# The Complete Guide to Solid Phase Extraction (SPE)

## A Method Development and Application Guide

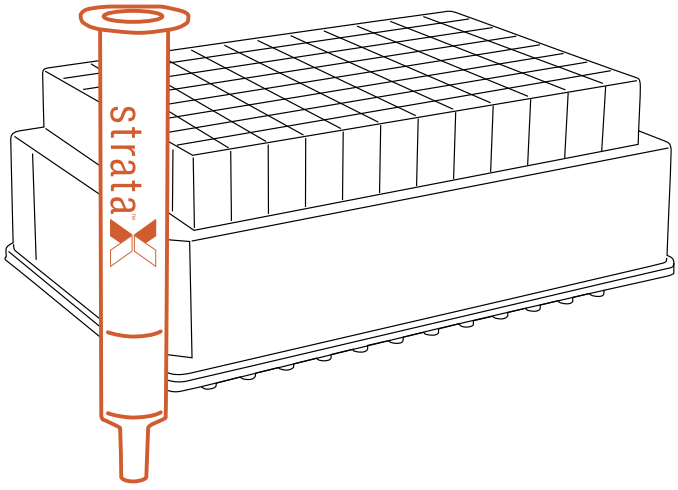
Revision: 1

PHEN-RUO-00202

strata™ Solid Phase Extraction

strata-X™ Polymeric SPE

STRATA-X-PRO™ A Rapid Solid Phase Extraction Solution

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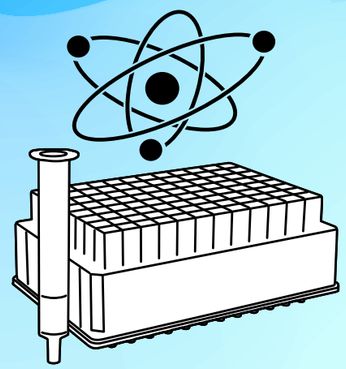
# Solid Phase Extraction (SPE)

**A targeted form of sample preparation that allows you to isolate your analyte of interest.**

**Removing any interfering compounds that may be in your sample.**

- Ultra clean extracts
- Concentration of samples for better chromatographic results
- Solvent switching for GC or LC compatibility
- Longer column lifetime and improved chromatographic results







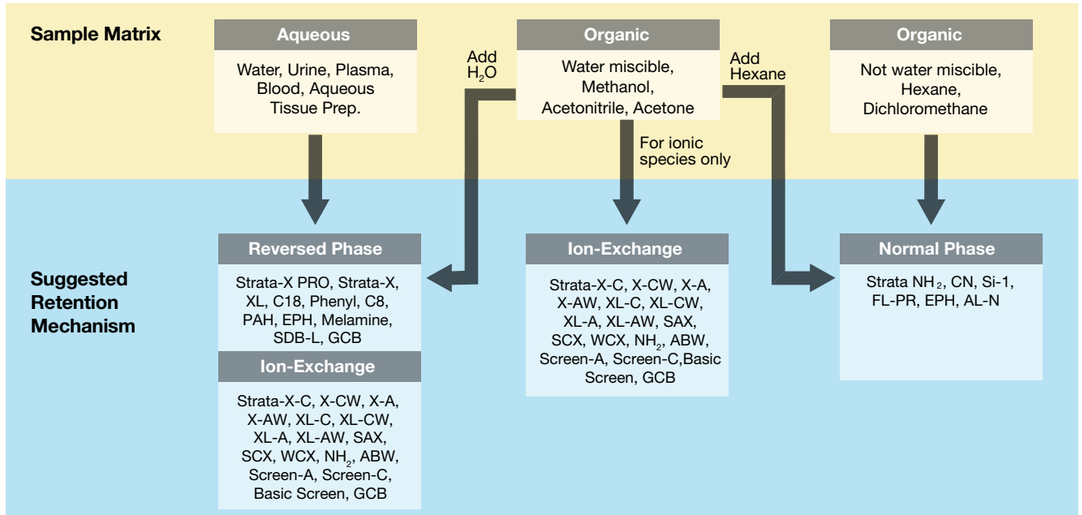
# Getting Started: Follow 3 Easy Steps

**and start implementing your complete SPE method.**

# Step 1
# Select a Sorbent

## Selecting The Right Sorbent: Strata™ Silica-Based, Strata-X Polymer-Based Sorbents, and Strata-X PRO

### Identify the SPE Retention Mechanism




### Available Formats

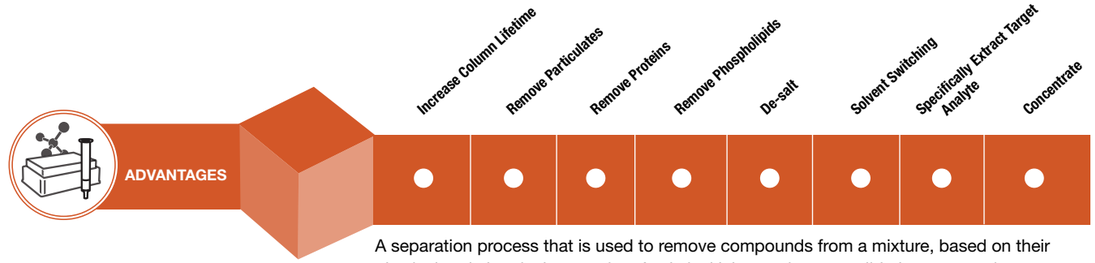
| Sample Matrix | 96-Well Plates | Microelution Plates | 1, 3, and 6 mL Tubes | Giga™ Tubes (12 mL - 150 mL) | On-line Extraction Cartridge | Bulk Sorbent |
|---|---|---|---|---|---|---|
| **Strata-X PRO SPE** | X | X | X | | | |
| **Strata-X Polymeric SPE** | X | X | X | X | X | X |
| **Strata Traditional SPE** | X | 100 mg | X | X | X | X |

### Determine the Sorbent Chemistry

| SPE Mechanism | Analyte Functional Group | Sorbent Functional Group | Strata-X PRO Sorbent | Strata-X Sorbent | Strata Sorbent |
|---|---|---|---|---|---|
| Reversed Phase | R hydrocarbon aromatic | R hydrocarbon aromatic | X PRO | X, XL | C18-E, C18-U, C8 C18-T Phenyl, SDBL |
| Normal Phase | R - OH hydroxyl R - $NH_2$ amino | CN polar OH polar | | | CN, $NH_2$ Si-1, CN, EPH |
| Ion-Exchange | NR4+ strong $RNH_3$+ weak $RSO3$- strong $RCO_2$- weak | $-O_2C$—weak $-O_3S$—strong $+H_3N$—weak $+R_3N$—strong | | X-CW, XL-CW X-C X-AW, XL-AW X-A, XL-A | WCX Screen-C, SCX $NH_2$ Screen-A, SAX |
| | | | **Strata-X-PRO** | **Strata-X** | **Strata** |
| | | | Continue to Page 10 | Continue to Page11 | Continue to Page 14 |



# Step 1
# Solid Phase Extraction




A separation process that is used to remove compounds from a mixture, based on their physical and chemical properties. Analytical laboratories use solid phase extraction to concentrate and purify samples for analysis from a wide variety of matrices.

## 3 Unique Sorbent Platforms

**STRATA™ X PRO** — A Rapid Solid Phase Extraction Solution

Rapid reversed phase polymer with matrix removal technology offers a faster, cleaner way to perform SP.

RAPID 3 STEPS · SUPER EXPRESS 2 STEPS

**strata™ X** Polymeric SPE

Polymeric sorbent available in reversed phase and ion-exchange capabilities for wide range of applications.

RELIABLE 5 STEPS

**strata™** Solid Phase Extraction

Silica-based SPE sorbent provides a reliable and clean extracts with high recoveries for target analytes across all sample matrices.

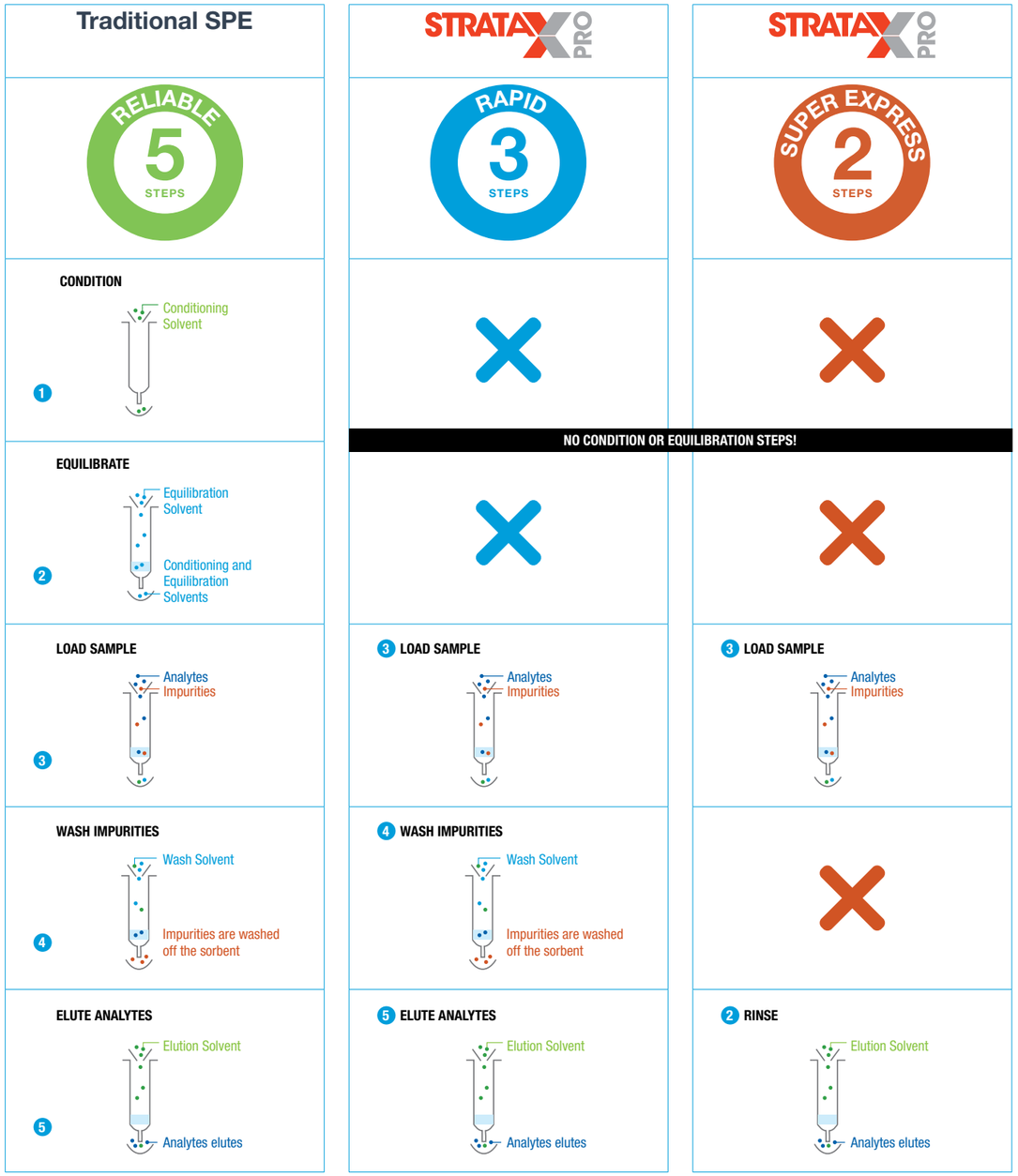
RELIABLE 5 STEPS

## Sorbent Properties

| SPE Overview | Strata-X PRO | Strata-X | Strata |
|---|---|---|---|
| **Increase Detection Sensitivity by removing matrix contaminants** | • | • | • |
| **Increase Column Lifetime by removing matrix contaminants** | • | • | • |
| **Quality Guaranteed by more than 20 QA and QC measures** | • | • | • |
| **Increase Reproducibility with robust methods** | • | • | • |
| **Save Time by processing multiple samples simultaneously or automating method** | • | • | • |
| **Specific Selectivity for your target analytes** | • | • | • |
| **Decreased Solvent Consumption with the highest loadability** | • | • | |
| **Decreased Blow-down Time with smaller elution volumes** | • | • | |
| **Decreased Sample Variation with deconditioning resistant sorbent** | • | • | |
| **pH Stable from 1-14** | • | • | |
| **Fast 2/3 Step SPE method.** | • | | |

## Select a Sorbent

An innovative solid phase extraction (SPE) sorbent that offers a faster, cleaner way to extract your samples, completely revolutionizing traditional SPE methods.








