SAMPLE PREPARATION

Your Essential Resource for Supplies

The Measure of Confidence

Agilent Technologies

SAMPLE PREPARATION PRODUCTS FOR CHROMATOGRAPHY

Reliably extract and concentrate samples from complex matrices

Sample preparation is an essential part of successful chromatography. It extends column lifetime, reduces the need for repeated samples, and minimizes interferences that can jeopardize your separation, detection, and quantification.

Agilent offers the most complete line of sample prep products across the full spectrum of instrumentation. These include:

- **Bond Elut SPE products** – selectively remove interferences and/or analytes from challenging matrices. They feature trifunctional bonding chemistry for greater stability – plus a three-tier QC process that confirms the correct particle size. Choose from the largest selection of sorbent formats in the market today.
- **Pre-packaged QuEChERS kits** – make sample preparation faster, easier, and more reliable. Options include extraction kits with pre-weighed salts in anhydrous packets, dispersive kits that accommodate aliquot volumes specified by AOAC/EN methods, and ceramic homogenizers that promote consistent extraction and recovery.
- **Filtration products** improve both system performance and analytical quality and prevent extractables or other contaminants from damaging the integrity of your samples. Choose from the industry's widest variety of membrane types and pore sizes to suit your applications.
- **Agilent Bond Elut Dried Matrix Spotting cards** use an innovative, non-cellulose technology that delivers a new level of confidence in sample collection, with significantly improved analytical sensitivity, reproducibility and ease-of-use.

How do you select the Sample Preparation product that is just right for your needs? We've included some tools that may help. In the following pages, please see our *Interferences Chart, Applications Guide, Sample Preparation Reference Guide* (showing typical matrices and compound types), and the Format Guide that displays the various physical configurations that are available to match your lab's workflow. These tools, along with information in each product section, can help narrow the multitude of choices and get the Agilent sample prep product that is just right for your lab.

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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.

LIFE SCIENCE SOLUTIONS

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

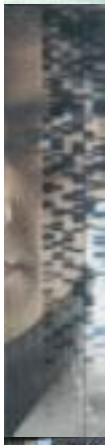
Research into how large sets of proteins affect the health of an organism requires special sets of analytical tools. Agilent has built a formidable arsenal of liquid chromatograph/mass spectrometers, bioinformatics systems, multiple affinity protein removal columns, and OFFGEL electrophoresis for protein 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.

Bond Elut Plexa

Bond Elut Plexa is the next generation of polymeric SPE products. A unique polymeric functionality and optimized methodologies deliver high recoveries with excellent cleanliness, reduced ion suppression and ease-of-use in any SPE workflow.

Turn to page 21.

Agilent Bond Elut QuEChERS Kits

With Agilent Bond Elut QuEChERS disposable pre-weighed extraction and dispersive kits, you can extract and prepare complex matrices for multi-class, multi-residue pesticide analysis in minutes rather than hours.

Turn to pages 90-99.

Captiva Filtration

Faster than centrifugation and easily automated, Captiva's unique dual-depth filtration media provide complete removal of precipitated proteins and outstanding resistance to sample clogging.

Turn to page 100.

Option 1 – Interference Guide: Select your Sample Preparation technique based on the type of interferences(s) you need to remove

	More Selective			*Instrument Separation and Detection Selectivity*			More Selective	
	Less Selective			*Sample Preparation Selectivity*			Less Selective	
Sample Prep Technique / Interference Removed	**Dilute & Shoot**	**Filtration**	**Dried Matrix Spotting**	**Supported Liquid Extraction (SLE)**	**Precipitation**	**QuEChERS**	**Lipid Removal 'Hybrid' Filtration**	**Solid Phase Extraction**
Lipids	No	No	No	No	No	Yes	Yes	Yes
Oligomeric Surfactants	No	No	No	No	No	No	Yes	Yes
Particulates	No	Yes	No	Some	Yes	Yes	Yes	Yes
Pigments	No	No	No	Some	No	Yes	No	Yes
Polar Organic Acids	No	No	No	Yes	No	Yes	No	Yes
Proteins	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Salts	No	No	No	Yes	No	Yes	No	Yes
Suggested Agilent Products	**Agilent Autosampler Vials**	**Captiva**	**Bond Elut DMS***	**Chem Elut Hydromatrix**	**Captiva Non-Drip (ND)**	**Bond Elut QuEChERS**	**Captiva ND^{LIPIDS}**	**Bond Elut Silica and Polymeric SPE**

*Bond Elut DMS cards are for sample collection/transport and are not for sample cleanup

TIPS & TOOLS

Agilent suggests adding filtration to any sample preparation process to extend the system uptime and maximize your application's performance.

Option 2 - Application Guide: Select the Sample Preparation product best suited for your analysis needs

Application Guide

Industry	Application	Technique	Product	Page No.
Biotechnology	Protein/Peptide Purification	Lysate Filtration	Captiva	100
		Micro-volume SPE	OMIX	80
Clinical Research and Forensics	Bioanalysis	Solid Phase Extraction	Bond Elut	21
			Bond Elut Plexa	21
			Bond Elut Plexa PCX	28
		Micro-volume SPE	OMIX	80
		Supported Liquid Extraction (SLE)	Chem Elut	118
		Protein Precipitation Filtration	Captiva ND	101
			Captiva ND^{Lipids}	102
			Captiva	100
Environmental Monitoring	Semi-volatiles	Solid Phase Extraction	Bond Elut	25
			SPEC	83
	Oils and Grease	Solid Phase Extraction	Bond Elut	25
			SPEC	83
		Water Removal	Bond Elut	25
			Na_2SO_4	25
	Emerging Contaminants	Solid Phase Extraction	Bond Elut	25
		Supported Liquid Extraction (SLE)	Chem Elut	118
	Textile analysis	Supported Liquid Extraction (SLE)	Chem Elut	118

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TIPS & TOOLS

Simplify your operations with Agilent J&W DB-CLP1 and DB-CLP2 GC columns – the most flexible universal column pair for nine EPA dual-ECD pesticide methods. Together, these fast, reliable columns deliver excellent resolving power with exceptionally low bleed while eliminating the need for time-consuming column switching. Learn more at **www.agilent.com/chem/CLP**

Application Guide continued

Application Guide				
Industry	**Application**	**Technique**	**Product**	**Page No.**
Food and Beverage	Pesticides and Herbicides	Filtration	Captiva ND	101
			Captiva ND^{Lipids}	102
			Captiva	100
		Solid Phase Extraction	Bondesil	88
			QuEChERS	90
		Supported Liquid Extraction (SLE)	Chem Elut	118
Pharmaceutical	Bioanalysis	Solid Phase Extraction	Bond Elut Plexa	25
			Bond Elut Plexa PCX	28
			Bond Elut Plexa PAX	30
			Bond Elut	21
			SPEC	83
		Micro-volume SPE	OMIX	80
		Protein Precipitation Filtration	Captiva ND	101
			Captiva ND^{Lipids}	102
			Captiva	100
		Supported Liquid Extraction (SLE)	Chem Elut	118
	Veterinary Drugs	Solid Phase Extraction	QuEChERS	90

Option 3 - Sample Preparation Reference Guide: Select the Sample Preparation product best suited for your matrix and compound types

Sample Preparation Reference Guide

Typical Matrices	Compound Types	Primary Extraction Mechanism	Product	Page No.
Various food matrices	Pesticide and industrial chemical residues	Buffered or unbuffered extraction, dSPE*	Bond Elut QuEChERS	90
Various food matrices	Veterinary drugs	Unbuffered extraction, dSPE*	Bond Elut QuEChERS	90
Various food matrices	Acrylamide	Unbuffered extraction, dSPE*	Bond Elut QuEChERS	90
Aqueous samples, biological fluids	Small molecules	Tip-based SPE: ion exchange, reversed phase	Bond Elut OMIX	80
Aqueous samples, biological fluids, beverages and food	Small molecules	Filtration	Captiva	100
			Captiva ND^{LIPIDS}	102
Aqueous samples, biological fluids, beverages and food	Small molecules	Filtration and lipid depletion	Captiva ND	101
Urine, plasma and biological fluids, beverages and food	Catecholamines, acrylamide in liquids and food	Strong cation and anion exchange	Bond Elut AccuCAT	59
Non-polar organics	Polar cleanup	Polar	Bond Elut Alumina	64
Urine, plasma, biological fluids	Strongly non-polar compounds	Non-polar, polar (as a normal phase extraction)	Bond Elut C1	44
Aqueous samples, biological fluids	Non-polar compounds	Non-polar	Bond Elut C18	35
Aqueous samples, biological fluids	Non-polar compounds, desalting	Non-polar	Bond Elut C18 OH	39
Aqueous samples, biological fluids, non-polar extracts	Extra wide pore for larger, macro molecules up to 15 kDa	Non-polar hydrogen bonding	Bond Elut C18 EWP	38

*Dispersive Solid Phase Extraction

(Continued)

Sample Preparation Reference Guide continued

Sample Preparation Reference Guide				
Typical Matrices	**Compound Types**	**Primary Extraction Mechanism**	**Product**	**Page No.**
Aqueous samples, biological fluids	Vitamin D, fat soluble compounds, steroids/hormones	Non-polar	Bond Elut C2	45
Aqueous samples, biological fluids	Strongly non-polar compounds	Non-polar	Bond Elut C8	40
Aqueous samples, biological fluids	Non-polar compounds	Weak anion exchange	Bond Elut CBA	57
Aqueous and non-polar organics	Strong and weak bases	Polar (Hydroxyl)	Bond Elut Cellulose	71
Aqueous samples, biological fluids	Polar impurities/compounds	Non-polar	Bond Elut CH (cyclohexyl)	43
Aqueous samples, biological fluids	Non-polar compounds	Non-polar, dipole	Bond Elut CN-E	47
Organic plant and tissue extracts	Mid-range polarity compounds	Wide range non-polar retention	Bond Elut Carbon	68
Urine, plasma, saliva, blood, biological fluids	Acid, basic and neutral drugs	Non-polar and strong cation exchange	Bond Elut Certify	60
Urine, plasma, saliva, blood, biological fluids	Acidic drugs	Non-polar and strong anion exchange	Bond Elut Certify II	62
Water, biological fluids, non-polar extracts	Strong acidic compounds	Weak anion exchange	Bond Elut DEA	58
Aqueous samples, biological fluids, non-polar organics	Polar, weakly non-polar	Polar and non-polar	Bond Elut Diol (2OH)	48
Water sources	Polar organic molecules, explosive residues	Non-polar	Bond Elut ENV	32

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Sample Preparation Reference Guide continued

Sample Preparation Reference Guide				
Typical Matrices	**Compound Types**	**Primary Extraction Mechanism**	**Product**	**Page No.**
Non-polar organics	Organic extracts, non-polar environmental extracts	Polar	Bond Elut Florisil	63
Urine, plasma, biological fluids	Non-polar compounds	Non-polar	Bond Elut LMS	33
Aqueous samples and polar organic grain extracts	Mycotoxins (trichothecenes and zearalenones)	Ionic cleanup	Bond Elut Mycotoxin	72
Horse urine, urine, biological fluids	Acidic, basic and neutral drugs, quaternary drugs, endocrine disruptors	Non-polar	Bond Elut NEXUS and Bond Elut NEXUS WCX	34
Aqueous, biological fluids, buffered organics	Polar and non-polar strong anions, polar structural isomers	Weak anion exchange	Bond Elut NH2	49
Plasma, urine, aqueous and biological fluids	cis-diol-containing compounds, catecholamines, ribonucleotides, amino alcohols, diketo and triketo compounds	Covalent bonding	Bond Elut PBA	74
Water sources	PCBs	Polar	Bond Elut PCB	71
Aqueous samples and biological fluids	Strongly non-polar compounds, aromatics	Non-polar	Bond Elut PH	42
Water sources, biological fluids	Non-polar compounds, phenols	Non-polar, electrostatic	Bond Elut PPL	31
Aqueous samples, biological fluids, buffered organics	Basic compounds (amine + pyridinium containing)	Strong cation exchange	Bond Elut PRS	55

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Sample Preparation Reference Guide continued

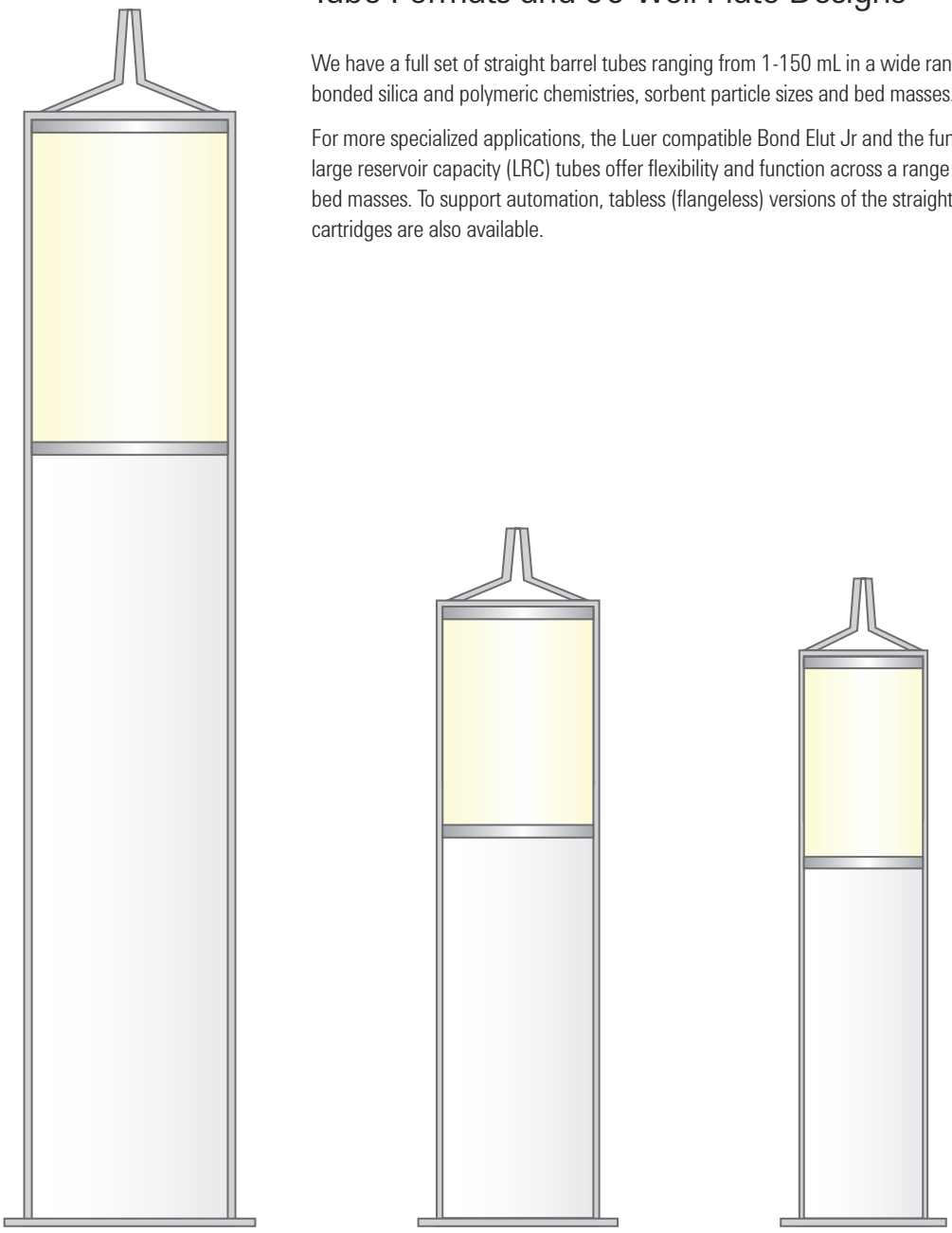
Sample Preparation Reference Guide				
Typical Matrices	**Compound Types**	**Primary Extraction Mechanism**	**Product**	**Page No.**
Aqueous samples, biological fluids, buffered organics	Acidic compounds (fruit acid removal for QuEChERS)	Weak anion exchange	Bond Elut PSA	56
Plasma, urine, aqeuous samples and biological fluids	Non-polar compounds with acidic/neutral fractionation PAH's from water	Non-polar	Bond Elut Plexa	21
Plasma, urine, aqeuous samples and biological fluids	Acidic compounds, carboxylic acid metabolites of drugs, peptides and amino acids	Mixed mode: non-polar and strong anion exchange	Bond Elut Plexa PAX	30
Plasma, urine, aqeuous samples and biological fluids	Basic drugs	Mixed mode: non-polar strong cation exchange	Bond Elut Plexa PCX	28
Aqueous samples, bioloigcal fluids	Weak acidic compounds	Strong anion exchange	Bond Elut SAX	51
Aqueous samples, biological fluids, buffered organics	Weak basic compounds	Strong cation exchange	Bond Elut SCX	53
Non-polar organics, oils, lipids	Cleanup of polar impurities	Polar	Bond Elut SI	46
Water sources, extracted soil samples	Pesticide and industrial chemical residue	Non-polar	EnvirElut	75
Aqueous biological fluids, organic reaction mixures (scavenging)	Nitrosamines, pesticides, herbicides	Solid supported LLE	Chem Elut	118
Aqueous biological fluids, organic reaction mixures (scavenging)	Nitrosamines, pesticides, herbicides	Solid supported LLE	Hydromatrix	118

Option 4 - Format Guide: Select the Sample Preparation product best suited for your analysis requirements

Agilent Offers a Broad Range of Tube Formats and 96-well Plate Designs

We have a full set of straight barrel tubes ranging from 1-150 mL in a wide range of bonded silica and polymeric chemistries, sorbent particle sizes and bed masses.

For more specialized applications, the Luer compatible Bond Elut Jr and the funnel-shaped large reservoir capacity (LRC) tubes offer flexibility and function across a range of sorbent bed masses. To support automation, tabless (flangeless) versions of the straight-barrel cartridges are also available.



Diagrams are to scale

60 mL 20 mL 12 mL

Bond Elut 96-well Plates

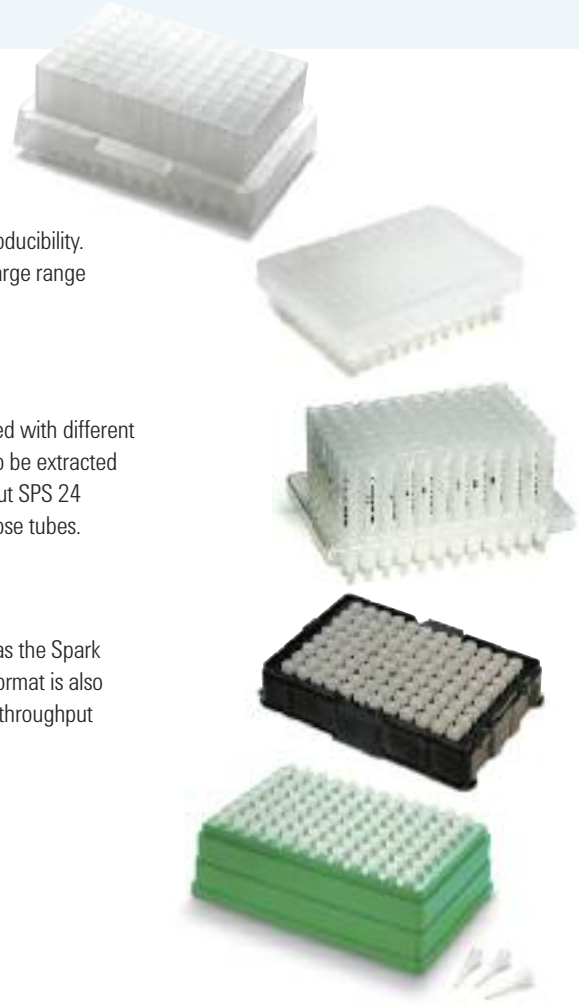
Bond Elut 96-well plate formats are best in class for flow performance and well-to-well reproducibility. These specially designed plates are available with well volumes of 1 mL and 2 mL and in a large range of different sorbent chemistries.

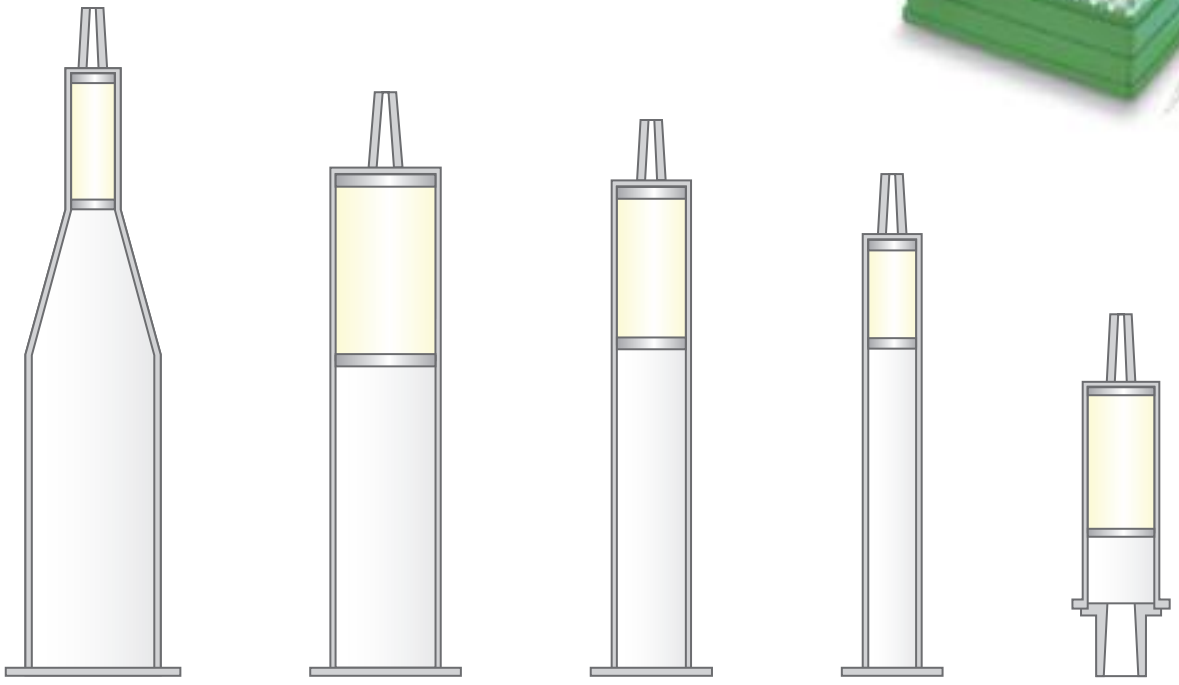
VersaPlate

VersaPlate is an innovative, versatile design that lets you customize plates. Insert tubes packed with different phases for sorbent screening, or insert only enough tubes to match the number of samples to be extracted for minimal waste. Luer tip of Versaplate tubes can also fit VacElut 12, VacElut 20, and VacElut SPS 24 vacuum manifolds. VersaPlate can be purchased in a pre-packed 96 position format or as loose tubes.

Packed Formats for Automation

Bond Elut sorbents are also available in packed bed formats for automation platforms, such as the Spark Holland Symbiosis, Gilson ASPEC and Gerstel MPS systems. Agilent's unique OMIX pipette format is also used with a wide range of liquid handling devices, ranging from hand-held pipettors to high-throughput automated systems.





Solid Phase Extraction (SPE)

Agilent Bond Elut:
Accuracy Starts Here

For over 30 years, Bond Elut has been the most trusted name in solid phase extraction. After years of use, demanding chemists at top companies worldwide have thoroughly documented its many applications and proven its performance.

Bond Elut is manufactured using state-of-the-art automation to guarantee quality and consistency. Optical scanners installed throughout our automated assembly process inspect each Bond Elut tube at multiple points. And during manufacture, 25 different tests are conducted to ensure reproducibility. If an imperfection is spotted, the tube is removed from the assembly line. The result is consistently reliable Bond Elut cartridges, time and time again.

Over 40 different sorbent functionalities are available in a variety of cartridge formats including straight barrel, large reservoir capacity (LRC) and Bond Elut Junior (Jr). 96-well plate configurations support automated workflows, with flexibility for method development and scale-up. Bulk packaging of popular products provides a cost-effective solution for high throughput. Trust integrated solutions from Agilent to connect your sample preparation, analysis and reporting needs to deliver the quality and reliability your lab needs.

The Bond Elut Difference

- Heritage of Reliability: With years of use in some of the most demanding analytical laboratories in the world, Bond Elut products have a proven track record resulting in a strong publication pedigree
- Options for Your Needs: Offering extraction solutions for the widest range of analytes and matrices, bonded silica phases for high specificity methods and polymeric phases for rapid method development, Bond Elut has the largest choice of formats and sorbents in the market today
- Innovative Products Designed for Lab Efficiency: Whether it be fast flow polymeric particles or our patented 96-well plate design, all Bond Elut products are created for ease-of-use, reliability and flexibility to meet both manual and automated requirements
- Technical Support at Every Step: For your specific applications, or to help solve occasional technical issues, a global team of analytical scientists is on hand to assist
- World Class Manufacturing and Quality: Unrivaled manufacturing control, plus exacting ISO 9001: 2000 compliant inspections guarantee the consistent quality of Bond Elut

Cross Reference of Comparable Phases by Manufacturer

Different chemistries and manufacturing processes create sorbents that exhibit differences in selectivity, so there is no universal equalivent for every application. However, the performance of products can be similar in many applications. This table provides suggestions for using Agilent Bond Elut products in comparison to products from other manufacturers.

If you are an Agilent SampliQ user, please contact our Technical Support for Bond Elut options for your sample prep needs.

Polymers

If you are using...				Try this...	Page No.
Phenomenex Strata	**Waters Oasis**	**Supelco Supelclean/Discovery**	**UCT**	**Agilent Bond Elut**	
Strata-X	HLB			Plexa	21
SDB-L		ENVI-ChromP	Styre Screen	ENV or LMS	32
Strata-X-C	MCX			Plexa PCX	28
	MAX			Plexa PAX	30

Silica-Based and Other Sorbents

If you are using...				Try this...	
Phenomenex Strata	**Waters Sep-Pak**	**Supelco Supelclean/Discovery**	**UCT**	**Agilent Bond Elut**	
C18-E	tC18	ENVI-18, DSC-C18, LC-18	C18-E	C18	35
C18-U	C18		C18-U	C18 OH	39
C8	C8	DSC-8, Envi-8, LC-8	C8	C8	40
	tC2			C2	45
Phenyl (PH)		DSC-Ph, LC-Ph	Phenyl	PH	42
Screen-C			Clean Screen	Certify	60
Si-1	Silica	DSC-Si, LC-SI	Silica	SI	46
FL-PR	Florisil	LC and ENVI Florisil	Florisil PR	FL	63
NH2	Amino Propyl	DSC-NH2, LC-NH	Amino Propyl	NH2	49
		DSC-Diol, LC-Diol	Diol	2OH	48
CN	Cyano Propyl	DSC-CN, LC-CN	Cyano Propyl	CN-E	47
	Alumina A, B, N	LC-Alumina A, B, N	Alumina A, B, N	Alumina A, B, N	64
SAX	AccellPlus QMA	DSC-SAX, LC-SAX, Quat amine with Cl	Quat amine with Cl	SAX	51
SCX	AccellPlus CM	DSC-SCX, LC-SCX	Benzenesulfonic acid	SCX	53
		ENVI-Carb	Carbon	Carbon	68
		ENVICarb-II/NH2		Carbon/NH2	68
		ENVICarb-II/PSA		Carbon/PSA	68

TIPS & TOOLS

For additional details on Agilent polymeric SPE products, see the *Agilent Bond Elut Plexa and Polymeric SPE Selection Guide*, publication number 5990-8589EN.
For details on Agilent Silica-Based SPE products, see the *Agilent Bond Elut Silica-Based SPE Selection Guide*, publication number 5990-8591EN.

