2018/2019

Your Essential Resource for

SAMPLE PREPARATION

Agilent Technologies

Agilent CrossLab
From Insight to Outcome

ACROSS THE LAB, AROUND THE WORLD, WITH YOU EVERY STEP OF THE WAY.

Real stories from the lab.

WHO WE ARE. WHAT WE DO.

Whatever your lab needs, Agilent CrossLab is ready to partner with you to create new and transformative opportunities. Together, we'll support your scientific and business goals with superior laboratory services, software, and consumables from Agilent. A direct connection to a global team of service experts delivers vital, actionable insights at every level for your lab.

Our solutions maximize performance, reduce complexity, and drive improved economic, operational, and measurable outcomes. And our innovative and comprehensive products generate immediate results and lasting impact.

Look out for CrossLab stories from the lab to find out how we can help.

Get the full story at
www.agilent.com/chem/CrossLabStories

YOUR ESSENTIAL RESOURCE FOR

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 preparation products across the full spectrum of instrumentation. These include:

- **Bond Elut SPE products** – selectively remove interferences and 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.
- **Prepackaged QuEChERS kits** – make sample preparation faster, easier, and more reliable. Options include extraction kits with preweighed salts in anhydrous packets, dispersive kits that accommodate aliquot volumes specified by AOAC/EN methods, and ceramic homogenizers that promote consistent extraction and recovery.
- **Captiva 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 to suit your applications.
- **EMR–Lipid** employs an innovative chemistry to selectively trap linear hydrocarbon chains (lipids) in dirty sample extracts, while bulkier target analytes remain in solution. EMR–Lipid is available in both Captiva filtration cartridges and 96-well plates and dispersive SPE (dSPE) formats.

Table of Contents

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, and format guide, which collectively display the various physical configurations available to match your lab's workflow. These tools, along with information in each product section, can help you select from a multitude of options and get the Agilent sample preparation product that is just right for your lab.

Featured Products

Bond Elut Plexa SPE Products

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.

Bond Elut QuEChERS Kits

With Agilent Bond Elut QuEChERS disposable preweighed extraction and dispersive kits, you can extract and prepare complex matrices for multiclass, multiresidue pesticide analysis in minutes rather than hours.

Bond Elut EMR–Lipid dSPE

Agilent offers dispersive SPE kits that are specifically designed to remove lipids from high fat samples. EMR–Lipid provides selective lipid removal from complex samples without analyte retention. EMR–Lipid employs an innovative chemistry to selectively trap linear hydrocarbon chains (lipids) in dirty sample extracts, while bulkier target analytes remain in solution.

Captiva EMR–Lipid

Captiva EMR–Lipid provides highly selective and efficient lipid/matrix removal without unwanted analyte loss. The novel EMR–Lipid technology removes lipids based on a combination of size exclusion and hydrophobic interaction. Effective lipid removal assures minimal ion suppression of target analytes, which significantly improves method reliability and ruggedness. Captiva EMR–Lipid is available in cartridge and 96-well plate formats.

Captiva Syringe Filters

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

PPM-48 and PPM-96

The Agilent positive pressure manifold 48 and 96 processors (PPM-48 and PPM-96) are both excellent alternatives for sample processing. The processors have unique restricted flow ports to create consistent gas flow through every channel, even when channels are not being used or have run dry. This consistency ensures reproducibility from row-to-row and cartridge-to-cartridge regardless of the cartridge or well contents.

Sample Preparation Selection

Option 1—Interference Guide

Select your sample preparation technique based on the type of interferences you need to remove

Sample Preparation Technique						
	Less Selective →					More Selective
Interference Removed	**Filtration**	**Protein Precipitation + Filtration**	**Protein Precipitation + Lipid Removal + Filtration**	**SLE**	**QuEChERS**	**SPE**
Particulates	••	••	••	••	••	••
Protein		••	••	••	••	••
Oligomeric Surfactants		••*	••		•	••
Lipids		•*	••	•	••**	••
Salts				••	•	••
Pigment			•	•	•	••
Polar Organic Acids				••	••	••
Recommended Solution	Captiva	Captiva ND, *Captiva ND Lipids	Captiva EMR—Lipid	Chem Elut and Hydromatrix	Bond Elut QuEChERS, **EMR—Lipid dSPE	Bond Elut SPE
	Page 96	Page 98	Page 97	Page 120, 121	Page 94	Page 7, 8

Legend:
•• Excellent Removal
• Some Removal

TIPS AND TOOLS

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

Option 2—Application Guide
Select the sample preparation product best suited for your analysis needs

Application Guide

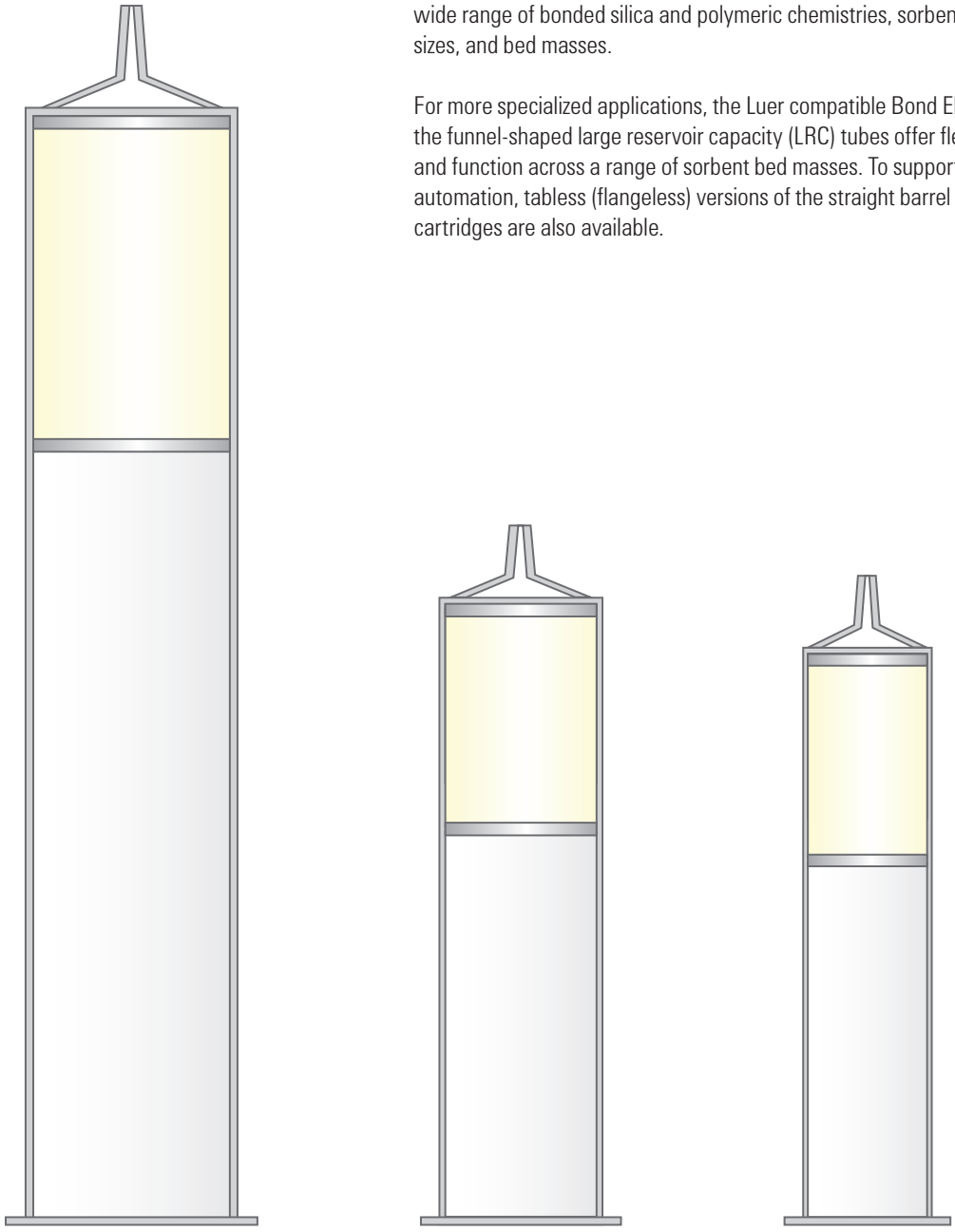
Industry	Application	Technique	Product	Page No.
Biotechnology	Protein Peptide Purification	Lysate Filtration	Captiva	96
		Microvolume SPE	OMIX	72
Clinical Research and Forensics	Bioanalysis	Solid Phase Extraction (SPE)	Bond Elut	7, 8
			Bond Elut Plexa	17, 18
			Bond Elut Plexa PCX	20, 21
		Microvolume SPE	OMIX	72
		Supported Liquid Extraction (SLE)	Chem Elut	120, 122
		Filtration	Captiva	96
		Protein Precipitation Filtration	Captiva ND	99, 100
			Capitva ND Lipids	100
		Protein Precipitation Lipid Removal Filtration	Captiva EMR—Lipid	97
Environmental Monitoring	Semivolatiles	Solid Phase Extraction (SPE)	Bond Elut	7, 8
			SPEC	73
	Oils and Grease	Solid Phase Extraction (SPE)	Bond Elut	7, 8
			SPEC	73
		Water Removal	Bond Elut	7, 8
			Na_2SO_4	59
	Emerging Contaminants	Solid Phase Extraction (SPE)	Bond Elut	7, 8
		Supported Liquid Extraction (SLE)	Chem Elut	120, 122
	Textile Analysis	Supported Liquid Extraction (SLE)	Chem Elut	120, 122
Food and Beverage	Pesticides, Herbicides, and Veterinary drugs	Filtration	Captiva	96
		QuEChERS	Bond Elut QuEChERS	83
		Solid Phase Extraction (SPE)	Bond Elut	7, 8
		Supported Liquid Extraction (SLE)	Chem Elut	120, 122
		Protein Precipitation Filtration	Captiva ND	99, 100
			Captiva ND Lipids	98, 100
		Protein Precipitation Lipid Removal Filtration	Captiva EMR—Lipid	97
Pharmaceutical	Bioanalysis	Solid Phase Extraction (SPE)	Bond Elut Plexa	17, 18
			Bond Elut Plexa PCX	20, 21
			Bond Elut Plexa PAX	22, 23
			Bond Elut	7, 8
			SPEC	73
		Microvolume SPE	OMIX	72
		Protein Precipitation Filtration	Captiva ND	99, 100
			Captiva ND Lipids	100
			Captiva	96
		Protein Precipitation Lipid Removal Filtration	Captiva EMR—Lipid	97
		Supported Liquid Extraction (SLE)	Chem Elut	120, 122
	Veterinary Drugs	Solid Phase Extraction (SPE)	Bond Elut	7, 8
		QuEChERS	Bond Elut QuEChERS	83
		Protein Precipitation Lipid Removal Filtration	Captiva EMR—Lipid	97

Option 3—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 offer a full set of straight barrel tubes ranging from 1 to 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 Plate

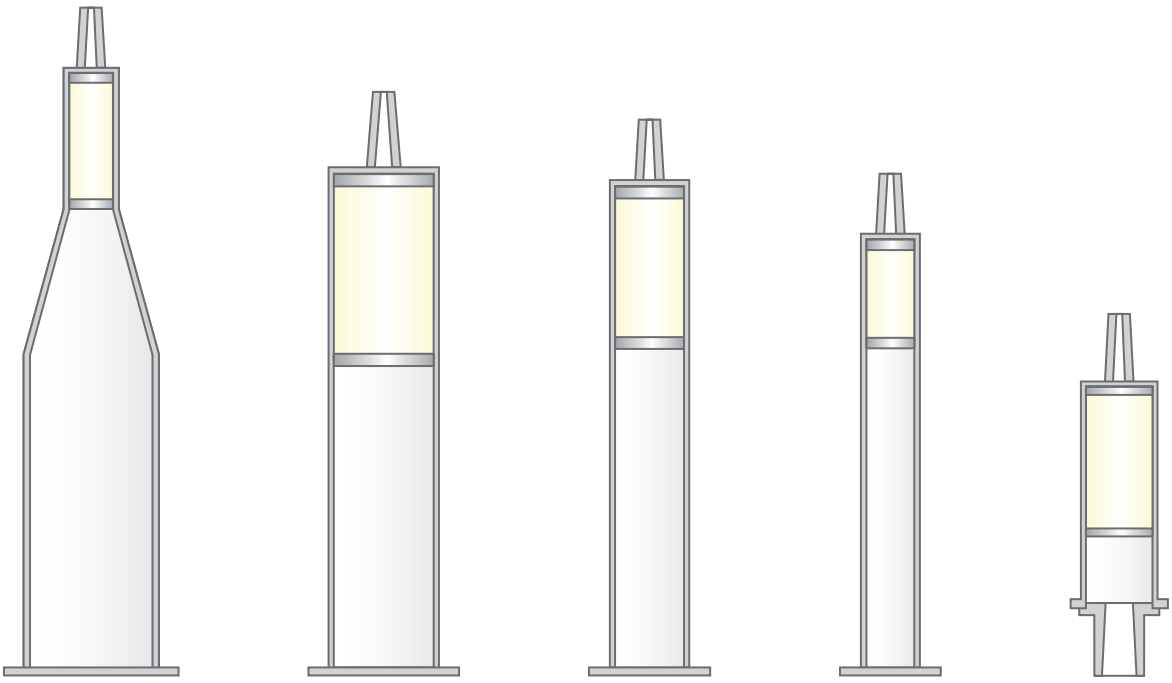
Bond Elut 96-well plate formats are best in class for flow performance and well-to-well reproducibility. These specially designed plates are available in a large range of sorbent chemistries with well volumes of 1 and 2 mL.

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. The Luer tip of VersaPlate tubes can also fit VacElut 12, VacElut 20, and VacElut SPS 24 vacuum manifolds. VersaPlate can be bought in a prepacked 96 position format or as loose tubes.

Online SPE

Agilent Bond Elut online SPE cartridges are designed to provide sample cleanup and preconcentration. Online SPE involves loading the sample onto the online SPE cartridge by applying flow in one direction across the sorbent. The flow across the sorbent is then reversed to elute the target analytes directly onto the analytical LC column. Available with Agilent PLRP-S polymeric sorbent materials, Bond Elut online SPE cartridges provide good stability and performance. Bond Elut online SPE cartridges also offer a simple, automated method for sample analysis.



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, 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. What's more, 25 different tests are conducted during manufacture, 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 many 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 is 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 compliance inspections guarantee the consistent quality of Bond Elut.

TIPS AND TOOLS

For more 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.

Cross Reference of Comparable Phases by Manufacturer

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

If you are an Agilent SampliQ user, contact our technical support for Bond Elut options for your sample preparation needs.

Polymers					
If you are using				**Try This**	**Page No.**
Phenomenex Strata	**Supelco Supel-Select**	**Thermo HyperSep Retain or SOLA**	**Waters Oasis**	**Agilent Bond Elut**	
Strata-X	HLB	PEP or HRP	HLB, HLB PRiME	Plexa	17, 18
SDB-L	DSC-PS-DVB			ENV or LMS	25, 26
Strata-X-C	SCX	CX	MCX	Plexa PCX	20, 21
Strata-X-A	SAX	AX	MAX	Plexa PAX	22, 23
Silica-Based and Other Sorbents					
If you are using				**Try This**	
Phenomenex Strata	**Supelco Supelclean/ Discovery**	**Thermo HyperSep**	**Waters Sep-Pak**	**Agilent Bond Elut**	
C18-E	ENVI-18, DSC-18, LC-18	C18	tC18	C18	28, 29, 30
C18-U	DSC-18Lt		C18	C18 OH	32
C8	DSC-8, ENVI-8, LC-8	C8	C8	C8	33, 34
			tC2	C2	38
Phenyl (PH)	DSC-Ph, LC-Ph	Phenyl		PH	35
Screen-C	DSC-MCAX	Verify CX		Certify	53, 54
Screen-A		Verify AX		Certify II	55
Si-1 (Silica)	DSC-Si, LC-Si	Silica	Silica	SI	39
FL-PR (Florisil)	LC-Florisil, ENVI-Florisil	Florisil	Florisil	FL	56
	DSC-Diol, LC-Diol	Diol	Diol	Diol (2OH)	41
CN	DSC-CN, LC-CN	Cyano	Cyanopropyl	CN-E	40
	LC-Alumina A,B,N		Alumina A,B,N	Alumina A,B,N	57, 58
SAX	DSC-SAX, LC-SAX	SAX	Accell Plus QMA	SAX	1, 2, 3, 44, 45
SCX	DSC-SCX, LC-SCX	SCX		SCX	46, 47
WCX	DSC-WCX, LC-WCX	Carboxylic Acid (WCX)	Accell Plus CM	CBA	50
NH2	DSC-NH2, LC-NH2	Aminopropyl (WAX)	Aminopropyl	NH2	61, 62
	ENVI-Carb	Hypercarb		Carbon	61, 62
	ENVICarb-II/NH2		Carbon Black/ Aminopropyl	Carbon/NH2	61, 62
	ENVICarb-II/PSA		Carbon Black/PSA	Carbon/PSA	61, 62

Sorbent Specifications

Our most common silica-based Bond Elut packings are described as 40 µm materials, but looking at the lot analyses, you can 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, because 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 preparation technology.