## Sorbert Properties

| SPE Overview | Strata-X PRO | Strata-X | Strata |
|---|---|---|---|
| Increase Detection Sensitivity by removing matrix contaminants | • | • | • |
| Increase Column Lifetime by removing matrix contaminants | • | • | • |
| Quality Guaranteed by more than 20 QA and QC measures | • | • | • |
| Increase Reproducibility with robust methods | • | • | • |
| Save Time by processing multiple samples simultaneously or automating method | • | • | • |
| Specific Selectivity for your target analytes | • | • | • |
| Decreased Solvent Consumption with the highest loadability | • | • | |
| Decreased Blow-down Time with smaller elution volumes | • | • | |
| Decreased Sample Variation with deconditioning resistant sorbent | • | • | |
| pH Stable from 1-14 | • | • | |
| Fast 2/3 Step SPE method. | • | | |

| Select Your Particle and Pore Size | Strata-X, X-C, X-A, X-CW, X-AW | Strata-XL, XL-C, XL-A, XL-CW, XL-AW |
|---|---|---|
| Particle & Pore Size | 33 µm, 85Å | 100 µm, 300Å |
| High Concentration Samples | • | |
| Small Sample Volume/ Less Viscous Samples | • | |
| Large Volume Samples | | • |
| Viscous Samples / More Viscous | | • |

### Polymer-Based Sorbents Loading Capacities

| Sample Matrix | Sorbent Mass | Strata-X, X-C, X-CW, X-A, X-AW | Strata-XL, XL-C, XL-CW, XL-A, XL-AW |
|---|---|---|---|
| Blood, serum, plasma | 30 mg | 250 µL | 125 µL |
| Urine | 30 mg | 1 mL | 500 µL |
| Filtered tissue homogenates | 60 mg | 100 mg | 50 mg |
| **Environmental Samples** | **Sorbent Mass** | **Strata-X, X-C, X-CW, X-A, X-AW** | **Strata-XL, XL-C, XL-CW, XL-A, XL-AW** |
| Water (particulate-free) drinking | 200 mg | 100 - 400 mL | 50 - 200 mL |
| Water (particulate-laden) rivers, runoff, etc. | 500 mg | 100 - 400 mL | 50 - 200 mL |
| Soil extracts | 500 mg | 100 g | 50 g |

### Sorbent Wash and Elution Volumes*

The volume of solvent needed for the wash and elution steps is directly related to the mass of sorbent in the SPE tube and more specifically the “bed volume” of the SPE device. Typically 4 – 16 bed volumes are used in SPE methods.

| strataX Polymeric SPE Sorbent Mass | 2 mg | 10 mg | 30 mg | 60 mg | 100 mg | 150 mg | 200 mg | 500 mg | 1 g | 2 g | 5 g | 10 g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Practical Minimum Wash and Elution Volume 4 bed volumes | 25 µL | 100 µL | 300 µL | 600 µL | 1 mL | 1.5 mL | 2 mL | 5 mL | 10 mL | 20 mL | 50 mL | 100 mL |
| Recommended Wash and Elution Volume 8 bed volumes | 5 µL | 200 µL | 600 µL | 1.2 mL | 2 mL | 3 mL | 4 mL | 10 mL | 20 mL | 40 mL | 100 mL | 200 mL |

* The elution volumes are specific to the chemical nature of the analyte being extracted, its concentration in the sample, the chemical nature of the eluting solvent and the bed mass used. The above is a guideline. An elution study should be conducted to determine the appropriate volume to use.

# Step 1
# Strata™ Silica-Based SPE

# Step 2
# Sample Pre-treatment

## Sorbent Properties

| SPE Overview | Strata-X PRO | Strata-X | Strata |
|---|---|---|---|
| Increase Detection Sensitivity by removing matrix contaminants | • | • | • |
| Increase Column Lifetime by removing matrix contaminants | • | • | • |
| Quality Guaranteed by more than 20 QA and QC measures | • | • | • |
| Increase Reproducibility with robust methods | • | • | • |
| Save Time by processing multiple samples simultaneously or automating method | • | • | • |
| Specific Selectivity for your target analytes | • | • | • |
| Decreased Solvent Consumption with the highest loadability | • | • | |
| Decreased Blow-down Time with smaller elution volumes | • | • | |
| Decreased Sample Variation with deconditioning resistant sorbent | • | • | |
| pH Stable from 1-14 | • | • | |
| Fast 2/3 Step SPE method. | • | | |

| Select Your Particle and Pore Size | Strata | Strata |
|---|---|---|
| Particle & Pore Size | 33 µm, 85Å | 100 µm, 300Å |
| High Concentration Samples | • | |
| Large Volume Samples | | • |
| Viscous Samples | | • |

### Silica-Based Sorbents Loading Capacities

| Sample Matrix | Sorbent Mass |
|---|---|
| Blood, serum, plasma | 50 mg sorbent per 250 µL |
| Urine | 50 mg sorbent per 500 µL |
| Filtered tissue homogenates | 100 mg sorbent per 100 mg tissue |
| **Environmental Samples** | **Sorbent Mass** |
| Water (particulate-free) drinking | 500 mg/100 mL - 500 mL sample |
| Water (particulate-laden) rivers, runoff, etc. | 1 g/100 mL - 500 mL sample |
| Soil extracts | 1 g/100 g of soil extract |

### Sorbent Wash and Elution Volumes*

The volume of solvent needed for the wash and elution steps is directly related to the mass of sorbent in the SPE tube and more specifically the "bed volume" of the SPE device. Typically 4 – 16 bed volumes are used in SPE methods.

| Strata™ Solid Phase Extraction Sorbent Mass | 10 mg | 50 mg | 100 mg | 150 mg | 200 mg | 500 mg | 1 g | 2 g | 5 g | 10 g |
|---|---|---|---|---|---|---|---|---|---|---|
| Practical Minimum Wash and Elution Volume 4 bed volumes | 60 µL | 300 µL | 600 µL | 900 µL | 1.2 mL | 3 mL | 6 mL | 12 mL | 30 mL | 60 mL |
| Recommended Wash and Elution Volume 8 bed volumes | 120 µL | 600 µL | 1.2 mL | 1.8 mL | 2.4 mL | 6 mL | 12 mL | 24 mL | 60 mL | 120 mL |

*The elution volumes are specific to the chemical nature of the analyte being extracted, its concentration in the sample, the chemical nature of the eluting solvent and the bed mass used. The above is a guideline. An elution study should be conducted to determine the appropriate volume to use.

Reproducible, high efficiency solid phase extraction requires that the sample be made liquid prior to loading onto a SPE device. The SPE sample should meet the following conditions:

- Liquid of low viscosity (to pass through the cartridge)
- Low solids or particulate contaminants (to prevent clogging)
- Solvent composition that is suitable for retention (each mechanism has different matrix solvent composition requirements for proper retention)

| Biological Samples (solid) | | |
|---|---|---|
| | **Urine, Whole blood, Serum, Plasma, Bile, etc.** | Dilute sample 1:2 with appropriate buffer, precipitate proteins if proteinaceous ($ZnSO_4$, ACN), hydrolyze urinary glucuronides, disruption of protein binding (sonication, enzymatic, acids/bases). |
| **Biological Samples (solid)** | | |
| | **Organ tissues, Feces, GI contents** | Homogenize with organic or aqueous solvent depending upon analyte solubility. Settle, decant, centrifuge or filter supernatant. Perform direct Matrix Solid Phase Dispersion (MSPD) extraction on tissue. |
| **Sample Matrix** | | |
| | **Water (waste, river, etc.)** | Buffer to appropriate pH and filter particulates from sample. |
| | **Soil, Sludge** | Homogenize with organic or aqueous solvent depending upon analyte solubility. Settle, decant and filter supernatant; perform Soxhlet extraction. |
| | **Ointments, Creams** | Oil-based<br>Dissolve in non-polar organic (hexane) and extract via polar SPE.<br>Water-based<br>Dissolve in water or water miscible organic (methanol) and extract via non-polar SPE. |
| | **Fruit, Vegetable, Herbs** | Homogenize with organic or aqueous solvent depending upon analyte solubility and filter supernatant. Use appropriate SPE mechanism for the dissolution solvent (hexane = polar mechanism; aqueous = non-polar mechanism; methanol/ACN = either non-polar or polar after proper dilution). |

**Strata™-X PRO** Continue to Page 10

**Strata™-X** Continue to Page 11

**Strata™** Continue to Page 14

### Sample Preparation Support at Your Fingertips

Dedicated sample preparation team available to assist your method development needs.

**Support@Phenomenex.com**

# Step 3
# Strata™-X PRO: Faster and Quicker Methods

Strata™-X PRO also improves on traditional SPE by implementing straightforward recommended methods that will work with most extractions, and optimization is only optional. This helps to save even more time in the lab and get you back to the things you really want to be doing. Like asking yourself, is a narwhal real? Yes, and now so is Strata-X PRO.

## Sorbent Properties

| SPE Mechanism | Analyte Functional Group | Sorbent Functional Group |
|---|---|---|
| Reversed Phase | R hydrocarbon aromatic | R hydrocarbon aromatic |

SUPER EXPRESS 2 STEPS

### 2-Step Protocol

Non-retentive SPE method to help achieve the fastest extraction.

**Load**
1 mL Pre-treated sample/0.1 %
Formic acid in Acetonitrile (1:4)
Apply 5" Hg vacuum until all tubes or wells have cleared

**Elute**
75 µL Water/0.1 % Formic acid in Acetonitrile (1:4)
Apply 5" Hg vacuum until all tubes or wells have cleared

Protocols are written for 30 mg/1 mL tubes, adjust based on sorbent size.

RAPID 3 STEPS

### 3-Step Protocol

Rapid protocol to reduce matrix effects and increase recovery of polar analytes.

**Load**
500 µL Pre-treated sample/buffer* (1:1)
Apply 2-5" Hg vacuum until liquid is no longer visible above top frit

**Wash**
600 µL 5 % Methanol in Water

**Elute**
600 µL 0.1 % Formic acid in Acetonitrile/Methanol (90:10)
Apply 2-5" Hg vacuum for 1 minute

Protocols are written for 30 mg/1 mL tubes, adjust based on sorbent size.

Select a buffer that maximizes the hydrophobicity of the analytes. For example, if an analyte is basic, dilute with a base.