Sorbent Specifications

Sorbent Phase	Category	Bonded Functional Group/ Base Material	Endcapped	Format	Typical Carbon Loading (%)	Surface Area (m^2/g)	Particle Size (µm) and Shape	Mean Pore Size (Å)	Page No.
AccuCAT	Mixed Mode	Sulfonic acid (SCX) and quaternary amine (SAX) silica based	No	Packed bed	7.0	500	40 and 120, irregular	60	59
Alumina (AL-A)	Polar	Aluminium oxide – acidic		Packed bed	0.0		25		64
Alumina (AL-B)	Polar	Aluminium oxide – basic		Packed bed	0.0		25		64
Alumina (AL-N)	Polar	Aluminium oxide – neutral		Packed bed	0.0		25		65
Aminopropyl (NH2)	Polar/Anion Exchanger	Aminopropyl/silica based	No	Packed bed	6.7	500	40 and 120, irregular	60	49
SPEC Aminopropyl (NH2)	Polar/Anion Exchanger	Aminopropyl/silica based	No	Monolithic disk		220		70	86
C1	Non-polar	Methyl/silica based	Yes	Packed bed	4.1	500	40, irregular	60	44
C2	Non-polar	Ethyl/silica based	Yes	Packed bed	5.6	500	40 and 120, irregular	60	45
SPEC C2	Non-polar	Dimethyl/silica based	No	Monolithic disk	2.7	220		70	86
C8	Non-polar	Octyl/silica based	Yes	Packed bed	12.2	500	40 and 120, irregular	60	40
SPEC C8	Non-polar	Octyl/silica based	Yes	Monolithic disk	5.0	220			86
Carbon	Strongly Non-polar	Graphitized carbon	No	Packed bed					68
C18	Non-polar	Trifunctional octadecyl/silica based	Yes	Packed bed	17.4	500	40 and 120, irregular	60	35
SPEC C18	Non-polar	Monofunctional octadecyl/silica based	No	Monolithic disk	8.0	220		70	86
SPEC C18 AR	Non-polar	Trifunctional octadecyl/silica based	Yes	Monolithic disk	9.0	220		70	86
C18 EWP	Non-polar	Trifunctional octadecyl/silica based	Yes	Packed bed	6.0	80	40, irregular	500	38
C18 OH	Non-polar	Monofunctional octadecyl/silica based	No	Packed bed	14.9	300	40 and 120, irregular	150	39
CBA	Cation Exchanger	Carboxylic acid/silica based	Yes	Packed bed	7.4	500	40 and 120, irregular	60	57
Certify	Mixed Mode	Octyl and benzenesulfonic acid (SCX)/silica based	No	Packed bed	9.0	500	40 and 120, irregular	60	60

(Continued)

Sorbent Specifications

Sorbent Phase	Category	Bonded Functional Group/ Base Material	Endcapped	Format	Typical Carbon Loading (%)	Surface Area (m^2/g)	Particle Size (µm) and Shape	Mean Pore Size (Å)	Page No.
Certify II	Mixed Mode	Octyl and quaternary amine (SAX)/ silica based	No	Packed bed	8.6	500	40 and 120, irregular	60	62
CH	Non-polar	Cyclohexyl/silica based	Yes	Packed bed	9.6	500	40 and 120, irregular	60	43
Cyano (CN-E)	Non-polar	Cyanopropyl/ silica based	Yes	Packed bed	8.1	500	40 and 120, irregular	60	47
SPEC Cyano	Polar	Cyanopropyl/ silica based	No	Monolithic disk		220		70	86
SPEC DAU	Application specific	Silica based		Monolithic disk		220		70	86
DEA	Anion Exchanger	Diethylaminopropyl/ silica based	No	Packed bed	8.5	500	40 and 120, irregular	60	58
Diol (2OH)	Polar	Diol/silica based	No	Packed bed	6.8	500	40, irregular	60	48
ENV	Non-polar	Styrene divinylbenzene		Packed bed			125, spherical	450	32
EnvirElut 1664	Application specific	Trifunctional octadecyl/silica based	No	Packed bed	18.0	500	40 and 120, irregular	60	75
FL	Polar	Florisil		Packed bed			200		63
LMS	Non-polar	Styrene divinylbenzene		Packed bed			75, spherical	300	33
SPEC MP1	Mixed Mode	Non-polar and benzenesulfonic acid (SCX)/silica based		Monolithic disk	6.0	220		70	86
SPEC MP3	Mixed Mode	Slightly polar and benzenesulfonic acid (SCX)/silica based		Monolithic disk		220		70	86
NEXUS	Mixed Mode	Mixed mode copolymer		Packed bed		575	70, spherical	100/450 Bimodal	34
PBA	Covalent	Phenylboronic acid/silica based	No	Packed bed	7.9	500	40, irregular	60	74
PCB	Application specific	Layered phase		Packed bed		500			57
PH	Non-polar	Phenyl/silica based	Yes	Packed bed	10.7	500	40 and 120, irregular	60	42
Plexa	Polar enhanced	Hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	42
Plexa PCX	Cation Mixed Mode	SCX functionalized hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	28
Plexa PAX	Anion Mixed Mode	SAX functionalized hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	30

(Continued)

Sorbent Specifications

Sorbent Phase	Category	Bonded Functional Group/ Base Material	Endcapped	Format	Typical Carbon Loading (%)	Surface Area (m^2/g)	Particle Size (µm) and Shape	Mean Pore Size (Å)	Page No.
PPL	Non-polar	Functionalized styrene divinylbenzene		Packed bed		600	125, spherical	150	31
PRS	Cation Exchanger	Propylsulfonic acid/ silica based	No	Packed bed	1.7	500	40, irregular	60	55
PSA	Anion Exchanger	Ethylenediamine-N-propyl/silica based	No	Packed bed	7.5	500	40 and 120, irregular	60	56
SPEC PSA	Anion Exchanger	Ethylenediamine-N-propyl/silica based	No	SPEC disk		220		70	86
SPEC PH	Non-polar	Phenyl/silica based	Yes	Monolithic disk		220		70	86
SAX	Anion Exchanger	Trimethylaminopropyl/ silica based	No	Packed bed	7.5	500	40 and 120, irregular	60	51
SPEC SAX	Anion Exchanger	Trimethylaminopropyl/ silica based	No	Monolithic disk		220		70	86
SCX	Cation Exchanger	Benzenesulfonic acid/silica based	No	Packed bed	10.9	500	40 and 120, irregular	60	53
SPEC SCX	Cation Exchanger	Benzenesulfonic acid/silica based	No	Monolithic disk		220		70	86
SI	Polar	Silica	No	Packed bed		600	40 and 120, irregular	60	46
SPEC SI	Polar	Silica	No	Monolithic disk		220		70	86

Particle Size Specifications

You will note that our most common silica-based Bond Elut packings are described as 40 µm materials, yet if you look at the actual lot analyses, you will see that the actual mean is around 55 µm. We have been making silica-based Bond Elut packings since 1979, using the same diameter silicas; in that time, the models used to estimate irregular particle "diameters" and the testing equipment have changed. We have retained the term "40 µm" however, because there are so many official methods that specify a 40 µm Bond Elut sorbent. As other suppliers attempted to copy the successful Bond Elut product specifications, the term has become an industry standard. You can be assured that the actual average particle in our regular silica Bond Elut is the same now as it was 30 years ago when we first pioneered SPE as a sample prep technology.

TIPS & TOOLS

If you don't see exactly what you're looking for, Agilent offers custom configurations for many of our sorbents and formats. Requests for custom products can be requested at www.agilent.com/chem/sampleprep or contact technical support at **SPP-Support@agilent.com**

Bond Elut Plexa Polymeric SPE

The Bond Elut Plexa Family is a new generation of polymeric SPE products, designed for simplicity, improved analytical performance and ease-of-use. Its uniqueness lies in the novel hydroxylated exterior, hydrophobic interior and advanced polymeric architecture.

Bond Elut Plexa

Bond Elut Plexa is a non-polar divinylbenzene-based neutral polymeric sorbent. This sorbent is the best choice for non-ionic extraction of a wide range of acidic, neutral and basic analytes from different matrices.

Bond Elut Plexa PCX

Bond Elut Plexa PCX is a cation exchanger with mixed mode sorbent characteristics and is therefore suitable for the extraction and cleanup of weak bases from biofluids. Bond Elut Plexa PCX demonstrates the same excellent particle size distribution and integrity as Bond Elut Plexa. A highly controlled sulfonation process results in zero fines for Bond Elut Plexa PCX.

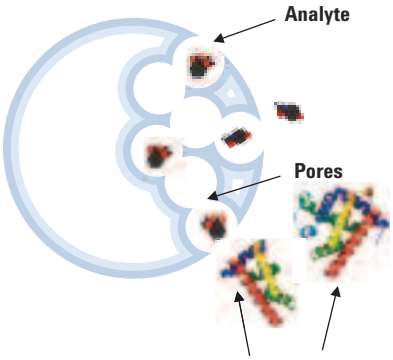
Bond Elut Plexa PAX

Bond Elut Plexa PAX is an anion exchange based on the same innovative base polymer particle technology as the other members of the Plexa SPE family. This advanced material offers excellent flow characteristics due to its monodisperse particle size distribution, affording superior ease-of-use, with minimal clogging of the packed bed. The amide-free particle technology does not provide binding sites for endogenous interferences such as proteins and lipids.

Advanced Polymer Architecture Improves Extraction Performance

LOAD:

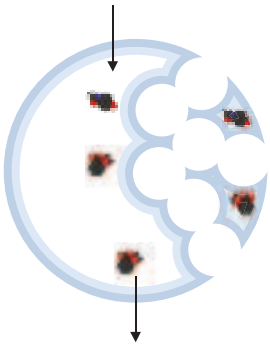
Water-rich, hydrophilic surface allows excellent phase transfer of analytes into the polymer core.



Large endogenous proteins do not bind to the surface of the polymer and cannot access pore structure.

WASH:

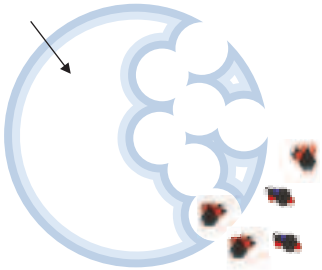
Analytes that have crossed the hydrophilic layers will remain tightly bound in the hydrophobic core.



Interferences wash away without leaching the analytes of interest.

ELUTE:

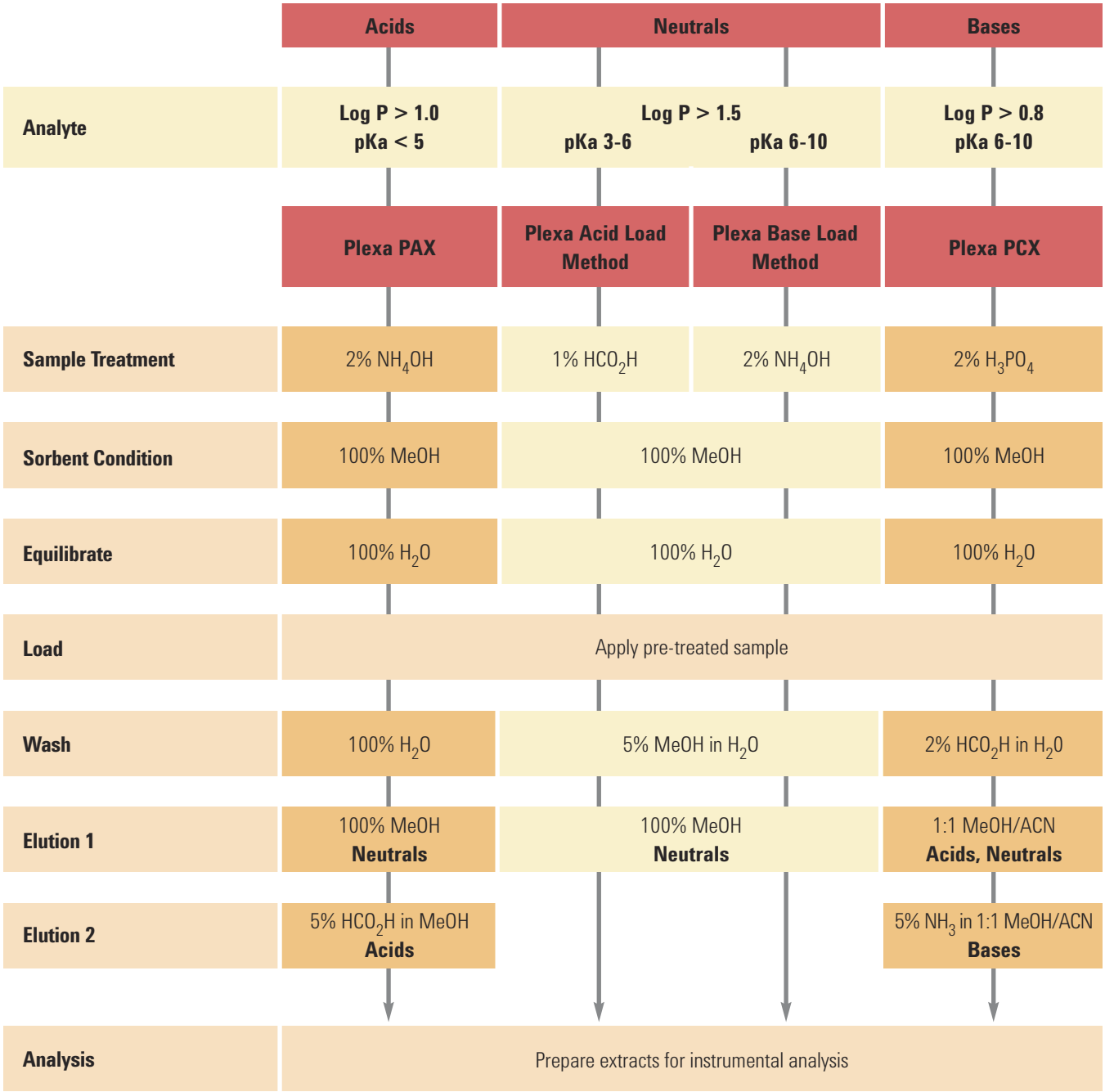
Specially engineered pore structure allows excellent mass transfer out of the polymer.



Clean extract with high recovery.

General Protocol for Trouble-Free SPE Applications with Bond Elut Plexa Polymeric SPE

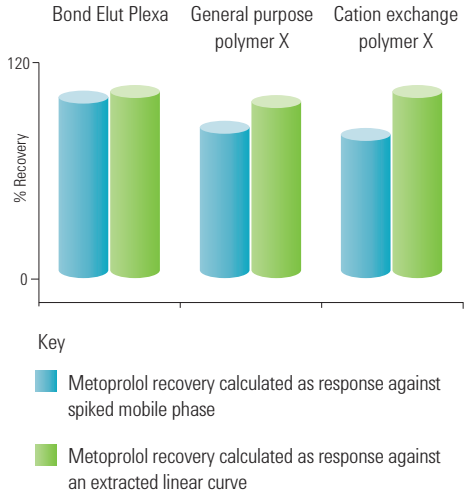
Regardless of your application or sample type, you will appreciate the difference the Bond Elut Plexa range makes. Plexa delivers simple methods and superior flow characteristics that effectively eliminate common matrix background that can cause interference and ion suppression, resulting in improved analytical sensitivity and data quality.



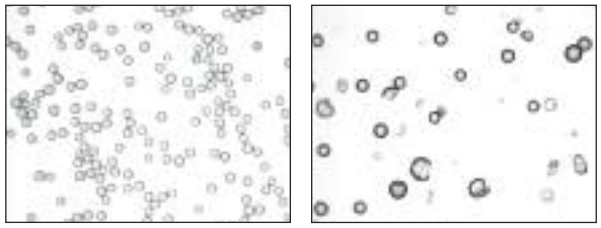
Improved Sensitivity

Matrix background can result in significantly decreased analytical sensitivity due to interference, co-elution or ion suppression. Bond Elut Plexa gives you higher recoveries in cleaner extracts, which translates into better sensitivity. Plexa delivers high recoveries regardless of whether absolute or relative calculations are used. This indicates that interference is minimized and maximum sensitivity is achieved. Relative recovery calculations (green bars) are routinely used, but these may mask the effects of interference or ion suppression, which are normalized.

Plexa improves sensitivity by minimizing interference or ion suppression effects and maximizing recovery



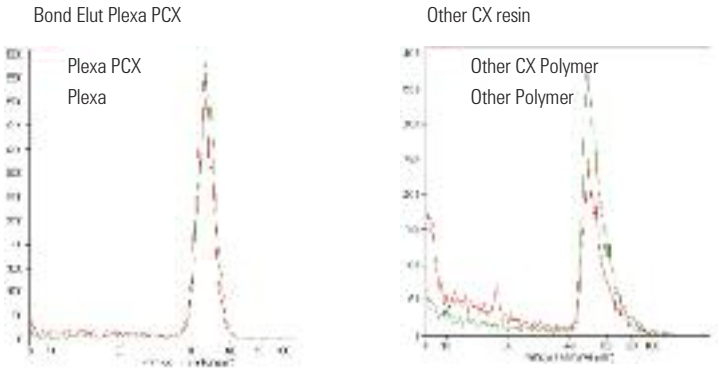
Comparison of particle sizes of non-polar SPE polymers by imaging analysis



Bond Elut Plexa PCX

Alternative Cation Exchange Polymer

Comparison of particle size distributions of non-polar SPE sorbents



The narrow particle size distribution offers reproducible, superior flow characteristics with minimal clogging

Bond Elut Plexa

- Fast flow, reproducible performance and ease-of-use
- Improved extract cleanliness minimizes sample matrix interferences
- Non-polar retention mechanism

Bond Elut Plexa polymeric SPE offers simple, easy-to-use methods that simplify sample preparation processes. The water-wettable, hydroxylated exterior allows excellent flow, even with biological fluids. A gradient of polarity on the polymer surface shunts small analytes to the more hydrophobic center of the polymer bead, where they are retained prior to the washing and elution steps. Plexa provides these performance enhancements due to a unique polymeric architecture with a non-retentive, hydroxylated, amide-free surface and a non-polar PS/DVB core for retaining small molecules. Binding of proteins and lipids on the polymer surface is minimized, resulting in cleaner samples and reduced matrix interference. Plexa is ideal for high-throughput tests requiring validated performance with minimal method development. The standard non-polar retention mechanism is applicable to almost any analyte type. The performance features operate at the sample loading step, making them largely method independent.

Typical Matrices

Plasma, urine, biological fluids and aqueous samples

Primary Extraction Mechanism

Non-polar

TIPS & TOOLS

Tabless (flangeless) cartridges are suitable for use with many automated SPE systems. Tabless products are typically designated with a "T" in the part number. If you need a tabless cartridge and do not see a part number listed, please contact **SPP-Support@agilent.com** to discuss custom options.

Bond Elut Plexa

Description	Unit	Part No.
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12109301
30 mg, 1 mL, Tabless	100/pk	12109301T
30 mg, 3 mL	50/pk	12109303
60 mg, 1 mL	100/pk	12109601
60 mg, 3 mL	50/pk	12109603
200 mg, 3 mL	50/pk	12109610
200 mg, 6 mL	30/pk	12109206
500 mg, 3 mL	30/pk	12109703
500 mg, 6 mL	30/pk	12259506
Bond Elut Jr		
200 mg	50/pk	12169610B
Mega Bond Elut Plexa		
500 mg, 12 mL	20/pk	327832
Other Formats		
Bond Elut Plexa Prospekt cartridge, 2 mm	96/pk	12221305
Bond Elut Plexa 800 Series cartridge	96/pk	12281305
60 mg, 3 mL, Gerstel format	50/pk	167816G
200 mg, 3 mL, Gerstel format	50/pk	167822G

Bond Elut Plexa 96-well Plates

Description	10 mg	30 mg
1 mL round-well plates	A4969010	A4969030
2 mL square-well plates	A3969010	A3969030

Bond Elut Plexa Method for Polyaromatic Hydrocarbons

Twenty-four PAHs in drinking water by automated SPE with fast HPLC-FLD/UV detection **(Pub No. 5990-7686EN)**

Method

800 mL water sample + 5% isopropanol + internal standard (benzo[a]pyrene-d^{12})

Condition with 4 mL ethyl acetate + 4 mL dichloromethane + 4 mL methanol + 4 mL water

Load sample

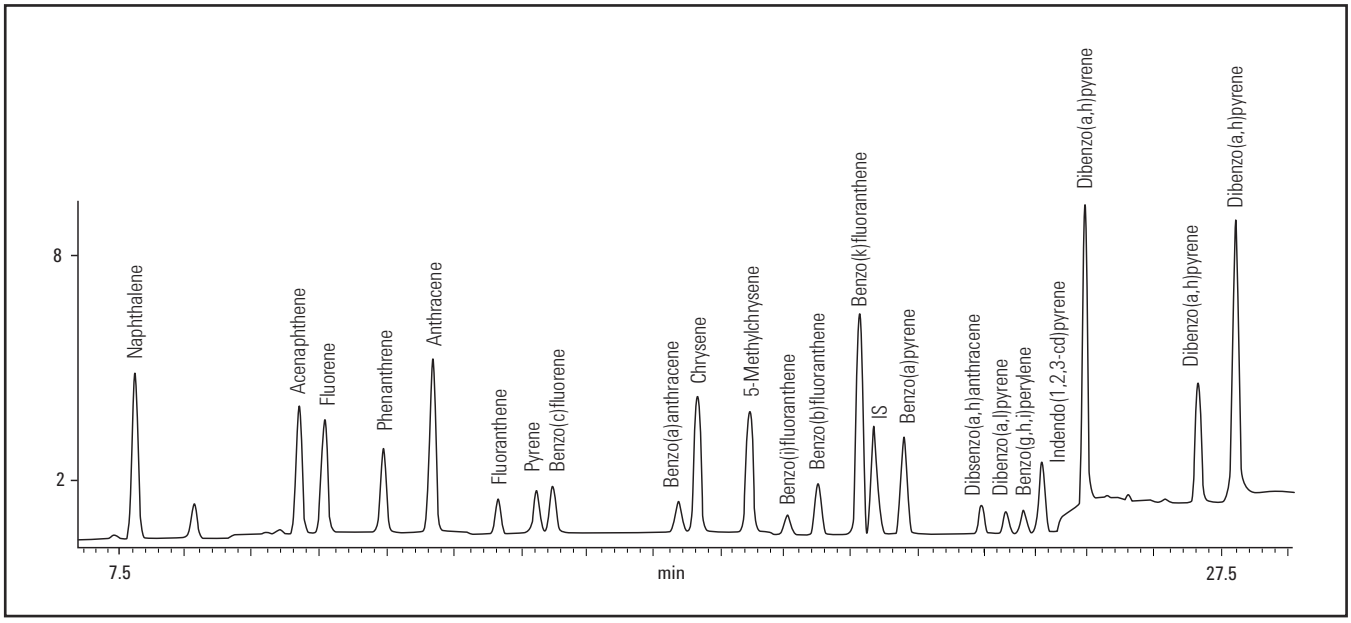
Dry for 30 min

Elute with 4 mL ethyl acetate + 4 mL dichloromethane

Make up to 10 mL with ethyl acetate:dichloromethane (1:1)

Evaporate off 4 mL

Add 0.5 mL acetonitrile



HPLC/FLD chromatogram of a 5 µL injection of the 20 ppt PAH standard solution on the Agilent Pursuit 3 PAH column

Pursuit HPLC Columns

Bond Elut Plexa PCX

- Faster flow rates improve productivity
- Extraction cleanliness and reduced interference improve precision
- Simplified, single method for ease-of-use

Bond Elut Plexa PCX is another milestone in the development of simple and robust SPE methods. Plexa PCX uses a polymeric cation exchange resin that combines the outstanding properties of Bond Elut Plexa – superior flow characteristics and improved analytical performance – with strong cation exchange functionalities. This mixed-mode SPE sorbent removes neutral and acidic interferences from the matrix, concentrates basic analytes and therefore improves sensitivity in the determination of basic compounds.

The Plexa PCX particles are near mono-dispersed, resulting in homogenous packing. Reproducible results are the norm, with very good tube-to-tube and well-to-well performance. Ion suppression is reduced because the highly polar, hydroxylated polymer surface is entirely amide-free and does not provide binding sites for endogenous species such as proteins and lipids.

Plexa PCX comes with a simple, single method approach for basic drugs that offers improved recoveries, cleaner extracts and reduced method development time and cost. Flow rate is improved because Plexa PCX particles have much narrower particle size distribution with no fines to cause blockages.

Typical Matrices

Plasma, urine, biological fluids and aqueous samples

Primary Extraction Mechanism

Mixed mode: non-polar and cation exchange

Bond Elut Plexa PCX

Description	Unit	Part No.
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12108301
60 mg, 1 mL	100/pk	12108601
30 mg, 3 mL	50/pk	12108303
60 mg, 3 mL	50/pk	12108603
60 mg, 3 mL, Tabless	50/pk	12108603T
200 mg, 6 mL	30/pk	12108206
500 mg, 6 mL	30/pk	12258506
Other Formats		
Bond Elut Plexa PCX Prospekt Cartridge, 2 mm	96/pk	12221306
Bond Elut Plexa PCX 800 Series Cartridge, 2 mm	96/pk	12281306
Gerstel format	50/pk	168016G

Bond Elut Plexa PCX 96-well Plates

Description	10 mg	30 mg
1 mL round-well plates	A4968010	A4968030
2 mL square-well plates	A3968010	A3968030

Typical Method for Bond Elut Plexa PCX

Sample:

100 µL plasma

Pretreatment:

Dilute 1:3 with 2% H_3PO_4

Conditioning:

1. 500 µL MeOH
2. 500 µL H_2O

Washes:

Acidic wash: 500 µL aqueous 2% formic acid

Neutral wash: 500 µL CH_3OH/CH_3CN (1:1, v/v)

Elution:

500 µL CH_3OH/CH_3CN + 5% NH_3 (28-30%)

Volumes stated are for Bond Elut 96 30 mg, 1 mL, P/N A4968030.

Bond Elut Plexa PAX

Typical Matrices

Plasma, urine, biological fluids and aqueous samples

Primary Extraction Mechanism

Mixed mode: non-polar and anion exchange

- Mixed mode, non-polar polymeric anion exchanger offers high level of analyte selectivity
- Exclusion of endogenous interferences offers superior cleanliness and minimizes ion suppression
- Simple, single method for ease-of-use, reduces method development time

Bond Elut Plexa PAX is a polymeric anion exchange product (PAX) that sets the performance standard in analyte cleanup and reproducibility for polar and non-polar acidic analytes. Existing polymeric anion exchange sorbents can exhibit a broad range of ion exchange capacity from batch to batch, leading to method irreproducibility and compromised data. Plexa PAX particles are functionalized using a proprietary process which allows anion exchange loadings to be controlled with a very high degree of reproducibility, giving more robust performance across the lifetime of your compound study or method.

This Plexa PAX polymeric mixed-mode SPE product comes with a simple, single method for non-polar acidic and polar acidic analytes that offers excellent clean up, even in complex matrices such as plasma. The optimized anion exchange methodology offers clean extracts, high recoveries and low RSDs, reducing method development time, sample repeats and overall cost per sample in the process.

