
# SAMPLE PREPARATION

## Your Essential Resource for Supplies


The Measure of Confidence

Agilent Technologies

# SAMPLE PREPARATION PRODUCTS FOR CHROMATOGRAPHY




## Reliably extract and concentrate samples from complex matrices

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

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

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


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

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

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

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

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

## CHEMICAL ANALYSIS SOLUTIONS

### Food

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

### Environmental

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

### Energy and Fuels

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

### Forensics

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

### Traditional Lab Informatics

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

### Materials Science

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

# LIFE SCIENCE SOLUTIONS

## Biopharmaceutical

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

## Pharmaceutical

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

## Proteomics

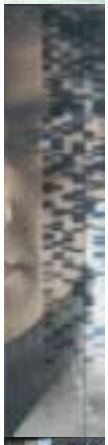
Research into how large sets of proteins affect the health of an organism requires special sets of analytical tools. Agilent has built a formidable arsenal of liquid chromatograph/mass spectrometers, bioinformatics systems, multiple affinity protein removal columns, and OFFGEL electrophoresis for protein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

## Metabolomics

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

## Genomics

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



## Life Science Informatics

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

## Lab Automation

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

## Vacuum Technology

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


### Get the Agilent Service Guarantee

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

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


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

# Agilent Service and Support for Instrument Systems

## Focus on what you do best

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

## Agilent Advantage Service Plans

### The best service available for your Agilent instruments

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

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

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

## Agilent Compliance Services

### Equipment qualification that meets the most stringent requirements

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

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

## Agilent Education and Consulting Services

### Our best minds, working for you

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

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

## The Agilent Value Promise – 10 Years of Guaranteed Value

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

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

## Technical Support at work for you

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

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

## Need more information?

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

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

# Bond Elut Plexa

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

**Turn to page 21.**


# Agilent Bond Elut QuEChERS Kits

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

**Turn to pages 90-99.**

# Captiva Filtration

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

**Turn to page 100.**

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

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

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


## TIPS & TOOLS

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

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

**Application Guide**

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

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## TIPS & TOOLS

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

# **Application Guide** continued

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

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

**Sample Preparation Reference Guide**

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

*Dispersive Solid Phase Extraction

(Continued)

# Sample Preparation Reference Guide continued

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

(Continued)

# Sample Preparation Reference Guide continued

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

(Continued)

# Sample Preparation Reference Guide continued

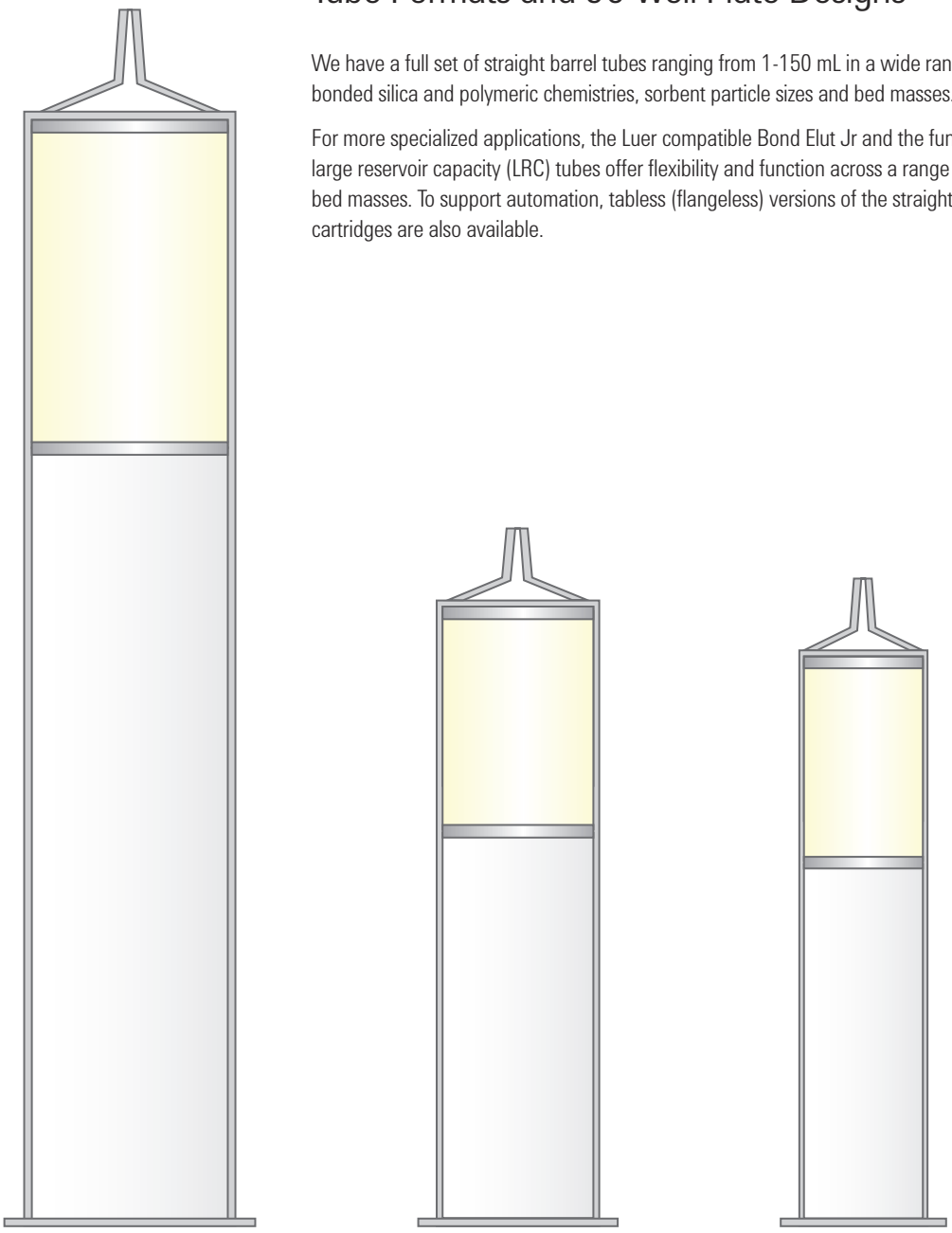
| Sample Preparation Reference Guide | | | | |
|---|---|---|---|---|
| **Typical Matrices** | **Compound Types** | **Primary Extraction Mechanism** | **Product** | **Page No.** |
| Aqueous samples, biological fluids, buffered organics | Acidic compounds (fruit acid removal for QuEChERS) | Weak anion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