**Methods are written for 30 mg/1 mL tube; adjust based on sorbent size.**

### Search Hundreds of Applications


Know the name of your analyte? Immediately find key Sample Prep applications for small molecules and biomolecules by entering the name or the chemical properties of the analyte.

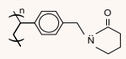
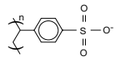
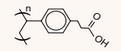
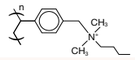
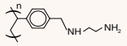
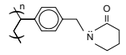
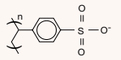
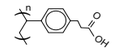
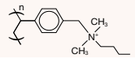
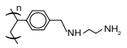
**www.phenomenex.com/applications**



# Step 3
# General Starting Methods: Strata™-X

## Strata-X Polymeric SPE Phase Overview

- Clean extracts from biological sample matrices
- Streamlined method development and simple processing

| Strata-X Phase | Functional Group | Mode | Analyte | Recommended Alternative to Waters® |
|---|---|---|---|---|
| Strata-X |  | Reversed Phase | Polar and Non-Polar | Oasis® HLB |
| Strata-X-C |  | Reversed Phase and Strong Cation-Exchange | Bases | Oasis MCX |
| Strata-X-CW |  | Reversed Phase and Weak Cation-Exchange | Bases (including Quaternary Amines) | Oasis WCX |
| Strata-X-A |  | Reversed Phase and Strong Anion-Exchange | Acids | Oasis MAX |
| Strata-X-AW |  | Reversed Phase and Weak Anion-Exchange | Acids (including Sulfonic acids) | Oasis WAX |
| Strata-XL |  | Large Particle Reversed Phase | Polar and Non-Polar | Oasis HLB |
| Strata-XL-C |  | Large Particle Reversed Phase and Strong Cation-Exchange | Bases | Oasis MCX |
| Strata-XL-CW |  | Large Particle Reversed Phase and Weak Cation-Exchange | Bases (including Quaternary Amines) | Oasis WCX |
| Strata-XL-A |  | Large Particle Reversed Phase and Strong Anion-Exchange | Acids | Oasis MAX |
| Strata-XL-AW |  | Large Particle Reversed Phase and Weak Anion-Exchange | Acids (including Sulfonic acids) | Oasis WAX |

## Strata-X / Strata-XL Reversed Phase

### For Neutral Compounds

**Condition**
1 mL Methanol

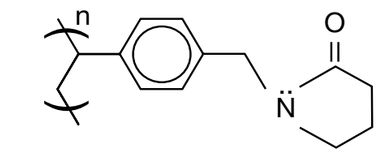
**Equilibrate**
1 mL Water

**Load**
Diluted Sample

**Wash**
1 mL 5-60 % Methanol

**Elute**
2x 500 µL 2 % Formic Acid in Methanol/Acetonitrile

### Reversed Phase



*Based on 30 mg/1 mL sorbent mass. The above is a convenient starting point for SPE method development. Further optimization may be required to tailor the method to your specific needs.

## Strata-X-C / Strata-XL-C

Strong Cation-exchange & Reversed Phase


**For Bases with p$K_a$ ≤ 10.5**

**Condition**
1 mL Methanol

**Equilibrate**
1 mL Acidified Water

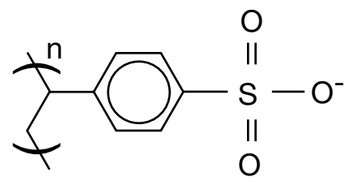
**Load**
Diluted Acidified Sample

**Wash 1**
1 mL 0.1 N HCl in Water
(collect this fraction to analyze Polar Neutrals)

**Wash 2**
1 mL 0.1 N HCl in Methanol
(collect this fraction to analyze Neutrals/Acids)

**Elute Bases**
2x 500 µL 5 % $NH_4OH$ in Methanol

**Strong Cation-exchange: sulfonic acid ligand**




## Strata-X-CW / Strata-XL-CW

Weak Cation-Exchange & Reversed Phase


**For Bases with p$K_a$ > 8**

**Condition**
1 mL Methanol

**Equilibrate**
1 mL Water, pH 6-7

**Load**
Diluted Sample, pH 6-7

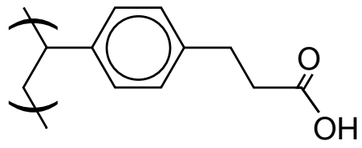
**Wash 1**
1 mL Water, pH 6-7

**Wash 2**
1 mL Methanol
(collect this fraction to analyze Neutrals/Acids)

**Elute Any Acids**
2x 500 µL 5 % Formic Acid in Methanol

**Elute Weak Acids**
2x 500 µL 5 % $NH_4OH$ in Methanol

**Weak Cation-exchange: carboxylic acid ligand**




* Based on 30 mg/1 mL sorbent mass. The above is a convenient starting point for SPE method development. Further optimization may be required to tailor the method to your specific needs.





## Strata-X-A / Strata-XL-A

Strong Anion-exchange & Reversed Phase


**For Acids with p$K_a$ > 2**

**Condition**
1 mL Methanol

**Equilibrate**
1 mL Water, pH 6-7

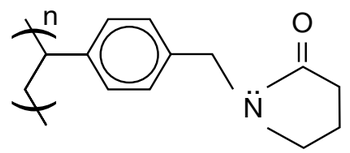
**Load**
Diluted Sample pH 6-7

**Wash 1**
1 mL 25 mM Ammonium Acetate Buffered, pH 6-7

**Wash 2**
1 mL Methanol
(collect this fraction to analyze Neutral/Bases)

**Elute Acids**
2x 500 µL 5 % Formic Acid in Methanol

**Strong Anion-exchange: di-methylbutyl quaternary amine ligand**




## Strata-X-AW / Strata-XL-AW

Weak Anion-exchange & Reversed Phase


**For Acids with p$K_a$ < 5**

**Condition**
1 mL Methanol

**Equilibrate**
1 mL Water, pH 6-7

**Load**
Diluted Sample pH 6-7

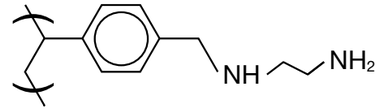
**Wash 1**
1 mL 25 mM Ammonium Acetate Buffered, pH 6-7

**Wash 2**
1 mL Methanol

**Elute Any Acids**
2x 500 µL 5 % $NH_4OH$ in Methanol

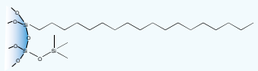
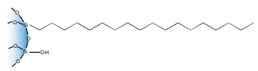
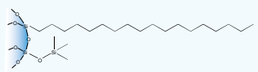
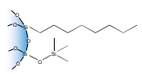
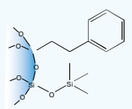
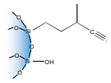
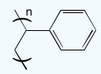
**Elute Weak Acids**
2x 500 µL 5 % Formic Acid in Methanol

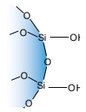
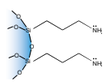
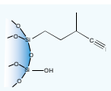
**Weak Anion-exchange: di-amino ligand**




* Based on 30 mg/1 mL sorbent mass. The above is a convenient starting point for SPE method development. Further optimization may be required to tailor the method to your specific needs.

## Strata Silica-Based SPE Phase Overview

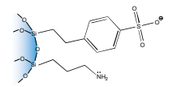
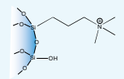
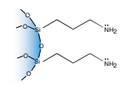
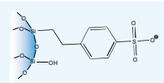
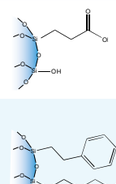
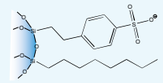
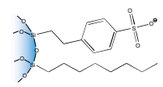
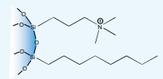
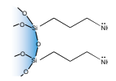
| Reversed Phase Sorbents | | | | Recommended Alternative to: | | | | |
|---|---|---|---|---|---|---|---|---|
| **Strata Phase** | **Phase Benefits** | **Sorbent Chemistry** | **Recommended Method ( See pp. 16-17)** | **Waters® Sep-Pak®** | **Agilent® SampliQ® Bond Elut®** | **Biotage® IST® ISOLUTE®** | **UCT® CleanScreen® StyreScreen®** | **Supelco® Discovery®** |
| **C18-E** | Extraction of hydrophobic molecules |  | METHOD 1 | C18 | SampliQ, C18EC, Bond Elut, C18 | C18 (EC) | C18 | DSC-18 |
| **C18-U** | Enhanced cleanup of hydrophobic compounds that contain hydroxy or amine functional groups |  | METHOD 1 | | Bond Elut, C18-OH | C18 | | |
| **C18-T** | Wide pore for the extraction of large hydrophobic molecules (up to 75 kDa) |  | METHOD 1 | C18 | Bond Elut, C18-EWP | | | DSC-18Lt |
| **C8** | Extraction of extremely hydrophobic compounds that are retained too tightly on C18-E |  | METHOD 1 | C8 | SampliQ C8, Octyl, Bond Elut, C8 | C8(EC) | C8 | DSC-8 |
| **Phenyl (PH)** | Extraction of aromatic compounds |  | METHOD 1 | | SampliQ, Phenyl, Bond Elut, PH | PH | Phenyl | DSC-Ph |
| **CN** | Extraction of polar compounds |  | METHOD 1 | CN | SampliQ, Cyano (CN), Bond Elut, Cyano (CN-E) | CN | CN | DSC-CN |
| **SDB-L** | Extraction of non-polar and polar compounds; pH resistant sorbent |  | METHOD 1 | | SampliQ, DVB, Bond Elut, ENV, Bond Elut, LMS | 101 | StyreScreen® DVB | DSC-PS/ DVB |
| **Activated Carbon** | For better retention of polar compounds | Proprietary | METHOD 1 (A) | AC2 | | | Enviro Clean 521 | Coconut Charcoal |

| Normal Phase Sorbents | | | | Recommended Alternative to: | | | | |
|---|---|---|---|---|---|---|---|---|
| **Strata Phase** | **Phase Benefits** | **Sorbent Chemistry** | **Recommended Method ( See pp. 16-17)** | **Waters® Sep-Pak®** | **Agilent® SampliQ® Bond Elut®** | **Biotage® IST® ISOLUTE®** | **UCT® CleanScreen® StyreScreen®** | **Supelco® Discovery®** |
| **Si-1 (Silica)** | Extraction of polar compounds that are similar in structure |  | METHOD 6 | Silica | SampliQ Silica, Bond Elut SI | SI | Silica | DSC-Si |
| **FL-PR (Florisil®)** | Extraction of pesticides | Florisil | METHOD 6 | Florisil® | SampliQ, Florisil® PR, Bond Elut, Florisil® | FL | Florisil® PR | ENVI-Florisil® |
| **$NH_2$** | Extraction of strong anions |  | METHOD 6 | $NH_2$ | SampliQ, Amino ($NH_2$), Bond Elut, Aminopropyl ($NH_2$) | $NH_2$ | Amino Propyl | DSC-$NH_2$ |
| **CN** | Extraction of polar compounds |  | METHOD 6 | CN | SampliQ, Cyano (CN), Bond Elut, Cyano (CN-E) | CN | CN | DSC-CN |