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	500	40 and 120, irregular	60	52
Alumina (AL-A)	Polar	Aluminium oxide—acidic		Packed Bed	0		25		57, 58
Alumina (AL-B)	Polar	Aluminium oxide—basic		Packed Bed	0		25		57, 58
Alumina (AL-N)	Polar	Aluminium oxide—neutral		Packed Bed	0		25		57, 58
Aminopropyl (NH2)	Polar/Anion Exchange	Aminopropyl/silica-based	No	Packed Bed	6.7	500	40 and 120, irregular	60	42, 43
SPEC Aminopropyl (NH2)	Polar/Anion Exchange	Aminopropyl/silica-based	No	Monolithic Disk		220		70	74, 75
C1	Nonpolar	Methyl/silica-based	Yes	Packed Bed	4.1	500	40, irregular	60	37
C2	Nonpolar	Ethyl/silica-based	Yes	Packed Bed	5.6	500	40 and 120, irregular	60	38
SPEC C2	Nonpolar	Dimethyl/silica-based	No	Monolithic Disk	2.7	220		70	74, 75
C8	Nonpolar	Octyl/silica-based	Yes	Packed Bed	12.2	500	40 and 120, irregular	60	33, 34
SPEC C8	Nonpolar	Octyl/silica-based	Yes	Monolithic Disk	5	220			74, 75
Carbon	Strongly nonpolar	Graphitized carbon	No	Packed Bed					61, 62
C18	Nonpolar	Trifunctional octadecyl/ silica-based	Yes	Packed Bed	17.4	500	40 and 120, irregular	60	28, 29, 30
SPEC C18	Nonpolar	Monofunctional octadecyl/ silica-based	No	Monolithic Disk	8	220		70	74, 75
SPEC C18 AR	Nonpolar	Trifunctional octadecyl/ silica-based	Yes	Monolithic Disk	9	220		70	74, 75
C18 EWP	Nonpolar	Trifunctional octadecyl/ silica-based	Yes	Packed Bed	6	80	40, irregular	500	31
C18 OH	Nonpolar	Monofunctional octadecyl/ silica-based	No	Packed Bed	14.9	300	40 and 120, irregular	150	32
CBA	Cation Exchanger	Carboxylic acid/silica-based	Yes	Packed Bed	7.4	500	40 and 120, irregular	60	50
Certify	Mixed Mode	Octyl and benzenesulfonic acid (SCX)/silica-based	No	Packed Bed	9	500	40 and 120, irregular	60	53, 54

(Continued)

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	55
CH	Nonpolar	Cyclohexyl/silica-based	Yes	Packed bed	9.6	500	40 and 120, irregular	60	36
Cyano (CN)	Nonpolar	Cyanopropyl/silica-based	Yes	Packed bed	8.1	500	40 and 120, irregular	60	40
SPEC Cyano	Polar	Cyanopropyl/silica-based	No	Monolithic disk		220		70	74
SPEC DAU	Application specific	Silica-based		Monolithic disk		220		70	74, 75
DEA	Anion exchanger	Diethylaminopropyl/silica-based	No	Packed bed	8.5	500	40 and 120, irregular	60	51
Diol (2OH)	Polar	Diol/silica-based	No	Packed bed	6.8	500	40, irregular	60	41
ENV	Nonpolar	Styrene divinylbenzene		Packed bed			125, spherical	450	25
EnvirElut 1664	Application specific	Trifunctional octadecyl/ silica-based	No	Packed bed	18	500	40 and 120, irregular	60	66
Florisil (FL)	Polar	Florisil		Packed bed			200		56
LMS	Nonpolar	Styrene divinylbenzene		Packed bed			75, spherical	300	26
SPEC MP1	Mixed Mode	Nonpolar and benzenesulfonic acid (SCX)/ silica-based		Monolithic disk	6	220		70	74, 75
SPEC MP3	Mixed Mode	Slightly polar and benzenesulfonic acid (SCX)/ silica-based		Monolithic disk		220		70	74, 75
NEXUS	Mixed Mode	Mixed mode copolymer		Packed bed		575	70, spherical	100/450 Bimodal	27
PBA	Covalent	Phenylboronic acid/silica-based	No	Packed bed	7.9	500	40, irregular	60	65, 66
PCB	Application specific	Layered phase		Packed bed		500			64
PH	Nonpolar	Phenyl/silica-based	Yes	Packed bed	10.7	500	40 and 120, irregular	60	35
Plexa	Polar enhanced	Hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	17, 18, 19
Plexa PCX	Cation Mixed Mode	SCX functionalized hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	20, 21
Plexa PAX	Anion Mixed Mode	SAX functionalized hydrophilic styrene divinylbenzene		Packed bed		550	45, spherical monodisperse	100	22, 23

(Continued)

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	Nonpolar	Functionalized styrene divinylbenzene		Packed bed		600	125, spherical	150	24
PRS	Cation Exchanger	Propylsulfonic acid/silica-based	No	Packed bed	1.7	500	40, irregular	60	48
PSA	Anion Exchanger	Ethylenediamine-N-propyl/silica-based	No	Packed bed	7.5	500	40 and 120, irregular	60	49
SAX	Anion Exchanger	Trimethylaminopropyl/silica-based	No	Packed bed	7.5	500	40 and 120, irregular	60	1, 2, 3, 44, 45
SCX	Cation Exchanger	Benzenesulfonic acid/silica-based	No	Packed bed	10.9	500	40 and 120, irregular	60	46, 47
SI	Polar	Silica	No	Packed bed		600	40 and 120, irregular	60	39

TIPS AND TOOLS

If you don't see exactly what you're looking for, Agilent offers custom configurations for many of our sorbents and formats. Contact your local sales representative or 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. 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.

Bond Elut Plexa

Bond Elut Plexa is a nonpolar divinylbenzene-based neutral polymeric sorbent. This sorbent is the best choice for nonionic 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 exchanger for nonpolar and acidic analytes, and is based on the same innovative base polymer particle technology as the other members of the Plexa SPE family.

See Page 11 for sorbent specifications.

www.agilent.com/chem/spe

TIPS AND TOOLS

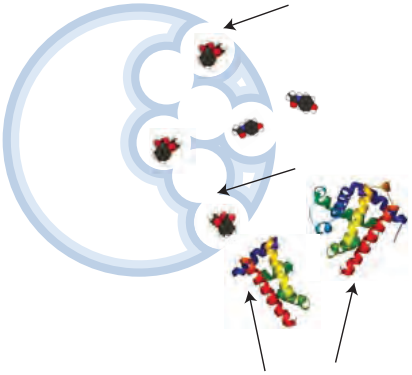
Request your Bond Elut Plexa SPE methodology poster for pharmaceutical analysis

http://www.agilent.com/chem/spe-kit

Advanced Polymer Architecture Improves Extraction Performance

LOAD:

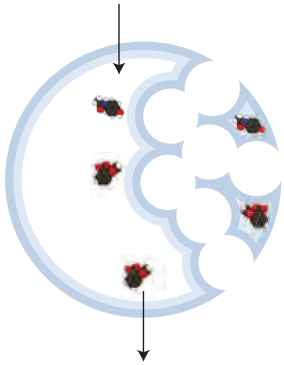
Water-rich, hydrophilic surface allows excellent phase transfer of analytes into the polymer core.



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

WASH:

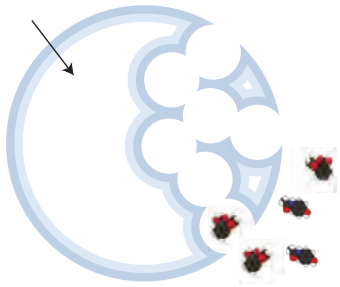
Analytes that have crossed the hydrophilic layers will remain tightly bound in the hydrophobic core.



Interferences wash away without leaching the analytes of interest.

ELUTE:

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



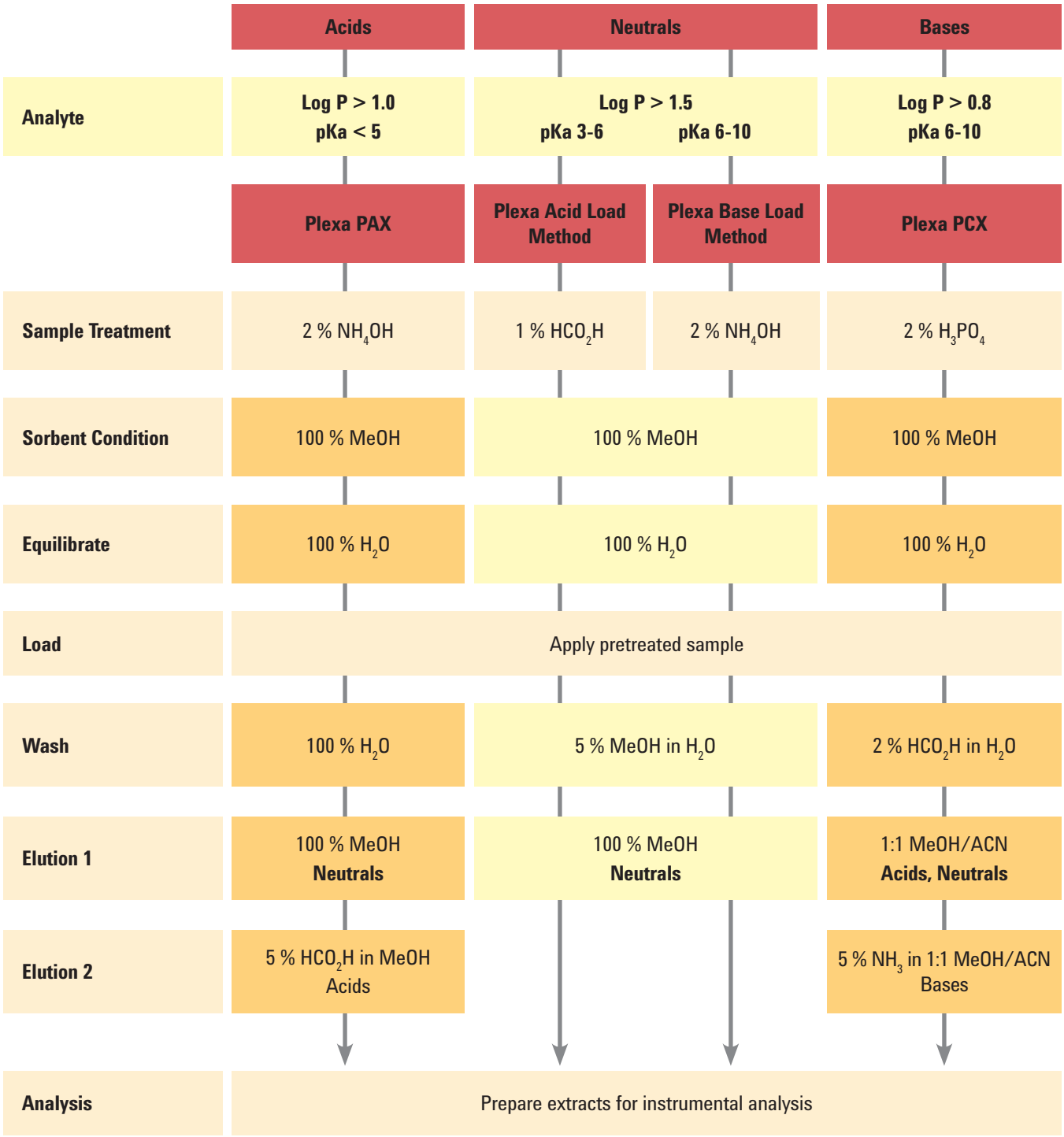
Clean extract with high recovery.

TIPS AND 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**

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

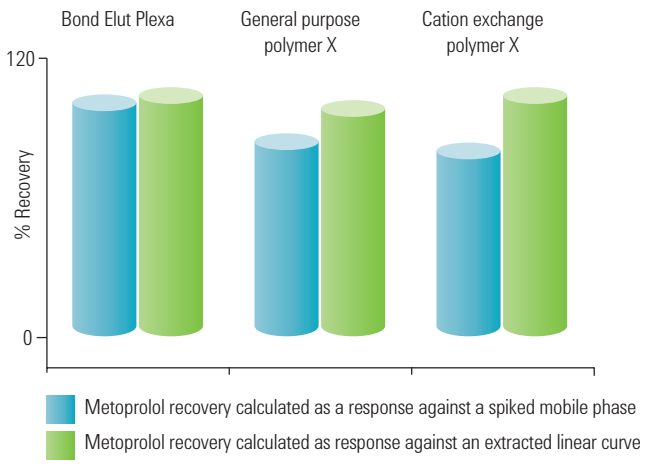
Regardless of your application or sample type, you will appreciate the difference the Bond Elut Plexa range makes. Plexa delivers simple methods and superior flow characteristics that effectively eliminate common matrix background that can cause interference and ion suppression, resulting in improved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



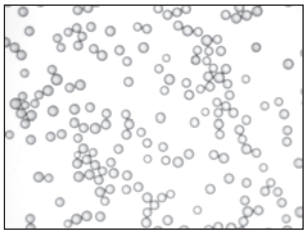
Improved Sensitivity

Matrix background can result in significantly decreased analytical sensitivity due to interference, coelution, 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.

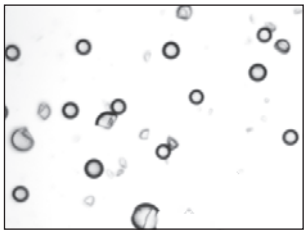
Plexa improves sensitivity by minimizing interference or ion suppression effects and maximizing recovery



Comparison of particle sizes of nonpolar SPE polymers by imaging analysis



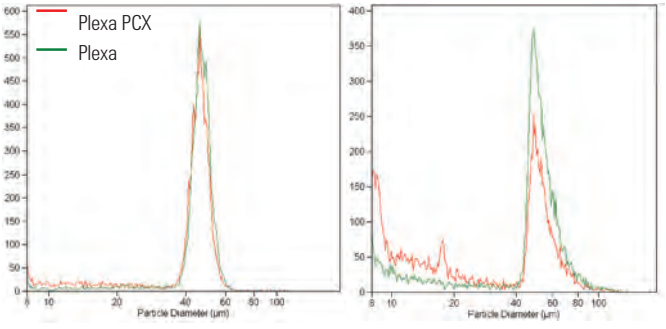
Bond Elut Plexa PCX



Alternative Cation Exchange Polymer

Comparison of particle size distributions of nonpolar SPE sorbents

Bond Elut Plexa PCX **Other CX resin**



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

Bond Elut Plexa

Advanced Polymer Technology for Simplified SPE

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

Bond Elut Plexa polymeric SPE offers straightforward, 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 before the washing and elution steps. Plexa provides these performance enhancements due to a unique polymeric architecture with a nonretentive, hydroxylated, amide-free surface, and a nonpolar 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. The performance features operate at the sample loading step, making them largely method independent. Plexa is ideal for high-throughput tests requiring validated performance with minimal method development. The standard nonpolar retention mechanism is applicable to almost any analyte type.