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

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

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

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



Diagrams are to scale

60 mL 20 mL 12 mL

## Bond Elut 96-well Plates

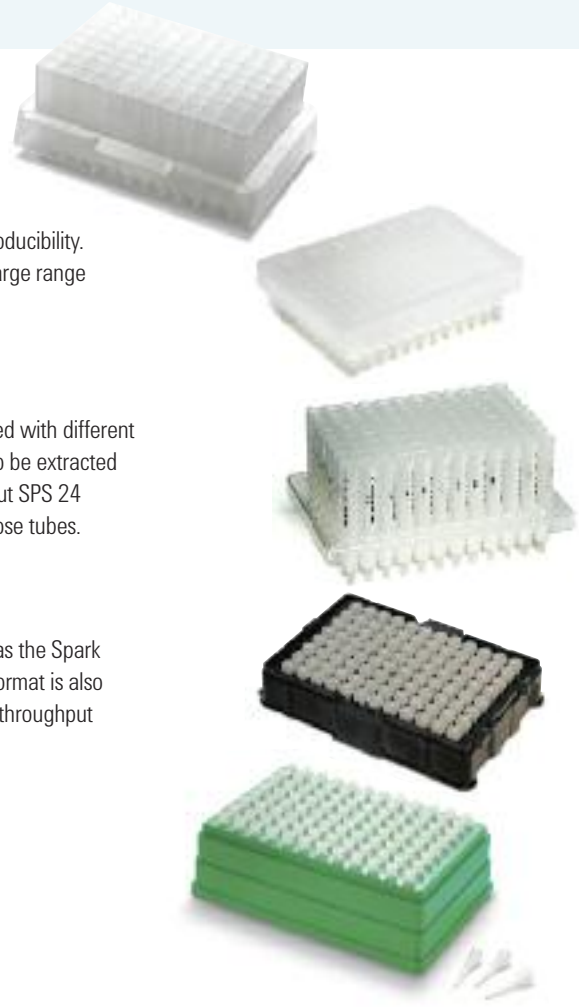
Bond Elut 96-well plate formats are best in class for flow performance and well-to-well reproducibility. These specially designed plates are available with well volumes of 1 mL and 2 mL and in a large range of different sorbent chemistries.

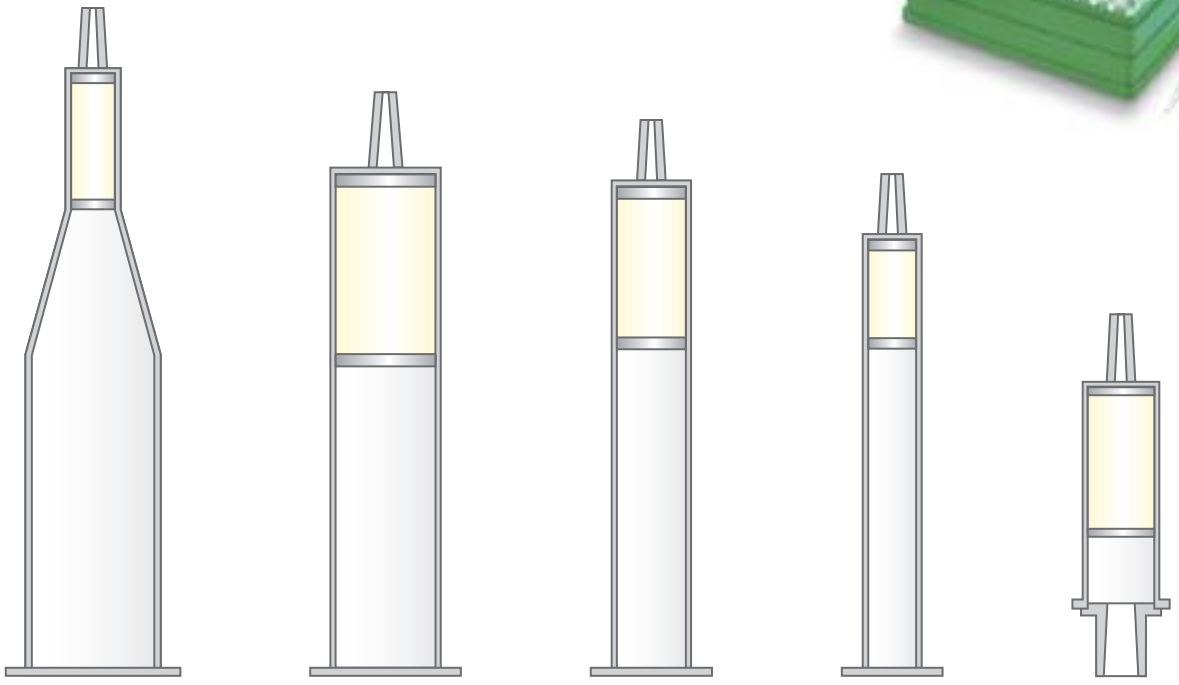
## VersaPlate

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

## Packed Formats for Automation

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





# Solid Phase Extraction (SPE)

## Agilent Bond Elut:
## **Accuracy Starts Here**

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

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

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


## The Bond Elut Difference

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

# Cross Reference of Comparable Phases by Manufacturer

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

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

## Polymers

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

## Silica-Based and Other Sorbents

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

### TIPS & TOOLS

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

## Sorbent Specifications

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

(Continued)

## Sorbent Specifications

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

(Continued)

**Sorbent Specifications**

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

## Particle Size Specifications

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

### TIPS & TOOLS

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

# Bond Elut Plexa Polymeric SPE

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

## Bond Elut Plexa

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

## Bond Elut Plexa PCX

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

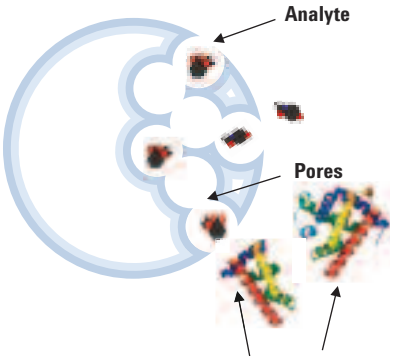
## Bond Elut Plexa PAX

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

## Advanced Polymer Architecture Improves Extraction Performance

**LOAD:**

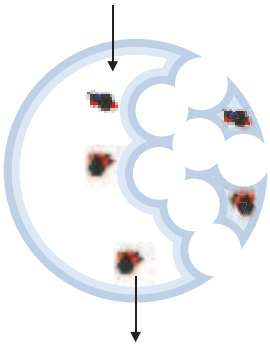
Water-rich, hydrophilic surface allows excellent phase transfer of analytes into the polymer core.