## Strata Silica-Based Phase Overview

| Ion-Exchange Sorbents | | | | Recommended Alternative to: | | | | |
|---|---|---|---|---|---|---|---|---|
| **Strata Phase** | **Phase Benefits** | **Sorbent Chemistry** | **Recommended Method ( See pp. 16-17)** | **Waters® Sep-Pak®** | **Agilent® SampliQ® Bond Elut®** | **Biotage® IST® ISOLUTE®** | **UCT® CleanScreen® StyreScreen®** | **Supelco® Discovery®** |
| **ABW** | Fractionation of neutral compounds such as amides from acidic and basic analytes |  | INQUIRE | | | | | |
| **SAX** | Extraction of weak anions |  | METHOD 5 | Accell Plus QMA | SampliQ, Si-SAX, Bond Elut, SAX | SAX | Quaternary Amine | DSC-SAX |
| **WAX** | Complete retention of strong acidic compounds ($pK_a$ <5) |  | METHOD 5 | OASIS WAX | PFAS | WAX | Enviro Clean WAX | ENVI-WAX |
| **SCX** | Extraction of 1°, 2°, and 3° amines |  | METHOD 3 | | SampliQ, Si-SCX, Bond Elut, SCX | SCX-3 | Benzene Sulfonic Acid | DSC-SCX |
| **WCX** | Extraction of quaternary amines |  | METHOD 3 | Accell Plus CM | Bond Elut CBA | CBA | Carboxylic Acid | DSC-WCX |
| **Screen-C** | Mixed-mode cation-exchange that also provides hydrophobic retention |  | METHOD 3 | | SampliQ, C8/Si-SCX, Mixed Mode, Bond Elut, Certify® | HCX | Clean Screen® DAU | |
| **Screen-C GF** | Large particle size, mixed-mode cation-exchange that also provides hydrophobic retention |  | METHOD 3 | | Bond Elut, Certify®, I HF | | Xtract® DAU | |
| **Screen-A** | Mixed-mode anion-exchange that also provides hydrophobic retention |  | METHOD 5 | | Bond Elut, Certify® II | HAX | Clean Screen THC | |
| **$NH_2$** | Extraction of strong anions |  | METHOD 4 | $NH_2$ | SampliQ, Amino ($NH_2$), Bond Elut, Aminopropyl ($NH_2$) | $NH_2$ | Amino Propyl | DSC-$NH_2$ |

| Special Sorbents | | | | Recommended Alternative to: | | | | |
|---|---|---|---|---|---|---|---|---|
| **Strata Phase** | **Phase Benefits** | **Sorbent Chemistry** | **Recommended Method ( See pp. 16-17)** | **Waters® Sep-Pak®** | **Agilent® SampliQ® Bond Elut®** | **Biotage® IST® ISOLUTE®** | **UCT® CleanScreen® StyreScreen®** | **Supelco® Discovery®** |
| **Alumina-N (AL-N)** | Extraction of polar compounds from food and environmental samples | Proprietary | METHOD 6 | Alumina-N | | | | |
| **EPH (Extractable Petroleum Hydrocarbons)** | Fractionation of aliphatic and aromatic hydrocarbons from environmental samples |  | METHOD 6 | | | | | |

## Strata
### Reversed Phase — Method 1

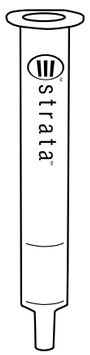
**Condition**
1 mL Methanol

**Equilibrate**
1 mL DI Water

**Load**
Pretreated sample

**Wash 1**
1 mL 5 % Methanol in DI Water, dry under vacuum for 2-5 min

**Elute**
1 mL Methanol



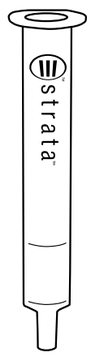

## Strata
### Activated Carbon — Method 1 (A)

**Condition**
2x10 mL Methylene Chloride
2x10mL Methanol

**Equilibrate**
2x10mL DI water

**Load**
500 mL water sample spiked with internal standard. Dry for 10 minutes

**Elute**
3x3 mL Methylene Chloride




## Strata WCX
### Weak Cation - Exchange — Method 2

**Condition**
1 mL Methanol

**Equilibrate**
1 mL DI Water, pH 6-7

**Load**
Pretreated sample, pH 6-7

**Wash 1**
1 mL Water, pH 6-7

**Wash 2**
1 mL Methanol, dry under vacuum for 2-5 min

**Elute Any Base**
1 mL 5 % Formic Acid in Methanol

**Elute Weak Bases**
1 mL 5 % $NH_4OH$ in Methanol


## Strata SCX
### Strong Cation - Exchange — Method 3

**Condition**
1 mL Methanol

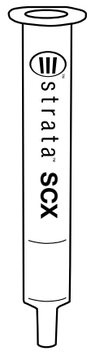
**Equilibrate**
1 mL Acidified Water

**Load**
Pretreated sample (acidified)

**Wash 1**
1 mL 0.1N HCl in Water

**Wash 2**
1 mL 0.1N HCl in Methanol, dry under vacuum for 2-5 min

**Elute**
1 mL 5 % $NH_4OH$ in Methanol




*100 mg sorbent mass





## Strata $NH_2$
### (WAX) Weak Anion - Exchange — Method 4

**Condition**
1 mL Methanol

**Equilibrate**
1 mL Water, pH 6-7

**Load**
Pretreated sample, pH 6-7

**Wash 1**
1 mL 25 mM Ammonium Acetate Buffer, pH 6-7

**Wash 2**
1 mL Methanol, dry under vacuum for 2-5 min

**Elute Any Base**
1 mL 5 % $NH_4OH$ in Methanol

**Elute Weak Bases**
1 mL 5 % Formic Acid in Methanol


## Strata SAX/WAX
### Strong Anion - Exchange — Method 5

**Condition**
1 mL Methanol

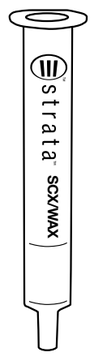
**Equilibrate**
1 mL Water

**Load**
Pretreated sample, pH 6-7

**Wash 1**
1 mL 25 mM Ammonium Acetate Buffer, pH 6-7

**Wash 2**
1 mL Methanol, dry under vacuum for 2-5 min

**Elute**
1 mL 5 % Formic Acid in Methanol




## Strata
### Normal Phase Method — Method 6

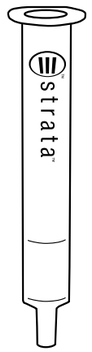
**Condition**
IPA / DCM

**Equilibrate**
Hexane

**Load**
Pretreated sample

**Wash 1**
5 % DCM in Hexane

**Elute**
1:1 Hexane / DCM or 1:1 Hexane / IPA




*100 mg sorbent mass

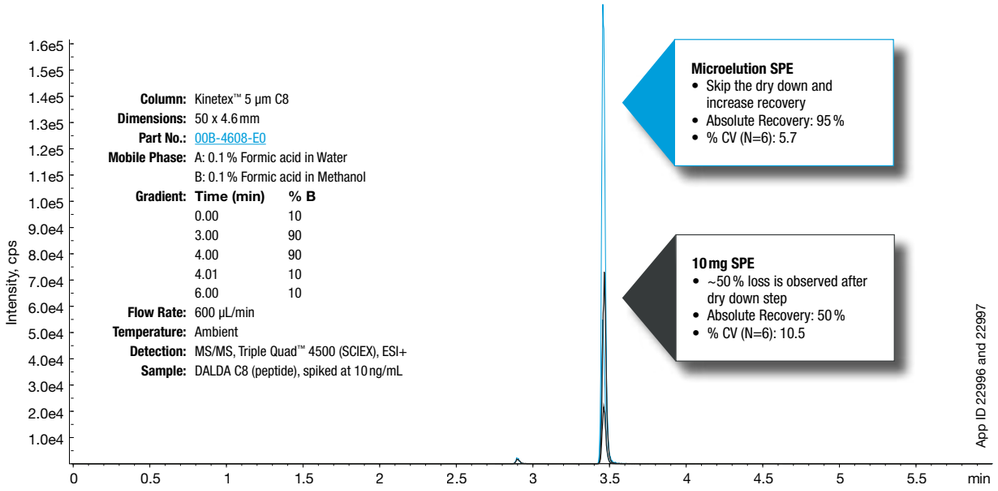
# Preventing Analyte Loss by Skipping the Dry Down Step Using Microelution SPE

Many target analytes, such as peptides and thermolabile compounds, can be lost during dry down steps. Stop risking analyte loss and skip the dry down, without losing sensitivity using Strata™-X microelution plates. A new format that provides increased sensitivity for analytes of interest.

## SPE Protocol

| | Strata-X 96-Well Plate, 10 mg/well | Strata-X Microelution 96-Well Plate, 2 mg/well |
|---|---|---|
| **Part No.** | 8E-S100-AGB | 8M-S100-4GA |
| **Condition** | 400 µL Methanol | 200 µL Methanol |
| **Equilibrate** | 400 µL Water | 200 µL Water |
| **Load** | 400 µL diluted serum (200 µL serum diluted 1:1 with 4 % Phosphoric acid in water) | 400 µL diluted serum (200 µL serum diluted 1:1 with 4 % Phosphoric acid in water) |
| **Wash 1** | 400 µL 2 % Formic acid in water | 200 µL 2 % Formic acid in water |
| **Wash 2** | 400 µL 20 % Acetonitrile in water | 200 µL 20 % Acetonitrile in water |
| **Elute** | 2x 175 µL Trifluoroacetic acid/acetonitrile/water (1:74:25) | 2x 25 µL Trifluoroacetic acid/acetonitrile/water (1:74:25) |
| **Dry Down** | Dry down under a gentle stream of Nitrogen and reconstitute in 50 µL Trifluoroacetic acid/ acetonitrile/ water (1:74:25) | NOT REQUIRED |
| **Injection** | 10 µL | 10 µL |

## DALDA C8 (peptide) Extracted from Serum








# Improved Clean Up and Recovery of Pharmaceutical Compounds From Plasma: SPE vs. Liquid-liquid Extraction

Although liquid-liquid extraction (LLE) has been frequently used in the past, newer techniques with improved specificity towards particular analytes have allowed analysts to improve recovery and reproducibility of their samples. It was found that SPE provides cleaner extracts, higher recoveries, and better reproducibility which can greatly improve results when working with pharmaceutical compounds from plasma.

## SPE Protocol

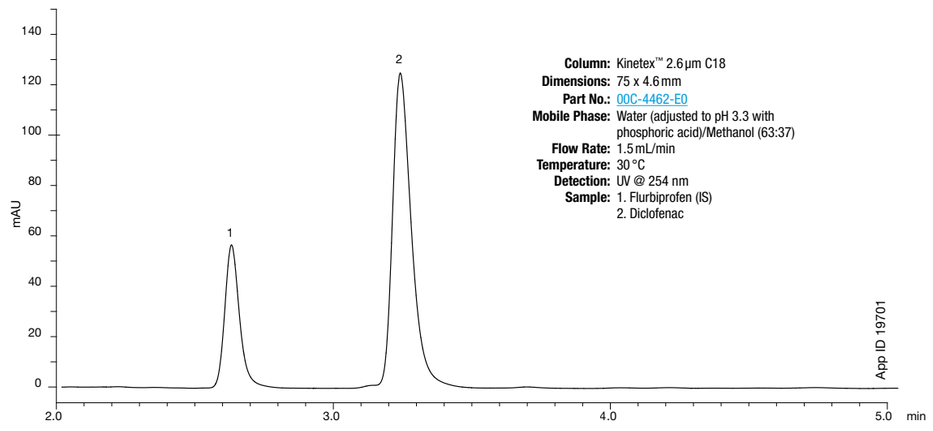
| | Strata™-X 30 mg/1 mL |
|---|---|
| **Part No.** | 8B-S100-TAK |
| **Condition** | 1 mL Methanol |
| **Equilibrate** | 2 mL Water |
| **Load** | 1.6 mL Pre-treated plasma |
| **Wash** | 1 mL 5 % Methanol |
| **Dry** | 1 minute under vacuum at 10 inches Hg |
| **Elute** | 1 mL Methanol |
| **Dry Down** | Dry down @ 53 °C under a stream of nitrogen for 20 minutes |
| **Reconstitute** | Reconstitute in 500 µL of mobile phase |

## % Absolute Recovery for Diclofenac

| | Spiked Concentration | Diclofenac |
|---|---|---|
| **SPE** | 15 µg/mL | 86 % (n=4) |
| **LLE** | 15 µg/mL | 46 % (n=4) |

Diclofenac spiked plasma sample (50 µg/mL) after extraction with Strata™-X. Flurbiprofen (IS) was added post-extraction at a concentration of 160 µg/mL. Note: the flurbiprofen was added post blow down, which is also post-extraction.

