fitting screws, stainless steel, 10-32, 4 mm, 5/pk | 5065-9948 |
| PEEK ferrule and stainless steel ring for 2 mm tube, 5/pk | 5065-9950 |
| Union, PEEK for 1/8 in od tubing | 0100-2410 |
| Waste adapter, 1200 Series autosamplers, gray | G1313-43216 |



Plastic tubing cutter, 8710-1930

Rigid Capillary Tubing

- Squarely cut, pre-cleaned and ready to use
- Use with stainless steel fittings and ferrules (P/N 5062-2418) or PEEK fittings (P/N 0100-1516)

Rigid Capillary Tubing

| Length (mm) | ID (mm) | Unit | Part No. |
|-------------|---------|-------|-----------|
| 100 | 0.17 | 10/pk | 5061-3361 |
| 200 | 0.17 | 10/pk | 5061-3362 |



Fitting screws, 5065-9948



PEEK ferrules and SS rings, 5065-9950



Fittings and Unions

Your best value: Agilent multi-use capillary and fitting kits with FREE cybertool

Agilent starter kits contain the most widely used capillary tubing, Swagelok connectors, and fittings in a variety of sizes, so you can find just the right length to minimize your connections and tubing volume. We've also included our flexible stainless steel capillaries to help you make the best LC connections, regardless of equipment brand. Plus, as a special bonus, all multi-use kits (the first three listed here) feature a FREE cybertool that puts more than 30 lab essentials at your fingertips.

For high-efficiency columns, it's best to use narrow-diameter red tubing (0.12 mm id), instead of conventional green (0.17 mm id) tubing.

Capillary and fittings kits

| Description | Contents | Part No. |
|--|--|-----------|
| Capillary/fitting starter kit for 1100 Capillary LC System Multi-use kit, a collection of various capillaries and tools for use in the lab. | Kit includes: Qty 2 – Fused silica/PEEK capillary, 50 µm, 55 cm Qty 1 – Fused silica/PEEK capillary, 50 µm, 20 cm Qty 1 – Fused silica/PEEK capillary, 100 µm, 110 cm Qty 2 – Fused silica/PEEK capillary, 50 µm, 50 cm Qty 2 – Fused silica/PEEK capillary, 50 µm, 40 cm Qty 4 – 4 mm stainless steel fitting, male 10-32 Qty 4 – 1/32 in PEEK ferrule and stainless steel lock ring Qty 4 – PEEK fittings for µ-valves Qty 4 – Double winged PEEK nuts and 1/32 in ferrules Cybertool | 5065-9938 |
| Capillary/fitting starter kit, 0.12 mm id Multi-use kit, a collection of various capillaries and tools for use in the lab. | Kit includes: Qty 1 – PEEK capillary, 0.13 mm id, 1.5 m Qty 4 – Stainless steel capillary, 0.12 x 105 mm Qty 4 – Stainless steel capillary, 0.12 x 150 mm Qty 2 – Stainless steel capillary, 0.12 x 170 mm Qty 2 – Stainless steel capillary, 0.12 x 200 mm Qty 2 – Stainless steel capillary, 0.12 x 220 mm Qty 2 – Stainless steel capillary, 0.12 x 280 mm Qty 1 – Stainless steel capillary, 0.12 x 400 mm Qty 3 – Stainless steel ZDV union Tubing cutter for PEEK capillaries 1/16 in Stainless steel fittings, 10/pk 1/16 in PEEK fittings, color, 10/pk 1/16 in PEEK fittings, 10/pk Rheotool Cybertool | 5065-9937 |

(Continued)

Capillary and fittings kits

| Description | Contents | Part No. |
|---|--|-------------|
| Capillary/fitting starter kit, 0.17 mm id Multi-use kit, a collection of various capillaries and tools for use in the lab. | Kit includes: Qty 1 – PEEK capillary, 0.18 mm id, 1.5 m Qty 4 – Stainless steel capillary, 0.17 x 105 mm Qty 4 – Stainless steel capillary, 0.17 x 150 mm Qty 2 – Stainless steel capillary, 0.17 x 200 mm Qty 2 – Stainless steel capillary, 0.17 x 280 mm Qty 1 – Stainless steel capillary, 0.17 x 400 mm Qty 3 – Stainless steel ZDV union Tubing cutter for PEEK capillaries 1/16 in Stainless steel fittings, 10/pk 1/16 in PEEK fittings, color, 10/pk 1/16 in PEEK fittings, 10/pk Rheotool Cybertool | 5065-9939 |
| Capillary starter kit, 0.17 mm BIO | Kit includes: Qty 1 – 1.5 m PEEK tubing PEEK finger-tight fitting, 10/pk Colored finger-tight PEEK fittings, 10/pk Qty 3 – Bio-inert union, 600 bar Qty 1 – Plastic tubing cutter Qty 1 – Rheotool socket wrench, 1/4 in Qty 1 – Ti capillary, 0.17 x 400 mm Qty 2 – PK/SS capillary, 0.17 x 105 mm Qty 2 – PK/SS capillary, 0.17 x 150 mm Qty 1 – PK/SS capillary, 0.17 x 300 mm Qty 2 – PK/SS capillary, 0.17 x 200 mm Multifunction tool | G5611-68710 |
| Rapid Resolution High Throughput capillary kit Used for converting an Agilent 1200 instrument to the RRLC configuration, to enable use of high efficiency columns (to 600 bar). Can also be used for Agilent 1100 instruments. | Kit includes: Qty 1 – PEEK fitting long for 1/32 in od capillaries Qty 1 – Stainless steel capillary, 0.12 x 280 mm Qty 1 – Stainless steel capillary, 0.12 x 150 mm Qty 1 – Stainless steel capillary, 0.12 x 70 mm Qty 1 – Needle seat capillary, 12 µL x 0.12 mm Qty 1 – PEEK capillary, 0.125 x 550 mm | 5065-9947 |
| Low dispersion capillary kit for G1316C | Kit includes: Qty 1 – Flexible tubing, 280 mm, 0.12 mm id Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 1 – Carrier for heat exchanger TCC SL Plus | 5067-4633 |

(Continued)

Capillary and fittings kits

| Description | Contents | Part No. |
|---|--|-------------|
| 1200 Infinity Series capillary kit 0.12 mm id, G1316C for installing valves G4231A (2 position/6 ports – 600 bar) and G4231B (2 position/6 ports – 1200 bar) | Kit includes: Qty 1 – Column clip set, eight colors Qty 1 – Stainless steel capillary 0.12 x 340 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm Qty 2 – Stainless steel capillary 0.12 x 90 mm Qty 2 – Stainless steel capillary 0.12 x 150 mm Qty 2 – Stainless steel capillary 0.12 x 280 mm Qty 1 – Stainless steel capillary 0.12 x 120 mm Qty 1 – Stainless steel capillary 0.12 x 200 mm Qty 1 – Heater Long Up 0.12 id (1.6 µL internal) Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC SL Plus | 5067-4646 |
| 1200 Infinity Series capillary kit 0.17 mm id G1316C for installing a 2 position/10 port valve G4232A (600 bar) | Kit includes: Qty 2 – PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm Qty 1 – Column clip set, eight colors Qty 3 – Stainless steel capillary 0.17 x 150 mm Qty 1 – Stainless steel capillary 0.17 x 340 mm Qty 4 – Stainless steel capillary 0.17 x 90 mm Qty 2 – Stainless steel capillary 0.17 x 280 mm Qty 1 – Stainless steel capillary 0.17 x 250 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm | 5067-5103 |
| 1200 Infinity Series capillary kit 0.12 mm id G1316C for installing a 2 position/10 port valve G4232B (1200 bar) | Kit includes: Qty 1 – Stainless steel capillary 0.12 x 120 mm Qty 2 – Stainless steel capillary 0.12 x 150 mm Qty 1 – Stainless steel capillary 0.12 x 200 mm Qty 2 – Stainless steel capillary 0.12 x 280 mm Qty 1 – Stainless steel capillary 0.12 x 340 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm Qty 2 – Stainless steel capillary 0.12 x 90 mm Qty 1 – Column clip set, eight colors Qty 1 – Heater Long Up 0.12 id (1.6 µL internal) Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC SL Plus | 5067-4682 |
| 1200 capillary kit for 0.12 mm id | Kit includes: Qty 1 – Stainless steel capillary, 0.12 x 130 mm Qty 2 – Stainless steel capillary, 0.12 x 170 mm Qty 1 – Stainless steel capillary, 0.12 x 210 mm Qty 1 – Stainless steel capillary, 0.12 x 300 mm Qty 3 – Stainless steel capillary, 0.12 x 500 mm Qty 1 – Stainless steel capillary, 0.12 x 700 mm Qty 1 – Stainless steel capillary, 0.12 x 340 mm Qty 1 – Low carry over seat Qty 1 – DAD heat exchanger capillary, 0.12 x 310 mm | G1316-68716 |

(Continued)



Capillary and fittings kits

| Description | Contents | Part No. |
|--|---|-----------|
| Stainless steel flexible capillary tubing kit | Kit includes: Qty 10 – 1.6 mm (1/16 in) Stainless steel back ferrules Qty 10 – 1.6 mm (1/16 in) Stainless steel front ferrules Qty 10 – Stainless steel fittings Qty 3 – Stainless steel Swagelok nut, 0.12 x 105 mm Qty 1 – Stainless steel capillary, 0.12 x 150 mm Qty 1 – Stainless steel capillary, 0.12 x 280 mm | 5061-3304 |
| Stainless steel flexible capillary tubing kit | Kit includes: Qty 2 – Stainless steel capillary, 0.12 x 35 mm Qty 3 – Stainless steel capillary, 0.12 x 105 mm Qty 1 – Stainless steel capillary, 0.12 x 280 mm | 5061-3315 |
| 1200 Infinity Series low dispersion capillary kit for installing a 6 position/14 port valve G4234A (600 bar) and G4234B (1200 bar) | Kit includes: Qty 1 – Stainless steel capillary, 0.12 x 250 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.12 x 340 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.12 x 500 mm, with removable fitting Qty 8 – Stainless steel capillary, 0.12 x 130 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.17 x 150 mm, with 2 long pre-swaged fittings Qty 4 – Stainless steel capillary, 0.12 x 170 mm Qty 2 – PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm Qty 2 – PEEK fitting, special for Chip-LC Qty 1 – Column clip set, eight colors Qty 2 – Heater Long Up 0.12 mm id (1.6 µL internal) Qty 2 – Heater Long Down 0.12 mm id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC Qty 2 – Fitting holder assembly | 5067-4729 |
| Ultra-low dispersion capillary kit for the 1290 Infinity LC | Kit includes: Qty 1 – Stainless steel capillary, 0.075 x 220 mm SV/SLV Qty 1 – Stainless steel capillary, 0.075 x 340 mm SV/SLV Qty 1 – Low dispersion needle seat for 1290 Infinity LC Qty 1 – Heater Long Up 0.075 mm (nominal 1.0 µL) Qty 1 – 1290 Infinity LC Low Dispersion Kit Note | 5067-5189 |



Ultra-low dispersion capillary kit, 5067-5189



Stainless steel fittings (S),
5062-2418



PEEK fittings (SPF),
0100-1516/5063-6591



Stainless steel long fittings (SL),
5065-4454



Finger-tight PEEK fitting (SPF),
0100-1516



Stainless steel extra long fitting (SX),
5065-9967



PEEK long fittings (SPFL),
5062-8541



Stainless steel nut,
5061-3303



Finger-tight PEEK fittings (SPF),
5065-4426



Stainless steel front ferrules,
5180-4108



Double winged fitting (SPF),
5042-6500



Stainless steel back ferrules,
5180-4114



PEEK RheFlex fittings (SPF),
0100-1631



1200 bar removable fitting (SV),
5067-4733



PEEK RheFlex fittings (SPF),
0100-2175



1200 bar removable long fitting (SLV),
5067-4738



Stainless steel blanking nut,
01080-83202



1200 bar removable extra long fitting
(SXV), 5067-4739

Fittings

| Description | Key | Unit | Part No. |
|---|------|-------|-------------|
| Swagelok 1.6 mm stainless steel fitting | S | 10/pk | 5062-2418 |
| Swagelok 1.6 mm stainless steel fitting, long screw | SL | 10/pk | 5065-4454 |
| Swagelok 1.6 mm stainless steel fitting, extra long screw | SX | 10/pk | 5065-9967 |
| Swagelok 1.6 mm screw | | 10/pk | 5061-3303 |
| 1.6 mm stainless steel front ferrule | | 10/pk | 5180-4108 |
| 1.6 mm stainless steel back ferrule | | 10/pk | 5180-4114 |
| Swagelok 1.6 mm 1200 bar removable fitting | SV | 1/ea | 5067-4733 |
| Swagelok 1.6 mm 1200 bar removable fitting, long screw | SLV | 1/ea | 5067-4738 |
| Swagelok 1.6 mm 1200 bar removable fitting, extra long screw | SXV | 1/ea | 5067-4739 |
| Swagelok 1.6 mm finger-tight PEEK fitting | SPF | 10/pk | 5063-6591 |
| Swagelok 1.6 mm PEEK finger-tight fitting | SPF | 2/pk | 0100-1516 |
| Swagelok 1.6 mm PEEK finger-tight long fitting | SPLF | 10/pk | 5062-8541 |
| Swagelok 1.6 mm PEEK finger-tight fitting (mixed colors) | SPF | 10/pk | 5065-4426 |
| Swagelok 1.6 mm finger-tight PEEK double winged fitting | SPF | 10/pk | 5042-6500 |
| Swagelok 1.6 mm finger-tight PEEK Rheflex fitting | SPF | 5/pk | 0100-1631 |
| Swagelok 1.6 mm finger-tight PEEK Rheflex fitting (mixed color) | SPF | 10/pk | 0100-2175 |
| Swagelok 1.6 mm stainless steel blanking nut | S | 1/ea | 01080-83202 |

Material

| Key | Description |
|------|---|
| S | Swagelok 1.6 mm port id |
| SL | Swagelok 1.6 mm port id, long |
| SX | Swagelok 1.6 mm port id, extra-long |
| SV | Swagelok 1.6 mm port id, 1200 bar |
| SLV | Swagelok 1.6 mm port id, long, 1200 bar |
| SLB | Swagelok 1.6 mm port id, long bio |
| SXV | Swagelok 1.6 mm port id, extra-long, 1200 bar |
| SPF | Swagelok 1.6 mm port id, PEEK, finger-tight |
| SPLF | Swagelok 1.6 mm port id, PEEK, long, finger-tight |

Fittings

| Description | Key | Unit | Part No. |
|--|------|---------------------|-----------|
| Swagelok 1.6 mm stainless steel screw for PEEK ferrule 5067-1547 | S | 6/pk | 5067-1540 |
| Swagelok stainless steel screw with 1.6 mm PEEK ferrule | SP | 1/ea | 0100-2086 |
| 1.6 mm PEEK ferrule for 5067-1540 screw | SP | 6/pk | 5067-1547 |
| Swagelok 1.6 mm finger-tight polyketone fitting | SPF | 10/pk | 5042-8957 |
| M4 stainless steel screw for stainless steel ferrule 5067-1558 | M | 6/pk | 5067-1558 |
| 0.8 mm stainless steel ferrule for 5067-1558 screw | M | 6/pk | 5067-1557 |
| Swagelok 1.6 mm plastic blank nut | M | 1/ea | 0100-1259 |
| Swagelok 1.6 mm ST screw, 4 mm head | G | 10/pk | 5063-6593 |
| 0.8 mm PEEK ferrule and stainless steel ring for 5063-6593 screw | W | 10/pk | 5065-4423 |
| M4 0.8 mm PEEK fitting | MP | 6 fittings, 2 plugs | 5065-4410 |
| Swagelok 0.8 mm finger-tight PEEK double winged fitting | WPF | 10/pk | 5065-4422 |
| Swagelok 0.8 mm finger-tight PEEK long fitting | WPFL | 1/ea | 5022-6536 |
| Swagelok 2.0 mm stainless steel screw, 4 mm head | | 5/pk | 5065-9948 |
| 2.0 mm PEEK ferrule and stainless steel ring | | 5/pk | 5065-9950 |

Material

| Key | Description |
|-----|---|
| S | Swagelok 1.6 mm port id |
| SP | Swagelok 1.6 mm port id, PEEK |
| SPF | Swagelok 1.6 mm port id, PEEK, finger-tight |
| W | Swagelok 0.8 mm port id |
| G | Small head SW 4 mm |
| WG | Swagelok 0.8 mm port id, small head SW 4 mm |
| MP | Metric M4 0.8 mm port id, PEEK |
| WPF | Swagelok 0.8 mm port id, PEEK, finger-tight |





ZDV union, 5022-2145



Adapter, PEEK, 0100-2298



ZDV universal union, 5022-2184



Barbed Y-connector PP, 5065-9971



ZDV union with fittings, 0100-0900



Union, female to female, 5042-8517



ZDV union, PEEK with fittings, 0100-2441



High flow union, 5022-2133



Adapter, male Luer to female, 5042-8518



PEEK adapter, 0100-1847



Adapter, female to male, 5023-1803



Bio-inert union, 600 bar, 5067-4741



Micro T-connector, PEEK, 5042-8519

Unions

| Description | Use With | Part No. |
|---|-----------------------|-----------|
| ZDV union, no fittings | Nano LC | 5022-2145 |
| ZDV universal union, stainless steel, no fittings | Standard LC | 5022-2184 |
| ZDV union, with fittings | Standard LC | 0100-0900 |
| ZDV union, PEEK with fittings | Bio-applications | 0100-2441 |
| High flow union, no fittings | Prep LC | 5022-2133 |
| PEEK adapter 1/4-28 to 10-32 | | 0100-1847 |
| Adapter, PEEK int. 1/4-28 to ext. 10-32 | | 0100-2298 |
| Barbed Y-connector PP for 3/16 in id tube, 10/pk | | 5065-9971 |
| Adapter, union PEEK 1/4-28 | | 5042-8517 |
| Adapter, male Luer to female 1/4-28 | | 5042-8518 |
| SS adapter Swagelok to 1/4-28 | | 5023-1803 |
| T-connector, PEEK, swept volume 0.57 µL | For 1/16 in od tubing | 5022-2144 |
| Micro T-connector, PEEK, swept volume 29 mL, with 1/32 in id fittings | | 5042-8519 |
| Bio-inert union, stainless steel with PEEK insert 600 bar | Bio-applications | 5067-4741 |

Tips and tools for creating the best possible connections

How do I tighten fittings correctly?

The chart below describes the steps you'll need to follow.

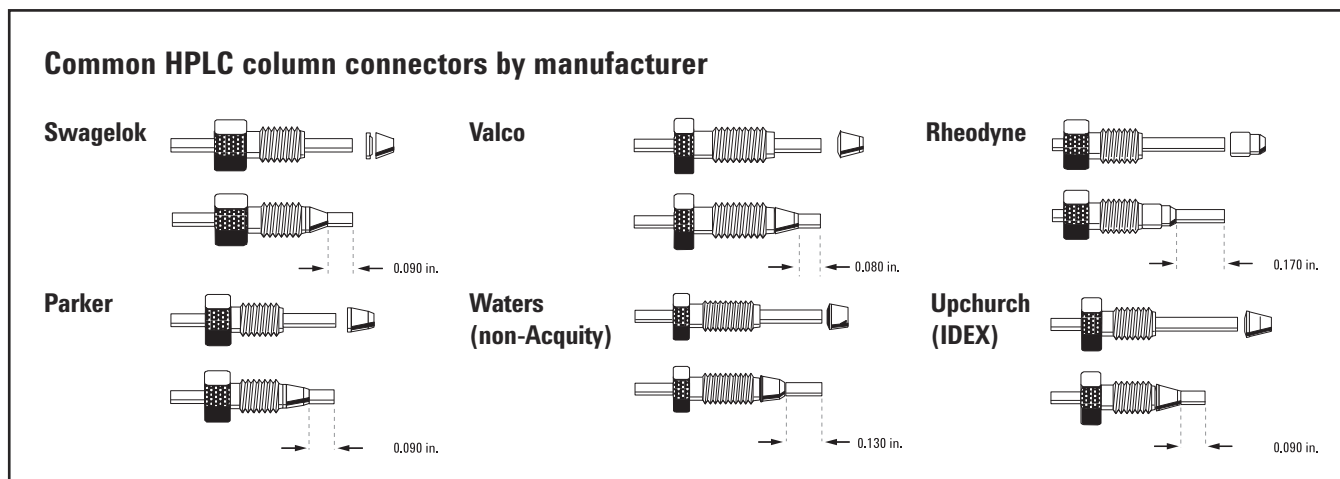


| Fitting type | First Connection | Further connection |
|---|---|--|
| Stainless steel | <ol style="list-style-type: none"> 1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut ½ to ¾ turn with a slitted socket wrench or Rheotool (P/N 8710-2391). If you are using a torque wrench, tightening torque should be between 1.5 and 3.0 Nm) | Finger-tighten, then tighten an extra ¼ to ½ turn with a slitted socket wrench or Rheotool (P/N 8710-2391). (If using a torque wrench, tightening torque should be between 1.5 and 3.0 Nm). |
| Polymeric finger-tight: PEEK and polyketone | <ol style="list-style-type: none"> 1. Slide the screw and ferrule onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Make sure the capillary cannot be easily pulled out. | <p>Additional tightening if necessary</p> <p>See "good connections" step by step</p> |
| 1200 bar removable fitting | <ol style="list-style-type: none"> 1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut about ¾ turn with a socket wrench. 5. For stainless steel capillaries, if using a torque wrench, tightening torque should be between 1.0 and 1.2 Nm. 6. For stainless steel coated PEEK capillaries, do not exceed 0.8 Nm. | <p>Finger-tighten, then tighten an extra ¼ to ½ turn with a socket wrench.</p> <p>For stainless steel capillaries, if using a torque wrench, tightening torque should be between 1.0 and 1.2 Nm.</p> <p>For stainless steel coated PEEK capillaries, if using a torque wrench, do not exceed 0.8 Nm.</p> |
| PEEK/stainless steel | <ol style="list-style-type: none"> 1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut about ½ turn with a socket wrench. | Finger-tighten, then tighten an extra ¼ to ½ turn with a socket wrench. |

How do I prepare the perfect fitting connection?

Problems with stainless steel tubing connections are commonly mistaken for column issues – and are the source of many calls to Agilent’s technical support line.

Connection problems often arise because different manufacturers supply different types of fittings, as you can see in the following diagram:



Ideally, you should use the fittings recommended by your column manufacturer. Most analytical reversed phase columns are compatible with Swagelok or Parker-type fittings when correctly seated in the column.

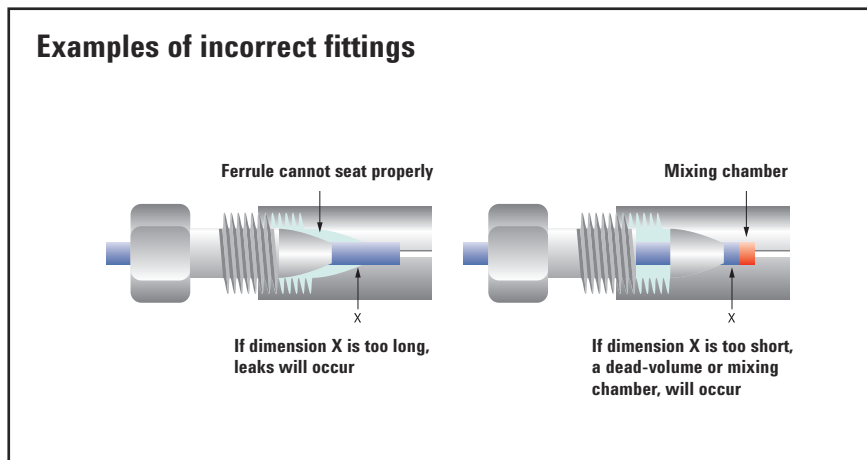
Stainless steel fittings are the best choice for permanent, high-pressure sealing. Agilent recommends Swagelok-type fittings with front and back ferrules, because they deliver the best performance for Agilent LC systems – and can be used on most instrument connections, including valves, heaters, and column connections.

For lower-pressure operation, finger-tight polymeric fittings allow you to easily adjust the end-fitting to seat the capillary into the column properly – helping avoid extra-column voids and leaks. These connectors can be tightened without wrenches. High-pressure fittings, which are designed to be removed and resealed, are also available for pressures up to 1200 bar.

How do I align the connection properly?

The importance of correct tubing length (relative to the distance from the end of the tubing to the bottom of the ferrule) cannot be overstated. If the tubing is too long, the ferrule will not seat properly and leaks will occur. Likewise, if the tubing is not pushed in far enough, a void occurs, creating extra-column volume that acts as a "mixing chamber", which can cause peak tailing, and/or poor peak shape.

Always make sure you use the correct fittings, and that all fittings are properly seated in the column end fitting – especially if you use columns from different manufacturers.

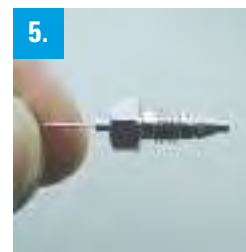
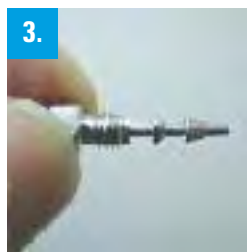
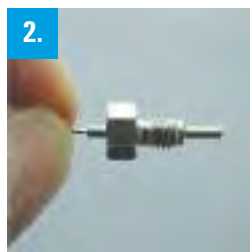


A good connection, step by step

This connection uses a Swagelok-type fitting which is good for connections to the instrument. For column connections, it is ideal to use polymeric finger-tight fittings, which are removable, or the 1200 bar removable fitting.

1. Select a nut that is long enough for the fitting you'll be using.
2. Slide the nut over the end of the tubing.
3. Carefully slide the ferrule components on after the nut, then finger-tighten the assembly while making sure the tubing is completely seated in the bottom of the end fitting.
4. Use a wrench to gently tighten the fitting; this will force the ferrule to seat onto the tubing, $\frac{1}{2}$ to $\frac{3}{4}$ turn with a wrench. Do not over-tighten! That will shorten the useful life of the fitting.
5. Once you are sure your fitting is complete, loosen the nut and inspect the ferrule for correct position on the tubing.

Note: Avoid re-using a capillary on a different location. The position of the fitting is done the first time it is screwed on a port and all the ports are not strictly identical.



What are the benefits of a small internal diameter?

The roughness of the internal capillary surface is a function of the capillary's outer diameter. A smaller outer diameter provides better smoothness for the internal capillary surface.

Agilent's unique stainless steel LC capillary connections for liquid chromatography are designed for small inner diameters, reducing backpressure and blocking. To make these connections compatible with standard 1/16 in capillaries, we weld a tight, flat sleeve at both ends. Agilent's unique laser welding process ensures that the capillary ends are absolutely flat, eliminating any chance of additional dead volume.

Which capillary connection size is right for me?

Choose the shortest practical length and narrowest diameter that your application and system allows. For 4.6 mm id columns, 0.17 mm capillaries are usually sufficient, but for narrower id columns like 2.1 mm, 0.12 mm id capillaries are used to keep sample dispersion as low as possible. There are also new ultra-low dispersion capillaries (0.075 mm id) for use with the 1290 Infinity LC.

How can I get rid of extra-column volume effects?

Extra-column volume effects can be caused by capillaries that are too long, so try a shorter- length capillary. For low-volume, high efficiency columns (e.g., Agilent ZORBAX Eclipse Plus C18, 2.1 x 50 mm, 1.8 μ m), replace 0.17 mm id (green) capillaries with 0.12 mm id (red).

For additional information on extra-column volume and its effect, see our application note "*Reduce Tubing Volume to Optimize Column Performance*" at www.agilent.com/chem/library/applications/5990-4964EN.pdf

What should I do about high backpressure?

High backpressure issues are usually not caused by capillaries. However, you should check to make sure the capillary isn't blocked, and replace if necessary, as part of your troubleshooting.

How can I reduce peak broadening, related to my capillary?

In addition to optimizing the length and diameter of the capillary, proper positioning in the fitting is important. The distance between the end of the capillary and the bottom of the ferrule may be too long or too short (creating a void), resulting in a poor connection. This can cause leaks or peak shape issues, such as broadening when the sample mixes in the void. A re-usable fitting can be adjusted, but with stainless steel a new fitting will need to be made.

How do I eliminate detector spikes and bubbles?

Check for air leaks at the capillary connections, and tighten as needed.

Pump Supplies

Regular pump maintenance helps lower operating costs and generate precise results that make you feel confident.

You can count on Agilent isocratic, binary, quaternary, capillary, and preparative pumps for superior flow and composition stability. And by following a regular maintenance routine, you can also count on maximum uptime and a steady, accurate solvent flow for the life of the pump.



Sapphire piston and seals

Pump Routine Maintenance Procedures

- Replace the seals and pistons
- Replace the PTFE frit
- Replace the cartridge in the Active Inlet Valve
- Clean the outlet ball valve
- Clean or replace the solvent inlet frits

Routine pump maintenance should be done on a regular basis to keep your Agilent LC system performing at its optimum. You can perform all maintenance procedures at once or as needed. Some parts may need to be replaced more than others depending upon your application and solvent preparation procedures.



Pump Routine Maintenance Procedures

| Symptom | Cause | Solution |
|---|------------------------------------|---|
| Solvent dripping out of waste outlet when valve closed | Leak on pump head | Exchange the purge valve frit or the purge valve |
| Pressure ripple unstable | Dirty active inlet valve cartridge | Run leak test for verification and exchange the active inlet valve cartridge |
| | Leak on pump head | Run leak test for verification and exchange the outlet ball valve sieve or the complete valve |
| Gradient performance problems, intermittent pressure fluctuations | Solvent filter is blocked | Change the solvent filter |
| A pressure drop of >10 bar across the frit (5 mL/min H ₂ O with purge valve open) indicates blockage | Dirty frit | Exchange the purge valve frit or the purge valve |
| Leaks at lower pump head side | High seal wear | Run leak test for verification and exchange the pump seals |
| Unstable retention time | | |
| Pressure ripple unstable | | |
| Seal lifetime shorter than normally expected | Scratch on plunger | Check plungers while changing the seals |
| Loss of wash solvent | Leaky wash seals | Exchange the wash seals |



Purge valve assembly, G1311-60009



Purge valve with PTFE frit, G4280-60061



PTFE frits, 01018-22707

Purge Valves

| Description | Comments | Part No. |
|--|--|-------------|
| Purge valve with PTFE frit, 400 bar | For G1310A, G1311A, G1312A, G1376A, G2226A | G1311-60009 |
| Purge valve with PTFE frit | For 1120 | G4280-60031 |
| Purge valve with PTFE frit | For G1311C, G1312C, 1220 | G4280-60061 |
| Purge valve with PTFE frit | For G1310B, G1311B, G1312B, G4302A, | G1312-60061 |
| PTFE frit | For G1310A, G1311A, G1312A, G1376A, G2226A, 1120, 1220, 1220, G1310B, G1311B, G1312B, G1311C, G1312C, G4202A | 01018-22707 |
| Seal cap | Not suitable for outlet ball valves with integrated seal | 5067-4728 |
| Seal for purge valve | For 1120 | 0905-1192 |
| Purge valve actuator | For 1120 | G4280-60033 |
| Bio-inert purge valve | For G5611A | G5611-60061 |
| 5 position / 7 port rotor seal | For G4220A, G4220B | 5068-0005 |
| 5 position / 7 port stator | For G4220A, G4220B | 5068-0004 |
| Multi purpose valve head | For G4204A | 5067-4174 |
| Stator for 5067-4174 multi purpose valve head | For G4204A | 5068-0122 |
| Rotor for 5067-4174 multi purpose valve head | G4204A | 5068-0123 |
| Stainless steel filter assembly with PEEK ring, 2 µm pore size | For G1361A | 5022-2192 |
| Open end wrench, 14 mm | To remove purge valve | 8710-1924 |



TIPS & TOOLS

Information on maintenance procedures can be found at www.agilent.com/chem/LCmaintenancenotes

Inlet and Outlet Valves

Inlet Valves

| Description | Comments | Part No. |
|---|--|--------------|
| Active inlet valve without cartridge | For G1310A, G1311A, G1312A, G1376A, G2226A, G1312B, G1312C | G1312-60025 |
| Cartridge for active inlet valve 400 bar | For G1310A, G1311A, G1312A, G1376A, G2226A, G1312C | 5062-8562 |
| Cartridge for active inlet valve 600 bar | For G1312B | G1312-60020 |
| Bio-inert active inlet valve | For G5611A | G5611-60025 |
| Bio-inert cartridge for active inlet valve, 600 bar | For G5611A | G5611-60020 |
| Inlet valve for 1290 quaternary pump | For G4204A | G4204-60022* |
| Valve assemblies (inlet/outlet) for prep pumps | For G1361A | G1361-60012 |
| Passive inlet valve | For G1310B, G1311B, G1311C, 1120, 1220, G4302A | G1312-60066* |
| Passive inlet valve | For G4220A, G4220B | G4220-60022* |
| Seal cap | Not suitable for outlet ball valves with integrated seal | 5067-4728 |

*Inlet valve with integrated seal.

Outlet Valves

| Description | Comments | Part No. |
|--|--|--------------|
| Outlet ball valve | For G1310A, G1311A, G1312A, G1376A, G2226A, 1120, 1220, G1310B, G1311B, G1311C, G1312B, G1312C, G4302A | G1312-60067* |
| Outlet ball valve | For G4220A, G4220B, G4204A | G4220-60028* |
| Bio-inert outlet ball valve | For G5611A | G5611-60067* |
| Valve assemblies (inlet/outlet) for prep pumps | For G1361A | G1361-60012 |
| Seal cap | Not suitable for outlet ball valves with integrated seal | 5067-4728 |

*Outlet ball valve with integrated seal.



Active inlet valve without cartridge, G1312-60025



Cartridge, 400 bar, 5062-8562



Passive inlet valve, G1312-60066



Seal cap, 5067-4728



Outlet ball valve, G1312-60067



Outlet ball valve, G4220-60028

TIPS & TOOLS

Information on maintenance procedures can be found at www.agilent.com/chem/LCmaintenancenotes





Sapphire piston and seals

Pistons and Seals

Agilent pistons are made from a high purity, monocrystalline sapphire for maximum durability. Although ceramic pistons can be manufactured at a lower cost, ceramic is a sintered, polycrystalline material, which can cause undesirable variations during the production process. Agilent sapphire pistons are:

- Meticulously cut at just the right angle, making them durable – and long lasting
- Precisely aligned in their stainless steel holder to minimize wear on the piston and seal

Agilent seals are designed to fit snugly around our pistons, and are capable of adapting to a wide range of flow rates and pressures. Agilent piston seals are:

- Spring-loaded and engineered to deliver optimal performance over highly dynamic flow and pressure ranges
- Manufactured from a proprietary polymer blend, and feature a spring made from the same high-quality stainless steel that is used in our pump's flow path

The combination of our piston and seal has undergone extensive testing under temperature stress, with all common HPLC solvents, and in many instruments. More importantly, they yield consistent, reproducible results.

Pistons

| Description | Comments | Part No. |
|---------------------------------|--|-------------|
| Sapphire plunger | For G5611A, 4302A | 5067-4695 |
| Zirconium based ceramic plunger | For G4220A, G4220B, G4204A | 5067-4678 |
| Sapphire plunger | For G1310A, G1311A, G1312A, G1376A, G2226A, 1120, 1220, G1310B, G1311B, G1312B, G1311C, G1312C | 5063-6586 |
| Sapphire plunger | For G1361A | G1361-22402 |

Seals

| Description | Comments | Part No. |
|--|--|-------------|
| Bio-inert piston seal | For G5611A | G5611-21503 |
| Piston seal polyethylene | For G4220A, G4220B, G4204A | 0905-1719 |
| Piston seal graphite filled PTFE (reversed-phase) (2/pk) | For G1310A, G1311A, G1312A, G1376A, G2226A, 1120, 1220, G1310B, G1311B, G1312B, G1311C, G1312C, G4302A | 5063-6589 |
| Piston seal Polyethylene (normal phase) | For G1310A, G1311A, G1312A, G1376A, G2226A, 1120, 1220, G1310B, G1311B, G1312B, G1311C, G1312C, G4302A | 0905-1420 |
| Piston seal | For G1361A | 5022-2188 |



Piston seals, 5063-6589

Specific parts for 1290 Infinity LC pumps

| Description | Comments | Part No. |
|-------------------------------------|----------------------------|-------------|
| Jet Weaver 35 µL/100 µL | For G4220A, G4220B, G4204A | G4220-60006 |
| Jet Weaver 380 µL | For G4220A, G4220B, G4204A | G4220-60012 |
| Clamp for in-line filter | For G4204A | G4204-40000 |
| Outlet filter 1290 quaternary pump | For G4204A | G4204-60004 |
| Inlet valve for flush pump | | 5067-4717 |
| Outlet valve for flush pump | | 5067-4716 |
| Tubing kit 270 mm, 2/pk | | 5067-4661 |
| Tubing kit 140 mm, 2/pk | | G4220-60035 |
| Shut-off valve | For G4220A, G4220B, G4204A | 5067-4124 |
| Inline pressure relief valve kit | For G4220A, G4220B | G4212-68001 |
| Solvent selection valve bridge tube | | 5067-4697 |
| Pressure relief valve | For G4220A, G4220B | G4212-60022 |
| PEEK seal for inlet weaver assembly | For G4204A | G4204-40005 |
| Support ring | For G4220A, G4220B | G4220-60015 |
| Seal keeper | For G4220A, G4220B | G4220-60016 |

TIPS & TOOLS

Information on maintenance procedures can be found at www.agilent.com/chem/LCmaintenancenotes





Peristaltic pump, 5042-8507



Peristaltic pump with ChemSure tubing, 5065-9952

Seal Wash

The routine use of highly concentrated buffer solutions (100 mM) will reduce the life of seals and pistons in your pump. Counteract the problem with one of Agilent's seal wash kits, which flush the back of the seal with a wash solvent. **Note:** Water/isopropanol (90/10) is recommended as the wash solvent.

Seal Wash

| Description | Comments | Part No. |
|--|---|-------------|
| Peristaltic pump cassette with silicone tubing | For 1100/1200/1200 RRLC and 1260 Infinity LC pumps | 5042-8507 |
| Silicone tubing, 1 mm id, 3 mm od, 5 m | | 5065-9978 |
| Peristaltic pump with ChemSure tubing | For 1100/1200/1200 RRLC and 1260 Infinity LC pumps | 5065-9952 |
| ChemSure tubing for peristaltic pump | | 5042-8954 |
| Wash Seal and Wash Keeper | | |
| Wash seal | For 1100/1200/1200 RRLC, 1120 and 1260/1220 Infinity LC pumps | 0905-1175 |
| Seal keeper | For 1100/1200/1200 RRLC and 1120 pumps | 5001-3743 |
| Bio-inert seal keeper | For G5611A LC pump | G5611-26210 |
| Wash seal gasket, 6/pk | For 1100/1200/1200 RRLC, 1120 and 1260/1220 Infinity LC pumps | 5062-2484 |
| Wash seal PE | For 1290/1260/1220 Infinity LC pump | 0905-1718 |
| Support ring | For 1290/1260/1220 Infinity LC pump | G4220-63010 |
| Support ring | For 1290 Infinity pump without seal wash | G4220-63015 |
| Backup ring for seal holder | For 1290/1260/1220 Infinity LC pump | G4220-24013 |
| Seal keeper | For 1290/1260/1220 Infinity LC pump | G4220-26210 |



TIPS & TOOLS

Information on maintenance procedures can be found at www.agilent.com/chem/LCmaintenancenotes

Solvent Reservoir and Supplies

Solvent Reservoir and Supplies

| Description | Part No. |
|---|-------------|
| Solvent Reservoir | |
| Solvent reservoir, 1 L | 9301-1420 |
| Solvent reservoir, 1 L, with cap | 9301-1421 |
| Solvent reservoir, 1 L, F29/32 | 9301-0656 |
| Solvent reservoir, amber, 1 L | 9301-1450 |
| Solvent bottle, clear, 2 L, 2 inlets | 5065-4421 |
| Solvent bottle, amber, 2 L | 9301-6341 |
| Solvent bottle, clear, 2 L | 9301-6342 |
| Bottle Head Assembly | |
| Bottle head assembly for screw bottle | G1311-60003 |
| Bottle head assembly for F29/32 tapered solvent bottle | G1312-68716 |
| Bottle head assembly with tubing and filter For capillary and nano systems (with stainless steel solvent filter) | G1376-60003 |
| Bottle head assembly for prep system | G1361-60022 |
| Bottle head assembly | G4220-60007 |
| Bottle cap with 3-hole insert | 5063-6531 |



Solvent reservoirs



Prep bottle, 5065-4421



Solvent bottle, amber, 9301-6341



Glass filter, 5041-2168

Cleaning the Solvent Filter

If the filter is in good condition, the solvent will freely drip out of the solvent tube (hydrostatic pressure). If the solvent filter is partially blocked, only very little solvent will drip out of the solvent tube.

Caution: Small particles can permanently block the capillaries and valves of the module.

- Always filter solvents
- Never use the module without solvent inlet filter

Solvent Filters

| Description | Recommended Use | Part No. | Frit Adapter | Part No. | Frit Inlet ID (mm) | Tube OD (mm) |
|--|---------------------------------------|-------------|---|-------------|--------------------|--------------|
| Glass filter, solvent inlet, 20 µm pore size | Analytical scale, micro scale | 5041-2168 | Frit adapter, PTFE, 3 mm, 4/pk | 5062-8517 | 5 | 3.2 |
| Glass filter, solvent inlet, 40 µm pore size | Preparative LC | 3150-0944 | Frit adapter, PTFE for 4.7 mm od tubing | G1361-23205 | 7 | 4.7 |
| Glass filter, solvent inlet, 40 µm pore size | Preparative LC | 3150-0944 | Frit adapter, PTFE, 4 mm | G1361-23204 | 7 | 4 |
| Glass filter, solvent inlet, 40 µm pore size | For G2258A Dual Loop Autosampler | 3150-0944 | Frit adapter, PTFE for 3.2 mm od tubing | G2258-23201 | 7 | 3.2 |
| Solvent inlet filter, stainless steel | For use in capillary and nano systems | 01018-60025 | | | | |



Filter frit adapters, 5062-8517

Frits and Adapters

| Description | Part No. |
|--|-------------|
| Solvent mixer, 1100 Series | G1312-87330 |
| Solvent mixer, short, 200 µL | 5067-1565 |
| Frit adapter, PTFE, for 4.7 mm od tubing | G1361-23205 |
| Frit adapter, PTFE, for 3.2 mm od tubing For G2258A Dual Loop Autosampler | G2258-23201 |
| O-ring, Viton, 30 mm | 0905-1516 |
| Stainless steel filter assembly with PEEK ring, 2 µm pore size | 5022-2192 |



Solvent inlet filter, 01018-60025

Safety Caps

Open or partially covered solvent bottles can lead to the evaporation of solvents and harmful solvent vapors. Prevent solvent evaporation and possible chemical spills with solvent safety caps from Agilent. These safety caps have been designed for optimal sealing with an integrated exhaust valve providing pressurization during solvent extraction and allowing proper solvent flow to your HPLC system. The exhaust valve contains a PTFE membrane to prevent contamination of your solvents from dirt and dust particles.

- Designed to fit all solvent bottles
- Constructed of PTFE and PFA for high chemical resistance
- Caps rotate freely, preventing tube twisting during bottle exchange
- Available in GL40, GL45, S60 and NS29/32 thread sizes



10 L waste can assembly, S60, 5043-0243

Installation Details for Solvent Safety Caps

Installation Guide for Standard Safety Caps – 4 Simple Steps to Install a Safety Cap

1. Guide the solvent tube through the fitting on the safety cap
2. Re-connect the solvent inlet filter to the solvent tube (open end)
3. Screw the safety cap on top of your solvent bottle
4. Adjust the length of the solvent tube in the solvent bottle and fix the tube by tightening the fitting

Installation Instructions for Safety Caps with Stopcocks

These caps have a shut-off valve which can be closed. This keeps the solvent tube in the bottle during maintenance activities with no risk of having solvent dropping out of the flow path.

4 Simple Steps to Install a Safety Cap with Stopcocks

1. Cut the solvent tube in 2 parts
2. Connect the upper part to the fitting (red or blue) on the safety cap (Top)
3. Cut a suitable length and connect the lower part to the fitting on the safety cap (Bottom)
4. Screw the safety cap on top of your bottle



Safety Cap I, 5043-0223



Safety Cap II, 5043-0224



Safety Cap IV for GL45 bottles, 5043-0226



Safety Cap IV for S60 threaded waste bottles, 5043-0227



5 L waste can assembly, GL45, 5043-0242



10 L waste can assembly, S60, 5043-0243

Safety Caps and Accessories

| Description | Kit Contents | Part No. |
|---|--|-----------|
| Safety Cap II with 2 ports – NS29/32 | Includes 1 safety cap, 2 fittings 3.2 mm PFA, 1 venting valve with 1 µm PTFE membrane | 5043-0221 |
| Safety Cap I with 1 port – GL 45 | Includes 1 safety cap, 1 fitting 3.2 mm PFA, 1 venting valve with 1 µm PTFE membrane | 5043-0223 |
| Safety Cap II with 2 ports – GL 45 | Includes 1 safety cap, 2 fittings 3.2 mm PFA, 1 venting valve with 1 µm PTFE membrane | 5043-0222 |
| Safety Cap I with 1 port for prep – GL45 | Includes 1 safety cap, 1 fitting 4.7 mm PFA, 1 venting valve with 1 µm PTFE membrane | 5043-0300 |
| Safety Cap I with 1 stopcock – GL45 | Includes 1 safety cap, 1 fitting 2.3 mm PFA, 1 fitting 2.3 mm PTFE, 1 venting valve with 1 µm PTFE membrane | 5043-0225 |
| Safety Cap II with 2 stopcocks – GL 45 | Includes 1 safety cap, 2 fittings 2.3 mm PFA, 2 fittings 2.3 mm PTFE, 1 venting valve | 5043-0224 |
| Safety Cap IV with 4 ports – 1 leak port – GL45 | Includes 1 safety cap, 4 fittings 2.3 mm PFA, 4 fittings 1.6 mm PFA, 4 fittings 2.3 mm PFA, 1 leak hose. Must be used with charcoal filter, P/N 5043-0230. | 5043-0226 |
| Safety Cap IV with 4 ports – 1 leak port – S60 | Includes 1 safety cap, 4 fittings 2.3 mm PFA, 4 fittings 1.6 mm PFA, 1 leak hose. Must be used with charcoal filter, P/N 5043-0230. | 5043-0227 |
| 5 L waste can GL45 with 4 ports and 1 leak port | Includes 5 L waste can, 1 safety cap (5043-0226), 2 ports collector PTFE. Must be used with charcoal filter, P/N 5043-0230. | 5043-0242 |
| 10 L waste can S60 with 4 ports and 1 leak port | Includes 10 L waste can, 1 safety cap (5043-0227), 2 ports collector PTFE. Must be used with charcoal filter, P/N 5043-0230. | 5043-0243 |
| Safety Waste Set S50 | Includes 5 L space saving waste can, 1 safety cap, 4 fittings 2.3 mm PFA, 1 x 6.4 mm tubing connector, Charcoal filter (48 g) | 5043-0831 |
| Venting valve with 1 µm PTFE membrane* | | 5043-0232 |
| Thread Adapter GL45-GL40 (PTFE) | | 5043-0234 |
| Thread Adapter PTFE, GL45-GL38 | | 5043-0272 |
| Thread adapter GL45-GPI38-23, (PTFE) | | 5043-0832 |
| Safety funnel + cover S60, PEHD, conductive | | 5043-0828 |
| Safety funnel + cover S60, PEHD | | 5043-0829 |
| Tool for fitting | | 5043-0830 |

*Valve change is recommended every six months

Replacement Parts for Safety Caps

| Description | Unit | Part No. |
|--|------|-----------|
| Fitting for 3.2 mm tube, PFA | 6/pk | 5043-0255 |
| Fitting for 2.3 mm tube, PFA | 5/pk | 5043-0228 |
| Fitting for 1.6 mm tube, PFA | 5/pk | 5043-0229 |
| Charcoal filter, 48 g | | 5043-0230 |
| Screw plug 1/4 in, PTFE | | 5043-0231 |
| Venting valve with 1 µm PTFE membrane* | | 5043-0232 |
| Screw plug 1/8 in, PTFE | 5/pk | 5043-0233 |
| 2 ports collector, PTFE | | 5043-0235 |
| 5 L waste can, GL45 | | 5043-0236 |
| 10 L waste can, S60 | | 5043-0237 |
| 3 port collector | | 5043-0238 |
| Adapter for two 3.2 mm tubes | | 5043-0239 |

*Valve change is recommended every 6 months



2.3 mm fittings to connect waste tubes from the purge valve, 5043-0228



1.6 mm fitting to connect wash tubes going to the peristaltic pump of the High Performance ALS/Wellplate Sampler, 5043-0229



Charcoal filter, 48 g, 5043-0230



Screw plug, 1/4 in, PTFE, 5043-0231



Replacement PTFE filter (replace every six months), 5043-0232



Screw plug, 1/8 in, PTFE, 5043-0233



2 ports collector (PTFE), 5043-0235



1200 Series Vacuum Degasser

Vacuum Degassers

A vacuum degasser is recommended for:

- Maximum sensitivity in the low UV wavelength range
- High injection precision
- High retention time reproducibility
- Flow rates below 0.5 mL/min



Mounting tool, 0100-1710

Vacuum Degasser Care

- To generally clean the vacuum degasser tubing, flush the system with isopropanol
- Flush the degasser with water after using buffers
- Speed solvent changes by drawing solvent through the degasser and tubing with syringe adapter kit



Plastic tubing cutter, 8710-1930



Ferrules and rings, 5063-6598



PPS nuts, 5063-6599

Vacuum Degassers

| Description | Comments | Part No. |
|--|--|-------------|
| Tubing kit, degasser to pump, 4/pk, 30 cm pieces of tubing with screws and bushings | For G1322A, G1379A/B | G1322-67300 |
| Inlet tubing | For Agilent 1260 Infinity Quaternary Pump VL | 5067-5378 |
| Mounting tool for flangeless nut | For G1322A, G1379A/B | 0100-1710 |
| Plastic tubing cutter | For G1322A, G1379A/B | 8710-1930 |
| Tefzel ferrules and SS lock rings, 1/8 in, 10/pk | For G1322A, G1379A/B | 5063-6598 |
| PPS nuts, 1/8 in, 1/4-28 thread, 10/pk | For G1322A, G1379A/B | 5063-6599 |
| Union, 1/4-28 thread, polypropylene | For G1322A, G1379A/B | 5022-2155 |
| PTFE solvent tubing, 5 m, 1.5 mm id, 3 mm od | For G1322A, G1379A/B | 5062-2483 |
| Disposable syringes, 20 mL, 10/pk | For G1322A | 5062-8534 |
| Syringe adapter, 1/16 in od, 2 in long | For G1322A | 9301-1337 |
| Micro vacuum degasser tubing kit | For G1379A | G1379-67310 |
| Micro vacuum degasser tubing kit | For G1379B | 5042-8922 |
| Online degasser accessory kit Includes 8 screws, 8 bushings, 4 markers, tubing, syringe and syringe adapter | For G1322A, G1379A/B | G1322-68705 |
| Vacuum chamber (2 channel) | For G1379A, G1379B | 5067-4798 |
| Tubing kit for 5067-4798 vacuum chamber | For G1379A, G1379B | 5067-5380 |
| Vacuum chamber replacement kit Includes two 5067-4798 and one 5067-5380 | For G1379A, G1379B | 5067-5383 |

Pump Kits

Pump Kits

| Description | Kit Contents | Part No. |
|---|--|-------------|
| Start-up Kits | | |
| Pump start-up kit For 1100/1200/1220 RRLC pumps | Includes 1 outlet cap, 5 PTFE frits, 4 piston seals, 1 outlet gold seal, 2 glass solvent inlet filters, 20 µm, and 1 cartridge for active inlet valve | G1311-68710 |
| Nanoflow LC start-up kit | Includes PEEK coated fused silica capillaries, column and fittings to start up a Nanoflow LC System | G2228-68700 |
| Seal Wash Kits | | |
| Active seal wash kit | Includes 2 wash seal gaskets, 2 pump seals, peristaltic pump (includes pump cassette and motor), 2 seal keepers, 2 support ring assemblies, seal insert tool and silicone tubing | G1311-68711 |
| Active seal wash kit | Includes 4 wash seal gaskets, 4 pump seals, 2 peristaltic pumps (includes pump cassette and motor), 4 seal keepers, 4 support ring assemblies, seal insert tool and silicone tubing | G1312-68711 |
| Continuous seal wash kit For 1100/1200/1200 RRLC pumps | Includes 2 wash seal gaskets, 4 m flex tubing, 2 pump seals, 1 flow regulator, 2 seal keepers, 2 support ring assemblies, 20 mL luer lock syringe, seal insert tool and abrasive paper | 01018-68722 |
| Seal wash kit for 1260 Capillary/Nano pump | Includes 3 adaptor luer/barbs, 2 film washers, 1 insert tool, 2 seal pumps, 1 clamp hose, 2 seal wash, 1 syringe, 2 support ring 1290 Infinity LC w/seal wash, 2 seal keepers for 1290 Infinity LC, and 2 backup rings for seal keeper 1290 Infinity | G1376-60005 |
| Seal wash PM kit For 1260 Infinity LC pumps | Includes 2 PTFE wash seals (P/N 0905-1175), 2 gasket wash seals (P/N 01018-07102) | G1310-68742 |
| PM kit for seal wash option | Includes 2 wash seals and 1 pack of 6 wash seal gaskets | G1310-68731 |
| Preventive Maintenance Kits | | |
| For 1260 Infinity LC isocratic or quaternary and 1220 pumps | Includes 1 PTFE pump seal (P/N 0905-1503), PTFE frits, 5/pk (P/N 01018-22707), 1 seal cap (P/N 5067-4728) | G1310-68741 |
| For 1260 Infinity LC binary pump | Includes 1 PTFE pump seals (P/N 0905-1503), PTFE frits, 5/pk (P/N 01018-22707), 1 seal cap (P/N 5067-4728), sieves for outlet valve, 10/pk (P/N 5063-6505) | G1312-68741 |
| For 1100/1200 isocratic or quaternary pumps | Includes piston seal, PTFE frits, and 2 seal caps | G1310-68730 |
| For 1290 Infinity pump | Includes pump seal exchange tool, torque wrench, and hex bit | 5067-4699 |
| For Bio-inert quaternary pump | Includes bio-inert piston seal, 5/pk PTFE frits, seal cap assembly, film washer, peristaltic pump, silicone tubing, Bio-inert wash seal | G5611-68741 |

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Pump start-up kit, G1311-68710

Pump Kits

| Description | Kit Contents | Part No. |
|---|---|-------------|
| Preventive Maintenance Kits | | |
| For 1100/1200 binary pump | Includes 4 piston seals, PTFE frits, 2 sieves, and 3 seal caps | G1312-68730 |
| For G1376A capillary pump | Includes 4 pump seals, 1 stainless steel frit, and 4 seal cap assemblies | G1376-68710 |
| For 1100/1200 and 1260 Infinity LC prep pump | Includes 1 filter cup (P/N 3150-0942), 4 seal prep flange (P/N 5022-2188), 1 filter assembly (P/N 5022-2192), 1 peristaltic pump | G1361-68710 |
| For 1120 manual injector systems | Includes 1 piston seal, 5 PTFE frits, 1 PEEK rotor seal, and 2 seal cap assemblies | G4280-68710 |
| For 1220 manual injector systems | Includes piston seals, PTFE frits, rotor seal, and 2 seal cap assemblies | G4280-68750 |
| For 1220 automated injector systems | Includes piston seals, PTFE frits, rotor seal, 2 seal cap assemblies, needle and needle seat | G4280-68770 |
| For 1120 automated injector systems | Includes 1 piston seal, 5 PTFE frits, 1 Vespel rotor seal, 1 needle, 1 needle seat, and 2 seal cap assemblies | G4280-68730 |
| Extended PM kit For 1100/1050/1200 pumps | Includes 2 piston seals (P/N 5063-6589), PTFE frits, 5/pk (P/N 01018-22707), cartridge active inlet valve (P/N 5062-8562), outlet ball valve (P/N G1312-60067) and 2 pistons (P/N 5063-6586) | 5065-4499 |
| Accessory Kits | | |
| 1260 Infinity LC binary pump accessory kit | Includes 1 tubing assembly (P/N 5063-6527), 1 CAN cable (P/N 5181-1519), 1 RRLC system configurator, 1 stainless steel capillary, 400 x 0.17 mm (P/N G1312-87303), 1 stainless steel capillary, 700 x 0.17 mm (P/N G1312-87304) | G1312-68755 |
| 1100/1200 pump accessory kit | Includes 3 wrenches, 5 PTFE frits, tubing, capillary and wrist strap | G1311-68705 |
| Pump configuration kit for G1312B with G1158B 2 position/6 port valve | Includes side cover with fixed rail, top and right cover for pump housing, and 6 connecting capillaries. Allows automatic switching between different delay volumes to optimize the system for 2.1 mm id or 4.6 mm id columns | G1312-68726 |
| Capillary pump accessory kit | Includes purge valve and holder, hex keys 2.5 and 3 mm, 2 wrenches 1/2 in x 1/16 in, wrenches 1/4 in x 5/16 in and 14 mm, wrist strap, torque adaptor and stainless steel frit, 0.5 µm | G1376-68705 |
| Accessory kit prep pump/gradient G1361A | Includes stainless steel connecting capillaries, solvent mixer, 2 L solvent bottle, bottle head assembly, filter, glass stop valve, stainless steel union, tubing and other parts | G1361-68707 |
| Online degasser accessory kit | Includes 8 screws, 8 bushings, 4 markers, tubing, syringe and syringe adapter | G1322-68705 |
| Extended flow range kit, 100 µL/min | Includes all parts to go from 20 µL/min to 100 µL/min flow rate in a capillary LC system | G1376-68707 |
| Manual prep injection valve kit, stainless steel | Includes position sensing, 10 mL loop, 25 mL syringe, ring mounting bracket, start cable and SS connecting capillaries, 0.5 mm id, 40 cm and 60 cm | 5065-9922 |



Outlet ball valve, G1312-60067

Autosampler Supplies

Your Agilent autosampler is designed to deliver accurate measurements, precise injection volumes, and high-quality data. And by following a regular schedule of preventive maintenance, you can ensure a lifetime of defensible results.



Autosampler Maintenance Schedule

| Procedure | When to Perform | Time Required |
|--------------------------------|--|---------------|
| Exchanging the needle assembly | When needle shows indication of damage or blockage | 15 minutes |
| Exchanging the seat assembly | When the seat shows indication of damage or blockage | 10 minutes |
| Exchanging the metering seal | When autosampler reproducibility indicates seal wear | 30 minutes |

Injection Valves

| Valve | Use With | Part No. | RheBuild Kit | Rotor Seal Material | Rotor Seal | Stator | Stator Face |
|---|---|-----------|--------------|---------------------|------------|-----------|-------------|
| 2 position/6 port injection valve, 400 bar | G1313A, G1329A, G1367A/B, 1120 | 0101-0921 | 0101-1257 | Vespel | 0100-1853 | 0100-1850 | 0100-1851 |
| | | | | Tefzel | 0100-1849 | | |
| | | | | PEEK | 0100-2231 | | |
| 2 position/6 port micro injection valve, 400 bar | G1377A, G1389A | 0101-1050 | | Vespel | 0100-2088 | 0100-2089 | |
| 2 position/6 port injection valve, 600 bar | G1329B, G1367C SL, G1367D SL Plus, G1367E, 1220 Infinity LC | 0101-1422 | | PEEK | 0101-1416 | 0101-1417 | |
| 10 port, dual loop valve, 400 bar | G2258A | 0101-1385 | | Vespel | 0101-2415 | 0101-1390 | |
| 2 position/6 port MBB injection valve, 400 bar | G2260A | 0101-1267 | 0101-1268 | PEEK | 0101-1268* | 0100-2195 | |
| 2 position/6 port ultra high pressure valve, 1200 bar | G4226A | 5067-4114 | | Vespel | 5068-0007 | 5068-0006 | |

*Includes seal and stator face



Injection Valve Assembly, 0101-0921



Stator for 2 position/6 port injection valve, 600 bar, 0101-1417



Stator for 2 position/6 port ultra high pressure valve, 1200 bar, 5068-0006

Needles and Needle Seats



The needle should be replaced when it becomes bent, burred or blunt, or when it is leaking or plugged. You should suspect a leak if you notice a trail of buffer crystals on the needle seat. The needle seat can become blocked if the sample contains particulates, as this is the first restriction that the sample experiences. If this occurs, try backflushing the needle seat capillary.

Needles and Needle Seats

| Agilent Autosampler | Needle Assembly Description | Part No. | Compatible with Needle Seat | Part No. |
|---|---|-------------|---|-------------|
| G1313A, G1329A/B, 1120, 1220 Infinity LC (automated sampler only) | Needle assembly, standard autosampler | G1313-87201 | Standard needle seat, PEEK 0.17 mm id capillary, 2.3 µL | G1329-87017 |
| | | | Standard needle seat, PEEK 0.12 mm id capillary, 1.2 µL | G1329-87012 |
| G1313A, G1329A, 1120, 1220 Infinity LC (automated sampler only) | Needle assembly, for use with PEEK seat | G1313-87203 | Standard needle seat, PEEK 0.17 mm id capillary, 2.3 µL | G1313-87102 |
| G1313A, G1329A/B, 1120, 1220 Infinity LC (automated sampler only) | Needle assembly, 900 µL upgrade | G1313-87202 | Standard needle seat 0.17 mm id capillary, 2.3 µL | G1329-87017 |
| G1389A | Needle assembly, micro LC autosampler | G1329-80001 | Micro LC Needle seat 100 µm id capillary, 1.2 µL | G1329-87101 |
| | | | Micro LC Needle seat 50 µm id capillary, 0.3 µL | G1329-87103 |
| G1367A/B | Needle assembly, well plate autosampler (green) | G1367-87200 | Needle seat Vespel, well plate autosampler 0.17 mm id capillary, 2.3 µL | G1367-87101 |
| | Needle assembly, well plate autosampler (blue) | G1367-87201 | Needle seat Vespel, well plate autosampler 0.12 mm id capillary, 1.2 µL | G1367-87102 |

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Seat Assembly 0.17 mm id standard autosampler, G1329-87017



Seat Assembly 0.12 mm id standard autosampler, G1329-87012

Needles and Needle Seats

| Agilent Autosampler | Needle Assembly Description | Part No. | Compatible with Needle Seat | Part No. |
|------------------------------|--|-------------|---|-------------|
| G1367C SL and G1367D SL Plus | Needle assembly, well plate autosampler (black) | G1367-87202 | Needle seat, 600 bar, with seat capillary 0.17 mm id x 100 mm, 0.8 mm od | G1367-87017 |
| | | | Needle seat, PEEK 600 bar, with seat capillary 0.12 mm id x 100 mm, 0.8 mm od | G1367-87012 |
| G1367E | Needle assembly, 1290/1260 Infinity LC autosampler | G4226-87201 | Needle seat, PEEK 600 bar, with seat capillary 0.12 mm id x 100 mm, 0.8 mm od | G1367-87012 |
| G1377A | Needle assembly, micro well plate sampler | G1377-87201 | Micro needle seat with seat capillary, 100 µm | G1377-87000 |
| | | | Micro needle seat with seat capillary, 75 µm | G1377-87001 |
| | | | Micro needle seat with seat capillary, 50 µm | G1377-87002 |
| G2258A | Needle assembly, dual loop autosampler | G2258-68710 | Twin needle seat, dual loop autosampler | G2258-87102 |
| G2260A | Needle assembly, prep autosampler | G2260-87201 | Needle seat, prep autosampler 0.5 mm id, 20 µL | G2260-87101 |
| G4226A | Needle assembly, 1290/1260 Infinity LC autosampler | G4226-87201 | Seat assembly, Vespel 0.12 mm, 1290 Infinity LC autosampler | G4226-87012 |
| G4226A | Needle assembly, 1290/1260 Infinity LC autosampler | G4226-87201 | Low dispersion needle seat | G4226-87020 |
| G5667A | Bio-inert needle, 600 bar | G5667-87200 | Bio-inert needle seat assembly, 600 bar | G5667-87017 |

Accessories

| Description | Use With | Part No. |
|---|---|-------------|
| Seat adapter | G1313A, G1329A, G1389A, G2260A, 1120 and 1220 Infinity LC | G1313-43204 |
| Finger caps, for Autosampler Gripper, 15/pk | G1313A, G1329A, G1389A, G2260A, 1120 and 1220 Infinity LC | 5063-6506 |
| Tool for micro seat capillary mounting | G1377A | G1377-44900 |



Needle seat, PEEK 600 bar, with seat capillary, G1367-87012



Seat assembly for 1290/1260 Infinity LC, G4226-87012



Needle Assembly for 1290/1260 Infinity LC, G4226-87201

Metering Device Supplies

Infrequently, the metering device seal and piston may need replacement if you see loss in injection volume precision or metering device leaking.

Metering Device Supplies

| Piston Description | Use With | Part No. | Seal Description | Part No. |
|--------------------------|--------------------------------------|-------------|---|-------------|
| Sapphire piston, 40 µL | G1367D, G1389A, G1377A, G4226A | 5064-8293 | Piston seal, 2 mm, for G1367D, G1389A, G1377A | 5022-2175 |
| | | | Piston seal for G4226A | 0905-1717 |
| Sapphire plunger, 100 µL | G1313A, G1329A/B, G1367A/B/C, G1367E | 5063-6586 | Piston seal graphite filled PTFE (reversed-phase), 2/pk | 5063-6589 |
| Sapphire plunger, 100 µL | G5667A | 5067-4695 | Bio-inert piston seal | G5611-21503 |
| Sapphire piston, 900 µL | G1313A, G1329A/B, G1367E | 5062-8587 | Metering valve seal | 0905-1294 |
| Piston, 5 mL | G2258A | G2258-60003 | Piston seal | 0905-1599 |

Loop Capillaries

| Description | Agilent Autosampler | Part No. |
|--|---------------------|-------------|
| Stainless steel loop capillary, 100 µL | G5667A | G5667-60320 |
| | G1313A | 01078-87302 |
| | G1329A/B | |
| | 1120 | |
| | 1220 Infinity LC | |
| | G1367A/B/C | G1367-87300 |
| | G4226A | 5067-4710 |
| Stainless steel loop capillary, 900 µL | G1329A/B | G1313-87303 |
| | G2260A | |
| Loop capillary, 40 µL | G1367D | G1377-87310 |
| | G4226A | 5067-4703 |
| | G1367E | |
| | G1377A | G1377-87300 |
| | G1389A | G1329-87302 |
| Loop capillary, 20 µL | G4226A | G4226-60310 |
| | G1367E | |
| Loop capillary, 8 µL | G1389A | G1375-87303 |
| | G1377A | G1375-87315 |
| Loop capillary, 5 mL | G2260A | G2260-68711 |



Piston seals, 5063-6589



Sample loop, 01078-87302



Loop capillary, 20 µL, G4226-60310

Autosampler Trays

Autosampler Trays

| Description | Part No. |
|--|-------------|
| For G1313A, G1329A/B, 1120, 1220 Infinity LC samplers | |
| 100 position tray for 2 mL vials | G1313-44510 |
| 100 position tray for 2 mL vials, thermostatable | G1329-60011 |
| 40 position tray for 2 mL vials | G1313-44512 |
| 15 position tray for 6 mL vials | G1313-44513 |
| External vial tray for 17 vials (disposal position) | G1313-60004 |
| Disposal tube for external vial tray | G1313-27302 |
| For G1367A/B/C/D/E, G2258A, G4226A | |
| Well plate tray, 2 well plates, 10 vials (supports 50 mm plates) | G2258-60011 |
| Vial plate for 54 x 2 mL vials, 6/pk | G2255-68700 |
| Vial plate for 15 x 6 mL vials | 5022-6539 |
| For G1367A/B/C/D/E | |
| 100 position tray for micro vials Also for G4226A | G4226-60021 |
| Plate for 27 Eppendorf Safe-lock tubes, 0.5/1.5/2 mL | 5022-6538 |
| For G2257A | |
| 8.5 in well plate rack, 2/pk For 16 shallow well plates, 4 deep well plates (max 48 mm height) or 6 vial racks | G2255-68709 |
| 10 in well plate rack, 2/pk For 20 shallow well plates (max height 16 mm), not compatible with deep well plates | G2255-68710 |
| 8.5 in well plate rack extension Includes 3 racks for 3 x 16 shallow well plates, 2 x 4 deep well plates (max 48 mm height) or 3 x 6 vial racks | G2255-68720 |
| 10 in well plate rack extension Includes 3 racks for 3 x 20 shallow well plates (max height 16 mm), not compatible with deep well plates | G2255-68730 |
| For G2250A | |
| 205H rack, two 96-deep well plates | G2250-04504 |
| 200 rack, 13 x 100 mm tubes (9 mL), 96 | G2250-04503 |
| 207 rack, 16 x 100 mm tubes (12 mL), 75 | G2250-04502 |
| 209 rack, 12 x 32 mm tubes (12 mL), 96 | G2250-04501 |
| 94A special holding 1100 tray | G2250-04500 |



Vial plate, G2255-68700



Vial plate, 5022-6539



Plate for 27 Eppendorf Safe-lock tubes, 5022-6538

Autosampler Kits

Autosampler Kits

| Description | Kit Contents | Part No. |
|--|--|-------------|
| Preventive Maintenance Kits | | |
| For G1329B autosamplers | Includes 1 PEEK rotor seal, 1 needle seat, 1 needle | G1313-68719 |
| For G1313A, G1329A autosamplers | Includes 1 Vespel rotor seal, 1 needle seat, 1 needle, 2 metering seals and 15 finger caps | G1313-68709 |
| For G1313A, G1329A samplers | Includes 1 Vespel rotor seal, 1 needle seat, 1 needle | G1313-68730 |
| For G1367A/B autosamplers | Includes 1 Vespel rotor seal, 1 needle seat, 1 needle, 1 peristaltic pump cartridge, 1 seal tight nut | G1367-68730 |
| For G1367C/D autosamplers | Includes 1 needle assembly, 1 low carry over seat, 1 peristaltic pump, 1 rotor seal | G1367-68734 |
| For G1367E autosampler | Includes 1 PEEK rotor seal, 1 needle seat, 1 needle, 1 peristaltic pump cartridge, 1 metering seal | G1367-68741 |
| For 1220 manual injector systems | Includes piston seals, PTFE frits, gold seals and rotor seal | G4280-68750 |
| For 1220 automated injector systems | Includes piston seals, PTFE frits, gold seals, rotor seal, needle and needle seat | G4280-68770 |
| For 1120 manual injector systems | Includes 1 piston seal, 5 PTFE frits, 2 gold seals, 4 outlet caps and 1 PEEK rotor seal | G4280-68710 |
| For 1120 automated injector systems | Includes 1 piston seal, 5 PTFE frits, 2 gold seals, 4 outlet caps, 1 Vespel rotor seal, 1 needle and 1 needle seat | G4280-68730 |
| For G4226A HiP autosampler | Includes 1 needle seat, 1 needle, 1 rotor 2 position/6 ports, 1 peristaltic pump, 1 metering seal | G4226-68735 |
| Extended PM kit For G1313A, G1329A autosamplers | Includes 1 Vespel rotor seal, 1 needle seat, 1 needle, 1 metering seal, 1 stator face | 5065-4498 |

(Continued)



Maintenance kit, G1313-68709



PM kit for 1220 manual injector systems, G4280-68750

Autosampler Kits

| Description | Kit Contents | Part No. |
|---|--|-------------|
| Door Replacement Kits | | |
| Cabinet upgrade kit for 1260 Infinity LC sampler | Includes side panel, top cover and front door | G1329-68736 |
| Cabinet kit for G1367E and G4226A | Includes side panel, base plate and top cover | 5067-4662 |
| Door replacement kit for 1260 Infinity LC sampler | Includes front and side doors | G1329-68737 |
| Door repair kit for G1367E and G4226A | Includes front door | G4226-67001 |
| Light protection kit for G1329A | Includes opaque front and side doors and front cover | G1329-68718 |
| Door replacement kit for G1329A | Includes transparent front and side doors | G1329-68727 |
| Upgrade Kits | | |
| Multidraw upgrade kit for G1313A/G1327A/G1329A autosamplers | Includes 500 μ L capillary, 1500 μ L capillary and ZDV union | G1313-68711 |
| Large volume injection kit for the Agilent 1290 Infinity autosampler G4226A | 80 μ L seat capillary | G4216-68711 |



Cabinet upgrade kit, G1329-68736



Door replacement kit, G1329-68737



Fraction Collector Supplies

Agilent fraction collectors are designed to process data in real-time for instantaneous and precise fraction collection, while increasing throughput on your purification system. So you can be certain that you are getting the highest degree of recovery and purity for your fractions – even with low flow rates.



Fraction Collector Maintenance Schedule

| Procedure | When to Perform |
|---|--|
| Analytical and Preparative Fraction Collector Maintenance | |
| Replace the inlet/waste tubing | Once per year – or when you notice signs of damage or wear |
| Replace the valve-to-needle tubing | Once per year – or when you notice signs of damage or wear |
| Exchange the preparative needle assembly | When the needle shows signs of damage or blockage |
| Exchange the analytical needle assembly | When the needle shows signs of damage or blockage, or when using the short needle assembly with tall test tubes (>45 mm) |
| Exchange the diverter valve | When the valve is leaking or not switching properly |
| Exchange the internal tray | When the flow delay sensor no longer works |
| Repair or exchange a funnel within the internal tray or funnel tray | When defective, leaky, blocked or contaminated |
| Micro Fraction Collector/Spotter Maintenance | |
| Replace fraction collector capillary | At least every six months or when worn, blocked or damaged |
| Exchange the capillary guiding assembly | When bent or damaged |
| Exchange the internal tray | When the flow delay sensor no longer works properly |
| Exchange the flap septum and waste tubing | At least every six months or when defective or contaminated |



Micro fraction collector

Collecting Tubes and Trays

| Tray Part No. | Hole Diameter (mm) | No. of Tubes | Tube Dimensions | Tube Part No. | Unit |
|---------------|--------------------|--------------|-----------------|---------------|--------|
| G1364-84523 | 30 | 40 | 30 x 100 mm | 5042-6458 | 100/pk |
| | | | 30 x 48 mm | 5042-6470 | 100/pk |
| G1364-84524 | 25 | 60 | 25 x 100 mm | 5042-6459 | 100/pk |
| G1364-84525 | 16 | 126 | 16 x 100 mm | 5022-6532 | 250/pk |
| | | | 16 x 48 mm | 5022-6533 | 100/pk |
| G1364-84516 | 12 | 215 | 12 x 100 mm | 5022-6531 | 250/pk |
| | | | 12 x 48 mm | 5022-6534 | 100/pk |
| G1364-84532 | Funnel tray | 40 | Any size | | |

Well Plate Trays

| Tray Part No. | Description | Well Plate Part No. | Description | Unit |
|---------------|--|---------------------|---|---------|
| G1364-84521 | Tray for 4 well plates, cooled | 5042-1385 | 96-well plates, 0.5 mL, polypropylene | 120/pk |
| | | 5042-1386 | 96-well plates, 0.5 mL, polypropylene | 10/pk |
| G1364-84531 | Tray for 4 well plates, adjustable, cooled | 5042-6454 | 96-deep well plates, 1 mL, polypropylene | 50/pk |
| | | 5042-1389 | Closing mats for 96-well plates, silicone, pre-slit, fits 96-well plates P/N 5042-1385 and 5042-1386 only | 50/pk |
| G1364-84522 | Tray for 2 well plates, 10 funnels, cooled | 5042-1388 | 384-well plates, 90 µL, polypropylene | 30/pk |
| | | 5065-4402 | 96-deep well collection plates with glass inserts, caps, and septa, pre-assembled, 0.35 mL | |
| G1367-60001 | Tray for 2 well plates, 10 vials, 2 mL | 5188-5321 | Glass inserts, 350 µL | 1000/pk |
| | | 5188-5322 | Caps/septa for glass inserts | 1000/pk |
| | | 5042-8502 | 96-well plates, 150 µL, conical, polypropylene | 25/pk |
| | | G2255-68700 | Vial plate for 54 x 2 mL vials | 6/pk |
| | | 5022-6538 | Plate for 27 Eppendorf Safe-lock tubes, 0.5/1.5/2 mL | |
| | | 5022-6539 | Vial plate for 15 x 6 mL vials | |



Funnel tray for G1364C fraction collector, G1364-84532



Collection plate, showing 96-position closing mat, 5042-1389



Vial plate, G2255-68700



Plate for 27 Eppendorf Safe-lock tubes, 5022-6538



Vial plate, 5022-6539

Fraction Collector Capillary Kits and Needles

| Module | Max Flow Rate | Tube Size | Tubing Kit | Needle Length | Needle | Typical Use |
|--------|---------------|------------|-------------|---------------|-------------|---------------------------------------|
| G1364B | 100 mL/min | 0.8 mm id | G1364-68711 | | G1364-87201 | Tubes (max 100 mm) |
| G1364C | 1 mL/min | 0.15 mm id | G1364-68723 | 50 mm | G1367-87200 | Tubes (max 48 mm), well plates, vials |
| | 10 mL/min | 0.25 mm id | G1364-68712 | 50 mm | G1367-87200 | |
| | 10 mL/min | 0.25 mm id | G1364-68712 | 20 mm | G1364-87202 | Funnel tray (tubes max 75 mm) |
| | 100 mL/min | 0.8 mm id | G1364-68711 | 20 mm | G1364-87202 | |
| G1364D | 4 µL/min | 25 µm id | G1364-87304 | | | MALDI targets, well plates |
| | 4-30 µL/min | 50 µm id | G1364-87305 | | | |
| | 30-100 µL/min | 100 µm id | G1364-87306 | | | |

TIPS & TOOLS

Information on maintenance procedures can be found at www.agilent.com/chem/LCmaintenancenotes

G1364D Micro Fraction Collector Supplies

| Description | Part No. |
|---|-------------|
| MALDI spotting adapter for G1364D | G1364-83205 |
| Well plate adapter assembly for G1364C/D | G1364-60021 |
| Flap septum, PEEK, for internal tray | G1364-27107 |
| Fused silica/PEEK capillary, 25 µm, 50 cm | G1364-87304 |
| Fused silica/PEEK capillary, 50 µm, 50 cm | G1364-87305 |
| Fused silica/PEEK capillary, 100 µm, 50 cm | G1364-87306 |
| Waste tube, PTFE, 20 cm, 1.4 mm id, 2.0 mm od | G1364-86711 |
| MALDI plate carrier Bruker | 5022-6541 |
| MALDI plate carrier Bruker PAC | 5022-6546 |
| MALDI plate carrier ABI | 5022-6542 |
| MALDI plate carrier ABI Opti-TOF | 5023-0238 |
| MALDI plate carrier Agilent | 5022-6543 |
| MALDI plate carrier Micromass | 5022-6544 |
| Target plate for AP-MALDI LC/MS | G1972-60025 |
| Calibration plate Bruker | 5023-0208 |
| Calibration plate ABI 192 | 5023-0209 |
| Calibration plate ABI 10x10 & 20x20 | 5023-0213 |
| Calibration plate Agilent | 5023-0214 |
| Calibration plate Micromass | 5023-0215 |
| On-line matrix kit for MALDI spotting | G1364-68706 |
| Includes BCD board/cable, syringe, needles, adapters, connector and capillary | |
| Adapter, female to female 1/4-28 | 5042-8517 |
| Adapter, male Luer to female 1/4-28 | 5042-8518 |
| Syringe, glass, 1 mL, 1/4-28 connector | 5181-1541 |
| Micro T-connector, PEEK, swept volume 29 nL, with 1/32 in id fittings | 5042-8519 |
| MALDI spotting tips, PTFE, 10/pk | G1364-81701 |



MALDI spotting adapter, G1364-83205



Well plate adapter assembly, G1364-60021



MALDI plate carrier Bruker, 5022-6541



Calibration plate Bruker, 5023-0208



Union, female to female, 5042-8517



Adapter, male Luer to female, 5042-8518



Micro T-connector, PEEK, 5042-8519



Injection Valve Assembly, 0101-0921


Valve Supplies

Agilent's industry-leading Manual Injection Valves are designed to ensure trouble-free operation with your HPLC System.

Our valves also feature patented "Make-Before-Break" architecture that allows you to switch between LOAD and INJECT positions without interrupting the flow. So you can analyze more samples in less time.