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

**WASH:**

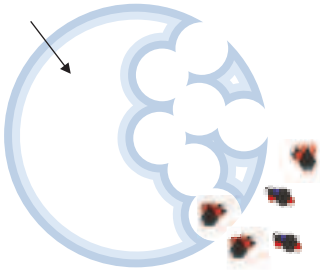
Analytes that have crossed the hydrophilic layers will remain tightly bound in the hydrophobic core.



Interferences wash away without leaching the analytes of interest.

**ELUTE:**

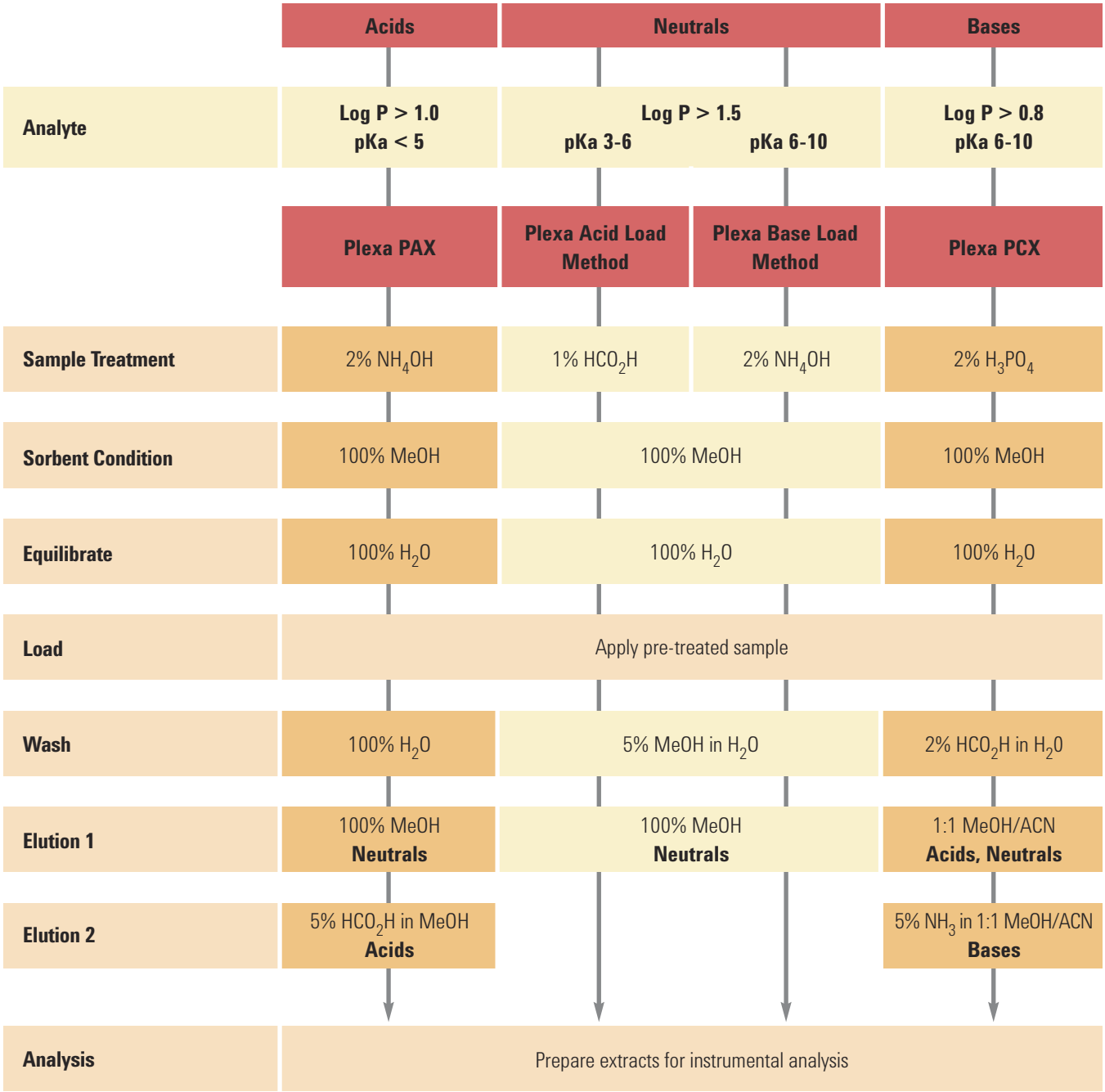
Specially engineered pore structure allows excellent mass transfer out of the polymer.



Clean extract with high recovery.