## Chromatogram after SPE Extraction from a Plasma Matrix




To learn more about this method and others, visit:
**www.phenomenex.com/SPE**

# Amphetamines from Urine Using Microelution SPE

An extraction method to isolate five amphetamines from urine using Strata™-X-C Microelution 96-well SPE plates followed by LC/MS/MS analysis. By utilizing the microelution SPE format, the dry down step was skipped saving at least 30 minutes without negatively impacting the sensitivity of our analysis. The five amphetamines were accurately quantified at detection levels down to 25 % below the cutoff levels specified by the Substance Abuse and Mental Health Services Administration (SAMHSA).

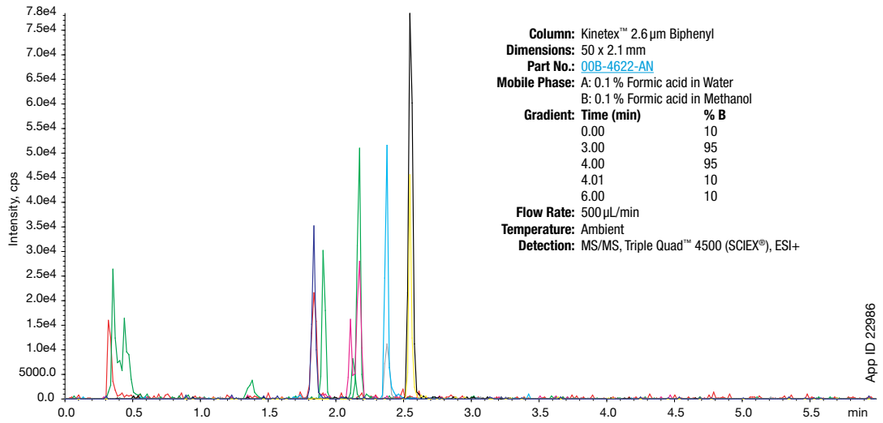
## SPE Protocol

| | Strata-X-C Microelution 96-Well Plate, 2 mg/well |
|---|---|
| **Part No.** | 8M-S029-4GA |
| **Condition** | 200 µL Methanol |
| **Equilibrate** | 200 µL Water |
| **Load** | 400 µL diluted urine (200 µL urine diluted 1:1 with water) |
| **Wash 1** | 200 µL 2 % Formic acid in water |
| **Wash 2** | 200 µL Methanol |
| **Elute** | 2x 25 µL 5 % Ammonium hydroxide in acetonitrile/methanol (60:40) |
| **Injection** | 2 µL |

## Amphetamines Extracted from Human Urine

| Amphetamines | Concentration (ng/mL) (25 % below SAMHSA cut off) | RT (min) | % Absolute Recovery | % CV (N=8) |
|---|---|---|---|---|
| **Amphetamine** | 125 | 1.83 | 82 | 13.1 |
| **Methamphetamine** | 125 | 2.12 | 107 | 15.1 |
| **MDA** | 62.25 | 2.15 | 106 | 4.2 |
| **MDMA** | 62.25 | 2.36 | 99 | 15.7 |
| **MDEA** | 62.25 | 2.53 | 108 | 10.5 |

## Chromatogram of Amphetamines Extracted from Human Urine




**Column:** Kinetex™ 2.6 µm Biphenyl
**Dimensions:** 50 x 2.1 mm
**Part No.:** 00B-4622-AN
**Mobile Phase:** A: 0.1 % Formic acid in Water
B: 0.1 % Formic acid in Methanol

| **Gradient:** | **Time (min)** | **% B** |
|---|---|---|
| | 0.00 | 10 |
| | 3.00 | 95 |
| | 4.00 | 95 |
| | 4.01 | 10 |
| | 6.00 | 10 |

**Flow Rate:** 500 µL/min
**Temperature:** Ambient
**Detection:** MS/MS, Triple Quad™ 4500 (SCIEX®), ESI+





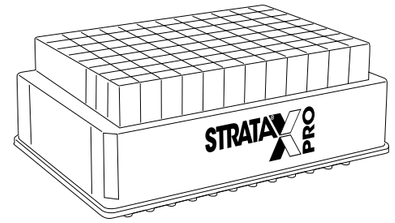
Using a generic method to extract multiple panels is another way Strata-X PRO excels. While the different panels of analytes are highlighted to show the ease of method development, changing the wash solvent could further optimize the method and provide even cleaner results. Using a stronger percent of organic in the wash will provide even cleaner results.

- Barbiturates
- Analgesics
- Opiates
- Benzodiazepines

## SPE Protocol

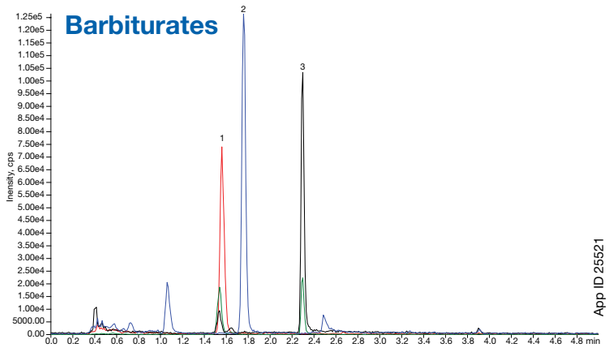
**96-Well Plates:** Strata™-X PRO, 30 mg/well
**Part No.:** 8E-S536-TGA
**Load:** 400 µL Human serum/1 % Formic acid in Water (1:1)
**Wash:** 600 µL 5 % Methanol in Water
**Dry:** 2-3 minutes @ 5" Hg
**Elute:** 600 µL 0.1 % Formic acid in Acetonitrile/Methanol (90:10)
**Dry Down:** Under a gentle stream of Nitrogen at 40 °C to dryness
**Reconstitute:** 200 µL 0.1 % Formic acid in water/0.1 % Formic acid in Methanol

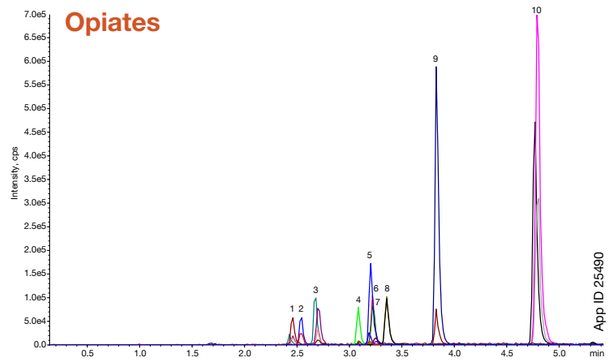
| Analyte | RT (min) | % Recovery | % CV |
|---|---|---|---|
| 1. Phenobarbital | 1.56 | 91 | 3.4 |
| 2. Butalbital | 1.76 | 103 | 2.3 |
| 3. Secobarbital | 2.3 | 98 | 2.1 |
| 1. Morphine | 2.43 | 68 | 3.8 |
| 2. Oxymorphone | 2.54 | 80 | 8.6 |
| 3. Hydromorphone | 2.67 | 75 | 10.5 |
| 4. Naloxone | 3.09 | 83 | 3.9 |
| 5. 6-MAM | 3.2 | 77 | 7 |
| 6. Codeine | 3.2 | 70 | 9 |
| 7. Oxycodone | 3.36 | 64 | 0.6 |
| 8. Hydrocodone | 3.41 | 73 | 3.2 |
| 9. Norfentanyl | 3.83 | 57 | 3.2 |
| 10. Fentanyl | 4.78 | 79 | 3.9 |
| 1. Meprobamate | 3.73 | 70 | 9.2 |
| 2. Tramadol | 3.9 | 71 | 5.1 |
| 3. Carisoprodol | 4.3 | 66 | 9.6 |
| 4. Norbuprenorphine | 4.3 | 70 | 8.4 |
| 5. Buprenorphine | 4.7 | 60 | 1.6 |
| 1. Lorazepam | 4.74 | 61 | 19.5 |
| 2. Oxazepam | 4.86 | 45 | 14.1 |
| 3. α-Hydroxy alprazolam | 5 | 60 | 14.2 |
| 4. Nordiazepam | 5.05 | 63 | 13 |
| 5. Temazepam | 5.19 | 66 | 6.5 |
| 6. Alprazolam | 5.26 | 50 | 5 |
| 7. Diazepam | 5.44 | 68 | 8 |

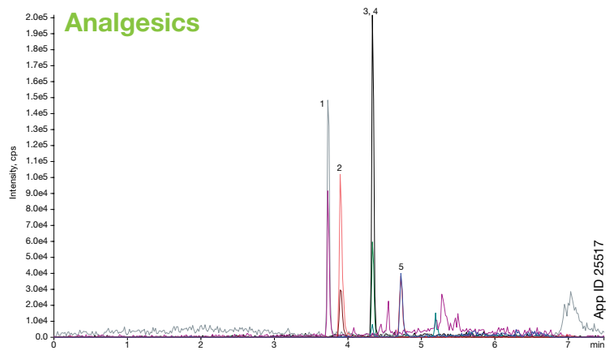


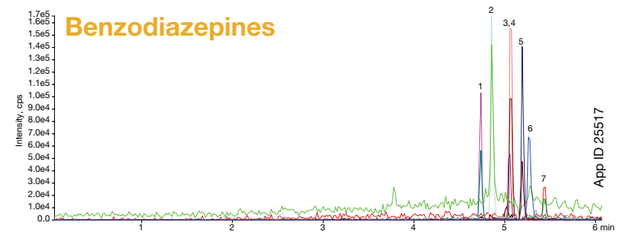
# Industry Applications
# Clinical Research: Barbiturates, Opiates, Analgesics, Benzodiazepines

Strata™-X PRO displays high sensitivity with less matrix effects for multiple panels of analytes with diverse properties and reduces phospholipids in the sample. In a comparison with a traditional protein precipitation method to clean up serum, Strata-X PRO removes the phospholipids to provide a cleaner background for more sensitive results and less maintenance to the MS.