Valve Maintenance Notes

- Vespel is a polyimide with low wear and high chemical resistance. Vespel tolerates a pH range of 0 to 10. More basic solutions dissolve Vespel, which damages the rotor seal
- PEEK offers a high chemical resistance and versatility, and will tolerate the entire pH range from 0 to 14
- Tefzel is recommended for use in applications where PEEK cannot be used, such as methylene chloride or DMSO in higher concentrations

|  | pH Range | | |
|---|----------|------|-------|
| | 0-7 | 7-10 | 10-14 |
| Vespel | | | |
| PEEK | | | |
| Tefzel | | | |

Injection Valves

Injection Valves

| Valve | Use With | Part No. | RheBuild Kit | Rotor Seal Material | Rotor Seal | Stator | Stator Face |
|---|---|-----------|--------------|---------------------|------------|-----------|-------------|
| 2 position/6 port injection valve, 400 bar | G1313A, G1329A, G1367A/B, 1120 | 0101-0921 | 0101-1257 | Vespel | 0100-1853 | 0100-1850 | 0100-1851 |
| | | | | Tefzel | 0100-1849 | | |
| | | | | PEEK | 0100-2231 | | |
| 2 position/6 port micro injection valve, 400 bar | G1377A, G1389A | 0101-1050 | | Vespel | 0100-2088 | 0100-2089 | |
| 2 position/6 port injection valve, 600 bar | G1329B, G1367C SL, G1367D SL Plus, G1367E, 1220 Infinity LC | 0101-1422 | | PEEK | 0101-1416 | 0101-1417 | |
| 10 port, dual loop valve, 400 bar | G2258A | 0101-1385 | | Vespel | 0101-2415 | 0101-1390 | |
| 2 position/6 port MBB injection valve, 400 bar | G2260A | 0101-1267 | 0101-1268 | PEEK | 0101-1268* | 0100-2195 | |
| 2 position/6 port ultra high pressure valve, 1200 bar | G4226A | 5067-4114 | | Vespel | 5068-0007 | 5068-0006 | |

*Includes seal and stator face



Stator for 2 position/6 port ultra high pressure valve, 1200 bar, 5068-0006



Switching valve

Switching Valve Supplies

A set of valve types specially designed for Agilent HPLC systems allows you to extend your HPLC applications. New valve offerings give you:

- More flexibility in solvent selection and column selection
- New automation capabilities in sample preparation
- Increased sample throughput through alternating column regeneration
- Increased separation performance with multidimensional chromatography

External Switching Valve Replacement Parts

| Description | Use With | Valve Head | Rotor Seal | | Stator Face | Stator Head | Repair Kit | Bearing Ring |
|--|----------|------------|------------|------------|-------------|-------------|------------|--------------|
| | | | Material | Rotor Seal | | | | |
| 2 position/6 port valve head, 600 bar | G4231A | 5067-4131 | PEEK | 0101-1409 | N/A | 0101-1417 | N/A | 1535-4045 |
| 2 position/6 port valve head, 1200 bar | G4231B | 5067-4117 | Vespel | 5068-0008 | N/A | 5068-0006 | | |
| 2 position/10 port micro valve head, 600 bar | G4232A | 5067-4144 | PEEK | 0101-1415 | N/A | 0101-1421 | | |
| 2 position/10 port valve head, 1200 bar | G4232B | 5067-4118 | Vespel | 5068-0012 | N/A | 5068-0011 | | |
| 6-Column selector valve head, 600 bar | G4234A | 5067-4146 | PEEK | 5068-0076 | N/A | 5068-0077 | | |
| 6-Column selector valve head, 1200 bar | G4234B | 5067-4142 | Vespel | 5068-0067 | N/A | 5068-0077 | | |
| Bio-inert 12 position/13 port valve POD, 210 bar | G4235A | 5067-4159 | PEEK | Repair Kit | Repair Kit | 5068-0097 | 0101-1288 | |
| Bio-inert 2 position/6 port, 600 bar | G5631A | 5067-4148 | PEEK | 0101-1409 | 0100-1851 | 5068-0060 | N/A | |
| 2 position/10 port valve head Bio-inert, 600 bar | G5632A | 5067-4132 | PEEK | 5068-0041 | 5068-0095 | 5068-0040 | | |
| Bio-inert 4-Column selector, 600 bar | G5639A | 5067-4134 | PEEK | 5068-0045 | 5068-0093 | 5068-0044 | | |

Internal Switching Valves Replacement Parts

| Description | Use With | Part No. | Rotor Seal | | Stator Face | Stator Head | Bearing Ring | Repair Kit |
|--|---------------------------|-------------|------------|------------|-------------|-------------|--------------|------------|
| | | | Material | Rotor Seal | | | | |
| 2 position/6 port, 400 bar | G1316A/B | G1316-67005 | Tefzel | 0100-1854 | 0100-1851 | 0100-1850 | 0100-1852 | 0101-1258 |
| | | | Vespel | 0100-1855 | | | | |
| | | | PEEK | 0100-2233 | | | | |
| 2 position/10 port CSV, 400 bar | G1316A | G1316-67007 | PEEK | Repair Kit | Repair Kit | 0101-1362 | 0100-1852 | 0101-1360 |
| 2 position/6 port HP CSV, 600 bar | G1316A 1260 Series/G1316B | G1353-68750 | PEEK | 0101-1409 | N/A | 0101-1417 | 1535-4045 | N/A |
| 2 position/6 port micro CSV, 400 bar | G1316A | G1316-67006 | Vespel | 0100-2087 | N/A | 0100-2089 | | |
| 2 position/10 port CSV, 600 bar | G1316B | G1316-67009 | PEEK | 0101-1415 | N/A | 0101-1421 | | |
| 2 position/6 port valve head, 600 bar | G1316C | 5067-4137 | PEEK | 0101-1409 | N/A | 0101-1417 | | |
| 2 position/6 port valve head, 1200 bar | G1316C | 5067-4117 | Vespel | 5068-0008 | N/A | 5068-0006 | | |
| 2 position/10 port micro valve head, 600 bar | G1316C | 5067-4144 | PEEK | 0101-1415 | N/A | 0101-1421 | | |
| 2 position/10 port valve head, 1200 bar | G1316C | 5067-4118 | Vespel | 5068-0012 | N/A | 5068-0011 | | |
| 6-Column selector valve head, 600 bar | G1316C | 5067-4146 | PEEK | 5068-0076 | N/A | 5068-0077 | | |
| 6-Column selector valve head, 1200 bar | G1316C | 5067-4142 | Vespel | 5068-0067 | N/A | 5068-0077 | | |
| 8 position/9 port valve head, 400 bar | G1316C | 5067-4108 | PEEK | 5067-4113 | 5067-4113 | 5067-4112 | | |
| 8 position/9 port valve head, 600 bar | G1316C | 5067-4107 | PEEK | 5067-4111 | N/A | 5068-0001 | | |
| 8 position/9 port valve head, 1200 bar | G1316C | 5067-4121 | Vespel | 5068-0002 | N/A | 5068-0001 | | |
| 2D-LC, valve head, 1200 bar | G1316C | 5067-4170 | Vespel | 5068-0116 | N/A | 5068-0115 | | |
| Bio-inert 12 position/13 port valve POD, 210 bar | G1316C | 5067-4159 | PEEK | 0101-1288 | 0101-1288 | 5068-0097 | | |
| Bio-inert 2 position/6 port, 600 bar | G1316C | 5067-4148 | PEEK | 0101-1409 | 0100-1851 | 5068-0060 | | |
| Bio-inert 4-Column selector, 600 bar | G1316C | 5067-4134 | PEEK | 5068-0045 | 5068-0093 | 5068-0044 | | |
| 2 position/10 port valve head Bio-inert, 600 bar | G1316C | 5067-4132 | PEEK | 5068-0041 | 5068-0095 | 5068-0040 | | |



Valve head, 2 position/6 port, 600 bar, 5067-4137



2 position/6 port ultra high pressure valve, 5067-4117



Valve head, 2 position/10 ports for ultra high pressure, 1200 bar, 5067-4118



Stator for 2 position/6 port ultra high pressure valve, 600 bar, 0101-1417



Rotor seal, 2 position/6 port, 600 bar for C1316B, 0101-1409

Manual Injection Valves

Agilent provides the latest developments in LC injection technology from Rheodyne.

- Continuous flow path with "Make-Before-Break" design
- Sample capacity
- Choice of stainless or PEEK flow path
- Easy access to fittings due to wide 30° port angles

Series 7725i and 9725i Analytical Injection Valves

Stainless steel (SS) 7725i and PEEK 9725i valves are the most popular injection valves for analytical HPLC. Features include:

- A 20 μ L loop (installed). Loops are also available in stainless steel or PEEK from 5 μ L to 5 mL (10 mL for PEEK)
- Make-Before-Break (MBB) technology allows switching without flow interruption
- Wide 30° port angles offer easier access to fittings
- Built-in position sensing switch provides the chromatograph with a reproducible start signal

Series 3725i-038 and 3725i Preparative Injection Valves

The series 3725i-038 (stainless steel) and 3725i (PEEK) are the most suitable manual valves for large sample volumes, high flow rates, and preparative columns sized 1.0-10 cm in diameter.

- Versatile ports accommodate 1/8 in (3.2 mm) and 1/16 in (1.6 mm) od tubing.
 - Note:** 1/16 in od tubing requires an adapter, P/N 5067-1503
- 1.0 mm diameter passages allow flow rates up to 800 mL/min with virtually no pressure drop
- Make-Before-Break technology allows switching without flow interruption
- High reproducibility for both partial-filling and complete-filling methods
- Sample range is 100 μ L to 20 mL (10 mL loop is installed)
- Flow range is 10 to 800 mL/min
- Built-in position sensing switch gives the chromatograph a reproducible start signal



7725i manual injection valve, 5063-6502

Manual Injection Valves with Position Sensing Switches

| Description | Comments | Part No. | Rotor Seal Material | Rotor Seal | Stator Face | Stator Head | Bearing Ring | Isolation Seal | Repair Kit | Needle Port Adaptor |
|--|-------------|-----------|---------------------|------------|-------------|-------------|--------------|----------------|------------|---------------------|
| 2 position/ 6 port valve, 400 bar, for G1328A/B | Analytical | 5063-6502 | Tefzel | 0101-0620 | 0100-1859 | 0100-1860 | 1535-4045 | 1535-4046 | 0101-1254 | N/A |
| | | | Vespel | 0101-0623 | | | | | | |
| | | | PEEK | 0101-1255 | | | | | | |
| 2 position/ 6 port valve, 600 bar, for G1328C | Analytical | 5067-4141 | PEEK | 5068-0052 | N/A | 5068-0053 | 1535-4045 | 1535-4046 | N/A | N/A |
| 2 position/ 6 port valve, 400 bar, for 1120 | Analytical | 5067-4104 | PEEK | 5067-4105 | N/A | 0100-1850 | 1535-5045 | N/A | N/A | 5067-1581 |
| 2 position/ 6 port, 600 bar, for 1220 | Analytical | 5067-4202 | PEEK | 0101-1409 | N/A | 0101-1417 | 1535-4045 | N/A | N/A | 5067-1581 |
| 2 position/ 6 port valve, 600 bar, for Bio-inert | Bio | 5067-4158 | PEEK | 5068-0082 | 0100-1851 | 5068-0060 | 1535-4045 | N/A | N/A | 5067-1581 |
| 2 position/ 6 port valve, 400 bar PEEK | Analytical | 0101-1253 | Tefzel | 0101-0620 | 0100-1859 | 1535-5082 | N/A | 1535-4046 | N/A | N/A |
| Manual prep injection valve, SSt 400 bar, for 3725i | Preparative | 0101-1232 | PEEK | 0101-1233 | N/A | N/A | N/A | 1535-4046 | N/A | N/A |
| Manual prep injection valve, PEEK | Preparative | 0101-1231 | PEEK | 0101-1233 | N/A | N/A | N/A | 1535-4046 | N/A | N/A |

Manual Injection Valve Replacement Parts

- Rotor seals wear with use and need routine replacement
- Stators only need replacement if the ports are damaged
- PEEK rotor seals are incompatible with concentrated nitric and sulfuric acids



Stainless steel sample loops

Manual Injection Valve Sample Loops

The right mix of injection valve sample loops are available for your application needs. Agilent offers factory-cut and finished loops of the highest quality.

- Stainless steel loops are square cut and free of burrs for a flush connection
- Flexible PEEK loops have a clean, straight cut for low dead volume connections

Stainless Steel Sample Loops

- Sample loops for Rheodyne 7725 Series and 7125 Series valves are not interchangeable due to the change in port angle
- Actual volumes can differ due to tolerance of metal tubing bore
- Accuracy of large metal loops is $\pm 5\%$, intermediate loops $\pm 10\%$, small loops $\pm 30\%$

PEEK Sample Loops

- Inert to most organic solvents
- Wall thickness, temperature, exposure time and concentration of organic solvents affect the durability of PEEK tubing
- Concentrated nitric acid and sulfuric acid weaken PEEK tubing
- THF, methylene chloride and DMSO cause PEEK to swell
- Actual volumes can differ because of tolerance of tubing bore
- Accuracy of large PEEK loops is $\pm 14\%$, intermediate loops $\pm 21\%$, small loops $\pm 65\%$

Manual Injection Valve Sample Loops

| Volume | ID (mm) | Material | Use With | Part No. |
|--------|---------|----------|---------------|-----------|
| 5 µL | 0.18 | SS | 7125 and 7010 | 1535-4860 |
| | 0.18 | SS | 7725 | 0101-1248 |
| | 0.18 | PEEK | 9725 | 0101-1241 |
| 10 µL | 0.30 | SS | 7125 and 7010 | 0101-0376 |
| | 0.30 | SS | 7725 | 0100-1923 |
| | 0.25 | PEEK | 9725 | 0101-1240 |
| 20 µL | 0.51 | SS | 7125 and 7010 | 0101-0377 |
| | 0.30 | SS | 7725 | 0100-1922 |
| | 0.25 | PEEK | 9725 | 0101-1239 |
| 50 µL | 0.51 | SS | 7125 and 7010 | 0101-0378 |
| | 0.51 | SS | 7725 | 0100-1924 |
| | 0.51 | PEEK | 9725 | 0101-1238 |
| 100 µL | 0.51 | SS | 7125 and 7010 | 0101-0379 |
| | 0.51 | SS | 7725 | 0100-1921 |
| | 0.51 | PEEK | 9725 | 0101-1242 |
| 200 µL | 0.76 | SS | 7125 and 7010 | 0101-1252 |
| | 0.76 | SS | 7725 | 0101-1247 |
| | 0.51 | PEEK | 9725 | 0101-1237 |
| 500 µL | 0.76 | SS | 7125 and 7010 | 0101-1251 |
| | 0.76 | SS | 7725 | 0101-1246 |
| | 0.76 | PEEK | 9725 | 0101-1236 |
| 1 mL | 0.76 | SS | 7125 and 7010 | 0101-1219 |
| | 0.76 | SS | 7725 | 0101-1245 |
| | 0.76 | PEEK | 9725 | 0101-1235 |
| 2 mL | 1.00 | SS | 7125 and 7010 | 0101-1250 |
| | 1.00 | SS | 7725 | 0101-1244 |
| | 0.76 | PEEK | 9725 | 0101-1234 |
| | 1.6 | PEEK | 3725 | 0101-1229 |
| 5 mL | 1.00 | SS | 7125 and 7010 | 0101-1249 |
| | 1.00 | SS | 7725 | 0101-1243 |
| | 0.76 | PEEK | 9725 | 0101-1230 |
| | 1.6 | PEEK | 3725 | 0101-1228 |
| 10 mL | 2.0 | PEEK | 3725 | 0101-1227 |
| 20 mL | 2.0 | PEEK | 3725 | 0101-1226 |



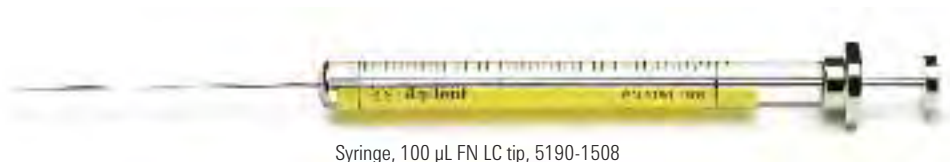
PEEK sample loops

Syringes for Manual Injection

Agilent syringes for manual injection valves have a blunt-tip point style needle to prevent damaging the valve's internal parts. They can be used with any type/brand of manual injection valve.

LC Manual Syringes with Fitted Plungers

| Volume (μL) | Description | Unit | Needle | Part No. |
|-------------|--------------------------------------|------|----------------------|-----------|
| 5 | Fixed | | 22 gauge/2 in/LC tip | 5190-1480 |
| 10 | Fixed | | 22 gauge/2 in/LC tip | 5190-1484 |
| | Removable | | 22 gauge/2 in/LC tip | 5190-1485 |
| | Replacement needle for 10 μL syringe | 3/pk | | 5190-1486 |
| 25 | Fixed | | 22 gauge/2 in/LC tip | 5190-1494 |
| 50 | Fixed | | 22 gauge/2 in/LC tip | 5190-1501 |
| 100 | Fixed | | 22 gauge/2 in/LC tip | 5190-1508 |
| 250 | Fixed | | 22 gauge/2 in/LC tip | 5190-1515 |
| 500 | Fixed | | 22 gauge/2 in/LC tip | 5190-1522 |



Syringe, 100 μL FN LC tip, 5190-1508

LC Manual Syringes with PTFE-Tipped Plungers

| Volume (µL) | Description | Unit | Needle | Part No. |
|-------------|--|------|----------------------|-----------|
| 10 | Removable | | 22 gauge/2 in/LC tip | 5190-1492 |
| | Replacement needle for 10 µL syringe | 3/pk | | 5190-1486 |
| | Replacement plunger with PTFE tip for 10 µL syringe | | | 5190-1558 |
| 25 | Removable | | 22 gauge/2 in/LC tip | 5190-1499 |
| | Replacement needle | 3/pk | | 5190-1571 |
| | Replacement plunger with PTFE tip for 25 µL syringe | | | 5190-1560 |
| 50 | Removable | | 22 gauge/2 in/LC tip | 5190-1505 |
| | Replacement needle | 3/pk | | 5190-1571 |
| | Replacement plunger with PTFE tip for 50 µL syringe | | | 5190-1561 |
| 100 | Removable | | 22 gauge/2 in/LC tip | 5190-1512 |
| | Replacement needle | 3/pk | | 5190-1571 |
| | Replacement plunger with PTFE tip for 100 µL syringe | | | 5190-1562 |
| 250 | Removable | | 22 gauge/2 in/LC tip | 5190-1520 |
| | Replacement needle | 3/pk | | 5190-1571 |
| 500 | Removable | | 22 gauge/2 in/LC tip | 5190-1526 |
| | Replacement needle | 3/pk | | 5190-1571 |
| | Replacement plunger with PTFE tip for 500 µL syringe | | | 5190-1564 |

TIPS & TOOLS

Agilent has made vial, cap and septum selection easy with its new Interactive Vial Selection Tool, available online in both desktop and mobile versions. The tool identifies the right vial and closures for your particular application, and provides the rationale for the choices offered.

Visit www.agilent.com/chem/SelectVials



Thermostatted Column Compartment Supplies



High temperature heat exchanger, G1316-80002



High temperature heat exchanger, G1316-80003



Heat exchanger/cooler, G1316-80004



Column Identification Module, 5062-8588

Thermostatted Column Compartment Supplies

| Description | Part No. |
|---|-------------|
| Capillary system for 0.12 mm id use | G1316-68744 |
| Rapid Resolution High Throughput capillary kit Used for converting an Agilent 1200 instrument to the RRLC configuration, to enable use of high efficiency columns (to 600 bar). Can also be used for Agilent 1100 instruments. | 5065-9947 |
| 1200 capillary kit for 0.12 mm id | G1316-68716 |
| High temperature heat exchanger, 1.6 µL, 0.12 mm id, "R" | G1316-80002 |
| High temperature heat exchanger, 1.6 µL, 0.12 mm id, "L" | G1316-80003 |
| Heat exchanger/cooler, 1.5 µL, 0.12 mm id | G1316-80004 |
| Carrier for heat exchanger 1290 Infinity TCC and 1200 Series TCC SL | G1316-83200 |
| Column Identification Module (CIM), 3/pk | 5062-8588 |
| Column clamp, 6/pk | 5063-6526 |
| Column holder for micro LC columns | 5001-3702 |
| Column connecting capillary with fittings, 7 cm, 0.12 mm id, 1/16 in male/male | G1316-87303 |
| Column connecting capillary with fittings, 9 cm, 0.17 mm id, 1/16 in male/male | G1316-87300 |
| Column connecting capillary with fittings, 18 cm, 0.12 mm id, 1/16 in male/male | G1313-87304 |
| Column connecting capillary with fittings, 18 cm, 0.17 mm id, 1/16 in male/male | G1313-87305 |
| PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm, Micro valve to waste | 5022-6503 |
| Thermal column insulation enclosure kit | G1316-60001 |

Capillary Tubing Kits

Capillary kits are available for easy ordering and setup of the switching valves. They include all capillaries and fittings for specific applications, as well as bulk PEEK capillaries and a capillary cutter to add maximum flexibility.

Capillary Tubing Kits

| Application | Valve Kit | Part No. |
|---|--|---------------------------|
| Column regeneration Capillaries: 0.17 mm id | G1157A | G1156-68711 |
| Column regeneration Capillaries: 0.25 mm id | G1157A | G1156-68713 |
| Capillary kit column regeneration intern Capillaries: 0.17 mm id | 2 position/10 port 400 bar valve, for G1316A/B | G1316-68711 |
| Column selection Capillaries: 0.17 mm id | G1159A | G1156-68712 |
| Sample enrichment Capillaries: 0.17 mm id | G1316A #055 | G1316-68710 |
| Sample enrichment Capillaries: 0.17 mm id | G1158A | G1156-68714 |
| Solvent selection Flow rate up to 10 mL/min | G1160A | G1160-68706 5067-4601* |

*Use for method development applications. Kit contains longer tubing.

Capillary Kits for Internal Switching Valves

| Description | Use With | Part No. |
|---|---|-------------|
| Capillary kit column switching valve | 2 position/6 port 400 bar valve, for G1316A/B | G1316-68708 |
| Capillary kit column regeneration intern | 2 position/10 port 400 bar valve, for G1316A/B | G1316-68711 |
| Column regeneration kit for μ -LC columns | 2 position/10 port CSV 600 bar, for G1316B | G1316-68721 |

Capillary Kits for Column Selection Valve

| Capillary Kits Part Numbers | | | Valve Kit | | |
|-----------------------------|------------|-----------|-----------|-------------------------------|----------|
| 0.12 mm ID-A | 0.17 mm ID | Other | Part No. | Valve Type | Pressure |
| 5067-4646 | 5067-4730 | | G4231A | 2 position/6 port | 600 |
| 5067-4646 | | | G4231B | 2 position/6 port | 1200 |
| 5067-4800 | 5067-5103 | | G4232A | 2 position/10 port | 600 |
| 5067-4682 | | | G4232B | 2 position/10 port | 1200 |
| 5067-4729 | | | G4234A | 6 position/14 port | 600 |
| 5067-4729 | | | G4234B | 6 position/14 port | 1200 |
| | | 5067-4601 | G4235A | 12 position/13 port Bio-inert | 210 |
| | 5067-4767 | | G5631A | 2 position/6 port Bio-inert | 600 |
| | 5067-4769 | | G5639A | 4 position/10 port Bio-inert | 600 |
| 5067-1595 | | | | 8 position/9 port | 1200 |
| | 5067-1596 | | | 8 position/9 port | 1200 |
| 5067-1597 | | | | 8 position/9 port | 1200 |

Capillary Kit Contents

| Part No. | Description | Quantity |
|-----------|--|----------|
| 5067-1595 | Heater long-up 0.12 id, 1.6 µL internal | 4 |
| | Heater long-down 0.12 id, 1.6 µL internal | 4 |
| | Carrier for heat exchanger, TCC SL Plus | 4 |
| | Flexible tubing, 280 mm, 0.12 mm id | 2 |
| | SS capillary, 340 x 0.12 mm, m/m, n-s/n-s | 1 |
| | SS capillary, 280 x 0.12 mm, ps/ps, 1 long nut, 1 short nut | 8 |
| | SS capillary, 280 x 0.12 mm, ps-ns, 2 long nuts, 1 short nut | 8 |
| | SS capillary, 280 x 0.17 mm, ps/ps, 1 long nut | 1 |
| | Flexible capillary, 0.12 x 500 mm, no fittings | 1 |
| | Fitting holder assembly | 4 |
| | Column clip set, eight colors | 2 |
| | Long fittings and ferrules, SS, 10/pk | 1 |

(Continued)



TIPS & TOOLS

For internal switching valves for your TCC, see page 75

Capillary Kit Contents

| Part No. | Description | Quantity |
|--|--|---|
| 5067-1596 | Capillary, 0.17 x 90 mm, 1/16 in male/male | 6 |
| | Flexible tubing, 400 mm, 0.17 mm id | 1 |
| | Flexible capillary, 0.17 x 280 mm, no fitting | 2 |
| | Plastic fitting | 8 |
| | Long fittings and ferrules, SS, 10/pk | 2 |
| | SS capillary, 280 x 0.17 mm, ps/ps, 2 long nut | 1 |
| | SS capillary, 280 x 0.17 mm, ps/ps, 1 long nut, 1 short nut | 6 |
| | SS capillary, 500 x 0.17 mm, ps-ns, 2 long nuts, 1 short nut | 6 |
| | Flexible capillary, 0.17 mm id x 600 mm | 1 |
| | Column clip set, eight colors | 2 |
| | VHP-fitting standard length (10 each = 1/pk) | 6 |
| | 5067-1597 | Heater long-up 0.12 id, 1.6 µL internal |
| Heater long-down 0.12 id, 1.6 µL internal | | 3 |
| Carrier for heat exchanger, TCC SL Plus | | 3 |
| Flexible tubing, 280 mm, 0.12 mm id | | 2 |
| SS capillary, 340 x 0.12 mm, m/m, n-s/n-s | | 1 |
| SS capillary, 280 x 0.12 mm, ps/ps, 1 long nut, 1 short nut | | 6 |
| SS capillary, 400 x 0.12 mm, ps-ns, 2 long nuts, 1 short nut | | 6 |
| SS capillary, 280 x 0.17 mm, ps/ps, 2 long nut | | 1 |
| Flexible capillary, 0.12 x 500 mm, no fittings | | 1 |
| Column clip set, eight colors | | 2 |
| Fitting holder assembly | | 3 |
| Long fittings and ferrules, SS, 10/pk | | 1 |
| 5067-4601 | Bottle head assembly | 4 |
| | Tefzel ferrules/SS rings, 1/8 in, 10/pk | 1 |
| | Flexible tubing, 1 ea / 1 meter | 5 |
| | PPS nuts, 1/8 in, 1/4-28 thread, 10/pk | 1 |
| | Long fittings and ferrules, SS, 10/pk | 5 |

(Continued)

Capillary Kit Contents

| Part No. | Description | Quantity | |
|--|---|--|---|
| 5067-4646 | SS capillary, 0.12 mm id, 340 mm pre-swaged | 1 | |
| | SS capillary, 0.17 mm id, 700 mm pre-swaged | 1 | |
| | SS capillary, 0.12 mm id, 90 mm pre-swaged | 2 | |
| | SS capillary, 0.12 mm id, 150 mm pre-swaged | 2 | |
| | SS capillary, 0.12 mm id, 280 mm pre-swaged | 2 | |
| | SS capillary, 0.12 mm id, 120 mm pre-swaged | 1 | |
| | SS capillary, 0.12 mm id, 200 mm pre-swaged | 1 | |
| | PTFE flexible tubing | 1 | |
| | Heat exchanger, long-up, 1.6 µL | 1 | |
| | Heat exchanger, long-down, 1.6 µL | 1 | |
| | Carrier for heat exchanger, TCC SL Plus | 2 | |
| | Fitting holder assembly | 1 | |
| | Column clip set, eight colors | 1 | |
| | 5067-4682 | SS capillary, 120 x 0.12 mm, ns ns, 1 large, 1 large | 1 |
| | | SS capillary, 150 x 0.12 mm, ns ns, 1 large, 1 large | 2 |
| SS capillary, 200 x 0.12 mm, ns ps, 1 short, 1 large | | 1 | |
| SS capillary, 280 x 0.12 mm, ns ns, 1 large, 1 large | | 2 | |
| SS capillary, 340 x 0.12 mm, ps ns, 1 short, 1 large | | 1 | |
| SS capillary, 0.17 mm id, 700 mm pre-swaged | | 1 | |
| SS capillary, 90 x 0.12 mm, ns ns, 1 short, 1 large | | 2 | |
| Column clip set, eight colors | | 1 | |
| Fitting holder assembly | | 2 | |
| Heater long-up 0.12 id, 1.6 µL internal | | 1 | |
| Heater long-down 0.12 id, 1.6 µL internal | | 1 | |
| Carrier for heat exchanger, TCC SL Plus | | 2 | |

(Continued)



Capillary Kit Contents

| Part No. | Description | Quantity |
|-----------------|--|-----------------|
| 5067-4729 | SS capillary, 0.8 x 0.11 mm, 340 mm, RF/M4 | 1 |
| | SS capillary, 0.8 x 0.11 mm, 5000 mm, RF/M4 | 1 |
| | SS capillary, 0.8 x 0.11 mm, 130 mm, lg RF/M4 | 8 |
| | SS capillary, 0.8 x 0.17 mm, 150 mm, lg M4/M4 | 1 |
| | SS capillary, 0.8 x 0.11 mm, 250 mm, lg ps/M4 | 1 |
| | Flexible PEEK tubing | 2 |
| | Heater long-up 0.12 id, 1.6 µL internal | 2 |
| | Heat exchanger, long-down, 1.6 µL | 2 |
| | Carrier for heat exchanger, TCC SL Plus | 2 |
| | Fitting holder assembly | 2 |
| | Column clip set, eight colors | 1 |
| 5067-4730 | SS capillary, 340 x 0.17 mm, ps-ns, 1 short, 1 long | 1 |
| | SS capillary, 0.17 mm id, 700 mm pre-swaged | 1 |
| | SS capillary, 90 x 0.17 mm, ns-ns, 1 short, 1 long | 4 |
| | SS capillary, 150 x 0.17 mm, ns-ns, 1 large, 1 large | 2 |
| | SS capillary, 280 x 0.17 mm, ns-ns, 1 large, 1 large | 2 |
| | SS capillary, 120 x 0.17 mm, ns-ns, 1 large, 1 large | 1 |
| | SS capillary, 200 x 0.17 mm, ns-ps, 1 short, 1 large | 1 |
| | PTFE flexible tubing | 1 |
| | Column clip set, eight colors | 1 |
| 5067-4800 | SS capillary, 340 x 0.11 mm, SW-1/16/M4 | 1 |
| | SS capillary, 0.17 mm id, 700 mm, SW-1/16/M4 | 1 |
| | SS capillary, 90 x 0.11 mm, SW-1/16/M4 | 2 |
| | SS capillary, 0.8 x 0.11 mm, 150 mm, large RF/M4 | 2 |
| | SS capillary, 0.8 x 0.11 mm, 280 mm, large RF/M4 | 1 |
| | SS capillary, 0.8 x 0.17 mm, 150 mm, large M4/M4 | 1 |
| | SS capillary, 0.8 x 0.12 mm, 250 mm, large ps/M4 | 1 |
| | PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm | 2 |
| | Heat exchanger, long-down, 1.6 µL | 1 |
| | Heater long-up 0.12 id, 1.6 µL internal | 1 |
| | Carrier for heat exchanger, TCC SL Plus | 2 |
| | Fitting holder assembly | 2 |
| | Column clip set, eight colors | 1 |

(Continued)

Capillary Kit Contents

| Part No. | Description | Quantity |
|-----------------|--|-----------------|
| 5067-4767 | Capillary, 400 x 0.17 mm Bio | 1 |
| | Capillary, 300 x 0.17 mm Bio | 2 |
| | Fitting holder assembly | 2 |
| | Column clip set, eight colors | 1 |
| | Finger-tight fittings, long, 1/16 in, 10/pk | 1 |
| 5067-4769 | Capillary, 400 x 0.17 mm Bio | 1 |
| | Capillary, 300 x 0.17 mm Bio | 4 |
| | Fitting holder assembly | 2 |
| | Column clip set, eight colors | 1 |
| | Finger-tight fittings, long, 1/16 in, 10/pk | 1 |
| 5067-5103 | SS capillary, 340 x 0.17 mm, ps-ns SW-M4 | 1 |
| | SS capillary, 0.17 mm id, 700 mm, SW-1/16/M4 | 1 |
| | SS capillary, 90 x 0.17 mm, SW-1/16/M4 | 2 |
| | SS capillary, 90 x 0.17 mm, RF/M4 | 2 |
| | SS capillary, 0.8 x 0.17 mm, 150 mm, lg RF/M4 | 2 |
| | SS capillary, 0.8 x 0.17 mm, 280 mm, lg RF/M4 | 2 |
| | SS capillary, 0.8 x 0.17 mm, 150 mm, large M4/M4 | 1 |
| | SS capillary, 0.8 x 0.12 mm, 250 mm, large ps/M4 | 1 |
| | PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm | 1 |
| | Column clip set, eight colors | 1 |



Detector Supplies

Agilent wavelength detectors combine exceptional flexibility with superior instrument control, data communication, and analytical capabilities. This section shows you how to maintain your detector's high level of selectivity and sensitivity.



Detector Maintenance Tips

| Symptom | What To Do | Additional Information |
|--|---------------------------------|---|
| Lamp does not ignite | Exchange the lamp | Perform a wavelength calibration test and an intensity test after lamp replacement |
| Noise exceeds application limit | Exchange the flow cell | Perform a wavelength calibration test after flow cell replacement |
| Drift exceeds application limit | Exchange the lamp | Perform a wavelength calibration test and a pressure tightness test after flow cell replacement |
| Leaky flow cell (For G4212 only) | Exchange the flow cell | Perform a wavelength calibration test after flow cell replacement |
| Leaky flow cell (For all G1314/G1315/G1365 detectors) | Clean or exchange the flow cell | Perform a wavelength calibration test and a pressure tightness test after flow cell replacement |
| Lower intensity (For G4212 only) | Exchange the flow cell | Perform a wavelength calibration test after flow cell replacement |
| Lower intensity (For all G1314/G1315/G1365 detectors) | Clean or exchange the flow cell | Perform a wavelength calibration test and a pressure tightness test after flow cell replacement |



Deuterium lamp, G1314-60100



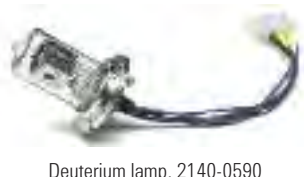
Long life HiS Deuterium lamp, 5190-0917



Deuterium longlife lamp, 2140-0813



Long life Deuterium lamp, 5182-1530



Deuterium lamp, 2140-0590



Tungsten lamp assembly, G1103-60001

Certified Lamps

- All lamps are tested for noise and drift specifications, correct operating voltage, light intensity and proper alignment
- Improved coating process increases Agilent lamp lifetimes up to 50%
- Agilent deuterium lamps are designed with a much narrower aperture providing increased light intensity and decreased noise – translating into an appreciably higher signal-to-noise ratio
- By providing higher sensitivity, Agilent lamps can extend detection capabilities and improve qualification at trace levels – for more than 2,000 hours of use

Agilent's lamps are manufactured in an ISO 9001 certified environment and are fully traceable throughout every step of the production process. Each lamp is then tested to ensure it meets Agilent's performance specifications. Test equipment is regularly calibrated using optical standards certified by NIST (National Institute of Standards and Technology) or PTB (Physikalisch-Technische Bundesanstalt).

Detector Lamps

| Description | Comments | Part No. |
|--|---|-------------|
| Variable Wavelength Detector (VWD) | | |
| Long life Deuterium lamp with RFID tag | For G1314D/E/F | G1314-60101 |
| Long life Deuterium lamp | For G1314A/B/C, 1120 and 1220 Infinity LC | G1314-60100 |
| Diode Array Detector (DAD)/Multiple Wavelength Detector (MWD) | | |
| Long life HiS Deuterium lamp (8-pin) with RFID tag | For G4212A/B | 5190-0917 |
| Long life Deuterium lamp with RFID tag | For G1315C/D and G1365C/D | 2140-0820 |
| Long life Deuterium lamp | For G1315A/B and G1365A/B | 2140-0813 |
| Long life Deuterium lamp | For G1315A/B and G1365A/B | 5182-1530 |
| Deuterium lamp | For G1315A/B and G1365A/B | 2140-0590* |
| Tungsten lamp | For G1315A/B/C/D and G1365A/B/C/D | G1103-60001 |

*Standard lamp for 1000 hours of use only

Variable Wavelength Detector (VWD)

VWD Flow Cell Selection

| Typical Column Length (cm) | Typical Peak Width | Recommended Flow Cell | | | | |
|----------------------------|--------------------|-----------------------|----------------------|----------------|--|---------------|
| < = 5 | 0.025 | Micro Flow Cell | | | High Pressure Flow Cell For Pressure Above 100 bar | |
| 10 | 0.05 | 0.05-0.2 mL/min | Semi-micro Flow Cell | | | |
| 20 | 0.1 | | | | Standard Flow Cell | |
| > = 40 | 0.2 | | | | | |
| Typical Flow Rate | | 0.05-0.2 mL/min | 0.2-0.4 mL/min | 0.4-0.8 mL/min | 1-2 mL/min | 0.05-5 mL/min |
| Internal Column Diameter | | 1.0 mm | 2.1 mm | 3.0 mm | 4.6 mm | |

Flow Cell and Repair Kits for VWD*

| Description | Use With | Specifications | Part No. | Repair Kit Part No. |
|-------------------------------|------------|----------------------------|-------------|---------------------|
| Standard flow cell, RFID | G1314D/E/F | 10 mm, 14 μ L, 40 bar | G1314-60186 | G1314-65061 |
| Standard "D" type flow cell | G1314A/B/C | 10 mm, 14 μ L, 40 bar | G1314-60086 | G1314-65061 |
| Semi-micro flow cell, RFID | G1314D/E/F | 6 mm, 5 μ L, 40 bar | G1314-60183 | G1315-68713 |
| Semi-micro flow cell | G1314A/B/C | 6 mm, 5 μ L, 40 bar | G1314-60083 | G1315-68713 |
| Micro flow cell, 3 mm, RFID | G1314D/E/F | 2 μ L, 120 bar | G1314-60187 | G1315-68713 |
| Micro flow cell, 3 mm | G1314A/B/C | 2 μ L, 120 bar | G1314-60087 | G1315-68713 |
| Micro flow cell, 5 mm | G1314A/B/C | 1 μ L, 40 bar | G1314-60081 | G1314-65052 |
| High pressure flow cell, RFID | G1314D/E/F | 10 mm, 14 μ L, 400 bar | G1314-60182 | G1314-65054 |
| High pressure flow cell | G1314A/B/C | 10 mm, 14 μ L, 400 bar | G1314-60082 | G1315-68713 |

*For more information about what is included in each kit, see page 97.



Variable wavelength detector

Capillaries for VWD Flow Cell

| Flow Cell Description | Part No. | Inlet Capillary | Part No. | Outlet Capillary | Part No. |
|-------------------------------|-----------------|--|-----------------|---|-----------------|
| Standard flow cell, RFID | G1314-60186 | Inlet capillary, 0.17 mm id, 600 mm long | 5062-8522 | Waste capillary, PEEK, 0.25 mm id | 5062-8535 |
| Standard "D" type flow cell | G1314-60086 | | | 1/16 in finger-tight PEEK fitting, 2/pk | 0100-1516 |
| Semi-micro flow cell, RFID | G1314-60183 | Inlet capillary, 0.12 mm id, 400 mm long | 5021-1823 | Waste capillary, PEEK, 0.25 mm id | 5062-8535 |
| Semi-micro flow cell | G1314-60083 | | | 1/16 in finger-tight PEEK fitting, 2/pk | 0100-1516 |
| Micro flow cell, 3 mm, RFID | G1314-60187 | Inlet capillary, 0.12 mm id, 310 mm long | G1314-87301 | Outlet capillary, 0.17 mm id, 120 mm long | G1314-87302 |
| Micro flow cell, 3 mm | G1314-60087 | | | | |
| Micro flow cell, 5 mm | G1314-60081 | Inlet capillary, 0.12 mm id, 400 mm long | 5021-1823 | Outlet capillary, 0.17 mm id, 120 mm long | G1314-87302 |
| High pressure flow cell, RFID | G1314-60182 | Inlet capillary, 0.17 mm id, 380 mm long | G1315-87311 | Outlet capillary, 0.17 mm id, 120 mm long | G1314-87302 |
| High pressure flow cell | G1314-60082 | | | | |



Diode Array Detector (DAD)/Multiple Wavelength Detector (MWD)



Diode array detector (DAD)/
Multiple wavelength detector (MWD)

Cleaning or Replacing DAD/MWD Flow Cells

- A decrease in detector performance or unusual noise levels may mean you have dirty flow cell windows
- Clean and reassemble one side of the flow cell before beginning the other side to prevent mixing the front and rear gaskets, which have different hole diameters
- While cleaning or replacing flow cell windows, if the washers fall out of the window assembly, they must be inserted in the correct order with a PTFE ring to prevent any leaks from the flow cell window
- Clean the cell body with water or isopropanol
- After opening the cell you should always use a new gasket

DAD/MWD Flow Cell Selection

| Typical Column Length (cm) | Typical Peak Width | Recommended Flow Cell | | | | |
|----------------------------|--------------------|-----------------------|---------------------|--------------------|------------|-------------------------|
| < = 5 | 0.025 | 80/500 nL Flow Cell | | | | High Pressure Flow Cell |
| 10 | 0.05 | | Semimicro Flow Cell | | | |
| 20 | 0.1 | | | Standard Flow Cell | | |
| > = 40 | 0.2 | | | | | |
| Typical Flow Rate | | 0.05-0.2 mL/min | 0.2-0.4 mL/min | 0.4-0.8 mL/min | 1-2 mL/min | 0.05-5 mL/min |
| Internal Column Diameter | | 0.3-1 mm | 2.1 mm | 3.0 mm | 4.6 mm | |

Flow Cell and Repair Kits for DAD/MWD*

| Description | Use With | Specifications | Part No. | Repair Kit Part No. |
|--|---|---------------------------------|-------------|---------------------|
| Standard flow cell with RFID tag | G1315C/D, G1365C/D | 10 mm, 13 μ L, 120 bar | G1315-60022 | G1315-68712 |
| Standard flow cell | G1315A/B, G1365A/B | 10 mm, 13 μ L, 120 bar | G1315-60012 | |
| Semi-micro flow cell, RFID | G1315C/D, G1365C/D | 6 mm, 5 μ L, 120 bar | G1315-60025 | G1315-68713 |
| Semi-micro flow cell | G1315A/B, G1365A/B | 6 mm, 5 μ L, 120 bar | G1315-60011 | |
| Micro flow cell, RFID | G1315C/D, G1365C/D | 3 mm, 2 μ L, 120 bar | G1315-60024 | G1315-68713 |
| Micro high-pressure flow cell | G1315A/B, G1365A/B | 6 mm, 1.7 μ L, 400 bar | G1315-60015 | |
| 500 nL flow cell | | 10 mm, 50 bar | G1315-68724 | |
| 80 nL flow cell | | 6 mm, 50 bar | G1315-68716 | |
| Preparative flow cell | G1315A/B, G1365A/B | 3 mm, 120 bar, stainless steel | G1315-60016 | G1315-68712 |
| Preparative flow cell | | 0.3 mm, 20 bar, quartz | G1315-60017 | |
| Preparative flow cell | | 0.06 mm, 20 bar, quartz | G1315-60018 | |
| Max-Light cartridge cell | G4212A/B Infinity LC DAD | 10 mm, 1.0 μ L, 60 bar | G4212-60008 | |
| Max-Light cartridge cell | G4212A/B Infinity LC DAD | 60 mm, 4.0 μ L, 60 bar | G4212-60007 | |
| Max-Light cartridge test cell | Must be used to perform detector build-in tests | | G4212-60011 | |
| Max-Light ultra low dispersion flow cell | G4212A/B Infinity LC DAD | 10 mm $V(\sigma) = 0.6 \mu$ L | G4212-60038 | |
| Max-Light High Dynamic Range (HDR) flow cell | G4212A/B Infinity LC DAD | 3.7 mm, $V(\sigma) = 0.9 \mu$ L | G4212-60032 | |

*For more information about what is included in this kit, see page 97.



Max-Light cartridge cell, G4212-60008



Ultra-low dispersion flow cell, G4212-60038

TIPS & TOOLS



Learn more about how different flow cells impact your chromatography, and the High Dynamic Range (HDR) Flow Cell. See application note 5991-0115EN at www.agilent.com/chem/library



Max-Light cartridge cell, interior view, 60 mm path for high concentrations, G4212-60007



Max-Light HDR flow cell, interior view, to show short 3.7 mm path length for high concentrations, G4212-60032

Capillaries for DAD/MWD Flow Cell

| Flow Cell Description | Part No. | Inlet Capillary | Part No. | Outlet Capillary | Part No. |
|------------------------------------|-------------|--|-------------|---|-------------|
| Standard flow cell with RFID tag | G1315-60022 | Inlet capillary with heat exchanger, 0.17 mm id, 590 mm long | G1315-87321 | Outlet capillary, 0.17 mm id, 200 mm long | G1315-87302 |
| Standard flow cell | G1315-60012 | | | | |
| Semi-micro flow cell with RFID tag | G1315-60025 | DAD heat exchanger capillary, 0.17 mm id, 310 mm long | G1315-87319 | Outlet capillary, 0.12 mm id, 200 mm long | G1315-87306 |
| Semi-micro flow cell | G1315-60011 | | | Outlet capillary, 0.17 mm id, 200 mm long | G1315-87302 |
| | | | | Outlet capillary, 0.12 mm id, 200 mm long | G1315-87306 |
| Micro flow cell with RFID tag | G1315-60024 | DAD heat exchanger capillary, 0.12 mm id, 310 mm long | G1315-87339 | Outlet capillary, 0.12 mm id, 200 mm long | G1315-87306 |
| | | | | Outlet capillary, 0.17 mm id, 200 mm long | G1315-87302 |
| Micro high-pressure flow cell | G1315-60015 | Inlet capillary with heat exchanger, 0.12 mm id, 290 mm long | G1315-87325 | Outlet capillary, 0.12 mm id, 200 mm long | G1315-87306 |

80 nL and 500 nL Flow Cell Supplies

| Description | Unit | Part No. |
|---|-------|-------------|
| Fitting screw | 10/pk | 5063-6593 |
| Double winged nuts and 1/32 in ferrules | 10/pk | 5065-4422 |
| 1/32 in ferrule and stainless steel lock ring, lite touch | 10/pk | 5063-6592 |
| Union adjustment tool | 2/pk | 5022-2146 |
| Universal ZDV union, stainless steel, no fittings | 2/pk | 5022-2184 |
| Torque wrench adapter | | G1315-45003 |
| Open end wrench, 4 mm | | 8710-1534 |



Stainless steel fittings, male (G), 5063-6593



Double winged PEEK nut & ferrule (WPF), 5065-4422



ZDV universal union, 5022-2184



Wrench, open end, for use with PEEK-coated fused silica capillaries, 8710-1534

500 nL Flow Cell and Replacement Parts

| Description | Comments | Part No. |
|--|--|-------------|
| 500 nL flow cell | Contains quartz flow cell with 10 mm path length and 500 nL volume and connecting capillaries, max 50 bar pressure | G1315-68724 |
| Sealing kit | Includes torque adapter, 2 cell seal assemblies, 5 LiteTouch front and back ferrules | G1315-68715 |
| Quartz cell body, 10 mm | | G1315-80001 |
| Cell seal assembly, 500 nL | | G1315-87101 |
| Fused silica/PEEK capillary, 100 µm id, 30 cm long | Inlet | G1315-87333 |
| Fused silica/PEEK capillary, 50 µm id, 40 cm long | Inlet | G1315-87323 |
| Fused silica/PEEK capillary, 100 µm id, 12 cm long | Outlet | G1315-87338 |
| Fused silica/PEEK capillary, 50 µm id, 12 cm long | Outlet | G1315-87328 |

80 nL Flow Cell and Replacement Parts

| Description | Comments | Part No. |
|---|--|-------------|
| 80 nL flow cell | Contains quartz flow cell with 6 mm path length and 80 nL volume and connecting capillaries, max 50 bar pressure | G1315-68716 |
| Sealing kit for 80 nL flow cell | Includes torque adapter, 2 cell seal assemblies, 5 LiteTouch front and back ferrules and 5 sleeves for 360 µm od capillaries | G1315-68725 |
| Quartz cell body, 80 nL, 6 mm path length | | G1315-80002 |
| Fused silica/PEEK capillary, 50 µm id, 40 cm long | Inlet | G1315-87323 |
| Fused silica/PEEK capillary, 50 µm id, 12 cm long | Outlet | G1315-87328 |
| Fused silica/PEEK capillary, 25 µm id, 20 cm long | Inlet | G1315-87313 |
| Fused silica/PEEK capillary, 25 µm id, 60 cm long | Outlet | G1315-87318 |

Preparative Flow Cells and Replacement Parts

| Description | Part No. |
|--|-------------|
| Preparative flow cell, 0.3 mm, 20 bar, quartz | G1315-60017 |
| Preparative flow cell, 0.06 mm, 20 bar, quartz | G1315-60018 |
| PTFE tubing, 0.8 mm id, 2 m | G1315-67301 |
| PTFE tubing, 0.5 mm id, 0.8 m | G1315-67302 |
| Cell housing | G1315-27705 |
| 1/16 in finger-tight PEEK fitting, 2/pk | 0100-1516 |
| Quartz body, 0.3 mm | G1315-80004 |
| Quartz body, 0.06 mm | G1315-80003 |
| Prep flow cell, stainless steel, 3 mm, 120 bar | G1315-60016 |
| Stainless steel connecting capillary, 0.5 mm, 250 mm | G1315-87305 |



Finger-tight PEEK fitting (SPF), 0100-1516

Detector Maintenance Kits

Detector Maintenance Kits

| Description | Kit Contents | Part No. |
|--|---|-------------|
| Variable Wavelength Detector (VWD) | | |
| Standard "D" type flow cell kit | Includes 2 windows, 2 gaskets #1, 2 gaskets #2 | G1314-65061 |
| Semi-micro flow cell kit | Includes 2 windows, 4 gaskets: 2 standard #1, 1 semi-micro #1, 1 semi-micro #2 | G1314-65056 |
| Micro flow cell kit | Includes 2 windows, 2 gaskets #1, 2 gaskets #2 | G1314-65052 |
| Cell repair kit, semi-micro | Includes window screw kit, 4 mm hexagonal wrench and seal kits | G1315-68713 |
| High-pressure flow cell kit | Includes 2 windows, 2 Kapton gaskets and 2 PEEK rings | G1314-65054 |
| Diode Array Detector (DAD)/Multiple Wavelength Detector (MWD) | | |
| Cell repair kit | Includes window screw kit, 4 mm hexagonal wrench and seal kit | G1315-68712 |
| Cell repair kit, semi-micro | Includes window screw kit, 4 mm hexagonal wrench and seal kits | G1315-68713 |
| Sealing kit for 500 nL flow cell | Includes torque adapter, 2 cell seal assemblies, 5 lite touch front and back ferrules | G1315-68715 |
| Sealing kit for 80 nL flow cell | Includes torque adapter, 2 cell seal assemblies, 5 lite touch front and back ferrules and 5 sleeves for 360 µm od capillaries | G1315-68725 |



1200 Series Evaporative Light Scattering Detector



Standard flow nebulizer, G4218-20000



Cartridge for gas regulator, G4218-40150

Other Detectors

G4218A 1200 Series Evaporative Light Scattering Detector Supplies

| Description | Part No. |
|---|-------------|
| Standard flow nebulizer | G4218-20000 |
| Semi-micro flow nebulizer | G4218-20001 |
| Large flow nebulizer | G4218-20002 |
| Micro flow nebulizer | G4218-20003 |
| RRLC nebulizer | G4218-20004 |
| Nebulization chamber, glass | G4218-40000 |
| Black plastic nut, 13 mm diameter, glassware | G4218-40010 |
| Black plastic nut, 22 mm diameter, glassware | G4218-40011 |
| Black exhaust tube, 2.5 m | G4218-40110 |
| Bulkhead | G4218-40130 |
| Cartridge, 0.01 µm for gas regulator | G4218-40150 |
| Pneumatic tube with stainless steel fitting | G4218-40220 |
| Drain tube with stainless steel fitting | G4218-40100 |
| Gas regulator with 0.01 µm filter and manometer | G4218-60100 |
| Seal kit for nebulization chamber | G4218-68010 |
| Caffeine standard, 250 µg/mL | G4218-85000 |

G1362A 1100/1200 Series Refractive Index Detector (RID) Supplies

| Description | Part No. |
|---|-------------|
| Tubing kit Includes 300 mm recycle valve to recycle port, 200 mm recycle valve to waste port, 120 mm purge valve to recycle valve, 270 mm purge valve to sample cell, 170 mm purge valve to reference cell | G1362-68709 |
| Interface tubing kit Includes 1/8 in ferrule, 1/3 in nut, PTFE tubing | G1362-68706 |
| Interface capillary, 400 mm, 0.17 mm id | G1362-87300 |
| Restriction capillary, 0.17 mm id | G1362-87301 |

G1321A/B 1100/1200 Series Fluorescence Detector (FLD) Supplies

| Description | Part No. |
|---|-------------|
| Detector lamp | 2140-0600 |
| Flow cell, 8 μ L, 20 bar | G1321-60005 |
| Flow cell, 4 μ L | G1321-60015 |
| Cuvette kit, 8 μ L, 20 bar Includes tubing, stainless steel fitting, front and back ferrule, PEEK fitting, syringe needle and syringe | G1321-60007 |
| Cut-off filter kit: | |
| 389, 408, 450, 500, 550 nm | 5061-3327 |
| 380, 399, 418, 470, 520 nm | 5061-3328 |
| 280, 295, 305, 335, 345 nm | 5061-3329 |
| Corrugated tubing, polypropylene, 6.5 mm id, 5 m | 5062-2463 |
| PTFE tubing, FEP, 0.7 mm id, 5 m | 5062-2462 |
| 1/16 in finger-tight PEEK fitting, 2/pk | 0100-1516 |
| Column connecting capillary with fittings, 380 x 0.17 mm | G1315-87311 |
| 1/16 in stainless steel front ferrule, 10/pk | 5180-4108 |
| 1/16 in stainless steel back ferrule, 10/pk | 5180-4114 |
| 1/16 in stainless steel fitting, 10/pk | 5061-3303 |
| Fluorescence detector calibration sample, 1 g glycogen | 5063-6597 |
| Open end wrench, 1/4 and 5/16 in | 8710-0510 |
| Glass syringe | 9301-1446 |
| Syringe needle | 9301-0407 |



Flow cell for G1321A fluorescence detector, G1321-60005



Finger-tight PEEK fitting (SPF), 0100-1516



Stainless steel front ferrules, 5180-4108



Back ferrules 1/16 in, 5180-4114

1100/1200 Series Chip LC Supplies

1100/1200 Series Chip LC Supplies

| Description | Part No. |
|---|-------------|
| Rotor, inner valve, 3 grooves, chip LC | G4240-23705 |
| Rotor, outer valve, 5 grooves, chip LC | G4240-25206 |
| PEEK fitting, special for chip LC | G4240-43200 |
| Fused silica/PEEK capillary, 15 μ m, 90 cm Nano pump to chip cube | G4240-87300 |
| Fused silica/PEEK capillary, 25 μ m, 105 cm Micro well plate sampler to chip cube | G4240-87301 |
| Fused silica/PEEK capillary, 100 μ m, 100 cm Chip cube to waste | G4240-87302 |
| Fused silica/PEEK capillary, 75 μ m, 100 cm Syringe pump to chip cube | G4240-87303 |
| Fused Silica/PEEK capillary, 50 μ m, 50 cm | G4240-87304 |
| Inline micro filter kit, 0.5 μ m, PEEK Use with chip cube LC system | 5067-1582 |
| Fitting with 0.5 μ m PEEK frit, 10/pk | 5067-1584 |
| PEEK fitting for use with 1/32 in od, 10/pk | 5067-1585 |
| PEEK sample transfer capillary, 25 μ m, 100 cm Micro inline filter to chip cube (Phospho-Chip application) | G4240-87309 |
| PEEK capillary, 25 μ m, 10 cm Micro well plate samper to micro inline filter (Phospho-Chip application) | G4240-87310 |

Bio-inert Supplies

Agilent 1260 Infinity Bio-inert Quaternary LC Supplies

For your challenging bio-molecule analyses, the new 1260 Infinity Bio-inert Quaternary LC System sets new standards in performance, reliability, and robustness. Analysis of proteins and biotherapeutics usually presents the most challenging solvent conditions for any LC instrument. In addition, bio-molecules tend to bind unspecifically to surfaces, requiring tedious procedures. To address these needs, Agilent designed this application-specific LC instrument for bio-molecular analysis – without any compromise in performance – built on the proven Agilent 1200 Infinity platform technology.

The Agilent 1260 Infinity Bio-inert Quaternary LC features bio-inertness for all components without exception. The sample flow path through autosampler, capillaries and a variety of detectors are completely metal-free, with only PEEK and ceramic components coming into contact with your bio-molecule. Thus, the uncertainty of secondary interaction for proteins and peptides with surfaces which can result in peak tailing, low recovery and decreased column lifetime is minimized – and your confidence maximized.

1260 Bio-inert Quaternary Pump Parts

| Description | Part No. |
|--|-------------|
| Bio-inert purge valve | G5611-60061 |
| Bio-inert active inlet valve | G5611-60025 |
| Bio-inert cartridge for active inlet valve, 600 bar | G5611-60020 |
| Bio-inert outlet ball valve | G5611-60067 |
| Sapphire plunger | 5067-4695 |
| Bio-inert piston seal | G5611-21503 |
| Bio-inert wash seal | 0905-1731 |
| Bio-inert seal keeper | G5611-26210 |
| Bio-inert support ring | G5611-63010 |
| Preventative maintenance kit for Bio-inert quaternary pump | G5611-68741 |

1260 Bio-inert High Performance Autosampler Parts

| Description | Part No. |
|---------------------------------------|-------------|
| 2 position/6 port valve head, 600 bar | 5067-4131 |
| Rotor seal, 3 grooves, max 600 bar | 0101-1416 |
| Bio-inert stator | 5068-0060 |
| Stator face, ceramic | 0100-1851 |
| Bio-inert needle, 600 bar | G5667-87200 |

(Continued)



TIPS & TOOLS

For information on the family of complementary Biocolumns, turn to page 350.



Stator face, ceramic, 0100-1851

1260 Bio-inert High Performance Autosampler Parts

| Description | Part No. |
|---|-------------|
| Tool for needle adjustment | G5667-40500 |
| Bio-inert needle seat assembly, 600 bar | G5667-87017 |
| Sapphire plunger | 5067-4695 |
| Bio-inert piston seal | G5611-21503 |
| Sample loop, 100 µL, Bio-inert | G5667-60320 |

1260 Bio-inert Valve Parts



Rotor seal, 2 position/6 port, 600 bar for G1316B, 0101-1409

| Description | Use With | Part No. |
|--|---|-------------|
| Rotor seal, 3 grooves, max 600 bar | Bio-inert 2 position/6 port switching valve | 0101-1409 |
| Bio-inert stator | Bio-inert 2 position/6 port switching valve | 5068-0060 |
| Stator face, ceramic | Bio-inert 2 position/6 port switching valve | 0100-1851 |
| Bio-inert rotor, 2-position/10-port, 600 bar | | 5068-0041 |
| Bio-inert stator, 2-position/10-port, 600 bar | | 5068-0040 |
| Bio-inert rotor seal, 4 column PEEK | Bio-inert 4 column selection valve | 5068-0045 |
| Bio-inert PEEK tube from valve to needle | | G5664-86703 |
| Bio-inert PEEK tube valve to detector | | G5664-86706 |
| Bio inert 12 position/13 port, solvent selection valve | G4235A | 5067-4159 |

1260 Bio-inert Detector Parts



Bio-inert union, 600 bar, 5067-4741

| Description | Use With | Part No. |
|---|-----------------------|-------------|
| Bio-inert standard flow cell, with RFID tag | G1315C/D and G1365C/D | G5615-60022 |
| Bio-inert max light cartridge cell | G4212A/B | G5615-60017 |
| Bio-inert max light cartridge cell | G4212A/B | G5615-60018 |
| Bio-inert FLD flow cell | G1321B | G5615-60005 |
| PEEK tubing | | 0890-1763 |

1260 Bio-inert Fittings

| Description | Part No. |
|---|-----------|
| Bio-inert union, stainless steel with PEEK insert 600 bar | 5067-4741 |

1260 Bio-inert Column Compartment



Bio-inert low dispersion heat exchanger, G5616-60050

| Description | Part No. |
|---|-------------|
| Bio-inert low dispersion heat exchanger | G5616-60050 |

LC/MS Supplies

Combined with Agilent's industry-leading LC systems, our single quadrupole, ion trap, triple quadrupole, TOF and Q-TOF LC/MS solutions combine world-class performance with legendary reliability and ease-of-use.

This section contains all of the mass spectrometry supplies you need to keep your LC mass spectrometer running at peak performance.



LC/MS Maintenance Schedule

| Procedure | When to Perform |
|---|---|
| Flush the nebulizer | Daily or at the end of each shift to flush traces of samples and buffers out of the tubing, valves, and nebulizer. |
| Clean the electrospray spray chamber | Daily or anytime you suspect carryover contamination from one sample or analysis to another. |
| Replace the electrospray nebulizer needle | When the needle is plugged. Common symptoms of a plugged needle are increased LC backpressure, off-axis spraying, or dripping from the nebulizer. |
| Clean the APCI spray chamber | Daily or anytime you suspect carryover contamination from one sample or analysis to another. |
| Replace the APCI nebulizer needle | When the needle is plugged. Common symptoms of a plugged needle are increased LC backpressure or off-axis spray from the nebulizer. |
| Clean the multimode source | Daily or anytime you suspect carryover contamination from one sample or analysis to another, or when you must access the end cap and capillary cap for cleaning and inspection. |
| Check calibrant levels | Monthly or weekly if you tune the LC/MS frequently. |





Agilent 6100 Series
Single Quadrupole LC/MS, G6140A

LC/MS Preventive Maintenance Kit

For your convenience, the LC/MS Preventive Maintenance Kit has the recommended common supplies needed for most Agilent LC/MS systems. Unique source parts should be ordered separately.

LC/MS Preventive Maintenance kit

| Description | Part No. |
|--|-----------|
| LC/MS Preventive Maintenance kit | 5190-1443 |
| Foreline pump (rotary pump) oil, Inland 45, 1 L, for E1M18/E2M28 | 6040-0834 |
| Oil mist filter element for E2M18 | 1535-4970 |
| Filter element, 5 µm, 5/pk | 0100-2051 |
| Spring, canted coil, 4/pk | 1460-2571 |
| Big hydrocarbon trap, 1/4 in fittings | BHT-4 |
| Rotor seal, Vespel, pH 0 to 10 | 0100-1855 |



Foreline pump oil, 6040-0834



Oil mist filter element for E2M18, 1535-4970



TIPS & TOOLS

Save ordering time and money with the LC/MS PM Kit! It contains the common supplies specified in Agilent service engineer preventive maintenance procedure for LC/MS platforms.

LC/MS Supplies

| Description | 6100 Series | 6200 Series | 6300 Series | 6400 Series | 6500 Series | Part No. |
|---|-------------------------------|-------------|-------------|-------------|-------------|-------------|
| | Single Quadrupole LC/MS | | | TOF LC/MS | | |
| ES nebulizer assembly, original | ✓ | ✓ | ✓ | ✓ | ✓ | G1946-60098 |
| ES nebulizer needle (original) replacement kit | ✓ | ✓ | ✓ | ✓ | ✓ | G2427A |
| ES nebulizer assembly, new | ✓ | ✓ | ✓ | ✓ | ✓ | G1958-60098 |
| ES nebulizer needle (new) replacement kit | ✓ | ✓ | ✓ | ✓ | ✓ | G1958-60136 |
| APCI nebulizer assembly | ✓ | ✓ | ✓ | ✓ | ✓ | G1946-60037 |
| APCI nebulizer needle replacement kit | ✓ | ✓ | ✓ | ✓ | ✓ | G2428A |
| Needle assembly APCI/Multimode | ✓ | ✓ | ✓ | | ✓ | G1947-60103 |
| Corona needle APCI/Multimode | ✓ | ✓ | ✓ | ✓ | ✓ | G1947-20029 |
| Capillary cap, high temperature, 3.0 mm | ✓ | ✓ | ✓ | ✓ | ✓ | G1946-20301 |
| Capillary, 0.5 mm id, dielectric* | ✓ | | ✓ | | | G1946-80009 |
| Capillary, 0.6 mm id, dielectric* | ✓ | ✓ | ✓ | ✓ | ✓ | 59987-20040 |
| Capillary, 0.6 mm id, resistive, fast polarity switching* | | | | ✓ | | G1960-80060 |
| Spring, canted coil, 0.25 in id, 0.53 mm | ✓ | ✓ | ✓ | ✓ | ✓ | 1460-2571 |
| 1/6 in tee, low dead volume, stainless steel | | ✓ | | | ✓ | 0100-0969 |

*Dielectric capillary supports standard polarity switching only. Resistive capillary supports fast polarity switching.

(Continued)



Corona needle APCI, G1947-20029

TIPS & TOOLS

ES nebulizer (original) is compatible with the following ion sources:

- ESI G1948A with Serial Number < US91801994
- ESI G1948B with Serial Number < US91201787
- Multimode G1978A with Serial Number < US90800804
- Multimode G1978B with Serial Number < US90700787
- Dual ESI G3251A with Serial Number < US91200355
- Dual ESI G3251B with Serial Number < US91200355



LC/MS Supplies

| Description | 6100 Series | 6200 Series TOF LC/MS | 6300 Series | 6400 Series | 6500 Series Accurate-Mass Q-TOF LC/MS | Part No. |
|---------------------------------------|-------------------------------|--------------------------|-------------------|-------------------------------|---|-------------|
| | Single Quadrupole LC/MS | | Ion Trap LC/MS | Triple Quadrupole LC/MS | | |
| Syringe adapter | | | ✓ | | | 9301-1291 |
| Syringe pump | | | ✓ | | | 3162-0178 |
| 1/16 in finger-tight PEEK fitting | | ✓ | ✓ | | ✓ | 0100-1516 |
| Female luer to female 10/32 adapter | | ✓ | ✓ | | ✓ | 0100-2304 |
| PEEK tubing | | ✓ | ✓ | | ✓ | 0890-1915 |
| Gas-tight syringe, PTFE Luer lock | | ✓ | ✓ | | ✓ | 5182-9710 |
| High-throughput skimmer, 2 mm | | ✓ | | ✓ | ✓ | G1969-20302 |
| Skimmer 1 (G1956A/B) | ✓ | | | | | G1956-20302 |
| HED assembly | ✓ | | | | | G1946-80019 |
| HED assembly (G6140A, G6460A, G6530A) | | | | ✓ | | G2571-80103 |
| HED assembly | | ✓ | | | | G1956-80000 |
| Electron multiplier replacement horn | ✓ | ✓ | | ✓ | | 05971-80103 |
| Replacement horn and dynode | ✓ | | ✓ | ✓ | | G2441-80010 |



Electron multiplier replacement horn,
05971-80103

LC/MS Foreline Pump Supplies

| Description | Part No. |
|--|-------------|
| Oil mist filter kit for E1M18/E2M28 | 3162-1056 |
| Oil mist cartridge filter for MS40+ | G1960-80039 |
| Oil return kit | 3162-1057 |
| Foreline pump (rotary pump) oil, Inland 45, 1 L, for E1M18/E2M28 | 6040-0834 |
| Foreline pump (rotary pump) oil, 4 L, for E1M18/E2M28 | 6040-0798 |
| Foreline exhaust adapter | 59980-20134 |
| Hose clamp | 1400-0563 |
| Oil mist filter element for E2M18 | 1535-4970 |
| KF25 clamp, stainless steel | 0100-0549 |
| KF25 coseal (inside clamp) | 0100-1597 |
| Exhaust tubing | 0890-1727 |
| Pump oil drip pan | G1946-00034 |



Adding foreline pump (rotary pump) oil, 4 L

LC/MS Chemicals

| Description | 6100 Series | | 6300 Series | 6400 Series | | 6500 Series | Part No. |
|--|-------------------------------|-----------|-------------|-------------------------------|------------------------------|-------------|-------------|
| | Single Quadrupole LC/MS | TOF LC/MS | | Triple Quadrupole LC/MS | Accurate-Mass Q-TOF LC/MS | | |
| ES/APCI positive ion performance standard, 5 x 1 mL ampoules | ✓ | ✓ | | ✓ | ✓ | | G2423A |
| Electrospray LC demo sample (Sulfamix) | ✓ | | | ✓* | | | 59987-20033 |
| ESI+APCI LC demo sample | ✓ | | | | | | G1978-85000 |
| ES negative ion performance standard, 5 x 1 mL ampoules | ✓ | | | ✓ | | | G2424A |
| APCI negative ion performance standard, 5 x 1 mL ampoules | ✓ | | | | | | G2425A |
| ES/APCI positive ion performance standard | ✓ | | | | | | G1946-85004 |
| Multiple-charge compound performance evaluation sample (horse heart myoglobin) | ✓ | | | | | | G2426A |
| ES/APCI positive ion performance standard, 5 x 1 mL ampoules | ✓ | | | | | | G2423A |
| ES-TOF reference mix, 6 x 2 mL ampoules | | ✓ | | | | ✓ | G1969-85001 |
| ES-TOF biopolymer reference standard kit | | ✓ | | | | | G1969-85003 |
| Flushing solvent | ✓ | ✓ | ✓ | ✓ | ✓ | | G1969-85026 |
| High purity water, 4 L | ✓ | ✓ | ✓ | ✓ | ✓ | | 8500-2236 |
| Methyl alcohol, 1 L | ✓ | ✓ | ✓ | ✓ | ✓ | | 8500-1867 |
| Ammonium formate | ✓ | ✓ | ✓ | ✓ | ✓ | | G1946-85021 |
| Formic acid, 5 mL | ✓ | ✓ | ✓ | ✓ | ✓ | | G2453-85060 |
| Acetonitrile, 1 L | ✓ | ✓ | ✓ | ✓ | ✓ | | G2453-85050 |

*Recommended item for familiarization

LC/MS Common Supplies*

| Description | Part No. |
|--|-----------------|
| Common Parts | |
| Filter element, 5 µm, 5/pk | 0100-2051 |
| Rotor seal, Tefzel, pH 0 to 14 | 0100-1854 |
| Rotor seal, Vespel, pH 0 to 10 | 0100-1855 |
| Inlet filter assembly | G1946-60180 |
| SSV long drain tubing assembly | G1969-60086 |
| Spring, canted coil | 1460-2571 |
| Cleaning Supplies | |
| Abrasive mesh, 4000 grit | 8660-0827 |
| Capillary cleaning wire for dip tube | G1946-80054 |
| Cleaning powder, dielectric capillary, Alconox | 5190-1401 |
| Cloths, lint-free | 05980-60051 |
| Cotton swabs, 100/pk | 5080-5400 |
| Gas Purifiers | |
| Big hydrocarbon trap, 1/4 in fittings | BHT-4 |
| Big moisture trap, 1/4 in fittings | BMT-4 |
| Big universal trap, 1/4 in fittings | RMSN-4 |
| Big universal trap, 1/8 in fittings, Nitrogen | RMSN-2 |
| Tools | |
| LC/MS tool kit | G1946-60157 |
| Nebulizer adjustment fixture | G1946-20215 |
| Nebulizer 25X magnifier | G1946-80049 |
| Plastic tubing cutter | 8710-1930 |
| Screwdriver, Torx T15 | 8710-1622 |
| Screwdriver, Torx T20 | 8710-1615 |
| Open end wrench, 1/4 and 5/16 in | 8710-0510 |
| Wrench, 1/2 and 7/16 in | 8710-0806 |
| Needle nose pliers, pointed serrated jaws | 8710-0004 |
| 3 mm wrench for nebulizer needle adjustment | 8710-2699 |

*These parts are common to all LC/MS systems



Quiet Cover

Agilent has a solution to the frequent maintenance of LC/MS and ICP-MS rough pumps (visual check of oil levels, oil changes, oil additions, clean-up of oil leaks, etc.), as well as the inherent noise produced by the pumps. Quiet Covers are designed for easy movement, maintenance, and better living with rough pumps used with Agilent and other LC/MS systems.

- Locking castors to move heavy pump for maintenance
- No tools necessary to remove sectioned cover for easy access to pump
- Built in lift-and-tilt lever raises end of pump to drain oil
- Removable drip pan with well and hand holds to collect and transport oil
- Sound absorbing cabinet with resistant foam insulation to reduce pump noise
- Pump mounted to minimize vibration
- 2 Integrated fans maintain temperature inside cover
- LEDs and audible alarm if temperature exceeds 35 °C limit
- Maximum ambient temperature of 35 °C when airflow is neither restricted nor recycled
- Standard one-year warranty; installation and familiarization included with new LC/MS or ICP-MS orders

Please check www.agilent.com/chem/quietcover for the most up-to-date instrument compatibility guide.

Please confirm rough pump used in your Agilent system to ensure compatibility.

Quiet Cover

| Description | Compatible Pump Models | Part No. |
|--------------------|---|----------|
| Quiet Cover | BOC Edwards Pumps, E2M28, E2M18, or E1M18 | G3199B |
| Quiet Cover MS | Agilent MS40+ | G6011A |
| Quiet Cover DS | Agilent DS202, DS302, DS402, and DS602 | G6012A |
| Quiet Cover TS | Agilent TS300, TS300INV, TS600, TS600INV, and TS800 | G6013A |
| Quiet Cover GC/MS* | Agilent DS42, Pfeiffer Duo 2.5 | G6014A |

*This model does not contain all features.



Quiet Cover MS, G6011A



Quiet Cover DS, G6012A



Quiet Cover MS, G6011A

LC/MS Standards Kits

LC/MS Standards Kits

| Description | Part No. |
|---|-----------|
| Caffeine standards kit for LC/MS OQ/PV | 8500-6917 |
| Caffeine standards kit for LC/MS-Trap OQ/PV | 5065-9908 |
| Sulfa drug standards kit for LC/MS OQ/PV | 5188-6523 |

LC/MS Application Kit Standards

| Description | Part No. |
|--|-----------|
| LC/MS pesticide checkout mixture | 5190-0469 |
| LC/MS pesticide comprehensive mixture | 5190-0551 |
| LC/MS toxicology checkout mixture | 5190-0556 |
| LC/MS toxicology comprehensive mixture | 5190-0555 |
| LC/MS vet drug checkout mixture | 5190-0443 |
| LC/MS vet drug comprehensive mixture | 5190-0554 |

LC/MS Calibrant Mixes

| Description | Part No. |
|---|-------------|
| Calibrant, ES | G2421-60001 |
| APCI/APPI calibrant solution, 100 mL | G2432A |
| ESI tuning mix for ion trap, 100 mL | G2431A |
| ES-TOF tuning mix, 100 mL | G1969-85000 |
| APCI-L low concentration tuning mix, 100 mL | G1969-85010 |
| MMI-L low concentration tuning mix, 100 mL | G1969-85020 |

LC/MS Calibrant Mix and Source Compatibility Matrix

| Source | 6100 Series Single Quadrupole LC/MS* | 6140A/6150B Single Quadrupole LC/MS | 6200 Series TOF LC/MS | 6300 Series Ion Trap LC/MS | 6400 Series Triple Quadrupole LC/MS | 6500 Series Accurate-Mass Q-TOF LC/MS |
|----------------|---|--|--------------------------|-------------------------------|--|---|
| ESI | G2421-60001 | G1969-85000 | G1969-85000 | G2431A | G1969-85000 | G1969-85000 |
| APCI | G2432A | G1969-85010 | G1969-85010 | G2432A | G1969-85010 ² | G1969-85010 ² |
| APPI | G2432A | G2432A | G1969-85010 | G2432A | G2432A ² | G1969-85010 ² |
| MMI | G2432A | G1969-85000 | G1969-85020 | G2432A | G1969-85020 | G1969-85020 |
| NanoESI | | | G1969-85000 ⁴ | G2431A | | G1969-85000 ⁴ |
| HPLC-Chip Cube | | G1969-85000 ² | G1969-85000 ⁴ | G2431A ¹ | G1969-85000 ³ | G1969-85000 ⁴ |

*G6110A, G6120A/B, G6130A/B

¹5X dilution suggested

²No autotune

³ESI positive tune only

⁴Calibration only



CrossLab

Agilent

Agilent CrossLab offers a growing portfolio of HPLC supplies manufactured for seamless performance with a variety of non-Agilent analytical instruments in your lab. Look inside this selection guide to find a wide range of products for your applications.

We currently support:

- Waters
- Shimadzu
- Dionex*
- CTC Analytics
- And more to come

Our growing portfolio includes the following products:

- Autosampler syringes
- Capillaries, tubing, and fittings
- Detector lamps
- Performance Maintenance kits
- Pump supplies
- Sample loops
- Valve supplies
- Vials and closures
- Well plates and sealing mats

Agilent CrossLab is more than supplies:

- Over 40 years of chromatography expertise
- The right supplies for both routine and challenging applications
- Hassle-free operations and reproducible results
- High-quality products manufactured to Agilent standards
- Technical and application support
- Dependable worldwide availability and delivery
- Convenience of consolidating purchasing
- 90-day risk free money back guarantee

*Dionex is now a part of Thermo Scientific

Agilent CrossLab works with **WATERS** | **SHIMADZU** | **THERMO SCIENTIFIC** | **AND MORE**

CrossLab Detector Lamps

Our detector lamps are designed for precise alignment and thermal stability

Agilent CrossLab lamps are designed and built to be compatible with a wide variety of detectors, including Variable Wavelength Detectors (VWD), Multiple Wavelength Detectors (MWD), and Diode Array Detectors (DAD) or Photodiode Array Detectors (PDA). All the lamps adhere to the tightest specifications for consistent quality and reproducible performance over the entire lifetime of the lamps. Test equipment is regularly calibrated using optical standards certified by NIST (National Institute of Standards and Technology) or PTB (Physikalisch-Technische Bundesanstalt).

- Manufactured in an ISO 9001 certified environment
- Quartz glass bulbs for extended lifetime
- Individually tested for light intensity, noise and drift, correct operating voltage, and proper alignment for low lamp-to-lamp variability
- Tight QA/QC with traceability for each lamp throughout every step of the product process
- Both deuterium lamps and tungsten lamps available



Long-life deuterium lamp, 8005-0705

Deuterium lamps

- High output stability and intensity for extended detection capabilities and improved qualification at trace level
- Guaranteed lifetime of 2,000 hours

Tungsten lamps

- Offer coverage in the visible wavelength range for high sensitivity detection
- Average lifetime range from 1,200 to 5,000 hours depending on operation conditions such as operation cycles, soft start, and operation voltage

TIPS & TOOLS

Each time after a replacement of a detector lamp, it is recommended to perform a wavelength calibration test and an intensity test after warm up.



TIPS & TOOLS

An Agilent CrossLab Supplies Selection Tool is available to help you choose the correct supplies for your non-Agilent instrument. For more information, visit www.agilent.com/chem/SelectCrossLab





Snap top vials with write-on spot, 8010-0025

CrossLab Vials and Closures

Agilent CrossLab vials and closures are thoroughly tested to ensure the highest level of quality. Additionally, CrossLab vials are designed for use in a wide range of non-Agilent GCs and LCs, including those from Bruker (formerly Varian), Dionex (now Thermo Scientific), PerkinElmer, Shimadzu, and Thermo Scientific. They are:

- Manufactured in an ISO 9001 certified facility
- Made from First Hydrolytic Type 1 Class A or Class B borosilicate glass, which conforms to US FDA, USP, and EU Pharmacopeia standards
- Protected by proprietary packaging with a crush barrier to reduce vial breakage
- Packaged in material that has been tested and selected for cleanliness
- Subjected to rigorous end-of-line sampling and quality control procedures to ensure all vials remain within specifications
- Compatible with a wide variety of autosamplers regardless of make and model

For Agilent CrossLab Vials and Closures ordering information please see the General Chromatography catalog (publication # 5991-1059EN)
www.agilent.com/chem/library

TIPS & TOOLS



Easy, Reliable pH Testing, Designed for Chromatographers

Agilent now offers a full line of pH meters and electrodes. Designed for chromatographers, these pH meters offer intuitive user design and exceptional ruggedness for your lab.

Learn more at www.agilent.com/chem/phmeters



CrossLab Well Plates and Sealing Mats

Choose the cleanest well plates and sealing mats for your autosamplers



96-well plate, 8010-0534

Advantages of Agilent CrossLab well plates:

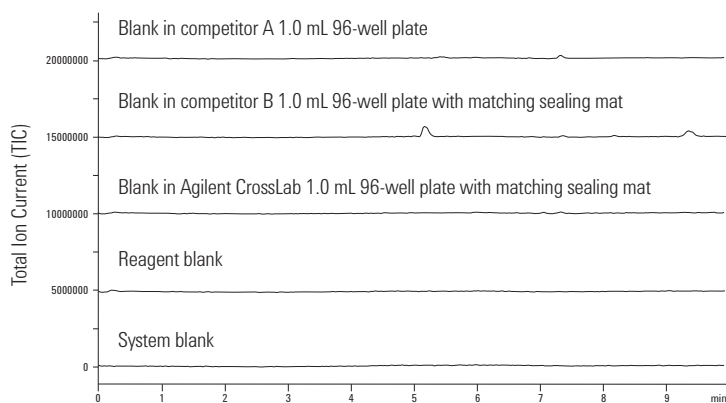
- Made from polypropylene
- Free from RNase, DNase, Endotoxins, and human DNA
- Chemically resistant to common solvents
- Autoclavable (121 °C/20 min)
- Alpha-numeric grid
- Compatible with pipetting workstations and multi-channel pipettes
- Raised rims are available with 0.5 mL and 1.0 mL deep well plates for efficient sealing and a reduced risk of cross-contamination during rigorous vortexing
- Available in 96- or 384-well plate format
- 96-well plates range from 0.2 mL to 2 mL
- 384-well plates available in 0.1 mL and 0.25 mL
- Stackable

Advantages of Agilent CrossLab sealing mats:

- Protect well contents during storage
- Free from RNase, DNase, Endotoxins, and human DNA
- Highly flexible for a tight seal and exact fit
- Insets in every well eliminate the need for glue during connection
- Pierceable with pipette tips (0.5 mL and 1.0 mL sealing mats)
- Prevent solvent evaporation
- Made from thermoplastic elastomer (TPE) or ethylene-vinyl acetate (EVA)
- Compatible with common solvents

For Agilent CrossLab Well Plates and Sealing Mats ordering information please see the General Chromatography catalog (publication # 5991-1059EN)
www.agilent.com/chem/library

Cleanliness of well plates and sealing mats: Agilent CrossLab vs. the competition



The chemical extraction experiments demonstrate the superior cleanliness of the Agilent CrossLab well plates and sealing mats compared to the competition, making them ideal for LC/MS applications.

LC/MS ESI positive chromatogram comparison. Reagent blank: 1:1 Acetonitrile/H₂O with 0.1% formic acid

CrossLab Autosampler Syringes and Manual Syringes

Agilent's CrossLab HPLC syringe portfolio contains a broad selection of syringe styles and volumes to provide what you need for accurate and effective sampling. From autosampler syringes in both large or small volume, to syringes for pump priming, CrossLab syringes meet all form, fit, and function criteria to support your HPLC systems.

- Accuracy to within $\pm 1\%$ of nominal volume with a precision of 1% at 80% of the total volume
- A chemically inert fluid path of stainless steel, borosilicate Type I glass, or PTFE
- Robust design for long lifetime

Agilent CrossLab Syringe Features



Syringe terminations at the end of the syringe barrel function as the interface between the syringe and its mating connection such as the needle. Terminations are offered in a number of different needle and connection configurations to accommodate a broad range of applications.

Fixed Needle



- Economical option for injections
- Preferred for applications requiring trace level samples
- Needle is cemented into the glass syringe barrel at a point corresponding to the zero graduation mark
- Dead volume is limited to the needle's internal volume
- Not autoclavable
- Recommended for use where probability of needle bending is minimal

Removable Needle



- Versatile option for injections
- Needle seats precisely at the zero graduation mark
- Needle can be replaced if damaged or clogged
- Allows for a removable needle without increasing dead volume
- Ideal for when there is a risk of needle clogging
- Autoclavable when disassembled (repeated autoclaving shortens syringe life)

PTFE Luer Lock

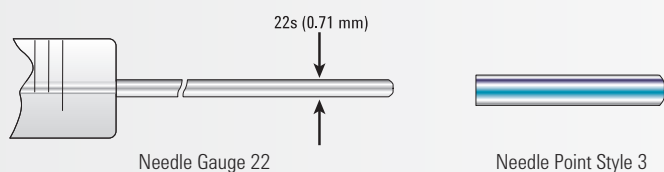


- PTFE, male Luer taper with nickel-plated brass locking hub for use with Kel-F needles or metal hub needles, and universal connectors
- Autoclavable when disassembled, except on 25 mL or greater syringes (repeated autoclaving shortens syringe life)

Chem



- ¼-28 UNF male fitting thread connection
- Used for low-volume applications where system dead volume must be minimized
- Can be screwed directly into injection valves



Note: Most manual HPLC injection valves are designed to be used with a 22-gauge, or a 22s-gauge blunt needle point style 3.