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

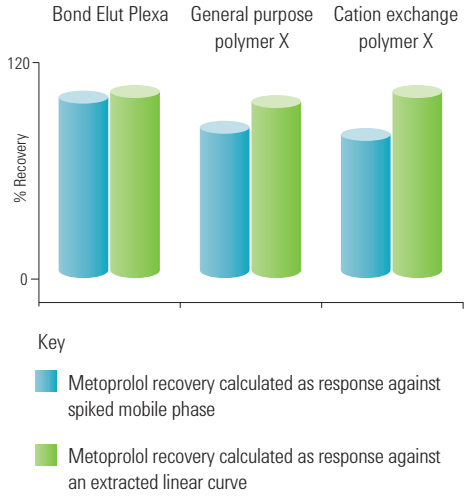
Regardless of your application or sample type, you will appreciate the difference the Bond Elut Plexa range makes. Plexa delivers simple methods and superior flow characteristics that effectively eliminate common matrix background that can cause interference and ion suppression, resulting in improved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



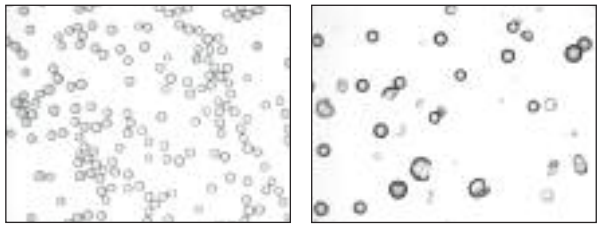
# Improved Sensitivity

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

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



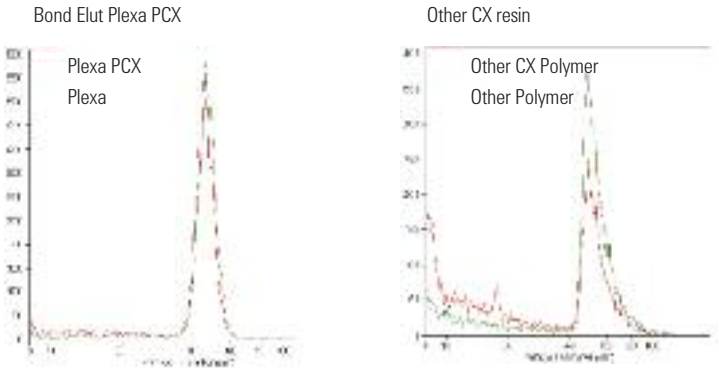

### Comparison of particle sizes of non-polar SPE polymers by imaging analysis



Bond Elut Plexa PCX

Alternative Cation Exchange Polymer

### Comparison of particle size distributions of non-polar SPE sorbents




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

# Bond Elut Plexa

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

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

**Typical Matrices**

Plasma, urine, biological fluids and aqueous samples

**Primary Extraction Mechanism**

Non-polar

## TIPS & TOOLS

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

## Bond Elut Plexa

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

## Bond Elut Plexa 96-well Plates

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

# Bond Elut Plexa Method for Polyaromatic Hydrocarbons

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

**Method**

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

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

Load sample

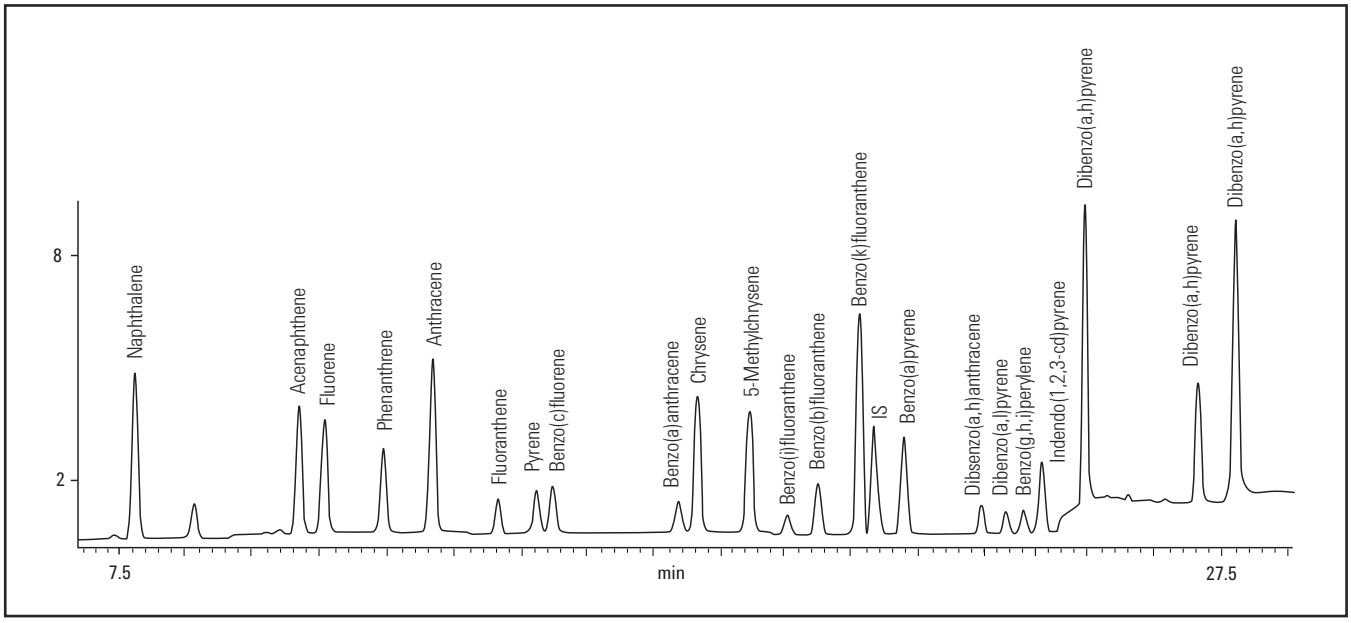
Dry for 30 min

Elute with 4 mL ethyl acetate + 4 mL dichloromethane

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

Evaporate off 4 mL

Add 0.5 mL acetonitrile




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

Pursuit HPLC Columns

# Bond Elut Plexa PCX

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

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

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

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

**Typical Matrices**

Plasma, urine, biological fluids and aqueous samples

**Primary Extraction Mechanism**

Mixed mode: non-polar and cation exchange

## Bond Elut Plexa PCX

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

## Bond Elut Plexa PCX 96-well Plates

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

### Typical Method for Bond Elut Plexa PCX

**Sample:**

100 µL plasma

**Pretreatment:**

Dilute 1:3 with 2% $H_3PO_4$

**Conditioning:**

1. 500 µL MeOH
2. 500 µL $H_2O$

**Washes:**

Acidic wash: 500 µL aqueous 2% formic acid

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

**Elution:**

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

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

# Bond Elut Plexa PAX

**Typical Matrices**

Plasma, urine, biological fluids and aqueous samples

**Primary Extraction Mechanism**

Mixed mode: non-polar and anion exchange

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

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

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

### Typical Method for Bond Elut Plexa PAX

**Sample:**

100 µL human plasma

**Pretreatment:**

Dilute 1:3 with 2% $NH_4OH$

**Conditioning:**

1. 500 µL MeOH
2. 500 µL $H_2O$

**Washes:**

1. 500 µL $H_2O$
2. 500 µL MeOH

**Elution:**

500 µL 5% formic acid:MeOH

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

### Bond Elut Plexa PAX

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

### Bond Elut Plexa PAX 96-well Plates

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

### TIPS & TOOLS

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

# Agilent Polymeric SPE

## Reversed Phase Polymeric SPE

### Bond Elut PPL

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

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

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

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

**Bond Elut PPL**

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

## Bond Elut ENV

**Typical Matrices**

Water sources

**Primary Extraction Mechanism**

Non-polar

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

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

### Bond Elut ENV

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

# Bond Elut LMS

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

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

**Typical Matrices**

Urine, plasma, biological fluids

**Primary Extraction Mechanism**

Non-polar

## Bond Elut LMS

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

## Bond Elut LMS 96-well Plates

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