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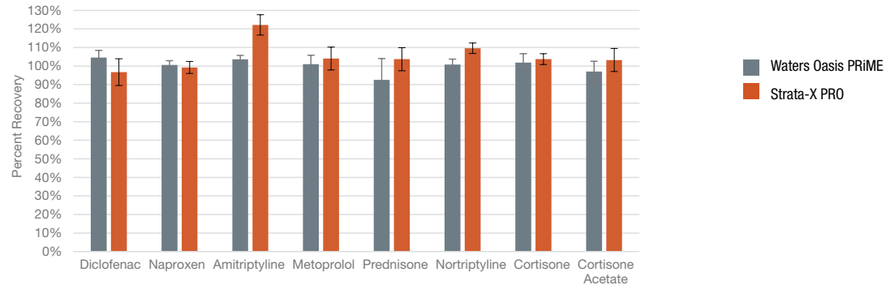
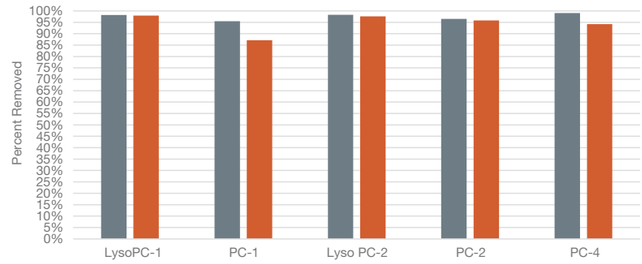
# Industry Applications
# Clinical Research: Recoveries from Plasma

STRATA X PRO
A Rapid Solid Phase Extraction Solution

## Recoveries of Analytes From Plasma for Strata™-X PRO and Waters™ Oasis PRiME




## Comparison of Removal of Phospholipids from Plasma




Lyso 1: 1 Palmitoyl 2 OH sn glycero phosphocholine, (16:0)

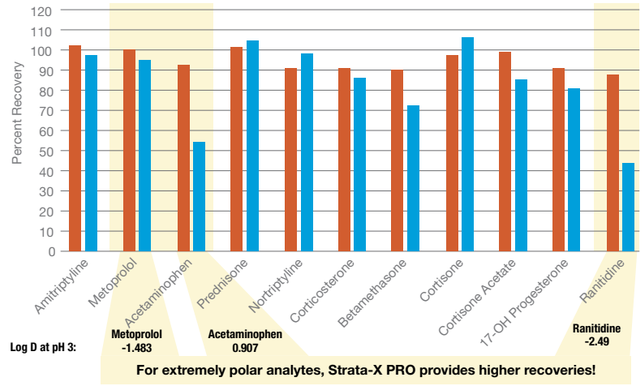
Lyso 2: 1 Oleoyl 2 OH sn glycero phosphocholine, (18:1) m

PC 1: 1 Palmitoyl 2 Oleoyl sn glycerol phosphocholine, (16:0, 18:1)

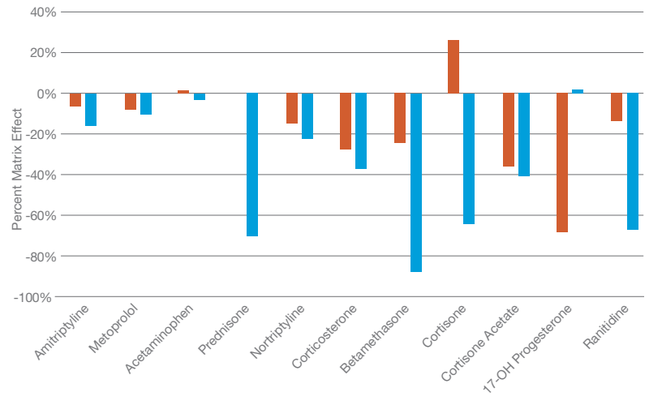
PC 2: 1 Stearoyl 2 Lindoleoyl sn glycerol phosphocholine, (18:0, 18:2)

PC 4: 1 Oleoyl 2 Lindoleoyl sn glycerol phosphocholine, (18:1, 18:2)

## Recovery from Human Plasma

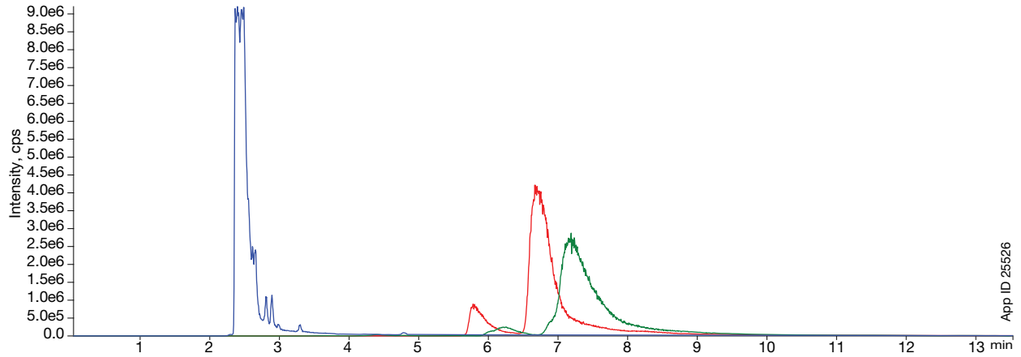



## Matrix Effects

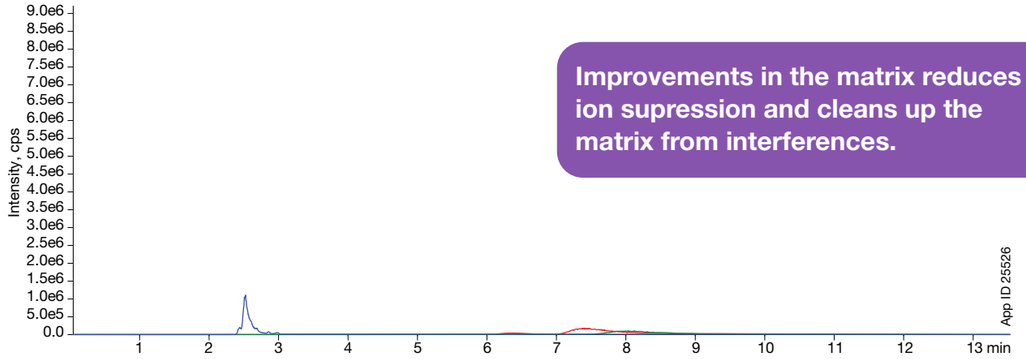


# Comparative Phospholipid Trace of Clean-up Methods

## Phospholipid Trace of Human Serum Sample After Protein Precipitation




## Phospholipid Trace of Human Serum Sample After Strata™-X PRO Extraction




**Improvements in the matrix reduces ion supression and cleans up the matrix from interferences.**

### LC Conditions for Phospholipid Comparison

**Column:** Kinetex™ 2.6 µm C18
**Dimensions:** 50 x 2.1 mm
**Part No.:** 00B-4462-AN
**SecurityGuard™ ULTRA:** AJ0-8782
**Mobile Phase:** A: 0.1 % Formic acid in Water
B: 0.1 % Formic acid in Methanol

**Gradient:**

| Time (min) | % B |
|---|---|
| 0 | 40 |
| 0.5 | 95 |
| 15.5 | 95 |
| 15.51 | 40 |
| 17 | 40 |

**Flow Rate:** 0.4 mL/min
**Injection Volume:** 5 µL
**Temperature:** 30 °C
**Detector:** SCIEX® Triple Quad™ 4500
**Sample:** Phospholipid (Retention time in minute)
1. Lyso PC (2.4), MRM transition 496.4/184.2
2. PC-1 (6.7), MRM transition 760.7/184.2
3. PC-2 (7.2), MRM transition 786.8/184.2





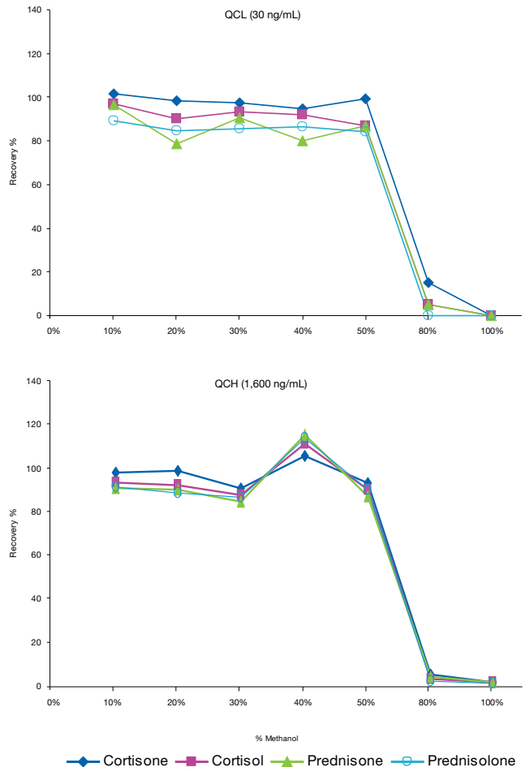
# Urinary Steroids using Strata™-X SPE

We evaluated a variety of silica-based and polymer-based SPE sorbents for the quantification of cortisol, cortisone, prednisolone, and prednisone, each of which provides a different retention mechanism. The evaluation showed that the Strata-X polymer-based SPE sorbent, with a unique elution solvent has been found to be a robust, reproducible, and cost effective sample preparation solution for the laboratory in human urine for all four corticosteroids.

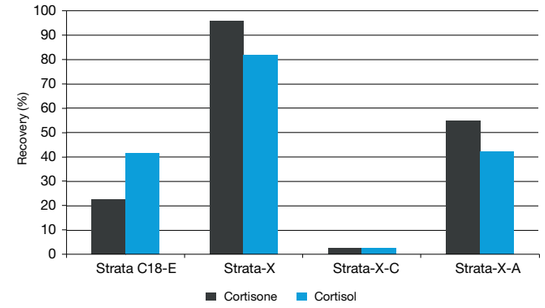
## SPE Protocol

| | Strata-X 30 mg/1 mL |
|---|---|
| **Part No.** | 8E-S100-UGB |
| **Condition** | 1 mL Methanol |
| **Equilibrate** | 1 mL Water |
| **Load** | 300 µL human urine diluted in 300 µL Water with 1 µg/mL IS (Cortisol D4) |
| **Wash 1** | 1 mL Water |
| **Wash 2** | 1 mL 10 % Methanol in Water |
| **Elute** | 2x 500 µL of 2 % Formic Acid in Ethyl acetate/Isopropanol (85:15) |
| **Dry Down** | To dryness under a gentle Nitrogen stream at 50 °C |
| **Reconstitute** | 100 µL of 10 mM Ammonium acetate/10 mM Ammonium acetate in Methanol (50:50) |

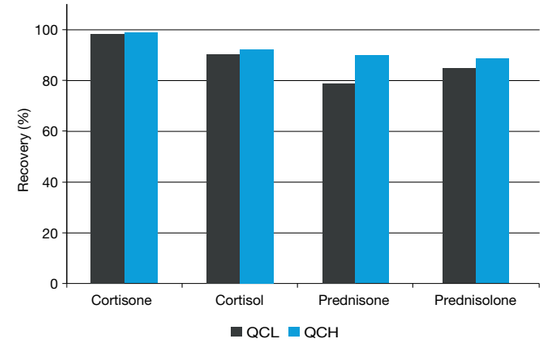
## Wash Solvent Optimization




## Recovery using SPE Sorbents




## Recovery using Strata-X Across Low (QCL, 30 ng/mL) and High (QCH, 1600 ng/mL) QC Concentrations



# Chlorinated Pesticides in Poultry Tissue Using Strata™ Alumina-N SPE

Animals used for food consumption are exposed to contaminants at levels that can pose harm to the human population. Presented is a method developed using Strata Alumina-N SPE and GC/ECD for pesticides analysis from poultry fat. This method improves upon the traditional procedure by reducing time and increasing accuracy and reliability.