Typical Matrices

Plasma, urine, biological fluids, and aqueous samples

Primary Extraction Mechanism

Nonpolar

Compound Types

Nonpolar compounds with acidic/neutral fractionation, for example, PAHs from water

TIPS AND 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, 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	1000/pk	12109301B
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, 6 mL	30/pk	12259506
Bond Elut Jr		
200 mg	50/pk	12169610B
Mega Bond Elut Plexa		
500 mg, 12 mL	20/pk	327832
96 Round-Well Plates		
10 mg, 1 mL round-well plate	1/pk	A4969010
30 mg, 1 mL round-well plate	1/pk	A4969030
96 Square-Well Plates		
10 mg, 2 mL square-well plate	10/pk	A3969010B
10 mg, 2 mL square-well plate	1/pk	A3969010
30 mg, 2 mL square-well plate	1/pk	A3969030
30 mg, 2 mL square-well plate	10/pk	A3969030B

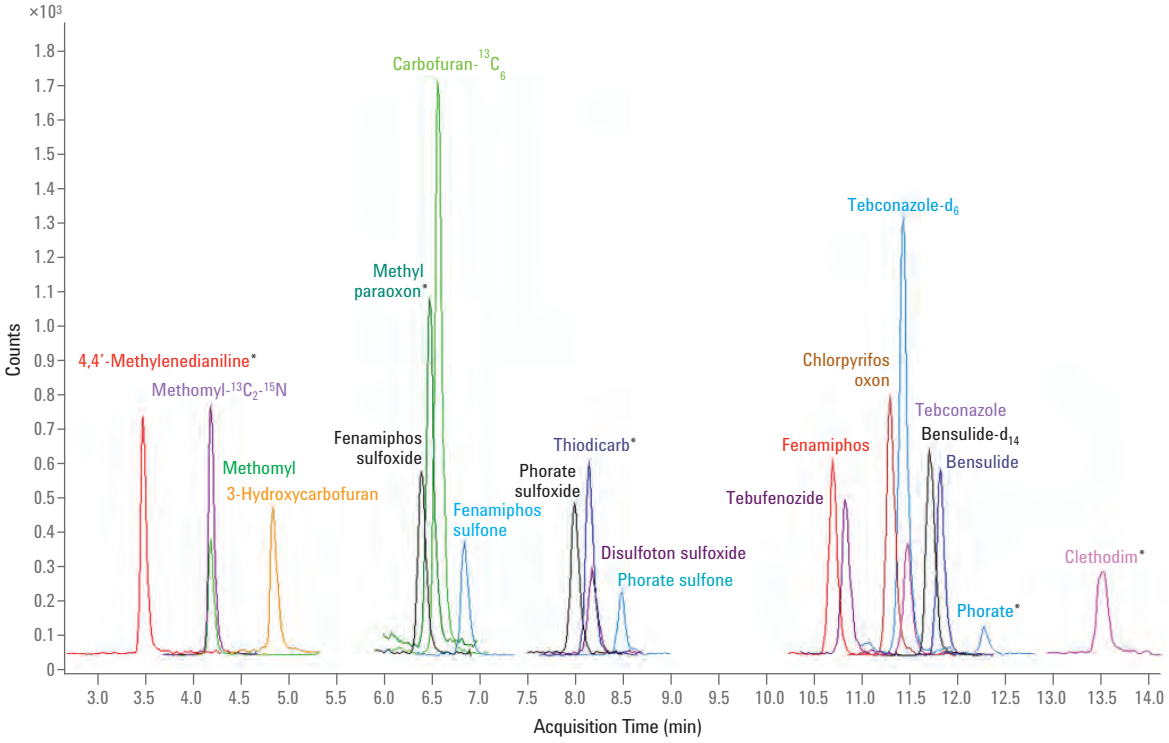
TIPS AND TOOLS

Learn more at **www.agilent.com/chem/bondelutspe**

Selected Organic Contaminants Using Agilent Bond Elut Plexa Cartridges

EPA Method 540: ***Selected Organic Contaminants Using Agilent Plexa Cartridges and the Agilent 6460 Triple Quadrupole LC/MS*** (publication number, 5991-5594EN)

Step	Procedure
Condition	5 mL methanol followed by 10 mL reagent water
Sample	4 to 5 mL reagent water followed by sample
Rinse	5 mL reagent water
Dry	5 minutes at 10 to 15 inches Hg of vacuum
Elution	2 mL methanol (use vacuum to start flow, stop vacuum and wait for 5 minutes). Add 3 mL methanol, continue elution
Concentration	Add ISTD to extract and concentrate the extract using nitrogen evaporation to ~1 mL. Vortex to rinse walls of tube
Make up	Transfer extract to an LC vial and add reagent water to the top of the vial label (~1.7 mL total volume)



EIC of quantifier ions for the 12 target compounds in the final EPA Method 540, plus the five compounds that were dropped from the EPA Draft Method 540 (marked with an *), as well as two surrogates, and two internal standards.

Bond Elut Plexa PCX

Polymeric Cation Exchange for Simplified SPE

- 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 improves sensitivity in the determination of basic compounds.

The Plexa PCX particles are near monodispersed, resulting in homogenous packing. Reproducible results are produced as standard, 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, which offers improved recoveries, cleaner extracts, and reduced method development time and cost. The 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: nonpolar and cation exchange

Compound Types

Basic drugs

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 MeOH/ACN
	(1:1, v/v)
Elution:	
500 µL MeOH/ACN + 5 % NH_3 (28 to 30 %)	
Volumes stated are for Bond Elut 96 round-well plate, 30 mg, 1 mL p/n A4968030	

Bond Elut Plexa PCX

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
30 mg, 1 mL	50/pk	1288012
30 mg, 3 mL	500/pk	5982-0603
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12108301
30 mg, 1 mL	500/pk	12108303B
30 mg, 1 mL	1000/pk	12108301B
30 mg, 3 mL	50/pk	12108303
60 mg, 1 mL	100/pk	12108601
60 mg, 3 mL, tabless	50/pk	12108603T
60 mg, 3 mL	50/pk	12108603
60 mg, 3 mL	500/pk	12108603B
200 mg, 6 mL	30/pk	12108206
500 mg, 6 mL	30/pk	12258506
96 Round-Well Plates		
10 mg, 1 mL round-well plate	1/pk	A4968010
30 mg, 1 mL round-well plate	1/pk	A4968030
30 mg, 1 mL round-well plate	10/pk	A4968031
96 Square-Well Plates		
10 mg, 2 mL square-well plate	1/pk	A3968010
30 mg, 2 mL square-well plate	1/pk	A3968030
30 mg, 2 mL square-well plate	10/pk	A3968030B

Bond Elut Plexa PAX

- Mixed mode, nonpolar polymeric anion exchanger offers a high level of analyte selectivity
- Exclusion of endogenous interferences provides 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 nonpolar acidic analytes. Existing polymeric anion exchange sorbents can exhibit various ion-exchange capacities 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 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 nonpolar acidic and polar acidic analytes that offers excellent cleanup, even in complex matrices such as plasma. The optimized anion-exchange methodology provides clean extracts, high recoveries and low RSDs, reducing method development time, sample repeats, and overall cost-per-sample in the process.

Typical Matrices

Plasma, urine, biological fluids, and aqueous samples

Primary Extraction Mechanism

Mixed mode: nonpolar and anion exchange

Compound Types

Acidic compounds, carboxylic acid metabolites of drugs, peptides, and amino acids

TIPS AND TOOLS

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

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 round-well plate, 10 mg, 1 mL, p/n A4967010

Bond Elut Plexa PAX

Description	Unit	Part No.
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12107301
30 mg, 3 mL	50/pk	12107303
60 mg, 1 mL	100/pk	12107601
60 mg, 3 mL	50/pk	12107603
200 mg, 6 mL	30/pk	12107206
500 mg, 6 mL	30/pk	12257506
96 Square-Well Plates		
10 mg, 1 mL round-well plate	1/pk	A4967010
30 mg, 1 mL round-well plate	1/pk	A4967030
96 Round-Well Plates		
10 mg, 2 mL square-well plate	1/pk	A3967010
30 mg, 2 mL square-well plate	1/pk	A3967030
100 mg, 2 mL square-well plate	1/pk	A3967100

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 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
Nonpolar, electrostatic

Compound Types
Polar compounds, phenols

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

Typical Matrices
Water sources

Primary Extraction Mechanism
Nonpolar

Compound Types
Polar organic molecules, explosive residues

Bond Elut ENV

- Unfunctionalized polystyrene-divinylbenzene polymer
- Large particle size allows fast extraction speeds
- High surface area and capacity for polar analytes
- Large average pore size (450 Å) for more efficient extraction of large molecules, such as explosives

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 flowthrough 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

- Ultraclean 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
Nonpolar

Compound Types
Nonpolar compounds

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
96 Round-Well Plates		
10 mg, 1 mL round-well plate	1/pk	A4961010
96 Square-Well Plates		
10 mg, 2 mL square-well plate	1/pk	A3961010
25 mg, 2 mL square-well plate	1/pk	A3961025

Typical Matrices
Horse urine, urine, biological fluids

Primary Extraction Mechanism
Nonpolar
Polar (NEXUS WCX)

Compound Types
Drugs of abuse, quaternary drugs, endocrine disruptors

Mixed Mode Polymeric SPE

Bond Elut NEXUS and Bond Elut NEXUS WCX

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

Bond Elut NEXUS is an ultraclean polymeric sorbent that has bimodal porosity and a high surface area. NEXUS offers a nonpolar retention mechanism with no preconditioning 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

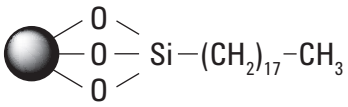
Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
30 mg, 10 mL	50/pk	12113100
60 mg, 10 mL	50/pk	12113101
Straight Barrel Cartridges		
30 mg, 1 mL	100/pk	12103100
60 mg, 3 mL	100/pk	12103101
60 mg, 3 mL, NEXUS WCX	100/pk	12102157
200 mg, 6 mL	30/pk	12103102
200 mg, 12 mL	20/pk	12253101
500 mg, 12 mL	20/pk	12253102
96 Round-Well Plate		
30 mg, 1 mL round-well plate	1/pk	A4962030
96 Square-Well Plate		
60 mg, 2 mL square-well plate	1/pk	A3962060

Silica-Based SPE

Reversed Phase (Nonpolar) Silica SPE

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

Bond Elut C18



- The most hydrophobic, bonded silica sorbent
- Extremely retentive for nonpolar 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 retentive nature for nonpolar 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 before ion exchange, as salts pass through the sorbent unretained.

Typical Matrices
Aqueous samples, biological fluids

Primary Extraction Mechanism
Nonpolar

Compound Types
Nonpolar compounds, desalting

TIPS AND 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, 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
500 mg, 6 mL, tabless	30/pk	12102052T	
1 g, 3 mL	50/pk	12102118	
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
Bond Elut Jr			
500 mg	100/pk	12162028B	
1 g	100/pk	12166001B	

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

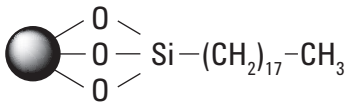
Preassembled 96-well plate, 75401050

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.

VersaPlate tubes, 75501050



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Nonpolar

Compound Types

Extra wide pore for larger, macromolecules up to 15 kDa, >15,000 MW

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 500 Å pores to allow more efficient extraction of large molecules (15,000 mol wt), which are typically excluded from standard porosity silica phases.

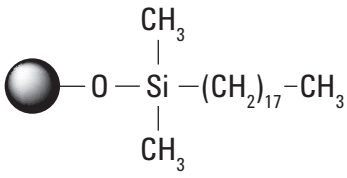
Bond Elut C18 EWP

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
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
- 150 Å pore size expands utility to higher molecular weight compounds

Bond Elut C18 OH is a nonendcapped 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, nonpolar extracts

Primary Extraction Mechanism

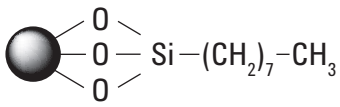
Nonpolar, hydrogen bonding

Compound Types

Vitamin D, fat-soluble compounds, steroids/hormones

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
96 Round-Well Plates		
100 mg, 1 mL round-well plate	1/pk	A496291C
96 Square-Well Plates		
25 mg, 2 mL square-well plate	1/pk	A3962925
50 mg, 2 mL square-well plate	1/pk	A3962950
100 mg, 2 mL square-well plate	1/pk	A396291C



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

Nonpolar

Compound Types

Nonpolar compounds

Bond Elut C8

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

Bond Elut C8 has very similar properties to C18, but is not as retentive for nonpolar compounds due to its shorter hydrocarbon chain. This results in 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 higher than in 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.
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

(Continued)

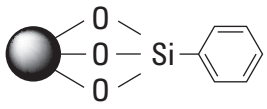
Bond Elut C8

Description	Unit	Part No.
Bond Elut Jr		
500 mg	100/pk	12162029B
1 g	100/pk	12166002B
96 Round-Well Plates		
25 mg, 1 mL round-well plate	1/pk	A4960325
50 mg, 1 mL round-well plate	1/pk	A4960350
100 mg, 1 mL round-well plate	1/pk	A496031C
96 Square-Well Plates		
25 mg, 2 mL square-well plate	1/pk	A3960325
50 mg, 2 mL square-well plate	1/pk	A3960350
100 mg, 2 mL square-well plate	1/pk	A396031C

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.



Typical Matrices

Aqueous and biological fluids

Primary Extraction Mechanism

Nonpolar

Compound Types

Strongly nonpolar compounds, aromatics

Bond Elut PH (phenyl)

Bond Elut PH is a nonpolar bonded silica material that 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

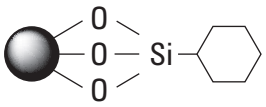
Bond Elut PH 96-Well Plates

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)

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

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



Typical Matrices

Aqueous samples, biological fluids

Primary Extraction Mechanism

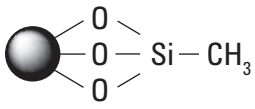
Nonpolar

Compound Types

Nonpolar compounds

Bond Elut CH (cyclohexyl)

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113032
Straight Barrel Cartridges		
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
96 Round-Well Plates		
25 mg, 1 mL round-well plate	1/pk	A4962225
50 mg, 1 mL round-well plate	1/pk	A4962250
100 mg, 1 mL round-well plate	1/pk	A496221C



Typical Matrices

Urine, plasma, biological fluids

Primary Extraction Mechanism

Nonpolar, polar (as a normal phase extraction)

Compound Types

Strongly nonpolar compounds

Bond Elut C1

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

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

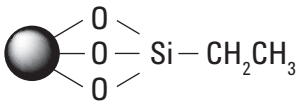
Bond Elut C1

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 nonpolar 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

Nonpolar

Compound Types

Strongly nonpolar compounds

Bond Elut C2

Description	Unit	Part No.
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, 1mL	500/pk	22102003
100 mg, 3 mL	50/pk	12102117
100 mg, 10 mL	50/pk	12113003
200 mg, 3 mL	50/pk	12102027
500 mg, 3 mL	50/pk	12102030
500 mg, 6 mL	30/pk	12102115
500 mg, 10 mL	50/pk	12113029
1 g, 6 mL	30/pk	12256003
96 Round-Well Plates		
50 mg, 1 mL round-well plate		A4961150
100 mg, 1 mL round-well plate		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

Nonpolar organics, oils, lipids

Primary Extraction Mechanism

Polar

Compound Types

Cleanup of polar impurities

Bond Elut SI

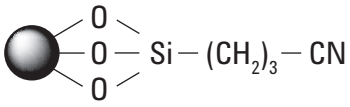
- Highly polar phase retains polar molecules from nonpolar matrices
- High-purity silica
- Separate compounds with very similar structures

Native silica is generally regarded as the most polar SPE sorbent available. Bond Elut SI is effective at separating compounds with very similar structures. Applying the analytes in a nonpolar 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		14256018
2 g, 12 mL	20/pk	12256018	
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	

Bond Elut Cyano (CN)



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

A medium polarity sorbent with many uses, Bond Elut Cyano (CN) SPE products are available as either endcapped (CN-E) or unendcapped (CN-U) versions. Both the Bond Elut CN-E and Bond Elut CN-U products are available in a 40 µm particle size. Bond Elut CN-E is ideal for applications in which extremely nonpolar compounds would be irreversibly retained on high carbon load sorbents, such as C8 and C18. This endcapped version of the cyano sorbent is best used when extracting analytes from an aqueous matrix. Bond Elut CN-U is a good choice for very polar analytes that may be irreversibly retained on SI or Diol (2OH) SPE phases. Bond Elut CN-U is ideally suited for the extraction of polar compounds from a nonpolar matrix, such as hexane or oils.