Typical Method for Bond Elut Plexa PAX

Sample:

100 µL human plasma

Pretreatment:

Dilute 1:3 with 2% NH_4OH

Conditioning:

1. 500 µL MeOH
2. 500 µL H_2O

Washes:

1. 500 µL H_2O
2. 500 µL MeOH

Elution:

500 µL 5% formic acid:MeOH

Volumes stated are for Bond Elut 96 1 mL Well Plate, P/N A4967010.

Bond Elut Plexa PAX

Description	Unit	Part No.
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12107301
60 mg, 1 mL	100/pk	12107601
30 mg, 3 mL	50/pk	12107303
60 mg, 3 mL	50/pk	12107603
200 mg, 6 mL	30/pk	12107206
500 mg, 6 mL	30/pk	12257506

Bond Elut Plexa PAX 96-well Plates

Description	10 mg	30 mg
1 mL round-well plates	A4967010	A4967030
2 mL square-well plates	A3967010	A3967030

TIPS & TOOLS

View the core concepts of SPE and demonstrations of sample preparation, please visit **www.agilent.com/chem/spevideo**

Agilent Polymeric SPE

Reversed Phase Polymeric SPE

Bond Elut PPL

- Modified styrene-divinylbenzene polymer
- Large particle size allows fast extraction speeds
- High surface area and capacity for polar analytes

Bond Elut PPL is a styrene-divinylbenzene (SDVB) polymer that is modified with a proprietary non-polar surface. PPL will retain even the most polar classes of analytes, including phenols. The large particle size allows ease of flow for viscous or particulate-rich water samples, while the high surface area and strong hydrophobicity ensure reproducible extractions with high recoveries upon elution.

Bond Elut PPL is suitable for methods such as the US EPA Method 528, 'Determination of Phenols in Drinking Water by SPE and Capillary GC/MS.'

Typical Matrices
Water sources, biological fluids
Primary Extraction Mechanism
Non-polar, electrostatic

Bond Elut PPL

Description	Unit	Part No.
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12105002
100 mg, 1 mL	100/pk	12105003
100 mg, 3 mL	50/pk	12105004
200 mg, 3 mL	50/pk	12105005
500 mg, 3 mL	50/pk	12105006
500 mg, 6 mL	30/pk	12255001
1 g, 3 mL	50/pk	12102148
1 g, 6 mL	30/pk	12255002
5 g, 60 mL	16/pk	12256087

Bond Elut ENV

Typical Matrices

Water sources

Primary Extraction Mechanism

Non-polar

- Modified styrene-divinylbenzene polymer
- Large particle size allows fast extraction speeds
- High surface area and capacity for polar analytes

Bond Elut ENV, a PS/DVB polymer, is designed for the extraction of polar organic residues. It contains 125 µm spherical particles, advantageous for high volume, fast flow-through applications.

Bond Elut ENV

Description	Unit	Part No.
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12105012
100 mg, 1 mL	100/pk	12105013
100 mg, 3 mL	50/pk	12105014
200 mg, 3 mL	50/pk	12105015
200 mg, 6 mL	30/pk	12255014
500 mg, 3 mL	50/pk	12105016
500 mg, 6 mL	30/pk	12255011
1 g, 6 mL	30/pk	12255012

Bond Elut LMS

- Ultra clean styrene-divinylbenzene polymer
- Optimized 75 µm particle size for reproducible flow
- High capacity and surface area for efficient extraction

Bond Elut LMS polymeric sorbent lets you elute without having to add amine modifiers, buffers, or acids. The elimination of secondary interactions means that elution of analytes can be achieved with pure organic solvents or solvent mixtures of low ionic strength compatible with the HPLC mobile phase. These characteristics allow easy compatibility with LC/MS or other delicate analytical techniques.

Typical Matrices

Urine, plasma, biological fluids

Primary Extraction Mechanism

Non-polar

Bond Elut LMS

Description	Unit	Part No.
Straight Barrel Cartridges		
25 mg, 1 mL	100/pk	12105021
100 mg, 1 mL	100/pk	12105023
100 mg, 3 mL	50/pk	12105024
200 mg, 3 mL	50/pk	12105025
500 mg, 3 mL	50/pk	12105026
500 mg, 6 mL	30/pk	12255021
1 g, 6 mL	30/pk	12255022

Bond Elut LMS 96-well Plates

Description	10 mg	25 mg
1 mL round-well plates	A4961010	
2 mL square-well plates	A3961010	A3961025

Mixed Mode Polymeric SPE

Bond Elut NEXUS and Bond Elut NEXUS WCX

Typical Matrices

Horse urine, urine, biological fluids

Primary Extraction Mechanism

Non-polar

- Large particle size allows excellent flow for viscous samples
- Non-conditioning method saves time and improves throughput
- WCX offers enhanced selectivity for certain analytes such as quaternary amine drugs

Bond Elut NEXUS is an ultra-clean polymeric sorbent which has bi-modal porosity and a high surface area. NEXUS offers a non-polar retention mechanism with no pre-conditioning required. The large particle size makes NEXUS ideal for extractions from highly viscous samples such as horse urine.

Based on the same base polymer technology, Bond Elut NEXUS WCX is a weak cation exchange sorbent that offers extra selectivity for analytes such as quaternary ammonium drugs and anabolic steroids.

Bond Elut NEXUS and Bond Elut NEXUS WCX

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
30 mg, 10 mL	50/pk	12113100
60 mg, 10 mL	50/pk	12113101
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12103100
60 mg, 3 mL	100/pk	12103101
60 mg, 3 mL, NEXUS WCX	100/pk	12102157
200 mg, 6 mL	30/pk	12103102
200 mg, 12 mL	20/pk	12253101
500 mg, 12 mL	20/pk	12253102
500 mg, 20 mL	20/pk	12253103

Bond Elut NEXUS 96-well Plates

Description	30 mg	60 mg
1 mL round-well plates	A4962030	
2 mL square-well plates		A3962060

References

Wynne, PM, Barry, DC, Vine, JH & Simpson, NKJ (2004) Approaches to the solid phase extraction of equine urine. Chromatography, 59, S51-S60.

Wynne, PM, Barry, DC, Vine, JH & Simpson, NKJ (2000) An improved method for the extraction of anabolic steroids from equine urine. In: RB Williams, E Houghton & J Wade (eds) Proc. 13th Int. Conf. Racing Analysts and Veterinarians. R & W Publications, Newmarket, UK.

Silica-Based SPE

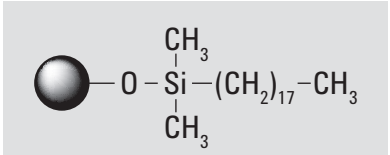
Reversed Phase (Non-Polar) Silica SPE

Reversed phase sorbents are non-polar and are used to retain (extract) non-polar analytes from polar matrices. For reversed phase sorbents, retention decreases as the eluting solvent becomes more non-polar.

Bond Elut C18

- The most hydrophobic, bonded silica sorbent
- Extremely retentive for non-polar compounds
- Effective for desalting aqueous mixtures

Bond Elut C18 is the most hydrophobic, bonded silica sorbent in the Bond Elut range. It is the most popular SPE sorbent because of its extremely retentive nature for non-polar compounds. C18 is generally regarded as having the broadest spectrum of retention among bonded silica sorbents, since it retains most organic analytes from aqueous matrices. When analyzing small to intermediate molecules, Bond Elut C18 can be used for desalting aqueous matrices prior to ion exchange, as salts pass through the sorbent unretained.



Typical Matrices
Aqueous samples, biological fluids
Primary Extraction Mechanism
Non-polar

TIPS & TOOLS

Tabless (flangeless) cartridges are suitable for use with many automated SPE systems. Tabless products are typically designated with a "T" in the part number. If you need a tabless cartridge and do not see a part number listed, please contact SPP-Support@agilent.com to discuss custom options.

Bond Elut C18 Flash cartridges, 12256060

Bond Elut C18

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113001	14113001
200 mg, 10 mL	50/pk	12113024	14113024
500 mg, 10 mL	50/pk	12113027	14113027
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102058	14102058
50 mg, 30 mL	500/pk	12102058B	
50 mg, 3 mL	50/pk	12105027	
100 mg, 1 mL	100/pk	12102001	14102001
100 mg, 3 mL	50/pk	12102099	
200 mg, 1 mL	100/pk	12102096	
200 mg, 3 mL	50/pk	12102025	14102025
200 mg, 3 mL tabless	50/pk	12102025T	12102025T
500 mg, 3 mL	50/pk	12102028	14102028
500 mg, 6 mL	30/pk	12102052	14102052
1 g, 3 mL	50/pk	12102118	
500 mg, 6 mL tabless	30/pk	12102052T	
1 g, 6 mL	30/pk	12256001	14256001
1 g, 60 mL	16/pk	12256060	
2 g, 12 mL	20/pk	12256001	14256015
5 g, 20 mL	20/pk	12256023	14256023
10 g, 60 mL	16/pk	12256031	14256031

(Continued)

Bond Elut C18

Description	Unit	40 µm Particle Size	120 µm Particle Size
Bond Elut Jr			
500 mg	100/pk	12162028B	
1 g	100/pk	12166001B	
Other Formats			
Prospekt cartridge, 800 Series, 2 mm	96/pk	12281001	
Prospekt cartridge, 800 Series, 1 mm	96/pk	12281024	
100 mg, 3 mL, Gerstel format	50/pk	161818G	
200 mg, 3 mL, Gerstel format	50/pk	161822G	
500 mg, 3 mL, Gerstel format	50/pk	161832G	

Bond Elut C18 VersaPlate Formats

Description	Particle Size (µm)	25 mg	50 mg	100 mg
Preassembled 96-well plate	40	75401025	75401050	7540101C
VersaPlate tubes, 96/pk*	40	75501025	75501050	7550101C
	120		75502050	

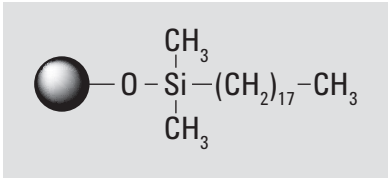
*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Preassembled 96-well plate, 75401050

Bond Elut C18 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960125	A4960150	A496011C
2 mL square-well plates	A3960125	A3960150	A396011C

VersaPlate tubes, 75501050



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Non-polar

Bond Elut C18 EWP

- No exclusion of large molecules
- Good for desalting proteins
- Successful separation of proteins, peptides or nucleotides

Bond Elut C18 EWP is based on standard particle size silica but with 500Å pores to allow more efficient extraction of large molecules (>15,000 MW), which are typically excluded from standard porosity silica phases.

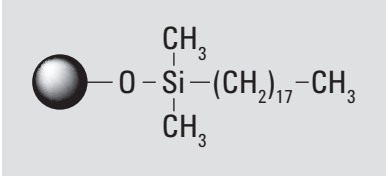
Bond Elut C18 EWP

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
50 mg, 10 mL	50/pk	12113068
500 mg, 10 mL	50/pk	12113071
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102136
100 mg, 1 mL	100/pk	12102137
500 mg, 3 mL	50/pk	12102139
1 g, 6 mL	30/pk	12256130

Bond Elut C18 OH

- Silanol activity permits metabolite fractionation
- Tight QC tolerances deliver batch-to-batch reproducibility
- 150Å pore size expands utility to higher molecular weight compounds

Bond Elut C18 OH is a non-endcapped version of the octadecyl bonded phases that enables the silanols on the silica surface to be more active. This low-load C18 has well-controlled silanol activity that permits the fractionation of metabolites and enhances retention of basic compounds compared to an endcapped C18.



Typical Matrices

Aqueous samples, biological fluids, non-polar extracts

Primary Extraction Mechanism

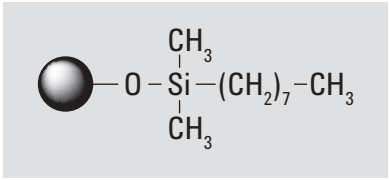
Non-polar, hydrogen bonding

Bond Elut C18 OH

Description	Unit	Part No.
Straight Barrel Cartridges		
100 mg, 1 mL	100/pk	12102020
500 mg, 3 mL	50/pk	12102046
1 g, 6 mL	30/pk	12256040

Bond Elut C18 OH 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates			A496291C
2 mL square-well plates	A3962925	A3962950	A396291C



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Non-polar

Bond Elut C8

- Excellent for strongly-retained analytes
- Polar interactions not significant
- Less retentive than C18

Bond Elut C8 is very similar in properties to C18, but is not as retentive for non-polar compounds, due to its shorter hydrocarbon chain, and therefore reduced carbon loading. C8 is an excellent replacement for C18 when analytes are too strongly retained for effective elution. The potential for polar interactions is somewhat higher than for C18 because there is less coverage of the silica surface. These polar interactions are not, however, a significant property of C8.

Bond Elut C8

Description	Unit	Part No.
Bond Elut Jr		
500 mg	100/pk	12162029B
1 g	100/pk	12166002B
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113075
200 mg, 10 mL	50/pk	12113025
500 mg, 10 mL	50/pk	12113028
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102059
50 mg, 3 mL	50/pk	12105028
100 mg, 1 mL	100/pk	12102002
100 mg, 1 mL	500/pk	52102002
100 mg, 3 mL	50/pk	12102100
200 mg, 3 mL	50/pk	12102026
200 mg, 3 mL	500/pk	52102026
500 mg, 3 mL	50/pk	12102029
500 mg, 6 mL	30/pk	12102053
1 g, 6 mL	30/pk	12256002
5 g, 20 mL	20/pk	12256024
10 g, 60 mL	16/pk	12256032
Other Formats		
Prospekt cartridge, 800 Series, 2 mm	96/pk	12281002
100 mg, 3 mL, Gerstel format	50/pk	161618G
200 mg, 3 mL, Gerstel format	50/pk	161622G
500 mg, 3 mL, Gerstel format	50/pk	161632G

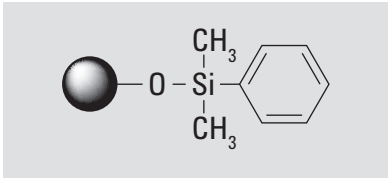
Bond Elut C8 VersaPlate Formats

Description	25 mg	50 mg	100 mg	200 mg
Preassembled 96-well plate	75403025	75403050	7540301C	7540302C
VersaPlate tubes, 96/pk*		75503050	7550301C	

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Bond Elut C8 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960325	A4960350	A496031C
2 mL square-well plates	A3960325	A3960350	A396031C



Typical Matrices

Aqueous and biological fluids

Primary Extraction Mechanism

Non-polar

Bond Elut PH

- Added selectivity compared to other non-polar sorbents
- Enhanced retention of planar, conjugated organic molecules
- Similar polarity to C8

Bond Elut PH is a non-polar bonded silica material which exhibits a different selectivity to alkyl or aliphatic functionalized phases such as C8 or cyclohexyl. The electron density present in the aromatic ring enhances retention of conjugated or aromatic ring-containing analytes due to desirable pi-pi interactions.

Bond Elut PH

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113005	14113005
500 mg, 10 mL	50/pk	12113031	14113031
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102062	14102062
100 mg, 1 mL	100/pk	12102005	14102005
500 mg, 3 mL	50/pk	12102032	14102032
1 g, 6 mL	30/pk	12256004	14256004

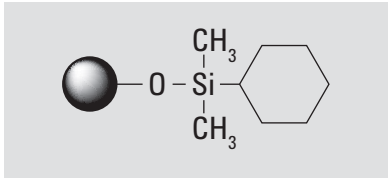
Bond Elut PH 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates			A496151C
2 mL square-well plates	A3961525	A3961550	A396151C

Bond Elut CH (cyclohexyl)

- Non-polar CH with polarity similar to C2
- Retains polar analytes from aqueous matrices
- Good choice when common non-polar sorbents do not provide the required selectivity

Bond Elut CH is a mid-polarity sorbent that exhibits unique selectivities for certain analytes. When employed as a non-polar sorbent, CH has the approximate polarity of a C2 sorbent. Bond Elut CH is often a good choice when non-polar sorbents such as C18, C8, or C2 do not provide the desired selectivity.



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

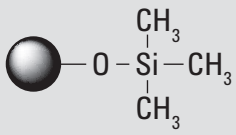
Non-polar

Bond Elut CH (cyclohexyl)

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113032
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102063
100 mg, 1 mL	100/pk	12102006
500 mg, 3 mL	50/pk	12102033
1 g, 6 mL	30/pk	12256005
2 g, 12 mL	20/pk	12256039

Bond Elut CH 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4962225	A4962250	A496221C



Typical Matrices

Urine, plasma, biological fluids

Primary Extraction Mechanism

Non-polar, polar
(as a normal phase extraction)

Bond Elut C1

- Least retentive of all alkyl group bonded phases
- Easy retention and release of polar compounds
- Easy retention and release of multi-functional compounds

Due to the methyl group and subsequent low carbon load, Bond Elut C1 is the least retentive of all alkyl group bonded phases for non-polar compounds. However, due to the extensive endcapping of this sorbent to mask polar silanol activity, retention and elution of polar and multi-functional analytes can still be achieved.

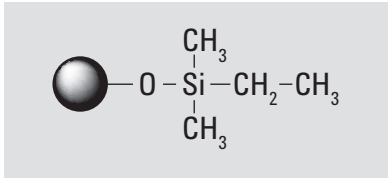
Bond Elut C1

Description	Unit	Part No.
Straight Barrel Cartridges		
100 mg, 1 mL	100/pk	12102004
100 mg, 3 mL	50/pk	12102090
500 mg, 3 mL	50/pk	12102031

Bond Elut C2

- Low carbon load sorbent
- Can be used alongside CN and C8 phases
- Popular for drug extraction from plasma and for flat baselines

Bond Elut C2 is a fairly non-polar sorbent because of the short chain length of the functional group. C2 is often used during the process of method development if analytes are retained too strongly on a C8 or C18 phase. The polarity of C2 is slightly lower than a cyano phase for polar interactions.



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Non-polar

Bond Elut C2

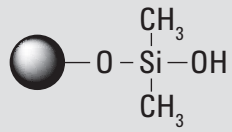
Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113003
500 mg, 10 mL	50/pk	12113029
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102060
50 mg, 3 mL	50/pk	12105029
100 mg, 1 mL	100/pk	12102003
100 mg, 3 mL	50/pk	12102117
200 mg, 3 mL	50/pk	12102027
500 mg, 3 mL	50/pk	12102030
500 mg, 6 mL	30/pk	12102115
1 g, 6 mL	30/pk	12256003

Bond Elut C2 96-well Plates

Description	50 mg	100 mg
1 mL round-well plates	A4961150	A496111C

Normal Phase (Polar) Silica SPE

Normal phase sorbents are polar and used to retain (extract) polar analytes. For normal phase sorbents, retention decreases as the eluting solvent becomes more polar.



Typical Matrices

Non-polar organics, oils, lipids

Primary Extraction Mechanism

Polar

Bond Elut SI

- Highly polar phase retains polar molecules from non-polar matrices
- High purity silica
- Separate compounds with very similar structures

Native silica is generally regarded as the most polar SPE sorbent available. Bond Elut SI is particularly effective at separating compounds with a very similar structure. Applying the analytes in a non-polar solvent, then increasing the solvent polarity by increasing the concentration of a polar modifier, such as THF or ethyl acetate, delivers effective separations.

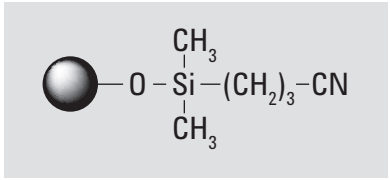
Bond Elut SI

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113010	14113010
500 mg, 10 mL	50/pk	12113036	14113036
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102068	14102068
100 mg, 1 mL	100/pk	12102010	14102010
500 mg, 3 mL	50/pk	12102037	14102037
1 g, 6 mL	30/pk	12256008	14256008
1.5 g, 3 mL	50/pk	12102119	
2 g, 6 mL	20/pk	12256018	14256018
5 g, 20 mL	20/pk	12256026	14256026
10 g, 60 mL	16/pk	12256034	14256034
Bond Elut Jr			
500 mg	100/pk	12162037B	
1 g	100/pk	12166008B	
Other Formats			
500 mg, 3 mL, Gerstel format	50/pk	167232G	

Bond Elut CN-E

- Ideal for extracting aqueous analytes
- Retention in aqueous and organic matrices
- Useful for many applications

A medium polarity sorbent with many uses, Bond Elut CN-E is ideal for applications in which extremely non-polar compounds would be irreversibly retained on high carbon load sorbents such as C8 and C18. This endcapped version of the cyano sorbent is best utilized when extracting analytes from an aqueous matrix.



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Non-polar, dipole

Bond Elut CN-E

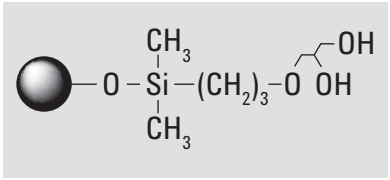
Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113033
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102064
100 mg, 1 mL	100/pk	12102007
500 mg, 3 mL	50/pk	12102034

Bond Elut CN-E 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960425	A4960450	A496041C

References

Pucci, V, Bugamelli, F, Mandrioli, R, Bartoletti, C, Rossi, N & Raggi, MA (2003) Liquid chromatographic analysis of the cis(Z)- and trans(E)-isomers of clopenthixol in human plasma using a novel solid phase extraction procedure. J. Chromatogr. B., 792, 313-321.



Bond Elut Diol (2OH)

- Provides polar and non-polar modes
- Strong hydrogen bonding with analytes
- Resembles un-bonded silica in its capabilities

Bond Elut Diol resembles un-bonded silica in its tendency for strong hydrogen bonding with analytes. 2OH can also be employed in the non-polar mode because the hydrocarbon spacer on its functional group provides enough non-polar character for retention of hydrophobic analytes. Bond Elut Diol is a listed SPE device for the DIN 14333-1 method on benzimidazole fungicides.

Typical Matrices

Aqueous, biological fluids, non-polar organics

Primary Extraction Mechanism

Polar and non-polar

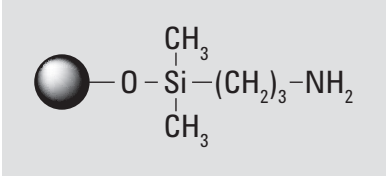
Bond Elut Diol (2OH)

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113009
500 mg, 10 mL	50/pk	12113035
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102067
100 mg, 1 mL	100/pk	12102009
500 mg, 3 mL	50/pk	12102036
1 g, 6 mL	30/pk	12256007

Bond Elut NH2

- Normal phase or anion exchange sorbent
- Weaker anion exchange than SAX
- Amenable to separating structural isomers

Bond Elut NH2 is a weaker anion exchanger than sorbents such as SAX (a quaternary amine sorbent that is always charged) and is therefore a better choice for retention of very strong anions, such as sulfonic acids, which may retain irreversibly on a SAX sorbent. Similar to Diol and SI sorbents, Bond Elut NH2 is excellent for the separation of structural isomers.



Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Weak anion exchange

Bond Elut NH2

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113014	
200 mg, 10 mL	50/pk	12113067	
500 mg, 10 mL	50/pk	12113040	14113040
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102076	14102076
100 mg, 1 mL	100/pk	12102014	
200 mg, 3 mL	50/pk	12102089	
200 mg, 6 mL	30/pk	12102106	
300 mg, 3 mL	50/pk	12102108	
500 mg, 3 mL	50/pk	12102041	14102041
500 mg, 6 mL	30/pk	12256045	
1 g, 3 mL	50/pk	12102107	
1 g, 6 mL	30/pk	12256012	14256012
2 g, 12 mL	20/pk	12256020	14256020
Bond Elut Jr			
500 mg	100/pk	12162041B	
1 g	100/pk	12166012B	
Other Formats			
200 mg, 3 mL, Gerstel format	50/pk	165022G	
500 mg, 3 mL, Gerstel format	50/pk	165032G	

Bond Elut NH2 VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg
Preassembled 96-well plate	40	75405050	7540501C

References

Schenck, F, Lehotay, S, & Vega, V (2002) Comparison of solid phase extraction sorbents for cleanup of pesticide residue analysis in fresh fruit and vegetables. J. Sep. Sci., 25, 883-890.

Bond Elut NH2 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960525	A4960550	A496051C
2 mL square-well plates	A3960525	A3960550	A396051C

The isolation of lipids from serum and tissue

Extraction Method

Matrix:
Chloroform extract of serum or adipose tissue

Sorbent Conditioning:
Hexane

Apply Sample:
Through Bond Elut NH2 cartridge

Elution 1:

(Neutral lipids)
(All except fatty acids and phospholipids) – 2:1 chloroform: 2-propanol

(Fatty acids)
2% acetic acid in diethyl ether

(Phospholipids)
Methanol

The neutral lipid fraction is then dried down, reconstituted in hexane, and passed through a second NH2 tube conditioned with hexane.

Elution 2:

(Cholesterol esters)
Hexane

Another Bond Elut NH2 sorbent column is attached below the existing one to trap cholesterol that breaks through the first during triglyceride elution.

Elution 3:

(Triglycerides)
Hexane containing 1% diethyl ether and 10% methylene chloride

The Bond Elut NH2 tubes are separated, cholesterol is eluted from both, and finally the di- and monoglycerides are eluted from the upper NH2 tube.

Elution 4:

(Cholesterol)
5% ethyl acetate in hexane

(Diglycerides)
15% ethyl acetate in hexane

(Monoglycerides)
2:1 chloroform:methanol

Simpson, N & Van Horne, C (eds) (1993) The Handbook of Sorbent Extraction Technology. Varian, Inc., Walnut Creek CA, USA.

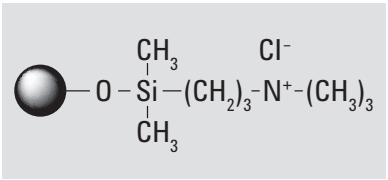
Ion Exchange Silica SPE

Ion exchange phases are more dependent on pH, ionic strength, and counter-ion strength than on solvent strength. These phases depend on ionic interactions as the primary retention mechanism.

Bond Elut SAX

- Retains compounds that elute from weak anion exchange sorbents
- Selectivity can be user-modified for increased flexibility
- Minimal non-polar interactions

Bond Elut SAX is a strong anion exchange sorbent ideally suited for the extraction of compounds such as carboxylic acids, which may not retain effectively on weak anion exchange sorbents.



Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Anion exchange

Bond Elut SAX

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113017	
500 mg, 10 mL	50/pk	12113043	14113043
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102079	14102079
100 mg, 1 mL	100/pk	12102017	14102017
100 mg, 1 mL	500/pk	52102017	
100 mg, 3 mL	50/pk	12102125	
100 mg, 3 mL tabless	100/pk	12102017T	
100 mg, 3 mL tabless	500/pk	12102017TB	
500 mg, 3 mL	50/pk	12102044	14102044
500 mg, 3 mL tabless	50/pk	12102044T	
500 mg, 6 mL	30/pk	12102144	
1 g, 3 mL	50/pk	12102087	
1 g, 6 mL	30/pk	12256013	14256013
2 g, 6 mL	30/pk	12256051	
2 g, 12 mL	20/pk	12256021	14256021
5 g, 20 mL	20/pk	12256029	14256029
10 g, 60 mL	16/pk	12256037	14256037
Bond Elut Jr			
500 mg	100/pk	12162044B	
1 g	100/pk	12166013B	

Bond Elut SAX 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4963025	A4963050	A496301C
2 mL square-well plates	A3960825	A3960850	A396081C

Bond Elut SAX VersaPlate Formats

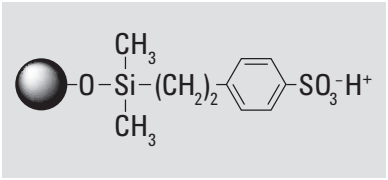
Description	Particle Size (µm)	50 mg
Preassembled 96-well plate	40	75408050
VersaPlate tubes, 96/pk*	40	75508050

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Bond Elut SCX

- Useful for compounds with both cationic and non-polar characteristics
- Superior cleanup from a single sorbent
- Very low pKa ligand elicits strong analyte interaction

Bond Elut SCX is a strong cation exchanger with a very low pKa. Although the pKa is similar to Bond Elut PRS, the presence of the benzene ring in the functional group increases the potential for non-polar interactions. This non-polar characteristic becomes particularly important when conducting ion exchange from aqueous systems, where selectivity towards compounds exhibiting cationic and non-polar character is seen.



Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Cation exchange

Bond Elut SCX

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113013	14113013
500 mg, 10 mL	50/pk	12113039	14113039
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102075	14102075
100 mg, 1 mL	100/pk	12102013	14102013
100 mg, 3 mL	50/pk	12102098	
500 mg, 3 mL	50/pk	12102040	14102040
1 g, 6 mL	30/pk	12256011	14256011
2 g, 6 mL	30/pk	12256053	14256019
3 g, 6 mL	30/pk	12256054	
5 g, 20 mL	20/pk		14256027
10 g, 60 mL	16/pk		14256035
Bond Elut Jr			
500 mg	100/pk	12162040B	
1 g	100/pk	12166011B	
Other Formats			
200 mg, 3 mL, Gerstel format	50/pk	167022G	

Bond Elut SCX VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg
Preassembled 96-well plate	40		7540701C
VersaPlate tubes, 96/pk*	40	75507050	7550701C

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Bond Elut SCX 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960725	A4960750	A496071C
2 mL square-well plates	A3960725	A3960750	A396071C

References

Codony, R, Compañó, R, Granados, M, Garcia-Regueiro, JA & Dolors Prat, M (2002) Residue analysis of macrolides in poultry muscle by liquid chromatography-electrospray mass spectrometry. J. Chromatogr. A, 959, 131-141.

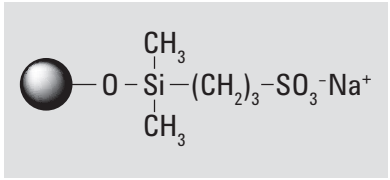
Horie, M, Saito, K, Ishii, R, Yoshida, T, Haramaki, Y & Nakazawa, H (1998) Simultaneous determination of five macrolide antibiotics in meat by high performance liquid chromatography. J. Chromatogr. A, 812, 295-302.

Stubbings, G, Tarbin, J, Cooper, A, Shaman, M. Bigwood, T & Robb, P (2005) A multi-residue cation-exchange clean up procedure for basic drugs in produce of animal origin. Analyt. Chim. Acta, 547, 262-268.

Bond Elut PRS

- Strong cation exchange sorbent, also capable of polar and hydrogen bonding interactions
- No appreciable non-polar interactions
- Unique selectivity properties

Bond Elut PRS is a strong cation exchange sorbent that is also relatively high in polarity. With no appreciable degree of hydrophobicity in non-polar solvents, PRS is capable of polar and hydrogen bonding interactions. Due to the very low pKa of PRS, it is recommended for weaker cationic species such as pyridinium compounds.



Typical Matrices

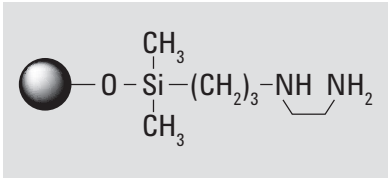
Aqueous, biological fluids, buffered organics

Primary Extraction Mechanism

Cation exchange

Bond Elut PRS

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113012
500 mg, 10 mL	50/pk	12113038
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102074
100 mg, 1 mL	100/pk	12102012
200 mg, 3 mL	50/pk	12102094
500 mg, 3 mL	50/pk	12102039
1 g, 6 mL	30/pk	12256010



Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Weak anion exchange

Bond Elut PSA

- Alternative choice to Bond Elut NH2 for polar compounds
- Higher ionic capacity than NH2

Bond Elut PSA is an alkylated amine sorbent that contains two different amino functionalities – one secondary and one primary. This gives a slightly higher pKa and ionic capacity compared to Bond Elut NH2. PSA has a significantly higher carbon load than most amino functional sorbents, thus is a better choice for polar compounds, which retain too strongly on Bond Elut NH2.

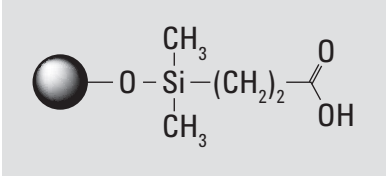
Bond Elut PSA

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113041
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102077
100 mg, 1 mL	100/pk	12102015
500 mg, 3 mL	50/pk	12102042
1 g, 6 mL	30/pk	12256140
2 g, 12 mL	20/pk	12256055
Bond Elut Jr		
500 mg	100/pk	12162042B
1 g	100/pk	12166050B

Bond Elut CBA

- Cation exchange with no need for extreme basic conditions
- Wider selectivity range provides more eluent options
- Polar or non-polar depending on matrix or solvent

CBA is a mid-polarity sorbent and weak cation exchanger (pKa 4.8). It can be used with a wider range of counter-ions than lower pKa sorbents like SCX, and will demonstrate easier elution of quaternary amine functionalized analytes.



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Weak cation exchange

Bond Elut CBA

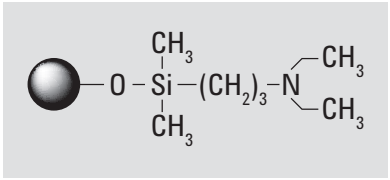
Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113011
500 mg, 10 mL	50/pk	12113037
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102073
100 mg, 1 mL	100/pk	12102011
100 mg, 3 mL	50/pk	12102097
200 mg, 3 mL	50/pk	12102124
500 mg, 3 mL	50/pk	12102038
1 g, 6 mL	30/pk	12256009
2 g, 12 mL	20/pk	12256058

Bond Elut CBA 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960625	A4960650	A496061C
2 mL square-well plates	A3960625	A3960650	A396061C

References

Murayama, N. & Sudo, K (1997) High performance liquid chromatographic method for determination of DX-9065a, a novel anticoagulant, in human urine and feces using cation-exchange solid-phase extraction. J. Chromatogr. Biomed. Appl., 692, 389-396.



Typical Matrices

Water, biological fluids, non-polar extracts

Primary Extraction Mechanism

Weak anion exchange

Bond Elut DEA

- Weak anion exchanger
- More polar than C8 but less polar than C2 or CN
- Alkyl side chains confer moderately non-polar characteristics

Bond Elut DEA bears some resemblance to Bond Elut NH2 in its properties but with a slightly lower capacity as an anion exchange sorbent. DEA has a moderately non-polar character due to the alkyl side chains on the amino functionality. These groups still afford a medium level of polarity, higher than C8 but less polar than C2 or CN-E.

Bond Elut DEA

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113016	
500 mg, 10 mL	50/pk	12113042	14113042
Straight Barrel Cartridges			
50 mg, 1 mL	100/pk	12102078	14102078
100 mg, 1 mL	100/pk	12102016	14102016
500 mg, 3 mL	50/pk	12102043	14102043
Bond Elut Jr			
1000 mg	100/pk	12166046B	

Bond Elut DEA VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg
VersaPlate tubes, 96/pk*	40	7551701C	7551701C

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

References

Kline, W., Matuszewski, B & Bayne, W (1990) Determination of 4-amino-1-hydroxybutane-1,1-bisphosphonic acid in urine by automated pre-column derivatization with 2,3-naphthalene dicarboxyaldehyde and high performance liquid chromatography with fluorescence detection. J. Chromatogr. Biomed.l Appl., 534, 139-149.

Mixed Mode Silica SPE

Bond Elut AccuCAT

- SCX and SAX functionalities offer broad analyte extraction potential
- Ultra clean, mixed sorbent bed delivers reproducible extractions
- Compatible with many biological fluids for easy method transfer

Bond Elut AccuCAT cartridges are mixed bed SPE cartridges consisting of a strong cation exchange (SCX) and a strong anion exchange (SAX) sorbent packed into one bed. AccuCAT is effective for the extraction of acidic, basic and neutral analytes from urine and other biological samples. AccuCAT is particularly effective for catecholamine extraction from bio-fluids.

Typical Matrices

Urine, plasma and biological fluids, beverages and food

Primary Extraction Mechanism

Strong cation and anion exchange

Bond Elut AccuCAT

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
200 mg, 10 mL	60/pk	12282005
600 mg, 10 mL	60/pk	12282001
Straight Barrel Cartridges		
200 mg, 3 mL	60/pk	12282003
200 mg, 6 mL	30/pk	12282004
400 mg, 6 mL	30/pk	12282006
600 mg, 3 mL	60/pk	12282002

References

Andrzejewski, D, Roach, JAG, Gay, ML and Musser, SM (2004) Analysis of coffee for the presence of acrylamide by LC-MS/MS. J. Agric. Food Chem., 52, 1996-2002.

Lenders, JW, Eisenhofer, G, Armando, I, Keiser, HR, Goldstein, DS and Kopin, IJ (1993) Determination of metanephrines in plasma by liquid chromatography with electrochemical detection. Clin. Chem., 39, 97-103.

Bond Elut Certify VersaPlate cartridges

Bond Elut Certify

- Special mixed-mode sorbent bed
- Broad application range for aqueous extraction
- Bimodal, non-polar and strong cation exchange

The Bond Elut Certify extraction cartridge is a mixed mode sorbent containing non-polar and C8 strong cation exchanger functionalities. Certify is most commonly used to extract basic (cationic) drugs from urine and blood, but it is also very effective for the extraction of a wide range of compounds from a diverse range of aqueous matrices. Rely on the Certify products for consistent performance and availability in a range of formats to support automation and high sample throughput.

Typical Matrices

Urine, plasma, saliva, blood, biological fluids

Primary Extraction Mechanism

Non-polar and strong cation exchange

Bond Elut Certify

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
130 mg, 10 mL	50/pk	12113050	14113050
130 mg, 10 mL	500/pk	52113050	14113055
200 mg, 10 mL	500/pk	52113051	
200 mg, 10 mL	50/pk	12113054	14113054
300 mg, 10 mL	50/pk	12113052	14113052
Straight Barrel Cartridges			
50 mg, 3 mL	50/pk	12105030	
130 mg, 1 mL	100/pk	12102083	14102083
130 mg, 3 mL	50/pk	12102051	14102051
130 mg 3 mL	500/pk	52102051	
130 mg, 3 mL tabless	50/pk	12102051T	
130 mg, 6 mL	30/pk	12256146	
130 mg, 6 mL tabless	500/pk	12256146TJ	
200 mg, 3 mL	50/pk	12102145	
200 mg, 6 mL	30/pk	12256145	
300 mg, 3 mL	50/pk	12102081	
300 mg, 3 mL	500/pk	52102081	
300 mg, 3 mL tabless	50/pk	12102081T	14102081T
300 mg, 6 mL	30/pk	12102082	
500 mg, 6 mL	30/pk	12102093	14102093
1 g, 6 mL	30/pk	12102085	14102085
Other Formats			
Prospekt cartridge, 800 Series	96/pk	12281101	

Bond Elut Certify VersaPlate Formats

Description	Particle Size (µm)	25 mg	50 mg	100 mg
Preassembled 96-well plate	40		75409050	7540901C
VersaPlate tubes*	40	75509025	75509050	7550901C

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Bond Elut Certify 96-well Plates

Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960925	A4960950	A496091C
2 mL square-well plates	A3960925	A3960950	A396091C

Bond Elut Certify II

Typical Matrices

Urine, plasma, saliva, blood, biological fluids

Primary Extraction Mechanism

Non-polar and strong anion exchange

- Ideal for non-polar and anionic compounds
- Optimized for acidic drug analysis
- Bimodal, non-polar and strong anion exchange

Bond Elut Certify II is designed for the rapid and effective extraction of acidic drugs and metabolites from urine and other biological matrices for forensic use. Certify II is a mixed-mode cartridge with non-polar C8 and strong anion exchange (SAX) functionalities. It has been optimized for acidic drugs such as 11-nor-delta-9-tetrahydrocannibinol-carboxylic acid, salicylic acid, ibuprofen, acetaminophen and other compounds that possess both non-polar and anionic characteristics.

Bond Elut Certify II

Description	Unit	40 µm Particle Size	120 µm Particle Size
Large Reservoir Capacity (LRC) Cartridges			
100 mg, 10 mL	50/pk	12113063	
200 mg, 10 mL	50/pk	12113051	14113051
Straight Barrel Cartridges			
50 mg, 3 mL	50/pk	12105031	
100 mg, 1 mL	100/pk	102818C	
200 mg, 3 mL	50/pk	12102080	14102080
500 mg, 6 mL	30/pk	12102084	14102084
1 g, 6 mL	30/pk	12102088	14102088
Other Formats			
Prospekt cartridge, 800 Series	96/pk	12281102	

Inorganic SPE

The following SPE phases have varying degrees of polarity and surface acidity or basicity. They are primarily used to retain polar analytes. For these phases, solvent retention generally decreases as the solvent becomes more polar.

Bond Elut Florisil

- Pesticide Residue (PR) grade
- For cleanup of polar interferences from non-polar samples
- Economical
- Fast flow, ideal for viscous samples

Florisil is a magnesia-loaded silica gel. Like silica, it is extremely polar in nature and ideal for the isolation of polar compounds from non-polar matrices. The larger particle size of the sorbent enables fast flow for large sample volumes and is therefore an attractive alternative to silica if the sample matrix is particularly viscous.

Typical Matrices

Non-polar organics

Primary Extraction Mechanism

Polar compounds

Bond Elut Florisil

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113049
Straight Barrel Cartridges		
100 mg, 1 mL	100/pk	12102024
200 mg, 3 mL	50/pk	12102129
500 mg, 6 mL	30/PK	12102159
500 mg, 3 mL	50/pk	12102050
1 g, 3 mL	50/pk	12102109
1 g, 6 mL	30/pk	12256014
1 g, 6 mL	250/pk	52256014
1 g, 20 mL	20/pk	12256047
2 g, 12 mL	20/pk	12256022
2 g, 20 mL	20/pk	12256046
5 g, 20 mL	20/pk	12256030
10 g, 60 mL	16/pk	12256038
Bond Elut Jr		
500 mg	100/pk	12162050B
1 g	100/pk	12166014B
Other Formats		
500 mg, 3 mL, Gerstel format	50/pk	164632G

Bond Elut Alumina

Typical Matrices

Non-polar organics

Primary Extraction Mechanism

Polar

- Available in acidic (A), basic (B) and neutral (N) formats
- High extraction efficiency
- Better high pH stability than unfunctionalized silica

Alumina, like silica, is an extremely polar sorbent. The alumina surface tends to be slightly more stable under high pH conditions than unfunctionalized silica. The small particle size of the Bond Elut Alumina range ensures high extraction efficiency even when small bed masses are used.

Bond Elut Alumina A

Description	Unit	Part No.
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102069
500 mg, 3 mL	50/pk	12102047
1 g, 6 mL	30/pk	12256043
Bond Elut Jr		
1 g	100/pk	12166043B

Bond Elut Alumina B

Description	Unit	Part No.
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102070
500 mg, 3 mL	50/pk	12102048
1 g, 6 mL	30/pk	12256044
Bond Elut Jr		
500 mg	100/pk	12162048B
1 g	100/pk	12166044B

Bond Elut Alumina N

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg	50/pk	12113048
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102071
100 mg, 1 mL	100/pk	12102023
500 mg, 3 mL	50/pk	12102049
500 mg, 6 mL	1000/pk	221032B
1 g, 6 mL	30/pk	12256086
20 g, 60 mL	16/pk	12256059
Bond Elut Jr		
500 mg	100/pk	12162049B
1 g	100/pk	12166045B

Bond Elut Sodium Sulfate Drying Cartridges

- Highly effective pre-packed dessicant
- Clean ACS grade, anhydrous sodium sulfate
- Pre-packed for convenience

Simplify sodium sulfate mediated drying steps by using cartridges pre-packed with ACS grade, granular anhydrous sodium sulfate. Available in three formats (LRC, Bond Elut Jr and straight barrels).

Bond Elut Jr cartridges have top and bottom luer fittings, allowing for easy sample processing when used in conjunction with standard SPE cartridges. Bond Elut LRC cartridges have a large reservoir above the sorbent bed and are suitable for use on any standard SPE vacuum manifold.

Bond Elut Sodium Sulfate Drying Cartridges

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
1 g, 10 mL	100/pk	12131033
Straight Barrel Cartridges		
15 g, 60 mL	100/pk	12132004
Bond Elut Jr		
1.4 g	100/pk	12162052B
2.2 g	100/pk	12162054B
3 g	100/pk	12162051B

TIPS & TOOLS

Agilent offers Bond Elut Adapters compatible with these tube formats. Turn to page 127.

Mega Bond Elut Flash

Bond Elut C18 Flash cartridges, 12256060

- Convenient disposable cartridges eliminate the need for packing glass columns
- Flexible "open" tube design for either liquid or solid samples
- Reliable, consistent flow characteristics deliver high-resolution performance

Mega Bond Elut Flash cartridges offer excellent levels of performance and productivity for the purification of organic compounds, and also for scale-up, solid phase extraction. Pre-packed, disposable cartridges offer greater convenience than glass columns that require washing, drying and re-packing after every sample.

Mega Bond Elut Flash

Description	Sorbent Mass (g)	Volume (mL)	Unit	40 µm Particle Size
C18	1	60	16/pk	12256060
	2	12	20/pk	12256015
	5	20	20/pk	12256023
	10	60	16/pk	12256031
	20	60	16/pk	12256078
	25	150	8/pk	12256079
	50	150	8/pk	12256080
	70	150	8/pk	12256081
NH2	2	12	20/pk	12256020
	5	20	16/pk	12256028
	10	60	16/pk	12256036
	20	60	16/pk	12256074
	25	150	8/pk	12256075
	50	150	8/pk	12256076
	70	150	8/pk	12256077
SCX	20	60	16/pk	12256066
	25	150	8/pk	12256070
	50	150	8/pk	12256072
	70	150	8/pk	12256073
SI	2	12	20/pk	12256018
	5	20	20/pk	12256026
	10	60	16/pk	12256034
	15	60	16/pk	12256068
	20	150	16/pk	12256042
	25	150	8/pk	12256069
	50	150	8/pk	12256067
	70	150	8/pk	12256071

Specialty SPE

Bond Elut Carbon

Typical Matrices

Organic plant and tissue extracts

Primary Extraction Mechanism

Wide range non-polar retention

- Excellent retention for small organics, including those that are too polar to retain on C18 or polymeric SPE
- Removal of chlorophyll and other pigments leads to fewer chromatographic or mass interferences
- Broader retention and easier elution of analytes across the polarity range, for improved multi-residue analysis

Bond Elut Carbon cartridges are packed with ultra-pure graphitized carbon particles that have been optimized for the absorption of pigments in food, fruits and vegetables, and small organic residues in waste water. The powerful retention mechanisms of these products are appropriate for a broad range of analytes. In addition, careful manufacturing techniques result in lower carbon fines on the wall of the device.

Bond Elut Carbon

Description	Unit	Part No.
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	126414
100 mg, 1 mL	100/pk	126418
250 mg, 6 mL	30/pk	12102201
500 mg, 6 mL	30/pk	12252201
Bond Elut Jr		
250 mg	100/pk	446424
400 mg	100/pk	466430

GLOBAL TIP

The Japanese Positive List System for Agriculture Residues in Food can be found at **http://www.ffcr.or.jp**

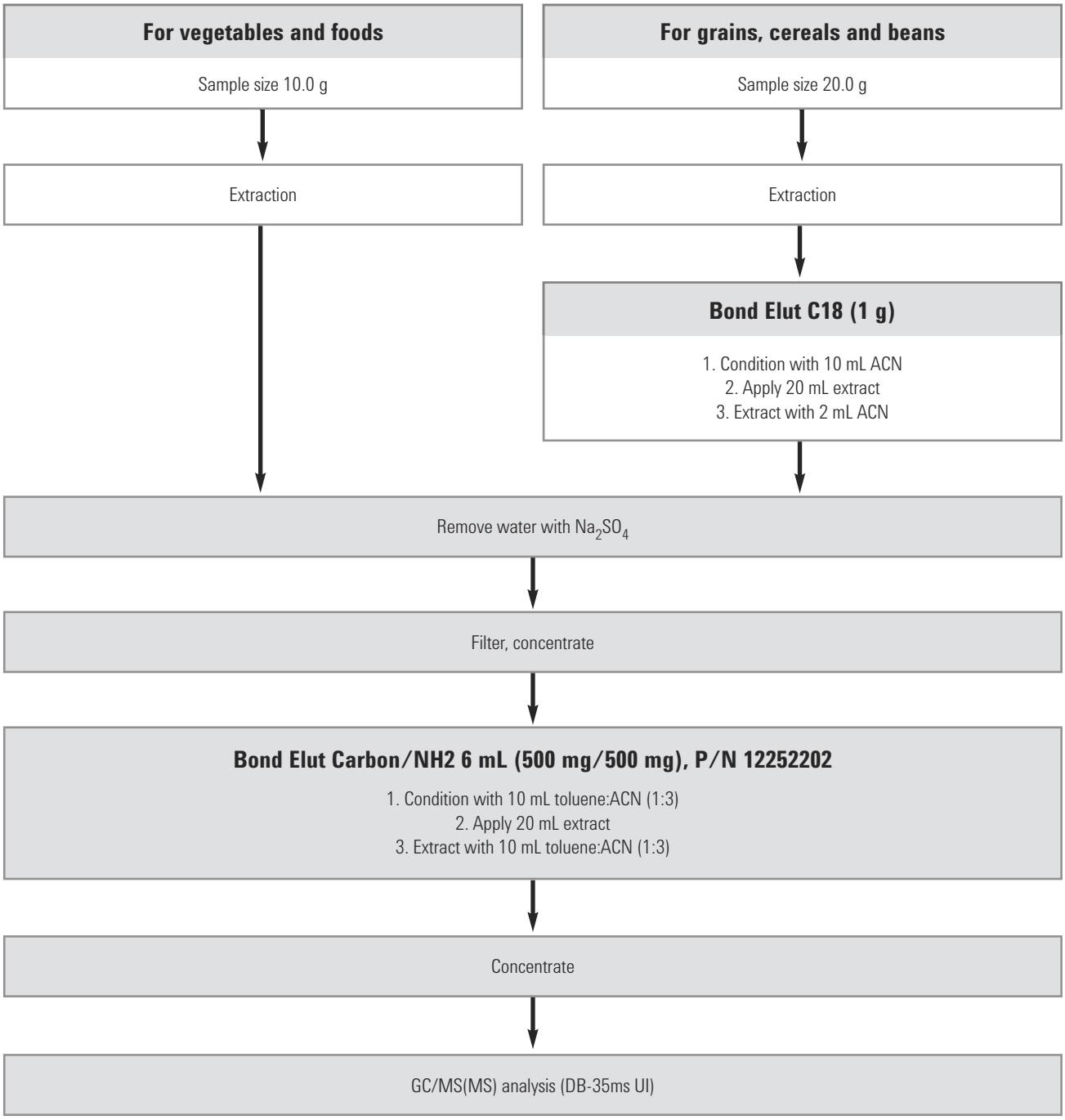
Bond Elut Carbon/NH2

Description	Unit	Part No.
Straight Barrel Cartridges		
300/500 mg, 6 mL	30/pk	2264265032
500/500 mg, 6 mL	30/pk	12252202
500/500 mg, 20 mL	20/pk	3664325032

Bond Elut Carbon/PSA

Description	Unit	Part No.
Straight Barrel Cartridges		
250/250 mg, 3 mL	50/pk	12102042C250
500/500 mg, 6 mL	30/pk	12102042C500

Method for the simultaneous monitoring of pesticide residues in agricultural products – extraction, refining (cleanup) and quantitative analysis



Bond Elut Cellulose

- High purity micro-granular cellulose with high α-cellulose content
- Stable across a broad pH range
- Extremely low metal content (Fe, Cu <5 ppm)

Bond Elut Cellulose columns use a pure micro-granular cellulose powder that is packed between two 20 µm polypropylene frits. The cellulose phase is very stable over a wide pH range with extremely low metal content. The combination of surface area and polymeric structure results in a sorbent with excellent capacity. The cellulose media contains numerous hydroxyl groups; because of it polar nature, it is able to accept high loading of many polar substances from aqueous and organic phases.

Typical Matrices

Aqueous samples and non-polar organics

Primary Extraction Mechanism

Polar (Hydroxyl)

Bond Elut Cellulose

Description	Unit	Part No.
Straight Barrel Cartridges		
300 g, 3 mL	500/pk	12102095

Bond Elut PCB

- Optimized bed mass affords excellent extraction reproducibility
- Special dual-phase enhances PCB selectivity
- All extractions can be completed with one solvent to simplify procedures

Bond Elut PCB is a specially designed sorbent which allows for the easy extraction of polychlorinated biphenyl (PCB) compounds from a variety of matrices. Desired analytes can be loaded and eluted using a simple, single solvent method prior to analysis by GC/ECD.

Typical Matrices

Water sources

Primary Extraction Mechanism

Polar

Bond Elut PCB

Description	Unit	Part No.
Straight Barrel Cartridges		
1 g, 3 mL	50/pk	12105032

Bond Elut Mycotoxin

Typical Matrices

Aqueous samples and polar organic grain extracts (beer, wine, sake), grains, and other foods

Primary Extraction Mechanism

Ionic cleanup

- Simple methodology saves time and increases throughput
- Use with a broad range of food matrices
- Economic and time-saving alternative to immunoaffinity techniques

Bond Elut Mycotoxin is a novel sorbent which cleans up food extracts for improved trichothecene and zearalenone analysis by LC/MS/MS. Results are comparable or superior to competing methods, including immunoaffinity columns (IAC) and charcoal/alumina columns. The sorbent is a proprietary silica-based ion exchange material.

The Bond Elut Mycotoxin method for extraction and cleanup is successful with a variety of food and grain sample types, including wheat, corn, durum, oats, bread, muesli and infant food.

Bond Elut Mycotoxin is easy to use and acts in a selective non-retention way – the toxin analytes pass through the cartridge while the food matrix components are retained.

Bond Elut Mycotoxin

Description	Unit	Part No.
Straight Barrel Cartridges		
500 mg, 3 mL	50/pk	12102167
Bond Elut Jr		
500 mg	100/pk	12165001B

References

Kiötzel, M, Lauber, U & Humpf, H-U (2006) A new solid phase extraction clean-up method for the determination of 12 type A and B trichothecenes in cereals and cereal-based food by LC-MS/MS. Mol. Nutr. Food Res, 50, 261-269.

Bretz, M, Beyer, M, Cramer, B & Humpf, H-U (2006) Stable isotope dilution analysis of the fusarium mycotoxins deoxynivalenol and 3-acetyldeoxynivalenol. Mol. Nutr. Food Res., 50, 251-260.