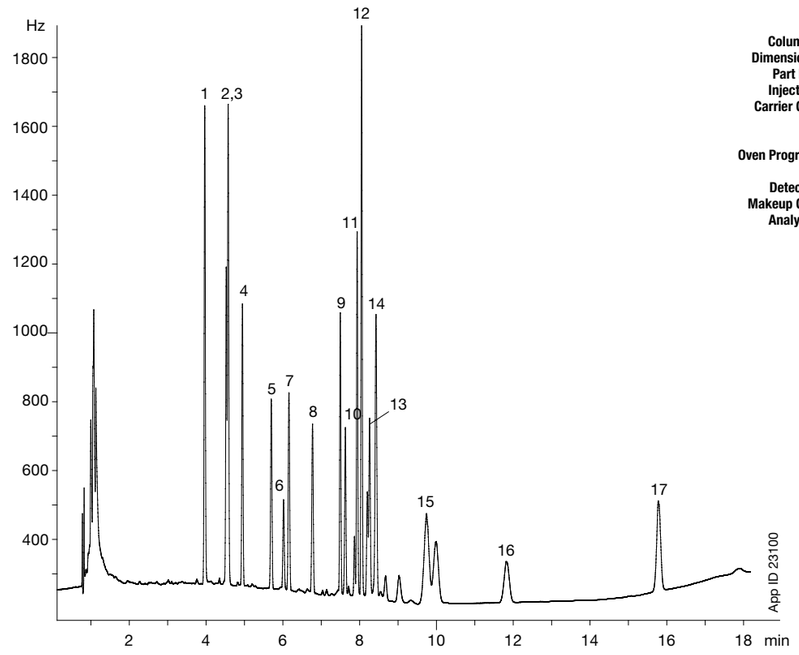
## Pretreatment Protocol

1. Using 1 minute intervals with a microwave, render poultry fat pads ensuring the sample does not exceed 100 °C
2. Weigh 1 gram of rendered fat into a 10 mL volumetric flask and bring to volume with hexane containing internal standards 1 and 2
3. Vortex or shake volumetric flasks to ensure proper mixing

## SPE Protocol

| | Strata Alumina-N, 2 g/12 mL |
|---|---|
| **Part No.** | 8B-S313-KDG |
| **Condition** | Methanol/Water (86:14) at 10 mL/min until dry |
| **Equilibrate** | Petroleum ether at full cartridge volume at 10 mL/min |
| **Load** | 1 mL Pretreated sample |
| **Elute** | Ethyl Ether/Petroleum Ether (1.5:98.5) at full cartridge volume and collect eluent |
| **Dry Down** | Dry down at ambient temperatures under a stream of nitrogen and evaporate to dryness |
| **Reconstitute** | 2 mL Hexane |

## GC / EDC Analysis of Chlorinated Hydrocarbons




**Columns:** Zebron™ ZB-MultiResidue™-1
**Dimensions:** 30 m x 0.32 mm x 0.50 µm
**Part No.:** 7HM-G016-17
**Injection:** Splitless @ 250 °C, 1.0 µL
**Carrier Gas:** Helium (ramped flow)
3.4 mL/min for 6 min ,ramp 5 mL/min to 8 mL/min, hold 12.08 min
**Oven Program:** 150 °C for 0.5 min to 220 °C @ 20 °C/min to 310 °C @ 6 °C/min
**Detector:** ECD @ 350 °C
**Makeup Gas:** 40 mL/min (N2)
**Analytes:**
1. 2,4,5,6-Tetrachloro-m-xylene (IS 1)
2. α-BHC
3. Hexachlorobenzene
4. Lindane
5. Heptachlor
6. Dursban® (Chlorpyrofos)
7. Aldrin
8. Heptachlor Epoxide
9. p,p'-DDE
10. Dieldrin
11. o,p-DDT
12. p,p'-DDE
13. Endrin
14. p,p'-DDT
15. Methoxychlor
16. Mirex
17. Decachlorobiphenyl (IS 2)





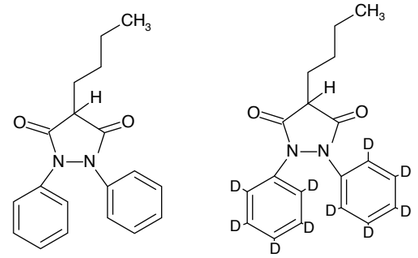
# Phenylbutazone in Ground Meat using Strata™-X-A SPE

A simple yet effective SPE and cleanup method for phenylbutazone from meat with recovery values > 90 %. Highly specific LC/MS/MS data is generated using a Kinetex core-shell column enabling rapid run times under 5 minutes with excellent precision and accuracy.

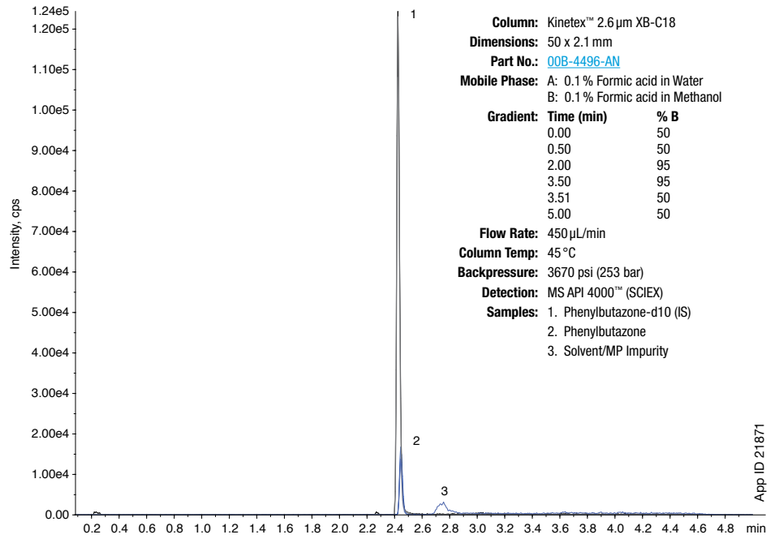
## SPE Protocol

| | Strata-X-A, 100 mg/6 mL |
|---|---|
| **Part No.** | 8B-S123-ECH |
| **Condition** | 3 mL Methanol |
| **Equilibrate** | 3 mL DI Water |
| **Load** | 4 mL of Pretreated sample |
| **Wash 1** | 2 mL D.I. Water |
| **Wash 2** | 2 mL Acetonitrile |
| **Wash 3** | 2 mL Ethyl Acetate |
| **Dry** | 5 minutes under full vacuum |
| **Elute** | 2x 1.5 mL 1 % Formic Acid in Methanol |
| **Dry Down** | Evaporate under a stream of nitrogen gas at 50 °C to dryness |
| **Reconstitute** | Resuspend the residue with 500 µL of Methanol/ 0.1 % Formic Acid (50:50) |

## Phenylbutazone and Phenylbutazone-D10 Chemical Structures




## Chromatogram of 10 ppb Phenylbutazone




**Column:** Kinetex™ 2.6 µm XB-C18
**Dimensions:** 50 x 2.1 mm
**Part No.:** 00B-4496-AN
**Mobile Phase:** A: 0.1 % Formic acid in Water
B: 0.1 % Formic acid in Methanol
**Gradient:**

| Time (min) | % B |
|---|---|
| 0.00 | 50 |
| 0.50 | 50 |
| 2.00 | 95 |
| 3.50 | 95 |
| 3.51 | 50 |
| 5.00 | 50 |

**Flow Rate:** 450 µL/min
**Column Temp:** 45 °C
**Backpressure:** 3670 psi (253 bar)
**Detection:** MS API 4000™ (SCIEX)
**Samples:**
1. Phenylbutazone-d10 (IS)
2. Phenylbutazone
3. Solvent/MP Impurity

## % Recovery of Phenylbutazone

**from Beef Extract at 5 ppb and 75 ppb (µg/kg) n=4**

| Spiked Conc. | %CV | Accuracy |
|---|---|---|
| 5 | 8.02 | 100.7 |
| 75 | 5.0 | 90.3 |

# Analysis of PFAS in Drinking Water

## A Direct Comparison of the Accuracy and Precision of Manual and Automated SPE Sample Preparation

Method 537.1 is a solid phase extraction (SPE) liquid chromatography in tandem with mass spectrometry (LC-MS/MS) method for the determination of selected per- and polyfluorinated alkyl substances (PFAS) in drinking water. Method 537.1 will be part of the upcoming UCMR5, with a focus on PFAS. A critical part of the method is the SPE sample preparation-concentration step which employs a Styrene-DVB copolymer in tube format. EPA 533 is complementary to EPA 537.1. It analyzes 14 of the 18 compounds from EPA 537.1, plus an additional 11 "short chain" (C4-C12) PFAS compounds. Of the original EPA 537 and EPA 537.1 compounds, 4 were not included in EPA 533, since they had been shown not to be present in drinking water during the previous UCMR study. Of the new EPA 533 compounds, PFBA and PFPeA, had been intentionally excluded from EPA 537.1 because they were too polar to be extracted by a styrene di-vinylbenzene (SDVB) solid phase extraction (SPE) sorbent from the sample preparation step. However, EPA 533 was able to include these 2 compounds, along with the other short chain analytes, because this new method employs a polymeric weak anion-exchange (WAX) sorbent in the SPE sample preparation step which is very selective for the more polar/acidic PFAS analytes. An additional distinction of EPA 533 is that it uses the isotope dilution technique to enhance method accuracy and robustness..

| Analyte | Low Fortification (ng/L) | Mean % Ra (n=7) | % RSDa | High Fortification (ng/L) | Mean % R (n=5) | % RSD |
|---|---|---|---|---|---|---|
| **PFBA** | 10 | 128 | 8.6 | 80 | 98.4 | 2.4 |
| **PFMPA** | 10 | 108 | 4.5 | 80 | 98.1 | 2.2 |
| **PFPeA** | 10 | 107 | 4.9 | 80 | 99.6 | 3.6 |
| **PFBS** | 10 | 102 | 9.1 | 80 | 96.2 | 2.9 |
| **PFMBA** | 10 | 111 | 6.8 | 80 | 101 | 3.4 |
| **PFEESA** | 10 | 107 | 10 | 80 | 98.8 | 4.0 |
| **NFDHA** | 10 | 110 | 15 | 80 | 98.5 | 5.4 |
| **4:2FTS** | 10 | 94.4 | 14 | 80 | 100 | 5.7 |
| **PFHxA** | 10 | 102 | 8.0 | 80 | 97 | 7.7 |
| **PFPeS** | 10 | 99.5 | 19 | 80 | 101 | 7.8 |
| **HFPO-DA** | 10 | 102 | 9.7 | 80 | 102 | 4.7 |
| **PFHpA** | 10 | 108 | 7.0 | 80 | 104 | 4.1 |
| **PFHxS** | 10 | 103 | 9.0 | 80 | 97.7 | 5.5 |
| **ADONA** | 10 | 96.3 | 3.1 | 80 | 96.8 | 5.6 |
| **6:2FTS** | 10 | 109 | 15 | 80 | 111 | 11 |
| **PFOA** | 10 | 108 | 7.4 | 80 | 98.5 | 6.9 |
| **PFHpS** | 10 | 98.8 | 8.9 | 80 | 102 | 7.0 |
| **PFNA** | 10 | 109 | 6.2 | 80 | 99.6 | 5.6 |
| **PFOS** | 10 | 104 | 8.7 | 80 | 98.0 | 4.3 |
| **9Cl-PF3ONS** | 10 | 99.7 | 4.6 | 80 | 103 | 6.8 |
| **8:2FTS** | 10 | 100 | 17 | 80 | 100 | 13 |
| **PFDA** | 10 | 100 | 4.2 | 80 | 100 | 1.8 |
| **PFUnA** | 10 | 102 | 10 | 80 | 97.3 | 8.1 |
| **11Cl-PF3OUdS** | 10 | 106 | 5.3 | 80 | 102 | 6.1 |
| **PFDoA** | 10 | 101 | 6.2 | 80 | 96.3 | 5.1 |