Gauge Selection Chart

| Gauge | Nominal OD | | Nominal ID | | Wall Thickness | | Volume μL/in |
|-------|-----------------|-------|-----------------|-------|----------------|------|-----------------|
| | in | mm | in | mm | in | mm | |
| 22s* | 0.0280 - 0.0285 | 0.718 | 0.0055 - 0.0077 | 0.168 | 0.022 | 0.55 | 0.563 |
| 22 | 0.0280 - 0.0285 | 0.718 | 0.0155 - 0.0170 | 0.413 | 0.012 | 0.30 | 3.403 |

*Note: 22s needles have a smaller inner diameter and a thicker wall for better durability.



TIPS & TOOLS

Replace syringe if dirt is noticeable, syringes cannot be cleaned, or plunger does not slide easily.



TIPS & TOOLS

Follow manufacturer's recommendation for syringe cleaning and regularly inspect syringe barrel for sample build-up and needle tip for wear.

Autosampler Routine Maintenance

Routine autosampler maintenance should be performed on a regular basis to keep your HPLC system performing at its optimum level. You can perform all maintenance procedures at once or as needed. Some parts may need to be replaced more often than others depending upon your application and solvent preparation procedures.

Regular autosampler maintenance helps lower operating costs and generate precise results with the utmost confidence. By following a regular maintenance routine, you can count on maximum uptime during the life of your autosampler.

Waters Autosampler Routine Maintenance Procedures

- Replace the metering syringe
- Rebuild the injector seal pack and replace the needle
- Rebuild the high-pressure motorized valves
- Replace the in-line filter insert
- Adjust the seal pack seal valves

Waters Autosampler Routine Maintenance and Troubleshooting

| Symptom | Cause | Solution |
|---|--|--|
| Poor injection reproducibility | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn metering syringe | Replace the metering syringe assembly |
| | Worn high-pressure motorized valve seals | Rebuild the high-pressure motorized valves |
| | Leaking waste valve | Replace the waste valve |
| | Worn injector seals | Rebuild the injector seal pack, replace the needle, and adjust the seal pack seal valves |
| Leaking syringe | Worn metering syringe | Replace the metering syringe assembly |
| Sample carryover | Needlewash solvent exhausted | Refill the needlewash solvent reservoir |
| | Dirty needlewash seals | Rebuild the seal pack and adjust seal pack seal valves |
| | Faulty needlewash valve | Replace the needlewash valve |
| Sample vials filling during injection cycle | Worn high-pressure motorized valve seal | Rebuild the high-pressure motorized valves |
| Low peak response | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn metering syringe | Replace the metering syringe assembly |
| | Worn high-pressure motorized valve seals | Rebuild the high-pressure motorized valves |
| | Leaking waste valve | Replace the waste valve |
| | Worn injector seals | Rebuild the injector seal pack, replace the needle, and adjust the seal pack seal valves |

Shimadzu Autosampler Routine Maintenance Procedures

- Replace the sample metering drive plunger seal
- Replace the sample needle
- Replace the needle seat seal
- If equipped, replace the rinse port septum
- If equipped, clean the high-pressure valve and replace the high-pressure valve rotor seal
- If equipped, clean the low-pressure valve and replace the low-pressure valve rotor seal
- If equipped, clean the injection valve and replace the injection valve rotor seal
- Adjust the needle if necessary

Shimadzu Autosampler Routine Maintenance and Troubleshooting

| Symptom | Cause | Solution |
|--------------------------------|--------------------------------|--|
| Poor injection reproducibility | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn metering seal | Replace the metering plunger seal |
| | Damaged metering plunger | Replace the metering plunger |
| | Worn high-pressure valve seals | Rebuild the high-pressure valve |
| | Worn low-pressure valve seals | Rebuild the low-pressure valve |
| | Leaking waste valve | Replace the waste valve |
| | Damaged sample needle | Replace the sample needle and needle seat seal |
| Sample carryover | Needlewash solvent exhausted | Refill the needlewash solvent reservoir |
| | Dirty needlewash seals | Rebuild the seal pack and adjust seal pack seal values |
| | Contaminated rinse port | Clean and flush the rinse port |
| Low peak response | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn metering plunger seal | Replace the metering plunger seal |
| | Damaged metering plunger | Replace the metering plunger |
| | Worn high-pressure valve seals | Rebuild the high-pressure valve |
| | Leaking waste valve | Replace the waste valve |
| | Damaged sample needle | Replace the sample needle and needle seat seal |

Dionex* Autosampler Routine Maintenance Procedures

- Replace the sample metering syringe
- Replace the sample needle
- Replace the needle seat seal
- If equipped, clean the injection valve and replace the injection valve rotor seal
- Replace the buffer tubing
- Replace the capillary tubing
- Fill the syringe reservoir
- Adjust the needle if necessary

*Dionex is now a part of Thermo Scientific

Dionex Autosampler Routine Maintenance and Troubleshooting

| Symptom | Cause | Solution |
|--------------------------------|------------------------------|--|
| Poor injection reproducibility | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn metering syringe seal | Replace the metering syringe |
| | Worn syringe valve | Replace the syringe valve |
| | Worn injection valve seal | Rebuild the injection valve |
| | Leaking waste valve | Replace the waste valve |
| | Leaking fittings | Check all the fittings for leaks |
| | Damaged sample needle | Replace the sample needle and needle seat seal |
| Sample carryover | Needlewash solvent exhausted | Refill the needlewash solvent reservoir |
| | Dirty needlewash seals | Rebuild the seal pack and adjust seal pack seal valves |
| | Contaminated rinse port | Clean and flush the rinse port |
| Leaking syringe | Damaged syringe | Replace the syringe |
| | Worn syringe valve | Check for leaks and replace if necessary |
| Low peak response | Low sample level in vials | Confirm sample level in the vials is at minimum a quarter full |
| | Worn syringe valve | Replace the metering syringe |
| | Damaged syringe valve | Check the syringe valve for leaks and replace if necessary |
| | Worn injector valve seal | Rebuild the injection valve |
| | Leaking waste valve | Replace the waste valve |
| | Leaking fittings | Check all the fittings for leaks |
| | Damaged sample needle | Replace the sample needle and needle seat seal |



Sapphire plunger assembly, 8005-0538



Plunger seal replacement kit, 8005-0541



Face seals replacement kit, 8005-0536

CrossLab Pump Supplies

Proper pump maintenance helps ensure precise, consistent results and lower operating costs

Regular pump maintenance helps lower operating costs and ensure precise and consistent results. By following a regular maintenance routine, you can count on maximum uptime, steady and accurate solvent flow, pressure stability throughout the life of a pump, and keep your HPLC system in its optimum condition.

CrossLab Plungers and Seals

Plungers (or pistons) and seals are two of the most important components of a pump. All Agilent CrossLab plungers combined with seals undergo extensive testing under temperature stress with common HPLC solvents for reproducible results.

Plungers:

- Available in sapphire or ceramic
- Sapphire plungers are made from high purity monocrystalline sapphire for optimal concentricity and resistance to wear
- Are meticulously cut and polished for great durability and long life

Seals:

- Manufactured from ultra-high-molecular-weight polyethylene (UHMWPE) or graphite-filled polytetrafluoroethylene (GFP)
- Designed to provide precise sealing around the plungers
- Engineered to deliver top performance over highly dynamic flow and pressure ranges

TIPS & TOOLS



Plungers (or pistons) should be exchanged on a regular basis in combination with seals to maintain the best sealing surface and durability for optimal instrument performance.

TIPS & TOOLS



Depending on your applications and solvent preparation protocols, some parts may need to be replaced more often than the others.

CrossLab Check Valves

Check valves are key components for a pump, and their lifetime is often related to the solvents used. A defective valve can lead to pressure fluctuation, inconsistent flow, and a noisy baseline.

Agilent CrossLab check valves and assembly components:

- Made to operate at different pressures (up to 16,000 psi, or 1,100 bar) per specifications from the Original Equipment Manufacturers (OEMs)
- Made from a variety of materials, such as stainless steel, titanium, ceramic, and PEEK, depending on OEM specifications
- Carefully assembled to ensure reliability and consistent performance
- Each ruby or ceramic ball and sapphire or ceramic seat is manufactured under extremely tight tolerances to ensure proper sealing within the operating pressure range

TIPS & TOOLS

Don't forget to check your check valve regularly and replace check valve cartridges to ensure proper pump operations.



TIPS & TOOLS



Pump seals should be replaced when there are leaks on the bottom of the pump head, when retention times are inconsistent, or when the pressure ripple is unstable.

HPLC Pump Routine Maintenance

Routine pump maintenance should be performed on a regular basis to keep your HPLC system performing at its optimum level. You can perform all maintenance procedures at once or as needed. Some parts may need to be replaced more often than others depending upon your application and solvent preparation procedures.

Regular pump maintenance helps lower operating costs and generate precise results with the utmost confidence. By following a regular maintenance routine, you can count on maximum uptime and a steady, accurate solvent flow for the life of the pump.



Sapphire plunger assembly, 8005-0523

Waters Pump Routine Maintenance Procedures

- Replace the seals and plungers (or pistons)
- Replace the in-line filter insert
- Replace the check valve cartridges
- Replace the seal wash seals and tube seals
- Replace the solvent inlet frits

Waters Pump Routine Maintenance Procedures

| Symptom | Cause | Solution |
|---|--------------------------------|---|
| Pressure ripple unstable | Dirty check valve cartridge(s) | Run static leak test to verify and exchange the check valve cartridge(s) |
| | Leak on pump head | Run static leak test to verify and exchange the in-line filter insert and plunger (or piston) seals |
| Gradient performance problems Intermittent pressure fluctuations | Blocked solvent filter(s) | Change the solvent filter(s) |
| A pressure drop of greater than 10 bar (150 psi) across the in-line filter (5 mL/min H ₂ O during wet priming) | Dirty in-line filter | Exchange the in-line filter insert |
| Leaks at lower pump head side Unstable retention time Pressure ripple unstable | High seal wear | Run leak test to verify and exchange the pump seals and in-line filter insert |
| Seal lifetime shorter than normally expected | Scratch on plunger | Check plungers while changing the seals Exchange the plungers if damaged or scratched |
| Loss of wash solvent | Leaky wash seals | Exchange the wash seals |

Shimadzu Pump Routine Maintenance Procedures

- Replace the seals and plungers (or pistons)
- Replace the in-line filter cartridge
- Replace the check valve cartridges
- Replace the seal wash seals
- Replace the solvent inlet frits



Plunger seal, 8001-0502

Shimadzu Pump Routine Maintenance and Troubleshooting

| Symptom | Cause | Solution |
|---|--------------------------------|---|
| Pressure ripple unstable | Dirty check valve cartridge(s) | Run Pump Pressure test to verify and exchange the check valve cartridge(s) |
| | Leak on pump head | Run Pump Pressure test to verify and exchange the in-line filter insert and plunger (or piston) seal Check inlet and outlet fittings for leaks Tighten all fittings and re-run the Pump Pressure test |
| Gradient performance problems Intermittent pressure fluctuations | Solvent filter(s) is blocked | Change the solvent filter(s) |
| A pressure drop of greater than 10 bar (150 psi) across the in-line filter (5 mL/min H ₂ O during wet priming) | Dirty in-line filter | Exchange the in-line filter insert |
| Leaks at lower pump head side Unstable retention time Pressure ripple unstable Broad peaks or peak tailing | High seal wear | Run Pump Pressure test to verify and exchange the pump seals and in-line filter cartridge |
| Seal lifetime shorter than normally expected | Scratch on plunger | Check plungers while changing the seals |
| | | Exchange the plungers if damaged or scratched |
| Loss of wash solvent | Leaky wash seals | Exchange the wash seals |



Vespel rotor seal, 8002-0602

Dionex* Pump Routine Maintenance Procedures

- Replace the purge valve cap seal
- Replace the seals, seal rings, and plungers (or pistons)
- Replace the in-line filter cartridge
- Replace the check valve cartridges
- Replace the seal wash seals and seal wash tubing
- Replace the mixing chamber gasket
- Replace the solvent inlet filter frits

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Dionex Pump Routine Maintenance and Troubleshooting

| Symptom | Cause | Solution |
|--|--------------------------------|---|
| Pressure ripple unstable | Dirty check valve cartridge(s) | Run Pump Pressure test to verify and exchange the check valve cartridge(s) |
| | Leak on pump head | Run Pump Pressure test to verify and exchange the in-line filter insert and plunger (or piston) seal Check inlet and outlet fittings for leaks Tighten all fittings and re-run the Pump Pressure test |
| Gradient performance problems, Intermittent pressure fluctuations | Solvent filter(s) is blocked | Change the solvent filter(s) |
| A pressure drop of greater than 10 bar (150 psi) across the in-line filter (5 mL/min H ₂ O during wet priming) | Dirty in-line filter | Exchange the in-line filter insert |
| Leaks at lower pump head side Unstable retention time Pressure ripple unstable Broad peaks or peak tailing | High seal wear | Run Pump Pressure test to verify and exchange the pump seals and in-line filter cartridge |
| Seal lifetime shorter than normally expected | Scratch on plunger | Check plungers while changing the seals Exchange the plungers if damaged or scratched |
| Loss of wash solvent | Leaky wash seals | Exchange the wash seals and seal wash tubing |

CrossLab Valve Supplies

Agilent CrossLab valve supplies work seamlessly with your HPLC systems for reliable, accurate, and reproducible results.

Rotor seals:

A variety of materials for a wide range of applications

A rotor seal is a polymeric disk that creates a high-pressure seal against the stator or stator face seal. A variety of materials are available for different applications. It is important to replace rotor seals on a routine basis to prevent excessive wear. The recommended replacement interval for most rotor seals is once per year for preventive maintenance or as needed depending on stresses imposed by specific applications.

- **Vespel:** Vespel is a polyimide with low wear and high chemical resistance. Recommended for use with solutions under pH 10; because more basic solutions dissolve Vespel over time and damage the rotor seal
- **PEEK (Polyetheretherketone):** PEEK offers high resistance, versatility, and applicability for the entire pH range between 0 and 14
- **Tefzel:** Recommended for use in applications where PEEK cannot be used, such as higher concentrations of methylene chloride or dimethyl sulfoxide (DMSO)

Recommended pH levels for rotor seal materials

| pH Range | 0-7 | 7-10 | 10-14 |
|----------|-----|------|-------|
| Vespel | | | |
| PEEK | | | |
| Tefzel | | | |



Rotor, 6-port valve, 8001-0601

TIPS & TOOLS

For any solution above pH 10, a PEEK rotor seal is recommended.



TIPS & TOOLS

PEEK rotor seals are incompatible with concentrated nitric and sulfuric acids.





Stator, 6-port valve, 8001-0604

Stators

- Available in 316 stainless steel, PEEK, and ceramic depending on the specifications of OEMs
- Typically require replacement only if the ports or sealing surfaces become damaged, which can be prevented by using proper injection needles.

Sample Loops

Stainless Steel Sample Loops:

- Have burr-free and square-cut ends to ensure a flush connection to valve ports
- Actual volumes might differ due to tolerance of metal tubing bore
- Accuracy of large metal loops (1.0 mm, 0.040 in bore) is $\pm 14\%$, intermediate loops (0.5 mm, 0.020 in bore) is $\pm 21\%$, and small loops (0.2 mm, 0.007 in bore) is $\pm 65\%$

PEEK Sample Loops

- Alternatives to stainless steel sample loops
- Clean, straight cuts for easy valve installation and low dead volume connections
- Inert to almost all organic solvents and biocompatible
- Actual volumes might differ due to tolerance of metal tubing bore
- Accuracy of large PEEK loops (0.8 mm, 0.030 in bore) is $\pm 5\%$, intermediate loops (0.5 mm, 0.020 in bore) is $\pm 10\%$, and small loops (0.2 mm, 0.007 in bore) is $\pm 30\%$
- Wall thickness, temperature, concentration of organic solvent, and solvent exposure time affect the durability of PEEK tubing

TIPS & TOOLS



Concentrated nitric acid and sulfuric acid weaken PEEK tubing while tetrahydrofuran (THF), methylene chloride, and DMSO cause swelling.

TIPS & TOOLS



Since both standards and unknowns are usually analyzed using the same sample loops, knowledge of the actual, accurate volume is rarely needed. If the sample loop volume must be known, it is best to calibrate the loop in place on the valve so the flow passages in the valve are taken into account.

CrossLab Performance Maintenance (PM) Kits

PM kits make it easier to keep your instruments running at peak performance

Many instrument failures are caused not by functional breakdowns, but by a lack of performance maintenance. As suggested by a recent study, a regular performance maintenance program can reduce instrument failure rates up to 25%, and is critical to ensure optimal overall system operations.

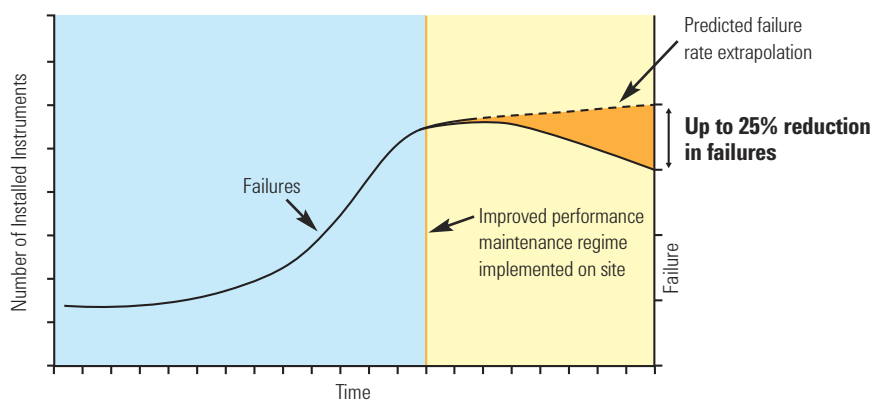


515 pump PM kit, 8005-0913



2960/2965 PM kit, 8005-0915

The Effect of Performance Maintenance



Agilent CrossLab PM kits contain the normal wear parts, tools for disassembly/reassembly, and instructions necessary to keep your systems operating at peak performance. The kits provide a convenient, cost-effective way to make sure your instruments are properly maintained. Each kit contains all the parts you need to:

- Boost system efficiency and reliability
- Reduce unplanned downtime and repair costs
- Increase accuracy by enhancing precision and sensitivity
- Comply with regulatory requirements, or meet quality accreditation standards
- Extend instrument useful life
- Eliminate individual part ordering
- PM kits available for pumps, valves, autosamplers, and HPLC systems

General HPLC Supplies

CrossLab LC Capillaries and Tubing

Your link to analytical success

Agilent CrossLab offers a range of capillaries and tubing made from stainless steel and PEEK. Used in combination with the right fittings, they are ideal for LC system plumbing, providing an inert surface, tight, leak-free connections, and zero dead volumes.

Stainless steel capillaries

- Made of ultra-clean stainless steel tubing
- Ideal for most standard applications, and the best choice for reliable high-pressure sealing
- Smooth inner surface for the lowest backpressure
- Precision cutting for burr-free, square-cut ends without inner-diameter distortion
- Both ends accept standard fittings
- Predefined lengths for specific path locations to avoid peak broadening
- Individually tested to ensure reproducibility
- Available in pre-swaged and non pre-swaged

TIPS & TOOLS



Always use the smallest capillary internal diameter and the shortest length to keep sample dispersion as low as possible.

PEEK tubing

- Flexible and easy to cut to desired lengths
- Ideal for frequently changed connections
- Resists mechanical and solvent damage, even at high temperatures
- Biocompatible and inert to almost all organic solvents
- A durable alternative to stainless steel connections
- Accepts both stainless steel and PEEK fittings

CrossLab Fittings

The right LC fittings make the best LC connections

To ensure leak-free connections, and to prevent the loss of peak shape and resolution, always use the recommended fitting style for columns, valves and unions.

With Agilent CrossLab fittings, you get the confidence and choice that come with:

- Robust design for long life and smooth, leak-free operation
- Stainless steel nuts and ferrules for high-pressure systems
- Polymer fittings for biocompatible applications



CrossLab HPLC In-Line Filters

Help stop time-wasting blockages

Column inlet frit contamination can increase backpressure and reduce efficiency. Microbore column blockages are of particular concern, due to the frit's small diameter.

To help prevent time-wasting contamination and blockages, the Agilent CrossLab portfolio offers two types of LC filters made from clean, high-quality stainless steel parts:

- In-line solvent filters, installed between the LC pump and injector, prevent blockages by removing particles from solvents before they reach the injector
- Column inlet filters, positioned immediately before an LC column, remove particles from both the injection system and sample

Troubleshooting Guide for HPLC Systems

The at-a-glance tables can help you pinpoint and solve the most common problems for your HPLC systems and ensure maximum instrument uptime and productivity.

HPLC Troubleshooting

| Symptom Type | Possible Cause | Solution |
|-----------------------------------|---|--|
| Baseline disturbance at void time | Positive/negative – Difference in refractive index of injection solvent | Use mobile phase for sample solvent |
| Detector leaks | Plugged inlet frit | Replace seals/gaskets |
| Drifting baseline | Positive direction – Contaminant buildup/elution | Flush column, clean up sample, use pure solvents |
| | Positive/negative – Difference in refractive index of injection solvent | Use mobile phase for sample solvent |
| | Negative direction (gradient) – Absorbance of "A" mobile phase solvent | Use non-absorbing or HPLC-grade or better solvent |
| | Positive direction (gradient) – Absorbance of "B" mobile phase solvent | Use non-absorbing or HPLC-grade or better solvent |
| | Random – Temperature changes | Insulate column and tubing |
| | Random – Temperature changes | Thermostat column and tubing |
| Ghost peaks | Wavy or undulating – Temperature changes in room | Monitor room temperature and control |
| | Peaks from previous injection | Flush column to remove contaminants |
| | Contamination | Sample cleanup or pre-fractionation |
| | Unknown interferences in samples | Sample cleanup or pre-fractionation |
| | Ion-pair – Upset equilibrium | Prepare sample in actual mobile phase to minimize disturbance |
| | Peptide mapping – Oxidation of TFA | Prepare fresh daily; use anti-oxidant |
| | Reversed-phase – Contaminated water | Check suitability of water by running different amount through reversed-phase column and measure peak height with elution; use HPLC grade solvents |
| Spikes – Bubbles in solvent | De-gas solvents | |

(Continued)

HPLC Troubleshooting

| Symptom Type | Possible Cause | Solution |
|---------------------------------|---|--|
| High column backpressure | Column blockage, adsorbed sample | Better sample cleanup; use guard column |
| | Mobile phase viscosity too high | Use lower viscosity solvents or higher temperature |
| | Particle size too small | Use larger d_p packing |
| | Plugged inlet frit | Replace column |
| | Plugged inlet frit | Reverse solvent flow |
| Leaks | Subtle – White powder at fitting/loose fitting | Tighten fittings, cut tubing, or replace ferrules |
| Leaks, injection valve | Catastrophic – Worn valve rotor | Replace rotor in valve |
| Leaks, column or other fittings | Catastrophic – Loose fittings | Tighten or replace fittings |
| Leak, pump | Catastrophic – Pump seal failure | Replace pump seal |
| Negative peaks | RI detector – solute refractive index less than solvent | No problem; reverse polarity to make positive |
| | UV detector – solute absorbance less than mobile phase | Use mobile phase with lower UV absorbance; do not recycle solvent too long |
| Noisy baseline | Random – Contaminant buildup | Flush column; clean up sample; use HPLC-grade solvent |
| | Continuous – Detector lamp problem | Replace detector lamp |
| | Occasional – External electrical interference | Use voltage stabilizer for LC system |
| Peak doubling | Sample volume too large | Reduce the volume e.g. by half and re-inject |
| | Injection solvent too strong | Use weaker injection solvent or mobile phase |
| | Blocked frit | Replace and use 0.5 μm porosity in-line filter |
| | Column void or channeling | Replace column; for some columns, fill in void with packing |
| | Unswep injector flowpath | Replace injector rotor |
| | Void at head of column | Replace column, top off column with packing |
| | Column overloaded with sample | Use higher capacity stationary phase Increase column diameter Decrease sample size |
| | Single peak – interfering components | Sample cleanup; pre-fractionation |

(Continued)

HPLC Troubleshooting

| Symptom Type | Possible Cause | Solution |
|--|--|--|
| Peak tailing | Beginning of peak doubling | See "peak doubling" |
| | Unswept dead volumes | Minimize number of connections Ensure injector seal is tight Ensure fittings are properly seated |
| | Basic compounds – Silanol interactions | Choose endcapped bonded phase Switch to polymeric phase |
| | Basic substances – Silanol interactions | Use stronger mobile phase or add competing base (e.g. TMA) |
| | Silica-based – Column degradation | Use specialty column; polymeric column or sterically protected |
| Peaks are broad | Injection volume too large | Decrease solvent strength of injection solvent to focus solute |
| | Peak dispersion in injector valve | Introduce air bubble in front/back of sample to decrease dispersion |
| | Sampling rate of data system too slow | Increase frequency of sampling |
| | Slow detector time constant | Adjust time constant to match peak width |
| | Mobile phase viscosity too high | Increase column temperature |
| | Detector cell volume too large | Use smallest possible cell volume with no heat exchanger in system |
| | Injector volume too large | Decrease injection volume |
| Pressure fluctuation | Long retention times | Use gradient elution or stronger mobile phase |
| | Leaky check valve | Replace check valve |
| | Pump seal leaks | Replace pump seals |
| Pressure increasing | Buildup of particulates | Filter sample; in-line filter; filter mobile phase |
| | Water/organic systems – buffer precipitation | Test buffer-organic mixtures; ensure compatibility |
| Retention beyond total permeation volume | Size exclusion – Specific interactions | Add mobile phase modifiers or change solvent |

(Continued)

HPLC Troubleshooting

| Symptom Type | Possible Cause | Solution |
|---|--|--|
| Retention times changing | Column temperature varying | Thermostat column; insulate column; ensure lab temperature constant |
| | Equilibration time insufficient with gradient run or changes in isocratic mobile phase | Make sure at least 10 column volumes pass through column after solvent change or gradient conclusion |
| | Selective evaporation of mobile phase component | Less vigorous helium sparging; keep solvent reservoirs covered; prepare fresh mobile phase |
| | Buffer capacity insufficient | Use >20 mM concentration of buffer |
| | Inconsistent on-line mobile phase mixing | Ensure gradient system delivering constant composition; check vs. manual prep of mobile phase |
| | Contamination buildup | Occasionally flush column with strong solvent to remove contaminants |
| | First few injections – Adsorption on active sites | Condition column by initial injection of concentrated sample |
| Retention times decreasing | Flow rate increasing | Check pump to make sure correct; if not, reset |
| | Column overloaded with sample | Decrease sample size |
| | Loss of bonded stationary phase | Keep mobile phase pH between 2 and 8.5 |
| Retention times increasing | Flow rate is slowing | Fix leaks in liquid lines, replace pump seals, check for pump cavitation or air bubbles |
| | Active sites on silica packing | Use mobile phase modifier |
| | Loss of bonded stationary phase | Keep mobile phase pH between 2 and 8.5 |
| | Mobile phase composition changing | Make sure mobile phase container is covered |
| | Active sites on silica packing | Add competing base to mobile phase |
| Sensitivity problem | Active sites on silica packing | Use higher coverage packing for stationary phase |
| | Peaks are outside of linear range of detector | Dilute/concentrate to bring into linear region |
| | First few sample injections – Absorption of sample in loop or column | Condition loop/column with concentrated sample |
| | Autosampler flow lines blocked | Check flow and make sure there are no blockages |
| | Injector sample loop underfilled | Make sure that loop is overfilled with sample |
| Slow column equilibration times (ion-pairing) | Sample-related losses during preparation | Use internal standard during sample prep; optimize sample prep method |
| | Equilibration time slow for long-chain ion-pairing reagents | Use shorter alkyl chain ion-pair reagent |

CrossLab Supplies for Waters HPLC Systems

Detector Lamps

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|---------------------------------------|-------------------------|---------------------------|
| 2996 Photodiode Array Detector 996 Photodiode Array Detector ACQUITY UPLC 2996 Photodiode Array Detector | Long-life deuterium lamp, 2,000 hours | WAT052586 | 8005-0705 |
| 2487 Dual Wavelength Absorbance Detector 2488 Multichannel Absorbance Detector ACQUITY TUV Detector UPLC TUV Detector | Long-life deuterium lamp, 2,000 hours | WAS081142 | 8005-0704 |
| 486 Tunable UV/Visible Absorbance Detector LC Module 1 | Long-life deuterium lamp, 2,000 hours | 700000356 WAT052666 | 8005-0702 |

Autosampler Syringes, 1/pk

| Model | Volume (µL) | Description | Needle Gauge/Length (mm)/Tip | Similar to OEM Part No. | Agilent CrossLab Syringe | Agilent CrossLab Replacement Needle | Agilent CrossLab Replacement Plunger | Similar to OEM Part No. |
|-----------------------------|-------------|-------------------------|------------------------------|-------------------------|--------------------------|-------------------------------------|--------------------------------------|-------------------------|
| 2777 Compact Sample Manager | 10 | Fixed needle | 22s/51/3 | 430000859 | 8010-0445* | | 8010-0457, 10/pk | 700002212 |
| 2777 Sample Manager | 25 | Fixed needle, gas tight | 22s/51/3 | 430000861 | 8010-0441 | | 8010-0458, 10/pk | 700002213 |
| | 100 | Fixed needle, gas tight | 22s/51/3 | 430000864 | 8010-0442* | | 8010-0459, 10/pk | 700002214 |
| | | Fixed needle, gas tight | 22/51/3 | 430000863 | 8010-0446* | | 8010-0459, 10/pk | 700002214 |
| | 250 | Fixed needle, gas tight | 22/51/3 | 430000865 | 8010-0467 | | 8010-0456, 10/pk | 700002215 |
| | 500 | Fixed needle, gas tight | 22/51/3 | 430000866 | 8010-0468 | | 8010-0460, 10/pk | 700002216 |
| | 1,000 | Fixed needle, gas tight | 22/51/3 | 430000867 | 8010-0443 | | 8010-0455, 1/pk | 700002217 |
| | 2,500 | Fixed needle, gas tight | 22/51/3 | 430000868 | 8010-0444 | | 8010-0448, 1/pk | 700002218 |

*Barrel od is 6.7 mm. All other 10, 25, and, 100 µL syringes have 7.9 mm od.

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Long-life deuterium lamp, 8005-0705



Long-life deuterium lamp, 8005-0704



Long-life deuterium lamp, 8005-0702

CrossLab Supplies for Waters HPLC Systems

Autosampler Syringes, 1/pk

| Model | Volume (µL) | Description | Needle Gauge/Length (mm)/Tip | Similar to OEM Part No. | Agilent CrossLab Syringe | Agilent CrossLab Replacement Needle | Agilent CrossLab Replacement Plunger | Similar to OEM Part No. |
|---|-------------|--|------------------------------|-------------------------|--------------------------|-------------------------------------|--------------------------------------|-------------------------|
| 510 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System CapLC System CapLC XE System | 10000 | Luer Lock | No needle | WAT025559 | 8005-0414 | | | |
| 600 MultiSolvent Delivery System Rheodyne Injector | 25 | Removable needle, gas tight | 22s/51/3 | WAT033381 | 8005-0416 | | 8005-0422 | |
| 2690 Separations Module 2690D Dissolution Separations Module | 25 | Chem (1/4-28 UNF screw threads), gas tight | No needle | WAT077343 | 8005-0420 | | | |
| 2695 Separations Module 2695D Dissolution Separations Module 2790 Separations Module 2795 Separations Module LC Module 1 717/717plus Autosampler | 250 | Chem (1/4-28 screw threads UNF), gas tight | No needle | WAT073109 | 8005-0419 | | | |
| Rheodyne Injector | 100 | Removable needle, gas tight | 22s/51/3 | WAT033383 | 8005-0417 | 8005-0418, 6/pk | 8005-0423 | |

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Autosampler syringe, gas tight, 8005-0417

CrossLab Supplies for Waters HPLC Systems

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--------------------------------------|--|------|-------------------------|---------------------------|
| Plungers and Seals | | | | |
| 2690 Separations Module | Sapphire plunger assembly, standard | 1/pk | WAT270959 | 8005-0538 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| 2796 Bioseparations Module | | | | |
| 2690 Separations Module | Plunger seals, clear | 2/pk | 700001326 | 8005-0514 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2690 Separations Module | Plunger seal replacement kit, standard, yellow | 2/pk | WAT270938 | 8005-0535 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| Alliance GPC/V 2000 Systems | | | | |
| 2690 Separations Module | Plunger seal replacement kit, black | 2/pk | WAT271066 | 8005-0541 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| 2690 Separations Module | Face seals replacement kit | 4/pk | WAT270939 | 8005-0536 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| Alliance GPC/V 2000 Systems | | | | |

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(Continued)



Plunger seal replacement kit,
8005-0535



Plunger seal replacement kit,
8005-0541



Face seals replacement kit,
8005-0536

CrossLab Supplies for Waters HPLC Systems

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--------------------------------------|---|------|-------------------------|---------------------------|
| Plungers and Seals | | | | |
| 2690 Separations Module | Seal wash face seal kit | 1/pk | WAT271017 | 8005-0539 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| Alliance GPC/V 2000 Systems | | | | |
| 2796 Bioseparations Module | Seal wash, plunger seal | 4/pk | 700002258 | 8005-0516 |
| 2796 Bioseparations Module | Plunger seal, standard | 2/pk | 700002257 | 8005-0515 |
| 2690 Separations Module | Seal wash plunger seal replacement kit | 2/pk | WAT271018 | 8005-0540 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| Alliance GPC/V 2000 Systems | | | | |
| 510 HPLC Pump | Sapphire plunger | 1/pk | WAT025656 | 8005-0527 |
| 600 MultiSolvent Delivery System | Oriented sapphire plunger | 1/pk | WAT069511 | 8005-0533 |
| 610 PowerLine Isocratic Pump | | | | |
| LC Module 1 | | | | |
| 510 HPLC Pump | Plunger seal, graphite-filled PTFE (GFP), black | 1/pk | WAT026613 | 8005-0529 |
| 515 HPLC Pump | | | | |
| 600 MultiSolvent Delivery System | | | | |
| LC Module 1 | | | | |
| 510 HPLC Pump | Plunger seal, black, 225 µL | 1/pk | WAT026644 | 8005-0530 |
| 515 HPLC Pump | | | | |
| 600 MultiSolvent Delivery System | | | | |
| 610 PowerLine Isocratic Pump | | | | |
| LC Module 1 | | | | |
| 616 LC System | Sapphire plunger | 1/pk | WAT031788 | 8005-0531 |
| 626 LC System | | | | |
| 1515 HPLC Pump | Sapphire plunger assembly | 1/pk | WAS207069 | 8005-0523 |
| 1525 HPLC Pump | | | | |
| 515 HPLC Pump | | | | |



Seal wash face seal kit,
8005-0539

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(Continued)

CrossLab Supplies for Waters HPLC Systems

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--------------------------------------|---------------------------------------|------|-------------------------|---------------------------|
| Plungers and Seals | | | | |
| 1515 HPLC Pump | Plunger seal, clear | 1/pk | WAT022934 | 8005-0524 |
| 1525 HPLC Pump | Plunger seal, clear | 4/pk | WAT022946 | 8005-0525 |
| 510 HPLC Pump | | | | |
| 515 HPLC Pump | | | | |
| 600 MultiSolvent Delivery System | | | | |
| 610 PowerLine Isocratic Pump | | | | |
| LC Module 1 | | | | |
| Check Valves and Cartridges | | | | |
| 2690 Separations Module | Check valve cartridge replacement kit | 2/pk | WAT270941 | 8005-0537 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2790 Separations Module | | | | |
| 2795 Separations Module | | | | |
| Alliance GPC/V 2000 Systems | | | | |
| 626 LC System | Check valve cartridge | 1/pk | WAT024120 | 8005-0526 |
| 1515 HPLC Pump | Check valve cartridge | 2/pk | 700000254 | 8005-0513 |
| 1525 HPLC Pump | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2795 Separations Module | | | | |
| 510 HPLC Pump | | | | |
| 515 HPLC Pump | | | | |
| 600 MultiSolvent Delivery System | | | | |
| 610 PowerLine Isocratic Pump | | | | |
| LC Module 1 | | | | |
| 1525 HPLC Pump | Check valve cartridge | 1/pk | 700002399 | 8005-0508 |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2795 Separations Module | | | | |
| 515 HPLC Pump | | | | |
| 600 MultiSolvent Delivery System | | | | |

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(Continued)

CrossLab Supplies for Waters HPLC Systems

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|--|------|-------------------------------|---------------------------------|
| Check Valves and Cartridges | | | | |
| 1515 HPLC Pump 1525 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System LC Module 1 | Cartridge check valve system | 2/pk | 700000253 | 8005-0512 |
| 510 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System 610 PowerLine Isocratic Pump LC Module 1 | Outlet check valve rebuild kit, 225 µL | 2/pk | WAT026014 | 8005-0528 |

Detector Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|-------------|------|-------------------------------|---------------------------------|
| 2996 Photodiode Array Detector 996 Photodiode Array Detector | Cell gasket | 2/pk | WAT057924 | 8005-0532 |

Valve Replacement Parts, 1/pk

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|---|------|-------------------------------|---------------------------------|
| 2767/2747 Sample Manager Column/Fluidics Organizer | Stator, 6 port, stainless steel | | 700001560 | 8005-0601 |
| Rheodyne 7725(i) Injector | Vespel rotor seal, for Rheodyne 7725(i) | | WAT055946 | 8005-0604 |
| 626 LC System Rheodyne 9125 Injector | Tefzel rotor seal | | WAT015781 | 8005-0603 |
| 2700 Sample Manager | Rotor seal | | WAT272615 | 8005-0605 |
| 2707 Autosampler | Rotor seal | | 700003851 | 8005-0602 |

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(Continued)

CrossLab Supplies for Waters HPLC Systems

Sample Loops, 1/pk

| Model | Volume (µL) | Material | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|-------------|-----------------|-------------------------|---------------------------|
| 2690 Separations Module | 100 | Stainless steel | 430001194 | 8005-0840 |
| 2690D Dissolution Separations Module | | | | |
| 2695 Separations Module | | | | |
| 2695D Dissolution Separations Module | | | | |
| 2695 Separations Module | 200 | Stainless steel | 430001630 | 8005-0841 |
| 2695D Dissolution Separations Module | | | | |
| 2796 Bioseparations Module | 20 | PEEK | 430000782 | 8005-0838 |
| 2796 Bioseparations Module | 100 | PEEK | 430000783 | 8005-0839 |
| 2707 Autosampler CapLC System CapLC XE System | 5 | Stainless steel | 700000683 | 8005-0843 |
| 2707 Autosampler | 10 | Stainless steel | 700003872 | 8005-0845 |
| 2707 Autosampler CapLC System CapLC XE System | 20 | Stainless steel | 700000680 | 8005-0842 |
| 2707 Autosampler | 50 | Stainless steel | 700003928 | 8005-0846 |
| 2707 Autosampler CapLC System CapLC XE System | 100 | Stainless steel | 700000685 | 8005-0844 |

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CrossLab Supplies for Waters HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|--------------------------------------|---|-------------------------|---------------------------|
| Performance Maintenance Kits for Separation Modules | | | | |
| 2690 Separations Module 2690D Dissolution Separations Module 2695 Separations Module 2695D Dissolution Separations Module | 2690/95 Performance Maintenance Kit | Contains 2 sapphire plungers, 2 seal wash plunger seal kits, 2 plunger seals replacements kits (standard, yellow), 4 wash tube seal replacement kits, 1 battery, 1 diffuser assembly, 4 face seal replacement kits, 4 solvent reservoir filters (10 µm), 1 250 µL syringe, 1 precolumn filter insert assembly, 2 check valve cartridges, 1 seal pack rebuild kit with needle, 1 wash tube seal, 1 sealwash tube, 1 PTFE washer, 1 filter retainer, 1 lower wash seal frit, 1 needlewash frit, 1 TFE washer, 1 needle assembly, 2 injector seals, 1 stainless steel ferrule 1/16 in, 1 compression screw | WAT270944 | 8005-0915 |
| 2690 Separations Module 2690D Dissolution Separations Module 2695 Separations Module 2695D Dissolution Separations Module | Seal Pack Rebuild Kit With Needle | Contains 1 wash tube seal, 1 sealwash tube, 1 PTFE washer, 1 filter retainer, 1 lower wash seal frit, 1 needlewash frit, 1 TFE washer, 1 needle assembly, 2 injector seals, 1 stainless steel ferrule 1/16 in, 1 compression screw | WAT271019 | 8005-0916 |
| Performance Maintenance Kits for Pumps | | | | |
| 515 HPLC Pump | 515 Pump Performance Maintenance Kit | Contains 2 sapphire plunger assemblies, 2 plunger seals, 1 solvent reservoir filter (10 µm), 1 sparge diffuser, 4 check valve cartridges | WAT052587 | 8005-0913 |
| 600 MultiSolvent Delivery System 610 PowerLine Isocratic Pump | 600 Pump Performance Maintenance Kit | Contains 2 sapphire plungers, 2 plunger seals, 4 solvent reservoir filters (10 µm), 4 check valve cartridges, 1 reference valve rebuild kit, 1 inlet manifold rebuild kit, 4 sparge diffusers | WAT052675 | 8005-0930 |
| 616 LC System | 616 LC Performance Maintenance Kit | Contains 2 sapphire plungers, 1 plunger seal kit (ultra high molecular weight polyethylene, yellow), 4 check valve cartridges, 4 sparge diffusers, 4 solvent reservoir filters (10 µm) | WAT052672 | 8005-0928 |

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(Continued)



2960/2965 PM kit, 8005-0915



515 pump PM kit, 8005-0913

CrossLab Supplies for Waters HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|---------------------------------------|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| 626 LC System | 626 LC Performance Maintenance Kit | Contains 2 sapphire plungers, 2 ultra high molecular weight polyethylene plunger seals (yellow), 4 solvent reservoir filters (10 µm), 4 check valve cartridges, 4 sparge diffusers | WAT052673 | 8005-0929 |
| 1515 HPLC Pump | 1515 Pump Performance Maintenance Kit | Contains 2 sapphire plungers, 2 plunger seals, 4 check valve cartridges, 1 reference valve rebuild kit, 1 solvent reservoir filter (10 µm) | 201000113 | 8005-0925 |
| 1525 HPLC Pump | 1525 Pump Performance Maintenance Kit | Contains 4 sapphire plungers, 4 plunger seals, 8 check valve cartridges, 1 reference valve rebuild kit, 2 solvent reservoir filters (10 µm) | 201000114 | 8005-0926 |
| 616 LC System 626 LC System | Plunger and Wash Seal Rebuild Kit | Contains parts for both pump heads, 2 plunger seals, 2 plunger wash seals, 2 retainer seal O-rings, 6 plunger bearings | WAT031790 | 8005-0912 |
| 1515 HPLC Pump 1525 HPLC Pump 510 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System 610 PowerLine Isocratic Pump | Reference Valve Rebuild Kit | Contains 1 diaphragm for check valve, 1 gasket for check valve, 1 reference valve button | WAT025746 | 8005-0911 |
| 510 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System 610 PowerLine Isocratic Pump LC Module 1 | Outlet Check Valve Rebuild Kit | Contains 2 ball and seat for outlet check valves, 2 polychlorotrifluoroethylene (PCTFE) inserts, 2 stainless steel cup filters (2 µm), 4 large PTFE washers, 2 small PTFE washers | WAT026014 | 8005-0528 |

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(Continued)

CrossLab Supplies for Waters HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|--|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| 510 HPLC Pump 515 HPLC Pump 600 MultiSolvent Delivery System 610 PowerLine Isocratic Pump LC Module 1 | Inlet Check Valve Rebuild Kit | Contains 2 ball and seat for inlet check valves, 2 retainer gaskets, 2 TFE washers, 2 PTFE washers, 2 PCTFE inserts | WAT060495 | 8005-0914 |
| Performance Maintenance Kits for Autosamplers | | | | |
| 717 Autosampler | 717 Autosampler Performance Maintenance Kit | Contains 1 seal pack replacement kit, 1 250 µL syringe, 1 filter (2.3 x 11.5 in), 2 filters (2 x 7 in) | WAT052669 | 8005-0927 |
| Performance Maintenance Kits for Rheodyne Valves | | | | |
| Rheodyne Injector, 3725(i) | Performance Maintenance Kit for Rheodyne 3725(i) Injector Valves | Contains 1 rotor seal (PEEK), 1 stator face assembly (PEEK), 1 isolation seal, 1 needle guide, 1 needle port cleaner, 1 5/64 in hex key, 1 9/64 in hex key | 201000116 | 8005-0901 |
| Rheodyne Injector, 7010 | Performance Maintenance Kit for Rheodyne 7010 Injector Valves | Contains 1 isolation seal, 1 rotor seal (Vespel), 1 5/64 in hex key, 1 9/64 in hex key | 201000117 | 8005-0902 |
| Rheodyne Injector, 7125 and 7126 | Performance Maintenance Kit for Rheodyne 7125 and 7126 Injector Valves | Contains 1 rotor seal (Vespel), 1 stator face assembly (PEEK/ceramic), 1 isolation seal, 1 needle guide, 1 needle port cleaner, 1 5/64 in hex key, 1 9/64 in hex key, instructions | 201000118 | 8005-0903 |
| Rheodyne Injector, 7725(i) | Performance Maintenance Kit for Rheodyne 7725(i) Injector Valves | Contains 1 stator face assembly (PEEK/ceramic), 1 rotor seal (Vespel), 1 isolation seal, 1 needle guide, 1 needle port cleaner, 1 5/64 in hex key, 1 9/64 in hex key, instructions | 201000119 | 8005-0904 |
| Rheodyne Injector, 7750E | Performance Maintenance Kit for Rheodyne 7750 Injector Valves | Contains 1 stator face assembly (PEEK/ceramic), 1 rotor seal (Vespel), 1 isolation seal, 1 9/64 in hex key, instructions | 201000122 | 8005-0907 |

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(Continued)



Rheodyne 7725(i) PM kit, 8005-0904

CrossLab Supplies for Waters HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|--|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Rheodyne Valves | | | | |
| Rheodyne Injector, 7750E-075 | Performance Maintenance Kit for Rheodyne 7750E-075 Valves | Contains 1 rotor seal (PEEK), 1 stator face seal (PEEK), 1 isolation seal, 1 9/64 in hex key, instructions | 201000125 | 8005-0908 |
| Rheodyne Injector, 8125 and 8126 | Performance Maintenance Kit for Rheodyne 8125 and 8126 Injector Valve | Contains 1 stator face assembly (PEEK/ceramic), 1 rotor seal (PEEK), 1 isolation seal, 1 needle guide, 1 needle port cleaner, 1 5/64 in hex key, 1 9/64 in hex key, instructions | 201000120 | 8005-0905 |
| Rheodyne Injector, 9125 and 9126 | Performance Maintenance Kit for Rheodyne 9125 and 9126 Injector Valves | Contains 1 stator face assembly (PEEK/ceramic), 1 rotor seal (Tefzel), 1 isolation seal, 1 needle guide, 1 needle port cleaner, 1 5/64 in hex key, 1 9/64 in hex key, instructions | 201000121 | 8005-0906 |

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Rheodyne 9125 PM kit, 8005-0906

CrossLab Supplies for Waters HPLC Systems

HPLC Capillaries, 1/pk

| Model | From | To | Material | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|---------------------------------|-------------------------|-----------------|---------|---------|-------------|--|-------------------------|---------------------------|
| 2690 Separations Module 2690D Dissolution Separations Module 2695 Separations Module 2695D Dissolution Separations Module | Pump | Autosampler | Stainless steel | 1.6 | 0.23 | 760 | With fittings, pre-swaged on both ends | WAT270975 | 8005-0824 |
| 2690 Separations Module 2690D Dissolution Separations Module 2695 Separations Module 2695D Dissolution Separations Module 2790 Separations Module 2795 Separations Module | Autosampler | Column Thermostat Valve | Stainless steel | 1.6 | 0.23 | 760 | With fittings, pre-swaged on both ends | WAT270979 | 8005-0825 |
| 2695 Separations Module 2695D Dissolution Separations Module | Autosampler | Column Thermostat Valve | PEEK | 1.6 | 0.13 | 6000 | With fittings, non pre-swaged | 430000922 | 8005-0812 |
| Alliance | Column Thermostat Valve | Column | Stainless steel | 1.6 | 0.23 | 3000 | No fittings | WAT026973 | 8005-0823 |
| | Column | Detector | | | | | | | |
| Alliance | Column Thermostat Valve | Column | Stainless steel | 1.6 | 0.508 | 3000 | No fittings | WAT026804 | 8005-0826 |
| | Column | Detector | | | | | | | |
| Alliance | Column Thermostat Valve | Column | Stainless steel | 1.6 | 1.02 | 3000 | No fittings | WAT026805 | 8005-0822 |
| | Column | Detector | | | | | | | |
| Fittings | | | | | | | | | |
| Alliance | Compression screws and ferrules | | | | | | | WAT025604 | 8005-0835* |

*This fitting is used with 8005-0823, 8005-0826, and 8005-0822

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CrossLab Supplies for Waters HPLC Systems

HPLC Fittings, Ferrules, and Unions

| Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|-------|-------------------------|---------------------------|
| Compression screw, stainless steel, 1/16 in od | 10/pk | WAT005070 | 8005-0837 |
| Compression screws and ferrules | 5/pk | WAT025604 | 8005-0835 |
| Union, stainless steel, 1/16 in od | 1/pk | WAT097332 | 8005-0836 |

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CrossLab Supplies for Shimadzu HPLC Systems



Long-life deuterium lamp, 8001-0701



Long-life deuterium lamp, 8001-0702



Long-life deuterium lamp, 8001-0704

Detector Lamps, 1/pk

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|---------------------------------------|------------------------------|---------------------------|
| SPD-M10Avp | Long-life deuterium lamp, 2,000 hours | 228-34016-00 | 8001-0701 |
| SPD-M20A | Tungsten lamp, 1,200 hours | 228-34410-91 228-34410-00 | 8001-0703 |
| SPD-20A/AV SPD-10A/AVvp SPD-10AV | Long-life deuterium lamp, 2,000 hours | 228-34016-02 | 8001-0702 |
| SPD-20AV SPD-10AVvp SPD-10AV | Tungsten lamp, 1,200 hours | 670-14602-00 | 8001-0705 |
| LC-2010 LC-2010HT | Long-life deuterium lamp, 2,000 hours | 228-37401-00 | 8001-0704 |

Autosampler Syringes, 1/pk

| Model | Volume (µL) | Description | Similar to OEM Part No. | Agilent CrossLab Syringe | Agilent CrossLab Replacement Plunger | Agilent CrossLab Replacement Barrel |
|---------------------|-------------|--|-------------------------|--------------------------|--------------------------------------|-------------------------------------|
| SIL-10A SIL-10Ai | 500 | Chem (1/4-28 UNF screw threads), gas tight | 228-25237-04 | 8001-0401 | 8001-0403 | 8001-0405 |
| SIL-10A SIL-10Ai | 2,500 | Chem (1/4-28 UNF screw threads), gas tight | 228-25237-06 | 8001-0402 | 8001-0406 | |

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Autosampler syringe, 8001-0401



Replacement syringe plunger, 500 µL, 8001-0403

CrossLab Supplies for Shimadzu HPLC Systems

Pump Supplies, 1/pk

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|--|-------------------------------|---------------------------------|
| Plungers and Seals | | | |
| LC-10ADvp LC-2010 (HT) | Sapphire plunger | 228-35601-92 228-34498-91 | 8001-0503 |
| LC-20AD LC-20ADXR LC-20AB | Sapphire plunger | 228-35601-93 | 8001-0504 |
| LC-20AT | Sapphire plunger assembly | 228-35009-93 | 8001-0501 |
| LC-2010 | Sapphire plunger assembly | 228-35281-93 | 8001-0514 |
| LC-10ATvp | Ceramic plunger assembly | 228-35009-92 | 8001-0533 |
| LC-10ADvp | Ceramic plunger assembly | 228-35601-91 | 8001-0534 |
| LC-10ADvp LC-20AD/20ADxr/AB LC-30 | Plunger holder | 228-35602-91 | 8001-0515 |
| LC-10AD/ADvp/LC-600/LC-9A LC-20AD/AB LC-2010 A/C (HT) | Plunger seal, graphite-filled PTFE (GFP) | 228-35146-00 | 8001-0502 |
| LC-10ATvp SIL-10ADvp SIL-20A/AC LC-20AT LC-2010 A/C LC-2010HT SIL-HT | Plunger seal, graphite-filled PTFE (GFP) | 228-35145-00 | 8001-0522 |



Plunger seal, 8001-0502

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(Continued)

CrossLab Supplies for Shimadzu HPLC Systems

Pump Supplies, 1/pk

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|------------------------------------|--------------------------------|----------------------------------|
| Plungers and Seals | | | |
| LC-20AD/20AB and LC-10ADvp | Plunger seal, polyethylene | 228-32628-00 | 8001-0530 |
| LC-10ATvp/10AT/10AS | Plunger seal, polyethylene | 228-21975-00 | 8001-0527 |
| LC-10AS/10AT/10ATvp | Plunger rinse seal, polyethylene | 228-28499-00 | 8001-0615 |
| LC-20AT | Rinse seal | 228-35935 | 8001-0520 |
| LC-20AT | Back-up ring for ring seal | 228-35934 | 8001-0516 |
| LC-20AT | Plunger seal spacer | 228-42700 | 8001-0510 |
| LC-10AD LC-10ADvp LC-2010 LC-20AD/AB | PTFE diaphragms, 2/pk | 228-32784-91 | 8001-0513 |
| Check Valves and Cartridges | | | |
| LC-10AT/ATvp | Check valve IN | 228-32166-91 | 8001-0528 |
| LC-10ADvp | Check valve IN | 228-39093-92 | 8001-0535 |
| LC-10ADvp/ATvp | Check valve OUT | 228-34976-91 | 8001-0532 |
| LC-10AD and LC-600 and LC-9A | Check valve IN | 228-33492-91 | 8001-0531 |
| LC-10AT/AD and LC-600 and LC-9A | Check valve OUT | 228-32531-92 | 8001-0529 |
| LC-20AD/AB _{XR} | Check valve IN | 228-48249-91 228-45557-91 | 8001-0511 |
| LC-20AD/AB LC-10ADvp/ATvp | Outlet check valve | 228-45705-91 228-45563-95 | 8001-0521 |
| LC-2010 LC-2010HT | Inlet valve cartridge | 228-37149-92 228-37149-91 | 8001-0519 |
| LC-2010 LC-2010HT | Outlet check valve | 228-37147-93 228-37147-92 | 8001-0506 |
| LC-20AT | Primary inlet check valve assembly | 228-48249-93 | 8001-0512 |

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Looking for Performance Maintenance Kits for Rheodyne Valves?
Please see pages 144-147.

CrossLab Supplies for Shimadzu HPLC Systems

Valve Replacement Parts, 1/pk

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|--|------------------------------|---------------------------|
| SiL-10A/10Ai/10A _{XL} | Rotor, 6-port valve | 228-21217-91 | 8001-0601 |
| SIL-10ADvp | Rotor, 6V assembly, stainless steel surround | 228-21217-97 | 8001-0603 |
| SIL-10A/10Ai | Stator, 6-port valve | 228-21220-91 | 8001-0604 |
| SIL-20A/AC LC-2010 | Stator, 5-port low pressure valve (LPV) | 228-36917-01 | 8001-0607 |
| SIL-20A/AC SIL-HT | Rotor, PEEK, high pressure valve (HPV) | 228-41310-92 228-40750-92 | 8001-0612 |
| LC-2010 | Rotor, Vespel, high pressure valve (HPV) | 228-38556-01 | 8001-0609 |
| SIL-20A/AC | High pressure stator assembly for SIL-20A/AC | 228-45408-91 | 8001-0613 |
| LC-2010 LC-2010HT SIL-20 SIL-HT | Rotor, PEEK, low pressure valve (LPV) | 228-36923-00 | 8001-0608 |
| LC-10ADvp LC-10ATvp SIL-10ADvp LC-20AT LC-2010/HT | O-ring for drain valve, perfluoroelastomer | 670-11518 | 8001-0614 |



Rotor, 6-port valve, 8001-0601



Stator, 6-port valve, 8001-0604



PEEK rotor, low pressure valve (LPV), 8001-0608

Sample Loops, 1/pk

| Model | Volume (μL) | Material | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--------------------------------|-------------|---|------------------------------|---------------------------|
| SIL-20A/AC | 100 | Stainless steel | 228-45402-91 228-45402-95 | 8001-0814 |
| SIL-10ADvp | 100 | Stainless steel, extended for pre-treatment | 228-39751-92 | 8001-0812 |
| LC-2010 LD-2010HT SIL-HT | 100 | Stainless steel | 228-41370-91 228-37549-91 | 8001-0809 |
| | 100 | Stainless steel, 1/16 in | 220-90800-20 | 8001-0801 |
| | 100 | Stainless steel, 1/8 in | 220-90800-30 | 8001-0802 |

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CrossLab Supplies for Shimadzu HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|--------------------------------|---|--|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| LC-20AT | Rinse seal holder assembly | Contains 1 rinse seal, 1 stainless steel rinse seal holder, 1 back up ring, 1 perfluoroelastomer O-ring for drain valve | 228-35946-92 | 8001-0517 |
| Performance Maintenance Kits for Valves | | | | |
| SIL-10ADvp | Stator assembly for SIL-10ADvp | Contains 1 ceramic rotor, 1 stator, 1 housing C manifold with intermediate plate | 228-36730-91 228-39349-01 228-39755-91 | 8001-0610 |
| LC-2010 | Stator assembly for LC-2010 | Contains 1 housing C manifold (stainless steel) packing, 1 stator, and pins | 228-40254-91 | 8001-0509 |

HPLC Capillaries, 1/pk

| Model | From | To | Material | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|----------------------------------|-------------|-----------------------------|--------------------------|---------|---------|-------------|-------------------------------|------------------------------|---------------------------|
| LC-2010 | Autosampler | Column | Flexible stainless steel | 0.6 | 0.17 | 200 | No fittings | 228-38043-91 | 8001-0810 |
| SIL-10ADvp | Injector | High pressure valve port #1 | Flexible stainless steel | 0.6 | 0.13 | 200 | With fittings, non pre-swaged | 228-39756-92 | 8001-8020 |
| SIL-10ADvp SIL-20A/AC | Pump | Autosampler | Stainless steel | 1.6 | 0.3 | 600 | No fittings | 228-22306-00 | 8001-0818 |
| LC-20AP | | | Stainless steel | 1.6 | 0.8 | 2000 | No fittings | 228-49820-00 228-50579-43 | 8001-0821 |
| LC-20AT LC-20AD SIL-10ADvp | | | Stainless steel | 1.6 | 0.3 | 2000 | No fittings | 228-36993-96 228-50579-91 | 8001-0822 |

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CrossLab Supplies for Shimadzu HPLC Systems

Tubing

| Model | Description | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|------------------------|---|---------|---------|-------------|-------------|------------------------------|---------------------------|
| LC-2010 LC-20AD | ETFE tubing for use between the inlet block and the check valve | 1.6 | 0.8 | 3000 | No fittings | 228-18495-01 | 8001-0807 |
| LC-2010 SII-20A/AC | FEP tubing | 3 | 1.5 | 3000 | No fittings | 670-10321-05 | 8001-0823 |
| SPD-20A/AV SPD-M20A | PEEK tubing | 1.6 | 0.25 | 500 | No fittings | 670-10324-01 228-33376-50 | 8001-0824 |

HPLC Fittings, Ferrules, and Unions

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|----------------------------------|--|------|-------------------------|---------------------------|
| LC-2010 | PTFE ferrule, 3.0 F-T | 1/pk | 228-12493-00 | 8001-0803 |
| LC-20AT LD-20AD | Stainless steel ferrule, 1.6 F | 1/pk | 228-16000-10 | 8001-0816 |
| LC-2010 | Flangeless nut, M6 | 1/pk | 228-39999-05 | 8001-0813 |
| SIL-20A/AC LC-20AT LC-20AD | Stainless steel male nut, 1.6 MN, for 1/16 in tubing | 1/pk | 228-16001-00 | 8001-0805 |
| SIL-10ADvp SIL-20A/AC | Stainless steel male nut, 1.6 MN, W6 (taller hex portion) | 1/pk | 228-16001-03 | 8001-0806 |
| LC-20AD/AB LC-10ADvp | PEEK male nut, 1.6 MN, for plumbing line between inlet block and check valve | 1/pk | 228-35403-00 | 8001-0819 |
| | PEEK male nut, fingertight for 1/16 in tubing | 1/pk | 228-18565-84 | 8001-0817 |

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CrossLab Supplies for Shimadzu HPLC Systems

HPLC In-Line Filters

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|----------------|--------------------------------|------|-------------------------|---------------------------|
| LC-2010 | Stainless steel in-line filter | 1/pk | 228-35871-96 | 8001-0808 |
| LC-20AD/AB/AT | | | 228-35871-94 | |
| LC-10ADvp/ATvp | | | | |

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CrossLab Supplies for Dionex HPLC Systems

Detector Lamps, 1/pk

| Model | Description | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|---------------------------------------|-------------------------|---------------------------|
| VWD-3000 Series MWD-3000 Series DAD-3000 Series | Long-life deuterium lamp, 2,000 hours | 6074.1110 | 8002-0703 |
| VWD-3000 Series MWD-3000 Series DAD-3000 Series | Tungsten lamp, 2,000 hours | 6074.2000 | 8002-0705 |
| UVD-3000 | Long-life deuterium lamp, 2,000 hours | 6073.2070 | 8002-0702 |
| UVD 170/340 UVD 160/320 | Long-life deuterium lamp, 2,000 hours | 5053.1204 | 8002-0701 |
| PDA-100 AD-25 | Long-life deuterium lamp, 2,000 hours | 939016T | 8002-0704 |
| PDA-100 AD-25 | Tungsten lamp, 5,000 hours | 056123T | 8002-0706 |



Long-life deuterium lamp, 8002-0701

Autosampler Syringes, 1/pk

| Model | Volume (µL) | Description | Similar to OEM Part No. | Agilent CrossLab Syringe | Agilent CrossLab Replacement Needle (Needle Gauge/Length (mm)/Tip) | Agilent CrossLab Replacement Plunger |
|------------|-------------|--|-------------------------|--------------------------|--|--------------------------------------|
| WPS-3000SL | 25 | Chem (1/4-28 UNF screw threads), gas tight | 6822.0001 | 8002-0405 | | |
| | 250 | Chem (1/4-28 UNF screw threads), gas tight | 6822.0003 | 8002-0407 | | |
| ASI-100 | 100 | Removable needle, gas tight | 5805.2920 | 8002-0401* | 8002-0413, 22/51/3, 6/pk 8002-0412, 22s/51/3, 6/pk | 8002-0402 |
| | 1,000 | Removable needle, gas tight | 5805.2940 | 8002-0403* | 8002-0414, 22/51/3, 6/pk 8002-0415, 22s/51/3, 6/pk | 8002-0406 |
| | 2,500 | Removable needle, gas tight | 5805.2950 | 8002-0404* | 8002-0414, 22/51/3, 6/pk 8002-0415, 22s/51/3, 6/pk | 8002-0408 |
| | | | | | | |

*Needles are sold separately

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Chem (1/4-28 UNF screw threads), gas tight,
8002-0405



Removable needle, gas tight, 8002-0401

CrossLab Supplies for Dionex HPLC Systems

Autosampler Supplies

| Model | Material | OD (mm) | ID (mm) | Length (mm) | Volume (µL) | Fittings | Similar to OEM Part No. | Part No. |
|--------------------------------------|-----------------|---------|---------|-------------|-------------|-------------------------------|-------------------------|-----------|
| Needle Seat Capillaries, 1/pk | | | | | | | | |
| WPS-3000SL | Stainless steel | 0.8 | 0.12 | 120 | 1.35 | With fittings, non pre-swaged | 6820.2407 | 8002-0808 |
| WPS-3000SL | Stainless steel | 0.8 | 0.18 | 120 | 3.1 | With fittings, non pre-swaged | 6820.2408 | 8002-0809 |
| WPS-3000SL Semiprep | Stainless steel | 0.8 | 0.5 | 120 | 24 | With fittings, non pre-swaged | 6820.2409 | 8002-0810 |

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. | | | | |
|---------------------------|-----------------------------|-------|-------------------------|---------------------------|--------------------------------|------|-----------|-----------|
| Pistons and Seals | | | | | | | | |
| ISO-3100A | Piston, sapphire | 1/pk | 6035.2240 | 8002-0515 | | | | |
| LPG-3400A | | | | | | | | |
| LPG-3400AB | | | | | | | | |
| LPG-3400M | | | | | | | | |
| LPG-3400MB | | | | | | | | |
| DGP-3600A | | | | | | | | |
| DGP-3600AB | | | | | | | | |
| DGP-3600M | | | | | | | | |
| DGP-3600MB | | | | | | | | |
| HPG-3x00A | | | | | | | | |
| HPG-3x00M | | | | | | | | |
| ISO-3100SD | Piston seal, reversed-phase | 2/pk | 6040.0304 | 8002-0502 | | | | |
| LPG-3400SD | | | | | | | | |
| LPG-3400RS | | | | | | | | |
| DGP-3400SD | | | | | | | | |
| DGP-3600RS | | | | | | | | |
| HPG-3x00SD | | | | | | | | |
| HPG-3x00RS | | | | | | | | |
| ISO-3100SD | | | | | Support ring for pistons seals | 2/pk | 6040.0012 | 8002-0501 |
| LPG-3400SD | | | | | | | | |
| LPG-3400RS | | | | | | | | |
| DGP-3400SD | | | | | | | | |
| DGP-3600RS | | | | | | | | |
| HPG-3x00SD | | | | | | | | |
| HPG-3x00RS | | | | | | | | |
| UltiMate 3000 pump series | Ring seal, DR-8, PTFE | 10/pk | 2266.0082 | 8002-0601 | | | | |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

Pump Supplies

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|--|------|-------------------------|---------------------------|
| Check Valves and Cartridges | | | | |
| UltiMate 3000 RS pumps, optional for SD and BM pumps | Check valve cartridge, ceramic | 1/pk | 6041.2301 | 8002-0517 |
| ISO-3100A LPG-3400A LPG-3400M LPG-3400MB LPG-3400AB DGP-3600A DGP-3600M DGP-3600MB DGP-3600AB HPG-3x00A HPG-3x00M HPG-3200P | Check valve cartridge, sapphire, biocompatible | 1/pk | 6035.2300 | 8002-0516 |

Valve Replacement Parts

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|-------------------------------|---|------|-------------------------|---------------------------|
| FLM-3x00 | Rotor seal, proprietary inert polymer composite, 2-position 10-port C2 switching valve (standard) | 1/pk | 6720.0110 | 8002-0607 |
| FLM-3x00 | Rotor seal, polyaryletherketone/PTFE composite, 2-position 10-port C2 switching valve (biocompatible) | 1/pk | 6720.0092 | 8002-0605 |
| FLM-3x00 | Stator, stainless steel, 2-position 10-port C2 switching valve (standard) | 1/pk | 6720.0111 | 8002-0608 |
| ASI-100 | Tefzel rotor seal | 1/pk | 709.7010.071 | 8002-0604 |
| ASI-100 Rheodyne injectors | Vespel rotor seal | 1/pk | 709.7010.039 | 8002-0602 |
| ASI-100 Rheodyne injectors | Stainless steel stator | 1/pk | 709.7010.040 | 8002-0603 |

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Vespel rotor seal, 8002-0602



Stainless steel stator, 8002-0603

CrossLab Supplies for Dionex HPLC Systems

Sample Loops, 1/pk

| Model | Description | Volume (µL) | Material | Similar to OEM Part No. | Agilent CrossLab Part No. |
|-----------------------|---------------------|-------------|-----------------|-------------------------|---------------------------|
| ASI-100 series | For 100 µL syringe | 100 | Stainless steel | 5810.3012 | 8002-0859 |
| ASI-100 ASI-100T | For 250 µL syringe | 150 | Stainless steel | 5810.3003 | 8002-0856 |
| ASI-100 series | For 1000 µL syringe | 1000 | Stainless steel | 5810.3010 | 8002-0857 |
| ASI-100P ASI-100PT | For 250 µL syringe | 2500 | Stainless steel | 5810.3011 | 8002-0858 |

Buffer Loops, 1/pk

| Model | Volume (µL) | Material | Similar to OEM Part No. | Agilent CrossLab Part No. |
|-------------------------------------|-------------|-----------------|-------------------------|---------------------------|
| WPS-3000SL Analytical WPS-3000RS | 100 | Stainless steel | 6820.2413 | 8002-0860 |
| WPS-3000SL Semiprep | >250 | Stainless steel | 6820.2421 | 8002-0811 |

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Looking for Performance Maintenance Kits for Rheodyne Valves?
Please see pages 144-147.

CrossLab Supplies for Dionex HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|---|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| ISO-3100SD | Performance Maintenance Kit for ISO-3100SD pump | Contains 1 solvent line filter holder, 1 stainless steel solvent line filter frit (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 3 tube connectors for 1.0-2.0 mm id tubing, 4 piston seals (reversed-phase), 2 support rings, 1 PTFE O-ring seal (9 mm x 1.5 mm) for seal wash system, 1 PTFE O-ring seal (32 mm x 1.5 mm) for seal wash system, 1 check valve cartridge (sapphire), 1 cap seal for purge valve knob | 6040.1950 | 8002-0907 |
| ISO-3100BM | Performance Maintenance Kit for ISO-3100BM pump | Contains 1 solvent line filter holder, 1 PEEK solvent line filter frit (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 3 tube connectors for 1.0-2.0 mm id tubing, 4 piston seals (reversed-phase, biocompatible), 2 support rings, 1 PTFE O-ring seal (9 mm x 1.5 mm) for seal wash system, 1 PTFE O-ring seal (32 mm x 1.5 mm) for seal wash system, 1 check valve cartridge (sapphire), 1 cap seal for purge valve knob | 6042.1950 | 8002-0917 |
| LPG-3400SD | Performance Maintenance Kit for LPG-3400SD pump | Contains 4 solvent line filter holders, 4 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 3 tube connectors for 1.0-2.0 mm id tubing, 4 piston seals (reversed-phase), 2 support rings, 1 PTFE O-ring seal (9 mm x 1.5 mm) for seal wash system, 1 PTFE O-ring seal (32 mm x 1.5 mm) for seal wash system, 1 check valve cartridge (sapphire), 1 cap seal for purge valve knob | 6040.1951 | 8002-0908 |
| LPG-3400RS | Performance Maintenance Kit for LPG-3400RS pump | Contains 4 solvent line filter holders, 4 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 3 tube connectors for 1.0-2.0 mm id tubing, 4 piston seals (reversed-phase), 1 PTFE O-ring seal (9 mm x 1.5 mm) for seal wash system, 1 PTFE O-ring seal (32 mm x 1.5 mm) for seal wash system, 1 check valve cartridge (ceramic), 1 cap seal for purge valve knob | 6040.1954 | 8002-0911 |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|---|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| LPG-3400BM | Performance Maintenance Kit for LPG-3400BM pump | Contains 4 solvent line filter holders, 4 PEEK solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 3 tube connectors for 1.0-2.0 mm id tubing, 4 piston seals (reversed-phase, biocompatible), 2 support rings, 1 PTFE O-ring seal (9 mm x 1.5 mm) for seal wash system, 1 PTFE O-ring seal (32 mm x 1.5 mm) for seal wash system, 1 titanium inline filter frit (Porosity: 2 µm), 1 check valve cartridge (sapphire), 1 cap seal for purge valve knob | 6042.1951 | 8002-0918 |
| DGP-3600SD | Performance Maintenance Kit for DGP-3600SD pump | Contains 6 solvent line filter holders, 6 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 5 tube connectors for 1.0-2.0 mm id tubing, 8 piston seals (reversed-phase), 4 support rings, 2 PTFE O-ring seals (9 mm x 1.5 mm) for seal wash system, 2 PTFE O-ring seals (32 mm x 1.5 mm) for seal wash system, 2 check valve cartridges (sapphire), 2 cap seals for purge valve knob | 6040.1952 | 8002-0909 |
| DGP-3600RS | Performance Maintenance Kit for DGP-3600RS pump | Contains 6 solvent line filter holders, 6 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 5 tube connectors for 1.0-2.0 mm id tubing, 8 piston seals (reversed-phase), 2 PTFE O-ring seals (9 mm x 1.5 mm) for seal wash system, 2 PTFE O-ring seals (32 mm x 1.5 mm) for seal wash system, 2 check valve cartridges (ceramic), 2 cap seals for purge valve knob | 6040.1955 | 8002-0912 |
| DGP-3600BM | Performance Maintenance Kit for DGP-3600BM pump | Contains 6 solvent line filter holders, 6 PEEK solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.3 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 5 tube connectors for 1.0-2.0 mm id tubing, 8 piston seals (reversed-phase, biocompatible), 4 support rings, 2 PTFE O-ring seals (9 mm x 1.5 mm) for seal wash system, 2 PTFE O-ring seals (32 mm x 1.5 mm) for seal wash system, 2 titanium inline filter frits (Porosity: 2 µm), 2 check valve cartridges (sapphire), 2 cap seals for purge valve knob | 6042.1952 | 8002-0919 |
| HPG-3x00SD | Performance Maintenance Kit for HPG-3x00SD pump | Contains 4 solvent line filter holders, 4 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 5 tube connectors for 1.0-2.0 mm id tubing, 8 piston seals (reversed-phase), 4 support rings, 2 PTFE O-ring seals (9 mm x 1.5 mm) for seal wash system, 2 PTFE O-ring seals (32 mm x 1.5 mm) for seal wash system, 2 check valve cartridges (sapphire), 1 cap seal for purge valve knob | 6040.1953 | 8002-0910 |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|--|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| HPG-3x00RS | Performance Maintenance Kit for HPG-3x00RS pump | Contains 4 solvent line filter holders, 4 stainless steel solvent line filter frits (Porosity: 10 µm), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 5 tube connectors for 1.0-2.0 mm id tubing, 8 piston seals (reversed-phase), 2 PTFE O-ring seals (9 mm x 1.5 mm) for seal wash system, 2 PTFE O-ring seals (32 mm x 1.5 mm) for seal wash system, 2 check valve cartridges (ceramic), 1 cap seal for purge valve knob | 6040.1956 | 8002-0913 |
| ISO-3100A LPG-3400A and M DGP-3600A and M HPG-3x00 A and M | Performance Maintenance Kit for UltiMate 3000 pumps with floating pistons | Contains 2 solvent line filter holders, 1 stirrer, 1 ECTFE tubing (1.60 mm od x 0.75 mm id x 1 m L), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 2 fittings (for 1/8 in od tubing, PEEK), 2 solvent line locking rings (PEEK), 2 solvent line support flanges (PEEK), 2 knurled head screws (1/4 in-28 for ferrule 1/16 in, PEEK), 1 tube connector for 1.0-2.0 mm id tubing, 2 ferrules (1/16 in for 1/4 in-28 head screw, PEEK), 4 ring seals (DR-8), 8 piston seals (reversed-phase), 2 mixing chamber gaskets, 4 O-rings (22 mm x 2 mm, silicone), 4 pistons (sapphire), 4 inline filter frits (stainless steel; porosity: 0.5 µm), 4 inline filter frits (stainless steel; porosity: 10 µm), 8 solvent line filter frits (stainless steel; porosity: 10 µm), 2 piston support hemispheres, 4 support rings, 2 micro flow ring seals, and 4 check valve cartridges (sapphire) | 6035.1961 | 8002-0904 |
| LPG-3400AB and MB DGP-3600AB and MB | Performance Maintenance Kit for UltiMate 3000 pumps with floating pistons, Biocompatible | Contains 1 ECTFE tubing (1.6 mm od x 0.75 mm id x 1 m L), 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 2 PEEK fittings for 1/8 in od tubing, 2 solvent line locking rings (PEEK), 2 solvent line support flanges (PEEK), 2 knurled head screws (1/4 in-28 for ferrule 1/16 in, PEEK), 1 tube connector for 1.0-2.0 mm id tubing, 2 ferrules (1/16 in for 1/4 in-28 head screw, PEEK), 4 ring seals (DR-8), 8 piston seals (reversed-phase), 4 O-rings (22 mm x 2 mm, silicone), 4 pistons (sapphire), 4 inline filter frits (titanium; Porosity: 10 µm), 4 inline filter frits (PEEK; Porosity: 0.5 µm), 2 solvent line filter holders, 6 solvent line filter frits (titanium; Porosity: 10 µm), 2 piston support hemispheres, 4 support rings, 2 micro flow ring seals, 4 check valve cartridges (sapphire), and 2 mixing chamber gaskets | 6035.1963 | 8002-0906 |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---|---|--|-------------------------|---------------------------|
| Performance Maintenance Kits for Pumps | | | | |
| HPG-3200P | Performance Maintenance Kit for HPG-3200P pump | Contains 1 stirrer, 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 1 FEP tubing (4.5 mm od x 3.0 mm id x 2 m L), 1 tube connector for 1.0-2.0 mm id tubing, 2 tube adaptors (3.0 mm id 1/4 in-28), 4 ring seals (DR-8), 8 piston seals (reversed-phase, semipreparative), 2 mixing chamber gaskets, 4 ceramic pistons (semipreparative), 4 stainless steel inline filter frits (Porosity: 10 µm), 2 stainless steel solvent line filters (Porosity: 10 µm), 4 support rings (semipreparative), 4 check valve cartridges (sapphire) | 6035.1962 | 8002-0905 |
| ISO-3100A LPG-3400 A and M DGP-3600 A and M HPG-3x00 A and M | Piston seal/support ring kit, reversed-phase | Contains 1 support ring and 2 piston seals | 6025.2010A | 8002-0923 |
| LPG-3400AB LPG-3400MB DGP-3600AB DGP-3600MB ISO-3100BM LPG-3400BM DPG-3600BM | Piston seal/support ring kit, reversed-phase, biocompatible | Contains 1 support ring and 2 piston seals | 6025.2012 | 8002-0901 |
| HPG-3200P P680 | Piston seal/support ring kit, reversed-phase, semipreparative | Contains 1 support ring and 2 piston seals | 6030.9010 | 8002-0902 |
| HPG-3200P P680 | Piston seal/support ring kit, normal phase, semipreparative | Contains 1 support ring and 2 piston seals | 6030.9011 | 8002-0903 |
| ISO-3100A LPG-3400A LPG-3400M DGP-3600A DGP-3600M HPG-3x00A HPG-3x00M ISO-3100SD LPG-3400SD DGP-3600SD HPG-3x00SD | Piston seal/support ring kit, normal phase | Contains 1 support ring and 2 piston seals | 6025.2011A | 8002-0924 |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

Performance Maintenance Kits

| Model | Description | Kit Contents | Similar to OEM Part No. | Agilent CrossLab Part No. | | | | |
|--|---|--|-------------------------|---------------------------|--------------------------------------|--|-----------|-----------|
| Performance Maintenance Kits for Pumps | | | | | | | | |
| ISO-3100SD | PTFE seal kit for rear seal wash system | Contains 5 PTFE O-ring seals 9 mm x 1.5 mm, 5 PTFE O-ring seals 32 mm x 1.5 mm | 6040.2208 | 8002-0915 | | | | |
| ISO-3100BM | | | | | | | | |
| LPG-3400SD | | | | | | | | |
| LPG-3400BM | | | | | | | | |
| LPG-3400RS | | | | | | | | |
| DGP-3600SD | | | | | | | | |
| DGP-3600BM | | | | | | | | |
| DGP-3600RS | | | | | | | | |
| HPG-3x00SD | | | | | | | | |
| HPG-3x00RS | | | | | | | | |
| HPG-3200BX | | | | | | | | |
| ISO-3100SD | | | | | Tubing Kit for Rear Seal Wash System | Contains 1 silicone tubing (2.80 mm od x 1.30 mm id x 1.5 m L), 1 PharMed tubing for peristaltic pump (3.2 mm od x 1.6 mm id x 180 mm L), 7 tube connectors for 1.0-2.0 mm id tubing | 6040.9502 | 8002-0916 |
| ISO-3100BM | | | | | | | | |
| LGP-3400SD | | | | | | | | |
| LGP-3400RS | | | | | | | | |
| LGP-3400BM | | | | | | | | |
| DGP-3600SD | | | | | | | | |
| DGP-3600RS | | | | | | | | |
| DGP-3600BM | | | | | | | | |
| HPG-3x00SD | | | | | | | | |
| HPG-3x00RS | | | | | | | | |
| Performance Maintenance Kits for Autosamplers | | | | | | | | |
| WPS-3000TBSL Autosampler | Rotor Seal and Stator Face Seal Kit | Contains 1 rotor seal and 1 stator face | 6722.9014 | 8002-0611 | | | | |
| WPS-3000SL | Rotor Seal Kit | Contains 2 PEEK rotor seals, 1 9/64 in hex key, instructions | 6840.0012 | 8002-0610 | | | | |
| WPS-3000RS | | | | | | | | |

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CrossLab Supplies for Dionex HPLC Systems

HPLC Capillaries, 1/pk

| Model | From | To | Material | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|------------------|-------------------------|-------------------------|--------------------------|---------|---------|-------------|-------------------------------|-------------------------|---------------------------|
| UltiMate 3000 RS | Pump | Autosampler | Flexible stainless steel | 0.6 | 0.13 | 450 | With fittings, non pre-swaged | 6040.2345 | 8002-0822 |
| UltiMate 3000 SD | Pump | Autosampler | Flexible stainless steel | 0.6 | 0.18 | 450 | With fittings, non pre-swaged | 6040.2365 | 8002-0824 |
| UltiMate 3000 RS | Autosampler | Column Thermostat Valve | Flexible stainless steel | 0.6 | 0.13 | 350 | With fittings, non pre-swaged | 6040.2335 | 8002-0821 |
| UltiMate 3000 SD | Autosampler | Column Thermostat Valve | Flexible stainless steel | 0.6 | 0.18 | 350 | With fittings, non pre-swaged | 6040.2375 | 8002-0825 |
| UltiMate 3000 | Autosampler | Column Thermostat Valve | Stainless steel | 1.6 | 0.23 | 340 | With fittings, non pre-swaged | 6820.2418 | 8002-0837 |
| UltiMate 3000 RS | Column Thermostat Valve | Column | Flexible stainless steel | 0.6 | 0.13 | 550 | With fittings, non pre-swaged | 6040.2305 | 8002-0818 |
| UltiMate 3000 RS | Pump | Autosampler | Flexible stainless steel | 0.6 | 0.18 | 550 | With fittings, non pre-swaged | 6040.2355 | 8002-0823 |
| UltiMate 3000 SD | Column Thermostat Valve | Column | | | | | | | |
| UltiMate 3000 RS | Column | Detector | Flexible stainless steel | 0.6 | 0.13 | 250 | With fittings, non pre-swaged | 6040.2325 | 8002-0820 |
| UltiMate 3000 SD | Column | Detector | Flexible stainless steel | 0.6 | 0.18 | 250 | With fittings, non pre-swaged | 6040.2385 | 8002-0826 |
| UltiMate 3000 | Column | Detector | Stainless steel | 1.6 | 0.13 | 250 | With fittings, non pre-swaged | 6074.2410 | 8002-0833 |
| UltiMate 3000 | Column | Detector | PEEK | 1.6 | 0.13 | 250 | With fittings, non pre-swaged | 6074.2415 | 8002-0834 |
| UltiMate 3000 | Column | Detector | Stainless steel | 1.6 | 0.23 | 250 | With fittings, non pre-swaged | 6074.2400 | 8002-0831 |
| UltiMate 3000 | Column | Detector | PEEK | 1.6 | 0.25 | 250 | With fittings, non pre-swaged | 6074.2405 | 8002-0832 |
| UltiMate 3000 RS | | | Flexible stainless steel | 0.6 | 0.13 | 150 | With fittings, non pre-swaged | 6040.2315 | 8002-0819 |

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(Continued)

CrossLab Supplies for Dionex HPLC Systems

HPLC Capillaries, 1/pk

| Model | From | To | Material | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|----------------|-------------|-------------|-----------------|---------|---------|-------------|-------------------------------|-------------------------|---------------------------|
| VWD-3100 | | | PEEK | 1.6 | 0.25 | 2000 | No fittings | 6251.6001 | 8002-0835 |
| VWD-3100RS | | | | | | | | | |
| VWD-3400 | | | | | | | | | |
| VWD-3400RS | | | | | | | | | |
| DAD-3000 | | | | | | | | | |
| DAD-3000RS | | | | | | | | | |
| MWD-3000 | | | | | | | | | |
| MWD-3000RS | | | | | | | | | |
| ISO-3100BM | | | | | | | | | |
| LPG-3400AB | | | | | | | | | |
| LPG-3400MB | | | | | | | | | |
| LPG-3400BM | | | | | | | | | |
| DPG-3600AB | | | | | | | | | |
| DPG-3600MB | | | | | | | | | |
| DPG-3600BM | | | | | | | | | |
| Summit P680 | Pump | Autosampler | Stainless steel | 1.6 | 0.508 | 178 | With fittings, non pre-swaged | 5030.3020 | 8002-0816 |
| Summit ASI-100 | Autosampler | Column | Stainless steel | | | | With fittings, non pre-swaged | 6000.0020 | 8002-0817* |
| UVD 170U | Column | Detector | PEEK | 1.6 | 0.5 | 1000 | No fittings | 2251.6002 | 8002-0815 |
| UVD 340U | | | | | | | | | |

*CrossLab capillary and fitting kit, for ASI-100 Autosampler, contains 1 stainless steel capillary (0.7 mm id x 1 m), 2 stainless steel capillaries (0.25 mm id x 2 m), 15 10-32UNF stainless steel fittings, 5 10-32UNF stainless steel long fittings, 3 10-32UNF stainless steel extra long fittings, 15 stainless steel ferrules 1/16 in, and 8 stainless steel long ferrules 1/16 in

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CrossLab Supplies for Dionex HPLC Systems

Tubing

| Model | Description | OD (mm) | ID (mm) | Length (mm) | Fittings | Similar to OEM Part No. | Agilent CrossLab Part No. |
|---------------------------|------------------------------|---------|---------|-------------|-------------|-------------------------|---------------------------|
| LPG-3x00 peristaltic pump | PharMed biocompatible tubing | 3.2 | 1.6 | 180 | No fittings | 6000.5000 | 8002-0803 |

HPLC Fittings, Ferrules, and Unions

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--|--|------|-------------------------|---------------------------|
| UltiMate 3000 Series | Blind nut, FS-8 biocompatible | 1/pk | 6000.0144 6000.0044 | 8002-0802 |
| WPS-3000(T)SL WPS-3000(T)SL Semiprep WPS-3000(T)RS | Ferrule and fitting kit, contains 6 ferrules and 6 long fitting screws | | 6822.0011 | 8002-0921 |

HPLC In-Line Filters

| Model | Description | Unit | Similar to OEM Part No. | Agilent CrossLab Part No. |
|--------------------------|---|------|-------------------------|---------------------------|
| LPG-3400BM DGP-3600BM | In-line filter, 10 µL | 1/pk | 6042.5014 | 8002-0805 |
| LPG-3400BM DGP-3600BM | Filter frit for titanium in-line filter, 2 µL | 1/pk | 6268.0036 | 8002-0806 |

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Please visit www.agilent.com/chem/CrossLabHPLC for up-to-date info for the growing portfolio of CrossLab LC Supplies for your non-Agilent HPLC systems.