Typical Matrices

CN-E: aqueous samples, biological fluids
CN-U: oils, hexane

Primary Extraction Mechanism

CN-E: nonpolar
CN-U: polar, dipole

Compound Types

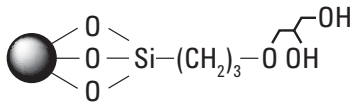
CN-E: very nonpolar compounds
CN-U: very polar compounds

Bond Elut Cyano (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
100 mg, 1 mL	100/pk	12102007T
500 mg, 3 mL	50/pk	12102034
96 Round-Well Plates		
25 mg, 1 mL round-well plate	1/pk	A4960425
50 mg, 1 mL round-well plate	1/pk	A4960450
100 mg, 1 mL round-well plate	1/pk	A496041C

Bond Elut Cyano (CN-U)

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
500 mg, 10 mL	50/pk	12113034
Straight Barrel Cartridges		
50 mg, 1 mL	100/pk	12102066
100 mg, 1 mL	100/pk	12102008
Bond Elut Jr		
1000 mg	100/pk	12166053B



Typical Matrices

Aqueous, biological fluids, nonpolar organics

Primary Extraction Mechanism

Polar and nonpolar

Compound Types

Polar, weakly nonpolar

Bond Elut Diol (20H)

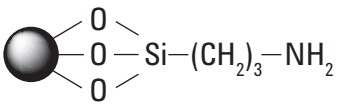
- Provides polar and nonpolar modes
- Strong hydrogen bonding with analytes
- Resembles unbonded silica in its capabilities

Bond Elut Diol resembles unbonded silica in its tendency for strong hydrogen bonding with analytes. 20H can also be employed in the nonpolar mode because the hydrocarbon spacer on its functional group provides enough nonpolar character for retention of hydrophobic analytes. Bond Elut Diol is a listed SPE device for the DIN 14333-1 method on benzimidazole fungicides.

Bond Elut Diol (20H)

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 (Aminopropyl)



- 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). It 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

Compound Types

Polar and nonpolar strong anions, polar structural isomers

Bond Elut NH2 (Aminopropyl)

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	

Bond Elut NH2 96-Well Plates

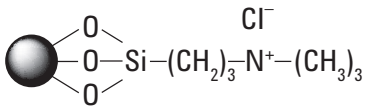
Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960525	A4960550	A496051C
2 mL square-well plates	A3960525	A3960550	A396051C

Bond Elut NH2 VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg	200 mg	250 mg
Preassembled 96-well plate	40	75405050	7540501C		7540502C
VersaPlate tubes 96/pk	40	75505050	7550501C	7553502C	

Ion Exchange Silica SPE

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



Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Strong anion exchange

Compound Types

Weak acidic compounds

Bond Elut SAX

- Retains compounds that elute from weak anion exchange sorbents
- Selectivity can be user-modified for increased flexibility
- Minimal nonpolar 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.

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
200 mg, 3 mL	50/pk	12102126	
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

(Continued)

Bond Elut SAX

Description	Unit	40 µm Particle Size	120 µm Particle Size
Bond Elut Jr			
500 mg	100/pk	12162044B	
1 g	100/pk	12166013B	

Bond Elut SAX 96-Well Plates

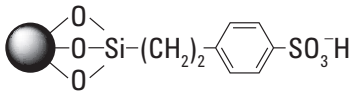
Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4963025	A4963050	A496301C
2 mL square-well plates	A3960825	A3960850	A396081C

Bond Elut SAX VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg	200 mg
Preassembled 96-well plate	40	75408050	7540801C	7540802C
VersaPlate tubes, 96/pk*	40	75508050	7550801C	

*Tubes need to be inserted into a VersaPlate base plate, p/n 75400000.

Bond Elut SCX



- Useful for compounds with both cationic and nonpolar 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 nonpolar interactions. This nonpolar characteristic becomes particularly important when conducting ion exchange from aqueous systems, where selectivity towards compounds exhibiting cationic and nonpolar character is seen.

Typical Matrices

Aqueous samples, biological fluids, buffered organics

Primary Extraction Mechanism

Strong cation exchange

Compound Types

Weak basic compounds

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	

Bond Elut SCX 96-Well Plates

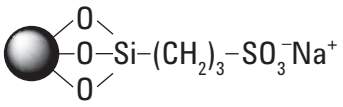
Description	25 mg	50 mg	100 mg
1 mL round-well plates	A4960725	A4960750	A496071C
2 mL square-well plates	A3960725	A3960750	A396071C

Bond Elut SCX VersaPlate Formats

Description	Particle Size (µm)	50 mg	100 mg	200 mg	400 mg	500 mg
Preassembled 96-well plate	40		7540701C			7542305C
VersaPlate tubes, 96/pk*	40	75507050	7550701C	7550702C	7550704C	

*Tubes need to be inserted into a VersaPlate base plate, p/n 75400000.

Bond Elut PRS



- Strong cation exchange sorbent, also capable of polar and hydrogen bonding interactions
- No appreciable nonpolar 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 nonpolar 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 samples, biological fluids, buffered organics

Primary Extraction Mechanism

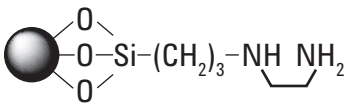
Strong cation exchange

Compound Types

Weak basic compounds (amine + pyridinium containing)

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

Compound Types

Acidic compounds (fruit acid removal for QuEChERS)

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, making it a better choice for polar compounds that retain too strongly on Bond Elut NH2.

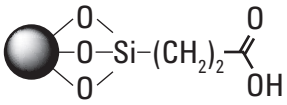
Bond Elut PSA

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 nonpolar depending on matrix or solvent

CBA is a midpolarity sorbent and weak cation exchanger (pKa 4.8). It can be used with a wider range of counterions 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

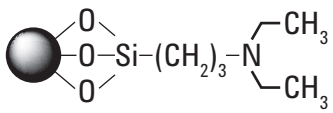
Weak cation exchange

Compound Types

Strong and weak bases

Bond Elut CBA

Description	Unit	Part No.
Large Reservoir Capacity (LRC) Cartridges		
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
96 Round-Well Plates		
25 mg, 1 mL round-well plate	1/pk	A4960625
50 mg, 1 mL round-well plate	1/pk	A4960650
100 mg, 1 mL round-well plate	1/pk	A496061C
96 Square-Well Plates		
25 mg, 2 mL square-well plate	1/pk	A3960625
50 mg, 2 mL square-well plate	1/pk	A3960650
100 mg, 2 mL square-well plate	1/pk	A396061C



Typical Matrices

Water, biological fluids, nonpolar extracts

Primary Extraction Mechanism

Weak anion exchange

Compound Types

Weak and strong acidic compounds

Bond Elut DEA

- Weak anion exchanger
- More polar than C8 but less polar than C2 or CN
- Alkyl side chains confer moderately nonpolar 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 nonpolar 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)	100 mg	200 mg
Preassembled 96-well plate	40	7541701C	7541702C
VersaPlate tubes, 96/pk*	40	7551701C	

*Tubes need to be inserted into a VersaPlate base plate, p/n 75400000.

Mixed Mode Silica SPE

Bond Elut AccuCAT

- SCX and SAX functionalities offer broad analyte extraction potential
- Ultraclean, 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 biofluids.

Typical Matrices

Urine, plasma and biological fluids, beverages and food

Primary Extraction Mechanism

Strong cation and anion exchange

Compound Types

Catecholamines, acrylamide in liquids and food

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

Typical Matrices

Urine, plasma, saliva, blood, biological fluids

Primary Extraction Mechanism

Nonpolar and strong cation exchange

Compound Types

Basic drugs, basic drugs of abuse

Bond Elut Certify

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

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

Tubes need to be inserted into a VersaPlate base plate, p/n 75400000.

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	
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

For Forensic Use

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

For Forensic Use

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.

For Forensic Use

TIPS AND TOOLS

LC Column and Sample Preparation Navigator

Find a more efficient replacement for your current column—or get recommendations for a new column, based on method parameters.
www.agilent.com/chem/navigator

Typical Matrices

Urine, plasma, saliva, blood, biological fluids

Primary Extraction Mechanism

Nonpolar and strong anion exchange

Compound Types

Acidic drugs, acidic drugs of abuse

Bond Elut Certify II

- Ideal for nonpolar and anionic compounds
- Optimized for acidic drug analysis
- Bimodal, nonpolar, 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 nonpolar C8 and strong anion exchange (SAX) functionalities. It has been optimized for acidic drugs such as 11-nor-delta-9-tetrahydrocannabinol-carboxylic acid, salicylic acid, ibuprofen, acetaminophen and other compounds that possess both nonpolar 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	

For Forensic Use

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, analyte retention generally decreases as the solvent becomes more polar.

Bond Elut Florisil (FL)

- Pesticide Residue (PR) grade
- For cleanup of polar interferences from nonpolar 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 nonpolar 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

Nonpolar organics

Primary Extraction Mechanism

Polar compounds

Compound Types

Organic extracts, nonpolar environmental extracts

Bond Elut Florisil (FL)

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, 3 mL	50/pk	12102050
500 mg, 6 mL	30/pk	12102159
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

Typical Matrices

Nonpolar organics

Primary Extraction Mechanism

Polar

Compound Types

Polar cleanup

Bond Elut Alumina

- 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.
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
500 mg, 10 mL	50/pk	12113048
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

TIPS AND TOOLS

Sample Preparation Fundamentals for Chromatography

By Ron Majors, PhD, LC GC Magazine Editorial Board

This comprehensive reference—containing hundreds of images and chromatograms—explains some of the most essential sample preparation methodologies in use today.

Download now at www.agilent.com/chem/sampleprepbook

Bond Elut Sodium Sulfate Drying Cartridges

- Highly effective prepacked dessicant
- Clean ACS grade, anhydrous sodium sulfate
- Prepacked for convenience

Simplify sodium sulfate mediated drying steps by using cartridges prepacked 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 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	Part No.
1 g, 10 mL	12131033
15 g, 60 mL	12132004
3 g	12162051B
1.4 g	12162052B
2.2 g	12162054B

TIPS AND TOOLS

Agilent offers Bond Elut Adapters compatible with these tube formats. Turn to Page 81

Mega Bond Elut

Mega Bond Elut C18 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. Prepacked, disposable cartridges offer greater convenience than glass columns that require washing, drying, and repacking after every sample.

Mega Bond Elut

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
	25	150	8/pk	12256079
	20	60	16/pk	12256078
	50	150	8/pk	12256080
	70	150	8/pk	12256081
NH2	1	6	250/pk	12256012J
	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	60	16/pk	12256042
	25	150	8/pk	12256069
	50	150	8/pk	12256067
	70	150	8/pk	12256071

Specialty SPE

Typical Matrices

Organic plant and tissue extracts

Primary Extraction Mechanism

Wide range nonpolar retention

Compound Types

Cleanup of pigments and endogenous plant extracts for pesticide and herbicide analysis

Bond Elut Carbon

- 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 multiresidue analysis

Bond Elut Carbon cartridges are packed with ultrapure graphitized carbon particles that have been optimized for the absorption of pigments in food, fruits, vegetables, and small organic residues in wastewater. 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
500/500 mg, 6 mL	30/pk	12252202
300/500 mg, 6 mL	30/pk	2264265032
500/500 mg, 20 mL	20/pk	3664325032
250/250 mg, 3 mL	50/pk	12102042C250
500/500 mg, 6 mL	30/pk	12102042C500
Bond Elut Jr		
250 mg	100/pk	446424
400 mg	100/pk	466430

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

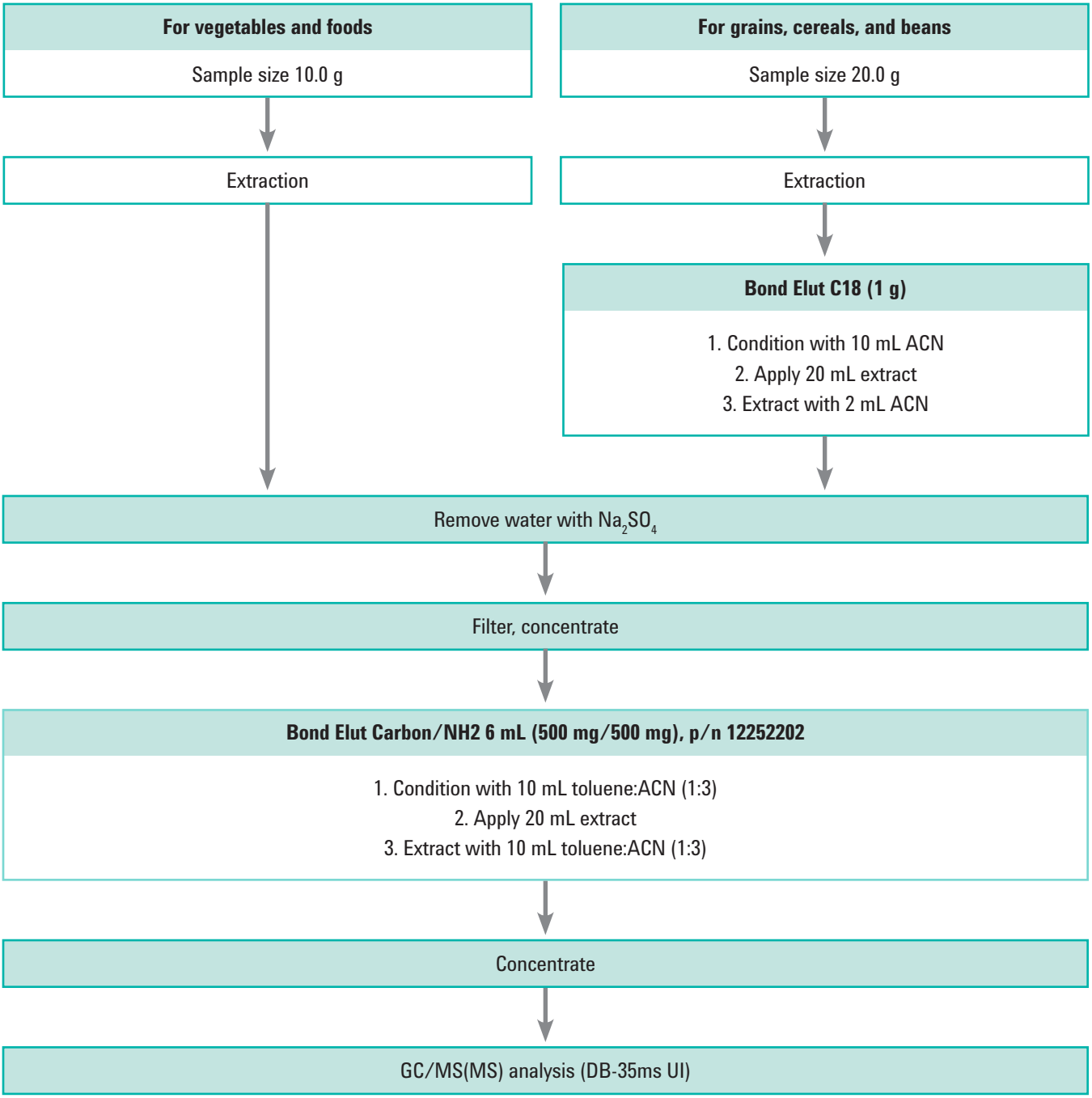
Bond Elut Carbon/PSA

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

GLOBAL TIP

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

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



Bond Elut Cellulose

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

Bond Elut Cellulose cartridges use a pure microgranular 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 its polar nature, it is able to accept high loading of many polar substances from aqueous and organic phases.

Typical Matrices

Aqueous samples and nonpolar organics

Primary Extraction Mechanism

Polar (Hydroxyl)

Compound Types

Polar impurities/compounds

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 that allows for the easy extraction of polychlorinated biphenyl (PCB) compounds from various matrices. Desired analytes can be loaded and eluted using a simple, single solvent method before analysis by GC/ECD.