# Mixed Mode Polymeric SPE

## Bond Elut NEXUS and Bond Elut NEXUS WCX

**Typical Matrices**

Horse urine, urine, biological fluids

**Primary Extraction Mechanism**

Non-polar

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

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

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

### Bond Elut NEXUS and Bond Elut NEXUS WCX

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

### Bond Elut NEXUS 96-well Plates

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

References

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

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

# Silica-Based SPE

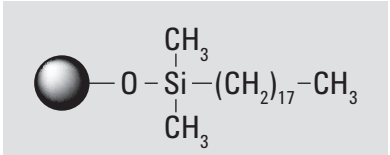
## Reversed Phase (Non-Polar) Silica SPE


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

### Bond Elut C18

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

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




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

**TIPS & TOOLS**

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

Bond Elut C18 Flash cartridges, 12256060

## Bond Elut C18

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

(Continued)

## Bond Elut C18

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

## Bond Elut C18 VersaPlate Formats

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

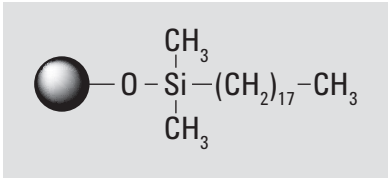
*Tubes need to be inserted into a VersaPlate base plate, P/N 75400000

Preassembled 96-well plate, 75401050

## Bond Elut C18 96-well Plates

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


VersaPlate tubes, 75501050




**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

Non-polar

# Bond Elut C18 EWP

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

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

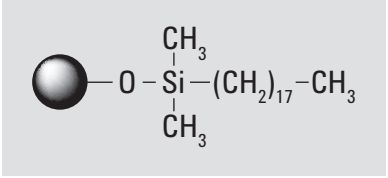
## Bond Elut C18 EWP

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

# Bond Elut C18 OH

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

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




**Typical Matrices**

Aqueous samples, biological fluids, non-polar extracts

**Primary Extraction Mechanism**

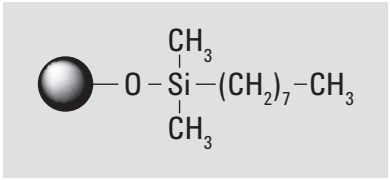
Non-polar, hydrogen bonding

## Bond Elut C18 OH

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

## Bond Elut C18 OH 96-well Plates

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



**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

Non-polar

## Bond Elut C8

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

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

### Bond Elut C8

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

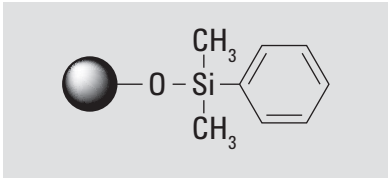
### Bond Elut C8 VersaPlate Formats

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

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

### Bond Elut C8 96-well Plates

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



**Typical Matrices**

Aqueous and biological fluids

**Primary Extraction Mechanism**

Non-polar

# Bond Elut PH

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

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

## Bond Elut PH

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

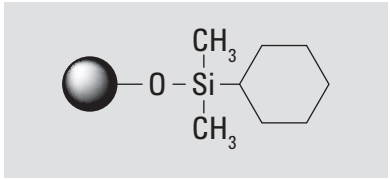
## Bond Elut PH 96-well Plates

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

## Bond Elut CH (cyclohexyl)

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

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




**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

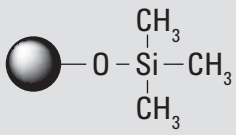
Non-polar

### Bond Elut CH (cyclohexyl)

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

### Bond Elut CH 96-well Plates

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



**Typical Matrices**

Urine, plasma, biological fluids

**Primary Extraction Mechanism**

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

## Bond Elut C1

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

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

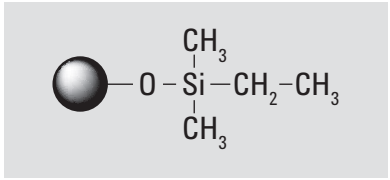
### Bond Elut C1

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

# Bond Elut C2

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

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




**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

Non-polar

## Bond Elut C2

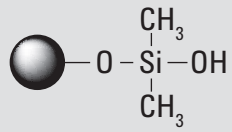
| Description | Unit | Part No. |
|---|---|---|
| **Large Reservoir Capacity (LRC) Cartridges** | | |
| 100 mg, 10 mL | 50/pk | 12113003 |
| 500 mg, 10 mL | 50/pk | 12113029 |
| **Straight Barrel Cartridges** | | |
| 50 mg, 1 mL | 100/pk | 12102060 |
| 50 mg, 3 mL | 50/pk | 12105029 |
| 100 mg, 1 mL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