For Agilent CrossLab Vials and Closures ordering information please see the General Chromatography catalog (publication # 5991-1059EN) www.agilent.com/chem/library

For Agilent CrossLab Well Plates and Sealing Mats ordering information please see the General Chromatography catalog (publication # 5991-1059EN) www.agilent.com/chem/library



CrossLab Supplies for CTC Analytics HPLC Autosamplers

Agilent's CrossLab portfolio includes a variety of syringes compatible with CTC Analytics HPLC HTS and HTC PAL systems.

Autosampler Syringes for CTC HTS and HTC PAL, 1/pk

| Volume (µL) | Description | Needle Gauge/Length (mm)/Tip | Agilent CrossLab Syringe | Agilent CrossLab Replacement Plunger |
|-------------|-------------------------|------------------------------|--------------------------|--------------------------------------|
| 10 | Fixed needle | 22s/51/3 | 8010-0440* | |
| | Fixed needle, gas tight | 22s/51/3 | 8010-0445* | 8010-0457, 10/pk |
| 25 | Fixed needle, gas tight | 22s/51/3 | 8010-0441 | 8010-0458, 10/pk |
| | Fixed needle, gas tight | 22s/51/3 | 8010-0449* | 8010-0450, 10/pk |
| 100 | Fixed needle, gas tight | 22s/51/3 | 8010-0442* | 8010-0459, 10/pk |
| | Fixed needle, gas tight | 22/51/3 | 8010-0446* | 8010-0459, 10/pk |
| 250 | Fixed needle, gas tight | 22/51/3 | 8010-0467 | 8010-0456, 10/pk |
| 500 | Fixed needle, gas tight | 22/51/3 | 8010-0468 | 8010-0460, 10/pk |
| 1.0 mL | Fixed needle, gas tight | 22/51/3 | 8010-0443 | 8010-0455, 1/pk |
| 2.5 mL | Fixed needle, gas tight | 22/51/3 | 8010-0444 | 8010-0448, 1/pk |

*Barrel od is 6.7 mm. All other 10, 25, and, 100 µL syringes have 7.9 mm od.

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All CrossLab supplies are backed by Agilent's 90-day money-back warranty.



CE and CE/MS

CE Solutions Kits

Agilent continues to introduce new CE solutions kits designed to simplify many of your applications:

- Inorganic anions
- Cations
- Organic acids
- Forensic anions
- μ Page

These kits include all you need to begin your CE analyses, including buffers, capillaries, conditioning solutions, test samples, methods and detailed descriptions. Each kit is designed to take advantage of the automation of the Agilent CE system to make your time in the laboratory more efficient. All kits are prepared using the same quality procedures as our buffers and are thoroughly tested and supported.

While the kits have been optimized for use with the Agilent CE system, they may be used with virtually any commercial or home-built CE system.

Inorganic Anion Solutions Kit

The Inorganic Anion Solutions Kit contains all components needed for the analysis of common inorganic anions such as chloride, bromide, iodide, fluoride, sulfate, and phosphate. Applications include the analysis of inorganic ions in:

- Ultra pure water
- Waste water
- High purity chemicals
- Drug formulations
- Pulp and paper solutions
- Semiconductor solutions

Using an indirect UV detection system optimized for small anions, analyses are sensitive and rapid, and provide an alternative to traditional ion chromatography. The kit contains buffer, capillaries, test mixture, and instructions.



Inorganic anion solutions kit, 5063-6511



Inorganic anion solutions kit, 5063-6511



Ultra pure CE water, 5062-8578



0.1 N sodium hydroxide, 5062-8575

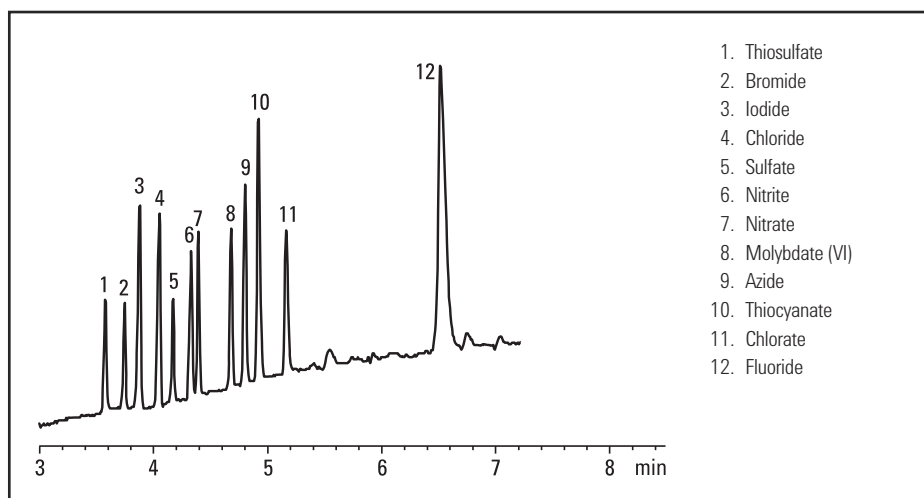


Inorganic anion test mixture, 5062-8524

Inorganic Anion Solutions Kit

| Description | Unit | Part No. |
|--|--------|-------------|
| Inorganic Anion Solutions Kit | | 5063-6511 |
| Inorganic anion buffer | 250 mL | 8500-6797 |
| Ultra pure CE water | 500 mL | 5062-8578 |
| 0.1 N sodium hydroxide | 250 mL | 5062-8575 |
| 1.0 N sodium hydroxide | 250 mL | 5062-8576 |
| Bare fused-silica capillary, 50 µm id, 72 cm long | 2/pk | G1600-62211 |
| Inorganic anion test mixture | 10 mL | 5062-8524 |
| Includes 1000 ppm each of fluoride, chloride, bromide, nitrite, sulfate and 2000 ppm phosphate | | |

Note: The following part should be ordered separately for use with the Agilent CE System:
 Alignment interface for standard 50 µm id capillary (P/N G1600-60210) for 1600 HP³D CE
 Alignment interface for standard 50 µm id capillary (P/N G7100-60210) for 7100 CE



Separation of common anions

Cation Solutions Kit

The Cation Solutions Kit provides everything you need for the analysis of inorganic and low-molecular-mass organic cations. It is specially designed for the separation of alkali metal ions, alkaline-earth metal ions and alkyl amines in a wide range of matrices.

Each kit contains a cation buffer, bare fused silica capillaries, cation standard, CE grade water and a detailed description of the analysis method and most common applications, including detection limits and reproducibility data. The Cation Solutions Kit and the separation methods were developed to fit perfectly with the Agilent CE system and to support its high automation capabilities. The methods are very easy to perform and provide accurate and quantitative analyses.

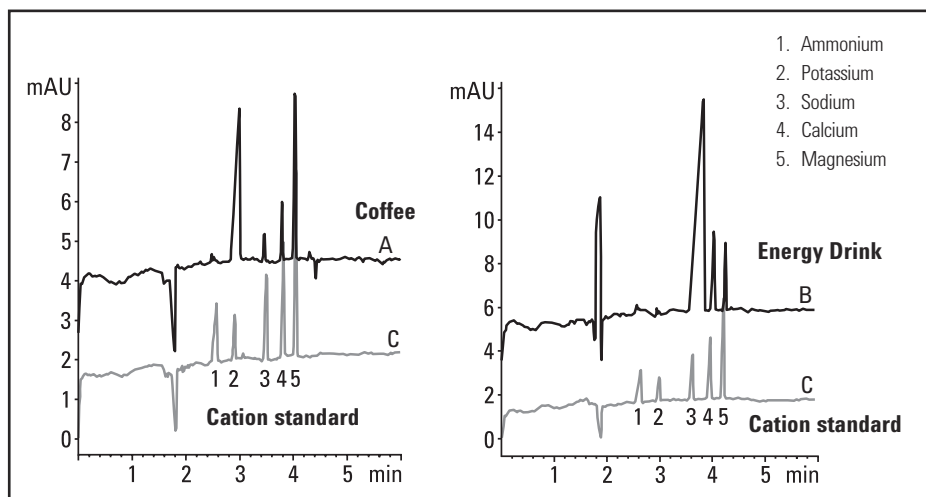
Cation Solutions Kit

| Column Description | Unit | Part No. |
|--|--------|-------------|
| Cation Solutions Kit | | 5064-8206 |
| Cation buffer | 250 mL | 5064-8203 |
| Ultra pure CE water | 500 mL | 5062-8578 |
| Bare fused silica capillary, extended light path bubble factor (3), 50 µm id, 56 cm long | 2/pk | G1600-61232 |
| Cation test mixture | 25 mL | 5064-8205 |

Note: The following part should be ordered separately for use with the Agilent CE System:

Alignment interface for 50 µm id extended light path capillary (P/N G1600-60230) for 1600 HP³D CE

Alignment interface for 50 µm id extended light path capillary (P/N G7100-60230) for 7100 CE



Cations in coffee and energy drinks

Organic Acids Solutions Kit

The Organic Acids Solutions Kit is ideal for the analysis of short alkyl chain carboxylic acids. Employing an indirect UV detection agent optimized for organic acids, the methodology is simple, sensitive, and provides accurate quantitative analysis. Suited for the analysis of organic acids in a wide range of matrices, it is especially useful for determination of organic acids in beverages and food.

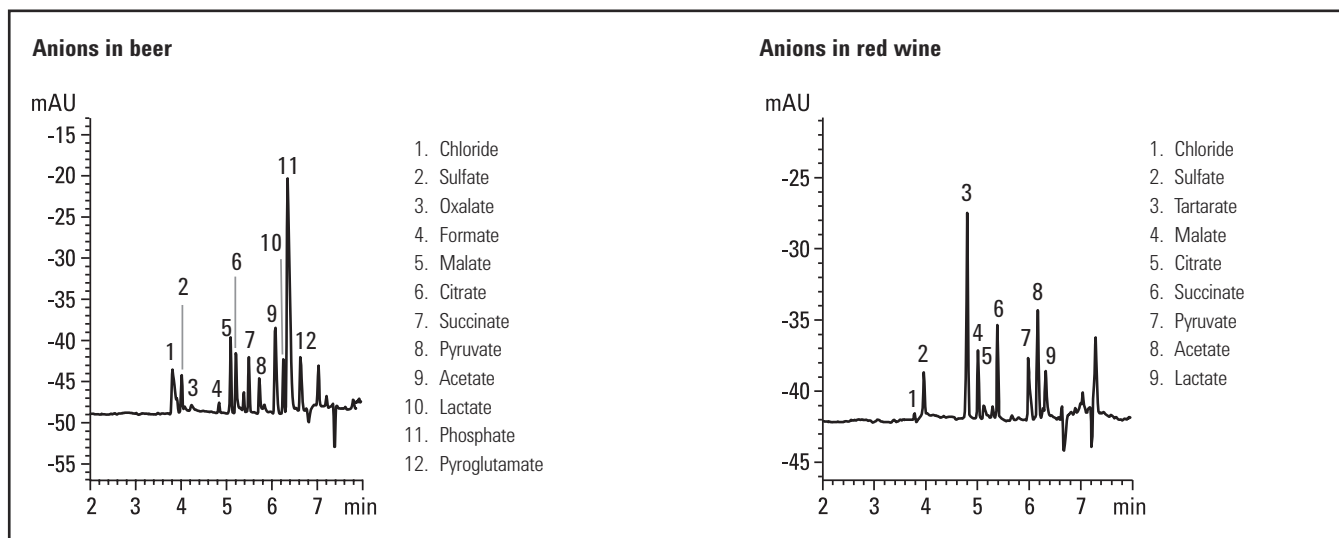
Organic Acids Solutions Kit

| Description | Unit | Part No. |
|--|--------|-------------|
| Organic Acids Solutions Kit | | 5063-6510 |
| Organic acids buffer | 250 mL | 8500-6785 |
| Ultra pure CE water | 500 mL | 5062-8578 |
| 1.0 N sodium hydroxide | 250 mL | 5062-8576 |
| Bare fused-silica capillary, 75 µm id, 72 cm long | 2/pkg | G1600-62311 |
| Organic acids test mixture | 20 mL | 8500-6900 |
| Includes 1000 ppm each of malate, succinate, and lactate | | |

Note: The following part should be ordered separately for use with the Agilent CE System:

Alignment interface for 75 µm id capillary (P/N G1600-60310) for 1600 HP³D CE

Alignment interface for 75 µm id capillary (P/N G7100-60310) for 7100 CE



Organic acids in beer and red wine

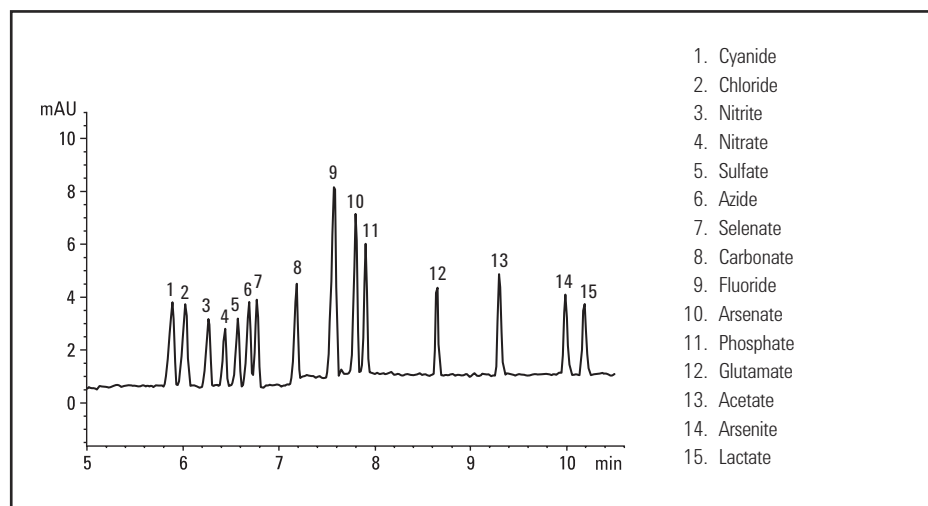
Forensic Anions Solutions Kit

This highly focused kit was developed specifically for the analysis of poisonous compounds, such as cyanide, azide, selenate, arsenate, and arsenite. In cases of poisoning, analytical tools are needed to determine the identity of toxins quickly and accurately. A rapid determination of anionic toxins in adulterated foods and beverages is possible using CE with indirect UV detection. Forensic and other anions can be detected within 15 minutes with minimal sample preparation.

Forensic Anions Solutions Kit

| Description | Unit | Part No. |
|---|-----------|-------------|
| Forensic Anions Solutions Kit | 5 x 50 mL | 5064-8208 |
| Basic anion buffer | 50 mL | 5064-8209 |
| Ultra pure CE water | 500 mL | 5062-8578 |
| Bare fused-silica capillary, 50 µm id, 104 cm long | 2/pk | G1600-64211 |
| Inorganic anion test mixture Includes 1000 ppm each of fluoride, chloride, bromide, nitrite, sulfate and 2000 ppm phosphate | 10 mL | 5062-8524 |

Note: The following part should be ordered separately for use with the Agilent CE System:
Alignment interface for standard 50 µm id capillary (P/N G1600-60210) for 1600 HP³D CE
Alignment interface for standard 50 µm id capillary (P/N G7100-60210) for 7100 CE



Analysis of an anion standard with the Forensic Anions Solutions Kit

μPAGE Solution Kits

μPAGE poly-acrylamide gel-filled capillaries are the most direct vehicles to transfer all of your applications from slab gel to CE, utilizing the automation, high speed, high resolution, and quantitative advantages of CE. The capillaries are ideal for high resolution separations of oligonucleotides, single-stranded and double-stranded DNA fragments, polymerase chain reaction (PCR) products, sequencing reaction products and oligosaccharides.

μPAGE capillaries are available in three different pore sizes. The size of the molecular sieving pores is controlled by the monomer concentration (%T) and the degree of polymer cross-linking (%C). Gels with higher %T and %C values have smaller pores and are, therefore, more effective at resolving smaller molecules. μPAGE-10 (10%T, 0%C) capillaries provide high resolution capabilities for separation of antisense therapeutic agents, primers and probes, as well as nucleotides.

μPAGE-5 (5%T, 5%C) allows single base resolution of oligonucleotides [pd(A)] ranging from 20 to 150 bases.

For your convenience, μPAGE capillaries and μPAGE buffers can be purchased together or separately. To achieve the highest reproducibility and provide optimal longevity, use μPAGE buffer with μPAGE capillaries.

μPAGE Starter Kits

Includes 3 μPAGE capillaries, 75 cm total length, 50 cm effective length, oligonucleotide standard and μPAGE buffer

| Kit as defined by type of μPAGE capillary | ID (μm) | Part No. |
|---|---------|----------|
| μPAGE-10 (10%T, 0%C) μPAGE pd(A) ₂₅₋₃₀ oligonucleotide standard for μPAGE-10 kit μPAGE buffer, 2 x 237 mL | 100 | 192-1311 |
| μPAGE-5 (5%T, 5%C) μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5 kits μPAGE buffer, 2 x 237 mL | 75 | 192-5211 |
| μPAGE-3 (3%T, 3%C) μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5 kits μPAGE buffer, 2 x 237 mL | 75 | 192-3211 |

μPAGE Basic Kits

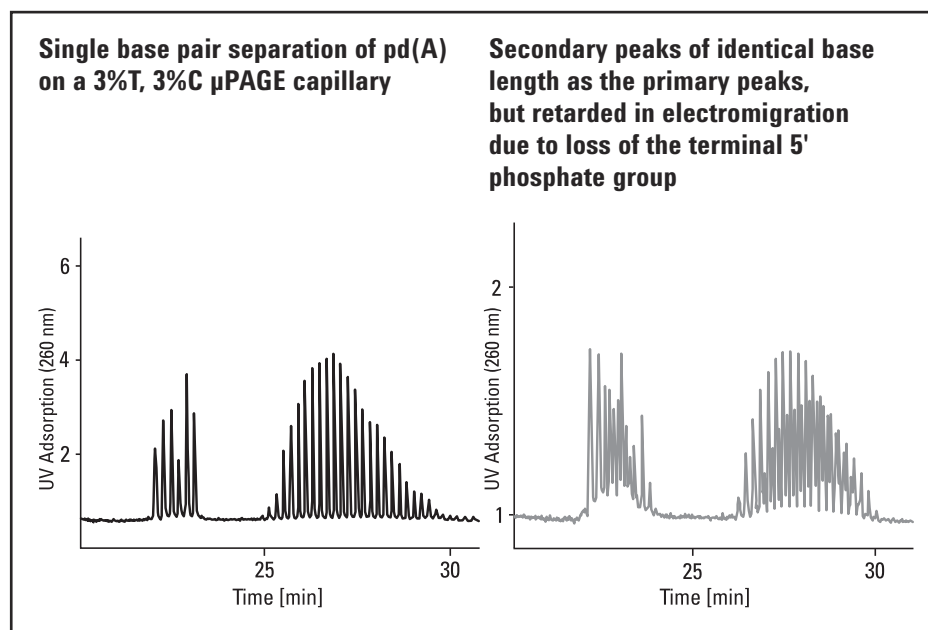
Includes 3 μPAGE capillaries, 75 cm total length, 50 cm effective length

| Kit as defined by type of μPAGE capillary | ID (μm) | Part No. |
|---|---------|----------|
| μPAGE-10 (10%T, 0%C) | 100 | 191-1311 |
| μPAGE pd(A) ₂₅₋₃₀ oligonucleotide standard for μPAGE-10 kit | | |
| μPAGE-5 (5%T, 5%C) | 75 | 191-5211 |
| μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5 kits | | |
| μPAGE-3 (3%T, 3%C) | 75 | 191-3211 |
| μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5 kits | | |

Note: The μPAGE capillaries are not pre-aligned for the G1600A CE and G7100 CE systems. To cut them to the correct length, use the CE column cutter (P/N 5183-4669). To create detection window, use the Window Etching Tool (P/N 590-3003).

μPAGE Buffer Solutions and Oligo Standards

| Kit as defined by type of μPAGE capillary | Part No. |
|---|----------|
| μPAGE tris-borate and urea buffer for μPAGE-10, 4 x 237 mL | 590-4005 |
| μPAGE tris-borate and urea buffer for μPAGE-3 and μPAGE-5, 4 x 237 mL | 590-4001 |
| μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5, 3 x 50 μL | 590-4000 |

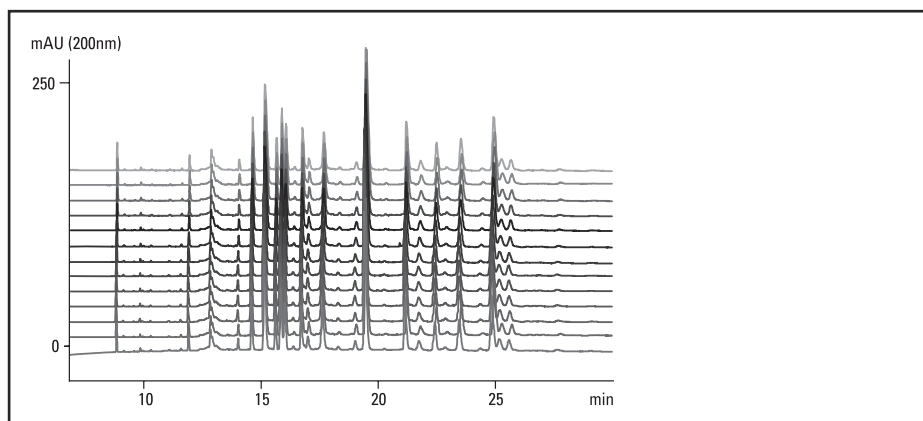


Oligonucleotide samples with or without terminal 5 phosphate group

CE and CE/MS Capillaries

Standard Bare Fused-Silica Capillaries

Fused-silica capillaries are the heart of CE. Pre-aligned capillaries from Agilent Technologies are designed and optimized for ease of use and reliability. All capillary ends are cut to a smooth, mirror-like finish. In addition, the polyimide outer coating is removed from the ends. These processes ensure minimal sample adsorption and help maintain sharp peak shapes. All capillaries have a pre-made detection "window" and a built-in alignment stopper that allows rapid and precise insertion in the alignment interface.



CZE of a tryptic digest of recombinant human growth hormone using a standard fused-silica capillary with 75 μm internal diameter

Standard Bare Fused-Silica Capillaries, 2/pk

| ID (μm) | Total Length (cm) | Effective Length (cm) | Color Code | Part No. |
|----------------------|-------------------|-----------------------|------------|-------------|
| 50 | 33 | 24.5 | Green | G1600-63211 |
| | 48.5 | 40 | Green | G1600-60211 |
| | 64.5 | 56 | Green | G1600-61211 |
| | 80.5 | 72 | Green | G1600-62211 |
| | 112.5 | 104 | Green | G1600-64211 |
| 75 | 33 | 24.5 | Blue | G1600-63311 |
| | 48.5 | 40 | Blue | G1600-60311 |
| | 64.5 | 56 | Blue | G1600-61311 |
| | 80.5 | 72 | Blue | G1600-62311 |
| | 112.5 | 104 | Blue | G1600-64311 |
| 100 | 33 | 24.5 | Gray | G1600-63411 |
| | 48.5 | 40 | Gray | G1600-60411 |
| | 64.5 | 56 | Gray | G1600-61411 |
| | 80.5 | 72 | Gray | G1600-62411 |
| | 112.5 | 104 | Gray | G1600-64411 |

TIPS & TOOLS



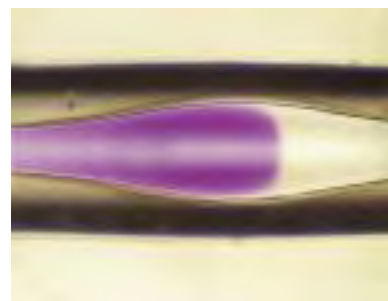
Different inner diameters of capillaries need to use different alignment interfaces to guarantee optimal detection. The color coding of the capillary and the alignment interface allow you to easily match the correct interface with the capillary.

Extended Light Path (Bubble Cell) Bare Fused-Silica Capillaries

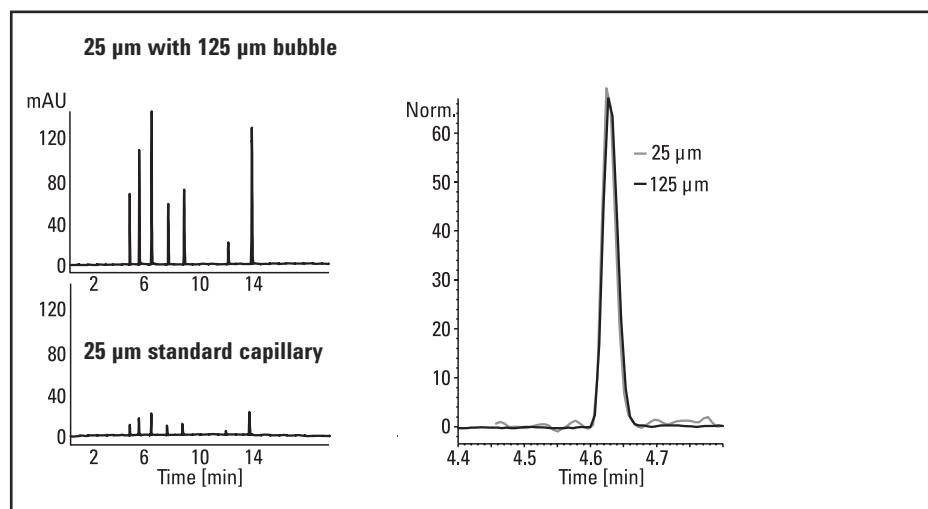
Use Agilent Technologies extended light path capillaries ("bubble" cell capillaries) to improve sensitivity 3- to 5-fold over standard capillaries. With extended light path capillaries, the inner diameter is increased only at the detection window, offering the sensitivity of a wide inner diameter capillary and the low current generation of a narrow one.

Resolution is not sacrificed when used with matching optical alignment interfaces from Agilent.

Through a computer-controlled proprietary process, the diameter is increased three to five times, with a manufacturing precision better than 3%. Take advantage of this process to extend the detection pathlength of 25 μm id capillaries to 125 μm , 50 μm to 150 μm , and 75 μm to 200 μm .



Electroosmotic flow maintains the "plug" flow in the bubble. Optical slits matched to the zone geometry maintain resolution.



Analysis of cold medicine ingredients in a standard capillary (25 μm id) and an Agilent Extended Light Path Capillary

TIPS & TOOLS

Use narrow 25 and 50 μm id "bubble" cell capillaries for highly conductive buffers without sacrificing sensitivity.



Extended Light Path (Bubble Cell) Bare Fused-Silica Capillaries, 2/pk

| ID (μm) | Total Length (cm) | Effective Length (cm) | Bubble Factor | Optical Path Length (μm) | Color Code | Part No. |
|----------------|--------------------------|------------------------------|----------------------|---------------------------------|-------------------|-----------------|
| 25 | 48.5 | 40 | 5 | 125 | Black | G1600-60132 |
| | 64.5 | 56 | 5 | 125 | Black | G1600-61132 |
| | 80.5 | 72 | 5 | 125 | Black | G1600-62132 |
| 50 | 43.5 | 35 | 3 | 150 | Red | G1600-60233 |
| | 48.5 | 40 | 3 | 150 | Red | G1600-60232 |
| | 64.5 | 56 | 3 | 150 | Red | G1600-61232 |
| | 80.5 | 72 | 3 | 150 | Red | G1600-62232 |
| | 112.5 | 104 | 3 | 150 | Red | G1600-64232 |
| 75 | 48.5 | 40 | 2.7 | 200 | Yellow | G1600-60332 |
| | 64.5 | 56 | 2.7 | 200 | Yellow | G1600-61332 |
| | 80.5 | 72 | 2.7 | 200 | Yellow | G1600-62332 |
| | 112.5 | 104 | 2.7 | 200 | Yellow | G1600-64332 |

Universal Bare Fused-Silica Capillaries

Universal Bare Fused-Silica Capillaries have a window, 75 cm effective length and 363 μm od, fitting into any CE instrument. To cut them to the correct length we recommend using the CE column cutter (P/N 5183-4669).

Universal Bare Fused-Silica Capillaries

| ID (μm) | Total Length (cm) | Effective Length (cm) | Part No. |
|----------------------|-------------------|-----------------------|----------|
| 20 | 100 | 75 | 190-0431 |
| 50 | 100 | 75 | 190-0131 |
| 75 | 100 | 75 | 190-0231 |
| 100 | 100 | 75 | 190-0331 |

Bulk Fused-Silica Capillaries

| ID (μm) | Total Length (m) | Part No. |
|----------------------|------------------|------------|
| 20 | 5 | 160-2660-5 |
| 50 | 5 | 160-2650-5 |
| 75 | 5 | 160-2644-5 |

Polyvinyl Alcohol (PVA) Coated Capillaries

PVA coated capillaries contain a permanently adsorbed layer of polyvinyl alcohol. This coating minimizes hydrophobic and electrostatic solute/wall interactions and eliminates electroosmotic flow (EOF). Using a proprietary deposition process, the PVA coating is stable over a wide pH range, even under basic conditions, from pH 2.5 to 9.5. This stability allows the use of many common CE buffers. Because the silica surface is covered, many proteins and amines can be analyzed without the peak tailing found with uncoated capillaries. In addition, since EOF is eliminated, cumbersome washing procedures are unnecessary and migration time reproducibility may be improved.

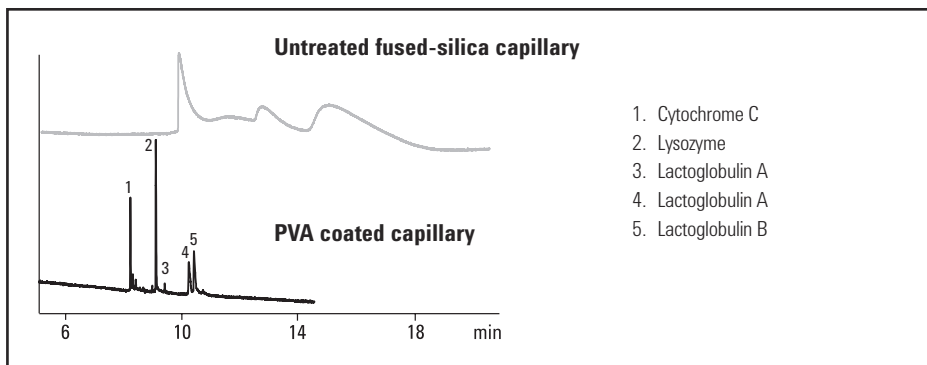
Each batch of PVA coated capillaries is rigorously tested by Agilent Technologies and includes a representative electropherogram to assure quality.

The color coding of the capillary (alignment stopper) and the alignment interfaces allow you to easily combine the correct interface with the capillary. Capillaries for non-Agilent CE systems have removable alignment stoppers without color code.

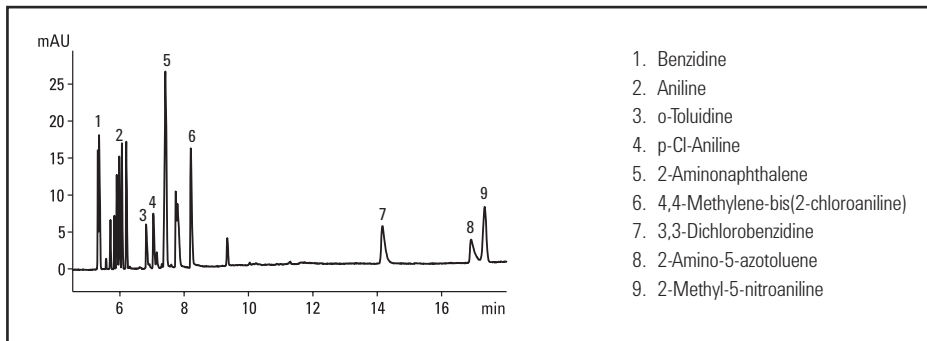
PVA coated capillaries can be used for a variety of applications, including protein analysis at physiological pH, isoelectric focusing, and small anion analysis without the need for flow-reversal agents in the buffer.

PVA coating is available in standard capillaries, or in Agilent Extended Light Path Capillaries ("bubble" cell capillaries) for high sensitivity applications. Both capillary types are available in longer lengths for use in non-Agilent systems.

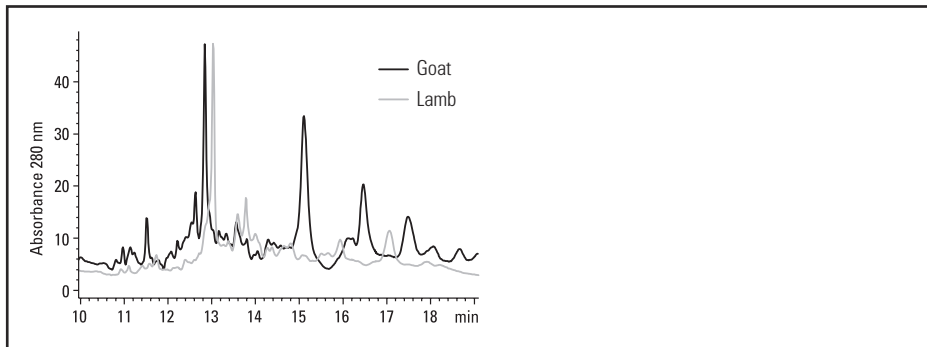
PVA is also available for use with the High Sensitivity Detection Cell for even further improved HPLC-like sensitivity. In addition, PVA coated capillaries are offered for CE-MS applications. The capillaries are provided with a normally positioned detection window to allow tandem UV-Vis and MS detection for improved sample identification.



Use of PVA coated capillaries to reduce protein adsorption



CZE analysis of basic amines using PVA coated capillaries (decomposition products of azo dyes)



Analysis of meat proteins by c-IEF using PVA capillaries

PVA Coated Capillaries for Agilent CE Systems*

| ID (μm) | Total Length (cm) | Effective Length (cm) | Bubble Factor | Optical Path Length (μm) | Color Code | Part No. |
|---------|-------------------|-----------------------|---------------|--------------------------|------------|-------------|
| 50 | 64.5 | 56 | 0 | 50 | Green | G1600-61219 |
| | 64.5 | 56 | 3 | 150 | Red | G1600-61239 |
| | 125 | 21.5 | 0 | 50 | Green | G1600-67219 |
| 75 | 64.5 | 56 | 0 | 1200 | | G1600-68319 |
| | 125 | 21.5 | 0 | 75 | Blue | G1600-67319 |
| 100 | 48.5 | 40 | 0 | 100 | Gray | G1600-60419 |
| | 64.5 | 56 | 0 | 100 | Gray | G1600-61419 |

*Not compatible with borate buffers

Note: PVA coated capillaries for CE/MS have a blue alignment stopper matching the blue color code of the alignment interface for MS-UV detection. The alignment stopper of the 50 μm id PVA capillary for CE/MS has a black dot for easy identification.

PVA Coated Capillaries for Non-Agilent CE Systems*

| ID (μm) | Total Length (cm) | Effective Length (cm) | Bubble Factor | Optical Path Length (μm) | Part No. |
|---------|-------------------|-----------------------|---------------|--------------------------|-------------|
| 50 | 71 | 60 | 0 | 50 | G160U-61219 |
| | 71 | 60 | 3 | 150 | G160U-61239 |
| 100 | 56 | 45 | 0 | 100 | G160U-60419 |
| | 71 | 60 | 0 | 100 | G160U-61419 |

*Not compatible with borate buffers

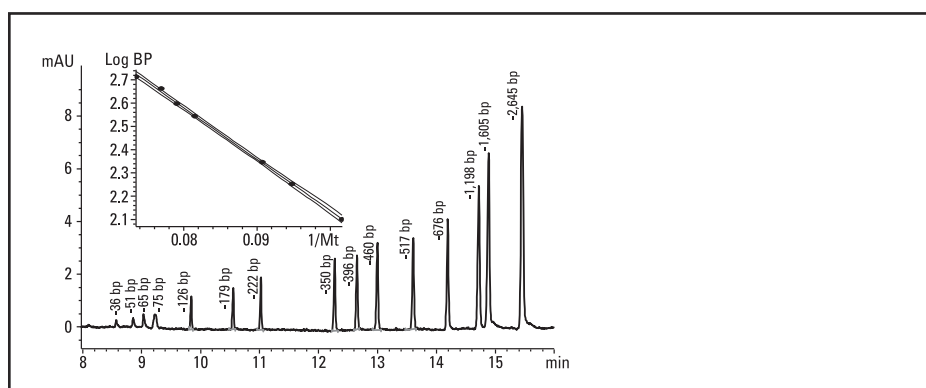
Note: When extended pathlength capillaries are used in non-Agilent systems, loss of resolution may be found if the axial slit width is not reduced. In Agilent systems, the alignment interface contains properly matched slits to maintain resolution.

CEP Coated Capillaries

CEP coated capillaries contain a permanently bonded polymer coating. This CEP coating shields the silanol functionality of the capillary surface and helps prevent sample adsorption. Additionally, EOF is nearly eliminated, making the capillary ideal for applications such as DNA separations with sieving polymer buffers.

Elimination of EOF also simplifies analysis of anions and organic acids by direct UV detection. Without EOF reduction, highly mobile ions such as nitrate can migrate in the opposite direction to the slower, longer chain acids.

The CEP coated capillary is stable from pH 2 to 8. It can be used with borate buffers, offering a different surface functionality to help alleviate sample adsorption. Each batch of CEP coated capillaries is rigidly tested by Agilent Technologies and each capillary includes a representative electropherogram to assure quality.



Restriction fragment separation (36–2645 bp)

CEP Coated Capillaries, 2/pk

| ID (μm) | Total Length (cm) | Effective Length (cm) | Bubble Factor | Optical Path Length (μm) | Part No. |
|---------|-------------------|-----------------------|---------------|--------------------------|-------------|
| 75 | 80.5 | 72 | 0 | 75 | G1600-62318 |



Cross-linked and Bonded μSIL Capillaries

μSIL-FC and μSIL-DNA Capillaries with Windows

A series of coated capillaries specifically designed for CE, which are prepared by cross-linking and bonding a novel, proprietary fluorocarbon (FC) polymer. μSIL-FC capillaries are chemically inert, hydrophobic, and stable from pH 2.5-10.

These capillaries are a must-have for cIEF, protein, peptide and carbohydrate separations, as well as replaceable gel CE applications such as oligonucleotides, DNA fragments, and PCR product separations.

μSIL-DNA capillaries are also coated with an FC polymer but have a 75 μm id to accommodate the viscosity of entangled polymer solutions. All μSIL capillaries are batch tested to ensure the highest performance and reproducibility.



μSIL-DNA, 199-2602

μSIL-WAX Capillaries with Windows

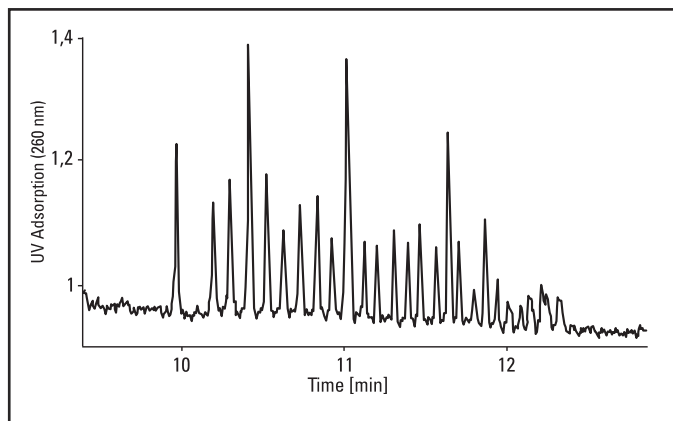
μSIL-WAX features a modified, polyethylene oxide, hydrophilic coating made through a special cross-linking and bonding process. The coating effectively masks active silanol sites, offering exceptional efficiency, resolution, peak shape and reproducibility. The highly stable coating and near-zero EOF of μSIL-WAX makes the capillary ideal for CE-MS, and protein and peptide separations from pH 2-5.

| Capillary | ID (μm) | Total Length (cm) | Effective Length (cm) | Film Thickness (μm) | Unit | Part No. |
|-----------|---------|-------------------|-----------------------|---------------------|------|----------|
| μSIL-FC | 50 | 80 | 50 | 0.075 | 3/pk | 194-8111 |
| μSIL-DNA | 75 | 65 | 50 | 0.075 | 2/pk | 199-2602 |
| μSIL-WAX | 50 | 100 | 75 | 0.1 | 2/pk | 196-7203 |
| μSIL-WAX | 100 | 100 | 75 | 0.1 | 2/pk | 197-7202 |

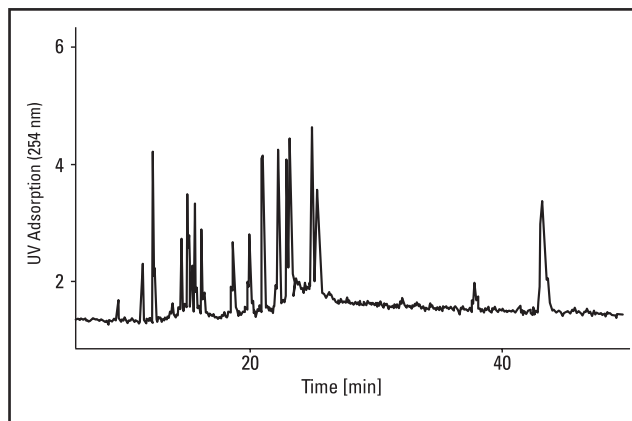
Bulk μ SIL-DB Capillaries

μ SIL-DB coated capillaries are available as μ SIL-DB-1 and μ SIL-DB-17. In combination with a cellulose based buffer system, μ SIL-DB coated capillaries have been widely used in cIEF applications, PCR product and DNA fragment separation, and many other CE applications which require reduced EOF.

| Capillary | ID (mm) | Length (m) | Film Thickness (μ m) | Part No. |
|-----------|---------|------------|---------------------------|----------|
| DB-1 | 0.05 | 10 | 0.05 | 126-1012 |
| DB-1 | 0.20 | 10 | 0.05 | 126-1013 |
| DB-1 | 0.10 | 10 | 0.10 | 127-1012 |
| DB-17 | 0.10 | 10 | 0.05 | 126-1713 |
| DB-17 | 0.10 | 10 | 0.10 | 127-1712 |
| DB-17 | 0.20 | 10 | 0.10 | 127-1713 |



Analysis of Allelic ladder with μ SIL-DNA



Analysis of Myoglobin tryptic digest using μ SIL-WAX

Capillary Electrochromatography (CEC) Capillaries

Capillary electrochromatography is a hybrid of CE and LC and can be performed in the Agilent CE system. Using CE capillaries packed with LC stationary phases, CEC offers the loadability and selectivity of LC and the high efficiency of CE.

Using the high pressure capabilities of the Agilent CE system, both ends of the CEC capillary can be pressurized. This process prevents outgassing upon application of high voltage and significantly extends capillary lifetime.

Use CEC to improve resolution of solutes, which are difficult to resolve by HPLC, for hydrophobic solutes which cannot be solubilized in MEKC buffers, or for reduced sample and solvent consumption compared to HPLC.

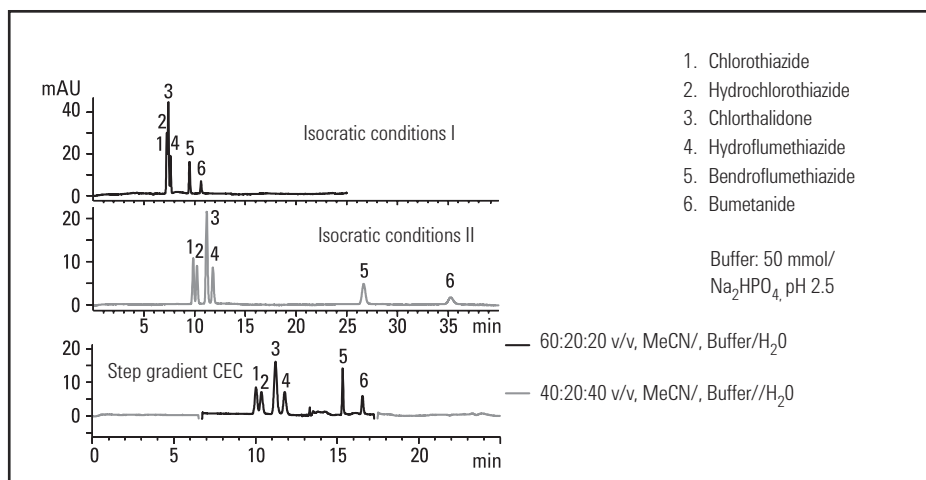
Standard Packed CEC Capillaries, 2/pk

| Description | ID (µm) | Total Length (cm) | Effective Length (cm) | Color Code* | Part No. |
|-----------------------|---------|-------------------|-----------------------|-------------|-----------|
| C18, 3 µm | 100 | 33.5 | 25 | Gray | 5063-6512 |
| | 100 | 48.5 | 40 | Gray | 5063-6513 |
| C8, 3 µm | 100 | 33.5 | 25 | Gray | 5063-6535 |
| | 100 | 48.5 | 40 | Gray | 5063-6540 |
| Phenyl, 3 µm | 100 | 33.5 | 25 | Gray | 5063-6536 |
| | 100 | 48.5 | 40 | Gray | 5063-6541 |
| Hypersil/Phenyl, 3 µm | 100 | 48.5 | 40 | Gray | 5063-6544 |

*The color coding of the capillary (alignment stopper) and the interface allows you to easily combine the correct alignment interface with the capillary.

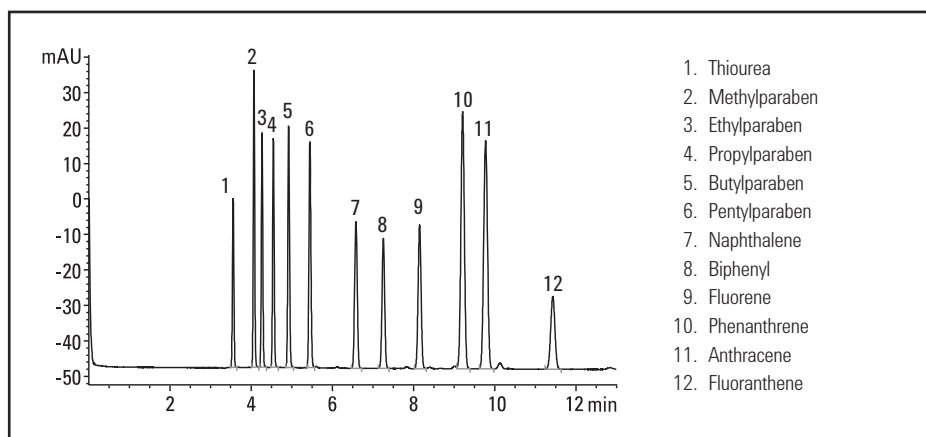


CEC C8 Capillaries, 2/pk, 5063-6535



Capillary Electrochromatography of diuretic test mixture

(courtesy of Dr. Melvin Euerby, Astra Chamwood, UK)



Capillary Electrochromatography of parabens and aromatics

TIPS & TOOLS

CEC capillaries require an Agilent CE system with external gas supply capabilities.



Alignment Interfaces and Capillary Cassette

Agilent Technologies alignment interfaces are an integral part of the Agilent diode-array detection (DAD) system. These interfaces contain optical slits which are precisely matched to the capillary inner diameter for optimized sensitivity and linear detection range.

In combination with the capillary cassette, alignment interfaces simplify capillary exchange, protect the fragile detection window and ensure exact alignment of the window in the detector. Quick-change cassette allows capillary exchange in less than one minute.

Note: The color code of the alignment interface must match the color code of the capillary's built-in alignment stopper.



Alignment interface for standard capillary, G1600-60310

Alignment Interfaces

| Description | ID (µm) | Color Code | Corresponding Capillary | G7100 CE Part No. | G1600 CE Part No. |
|--|---------|------------|-------------------------|-------------------|-------------------|
| Alignment interface for standard capillary | 50 | Green | Green | G7100-60210 | G1600-60210 |
| | 75 | Blue | Blue | G7100-60310 | G1600-60310 |
| | 100 | Gray | Gray | | |
| | 150 | Brown | Brown | | |
| Alignment interface for Agilent Extended Light Path capillaries | 25 | Black | Black | G7100-60150 | G1600-60150 |
| | 50 | Red | Red | G7100-60230 | G1600-60230 |
| | 75 | Yellow | Yellow | G7100-60330 | G1600-60330 |
| CE/MS alignment interface for 360 µm od capillaries, nonmetallic | | Blue | Blue Gray | G7100-60400 | |

Note: 75, 100 and 150 µm id standard capillaries use the same interface (color blue).

PVA coated 50 and 75 µm id capillary for CE/MS use the same nonmetallic interface with color code blue for use with standard and extended light path capillaries, and the high sensitivity detector cell.



Capillary cassette, G7100-60002

Capillary cassette

| Description | G7100 CE Part No. | G1600 CE Part No. |
|--------------------|-------------------|-------------------|
| Capillary cassette | G7100-60002 | G1600-60002 |

Note: Only use G7100-60002 cassette in G7100 and G1600-60002 cassette in G1600. Never mix cassettes.

Optical filter for DAD

| Description | G7100 CE Part No. | G1600 CE Part No. |
|--|-------------------|-------------------|
| Optical filter for DAD 260 nm, for DNA analysis with polyacrylamide filled capillaries and oligonucleotide analysis | G7100-62700 | G1600-62700 |

TIPS & TOOLS



Cassette and interfaces accept all commercially available capillaries (~365 µm od).

Instrument Parts and Supplies

High Sensitivity Detection Cell

The Agilent high sensitivity detection cell – a technological leap which extends sensitivity by an order of magnitude – provides a solution to sensitivity limitations often encountered in CE. This improvement will substantially increase the utility of CE for impurity analysis of chiral drugs, biologicals, and compounds of environmental interest, among others.

The high linear range allows quantification of both <0.1% impurities and the main component in one run. This is useful for all impurity determinations and is especially useful for determining chiral excess.

The high sensitivity detection cell for the Agilent CE system not only improves detection sensitivity more than 10-fold over standard capillaries, but also extends linearity beyond 2000 mAU and provides unsurpassed spectral fidelity. These improvements are a result of a proprietary micromachined design which increases the detection pathlength from 75 μm to 1200 μm while dramatically reducing stray light.

The high sensitivity detection cell has a design comprised of a fused-silica cell body and removable capillaries. The light path through the cell is made from black fused-silica which significantly minimizes stray light and defines the aperture for the diode-array spectrometer. In addition, the reflective interior functions as a "lightpipe," ensuring almost 100% transmission of light which entered the cell. These properties result in enhanced linearity and unsurpassed spectral fidelity with the diode-array detector.



High Sensitivity Detection Cell

Characteristics of the Agilent High Sensitivity Detection Cell

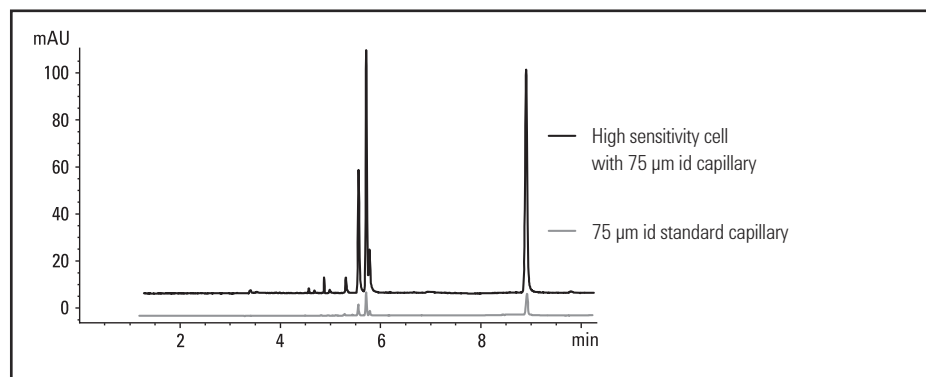
- Up to 10-fold increase in signal-to-noise
- Detector linearity beyond 2000 mAU for accurate quantitative analysis
- Decoupled design allows replaceable capillaries and reduced cost operation
- Special capillary geometry ensures maintenance of peak symmetry
- Full diode-array spectral capabilities
- Design fits all Agilent CE instruments

High Sensitivity Detection Cell

| Description | G7100 CE Part No. | G1600 CE Part No. |
|--|-------------------|-------------------|
| High sensitivity cell kit Includes detection cell, 75 μ m id inlet capillary (72 cm) and outlet capillary (8.5 cm) pair, capillary cassette, fittings (3 fitting screws with seals, 2 fitting caps), cleaning solution, CE Partner CD-ROM | G7100-68723 | G1600-68723 |
| CE cell fitting kit Includes 3 fitting screws, 2 fitting caps | | G1600-63200 |
| Replacement detection cell | | G1600-60027 |
| Cell cleaning fluid, 1 L | | 5062-8529 |

Capillary Kits for High Sensitivity Detection Cell

| Description | Effective Length (cm) | G1600 CE Part No. |
|--|-----------------------|-------------------|
| 75 μ m capillary kit with 8.5 cm outlet | 56 | G1600-68716 |
| | 72 | G1600-68715 |
| | 88 | G1600-68714 |
| PVA coated 75 μ m capillary kit with 8.5 cm outlet | 56 | G1600-68319 |



Agilent high sensitivity detection cell vs. 75 μ m standard capillary for the CZE separation of naphthalene sulfonic acids

CE/MS Accessories

The CE/MS Adapter Kit simplifies coupling the Agilent CE system with MS systems equipped with an electrospray ionization (ESI) source. Integral to this kit is the CE/MS cassette, which completely thermostats the capillary until it exits the CE system. The cassette offers multiple capillary paths that vary the capillary length. A method development configuration uses online diode array detection and MS. For rapid or routine MS analysis, the detector can be bypassed to decrease the total capillary length and reduce analysis time. The CE/MS adapter kit can be used with the complete Agilent 6000 Series mass spectrometers, or virtually any electrospray-MS platform.

The CE/MS cassette completely thermostats the capillary until it exits the CE system. Methods development configuration uses online diode array detection (DAD) and MS. For rapid or routine MS analysis the DAD can be by-passed to decrease the total capillary length and reduce analysis time.

The CE/MS Sprayer Kit includes the electrospray needle and splitter assembly, which allows the direct connection of the CE instrument with Agilent and other electrospray MS systems. The CE/MS Sprayer Kit needs the CE/MS Adapter Kit to fully support CE/MS coupling.

CE with tandem UV-Vis and MS detection allows the analysis of complex mixtures. Analyte mixtures are separated and the components detected via UV-Vis absorption, allowing preliminary identification based on peak elution time and UV-Vis spectra, or both, when compared to a standard. Online coupling to electrospray-ionization mass spectrometry (ESI-MS) then reveals unambiguous information on the solute's molecular weight, and possibly structure.

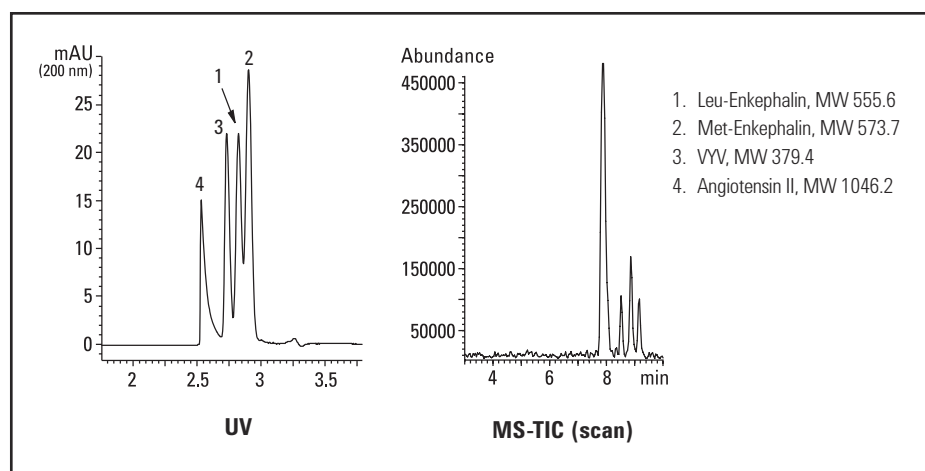


Interfacing the capillary requires an electrospray needle which is not included in this kit but in the CE-ESI-MS Nebulizer Kit. For coupling with non-Agilent MS please contact the MS vendor.

CE/MS Adapter Kit

| Description | Part No. |
|---|-------------|
| CE/MS Adapter Kit For interfacing the Agilent CE system with a mass spectrometer Includes parts below, which can be ordered separately* | G1603A |
| CE/MS interface cassette, metallic, for G1600 and G7100 CE | G1600-60013 |
| CE/MS alignment interface for 360 μm od capillaries, nonmetallic, for G1600 CE | G1600-60400 |
| CE/MS alignment interface for 360 μm od capillaries, nonmetallic, for G7100 CE | G7100-60400 |
| Bare fused-silica, 50 μm id, 125 cm long, 2/pk | G1600-67311 |

*Interfacing the capillary requires an electrospray needle which is not included in this kit



CE/MS of 4-component peptide mixture (210 fmol)

CE/MS Sprayer Kit

| Description | Unit | Part No. |
|--|----------|-------------|
| CE/MS Sprayer Kit Includes CE/MS test sample (5 g quinine sulfate dihydrate) and the parts listed below | | G1607A |
| ES needle assembly | | G1607-60041 |
| CE-ESI sprayer | | G1607-60001 |
| Splitter assembly | | G1607-60000 |
| PEEK ferrule, 360 µm for CE/MS Sprayer | | 5022-2141 |
| Nut, finger-tight fitting and ferrule | 2/pk | 0100-1543 |
| Flex loc element | 2/pk | 1520-0401 |
| Gasket | 1/pk | G1607-20030 |
| Ion kit (ammonium acetate) | 5 x 5 mL | 8500-4410 |

CE/MS Capillaries

| Description | Color Code | Unit | Part No. |
|---|------------|------|-------------|
| Bare fused-silica, 50 µm id, 125 cm long | Green | 2/pk | G1600-67311 |
| Bare fused-silica, 50 µm id, 100 cm long | Green | 2/pk | G1600-67312 |
| PVA coated capillary, 50 µm id, 125 cm long | Green | 1/pk | G1600-67219 |
| PVA coated capillary, 50 µm id, 100 cm long | Green | 1/pk | G1600-67220 |
| PVA coated capillary, 75 µm id, 125 cm long | Blue | 1/pk | G1600-67319 |

CE Standards & Reagents

Premade buffers help eliminate the time-consuming buffer preparation process. All Agilent buffers and reagents are designed to meet the stringent demands of CE. Manufactured under GLP/GMP conditions in ISO 9001 facilities, each is shipped with assay information and verification of purity. Chemicals are all electrophoresis grade, with nearly all ionic and organic impurities removed. Solutions are prepared under Class 10 clean room conditions and prefiltered through 0.2 μm filters to ensure removal of particulates. Superior quality control ensures reproducible results bottle-to-bottle and batch-to-batch.

In addition to a set of kit buffers, which are specially designed for dedicated applications, Agilent offers a series of basic CZE buffers covering a broad pH range. The product portfolio also includes special buffers for protein analysis and for Micellar Electrokinetic Chromatography (MEKC). Cleaning and conditioning solutions complete the offering.



Ultra pure CE water, 5062-8578

Ultra Pure CE Water

| Description | Volume (mL) | Part No. |
|---------------------|-------------|-----------|
| Ultra pure CE water | 500 | 5062-8578 |



0.1 N sodium hydroxide, 5062-8575

Capillary Conditioning Solutions

| Description | Volume (mL) | Part No. |
|------------------------|-------------|-----------|
| 0.1 N sodium hydroxide | 250 | 5062-8575 |
| 1.0 N sodium hydroxide | 250 | 5062-8576 |
| 0.1 N phosphoric acid | 250 | 5062-8577 |

CZE Buffers for Charged Analytes

| Description | Volume (mL) | Part No. |
|---|-------------|-----------|
| 50 mM sodium phosphate buffer, pH 2.5 | 250 | 5062-8571 |
| 50 mM sodium phosphate buffer, pH 7.0 | 250 | 5062-8572 |
| 50 mM sodium tetraborate buffer, pH 9.3 | 250 | 5062-8573 |
| 20 mM sodium tetraborate buffer, pH 9.3 | 100 | 8500-6782 |



50 mM sodium phosphate buffer, pH 2.5,
5062-8571

CZE Buffers for Proteins

| Description | Volume (mL) | Part No. |
|--|-------------|-----------|
| 50 mM phosphate, 0.05% hydroxyethyl cellulose buffer, pH 2.5 | 250 | 8500-6786 |
| 150 mM phosphate, 200 mM ammonium sulfate buffer, pH 7.0 | 250 | 8500-6787 |

MEKC Buffers for Neutral and Charged Analytes

| Description | Volume (mL) | Part No. |
|---|-------------|-----------|
| 50 mM sodium tetraborate, 100 mM sodium dodecyl sulfate buffer, pH 9.3* | 250 | 5062-8574 |

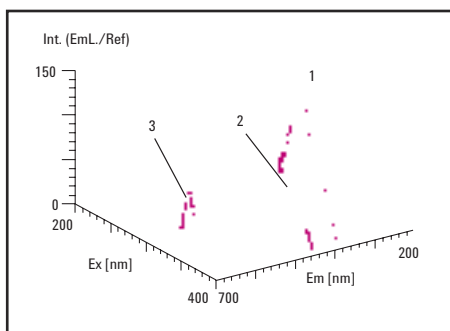
*Dilute with 50 mM sodium tetraborate, pH 9.3 (P/N 5062-8573) to reduce SDS concentration without affecting the tetraborate composition or pH

Plating Bath Analysis Buffer

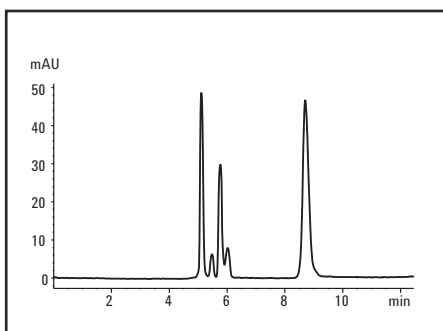
| Description | Volume (mL) | Part No. |
|------------------------------|-------------|-----------|
| Plating bath analysis buffer | 250 | 5064-8236 |

μPAGE Buffer Solutions and Oligo Standards

| Description | Part No. |
|---|----------|
| μPAGE tris-borate and urea buffer for μPAGE-10, 4 x 237 mL | 590-4005 |
| μPAGE tris-borate and urea buffer for μPAGE-3 and μPAGE-5, 4 x 237 mL | 590-4001 |
| μPAGE pd(A) _{25-30, 40-60} oligonucleotide standard for μPAGE-3 and μPAGE-5, 3 x 50 μL | 590-4000 |



The total fluorimetry spectrum of the 50 mM borate buffer pH 9.2 verifies that the solution is free of fluorescence-active impurities (1 and 2 = Rayleigh stray light of zero and first order, 3 = Raman stray light).



CZE analysis of a peptide mixture using pre-made 50 mM sodium phosphate buffer, pH 2.5

CE System Start-up and Test Kits

Chemical test kits and validation packages are available to help comply with regulatory and quality standards. The Installation Qualification (IQ) Chemical Kit and Hardware Start-Up Kits, which are shipped with new instruments, are useful for rapidly verifying system functionality. For rigorous testing, the Operational Qualification (OQ)/Performance Verification (PV) Kit can be used to verify DAD noise, drift, linearity, wavelength accuracy and replenishment functionality. The OQ/PV kit is only part of the validation services available from Agilent Technologies. When implemented by qualified Agilent personnel, our service packages can be used to help validate your Agilent CE system.

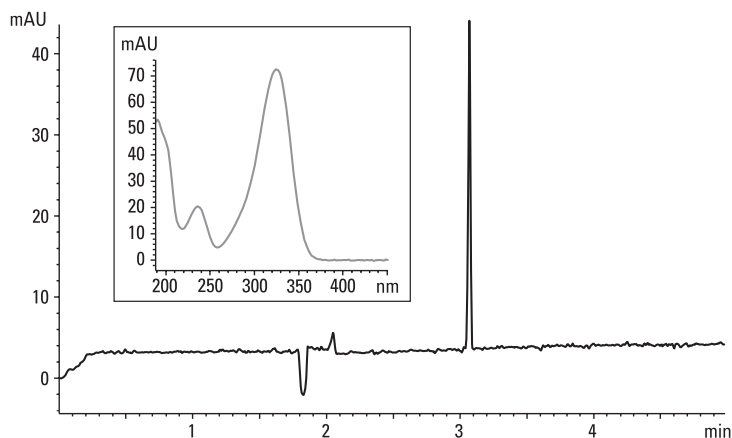
CE System Start-up and Test Kits

| Description | Part No. |
|---|-----------|
| CE Installation Qualification (IQ) Kit Includes buffer (20 mM borate, pH 9.3, 100 mL), test sample (4-(hydroxy)-acetophenone, 2 mL), capillary conditioning solution (0.1 N sodium hydroxide, 100 mL) | 5063-6514 |
| CE Operational Qualification Performance Verification (OQ/PV) Chemical Kit Includes buffer (20 mM borate, pH 9.3, 100 mL), test samples (0.1, 0.5, 1.0, and 5.0 mM 4-(hydroxy)-acetophenone, 2 mL ea.), capillary conditioning solution (0.1 N sodium hydroxide, 100 mL), test capillary (L 48.5 cm, I 40 cm, id 50 µm), diskette with methods, sequence, spectral library. Note: Method is supported for G1600 only. | 5063-6515 |
| CE OQ/PV Chemicals Only Kit Includes buffer (20 mM borate, pH 9.3, 100 mL), test samples (0.1, 0.5, 1.0, and 5.0 mM 4-(hydroxy)-acetophenone, 2 mL) | 5063-6520 |

CE System Start-up and Test Kits

IQ and OQ/PV test method

| | |
|--------------|----------------------------------|
| Sample: | p-Hydroxyacetophenone |
| Buffer: | 20 mM Borate pH 9.2 |
| Capillary: | I = 40 cm, L = 48.5 cm, 50 µm id |
| Injection: | 250 mbar*s |
| Voltage: | 30 kV |
| Temperature: | 20 °C |
| Detector: | 192/4 nm |



Vials and Caps for CE

| Description | Unit | Part No. |
|--|---------|-----------|
| Crimp/snap top vial, 1 mL, Polypropylene, crimp/snap top | 100/pk | 5182-0567 |
| Clear, wide opening crimp/snap top vial, 2 mL | 100/pk | 5182-9697 |
| Clear, wide opening crimp/snap top glass vial, 2 mL | 500/pk | 5183-4623 |
| Amber, wide opening crimp/snap top vial, write-on spot, 2 mL | 100/pk | 5183-4619 |
| Crimp/snap top vial, 250 µL | 1000/pk | 9301-0978 |
| Snap caps PEO (polyethylene olefin for chemical resistance) | 100/pk | 5181-1507 |
| Snap caps PEO (polyethylene olefin for chemical resistance) | 500/pk | 5181-1513 |
| Snap caps PUR (polyurethane for resealing)* | 100/pk | 5181-1512 |
| Snap caps PUR (polyurethane for resealing)* | 500/pk | 5042-6491 |

*PUR caps are recommended to help prevent sample or buffer evaporation even after multiple injections

Instrument Supplies

| Description | Unit | Part No. |
|--|-------|-------------|
| Long life HiS Deuterium lamp (8-pin) with RFID tag | | 5190-0917 |
| Deuterium lamp | | 2140-0585 |
| Electrode assembly, standard (for G1600 only) | | G1600-60007 |
| Electrode assembly, short (for G1600 only) | | G1600-60033 |
| Electrode assembly, standard (for G7100 only) | | G7100-60007 |
| Electrode assembly, short (for G7100 only) | | G7100-60033 |
| Electrode O-ring, silicone | 5/pk | 5062-8544 |
| Electrolyte bottle, 500 mL | | 9300-1748 |
| Electrolyte bottle, 100 mL | | 5042-6478 |
| Electrolyte bottle cap | | 9300-1747 |
| Bottle sealing O-ring | | 0905-1163 |
| Glass filter, solvent inlet, 20 µm | | 5041-2168 |
| Filter frit adapter, 3 mm | 4/pk | 5062-8517 |
| Bottle cap plug | | G1600-23223 |
| Air filter, 5 µm | | 3150-0619 |
| Pre-puncher | | G1600-67201 |
| Screws for pre-puncher/insulation plate holding | 10/pk | G1600-62402 |



Snap caps, polyurethane, 5181-1512, 5042-6491



Electrode assembly, standard (for G1600 only), G1600-60007



Electrode O-ring, silicone, 5062-8544



Electrolyte bottle, 500 mL, 9300-1748



Filter frit adapters, 5062-8517



Air filter, 5 µm, 3150-0619



Screws for pre-puncher/insulation plate holding, G1600-62402



Pre-puncher, G1600-67201



Vial rack, 9301-0722

Accessories

| Description | Part No. |
|--|-------------|
| CE accessory kit Includes electrode tool, screwdriver, fuses, air filter, glass frit, vials and caps alignment interfaces (red and green) standard and 50 µm id capillaries: L 64.5 cm, Standard: L 64.5 cm, Extended Light Path: L 48.5 cm | G7100-68705 |
| Rack for 12 mm, 2 mL vials, holds 50 vials per rack, 5/pk | 9301-0722 |
| CE column cutter | 5183-4669 |
| Diamond blade replacement kit for CE column cutter | 5183-4670 |
| Capillary tubing cutter, 4/pk | 5181-8836 |



CE column cutter, 5183-4669

Window Etching Tool

The window etching tool is designed for fast, convenient and reproducible preparation of detection windows on fused-silica capillaries. The polyimide coating is removed without destroying the inner polymeric coating. The tool contains three glass blocks with fine grooves, precisely controlling the size of the windows.

| Description | Part No. |
|---------------------------|----------|
| Window etching tool, 3/pk | 590-3003 |



Window etching tool, 590-3003

Troubleshooting

Basic Capillary Electrophoresis Troubleshooting

| Symptom | Possible Cause | Solution(s) |
|--------------------------|---|---|
| Unstable Current | | |
| Variable or no current | Air bubble formed in capillary | Flush capillary, ramp voltage to limit initial heating, and/or degas buffers. |
| | Clogged capillary | Flush capillary with absorbing solution (such as NaOH). A "step" on the baseline should be observed when viewing the online signal at 200 nm. If still plugged, flush manually with syringe or high pressure gas. |
| | Broken capillary | Replace capillary. |
| | No or incorrect solution in buffer vials | Fill/change buffer vials. |
| | Large volume injection | Normal situation. Current should stabilize during analysis. |
| Unstable Baseline | | |
| Spikes in baseline | Precipitates in buffer | Filter buffer through 0.2 or 0.45 μm filter. |
| | Micro air bubbles in buffer | Degas buffer by ultrasonication or vacuum. |
| | Precipitation of sample | Verify that sample components are sufficiently soluble in buffer. |
| Noisy baseline | Optical slit in capillary interface is occluded | Clean slit with methanol or water. View under magnifier. |
| | Aging deuterium lamp | Use DAD test to measure lamp output and time-on. Replace if necessary. |
| | Data acquisition rate too high | Determine peak width and decrease acquisition rate if appropriate. |
| | Improper reference wavelength | Acquire UV spectrum during analysis. Use lowest wavelength possible without impinging where sample absorbs. Also use wide bandwidth. |
| | Buffer absorbs at detection wavelength | Use minimally UV-absorbing buffers such as phosphate and borate, especially below 210 nm. |
| Drifting baseline | Improper capillary alignment | Re-seat capillary cartridge in detector block. |
| | Unequilibrated temperature | Allow 10-20 minutes for equilibration after opening top cover. |
| | Lamp recently ignited | Allow 15-30 minutes for equilibration after igniting lamp. |

(Continued)

Basic Capillary Electrophoresis Troubleshooting

| Symptom | Possible Cause | Solution(s) |
|--|--|---|
| Poor Peak Efficiency | | |
| Broad peaks | Sample overloading | Decrease sample injection or concentration. |
| | Excessive Joule heating | Reduce voltage, buffer conductivity, or capillary id. |
| Skewed peaks | Mismatched sample buffer ion mobilities | Match mobilities or increase difference between buffer and sample conductivity. |
| | Sample overloading | Decrease sample injection or concentration. |
| Tailing peaks | Adsorption to capillary wall | Use pH extremes, high buffer concentrations, polymer additives, or coated capillary. |
| Poor Migration Time Reproducibility | | |
| Adsorption to capillary walls | Changes in EOF caused by buffer (especially phosphates and detergents) or sample adsorption | Condition capillary and allow sufficient equilibration time. Replace capillary. |
| Hysteresis of wall charge | Caused by conditioning capillary at high (or low) pH and employing a low (or high) pH running buffer | Avoid pH differences. Allow sufficient equilibration time. |
| Changes in buffer composition | pH changes due to electrolysis | Replenish buffer. |
| | Buffer evaporation | Tightly cap buffer vials and reduce carousel temperature. |
| | Conditioning solution waste flushed into outlet reservoir | Use separate vial to collect waste. |
| | Conditioning solution carried over into buffer vial | First dip capillary in separate buffer or water vial. |
| Buffer reservoirs not level | Generation of laminar flow | Level liquid in reservoirs. If not replenishing buffer, do not use inlet vial for flushing capillary. |
| Different silanol content of capillary batches | Different wall charge and variations in EOF | Measure EOF and normalize. |
| Temperature changes | Changes in viscosity and EOF | Use system with capillary thermostating. |

(Continued)

Basic Capillary Electrophoresis Troubleshooting

| Symptom | Possible Cause | Solution(s) |
|---|---|---|
| Poor Peak Area Reproducibility | | |
| Sudden application of high voltage | Heating, thermal expansion of buffer, and expulsion of sample | Ramp separation voltage or inject buffer plug after sample. |
| Sample evaporation | Increasing sample concentration and peak area | Cap vials and/or reduce temperature of sample carousel. |
| Instrumental limitations | System rise time significant proportion of injection time | Increase injection time. |
| Sample carry-over | Extraneous injection | Use capillary with flat, smooth injection end. Remove polyimide from end of capillary. |
| Zero-injection caused by simply dipping the capillary in the sample | Extraneous injection | Cannot be totally eliminated. Increase injection amount to minimize effect. |
| Sample adsorption to capillary walls | Distorted peak shape (tailing) Non-eluting sample | Change buffer pH. Increase buffer concentration. Use additive such as cellulose or coated capillary. |
| Low signal-to-noise ratio | Integration errors | Optimize integration parameters. Increase sample concentration. Use peak height. |
| Temperature changes of capillary environment | Changes in viscosity and injection amount | Use system with capillary thermostating. |

LC and LC/MS Columns

The largest portfolio of Fast LC columns, and a broad family of phases across all particle sizes for exceptional flexibility and scalability

Whether you are performing conventional or ultra-fast chromatography, separating biomolecules, or analyzing complex basic compounds, you can trust Agilent for the industry's highest-performing columns that deliver the fast, reproducible results you need – all engineered with Agilent's unparalleled quality and reliability.

- **Poroshell 120 columns** – high efficiency and high resolution with up to 50% less pressure than sub-2 μm columns.
- **ZORBAX Rapid Resolution High Definition (RRHD) columns** – 1.8 μm columns feature improved packing processes to achieve stability up to 1200 bar for use with the Agilent 1290 Infinity LC and other UHPLC instruments and are available in more than 14 phases, plus HILIC.
- **ZORBAX Eclipse Plus columns** – C18 and C8 columns deliver superior peak shape, while the phenyl-hexyl bonded phase and C18 bonded phase for PAH separations expand selectivity options for more applications. All Eclipse Plus phases are available in Fast LC/UHPLC RRHD and RRHT columns, 1.8 μm . For scalability, the Eclipse Plus C18 phase is very similar to the Poroshell 120 EC-C18 phase.
- In addition to Poroshell 120 and RRHD columns, **ZORBAX Rapid Resolution High Throughput (RRHT) columns** are a third Fast LC option with over 140 1.8 μm columns choices. RRHT columns are available in 2.1, 3.0 and 4.6 mm ids, all with 600 bar stability.

And remember, when you choose Agilent ZORBAX LC columns, you get more than just a dependable product. You also get over 40 years of expertise – along with unmatched technical support – from the world's largest chromatography supplier. On the web, by phone or in person, Agilent helps you solve the problems that can slow you down and get in the way of your results.