Typical Matrices

Water sources

Primary Extraction Mechanism

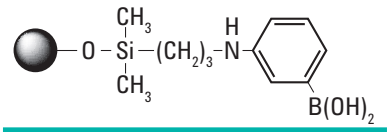
Polar

Compound Types

PCBs

Bond Elut PCB

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



Bond Elut PBA

- Unique phenylboronic acid sorbent
- High specificity for cis-diol compounds
- Amenable to a broad range of biomolecule 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. Amino alcohols, 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

Compound Types

Cis-diol-containing compounds, catecholamines, ribonucleotides, amino alcohols, diketo and triketo compounds

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
200 mg/PCX 60 mg, 3mL	50/pk	12105033
500 mg, 6 mL	30/pk	12102105
96 Square-Well Plate		
100 mg, 2 mL square-well plate	1/pk	A396121C
96 Round-Well Plate		
100 mg, 1 mL round-well plate	1/pk	A496121C

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)

Retained 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 and 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

Nonpolar

Compound Types

Pesticide and industrial chemical residues

EnvirElut

Description	Unit	Part No.
Straight Barrel Cartridges		
500 mg, 6 mL (pesticide)	30/pk	12272004
1 g, 6 mL (PAH)	30/pk	12272005
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

Online SPE (PLRP-S)

- A polymeric reversed-phase sorbent that is hydrophobic, with no bonded phase or alkyl ligands. This makes PLRP-S a flexible sorbent to use as a starting point for online SPE applications
- Suitable for applications with target compounds over a wide range of chemical properties
- PLRP-S online SPE cartridges use 15 µm PLRP-S
- Designed for use with the ZORBAX guard column hardware kit (p/n 820999-901)
- Very stable sorbent bed to support flow reversal
- Available in 4.6 mm id x 12.5 mm length or 2.1 mm id x 12.5 mm length
- Three cartridges per pack
- Maximum gradient pressure is 250 psi

Bond Elut Online SPE, PLRP-S, 5982-1271

Online SPE (PLRP-S)

Description	Part No.
Bond Elut Online SPE, PLRP-S, 4.6 x 12.5 mm	5982-1270
Bond Elut Online SPE, PLRP-S, 2.1 x 12.5 mm	5982-1271

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. 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 various 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 if treated with the proper care and caution. Each fiber has a color-coded or notched hub indicating the type of coating on the fiber.

Inlet	Use	Description	Fiber Length (cm)	Fiber Coating (df) – µm	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	1	60	23	SU57354U	
		Carboxen/PDMS – A/S	1	85	24		SU57335U
			1	75	24	391896316	
		DVB/Carboxen/PDMS – A/S	1	50/30	24		SU57329U
		PDMS – A/S	1	7	24	391896303	
			1	100	24	391896302	
		PDMS/DVB – A/S	1	65	24	391896314	SU57327U
		Polyacrylate (PA) – A/S	1	85	24	391896306	
	Manual	Carbowax/Polyethylene Glycol (PEG) – manual (metal alloy)	1	60	23	SU57355U	
		DVB/Carboxen/PDMS – manual	1	50/30	24		SU57328U
			1	50/30	24		SU57348U
		Carboxen/PDMS – manual	1	75	24	391896315	
		PDMS – manual	1	7	24	391896304	
			1	30	24	391896309	
			1	100	24	391896301	
		PDMS/DVB – manual	1	65	24	391896313	SU57326U

(Continued)

Inlet	Use	Description	Fiber Length (cm)	Fiber Coating (df) – µm	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	1	60	23	SU57354U	
		Carboxen/PDMS – A/S (For Merlin Microseal use)	1	75	23	SU57343U	
		PDMS – A/S (For Merlin Microseal use)	1	100	23	SU57341U	
		PDMS/DVB – A/S (For Merlin Microseal use)	1	65	23	SU57345U	
	Manual	Carbowax/Polyethylene Glycol (PEG) – manual (metal alloy). Also for Merlin Microseal use	1	60	23	SU57355U	
		Carboxen/PDMS – manual (For Merlin Microseal use)	1	75	23	SU57344U	
		PDMS – manual (For Merlin Microseal use)	1	100	23	SU57342U	
		PDMS/DVB – manual (For Merlin Microseal use)	1	65	23	SU57346U	

PDMS/DVB – A/S (for Merlin Microseal use), SU57345U

TIPS AND 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, enter 5991-5213EN at www.agilent.com/search to view the range of Merlin Microseal kits in the *GC and GC/MS Columns and Supplies* catalog.

Solid Phase Microextraction Kits

SPME Fiber kits contain three fibers. Note that the fiber coating thickness (df) is expressed in m, 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	Use	Description	Fiber Coating (df) – µm	Fiber Length (cm)	Gauge	Quantity	Part No.
Septum	Autosampler	Kit 1: Polyacrylate, PDMS, PDMS; for 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 and 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 – manual	65, 50/30, 85, 85	1 and 2	24	4	SU57550U

TIPS AND TOOLS

Agilent offers inlet liners designed to work with SPME applications for best performance. For more liners, enter 5991-5213EN at www.agilent.com/search to view the options in the *GC and GC/MS Columns and Supplies* catalog.

SPME inlet guide for manual injection, SU57356U

Solid Phase Microextraction Accessories

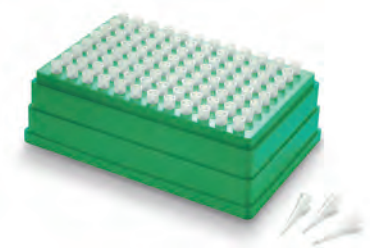
The following accessories are helpful with SPME sample preparation. Select the appropriate accessories for your application needs.

SPME inlet guide for manual injection, SU57356U

Solid Phase Microextraction Accessories

Description	Part No.
SPME fiber holder for manual sampling	391896401
SPME fiber holder for CTC autosampler	SU57347U
SPME inlet guide for manual injection—fits most Agilent injection ports	SU57356U
SPME 15 mL stand	SU57357U

Microvolume SPE



Omix tips tray, A57009MB

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 before 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. The superior flow and exceptional binding capacity of OMIX ensure reliable recovery of your peptides, minimizing peptide loss during multi-aliquot, multitip, and evaporation steps.

OMIX Tips

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

Disk SPE Formats

SPEC 47 mm disks and SPEC SPE cartridges, A74702

Bond Elut SPEC SPE

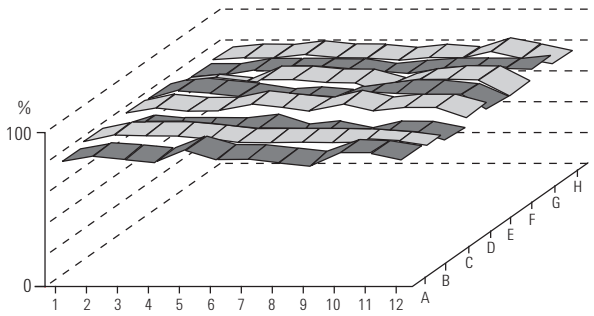
Using an advanced disk design, Bond Elut SPEC delivers superior flow characteristics and trouble-free automation. Due to the low volume of the extraction bed, very low elution volumes can be used. This means that, in some applications, the evaporation and reconstitution steps can be eliminated, resulting in accelerated sample processing times. The combination of low bed masses, ultraclean 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 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.

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 designed for the forensic analysis of drugs in urine. Its unique sorbent chemistry results in excellent sample cleanup and concentration of samples before GC/MS and LC/MS.
- **MP1**—SPEC MP1 is a mixed mode, nonpolar/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) has 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 do not need to worry about clogging, and as an added benefit, the typically low vacuum pressure requirement prevents cross-talk (for example, 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

Description	Part No.
Silica-Based Sorbents	
C18	A59603
C18AR, 15 mg	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
C8	A59602
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.

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 Disks and Accessories

Description	Part No.
SPEC disks, C18AR, 47 mm, 20/pk	A74819
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

Bulk SPE

Bondesil Bulk Sorbents

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

Bondesil Alumina N bulk sorbent, 12213073

Bulk SPE

Description	Particle Size (µm)	Unit	Part No.
Al-N		100 g	12213076
C18	40	10 g	12213011
	40	100 g	12213012
	40	1000 g	12213013
	120	1000 g	14213013
	120	100 g	14213012
		1 kg	12214001
		25 g	5982-1182
C18 OH	40	100 g	12213049
C18, endcapped		100 g	5982-5752
		25 g	5982-1382
C8	40	100 g	12213009
		25 g	5982-1082
C2	40	100 g	12213006
		500/pk	1247232
Carbon		100 g	64100G
		10 g	6410G
		25 g	5982-4482
CBA	40	100 g	12213033
CN-U	40	100 g	12213027

(Continued)

Bulk SPE

DEA	40	100 g	12213047
ENV (polymeric)	125	100 g	12216061
EnvirElut	40	100 g	12214016
	40	1000 g	12214019
Florisil	200	1000 g	12214015
	200	100 g	12214013
		25 g	5982-4382
MgSO4, anhydrous		100 g	5982-8082
NH2	40	10 g	12213020
	40	100 g	12213021
		25 g	5982-1882
PBA	40	10 g	12213044
PH	40	100 g	12213015
Plexa (polymeric)	45	100 g	12219001
PPL	125	100 g	12216062
PRS	40	1000 g	12213037
PSA	40	10 g	12213023
	40	100 g	12213024
	40	1000 g	12213025
		25 g	5982-8382
SAX	40	100 g	12213042
		25 g	5982-2082
SCX	40	100 g	12213039
	40	10 g	12213038
	120	100 g	14213039
SI	40	500 g	12213001
		25 g	5982-2282

Bond Elut Accessories

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

Many empty reservoirs are available for packing custom SPE cartridges with bulk Bondesil sorbents or other desired sorbents. Cartridges are available from 1 to 60 mL. Order frits separately, or see the table for reservoirs with preinstalled frits.

Empty SPE cartridges, 60 mL, 12131012

Empty SPE cartridges, 1 mL, 12131007

Empty SPE cartridges, 12 mL, 12131010

Empty SPE cartridges, 20 mL, 12131011

Bond Elut Accessories

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

Empty SPE cartridges with two frits (preinserted), 60 mL, 12131018

Empty SPE cartridges with two frits (preinserted), 1 mL, 12131013

Empty SPE cartridges with two frits (preinserted), 20 mL, 12131017

Bond Elut Empty SPE Cartridges with Two Frits

- Preinstalled 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 preinserted polyethylene frits, an ideal configuration for simple filtration. For custom sorbent packing, extra frits can be bought 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
Large Reservoir Capacity (LRC) Cartridge		
60	100/pk	131005

20 µm Polyethylene Frits for SPE Cartridges

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

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

Polyethylene Frits, 12131021

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 Adapter Configurations

Configuration 1: Stack two cartridges to perform multisorbent methods.

Configuration 2 + 3: Increase the volume of any cartridge 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, 0.12 inch 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.

Adapter Caps for Gilson ASPEC SPE Systems

- Enhance the high-throughput compatibility of Bond Elut cartridges
- Convert 1 and 3 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

QuEChERS

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

- Extraction kits with preweighed 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 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.
- EMR–Lipid dispersive kit provides excellent lipid removal from high lipid (>3 %) matrix.

Learn more at **www.agilent.com/chem/quechers**

Agilent Recommended Standard Operating Procedure for QuEChERS

In just three easy steps, you can prepare any fruit or vegetable sample for multiclass, multiresidue pesticide analysis.

Comminuted Sample: 10 g or 15 g

Add Acetonitrile

Add internal standard

Select Extraction Kit

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

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.

Shake and centrifuge

Aliquot: 1 mL, 6 mL or 8 mL*

Select Dispersive SPE Kit

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

Selection criteria

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

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 or use a dispersive SPE without PSA, for example, p/n 5982-4921, p/n 5982-4956). These acidic groups will react with PSA, so dispersive SPE kits without PSA should be used.

QuEChERS AOAC 2007.01 extraction kit, 5982-5755

Ceramic homogenizer for 50 mL tubes, 5982-9313

QuEChERS Extraction Kits

Step 1: Extraction

- Available with or without 50 mL centrifuge tubes and caps
- Available with or without ceramic homogenizers, (CH)
- Include $MgSO_4$, NaCl, or other salts for buffering, preweighed in anhydrous packets

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 or 15 g) enables you to extract the pesticides of interest into the organic layer. Agilent prepackages 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 ceramic homogenizers for those particular kits.

For more information on ceramic homogenizers, see Page 85, 92

QuEChERS Extraction Kits

Method	Buffered	Contents	Ceramic Homogenizers	With 50 mL Tubes 50/pk	Packets Only	
					50/pk	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	4 g Na_2SO_4, 1 g NaCl	No	5982-0032		

QuEChERS Dispersive Kits

Step 2: Dispersive SPE Cleanup

QuEChERS dispersive kit, 5982-5022

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 or 15 mL centrifuge tube containing a small amount of SPE sorbent and $MgSO_4$. The sorbent will remove interfering matrix materials from the sample, while the $MgSO_4$ helps get rid of excess water and improve analyte partitioning. Selected kits are now available with ceramic homogenizers (two per tube). Their part numbers are designated by a CH.

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.
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)

TIPS AND TOOLS

Request your Bond Elut QuEChERS poster at **www.agilent.com/chem/quechersposter**

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.

(Continued)

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.
Drug Residues in Meat 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	
Universal 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	
Vet Drug in 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 AND TOOLS

View the advanced 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	Sample 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	Sample 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					
	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	Sample 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					
	coco solids					
 Soil	soil					
 Whole Blood	whole blood					

QuEChERS Ceramic Homogenizers

Ceramic homogenizers increase your overall lab productivity and give you greater confidence in your results.

The same great ceramic homogenizers available in our QuEChERS kits are also available to bulk buy, providing excellent grinding of the samples. They make analyte extraction easier by:

- Increasing extraction efficiency
- Maintaining high, reproducible extractions
- Minimizing variance between technicians
- Breaking up salt agglomerates and maintaining a consistent grinding of homogenizing material

Ceramic homogenizer for 50 mL tubes, 5982-9313

QuEChERS Ceramic Homogenizers

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

QC solution, AOAC Method, 500 g/mL, 5190-0503

Standards for QuEChERS Products

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

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.

Standards for QuEChERS Products

Description	Concentration	Kit Contents	Part No.
HPLC internal standard, EN method	100 g/mL	Tris (1,3-dichloroisopropyl) phosphate, Nicarbazin	5190-0500
QC solution, AOAC method	500 g/mL	Triphenyl phosphate	5190-0503
QC surrogate for GC standard, EN method	500 g/mL 1000 g/mL	(2,2′,3,4,4′,5′-hexachlorobiphenyl) Anthracene-d10	5190-0499
HPLC and GC internal standard, AOAC method	1000 g/mL	Parathion-d10 (diethyl-d10), Alpha-BHC-d6 (alpha-HCH-d6)	5190-0502
GC internal standard, EN method	5000 g/mL	(2,2′5,5′-tetrachlorobiphenyl), Triphenylmethane, Tris (1,3-dichloroisopropyl) phosphate	5190-0501

TIPS AND TOOLS

Find the best QuEChERS products for your applications here
www.agilent.com/chem/SelectQuEChERS

Bond Elut Enhanced Matrix Removal—Lipid

Interference from lipids is a problem for labs measuring trace residues in fatty foods or complex biological matrices. Lipids can build up in the instrument and column, decreasing lifetime and reducing analyte sensitivity due to ion suppression. The requirement for MS maintenance increases too, because of lipid deposits on the source.

The need for lipid removal is well understood, but current methods often sacrifice analyte recovery, removing some target analytes along with the lipids. Now, you don't have to choose between lipid removal and analyte recovery, because Agilent Enhanced Matrix Removal—Lipid delivers the most complete lipid removal and analyte recovery of any sample preparation product.

For optimal results, we recommend trying Bond Elut EMR—Lipid polish pouch kit (anhydrous MgSO4 only), which contains 50 pouches. Alternatively, a polish tube kit (NaCl/anhydrous MgSO4) containing 50 centrifuge tubes of 15 mL is available.

- **Higher-quality results:** A cleaner sample profile leads to greater data integrity, confidence in results, and fewer reruns.
- **Improved productivity:** Better sensitivity and signal-to-noise from fewer matrix interferences enables faster data processing and greater sample throughput.
- **Reduced lab costs:** Cleaner samples using EMR—Lipid can offer up to 50 % less MS source maintenance, giving you more time to analyze samples rather than spend time on costly troubleshooting, downtime, and instrument repair.
- **Simplified workflows:** Standardize on an easy-to-use, single-sorbent procedure that maximizes analyte recovery from a wide variety of fatty samples.
- **Save time and money** by reducing material costs, inventory, training time, and documentation to streamline lab efficiency.