General Mycotoxin Methods

For Solids

1. Finely grind 25 g sample and extract with a solution of 100 mL acetonitrile/water (80:20) by blending at high speed for 3 min. For simultaneous determination of zearalenone, spike extract at a level of 50 ng/g sample with zearalanone (ZAN) solution in acetonitrile internal standard. Filter.
2. Pass 4 mL of the filtrate through a Bond Elut Mycotoxin column.
3. Evaporate 2 mL of eluate to dryness at 50 °C under a gentle stream of nitrogen.
4. Reconstitute in 0.5 mL ACN/H_2O (1:4; v/v).
5. Inject 10 µL into LC for analysis.

For Beverages

1. Sonicate the beverage sample for 30 min. Filter.
2. Pass 4 mL of the filtrated sample extract through a Bond Elut Mycotoxin cartridge.
3. Evaporate 2 mL of the eluate to dryness at 50 °C under a gentle stream of nitrogen.
4. Reconstitute in 0.5 mL ACN/H_2O (20/80; v/v).
5. Inject into LC/MS QQQ.

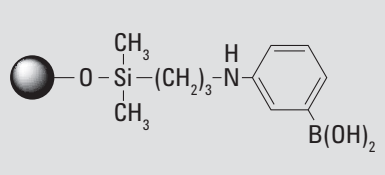
Wheat beer

	% Recovery	% RSD	% Recovery	% RSD
Mycotoxin	**35 ng/g**		**350 ng/g**	
DON	92.0	2.6	95.5	1.5
ZEA	116.0	6.1	101.9	1.3
T-2	61.3	12.6	60.1	1.1
HT-2	81.8	5.6	76.1	1.4

Sake wine

	% Recovery	% RSD	% Recovery	% RSD
Mycotoxin	**35 ng/g**		**350 ng/g**	
DON	94.3	7.4	96.8	0.5
ZEA	99.3	1.3	99.8	0.8
T-2	101.3	1.3	66.0	0.9
HT-2	113.9	8.3	111.0	1.0

This application shows the optimized extraction and cleanup of type A- and B-trichothecenes [deoxynivalenol [DON], HT-2 toxin [HT-2], T-2 toxin [T-2] and zearalenone (ZEA).



Bond Elut PBA

- Unique phenylboronic acid sorbent
- High specificity for cis-diol compounds
- Amenable to a broad range of bio-molecule applications

Bond Elut PBA is a unique silica SPE sorbent containing a phenylboronic acid functionality that can retain analytes via a reversible covalent bond. This very strong covalent retention mechanism enables high specificity and cleanliness. The boronate group has a strong affinity for cis-diol containing compounds such as catechols, nucleic acids, some proteins, carbohydrates and PEG compounds. Aminoalcohols, alpha-hydroxy amides, keto compounds, and others can also be retained.

Typical Matrices

Plasma, urine, aqueous samples and biological fluids

Primary Extraction Mechanism

Covalent bonding

Bond Elut PBA

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
100 mg, 10 mL	50/pk	12113018
Straight Barrel Cartridges		
100 mg, 1 mL	20/pk	12102018
100 mg, 1 mL	100/pk	12102019
100 mg, 3 mL	50/pk	12102127
500 mg, 6 mL	30/pk	12102105

Bond Elut PBA 96-well Plates

Description	100 mg
1 mL round-well plates	A496121C
2 mL square-well plates	A396121C

Generic Method

Condition:

1. 70:30 H_2O:ACN with 1% TFA
2. 50 mM phosphate buffer (pH 10)

Sample Addition:

Sample should be buffered to pH 8.5 with 50 mM phosphate buffer

Interference Wash:

10 mM phosphate buffer (pH 8.5) with 5% ACN

Analyte Elution:

70:30 H_2O:ACN with 1% TFA (pH <5.0)

Compound Class	Examples
Polyhydroxy	Mannitol, fructose-6-phosphate, CDP-ethanol-amine, glycoproteins
Aromatic O-dihydroxy	Catechols, tannins, epinephrine
α-Hydroxy acids	Lactate, 6-phospho-gluconate
Aromatic O-hydroxy acids and amines	Salicylate, salicylamide
1,3-Dihydroxy	Tris, pyridoxine
Diketo & triketo	Dehydroascorbic acid, benzil, alloxan
Other dihydroxys	Steroids, prostaglandins

EnvirElut

- Extreme purity offers cleanliness in extract
- High capacity allows for the processing of large sample volumes
- Broad compound specificity

EnvirElut sorbents are specially designed for the extraction of a wide range of compounds from aqueous matrices. EnvirElut PAH and Pesticides are available in standard SPE straight barrel cartridges, which can be used on conventional vacuum manifolds such as the Vac Elut SPS 24.

Typical Matrices

Water sources, extracted soil samples

Primary Extraction Mechanism

Non-polar

EnvirElut

Description	Unit	Part No.
Straight Barrel Cartridges		
1 g, 3 mL (PAH)	50/pk	12272007
1 g, 6 mL (PAH)	30/pk	12272005
500 mg, 6 mL (Pesticide)	30/pk	12272004
5 g, 20 mL (Oil + Grease)	20/pk	12272001
US EPA 1664, 20 mL	20/pk	12272020
NH2/EnvirElut (100 mg/500 mg), 3 mL	50/pk	12102158
5 g, 20 mL (Phenols)	20/pk	12272002

Solid Phase Microextraction

Solid phase microextraction (SPME) is a technique for extracting analytes from solid, liquid or gaseous samples by adsorbing them onto the SPME fiber and then desorbing them into an inlet, either on a gas chromatograph (GC) or an HPLC system. SPME is amenable to automation using an autosampler or it can be performed manually as well. Agilent offers SPME fibers in a range of chemistries, formats, and for use with autosamplers or manual injections. Kits are also available to support method development, offering a variety of fiber types and configurations within a single kit.

Solid Phase Microextraction Fibers

When ordering SPME fibers, note that the fiber kits contain only the fibers. For a first-time order, you will also need to order the appropriate fiber holder for your needs. SPME fibers can be used multiple times depending on the application and when treated with the proper care and caution. Each fiber has a color-coded or notched hub indicating the type of coating on the fiber.

Solid Phase Microextraction Fibers

Inlet	Usage	Description	Fiber Coating (df) – µm	Fiber Length (cm)	Gauge	Fused Silica or Metal Alloy Part No.	StableFlex Part No.
Septum	Autosampler	Carbowax/Polyethylene Glycol (PEG) – A/S (Metal Alloy). Also for Merlin Microseal use	60	1	23	SU57354U	
		Carboxen/PDMS – A/S	85	1	24		SU57335U
			75	1	24	391896316	
		DVB/Carboxen/PDMS – A/S	50/30	1	24		SU57329U
		PDMS – A/S	7	1	24	391896303	
			100	1	24	391896302	
		PDMS/DVB – A/S	65	1	24	391896314	SU57327U
		Polyacrylate (PA) – A/S	85	1	24	391896306	
	Manual	Carbowax/Polyethylene Glycol (PEG) – Manual (Metal Alloy)	60	1	23	SU57355U	
		DVB/Carboxen/PDMS – Manual	50/30	1	24		SU57328U
			50/30	1	24		SU57348U
		Carboxen/PDMS – Manual	75	1	24	391896315	
		PDMS – Manual	7	1	24	391896304	
			30	1	24	391896309	
			100	1	24	391896301	
		PDMS/DVB – Manual	65	1	24	391896313	SU57326U

(Continued)

Solid Phase Microextraction Fibers

Inlet	Usage	Description	Fiber Coating (df) – µm	Fiber Length (cm)	Gauge	Fused Silica or Metal Alloy Part No.	StableFlex Part No.
Merlin Microseal	Autosampler	Carbowax/Polyethylene Glycol (PEG) – A/S (Metal Alloy). Also for Merlin Microseal use	60	1	23	SU57354U	
		Carboxen/PDMS – A/S (For Merlin Microseal Use)	75	1	23	SU57343U	
		PDMS – A/S (For Merlin Microseal Use)	100	1	23	SU57341U	
		PDMS/DVB – A/S (For Merlin Microseal Use)	65	1	23	SU57345U	
	Manual	Carbowax/Polyethylene Glycol (PEG) – Manual (Metal Alloy). Also for Merlin Microseal use.	60	1	23	SU57355U	
		Carboxen/PDMS – Manual (For Merlin Microseal Use)	75	1	23	SU57344U	
		PDMS – Manual (For Merlin Microseal Use)	100	1	23	SU57342U	
		PDMS/DVB – Manual (For Merlin Microseal Use)	65	1	23	SU57346U	

TIPS & TOOLS

The Merlin Microseal system can reduce septum coring and help eliminate septum bleed. Only use the Merlin Microseal with a 23 gauge SPME fiber assembly. To replace your GC septum nut with a Merlin microseal, you can find Merlin Microseal kits in the GC and GC/MS Columns & Supplies Catalog, publication number 5991-1058EN

Solid Phase Microextraction Kits

SPME Fiber kits contain three fibers. Note that the fiber coating thickness (df) is expressed in µm, and when multiple phase types are included in a kit, the fiber coatings are listed in the respective order that the phases are listed in the description.

Solid Phase Microextraction Kits

Inlet	Usage	Description	Fiber Coating (df) – µm	Fiber Length (cm)	Gauge	Quantity	Part No.
Septum	Autosampler	Kit 1: Polyacrylate, PDMS, PDMS; F or Volatiles and Semivolatiles – A/S	85, 100, 7	1	24	3	391896308
		Kit 2: Carboxen/PDMS, PDMS/DVB, and polyacrylate; For Volatiles or Polar Organics – A/S	75, 65, 85	1	24	3	SU57321U
		Kit 3: PDMS/DVB, polyacrylate, PDMS; For HPLC – A/S	60, 85, 100	1	24	3	SU57323U
		Kit 4: PDMS, PDMS/DVB and Carboxen/PDMS; For Flavors and Odors – A/S	100, 65, 75	1	24	3	SU57325U
		StableFlex Fiber Kit: PDMS/DVB, DVB/Carboxen/PDMS, Carboxen/PDMS and Polyacrylate – A/S	65, 50/30, 85, 85	1 & 2	24	4	SU57551U
	Manual	Kit 1: Polyacrylate, PDMS, PDMS; For Volatiles and Semivolatiles – Manual	85, 100, 7	1	24	3	391896307
		Kit 2: Carboxen/PDMS, PDMS/DVB, and polyacrylate; For Volatiles or Polar Organics – Manual	75, 65, 85	1	24	3	SU57320U
		Kit 4: PDMS, PDMS/DVB and Carboxen/PDMS; For Flavors and Odors – Manual	100, 65, 75	1	24	3	SU57324U
		StableFlex Fiber Kit: PDMS/DVB, DVB/Carboxen/PDMS, Carboxen/PDMS and Polyacrylate – A/S	65, 50/30, 85, 85	1 & 2	24	4	SU57550U

TIPS & TOOLS

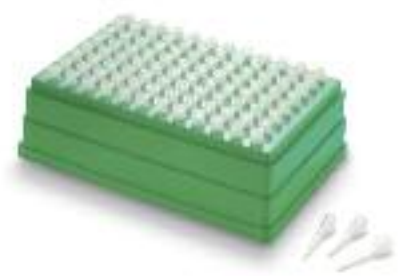
Agilent offers inlet liners designed to work with SPME applications for best performance.
These liners can be found in the GC and GC/MS Columns & Supplies Catalog, publication number 5991-1058EN

Solid Phase Microextraction Accessories

The following accessories are helpful with SPME sample preparation. Select the appropriate accessories for your application needs.

Solid Phase Microextraction Accessories

Description	Part No.
Merlin Microseal SPME replacement seal, 23 gauge, 1/pk	392609902
SPME 15 mL Stand	SU57357U
SPME Fiber Holder for CTC Autosampler	SU57347U
SPME Fiber Holder for Manual Sampling	391896401
SPME Inlet Guide for Manual Injection - fits most Agilent injection ports	SU57356U
SPME Link Septa, 11 mm	392548402



Omix tips tray, A57009MB

Micro-volume SPE

OMIX Tips

- Fast, uniform flow maximizes productivity and reproducibility
- Minimal peptide losses lead to higher recoveries
- Available in three phases and sizes to deliver better sequence coverage

OMIX tips with monolithic sorbent tip technology offer dependable purification and superior results in proteomics research. Agilent OMIX pipette tips reliably purify and enrich femtomole and picomole levels of peptides and proteins prior to MALDI-TOF or LC/MS/MS. The unique monolithic sorbent technology used in OMIX consistently outperforms other tips by delivering uniform flow and strong analyte-to-surface interactions. The high binding capacity of OMIX delivers high productivity – the 10 µL tips bind up to 8 µg of peptide – twice as much as tips from other suppliers. OMIX's superior flow and exceptional binding capacity ensure reliable recovery of your peptides, minimizing peptide loss during multi-aliquot, multi-tip and evaporation steps.

OMIX Tips

Description	Elution Volume	Unit	C4 Part No.	C18 Part No.	SCX Part No.
10 µL Mini-Bed	0.5 - 2 µL	1 x 96 tips	A57009MB	A57003MB	A57004MB
		6 x 96 tips	A57009MBK	A57003MBK	
10 µL	2 - 10 µL	1 x 96 tips	A5700910	A5700310	A5700410
		6 x 96 tips	A5700910K	A5700310K	
100 µL	10 - 100 µL	1 x 96 tips	A57009100	A57003100	A57004100
		6 x 96 tips	A57009100K	A57003100K	

OMIX Tips and Plates for Robotic Automation

- Fast, uniform flow maximizes productivity and reproducibility
- Small monolithic tip delivers low elution volumes, increasing sensitivity and reducing solvent usage
- Vacuum-free processing improves reproducibility and shortens processing times

OMIX 96-well VersaPlate

OMIX automation-friendly 96-well monolithic SPE plates are specially designed to process small samples. They offer small extraction beds with almost no dead volume. Elution is achieved with microliter solvent volumes, allowing direct injection and improving assay speed and sample throughput. OMIX tips are highly amenable to ADME/DMPK bioanalysis applications.

OMIX 96-well VersaPlate Formats

Description	Part No.
OMIX 96-well VersaPlate, C4 with tubes	A57109
OMIX C4 tubes only, 96/pk*	A57109A
OMIX 96-well VersaPlate, C18 with tubes	A57103
OMIX C18 tubes only, 96/pk*	A57103A
OMIX 96-well VersaPlate, MP1 with tubes	A57111
OMIX MP1 tubes only, 96/pk*	A57111A

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

OMIX Tips for Tomtec Quadra

Tomtec-compatible tips contain a slice of monolithic SPE material, allowing for vacuum-free processing and walk-away automation. With hands-free SPE, the process becomes much more streamlined and reproducible.

OMIX Tips for Tomtec Quadra

Description	Unit	Part No.
OMIX C18	5 racks x 96 tips	A57303
OMIX MP1	5 racks x 96 tips	A57311

OMIX C18 for Tomtec Quadra, A57303

Close-up of OMIX tips for Tomtec Quadra

OMIX C18 for Hamilton 300 µL, A57403

Close-up of OMIX tips for Hamilton

OMIX Tips for Hamilton Microlab STAR Line

Offering excellent versatility and end-user productivity enhancements, these tips have an operating volume of 300 µL, allowing flexibility in sample size. Processing 96 samples can be reduced to just a few minutes in certain applications.

OMIX Tips for Hamilton Microlab STAR Line, 300 µL

Description	Unit	Part No.
OMIX C18	5 x 96 tips	A57403
OMIX MP1	5 x 96 tips	A57411

OMIX Tips for Hamilton STAR, MP1, 5 mg

Sample Pretreatment
Add 200 µL 2% H_3PO_4 to 100 µL of human plasma

Conditioning
Aspirate 300 µL of methanol, dispense into waste tray
Aspirate 300 µL of water, dispense into waste tray

Washing
Add 5 mL 0.1M HCl, 2 mL methanol
Vacuum extract for 1 min

Conditioning
Pre-mix 300 µL sample 3 times
Aspirate 300 µL and dispense into waste tray

Washing
Aspirate 300 µL of deionized water, dispense into waste tray
Aspirate 300 µL of methanol, dispense into waste tray

Aspirate and dispense parameters

Flow rate:	50 µL/s
Setting time:	3 s
Total extraction time:	< 5 min

Albuterol Relative Recoveries

Amount (ng/mL)	% Recovery
48.0	96
46.0	92
49.7	99
46.6	93
49.1	98
47.4	95

Mean recovery 96%, RSD 3%

Disk SPE Formats

Bond Elut SPEC SPE

- No loose sorbent means no channeling of sample
- Uniform flow and extraction properties offer robust performance
- Low elution volume affords excellent concentration of analyte, improving sensitivity

Using an advanced disk design, Bond Elut SPEC delivers superior flow characteristics and trouble-free automation. Due to the low volume of the extraction bed, very low elution volumes can be used. This means that, in some applications, evaporation and reconstitution steps can be eliminated, resulting in accelerated sample processing times. The combination of low bed masses, ultra-clean base materials and a broad toolbox of selectivities delivers higher recoveries free of the matrix interferences that can cause ion suppression.

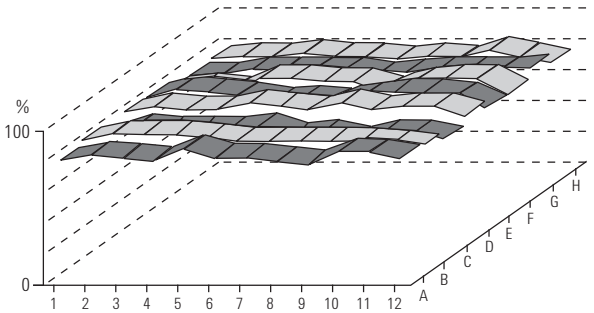
SPEC provides high recoveries at low elution volumes – as low as 100 µL. This is due to the very high surface area yet small physical volume of the monolithic disk. Overall, extraction efficiency is very high for this format of sample preparation product, and the range of functionalities allows fast method development. SPEC extraction methods are typically shorter and require less reagent and solvent than other SPE methods, for lower costs and greener operation.

SPEC 47 mm disks and SPEC SPE cartridges, A74702

Unique phases available in SPEC 96-well and SPE tube formats

Uniform recovery and reproducibility between wells from the same well plate

- **DAU** – This functionalized SPEC disk is specifically designed for the forensic analysis of drugs in urine. Its unique sorbent chemistry results in excellent sample cleanup and concentration of samples prior to GC/MS and LC/MS.
- **MP1** – SPEC MP1 is a mixed-mode, non-polar/SCX monolithic disk ideal for analytes with polar functional groups in plasma. The dual retention mechanism results in cleaner extracts. The SCX functionality strongly binds polar basic analytes allowing rigorous washing steps to be employed. Bond Elut Certify offers similar selectivity to SPEC MP1.
- **MP3** – SPEC MP3 is slightly more polar than MP1, making it ideal for hydrophobic analytes that would bind too strongly to MP1. MP3 chemistry is particularly suited to the extraction of opiate alkaloids from biological fluids.



Note the high recovery (y axis) with an average deviation across the 96 wells of just 3.2% (well positions are shown on the x and z axes). SPEC provides the predictable flow characteristics analysts require for true walk-away automated processing. With SPEC you need not worry about clogging, and as an added benefit, the typically low vacuum pressure requirement prevents cross-talk (e.g. spraying of fast running eluates between wells in the collection plate).

SPEC 96-well Plates

When used on an automated platform, SPEC 96-well plates offer outstanding flow characteristics. Flow across all 96-well plates is uniform and highly reproducible, meaning your recoveries are too.

SPEC 96-well plate

SPEC 96-well Plates, 15 mg

Sorbent Phase	Part No.
Silica-based Sorbents	
C18	A59603
C18AR	A59619
C18AR, 30 mg	A5960330
C2	A59601
C8	A59602
CN	A59606
DAU	A596DAU
NH2	A59607
Phenyl	A59610
Ion Exchange Sorbents	
SAX	A59605
SCX	A59604
Mixed Mode Sorbents	
MP1	A59611
MP3	A59620
Method Development Plate	
C2, C8, C18, C18AR, CN, MP1, MP3, PH	A59630

SPEC SPE C18 cartridges, A5320320

SPEC SPE Cartridges

SPEC functionalities are also available in a standard straight barrel tube format, offering flexibility in sample size. Use on any standard vacuum manifold such as the Vac Elut 20 or SPS 24.

SPEC SPE Cartridges, 100/pk

Sorbent Phase	Description	Part No.
C18	15 mg, 3 mL	A5320320
	30 mg, 3 mL	A5320330
C18AR	15 mg, 3 mL	A5321920
	30 mg, 3 mL	A5321930
	35 mg, 10 mL	A5021935
C18AR/MP3	70 mg, 10 mL	A5022570
C2	30 mg, 3 mL	A5320130
C8	15 mg, 3 mL	A5320220
	30 mg, 3 mL	A5320230
DAS	15 mg, 3 mL	A532DAS
DAU	15 mg, 3 mL	A532DAU
MP1	15 mg, 3 mL	A5321120
	30 mg, 3 mL	A5321130
	35 mg, 10 mL	A5021135
	70 mg, 10 mL	A5021170
MP3	15 mg, 3 mL	A5322020
	30 mg, 3 mL	A5322030
	35 mg, 10 mL	A5020735
NH2	15 mg, 3 mL	A5320720
	70 mg, 10 mL	A5020770
Phenyl	15 mg, 3 mL	A5321020
	30 mg, 3 mL	A5321030
SAX	15 mg, 3 mL	A5320520
	30 mg, 3 mL	A5320530
	35 mg, 10 mL	A5020535

SPEC 47 mm disks and SPEC SPE cartridges, A74702

SPEC Disks and Accessories

Description	Part No.
SPEC disks, C18AR, 47 mm, 20/pk	A74819
SPEC disks, C18AR, 90 mm, 12/pk	A79019
SPEC disks, C8, 47 mm, 24/pk	A74702
SPEC environmental disk holder, 47 mm	A713
SPEC flask, 1 L, male 40/35 ground glass fitting	A714

Empore Disk SPE

- Good flow of large sample volumes
- Range of versatile sorbent chemistries
- Available in two disk diameters for better performance

Empore extraction disks provide a high flow rate solution for large volume sample preparation, and are available in a variety of bonded phases and two diameters, 47 and 90 mm. Increasing the diameter of the disk gives better solvent flow rates through the disk.

Empore Disk SPE

Description	Unit	Part No.
Anion extraction disks, 47 mm	20/pk	12145012
Chelating extraction disks, 47 mm	20/pk	12145029
SDB-XC extraction disks, 47 mm	20/pk	12145010
C8 extraction disks, 47 mm	20/pk	12145002
C18 extraction disks, 47 mm	20/pk	12145004
C18 extraction disks, 90 mm	10/pk	12145007

Anion extraction disks, 47 mm, 12145012

TIPS & TOOLS

Maximum Binding Capacity of SPEC discs or Empore Disks is 10% of the sorbent bed mass.

Bondesil Alumina-N bulk sorbent, 12213073

Bulk SPE

Bondesil Bulk Sorbents

- Ideal for dispersive cleanup techniques
- Advanced bonding offers reproducible batch-to-batch performance
- Multi-kilo quantities available upon request

Bondesil Bulk Sorbents

Description	Particle Size (µm)	Unit	Part No.
Alumina-N	25	1000 g	12213073
C18	40	10 g	12213011
	40	100 g	12213012
	40	1000 g	12213013
	120	100 g	14213012
	120	1000 g	14213013
C18 OH	40	100 g	12213049
C2	40	100 g	12213006
C8	40	100 g	12213009
CBA	40	100 g	12213033
CN-E	40	100 g	12213061
CN-U	40	100 g	12213027
DEA	40	100 g	12213047
ENV (polymeric)	125	100 g	12216061
EnvirElut	40	100 g	12214016
	40	1000 g	12214019
Florisil	200	100 g	12214013
	200	1000 g	12214015

(Continued)

Bondesil Bulk Sorbents

Description	Particle Size (µm)	Unit	Part No.
NH2	40	10 g	12213020
	40	100 g	12213021
	120	100 g	14213021
PBA	40	10 g	12213044
PH	40	100 g	12213015
Plexa (polymeric)	45	100 g	12219001
PRS	40	1000 g	12213037
PSA	40	10 g	12213023
	40	100 g	12213024
	40	1000 g	12213025
SAX	40	10 g	12213041
	40	100 g	12213042
SCX	40	100 g	12213039
	40	1000 g	12213040
	120	100 g	14213039
SI	40	500 g	12213001

QuEChERS

Agilent Bond Elut QuEChERS Kits make sample prep as easy as 1- 2- 3. Pre-packaged Agilent Bond Elut QuEChERS Kits are an easy way to capture the time-saving benefits of QuEChERS sample preparation.

- Extraction kits with pre-weighed anhydrous salts in sealed packets allow you to add salts after you add organic solvent to your sample – minimizing an exothermic reaction that can compromise analyte recovery
- Dispersive kits with sorbents and salts supplied in 2 mL or 15 mL centrifuge tubes accommodate the aliquot volumes specified by current AOAC and EN methodologies
- Universal dispersive kits provide excellent recoveries and reproducibility for all types of fruits and vegetables
- Ceramic homogenizers break up salt agglomerates, promoting consistent sample extraction and increasing product recovery during extraction and dispersion; shaking time reduced from 60 to 20 seconds

TIPS & TOOLS

For more information on QuEChERS, please view our webinar "QuEChERS 101: The Basics and Beyond" at **www.agilent.com/chem/quecherswebinar**

Agilent Recommended Standard Operating Procedure for QuEChERS

In just 3 easy steps, you can prepare any fruit or vegetable sample for multi-class, multi-residue pesticide analysis.

Comminuted Sample: 10 g or 15 g

Add Acetonitrile

Select Extraction Kit

Original Method 10 g samples	**Original Method** 15 g samples	**Buffered** **AOAC 2007.1 Method** 15 g samples	**Buffered** **EN 15662 Method** 10 g samples

Check pH and adjust to 5 - 5.5
Add internal standard
Shake and centrifuge

Aliquot: 1 mL, 6 mL or 8 mL*

Select Dispersive SPE Kit

General Fruits & Vegetables 2 mL and 15 mL kits	**Fatty/Waxy Fruits & Vegetables** 2 mL and 15 mL kits	**General Fruits & Vegetables** 2 mL and 15 mL kits	**Fatty/Waxy Fruits & Vegetables** 2 mL and 15 mL kits
Pigmented Fruits & Vegetables 2 mL and 15 mL kits	**High Pigment Fruits & Vegetables** 2 mL and 15 mL kits	**Pigmented Fruits & Vegetables** 2 mL and 15 mL kits	**Fruits & Vegetables with Fats, Pigments** 2 mL and 15 mL kits
AOAC Method		**EN Method**	

Shake and centrifuge

Analysis

*Aliquot size is specified by the method, and kits are created for these specific amounts. For pesticides with acidic groups (phenoxyalcanoic acids), analyze directly by LC/MS/MS at this point (skip the dispersive SPE stage). These acidic groups interact with the PSA that is part of the dispersive SPE step.

Selection criteria

- QuEChERS method
- Compounds for screening

Use buffered kits if base-sensitive pesticides are present. Agilent recommends using buffered kits as a first choice.