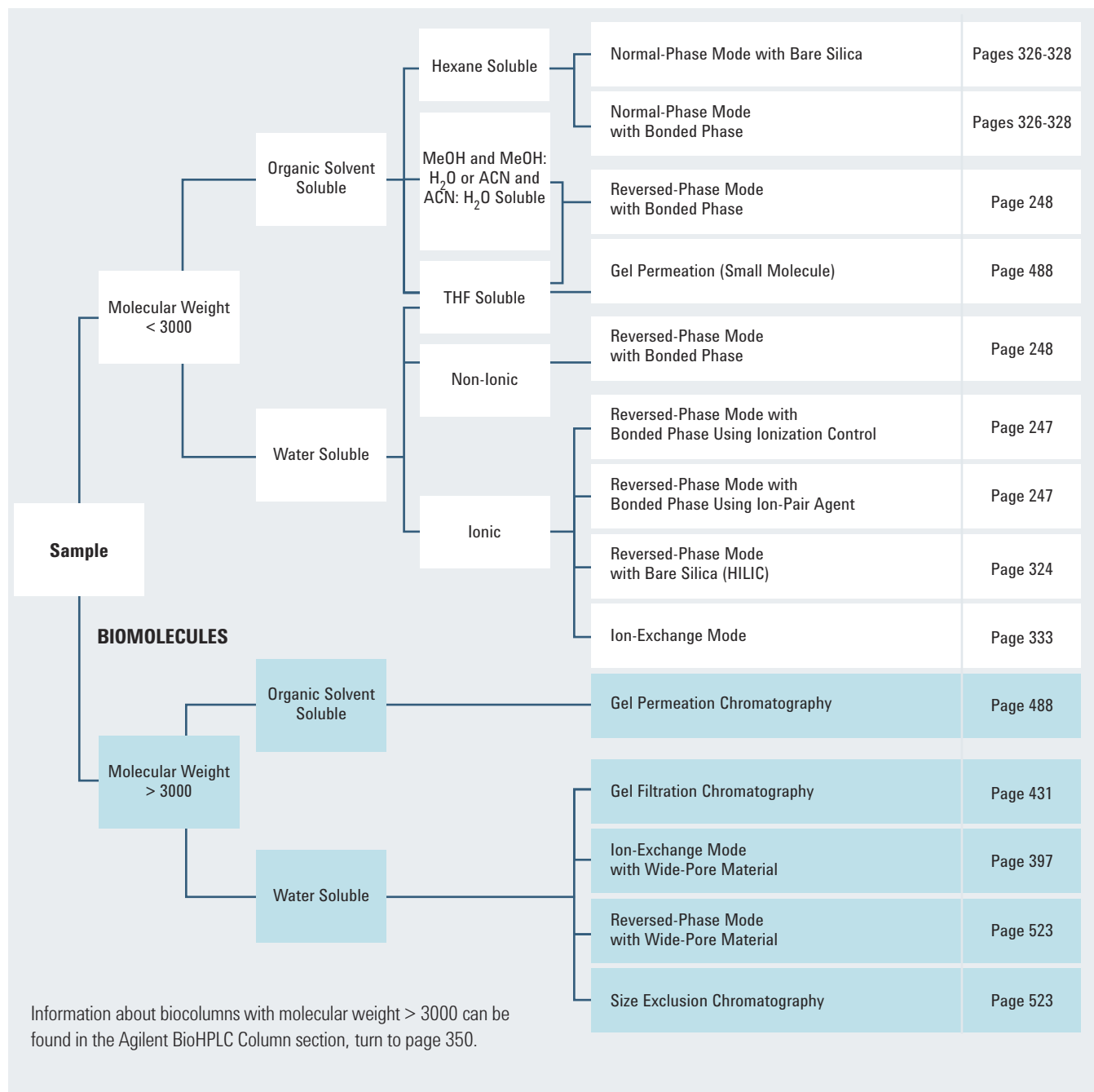
Table of Contents

LC and LC/MS Columns for Small Molecule Separations

| | | | |
|---|------------|--|------------|
| HPLC Column Selection..... | 206 | Preparative HPLC Columns..... | 311 |
| Fast Columns for Reversed-Phase HPLC/UHPLC..... | 227 | Agilent Prep LC Columns | 311 |
| Poroshell 120..... | 228 | ZORBAX PrepHT | 314 |
| ZORBAX Rapid Resolution High Definition 1.8 μm | 233 | Pursuit and Pursuit XRs Prep | 319 |
| ZORBAX Rapid Resolution High Throughput 1.8 μm | 239 | Polaris Prep Columns..... | 321 |
| Agilent UHPLC Guards..... | 246 | Load & Lock | 322 |
| Columns for Reversed-Phase Analytical HPLC..... | 247 | Columns for Other HPLC Techniques..... | 323 |
| ZORBAX Eclipse Plus..... | 248 | ZORBAX HILIC Plus..... | 324 |
| ZORBAX Eclipse PAH..... | 254 | Normal-Phase Columns..... | 326 |
| ZORBAX Eclipse XDB..... | 256 | ZORBAX Ion-Exchange Columns – SAX and SCX..... | 333 |
| ZORBAX 80Å StableBond..... | 264 | Hi-Plex Columns for Carbohydrate Analysis | 335 |
| ZORBAX Rx..... | 272 | Appendices..... | 343 |
| ZORBAX 80Å Extend-C18..... | 274 | Quick Guide to USP Designations for HPLC Columns..... | 343 |
| ZORBAX Bonus-RP..... | 278 | Oligo Solutions | 347 |
| ZORBAX Original Reversed-Phase Columns..... | 283 | StratoSpheres DNA Cartridges | 347 |
| Kits for Analytical HPLC | 284 | TOP, TOP-DNA and TOP-RNA Cartridges..... | 348 |
| Pursuit..... | 287 | | |
| Polaris | 298 | | |
| TC-C18(2) and HC-C18(2) | 304 | | |
| PLRP-S | 306 | | |

HPLC Column Selection

To use the column selection guide diagram below, simply follow the path for your analyte and mobile phase. At the far right, follow your final column selection to the pages indicated.



Adapted with permission from "Practical HPLC Methodology and Applications," Brian A. Bidlingmeyer, John Wiley & Sons, Inc., New York, p. 109

Quick Guide to Agilent Reversed-Phase Bonded Phases

| ZORBAX RP-HPLC Columns | Recommended Uses and Applications | Page No. |
|---|---|----------|
| Poroshell 120 | <ul style="list-style-type: none"> • Superficially porous particles for high efficiency at low pressure • Sub-2 μm efficiency with a 2.7 μm particle • Endcapped and non-endcapped C18 and C8 phases, and a variety of other phases, for selectivity optimization • Compatible with 400 bar and 600 bar LC's | 228 |
| Eclipse Plus Available in RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 μm | <ul style="list-style-type: none"> • Excellent first choice for method development • Long life from pH 2-9 for reliable separations of basic, acidic and neutral compounds • Superior peak shape with basic compounds • High resolution and efficiency with 1.8, 3.5 and 5 μm columns • Rigorous QA/QC testing for greater long-term reproducibility | 248 |
| Eclipse XDB Available in RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 μm | <ul style="list-style-type: none"> • Four selectivity choices for flexible method development • High performance over a wide pH range (2-9) • Good peak shape for acids, bases and neutrals • Long lifetime with eXtra Dense Bonding and double endcapping • Fast, ultra-fast, and high resolution separations using 1.8 and 3.5 μm columns • Choices from capillary to prep | 256 |
| StableBond (SB) Available in RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 μm | <ul style="list-style-type: none"> • Basic, acidic, neutral compounds • Exceptional stability at low pH (1-2) • Use of high temperature (up to 90 °C for C18, 80 °C for C8, C3, Phenyl, CN, and Aq) and low pH as an added selectivity tool • Widest selection of bonded phases for different selectivity (C18, C8, C3, CN, Phenyl, Aq) • Uses mobile phases for LC/MS with formic acid, acetic acid, or TFA • Uses mobile phases with TFA for peptide and protein separation • Rapid separations using 1.8 and 3.5 μm columns | 264 |

(Continued)

Information about biocolumns can be found in the section beginning on page 350

Quick Guide to Agilent Reversed-Phase Bonded Phases

| ZORBAX RP-HPLC Columns | Recommended Uses and Applications | Page No. |
|---|--|----------|
| ZORBAX Rx Available in RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 µm | <ul style="list-style-type: none"> • General separation of basic, acidic and neutral compounds at low pH with different selectivity than SB columns • Rx-C8 is the same as SB-C8 | 272 |
| Bonus-RP Available in Fast LC/UHPLC RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 µm | <ul style="list-style-type: none"> • Separating basic compounds in higher aqueous mobile phases • General separation of basic, neutral, acidic compounds at mid-range pH or low pH; especially stable at low pH • Separating peptides for different selectivity • Rapid separations using 3.5 µm columns | 278 |
| Extend-C18 Available in Fast LC/UHPLC RRHD (1200 bar) and RRHT (600 bar) configurations, 1.8 µm | <ul style="list-style-type: none"> • Separating basic compounds above their pKa in free base form; separation of basic, acidic, neutral compounds at high pH; up to pH 11.5 • Uses ammonium hydroxide as mobile phase additive with LC/MS with small molecules or peptides • Separating at high, mid-range and low pH for selectivity changes • Rapid separations using 3.5 µm columns | 274 |
| Original ZORBAX Columns | Recommended Uses and Applications | Page No. |
| ZORBAX | <ul style="list-style-type: none"> • General separation of basic, acidic, neutral compounds at low pH with different selectivity than SB columns; higher number of active silanols than SB • "Mixed mode" separation at more neutral pH values • Available in ODS, C8, CN and ODS "Classic" (non-encapped) | 283 |

TIPS & TOOLS



The LC Handbook: Guide to LC Columns and Method Development

This handy guide makes it easy to choose the right LC column, and contains plenty of tips and tricks to make your job easier and more productive (publication # 5990-7595EN).

Request a copy or download a mobile copy at www.agilent.com/chem/lchandbook



Quick Guide to Additional Agilent Reversed-Phase Columns

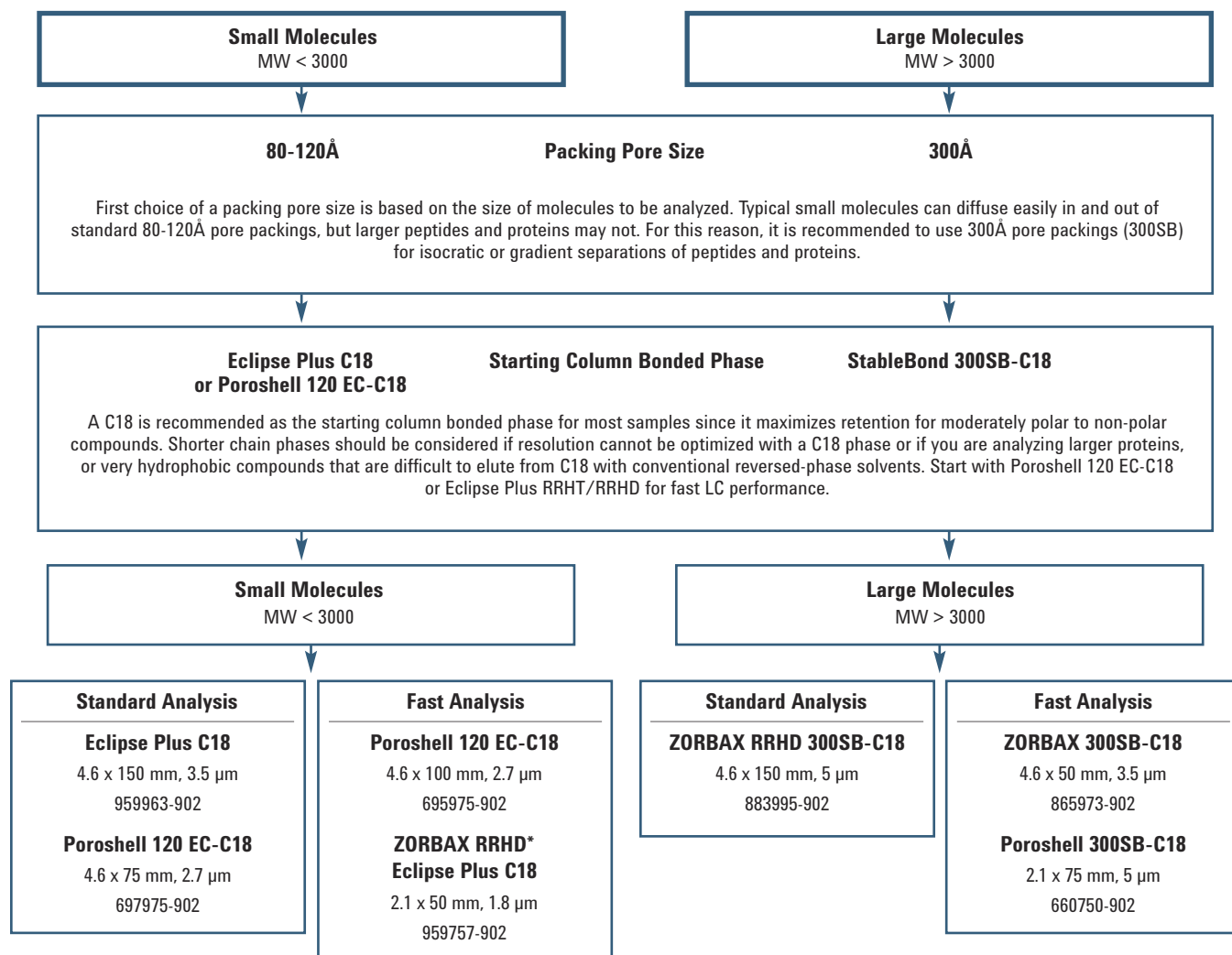
| Pursuit Family | Recommended Uses and Applications | Page No. |
|---|---|-----------------|
| Pursuit HPLC | <ul style="list-style-type: none"> • Full range of phases, including C18 and C8 • Diphenyl utilizes strong dipole-dipole hydrogen bonding and pi-pi mechanisms for different selectivity with aromatic compounds • PFP provides excellent separation of polar (halogenated) analytes and positional isomers under standard reversed-phase conditions | 287 |
| Pursuit XRs and Pursuit XRs Ultra | <ul style="list-style-type: none"> • Offer larger surface area and smaller pore size, in complementary phases to Pursuit family • Ultra offers stability to 600 bar, due to special hardware and loading | 287 |
| Polaris Family | Recommended Uses and Applications | Page No. |
| C18-A and C8-A Available in 3.0, 5.0, and 10 µm (C18-A only) | <ul style="list-style-type: none"> • C18-A and C8-A offer alternate selectivities for general polar applications • Designed with hydrogen-bond-accepting endcapping | 298 |
| Amide-C18 Available in 3.0 and 5.0 µm | <ul style="list-style-type: none"> • Subtle alternative selectivity due to the absence of steric protection • Utilize an embedded amide, similar to ZORBAX Bonus-RP | 298 |
| C18-Ether and C8-Ether Available in 3.0 and 5.0 µm | <ul style="list-style-type: none"> • Endcapped with an ether group to create a more polar surface for selectivity variation | 298 |
| Other Agilent Columns | Recommended Uses and Applications | Page No. |
| TC-C18(2) Available in 5 µm | <ul style="list-style-type: none"> • An excellent choice for mixtures of polar and non-polar compounds, including strong basic compounds | 304 |
| HC-C18(2) Available in 5 µm | <ul style="list-style-type: none"> • High-value, highly retentive option • Carbon load of 17% • Superior peak shape for basic compounds | 304 |

ZORBAX Reversed-Phase HPLC Column Selection Flow Chart

For small and large molecules

Most chromatographers use reversed-phase HPLC as one of their key analysis techniques. Reversed-phase HPLC can be used to analyze ionic and nonionic analytes. Therefore this ZORBAX Column Selection Flow Chart will focus on reversed-phase columns. To more easily select a reversed-phase column for method development of small and large molecules, follow the outline on these pages.

This flow chart provides information on choosing an initial column for method development of small molecule and protein and peptide samples, and includes decisions on bonded phase and column configuration.



* First choice for use on the 1290 Infinity LC or other UHPLC instruments with 1000+ bar pressure limit.

Information about biocolumns can be found in the section beginning on page 350

Column and Mobile Phase Guidelines: Reversed-Phase

HPLC columns consist of two parts: the column chemistry and hardware. For the proper column chemistry, consult the catalog section for each type of bonded phase. For choosing column hardware and particle sizes, consult the section on column sizes and rapid separations, including Agilent ZORBAX Rapid Resolution HT, Solvent Saver, Capillary and PrepHT columns.

Pore Size Selection

Choose a column packing with small pore (60-120Å) if the solute molecular weight is less than about 3000. Otherwise, use column packing with the 300Å pore size.

Particle Size Selection

The typical particle size for HPLC columns is 5 µm with 3.5 µm and smaller, now common in method development. If high-speed analyses or higher resolution analyses are required, packing with 1.8 µm and 2-3 µm particles can be used. Shorter columns with these particles can produce faster high-resolution separations, with the 1.8 µm particle size providing the highest efficiency and 2.7 µm superficially porous providing similar results. With 1.8, 2.7, 3.5 and 5 µm particle sizes to choose from, start with the smallest particle size for your HPLC or UHPLC – 400 bar, 600 bar, or 1200 bar – to achieve the best results.

Column Configuration

Choosing the best column size for method development has changed dramatically in the past few years. Smaller 3.0 mm id or 2.1 mm id columns are now used more than 4.6 mm id to lower solvent use and achieve compatibility with MS detectors. And shorter 50, 75 and 100 mm long columns can be a great starting choice, with longer columns used only when more resolution is needed or when 3.5 and 5 µm particle sizes are used.



ZORBAX Rapid Resolution
High Throughput (RRHT) Columns

TIPS & TOOLS

Need help selecting the right LC column for your method?

Try the Navigator: A selection tool for LC columns and sample prep.

Look for it online and via your mobile device at <http://navigator.chem.agilent.com>



Silica, Polymers, and Bonded Phase

Base Material

The base material for an LC column is most often high purity silica material with totally porous particles such as that used in most Agilent columns, including ZORBAX, Pursuit, and Polaris. However, more choices are available, including polymer material with high pH stability used in PLRP-S columns and superficially porous silica particles such as those used in Poroshell 120 columns. The high purity Type B silicas, including the ZORBAX Rx-Sil used in ZORBAX Eclipse Plus, and superficially porous Poroshell 120, are an excellent first choice for most methods. Type A silicas, such as ZORBAX SIL, used in Original ZORBAX columns, are still manufactured and used in many methods.

Bonded Phase

A good first choice for bonded phase is C18 or C8, and the recommended starting column choices are Eclipse Plus C18 or Poroshell 120 EC-C18. These two choices provide excellent peak shape and can be used over the pH range 2-9, accommodating most typical LC and LC/MS mobile phases. If the sample solutes of interest are not adequately separated on these columns, CN and Phenyl columns – including Phenyl, Phenyl-Hexyl and Diphenyl – may offer significant differences in selectivity from straight-chain alkyl phases to effect the separation.

In general, larger solutes, such as proteins, are best separated on short-chain reversed-phase columns (C3, CN, C8) and peptides and small molecules are separated on longer-chain columns (C18). However, there are many cases where this conventional wisdom does not apply. For example, peptides can also be effectively separated using short-chain columns, and hydrophobic peptides can show better recovery on longer-chain phases. Therefore, it is best to initially select a phase in the middle of the hydrophobic spectrum (e.g., C8), then change to a more hydrophobic phase or more hydrophilic phase depending on initial results and solubility properties of your sample.

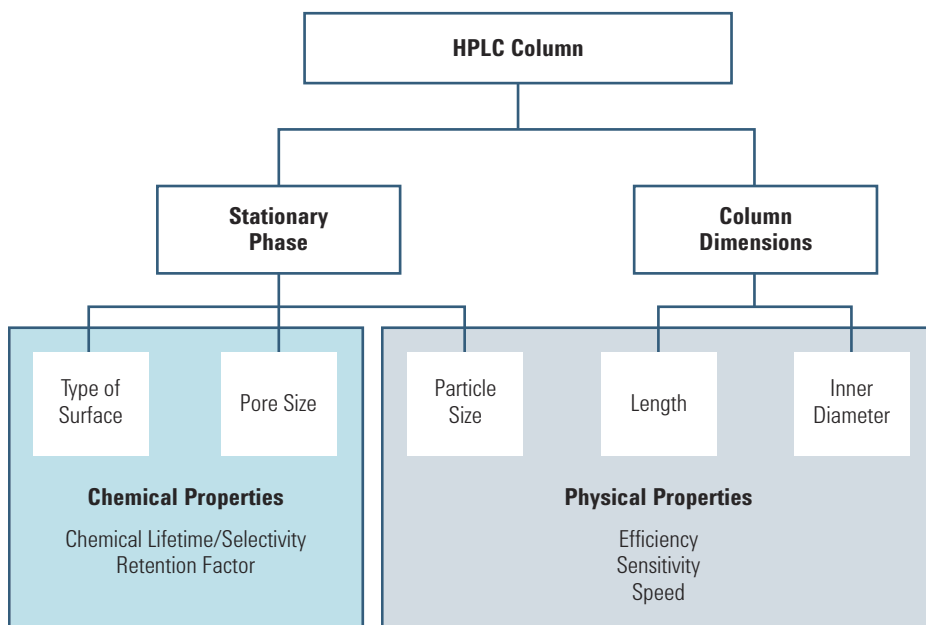
Polymers

When a column is needed that can operate at very low and very high pH, polymeric packings provide an alternative to silica-based materials. Polymeric particles are good for small-scale chromatography, particularly LC/MS, as they are chemically stable and do not leach soluble or particulate species. Reversed-phase spherical polymeric packings used in Agilent PLRP-S columns, for example, are based on a styrene/divinylbenzene copolymer with an inherently hydrophobic surface. No bonded phase is required for reversed-phase chromatography with polymeric particles. These rigid macroporous particles can be coated and derivatized to give a range of functionalities, including weak and strong cation and anion exchangers.

pH and Mobile Phase

The choice of mobile phase for a reversed-phase system starts with selecting the organic modifier. Acetonitrile is the most commonly used organic modifier. However, selectivity differences and sample retention will vary significantly among mobile phases containing acetonitrile, methanol, and tetrahydrofuran (THF). Sample solubility is likely to differ in such solvents and dictate use of a specific solvent or solvents. UV detection at certain wavelengths is not possible with certain modifiers (e.g., methanol at 200 nm).

Both pH and ionic strength of the aqueous portion of mobile phases are important parameters in developing rugged methods that are not sensitive to small variations in conditions. With ionic compounds, retention of typical species shows significant changes with pH. It is very important to control pH in such reversed-phase systems to stabilize retention and resolution. A pH between 2 and 4 generally provides the most stable conditions for retention vs. small changes in pH, and this pH is recommended for starting method development for most samples, including basic compounds and typical weak acids.



Working with LC/MS

When choosing HPLC columns for LC/MS, chromatographers often need to consider several aspects of their method and separation, typically including resolution, flow rate, and stationary phase choice. Often, for relatively simple analytes, shorter high resolution columns are the best choice. These columns allow for high throughput while maintaining high separation efficiency. Narrow bore Rapid Resolution High Definition (RRHD) for separations (> 600 bar) and Poroshell 120 columns (< 600 bar) offer high resolution even in shorter columns dimensions. For more difficult samples, users should seek longer column lengths.

Since many LC/MS analyses are run at lower flow rates (typically from $\mu\text{L}/\text{min}$ flow rates up to 1 mL/min), moving to smaller internal diameter columns is the best choice for the user. Agilent's Solvent Saver (3.0 mm id) and narrow bore (2.1 mm id) will often result in lower solvent usage for the method, and are excellent options for high resolution and higher sensitivity than the larger id columns.

Most often, the best bonded phase choice is an endcapped C18 phase. Eclipse Plus C18 is a high performance endcapped C18 phase available in sub-2 μm RRHD and RRHT column formats. For fast high-throughput separations with LC/MS, Poroshell 120 EC-C18 is an excellent choice. Poroshell has a larger frit, so it's well suited for dirtier LC/MS samples, such as blood plasma, which may often clog columns with smaller porosity frits.

Both Eclipse Plus C18 and Poroshell 120 EC-C18 phases are stable over a wide pH range and are compatible with the volatile buffers such as acetic and formic acids.

TIPS & TOOLS



LC Flow Rate Calculator App

This FREE Smartphone app lets you quickly adjust your flow rate to accommodate other method changes.

Download at www.agilent.com/chem/lcapp



Transferring your method to a high efficiency column

High efficiency columns for UHPLC/Fast LC will help you increase your analytical speed and resolution. Depending on the instrument configuration you are using, you may need to make a few adjustments to get the most from these columns.

Because of their high efficiency, very narrow peaks elute from higher efficiency columns quickly. While modern HPLC instrumentation and data systems are able to capture the benefits of these particles, attention to instrumental configuration is important to get the best results.

Steps to transfer your method:

Check the specifications that came with your instrument – Your instrument may already be configured appropriately for high efficiency columns. If not, then continue.

Optimize the data collection rate for LC and LC/MS (at least 40 Hz detector with fast response time for UV) – Set the detector to the fastest setting, then to the second fastest setting and evaluate if the resolution is different.

Use a semi-micro or micro-flow cell – Smaller volume flow cells such as the semi-micro (6 mm/5 μ L) or micro (3 mm/2 μ L) are recommended for best performance. There are newer cartridge flow cells (e.g. the Ultra Low-Dispersion Max-Light Ultra Flow Cell, P/N G4212-60007) designed to optimize UHPLC instrument performance.

TIPS & TOOLS

For the Agilent 1290 Infinity LC, in situations requiring extremely low dead volumes, use the ultra-low dispersion kit, which includes an ultra-low dispersion flow cell and 0.08 mm id capillaries.



Minimize tubing volume in the instrument – Use Red (0.12 mm id) tubing instead of Green (0.17 mm id) as it has only half of the volume that the sample has to travel through. This cuts down extra column band broadening. Ensure that your connections are as short as possible. The key locations to check are:

- The autosampler needle seat
- The autosampler to the Thermostatted Column Compartment – or ‘TCC’
- The TCC to the column
- The column to the flow cell, including the internal diameter of the integral flow cell inlet capillary

All of these specific capillaries can be ordered individually from Agilent, in the lengths you need, and for your instrument.

Turn to pages 36-39.

Scale your gradient profile and injection volume – If using gradient elution, scale the gradient profile and injection volume to the new smaller column to quickly transfer the method and avoid overloading. For isocratic and gradient elution, make sure that you scale the injection volume to match the overall column volume.

Minimize injection sample dispersion in the column – Use an injection solvent with solvent strength that is equivalent to or weaker than the mobile phase, especially when using an isocratic method. This is good practice in general for any column, and more important with high efficiency columns.

TIPS & TOOLS



See a video that takes you through these steps at www.agilent.com/chem/poroshell120video

Also, check out the LC Method Translator Tool at www.agilent.com/chem/lcmethodtranslator



Take care to make proper connections – Agilent recommends Swagelok fittings with front and back ferrules, which give best sealing performance throughout our LC system (use this on the instrument connections, i.e. valves, heaters, etc). Polyketone fittings are highly recommended for up to 600 bar. Use this fitting (P/N 5042-8957) on column connections with Poroshell 120. For RRHD columns, use Agilent's removable 1200 bar fitting (P/N 5067-4733).

Optimize your flow rate – For Poroshell 120, if you're using a 2.1 mm id, the suggested starting flow rate is 0.42 mL/min; for 3.0 mm id Poroshell 120 columns, we suggest starting at 0.85 mL/min, and for 4.6 mm id, we suggest starting at 1.5 - 2 mL/min.



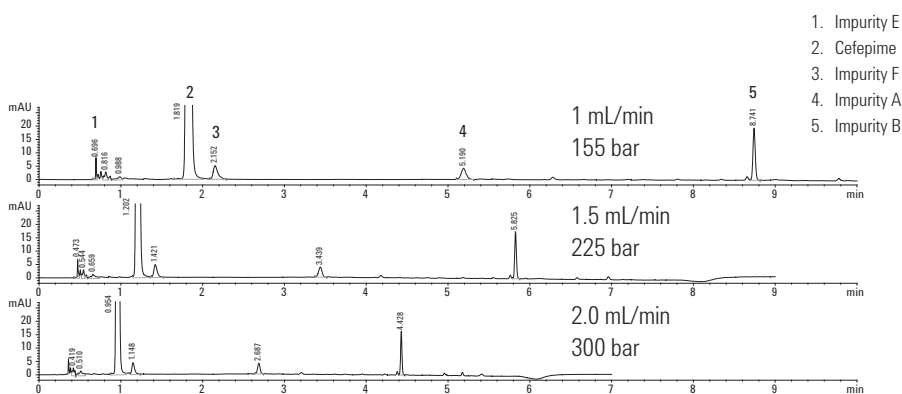
1200 bar removable fitting (SV), 5067-4733

Fast analysis of cefepime and related impurities

Column: Poroshell 120 EC-C18
697975-902
4.6 x 75 mm, 2.7 µm

Instrument: Agilent 1200 Infinity Series
Rapid Resolution LC System

Detector: DAD, 254 nm

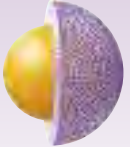
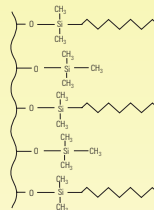
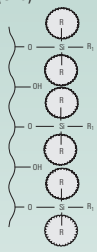
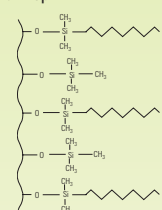


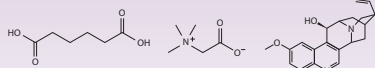
VHP FITTINGS

Agilent's 1200 bar removable fitting (for 1/16 in od capillaries) consists of a stainless steel screw, an internal stainless steel ferrule and a front ferrule in PEEK. The fitting can be used throughout the flow path, but because it can be re-used without losing tightness, it is especially suitable for the connection between the heat exchanger and the column. This new and improved fitting replaces the standard stainless steel Swagelok fitting which was not removable. The Very High Pressure (VHP) fitting is available in three sizes – short (P/N 5067-4733), long (P/N 5067-4738) and extra long (P/N 5067-4739). The short fitting is the one that is most commonly used, and will be appropriate 90% of the time. In some cases, if using columns with longer nuts, a longer fitting will be needed.



Agilent LC Columns Overview: Small Molecules

| Start with Poroshell 120 for Fast LC performance on any HPLC – phases align with ZORBAX family. | | | | |
|--|--|---|---|---|
| Up to 50% less pressure than sub-2 µm; a total lab productivity enhancer | | | | |
| Poroshell 120 | 1.7 µm solid core; 0.5 µm porous outer layer for a 2.7 µm particle, id's: 4.6 mm, 3.0 mm, 2.1 mm, Lengths: 30-150 mm. New phases coming soon! Check www.agilent.com/chem/poroshell120 Compatible with HPLC and UHPLC instruments. Suitable for analysis of acids, bases, and neutrals. Also great for peptide mapping. Poroshell 120 is for any lab looking for increased analytical speed and resolution with less backpressure. | | |  |
| | Poroshell 120 SB-C18 (USP L1), SB-C8 Carbon Load: SB-C18 - 7.5%, SB-C8 - 4.5% | Poroshell 120 EC-C18** (USP L1), EC-C8** (USP L1), Phenyl-Hexyl (USP L11) Carbon Load: Phenyl-Hexyl - 8% | Poroshell 120 EC-CN (USP L10) | |
| **Best Phase for Method Development | | | | |
| ZORBAX Family | ZORBAX Eclipse Plus** | ZORBAX StableBond | ZORBAX Eclipse XDB | |
| | RRHD: 1.8 µm, stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 30-250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm, 1.0 mm; Prep | RRHD: 1.8 µm, stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 20-250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm, 1.0 mm; Prep, Capillary (C18) | RRHD: 1.8 µm, stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 15-250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm, 1.0 mm; Capillary and Prep | |
| |  <p> C18 (USP L1), C8 (USP L7), Phenyl-Hexyl (USP L11), PAH (USP L1) </p> <p>High performance and excellent peak shape with acids, bases and neutrals.</p> <p> Sample Applications Environmental: EPA Method 1694, Illicit and prescribed drugs in wastewater Food Safety: Quinolone antibiotics Pharmaceutical: Chloramphenicol, Simvastatin, Chrysophenol (TCM), amphetamine, ranitidine </p> <p> Double Endcapped (except PAH, which is not endcapped) Temp limit: 60 °C Pore size: 95Å Surface area: 160 m²/g </p> <p> Particle sizes: 1.8, 3.5, 5 µm pH: 2.0-9.0 for C18, C8; 2.0-8.0 for PAH, Phenyl-Hexyl Carbon load: C18: 9%; C8: 7%; Phenyl-Hexyl: 9%; PAH: 14% </p> |  <p> SB-C18 (USP L1), SB-C8 (USP L7), SB-C3 (USP L56), SB-Phenyl (USP L11), SB-CN (USP L10), SB-Aq </p> <p>High performance with acids, bases, and neutrals with superior lifetime at low pH.</p> <p> Sample Applications Chemical/Industrial: Triton Environmental: Organic acids, pesticides in drinking water Food Safety: Anthocyanine, parabenes, melamine Pharmaceutical: Analgesics, anesthetics, traditional Chinese medicine </p> <p> Non-Endcapped Temp limit: 80 °C (90 °C for SB-C18) Pore size: 80Å Surface area: 180 m²/g Particle sizes: 1.8, 3.5, 5, 7 µm </p> <p> pH: 1.0-8.0 (0.8-8.0 for SB-C18) Carbon Load: C18: 10%; C8: 5.5%; C3: 4%; Phenyl: 5.5%; CN: 4%; Aq: Proprietary </p> |  <p> C18 (USP L1), C8 (USP L7), Phenyl (USP L11), CN (USP L10) </p> <p>Good peak shape for basic, acidic, and neutral compounds with high performance over a wide pH range (pH 2-9). eXtra Dense Bonding and double endcapping help give this column a long lifetime.</p> <p> Sample Applications Environmental: Herbicides/pesticides, steroids in water Food Safety: Food colors, aromatic flavorings, mycotoxins, epoxyphenolic-based coatings Pharmaceutical: Goldenseal and related alkaloids, antidepressants, triamcinolone </p> <p> Double Endcapped Temp limit: 60 °C Pore size: 80Å Surface area: 180 m²/g Particle sizes: 1.8, 3.5, 5, 7 µm </p> <p> pH: 2.0-9.0 (2.0-8.0 for CN) Carbon load: C18: 10%; C8: 7.6%; Phenyl: 7.2%; CN: 4.3% </p> | |
| Best all around – exceptional peak shape, efficiency, resolution, and lifetime | Best for low pH mobile phases – great for method development | High performance over a wide pH range | | |
| Pursuit/ Pursuit XRs | | Reliable Selectivity Alternatives | | |
| Lengths: 30-250 mm IDs: 2.0 mm, 3.0 mm, 4.6 mm; Prep | | Endcapped (except Pursuit XRs Si) Pore Size: 200Å (Pursuit), 100Å (Pursuit XRs) Surface area: 200 m ² /g (Pursuit); 440 m ² /g (Pursuit XRs) Particle Sizes: 3, 5, 10 µm | | |
| C18 (USP L1), C8 (USP L7), Diphenyl (USP L11), PFP (USP L43), PAH (USP L1), Si (USP L3) | | pH: 2.0-9.0 Carbon Load: Pursuit C18: 12.9%; Pursuit C8: 7.4%; Pursuit Diphenyl: 7.3%; PFP: 6.3%; XRs C18: 22%; XRs Ultra C18: 23.3%; XRs Ultra C8: 15%; XRs Ultra Diphenyl: 14.6% | | |
| Pursuit XRs offers higher loadability and Pursuit XRs Ultra is loaded for higher pressure stability. | | | | |



Endcapped: EC-C18, EC-C8, Phenyl-Hexyl, Bonus-RP (triple), EC-CN
Non-endcapped: SB-C18, SB-C8 and SB-Aq
 Temp Limit: 60 °C (EC-C18, EC-C8, Phenyl-Hexyl, Bonus-RP); 80 °C (SB-C8, SB-Aq); 90 °C (SB-C18)
 Pore Size: 120Å ; Surface Area: 130 m²/g; pH: 2.0-8.0 (EC-C18, EC-C8, Phenyl-Hexyl); 1.0-8.0 (SB-C18, SB-C8, SB-Aq); 2.0-9.0 (Bonus-RP); Carbon Load: 8% (EC-C18); 7% (EC-C8)

Poroshell 120 Bonus-RP (USP L60)
 Carbon Load - 7.5%

Poroshell 120 SB-AQ
 Carbon Load: Proprietary

POLAR Compounds

| ZORBAX Extend-C18 | ZORBAX Bonus-RP | SB-AQ | Polaris |
|---|--|--|--|
| <p>RRHD: 1.8 µm, stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 20-250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm, 1.0 mm</p> <p>C18 (USP L1)</p> <p><i>High efficiency and long life at high pH – up to pH 11.5. Improve retention, resolution and peak shape of basic compounds. High sensitivity for LC/MS separations of peptides. Unique bidendate bonding and double endcapping provides high pH stability.</i></p> <p>Sample Applications Environmental: EPA 8330 (explosives) Food Safety: Aflatoxins, mycotoxins Pharmaceutical: Antihistamines, xanthenes</p> <p>Double-Endcapped pH: 2.0-11.5 Temp limit: 60 °C Carbon load: 12.5% Pore Size: 80Å Surface area: 180 m²/g Particle sizes: 1.8, 3.5, 5 µm</p> | <p>RRHD: 1.8 µm, stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 30-250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm, 1.0 mm; Prep</p> <p>Bonus-RP (USP-L60)</p> <p><i>Polar-embedded to improve peak shapes; for basic compounds at low and mid pH.</i></p> <p>Sample Applications Environmental: Triazine pesticides Food Safety: Hydroxymethylfurfural Pharmaceutical: Antifungal medications, anorectics, ulcer medications</p> <p>Triple-Endcapped pH: 2.0-9.0 Temp limit: 60 °C Carbon load: 9.5% Pore size: 80Å Surface area: 180 m²/g Particle sizes: 1.8, 3.5, 5 µm</p> | <p>RRHD: 1.8 µm stable to 1200 bar; RRHT: 1.8 µm, 600 bar Lengths: 20 - 250 mm IDs: 4.6 mm, 3.0 mm, 2.1 mm; Prep</p> <p>ZORBAX SB-Aq</p> <p><i>Proprietary phase ideal for polar compounds and high aqueous conditions.</i></p> <p>Sample Applications Environmental: Pesticides in drinking water Food Safety: Pesticides in food Pharmaceutical: Water-soluble vitamins</p> <p>See ZORBAX StableBond for specification and structure.</p> | <p>Lengths: 30-250 mm, (available in 3 µm and 5 µm particles) IDs: 2.0 mm, 3.0 mm, 4.6 mm; Prep</p> <p>C18-A (USP L1), C8-A (USP L7), C18-Ether (USP L1), C8-Ether (USP L7), Amide-C18 (USP L60), NH2 (USP L8), Si-A (USP L3)</p> <p><i>Hydrogen-bond accepting and ether group endcapping provide alternate selectivities.</i></p> <p>Sample Applications Environmental: Triazine pesticides Food Safety: Hydroxymethylfurfural Pharmaceutical: Antifungal medications, anorectics, ulcer medications</p> <p>Endcapped Carbon load: Polaris Pore size: 180Å C18-A: 13.8%; Surface Area: Polaris C8-A: 7.4%; 200 m²/g Polaris C18-Ether: Particle Sizes: 12.1%; Polaris 3, 5, 10 µm C8-Ether: 7.1% pH: 2.0-9.0</p> |
| A good option for separations at high pH | Alternative selectivity to alkyl, phenyl, cyano phases | Exceptional lifetime at low pH – no endcapping | More options for Polar Compounds |

Information about biocolumns can be found in the section beginning on page 350

Looking for a HILIC column?

HILIC Plus is a HILIC column based on Eclipse Plus silica for excellent peak shapes

Poroshell 120 HILIC: 2.7 µm, stable to 600 bar

Non-bonded silica

Pore size: 95Å (120Å, Poroshell 120)
 Surface Area: 160 m²/g(130 m²/g for Poroshell 120)
 Particle Sizes: 1.8, 2.7, 3.5 µm
 pH: 0-8.0

RRHD: 1.8 µm, stable to 1200 bar
 Lengths: 50, 100, 150 mm
 IDs: 4.6 mm (3.5 µm only), 3.0 mm, 2.1 mm

High sensitivity for LC/MS applications and recommended for EPA 1694.

Method Development from pH 1-12

Start method development at low pH (pH 2-3)

With so many column choices available, how do you know where to start your method development? The recommended starting point for method development is using a buffered low pH mobile phase – around pH 2-3. Using a low pH mobile phase most often results in the best peak shape for basic compounds on silica-based columns. At low pH, the silanols on the silica are fully protonated so positively charged basic compounds do not interact strongly. The result is good peak shape. Many acidic compounds are non-charged, maximizing their retention at low pH. These observations are key advantages to method development at low pH.

For standard analytical work, start method development with acetonitrile as the mobile phase organic modifier and 20-50 mM phosphate buffer (pH 2-3) as the aqueous component for non-LC/MS applications. These conditions provide good pH control, necessary for the most reproducible analyses of ionizable compounds. For LC/MS applications formic acid or TFA are good mobile phase additives for low pH.

Optimize solvents and bonded phases at low pH

The initial method development steps may lead very quickly to a satisfactory separation. But if more optimization is needed, acetonitrile can be replaced with methanol or tetrahydrofuran and the separation re-optimized. This step may lead to a satisfactory solution, but if still more selectivity optimization is needed, the column bonded phase can be changed.

At low pH there are many bonded phase choices available for optimization. These include the Eclipse Plus phases as well as the Eclipse XDB family with C18, C8, Phenyl and CN. Alternate choices include five different StableBond bonded phases: SB-C18, SB-C8, SB-Phenyl, SB-CN, and SB-C3. For polar analytes, try Bonus-RP, SB-Aq or the Polaris family, including C18-A, C8-A, C18-Ether and Amide-C18 phases.

It may be necessary at low pH to improve the retention of acidic compounds. For these situations, lower the pH even further, down to pH 1-2, and use StableBond columns. These columns provide the greatest stability at very low pH and provide many selectivity options for achieving the highest resolution separations.

TIPS & TOOLS

LC Method Translator



Use this online tool to quickly factor in changes to column length, diameter, flow rate, and more – and to calculate method adjustments. This is particularly useful for gradient methods.

To download, go to www.agilent.com/chem/lcmethodtranslator



Choose Agilent ZORBAX Eclipse Plus or Poroshell 120 for method development at mid pH (pH 4-9)

There are some samples that may not be resolved at low pH or may have better solubility and stability at mid pH. The Eclipse Plus C18 and Poroshell 120 EC-C18 columns can be used at the mid pH range for method development. The Eclipse Plus column is stable to pH 9 so it is equally reliable at mid pH. These double endcapped columns have two key advantages – good peak shape at low and mid pH, as well as sufficient bonded phase density to protect the column from silica degradation from pH 6-9.

At mid pH, basic compounds (e.g., amines) may still have a positive charge and the silanols on the silica surface may have a negative charge. Therefore covering as many silanols as possible leads to the best peak shape at mid pH. This makes the Eclipse Plus C18 the best starting choice for a column at mid pH. Phosphate buffer is usually the first choice for mobile phase modifier at pH 7 because its buffer range is pH 6.1-8.1. A second choice for mid pH is acetate buffer since it buffers from pH 3.8-5.8 and its volatility makes it a good choice for LC/MS compatibility.

Choose Agilent ZORBAX Extend-C18 columns for method development at high pH (pH 9-12)

At low or mid pH, some separations of basic compounds may still not have enough retention or the desired selectivity. For these samples, high pH separations may be appropriate. Until recently, high pH separations on silica-based columns were avoided because of short column lifetimes, due to dissolution of the underlying silica gel. Special bonded phases such as the ZORBAX Extend-C18, can protect the silica from dissolution, so that a reasonable column lifetime can be achieved and the selectivity advantages of high pH can be explored.

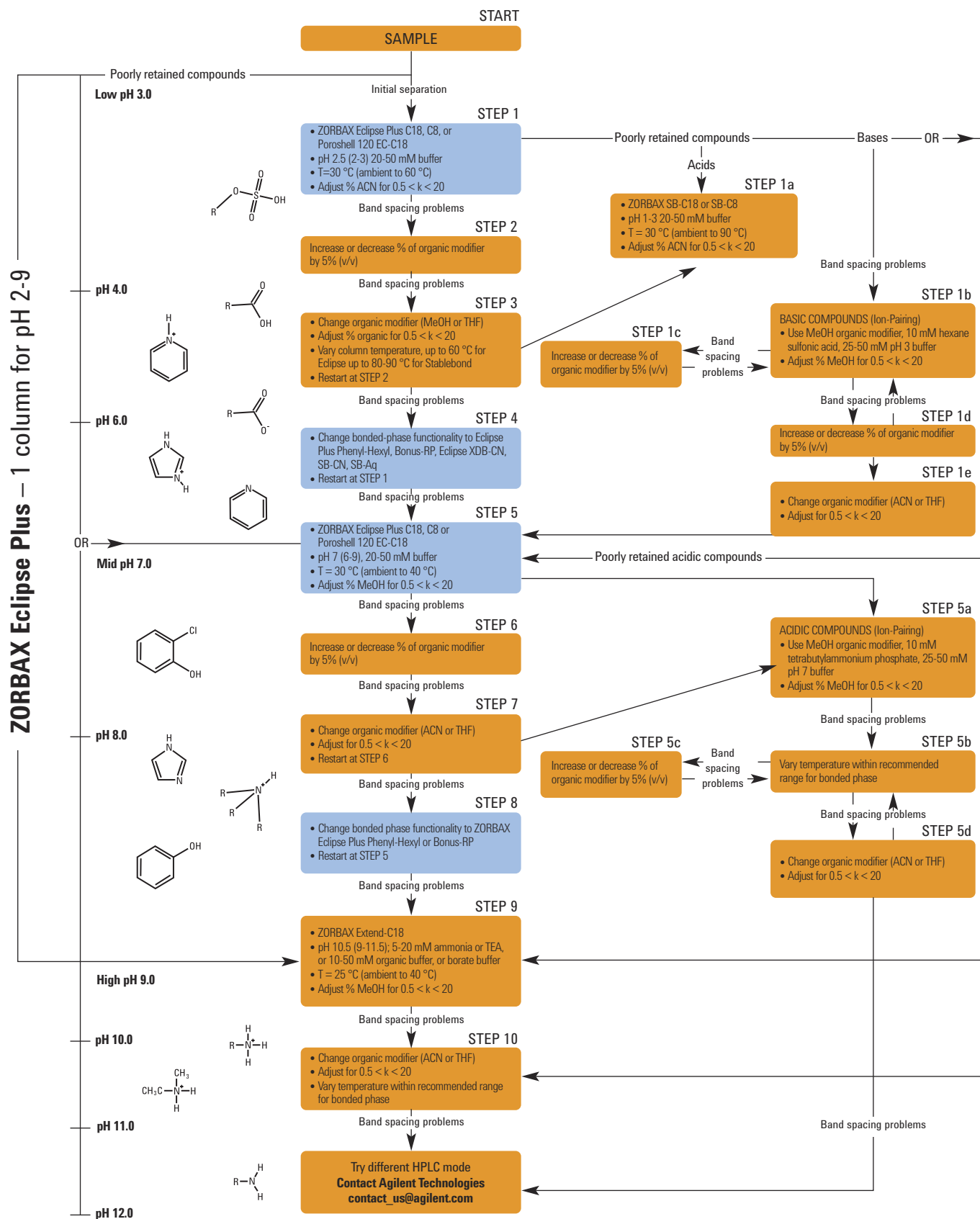
The mobile phase buffer choices at high pH with the Extend-C18 column are organic buffers like triethylamine and ammonium hydroxide. These buffers are best used with methanol as the organic modifier to extend the column lifetime at high pH. This is another good option to consider when working with high pH and PLRP-S columns, which are made from a polymeric material.

EASY, RELIABLE PH TESTING

Agilent offers a full line of pH meters and electrodes. Designed for chromatographers, these pH meters offer intuitive user design and exceptional ruggedness for your lab. Learn more at www.agilent.com/chem/AgilentpH



Method Development Guidelines from Low to High pH



Guard Columns

The Value of Guard Columns

Guard columns can help extend the life of your analytical column. Choosing to use guard columns can help reduce operating expenses, by reducing the frequency of analytical column replacement.

The guard column prevents damage caused by particulate matter and strongly adsorbed material. To maintain an adequate capacity for sample impurities, choose a guard column with an internal diameter similar to the column internal diameter. Ideally, the packing of the guard column should be the same as the analytical column so that the chromatography of the analytical column is not altered.

Guard columns contribute to the separation, so you should include a guard column in-line during method development.

Agilent UHPLC guards provide protection for high-efficiency Poroshell 120 and ZORBAX RRHD and RRHT columns, without reducing performance. Part numbers for all guard columns are incorporated into the different product family tables.

Judging when to replace a guard column can be difficult. As a rough guide, if plate number, pressure or resolution change by more than 10%, the guard column probably needs replacing. You will need to make a judgment call on how often to replace your guard columns based on your application type. It is always preferable to change the guard column sooner rather than later.



UHPLC Guard, 1200 bar, 821725-903

Cartridge Selection Guide

| Icon* | Type of Cartridge | Features | Benefits |
|-------|---|--|---|
| AC | Agilent HPLC Cartridge | Can reverse collets in the end fitting to add guard cartridges | Inexpensive Extends column lifetime Permits rapid column changes Can use 2, 3, 4 and 4.6 mm cartridges |
| | | Cartridges have a unique filter and sieve at each end | Helps prevent blockage |
| ZGC | ZORBAX Guard Cartridge: Standalone system | High efficiency, standalone, low-dead-volume cartridge | Seals up to 5000 psi (340 bar) or 3000 psi with a PEEK fitting |
| | | Polymeric cartridge designed for leak-tight seals against metal surfaces | No gaskets required More solvent-resistant than PEEK |
| | | Reusable fittings | Adapt for connections to 1/16 in LC fittings |
| RR | ZORBAX Rapid Resolution and Rapid Resolution HT Cartridge Columns: 3.5 µm and 1.8 µm packings, Standalone system | For high throughput LC/MS, LC/MS/MS and combinatorial separations | |
| | | Packed with Eclipse XDB for pH use from 2-9 Packed with StableBond for low pH use | For all analyte types Low bleed |
| | | Sold individually or as three-packs | |
| P | ZORBAX Semi-Preparative Guard HPLC Hardware Kit: Standalone system | Easy, low-dead-volume assembly | Seals up to 2000 psi (135 bar, 13.5 MPa) |
| | | Tubing (polyphenylene sulfone) designed for leak-tight seals against metal surfaces | No gaskets required |
| | | Reusable fittings | Adapt for connections to 1/16 in LC fittings |
| PI | ZORBAX and Agilent Prep Preparative Cartridge Column and Guard HPLC System: Standalone and integral hardware options | Easy, low-dead-volume assembly | Extends column lifetime |
| | | Reusable fittings | Permits rapid column changes |
| | | Hardware options for integral and external guards | Can use with 21.2 and 30 mm id columns |
| PL | Polymeric Analytical Column and Guard Cartridge | High efficiency | Inexpensive |
| | | Low dead volume | Rapid cartridge changes |
| | | Reusable holder | Extends column lifetime |
| CS | ChromSep Column Hardware: Complete systems and replacement cartridges | Easy, no-dead-volume assembly | Economical format No tools required Modular flexibility |
| | | | |
| | | | |
| MG | MetaGuard Column Hardware: Complete systems and replacement cartridges | Easy, no-dead-volume assembly | Economical format No tools required Modular flexibility |
| | | | |
| | | | |
| UG | Agilent Fast Guards for UHPLC | Requires no special hardware – connects right to the analytical column | Extends column lifetime without impacting performance |
| | | Available in matching phases for Poroshell 120, RRHD and RRHT columns | |

*Look for these icons to help you select the proper guard cartridges and columns.

Cartridge/Guard Cartridge Systems Compatibility Guide*

| Icon | Column Type | Guard Cartridge Holder | ID (mm) | Phases |
|---|---|---|--------------------------|---|
|  | Cartridge column cartridge holder 5021-1845 | Guard cartridge (internal system) cartridge holder 5021-1845 | 2.0 3.0 4.0 4.6 | LiChrospher Nucleosil Purospher Superspher ZORBAX |
|  | |  | | |
|  | Standard fitting | Column guard cartridge (standalone) cartridge holder 820999-901 | 2.1 3.0 4.6 | ZORBAX |
|  | |  | | |
|  | Rapid Resolution cartridge holder 820555-901 | No guard cartridge holder | 4.6 | ZORBAX |
|  | | | | |
|  | Semi-preparative column | Semi-prep guard cartridge (standalone) cartridge holder 840140-901 | 9.4 | ZORBAX |
|  | |  | | |

(Continued)

Cartridge/Guard Cartridge Systems Compatibility Guide*

| Icon | Column Type | Guard Cartridge Holder | ID (mm) | Phases |
|--|---|---|-------------------|--|
|  | PrepHT | Guard cartridge 820444-901 | 21.2 | ZORBAX Agilent Prep |
|  | |  | | |
|  | Analytical | Guard cartridge holder (PL1310-0016) and PLRP-S guard cartridges, 2/pk (PL1612-1801) | 3.0 | PLRP-S |
|  | |  | | |
|  | Single replacement column | No guard cartridge holder | 1.0 2.0 4.6 | Pursuit Pursuit XRs Polaris phases |
|  | | | | |
|  NEW! | Fast Guards for UHPLC: Single replacement guard column | No guard cartridge holder | 2.1 3.0 4.6 | Poroshell 120: EC-C18 EC-C8 SB-C18 Phenyl-Hexyl Sub-2 µm: Eclipse Plus C18 Eclipse XDB-C18 SB-C18 SB-C8 |
|  | | | | |

*Standalone guard cartridges fit all cartridge and standard fitting columns available from Agilent. All columns without icons are standard fitting columns.

Fast Columns for Reversed-Phase HPLC/UHPLC



The past decade has seen a steady increase in the efficiency and speed of chromatography, starting with smaller particle sizes, that enable higher resolution, and continuing with new technological advances in particle design – superficially porous particles – that enable these same resolution enhancements with lower backpressure.

Designed especially for high-productivity analysis (Fast LC), Agilent ZORBAX and Poroshell columns are the best first choice for any analysis, because they give you:

- The productivity you need to stay ahead of your competition: technological advances like sub-2 μm particles and superficially porous Poroshell 120 columns deliver increased speed and resolution.
- Flexibility and method scalability from lab to lab and around the world – for small molecule and biomolecule analyses.
- Unbeatable chromatographic performance: ZORBAX silica – the base silica used for all ZORBAX and Poroshell 120 columns – is ultra-pure, very strong, and highly uniform for ultimate reliability.
- The broadest range of phases and column configurations to suit your specific application needs.

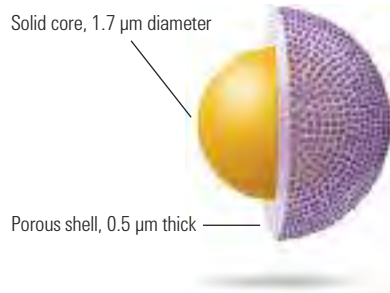
Recommendations for Fast LC Columns

| Your Lab Situation | Agilent Recommends | Rationale |
|---|--|---|
| You're using both UHPLC (1000+ bar) and HPLC instruments (e.g. Agilent 1290 Infinity LC and 1260 Infinity LC – 600 bar) | 1. Poroshell 120 2. ZORBAX RRHD 1.8 μm | Poroshell 120 is an easy column to use on both instrument types. ZORBAX RRHD will help you optimize the capabilities of the 1290 Infinity LC for UHPLC. |
| Only 400-600 bar HPLCs – Agilent 1200s, Agilent 1100s (400 bar) as well as the 1220 Infinity LC or 1260 Infinity LC (600 bar) | 1. Poroshell 120 2. ZORBAX Eclipse Plus 3.5 μm and 5 μm | With Poroshell 120, you can enhance the performance of older 400-bar instruments, and also get even better performance from newer 600 bar UHPLC instruments. For established methods that you can't transfer, the ZORBAX Eclipse Plus column will provide exceptional peak shape and performance. |
| A mix of UHPLC instruments (Agilent 1290 Infinity LC, other 1000+ bar instruments) and some HPLC instruments (e.g. 1200 LC) | 1. ZORBAX RRHD 1.8 μm 2. Poroshell 120 | ZORBAX RRHD can deliver optimum performance on all these instruments. Poroshell 120 can be used on the 600 bar instruments to optimize their performance. |

TIPS & TOOLS

Agilent CrossLab offers a range of PEEK capillaries and tubing. Used in combination with the right fittings, they provide an inert surface for the Fast LC of sensitive biomolecules. Turn to page 130.





Poroshell 120

- High efficiency and high resolution, with up to 50% less backpressure than sub-2 μm columns
- 2 μm frit, for rugged performance with dirty samples
- Compatible with 400 bar and 600 bar LCs, as well as UHPLC instruments
- An expanding family of bonded phases to align with the ZORBAX Family, for reliable scalability
- Excellent selectivity and peak shapes
- Designed for exceptional reproducibility

Agilent Poroshell 120 columns are a 2.7 μm particle with a 1.7 μm solid core and 0.5 μm porous outer layer. This small particle size provides high efficiency, similar to sub-2 μm columns, but with 40-50% less pressure. These high efficiency, high resolution columns can be used on any type of LC. The porous outer layer and solid core limit diffusion distance and improve separation speed while the narrow particle size distribution improves efficiency and resolution. The columns can support high pressure and multiple columns can be used for the highest resolution and efficiency possible. The same principles are used in Poroshell 300 columns, ideal for fast, high resolution separations of biomolecules.

Column Specifications

| Bonded Phase | Pore Size | Temp Limits | pH Range | Endcapped | Carbon Load | Surface Area |
|--------------|-----------|-------------|----------|-----------|-------------|-----------------------|
| EC-C18 | 120Å | 60 °C | 2.0-8.0 | Double | 10% | 130 m ² /g |
| EC-C8 | 120Å | 60 °C | 2.0-8.0 | Double | 5% | 130 m ² /g |
| Phenyl-Hexyl | 120Å | 60 °C | 2.0-8.0 | Double | 9% | 130 m ² /g |
| SB-C18 | 120Å | 90 °C | 1.0-8.0 | No | 8% | 130 m ² /g |
| SB-C8 | 120Å | 80 °C | 1.0-8.0 | No | 5.5% | 130 m ² /g |
| SB-Aq | 120Å | 80 °C | 1.0-8.0 | No | Proprietary | 130 m ² /g |
| Bonus-RP | 120Å | 60 °C | 2.0-9.0 | Triple | 9.5% | 130 m ² /g |
| EC-CN | 120Å | 60 °C | 2.0-8.0 | Double | 3.5% | 130 m ² /g |
| HILIC | 120Å | 60 °C | 0.0-8.0 | No | N/A | 130 m ² /g |

Specifications represent typical values only




TIPS & TOOLS



Watch the Poroshell 120 Method Transfer Video to learn how easy it is to transfer existing methods to Poroshell 120 at www.agilent.com/chem/poroshell120video



Poroshell 120
(Maximum pressure: 600 bar)

| Hardware | Description | Size (mm) | Particle Size (µm) | EC-C18 USP L1 | EC-C8 USP L7 | Phenyl-Hexyl USP L11 | SB-C18 USP L1 | SB-C8 USP L7 | SB-Aq | Bonus-RP USP L60 |
|---|----------------------------|-----------|--------------------|---------------|--------------|----------------------|---------------|--------------|------------|------------------|
| | Analytical | 4.6 x 150 | 2.7 | 693975-902 | 693975-906 | 693975-912 | 683975-902 | 683975-906 | 683975-914 | 693968-901 |
| | Analytical | 4.6 x 100 | 2.7 | 695975-902 | 695975-906 | 695975-912 | 685975-902 | 685975-906 | 685975-914 | 695968-901 |
| | Analytical | 4.6 x 75 | 2.7 | 697975-902 | 697975-906 | | 687975-902 | | | |
| | Analytical | 4.6 x 50 | 2.7 | 699975-902 | 699975-906 | 699975-912 | 689975-902 | 689975-906 | 689975-914 | 699968-901 |
| | Analytical | 4.6 x 30 | 2.7 | 691975-902 | 691975-906 | | 681975-902 | | | |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 2.7 | 820750-911 | 820750-913 | 820750-914 | 820750-912 | | | |
| | Solvent Saver | 3.0 x 150 | 2.7 | 693975-302 | 693975-306 | 693975-312 | 683975-302 | 683975-306 | 683975-314 | 693968-301 |
| | Solvent Saver | 3.0 x 100 | 2.7 | 695975-302 | 695975-306 | 695975-312 | 685975-302 | 685975-306 | 685975-314 | 695968-301 |
| | Solvent Saver | 3.0 x 75 | 2.7 | 697975-302 | 697975-306 | | 687975-302 | | | |
| | Solvent Saver | 3.0 x 50 | 2.7 | 699975-302 | 699975-306 | 699975-312 | 689975-302 | 689975-306 | 689975-314 | 699968-301 |
| | Solvent Saver | 3.0 x 30 | 2.7 | 691975-302 | 691975-306 | | 681975-302 | | | |
|  | UHPLC Guard, 600 bar, 3/pk | 3.0 x 5 | 2.7 | 823750-911 | 823750-913 | 823750-914 | 823750-912 | | | |
| | Narrow Bore | 2.1 x 150 | 2.7 | 693775-902 | 693775-906 | 693775-912 | 683775-902 | 683775-906 | 683775-914 | 693768-901 |
| | Narrow Bore | 2.1 x 100 | 2.7 | 695775-902 | 695775-906 | 695775-912 | 685775-902 | 685775-906 | 685775-914 | 695768-901 |
| | Narrow Bore | 2.1 x 75 | 2.7 | 697775-902 | 697775-906 | | 687775-902 | | | |
| | Narrow Bore | 2.1 x 50 | 2.7 | 699775-902 | 699775-906 | 699775-912 | 689775-902 | 689775-906 | 689775-914 | 699768-901 |
| | Narrow Bore | 2.1 x 30 | 2.7 | 691775-902 | 691775-906 | | 681775-902 | | | |
|  | UHPLC Guard, 600 bar, 3/pk | 2.1 x 5 | 2.7 | 821725-911 | 821725-913 | 821725-914 | 821725-912 | | | |



Poroshell 120 Columns

Environmental phenols on Poroshell 120

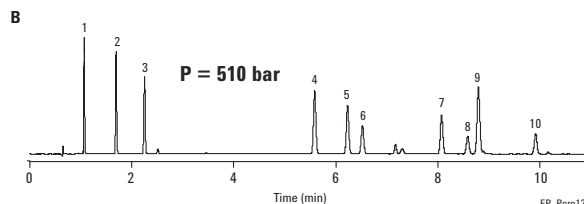
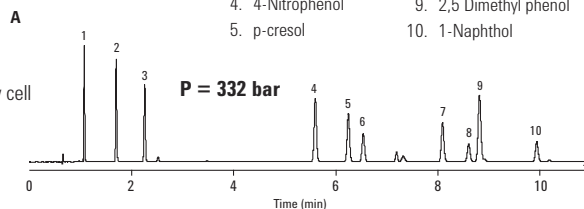
Column A: Poroshell 120 EC-C18
695975-902
4.6 x 100 mm, 2.7 µm

Column B: Eclipse Plus C18
959964-902
4.6 x 100 mm, 1.8 µm

Gradient: A: Water 0.1% formic acid
 B: Acetonitrile 0.1% formic acid
 2 mL/min
 Initial: 8% B
 10 min: 30% B

Detector: 275 nm, 2 mm flow cell
 Injection: 10 µL
 Agilent 1200 SL 40 °C
 No pulse damper
 No mixer 3 µL heater

- 1. Hydroquinone
- 2. Resorcinol
- 3. Catechol
- 4. 4-Nitrophenol
- 5. p-cresol
- 6. o-cresol
- 7. 2-Nitrophenol
- 8. 2,3 Dimethyl phenol
- 9. 2,5 Dimethyl phenol
- 10. 1-Naphthol



Poroshell 120 provides sub-2 µm like efficiency at lower pressure.

UHPLC efficiency at HPLC pressures

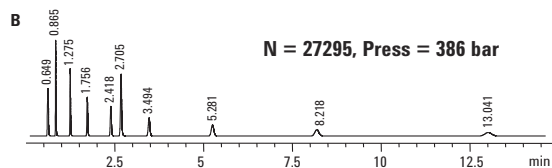
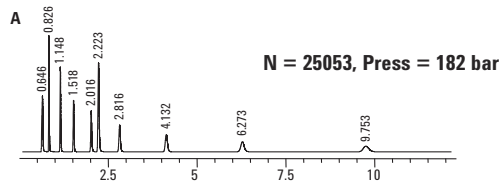
Column A: Poroshell 120 EC-C18
695975-302
3.0 x 100 mm, 2.7 µm

Column B: Eclipse Plus C18
959964-302
3.0 x 100 mm, 1.8 µm

Mobile Phase: 60% Acetonitrile:40% water
 Flow Rate: 0.58 mL/min
 Temperature: 26 °C
 Injection Volume: 4 µL

Detector: DAD Sig = 254,4 nm
 Ref = 360,100 nm

Sample: RRLLC checkout sample (P/N 5188-6529) spiked
 w/50 µL 2 mg/mL thiourea in water/acetonitrile (65:35)



For this sample of neutral alkylphenones, the Poroshell 120 column delivered >90% of the efficiency attained by the 1.8 µm column. Also note that the pressure on the Poroshell 120 column is about 50% of the pressure on the 1.8 µm column.

HPLC separation of 12 phenols performed in just 5 minutes – and under 400 bar – using an Agilent Poroshell 120 EC-C18 column

Column: Poroshell 120 EC-C18
699975-902
4.6 x 50 mm, 2.7 µm

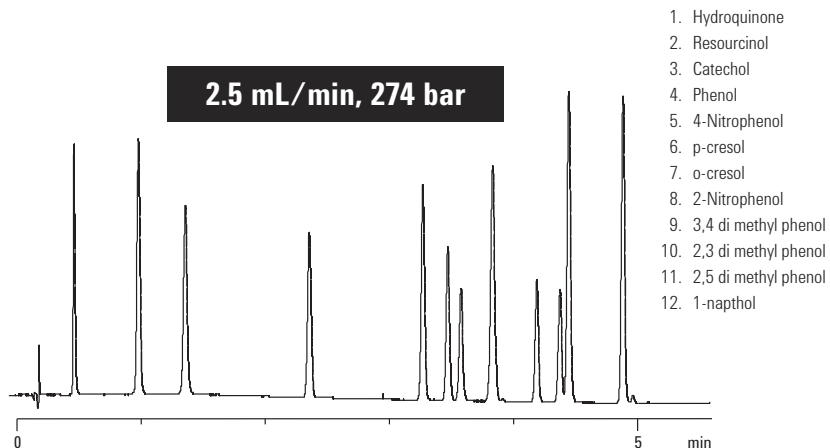
Mobile Phase: Solvent A: Water with 0.1% formic acid
Solvent B: Acetonitrile

Gradient: 5% B in 0.8 min
60% B in 6.8 min
1200 SL controlled temperature
at 25 °C 2 mm flow cell

Detector: DAD, 270 nm

Importantly, the flow rate was kept to 2.5 mL/min, reducing the amount of mobile phase consumed per analysis to about 15 mL.

Agilent Poroshell 120 gives high efficiency, high resolution separations quickly at HPLC pressures.



12 phenols analyzed using a longer (4.6 x 100 mm) Agilent Poroshell 120 EC-C18 column

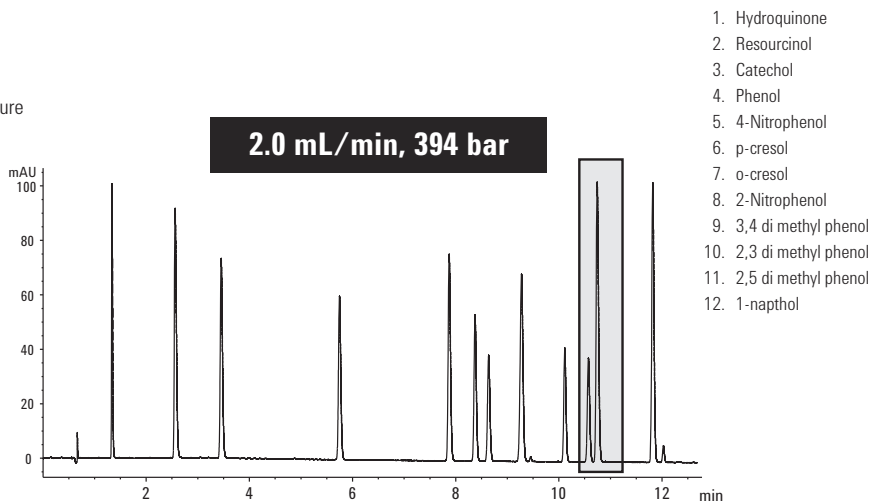
Column: Poroshell 120 EC-C18
695975-902
4.6 x 100 mm, 2.7 µm

Mobile Phase: Solvent A: Water with 0.1% formic acid
Solvent B: Acetonitrile

Gradient: 5% B in 2 min
60% B in 17 min
1200 RRLLC SL controlled temperature
at 25 °C 2 mm flow cell

Detector: DAD, 270 nm

By reducing the flow rate to 2.0 mL/min, the pressure was kept to less than 400 bar improving the separation of a late-eluting peak pair (highlighted) with only a minor increase in analysis time. This separation can be achieved using HPLC or, if a higher flow rate is desired, a UHPLC.



**Poroshell 120 EC-C18
for fast UHPLC separations**

Column: Poroshell 120 EC-C18
695975-302
3.0 x 100 mm, 2.7 µm

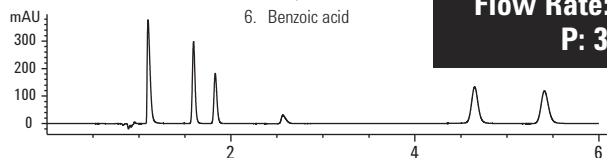
Mobile Phase: 65% A: 0.2% Formic acid
35% B: Methanol
Isocratic

Flow Rate: Varies

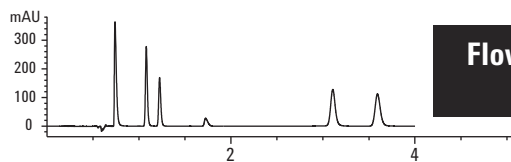
Temperature: 26 °C

Detector: Sig = 220, 4 nm, Ref = Off

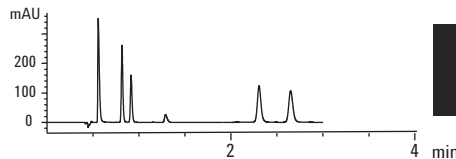
1. Saccharin
2. Caffeine
3. P-hydroxybenzoic acid
4. Aspartame
5. Dehydroacetic acid
6. Benzoic acid



**Flow Rate: 0.5 mL/min,
P: 300 bar**



**Flow Rate: 0.75 mL/min,
P: 433 bar**



**Flow Rate: 1.0 mL/min,
P: 559 bar**

This example shows a fast separation using a mobile phase that generates higher pressures. In the top chromatogram, a 3.0 mm id column was used, with a flow rate of 0.5 mL/min and a pressure below 400 bar – making this a typical LC separation.

Although the top separation was fast (just under 6 minutes), the middle and bottom chromatograms show that you can reduce run times to under 3 minutes by increasing the flow rate. These faster analyses will take your pressure to 400-560 bar; look to the Agilent 1200 Infinity Series flexible upgrade options to help you take advantage of UHPLC capabilities.

More viscous solvents like methanol can be used at HPLC or UHPLC pressures.



TIPS & TOOLS

For a full listing of our LC capillary portfolio, turn to pages 16-46.

ZORBAX Rapid Resolution High Definition (RRHD) 1.8 μm

- High pressure (1200 bar) columns for optimum results with the 1290 Infinity LC or other UHPLC instruments
- 1.8 μm particles deliver maximum resolution for the most defined separations
- Available in 12 ZORBAX phases, including Eclipse Plus C18 for superior peak shape, ZORBAX StableBond C18 for low pH stability, Bonus-RP, Eclipse PAH, Eclipse Plus Phenyl-Hexyl and Extend-C18
- Also available in HILIC Plus
- Achieve the same selectivity on 3.5 and 5 μm ZORBAX columns with the same bonded phase for compatibility with any LC

ZORBAX Rapid Resolution High Definition (RRHD) columns are an expansion of the ZORBAX 1.8 μm particle column line. The new RRHD columns use improved packing processes to achieve stability up to 1200 bar for use with the Agilent 1290 Infinity LC or other UHPLC instruments. RRHD 1.8 μm columns are available in 50, 100 and 150 mm lengths for fast or high resolution – truly high definition – separations of your most complex samples.

ZORBAX RRHD Column Specifications

| Bonded Phase | Pore Size | Surface Area | pH Range | Endcapped | Temp Limit |
|----------------------------------|-----------|-----------------------|------------|-----------|------------|
| ZORBAX Eclipse Plus C18 | 95Å | 160 m ² /g | 2.0-9.0 | Double | 60 °C |
| ZORBAX Eclipse Plus C8 | 95Å | 160 m ² /g | 2.0-9.0 | Double | 60 °C |
| ZORBAX Eclipse Plus Phenyl-Hexyl | 95Å | 160 m ² /g | 2.0-9.0 | Double | 60 °C |
| ZORBAX Eclipse XDB-C18 | 80Å | 180 m ² /g | 2.0-9.0 | Double | 60 °C |
| ZORBAX Extend-C18 | 80Å | 180 m ² /g | 2.0-11.5** | Double | 60 °C |
| ZORBAX Bonus RP | 80Å | 180 m ² /g | 2.0-9.0 | Triple | 60 °C |
| ZORBAX StableBond SB-C18 | 80Å | 180 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond SB-C8 | 80Å | 180 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond SB-Phenyl | 80Å | 180 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond SB-CN | 80Å | 180 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond SB-Aq | 80Å | 180 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX Eclipse PAH | 95Å | 160 m ² /g | 2.0-8.0 | No | 60 °C |
| ZORBAX HILIC Plus | 95Å | 160 m ² /g | 0.0-8.0 | No | 60 °C |
| ZORBAX StableBond 300SB-C8 | 300Å | 45 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond 300SB-C18 | 300Å | 45 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX StableBond 300SB-C3 | 300Å | 45 m ² /g | 1.0-8.0* | No | 80 °C |
| ZORBAX 300-Diphenyl | 300Å | 45 m ² /g | 1.0-8.0* | No | 80 °C |

* StableBond columns are designed for optimal use at low pH. At pH >6, highest column stability for all silica based columns is obtained by operating at temperatures <40 °C and using lower buffer concentrations – 10-20 mM or organic buffers. 300SB-C18 may be used up to 90 °C. For pH 6-8, select the Eclipse Plus C18 column.

** Temperature limits are 60 °C up to pH 8, 40 °C from pH 8-11.5.



ZORBAX Rapid Resolution High Definition (RRHD) 1.8 μm Columns

Separation of licorice root on RRHD columns

Column A: ZORBAX RRHD SB-C18
857700-902
2.1 x 50 mm, 1.8 μm

Column B: 858700-902
2.1 x 100 mm, 1.8 μm

Column C: 859700-902
2.1 x 150 mm, 1.8 μm

Mobile Phase: 10-100% B/30 min
A: 0.1% Formic acid (fa)
B: Acetonitrile with 0.1% fa

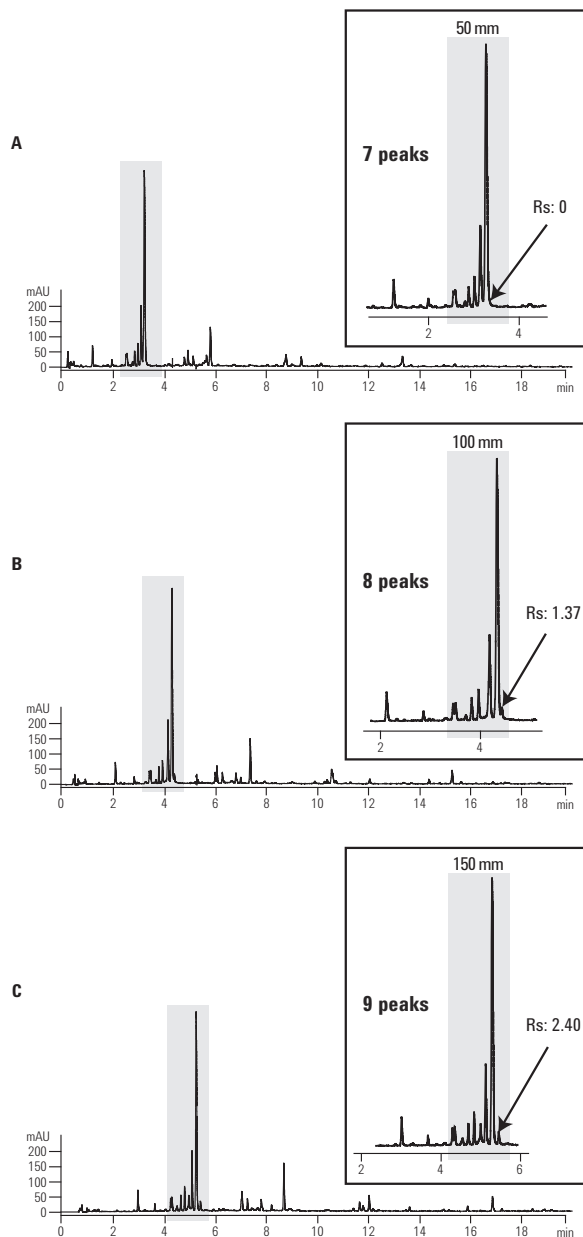
Flow Rate: F = 0.4 mL/min

Gradient: 30 minute gradient on each length

Temperature: Ambient

Detector: 280 nm UV

Instrument: 1290 Infinity LC



Sub 1 minute separations with RRHD columns

Column: ZORBAX RRHD SB-C18
857700-902
2.1 x 50 mm, 1.8 µm

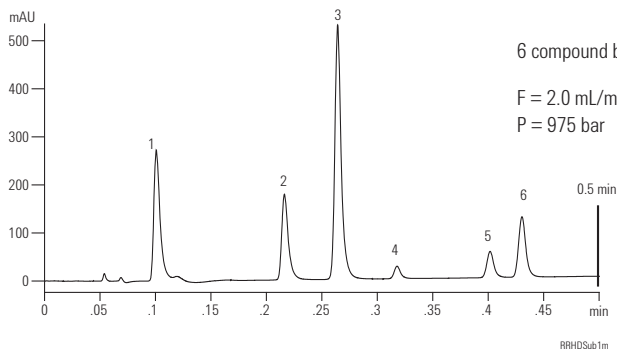
Gradient: H₂O (0.05% trifluoroacetic acid)/10-40% ACN/1 min

Temperature: 60 °C

Injection Volume: 0.5 µL x 100 ppm each

Detector: UV, 275 nm

Data Rate: 160 Hz



1. 2-methyl-4-isothiazolin-3-one
2. 5-chloro-2-methyl-4-isothiazolin-3-one
3. Carbendazim
4. Benzisothiazol-3(2H)-one
5. 2-phenoxyethanol
6. Methylparaben

New levels of sensitivity and resolution

Column A: ZORBAX RRHD Eclipse Plus C18
959758-302
3.0 x 100 mm, 1.8 µm

Ion Source: 360 °C, 12 L/min, 50 psi, 3500 V.

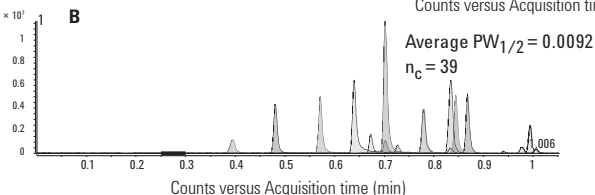
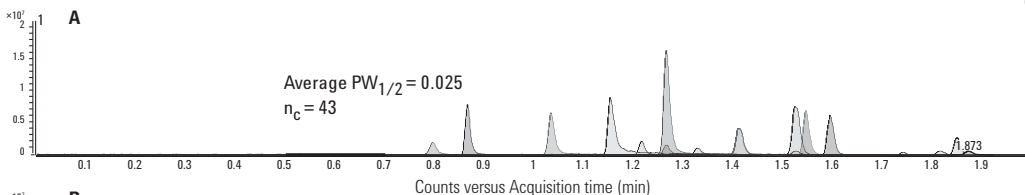
Temperature: Ambient, no temperature control (approx 24 °C)

Column B: ZORBAX RRHD Eclipse Plus C18
959757-302
3.0 x 50 mm, 1.8 µm

Mobile Phase: A: 0.2% Formic acid in water
B: ACN

Detector: Agilent 1290 Infinity LC with 6410 MS/MS

Sample: 20 µL (10 µL for 50 mm column) of 1 µg/mL standard



Compounds (in elution order) with identifying mass:

1. Acetaminophen, m/z 109
2. Caffeine, m/z 194
3. 2-acetamidophenol, m/z 109
4. Acetanilide, m/z 135
5. Acetylsalicylic acid, m/z 120
6. Phenacetin, m/z 179
7. Salicylic acid, m/z 120
8. Sulindac, m/z 356
9. Piroxicam, m/z 332
10. Tolmetin, m/z 257
11. Ketoprofen, m/z 254
12. Diflunisal, m/z 332
13. Diclofenac, m/z 235
14. Celecoxib, m/z 351
15. Ibuprofen, m/z 160

By transferring your method to an Agilent RRHD column, you can enhance resolution for difficult analyses – allowing you to save time by using shorter columns without compromising performance.

The RRHD column saves analytical time without sacrificing performance.

Selectivity comparison: C18 columns

Column A: ZORBAX RRHD Eclipse Plus C18
959758-902
2.1 x 100 mm, 1.8 μm

Column B: ZORBAX RRHD Eclipse XDB-C18
981758-902
2.1 x 100 mm, 1.8 μm

Column C: ZORBAX RRHD Extend-C18
758700-902
2.1 x 100 mm, 1.8 μm

Column D: ZORBAX RRHD SB-C18
858700-902
2.1 x 100 mm, 1.8 μm

Mobile Phase: A: 0.1% HCOOH in H₂O (30%)
B: 0.1% HCOOH in CH₃CN (70%)

Flow Rate: 1 mL/min, isocratic

Temperature: 30 °C

Sample: 1 μL

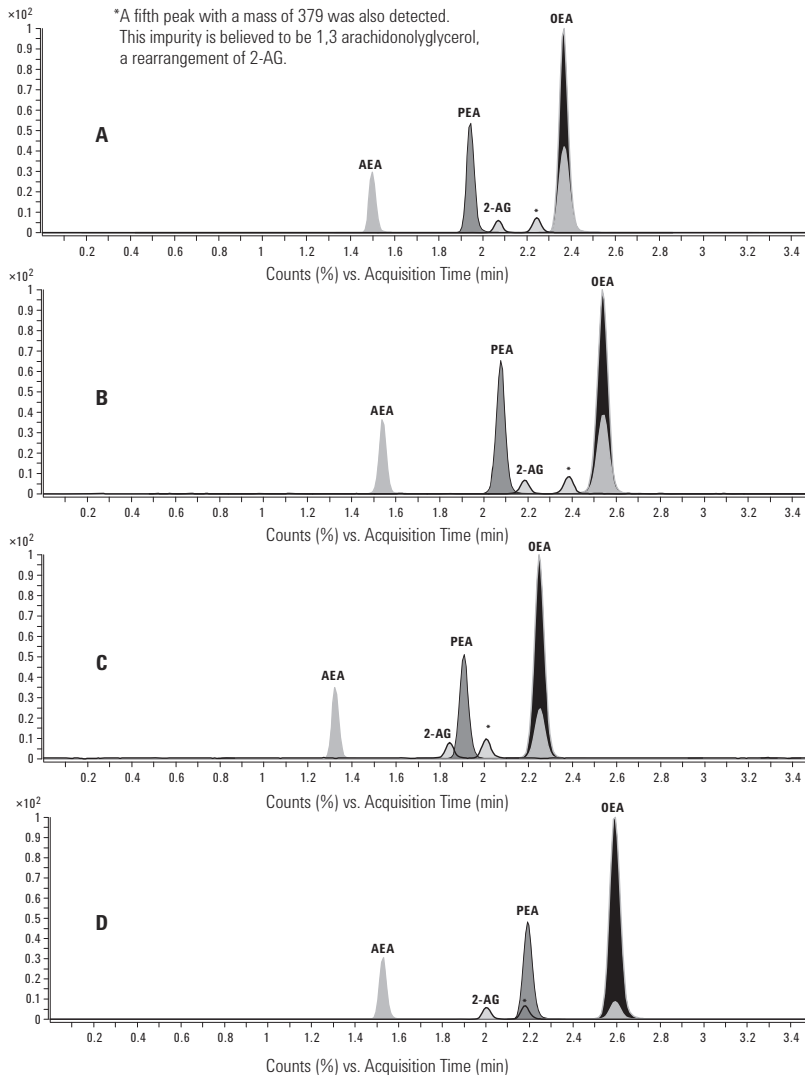
MS2 Scan: 290-390, ESI positive mode,
scan time: 500, fragmentor:
135 V; drying gas: 12 L/min, 325 °C;
nebulizer pressure: 35 psig;
capillary voltage: 3000

Selectivity differences are due to subtle, yet important variations, such as bonding type, endcapping, or the amount and type of silanols on the silica. Other factors that influence selectivity include mobile phase composition, temperature, and pH. (Note that these factors are identical in the following example.)