Learn more at **www.agilent.com/chem/EMR-Lipid**

TIPS AND TOOLS

For simple steps to maximize lipid removal with EMR—Lipid visit **www.agilent.com/chem/emr_video**

Bond Elut EMR—Lipid

Description	Unit	Part No.
Bond Elut EMR—Lipid dispersive SPE	50/pk	5982-1010
Bond Elut EMR—Lipid polish pouch, anhydrous $MgSO_4$ only	50/pk	5982-0102
Bond Elut EMR—Lipid polish tube, NaCl/anhydrous $MgSO_4$	50/pk	5982-0101

TIPS AND TOOLS

For more information on the Bond Elut EMR—Lipid polish pouch, search 5991-6707EN on the Agilent website to read the Application Note ***Benefits of EMR—Lipid Cleanup with Enhanced Post Treatment on Pesticides Analysis by GC/MS/MS.***

Captiva Filtration

Capitiva ND 96-well plate, A5969045

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 ultraclean, and rigorously tested to prevent nonspecific binding. With Captiva, your 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, with a simple and streamlined three-step process.

While many regulatory and standard methods require sample filtration before measurement, Captiva syringe filters can also improve your sample analysis workflow if you're working with a nonregulated method.

Sample filtration before measurement using Captiva syringe filters provides a convenient way to remove particulates before determination.

The Captiva range includes:

- Captiva EMR—Lipid 96-well plates and cartridges for highly selective and efficient lipid/matrix removal
- Captiva ND nondrip filtration plates for organic-based protein precipitation
- Captiva ND Lipids nondrip filtration plates for lipid and protein depletion
- Captiva 96-well filter plates for general sample filtration
- Captiva filter cartridges, offering all the same Captiva benefits in a standard SPE cartridge format
- Captiva syringe filters, available in a wide range of sizes, formats, and membranes

TIPS AND TOOLS

Nebulizer blockage is the most frequent cause of instrument downtime for analysts working with AA/MP-AES and ICP-MS/ICP-OES. Nebulization of samples containing even small amounts of particulates can block the nebulizer, introducing drift, reducing sensitivity and, ultimately, requiring shutdown of the instrument.

Captiva syringe filters are an essential tool to reduce blockage from particulates when using AA/MP-AES or ICP-MS/ICP-OES.

Captiva EMR–Lipid

- Highly selective and efficient lipid removal: The unique EMR–Lipid mechanism combines size exclusion and hydrophobic interactions between the sorbent and the long aliphatic chain of lipids.
- Clog-free operation: Advanced filter design and construction technology ensures an easy flow.
- Time savings and improved precision: A protein crash solvent retention frit in 1 mL and 96-well plate formats promotes a streamlined, automatable in-well protein precipitation workflow.

Captiva EMR–Lipid provides highly selective and efficient lipid/matrix removal without unwanted analyte loss. The novel EMR–Lipid technology removes lipids based on a combination of size exclusion and hydrophobic interaction. Effective lipid removal assures minimal ion suppression of target analytes, which significantly improves method reliability and ruggedness. The 96-well plate and 1 mL cartridge formats contain a solvent retention frit, allowing solvent-first in-well protein precipitation, which streamlines sample preparation. The improved filter design gives easy flow with vacuum or positive pressure. The 3 and 6 mL cartridge formats allow gravity flow with the absence of solvent retention frits and are easy to use. Winner of an Analytical Scientist Innovation Award (TASIA) for 2017.

Captiva EMR–Lipid, 1 mL, 40 mg, 100/pk (5190-1002)

Captiva EMR–Lipid, 1 mL, 40 mg, 100/pk (5190-1002)

Captiva EMR–Lipid, 1 mL, 96-well plate, 40 mg, 5/pk (5190-1001)

Captiva EMR–Lipid, 1 mL, 96-well plate, 40 mg, 1/pk (5190-1000)

Captiva EMR–Lipid

Description	Volume (mL)	Sorbent Mass (mg)	Unit	Part No.
Straight Barrel Cartridges				
Captiva EMR–Lipid	1	40	1/pk	5190-1000
Captiva EMR–Lipid	1	40	5/pk	5190-1001
96 Round-Well Plates				
Captiva EMR–Lipid	1	40	100/pk	5190-1002
Captiva EMR–Lipid	3	300	100/pk	5190-1003
Captiva EMR–Lipid	6	600	50/pk	5190-1004

Captiva ND

A simple-to-use filtration device designed for high-throughput, automated, in-well protein precipitation. Built with a unique nondrip (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

Designed for LC/MS bio-analysis 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.

Captiva Syringe Filters

Captiva syringe filters reliably filter from 1 to 150 mL 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.

Premium syringe filter, glass microfiber, 5190-5122

TIPS AND TOOLS

Agilent provides you with the tools you need to make bio-analysis quick and reliable. In this video, we demonstrate an opiate panel analysis, from sample preparation using Captiva ND Lipids to HPLC separation using InfinityLab Poroshell 120 columns, and the Agilent 6490 triple quadrupole LC/MS with iFunnel. For part one of this video, visit **www.agilent.com/chem/bioanalysis1**—for part two of this video, visit **www.agilent.com/chem/bioanalysis2**

Captiva ND

- Easy automation—nondrip 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 of the time
- Multiple pore sizes available for greater flexibility with solvent use

Captiva ND's unique nondrip 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.

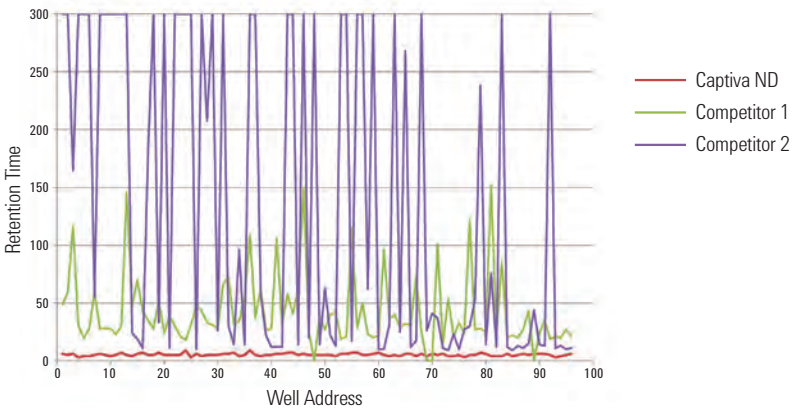
Captiva ND 96-Well Filter Plates

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

For Research Use Only. Not for use in diagnostic procedures.

Get fast, reproducible flow with Agilent Captiva ND

Flow Rate Consistency
(100 µL Plasma w/400 µL ACN)



TIPS AND TOOLS

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

Captiva ND Lipids

Improve Analysis by Depleting Phospholipids During Precipitation

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

Captiva ND Lipids 96-well filtration starter kit, A59640002SK

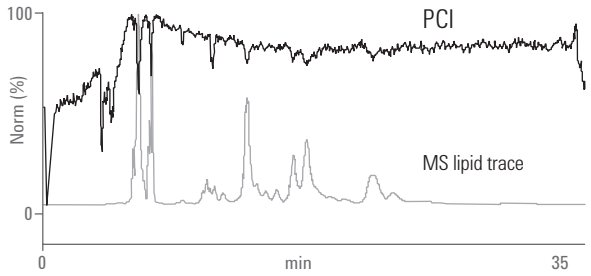
Designed for LC/MS bio-analysis of plasma, Captiva ND Lipids combine the ease-of-use and superior flow properties of Captiva ND with a unique chemical filter. The plate efficiently removes ion-suppressing phospholipids, proteins, and surfactant interferences from precipitated plasma samples.

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 filter plate, 100/pk	A59640002B
Captiva ND Lipids 96-well filter plate, 1 mL well, 1/pk	A59640002I
Captiva ND Lipids 96-well filter plate, 1 mL well, 5/pk	A59640002V
DuoSeal 96-well plate seal, 10/pk	A8961008

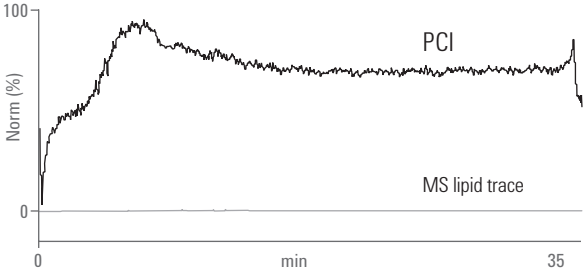
For Research Use Only. Not for use in diagnostic procedures.

Postcolumn infusion (PCI) of albuterol before treatment with Captiva ND Lipids



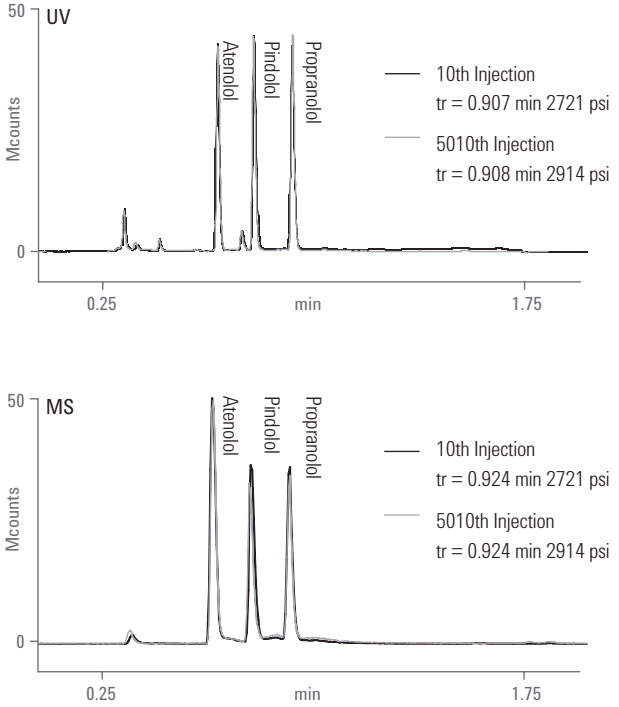
Note that the ion suppression features (top trace) correlate with the elution of phospholipids (bottom trace).

Same experiment after protein and lipid depletion with Captiva ND Lipids



Ion suppression is dramatically reduced and the lipids are almost nondetectable.

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 bio-analysis (top = UV detection; bottom = MS detection).

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

Captiva 96-well filter kit

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 ultraclean, and rigorously tested to ensure against nonspecific 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
0.45	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, A5960045

Captiva 96-Well Filter Plates

- 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 and 0.45 µm depth filter plates are ideal for filtering samples before LC/MS injection. Captiva 10 and 20 µm glass fiber filter plates are designed for clarifying highly particle-laden samples, such as freshly thawed plasma and hepatocyte filtration, and can prevent 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
0.2	Polypropylene	100/pk	A5960002B
0.45	Polyvinyldifluoride and polypropylene	5/pk	A5967045
0.45	Polypropylene	5/pk	A5960045
0.45	Polypropylene	100/pk	A5960045B
10	Glass fiber	5/pk	A596401000
20	Polypropylene	5/pk	A596002000
20	Polypropylene bulk pack	100/pk	A596002000B

Captiva 96-Well Collection Plates and Cover

Captiva 96-well collection plate, A696001000

- Designed for Captiva filtration and SPEC, as well as Bond Elut 96 applications
- Regular 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 from spillage or evaporation and no sample contamination. The silicone is 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
Captiva 96-well collection plate seals	100/pk	A8961007B
DuoSeal 96-well plate seal	10/pk	A8961008

Captiva filter cartridges, glass fiber, A500401000

Captiva Filter Cartridges

- Standard SPE format
- Ideal for LC/MS samples
- Avoid sample transfer problems
- Nondrip (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, which prevents sample transfer problems due to pipette tip clogging.

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

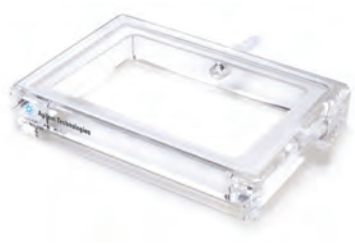
Captiva ND Filter Cartridges

Pore Size (µm)	Filter Material	Volume (mL)	Unit	Part No.
ND				
0.22	Polypropylene	3	20/pk	A5300263
			100/pk	A5300063
ND Lipids				
0.22	Polypropylene	3	20/pk	A5302635
			100/pk	A5300635

CaptiVac Vacuum Collars

- 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 your collection plate. The unique design of the Captiva collar forms a preset, pre-aligned vacuum seal between the filtration and collection plate, which positions the outlet tips at a specified distance inside each well, to prevent cross contamination of samples.



CaptiVac vacuum collar, A796

CaptiVac Vacuum Collars

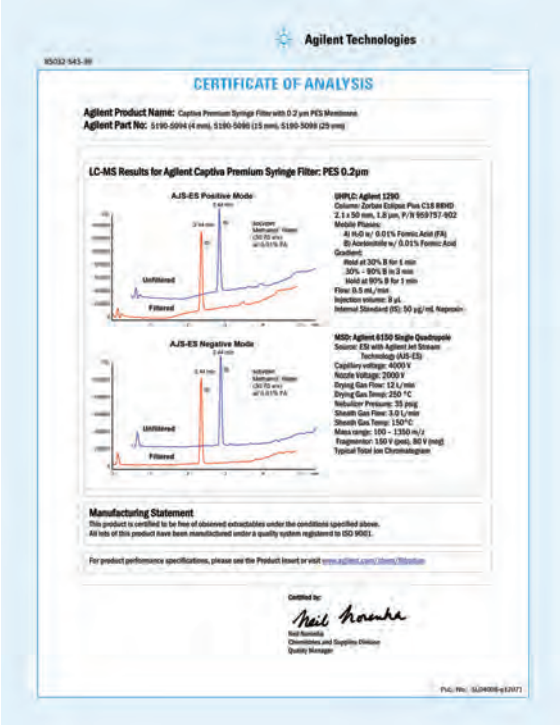
Description	Unit	Part No.
CaptiVac vacuum collar	1/pk	A796
CaptiVac gasket kit	5/pk	A796G

Premium Syringe Filters

- **More choices**. Captiva syringe filters are available in many 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 before 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. All syringes 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 (p/n 5190-5120) premium syringe filters are LC/MS certified to be free of extractables.

Choose from a variety of membranes to suit your needs.


Agilent Technologies

CERTIFICATE OF ANALYSIS

Agilent Product Name:

Agilent Part No:

LC-MS Results for Agilent Captiva Premium Syringe Filter: PES 0.2µm

Manufacturing Statement

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
PES	4	0.2	LC/MS	Polypropylene	5190-5094
	4	0.45	LC/MS	Polypropylene	5190-5095
	15	0.2	LC/MS	Polypropylene	5190-5096
	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	5190-5 116
	28	0.45	LC	MBS	5190-5117
Glass microfiber	15	0.7	LC/MS	Polypropylene	5190-5120
	28	0.7	LC	MBS	5190-5122

TIPS AND TOOLS

Our syringe filter online selection guide makes it fast and easy to choose the best syringe filter for your application.

Try it now at: **www.agilent.com/chem/SelectFilters**

Captiva disposable syringe, 5 mL, 9301-6476

Captiva disposable syringe, 10 mL, 9301-6474

Captiva disposable syringe, 20 mL, 5190-5103

Layered Filters with Prefilter

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

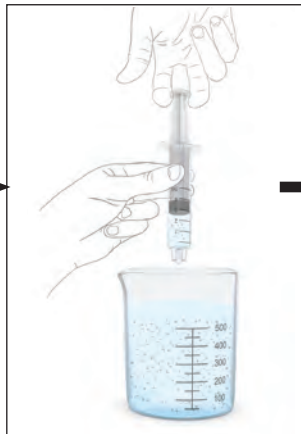
Captiva Disposable Syringes, 100/pk

Volume (mL)	Part No.
5	9301-6476
10	9301-6474
20	5190-5103

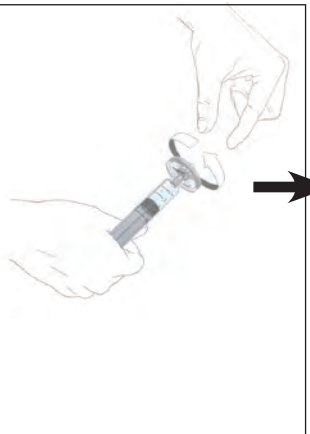
Step-by-step Instructions

Follow these steps to realize the full benefits of filtration

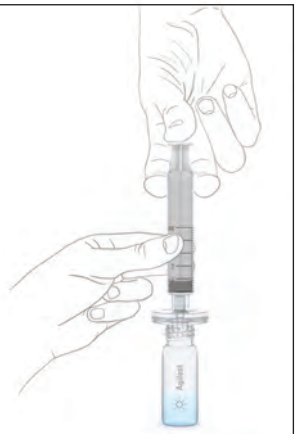
Before filling with sample, draw approximately 1 mL of air into the syringe. This will minimize fluid retention.