Selection criteria

- QuEChERS method
- Food type to be analyzed
- Aliquot volume

QuEChERS AOAC 2007.01 extraction kit, 5982-5755

Ceramic homogenizer for 50 mL tubes, 5982-9313

QuEChERS Extraction Kits

- Available with or without 50 mL centrifuge tubes and caps
- Include $MgSO_4$, NaCl, or other salts for buffering; pre-weighed in anhydrous packet

Step 1: Extraction

Choose the extraction salt packet based on your method of analysis, AOAC or EN. The buffered extraction salts are amenable for more labile pesticides. Adding solvent and then salts to a comminuted fruit or vegetable sample (10 g or 15 g) enables you to extract the pesticides of interest into the organic layer. Agilent pre-packages its QuEChERS salts and buffers in anhydrous packages. This allows you to add them after adding your solvent to the sample, as specified in QuEChERS methodologies.

In the table below, the "CH" products contain the appropriately sized CH for those particular kits. For more information on Ceramic Homogenizers see page 99.

QuEChERS Extraction Kits

Method	Buffered	Contents	Ceramic Homogenizers	With 50 mL Tubes 50/pk	Packets Only 50/pk	Packets Only 200/pk
AOAC 2007.01	Yes	6 g $MgSO_4$; 1.5 g NaAcetate	Yes	5982-5755CH		
			No	5982-5755	5982-6755	5982-7755
Original (10 g samples)	No	4 g $MgSO_4$; 1 g NaCl	Yes	5982-5550CH		
			No	5982-5550	5982-6550	5982-7550
Original (15 g samples)	No	6 g $MgSO_4$; 1.5 g NaCl	Yes	5982-5555CH		
			No	5982-5555	5982-6555	5982-7555
EN 15662	Yes	4 g $MgSO_4$; 1 g NaCl; 1 g NaCitrate; 0.5 g disodium citrate sesquihydrate	Yes	5982-5650CH		
			No	5982-5650	5982-6650	5982-7650
Acrylamides*	No	4 g $MgSO_4$; 0.5 g NaCl	No	5982-5850		
Veterinary Drugs**	No	4g Na2SO4, 1 g NaCl	No	5982-0032		

*Katerina Mastovaka and Steven J. Lehotay have done work to extend the scope of QuEChERS beyond fruits and vegetables(1), using it to extract acrylamides in potato chips and other fried foods.

**See Application Note publication number 5991-0013EN: Screening 36 Veterinary Drugs in Animal Origin Food by LC/MS/MS Combined with Modified QuEChERS Method.

1: "Rapid Sample Preparation Method for LC-MS/MS or GC-MS Analysis of Acrylamides in Various Food Matrices", J. Agric. Food Chem, 2006, 54, 7001-7008.

QuEChERS Dispersive Kits

QuEChERS dispersive kit, 5982-5022

QuEChERS dispersive kit, 5982-5022CH

Step 2: Dispersive SPE Cleanup

Select the Dispersive SPE kit suited to the type of food being analyzed and the method you are following. In this step, an aliquot of the sample extract from Step One is added to a 2 mL or 15 mL centrifuge tube containing a small amount of SPE sorbent and $MgSO_4$. The sorbent will pull out interfering matrix materials from the sample, while the $MgSO_4$ helps remove excess water and improve analyte partitioning. Select kits are now available with ceramic homogenizers (2 per tube). Their part numbers are designated by a CH.

QuEChERS Dispersive Kits, Fruits and Vegetables

			AOAC 2007.01 Method	European Method EN 15662
Kit	**Size**	**Unit**	**Kit Contents Part No.**	**Kit Contents Part No.**
General fruits and vegetables: Removes polar organic acids, some sugars and lipids	2 mL	100/pk	50 mg PSA 150 mg $MgSO_4$ 5982-5022 5982-5022CH	25 mg PSA 150 mg $MgSO_4$ 5982-5021 5982-5021CH
	15 mL	50/pk	400 mg PSA 1200 mg $MgSO_4$ 5982-5058 5982-5058CH	150 mg PSA 900 mg $MgSO_4$ 5982-5056 5982-5056CH
Fruits and vegetables with fats and waxes: Removes polar organic acids, some sugars, more lipids and sterols	2 mL	100/pk	50 mg PSA 50 mg C18EC 150 mg $MgSO_4$ 5982-5122 5982-5122CH	25 mg PSA 25 mg C18EC 150 mg $MgSO_4$ 5982-5121 5982-5121CH
	15 mL	50/pk	400 mg PSA 400 mg C18EC 1200 mg $MgSO_4$ 5982-5158 5982-5158CH	150 mg PSA 150 mg C18EC 900 mg $MgSO_4$ 5982-5156 5982-5156CH

Part numbers ending in CH indicate tubes containing ceramic homogenizers.

(Continued)

QuEChERS Dispersive Kits, Fruits and Vegetables

Kit	Size	Unit	AOAC 2007.01 Method Kit Contents Part No.	European Method EN 15662 Kit Contents Part No.
Pigmented fruits and vegetables: Removes polar organic acids, some sugars and lipids, and carotenoids and chlorophyll; not for use with planar pesticides	2 mL	100/pk	50 mg PSA 50 mg GCB 150 mg $MgSO_4$ 5982-5222 5982-5222CH	25 mg PSA 2.5 mg GCB 150 mg $MgSO_4$ 5982-5221 5982-5221CH
	15 mL	50/pk	400 mg PSA 400 mg GCB 1200 mg $MgSO_4$ 5982-5258 5982-5258CH	150 mg PSA 15 mg GCB 885 mg $MgSO_4$ 5982-5256 5982-5256CH
Highly pigmented fruits and vegetables: Removes polar organic acids, some sugars and lipids, plus high levels of carotenoids and chlorophyll; not for use with planar pesticides	2 mL	100/pk		25 mg PSA 7.5 mg GCB 150 mg $MgSO_4$ 5982-5321 5982-5321CH
	15 mL	50/pk		150 mg PSA 45 mg GCB 855 mg $MgSO_4$ 5982-5356 5982-5356CH
Fruits and vegetables with pigments and fats: Removes polar organic acids, some sugars and lipids, plus carotenoids and chlorophyll; not for use with planar pesticides	2 mL	100/pk	50 mg PSA 50 mg GCB 150 mg $MgSO_4$ 50 mg C18EC 5982-5421 5982-5421CH	
	15 mL	50/pk	400 mg PSA 400 mg GCB 1200 mg $MgSO_4$ 400 mg C18EC 5982-5456 5982-5456CH	

Part numbers ending in CH indicate tubes containing ceramic homogenizers.

QuEChERS Dispersive Kits: Other Food Methods

Kit	Size	Unit	AOAC 2007.01 Method Kit Contents Part No.	European Method EN 15662 Kit Contents Part No.
Other Food Methods Removes biological matrix interferences, including hydrophobic substances (fats, lipids) and proteins	2 mL	100/pk	25 mg C18 150 mg $MgSO_4$ 5982-4921 5982-4921CH	
	15 mL	50/pk	150 mg C18 900 mg $MgSO_4$ 5982-4956 5982-4956CH	
All Food Types Removes all matrix interfering materials including polar organic acids, lipids, sugars, proteins, carotenoids and chlorophyll	2 mL	100/pk	50 mg PSA 50 mg C18 7.5 mg GCB 150 mg $MgSO_4$ 5982-0028 5982-0028CH	
	15 mL	50/pk	400mg PSA 400 mg C18 45 mg GCB 1200 $MgSO_4$ 5982-0029 5982-0029CH	
Animal Origin Food Removes matrix interferences such as polar organic salts, sugars, lipids and proteins	15 mL	50/pk	50 mg PSA 150 mg C18EC 900 mg Na_2SO_4 5982-4950	

Part numbers ending in CH indicate tubes containing ceramic homogenizers.

TIPS & TOOLS

View the core concepts surrounding the QuEChERS method at **www.agilent.com/chem/QuEChERSvideo**

Suggested Bond Elut QuEChERS Dispersive Kit by Food Type and Method

Commodity Group	Commodity	General Fruits and Vegetables EN or AOAC	Fruits and Vegetables w/Fats and Waxes; EN or AOAC	Pigmented Fruits and Vegetables EN or AOAC	Highly Pigmented Fruits and Vegetables; EN	Fruits and Vegetables w/Pigment and Fats; AOAC only
Use With		Lightly colored samples	Samples containing > 1% Fat/Lipids	Colored samples (chloryphyl, carotinoids), no planar pesticides	Highly colored samples (chloryphyl, carotinoids), no planar pesticides	Colored samples that also contain fats or waxes
Fruits						
 Citrus Fruits	citrus juices					
	grapefruit					
	lemon/lime					
	orange					
	orange peel					
	nectarine					
	tangerine					
 Pome Fruits	apple					
	apple, dried					
	apple sauce					
	apple juice					
	pear					
	quince					
 Stone Fruits	apricot					
	apricot, dried					
	apricot nectar					
	cherry					
	mirabelle					
	nectarine					
	peach					
	peach, dried					
	plum					
	plum, dried					
 Soft and Small Fruits	blackberry					
	blueberry					
	currant					
	elderberry					
	gooseberry, red					
	grapes, red					
	grapes, green					
	raspberry					
	raisin					
	cranberry					
	strawberry					
 Other Fruits	pineapple					
	banana					
	avocado					
	olives					
	fig, dried					
	melon					
	kiwi					
	mango					
	papaya					

(Continued)

Suggested Bond Elut QuEChERS Dispersive Kit by Food Type and Method

Commodity Group	Commodity	General Fruits and Vegetables EN or AOAC	Fruits and Vegetables w/Fats and Waxes; EN or AOAC	Pigmented Fruits and Vegetables EN or AOAC	Highly Pigmented Fruits and Vegetables; EN	Fruits and Vegetables w/Pigment and Fats; AOAC only
Use With		Lightly colored samples	Samples containing > 1% Fat/Lipids	Colored samples (chloryphyl, carotinoids), no planar pesticides	Highly colored samples (chloryphyl, carotinoids), no planar pesticides	Colored samples that also contain fats or waxes
Vegetables						
 Root and Tuber Vegetables	beets	■				
	carrot	■				
	celeriac	■				
	horseradish	■				
	parsley root	■				
	radish	■				
	black salsify	■				
	potato	■				
 Leek Plants	garlic	■	■			
	onion	■	■			
	scallion	■		■	■	
	leek	■				
	shallot	■				
	chive			■	■	
 Fruiting Vegetables	eggplant/aubergine	■				
	cucumber	■				
	pepper, sweet green			■	■	
	pepper, sweet, red			■	■	
	pumpkin			■		
	tomato	■				
	zucchini (courgette)	■				
 Broccoli	broccoli	■		■		
	brussels sprouts	■				
	cauliflower	■				
	chinese cabbage	■				
	kale			■	■	
	kohlrabi	■				
	red cabbage			■		
	savoy cabbage	■				
	white cabbage	■				
 Leafy Vegetables and Herbs	lettuce varieties	■		■	■	
	endive			■	■	
	cress			■	■	
	lamb's lettuce			■	■	
	cilantro			■	■	
	basil			■	■	
	parsley			■	■	
	rucola, arugula			■	■	
	spinach			■	■	
 Stem Vegetables	asparagus	■				
	celery	■				
	leek	■				
	rhubarb	■		■		
	artichokes	■				
 Legumes	beans, peas, lentils, (fresh)	■		■	■	
	beans, peas, lentils, (dried)	■				

(Continued)

Suggested Bond Elut QuEChERS Dispersive Kit by Food Type and Method

Commodity Group	Commodity	General Fruits and Vegetables EN or AOAC	Fruits and Vegetables w/Fats and Waxes; EN or AOAC	Pigmented Fruits and Vegetables EN or AOAC	Highly Pigmented Fruits and Vegetables; EN	Fruits and Vegetables w/Pigment and Fats; AOAC only
Use With		Lightly colored samples	Samples containing > 1% Fat/Lipids	Colored samples (chloryphyl, carotinoids), no planar pesticides	Highly colored samples (chloryphyl, carotinoids), no planar pesticides	Colored samples that also contain fats or waxes
Animal-Sourced Foods						
Meats	beef, pork, veal, chicken					
	liver, kidney					
Seafood	finfish					
	bivalve, shellfish					
Dairy	dairy					
Other Foods						
Cereals	wheat, corn, rice					
	grain, flour, etc.					
Tea/Coffee	coffee beans					
	tea leaves					
Dried Spices	peppercorn seeds					
	peppers, curry					
	leek plants					
Oils	olive, canola					
	citrus					
Baby Food	baby food					
Other						
Agricultural Products	tobacco					
	cotton, hemp					
	cocoa solids					
Soil	soil					
Whole Blood	whole blood					

TIPS & TOOLS

Acccess the complete QuEChERS applications library at **www.agilent.com/chem/QuEChERS**

QuEChERS Ceramic Homogenizers

Ceramic homogenizers increase your overall lab productivity and give you greater confidence in your results. They make analyte extraction easier by:

- Cutting the required extraction time from 60 seconds to as little as 20 seconds – a time savings of 70% per sample
- Maintaining high, reproducible extractions in a third of the time
- Minimizing variance between technicians
- Breaking up salt agglomerates and maintaining a consistent grinding of homogenizing material

The same great ceramic homogenizers available in our QuEChERS Kits are also available for bulk purchase, providing excellent grinding capabilities of the samples.

QuEChERS Ceramic Homogenizers

Description	Unit	Part No.
Ceramic homogenizer for 50 mL tubes	100/pk	5982-9313
Ceramic homogenizer for 15 mL tubes	100/pk	5982-9312
Ceramic homogenizer for 2 mL tubes	200/pk	5982-9311

Ceramic homogenizer for 50 mL tubes, 5982-9313

Standards for QuEChERS Products

In addition to our industry-leading QuEChERS Kits, Agilent makes your analysis easier by providing standards for the most commonly used regulatory methods, including AOAC and EN.

- Save time and avoid inconvenience of making standards
- Available for both GC and LC instruments
- Ready to use for QuEChERS extractions – no dilutions required

Standards for QuEChERS Products

Description	Concentration	Kit Contents	Part No.
HPLC & GC Internal Standard, AOAC Method	1000 µg/mL	Parathion-d10 (diethyl-d10), Alpha-BHC-d6 (alpha-HCH-d6)	5190-0502
QC Solution, AOAC Method	500 µg/mL	Triphenyl phosphate	5190-0503
HPLC Internal Standard, EN Method	100 µg/mL	Tris (1,3-dichloroisopropyl) phosphate, Nicarbazin	5190-0500
GC Internal Standard, EN Method	5000 µg/mL	(2,2'5,5'-tetrachlorobiphenyl), Triphenylmethane, Tris (1,3-dichloroisopropyl) phosphate	5190-0501
QC Surrogate for GC Standard, EN Method	500 µg/mL 1000 µg/mL	(2,2',3,4,4',5'-hexachlorobiphenyl) Anthracene-d10	5190-0499

Capitiva ND 96-well plate, A5969045

Captiva Filtration

Captiva's unique dual-depth filtration media provides complete removal of precipitated proteins and outstanding resistance to sample clogging, with no loss of analytes. All Captiva components are ultra clean, and rigorously tested to ensure against non-specific binding. With Captiva, your plasma samples are processed quickly and reliably. Captiva is easily automated for enhanced productivity and excellent for sample storage.

Time-consuming sample transfer steps required with conventional precipitation are now a thing of the past. With Captiva, clean, clear filtrates are ready for injection in minutes – this user-friendly filtration device is simple and streamlined with an easy-to-follow 3-step process. And because Captiva samples are pellet-free, you can sample directly from the collection plate.

The Captiva range includes:

- Captiva ND non-drip filtration plates for organic-based protein precipitation
- Captiva ND^{Lipids} non-drip filtration plates for lipid and protein depletion
- Captiva 96-well filter plates for general sample filtration
- Captiva filter cartridges, all the usual Captiva benefits in a standard SPE cartridge format
- Captiva Syringe Filters available in a wide range of sizes,formats, and membranes to cover every matrix and sample

Captiva ND

A simple-to-use filtration device designed for high-throughput, automated, in-well protein precipitation. Built with a unique non-drip (ND) membrane, Captiva ND plates allow for solvent-first protein precipitation using methanol or acetonitrile. Captiva's unique dual filter design offers fast uniform flow while avoiding sample loss and filter plugging.

Captiva ND^{Lipids}

Specifically designed for LC/MS bioanalysis of plasma, Captiva ND^{Lipids} combine the ease of use and superior flow properties of Captiva ND with a unique chemical filter. The plate efficiently removes ion-suppressing phospholipids, proteins, and surfactant interferences from precipitated plasma samples.

Premium syringe filter, glass microfiber, 5190-5122

Captiva Syringe Filters

Captiva Syringe Filters reliably filter from 1mL up to 150mL sample volume for HPLC, UHPLC, CE, ICP-MS and LC/MS with superior flow rates and maximum loading capacity to ensure maximum productivity.

All products are supplied with an HPLC or LC/MS Certificate guaranteeing extremely low levels of extractables. Packages are color coded by membrane for easy and fast identification.

Captiva ND

- Easy automation – non-drip design resists organic solvent flow until vacuum is applied
- Exceptional flow – dual depth filter avoids plugged membranes and lost samples
- Efficient protein removal – MS-suitable samples in as little as one-fifth the time
- Multiple pore sizes available for greater flexibility with solvent use

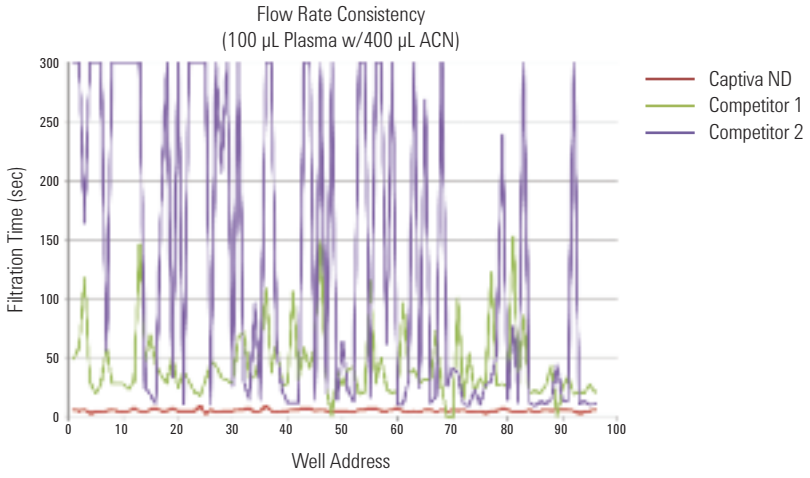
Captiva ND's unique non-drip design simplifies your workflow, ends the need to use messy tip or well seals, and reduces the number of liquid transfer steps needed to process samples. Best of all, Captiva ND's dual-depth filter construction delivers a fast reproducible flow, so you get uniform sample treatment and reliable filtrate recovery in a fraction of the time of other protein precipitation plates.

Captiva ND 96-well filter plates

Description	Unit	Part No.
Capitiva ND plate, 0.2 µm, polypropylene Recommended for both methanol and acetonitrile	5/pk	A5969002
Capitiva ND plate, 0.45 µm, polypropylene Suitable for acetonitrile only	5/pk	A5969045

Get fast, reproducible flow with Agilent Captiva ND

Agilent Captiva ND plates process samples quickly and uniformly without the need for positive pressure manifolds. Plus, its uniform flow facilitates vacuum processing making it more automation friendly.



TIPS & TOOLS

For more information on Agilent Captiva ND Plates, please visit **www.agilent.com/chem/captiva**

Captiva ND^{Lipids} 96-well filtration starter kit, A59640002SK

Captiva ND^{Lipids}

- More precise and reproducible quantitation with removal of phospholipids and proteins
- Increased productivity due to extended column lifetimes and cleaner MS ion sources
- Simple 3-step procedure
- Available with 0.2 µm pore size only, to optimize lipid removal; Methanol recommended

Capitiva ND^{Lipids} is as simple and easy-to-use as a standard protein precipitation plate. The non-drip 96-well filtration plate is specially designed to effectively remove phospholipids from biofluids. Captiva ND^{Lipids} removes lipids, proteins, surfactants and other matrix interferences from plasma extracts. Ion suppression is significantly reduced for enhanced sensitivity and precision during trace analysis. The depletion of lipid compounds also gives you better peak shapes and reproducible retention times so that standard operating procedures are easily validated. In addition, the fast, in-well precipitation technology of Captiva ND^{Lipids} ensures high sample throughput and helps reduce instrument downtime, with virtually no need for method development on a wide range of analytes.

Captiva ND^{Lipids} 96-well filter plates

Description	Part No.
Captiva ND^{Lipids} 96-well filtration starter kit Includes 1 CaptiVac vacuum collar, 2 Captiva ND^{Lipids} filter plates, 2 Captiva 96 deep-well 1 mL collection plates and 2 Captiva collection plate pierceable covers	A59640002SK
Captiva ND^{Lipids} 96-well filtration replacement kit Includes 2 Captiva ND^{Lipids} filter plates, 2 Captiva 96 deep-well 1 mL collection plates and 2 Captiva collection plate pierceable covers	A59640002RK
Captiva ND^{Lipids} 96-well filtration plate, 100/pk	A59640002B
Captiva ND^{Lipids} 96-well filter plate, 1 mL well, 1/pk	A59640002I
Captiva ND^{Lipids} 96-well filter plates, 1 mL well, 5/pk	A59640002V
DuoSeal 96 96-well plate seals, 10/pk	A8961008

TIPS & TOOLS

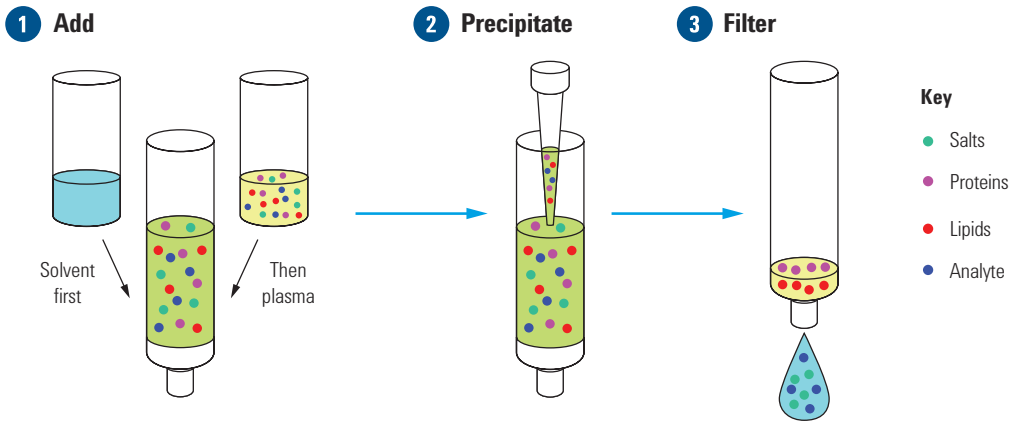
Using Captiva ND^{Lipids} with methanol is an excellent replacement for acetonitrile as the precipitation solvent. Methods with methanol show better removal of lipids than with acetonitrile. Converting to methanol is advantageous when the supply or cost of acetonitrile is restrictive. Methanol can now be your solvent of choice for lipid removal.

For more information about solvents, reference Application Note *"Agilent Captiva ND Lipids Sample Prep Choice of Precipitation Solvent: Acetonitrile versus Methanol"* publication number 5991-0445EN.

TIPS & TOOLS

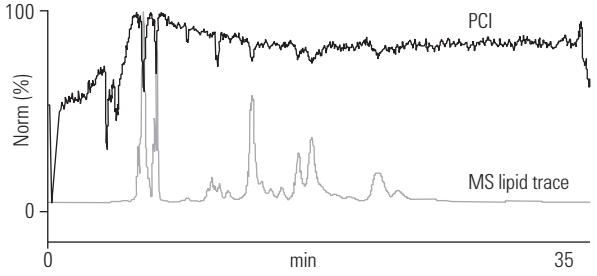
Agilent provides you with the tools you need to make bioanalysis quick and reliable. Here, in this video, we demonstrate an opiate panel analysis, from sample prep using Captiva ND^{Lipids} through HPLC separation using Poroshell 120 columns and the Agilent 6490 QQQ MS/MS with iFunnel. For part one of this video, please visit **www.agilent.com/chem/bioanalysis1** – for part two of this video, please visit **www.agilent.com/chem/bioanalysis2**

Operating Instructions and Tips for Captiva ND^{Lipids} 96-well Plates

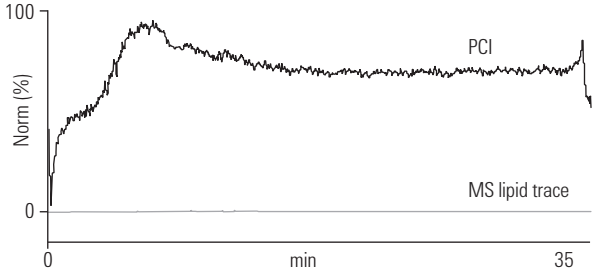


Post-Column Infusion (PCI) of Albuterol Before Treatment With Captiva ND^{Lipids}

Note that the ion-suppression features (top trace) correlate with the elution of phospholipids (bottom trace).

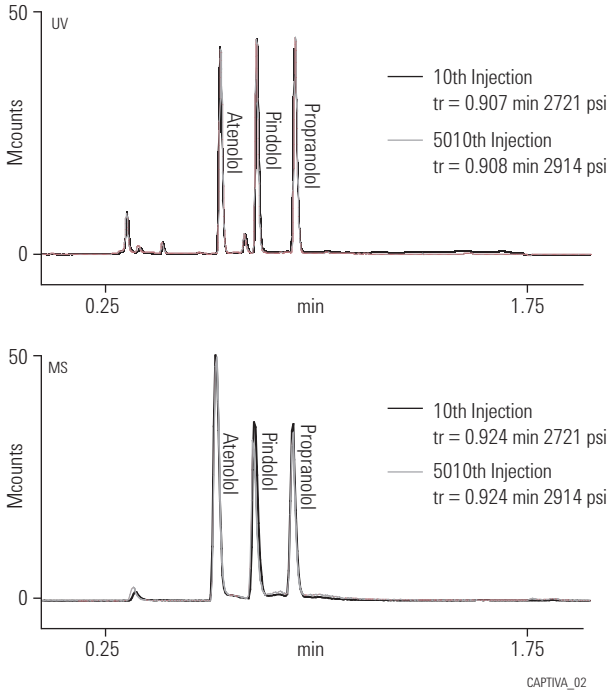


Same Experiment After Protein and Lipid Depletion With Captiva ND^{Lipids}



Ion suppression is dramatically reduced and the lipids are almost non-detectable.

Longevity Study Illustrating Prolonged Column Lifetime When Using Captiva ND^{Lipids}



No significant changes in back pressure, retention time, and peak shape with Captiva ND^{Lipids} after 10 and 5010 injections for LC/MS or LC/MS/MS bioanalysis (top = UV detection; bottom = MS detection).

Captiva 96-well filter kit

Captiva 96-well Filter Kits

- The industry standard for centrifugation-free sample filtration
- Fast and reliable processing improves productivity
- Starter kits contain everything you need

Faster than centrifugation and easily automated, Captiva's unique dual-depth filtration media provides outstanding resistance to sample clogging. With Captiva, your samples are processed quickly and reliably, and you can avoid fibrinogen clogging forever. The plates are also excellent for sample storage. All Captiva components are ultra clean, and rigorously tested to ensure against non-specific binding. Starter kits contain everything you need to get up and running with minimum fuss. Replacement kits include everything you need to replenish your Captiva system.