Here we compared the selectivity of four Agilent ZORBAX RRHD C18 columns using an endocannabinoid analysis method.

1. Anandamine (AEA), m/z 348
2. Palmitoylethanolamide (PEA), m/z PEA
3. 2-arachinoylglycerol (2-AG), m/z 379*
4. Oleoylethanolamide (OEA), m/z 326

*A fifth peak with a mass of 379 was also detected. This impurity is believed to be 1,3 arachidonoylglycerol, a rearrangement of 2-AG.



TIPS & TOOLS

For full details, see Agilent publication 5990-7166EN, www.agilent.com/chem/library

**Selectivity comparison:
Phenyl and other columns**

Column A: ZORBAX RRHD Eclipse Plus C18
959758-902
2.1 x 100 mm, 1.8 μ m

Column B: ZORBAX RRHD Eclipse Plus Phenyl-Hexyl
959758-912
2.1 x 100 mm, 1.8 μ m

Column C: ZORBAX RRHD SB-Aq
858700-914
2.1 x 100 mm, 1.8 μ m

Column D: ZORBAX RRHD SB-Phenyl
858700-912
2.1 x 100 mm, 1.8 μ m

Mobile Phase: A: 5% HCOOH in H₂O
B: CH₃CN

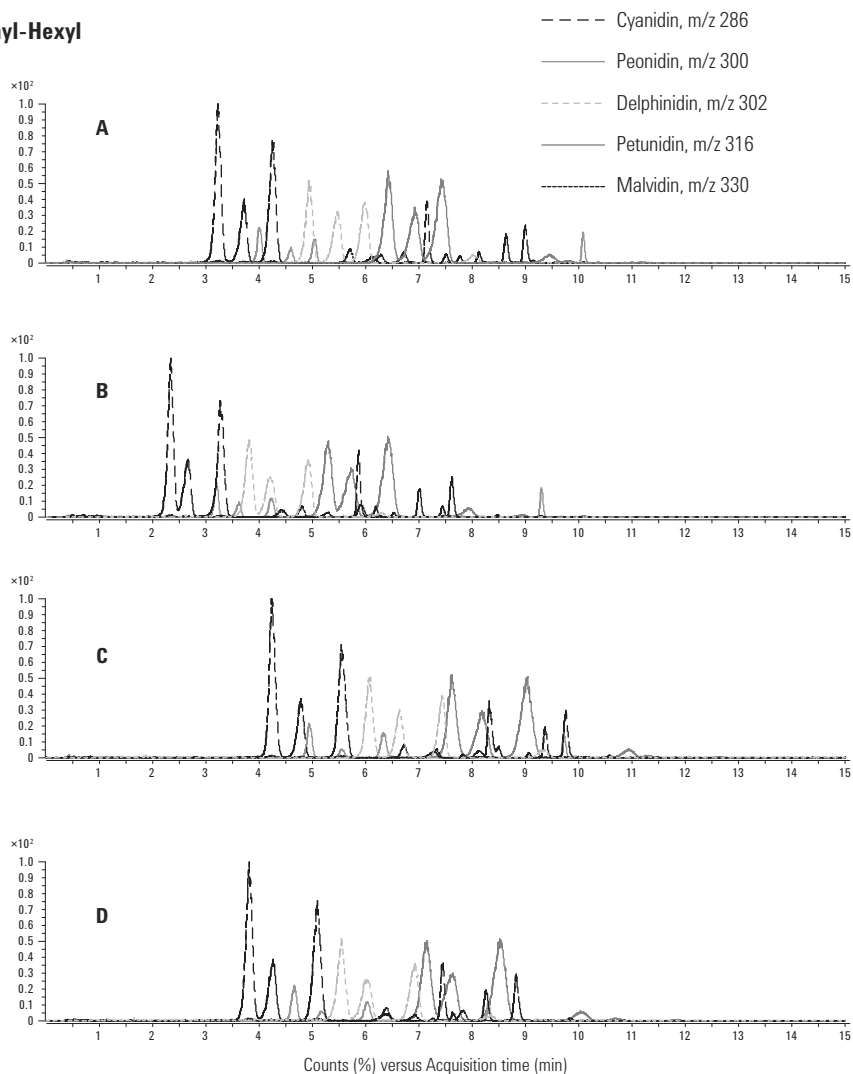
Flow Rate: 0.65 mL/min

Gradient: 10-50% B in 15 min

Temperature: 30 °C

MS2 Scan: ESI +, 200-1000

Extracted ion chromatograms from LC/MS scan data of
blueberry anthocyanins.


TIPS & TOOLS

For full details, see Agilent publication 5990-8470EN, www.agilent.com/chem/library



Rapid Resolution High Definition (RRHD) Columns for High Pressure Use (Maximum Pressure: 1200 bar)

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse Plus C18 USP L1 | Eclipse Plus C8 USP L7 | Eclipse Plus Phenyl-Hexyl USP L11 | Eclipse PAH USP L1 |
|----------|------------------------------|-----------|--------------------|-------------------------|------------------------|-----------------------------------|--------------------|
| | Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 959759-302 | 959759-306 | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 959758-302 | 959758-306 | 959758-312 | 959758-318 |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 959757-302 | 959757-306 | 959757-312 | 959757-318 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-901 | | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 959759-902 | 959759-906 | 959759-912 | 959763-918 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 959758-902 | 959758-906 | 959758-912 | 959764-918 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 959757-902 | 959757-906 | 959757-912 | 959741-918 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-901 | | | |

Rapid Resolution High Definition (RRHD) Columns for High Pressure Use (Maximum Pressure: 1200 bar)

| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-CN USP L10 | SB-Phenyl USP L11 | SB-Aq |
|----------|------------------------------|-----------|--------------------|---------------|--------------|---------------|-------------------|------------|
| | Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 859700-302 | 859700-306 | | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 858700-302 | 858700-306 | 858700-305 | 858700-905 | 858700-314 |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 857700-302 | 857700-306 | 857700-305 | 857700-312 | 857700-314 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-902 | 823750-904 | | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 859700-902 | 859700-906 | 859700-905 | 859700-912 | 859700-914 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 858700-902 | 858700-906 | 858700-905 | 858700-912 | 858700-914 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 857700-902 | 857700-906 | 857700-905 | 857700-912 | 857700-914 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-902 | 821725-904 | | | |

Rapid Resolution High Definition (RRHD) Columns for High Pressure Use (Maximum Pressure: 1200 bar)

| Hardware | Description | Size (mm) | Particle Size (µm) | Extend-C18 USP L1 | Eclipse XDB-C18 USP L1 | Bonus-RP USP L60 | HILIC Plus |
|----------|------------------------------|-----------|--------------------|-------------------|------------------------|------------------|------------|
| | Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 759700-302 | 981759-302 | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 758700-302 | 981758-302 | | 959758-301 |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 757700-302 | 981757-302 | | 959757-301 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | | 823750-903 | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 759700-902 | 981759-902 | 859768-901 | 959759-901 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 758700-902 | 981758-902 | 858768-901 | 959758-901 |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 757700-902 | 981757-902 | 857768-901 | 959757-901 |
| UG | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | | 821725-903 | | |

ZORBAX RRHD columns are also available in 300Å configurations for biomolecules. Turn to page 364.

ZORBAX RRHD 300-HILIC will be available in 2013.

ZORBAX Rapid Resolution High Throughput (RRHT) 1.8 μm

- High pressure (600 bar) columns for ultra high speed or maximum resolution analyses with Rapid Resolution HT columns packed with totally porous, 1.8 μm packings
- Carefully engineered particles deliver maximum resolution at 25% less pressure than other sub-2 μm materials
- Reduce analysis time by up to 95%
- Develop HPLC methods more quickly
- Securely transfer conventional methods with over 140 RRHT column choices
- Analyze complex samples on shorter columns faster and maximize peak capacity
- Matching selectivity in 3.5, 5 and 7 μm particle sizes for complete method scalability
- Short (50 mm long and less) column can be used on some conventional LCs

Agilent ZORBAX Rapid Resolution HT (1.8 μm) columns use a totally porous, 1.8 μm particle to provide maximum resolution in fast, ultra-fast and high resolution analyses. You can reduce analysis time by up to 95% in comparison to 250 mm length columns. With more than 140 RRHT column choices, including the high performance ZORBAX Eclipse Plus and many other ZORBAX column choices (Eclipse XDB, StableBond, Extend, Bonus-RP), methods can be developed quickly or securely transferred to a smaller particle size column with no loss in resolution. The small particle size provides double the efficiency of a 3.5 μm column in the same column length, providing the highest efficiency and resolution possible. This permits the analysis of complex samples on shorter columns with the highest resolution and peak capacity. The 1.8 μm Rapid Resolution HT columns take high-speed, high-resolution HPLC to a new level.

The 600 bar columns can be used with the Agilent 1260 Infinity LC System up to this high pressure limit. In addition, the shorter columns can be used on many other LC's, including the Agilent 1200 Rapid Resolution LC System.



ZORBAX Rapid Resolution High Throughput (RRHT) 1.8 μm Columns

Rapid Resolution HT (RRHT) provides double the efficiency of Rapid Resolution columns

Column A: ZORBAX Rapid Resolution SB-C18
835975-902
4.6 x 50 mm, 3.5 µm

Column B: ZORBAX RRHT SB-C18
827975-902
4.6 x 50 mm, 1.8 µm

Mobile Phase: 25% Water, 75% MeOH

Flow Rate: 1.5 mL/min

Temperature: Ambient

Detector: UV, 254 nm

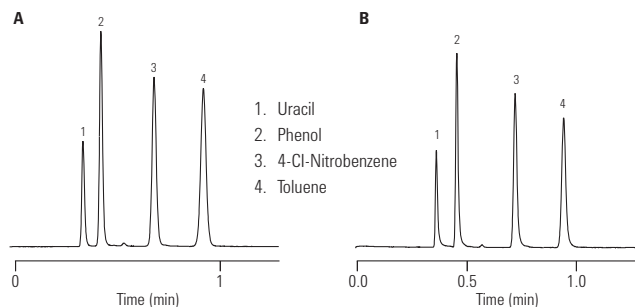
This figure shows that Rapid Resolution HT columns can provide double the efficiency of a 3.5 µm column in the same column length. This high efficiency can be used for very high-resolution, high throughput analyses.

Plates (N)

- 1. 3476
- 2. 4585
- 3. 5673
- 4. 6180

Plates (N)

- 1. 6560
- 2. 8958
- 3. 11508
- 4. 12266



LCRR002

Increase peak capacity with RRHT columns

Column A: Eclipse RRHT XDB-C8
928700-906
2.1 x 100 mm, 1.8 µm

Column B: Eclipse XDB-C18
961753-902
2.1 x 100 mm, 3.5 µm

Mobile Phase: A: H₂O
B: ACN

Peak capacity: A: 461
B: 343

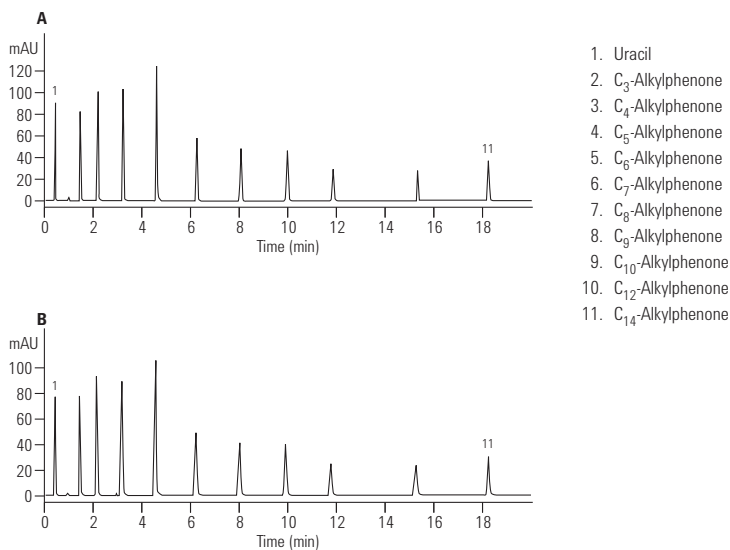
Flow Rate: 0.5 mL/min

Gradient: 0.0 min 50% B
20.0 min 100% B

Temperature: 40 °C

Detector: UV, 254 nm

Sample: Alkylphenones



LCRR004

Reduce analysis time dramatically with Rapid Resolution HT columns

Column A: Eclipse XDB-C18
990967-902
4.6 x 250 mm, 5 µm

Column B: Eclipse XDB-C18
963967-902
4.6 x 150 mm, 3.5 µm

Column C: Eclipse XDB-C18
966967-902
4.6 x 75 mm, 3.5 µm

Column D: ZORBAX Eclipse XDB-C18
935967-902
4.6 x 50 mm, 3.5 µm

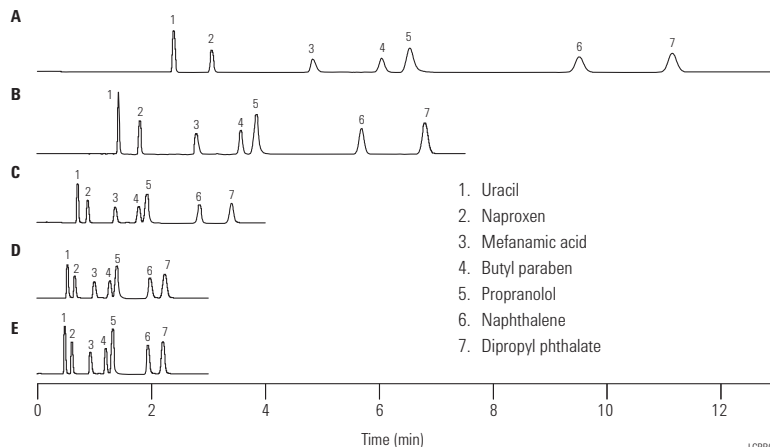
Column E: Eclipse RRHT XDB-C18
925975-902
4.6 x 50 mm, 1.8 µm

Mobile Phase: 73% MeOH:27% 20 mM Phosphate Buffer, pH 7.0

Flow Rate: 1 mL/min

Temperature: Ambient

Detector: UV, 254 nm



LCRR003

This figure shows the dramatic reduction in analysis time made possible by using Rapid Resolution HT columns. Chromatogram A shows a separation that takes 11.5 minutes on a 25 cm, 5 µm column. Rapid Resolution (3.5 µm) columns, shown in chromatogram B and C, reduce analysis time substantially, but with a slight compromise in resolution. The Rapid Resolution HT column reduces analysis time to 2.2 minutes, an 80% reduction, while still maintaining baseline resolution.

Long lifetime of RRHT columns at elevated temperatures

Column: ZORBAX RRHT SB-C18
827700-902
2.1 x 50 mm, 1.8 µm

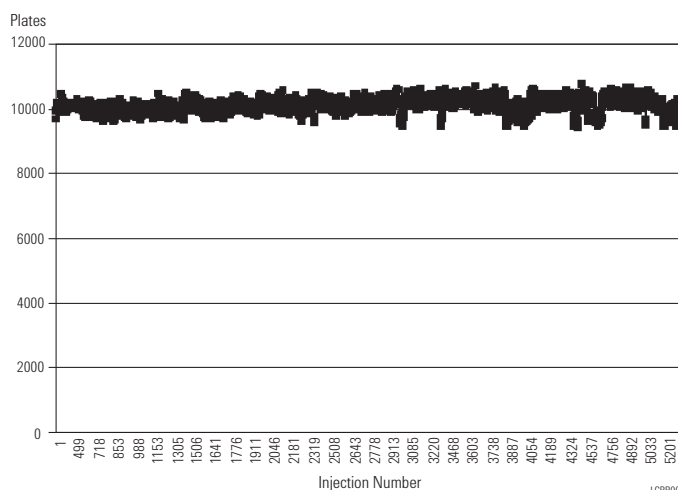
Mobile Phase: A: 60% H₂O
B: 40% ACN

Flow Rate: 1 mL/min

Temperature: 80 °C

Detector: UV, 254 nm

Sample: QC test mix



LCRR005

Comparison of efficiencies – Rapid Resolution High Definition (RRHD)/RRHT (1.8 µm) and Rapid Resolution (3.5 µm) columns

| Column Length (mm) | Poroshell 120 | Resolving Power N (3.5 µm)* | Resolving Power N (1.8 µm) |
|------------------------------|---------------|-----------------------------|----------------------------|
| High Resolution | | | |
| 150 | 32,000 | 21,000 | 32,500 |
| 100 | 21,000 | 14,000 | 24,000 |
| 75 | 16,000 | 10,500 | 17,000** |
| Ultra Fast | | | |
| 50 | 11,000 | 7,000 | 12,000 |
| 30 | 5,500 | 4,200 | 6,000 |
| 20 | — | — | 3,500 |
| 15 | — | 2,100 | 2,500 |
| Resolution $\propto N^{1/2}$ | | | |

*5 µm HPLC columns of the same length have 40% fewer plates (N-value); 4.6 mm id

**Available as a custom column

Data is based on 4.6 mm id columns

TIPS & TOOLS






The LC Rack from Agilent can help you reduce capillary lengths and minimize extra-column volume. It also protects your instrument and enables you to switch out modules as needed.






Agilent rack for LC systems, 5001-3726

Rapid Resolution HT Columns for High Pressure Use (Maximum Pressure: 600 bar, 9000 psi)

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse Plus C18 USP L1 | Eclipse Plus C8 USP L7 | Eclipse Plus Phenyl-Hexyl USP L11 | Eclipse PAH USP L1 | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 | Eclipse Extend-C18 USP L1 |
|---|------------------------------|-----------|--------------------|-------------------------|------------------------|-----------------------------------|--------------------|------------------------|-----------------------|---------------------------|
| | Rapid Resolution HT, 600 bar | 4.6 x 150 | 1.8 | 959994-902 | | | | | | |
| | Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 959964-902 | 959964-906 | 959964-912 | 959964-918 | 928975-902 | | 728975-902 |
| | Rapid Resolution HT, 600 bar | 4.6 x 75 | 1.8 | 959951-902 | | | | | | |
| | Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 959941-902 | 959941-906 | 959941-912 | 959941-918 | 927975-902 | 927975-906 | 727975-902 |
| | Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 959931-902 | 959931-906 | 959931-912 | 959931-918 | 924975-902 | 924975-906 | 724975-902 |
| | Rapid Resolution HT, 600 bar | 4.6 x 20 | 1.8 | | | | | 926975-902 | 926975-906 | 726975-902 |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-901 | | | | 820750-903 | | |
| | Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 959964-302 | 959964-306 | 959964-312 | | 928975-302 | | 728975-302 |
| | Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 959941-302 | 959941-306 | 959941-312 | | 927975-302 | 927975-306 | 727975-302 |
| | Solvent Saver HT, 600 bar | 3.0 x 30 | 1.8 | | | | | 924975-302 | 924975-306 | 724975-302 |
| | Solvent Saver HT, 600 bar | 3.0 x 20 | 1.8 | | | | | 926975-302 | 926975-306 | 726975-302 |
|  | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-901 | | | | 823750-903 | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 150 | 1.8 | 959794-902 | | | | | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 959764-902 | 959764-906 | 959764-912 | 959764-918 | 928700-902 | 928700-906 | 728700-902 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 959741-902 | 959741-906 | 959741-912 | 959741-918 | 927700-902 | 927700-906 | 727700-902 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 959731-902 | 959731-906 | 959731-912 | | 924700-902 | 924700-906 | 724700-902 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 20 | 1.8 | | | | | 926700-902 | 926700-906 | 726700-902 |
|  | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-901 | | | | 821725-903 | | |

Rapid Resolution HT Columns for High Pressure Use (Maximum Pressure: 600 bar, 9000 psi)

| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-Phenyl USP L11 | SB-CN USP L10 | SB-Aq | Rx-SIL USP L3 | Bonus-RP USP L60 |
|---|------------------------------|-----------|--------------------|---------------|--------------|-------------------|---------------|------------|---------------|------------------|
| | Rapid Resolution HT, 600 bar | 4.6 x 150 | 1.8 | 829975-902 | 829975-906 | 829975-912 | 829975-905 | 829975-914 | | |
| | Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 828975-902 | 828975-906 | 828975-912 | 828975-905 | 828975-914 | 828975-901 | 828668-901 |
| | Rapid Resolution HT, 600 bar | 4.6 x 75 | 1.8 | | 830975-906 | | | | | 830668-901 |
| | Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 827975-902 | 827975-906 | 827975-912 | 827975-905 | 827975-914 | 827975-901 | 827668-901 |
| | Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 824975-902 | 824975-906 | 824975-912 | 824975-905 | 824975-914 | | |
| | Rapid Resolution HT, 600 bar | 4.6 x 20 | 1.8 | 826975-902 | 826975-906 | | | | | |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-902 | 820750-904 | | | | | |
| | Solvent Saver HT, 600 bar | 3.0 x 150 | 1.8 | 829975-302 | 829975-306 | 829975-312 | 829975-305 | | | |
| | Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 828975-302 | 828975-306 | 828975-312 | 828975-305 | 828975-314 | 828975-301 | 828668-301 |
| | Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 827975-302 | 827975-306 | 827975-312 | 827975-305 | 827975-314 | 827975-301 | 827668-301 |
| | Solvent Saver HT, 600 bar | 3.0 x 30 | 1.8 | 824975-302 | 824975-306 | | 824975-305 | | | |
| | Solvent Saver HT, 600 bar | 3.0 x 20 | 1.8 | 826975-302 | 826975-306 | | | | | |
|  | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-902 | 823750-904 | | | | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 150 | 1.8 | 820700-902 | 820700-906 | 820700-912 | 820700-905 | | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 828700-902 | 828700-906 | 828700-912 | 828700-905 | 828700-914 | 828700-901 | 828768-901 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 827700-902 | 827700-906 | 827700-912 | 827700-905 | 827700-914 | 827700-901 | 827768-901 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 824700-902 | 824700-906 | 824700-912 | 824700-905 | 824700-914 | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 20 | 1.8 | 826700-902 | 826700-906 | | | | | |
|  | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-902 | 821725-904 | | | | | |



Rapid Resolution HT Columns and Cartridges (Maximum Pressure: 400 bar, 6000 psi)

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 | SB-C18 USP L1 | SB-C8 USP L7 | Extend-C18 USP L1 |
|---|---|-----------|--------------------|------------------------|-----------------------|---------------|--------------|-------------------|
| | Rapid Resolution HT, 400 bar | 4.6 x 50 | 1.8 | 922975-902 | 922975-906 | 922975-902 | 822975-906 | 722975-902 |
| | Rapid Resolution HT, 3/pk, 400 bar | 4.6 x 50 | 1.8 | 922975-932 | | 922975-932 | | |
| | Narrow Bore RRHT, 400 bar | 2.1 x 50 | 1.8 | 922700-902 | | 922700-902 | | |
| | Narrow Bore RRHT, 3/pk, 400 bar | 2.1 x 50 | 1.8 | 922700-932 | | 922700-932 | | |
| Rapid Resolution HT Cartridges (require hardware kit 820555-901) | | | | | | | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 50 | 1.8 | 925975-902 | | 825975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 50 | 1.8 | 925975-932 | | 825975-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 50 | 1.8 | 925700-902 | | 825700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 50 | 1.8 | 925700-932 | | 825700-932 | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 30 | 1.8 | 923975-902 | | 823975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 30 | 1.8 | 923975-932 | | 823975-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 30 | 1.8 | 923700-902 | | 823700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 30 | 1.8 | 923700-932 | | 823700-932 | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 15 | 1.8 | 921975-902 | | 821975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 15 | 1.8 | 921975-932 | | 821975-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 15 | 1.8 | 921700-902 | | 821700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 15 | 1.8 | 921700-932 | | 821700-932 | | |
| RR | Hardware Kit for RR and RRHT Cartridges | | | 820555-901 | | 820555-901 | | |



UHPLC Guard, 1200 bar, 821725-903

Agilent Fast Guards for UHPLC




- High performance guard columns for Fast LC columns
- Two formats – one for Poroshell 120 columns, stable to 600 bar, RRHD columns, 1.8 μm (stable to 1200 bar), and RRHT columns, 1.8 μm (stable to 600 bar)

Agilent UHPLC Guards are high performance guards designed by Agilent for its Fast LC columns families. Agilent UHPLC Guards use easy-to-install hardware that fits directly on the end of the column; no extra hardware is needed. They are sold in packages of three.




Agilent UHPLC Guards extend the lifetime of analytical columns without diminishing performance.

Fast Guards for UHPLC

ZORBAX RRHD columns, 1.8 μm (1200 bar), and ZORBAX RRHT columns, 1.8 μm (600 bar)

| Hardware | Description | Size (mm) | Particle Size (μm) | Eclipse Plus C18 USP L1 | Eclipse XDB-C18 USP L1 | SB-C18 USP L1 | SB-C8 USP L7 |
|---|-----------------------------|-----------|---------------------------------|-------------------------|------------------------|---------------|--------------|
|  | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-901 | 821725-903 | 821725-902 | 821725-904 |
|  | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-901 | 823750-903 | 823750-902 | 823750-904 |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-901 | 820750-903 | 820750-902 | 820750-904 |

Poroshell 120 columns, 2.7 μm (600 bar)

| Hardware | Description | Size (mm) | Particle Size (μm) | EC-C18 USP L1 | EC-C8 USP L7 | SB-C18 USP L1 | Phenyl-Hexyl USP L11 |
|---|----------------------------|-----------|---------------------------------|---------------|--------------|---------------|----------------------|
|  | UHPLC Guard, 600 bar, 3/pk | 2.1 x 5 | 2.7 | 821725-911 | 821725-913 | 821725-912 | 821725-914 |
|  | UHPLC Guard, 600 bar, 3/pk | 3.0 x 5 | 2.7 | 823750-911 | 823750-913 | 823750-912 | 823750-914 |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 2.7 | 820750-911 | 820750-913 | 820750-912 | 820750-914 |



TIPS & TOOLS

Learn about Fast Guards for UHPLC – an easy way to extend the life of your analytical Fast LC column without losing performance. www.agilent.com/chem/fastguardsvideo



Other Columns for Reversed-Phase Analytical HPLC

Achieve excellent peak shape and resolution every time — leveraging the industry's broadest selection of reversed-phase columns

Whether you are using Fast LC or working with more conventional HPLC applications, Agilent's LC family offers you a range of phases and selectivities to help you perfect your separation.

The ZORBAX Family of phases scales readily to Fast LC columns in the Rapid Resolution High Throughput (RRHT) and Rapid Resolution High Definition (RRHD) families and Poroshell 120 columns, see previous section, page 227.

In this section, we'll provide overviews of other key analytical columns from Agilent:

ZORBAX Rapid Resolution, 3.5 μm , configurations are an ideal choice for initial method development, providing increased sample throughput for any application when compared to 5 μm columns.

ZORBAX Solvent Saver 3.0 mm id column configurations provide 60% mobile phase reduction over 4.6 mm id columns.

ZORBAX Eclipse Plus HPLC columns are designed to reliably produce superior peak shapes for basic compounds, and are available across all ZORBAX column configurations.

More than 13 additional ZORBAX phases including StableBond, Eclipse PAH, Eclipse XDB, ZORBAX Rx, Extend-C18, Bonus-Rx and Original ZORBAX columns — in total, more than 1400 configurations for reliable scalability and method transfer.

ZORBAX Method Development kits contain three columns for the price of two! Each as a different bonded phase for optimizing selectivity.

ZORBAX Method Validation kits — choose as many columns as you need (or as few) to make method validation easier and less expensive.

Pursuit, Pursuit XRs and Pursuit XRs Ultra columns provide alternate selectivities to the ZORBAX family.

Polaris Columns provide polar-modified phases for routine polar applications.

Other Columns for Reversed-Phase Analytical HPLC.



ZORBAX Eclipse Plus Columns

ZORBAX Eclipse Plus

- The ideal column for method development – excellent results for a wide range of compounds
- High level of performance – peak shape, efficiency, resolution, and lifetime – with all sample types: acids, bases and neutrals
- Superior reproducibility with more rigorous QA/QC testing
- Improved, patented silica manufacturing with start-to-finish product control
- Available in 1.8, 3.5, and 5 μm particle sizes for all analytical, high resolution, and fast LC analyses

Agilent ZORBAX Eclipse Plus columns provide the ultimate in performance for silica-based columns. Peak shape is excellent for the most challenging basic compounds, improving efficiency and resolution with these sample types. These results are achieved by improvements in the silica manufacturing and bonding technology, which is completely controlled by Agilent.

Because of their high level of performance, Eclipse Plus columns are the ideal first choice for method development of all samples. If you need to achieve fast method development and superior productivity, then choose a column with high-resolution 1.8 μm particles. For standard methods, conventional 5 μm and Rapid Resolution 3.5 μm columns are your best choice. With all particle sizes, easy method transfer is possible.

With more rigorous QA and QC testing, column lot-to-lot reproducibility is also improved, resulting in long-term reliable results for all analyses.

Column Specifications

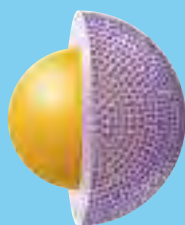
| Bonded Phase | Pore Size | Surface Area | Temp. Limits | pH Range* | Endcapped | Carbon Load |
|----------------------------------|-----------|-----------------------|--------------|-----------|-----------|-------------|
| ZORBAX Eclipse Plus C18 | 95Å | 160 m ² /g | 60 °C | 2.0-9.0 | Double | 9% |
| ZORBAX Eclipse Plus C8 | 95Å | 160 m ² /g | 60 °C | 2.0-9.0 | Double | 7% |
| ZORBAX Eclipse PAH | 95Å | 160 m ² /g | 60 °C | 2.0-8.0 | No | 14% |
| ZORBAX Eclipse Plus Phenyl-Hexyl | 95Å | 160 m ² /g | 60 °C | 2.0-8.0 | Double | 9% |

Specifications represent typical values only.

*Column lifetime will be reduced significantly at pH >7 and temperature >40 °C. At pH 6-9, highest column stability for all silica based columns is obtained by operating at temperatures <40 °C and using lower buffer concentrations in range of 0.01-0.02 M, especially with phosphate and carbonate buffers.



TIPS & TOOLS



The EC-C18, EC-C8 and Phenyl-Hexyl phases on Poroshell 120 are very similar to Eclipse Plus C18, Eclipse Plus C8 and Eclipse Plus Phenyl-Hexyl phases.

Turn to page 228.

ZORBAX Eclipse Plus: Best peak shape in the industry without tailing

Column: Eclipse Plus C18
959996-902
4.6 x 100 mm, 5 µm

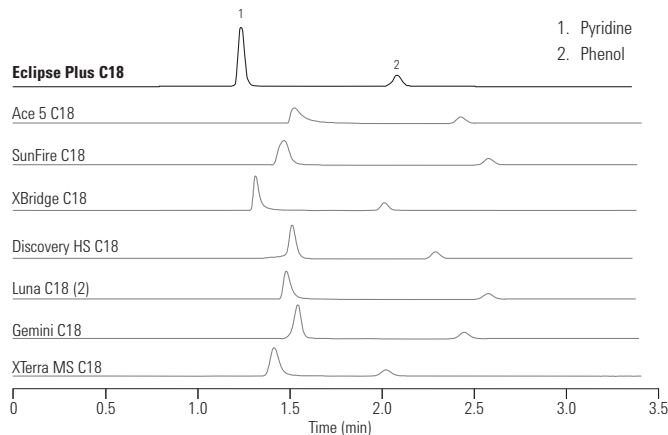
Mobile Phase: A: 60% Water
B: 40% Acetonitrile

Flow Rate: 1.0 mL/min

Temperature: Ambient

Detector: UV, 254 nm

Sample: Pyridine, Phenol



LCEC001

Peak shape and efficiency are better with ZORBAX Eclipse Plus

Column A: XBridge C18, 4.6 x 150 mm, 5 µm

Column B: Eclipse Plus C18
959993-902
4.6 x 150 mm, 5 µm

Mobile Phase: A: 0.1% Formic acid
B: 0.1% Formic acid in ACN

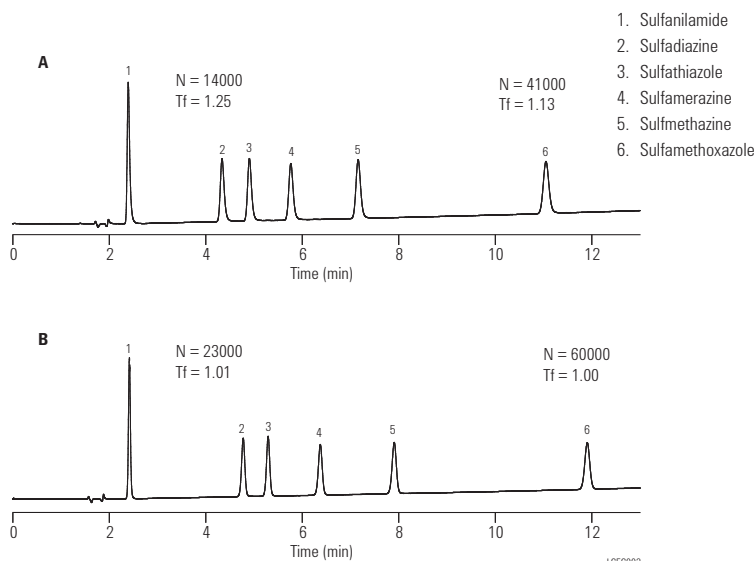
Flow Rate: 1.0 mL/min

Gradient: 0.0 min 10% B
15 min 30% B

Temperature: 40 °C

Detector: UV, 254 nm

Sample: Sulfonamides



LCEC003

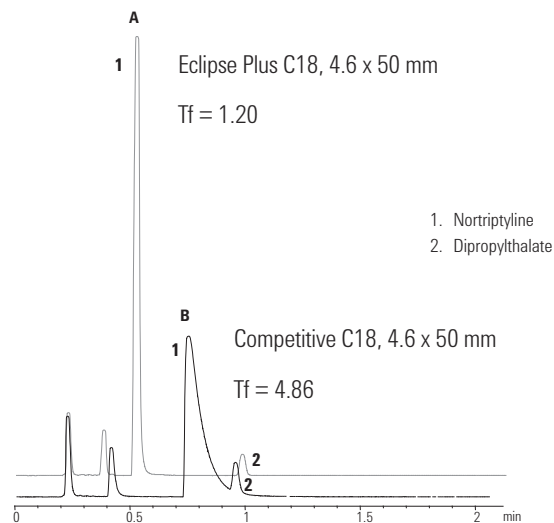
Eliminate tailing and maximize resolution with Eclipse Plus Columns

Column A: Eclipse Plus C18, 4.6 x 50 mm

Column B: Competitive C18, 4.6 x 50 mm

Mobile Phase: 65% ACN:35% 25 mM phosphate buffer (pH 7.4)

Superior peak shape and better selectivity with Eclipse Plus means more resolution, easier quantitation and better results in your separations.



Eclipse Plus C18 vs. C8

**Column A: Eclipse Plus C18
4.6 x 50 mm, 5 µm**

**Column B: Eclipse Plus C8
4.6 x 50 mm, 5 µm**

Mobile Phase: Water: acetonitrile (30:70)

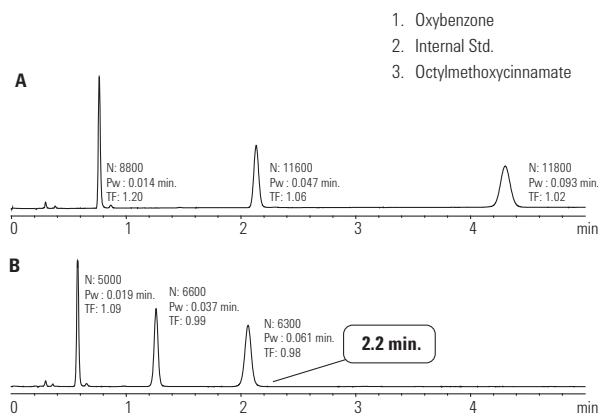
Flow Rate: 2.0 mL/min

Temperature: 30 °C

Detector: UV, 230 nm

Sample: Lip balm extract in ACN
(melted at 100 °C, cooled and 0.45 µm filtered)

Less retention can save significant time – the C8 is a good choice here.



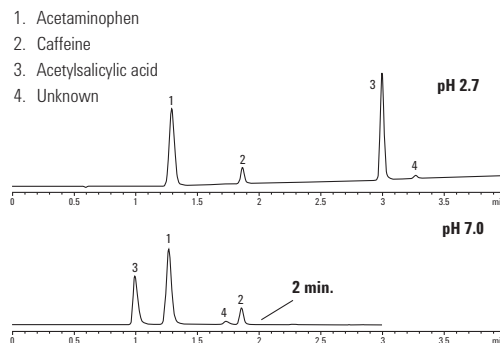
Rapid analysis of an analgesic tablet, selectivity differences at pH 2 and pH 7

**Column: Eclipse Plus C8
959946-906
4.6 x 50 mm, 5 µm**

Gradient: 10-60% B/3 min
pH 2.7: A: 0.1% Formic acid B: 0.1% fa in ACN
pH 7.0: A: 20 mM Na phosphate B: ACN

Sample: generic Excedrin tablet

Both Eclipse Plus C18 and C8 can be used over a wide pH range to optimize selectivity or analysis time.

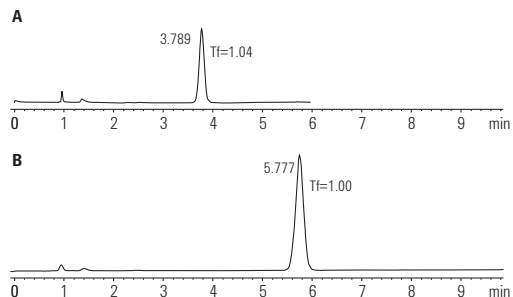


Eclipse Plus C8 is less retentive than Eclipse Plus C18

Column A: Eclipse Plus C8
959996-906
4.6 x 100 mm, 5 µm

Column B: Eclipse Plus C18
959996-902
4.6 x 100 mm, 5 µm

Mobile Phase: 80% Methanol 8 mM (total) K₂HPO₄ pH 7
Flow Rate: 1.0 mL/min
Detector: UV, 215 nm
Sample: Amitriptyline 0.05 µg/µL (0.5 µL injection)



A C8 column is typically selected because it will retain less than a C18 column, reducing analysis time.

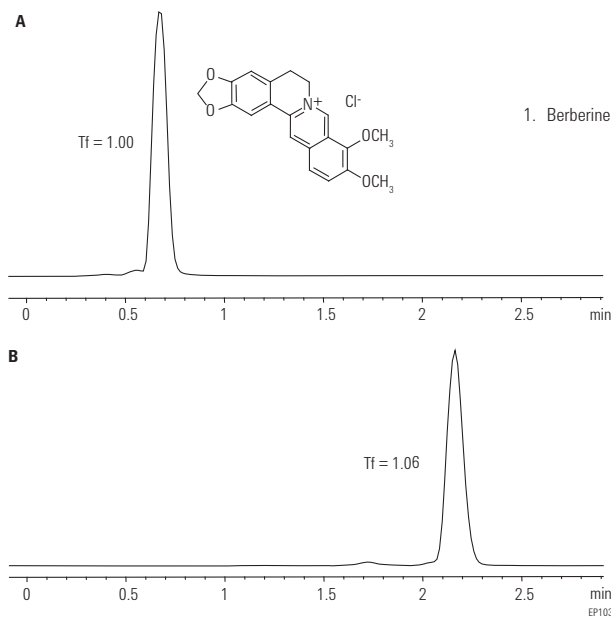
The Eclipse Plus C8 column shows the same behavior with excellent peak shape on difficult basic compounds.

Fast and ultra-fast analysis of basic compounds on Eclipse Plus

Column A: Eclipse Plus C18
959941-902
4.6 x 50 mm, 1.8 µm


Column B: Eclipse Plus C18
959993-902
4.6 x 150 mm, 5 µm

Mobile Phase: A: 50% 8 mM K₂HPO₄, pH 7
B: 50% ACN
Flow Rate: 1.0 mL/min
Temperature: Ambient
Detector: UV, 254 nm
Sample: Berberine, 0.4 mg/mL, 2 µL



ZORBAX Eclipse Plus Columns






ZORBAX Eclipse Plus

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse Plus C18 USP L1 | Eclipse Plus C8 USP L7 | Eclipse Plus Phenyl-Hexyl USP L11 | Eclipse PAH USP L1 |
|---|------------------------------|-----------|--------------------|-------------------------|------------------------|-----------------------------------|--------------------|
| | Analytical | 4.6 x 250 | 5 | 959990-902 | 959990-906 | 959990-912 | 959990-918 |
| | Analytical | 4.6 x 150 | 5 | 959993-902 | 959993-906 | 959993-912 | 959993-918 |
| | Analytical | 4.6 x 100 | 5 | 959996-902 | 959996-906 | 959996-912 | 959996-918 |
| | Analytical | 4.6 x 50 | 5 | 959946-902 | 959946-906 | | |
| | Rapid Resolution | 4.6 x 150 | 3.5 | 959963-902 | 959963-906 | 959963-912 | 959963-918 |
| | Rapid Resolution | 4.6 x 100 | 3.5 | 959961-902 | 959961-906 | 959961-912 | 959961-918 |
| | Rapid Resolution | 4.6 x 75 | 3.5 | 959933-902 | 959933-906 | 959933-912 | |
| | Rapid Resolution | 4.6 x 50 | 3.5 | 959943-902 | 959943-906 | 959943-912 | 959943-918 |
| | Rapid Resolution | 4.6 x 30 | 3.5 | 959936-902 | 959936-906 | 959936-912 | |
| | Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 959964-902 | 959964-906 | 959964-912 | 959964-918 |
| | Rapid Resolution HT, 600 bar | 4.6 x 75 | 1.8 | 959951-902 | | | |
| | Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 959941-902 | 959941-906 | 959941-912 | 959941-918 |
| | Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 959931-902 | 959931-906 | 959931-912 | 959931-918 |
|  | UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-901 | | | |
| | Solvent Saver | 3.0 x 250 | 5 | | | | 959990-318 |
| | Solvent Saver | 3.0 x 150 | 5 | 959993-302 | 959993-306 | | |
| | Solvent Saver Plus | 3.0 x 150 | 3.5 | 959963-302 | 959963-306 | 959963-312 | |
| | Solvent Saver Plus | 3.0 x 100 | 3.5 | 959961-302 | 959961-306 | 959961-312 | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 959759-302 | 959759-306 | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 959758-302 | 959758-306 | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 959757-302 | 959757-306 | | |
| | Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 959964-302 | 959964-306 | 959964-312 | |
| | Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 959941-302 | 959941-306 | 959941-312 | |

(Continued)

Agilent HILIC Plus uses the same manufacturing processes as the Eclipse Plus family. See information about ZORBAX HILIC Plus on page 324.

ZORBAX Eclipse Plus

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse Plus C18 USP L1 | Eclipse Plus C8 USP L7 | Eclipse Plus Phenyl-Hexyl USP L11 | Eclipse PAH USP L1 |
|--|-----------------------------|------------|--------------------|-------------------------|------------------------|-----------------------------------|--------------------|
|  | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-901 | | | |
| | Narrow Bore | 2.1 x 250 | 5 | | | | 959790-918 |
| | Narrow Bore | 2.1 x 150 | 5 | 959701-902 | 959701-906 | 959701-912 | 959701-918 |
| | Narrow Bore | 2.1 x 50 | 5 | 959746-902 | 959746-906 | | |
| | Narrow Bore RR | 2.1 x 150 | 3.5 | 959763-902 | 959763-906 | 959763-912 | |
| | Narrow Bore RR | 2.1 x 100 | 3.5 | 959793-902 | 959793-906 | 959793-912 | 959793-918 |
| | Narrow Bore RR | 2.1 x 50 | 3.5 | 959743-902 | 959743-906 | 959743-912 | |
| | Narrow Bore RR | 2.1 x 30 | 3.5 | 959733-902 | 959733-906 | 959733-912 | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 959759-902 | 959759-906 | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 959758-902 | 959758-906 | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 959757-902 | 959757-906 | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 959764-902 | 959764-906 | 959764-912 | 959764-918 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 959741-902 | 959741-906 | 959741-912 | 959741-918 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 959731-902 | 959731-906 | 959731-912 | |
|  | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-901 | | | |
|  | Guard Cartridges, 4/pk | 4.6 x 12.5 | 5 | 820950-936 | 820950-937 | 820950-938 | 820950-939 |
|  | Guard Cartridges, 4/pk | 2.1 x 12.5 | 5 | 821125-936 | 821125-937 | 821125-938 | 821125-939 |
|  | Guard Hardware Kit | | | 820999-901 | 820999-901 | 820999-901 | 820999-901 |



ZORBAX Eclipse PAH Columns

ZORBAX Eclipse PAH

- High resolution separation of 16 PAHs in EPA Method 610
- Extensive range of particle sizes (1.8, 3.5 and 5 μm) and sizes for fast and high resolution separations
- Each batch of material is specifically tested with PAHs for maximum reproducibility under expected operating conditions
- Excellent performance using the high quality, improved silica of Eclipse Plus columns
- Good for applications requiring "shape selectivity" or the separation of geometric isomers

Agilent ZORBAX Eclipse PAH columns are recommended for the separation of polycyclic aromatic hydrocarbons. PAHs are considered priority pollutants and the analysis of these potentially carcinogenic compounds in water, soil and food is of major importance. Eclipse PAH columns separate all 16 PAHs in EPA method 610 quickly and with high resolution.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits | pH Range | Endcapped | Carbon Load |
|--------------------|-----------|-----------------------|--------------|----------|-----------|-------------|
| ZORBAX Eclipse PAH | 95Å | 160 m ² /g | 60 °C | 2.0-8.0 | No | 14% |

Specifications represent typical values only.

High resolution and fast analysis on RRHT Eclipse PAH column

Column: Eclipse PAH
959941-918
4.6 x 50 mm, 1.8 μm

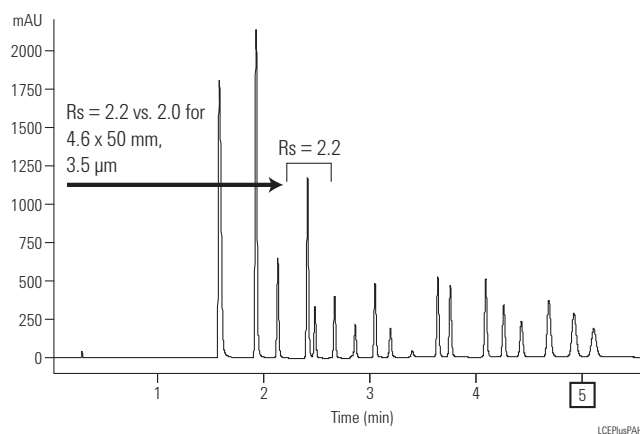
Mobile Phase: A: Water; B: Acetonitrile

| Gradient: | Time (Min) | % B |
|-----------|------------|-----|
| | 0.00 | 40 |
| | 3.5 | 100 |
| | 5.2 | 100 |
| | 5.5 | 40 |
| | 6.5 | 40 |

Flow Rate: 2.0 mL/min

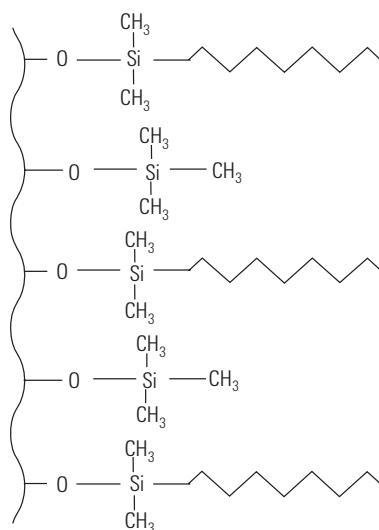
Temperature: 25 °C

Detector: DAD 220, 4 nm No Ref. DAD Stop Time = 6.0 min
Stop Time = 7.0



ZORBAX Eclipse PAH

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse PAH USP L1 |
|----------|------------------------------|------------|--------------------|--------------------|
| | Analytical | 4.6 x 250 | 5 | 959990-918 |
| | Analytical | 4.6 x 150 | 5 | 959993-918 |
| | Analytical | 4.6 x 100 | 5 | 959996-918 |
| | Rapid Resolution | 4.6 x 150 | 3.5 | 959963-918 |
| | Rapid Resolution | 4.6 x 100 | 3.5 | 959961-918 |
| | Rapid Resolution | 4.6 x 50 | 3.5 | 959943-918 |
| | Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 959964-918 |
| | Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 959941-918 |
| | Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 959931-918 |
| | Solvent Saver | 3.0 x 250 | 5 | 959990-318 |
| | Narrow Bore | 2.1 x 250 | 5 | 959790-918 |
| | Narrow Bore | 2.1 x 150 | 5 | 959701-918 |
| | Narrow Bore RR | 2.1 x 100 | 3.5 | 959793-918 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 959764-918 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 959741-918 |
| ZGC | Guard Cartridges, 4/pk | 4.6 x 12.5 | 5 | 820950-939 |
| ZGC | Guard Cartridges, 4/pk | 2.1 x 12.5 | 5 | 821125-939 |
| ZGC | Guard Hardware Kit | | | 820999-901 |



eXtra Densely Bonded and Double Endcapped
Eclipse XDB Bonded Phase

ZORBAX Eclipse XDB

- Four selectivity choices for method development optimization
- Good peak shape for basic, acidic and neutral compounds
- High performance over a wide pH range – pH 2-9
- Particle sizes from 1.8 to 7 μm
- Long lifetime with eXtra Dense Bonding and double endcapping

Agilent ZORBAX Eclipse XDB columns – C18, C8, Phenyl and CN – provide four bonded phase choices for method development optimization. These columns provide good peak shape over a wide pH range (2-9) for additional method development flexibility with one family of columns. Eclipse XDB columns can be used for method development at low pH (2-3) and the same column can be used for method development in the mid pH (6-8) region. In the mid pH region residual silanols are more active and tailing interactions are more likely. To overcome these interactions, Eclipse XDB columns are eXtra Densely Bonded and double endcapped through a proprietary process to cover as many active silanols as possible. The result is superior peak shape of basic compounds from pH 2-9. Eclipse XDB columns are available in 1.8, 3.5, 5 and 7 μm particle sizes for high speed, high resolution, analytical and prep scale separations.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits | pH Range* | Endcapped | Carbon Load |
|---------------------------|-----------|-----------------------|--------------|-----------|-----------|-------------|
| ZORBAX Eclipse XDB-C18 | 80Å | 180 m ² /g | 60 °C | 2.0-9.0 | Double | 10% |
| ZORBAX Eclipse XDB-C8 | 80Å | 180 m ² /g | 60 °C | 2.0-9.0 | Double | 7.6% |
| ZORBAX Eclipse XDB-Phenyl | 80Å | 180 m ² /g | 60 °C | 2.0-9.0 | Double | 7.2% |
| ZORBAX Eclipse XDB-CN | 80Å | 180 m ² /g | 60 °C | 2.0-8.0 | Double | 4.3% |

Specifications represent typical values only

*Eclipse XDB columns are designed for operation over a wide pH range. At pH 6-9, highest columns stability for all silica based columns is achieved by operating at temperatures <40 °C and using low buffer concentrations in the range of 0.01-0.02 M.



TIPS & TOOLS

Poroshell 120 EC-CN is very similar to ZORBAX XDB-CN. Page 228

Good peak shape over a wide pH range with ZORBAX Eclipse XDB

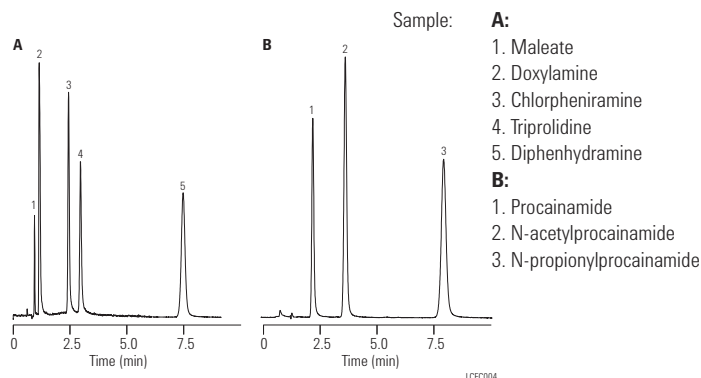
Column: Eclipse XDB-C8
993967-906
4.6 x 150 mm, 5 µm

Mobile Phase: A: pH 3.0 75% 25 mM phosphate buffer 25% ACN
B: pH 7.0 90% 20 mM phosphate 10% ACN

Flow Rate: 1.5 mL/min

Temperature: 40 °C

ZORBAX Eclipse XDB columns provide good peak shape over a wide pH range and are an excellent choice for method development from pH 2-9.



Column stability testing at pH 3 and 60 °C

Column: ZORBAX SB-C8
883975-906
4.6 x 150 mm, 5 µm

Column: Eclipse XDB-C8
993967-906
4.6 x 150 mm, 5 µm

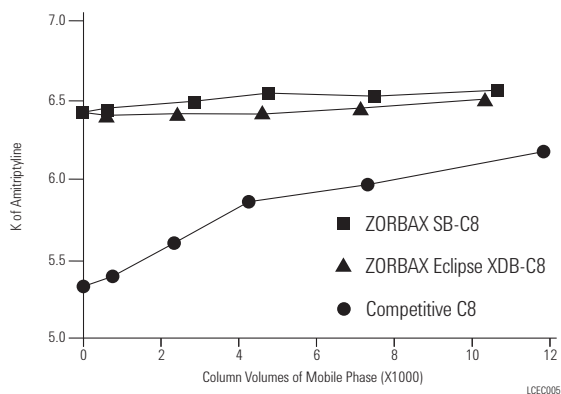
Mobile Phase: Purge Conditions:
70% 50 mM NaAc-HCl, pH 3.0
30% ACN

Retention Test Conditions:
65% Methanol
35% Water

Flow Rate: 1.0 mL/min

Temperature: 60 °C

Sample: Tricyclic antidepressants



Eclipse XDB columns are stable over a wide pH range. At low pH an Eclipse endcapped column is extremely stable and shows equivalent stability to a non-endcapped column, SB-C8, at pH 3. The columns were purged with a pH 3 mobile phase at 60 °C. Then they were tested with a strongly basic compound to determine if the endcapping or bonded phase had been hydrolyzed from the silica surface. The Eclipse XDB column was very stable, as shown by the consistency of the retention of amitriptyline over the 12,000 column volumes of the test. Another endcapped column shows less stability under these same conditions.

Column stability testing at pH 7.0

**Column A: Competitive C8
SIL-type
After 1826 column volumes**

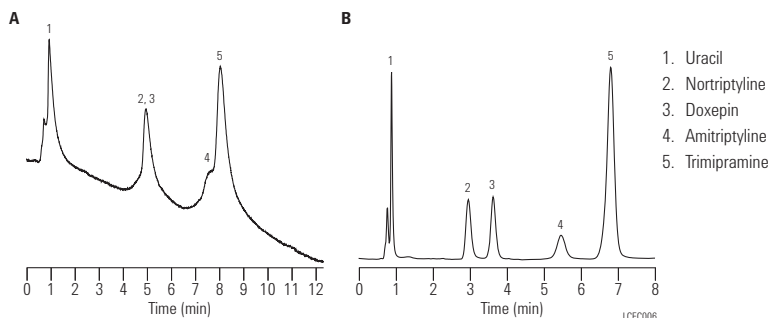
**Column B: Eclipse XDB-C8
993967-906
4.6 x 150 mm, 5 µm
Sol-type
After 1843 column volumes**

Mobile Phase: 60% ACN
40% 250 mM Phosphate Buffer, pH 7.0

Flow Rate: 1.5 mL/min

Temperature: 60 °C

Sample: Tricyclic antidepressants



Double endcapping, dense bonding and the durable Rx-Sil particles (sol-type) combine to provide long lifetime at pH 7 when compared to single endcapped sil-gel columns used here. The conditions used for this test – high temperature (60 °C) and high salt concentration (250 mM), accelerate the dissolution of silica, causing premature failure of the sil-gel type column.

Selectivity changes for basic compounds with Eclipse XDB and StableBond

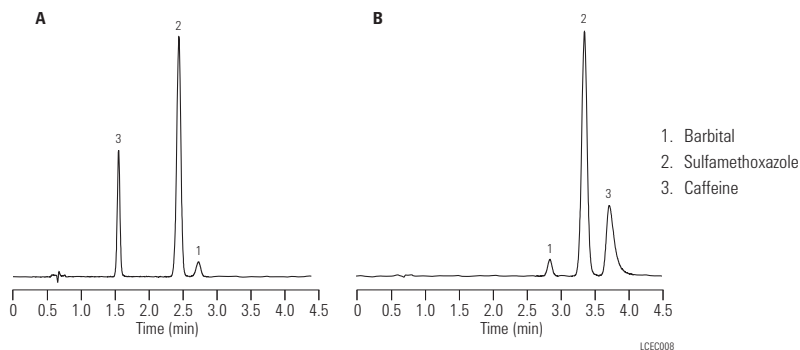
**Column A: Eclipse XDB-C8
966967-906
4.6 x 75 mm, 3.5 µm**

**Column B: ZORBAX Rx/SB-C8
866953-906
4.6 x 75 mm, 3.5 µm**

Mobile Phase: 70% 25 mM NaH₂PO₄, pH 3.0
30% Methanol

Flow Rate: 1.0 mL/min

Temperature: 35 °C



Eclipse XDB and StableBond columns are based on the same silica but have different bonding and endcapping. Therefore, they can have very different selectivity for the same sample under the same conditions, as this example shows.

Optimize separations with Eclipse XDB selectivity options

Column A: Eclipse XDB-Phenyl
963967-912
4.6 x 150 mm, 3.5 µm

Column B: Eclipse XDB-C8
963967-906
4.6 x 150 mm, 3.5 µm

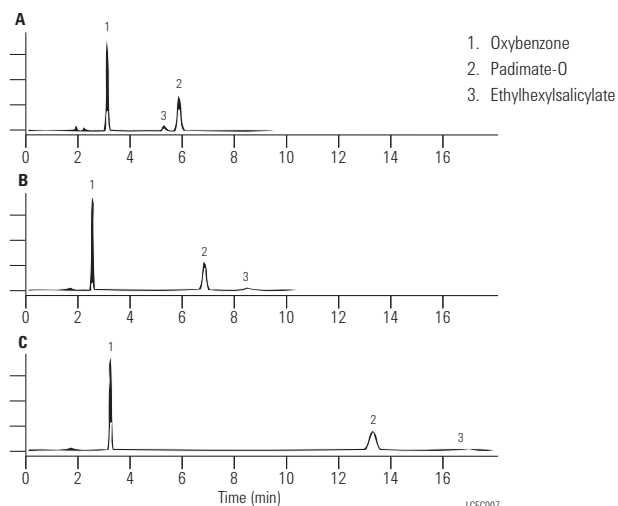
Column C: Eclipse XDB-C18
963967-902
4.6 x 150 mm, 3.5 µm

Mobile Phase: 15% H₂O:85% MeOH

Flow Rate: 1.0 mL/min

Temperature: 35 °C

Sample: Sunscreens



This separation of sunscreens on all three Eclipse XDB bonded phases – C18, C8 and Phenyl – shows that different bonded phases can be used to optimize a separation. While all three bonded phases provide an adequate separation, the Eclipse XDB-Phenyl provides a different peak elution order and a much shorter overall analysis time. All three bonded phases also provide excellent peak shape with no mobile phase additives.

Selectivity for urea pesticides

Column A: Eclipse XDB-C18
993967-902
4.6 x 150 mm, 5 µm

Column B: Eclipse XDB-CN
993967-905
4.6 x 150 mm, 5 µm

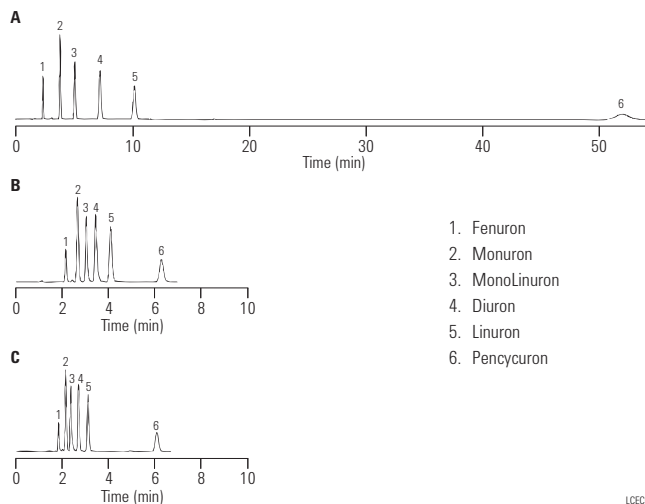
Column C: Eclipse XDB-C18
993967-902
4.6 x 150 mm, 5 µm

Mobile Phase: A. 60:40 MeOH:Water
B. 60:40 MeOH:Water
C. 77:23 MeOH:Water

Flow Rate: 1.0 mL/min



Temperature: 25 °C

Sample: Urea pesticides



The Eclipse XDB-CN column reduces retention time and provides good selectivity for Urea pesticides when compared to an Eclipse XDB-C18 column.

ZORBAX Eclipse XDB















| Hardware Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 | Eclipse XDB-Phenyl USP L11 | Eclipse XDB-CN USP L10 |
|---|-----------|--------------------|------------------------|-----------------------|----------------------------|------------------------|
| Standard Columns (no special hardware required) | | | | | | |
| Semi-Preparative | 9.4 x 250 | 5 | 990967-202 | 990967-206 | | |
| Analytical | 4.6 x 250 | 5 | 990967-902 | 990967-906 | 990967-912 | 990967-905 |
| Analytical | 4.6 x 150 | 5 | 993967-902 | 993967-906 | 993967-912 | 993967-905 |
| Analytical | 4.6 x 50 | 5 | 946975-902 | 946975-906 | | |
| Rapid Resolution | 4.6 x 150 | 3.5 | 963967-902 | 963967-906 | 963967-912 | 963967-905 |
| Rapid Resolution | 4.6 x 100 | 3.5 | 961967-902 | 961967-906 | | 961967-905 |
| Rapid Resolution | 4.6 x 75 | 3.5 | 966967-902 | 966967-906 | 966967-912 | 966967-905 |
| Rapid Resolution | 4.6 x 50 | 3.5 | 935967-902 | 935967-906 | 935967-912 | |
| Rapid Resolution | 4.6 x 30 | 3.5 | 934967-902 | 934967-906 | | |
| Rapid Resolution | 4.6 x 20 | 3.5 | 932967-902 | 932967-906 | | |
|  UHPLC Guard, 1200 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-903 | | | |
| Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 928975-902 | 928975-906 | | |
| Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 927975-902 | 927975-906 | | |
| Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 924975-902 | 924975-906 | | |
| Rapid Resolution HT, 600 bar | 4.6 x 20 | 1.8 | 926975-902 | 926975-906 | | |
| Solvent Saver | 3.0 x 250 | 5 | 990967-302 | 990967-306 | 990967-312 | 990967-305 |
| Solvent Saver | 3.0 x 150 | 5 | 993967-302 | 993967-306 | 993967-312 | 993967-305 |
| Solvent Saver Plus | 3.0 x 150 | 3.5 | 963954-302 | 963954-306 | 963954-312 | 963954-305 |
| Solvent Saver Plus | 3.0 x 100 | 3.5 | 961967-302 | 961967-306 | 961967-312 | |
| Solvent Saver Plus | 3.0 x 75 | 3.5 | 966954-302 | | | |
| Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 981759-302 | | | |
| Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 981758-302 | | | |
| Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 981757-302 | | | |
| Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 928975-302 | 928975-306 | | |
| Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 927975-302 | 927975-306 | | |
| Solvent Saver HT, 600 bar | 3.0 x 30 | 1.8 | 924975-302 | 924975-306 | | |
| Solvent Saver HT, 600 bar | 3.0 x 20 | 1.8 | 926975-302 | 926975-306 | | |
|  UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-903 | | | |
| Narrow Bore | 2.1 x 150 | 5 | 993700-902 | 993700-906 | 993700-912 | 993700-905 |
| Narrow Bore | 2.1 x 50 | 5 | 960967-902 | 960967-906 | 960967-912 | 960967-905 |
| Narrow Bore RR | 2.1 x 150 | 3.5 | 930990-902 | 930990-906 | | |

Unless indicated, column pressure limit is 400 bar.

*These columns are packed with Eclipse XDB-C18, 5 µm.

(Continued)

ZORBAX Eclipse XDB

| Hardware Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 | Eclipse XDB-Phenyl USP L11 | Eclipse XDB-CN USP L10 |
|---|------------|--------------------|------------------------|-----------------------|----------------------------|------------------------|
| Standard Columns (no special hardware required) | | | | | | |
| Narrow Bore RR | 2.1 x 100 | 3.5 | 961753-902 | 961753-906 | | 961753-905 |
| Narrow Bore RR | 2.1 x 75 | 3.5 | 966735-902 | | | |
| Narrow Bore RR | 2.1 x 50 | 3.5 | 971700-902 | 971700-906 | | |
| Narrow Bore RR | 2.1 x 30 | 3.5 | 974700-902 | 974700-906 | | |
| Narrow Bore RR | 2.1 x 20 | 3.5 | 972700-902 | 972700-906 | | |
| Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 981759-902 | | | |
| Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 981758-902 | | | |
| Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 981757-902 | | | |
| Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 928700-902 | 928700-906 | | |
| Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 927700-902 | 927700-906 | | |
| Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 924700-902 | 924700-906 | | |
| Narrow Bore RRHT, 600 bar | 2.1 x 20 | 1.8 | 926700-902 | 926700-906 | | |
|  UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-903 | | | |
| MicroBore RR | 1.0 x 150 | 3.5 | 963600-902 | 963600-906 | | |
| MicroBore RR | 1.0 x 50 | 3.5 | 965600-902 | 965600-906 | | |
| MicroBore RR | 1.0 x 30 | 3.5 | 961600-902 | 961600-906 | | |
| MicroBore Guard, 3/pk | 1.0 x 17 | 5 | 5185-5921 | 5185-5921 | | |
|  Guard Cartridge | 9.4 x 15 | 5 | 820675-112* | 820675-112* | 820675-112* | 820675-112* |
|  Guard Cartridges, 4/pk | 4.6 x 12.5 | 5 | 820950-925 | 820950-926 | 820950-927 | 820950-935 |
|  Guard Cartridges, 4/pk | 2.1 x 12.5 | 5 | 821125-926 | 821125-926 | 821125-926 | 821125-935 |
|  Guard Hardware Kit | | | 840140-901 | 840140-901 | 840140-901 | 840140-901 |
|  Guard Hardware Kit | | | 820999-901 | 820999-901 | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | | |
|  PrepHT Cartridge | 21.2 x 250 | 7 | 977250-102 | 977250-106 | | |
|  PrepHT Cartridge | 21.2 x 150 | 7 | 977150-102 | 977150-106 | | |
|  PrepHT Cartridge | 21.2 x 150 | 5 | 970150-902 | 970150-906 | | |
|  PrepHT Cartridge | 21.2 x 100 | 5 | 970100-902 | 970100-906 | | |
|  PrepHT Cartridge | 21.2 x 50 | 5 | 970050-902 | 970050-906 | | |
|  PrepHT Guard Cartridge | 17.0 x 7.5 | 5 | 820212-925 | 820212-926 | | |
|  Guard Cartridge Hardware | | | 820444-901 | 820444-901 | | |
|  PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | | |

Unless indicated, column pressure limit is 400 bar.

*These columns are packed with Eclipse XDB-C18, 5 µm.

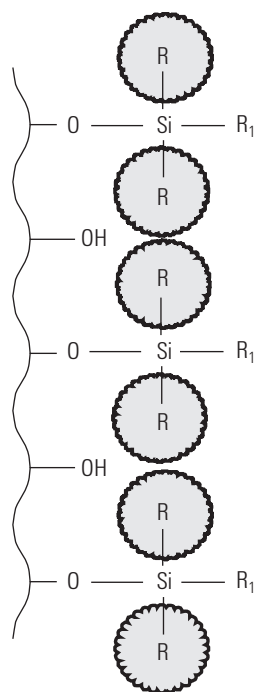
ZORBAX Eclipse XDB

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 |
|---|--|-----------|--------------------|------------------------|-----------------------|
| Agilent Cartridge Columns (require hardware kit 5021-1845) | | | | | |
| AC | Analytical | 4.6 x 250 | 5 | 7995118-585 | 7995108-585 |
| AC | Analytical | 4.6 x 150 | 5 | 7995118-595 | 7995108-595 |
| AC | Rapid Resolution | 4.6 x 75 | 3.5 | 7995118-344 | 7995108-344 |
| AC | Solvent Saver Plus | 3.0 x 75 | 3.5 | 7995230-344 | |
| AC | Guard Cartridges, 10/pk | 4.0 x 4 | 5 | 7995118-504 | 7995118-504 |
| AC | Cartridge Holder | | | 5021-1845 | 5021-1845 |
| Standard Columns (no special hardware required) | | | | | |
| | Rapid Resolution HT, 400 bar | 4.6 x 50 | 1.8 | 922975-902 | 922975-906 |
| | Rapid Resolution HT, 3/pk, 400 bar | 4.6 x 50 | 1.8 | 922975-932 | |
| | Narrow Bore RRHT, 400 bar | 2.1 x 50 | 1.8 | 922700-902 | |
| | Narrow Bore RRHT, 3/pk, 400 bar | 2.1 x 50 | 1.8 | 922700-932 | |
| Rapid Resolution HT Cartridges (require hardware kit 820555-901) | | | | | |
| RR | Rapid Resolution Cartridge | 4.6 x 30 | 3.5 | 933975-902 | 933975-906 |
| RR | Rapid Resolution Cartridge, 3/pk | 4.6 x 30 | 3.5 | 933975-932 | 933975-936 |
| RR | Rapid Resolution Cartridge | 4.6 x 15 | 3.5 | 931975-902 | 931975-906 |
| RR | Rapid Resolution Cartridge, 3/pk | 4.6 x 15 | 3.5 | 931975-932 | 931975-936 |
| RR | Rapid Resolution Cartridge | 2.1 x 30 | 3.5 | 973700-902 | 973700-906 |
| RR | Rapid Resolution Cartridge, 3/pk | 2.1 x 30 | 3.5 | 973700-932 | 973700-936 |
| RR | Rapid Resolution Cartridge | 2.1 x 15 | 3.5 | 975700-902 | 975700-906 |
| RR | Rapid Resolution Cartridge, 3/pk | 2.1 x 15 | 3.5 | 975700-932 | 975700-936 |
| RR | Rapid Resolution HT Cartridge, 400 bar | 4.6 x 50 | 1.8 | 925975-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 4.6 x 50 | 1.8 | 925975-932 | |
| RR | Rapid Resolution HT Cartridge, 400 bar | 4.6 x 30 | 1.8 | 923975-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 4.6 x 30 | 1.8 | 923975-932 | |

(Continued)

ZORBAX Eclipse XDB

| Hardware | Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 |
|---|--|-----------|--------------------|------------------------------|-----------------------------|
| Rapid Resolution HT Cartridges (require hardware kit 820555-901) | | | | | |
| RR | Rapid Resolution HT Cartridge, 400 bar | 4.6 x 15 | 1.8 | 921975-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 4.6 x 15 | 1.8 | 921975-932 | |
| RR | Rapid Resolution HT Cartridge, 400 bar | 2.1 x 50 | 1.8 | 925700-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 2.1 x 50 | 1.8 | 925700-932 | |
| RR | Rapid Resolution HT Cartridge, 400 bar | 2.1 x 30 | 1.8 | 923700-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 2.1 x 30 | 1.8 | 923700-932 | |
| RR | Rapid Resolution HT Cartridge, 400 bar | 2.1 x 15 | 1.8 | 921700-902 | |
| RR | Rapid Resolution HT Cartridge, 3/pk, 400 bar | 2.1 x 15 | 1.8 | 921700-932 | |
| RR | Hardware Kit for RR and RRHT Cartridges | | | 820555-901 | |
| Capillary Glass-lined Columns | | | | | |
| | Capillary | 0.5 x 250 | 5 | 5064-8286 | |
| | Capillary | 0.5 x 150 | 5 | 5064-8287 | |
| | Capillary RR | 0.5 x 150 | 3.5 | 5064-8288 | |
| | Capillary RR | 0.5 x 35 | 3.5 | 5064-8298 | |
| | Capillary | 0.3 x 250 | 5 | 5064-8269 | |
| | Capillary | 0.3 x 150 | 5 | 5064-8291 | |
| | Capillary RR | 0.3 x 150 | 3.5 | 5064-8271 | |
| | Capillary | 0.5 x 35 | 5 | 5064-8296 | |
| | Capillary | 0.3 x 35 | 5 | 5064-8297 | |



Sterically Protected StableBond Bonded Phase

ZORBAX 80Å StableBond

- Longest column lifetime and best reproducibility for low pH separations – down to pH 1
- Patented stable column chemistry allows use at high temperature and low pH without degradation
- Six different bonded phases provide broad selectivity – SB-C18, SB-C8, SB-CN, SB-Phenyl, SB-C3, and SB-Aq
- High purity (Type B) silica for good peak shape

Agilent ZORBAX StableBond columns use patented, unique, nonfunctional silanes with bulky diisobutyl (SB-C18) or diisopropyl (SB-C8, SB-C3, SB-Phenyl, SB-CN, and SB-Aq) side chain groups that sterically protect the key siloxane bond to the silica surface from hydrolytic attack at low pH. StableBond packing materials are not endcapped in order to provide exceptional stability and to maximize lifetime and reproducibility under acidic mobile phase conditions. The high purity, low acidity silica provides excellent peak shape with acidic, basic and neutral compounds making StableBond columns an excellent choice for low pH method development. ZORBAX StableBond columns are compatible with all common mobile phases, including very high aqueous mobile phases.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits* | pH Range* | Endcapped | Carbon Load |
|------------------|-----------|-----------------------|---------------|-----------|-----------|-------------|
| ZORBAX SB-C18 | 80Å | 180 m ² /g | 90 °C | 0.8-8.0 | No | 10% |
| ZORBAX SB-C8 | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | 5.5% |
| ZORBAX SB-C3 | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | 4% |
| ZORBAX SB-Phenyl | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | 5.5% |
| ZORBAX SB-CN | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | 4% |
| ZORBAX SB-Aq | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | proprietary |

Specifications represent typical values only

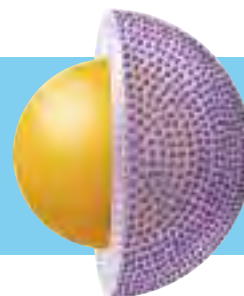
*StableBond columns are designed for optimal use at low pH. At pH 6-8, highest column stability for all silica-based columns is obtained by operating at temperatures <40 °C and using lower buffer concentrations in the range of 0.01-0.02 M. At mid-range pH, Eclipse Plus, Eclipse XDB and Bonus-RP are recommended.

TIPS & TOOLS



ZORBAX StableBond SB-C18, SB-C8 and SB-Aq phases are also available on Poroshell 120.

Turn to page 228



StableBond SB-C18 shows excellent stability at low pH and high temperature (pH 0.8, 90 °C)

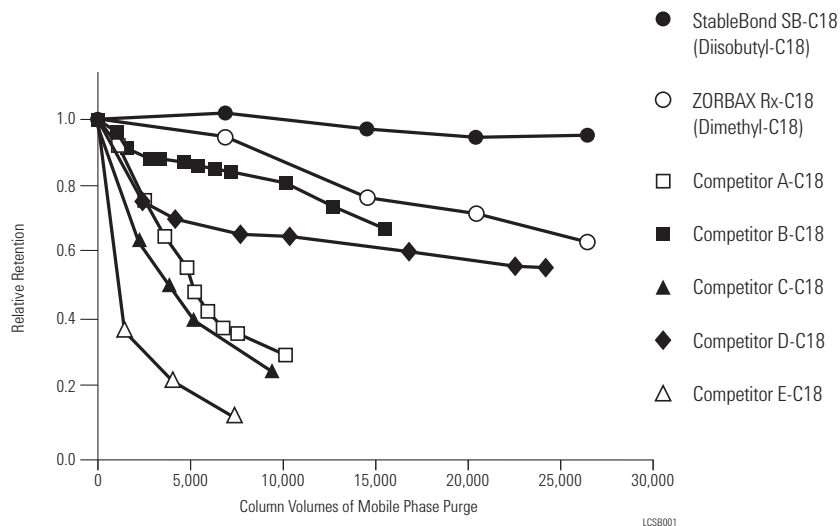
Column: ZORBAX SB-C18
883975-902
4.6 x 150 mm, 5 µm

Column: ZORBAX Rx-C18
883967-902
4.6 x 150 mm, 5 µm

Mobile Phase: 50% Methanol/50% Water
with 1.0% TFA
Test Solute: Toluene

Temperature: 90 °C

As an indicator of column breakdown, retention time of toluene was measured after purging the column with mobile phase. Only the StableBond SB-C18 is unchanged after three working months of use under these very low pH (0.8) and high temperature (90 °C) conditions. ZORBAX Rx-C18 also provides a stable matrix, and can be used as an alternative selectivity to StableBond SB-C18.



Shorter chain ZORBAX SB-CN is also stable at low pH (pH 2.0, 50 °C)

Column: ZORBAX SB-CN
883975-905
4.6 x 150 mm, 5 µm

Mobile Phase: 0.1% TFA, pH 2:ACN

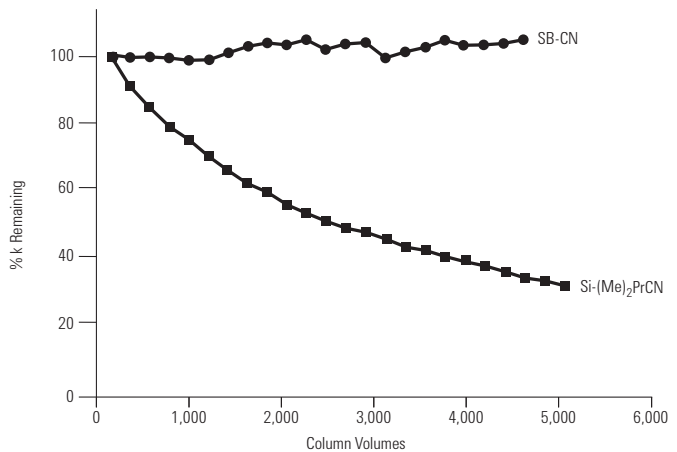
Flow Rate: 1 mL/min

Gradient: 0-100% ACN

Temperature: 50 °C

Sample: 1-phenylheptane @ 50% AC/50% water
with 0.1% TFA

ZORBAX StableBond SB-CN and other short chain StableBond bonded phases are also exceptionally stable at low pH. Conventional dimethyl CN and similar bonded phases lack this stability.



SB-CN optimizes retention and resolution

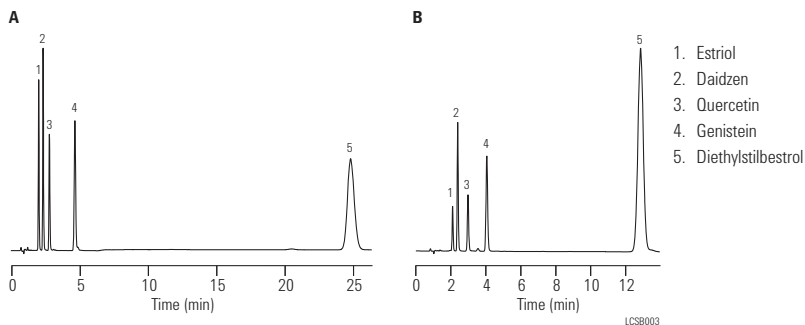
Column A: ZORBAX SB-C18
866953-902
4.6 x 75 mm, 3.5 µm

Column B: ZORBAX SB-CN
866953-905
4.6 x 75 mm, 3.5 µm

Mobile Phase: 30% ACN
70% 25mM NaH₂PO₄, pH 2.5

Flow Rate: 1.0 mL/min

Temperature: 35 °C



The SB-CN column is used here to reduce analysis time by 50%. The retention of the most hydrophobic analyte is cut in half. At the same time, retention of the more polar, early eluting peaks increases slightly.