Draw your sample into the syringe, then draw in about 1 mL of air. Invert the syringe and wipe residue off tip.



Connect the syringe to the syringe filter using a Luer connection. Twist gently to ensure a secure seal.



Filter syringe contents into a vial. Afterwards, remove the syringe filter, draw air into the syringe, re-attach the syringe filter, and press the plunger to filter the residual sample. This will maximize sample recovery.

WARNING

Use caution with syringes smaller than 10 mL. They can easily generate enough power to burst the syringe filter. Agilent syringe filters are for laboratory use only.

Prewetting the filter, while not necessary, can be performed as an extra step.

Premium Syringe Filter Chemical Compatibility

Learn more about Agilent Captiva filtration products at **www.agilent.com/chem/filtration**

Legend		Polypropylene membrane	Polyethersulfone membrane	Cellulose Acetate membrane*	Polytetrafluorethylene membrane	Regenerated Cellulouse membrane	Nylon membrane	Glass Fiber membrane*	Housing Methyacrylate Butadiene Styrene	Housing Polypropylene
Compatible	••									
Limited compatibility	•									
Not compatible	–									
Not analyzed	N/A									
Filter		**PP**	**PES**	**CA**	**PTFE**	**RC**	**Nylon**	**GF**		
Housing									**MBS**	**PP**
Solvents										
Acetone		••	–	–	••	••	••	••	–	••
Acetonitrile		•	–	–	••	••	N/A	••	–	••
Benzene		–	–	•	••	••	••	••	–	••
Benzyl alcohol		••	–	–	••	••	••	••	–	•
n-Butyl acetate		N/A	–	–	••	••	••	••	–	••
n-Butanol		••	•	•	••	••	••	••	••	••
Carbon tetrachloride		•	–	–	••	••	••	••	–	–
Chloroform		•	–	–	••	••	••	••	–	••
Cyclohexane		••	–	•	••	••	••	••	•	•
Diethylacetamide		••	–	–	••	••	••	••	–	••
Diethyl ether		•	–	•	••	••	••	••	–	••
Dimethyl formamide		••	–	–	••	•	•	••	–	•
Dimethylsulfoxide		••	–	–	••	••	••	••	–	••
Dioxane		•	–	–	••	••	••	••	–	••
Ethanol, 98%		••	••	•	••	••	••	••	–	•
Ethyl acetate		•	–	–	••	••	••	••	–	•
Ethylene glycol		••	••	•	••	••	••	••	••	••
Formamide		N/A	••	–	••	•	••	••	••	••
Gasoline		•	•	•	••	••	••	••	••	••
Glycerin		••	••	•	••	••	••	••	•	•
n-Heptane		–	••	•	••	••	••	••	•	••
n-Hexane		–	••	•	••	••	••	••	•	•
Isopropanol		••	••	•	••	••	••	••	–	••
Isopropyl acetate		N/A	–	–	••	••	••	••	–	••
Methanol, 30 %		••	••	N/A	••	••	••	••	••	••
Methanol, 98 %		••	•	–	••	••	••	••	••	•
Methyl acetate		•	–	–	••	••	••	••	–	•
Methylene chloride		•	–	–	••	••	••	••	–	••

*CA and GF membranes in MBS housing for 28 mm size.

Contact time: 24 hours at 20 °C.
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Legend		Polypropylene membrane	Polyethersulfone membrane	Cellulose Acetate membrane*	Polytetrafluorethylene membrane	Regnerated Cellulouse membrane	Nylon membrane	Glass Fiber membrane*	Housing Methyacrylate Butadiene Styrene	Housing Polypropylene
Compatible	••									
Limited compatibility	•									
Not compatible	–									
Not analyzed	N/A									
Filter		**PP**	**PES**	**CA**	**PTFE**	**RC**	**Nylon**	**GF**		
Housing									**MBS**	**PP**
Solvents										
Methyl ethyl ketone		•	–	–	••	••	••	••	–	•
Methyl isobutyl ketone		•	–	–	••	••	••	••	–	•
Monochlorobenzene		••	–	–	••	••	••	••	•	••
Pyridine		•	–	–	••	••	••	••	–	••
Tetrahydrofuran		••	–	–	••	••	••	••	–	••
Toluene		–	–	•	••	••	••	••	–	••
Trichloroethane		N/A	–	–	••	••	••	••	–	N/A
Xylene		–	–	•	••	••	••	••	–	•
Acids										
Acetic acid, 25 %		••	•	•	••	••	–	••	–	•
Acetic acid, 80 %		••	N/A	–	••	••	–	••	–	•
Hydrochloric acid, 20%		••	••	–	••	–	–	••	•	•
Hydrofluoric acid, 25 %		••	•	–	••	•	–	••	•	•
Nitric acid, 25 %		••	•	–	••	–	–	••	•	•
Phosphoric acid, 1 %		••	••	•	••	–	–	••	•	•
Sulfuric acid, 25 %		••	•	–	••	•	–	••	•	••
Trichloroacetic acid, 10 %		••	N/A	–	••	••	–	••	–	•
Bases										
Ammonium hydroxide, 25 %		••	•	•	••	•	•	•	–	•
Sodium hydroxide, 1N		••	••	–	••	•	•	•	–	••
Aqueous solutions										
Formalin, 30 %		••	•	••	••	•	••	••	•	•
Hydrogen peroxide, 30 %		••	••	–	••	–	–	••	•	••
Sodium hypochlorite, 5 %		N/A	••	–	••	–	–	••	•	•
pH range										
pH 1-14		••	–	–	••	–	–	••	–	••
pH 1-13		••	••	–	••	–	–	••	–	••
pH 3-14		••	•	–	••	•	••	••	–	••
pH 3-12		••	••	–	••	••	••	••	•	••
pH 4-8		••	••	••	••	••	••	••	••	••

*CA and GF membranes in MBS housing for 28 mm size.

Contact time: 24 hours at 20 °C.
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Econofilters, PES, 5190-5272

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, 1000/pk

Econofilters

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 (RC)	25	0.45	Polypropylene	5190-5307
	15	0.45	Polypropylene	5190-5308
	25	0.2	Polypropylene	5190-5309
	15	0.2	Polypropylene	5190-5310

TIPS AND TOOLS

Request your printed Captiva filtration slide and select guide at **www.agilent.com/chem/syringe-filter-tool**

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 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	
AA, ICP-OES, and MP-AES	PES	PTFE or Polypropylene

Proof of Performance: Filtration Efficiency

Testing Method

The surfactant solution, 0.1 % Triton X-100, was used to prepare 0.01 % Latex Beads (0.3 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 of filter were tested.

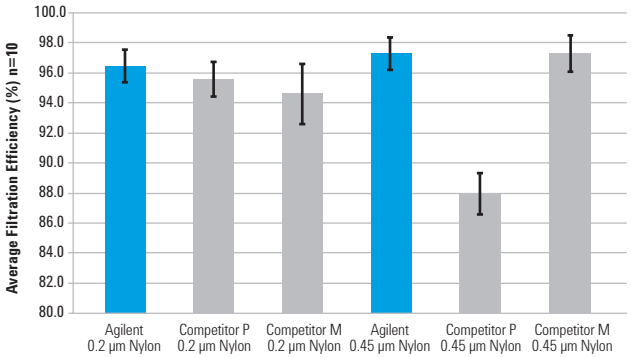
Filtrate measuring on HPLC/UV

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

An eluted peak 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.

The Agilent Captiva syringe filters provide equivalent or better filtration efficiency than competitors' equivalent products for particulates removal

Average Filtration Efficiency of Agilent Captiva Syringe Filters vs. Competitors



Filtration efficiency (%) calculation

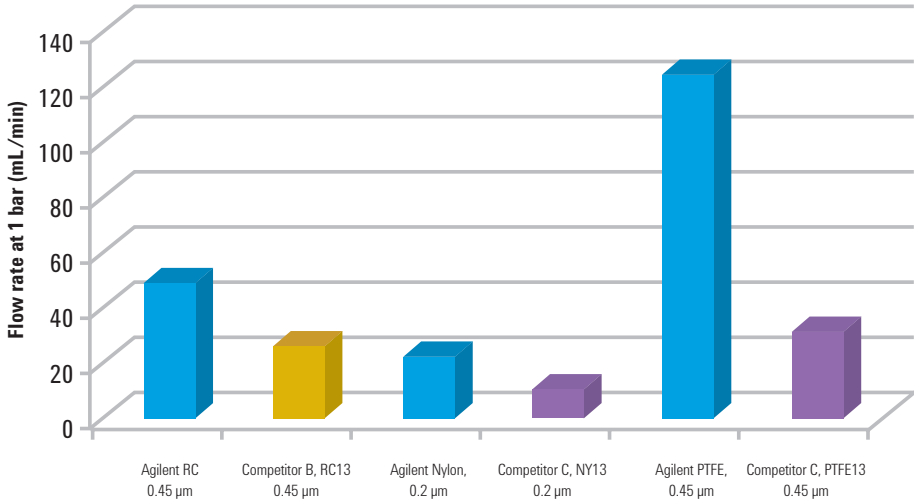
$$\text{Filtration EFF (\%)} = \frac{(\text{PeakArea}_{\text{Unfiltered LBsolution}} - \text{PeakArea}_{\text{Unfiltered Blank}})\,(\text{PeakArea}_{\text{Filtered LBsolution}} - \text{PeakArea}_{\text{Filtered Blank}})}{(\text{PeakArea}_{\text{Unfiltered LBsolution}} - \text{PeakArea}_{\text{Unfiltered Blank}})} \times 100\%$$

	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	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	97.1	98.8
3	94.5	93.3	90.3	89.5	99.2	99	95.5	97.5	93.5	96.3	96.4	97.7
4	96.6	92.3	91.7	99	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	88.2	96	99	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	99.4	99.4	99.5	95.2	94.9	96.7	98.2	97.6
8	99.8	91.2	99	97.8	95	99	98	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
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**	**99.1**	**96.4**	**96.2**	**90.9**	**94.8**	**98.6**	**98.6**
RSD (%)	2.2	0.8	3.7	3.7	2	0.5	2.2	1.1	3.3	1.9	1.5	1.3

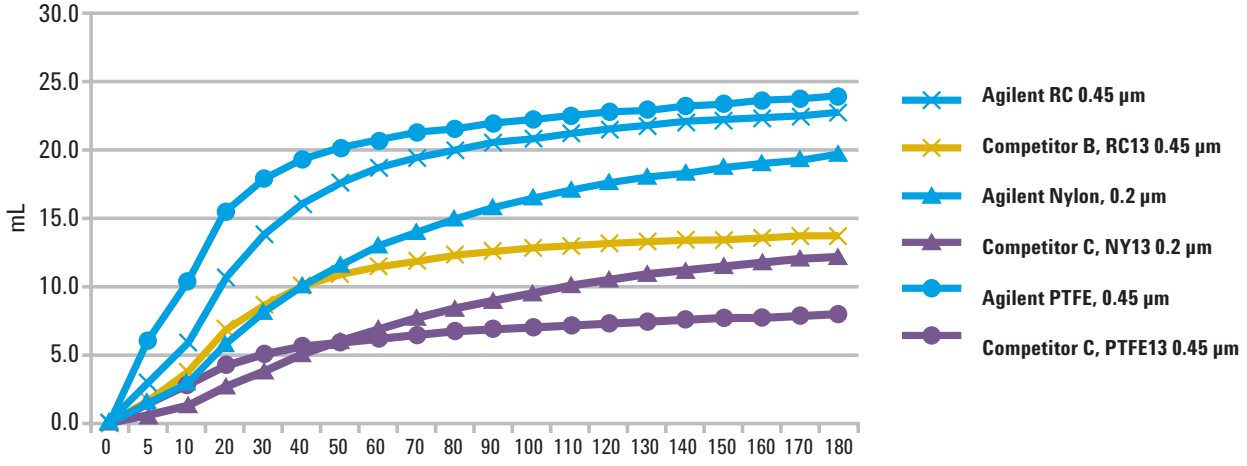
Proof of Performance: Flow Rate and Volume Capacity

Agilent Captiva premium syringe filters provide unparalleled 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, causing high column backpressure, retention time shift, and loss of resolution, which shortens 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, and are therefore more sensitive to pressure increases caused by the accumulated particulates on the column.

Testing Method

Sample Preparation

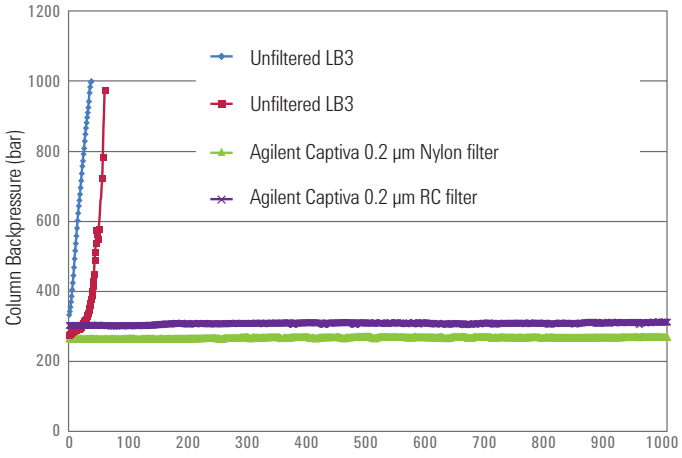
A.) The surfactant solution, 0.002 % Triton X-100, was used to prepare 0.05 % latex bead (0.3 µm and 0.5 µm) solution.

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

C.) Human plasma extract was used for sub-2 µm column life application test. Unfiltered, centrifuged, and filtered (by 0.2 µm filters) samples were used for comparison of impact on sub-2 µm column life. The sample was prepared using the following 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 supernatant was transferred into a clean test tube.
5. The supernatant was blown dry with N_2 flow at 37 °C.
6. The dried sample was reconstituted in 10:90 MeOH/H_2O, vortexed and sonicated.

Results—Filtration impact on sub-2 µm column A by latex bead 0.3 µm solution



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, one injection per minute.

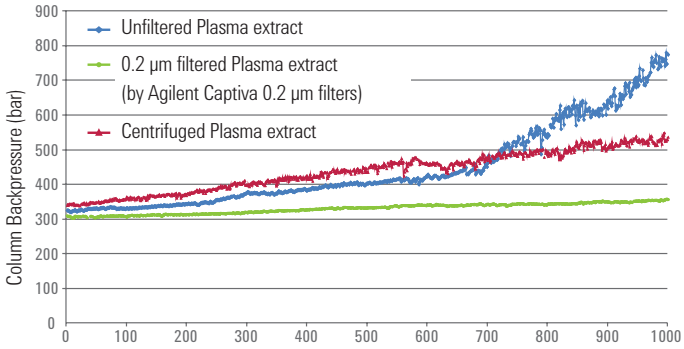
Monitoring: Column backpressure was recorded with the number of injections.

Column failure: When column back pressure exceeded 1000 bar.

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

Conclusion: Filtration before sample introduction into an HPLC system significantly improves column life time.

Results—Filtration impact on sub-2 µm column B by human plasma PPT extract



Number of injections of unfiltered, centrifuged, and filtered human plasma PPT Extract.

Chem Elut Supported Liquid Extraction (SLE)

Chem Elut and Hydromatrix

- High-purity sorbent supported liquid extraction (SLE) applications
- Available in prepacked cartridges or in bulk
- Packing method delivers excellent tube-to-tube reproducibility

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 various matrices.