## Bond Elut C2 96-well Plates

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

# Normal Phase (Polar) Silica SPE

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




**Typical Matrices**

Non-polar organics, oils, lipids

**Primary Extraction Mechanism**

Polar

## Bond Elut SI

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

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

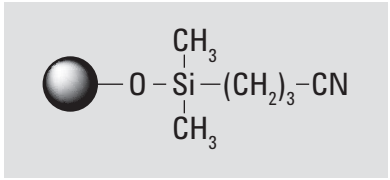
### Bond Elut SI

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

# Bond Elut CN-E

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

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




**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

Non-polar, dipole

## Bond Elut CN-E

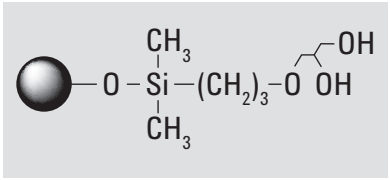
| Description | Unit | Part No. |
|---|---|---|
| **Large Reservoir Capacity (LRC) Cartridges** | | |
| 500 mg, 10 mL | 50/pk | 12113033 |
| **Straight Barrel Cartridges** | | |
| 50 mg, 1 mL | 100/pk | 12102064 |
| 100 mg, 1 mL | 100/pk | 12102007 |
| 500 mg, 3 mL | 50/pk | 12102034 |

## Bond Elut CN-E 96-well Plates

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

References

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



## Bond Elut Diol (2OH)

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

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

**Typical Matrices**

Aqueous, biological fluids, non-polar organics

**Primary Extraction Mechanism**

Polar and non-polar

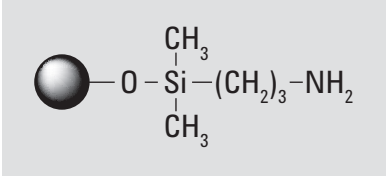
### Bond Elut Diol (2OH)

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

# Bond Elut NH2

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

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




**Typical Matrices**

Aqueous samples, biological fluids, buffered organics

**Primary Extraction Mechanism**

Weak anion exchange

## Bond Elut NH2

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

## Bond Elut NH2 VersaPlate Formats

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

References

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

## Bond Elut NH2 96-well Plates

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

## The isolation of lipids from serum and tissue

### Extraction Method

**Matrix:**
Chloroform extract of serum or adipose tissue

**Sorbent Conditioning:**
Hexane

**Apply Sample:**
Through Bond Elut NH2 cartridge

**Elution 1:**

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

**(Fatty acids)**
2% acetic acid in diethyl ether

**(Phospholipids)**
Methanol

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

**Elution 2:**

**(Cholesterol esters)**
Hexane

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

**Elution 3:**

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

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

**Elution 4:**

**(Cholesterol)**
5% ethyl acetate in hexane

**(Diglycerides)**
15% ethyl acetate in hexane

**(Monoglycerides)**
2:1 chloroform:methanol

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

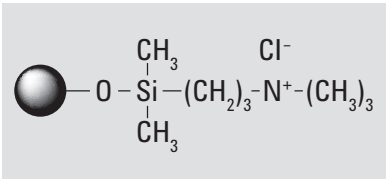
# Ion Exchange Silica SPE

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

## Bond Elut SAX

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

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




**Typical Matrices**

Aqueous samples, biological fluids, buffered organics

**Primary Extraction Mechanism**

Anion exchange

### Bond Elut SAX

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

## Bond Elut SAX 96-well Plates

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

## Bond Elut SAX VersaPlate Formats

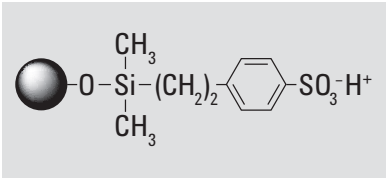
| Description | Particle Size (µm) | 50 mg |
|---|---|---|
| Preassembled 96-well plate | 40 | 75408050 |
| VersaPlate tubes, 96/pk* | 40 | 75508050 |

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

# Bond Elut SCX

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

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




**Typical Matrices**

Aqueous samples, biological fluids, buffered organics

**Primary Extraction Mechanism**

Cation exchange

## Bond Elut SCX

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

## Bond Elut SCX VersaPlate Formats

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

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

## Bond Elut SCX 96-well Plates

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

References

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

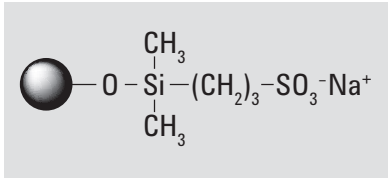
Horie, M, Saito, K, Ishii, R, Yoshida, T, Haramaki, Y & Nakazawa, H (1998) Simultaneous determination of five macrolide antibiotics in meat by high performance liquid chromatography. J. Chromatogr. A, 812, 295-302.

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

# Bond Elut PRS

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

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




**Typical Matrices**

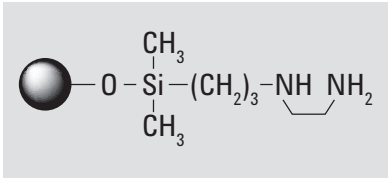
Aqueous, biological fluids, buffered organics

**Primary Extraction Mechanism**

Cation exchange

## Bond Elut PRS

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



**Typical Matrices**

Aqueous samples, biological fluids, buffered organics

**Primary Extraction Mechanism**

Weak anion exchange

## Bond Elut PSA

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

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

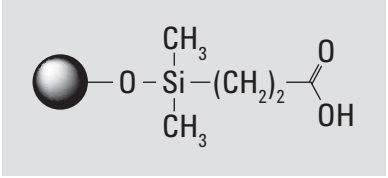
### Bond Elut PSA

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

# Bond Elut CBA

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

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




**Typical Matrices**

Aqueous samples, biological fluids

**Primary Extraction Mechanism**

Weak cation exchange

## Bond Elut CBA

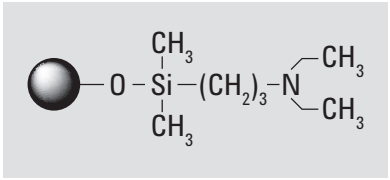
| Description | Unit | Part No. |
|---|---|---|
| **Large Reservoir Capacity (LRC) Cartridges** | | |
| 100 mg, 10 mL | 50/pk | 12113011 |
| 500 mg, 10 mL | 50/pk | 12113037 |
| **Straight Barrel Cartridges** | | |
| 50 mg, 1 mL | 100/pk | 12102073 |
| 100 mg, 1 mL | 100/pk | 12102011 |
| 100 mg, 3 mL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