Five different bonded phases provide selectivity options

Column A: ZORBAX SB-C18
883975-902
4.6 x 150 mm, 5 µm

Column B: ZORBAX SB-C8
883975-906
4.6 x 150 mm, 5 µm

Column C: ZORBAX SB-C3
883975-909
4.6 x 150 mm, 5 µm

Column D: ZORBAX SB-Phenyl
883975-912
4.6 x 150 mm, 5 µm

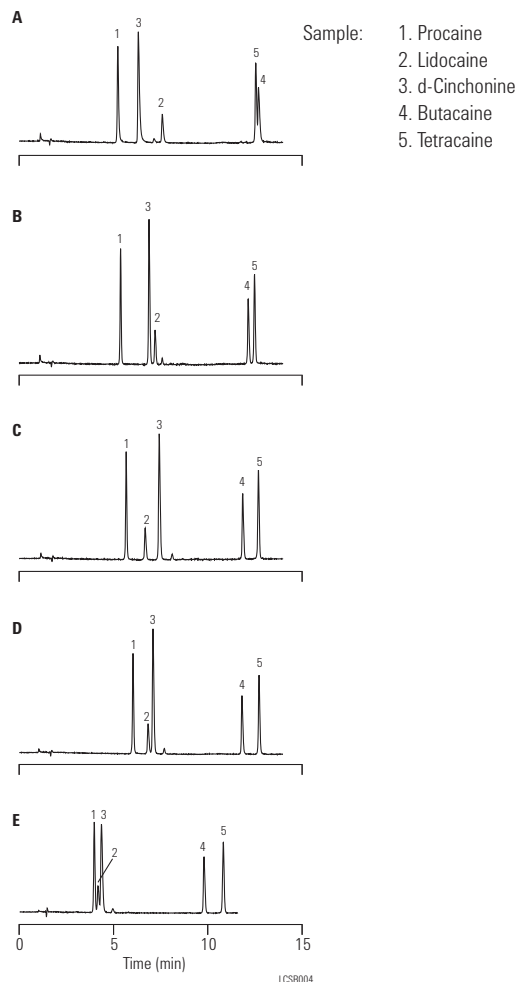
Column E: ZORBAX SB-CN
883975-905
4.6 x 150 mm, 5 µm

Mobile Phase: 0-100% B in 18.8 min
A: 50 mM NaH₂PO₄, pH 2.5 in 95% H₂O / 5% ACN
B: 50 mM NaH₂PO₄, pH 2.5 in 47% H₂O / 53% ACN

Flow Rate: 1.0 mL/min


Temperature: 26 °C

Detector: 254 nm



SB-C3 is just one of the five different StableBond selectivity choices. In this example, optimum resolution is obtained with SB-C3. All are based on the same high purity Rx-SIL. Selectivity changes are therefore dependent only on the bonded phases, making method development more reliable.


ZORBAX 80Å StableBond

| Hardware Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-CN USP L10 | SB-C3 USP L56 | SB-Phenyl USP L11 | SB-Aq |
|--|-----------|--------------------|---------------|--------------|---------------|---------------|-------------------|------------|
| Standard Columns (no special hardware required) | | | | | | | | |
| Semi-Preparative | 9.4 x 250 | 5 | 880975-202 | 880967-201 | 880975-205 | 880975-209 | 880975-212 | |
| Semi-Preparative | 9.4 x 150 | 5 | 883975-202 | | | | | |
| Semi-Preparative | 9.4 x 100 | 5 | 884975-202 | | | | | |
| Semi-Preparative | 9.4 x 50 | 5 | 846975-202 | | | | | |
| Analytical | 4.6 x 250 | 5 | 880975-902 | 880975-906 | 880975-905 | 880975-909 | 880975-912 | 880975-914 |
| Analytical | 4.6 x 150 | 5 | 883975-902 | 883975-906 | 883975-905 | 883975-909 | 883975-912 | 883975-914 |
| Analytical | 4.6 x 50 | 5 | 846975-902 | 846975-906 | | | | 846975-914 |
| Rapid Resolution | 4.6 x 250 | 3.5 | 884950-567 | | | | | |
| Rapid Resolution | 4.6 x 150 | 3.5 | 863953-902 | 863953-906 | 863953-905 | | 863953-912 | 863953-914 |
| Rapid Resolution | 4.6 x 100 | 3.5 | 861953-902 | 861953-906 | 861953-905 | | 861953-912 | 861953-914 |
| Rapid Resolution | 4.6 x 75 | 3.5 | 866953-902 | 866953-906 | 866953-905 | | 866953-912 | 866953-914 |
| Rapid Resolution | 4.6 x 50 | 3.5 | 835975-902 | 835975-906 | 835975-905 | | 835975-912 | 835975-914 |
| Rapid Resolution | 4.6 x 30 | 3.5 | 834975-902 | 834975-906 | | | | |
| Rapid Resolution | 4.6 x 20 | 3.5 | 832975-902 | 832975-906 | | | | |
| Rapid Resolution HT, 600 bar | 4.6 x 150 | 1.8 | 829975-902 | 829975-906 | 829975-905 | | 829975-912 | 829975-914 |
| Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 828975-902 | 828975-906 | 828975-905 | | 828975-912 | 828975-914 |
| Rapid Resolution HT, 600 bar | 4.6 x 75 | 1.8 | | 830975-906 | | | | |
| Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 827975-902 | 827975-906 | 827975-905 | | 827975-912 | 827975-914 |
| Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 824975-902 | 824975-906 | 824975-905 | | 824975-912 | 824975-914 |
| Rapid Resolution HT, 600 bar | 4.6 x 20 | 1.8 | 826975-902 | 826975-906 | | | | |
|  UHPLC Guard, 600 bar, 3/pk | 4.6 x 5 | 1.8 | 820750-902 | 820750-904 | | | | |
| Solvent Saver | 3.0 x 250 | 5 | 880975-302 | 880975-306 | 880975-305 | 880975-309 | 880975-312 | 880975-314 |
| Solvent Saver | 3.0 x 150 | 5 | 883975-302 | 883975-306 | 883975-305 | 883975-309 | 883975-312 | 883975-314 |
| Solvent Saver Plus | 3.0 x 150 | 3.5 | 863954-302 | 863954-306 | 863954-305 | | 863954-312 | 863954-314 |
| Solvent Saver Plus | 3.0 x 100 | 3.5 | 861954-302 | 861954-306 | 861954-305 | 861954-309 | 861954-312 | 861954-314 |
| Solvent Saver Plus | 3.0 x 75 | 3.5 | 866953-302 | | | | | |

Unless indicated, column pressure limit is 400 bar.

(Continued)

ZORBAX 80Å StableBond













| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-CN USP L10 | SB-C3 USP L56 | SB-Phenyl USP L11 | SB-Aq |
|---|------------------------------|-----------|--------------------|------------------|-----------------|------------------|------------------|----------------------|------------|
| Standard Columns (no special hardware required) | | | | | | | | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 150 | 1.8 | 859700-302 | 859700-306 | | | | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 858700-302 | 858700-306 | 858700-305 | | 858700-312 | |
| | Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 857700-302 | 857700-306 | 857700-305 | | 857700-312 | |
| | Solvent Saver HT, 600 bar | 3.0 x 150 | 1.8 | 829975-302 | 829975-306 | 829975-305 | | 829975-312 | |
| | Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 828975-302 | 828975-306 | 828975-305 | 828975-309 | 828975-312 | 828975-314 |
| | Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 827975-302 | 827975-306 | 827975-305 | | | |
| | Solvent Saver HT, 600 bar | 3.0 x 30 | 1.8 | 824975-302 | 824975-306 | 824975-305 | | 827975-312 | 827975-314 |
| | Solvent Saver HT, 600 bar | 3.0 x 20 | 1.8 | 826975-302 | 826975-306 | | | | |
|  | UHPLC Guard, 1200 bar, 3/pk | 3.0 x 5 | 1.8 | 823750-902 | 823750-904 | | | | |
| | Narrow Bore | 2.1 x 150 | 5 | 883700-922 | 883700-906 | 883700-905 | 883700-909 | 883700-912 | |
| | Narrow Bore | 2.1 x 50 | 5 | 860975-902 | 860975-906 | 860975-905 | 860975-909 | 860975-912 | 860975-914 |
| | Narrow Bore RR | 2.1 x 150 | 3.5 | 830990-902 | 830990-906 | | | | 830990-914 |
| | Narrow Bore RR | 2.1 x 100 | 3.5 | 861753-902 | 861753-906 | 861753-905 | | 861753-912 | 861753-914 |
| | Narrow Bore RR | 2.1 x 75 | 3.5 | 866735-902 | | | | | |
| | Narrow Bore RR | 2.1 x 50 | 3.5 | 871700-902 | 871700-906 | | | | 871700-914 |
| | Narrow Bore RR | 2.1 x 30 | 3.5 | 874700-902 | 874700-906 | | | | |
| | Narrow Bore RR | 2.1 x 20 | 3.5 | 872700-902 | 872700-906 | | | | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 859700-902 | 859700-906 | 859700-905 | | 859700-912 | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 858700-902 | 858700-906 | 858700-905 | | 858700-912 | |
| | Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 857700-902 | 857700-906 | 857700-905 | | 857700-912 | |

Unless indicated, column pressure limit is 400 bar.

(Continued)



ZORBAX 80Å StableBond

| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-CN USP L10 | SB-C3 USP L56 | SB-Phenyl USP L11 | SB-Aq |
|---|------------------------------|------------|--------------------|---------------|--------------|---------------|---------------|-------------------|------------|
| Standard Columns (no special hardware required) | | | | | | | | | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 150 | 1.8 | 820700-902 | 820700-906 | 820700-905 | | 820700-912 | |
| | Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 828700-902 | 828700-906 | 828700-905 | | 828700-912 | 828700-914 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 827700-902 | 827700-906 | 827700-905 | | 827700-912 | 827700-914 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 824700-902 | 824700-906 | 824700-905 | | 824700-912 | 824700-914 |
| | Narrow Bore RRHT, 600 bar | 2.1 x 20 | 1.8 | 826700-902 | 826700-906 | | | | |
|  | UHPLC Guard, 1200 bar, 3/pk | 2.1 x 5 | 1.8 | 821725-902 | 821725-904 | | | | |
| | MicroBore RR | 1.0 x 150 | 3.5 | 863600-902 | 863600-906 | 863600-905 | | | |
| | MicroBore RR | 1.0 x 50 | 3.5 | 865600-902 | 865600-906 | | | | |
| | MicroBore RR | 1.0 x 30 | 3.5 | 861600-902 | 861600-906 | | | | |
| | MicroBore Guard, 3/pk | 1.0 x 17 | 5 | 5185-5920 | 5185-5920 | | | | |
|  | Guard Cartridge, 2/pk | 9.4 x 15 | 7 | 820675-115 | 820675-115 | 820675-124 | 820675-124 | 820675-115 | |
|  | Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-920 | 820950-915 | 820950-916 | 820950-922 | 820950-917 | 820950-933 |
|  | Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | 821125-915 | 821125-915 | 821125-924 | 821125-924 | 821125-915 | 821125-933 |
|  | Guard Hardware Kit | 9.4 x 15 | 0 | 840140-901 | 840140-901 | 840140-901 | 840140-901 | 840140-901 | |
|  | Guard Hardware Kit | | | 820999-901 | 820999-901 | 820999-901 | 820999-901 | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | | | | | |
|  | PrepHT Cartridge | 21.2 x 250 | 7 | 877250-102 | 877250-106 | 877250-105 | | 877250-112 | 877250-114 |
|  | PrepHT Cartridge | 21.2 x 150 | 7 | 877150-102 | 877150-106 | | | | 877150-114 |
|  | PrepHT Cartridge | 21.2 x 150 | 5 | 870150-902 | 870150-906 | | | | 870150-914 |
|  | PrepHT Cartridge | 21.2 x 100 | 5 | 870100-902 | 870100-906 | | | | 870100-914 |
|  | PrepHT Cartridge | 21.2 x 50 | 5 | 870050-902 | 870050-906 | | | | 870050-914 |
|  | PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-920 | 820212-915 | 820212-915 | | 820212-915 | 820212-933 |
| | Guard Cartridge Hardware | | | 820444-901 | 820444-901 | 820444-901 | 820444-901 | 820444-901 | 820444-901 |
| | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | 820400-901 | 820400-901 | 820400-901 | 820400-901 |

Unless indicated, column pressure limit is 400 bar.

ZORBAX 80Å StableBond

| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-Phenyl USP L11 |
|---|---|-----------|--------------------|------------------|-----------------|----------------------|
| Agilent Cartridge Columns (require hardware kit 5021-1845) | | | | | | |
| AC | Analytical | 4.6 x 250 | 5 | 7995218-585 | 7995208-585 | |
| AC | Analytical | 4.6 x 150 | 5 | 7995218-595 | 7995208-595 | |
| AC | Rapid Resolution | 4.6 x 75 | 3.5 | 7995218-344 | 7995208-344 | |
| AC | Guard Cartridges, 10/pk | 4.0 x 4 | 5 | 7995118-504 | 7995118-504 | |
| AC | Cartridge Holder | | | 5021-1845 | 5021-1845 | |
| Standard Columns (no special hardware required) | | | | | | |
| | Rapid Resolution HT | 4.6 x 50 | 1.8 | 822975-902 | 822975-906 | |
| | Rapid Resolution HT, 3/pk | 4.6 x 50 | 1.8 | 822975-932 | | |
| | Narrow Bore RRHT | 2.1 x 50 | 1.8 | 822700-902 | | |
| | Narrow Bore RRHT, 3/pk | 2.1 x 50 | 1.8 | 822700-932 | | |
| Rapid Resolution Cartridges (require hardware kit 820555-901) | | | | | | |
| RR | Rapid Resolution Cartridge | 4.6 x 30 | 3.5 | 833975-902 | 833975-906 | 833975-912 |
| RR | Rapid Resolution Cartridge, 3/pk | 4.6 x 30 | 3.5 | 833975-932 | 833975-936 | |
| RR | Rapid Resolution Cartridge | 4.6 x 15 | 3.5 | 831975-902 | 831975-906 | |
| RR | Rapid Resolution Cartridge, 3/pk | 4.6 x 15 | 3.5 | 831975-932 | 831975-936 | |
| RR | Rapid Resolution Cartridge | 2.1 x 30 | 3.5 | 873700-902 | 873700-906 | |
| RR | Rapid Resolution Cartridge, 3/pk | 2.1 x 30 | 3.5 | 873700-932 | 873700-936 | |
| RR | Rapid Resolution Cartridge | 2.1 x 15 | 3.5 | 875700-902 | 875700-906 | |
| RR | Rapid Resolution Cartridge, 3/pk | 2.1 x 15 | 3.5 | 875700-932 | 875700-936 | |
| Rapid Resolution HT Cartridges (require hardware kit 820555-901) | | | | | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 50 | 1.8 | 825975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 50 | 1.8 | 825975-932 | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 30 | 1.8 | 823975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 30 | 1.8 | 823975-932 | | |
| RR | Rapid Resolution HT Cartridge | 4.6 x 15 | 1.8 | 821975-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 4.6 x 15 | 1.8 | 821975-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 50 | 1.8 | 825700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 50 | 1.8 | 825700-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 30 | 1.8 | 823700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 30 | 1.8 | 823700-932 | | |
| RR | Rapid Resolution HT Cartridge | 2.1 x 15 | 1.8 | 821700-902 | | |
| RR | Rapid Resolution HT Cartridge, 3/pk | 2.1 x 15 | 1.8 | 821700-932 | | |
| RR | Hardware Kit for RR and RRHT Cartridges | | | 820555-901 | | |

ZORBAX 80Å StableBond

| Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 |
|--------------------------------------|------------------|---------------------------|--------------------------|
| Capillary Glass-lined Columns | | | |
| Capillary | 0.5 x 250 | 5 | 5064-8258 |
| Capillary | 0.5 x 150 | 5 | 5064-8256 |
| Capillary | 0.5 x 35 | 5 | 5064-8254 |
| Capillary RR | 0.5 x 150 | 3.5 | 5064-8262 |
| Capillary RR | 0.5 x 35 | 3.5 | 5064-8260 |
| Capillary | 0.3 x 250 | 5 | 5064-8257 |
| Capillary | 0.3 x 150 | 5 | 5064-8255 |
| Capillary | 0.3 x 35 | 5 | 5064-8253 |
| Capillary RR | 0.3 x 150 | 3.5 | 5064-8261 |

ZORBAX Rx

- Recommended for alternate selectivity at low pH relative to Eclipse Plus C18, Eclipse XDB-C18 and StableBond SB-C18; for higher temperature applications, StableBond is recommended
- Higher carbon load than SB-C18 columns (12% vs. 10%)
- High stability and good peak shape for low pH applications (up to pH 8)
- Manufactured using dimethyloctadecylsilane and non-encapped
- ZORBAX Rx-C8 is the same product as SB-C8

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits | pH Range* | Encapped | Carbon Load |
|---------------|-----------|-----------------------|--------------|-----------|----------|-------------|
| ZORBAX Rx-C18 | 80Å | 180 m ² /g | 60 °C | 2.0-8.0 | No | 12% |
| ZORBAX Rx-C8 | 80Å | 180 m ² /g | 80 °C | 1.0-8.0 | No | 5.5% |

Specifications represent typical values only

*At pH 6-9 highest column stability for all silica based columns is obtained by operating at temperatures <40 °C and using lower buffer concentrations in the range of 0.01-0.02 M.

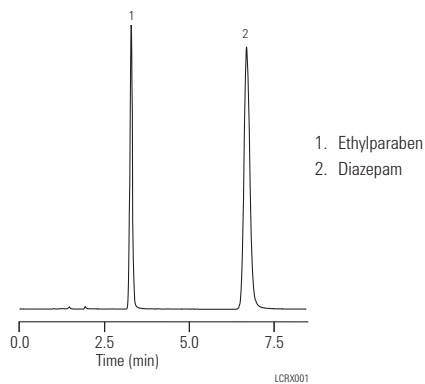
Analysis of diazepam on Rx-C18

Column: ZORBAX Rx-C18
880967-302
3.0 x 250 mm, 5 µm

Mobile Phase: 35% H₂O:65% MeOH

Flow Rate: 0.5 mL/min

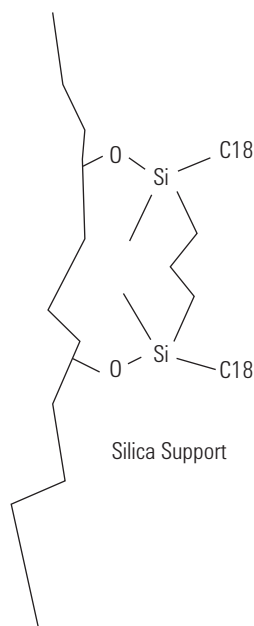
An Rx-C18 column is used for this USP analysis of diazepam and the internal standard ethylparaben. The Solvent Saver 3.0 mm id Rx-C18 column reduces solvent usage by 60% over what would be used if the analysis was done on a 4.6 x 250 mm column.



ZORBAX Rx

| Hardware | Description | Size (mm) | Particle Size (µm) | Rx-C18 USP L1 | Rx-C8 USP L7* |
|--|------------------------------|------------|--------------------|---------------|---------------|
| | Semi-Preparative | 9.4 x 250 | 5 | 880967-202 | 880967-201 |
| | Analytical | 4.6 x 250 | 5 | 880967-902 | 880967-901 |
| | Analytical | 4.6 x 150 | 5 | 883967-902 | 883967-901 |
| | Rapid Resolution | 4.6 x 150 | 3.5 | 863967-902 | |
| | Rapid Resolution | 4.6 x 100 | 3.5 | 861967-902 | |
| | Rapid Resolution | 4.6 x 75 | 3.5 | 866967-902 | |
| | Solvent Saver | 3.0 x 250 | 5 | 880967-302 | |
| | Solvent Saver | 3.0 x 150 | 5 | 883967-302 | |
| | Solvent Saver Plus | 3.0 x 150 | 3.5 | 863967-302 | |
| | Solvent Saver Plus | 3.0 x 100 | 3.5 | 861967-302 | |
| | Narrow Bore | 2.1 x 150 | 5 | 883700-902 | |
| | Narrow Bore RR | 2.1 x 100 | 3.5 | 861767-902 | |
| P | Guard Cartridge, 2/pk | 9.4 x 15 | 7 | 820675-115 | 820675-115 |
| ZGG | Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-914 | 820950-913 |
| ZGG | Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | 821125-915 | 821125-915 |
| P | Guard Hardware Kit | 9.4 x 15 | | 840140-901 | 840140-901 |
| ZGG | Guard Hardware Kit | | | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | |
| A | PrepHT Cartridge | 21.2 x 250 | 7 | 877967-102 | 877250-106 |
| A | PrepHT Cartridge | 21.2 x 150 | 7 | | 877150-106 |
| A | PrepHT Cartridge | 21.2 x 150 | 5 | | 870150-906 |
| A | PrepHT Cartridge | 21.2 x 100 | 5 | | 870100-906 |
| A | PrepHT Cartridge | 21.2 x 50 | 5 | | 870050-906 |
| A | PrepHT Guard Cartridge, 2/pk | | 5 | 820212-914 | 820212-915 |
| A | Guard Cartridge Hardware | | | 820444-901 | 820444-901 |
| A | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 |

*Rx-C8 is the same product as SB-C8. For other sizes and configurations, see the ZORBAX StableBond section, page 264.



ZORBAX 80Å Extend-C18

- High efficiency and long life at high pH – up to pH 11.5
- Unique bidentate bonding and double endcapping provides high pH stability
- More efficiency and better peak shape than polymer-based columns
- Improve retention, resolution and peak shape of basic compounds
- High sensitivity for LC/MS separations of peptides

The Agilent ZORBAX Extend-C18 column uses a novel bidentate C18-C18 bonding technology to make it possible to develop high-resolution separations at high pH with a silica-based column. At high pH, non-charged basic compounds will not interact with the underlying silica. The result is high efficiency separations with superior peak shape and improved resolution. High pH separations are also the best choice for compounds that are more stable or more soluble in high pH solutions. Some of the mobile phase buffer options for high pH include triethylamine, pyrrolidine, glycine, borate and ammonium hydroxide. Ammonium hydroxide at pH 10.5 is an excellent mobile phase modifier for the LC/MS of peptides and small molecules with improved sensitivity compared with TFA containing mobile phase at low pH. The Extend-C18 column is stable from pH 2-11.5 with good peak shape for all types of compounds. Extend-C18 columns also provide an additional selectivity choice at low pH.



TIPS & TOOLS

Always use Agilent Certified Lamps for Best LC Performance

Agilent detector lamps are built to the tightest specifications and quality standards. They are designed to increase light intensity and decrease noise, which improves chromatographic results. Agilent rigorously tests its lamps for lowest lamp-to-lamp variability. Trust Agilent lamps for robust, long-lasting performance and lower cost of ownership. To learn more, visit www.agilent.com/chem/lamps



Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits* | pH Range** | Endcapped | Carbon Load |
|-------------------|-----------|-----------------------|---------------|------------|-----------|-------------|
| ZORBAX Extend-C18 | 80Å | 180 m ² /g | 60 °C | 2.0-11.5 | Double | 12.5% |

Specifications represent typical values only.

*Temperature limits are 60 °C up to pH 8, 40 °C from pH 8-11.5.

**Above pH 6 highest column stability for all silica based columns is obtained by reducing the operating temperature to 40 °C or below and using lower buffer concentrations (0.01-0.02 M) or organic buffers.

Basic antihistamines on Extend-C18 at high pH

Column: ZORBAX Extend-C18
773450-902
4.6 x 150 mm, 5 µm

Mobile Phase: pH 7:
30% 20 mM Na₂HPO₄ 70% MeOH
pH 11:
30% 20 mM TEA 70% MeOH

Flow Rate: 1.0 mL/min

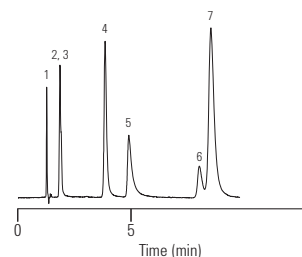
Temperature: Ambient

Detector: 254 nm

Sample: Antihistamines

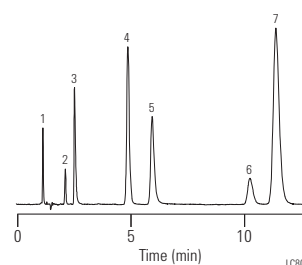
Pseudoephedrine and scopolamine are difficult to retain at low and mid pH. Pseudoephedrine is often analyzed by ion exchange methods. The Extend-C18 column retains these compounds in a noncharged form at high pH and improves resolution.

pH 7



1. Maleate
2. Scopolamine
3. Pseudoephedrine
4. Doxylamine
5. Chlorpheniramine
6. Triprolidine
7. Diphenhydramine

pH 11



Long life at high pH with Extend-C18

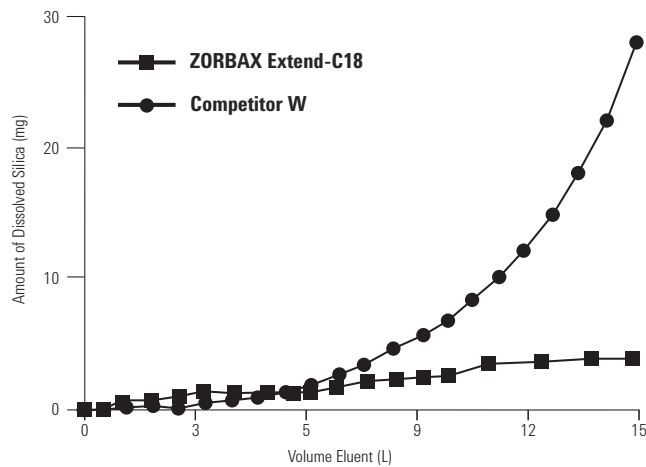
Column: ZORBAX Extend-C18
773450-902
4.6 x 150 mm, 5 µm

Mobile Phase: 20% Methanol
80% 0.1 M Carbonate buffer, pH 10.0

Flow Rate: 1.0 mL/min

Temperature: Ambient

At high pH, columns will fail due to silica dissolution. The example here shows extended lifetime of ZORBAX Extend-C18 at high pH in comparison to competitor W. This was measured by the amount of dissolved silica.



Extend-C18 provides good peak shape at low pH

Column: ZORBAX Extend-C18
773450-902
4.6 x 150 mm, 5 µm

Mobile Phase: 80% 25 mM NaH₂PO₄, pH 3.0
20% Methanol

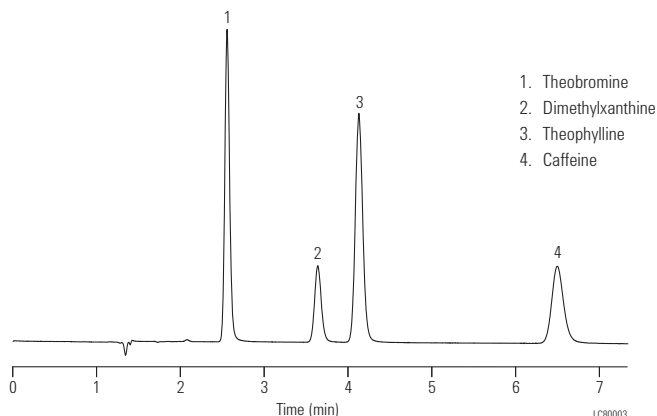
Flow Rate: 1.0 mL/min

Temperature: 35 °C

Detector: UV, 254 nm

Sample: Basic compounds

These basic compounds are separated on the Extend-C18 at low pH with excellent peak shape. The Extend-C18 column can be used at high and low pH.












ZORBAX 80Å Extend-C18

| Hardware Description | Size (mm) | Particle Size (µm) | Extend-C18 USP L1 |
|--|-----------|--------------------|-------------------|
| Standard Columns (no special hardware required) | | | |
| Analytical | 4.6 x 250 | 5 | 770450-902 |
| Analytical | 4.6 x 150 | 5 | 773450-902 |
| Analytical | 4.6 x 50 | 5 | 746450-902 |
| Rapid Resolution | 4.6 x 150 | 3.5 | 763953-902 |
| Rapid Resolution | 4.6 x 100 | 3.5 | 764953-902 |
| Rapid Resolution | 4.6 x 75 | 3.5 | 766953-902 |
| Rapid Resolution | 4.6 x 50 | 3.5 | 735953-902 |
| Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 728975-902 |
| Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 727975-902 |
| Rapid Resolution HT, 600 bar | 4.6 x 30 | 1.8 | 724975-902 |
| Rapid Resolution HT, 600 bar | 4.6 x 20 | 1.8 | 726975-902 |
| Solvent Saver | 3.0 x 250 | 5 | 770450-302 |
| Solvent Saver | 3.0 x 150 | 5 | 773450-302 |
| Solvent Saver Plus | 3.0 x 150 | 3.5 | 763954-302 |
| Solvent Saver Plus | 3.0 x 100 | 3.5 | 764953-302 |
| Solvent Saver Plus | 3.0 x 50 | 3.5 | 735954-302 |

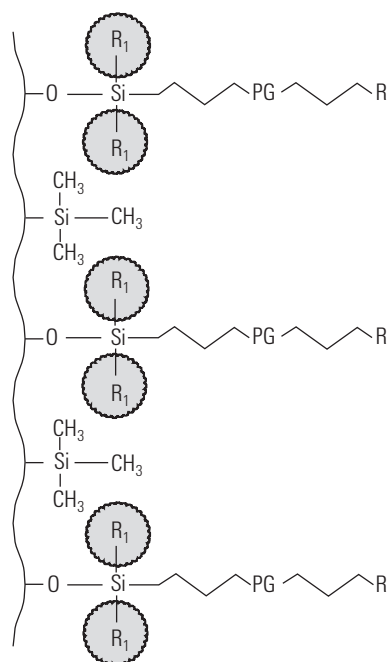
Unless indicated, column pressure limit is 400 bar.

(Continued)

ZORBAX 80Å Extend-C18

| Hardware Description | Size (mm) | Particle Size (µm) | Extend-C18 USP L1 |
|--|------------|--------------------|-------------------|
| Standard Columns (no special hardware required) | | | |
| Solvent Saver RRHD, 1200 bar | 3.0 x 100 | 1.8 | 758700-302 |
| Solvent Saver RRHD, 1200 bar | 3.0 x 50 | 1.8 | 757700-302 |
| Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 728975-302 |
| Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 727975-302 |
| Solvent Saver HT, 600 bar | 3.0 x 30 | 1.8 | 724975-302 |
| Solvent Saver HT, 600 bar | 3.0 x 20 | 1.8 | 726975-302 |
| Narrow Bore | 2.1 x 150 | 5 | 773700-902 |
| Narrow Bore | 2.1 x 50 | 5 | 760450-902 |
| Narrow Bore RR | 2.1 x 100 | 3.5 | 761753-902 |
| Narrow Bore RR | 2.1 x 50 | 3.5 | 735700-902 |
| Narrow Bore RRHD, 1200 bar | 2.1 x 150 | 1.8 | 759700-902 |
| Narrow Bore RRHD, 1200 bar | 2.1 x 100 | 1.8 | 758700-902 |
| Narrow Bore RRHD, 1200 bar | 2.1 x 50 | 1.8 | 757700-902 |
| Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 728700-902 |
| Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 727700-902 |
| Narrow Bore RRHT, 600 bar | 2.1 x 30 | 1.8 | 724700-902 |
| Narrow Bore RRHT, 600 bar | 2.1 x 20 | 1.8 | 726700-902 |
| MicroBore RR | 1.0 x 150 | 3.5 | 763600-902 |
| MicroBore RR | 1.0 x 50 | 3.5 | 765600-902 |
| MicroBore RR | 1.0 x 30 | 3.5 | 761600-902 |
| MicroBore Guard, 3/pk | 1.0 x 17 | 5 | 5185-5923 |
|  Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-930 |
|  Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | 821125-930 |
|  Guard Hardware Kit | | | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | |
|  PrepHT Cartridge | 21.2 x 150 | 5 | 770150-902 |
|  PrepHT | 21.2 x 100 | 5 | 770100-902 |
|  PrepHT | 21.2 x 50 | 5 | 770050-902 |
|  PrepHT Endfittings, 2/pk | | | 820400-901 |
|  PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-930 |
|  Guard Cartridge Hardware | | | 820444-901 |

Unless indicated, column pressure limit is 400 bar.



Unique, Polar Alkyl Bonus-RP Bonded Phase

ZORBAX Bonus-RP

- Excellent peak shape for challenging basic compounds at low and mid pH
- Unique reversed-phase selectivity
- Novel bonding technology with embedded polar group and steric protection
- Usable in 100% aqueous mobile phases

The Agilent ZORBAX Bonus-RP column has a polar amide group embedded in a long alkyl chain. This novel bonding reduces interactions between basic compounds and the silica support, improving peak shape for the most difficult basic compounds. Peak shape and column lifetime are further improved by triple endcapping. In addition, diisopropyl side groups provide steric protection against acid hydrolysis for good lifetime at low pH. The Bonus-RP column provides an alternate selectivity to C18 and C8 alkyl bonded phases.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits* | pH Range | Endcapped | Carbon Load |
|-----------------|-----------|-----------------------|---------------|----------|-----------|-------------|
| ZORBAX Bonus-RP | 80Å | 180 m ² /g | 60 °C | 2.0-9.0 | Triple | 9.5% |

Specifications represent typical values only.

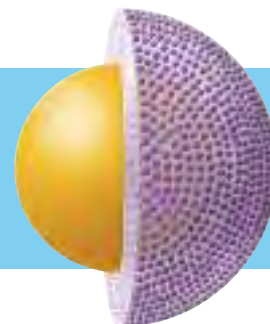
*Temperature limits are 60 °C up to pH 8, 40 °C from pH 8-9.

TIPS & TOOLS



ZORBAX Bonus-RP is also available on Poroshell 120.

Turn page 228



Improved peak shape of basic compounds using Bonus-RP

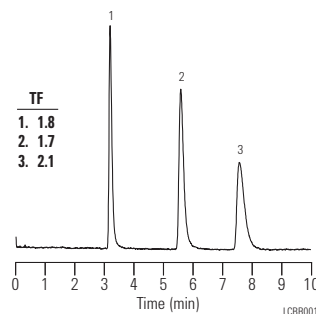
Column: Alkyl-C8
4.6 x 150 mm, 5 µm

Mobile Phase: 75% 25 mM NH₄OAc, pH 5.5
25% ACN

Flow Rate: 1.5 mL/min

Temperature: 40 °C

Detector: 254 nm



1. Doxylamine
2. Chlorpheniramine
3. Triprolidine

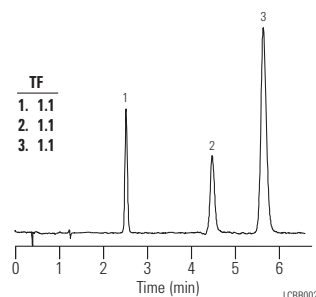
Column: ZORBAX Bonus-RP
883668-901
4.6 x 150 mm, 5 µm

Mobile Phase: 80% 25 mM NH₄OAc, pH 5.5
20% ACN

Flow Rate: 1.5 mL/min

Temperature: 40 °C

Detector: 254 nm



1. Doxylamine
2. Chlorpheniramine
3. Triprolidine

Bonus-RP eliminates peak tailing of these basic compounds in comparison to a typical alkyl C8 bonded phase. In the mid-pH region, residual silanols can interact more strongly with basic compounds to cause peak tailing. The polar group in the Bonus-RP bonded phase eliminates peak tailing of these basic compounds by reducing interactions with residual silanols.

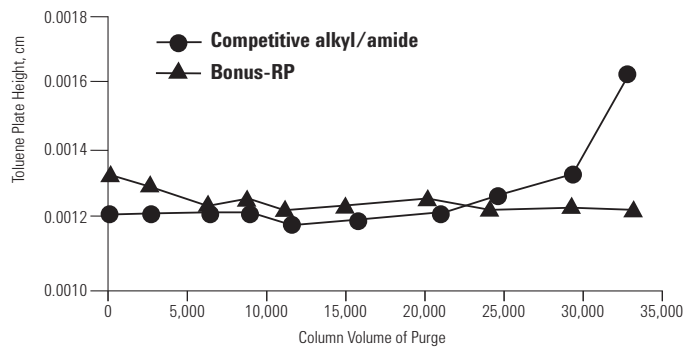
ZORBAX Bonus-RP is stable at low and mid pH

Column: ZORBAX Bonus-RP
883668-901
4.6 x 150 mm, 5 µm

Mobile Phase: 60% 25 mM
Phosphate Buffer,
pH 7.0:40% ACN

Flow Rate: 1.5 mL/min

Temperature: 23 °C



Triple endcapping of Bonus-RP enhances stability at pH 7. Each 10,000 column volume is equivalent to approximately one working month.

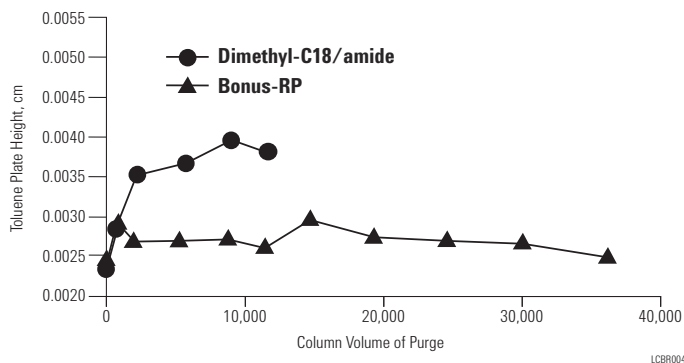
Dimethyl-C18/amide, Bonus-RP

Column: ZORBAX Bonus-RP
883668-901
4.6 x 150 mm, 5 µm

Mobile Phase: Aging:
50% MeOH
50% 0.1% TFA
Test:
80% MeOH
20% H₂O

Flow Rate: 1.0 mL/min

Temperature: Aging:
60 °C
Test:
23 °C



Sterically protecting side groups provide good low pH stability and longer column lifetime than similar polar alkyl bonded phases.

ZORBAX Bonus-RP provides unique selectivity

Column A: ZORBAX Bonus-RP
883668-901
4.6 x 150 mm, 5 µm

Column B: Eclipse XDB-C8
993967-906
4.6 x 150 mm, 5 µm

Mobile Phase: 75% 25 mM Na Citrate, pH 6
25% MeOH

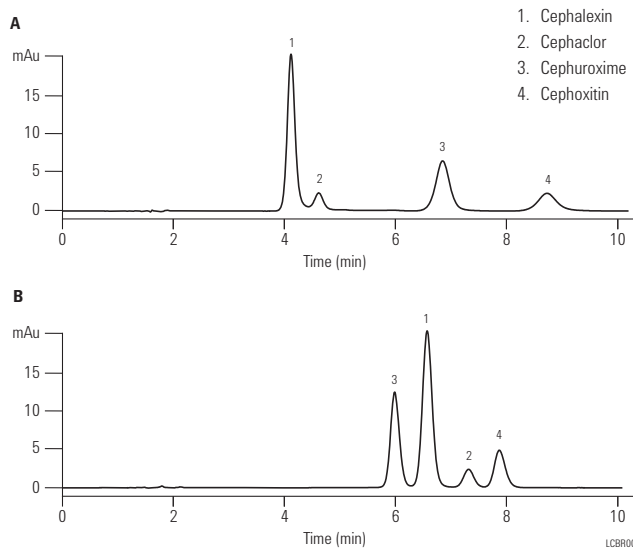
Flow Rate: 1.0 mL/min

Temperature: Ambient

Detector: 254 nm

Sample: 3 µL
Cephalosporins

Peak elution order can change dramatically when using Bonus-RP. In this example, the elution order of the first three peaks changes.



ZORBAX Bonus-RP












| Hardware Description | Size (mm) | Particle Size (µm) | Bonus-RP USP L60 |
|--|-----------|--------------------|------------------|
| Standard Columns (no special hardware required) | | | |
| Analytical | 4.6 x 250 | 5 | 880668-901 |
| Analytical | 4.6 x 150 | 5 | 883668-901 |
| Rapid Resolution | 4.6 x 250 | 3.5 | 884950-577 |
| Rapid Resolution | 4.6 x 150 | 3.5 | 863668-901 |
| Rapid Resolution | 4.6 x 100 | 3.5 | 864668-901 |
| Rapid Resolution | 4.6 x 75 | 3.5 | 866668-901 |
| Rapid Resolution | 4.6 x 50 | 3.5 | 835668-901 |
| Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 828668-901 |
| Rapid Resolution HT, 600 bar | 4.6 x 75 | 1.8 | 830668-901 |
| Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 827668-901 |
| Solvent Saver | 3.0 x 250 | 5 | 880668-301 |
| Solvent Saver | 3.0 x 150 | 5 | 883668-301 |
| Solvent Saver Plus | 3.0 x 150 | 3.5 | 863668-301 |
| Solvent Saver Plus | 3.0 x 100 | 3.5 | 864668-301 |
| Solvent Saver HT, 600 bar | 3.0 x 100 | 1.8 | 828668-301 |
| Solvent Saver HT, 600 bar | 3.0 x 50 | 1.8 | 827668-301 |
| Rapid Resolution HD, 1200 bar | 2.1 x 150 | 1.8 | 859768-901 |
| Rapid Resolution HD, 1200 bar | 2.1 x 100 | 1.8 | 858768-901 |
| Rapid Resolution HD, 1200 bar | 2.1 x 50 | 1.8 | 857768-901 |
| Narrow Bore | 2.1 x 150 | 5 | 883725-901 |
| Narrow Bore | 2.1 x 50 | 5 | 861971-901 |

Unless indicated, column pressure limit is 400 bar.

(Continued)

ZORBAX Bonus-RP bonding is also available on Poroshell 120 columns. Turn to page 228.

ZORBAX Bonus-RP

| Hardware Description | Size (mm) | Particle Size (µm) | Bonus-RP USP L60 |
|--|------------|--------------------|------------------|
| Standard Columns (no special hardware required) | | | |
| Narrow Bore RR | 2.1 x 150 | 3.5 | 863700-901 |
| Narrow Bore RR | 2.1 x 100 | 3.5 | 861768-901 |
| Narrow Bore RR | 2.1 x 50 | 3.5 | 861700-901 |
| Narrow Bore RRHT, 600 bar | 2.1 x 100 | 1.8 | 828768-901 |
| Narrow Bore RRHT, 600 bar | 2.1 x 50 | 1.8 | 827768-901 |
| MicroBore RR | 1.0 x 150 | 3.5 | 863608-901 |
| MicroBore RR | 1.0 x 50 | 3.5 | 865608-901 |
| MicroBore RR | 1.0 x 30 | 3.5 | 861608-901 |
| MicroBore Guard, 3/pk | 1.0 x 17 | 5 | 5185-5922 |
|  Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-928 |
|  Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | 821125-928 |
|  Guard Hardware Kit | | | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | |
|  PrepHT Cartridge | 21.2 x 250 | 7 | 878250-101 |
|  PrepHT Cartridge | 21.2 x 150 | 7 | 878150-101 |
|  PrepHT Cartridge | 21.2 x 150 | 5 | 868150-901 |
|  PrepHT Cartridge | 21.2 x 100 | 5 | 868100-901 |
|  PrepHT Cartridge | 21.2 x 50 | 5 | 868050-901 |
|  PrepHT Endfittings, 2/pk | | | 820400-901 |
|  PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-928 |
|  Guard Cartridge Hardware | | | 820444-901 |

Unless indicated, column pressure limit is 400 bar.

TIPS & TOOLS



Watch LC troubleshooting videos featuring Agilent chromatographic experts at www.agilent.com/chem/lctroubleshooting









ZORBAX Original Reversed-Phase Columns

Agilent Original ZORBAX columns are made with Type A silica and are useful for many applications of acidic or neutral compounds. These columns have a higher activity level and are therefore useful for separating isomers (e.g. cis-trans, geometric) or other compounds where silanol activity enhances selectivity. These columns are used in many established methods.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp Limit | pH Range | Endcapped | Carbon Load |
|---------------|-----------|-----------------------|------------|-----------|-----------|-------------|
| ZORBAX C18 | 70Å | 300 m ² /g | 60 °C | 2.0 - 8.0 | Yes/No | 20% |
| ZORBAX C8 | 70Å | 300 m ² /g | 60 °C | 2.0 - 8.0 | Yes | 12% |
| ZORBAX-Phenyl | 70Å | 300 m ² /g | 60 °C | 2.0 - 8.0 | Yes | 12% |
| ZORBAX CN | 70Å | 300 m ² /g | 60 °C | 2.0 - 8.0 | N/A | 7% |
| ZORBAX-TMS | 70Å | 300 m ² /g | 60 °C | 2.0 - 7.0 | N/A | 4% |

ZORBAX Original Reversed-Phase Columns

| Hardware | Description | Size (mm) | Particle Size (µm) | ODS (C18) USP L1 | C8 USP L7 | Phenyl USP L11 | CN USP L10 | TMS USP L13 |
|---|----------------------------|------------|--------------------|------------------|------------|----------------|------------|-------------|
| Standard Columns (no special hardware required) | | | | | | | | |
| | Semi-Preparative | 9.4 x 250 | 5 | 880952-202 | 880952-206 | | | |
| | Analytical (Endcapped) | 4.6 x 250 | 5 | 880952-702 | 880952-706 | 880952-712 | 884950-507 | 880952-710 |
| | Analytical (Non-endcapped) | 4.6 x 250 | 5 | 884950-543 | | | | |
| | Analytical | 4.6 x 150 | 5 | 883952-702 | 883952-706 | 883952-712 | 884950-526 | 883952-710 |
| | Solvent Saver | 3.0 x 250 | 5 | 880952-302 | | | | |
| | Solvent Saver | 3.0 x 150 | 5 | 883952-302 | | | | |
| Guard Columns (hardware required) | | | | | | | | |
|  | Guard Cartridge, 2/pk | 9.4 x 15 | 7 | 820675-115 | 820675-115 | 820675-115 | 820675-124 | |
|  | Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-902 | 820950-906 | 820950-912 | 820950-905 | 820950-924 |
|  | Guard Hardware Kit | | | 840140-901 | 840140-901 | 840140-901 | 840140-901 | 840140-901 |
|  | Guard Hardware Kit | | | 820999-901 | 820999-901 | 820999-901 | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | | | | |
|  | PrepHT Cartridge | 21.2 x 250 | 7 | 877952-102 | 877952-106 | | 877952-105 | |
|  | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | | 820400-901 | |



ZORBAX Method Development Kits

Kits for Analytical HPLC

ZORBAX Method Development Kits

Agilent offers a series of kits that allow for fast method development at an attractive price. Each kit contains 3 columns. Six new kits have been added and are recommended for use with the new Agilent Automated Method Development LC. Several of these kits contain Rapid Resolution HT (1.8 μm) columns in a variety of bonded phases for easy method optimization and several kits contain Rapid Resolution (3.5 μm) columns in the same variety of bonded phases. These kits contain some of the Eclipse Plus family of columns for excellent peak shape and optimum performance with a wide variety of compounds.

ZORBAX Method Development Kits



Recommended for use with the Agilent Automated Method Development LC System

| Description | Part No. |
|--|-----------|
| Rapid Resolution HT (RRHT) Selectivity Method Development Kit, 2.1 mm id Includes 2.1 x 50 mm, 1.8 μm , 600 bar columns: one each Eclipse Plus C18, Eclipse Plus Phenyl-Hexyl and Bonus-RP | 5190-1431 |
| Rapid Resolution HT (RRHT) pH Method Development Kit, 2.1 mm id Includes 2.1 x 50 mm, 1.8 μm , 600 bar columns: one each Eclipse Plus C18, SB-C18 and Extend-C18 | 5190-1432 |
| Rapid Resolution HT (RRHT) Selectivity Method Development Kit, 4.6 mm id Includes 4.6 x 50 mm, 1.8 μm , 600 bar columns: one each Eclipse Plus C18, Eclipse Plus Phenyl-Hexyl and Bonus-RP | 5190-1433 |
| Rapid Resolution HT (RRHT) pH Method Development Kit, 4.6 mm id Includes 4.6 x 50 mm, 1.8 μm , 600 bar columns: one each Eclipse Plus C18, SB-C18 and Extend-C18 | 5190-1434 |
| Rapid Resolution Selectivity Method Development Kit, 4.6 mm id Includes 4.6 x 100 mm, 3.5 μm columns: one each Eclipse Plus C18, Eclipse Plus Phenyl-Hexyl and Bonus-RP | 5190-1435 |
| Rapid Resolution pH Method Development Kit, 4.6 mm id Includes 4.6 x 100 mm, 3.5 μm columns: one each Eclipse Plus C18, SB-C18 and Extend-C18 | 5190-1436 |

ZORBAX Method Development Kits

| Description | Part No. |
|--|-----------------|
| StableBond Method Development Kit Includes 4.6 x 150 mm, 5 µm columns; one each: SB-C18, SB-CN and SB-Phenyl phases | 5183-4624 |
| Fast StableBond Method Development Kit Includes 4.6 x 75 mm, 3.5 µm columns; one each: SB-C18, SB-CN and SB-Phenyl phases | 5183-4625 |
| Eclipse XDB Method Development Kit Includes 4.6 x 150 mm, 5 µm columns; one each: XDB-C18, XDB-C8, XDB-Phenyl phases | 5183-4626 |
| Fast Eclipse XDB Method Development Kit Includes 4.6 x 75 mm, 3.5 µm columns; one each: XDB-C18, XDB-C8 and XDB-Phenyl phases | 5183-4627 |
| pH Method Development Kit Includes 4.6 x 150 mm, 5 µm columns; one each: SB-C18, XDB-C18 and Extend-C18 phases | 5185-5807 |
| Fast pH Method Development Kit Includes 4.6 x 75 mm, 3.5 µm columns; one each: SB-C18, XDB-C18 and Extend-C18 phases | 5185-5808 |
| Aqueous Method Development Kit Includes 4.6 x 150 mm, 5 µm columns; one each: SB-Aq, Bonus RP and SB-C18 | 5185-5809 |
| Fast Aqueous Method Development Kit Includes 4.6 x 75 mm, 3.5 µm columns; one each: SB-Aq, Bonus RP and SB-C18 | 5185-5810 |

ZORBAX Cartridge Column Starter Kits

| Hardware | Description | Part No. |
|---|---|-----------------|
|  | ZORBAX C18 Kit Includes one 4.6 x 150 mm, 5 µm Eclipse XDB-C18 column; one 4.6 x 150 mm, 5 µm StableBond C18 column; cartridge holder; mounting tool; replacement filter (2/pk); and open-end wrench | 5183-2021 |
|  | ZORBAX C8 Kit Includes one 4.6 x 150 mm, 5 µm Eclipse XDB-C8 column; one 4.6 x 150 mm, 5 µm StableBond C8 column; cartridge holder; mounting tool; replacement filter (2/pk); and open-end wrench | 5183-2022 |

ZORBAX Method Validation Kits

ZORBAX Method Validation Kits are supplied to customers who need the same HPLC column type (bonded phase, particle size, configuration) but from different manufacturing lots. To request columns from different lots, contact Agilent Technologies or your local Agilent Authorized Distributor using the following procedure:

- Request Validation Kits (columns from different lots) by using Part Number 899999-888
- Indicate the Part Number of the current column you are using
- Indicate the Lot Number of the current column you are using
- Indicate the number of additional columns needed from different lots (example: you have a current column and may need two additional lots)
- Please fax your request to **(302) 993-5354** (United States and Canada) or email to **cag_sales-na@agilent.com**. You will receive a quote from your Customer Service Representative within 1-2 business days. Delivery of your method validation kit is usually 3 weeks or less from the time your order is placed, depending on lot availability.

Custom HPLC Column Ordering

Columns not listed can be easily ordered using the following procedure:

- Request a Special Products Quotation (SPQ) using Part Number 899999-999
- Indicate column dimensions (example: 4.6 x 50 mm); bonded phase type (example: StableBond C3); particle size (example: 5 μm); and pore size (example: 80Å)
- Please fax your request to **(302) 993-5354** (United States and Canada) or email to **cag_sales-na@agilent.com**. You will receive a quote from your Customer Service Representative within 1-2 business days. Delivery of your custom column is usually 3 weeks or less from the time your order is placed, depending on lot availability.

Custom columns are priced with a minimal surcharge over the price of stocked columns.

Pursuit HPLC Columns

Beginning in drug discovery and drug metabolism, Pursuit columns are ideal for analyzing lead compounds and biological samples. The column's performance is due to the unique combination of advanced bonding chemistry and ultra-high purity silica. These factors combine to provide rapid separations with excellent first time resolution and symmetrical peaks for polar compounds, whether at pH 1.5 or 10. Additionally, the need for ion-pairing agents such as TFA is often eliminated, thus maximizing the performance of single and parallel multi-channel LC/MS systems.

Culminating in QC, Pursuit is ideal for implementing dependable trouble-free analysis of raw materials and approved drugs. Rigorous control and validation of each step in the manufacturing process ensures column reproducibility. With Pursuit, your laboratory can spend its energy on producing results.

Special columns, such as Pursuit PFP (for very polar compounds) and Pursuit PAH (environmental), give you the extra selectivities you need for your most challenging applications.



Pursuit HPLC Columns

Pursuit

For LC/MS and high throughput applications, the Pursuit column is built on the larger 200Å pore size silica. High ligand density delivers up to 40% faster separations without sacrificing resolution. This is accomplished by optimizing mass transfer with the larger pore size.

Pursuit XRs

Pursuit XRs columns are for performance in analytical R&D, QC and preparative applications. Combining high ligand density with a 100Å pore size, high surface area silica, Pursuit XRs columns are designed to increase productivity, as they offer maximum loadability, excellent stability and easy scalability while maintaining superior resolution.

Pursuit XRs Ultra

For the ultimate in speed and good resolution on any instrument, we designed the Pursuit XRs Ultra around an optimized 2.8 µm particle and an advanced packing procedure. Now you can decrease your run time while maintaining resolution. Lower backpressure allows high flow rates to be used, and the 2.8 µm particles of ultra-pure silica delivers 10-15% higher efficiency than 3 µm columns.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | pH Range | Endcapped | Carbon Load | Pore Volume | Ligand Coverage |
|----------------------------|-----------|-----------------------|----------|-----------|-------------|-------------|-------------------------|
| Pursuit C18 | 200Å | 200 m ² /g | 1.5-10 | Yes | 12.9% | 11 mL/g | 3.5 µmol/m ² |
| Pursuit C8 | 200Å | 200 m ² /g | 1.5-10 | Yes | 7.4% | 11 mL/g | 3.8 µmol/m ² |
| Pursuit Diphenyl | 200Å | 200 m ² /g | 1.5-8.0 | Yes | 7.3% | 11 mL/g | 2.8 µmol/m ² |
| Pursuit PFP | 200Å | 200 m ² /g | 1.5-10 | Yes | 6.3% | 11 mL/g | 3.4 µmol/m ² |
| Pursuit PAH | 200Å | 200 m ² /g | 1.5-10 | Yes | | 11 mL/g | |
| Pursuit XRs C18 | 100Å | 440 m ² /g | 1.5-10 | Yes | 22% | 11 mL/g | 2.9 µmol/m ² |
| Pursuit XRs C8 | 100Å | 440 m ² /g | 1.5-10 | Yes | 15% | 11 mL/g | 3.7 µmol/m ² |
| Pursuit XRs Diphenyl | 100Å | 440 m ² /g | 1.5-8.0 | Yes | 14.6% | 11 mL/g | 2.6 µmol/m ² |
| Pursuit XRs Si | 100Å | 440 m ² /g | 1.5-10 | Yes | | 11 mL/g | |
| Pursuit XRs Ultra C18 | 100Å | 440 m ² /g | 1.5-10 | Yes | 23.2% | 11 mL/g | 3.2 µmol/m ² |
| Pursuit XRs Ultra C8 | 100Å | 440 m ² /g | 1.5-10 | Yes | 15% | 11 mL/g | 3.7 µmol/m ² |
| Pursuit XRs Ultra Diphenyl | 100Å | 440 m ² /g | 1.5-8.0 | Yes | 14.6% | 11 mL/g | 2.6 µmol/m ² |

Specifications represent typical values only



TIPS & TOOLS

Request custom LC columns online at www.agilent.com/chem/customlccol

Tricyclic antidepressants and benzodiazepines

Column: Pursuit XRs C18
A6000150X046
4.6 x 150 mm, 5 µm

Mobile Phase: A: Water+0.1% HCOOH
B: MeCN+0.1% HCOOH

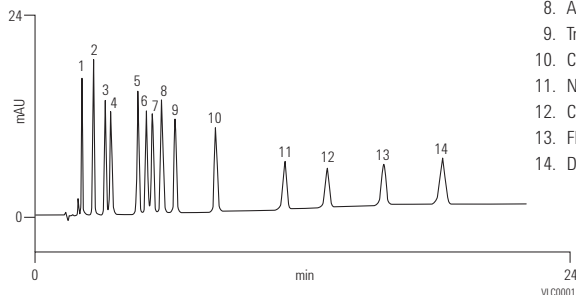
Gradient: 30-40% B in 15 min, hold at 40% B for 15 min

Flow Rate: 1.0 mL/min

Temperature: Ambient

Detector: UV, 254 nm

1. 7-Aminoclonazepam
2. 7-Aminoflunitrazepam
3. Nordoxepin
4. Doxepin
5. Desipramine
6. Imipramine
7. Nortriptyline
8. Amitriptyline
9. Trimipramine
10. Clomipramine
11. Nordiazepam
12. Clonazepam
13. Flunitrazepam
14. Diazepam



Mechanical stability of Pursuit XRs

Column: Pursuit XRs C18
A6000050X020
2.0 x 50 mm, 5 µm

Sample: DMSO mix

Mobile Phase: A: MeOH:water, 10:90 + 0.1% HCOOH
B: MeOH:water, 90:10 + 0.1% HCOOH

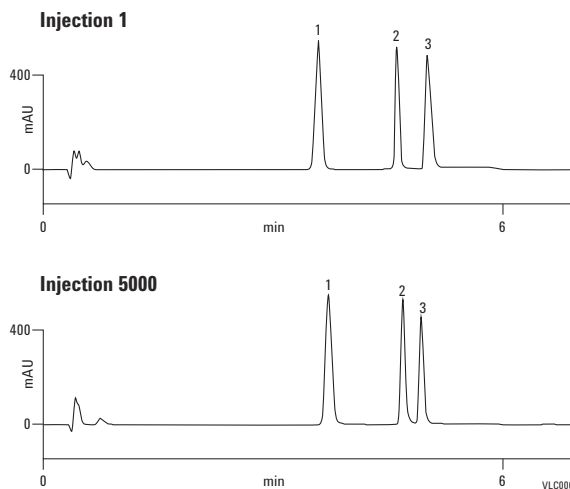
Gradient: 0-100% B in 3 min, back to 0% B in 0.5 min, hold at 0% B for 3.5 min

Flow Rate: 0.4 mL/min

Temperature: Ambient

Detector: UV, 254 nm

1. 4-Methoxybenzenesulfonamide
2. Methyl 3-aminothiophene-2-carboxylate
3. Trimipramine



Antifungals

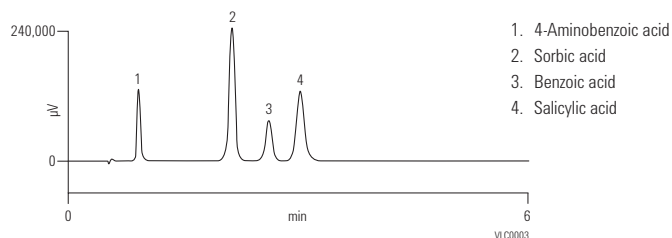
Column: Pursuit XRs Ultra Diphenyl
A7521050X020
2.0 x 50 mm, 2.8 μm

Mobile Phase: Water+0.1% HCOOH:MeCN+0.1% HCOOH, 80:20

Flow Rate: 0.4 mL/min

Temperature: Ambient

Detector: UV, 254 nm



1. 4-Aminobenzoic acid
2. Sorbic acid
3. Benzoic acid
4. Salicylic acid

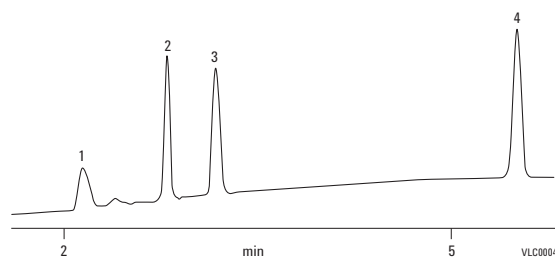
Liquid chromatography phase test mixture (LPTM) on Pursuit C8

Column: Pursuit C8
A3031050X020
2.0 x 50 mm, 3 μm

Mobile Phase: A: 0.05% HCOOH in water
B: 0.05% HCOOH in MeCN

Flow Rate: 0.6 mL/min

Detector: UV, 220 nm



1. Aspartame
2. Cortisone
3. Reserpine
4. Dioctyl phthalate

Adrenocorticosteroids on Pursuit PFP and C18

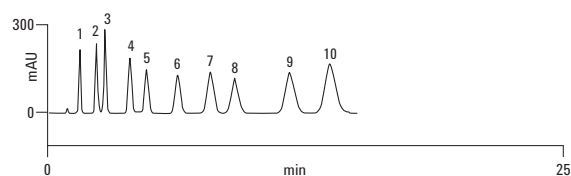
Mobile Phase: MeCN:water, 22.5:77.5

Flow Rate: 1.5 mL/min

Temperature: Ambient

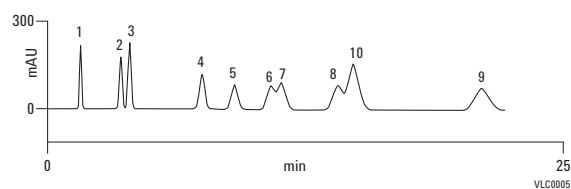
Detector: UV, 240 nm

Pursuit PFP



1. Triamcinolone
2. Prednisolone
3. Cortisone
4. Methylprednisolone
5. Corticosterone
6. Beclomethasone
7. Prednisolone acetate
8. Triamcinolone acetonide
9. Cortisone acetate
10. Flucinolone acetonide

Pursuit C18



Pursuit HPLC Columns

Semi-Prep Scale

| Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit Diphenyl | Pursuit PFP | Pursuit PAH USP L1 |
|------------|--------------------|-----------------------|----------------------|------------------|--------------|-----------------------|
| 10.0 x 250 | 10 | A3002250X100 | A3032250X100 | | | |
| 10.0 x 150 | 5 | A3000150X100 | | | A3050150X100 | |
| 10.0 x 250 | 5 | A3000250X100 | A3030250X100 | | A3050250X100 | |

Pursuit HPLC Columns

Analytical Scale

| Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit Diphenyl | Pursuit PFP | Pursuit PAH USP L1 |
|-----------|--------------------|-----------------------|----------------------|------------------|--------------|-----------------------|
| 4.6 x 250 | 10 | A3002250X046 | A3032250X046 | | | |
| 4.6 x 150 | 10 | A3002150X046 | A3032150X046 | | | |
| 4.6 x 100 | 10 | A3002100X046 | A3032100X046 | | | |
| 4.6 x 250 | 5 | A3000250X046 | A3030250X046 | A3040250X046 | A3050250X046 | A7000250X046 |
| 4.6 x 150 | 5 | A3000150X046 | A3030150X046 | A3040150X046 | A3050150X046 | A7000150X046 |
| 4.6 x 100 | 5 | A3000100X046 | A3030100X046 | A3040100X046 | A3050100X046 | |
| 4.6 x 50 | 5 | A3000050X046 | A3030150X046 | A3040050X046 | A3050050X046 | |
| 4.6 x 250 | 3 | A3001250X046 | A3031250X046 | A3041250X046 | A3051250X046 | |
| 4.6 x 150 | 3 | A3001150X046 | A3031150X046 | A3041150X046 | A3051150X046 | |
| 4.6 x 100 | 3 | A3001100X046 | A3031100X046 | A3041100X046 | A3051100X046 | A7001100X046 |
| 4.6 x 50 | 3 | A3001050X046 | | A3041050X046 | A3051050X046 | |
| 4.6 x 30 | 3 | A3001030X046 | | | | |
| 4.0 x 250 | 5 | A3000250X040 | | | | |
| 4.0 x 125 | 5 | A3000125X040 | | | | |
| 3.9 x 300 | 10 | A3002300X039 | | | | |
| 3.9 x 300 | 5 | A3000300X039 | | | | |
| 3.9 x 150 | 5 | A3000150X039 | | | | |
| 3.0 x 250 | 5 | A3000250X030 | | A3040250X030 | | |
| 3.0 x 150 | 5 | A3000150X030 | | A3040150X030 | A3050150X030 | |
| 3.0 x 100 | 5 | A3000100X030 | | | A3050100X030 | |
| 3.0 x 250 | 3 | A3001250X030 | | | | |
| 3.0 x 150 | 3 | A3001150X030 | | A3041150X030 | A3051150X030 | |
| 3.0 x 100 | 3 | A3001100X030 | | A3041100X030 | A3051100X030 | A7001100X030 |

(Continued)

Pursuit HPLC Columns

Analytical Scale

| Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit Diphenyl | Pursuit PFP | Pursuit PAH USP L1 |
|-----------|--------------------|-----------------------|----------------------|------------------|--------------|-----------------------|
| 3.0 x 50 | 3 | A3001050X030 | | A3041050X030 | A3051050X030 | |
| 2.0 x 250 | 5 | A3000250X020 | | | | |
| 2.0 x 150 | 5 | A3000150X020 | A3030150X020 | A3040150X020 | | |
| 2.0 x 100 | 5 | A3000100X020 | A3030100X020 | A3040100X020 | A3050100X020 | |
| 2.0 x 50 | 5 | A3000050X020 | A3030050X020 | A3040050X020 | A3050050X020 | |
| 2.0 x 30 | 5 | A3000030X020 | | A3040030X020 | A3050030X020 | |
| 2.0 x 20 | 5 | A3000020X020 | | | A3050020X020 | |
| 2.0 x 250 | 3 | A3001250X020 | | A3041250X020 | | |
| 2.0 x 200 | 3 | | | A3041200X020 | | |
| 2.0 x 150 | 3 | A3001150X020 | A3031150X020 | A3041150X020 | A3051150X020 | |
| 2.0 x 100 | 3 | A3001100X020 | A3031100X020 | A3041100X020 | A3051100X020 | A7001100X020 |
| 2.0 x 50 | 3 | A3001050X020 | A3031050X020 | A3041050X020 | A3051050X020 | |
| 2.0 x 30 | 3 | A3001030X020 | A3031030X020 | A3041030X020 | A3051030X020 | |
| 2.0 x 20 | 3 | A3001020X020 | | A3041020X020 | A3051020X020 | |

Pursuit HPLC Columns

Prep Scale

| Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit Diphenyl | Pursuit PFP | Pursuit PAH USP L1 |
|------------|--------------------|-----------------------|----------------------|------------------|--------------|-----------------------|
| 50.0 x 250 | 10 | A3002250X500 | A3032250X500 | | | |
| 21.2 x 250 | 10 | A3002250X212 | A3032250X212 | | | |
| 21.2 x 150 | 10 | A3002150X212 | | | | |
| 21.2 x 250 | 5 | A3000250X212 | | | A3050250X212 | |
| 21.2 x 150 | 5 | A3000150X212 | | | A3050150X212 | |
| 21.2 x 100 | 5 | | | A3040100X212 | | |



Pursuit ChromSep Complete Cartridge Systems

| Hardware | Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit PAH USP L1 |
|-----------|-----------|--------------------|-----------------------|----------------------|-----------------------|
| CS | 4.6 x 250 | 5 | A3000250C046 | A3030250C046 | A7000250C046 |
| CS | 4.6 x 250 | 3 | | A3031250C046 | |
| CS | 4.6 x 150 | 5 | A3000150C046 | A3030150C046 | A7000150C046 |
| CS | 4.6 x 100 | 5 | A3000100C046 | A3030100C046 | |
| CS | 4.6 x 150 | 3 | A3001150C046 | A3031150C046 | A7001150C046 |
| CS | 4.6 x 100 | 3 | A3001100C046 | A3031100C046 | A7001100C046 |
| CS | 4.6 x 50 | 3 | A3001050C046 | | |
| CS | 3.0 x 250 | 5 | A3000250C030 | | |
| CS | 3.0 x 150 | 5 | A3000150C030 | | |
| CS | 3.0 x 100 | 5 | A3000100C030 | | A7000100C030 |
| CS | 3.0 x 150 | 3 | A3001150C030 | | |
| CS | 3.0 x 100 | 3 | A3001100C030 | | |
| CS | 2.0 x 250 | 5 | A3000250C020 | | |
| CS | 2.0 x 150 | 5 | A3000150C020 | A3030150C020 | |
| CS | 2.0 x 100 | 5 | A3000100C020 | | |
| CS | 2.0 x 150 | 3 | A3001150C020 | | |
| CS | 2.0 x 100 | 3 | A3001100C020 | | |
| CS | 2.0 x 50 | 3 | A3001050C020 | | |

Pursuit ChromSep Replacement Cartridges

| Hardware | Size (mm) | Particle Size (µm) | Unit | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit PAH USP L1 |
|----------|-----------|--------------------|------|-----------------------|----------------------|-----------------------|
| CS | 4.6 x 250 | 5 | | | | A7000250R046 |
| | | | 3/pk | | | A7000250T046 |
| CS | 4.6 x 150 | 5 | | A3000150R046 | A3030150R046 | A7000150R046 |
| | | | 3/pk | A3000150T046 | A3030150T046 | A7000150T046 |
| CS | 4.6 x 150 | 3 | | | A3031150R046 | A7001150R046 |
| | | | 3/pk | | A3031150T046 | A7001150T046 |
| CS | 4.6 x 100 | 3 | | | | A7001100R046 |
| | | | 3/pk | | | A7001100T046 |
| CS | 4.6 x 50 | 3 | | A3001050R046 | | |
| | | | 3/pk | A3001050T046 | | |
| CS | 3.0 x 150 | 5 | | A3000150R030 | | |
| | | | 3/pk | A3000150T030 | | |
| CS | 3.0 x 100 | 5 | | A3000100R030 | | A7000100R030 |
| | | | 3/pk | A3000100T030 | | A7000100T030 |
| CS | 3.0 x 150 | 3 | | A3001150R030 | | |
| | | | 3/pk | A3001150T030 | | |
| CS | 3.0 x 100 | 3 | | A3001100R030 | | A7001100R030 |
| | | | 3/pk | A3001100T030 | | A7001100T030 |
| CS | 2.0 x 50 | 3 | | | A3031050R020 | |
| | | | 3/pk | | | A3031050T020 |

MetaGuard Columns, 3/pk

| Hardware | ID (mm) | Particle Size (µm) | Pursuit C18 | Pursuit C8 | Pursuit DP | Pursuit PFP |
|----------|---------|--------------------|-------------|------------|------------|-------------|
| MG | 4.6 | 10 | A3002MG | | | |
| MG | 2.0 | 10 | A3002MG2 | | | |
| MG | 4.6 | 5 | A3000MG | A3030MG | A3040MG | A3050MG |
| MG | 2.0 | 5 | A3000MG2 | A3030MG2 | A3040MG2 | A3050MG2 |
| MG | 1.0 | 5 | A3000MG1 | | A3040MG1 | |
| MG | 4.6 | 3 | A3001MG | A3031MG | A3041MG | A3051MG |
| MG | 2.0 | 3 | A3001MG2 | A3031MG2 | A3041MG2 | A3051MG2 |
| MG | 1.0 | 3 | | | A3041MG1 | |

Pursuit XRs HPLC Columns

Semi-Prep Scale

| Size (mm) | Particle Size (µm) | Pursuit XRs C18 USP L1 | Pursuit XRs C8 USP L7 | Pursuit XRs Diphenyl USP L11 | Pursuit XRs Si* USP L3 |
|------------|--------------------|------------------------|-----------------------|------------------------------|------------------------|
| 10.0 x 250 | 10 | A6002250X100 | | | A6004250X100 |
| 10.0 x 250 | 5 | A6000250X100 | | A6020250X100 | |
| 10.0 x 150 | 5 | A6000150X100 | | | |
| 10.0 x 50 | 5 | A6000050X100 | | | |
| 10.0 x 150 | 3 | | | A6021150X100 | |

*Pursuit XRs Si is a normal phase column.

Pursuit XRs HPLC Columns

Analytical Scale

| Size (mm) | Particle Size (µm) | Pursuit XRs C18 USP L1 | Pursuit XRs C8 USP L7 | Pursuit XRs Diphenyl USP L11 | Pursuit XRs Si* USP L3 |
|-----------|--------------------|------------------------|-----------------------|------------------------------|------------------------|
| 4.6 x 250 | 10 | A6002250X046 | | | A6004250X046 |
| 4.6 x 50 | 10 | A6002050X046S | | | |
| 4.6 x 250 | 5 | A6000250X046 | A6010250X046 | A6020250X046 | |
| 4.6 x 150 | 5 | A6000150X046 | A6010150X046 | A6020150X046 | |
| 4.6 x 100 | 5 | A6000100X046 | A6010100X046 | A6020100X046 | A6006100X046 |
| 4.6 x 50 | 5 | A6000050X046 | | A6020050X046 | A6006050X046 |
| 4.6 x 250 | 3 | A6001250X046 | | A6021250X046 | |
| 4.6 x 150 | 3 | A6001150X046 | A6010150X046 | A6021150X046 | |
| 4.6 x 100 | 3 | A6001100X046 | A6011100X046 | A6021100X046 | A6005100X046 |
| 4.6 x 50 | 3 | A6001050X046 | A6011050X046 | A6021050X046 | A6005050X046 |
| 4.6 x 30 | 3 | A6001030X046 | | A6021030X046 | |
| 4.0 x 250 | 5 | A6000250X040 | A6010250X040 | | |
| 4.0 x 150 | 5 | A6000150X040 | A6010150X040 | | |
| 3.0 x 250 | 5 | A6000250X030 | A6010250X030 | A6020250X030 | |
| 3.0 x 150 | 5 | A6000150X030 | A6010150X030 | A6020150X030 | |
| 3.0 x 100 | 5 | A6000100X030 | A6010100X030 | A6020100X030 | |
| 3.0 x 150 | 3 | A6001150X030 | A6011150X030 | A6021150X030 | |
| 3.0 x 100 | 3 | A6001100X030 | A6011100X030 | A6021100X030 | |
| 3.0 x 50 | 3 | A6001050X030 | A6011050X030 | A6021050X030 | |
| 3.0 x 30 | 3 | A6001030X030 | | | |

*Pursuit XRs Si is a normal phase column.

(Continued)

Pursuit XRs HPLC Columns

Analytical Scale

| Size (mm) | Particle Size (µm) | Pursuit XRs C18 USP L1 | Pursuit XRs C8 USP L7 | Pursuit XRs Diphenyl USP L11 | Pursuit XRs Si* USP L3 |
|-----------|--------------------|------------------------|-----------------------|------------------------------|------------------------|
| 2.1 x 100 | 5 | | | | A6006100X021 |
| 2.0 x 250 | 5 | A6000250X020 | | A6020250X020 | |
| 2.0 x 150 | 5 | A6000150X020 | A6010150X020 | A6020150X020 | |
| 2.0 x 100 | 5 | A6000100X020 | A6010100X020 | | |
| 2.0 x 50 | 5 | A6000050X020 | A6010050X020 | A6020050X020 | |
| 2.0 x 30 | 5 | A6000030X020 | | | |
| 2.0 x 250 | 3 | A6001250X020 | | A6021250X020 | |
| 2.0 x 150 | 3 | A6001150X020 | A6011150X020 | A6021150X020 | |
| 2.0 x 100 | 3 | A6001100X020 | A6011100X020 | A6021100X020 | |
| 2.0 x 50 | 3 | A6001050X020 | A6011050X020 | A6021050X020 | A6005050X020 |
| 2.0 x 30 | 3 | | | A6021030X020 | |
| 2.0 x 20 | 3 | A6001020X020 | | | |
| 1.0 x 150 | 3 | A6001150X010 | | | |
| 1.0 x 100 | 3 | A6001100X010 | | A6021100X010 | |

*Pursuit XRs Si is a normal phase column.








Pursuit XRs HPLC Columns

Prep Scale

| Size (mm) | Particle Size (µm) | Pursuit XRs C18 USP L1 | Pursuit XRs C8 USP L7 | Pursuit XRs Diphenyl USP L11 | Pursuit XRs Si* USP L3 |
|------------|--------------------|------------------------|-----------------------|------------------------------|------------------------|
| 50.0 x 250 | 10 | A6002250X500 | | A6002250X500 | A6004250X500 |
| 30.0 x 250 | 5 | A6000250X300 | | | A6004250X300 |
| 30.0 x 150 | 5 | A6000150X300 | | A6020150X300 | |
| 30.0 x 100 | 5 | A6000100X300 | | | |
| 30.0 x 50 | 5 | A6000050X300 | | | |
| 21.2 x 250 | 10 | A6002250X212 | A6012250X212 | | A6004250X212 |
| 21.2 x 250 | 5 | A6000250X212 | | A6020250X212 | |
| 21.2 x 150 | 5 | A6000150X212 | | | |
| 21.2 x 100 | 5 | A6000100X212 | | A6020100X212 | |
| 21.2 x 50 | 5 | A6000050X212 | | | |
| 21.2 x 30 | 5 | A6000030X212 | | | |

*Pursuit XRs Si is a normal phase column.

MetaGuard Columns, 3/pk

| Hardware | ID (mm) | Particle Size (μm) | Pursuit XRs C18 | Pursuit XRs Si | Pursuit XRs C8 | Pursuit XRs Diphenyl | Pursuit PAH |
|---|---------|---------------------------------|-----------------|----------------|----------------|----------------------|-------------|
|  | 4.6 | 10 | A6002MG | A6004MG | | | |
|  | 4.6 | 5 | A6000MG | | A6010MG | A6020MG | |
|  | 3.0 | 5 | | | | | A7000MG3 |
|  | 2.0 | 5 | A6000MG2 | | A6010MG2 | A6020MG2 | |
|  | 4.6 | 3 | A6001MG | | A6011MG | A6021MG | |
|  | 3.0 | 3 | | | | | A7001MG3 |
|  | 2.0 | 3 | A6001MG2 | | A6011MG2 | A6021MG2 | A6001MG2 |

Pursuit XRs Ultra HPLC Columns

| Size (mm) | Particle Size (μm) | Pursuit XRs Ultra C18 | Pursuit XRs Ultra C8 | Pursuit XRs Ultra Diphenyl |
|-----------|---------------------------------|-----------------------|----------------------|----------------------------|
| 3.0 x 150 | 2.8 | A7501150X030 | A7511150X030 | |
| 3.0 x 100 | 2.8 | A7501100X030 | | |
| 2.0 x 150 | 2.8 | A7501150X020 | | |
| 2.0 x 100 | 2.8 | A7501100X020 | A7511100X020 | A7521100X020 |
| 2.0 x 50 | 2.8 | A7501050X020 | A7511050X020 | A7521050X020 |
| 2.0 x 30 | 2.8 | A7501030X020 | A7511030X020 | A7521030X020 |



Polaris HPLC Columns

Polaris HPLC Columns

In areas like drug discovery where target compounds are increasingly polar, it is critical to have a reversed-phase column that performs well under aqueous conditions. Retention is critical, but cannot come with troublesome secondary interactions. Likewise, phase collapse and shifting retention times need to be avoided. The answer is our Polaris line of polar-modified columns.

From the collapse-resistant pore structure of our base silica, to the "wettability" engineered into the bonded phases, Polaris columns have been designed for high aqueous conditions. The combination of high phase density bonding, ultra pure silica, and silanol shielding leads to excellent peak shape among polar-modified columns.

As a family, Polaris offers a variety of polar modifications in both C18 and C8 chemistries.

Polaris C18-A

Polaris C18-A is the best starting place for separations where the benefits of polar-modified columns are desired. The polar modifications of C18-A help it avoid poor peak shape and retention issues in low organic conditions.

Polaris C8-A

Polaris C8-A offers an alternative selectivity to standard C8 phases and has a lower hydrophobicity than Polaris C18-A, making it ideal for polar samples, or faster overall analysis times.

Polaris C18-Ether

Polaris C18-Ether offers an alternative selectivity to Polaris C18-A and standard C18 phases, and typically delivers increased retention of polar compounds away from the void volume.

Polaris C8-Ether

Polaris C8-Ether offers an alternative selectivity to Polaris C8-A with particular utility for hydrogen bonding compounds.

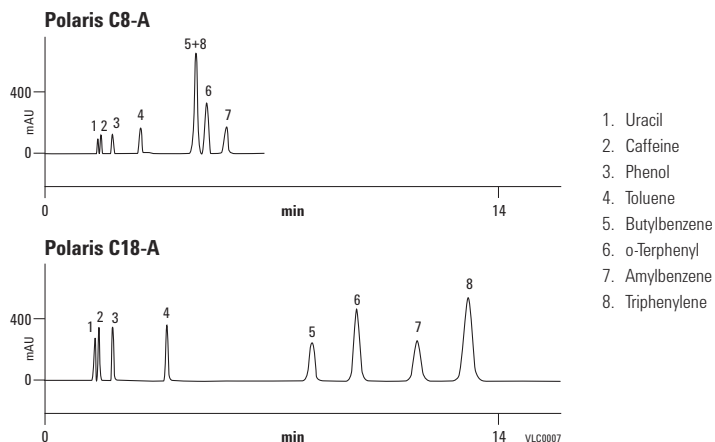
Column Specifications

| Bonded Phase | Pore Size | Surface Area | Carbon Load | Endcapped | Pore Volume | Ligand Coverage |
|-------------------------|-----------|-----------------------|-------------|-----------|------------------------|-------------------------|
| Polaris C18-A | 180Å | 200 m ² /g | 13.8% | Yes | 1.1 cm ³ /g | 3.9 μmol/m ² |
| Polaris C8-A | 180Å | 200 m ² /g | 7.4% | Yes | 1.1 cm ³ /g | 4.8 μmol/m ² |
| Polaris C18-Ether | 180Å | 200 m ² /g | 12.1% | Yes | 1.1 cm ³ /g | 3.3 μmol/m ² |
| Polaris C8-Ether | 180Å | 200 m ² /g | 7.1% | Yes | 1.1 cm ³ /g | 4.5 μmol/m ² |
| Polaris Amide C18 | 180Å | 200 m ² /g | 15% | Yes | 1.1 cm ³ /g | 4.4 μmol/m ² |
| Polaris NH ₂ | 180Å | 200 m ² /g | 5.5% | Amide | 1.1 cm ³ /g | 3.8 μmol/m ² |
| Polaris Si-A | 180Å | 200 m ² /g | N/A | N/A | 1.1 cm ³ /g | N/A |

Specifications represent typical values only.