Captiva 96-well Filter Kits

Pore Size (µm)	Filter Material	Part No.
Starter Kits		
0.2	Polypropylene	A5960002SK
0.45	Polypropylene	A5960045SK
Includes 1 CaptiVac vacuum collar, 5 Captiva filter plates, 10 DuoSeal 96 96-well plate seals, 5 Captiva 96 deep-well 1 mL collection plates, 5 Captiva collection plate pierceable covers		
Replacement Kits		
0.2	Polypropylene	A5960002K
0.45	Polyvinyldifluoride and polypropylene	A5967045K
	Polypropylene	A5960045K
Includes 5 Captiva filter plates, 10 DuoSeal 96 96-well plate seals, 5 Captiva 96 deep-well 1 mL collection plates, 5 Captiva collection plate pierceable covers		

Captiva 96-well Filter Plates

Captiva 96-well filter plates, A5960045

- Protect HPLC columns from clogging to reduce instrument downtime
- Clean and clear filtrates offer improved sensitivity
- High analyte recovery with simple robust methods allows faster method development

Filtration is simple, versatile, and necessary to prevent clogging of valuable HPLC columns. Captiva 0.2 µm and 0.45 µm depth filter plates are ideal for filtering samples prior to LC/MS injection. Captiva 10 µm and 20 µm glass fiber filter plates are designed for clarifying highly particle-laden samples, such as freshly thawed plasma and hepatocyte filtration, preventing sample transfer problems from pipette tip clogging. They are perfect for automated systems and for use with DuoSeal 96 96-well seals.

Captiva 96-well Filter Plates

Pore Size (µm)	Filter Material	Quantity	Part No.
0.2	Polypropylene	5/pk	A5960002
	Polypropylene	100/pk	A5960002B
0.45	Polyvinyldifluoride and polypropylene	5/pk	A5967045
	Polypropylene	5/pk	A5960045
	Polypropylene	100/pk	A5960045B
10	Glass fiber	5/pk	A596401000
20	Polypropylene	5/pk	A596002000
	Polypropylene Bulk Pack	100/pk	A596002000B

Captiva 96-well collection plate, A696001000

Captiva 96-well Collection Plates and Cover

- Designed for Captiva filtration, SPEC and Bond Elut 96 applications
- Standard 1 mL format offers compatibility with further automation or liquid handling
- Silicone cover preserves sample integrity

Captiva 96-well collection plates are specially designed for use with Captiva filtration plates, SPEC SPE 96-well plates and Bond Elut 96-well plates. The 1 mL capacity provides the volume needed to collect all of your filtrate or eluate. Captiva pierceable 96-well silicone covers are easily applied to completely seal the plates, ensuring no sample loss due to spillage or evaporation and no sample contamination. The silicone is specially designed for 96-well auto injectors, providing easy piercing and removal.

Captiva 96-well Collection Plates and Cover

Description	Unit	Part No.
Captiva 96-deep well collection plate, 1 mL	10/pk	A696001000
Captiva 96-deep well collection plate, 1 mL	100/pk	A696001000B
Captiva pierceable 96 deep-well collection plate cover, 1 mL	10/pk	A8961007
DuoSeal 96-well plate seal	10/pk	A8961008

Captiva Filter Cartridges

- Standard SPE format
- Ideal for LC/MS samples
- Avoid sample transfer problems
- Non-Drip (ND) 3 mL cartridges resist flow until vacuum is applied
- Effectively remove phospholipids from biological samples with Captiva ND^{Lipids}

Captiva filter cartridges bring all of the benefits of Captiva filtration to the standard SPE cartridge format. The 0.2 µm and 0.45 µm filter cartridges are ideal for preparing precipitated protein samples for LC/MS analysis. The Captiva 10 µm glass fiber filter cartridge is designed for clarifying highly particle-laden samples, such as freshly thawed plasma, preventing sample transfer problems due to pipette tip clogging.

Captiva filter cartridges, glass fiber, A500401000

Captiva Filter Cartridges

Pore Size (µm)	Filter Material	Volume (mL)	Unit	Part No.
0.2	Polyvinyldifluoride and polypropylene	3	100/pk	A5300002
0.45	Polyvinyldifluoride and polypropylene	3	100/pk	A5307045
		6	100/pk	A5060045
10	Glass fiber	10	100/pk	A500401000

Captiva Non-Drip Filter Cartridges

Pore Size (µm)	Filter Material	Volume (mL)	Unit	Part No.
Non-Drip				
.22	Polypropylene	3	100/pk	A5300063
Non-Drip Lipids				
.22	Polypropylene	3	100/pk	A5300635

TIPS & TOOLS

Using Captiva ND^{Lipids} with methanol is an excellent replacement for acetonitrile as the precipitation solvent. Methods with methanol show better removal of lipids than with acetonitrile. Converting to methanol is advantageous when the supply or cost of acetonitrile is restrictive. Methanol can now be your solvent of choice for lipid removal.

For more information about solvents, reference Application Note *"Agilent Captiva ND^{Lipids} Sample Prep Choice of Precipitation Solvent: Acetonitrile versus Methanol"* publication number 5991-0445EN.

CaptiVac Vacuum Collar

- Pre-aligned for trouble-free operation
- Vacuum sealed for maximum efficiency
- Simple, cost effective solution

For use with Captiva Filtration and SPEC 96-well Plates, this patented vacuum collar is a completely transparent device that joins Captiva or SPEC plates directly onto our collection plate. The unique design of the Captiva collar forms a pre-set, pre-aligned vacuum seal between the filtration and collection plate, which positions the outlet tips at a specified distance inside each well, so as to prevent cross contamination of samples.

CaptiVac vacuum collar, A796

CaptiVac Vacuum Collar

Description	Part No.
CaptiVac vacuum collar	A796
CaptiVac gasket kit, 5/pk	A796G

Premium Syringe Filters

- More choices. Captiva syringe filters are available in a wide range of sizes, formats, and membranes to cover every matrix and sample.
- Certified. All products are supplied with an HPLC or LC/MS Certificate, guaranteeing extremely low levels of observed extractables.
- Exceptional Flow Rate. Captiva syringe filters have excellent flow rates and maximum sample loading capacity.
- Highest Quality. Agilent Captiva syringe filters are constructed with the highest-grade virgin polypropylene housing, and are securely welded to prevent bursting and ensure sample integrity.

Sample filtration prior to HPLC, LC/MS, UHPLC, CE and ICP-MS analysis is critical to achieving optimal system performance, and Agilent Captiva Premium Syringe Filters make the process faster than ever with the industry's highest flow rates and loading capacities. Manufactured with the highest-grade virgin polypropylene, and all are HPLC or LC/MS certified to guarantee low levels of observed extractables. PES (part numbers 5190-5094, 5190-5095,5190-5096 and 5190-5098) and Glass Fiber (5190-5120) premium syringe filters are LC/MS certified to be free of extractables Choose from a variety of membranes to suit your needs.

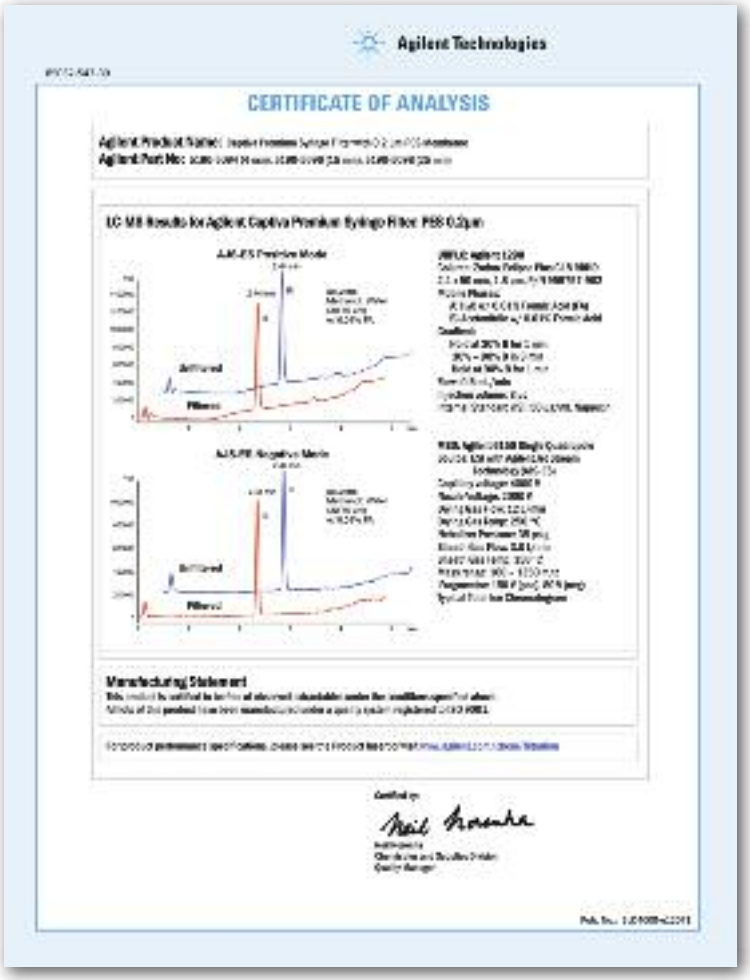
Premium Filters, 100/pk

Description	Diameter (mm)	Pore Size (µm)	Certification	Housing	Part No.
PTFE	4	0.2	LC	Polypropylene	5190-5082
	4	0.45	LC	Polypropylene	5190-5083
	15	0.2	LC	Polypropylene	5190-5084
	15	0.45	LC	Polypropylene	5190-5085
	25	0.2	LC	Polypropylene	5190-5086
	25	0.45	LC	Polypropylene	5190-5087
Nylon	15	0.2	LC	Polypropylene	5190-5088
	15	0.45	LC	Polypropylene	5190-5091
	25	0.2	LC	Polypropylene	5190-5092
	25	0.45	LC	Polypropylene	5190-5093

(Continued)

Premium Filters, 100/pk

Description	Diameter (mm)	Pore Size (µm)	Certification	Housing	Part No.
PES	15	0.2	LC/MS	Polypropylene	5190-5096
	4	0.45	LC/MS	polypropylene	5190-5095
	4	0.2	LC/MS	Polypropylene	5190-5094
	15	0.45	LC	Polypropylene	5190-5097
	25	0.2	LC/MS	Polypropylene	5190-5098
	25	0.45	LC	Polypropylene	5190-5099
Regenerated cellulose	4	0.2	LC	Polypropylene	5190-5106
	4	0.45	LC	Polypropylene	5190-5107
	15	0.2	LC	Polypropylene	5190-5108
	15	0.45	LC	Polypropylene	5190-5109
	25	0.2	LC	Polypropylene	5190-5110
	25	0.45	LC	Polypropylene	5190-5111
Cellulose acetate	28	0.2	LC	MBS	5190-5116
	28	0.45	LC	MBS	5190-5117
Glass microfiber	15		LC/MS	Polypropylene	5190-5120
	28		LC	MBS	5190-5122



LC/MS Certificate of Analysis

Layered Filters with Pre-Filter

Layered Filters, 100/pk

Description	Diameter (mm)	Pore Size (µm)	Certification	Housing	Part No.
Glass Microfiber/PTFE	15	0.2	LC	Polypropylene	5190-5126
	15	0.45	LC	Polypropylene	5190-5127
	25	0.2	LC	Polypropylene	5190-5128
	25	0.45	LC	Polypropylene	5190-5129
Glass Microfiber/Nylon	15	0.2	LC	Polypropylene	5190-5132
	15	0.45	LC	Polypropylene	5190-5133
	25	0.2	LC	Polypropylene	5190-5134
	25	0.45	LC	Polypropylene	5190-5135

Captiva Disposable Syringes, 100/pk

Volume (mL)	Part No.
5	9301-6476
10	9301-6474
20	5062-8534

Captiva disposable syringe, 5 mL, 9301-6476

Captiva disposable syringe, 10 mL, 9301-6474

Captiva disposable syringe, 20 mL, 5062-8534

Econofilters

High quality Econofilters are shipped in large packs and are ideal for busy labs that need fast, efficient filtration at a reasonable price.

Econofilters, PES, 5190-5272

Econofilters, 1000/pk

Description	Diameter (mm)	Pore Size (µm)	Housing	Part No.
PVDF	13	0.2	Polypropylene	5190-5261
	13	0.45	Polypropylene	5190-5262
	25	0.2	Polypropylene	5190-5263
	25	0.45	Polypropylene	5190-5264
PTFE	13	0.2	Polypropylene	5190-5265
	13	0.45	Polypropylene	5190-5266
	25	0.2	Polypropylene	5190-5267
	25	0.45	Polypropylene	5190-5268
Nylon	13	0.2	Polypropylene	5190-5269
	13	0.45	Polypropylene	5190-5270
	25	0.2	Polypropylene	5190-5271
	25	0.45	Polypropylene	5190-5272
PES	13	0.2	Polypropylene	5190-5273
	13	0.45	Polypropylene	5190-5274
	25	0.2	Polypropylene	5190-5275
	25	0.45	Polypropylene	5190-5276
Polypropylene	13	0.2	Polypropylene	5190-5277
	13	0.45	Polypropylene	5190-5278
	25	0.2	Polypropylene	5190-5279
	25	0.45	Polypropylene	5190-5280
Regenerated cellulose	13	0.2	Polypropylene	5190-5281
	13	0.2	Polypropylene	5190-5282
	25	0.2	Polypropylene	5190-5283
	25	0.45	Polypropylene	5190-5284

Agilent Captiva Syringe Filter Selection Guide

STEP 1

Sample Composition

Aqueous

All aqueous solutions

- tissue culture/ protein applications/ large molecules
- small molecules applications/ general aqueous

Solvents

- Hydrophilic aqueous/ solvent mixtures/ solvents
- Hydrophilic solvent-mixtures/ solvents
- Hydrophobic solvents/gases/ acids/bases

PES Polyethersulfone pH Range 3-12		
CA Cellulose Acetate pH Range 4-8	**RC** Regenerated Cellulose pH Range 3-12	
	NY Nylon pH Range 3-14	
		PTFE Polytetra-fluorethylene pH Range 1-14

STEP 2

Sample Volume

4 mm for **up to 1 mL**	15 mm for **up to 15 mL**	25-28 mm for **up to 150 mL**
 0.1-1 mL	 15 mL	 10-150 mL

STEP 3

What is the Particle Size of Your LC Column?

Columns packed < 2 µm particles	Columns packed > 2 µm particles
0.2 µm UHPLC	**0.2 µm or 0.45** µm HPLC

Applications

Type of Filtration	Recommended	Alternatives
HPLC • UHPLC • LC/MS • GC	RC	PTFE or Nylon
ICP-MS	PTFE	Glass Fiber/PTFE (High Particle Samples)
CE	RC	Nylon
Undiluted Organic Solvents	PTFE	Nylon
Protein Analysis • Samples with Biomolecules – Buffers	PES	RC or CA
Tissue Culture Media	PES	RC or CA
High Particle-Load Samples – Organic Solvents	Glass Fiber/PTFE	
High Particle-Load Samples – Aqueous Solutions	Glass Fiber/Nylon	

Proof of Performance: Filtration Efficiency

Testing Method

Sample preparation

The surfactant solution, 0.1% Triton X-100, was used to prepare 0.01% Latex Beads (0.3 µm and 0.5 µm) solution. The 0.1% Triton X-100 was used to maintain the homogeneity of Latex Beads solutions.

Filtration

The challenging solution was passed through each individual syringe filter and a 1 mL filtrate was collected in a 2 mL vial for HPLC run.

Ten different filters from each kind filter were tested.

Filtrate measuring on HPLC/UV

The maximum absorbance of the latex beads solutions was observed at 272 nm, which was used to correlate latex beads concentration with absorbance.

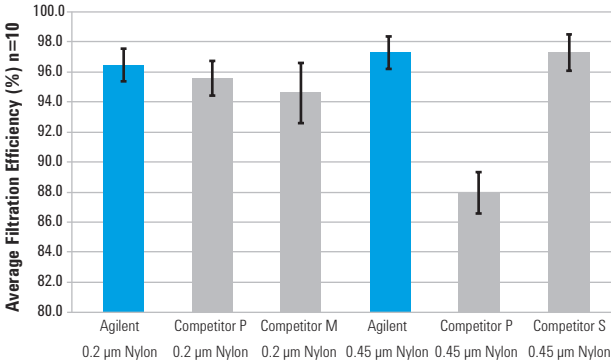
A simple HPLC method was used for automatic testing under UV 272 nm. No column was used. The mobile phase was water, and the flow rate of 1.0 mL/min was used.

The eluted peak are at 272 nm was used for filtration efficiency calculation.

Blank 0.1% Triton X-100 was run to correct contributions from surfactant absorbance at 272 nm.

Agilent Captiva Syringe Filters provide equivalent or better filtration efficiency than competitors equivalent products on particulates removal

Average Filtration Efficiency of Agilent Captiva Syringe Filters vs. Competitors



Filtration efficiency (%) calculation

$$Filtration\ EFF\,(\%) = \frac{\left(PeakArea_{Unfiltered\ LBsolution} - PeakArea_{Unfiltered\ Blank}\right) - \left(PeakArea_{Filtered\ LBsolution} - PeakArea_{Filtered\ Blank}\right)}{\left(PeakArea_{Unfiltered\ LBsolution} - PeakArea_{Unfiltered\ Blank}\right)} \times 100\%$$

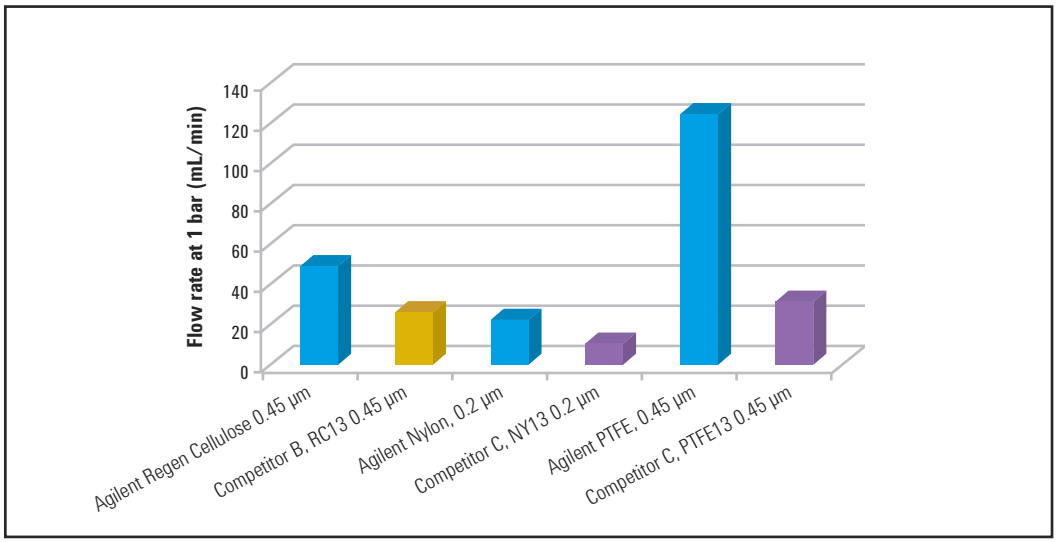
Agilent Captiva Syringe Filters provide consistent and higher than 90% filtration efficiency on particulate removal

	Agilent premium 0.2 µm syringe filters						Agilent premium 0.45 µm syringe filters					
	Nylon	**PTFE**	**RC**	**PES**	**GF/NY**	**GF/PTFE**	**Nylon**	**PTFE**	**PES**	**CA**	**GF/NY**	**GF/PTFE**
1	96.0	92.3	89.8	92.1	99	99.4	95.2	97	93.6	92.4	96.8	98.4
2	95.9	91.4	90.6	91.4	99	98.9	93.2	96.5	93.6	95.0	97.1	98.8
3	94.5	93.3	90.3	89.5	99.2	99.0	95.5	97.5	93.5	96.3	96.4	97.7
4	96.6	92.3	91.7	99.0	99.6	98.6	95.4	96.6	88.5	97.2	99.3	98.8
5	95.4	91.2	92.4	96.3	98.8	98.8	94.9	96.0	88.2	96	99.0	99.7
6	95.6	91.1	90.8	99.9	99.3	98.5	95.3	95.7	92.3	95.6	100	96.8
7	99.9	91.1	98.2	99.0	99.4	99.4	99.5	95.2	94.9	96.7	98.2	97.6
8	99.8	91.2	99.0	97.8	95.0	99.0	98.0	97.8	89.4	93.8	98.9	98.5
9	99.7	90.9	96.4	95.2	95.9	99.9	97.7	94.9	87.3	92.5	100.2	98.0
10	99.2	91.3	95.7	96.1	94.7	99.6	99.7	94.8	87.5	92.8	100.5	101.3
Average Eff (%)	**97.3**	**91.6**	**93.5**	**95.6**	**98.0**	**99.1**	**96.4**	**96.2**	**90.9**	**94.8**	**98.6**	**98.6**
RSD (%)	2.2	0.8	3.7	3.7	2.0	0.5	2.2	1.1	3.3	1.9	1.5	1.3

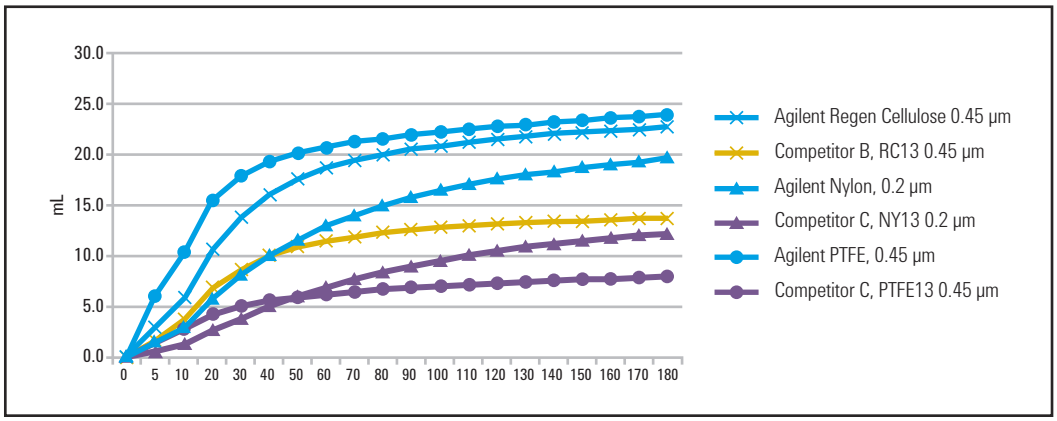
Proof of Performance: Flow Rate & Volume Capacity

Agilent Captiva Premium Syringe Filters provide incomparable loading capacity with the fastest flow rates in the market today to allow for maximum efficiency.

Flow rate for 15 mm Premium Syringe Filters



Capacity (volume) of 15 mm syringe filters over time (with Particulate-Laden Samples)



Filtration Impact on LC Column Life

Importance of Filtration

Column plugging is the most frequent cause of column failure encountered by analytical chemists. Injection of samples containing even small amounts of particulate will clog the column inlet, cause high column backpressure, retention time shift and loss of resolution, and subsequently shorten the normal column lifetime. This impact can be more significant for sub-2 µm columns. These smaller particle size columns are usually used under high pressure, thus are more sensitive to pressure increase caused by the accumulated particulates on column.

It is the intent of this work to demonstrate that sample filtration will lengthen the life of a column, not only the traditional LC columns by 0.45 µm filters, but also the sub-2 micron LC columns by 0.2 µm filters. In order to correlate the column life extend to the actual application, the plasma extracts by PPT treatment were tested also for the comparison of samples without filtration, samples with centrifugation and samples with filtration.

Testing Method

Sample preparation

A.) The surfactant solution, 0.002% Triton X-100, was used to prepare 0.05% Latex Beads (0.3 µm and 0.5 µm) solution.

B.) Latex Beads solution (0.3 µm) was used for sub-2 micron column life test. Unfiltered and filtered (by 0.2 µm filters) samples were used for comparison of impact on sub-2 micron column life.

C.) Human plasma extract was used for sub-2 micron column life actual application test. Unfiltered, centrifuged and filtered (by 0.2 µm filters) samples were used for comparison of impact on sub-2 micron column life. The sample was prepared following the below steps.

1. 2 mL of Human plasma was aliquoted in to a test tube.
2. 10 mL of Acetonitrile with 1% Acetic Acid was added.
3. Sample was vortexed vigorously and then centrifuged at 4000 rpm for 5 min.
4. The supernant was transferred into a clean test tube.
5. The supernant was blown dry with N2 flow at 37 °C.
6. The died sample was reconstituted in 10:90 MeOH/H2O. Vortex and sonicate.

Filtration

The challenging solution was passed through each individual syringe filter and a 1 mL filtrate was collected in a 2 mL vial for HPLC run.

UHPLC instrumentation
(for sub-2 column life test)

Column: Agilent Zorbax Eclipse Plus C18 RRHD column, 2.1 x 50 mm, 1.8 µm, P/N 959757-902
Column was disconnected from the detector and allowed to run to drain.

Mobile phase: Acetonitrile: Water (35:65, v/v)

Flow rate: 0.4 mL/min, isocratic

Injections: 10 µL per injection, 1 injection per minute

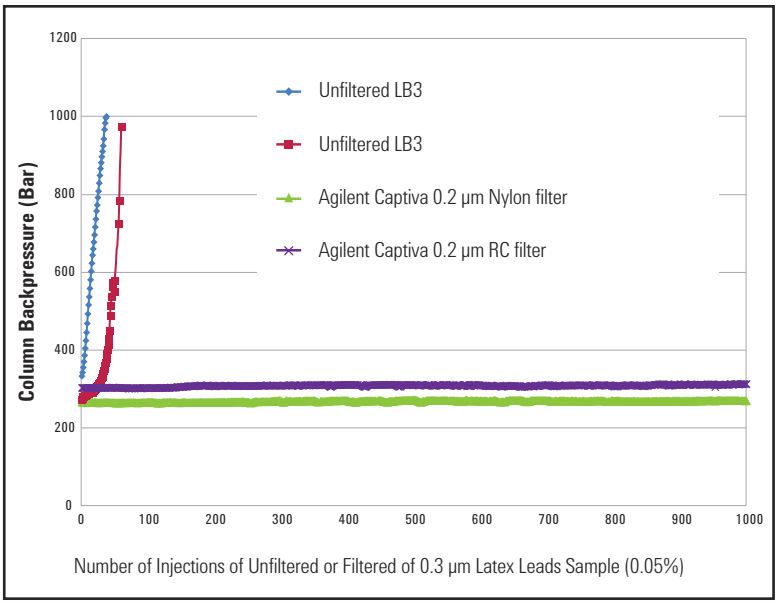
Monitoring: Column backpressure was recorded with the number of injections.

Column failure: When column back pressure exceed 1000 bar.

Sequence: A 1000 injections sequence was usually used, unless column failed in the middle due to high pressure. A new column was used for each individual sequence

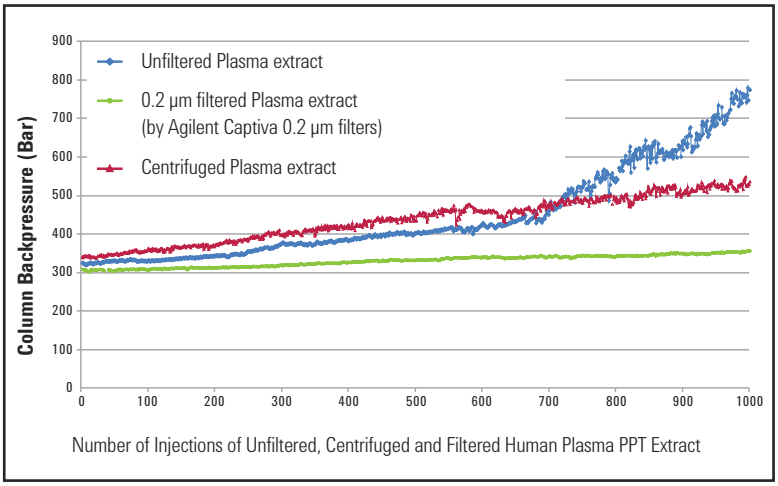
Results – Filtration impact on sub-2 micron column A by Latex Bead 0.3 µm solution

Effects on Filtration on sub-2 micron Column Life



Results – Filtration impact on sub-2 micron column B by Human Plasma PPT Extract

Effects of filtration on sub-2 column life time



Conclusion

Sample filtration prior to their introduction into an HPLC system was demonstrated to make significant improvement on the column usage life time.