## Bond Elut CBA 96-well Plates

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

References

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



**Typical Matrices**

Water, biological fluids, non-polar extracts

**Primary Extraction Mechanism**

Weak anion exchange

## Bond Elut DEA

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

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

### Bond Elut DEA

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

### Bond Elut DEA VersaPlate Formats

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

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

References

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

# Mixed Mode Silica SPE

## Bond Elut AccuCAT

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

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

**Typical Matrices**

Urine, plasma and biological fluids, beverages and food

**Primary Extraction Mechanism**

Strong cation and anion exchange

### Bond Elut AccuCAT

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

References

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

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

Bond Elut Certify VersaPlate cartridges

## Bond Elut Certify

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

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

**Typical Matrices**

Urine, plasma, saliva, blood, biological fluids

**Primary Extraction Mechanism**

Non-polar and strong cation exchange

### Bond Elut Certify

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

### Bond Elut Certify VersaPlate Formats

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

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

### Bond Elut Certify 96-well Plates

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

## Bond Elut Certify II

**Typical Matrices**

Urine, plasma, saliva, blood, biological fluids

**Primary Extraction Mechanism**

Non-polar and strong anion exchange

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

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

### Bond Elut Certify II

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

# Inorganic SPE

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

## Bond Elut Florisil

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

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

**Typical Matrices**

Non-polar organics

**Primary Extraction Mechanism**

Polar compounds

### Bond Elut Florisil

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

# Bond Elut Alumina

**Typical Matrices**

Non-polar organics

**Primary Extraction Mechanism**

Polar

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

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

## Bond Elut Alumina A

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

## Bond Elut Alumina B

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

## Bond Elut Alumina N

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

## Bond Elut Sodium Sulfate Drying Cartridges

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

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

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

### Bond Elut Sodium Sulfate Drying Cartridges

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



### TIPS & TOOLS

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

# Mega Bond Elut Flash

Bond Elut C18 Flash cartridges, 12256060

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

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

### Mega Bond Elut Flash

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

# Specialty SPE

## Bond Elut Carbon

**Typical Matrices**

Organic plant and tissue extracts

**Primary Extraction Mechanism**

Wide range non-polar retention

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

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

### Bond Elut Carbon

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

### GLOBAL TIP

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

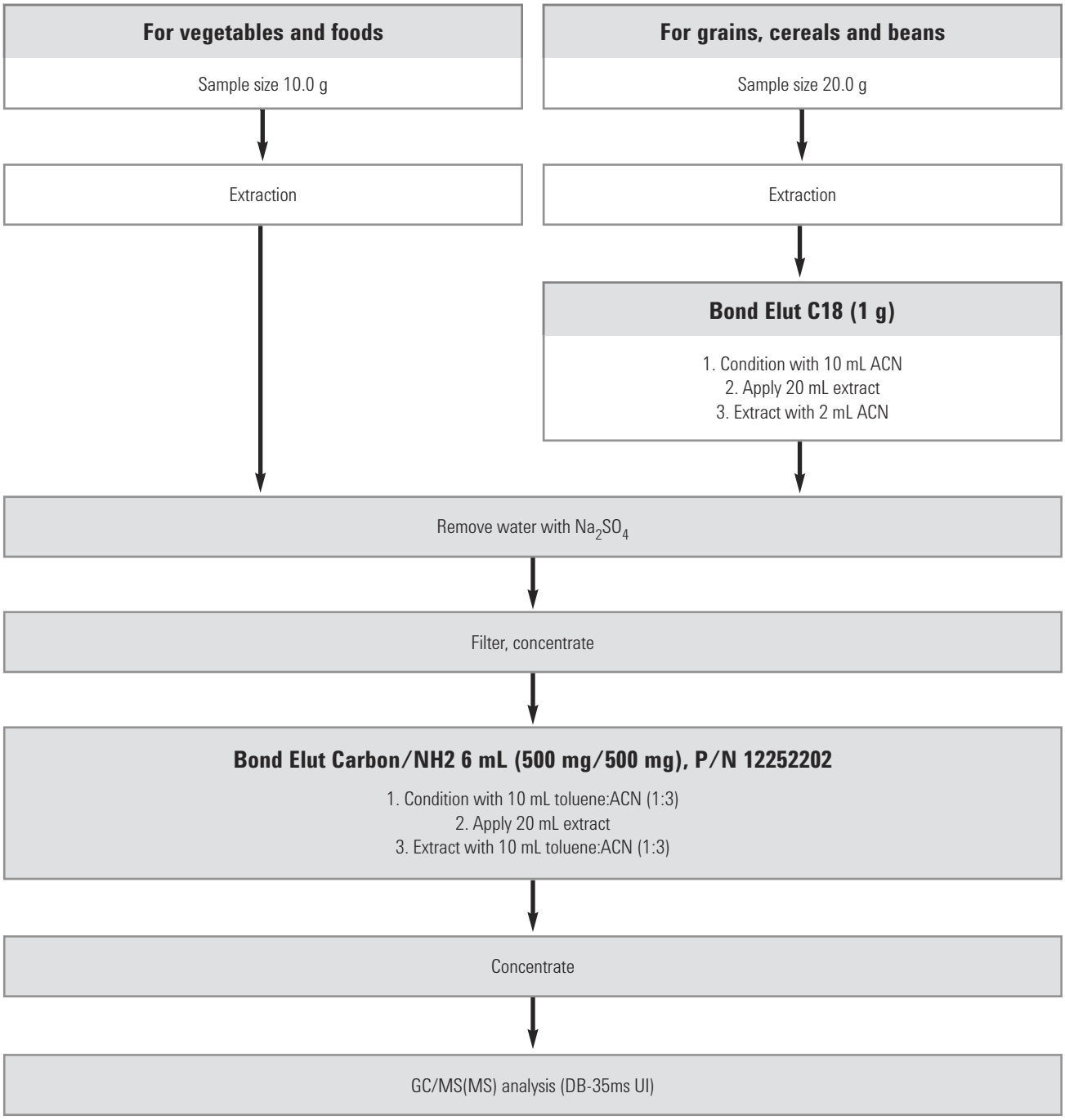
## Bond Elut Carbon/NH2

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

## Bond Elut Carbon/PSA

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

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



## Bond Elut Cellulose

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

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

**Typical Matrices**

Aqueous samples and non-polar organics

**Primary Extraction Mechanism**

Polar (Hydroxyl)