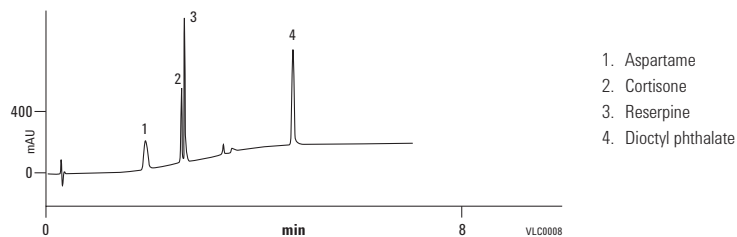
Selectivity test mix for Polaris columns

Mobile Phase: MeCN:water 70:30
 Flow Rate: 1.0 mL/min
 Temperature: Ambient
 Detector: UV, 254 nm

**LC/MS performance test mix for Polaris C8-A**

**Column: Polaris C8-A
 A2011030X030
 3.0 x 30 mm, 3 µm**

Mobile Phase: A: Water+0.05% HCOOH
 B: MeCN+0.05% HCOOH
 Gradient: 5-90% B in 3 min and hold for 4 min
 Flow Rate: 0.6 mL/min
 Temperature: Ambient
 Detector: UV, 220 nm



Polaris HPLC Columns

| Size (mm) | Particle Size (µm) | Polaris C18-A | Polaris C8-A | Polaris C18-Ether | Polaris C8-Ether | Polaris Amide C18 | Polaris NH2* | Polaris Si-A* |
|------------|--------------------|---------------|--------------|-------------------|------------------|-------------------|--------------|---------------|
| 50.0 x 250 | 10 | A2002250X500 | | | | | | A2004250X500 |
| 30.0 x 100 | 5 | A2000100X300 | | | | | | |
| 30.0 x 3.0 | 3 | | | | | A2007030X030 | | |
| 21.2 x 250 | 10 | A2002250X212 | | | | A2008250X212 | | A2004250X212 |
| 21.2 x 250 | 5 | A2000250X212 | A2010250X212 | A2020250X212 | A2030250X212 | A2006250X212 | A2013250X212 | A2003250X212 |
| 21.2 x 150 | 5 | A2000150X212 | | | | | | A2003150X046 |
| 21.2 x 100 | 5 | A2000100X212 | | | | | | |
| 21.2 x 50 | 5 | | | | | | | A2003050X212 |
| 10.0 x 250 | 10 | | | | | A2008250X100 | | |
| 10.0 x 250 | 5 | A2000250X100 | | A2020250X100 | A2030250X100 | A2006250X100 | A2013250X100 | |
| 10.0 x 50 | 3 | | | A2021050X100 | | | | |
| 4.6 x 250 | 10 | A2002250X046 | | | | | | A2003250X046 |
| 4.6 x 250 | 5 | A2000250X046 | A2010250X046 | A2020250X046 | A2030250X046 | A2006250X046 | A2013250X046 | |
| 4.6 x 200 | 5 | A2000200X046 | | | | | | |
| 4.6 x 150 | 5 | A2000150X046 | A2010150X046 | A2020150X046 | A2030150X046 | A2006150X046 | A2013150X046 | A2003150X046 |
| 4.6 x 100 | 5 | A2000100X046 | A2010100X046 | | | A2006100X046 | A2013100X046 | A2003100X046 |
| 4.6 x 50 | 5 | A2000050X046 | | A2020050X046 | | A2006050X046 | A2013050X046 | A2003050X046 |
| 4.6 x 30 | 5 | A2000030X046 | | | | | | |
| 4.6 x 250 | 3 | A2001250X046 | | A2021250X046 | A2031250X046 | A2007250X046 | A2014250X046 | A2005250X046 |
| 4.6 x 150 | 3 | A2001150X046 | A2011150X046 | | | A2007150X046 | A2014150X046 | A2005150X046 |
| 4.6 x 100 | 3 | A2001100X046 | A2011100X046 | | | A2007100X046 | A2014100X046 | A2005100X046 |
| 4.6 x 75 | 3 | A2001075X046 | A2011075X046 | | | | | |

*Normal phase columns.

(Continued)



Polaris HPLC Columns

| Size (mm) | Particle Size (µm) | Polaris C18-A | Polaris C8-A | Polaris C18-Ether | Polaris C8-Ether | Polaris Amide C18 | Polaris NH2* | Polaris Si-A* |
|-----------|--------------------|---------------|--------------|-------------------|------------------|-------------------|--------------|---------------|
| 4.6 x 50 | 3 | A2001050X046 | | A2021050X046 | A2031050X046 | A2007050X046 | A2014050X046 | A2005050X046 |
| 4.6 x 30 | 3 | A2001030X046 | | | | | | |
| 4.0 x 250 | 5 | A2000250X040 | A2010250X040 | A2020250X040 | A2030250X040 | | A2013250X040 | A2003250X040 |
| 4.0 x 150 | 5 | A2000150X040 | A2010150X040 | A2020150X040 | A2030150X040 | | A2013150X040 | A2003150X040 |
| 4.0 x 125 | 5 | A2000125X040 | A2010125X040 | A2020125X040 | A2030125X040 | | A2013125X040 | A2003125X040 |
| 3.0 x 250 | 5 | A2000250X030 | A2010250X030 | A2020250X030 | A2030250X030 | A2006250X030 | A2013250X030 | A2005250X046 |
| 3.0 x 150 | 5 | A2000150X030 | A2010150X030 | A2020150X030 | A2030150X030 | A2006150X030 | A2013150X030 | A2003150X030 |
| 3.0 x 100 | 5 | A2000100X030 | A2010100X030 | A2020100X030 | A2030100X030 | A2006100X030 | A2013100X030 | A2003100X030 |
| 3.0 x 50 | 5 | A2000050X030 | | | | | | A2003050X030 |
| 3.0 x 250 | 3 | A2001250X030 | | | | A2007250X030 | A2014250X030 | A2003250X030 |
| 3.0 x 200 | 3 | A2001200X030 | | | | | | |
| 3.0 x 150 | 3 | A2001150X030 | | A2021150X030 | | A2007150X030 | A2014150X030 | A2005150X030 |
| 3.0 x 100 | 3 | A2001100X030 | | | | A2007100X030 | A2014100X030 | A2005100X030 |
| 3.0 x 50 | 3 | A2001050X030 | | A2021050X030 | A2031050X030 | A2007050X030 | A2014050X030 | A2005050X030 |
| 3.0 x 30 | 3 | A2001030X030 | A2011030X030 | | | | | |
| 2.0 x 250 | 5 | A2000250X020 | | A2020250X020 | A2030250X020 | A2006250X020 | A2013250X020 | A2003250X020 |
| 2.0 x 150 | 5 | A2000150X020 | A2010150X020 | A2020150X020 | A2030150X020 | A2006150X020 | A2013150X020 | A2003150X020 |
| 2.0 x 100 | 5 | A2000100X020 | | | | A2006100X020 | A2013100X020 | A2003100X020 |
| 2.0 x 50 | 5 | A2000050X020 | A2010050X020 | A2020050X020 | A2030050X020 | A2006050X020 | A2013050X020 | A2003050X020 |
| 2.0 x 30 | 5 | A2000030X020 | | | | A2006030X020 | A2013030X020 | A2003030X020 |
| 2.0 x 20 | 5 | A2000020X020 | | | | | A2013020X020 | A2003020X020 |
| 2.0 x 250 | 3 | A2001250X020 | A2011250X020 | A2021250X020 | A2031250X020 | A2007250X020 | A2014250X020 | A2005250X020 |
| 2.0 x 150 | 3 | A2001150X020 | A2011150X020 | A2021150X020 | A2031150X020 | A2007150X020 | A2014150X020 | A2005150X020 |
| 2.0 x 100 | 3 | A2001100X020 | | A2021100X020 | A2031100X020 | A2007100X020 | A2014100X020 | A2005100X020 |
| 2.0 x 75 | 3 | | | A2021075X020 | | | | |
| 2.0 x 50 | 3 | A2001050X020 | A2011050X020 | A2021050X020 | A2031050X020 | A2007050X020 | A2014050X020 | A2005050X020 |
| 2.0 x 30 | 3 | A2001030X020 | | A2021050X020 | | A2007030X020 | A2014030X020 | A2005030X020 |
| 2.0 x 20 | 3 | A2001020X020 | | | | | A2014020X020 | A2005020X020 |

*Normal phase columns.








Polaris ChromSep Complete Cartridge Systems

| Hardware | Size (mm) | Particle Size (μm) | Polaris C18-A |
|-----------|-----------|---------------------------------|---------------|
| CS | 4.6 x 250 | 5 | A2000250C046 |
| CS | 4.6 x 150 | 5 | A2000150C046 |
| CS | 4.6 x 100 | 5 | A2000100C046 |
| CS | 4.6 x 250 | 3 | A2001250C046 |
| CS | 4.6 x 150 | 3 | A2001150C046 |
| CS | 3.0 x 250 | 5 | A2000250C030 |
| CS | 3.0 x 100 | 5 | A2000100C030 |
| CS | 2.0 x 100 | 5 | A2000100C020 |
| CS | 2.0 x 150 | 3 | A2001150C020 |
| CS | 2.0 x 100 | 3 | A2001100C020 |
| CS | 2.0 x 50 | 3 | A2001050C020 |

Polaris ChromSep Replacement Cartridges

| Hardware | Size (mm) | Particle Size (μm) | Unit | Polaris C18-A |
|-----------|-----------|---------------------------------|------|---------------|
| CS | 4.6 x 250 | 5 | | A2000250R046 |
| | | | 3/pk | A2000250T046 |
| CS | 4.6 x 150 | 5 | | A2000150R046 |
| | | | 3/pk | A2000150T046 |
| CS | 4.6 x 100 | 5 | | A2000100R046 |
| | | | 3/pk | A2000100T046 |
| CS | 4.6 x 150 | 3 | | A2001150R046 |
| | | | 3/pk | A2001150T046 |
| CS | 4.6 x 100 | 3 | | A2001100R046 |
| | | | 3/pk | A2001100T046 |
| CS | 3.0 x 150 | 5 | | A2000150R030 |
| | | | 3/pk | A2000150T030 |
| CS | 3.0 x 100 | 5 | | A2000100R030 |
| | | | 3/pk | A2000100T030 |
| CS | 3.0 x 100 | 3 | | A2001100R030 |
| | | | 3/pk | A2001100T030 |
| CS | 2.0 x 150 | 3 | | A2001150R020 |
| | | | 3/pk | A2001150T020 |
| CS | 2.0 x 50 | 3 | | A2001050R020 |
| | | | 3/pk | A2001050T020 |

MetaGuard Columns

| Hardware | Dimensions | Particle Size (µm) | Polaris C18-A | Polaris C8-A | Polaris C18-Ether | Polaris C8-Ether | Polaris Amide C18 | Polaris NH2* | Polaris Si-A* |
|---|------------|--------------------|---------------|--------------|-------------------|------------------|-------------------|--------------|---------------|
|  | 4.6 | 10 | A2002MG | | | | | | A2004MG |
|  | 2.0 | 10 | | | | | A2008MG2 | | A2004MG2 |
|  | 4.6 | 5 | A2000MG | A2010MG | A2020MG | A2030MG | A2006MG | A2013MG | A2003MG |
|  | 2.0 | 5 | A2000MG2 | A2010MG2 | A2020MG2 | | A2006MG2 | A2013MG2 | A2003MG2 |
|  | 4.6 | 3 | A2001MG | A2011MG | A2021MG | | A2007MG | A2014MG | A2005MG |
|  | 2.0 | 3 | A2011MG2 | A2011MG2 | A2021MG2 | A2031MG2 | A2007MG2 | A2014MG2 | A2005MG2 |
|  | 1.0 | 3 | A2001MG1 | | | | | | |

*Normal phase columns.

Agilent TC-C18(2) and HC-C18(2)

For cost-conscious chromatographers who need traditional LC columns and don't need the individual testing of ZORBAX, Pursuit or Polaris columns, the Agilent TC(2)/HC(2) columns provide an alternative.

TC-C18(2)

Agilent TC-C18(2) is the ideal choice for complex natural product extract samples, traditional medicines and environmental samples or any sample where you need to analyze mixtures of polar and non-polar compounds, including strong basic compounds.

- Lower carbon load – 12%
- Ideal for polar compounds and gradient separations that start at low % organic or cover a wide organic range
- Good choice for samples dissolved in water, or mostly water
- Use with most common mobile phases, including formic acid, acetic acid, trifluoroacetic acid (TFA) and phosphate buffers with acetonitrile and methanol as the organic modifiers
- Excellent performance from pH 2-8

HC-C18(2)

Agilent HC-C18(2) is a more retentive C18 with a higher carbon load. An excellent value alternative to other high carbon load columns, it also provides superior peak shape for basic compounds.

- Higher carbon load – 17% – provides greater retention for moderately polar and non-polar compounds
- Ideal for non-polar compounds and separations that start at mid-level % organic (at least greater than 10% organic)
- Good choice for industrial samples or samples dissolved in organic/mostly organic solvents
- Stable over a very wide pH range (2-9) for maximum flexibility

Column Specifications

| Bonded Phase | Pore Size | Surface Area | Temp. Limits | pH Range* | Endcapped | Carbon Load |
|--------------|-----------|-----------------------|--------------|-----------|-----------|-------------|
| TC-C18(2) | 170Å | 290 m ² /g | 60 °C | 2.0-8.0 | Yes | 12% |
| HC-C18(2) | 170Å | 290 m ² /g | 60 °C | 2.0-9.0 | Yes | 17% |

Specifications represent typical values only.

Agilent HC-C18(2) and TC-C18(2)

| Description | Size (mm) | Particle Size (µm) | Part No. |
|--------------------------------|------------|--------------------|------------|
| Agilent HC-C18(2) | 4.6 x 250 | 5 | 588905-902 |
| Agilent HC-C18(2) | 4.6 x 150 | 5 | 588915-902 |
| Agilent TC-C18(2) | 4.6 x 250 | 5 | 588925-902 |
| Agilent TC-C18(2) | 4.6 x 150 | 5 | 588935-902 |
| Agilent HC-C18(2) guards, 2/pk | 4.6 x 12.5 | 5 | 520518-904 |
| Agilent TC-C18(2) guards, 2/pk | 4.6 x 12.5 | 5 | 520518-905 |
| Guard Hardware Kit | | | 820999-901 |

TIPS & TOOLS

Don't forget, we have special offers throughout the year.

To learn more, visit www.agilent.com/chem/specialoffers



PLRP-S HPLC Columns

- Contain durable and resilient polymer particles that deliver reproducible results over longer lifetimes
- Thermally and chemically stable
- Comply with USP L21 designation
- Used in bioscience, chemical, clinical research, energy, environmental, food and agriculture, material science and pharmaceutical industries
- Pore sizes (100Å-4000Å) for separations of small molecules to large complexes and polynucleotides

The PLRP-S family of columns consists of a range of pore sizes and particle sizes, all with identical chemistry and fundamental adsorptive characteristics. The particles are inherently hydrophobic, therefore no bonded phase, alkyl ligand is required for reversed-phase separations. This gives a highly reproducible material that is free from silanols and heavy metal ions. Columns within the extensive product range are suitable for micro separations, including both bottom-up and top-down proteomics, analytical separations, and preparative purifications. In addition, process columns can be packed with bulk media.

Column Specifications

| | |
|--------------------|--|
| pH Range | 1-14 |
| Buffer Content | Unlimited |
| Organic Modifier | 1-100% |
| Temperature Limits | 200 °C |
| Maximum Pressure | 5-8 µm: 3000 psi (210 bar) 3 µm: 4000 psi (300 bar) |

PLRP-S Applications

| Pore Size | Application |
|-----------|--|
| 100Å | Small molecules/synthetic biomolecules |
| 300Å | Recombinant peptides/proteins |
| 1000Å | Large proteins |
| 4000Å | DNA/high speed |

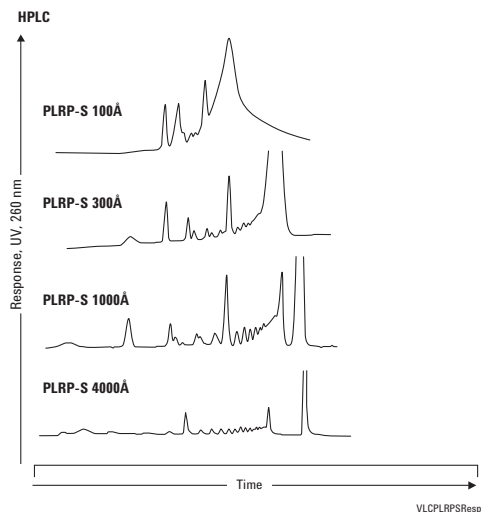
HPLC of 25 bp DNA ladder

Column: PLRP-S, 2.1 x 150 mm

Mobile Phase: A: 0.1 M TEAA
B: 0.1 M TEAA in 50% water:50% ACN

Flow Rate: 200 µL/min

Gradient: 12.5-50% B in 150 min



Polyethylene glycols

Column: PLRP-S 100Å
PL1111-3500
4.6 x 150 mm, 5 µm

Mobile Phase: A: Water
B: ACN

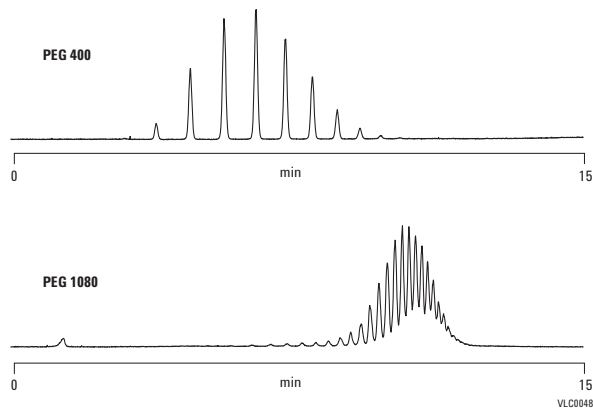
Gradient: 10-30% B in 12 min, held at 30% B for 3 min

Flow Rate: 1.0 mL/min

Injection Volume: 10 µL

Sample Conc: 1 mg/mL

Detector: ELS (neb=50 °C, evap=70 °C, gas=1.6 SLM)



**Exploiting chemical stability –
NH₄OH concentration**

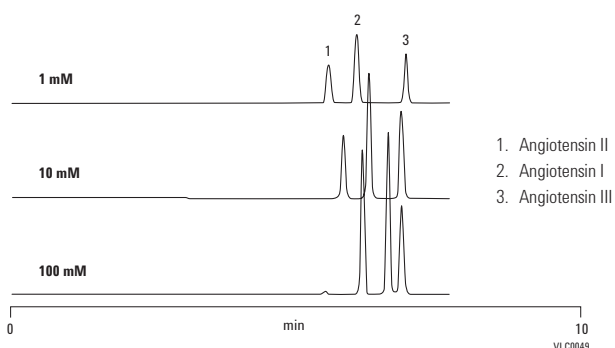
Column: PLRP-S 100Å
PL1512-5500
4.6 x 250 mm, 5 µm

Mobile Phase: A: NH₄OH (various mM) in water
B: NH₄OH (various mM) in ACN

Gradient: Linear 10-100% B in 15 min

Flow Rate: 1.0 mL/min

Detector: ELS (neb=80 °C, evap=85 °C, gas=1.0 SLM)



Alberta Peptide Institute test mix

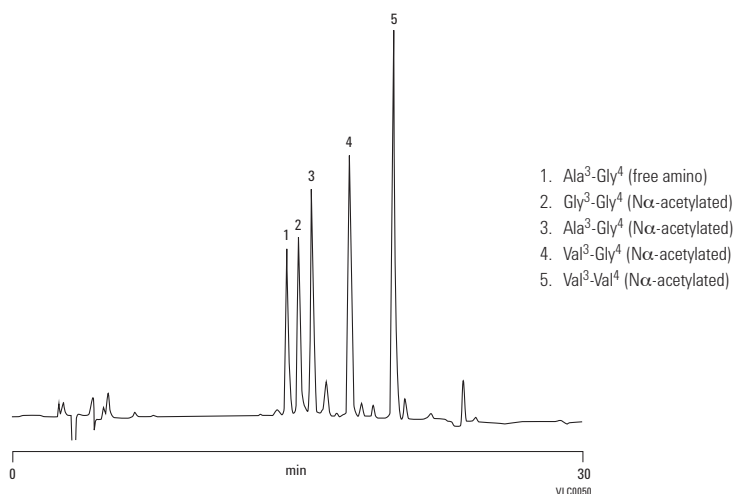
Column: PLRP-S 100Å
PL1512-5500
4.6 x 250 mm, 5 µm

Mobile Phase: A: 0.1% TFA in 99% water:1% ACN
B: 0.1% TFA in 70% water:30% ACN

Gradient: 0-100% B in 30 min

Flow Rate: 1.0 mL/min

Detector: UV, 220 nm



Large fibrous proteins

Column: PLRP-S 300Å
PL1512-3801
4.6 x 150 mm, 8 µm

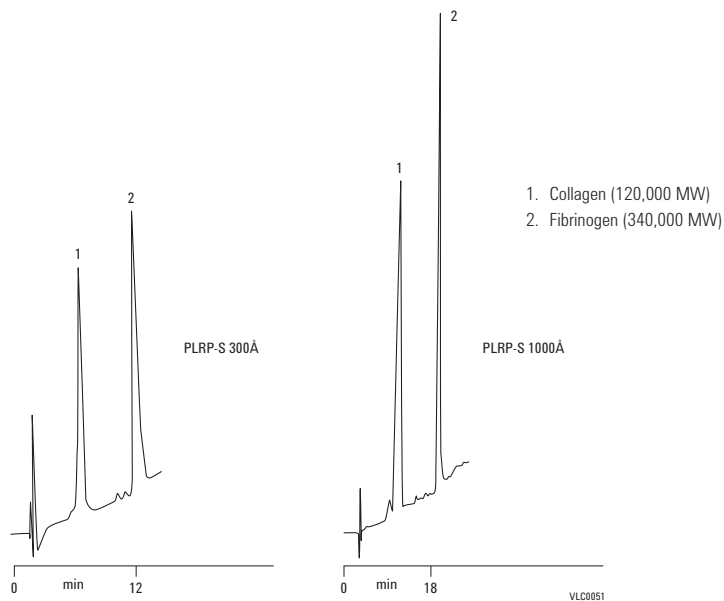
Column: PLRP-S 1000Å
PL1512-3802
4.6 x 150 mm, 8 µm

Mobile Phase: A: 0.25% TFA in water
B: 0.25% TFA in 5% water:95% ACN



Flow Rate: 1.0 mL/min

Gradient: 20-60% B in 15 min

Detector: UV, 220 nm



PLRP-S HPLC Columns

| Hardware | Size (mm) | Particle Size (µm) | PLRP-S 100Å USP L21 | PLRP-S 300Å USP L21 | PLRP-S 1000Å USP L21 | PLRP-S 4000Å USP L21 |
|---|--|--------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| | 4.6 x 250 | 8 | PL1512-5800 | PL1512-5801 | PL1512-5802 | |
| | 4.6 x 150 | 8 | PL1512-3800 | PL1512-3801 | PL1512-3802 | PL1512-3803 |
| | 4.6 x 50 | 8 | | PL1512-1801 | PL1512-1802 | PL1512-1803 |
| | 4.6 x 250 | 5 | PL1512-5500 | PL1512-5501 | | |
| | 4.6 x 150 | 5 | PL1111-3500 | PL1512-3501 | | |
| | 4.6 x 50 | 5 | PL1512-1500 | PL1512-1501 | PL1512-1502 | PL1512-1503 |
| | 4.6 x 150 | 3 | PL1512-3300 | PL1512-3301 | | |
| | 4.6 x 50 | 3 | PL1512-1300 | PL1512-1301 | | |
| | 2.1 x 250 | 8 | | PL1912-5801 | | |
| | 2.1 x 150 | 8 | | PL1912-3801 | PL1912-3802 | PL1912-3803 |
| | 2.1 x 50 | 8 | | PL1912-1801 | PL1912-1802 | PL1912-1803 |
| | 2.1 x 250 | 5 | PL1912-5500 | PL1912-5501 | | |
| | 2.1 x 150 | 5 | PL1912-3500 | PL1912-3501 | | |
| | 2.1 x 50 | 5 | PL1912-1500 | PL1912-1501 | PL1912-1502 | PL1912-1503 |
| | 2.1 x 150 | 3 | PL1912-3300 | PL1912-3301 | | |
| | 2.1 x 50 | 3 | PL1912-1300 | PL1912-1301 | | |
|  | PLRP-S Guard Cartridges for 5 x 3 mm, 2/pk | | PL1612-1801 | PL1612-1801 | PL1612-1801 | PL1612-1801 |
|  | Guard Cartridge holder for 3.0 x 5.0 mm cartridges | | PL1310-0016 | PL1310-0016 | PL1310-0016 | PL1310-0016 |

*Prep columns are also available for the PLRP-S family. Turn to pages 467-471

Preparative HPLC Columns

Flexible, cost-effective options for scaling and prep

Whether you are scaling up a routine analytical method, or maintaining precise separations throughout every phase of production, Agilent can help you rise to the challenge.

- Agilent Prep LC columns are a cost-effective prep solution designed for high loadability to purify milligram to gram quantities of product
- ZORBAX PrepHT columns are designed for rapid scale-up from the ZORBAX family of phases
- Scalable prep columns are also available for Pursuit and Polaris columns
- Bulk materials are available for all phases and can be ordered through Agilent's Custom Ordering Process, www.agilent.com/chem/customlc

Agilent Prep LC Columns

- High loadability for maximum sample purification
- Easy scalability from 4.6 up to 50 mm id for rapid method development
- High throughput 21.2 mm id cartridges for fast purification
- Exceptional column stability and loadability up to pH 10

Agilent Prep LC columns are designed for high loadability to purify milligram to gram quantities of products. Preparative sized columns are available in 21.2, 30, and 50 mm internal diameters with lengths ranging from 50-250 mm. Columns are available in 5 and 10 μm particle sizes with very high efficiency in every dimension. These column choices accommodate almost every preparative sample.

Agilent Prep 21.2 mm id columns are available with Agilent's Preparative Cartridge Hardware. This reliable cartridge hardware makes it simple to use columns with different lengths to increase sample load. Guard columns are easily integrated onto these columns, providing superior protection of the analysis column. Analytical size 4.6 mm id scalar columns are available for method development and optimization prior to scaling up to larger columns. Bulk material is also available.

Agilent Prep columns are available in a C18 bonded phase suitable for purification of a wide variety of non-polar and polar compounds. Unbonded silica columns are also available.



Prep LC Columns

Column Specifications

| Bonded Phase | Pore Size | Surface | | Temp. Limits | pH Range | Endcapped | Carbon Load |
|--------------|-----------|-----------------------|--------------|--------------|----------|-----------|-------------|
| | | Area | Temp. Limits | | | | |
| C18 | 100Å | 400 m ² /g | 60 °C* | 2.0-10.0 | Single | 24% | |
| Silica | 100Å | 400 m ² /g | ** | 1.0-8.0 | N/A | N/A | |

Specifications represent typical values only.

*Temperature limits are 60 °C up to pH 8, 40 °C from pH 8-10.

**Temperature limits for bare silica are determined by the pH of the mobile phase.

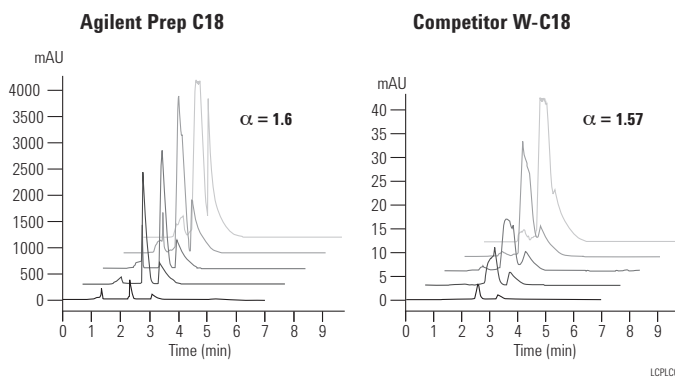
Superior loadability on Agilent Prep C18 with basic compounds

Column: **Agilent Prep C18**
443905-902
4.6 x 150 mm, 5 µm

Mobile Phase: 50% 0.1%TFA:50% ACN

Flow Rate: 1 mL/min

Sample: 10 µL
 Doxepin/Amitriptyline
 0.5-50 mg/mL



Agilent Prep columns show better resolution and loadability than competitor columns.

Steroids: Easy scalability using Agilent Prep columns

Column A: **Agilent Prep C18**
443905-902
4.6 x 150 mm, 5 µm

Column B: **Agilent Prep C18**
443905-102
21.2 x 150 mm, 5 µm

Column C: **Agilent Prep C18**
413910-302
30.0 x 150 mm, 10 µm

Column D: **Agilent Prep C18**
413910-502
50.0 x 150 mm, 10 µm

Mobile Phase: 55% Water:45% ACN

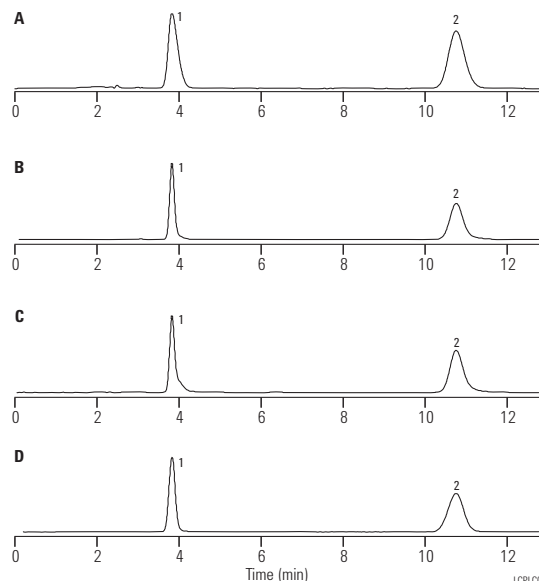
Flow Rate: 0.7 mL/min
 14.87 mL/min
 29.77 mL/min
 85.37 mL/min

Temperature: Ambient

Detector: 240 nm











Sample: 2 µL
 42.4 µL
 170 µL
 488 µL

1. Hydrocortisone
2. Testosterone (in MeOH @ 1mg/mL)



Agilent Prep C18 shows excellent scalability, making method transfer simple and predictable.

Agilent Prep LC Columns

| Hardware Description | Size (mm) | Particle Size | | C18 | Silica |
|--|------------|---------------|-------------------|------------|------------|
| | | | (μm) | | |
| Standard Columns (no special hardware required) | | | | | |
| Scalar | 4.6 x 250 | 10 | | 440910-902 | 440910-901 |
| Scalar | 4.6 x 150 | 10 | | 443910-902 | 443910-901 |
| Scalar | 4.6 x 100 | 10 | | 449910-902 | |
| Scalar | 4.6 x 250 | 5 | | 440905-902 | 440905-901 |
| Scalar | 4.6 x 150 | 5 | | 443905-902 | 443905-901 |
| Scalar | 4.6 x 100 | 5 | | 449905-902 | 449905-901 |
| Scalar | 4.6 x 50 | 5 | | 446905-902 | 446905-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901)* | | | | | |
|  PrepHT | 21.2 x 250 | 10 | | 410910-102 | 410910-101 |
|  PrepHT | 21.2 x 150 | 10 | | 413910-102 | 413910-101 |
|  PrepHT | 21.2 x 50 | 10 | | 446910-102 | |
|  PrepHT | 21.2 x 150 | 5 | | 443905-102 | 443905-101 |
|  PrepHT | 21.2 x 100 | 5 | | 449905-102 | 449905-101 |
|  PrepHT | 21.2 x 50 | 5 | | 446905-102 | 446905-101 |
|  PrepHT Endfittings, 2/pk | | | | 820400-901 | 820400-901 |
| Standard Columns (no special hardware required) | | | | | |
| Prep 30 | 30.0 x 250 | 10 | | 410910-302 | 410910-301 |
| Prep 30 | 30.0 x 150 | 10 | | 413910-302 | 413910-301 |
| Prep 30 | 30.0 x 100 | 10 | | 419910-302 | 419910-301 |
| Prep 30 | 30.0 x 100 | 5 | | 449905-302 | 449905-301 |
| Prep 30 | 30.0 x 50 | 5 | | 446905-302 | 446905-301 |
| Prep 50 | 50.0 x 250 | 10 | | 410910-502 | 410910-501 |
| Prep 50 | 50.0 x 150 | 10 | | 413910-502 | 413910-501 |
| Prep 50 | 50.0 x 100 | 10 | | 419910-502 | 419910-501 |
| Prep 50 | 50.0 x 100 | 5 | | 449905-502 | 449905-501 |
| Guard Columns (hardware required) | | | | | |
|  PrepHT Guard Cartridges, 2/pk | 21.2 x 10 | 10 | | 420212-902 | 420212-901 |
|  Guard Cartridge Hardware | | | | 820444-901 | 820444-901 |
|  PrepHT External Guard Hardware Kit | | | | 420420-901 | 420420-901 |
| Bulk Packing (1 kg) | | 10 | | 420910-902 | 420910-901 |

*All PrepHT cartridge columns require hardware kit P/N 820400-901. If a guard column is desired for the 21.2 mm id columns, the PrepHT Guard Hardware Kit, P/N 820444-901, is also required. If the guard column is used on a 30 mm id column then the external guard column hardware kit, P/N 420420-901, is required.



ZORBAX PrepHT Columns

ZORBAX PrepHT

- Easy scale-up from analytical to preparative scale with ZORBAX phases
- Fast preparative separations, up to 2000 mg
- 5 to 7 μm particles for high efficiency and high yield
- Easy to install finger-tight connections seal up to 5000 psi/350 bar
- Use to maintain selectivity of the analytical phase in your prep separations

High purity, high recovery and high throughput can be easily achieved with Agilent ZORBAX PrepHT columns. These are available in a variety of bonded phases – Eclipse XDB, StableBond, Bonus-RP, and Extend-C18 – for optimized resolution and loadability under any conditions.

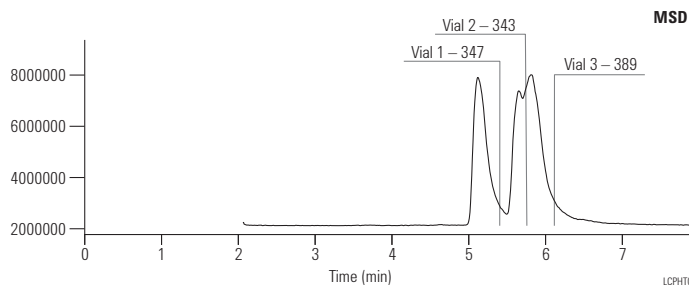
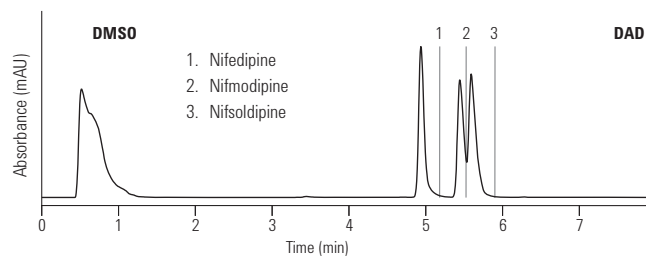
ZORBAX PrepHT columns are packed with 5 and 7 μm particle sizes for very high resolution. The high resolution allows high loadability, high yield, and high purity of compounds. The larger diameter columns and mechanically stronger ZORBAX particles allow for flow rates up to 100 mL/min, thus increasing throughput.

ZORBAX PrepHT columns are designed for rapid scale-up from analytical to preparative scale without losing resolution. For complex separations on larger columns (21.2 mm id, 150 mm length and longer), Agilent has carefully chosen the 7 μm particle size to achieve a balance between high efficiency and high loadability.

High purity and high recovery with ZORBAX PrepHT columns

Sample: Antianginal drugs

Mass-based fraction collection using ZORBAX SB-C18 column shows high purity and high recovery of each compound (Application Note publication number 5988-7113EN). The separation of the three antianginal drugs was successfully done in a single run with high recovery and >90% purity. Separations up to 2000 mg are possible depending on the complexity of separation.



| | Amount Nifedipine [mg] | Amount Nifmodipine [mg] | Amount Nifsoldipine [mg] | | |
|----------------------|------------------------|-------------------------|--------------------------|---------------------|-------|
| Fraction 1 | 18.90 | 0.11 | 0.16 | Purity Nifedipine | 98.6% |
| Fraction 2 | 0.29 | 17.66 | 0.77 | Purity Nifmodipine | 94.4% |
| Fraction 3 | 0.49 | 1.66 | 18.36 | Purity Nifsoldipine | 89.5% |
| Recovery [mg] | 19.68 | 19.43 | 19.29 | | |
| Recovery [%] | 101.3 | 102.0 | 101.9 | | |

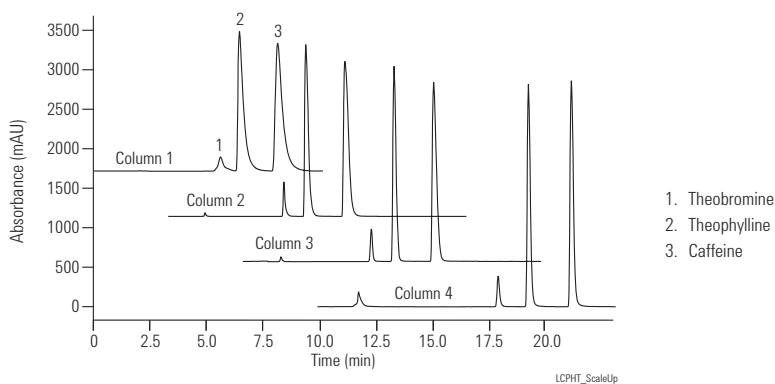
ZORBAX PrepHT columns are designed for rapid scale-up from analytical to preparative scale without losing resolution. For complex separations for larger columns (21.2 mm id and higher, 150 mm length and higher), Agilent has carefully chosen the 7 μm particle size to achieve a balance between high efficiency and high loadability.

Scale-up from analytical to prep ZORBAX SB-C18 columns using the same pump

| Column | Size | Flow (mL/min) | Injection (μL) | Detector Cell | Part No. |
|----------|---------------|---------------|-----------------------------|---------------|---------------|
| Column 1 | 50 x 150 mm | 100 | 2200 | 0.3 mm quartz | Custom Column |
| Column 2 | 21.2 x 150 mm | 18 | 400 | 0.3 mm quartz | 877150-102 |
| Column 3 | 9.4 x 150 mm | 3.5 | 80 | 0.3 mm quartz | 883975-202 |
| Column 4 | 4.6 x 150 mm | 0.85 | 2.0 | 3 mm SS | 883975-902 |

Using the same 1100 pump, a scale-up from 4.6 mm to 50 mm id was possible without any loss of resolution. This increases throughput by reducing the time required for redeveloping and adjusting the method.

Scale-up to PrepHT



ZORBAX PrepHT 80StableBond (require hardware 820400-901)

| Hardware | Description | Size (mm) | Particle Size (µm) | SB-C18 USP L1 | SB-C8 USP L7 | SB-Aq | SB-CN USP L10 | SB-Phenyl USP L11 |
|----------|------------------------------|------------|--------------------|---------------|--------------|------------|---------------|-------------------|
| ▲ | PrepHT Cartridge | 21.2 x 250 | 7 | 877250-102 | 877250-106 | 877250-114 | 877250-105 | 877250-112 |
| ▲ | PrepHT Cartridge | 21.2 x 150 | 7 | 877150-102 | 877150-106 | 877150-114 | | |
| ▲ | PrepHT Cartridge | 21.2 x 150 | 5 | 870150-902 | 870150-906 | 870150-914 | | |
| ▲ | PrepHT Cartridge | 21.2 x 100 | 5 | 870100-902 | 870100-906 | 870100-914 | | |
| ▲ | PrepHT Cartridge | 21.2 x 50 | 5 | 870050-902 | 870050-906 | 870050-914 | | |
| ▲ | PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-920 | 820212-915 | 820212-933 | 820212-933 | 820212-915 |

ZORBAX PrepHT 300StableBond (require hardware 820400-901)

| Hardware | Description | Size (mm) | Particle Size (µm) | 300SB-C18 USP L1 | 300SB-C8 USP L7 | 300SB-C3 USP L56 | 300SB-CN USP L10 |
|----------|---|------------|--------------------|------------------|-----------------|------------------|------------------|
| ▲ | PrepHT Cartridge | 21.2 x 250 | 7 | 897250-102 | 897250-106 | 897250-109 | 897250-105 |
| ▲ | PrepHT Cartridge | 21.2 x 150 | 7 | 897150-102 | 897150-106 | 897150-109 | |
| ▲ | PrepHT Cartridge | 21.2 x 150 | 5 | 895150-902 | 895150-906 | 895150-909 | |
| ▲ | PrepHT Cartridge | 21.2 x 100 | 5 | 895100-902 | 895100-906 | 895100-909 | |
| ▲ | PrepHT Cartridge | 21.2 x 50 | 5 | 895050-902 | 895050-906 | 895050-909 | |
| ▲ | PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-921 | 820212-918 | 820212-924 | 820212-924 |
| | Guard Cartridge Hardware Includes guard column end fitting, polymeric seal, and seal insertion tool (seal holder and seal pusher) | | | 820444-901 | 820444-901 | 820444-901 | 820444-901 |
| | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | 820400-901 | 820400-901 |

ZORBAX PrepHT Original (require hardware 820400-901)

| Hardware | Description | Size (mm) | Particle Size (µm) | ODS (C18) USP L1 | C8 USP L7 | CN USP L10 | NH2 USP L8 | SIL USP L3 |
|----------|--------------------------|------------|--------------------|------------------|------------|------------|------------|------------|
| ▲ | PrepHT Cartridge | 21.2 x 250 | 7 | 877952-102 | 877952-106 | 877952-105 | 877952-108 | 877952-101 |
| | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | 820400-901 | 820400-901 | 820400-901 |

ZORBAX PrepHT Eclipse XDB (require hardware 820400-901)

| Hardware Description | Size (mm) | Particle Size (µm) | Eclipse XDB-C18 USP L1 | Eclipse XDB-C8 USP L7 |
|--|------------|--------------------|------------------------|-----------------------|
| ▲▲ PrepHT Cartridge | 21.2 x 250 | 7 | 977250-102 | 977250-106 |
| ▲▲ PrepHT Cartridge | 21.2 x 150 | 7 | 977150-102 | 977150-106 |
| ▲▲ PrepHT Cartridge | 21.2 x 150 | 5 | 970150-902 | 970150-906 |
| ▲▲ PrepHT Cartridge | 21.2 x 100 | 5 | 970100-902 | 970100-906 |
| ▲▲ PrepHT Cartridge | 21.2 x 50 | 5 | 970050-902 | 970050-906 |
| ▲▲ PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-925 | 820212-926 |
| Guard Cartridge Hardware Includes guard column end fitting, polymeric seal, and seal insertion tool (seal holder and seal pusher) | | | 820444-901 | 820444-901 |
| PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 |

ZORBAX PrepHT Bonus-RP and Extend-C18 (require hardware 820400-901)

| Hardware Description | Size (mm) | Particle Size (µm) | Bonus-RP USP L60 | Extend-C18 USP L1 |
|--|------------|--------------------|------------------|-------------------|
| ▲▲ PrepHT Cartridge | 21.2 x 250 | 7 | 878250-101 | |
| ▲▲ PrepHT Cartridge | 21.2 x 150 | 7 | 878150-101 | |
| ▲▲ PrepHT Cartridge | 21.2 x 150 | 5 | 868150-901 | 770150-902 |
| ▲▲ PrepHT Cartridge | 21.2 x 100 | 5 | 868100-901 | 770100-902 |
| ▲▲ PrepHT Cartridge | 21.2 x 50 | 5 | 868050-901 | 770050-902 |
| ▲▲ PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-928 | 820212-930 |
| Guard Cartridge Hardware Includes guard column end fitting, polymeric seal, and seal insertion tool (seal holder and seal pusher) | | | 820444-901 | 820444-901 |
| PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 |

ZORBAX PrepHT Rx-SIL (require hardware 820400-901)

| Hardware Description | Size (mm) | Particle Size (µm) | Rx-SIL USP L3 | Rx-C18 USP L1 |
|--|------------|--------------------|---------------|---------------|
| ▲▲ PrepHT Cartridge | 21.2 x 250 | 7 | 877250-101 | |
| ▲▲ PrepHT Cartridge | 21.2 x 250 | 7 | | 877967-102 |
| ▲▲ PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-919 | 820212-914 |
| Guard Cartridge Hardware Includes guard column end fitting, polymeric seal, and seal insertion tool (seal holder and seal pusher) | | | 820444-901 | 820444-901 |
| PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 |

ZORBAX PrepHT Accessories

| Hardware Description | Part No. |
|-----------------------------|------------|
| ▲▲ Guard Cartridge Hardware | 820444-901 |
| ▲▲ PrepHT Endfittings, 2/pk | 820400-901 |
| ▲▲ Replacement Seals | 820385-901 |

Pursuit and Pursuit XRs Prep

- Prep-scalable columns for Pursuit and Pursuit XRs columns
- Particle sizes to 10 μm and column diameters up to 50 mm
- High surface area silica

Pursuit and Pursuit XRs Prep columns are designed for high loadability with a high surface area.

Natural products – capsaicin and dihydrocapsaicin on Pursuit XRs C18

Column A: Pursuit XRs C18
A6001150X046
4.6 x 150 mm, 3 μm

Column B: Pursuit XRs C18
A6000150X046
4.6 x 150 mm, 5 μm

Column C: Pursuit XRs C18
A3002150X046
4.6 x 150 mm, 10 μm

Mobile Phase: $\text{CH}_3\text{CH}_2\text{H}_2\text{O}$ - 70:30

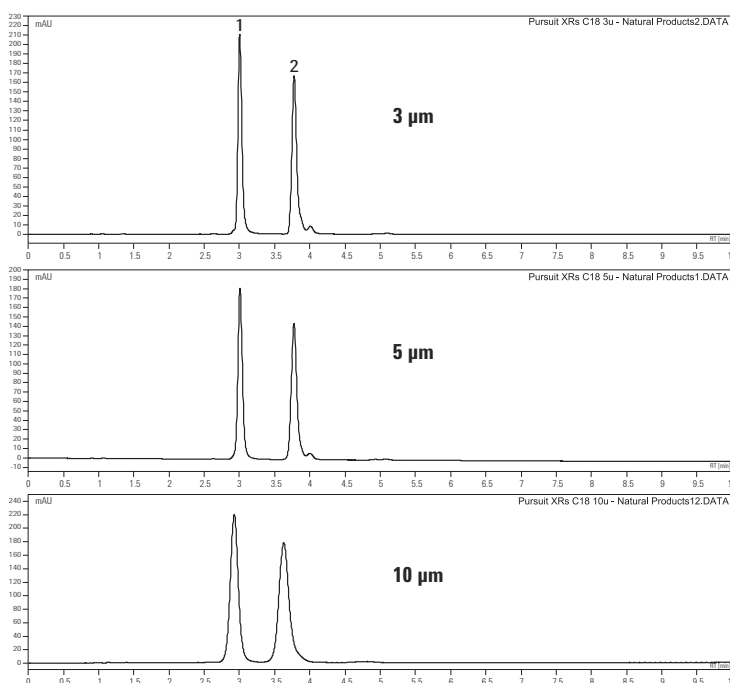
Flow Rate: 1.0 mL/min

Temperature: Ambient

Detector: 220 nm

Sample:
1. Capsaicin
2. Dihydrocapsaicin

Demonstrating an easy, linear scale-up of natural products from Pursuit XRs C18 3 μm and 5 μm analytical columns to a 10 μm preparative column.



Agilent Pursuit Prep Columns

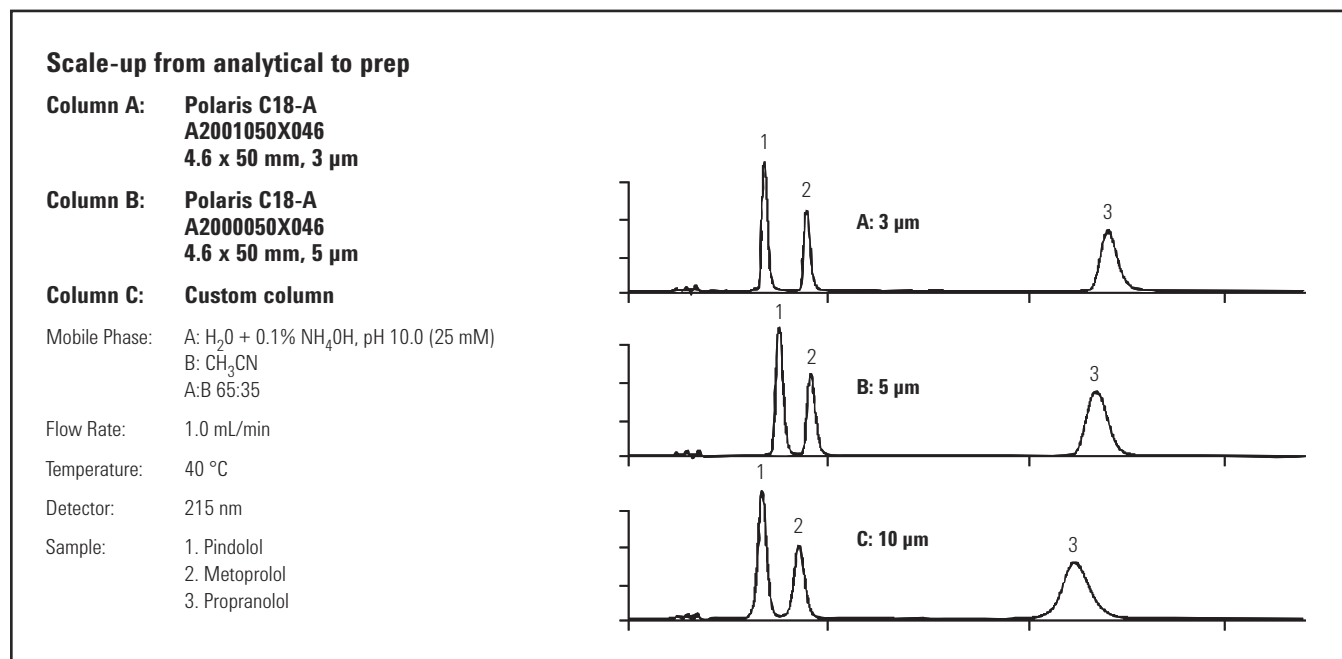
| Size (mm) | Particle Size (µm) | Pursuit C18 USP L1 | Pursuit C8 USP L7 | Pursuit Diphenyl | Pursuit PFP |
|------------|--------------------|--------------------|-------------------|------------------|--------------|
| 10.0 x 250 | 5 | A3000250X100 | A3030250X100 | A3040250X100 | A3050250X100 |
| 10.0 x 250 | 10 | A6002250X100 | A3032250X100 | | |
| 21.2 x 250 | 10 | A6002250X212 | | | |
| 21.2 x 250 | 10 | A6002250X212 | A3032250X212 | | |

Agilent Pursuit XRs Prep Columns

| Size (mm) | Particle Size (µm) | Pursuit XRs C18 USP L1 | Pursuit XRs C8 USP L7 | Pursuit XRs Diphenyl | Pursuit XRs Si USP L3 |
|------------|--------------------|------------------------|-----------------------|----------------------|-----------------------|
| 21.2 x 250 | 10 | A6002250X212 | | | A6004250X212 |
| 21.2 x 250 | 5 | A6000250X212 | | A6020250X212 | |
| 21.2 x 150 | 5 | A6000150X212 | A6010150X212 | | |
| 21.2 x 100 | 5 | A6000100X212 | A6010100X212 | A6020100X212 | |
| 21.2 x 50 | 5 | A6000050X212 | | | |
| 30.0 x 250 | 10 | A6002250X300 | | | A6004250X300 |
| 30.0 x 150 | 10 | A6002150X300 | | | |
| 30.0 x 250 | 5 | A6000250X300 | A6010250X300 | | |
| 30.0 x 150 | 5 | A6000150X300 | | | |
| 30.0 x 100 | 5 | A6000100X300 | | | |
| 50.0 x 250 | 10 | A6002250X500 | | A6022250X500 | A6004250X500 |

Polaris Prep Columns

- Prep-scalable columns for Polaris phases
- 10.0 and 21.2 mm ids available, with particles up to 10 μm



Polaris Prep Columns

| Size (mm) | Particle Size (μm) | Polaris C18-A | Polaris C18-Ether | Polaris Amide C18 | Polaris Si-A | Polaris C8-A | Polaris C8-Ether | Polaris NH2 |
|------------|---------------------------------|---------------|-------------------|-------------------|--------------|--------------|------------------|--------------|
| 10.0 x 250 | 5 | A2000250X100 | A2020250X100 | A2006250X100 | | A2010250X100 | A2030250X100 | A2013250X100 |
| 21.2 x 250 | 5 | A2000250X212 | A2030250X212 | | A2003250X212 | A2010250X212 | | A2013250X212 |
| 21.2 x 250 | 10 | A2002250X212 | | | A2004250X212 | | | |

Bulk materials for prep

Agilent has bulk materials available for all phases. Most materials and quantities can be ordered through the Custom Column and Bulk Ordering process, and can be produced in multiple kg. quantities. Quotes are able to be delivered within 48 hours. Contact your Agilent product specialist for support in placing a custom order.

Load & Lock Preparative HPLC Column Packing Systems



Load & Lock Columns

Agilent offers a complete range of Load & Lock column systems for laboratory and process preparative LC. They are designed to let you easily and quickly pack your own preparative high efficiency columns. This is the right solution for applications ranging in scale from development (multigrams) to production (multi-kilo) of pharmaceutical compounds, peptides, and natural products. Our Load & Lock columns have a unique fluid/sample distribution system to maximize productivity. The system provides dynamic axial compression (DAC) and static "locked" axial compression (SAC) and is designed for easy operation to deliver greater convenience.

Laboratory Load & Lock Columns

- Mobile packing station supports three different column sizes
- Runs on compressed air with no need for a power supply
- Quick and easy packing and unpacking within minutes

Agilent's laboratory scale Load & Lock columns combine excellent packed-bed stability with enhanced flow distribution to deliver the highest quality purification possible with maximum speed, flexibility, and ease of operation. Three different column sizes are supported: 1 in, 2 in and 3 in id. Because the station is powered by compressed air, it is the perfect solution for hazardous environments. The quick-release single bolt clamp offers speedy and easy packing and unpacking within minutes.

Load & Lock Preparative HPLC Column Packing Systems

| Description | Water Jacket | Size (mm) | Part No. |
|---|-----------------|------------|-----------------|
| Load & Lock 4001 Column | No | 25.0 x 500 | PCG93LL500X25 |
| | Yes | 25.0 x 500 | PCG93LL500X25WJ |
| | Spare parts kit | | PCG931AAKIT |
| Load & Lock 4002 Column | No | 50.0 x 500 | PCG93LL500X50 |
| | Yes | 50.0 x 500 | PCG93LL500X50WJ |
| | Spare parts kit | | PCG932AAKIT |
| Load & Lock 4003 Column | No | 75.0 x 500 | PCG93LL500X75 |
| | Yes | 75.0 x 500 | PCG93LL500X75WJ |
| | Spare parts kit | | PCG933AAKIT |
| Mobile packing station (air driven hydraulic) | | | PCG93LLSTAND123 |

Columns for Other HPLC Techniques

Reproducible results for Normal Phase and beyond

Agilent's extended family of HPLC columns support every technique, providing you with the Agilent quality you depend on for every application.

- ZORBAX HILIC Plus – good retention of small, polar analytes and high sensitivity for LC/MS – in Fast LC 1.8 μm options
- ZORBAX normal phase columns – bonded and non-bonded silica packings
- ZORBAX ion-exchange columns – based on rugged ZORBAX Silica, stable from pH 2-7
- Hi-Plex columns for carbohydrate analysis – ligand-exchange columns
- Ultron ES Chiral columns – with two complimentary protein-based chiral stationary phases – are an excellent choice for enantiomeric separations. Ideal for many pharmacological applications.





ZORBAX HILIC Plus

- HILIC column for good retention of small, polar analytes
- Based on Eclipse Plus silica for excellent peak shape
- High sensitivity for LC/MS applications
- Recommended for EPA Method 1694

Agilent ZORBAX HILIC Plus columns are for use in hydrophilic interaction chromatography (HILIC) applications, which are typically used for the retention and resolution of small polar compounds. HILIC Plus columns are non-bonded silica columns based on the high performance silica used in ZORBAX Eclipse Plus columns. This silica provides excellent peak shape, critical for many polar, basic analytes. These columns ship prepared for use in HILIC mode – containing acetonitrile:water – in order to reduce the extensive equilibration typically required for HILIC separations. HILIC Plus columns are available in a 3.5 μm particle size for high resolution and in 2.1 and 4.6 mm id for compatibility with mass spectrometers or with standard UV detectors.

Column Specifications

| Phase | Pore Size | Surface Area | pH Range |
|-------------------|-----------|-----------------------|----------|
| Non-bonded silica | 95Å | 160 m ² /g | 0-8.0 |

Specifications represent typical values only.

TIPS & TOOLS



Poroshell 120 HILIC is very similar to ZORBAX HILIC Plus.

Turn to page 228

Separation of group 4 analytes in EPA 1694 on ZORBAX HILIC Plus column

Column: ZORBAX HILIC Plus
959793-901
2.1 x 100 mm, 3.5 μm

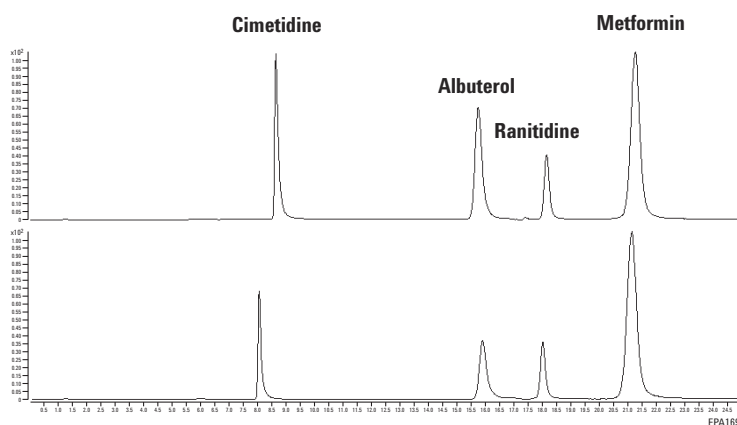
Mobile Phase: 90% Acetonitrile:10% Water

Flow Rate: 0.25 mL/min

Gradient: Linear gradient to 55% acetonitrile in 7 min
Held at 55%

Temperature: 25 °C

Duplicate runs for column USCJP0004;
10 min equilibration between two runs



ZORBAX HILIC Plus

| Description | Size (mm) | Particle Size (μm) | Part No. |
|-------------|-----------|---------------------------------|------------|
| Analytical | 4.6 x 100 | 3.5 | 959961-901 |
| Analytical | 4.6 x 50 | 3.5 | 959943-901 |
| Narrow Bore | 2.1 x 100 | 3.5 | 959793-901 |
| Narrow Bore | 2.1 x 50 | 3.5 | 959743-901 |

ZORBAX HILIC Plus RRHD, stable to 1200 bar

| Size (mm) | Particle Size (μm) | Part No. |
|-----------|---------------------------------|------------|
| 3.0 x 100 | 1.8 | 959758-301 |
| 3.0 x 50 | 1.8 | 959757-301 |
| 2.1 x 150 | 1.8 | 959759-901 |
| 2.1 x 100 | 1.8 | 959758-901 |
| 2.1 x 50 | 1.8 | 959757-901 |

Poroshell 120 HILIC Plus

| Size (mm) | Particle Size (μm) | Part No. |
|-----------|---------------------------------|------------|
| 2.1 x 50 | 2.7 | 699775-901 |
| 2.1 x 100 | 2.7 | 695775-901 |
| 2.1 x 150 | 2.7 | 693775-901 |
| 3 x 50 | 2.7 | 699975-301 |
| 3 x 150 | 2.7 | 693975-301 |
| 4.6 x 50 | 2.7 | 699975-901 |
| 4.6 x 100 | 2.7 | 695975-901 |
| 4.6 x 150 | 2.7 | 693975-901 |

ZORBAX Normal-Phase Columns

For normal-phase chromatography, the Agilent ZORBAX product line offers a choice of bonded and non-bonded silica packings.

ZORBAX Rx-SIL

- Made from highly pure (> 99.995%) porous silica microspheres (pore size is the space between the solid silica microparticles)
- Available in 1.8 and 5 μm particle sizes
- Stronger than other silica types
- Less acidic than ZORBAX SIL, lower metal content
- Low acidity and low metal content make ZORBAX Rx-SIL ideal for normal-phase separation of polar compounds that exhibit poor peak symmetry on more acidic silica
- Useful for very hydrophilic compounds with high organic mobile phases in HILIC mode

ZORBAX Eclipse XDB-CN

- Made from highly pure Rx-SIL
- Excellent choice for normal-phase applications with basic compounds
- Equilibrates more rapidly than ZORBAX Rx-SIL and is used for many of the same normal-phase applications

ZORBAX CN

- Cyanopropyltrimethylsilane monolayer bonded to ZORBAX SIL
- Equilibrates more rapidly than ZORBAX SIL, and used for many of the same normal-phase applications
- Less prone to fouling and less water sensitive than silica

Pursuit XRs Si

- 100Å silica for higher surface area and good loadability
- 14.6% carbon load
- Available in 3 µm, 5 µm and 10 µm

Polaris NH2

- 180Å silica for high surface area and loadability
- 5.5% carbon load
- Available in 3 µm, 5 µm, and 10 µm sizes
- Polar-modified with silanol shielding
- Designed for high-aqueous conditions

Polaris Si-A

- 180Å silica with highest surface area and loadability
- Available in 3 µm, 5 µm, and 10 µm

High resolution normal-phase separation of octylphenoxy ethanol surfactant on ZORBAX CN

Column: ZORBAX CN
880952-705
4.6 x 250 mm, 5 µm

Mobile Phase: Primary: Heptane
Secondary: 2-Methoxyethanol/Isopropanol (50/50)

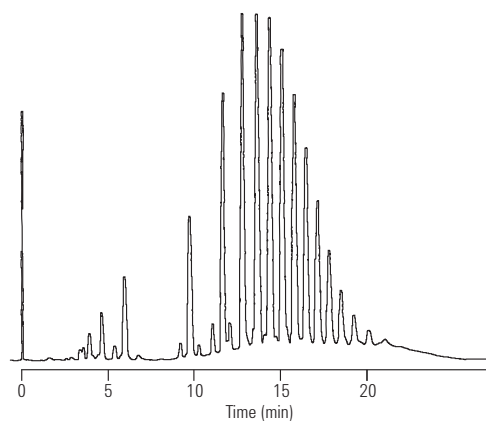
Flow Rate: 2 mL/min

Gradient: 2-20% Secondary in 10 min, Linear Hold at 20%

Temperature: 50 °C

Detector: 278 nm

Sample: Octylphenoxy (polyethylene oxy)
Ethanol Surfactant (n=10)



Polaris ordering information can be found on pages 300-303

Pursuit ordering information can be found on pages 291-297

ZORBAX NH2

- Amino-propyl silane phase bonded to ZORBAX SIL
- Used for normal-phase and weak anion-exchange, and reversed-phase HPLC of polar compounds
- Vitamins A and D are separated in the normal-phase mode
- Carbohydrates and sugars are separated in the reversed-phase mode

Column Specifications










| Phase | Pore Size | Surface Area | pH Range | Endcapped | Carbon Load |
|-----------------------|-----------|-----------------------|----------|-----------|-------------|
| ZORBAX Rx-SIL | 80Å | 180 m ² /g | 0-8.0 | No | |
| ZORBAX Eclipse XDB-CN | 80Å | 180 m ² /g | 2.0-8.0 | Yes | 4.3% |
| ZORBAX SIL | 70Å | 300 m ² /g | 0-8.0 | No | |
| ZORBAX CN | 70Å | 300 m ² /g | 2.0-7.0 | Yes | 7% |
| ZORBAX NH2 | 70Å | 300 m ² /g | 2.0-7.0 | Yes | 4% |

TIPS & TOOLS



Pursuit XRs Silica is another choice for normal-phase chromatography. For more information, see pages 295-296.









Normal-Phase Columns Based on ZORBAX Rx-SIL

| Hardware | Description | Size (mm) | Particle Size (µm) | Rx-SIL** USP L3 | Eclipse XDB-CN USP L10 |
|---|------------------------------|------------|--------------------|--------------------|------------------------------|
| Standard Columns (no special hardware required) | | | | | |
| | Semi-Prep | 9.4 x 250 | 5 | 880975-201 | |
| | Analytical | 4.6 x 250 | 5 | 880975-901 | 990967-905* |
| | Analytical | 4.6 x 150 | 5 | 883975-901 | 993967-905* |
| | Rapid Resolution HT, 600 bar | 4.6 x 100 | 1.8 | 828975-901 | |
| | Rapid Resolution HT, 600 bar | 4.6 x 50 | 1.8 | 827975-902 | |
| | Rapid Resolution HT, 600 bar | 3.0 x 100 | 1.8 | 828975-301 | |
| | Rapid Resolution HT, 600 bar | 3.0 x 50 | 1.8 | 827975-301 | |
| | Narrow Bore | 2.1 x 150 | 5 | 883700-901 | 993700-905* |
| | Rapid Resolution HT, 600 bar | 2.1 x 100 | 1.8 | 828700-901 | |
| | Rapid Resolution HT, 600 bar | 2.1 x 50 | 1.8 | 827700-901 | |
| Guard Columns (hardware required) | | | | | |
|  | Guard Cartridge, 2/pk | 9.4 x 15 | 5 | 820675-119 | |
|  | Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-919 | 820950-935 |
|  | Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | 821125-919 | 821125-935 |
|  | Guard Hardware Kit | 9.4 x 15 | | 840140-901 | |
|  | Guard Hardware Kit | | | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | |
|  | PrepHT Cartridge | 21.2 x 250 | 7 | 877250-101 | |
|  | PrepHT Endfittings, 2/pk | | | 820400-901 | |
|  | PrepHT Guard Cartridge, 2/pk | 17.0 x 7.5 | 5 | 820212-919 | |
|  | Guard Cartridge Hardware | | | 820444-901 | |

*These columns ship containing reversed-phase solvents. Flush with isopropanol before using normal-phase solvents.

**These columns can also be used in HILIC mode.

Normal-Phase Columns Based on ZORBAX Original SIL

| Hardware | Description | Size (mm) | Particle Size (µm) | SIL USP L3 | CN USP L10 | NH2 USP L8 | Carbohydrate Analysis* |
|---|--------------------------|------------|--------------------|------------|------------|------------|------------------------|
| Standard Columns (no special hardware required) | | | | | | | |
| | Semi-Prep | 9.4 x 250 | 5 | 880952-201 | 880952-205 | 880952-208 | |
| | Analytical | 4.6 x 250 | 5 | 880952-701 | 880952-705 | 880952-708 | 840300-908 |
| | Analytical | 4.6 x 150 | 5 | 883952-701 | 883952-705 | 883952-708 | 843300-908 |
| | Narrow Bore | 2.1 x 50 | 5 | | | 860700-708 | |
| Guard Columns (hardware required) | | | | | | | |
|  | Guard Cartridge, 2/pk | 9.4 x 15 | 5 | 820675-119 | 820675-111 | 820675-111 | |
|  | Guard Cartridge, 4/pk | 4.6 x 12.5 | 5 | 820950-901 | 820950-905 | 820950-908 | 820950-908 |
|  | Guard Cartridge, 4/pk | 2.1 x 12.5 | 5 | | | | |
|  | Guard Hardware Kit | 9.4 x 15 | | 840140-901 | 840140-901 | 840140-901 | |
|  | Guard Hardware Kit | | | 820999-901 | 820999-901 | 820999-901 | 820999-901 |
| PrepHT Cartridge Columns (require endfittings kit 820400-901) | | | | | | | |
|  | PrepHT Cartridge | 21.2 x 250 | 7 | 877952-101 | 877952-105 | 877952-108 | |
|  | PrepHT Endfittings, 2/pk | | | 820400-901 | 820400-901 | 820400-901 | |
|  | Guard Cartridge Hardware | | | 820444-901 | | | |

*Columns ship in acetonitrile:water and are tested with a mix of sugars.



Pursuit XRs Si, USP L3

| Size (mm) | Particle Size (μm) | Part No. |
|-------------------------|---------------------------------|--------------|
| Semi-Prep Scale | | |
| 10.0 x 250 | 10 | A6004250X100 |
| Analytical Scale | | |
| 4.6 x 250 | 10 | A6004250X046 |
| 4.6 x 100 | 5 | A6006100X046 |
| 4.6 x 50 | 5 | A6006050X046 |
| 4.6 x 100 | 3 | A6005100X046 |
| 4.6 x 50 | 3 | A6005050X046 |
| 2.1 x 100 | 5 | A6006100X021 |
| 2.0 x 50 | 3 | A6005050X020 |
| Prep Scale | | |
| 50.0 x 250 | 10 | A6004250X500 |
| 30.0 x 250 | 10 | A6004250X300 |
| 21.2 x 250 | 10 | A6004250X212 |

Polaris HPLC Columns







| Size (mm) | Particle Size (μm) | Polaris NH2 | Polaris Si-A |
|------------|---------------------------------|--------------|--------------|
| 50.0 x 250 | 10 | | A2004250X500 |
| 21.2 x 250 | 10 | | A2004250X212 |
| 21.2 x 250 | 5 | A2013250X212 | A2003250X212 |
| 21.2 x 150 | 5 | | A2003150X046 |
| 21.2 x 50 | 5 | | A2003050X212 |
| 10.0 x 250 | 5 | A2013250X100 | |

(Continued)

Polaris HPLC Columns

| Size (mm) | Particle Size (µm) | Polaris NH2 | Polaris Si-A |
|-----------|--------------------|--------------|--------------|
| 4.6 x 250 | 10 | | A2003250X046 |
| 4.6 x 250 | 5 | A2013250X046 | |
| 4.6 x 150 | 5 | A2013150X046 | A2003150X046 |
| 4.6 x 100 | 5 | A2013100X046 | A2003100X046 |
| 4.6 x 50 | 5 | A2013050X046 | A2003050X046 |
| 4.6 x 250 | 3 | A2014250X046 | A2005250X046 |
| 4.6 x 150 | 3 | A2014150X046 | A2005150X046 |
| 4.6 x 100 | 3 | A2014100X046 | A2005100X046 |
| 4.6 x 50 | 3 | A2014050X046 | A2005050X046 |
| 4.0 x 250 | 5 | A2013250X040 | A2003250X040 |
| 4.0 x 150 | 5 | A2013150X040 | A2003150X040 |
| 4.0 x 125 | 5 | A2013125X040 | A2003125X040 |
| 3.0 x 250 | 5 | A2013250X030 | A2005250X046 |
| 3.0 x 150 | 5 | A2013150X030 | A2003150X030 |
| 3.0 x 100 | 5 | A2013100X030 | A2003100X030 |
| 3.0 x 50 | 5 | | A2003050X030 |
| 3.0 x 250 | 3 | A2014250X030 | A2003250X030 |
| 3.0 x 150 | 3 | A2014150X030 | A2005150X030 |
| 3.0 x 100 | 3 | A2014100X030 | A2005100X030 |
| 3.0 x 50 | 3 | A2014050X030 | A2005050X030 |
| 2.0 x 250 | 5 | A2013250X020 | A2003250X020 |
| 2.0 x 150 | 5 | A2013150X020 | A2003150X020 |
| 2.0 x 100 | 5 | A2013100X020 | A2003100X020 |
| 2.0 x 50 | 5 | A2013050X020 | A2003050X020 |
| 2.0 x 30 | 5 | A2013030X020 | A2003030X020 |
| 2.0 x 20 | 5 | A2013020X020 | A2003020X020 |
| 2.0 x 250 | 3 | A2014250X020 | A2005250X020 |
| 2.0 x 150 | 3 | A2014150X020 | A2005150X020 |
| 2.0 x 100 | 3 | A2014100X020 | A2005100X020 |
| 2.0 x 50 | 3 | A2014050X020 | A2005050X020 |
| 2.0 x 30 | 3 | A2014030X020 | A2005030X020 |
| 2.0 x 20 | 3 | A2014020X020 | A2005020X020 |

MetaGuard Columns

| Hardware | Dimensions | Particle Size (µm) | Polaris NH2 | Polaris Si-A |
|---|------------|--------------------|-------------|--------------|
|  | 4.6 | 10 | | A2004MG |
|  | 2.0 | 10 | | A2004MG2 |
|  | 4.6 | 5 | A2013MG | A2003MG |
|  | 2.0 | 5 | A2013MG2 | A2003MG2 |
|  | 4.6 | 3 | A2014MG | A2005MG |
|  | 2.0 | 3 | A2014MG2 | A2005MG2 |

Ion-Exchange Columns

ZORBAX Ion-Exchange Columns – SAX and SCX

- ZORBAX SAX and 300SCX columns are based on rugged ZORBAX silica
- Stable from pH 2-7
- Provide high efficiency, rapid separations
- Compatible with organic mobile phase modifiers

Agilent ZORBAX Strong Ion-Exchange columns are available as both Strong Anion-Exchange (SAX) and Strong Cation-Exchange (300SCX) columns. Each column is packed with bonded, 5 μm , spherical silica particles for optimum efficiency.

ZORBAX SAX packing has a permanently bonded quaternary amine. A trifunctional organo-silane reagent is used in producing this packing to maximize its stability with aqueous mobile phases. This column is ideal for separation of water-soluble compounds such as aromatic and aliphatic carboxylic acids and sulfonic acids.

ZORBAX SCX packing has 300Å pore size silica particles chemically bonded to an aromatic sulfonic acid group. This column is used for separations of basic, water-soluble compounds and bio-molecules.

Column Specifications

| Bonded Phase | Pore Size | Surface Area | pH Range | Functionality | Max Pressure |
|---------------|-----------|-----------------------|----------|------------------|--------------|
| ZORBAX SAX | 70Å | 300 m ² /g | 2.0-7.0 | Quaternary amine | 350 bar |
| ZORBAX 300SCX | 300Å | 50 m ² /g | 2.0-7.0 | Sulfonic acid | 350 bar |

Specifications represent typical values only.

Cough/cold remedies on ZORBAX 300SCX

Column: ZORBAX 300SCX
880952-704
4.6 x 250 mm, 5 µm

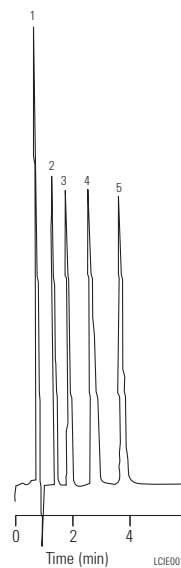
Mobile Phase: 100 mM NaH₂PO₄ (pH 6.5)

Flow Rate: 3 mL/min

Temperature: 20 °C

Detector: 210 nm

Sample: Cold remedies



1. Pyrilamine
2. Theophylline
3. Glyceryl Guaiacolate
4. Caffeine
5. Phenylephrine

ZORBAX Ion-Exchange Columns – SAX and SCX

| Description | Size (mm) | Particle Size (µm) | Particle Size | |
|--------------------|-----------|--------------------|---------------|-------------|
| | | | SAX | 300SCX |
| Semi-preparative | 9.4 x 250 | 5 | 880952-203 | 880952-204 |
| Analytical | 4.6 x 250 | 5 | 880952-703 | 880952-704 |
| Analytical | 4.6 x 250 | 5 | | 880952-714* |
| Analytical | 4.6 x 150 | 5 | 883952-703 | 883952-704 |
| Analytical | 4.6 x 150 | 5 | | 883952-714* |
| Analytical | 4.6 x 50 | 5 | | 846952-704 |
| Solvent Saver | 3.0 x 50 | 5 | | 860700-304 |
| Narrow Bore | 2.1 x 150 | 5 | | 883700-704 |
| Narrow Bore | 2.1 x 150 | 5 | | 883700-714* |
| Narrow Bore | 2.1 x 50 | 5 | | 860700-704 |
| Guard Hardware Kit | | | 820999-901 | 820999-901 |

*These columns have been modified to provide less retention, for those who desire that in their application.

Hi-Plex Columns for Carbohydrate Analysis

- Agilent's recommended column for accurate, low-pressure analysis of typical carbohydrates, providing leading-edge features for reliable quantitative and qualitative analysis
- Enable reduced column operating pressures for repeatable performance and longer column life
- Wide range of ligand counter ions and column configurations meet requirements of challenging organic applications
- Simplified HPLC system requirements through isocratic separation capabilities; excellent batch-to-batch reproducibility for ultimate confidence in your results
- Can be used with water or diluted acid as an eluent
- Available in 8 μm and 10 μm particle sizes in a range of choices for USP media types – L17, L19, L34 and L58

The least complicated LC methods for detecting sugars, sugar alcohols and organic acids call for ligand-exchange columns with a simple mobile phase. However, the wide particle size distribution of conventional resins can lead to high backpressures and reduced productivity.

Hi-Plex columns are engineered with monodisperse sulfonated particles, creating a high-performance media uniquely suited to stringent USP methods for analyzing carbohydrates, alcohols and organic acids. Unlike the ZORBAX NH₂ column used for carbohydrate analysis with an acetonitrile:water mobile phase, Hi-Plex ligand-exchange columns provide more resolution for mono- and disaccharides due to the interaction of the hydroxyl groups with the metal ion associated with the cation-exchange functionality of the sulfonic acid group.



Column Specifications

| Bonded Phase | Temperature Range | Flow Rate (mL/min) | Eluent |
|-----------------------------|-------------------|--------------------|-------------------------|
| Hi-Plex Ca | 80-90 °C | 0.6 | Water |
| Hi-Plex Ca USP L19 | 80-90 °C | 0.3 | Water |
| Hi-Plex Pb | 70-90 °C | 0.6 | Water |
| Hi-Plex H for carbohydrates | 60-70 °C | 0.6 | Water |
| Hi-Plex H for organic acids | 40-60 °C | 0.6 | Dilute Acid |
| Hi-Plex Ca (Duo) | 80-90 °C | 0.6 | Water |
| Hi-Plex K | 80-90 °C | 0.6 | Water |
| Hi-Plex Na (Octo) | 80-90 °C | 0.6 | Water, Sodium Hydroxide |
| Hi-Plex Na | 80-90 °C | 0.3 | Water |

Hi-Plex Column Selection

USP methods specify the type of HPLC media and column dimensions which should be used for the analysis. The Hi-Plex product range has four materials that comply with USP definitions.

Media Type L17

Strong cation-exchange resin consisting of sulfonated, cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 7 to 11 μm in diameter – Hi-Plex H.

Media Type L19

Strong cation-exchange resin consisting of sulfonated, cross-linked styrene-divinylbenzene copolymer in the calcium form, 9 μm in diameter – Hi-Plex Ca and Hi-Plex Ca (Duo).

Media Type L34

Strong cation-exchange resin consisting of sulfonated, cross-linked styrene-divinylbenzene copolymer in the lead form, about 9 μm in diameter – Hi-Plex Pb.

Media Type L58

Strong cation-exchange resin consisting of sulfonated, cross-linked styrene-divinylbenzene copolymer in the sodium form, 6 to 30 μm diameter – Hi-Plex Na and Hi-Plex Na (Octo).

In addition to the standard column sizes, the media is also packed in specific column dimensions for different USP methods, including sugar alcohol analysis.

For some application areas there are several column options, and the choice of the most appropriate Hi-Plex media will depend on sample matrix and exact carbohydrate composition.

Hi-Plex Column Selection

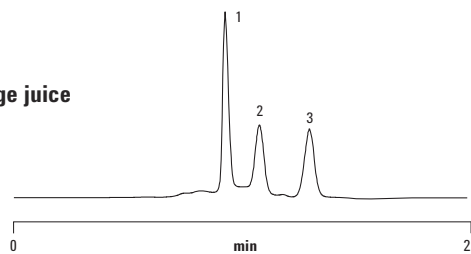
| Application Area | Recommended Column |
|---|----------------------------------|
| USP Methods Specifying L17 Media | Hi-Plex H |
| USP Methods Specifying L19 Media | Hi-Plex Ca and Hi-Plex Ca (Duo) |
| USP Methods Specifying L34 Media | Hi-Plex Pb |
| USP Methods Specifying L58 Media | Hi-Plex Na and Hi-Plex Na (Octo) |
| Mono- and Disaccharides | Hi-Plex Ca |
| | Hi-Plex Pb |
| | Hi-Plex H |
| | Hi-Plex Na (Octo) |
| Anomer Separations | Hi-Plex Ca |
| Organic Acids | Hi-Plex H |
| Alcohols | Hi-Plex Ca |
| | Hi-Plex K |
| | Hi-Plex H |
| | Hi-Plex Pb |
| Adulteration of Food and Beverages | Hi-Plex Ca and Hi-Plex Pb |
| Food Additives | Hi-Plex Ca and Hi-Plex Pb |
| Dairy Products | Hi-Plex Ca and Hi-Plex H |
| Sweetened Dairy Products | Hi-Plex Pb |
| Confectionery | Hi-Plex Ca and Hi-Plex Pb |
| Fruit Juice | Hi-Plex Ca |
| Wine | Hi-Plex H |
| Wood Pulp Hydrolysates (cellulose/hemi-cellulose) | Hi-Plex Pb |
| Fermentation Monitoring | Hi-Plex H |
| Oligosaccharides | Hi-Plex Na |
| Samples with High Salt Content (molasses) | Hi-Plex Na (Octo) |
| Oligosaccharides <Dp5 with Monosaccharides | Hi-Plex Ca (Duo) |
| Corn Syrups | Hi-Plex Na |

Analysis of fruit juice

Column: Hi-Plex Ca
 PL1170-6810
 7.7 x 300 mm, 8 µm

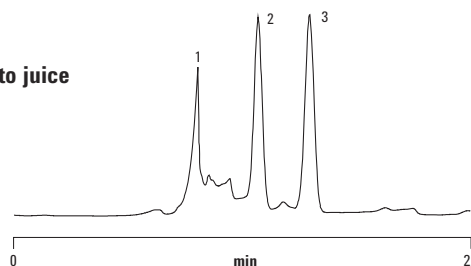
Mobile Phase: Water
 Flow Rate: 0.6 mL/min
 Temperature: 85 °C
 Detector: RI

Orange juice

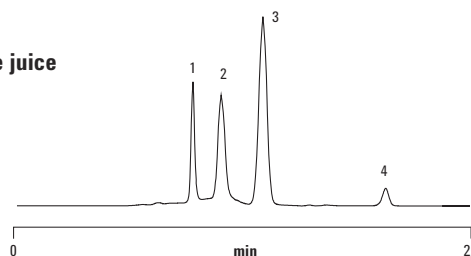


- 1. Sucrose
- 2. Glucose
- 3. Fructose
- 4. Sorbitol

Tomato juice



Apple juice



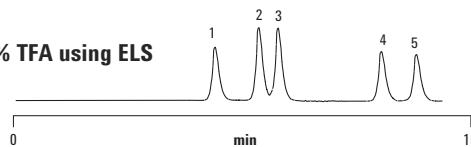
VLC0009

Organic acid analysis

Column: Hi-Plex H
 PL1170-6830
 7.7 x 300 mm, 8 µm

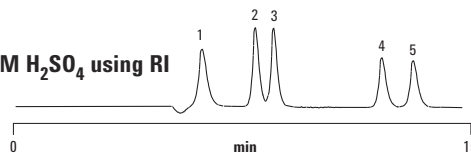
Mobile Phase: Water with acid as specified
 Flow Rate: 0.6 mL/min
 Temperature: 60 °C
 Detector: ELS (neb=80 °C,
 evap=90 °C,
 gas=0.7 SLM), RI

0.1% TFA using ELS



- 1. Oxalic acid
- 2. Citric acid
- 3. Tartaric acid
- 4. Succinic acid
- 5. Lactic acid

5 mM H₂SO₄ using RI



VLC0010