Typical Matrices

Aqueous, biological fluids, organic reaction mixtures (scavenging)

Primary Extraction Mechanism

Solid supported LLE

Compound Types

Nitrosamines, pesticides, herbicides

Chem Elut Cartridges*

Description	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 cartridge, select the product that fits the total volume of the sample. Volumes stated here are not the actual cartridge size, but rather the volume available for sample.

Chem Elut cartridges, 12198006

Combilute plate, 200 mg, 65401507

Tox Elut Cartridges*

Description	Volume (mL)	Unit	Part No.
9.0	10	100/pk	12198014
	20	100/pk	12198017
Unbuffered	1	100/pk	12199002
	10	100/pk	12198012
	20	100/pk	12198015
	20	100/pk	12198022
	20	100/pk	12199008
		1/pk	65401507

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

Other Formats

Description	Part No.
Combilute 96-well plate, 200 mg	65401507
VersaPlate tubes*, 96/pk, tubes only, 260 mg	75530260
Pre-assembled 96-well plate (VersaPlate tubes and base plate) 260 mg	75430260

*Tubes need to be inserted into a VersaPlate base plate, p/n 75400000.

Hydromatrix

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.

Hydromatrix

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

ITLC SG paper, SGI0001

Chromatography Papers

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

Chromatography paper is used in thin layer chromatography applications, such as those that evaluate 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).

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

Sample Processing Devices and Accessories

Positive Pressure

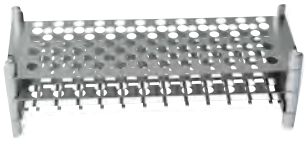
- Uniform flow: Restricted-flow ports ensure consistent processing across the manifold, regardless of cartridge or well contents.
- No more troublesome stopcocks: The PPM-48 eliminates the need for stopcocks that are necessary with vacuum manifolds and must be individually and manually controlled.
- Speed and cost efficiency: The 48-cartridge capacity lets you process more samples at once.
- Time and resource savings: The autosampler vial collection rack for the PPM-48 allows you to skip the final transfer step.
- Greater flexibility: Forced gas supplies a wide range of pressures for processing diverse samples, including viscous samples.

Positive pressure processing of cartridges and 96-well plates, such as solid phase extraction (SPE), supported liquid extraction (SLE), and filtration (protein precipitation), offers many advantages over traditional vacuum processing. Conventional vacuum manifolds pull liquid from the bottom of a cartridge or 96-well plate. When faster flowing cartridges run dry, the vacuum will follow the path of least resistance through the empty cartridges, slowing the flow through the remaining cartridges. This inconsistency can lead to variations in processing times and irreproducible results.

The Agilent positive pressure manifold 48 processor (PPM-48) and 96 processor (PPM-96) are excellent alternatives for sample processing. The PPM-48 and PPM-96 have unique restricted flow ports to create consistent gas flow through every channel, even when channels are not being used, or run dry. This consistency ensures reproducibility from row-to-row and cartridge-to-cartridge regardless of the cartridge or well contents.

Positive pressure manifold 48 processor (PPM-48) (5191-4101)

SPE cartridge rack, 1 mL, for PPM-48 (5191-4102)



Collection rack, 10 x 75 mm tubes, PPM-48 (5191-4105)

Sealing gasket, for PPM-48 (5191-4110)

Waste rack and 3 waste bins, for PPM-48 (5191-4112)

Waste bin, for PPM-48, 3/pk (5191-4113)

Installation kit, for PPM-48 and PPM-96 (5191-4114)

Positive Pressure Manifold 48 Processor (PPM-48)

For cartridge processing, choose the PPM-48.

Product	Description	Part No.
Positive Pressure Manifold Processor		
PPM-48: Cartridge format	Included with the PPM-48: waste rack with three waste bins (5191-4112) and processor installation kit (5191-4114)	5191-4101
PPM-48 Accessories		
Cartridge Racks	1 mL SPE cartridge rack	5191-4102
	3 mL SPE cartridge rack	5191-4103
	6 mL SPE cartridge rack	5191-4104
Collection Racks	10 x 75 mm tubes	5191-4105
	12 x 75 mm tubes	5191-4106
	13 x 100 mm tubes	5191-4107
	16 x 100 mm tubes	5191-4108
	12 x 32 mm autosampler vials	5191-4109
Additional Accessories	Installation kit for PPM-48 and PPM-96	5191-4114
	Sealing gasket for PPM-48	5191-4110
	Waste rack and three waste bins	5191-4112
	Waste bin for PPM-48, 3/pk	5191-4113
Gas trap	Big hydrocarbon trap (1/4 inch fittings)	BHT-4
	Big hydrocarbon trap (1/8 inch fittings)	BHT-2

NOTE

When ordering the PPM-48, the collection rack and cartridge racks are not included. These must be ordered separately.

To order now, go to **www.agilent.com/chem/store**

Positive Pressure Manifold 96 Processor (PPM-96)

For 96-well plate, VersaPlate, or tabless 1 mL cartridge processing, choose the PPM-96.

Product	Description	Part No.
Positive Pressure Manifold Processor		
PPM-96: 96-well plate format	Included with the PPM-96: single well waste plate (5191-4121), plate holder (5191-4120), and processor installation kit (5191-4114).	5191-4116
PPM-96 Accessories		
Additional Accessories	Installation kit for PPM-48 and PPM-96	5191-4114
	Sealing gasket for PPM-96	5191-4117
	Tabless cartridge holder for PPM-96, 1 mL	5191-4119
	Plate holder	5191-4120
	Single well waste plate for PPM-96	5191-4121
Gas trap	Big hydrocarbon trap (1/4 inch fittings)	BHT-4
	Big hydrocarbon trap (1/8 inch fittings)	BHT-2

Positive pressure manifold 96 processor (5191-4116)

Single well waste plate, for PPM-96 (5191-4121)

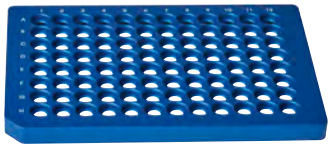
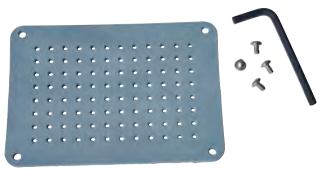


Plate holder, for PPM-96 (5191-4120)

Tabless cartridge holder, 1 mL, for PPM-96 (5191-4119)



Sealing gasket, for PPM-96 (5191-4117)

Vac Elut SPS 24 manifold

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
- Increased productivity/sample throughput

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

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
Waste funnel for 12 x 75 or 13 x 100 mm test tubes	12234032
Stainless steel delivery needles, 25/pk	12234038

Vac Elut Cartridge Manifolds

- 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 little bench space.

To minimize the risk of sample carryover, the 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 ensured by an interlocking fit between the lid and internal test tube rack.

Vac Elut 20 Vacuum Extraction Manifolds

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

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 various sizes to accommodate the types of 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 with collection rack, 12234105

Vac Elut 20 collection rack, 12234517

PP Delivery needles, 25/pk, for SPS 24/Vac 20, 12234511

Vac Elut 20 replacement exit valve, 12234506

Vac Elut 20 Vacuum gauge assay, 12234504

Vac Elut 20 Vacuum Extraction Manifolds

Description	Part No.
Manifold Set	
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 13 x 100 mm test tubes	12234508
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 Tall Glass Basin

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 employed 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 Tall Glass Basin

Description	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. It 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. This 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

Valve stopcock, 5982-9102

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

Luer Stopcocks

- Control flow rates during SPE
- 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

Description	Unit	Part No.
Luer stopcocks short	15/pk	12131005
Luer stopcocks long	20/pk	12234520

Luer stopcocks, 12131005

Bond Elut 96-well manifold, acrylic, 5133000

96-well manifold shimset, 12236104

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

Sealing tape pad, 12143105

Bond Elut 96 square-well plate, 5133009

Well Plate Vacuum Manifolds

- 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 microplates), ensuring maximum penetration of the SPE plate into the collection plate and reducing well-to-well contamination
- Solvent resistant gasket in the manifold lid

Agilent Vacuum manifolds for 96-well plates handle both fixed position and second version plates. It contains a disposable reservoir tray for collecting excess sample and wash solvents. Spacer inserts can be placed into the base so that collection plates of differing heights can be processed—ensuring maximum penetration of the SPE plate into the collection plate, and reducing well-to-well contamination. Agilent manifolds and accessories complement the quality of our sorbents. Configurations and individual components can be bought, providing flexibility and increased capability at any stage, from method development to high-throughput operation.

Well Plate Vacuum Manifolds

Description	Unit	Part No.
96-well manifold, acrylic	1/pk	5133000
96-well manifold, shimset	1/pk	12236104
96-well vacuum manifold, base assembly only		5185-5797
Well Plates and Sealing Mats		
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
96-well plates, 0.5 mL, polypropylene	120/pk	5042-1385
96-well plates, 0.5 mL, polypropylene	10/pk	5042-1386
96-well plate sealing mats, round	50/pk	5042-1389
96-deep well plates, 1 mL, polypropylene	50/pk	5042-6454

(Continued)

Well Plate Vacuum Manifolds

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
Accessories		
Collection plate spacer for microplate and Agilent 0.5 mL shallow well plate, 29 mm		5185-5781
Luer stopcocks short	15/pk	12131005
Lid gasket for 96-well plate manifold		5185-5778
Vacuum outlet (Ni plated) for 96-well manifold		5185-5784
Collection plate spacer for Agilent 1 mL deep-well, 12 mm		5185-5775
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
Luer adapters for 96-well flexible cartridge	25/pk	5185-5789
Lid for 96-well fixed well vacuum manifold		5185-5798
Disposable reservoir tray for 96-well manifold	25/pk	5185-5782
Base O-ring for 96-well plate manifold		5185-5779
Collection plate spacer for most industry-standard deep-well plates, 2 mm		5185-5780

*Square 96-well sealing caps, EVA, pierceable (works with part numbers 5133007, 5133008, and 5133009).

Base O-ring, 5185-5779

Collection plate spacer in sizes to match the collection plate used, 5185-5780

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

Customers who have been with Agilent for a long time have experienced our commitment firsthand. 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 pesticide screening in food products to rapid identification of pathogens, Agilent understands the analytical needs of food producers, shippers, and regulators. Utilizing our easy-to-use analyzers and up-to-date screening libraries, customers can quickly develop robust and reliable methods. Agilent's leading gas chromatography and mass spectrometry systems are widely regarded as valuable food testing techniques for an array of different analyses.

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 Chemicals

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. From crude oil, natural gas, and refining, to specialty chemicals and alternative fuels, Agilent provides the latest technologies and solutions to increase quality, safety, and profitability for energy and chemical labs, while meeting the industry's stringent quality requirements. Agilent leads the way in ASTM collaborations that have evolved—and will continue to evolve—into industry standards.

Forensics

Whether testing for poisons in a forensics investigation, screening athletes for performance enhancing drugs, analyzing samples for recreational drugs, or checking a crime scene for explosive residue—lives and professions may be dependent on the accuracy of your equipment. Agilent leads the industry with a comprehensive portfolio of workflow solutions that provide the ability to identify, confirm, and quantify thousands of substances.

Lab Informatics

The way a lab captures, analyzes, and shares data profoundly affects its efficiency. Agilent offers a rich, integrated suite of software products built on customer-driven architectural values with the Agilent OpenLAB software suite. OpenLAB delivers superior performance and connection across multiple systems, providing open systems integration and investment protection. Our commitment is to deliver 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 and paper. Tools for atomic spectroscopy, molecular spectroscopy, chromatography, and X-ray crystallography all support continuous progress in materials science.

LIFE SCIENCE SOLUTIONS

Biopharmaceutical

Biotherapeutics have enormous potential to improve human health, with growing numbers of protein and antibody therapeutics to address unmet medical needs. At every development stage, from disease research to QA/QC and manufacturing, Agilent can help you make the right choices for moving therapeutics to market. We understand the biopharmaceutical workflow so our product families work together seamlessly, as engines of research, discovery, and development. Agilent columns deliver complete characterization of biomolecules using reversed-phase, size exclusion, ion exchange, and affinity chromatography. Our bio-inert supplies ensure that every part of your workflow delivers the performance you need to optimize your bioseparation.

Pharmaceutical

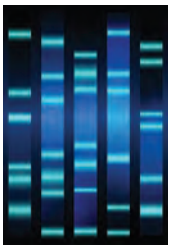
You need the most efficient processes to evaluate drug candidates, determine efficacy, and ensure safety and compliance during development and manufacture. Agilent has worked with pharma companies for many years to ensure reliability and reproducibility for regulatory compliance, from lab-to-lab and around the world. Our pharma solutions provide high-throughput capability at every stage of the product life cycle, with automated sample preparation, industry-leading U/HPLC systems, the largest family of Fast LC columns, open access LC/MS, spectroscopy, and automated dissolution. A complete family of LC supplies and lamps help optimize every analysis and take day-to-day lab efficiency one step further.

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, bio-informatics systems, multiple affinity protein removal columns, and OFFGEL electrophoresis for protein identification and protein biomarker discovery. Accurate-Mass mass spectrometry and 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 viewed 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, and MS portfolios, along with our excellent bio-informatics 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 the needs of metabolomics researchers.



Genomics

Agilent is a global leader in microarrays, scanners, and NGS reagents used in a wide variety of genomic-based disease research experiments. Our SureSelect and HaloPlex Target Enrichment Systems dominate the category, streamlining next-generation sequencing studies. Agilent offers a wide range of catalog CGH and gene expression microarrays and a highly developed capability to produce custom arrays using our free online design tool, SureDesign. All Agilent microarrays feature highly sensitive, selective 60-mer probes, and, with as many as eight arrays printed on a slide, the cost-per-sample is cost efficient.

Life Science Informatics

Mirroring its extensive instrument portfolio, Agilent offers the industry's most extensive suite of bio-informatics software, helping users derive knowledge from complex genomic, proteomic, metabolomic, and other biological data. SureCall and CytoGenomics software analyzes NGS and aCGH data, and the GeneSpring suite provides multi-omic analysis and visualization capabilities to help compare complex datasets to explore biological questions from multiple perspectives. The GeneSpring suite includes the GX module for microarray-based gene expression and genotyping data, the PA module for Pathway Analysis and multi-omic analysis and the MPP software, which analyzes mass spectrometry data from proteomics and metabolomics experiments.

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 is 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 nanotechnology. 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 Big Bang machine, which was used in the discovery of the Higgs boson.

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 CrossLab 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 CrossLab Gold**—Priority-one coverage for ultimate uptime and productivity
- **Agilent CrossLab Silver**—Comprehensive coverage for dependable laboratory operations
- **Agilent CrossLab Bronze**—Total repair coverage at a fixed annual price

Agilent 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.

Get the Agilent Service Guarantee

Should your instrument require service while covered by an Agilent Advantage 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.

Agilent Compliance Services

Equipment qualification that meets the most stringent requirements

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

- Improve qualification efficiency by harmonizing protocols across platforms to ensure greater efficiency and minimize regulatory risk
- Standardize your entire compliance operation with robust test designs that work with all of your instruments
- Add, remove, or reconfigure tests based on your unique user requirements
- Reduce staff review time significantly 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 consultations from the same experts who designed the instruments, software, and processes you use every day.

- Classroom, online, and onsite 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 promise guarantee. The Agilent Value Promise guarantees you at least 10 years of instrument use from the date bought, or we will credit you with the residual value of the system toward an upgraded model. Not only does Agilent ensure a reliable product 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

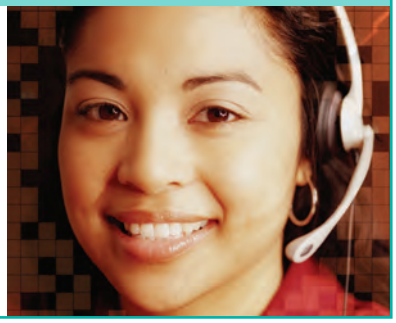
Have a hardware, software, application, instrument repair, or troubleshooting question? Agilent's technical experts are available to answer your questions. With years of laboratory experience, our technical support specialists can provide in-depth knowledge and experience.

For questions about 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.



Agilent CrossLab
From Insight to Outcome

ACROSS THE LAB, AROUND THE WORLD, WITH YOU EVERY STEP OF THE WAY.

For more information

Buy online:
www.agilent.com/chem/store

Contact us:
www.agilent.com/chem/contactus

Printed in the USA, July, 2018
5994-0114EN

Agilent Technologies