Diatomaceous Earth Sorbents

Typical Matrices

Aqueous, biological fluids, organic reaction mixtures (scavenging)

Primary Extraction Mechanism

Solid supported LLE

Compound Types

Nitrosamines, pesticides, herbicides

Chem Elut and Hydromatrix

- High purity sorbent supported liquid extraction (SLE) applications
- Available in pre-packed cartridges or bulk
- Packing method delivers excellent tube-to-tube reproducibility
- Tox Elut cartridges are effective for forensic analysis of drugs in urine

Chem Elut is an economical broad performance sorbent for rapid, general sample preparation of biological samples such as plasma, serum, whole blood and urine. Chem Elut products are available in buffered and unbuffered formats. The buffered devices can be used for simple scrubbing operations on organic reactions. The base-treated cartridge can remove residual acid compounds from a variety of matrices.

Hydromatrix is a high purity, inert diatomaceous earth sorbent available in 96-well plates (Combilute and Chem Elut SLE Plates, which are designed for sample volumes of less than 80 µL) and as bulk material, offering end user flexibility and an excellent diversity of applications.

Chem Elut cartridges, 12198006

Chem Elut Cartridges*

Buffered pH	Volume (mL)	Unit	Part No.
4.5	3	100/pk	12198004
9.0	3	100/pk	12198005
Unbuffered	0.3	100/pk	12198001
	1	100/pk	12198002
	3	100/pk	12198003
	5	100/pk	12198006
	10	100/pk	12198007
	20	100/pk	12198008
	50	50/pk	12198009
	100	25/pk	12198010
	300	15/pk	12198011

*For Chem Elut and Tox Elut cartridge, select the product which fits the total volume of the sample. Volumes stated here are not the actual cartridge size, but rather the volume available for sample.

Tox Elut Cartridges*

Buffered pH	Volume (mL)	Unit	Part No.
9.0	10	100/pk	12198014
9.0	20	100/pk	12198017
Unbuffered	10	100/pk	12198012
	10	100/pk	12198015

*For Chem Elut and Tox Elut cartridge, select the product which fits the total volume of the sample. Volumes stated here are not the actual cartridge size, but rather the volume available for sample.

Hydromatrix

Description	Part No.
Hydromatrix bulk material, 1 kg	198003
Hydromatrix bulk material, 4 kg	198004

Other Formats*

Description	Part No.
Combilute 96-well plate, 200 mg	65401507
Chem Elut SLE Plate, 50 mg	A4964050
Chem Elut SLE Plate, 150 mg	A4964150
Preassembled 96-well plate (VersaPlate tubes and base plate) 260 mg	75430260
VersaPlate tubes, 96/pk, tubes only, 260 mg	75530260

*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Combilute plate, 200 mg, 65401507

References

Plum, J & Daldrup, T (1986) Detection of digoxin, digitoxin, their cardioactive metabolites and derivatives by high performance liquid chromatography and high performance liquid chromatography-radioimmunoassay. J. Chromatogr. A, 377, 221-231.

Biondi, PA, Guidotti, L, Montana, M, Manca, F, Brambilla, G & Lucarelli, C (1991) A derivatization procedure suitable for HPLC analysis of clenbuterol. J. Chromatogr. Sci., 29(5), 190-193.

Raou, S, Gremaud, E, Biaudet, J & Turesky, R (1997) Rapid solid-phase extraction method for the detection of volatile nitrosamines in food. J. Agricultural and Food Chem., 45, 4706-4713.

The prohibition on the use of certain azo dyes is laid down in Annex XVII to the EU Regulation (EC) 1907/2006 on the registration, evaluation and authorization of chemicals (REACH), which is directly applicable in all EU Member States. CEN Leather - Chemical tests - Determination of certain azo colourants in dyed leathers. Reference: CEN ISO/TS 17234:2003

DMS card, 50/pk, A400150

Dried Matrix Spotting

Bond Elut Dried Matrix Spotting (DMS)

Dried blood spotting techniques for DMPK/ADME applications have gained significant exposure in the past few years. The practical advantages of sample collection, shipping and storage offer significant resource benefits to large pharmaceutical and CRO laboratories. Bond Elut DMS resets the bar in performance for dried blood spotting applications. The innovative non-cellulose spotting material offers key sensitivity and workflow advantages, mitigating key pains with existing cellulose blood spotting cards.

- Non-cellulose 'paper' reduces non-specific binding, improving MS analyte response, increasing signal to noise ratios
- Easy product selection – one single, untreated card for fast method development for a variety of biological matrices
- Spot size, homogeneity and recovery are highly reproducible across a range of hematocrit levels: allowing confidence in assay development for a variety of biological matrices
- Non-hygroscopic material does not absorb moisture, even in aggressively humid environments, reduces potential risk of analyte stability during transportation/storage
- Card requires five times less punching force than a cellulose based DBS card, enabling easier workflow and amenability to automation

Bond Elut Dried Matrix Spotting (DMS)

Description	Unit	Part No.
DMS card	50/pk	A400150
DMS card	500/pk	A400150K
DMS accessory pack Includes 5 x 3 mm punching tools and 5 punching mats		A42001
DMS starter kit Includes 1 accessory pack (P/N A42001) with 5 x 3 mm punching tools and 5 punching mats and Bond Elut DMS card, 50/pk (P/N A400150)		A400150SK

TIPS & TOOLS

Visit **www.agilent.com/chem/sampleprep** for Dried Matix Spotting Application Notes, including: *"Homogeneity of Dried Matrix Spots,"* publication # 5990-8035EN.

Dried Blood Spotting Workflow and Method Guide

1. SPOTTING

- Use existing sample collection workflow and preferred blood volume (typically 15 µL, but better MS responses can be achieved using 30 µL)
- Hold the pipette tip or capillary just above the paper in the center of the dotted circle (DO NOT ALLOW THE TIP TO TOUCH THE CARD SURFACE)
- Dispense, allowing the blood drop to touch the spotting surface on the card
- The blood spot will quickly soak into the surface of the card leaving a circular spot

2. DRYING

- Drying times for Bond Elut DMS cards are comparable to cellulose based cards
- It is recommended that the sample is given a minimum of 2 hours drying time prior to punching

3. PUNCHING

The Agilent DMS card is compatible with handheld punch tools and can easily be configured for automated punching systems compatible with a 4 spot card format.

- Cut a suitable sized punch from the center of the blood spot (typically 3 mm)
- Transfer the punched blood disk to a suitable vial or 96-well

4. EXTRACTION

- Add 300 µL of 0.1% formic acid* in 80% methanol to the punched disk
- Add a suitable internal standard to the sample and vortex
- Centrifuge for 15 minutes or filter if required
- Evaporate sample to dryness and reconstitute in 100 µL of mobile phase
- Inject into LC/MS/MS

*The use of 0.1% formic acid can assist the elution of more hydrophobic analytes

OTHER PRACTICAL CONSIDERATIONS

Blood Sample: Fresh, untreated blood can be used provided it shows no sign of clotting. In most cases it is common to use blood that contains an anticoagulant (EDTA or heparin). Frozen blood samples are not recommended due to the occurrence of cellular damage upon thawing.

Oval Spots: Oval spots can be caused by sudden hand movement during the spotting process. This does not create any experimental issues, as the subsequent punch from the center of the spot will normalize the assay volume.

Hematocrit Levels: Bond Elut DMS displays improved spot homogeneity and recovery compared to cellulose devices, across a wide range of hematocrit levels.

Punching Force: Bond Elut DMS cards require 4 times less punching force than a cellulose based card. There is no need to twist the cutting tool while punching the blood spot.

Cross Contamination: Provided that the blood spots have had sufficient time to dry, then cross contamination should not be an issue.

Effect of Humidity: Bond Elut DMS cards are non-hygroscopic and do not absorb water, even in high humidity environments.

Untreated Card: Bond Elut DMS contains no chemical impregnation.

Other Matrices: Bond Elut DMS is amenable to a broad range of biological matrices including plasma.

TIPS & TOOLS

To view Agilent application note "Improving Sensitivity of Basic Drugs in Dried Blood Spotting through Optimal Desorption" please visit **www.agilent.com/chem/driedbloodspotting**

ITLC SG paper, SGI0001

Chromatography Papers

Chromatography Paper is used in thin layer chromatography applications such as evaluating radioisotope purity. The porous paper is made of glass microfibers impregnated with silica gel. Agilent offers two kinds of paper: SA (contains sodium salt) and SG (contains potassium salt).

- More convenient with faster developing times than traditional TLC; no interference from organic binders
- Ideal for evaluating radioisotope QC testing
- Separates lipids and other non-polar compounds
- Can easily be cut to convenient testing sizes, and can be imprinted

Chromatography Papers

Description	Part No.
Chromatography paper (SA), 4.5 x 12 in, 50/pk	A120B12
ITLC SG paper, 4.5 x 12 in, 50/pk	SGI0001

Bond Elut Accessories

Bond Elut 96-well Accessories

Bond Elut 96-well Accessories

Description	Unit	Part No.
96-well manifold, acrylic	1/pk	5133000
96-well manifold, shimset	1/pk	12236104
Square-well collection plates, 2 mL	50/pk	5133009
Square-well collection plates, 1 mL	50/pk	5133008
Square-well collection plates, 350 µL	50/pk	5133007
Sealing tape pad	10/pk	12143105
Square 96-well sealing caps, EVA, pierceable	50/pk	5133005
VersaPlate sealing strips, each covers one column	240/pk	12236108

Bond Elut 96-well manifold, acrylic, 5133000

96-well manifold, shimset, 12236104

Bond Elut 96 square-well plate, 5133009

Bond Elut 96 square-well plate, 5133008

Bond Elut 96 square-well plate, 5133007

Sealing tape pad, 12143105

Empty SPE cartridges, 1 mL, 12131007

Empty SPE cartridges, 12 mL, 12131010

Empty SPE cartridges, 20 mL, 12131011

Empty SPE cartridges, 60 mL, 12131012

Bond Elut Empty SPE Cartridges

- Made with high purity polypropylene for cleaner extracts
- Uniform batch-to-batch size for consistent performance
- Economical for everyday use

A variety of empty reservoirs is available for packing custom SPE cartridges with bulk Bondesil or other desired sorbents. Cartridges are available from 1 to 60 mL. Order frits separately, or see the table for reservoirs with pre-installed frits.

Bond Elut Empty SPE Cartridges

Volume (mL)	Unit	Part No.
1	100/pk	12131007
3	100/pk	12131008
6	100/pk	12131009
12	100/pk	12131010
20	100/pk	12131011
60	100/pk	12131012

Bond Elut Empty SPE Cartridges with Two Frits

- Pre-installed frits for ease-of-use
- Broad range of filtration operations for maximum flexibility
- Customizable packing for specific applications

These clean polypropylene reservoirs contain two 20 µm polylethylene frits pre-inserted, an ideal configuration for simple filtration. For custom sorbent packing, additional frits can be purchased separately. Available from 1 to 60 mL.

Bond Elut Empty SPE Cartridges with Two Pre-Installed Frits

Volume (mL)	Unit	Part No.
1	100/pk	12131013
3	100/pk	12131014
12	100/pk	12131016
20	100/pk	12131017
60	100/pk	12131018
Bond Elut Empty SPE Cartridges with One Thick Frit		
6	100/pk	12131015

Empty SPE cartridges with two frits (pre-inserted), 1 mL, 12131013

Empty SPE cartridges with two frits (pre-inserted), 20 mL, 12131017

Empty SPE cartridges with two frits (pre-inserted), 60 mL, 12131018

Polyethylene Frits, 12131021

20 µm Polyethylene Frits for SPE Cartridges

- Made with high-grade, clean polyethylene for clean extracts
- Pre-cut to correct size for accuracy
- Use with reservoirs or custom packing

These frits are pre-cut to fit into Bond Elut reservoirs for use in filtration applications or for custom SPE sorbent packing.

20 µm Polyethylene Frits for SPE Cartridges

Diameter (mm)	To Fit Tube Size (mL)	Unit	Part No.
6.4	1	100/pk	12131019
9.5	3	100/pk	12131020
12.7	6	100/pk	12131021
15.9	12	100/pk	12131022
20.6	20	100/pk	12131023
27.0	60	100/pk	12131024

Bond Elut Adapters

- Connect SPE cartridges in series for large samples
- Expand cartridge volume for even more applications
- Transfer large-volume samples to any SPE cartridge

Bond Elut Adapters

Description	Unit	Part No.
Adapter cap for 1, 3 and 6 mL Bond Elut cartridges	15/pk	12131001
Adapter cap for LRC 12, and 20 mL Bond Elut cartridges	10/pk	12131003
Adapter cap for 60 mL Bond Elut cartridges	10/pk	12131004

Bond Elut adapters fit on top of any Bond Elut cartridge and contain a female Luer fitting that accommodates the tip of another cartridge, allowing the following configurations:

Bond Elut Adapter Configurations

Configuration 1: Stack two cartridges to perform multi-sorbent methods

Configuration 2 + 3: Increase any cartridge's volume by stacking an empty reservoir on top of the device.

Configuration 4: Standard Luer-tipped syringes will fit into any Bond Elut adapter. Gentle pressure can then be used to apply conditioning solvents, samples, rinsing solvents and eluents. This configuration is particularly useful for single sample processing, where a vacuum manifold is not required.

Configuration 5: For excessively large sample volumes, 1/8 in od tubing can be connected to the end of an adapter and the sample can be drawn directly from the sample container via high vacuum.

Luer Stopcocks

- Control flow rates during SPE vacuum extraction
- Improve method reproducibility
- Instant isolation from vacuum reduces accidental tube drying

Luer stopcocks are used to provide independent flow control of each individual Bond Elut cartridge when used with vacuum manifolds. They are made from solvent resistant high-grade polypropylene, are reusable and can be readily cleaned using organic solvents such as methanol or acetone.

Luer stopcocks, 12131005

Luer Stopcocks

Description	Unit	Part No.
Luer stopcocks	15/pk	12131005

Adapter Caps for Gilson ASPEC SPE Systems

- Enhance the high-throughput compatibility of Bond Elut cartridges
- Converts 1, 3 and 6 mL cartridges for use in Gilson SPE systems
- Specially engineered for leak-free operation

Gilson-engineered caps produce a positive pressure seal with the needle in Gilson ASPEC, ASPEC XL and ASPEC XL4 solid phase extraction systems.

Gilson adapter cap, 12131034

Adapter Caps for Gilson ASPEC SPE Systems

Description	Unit	Part No.
Gilson adapter cap, 1 mL	1000/pk	12131034
Gilson adapter cap, 3 mL	1000/pk	12131035
Gilson adapter cap, 6 mL	1000/pk	12131036

Vac Elut Vacuum Extraction Manifolds

- Increased productivity/sample throughput
- Disposable needles eliminate cross contamination
- Rugged, reliable construction

Engineered to increase laboratory productivity, the corrosion-resistant Vac Elut vacuum extraction manifolds permit extraction of up to 12 or 20 samples at one time, for improved efficiency. The manifold's clear glass base allows careful monitoring of the entire sample collection process, and the compact design requires very little bench space.

To minimize the risk of sample carryover, low-cost, disposable, medical grade polypropylene delivery needles can be easily replaced. Polypropylene extender tips are also available as a replacement for the standard needle valves, ensuring a direct path into the collection tube. Correct sample identification is also ensured by an interlocking fit between the lid and internal test tube rack.

Vac Elut 20 manifold with collection rack, 12234105

Vac Elut 20 collection rack, 12234517

Vac Elut 20 Vacuum Extraction Manifolds

The Vac Elut 20 vacuum control valve, vacuum gauge, and quick release valve are mounted on the lid, away from the corrosive waste stream and within convenient reach. The solvent-resistant polypropylene rack is available in a variety of sizes to accommodate collection tubes commonly used in sample preparation. Manifold sets include the glass basin, lid cover, collection rack and vacuum gauge assembly.

Vac Elut 20 Manifold

Manifold Sets	Part No.
Vac Elut 20 manifold with collection rack for 10 x 75 mm test tubes	12234105
Vac Elut 20 manifold with collection rack for 13 x 75 mm test tubes	12234100
Vac Elut 20 manifold with collection rack for 13 x 100 mm test tubes	12234101
Vac Elut 20 manifold with collection rack for 16 x 75 mm test tubes	12234102
Vac Elut 20 manifold with collection rack for 16 x 100 mm test tubes	12234103
Accessories for Vac Elut 20 Manifold	
Standard glass basin	12234505
Collection rack for 10 x 75 mm test tubes	12234517
Collection rack for 13 x 75 mm test tubes	12234507
Collection rack for 16 x 100 mm test tubes	12234510
Replacement Components	
Polypropylene delivery needles, 25/pk	12234511
Replacement exit valve for glass basin	12234506
Replacement lid gasket	12234502
Vac Elut 20 lid cover	12234501
Vacuum gauge assembly	12234504

Vac Elut 20 Manifold with Tall Glass Basin

- For extractions greater than 10 mL
- Transparent glass base allows you to monitor the whole collection operation
- Simple vacuum adjustment

The Vac Elut 20 with a large glass basin and collection rack accommodates larger 16 x 150 mm test tubes. The same high quality material and features on the standard Vac Elut system are incorporated on this special unit. These collection vessels can be utilized in combinatorial chemistry applications using large boiling tubes for collection of purified synthesis mixtures, or for any SPE extraction in which an elution volume greater than 10 mL is required.

Vac Elut 20 manifold tall glass basin, 12234104

Vac Elut 20 Manifold with Tall Glass Basin

Manifold Set	Part No.
Vac Elut 20 Manifold with tall glass basin and collection rack for 16 x 150 mm test tubes, complete system	12234104

Vac Elut 12 manifold, 5982-9110

Vac Elut 12 Manifold

The Vac Elut 12 vacuum extraction manifold is a compact tool for small sample sets. The Vac Elut 12 offers the same durability of components and operation as the Vac Elut 20 manifolds, but works well when only a few samples need to be processed at a time. The Vac Elut has 12 sample positions, a clear glass basin for easy visualization of the extraction, and a gauge for precise vacuum settings.

Vac Elut 12 Manifold

Manifold Set	Part No.
Vac Elut 12 manifold with collection rack for 16 x 100 mm test tubes	5982-9110

12-port rack for 13 x 75 mm tubes, 5982-9114

Replacement Parts for Vac Elut Vacuum Manifolds

Description	Part No.
Manifold ball ring/vacuum quick release	5982-9106
Manifold exit valve replacement kit	5982-9107
Manifold vacuum gauge assembly with valve	5982-9108
White cover for 12-port manifold	5982-9111
Sealing gasket for 12-port manifold	5982-9112
Glass chamber for 12-port manifold	5982-9113
12-port rack for 13 x 75 mm tubes	5982-9114
12-port rack for 13 x 100 mm tubes	5982-9115
12-port rack for 16 x 75 mm tubes	5982-9116
12-port rack for 16 x 100 mm tubes	5982-9117

Parts and Disposables for Vac Elut Cartridge Manifolds

Description	Unit	Part No.
Disposable needle tip	20/pk	5982-9100
Stainless steel needle with polypropylene coating	20/pk	5982-9101
Short valve stopcock	20/pk	5982-9102
Long valve stopcock	20/pk	5982-9103
Male luer plugs	25/pk	5982-9104
Needle tip ejector tool		5982-9105
Cartridge stacking adapters	12/pk	5982-9109

Vac Elut SPS 24 Manifold

- Closed operation prevents cross contamination
- Stainless steel tips deliver maximum extract purity
- Range of rack sizes covers most tube configurations

The Vac Elut SPS 24 allows simultaneous processing of up to 24 SPE cartridges. Like all Vac Elut manifolds, the SPS 24 is made from durable, solvent-resistant materials and engineered to last. The glass sides allow easy viewing of the entire sample collection process.

The ultimate feature of the SPS 24 manifold is its waste diversion funnel, which enables all steps of the SPE procedure to be completed without removing the lid. Since the collection rack is placed inside the unit before extraction begins, splash back and cross contamination are eliminated, while hazardous waste and biohazard exposure are minimized. Wastes collect outside of the manifold itself, simplifying cleanup and reducing the time needed to extract and elute samples.

Complete with replacement stainless steel delivery tips for maximum extract purity, the Vac Elut SPS 24 system also includes a vacuum controller/release, collection rack, and port sealing plugs. Racks for several different collection tube configurations are available.

Vac Elut SPS 24 manifold

Vac Elut SPS 24 Manifold

Description	Part No.
Vac Elut SPS 24 manifold with collection rack for 10 x 75 mm test tubes	12234003
Vac Elut SPS 24 manifold with collection rack for 12 x 75 mm test tubes	12234041
Vac Elut SPS 24 manifold with collection rack for 13 x 100 mm test tubes	12234022
Vac Elut SPS 24 manifold with collection rack for 16 x 100 mm test tubes	12234004
Replacement Components	
Collection rack and funnel set for 12 or 15 mL conical tubes	12234027
Collection rack and funnel set for 12 x 75 mm test tubes	12234030
Collection rack and funnel set for 13 x 100 mm test tubes	12234031
Collection rack and funnel set for 16 x 100 mm test tubes	12234028
Elastic lid fasteners, 6/pk	12234034
Complete Upper Lid Assembly	12234025C
SPS 24 upper lid cover	12234025
SPS 24 waste tower repair kit Includes base exit tube, hose connector, washer, center tube, 900 connector elbow	12234005
Stainless steel delivery needles, 25/pk	12234038

SPS 24 waste tower repair kit, 12234005

96-Well Plate Vacuum Manifold Accessories

- Can handle 96-well fixed position plates or second version to handle 96-well flexible format plate
- Constructed with polypropylene base and polyethylene lid
- Small footprint
- Supplied with on/off valve, vacuum gauge, and fine vacuum control valve
- Disposable reservoir tray collects excess sample and wash solvents
- Spacer inserts can be placed into the base so that collection plates of differing heights can be processed (both deep-well and standard microtiter plates), ensuring maximum penetration of the SPE plate into the collection plate and reducing well-to-well contamination
- Resistant gasket in the manifold lid

Base O-ring, 5185-5779

96-well vacuum manifold,
base assembly only, 5185-5797

Collection plate spacer in sizes
to match the collection plate used

Vacuum Manifolds for 96-well Plates

Description	Part No.
Manifold for 96-well plates Includes base, vacuum gauge, needle valve and fixed lid	5185-5776

Parts and Disposables for 96-well Plate Manifolds

Description	Unit	Part No.
Base O-ring for 96-well plate manifold		5185-5779
Collection plate spacer for Agilent 1 mL deep-well, 12 mm		5185-5775
Collection plate spacer for microtiter plate and Agilent 0.5 mL shallow well plate, 29 mm		5185-5781
Collection plate spacer for most industry-standard deep-well plates, 2 mm		5185-5780
Disposable reservoir tray for 96-well manifold	25/pk	5185-5782
96-well vacuum manifold, base assembly only		5185-5797
Lid for 96-fixed well vacuum manifold		5185-5798
Lid gasket for 96-well plate manifold		5185-5778
Luer adapters for 96-well flexible cartridge	25/pk	5185-5789
Needle valve for 96-well manifold		5185-5783
On/off valve for 96-well manifold		5185-5785
Vacuum gauge for 96-well manifold		5185-5786
Vacuum outlet (Ni plated) for 96-well manifold		5185-5784

Sealing Mats

Sealing mats help prevent sample contamination or evaporation that can occur when plates are exposed to environmental conditions.

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

Sealing Mats

Description	Unit	Part No.
96-well plate sealing mats, round	50/pk	5042-1389

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Easy Ordering Terms and Conditions

Discounts and Delivery

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A shipping and handling fee will be added to your order unless the purchase is over $2000 US for orders place online or over $4000 for orders place via phone. Special shipping (i.e., overnight in the US) is available in most regions at an additional cost.

Agilent is required to collect all state and local sales taxes unless the buyer's tax-exempt certificate is on file with Agilent Technologies. Please be prepared to provide a copy if it is not on file, when placing your order.

Please check with your Agilent Customer Service Representative, local Authorized Distributor, or the Agilent website for current prices, special offers, promotions and discounts when placing your order.

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If you are not satisfied with your Agilent product within the first 60 days, you may return your purchase in its original condition for a full refund or credit. A return policy statement is included in every Agilent shipment and posted under Product Information on the website. In the US and Canada, please call for a Return Authorization form and return instructions at **1-800-227-9770**. If your Agilent product was purchased from a distributor, please contact the distributor.

Shipping Damages

If items are damages in transit, please follow the instructions below:

- If a shipment is visibly damaged upon arrival, do not accept it until the person making the delivery has endorsed the bill of lading with statement for the extent of the damage.
- If any damage is found after unpacking, retain all cartons and inner packaging and immediately request an inspection from the carrier.
- Notify the Agilent Customer Contact Center at **1-800-227-9770** about the damaged shipment so that we can make the appropriate sales adjustment and/or provide you with return instructions (Sales order number, product number and quantity damaged will be needed).

Easy Ways To Order

- Phone: **1-800-227-9770** (option 1, 1) in the US and Canada – Mon-Fri, 8AM to 8PM EST
- Fax: **1-302-633-8901** in the US
- Email: **cag_sales-na@agilent.com** in the US and Canada
- Online: **www.agilent.com/chem** in the US and Canada

Payment Options

- In the US, Visa, MasterCard, Discover and American Express are accepted with a minimum order of $20 (not applicable in all countries).
- Email ePay@agilent.com to make an electronic payment using the ACH/EFT (Automated Clearing House/Electronic Funds Transfer) method.
- Establish a charge account through your Agilent Customer Service Representative or Your Local Agilent sales office. An account number will be assigned to you for charging your purchases. Payment terms are net 30 days from the invoice date. All orders are subject to credit approval.

We will be happy to supply a price quote via, phone, email or fax if you need it in writing.

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Deliver to:		

Part Number	Description	Quantity	Price	Total Cost

Special Instructions:		
	Subtotal:	
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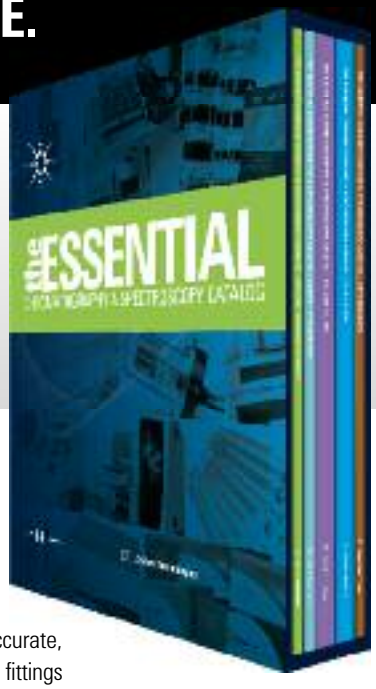

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