### Bond Elut Cellulose

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

## Bond Elut PCB

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

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

**Typical Matrices**

Water sources

**Primary Extraction Mechanism**

Polar

### Bond Elut PCB

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

# Bond Elut Mycotoxin

**Typical Matrices**

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

**Primary Extraction Mechanism**

Ionic cleanup

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

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

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

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

## Bond Elut Mycotoxin

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

References

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

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

## General Mycotoxin Methods

### For Solids

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

### For Beverages

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

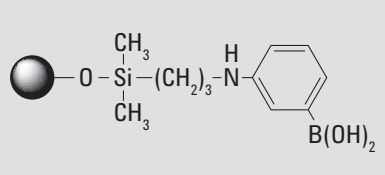
### Wheat beer

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

### Sake wine

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

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




# Bond Elut PBA

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

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

**Typical Matrices**

Plasma, urine, aqueous samples and biological fluids

**Primary Extraction Mechanism**

Covalent bonding

## Bond Elut PBA

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

## Bond Elut PBA 96-well Plates

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

## Generic Method

**Condition:**

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

**Sample Addition:**

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

**Interference Wash:**

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

**Analyte Elution:**

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

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

## EnvirElut

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

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

**Typical Matrices**

Water sources, extracted soil samples

**Primary Extraction Mechanism**

Non-polar

### EnvirElut

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

# Solid Phase Microextraction

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

## Solid Phase Microextraction Fibers

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

### Solid Phase Microextraction Fibers

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

(Continued)

## Solid Phase Microextraction Fibers

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

### TIPS & TOOLS

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

## Solid Phase Microextraction Kits

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

### Solid Phase Microextraction Kits

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

### TIPS & TOOLS

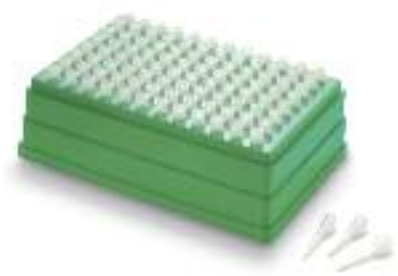
Agilent offers inlet liners designed to work with SPME applications for best performance.
These liners can be found in the GC and GC/MS Columns & Supplies Catalog, publication number 5991-1058EN

## Solid Phase Microextraction Accessories

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

### Solid Phase Microextraction Accessories

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



Omix tips tray, A57009MB

# Micro-volume SPE

## OMIX Tips

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

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

### OMIX Tips

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

## OMIX Tips and Plates for Robotic Automation

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

## OMIX 96-well VersaPlate

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

### OMIX 96-well VersaPlate Formats

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

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

## OMIX Tips for Tomtec Quadra

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

### OMIX Tips for Tomtec Quadra

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

OMIX C18 for Tomtec Quadra, A57303

Close-up of OMIX tips for Tomtec Quadra

OMIX C18 for Hamilton 300 µL, A57403

Close-up of OMIX tips for Hamilton

## OMIX Tips for Hamilton Microlab STAR Line

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

### OMIX Tips for Hamilton Microlab STAR Line, 300 µL

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

### OMIX Tips for Hamilton STAR, MP1, 5 mg

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

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

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

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

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

**Aspirate and dispense parameters**

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

**Albuterol Relative Recoveries**

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

Mean recovery 96%, RSD 3%

# Disk SPE Formats

## Bond Elut SPEC SPE

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

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

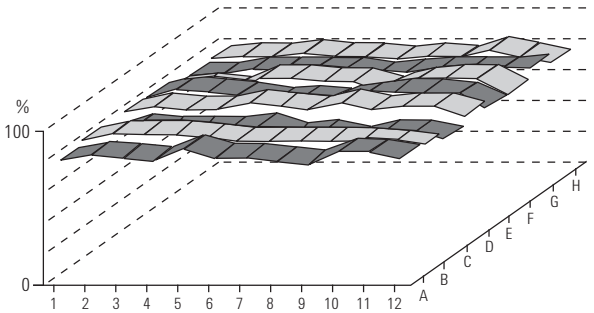
SPEC provides high recoveries at low elution volumes – as low as 100 µL. This is due to the very high surface area yet small physical volume of the monolithic disk. Overall, extraction efficiency is very high for this format of sample preparation product, and the range of functionalities allows fast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

SPEC 47 mm disks and SPEC SPE cartridges, A74702

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

### Uniform recovery and reproducibility between wells from the same well plate

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




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

## SPEC 96-well Plates

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

SPEC 96-well plate

### SPEC 96-well Plates, 15 mg

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

SPEC SPE C18 cartridges, A5320320

## SPEC SPE Cartridges

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

### SPEC SPE Cartridges, 100/pk

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

SPEC 47 mm disks and SPEC SPE cartridges, A74702

### SPEC Disks and Accessories

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

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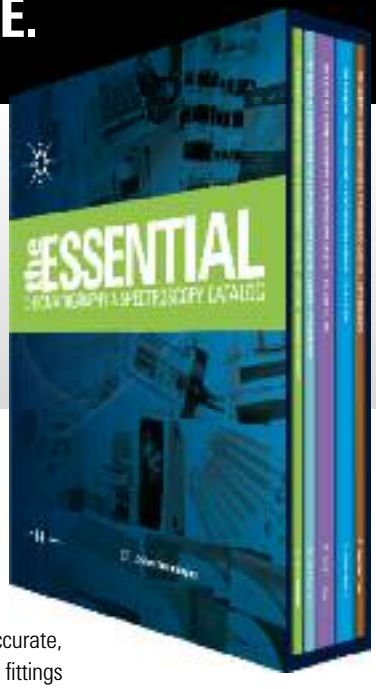


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