### Sample Preparation Protocol

**Pre-treatment:** 100-250 mL sample is fortified with isotopically labeled analogues of the method analytes
**Cartridge:** Strata™-X-AW 500 mg/6 mL
**Part No.:** 8B-S038-HCH
**Load:** Pass pre-treated sample through the cartridge
**Wash 1:** Aqueous Ammonium acetate followed by Methanol
**Wash 2:** Methanol
**Elute:** Ammonium hydroxide in Methanol
**Dry Down:** Under a gentle stream of Nitrogen in a heated water bath
**Reconstitute:** Adjust the final volume to 1 mL with 20 % Water in Methanol (v/v) before analyzing by LC-MS

### LC Conditions

**Column:** Gemini™ 3 µm C18
**Dimension:** 50 x 2.0 mm
**Part No.:** 00B-4439-B0
**Mobile Phase:** A: 20 mM Ammonium Acetate
B: Methanol
**Gradient:**

| Time (min) | %B |
|---|---|
| 0 | 5 |
| 0.5 | 5 |
| 3 | 40 |
| 16 | 80 |
| 18 | 80 |
| 20 | 95 |
| 22 | 95 |
| 25 | 5 |
| 35 | 5 |

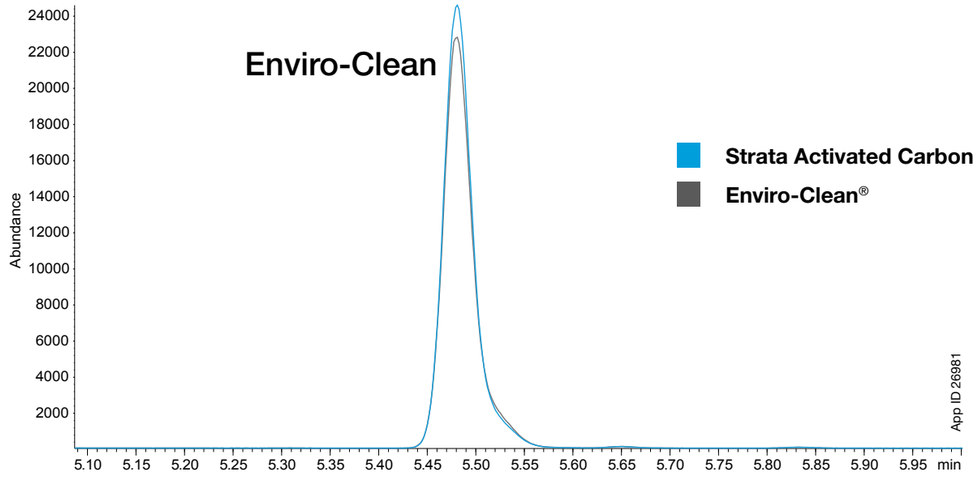
**Injection Volume:** 2 µL
**Flow Rate:** 0.25 mL/min
**MS Detection:** Electrospray Ionization Tandem Mass Spectrometer (ESI-MS/MS)



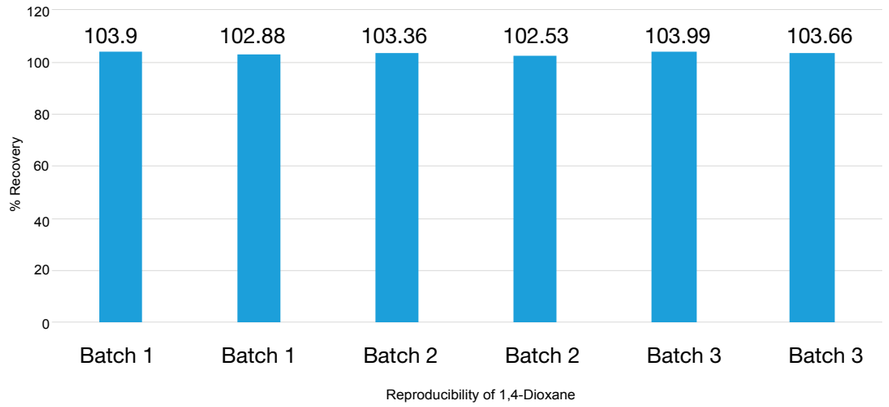


# Strata Activated Carbon

## Higher response with Strata™ Activated Carbon extraction




## Batch-to-Batch Reproducibility with Strata Activated Carbon

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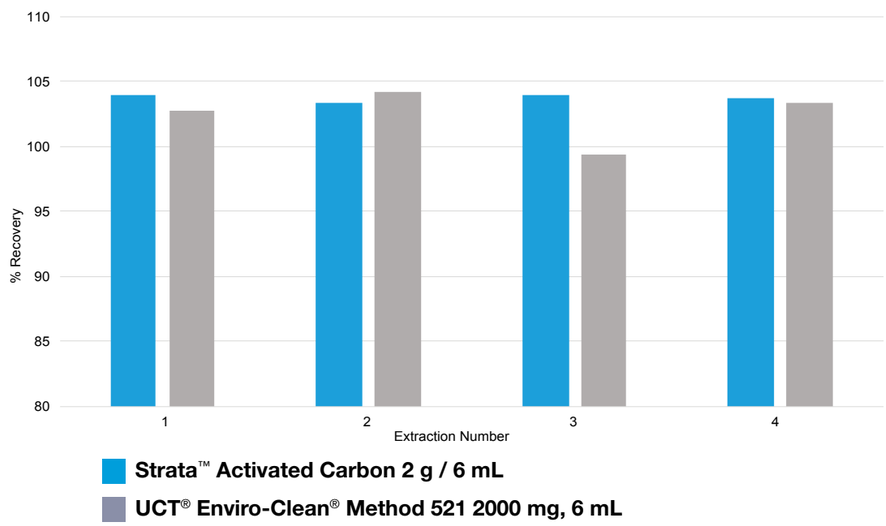
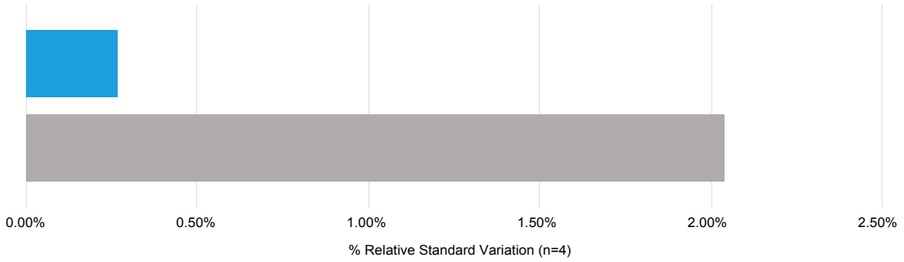
# Reproducible Extraction of 1,4-Dioxane from Water (Modified EPA 8270 / 522)

## Strata Activated Carbon

### % Recovery for 1,4-Dioxane



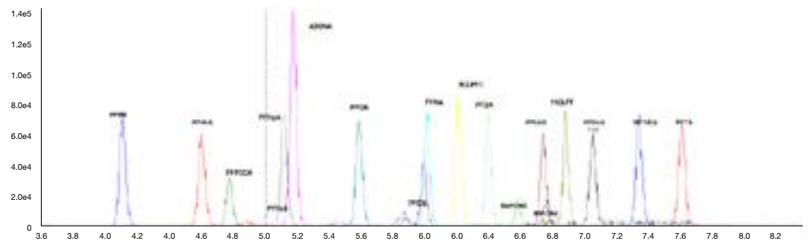

### 1,4-Dioxane Recovery Variability



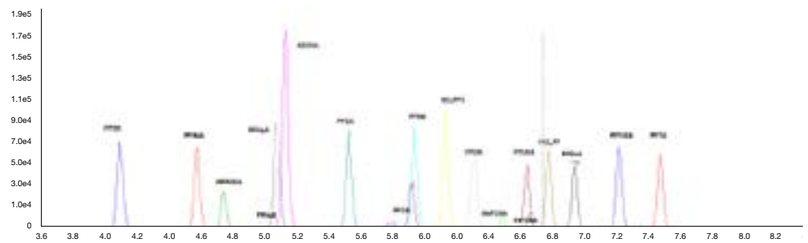



# Industry Application
# Environmental: PFAS in Water EPA Method 537.1 & 533

### HPLC Chromatogram of a 2 ng/L Internal Standard



### HPLC Chromatogram of a 2 ng/L LFB



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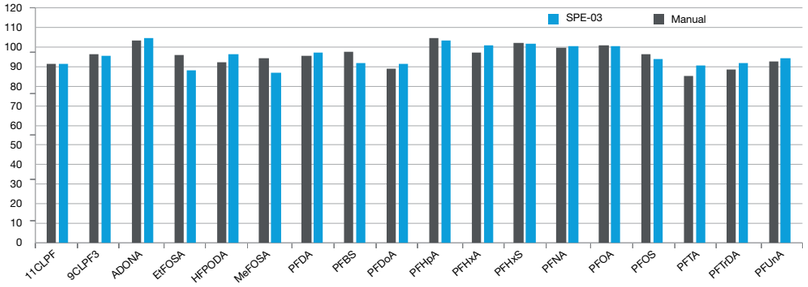
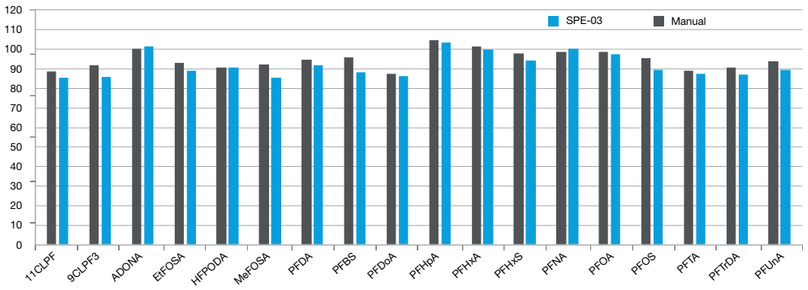
### Comparison of Mean Analyte % Recoveries from 20 ng/L LFB, n=19




### Comparison of Mean Analyte % Recoveries from 2 ng/L LFB, n=19



## Evaluation of Extraction Options for EPA Draft Method 1633

To sort out these challenge, Strata™ PFAS cartridges were developed as a single cartridge stacked with Strata-X-AW and Strata GCB sorbents that function as a traditional SPE cartridge with a built-in polishing step to meet the method guidelines. We have previously demonstrated the utility of the Strata PFAS stacked SPE format for PFAS analysis following DOD QSM 5.2/Table B15 for a variety of water matrices. We have shown that using a single, stacked WAX/GCB is cheaper, easier, and ultimately yields better recoveries for PFAS analytes from various water samples. This technical note presents a study to validate method performance for the broader compound list in EPA 1633 and demonstrate the same utility for both water and soil extracts.

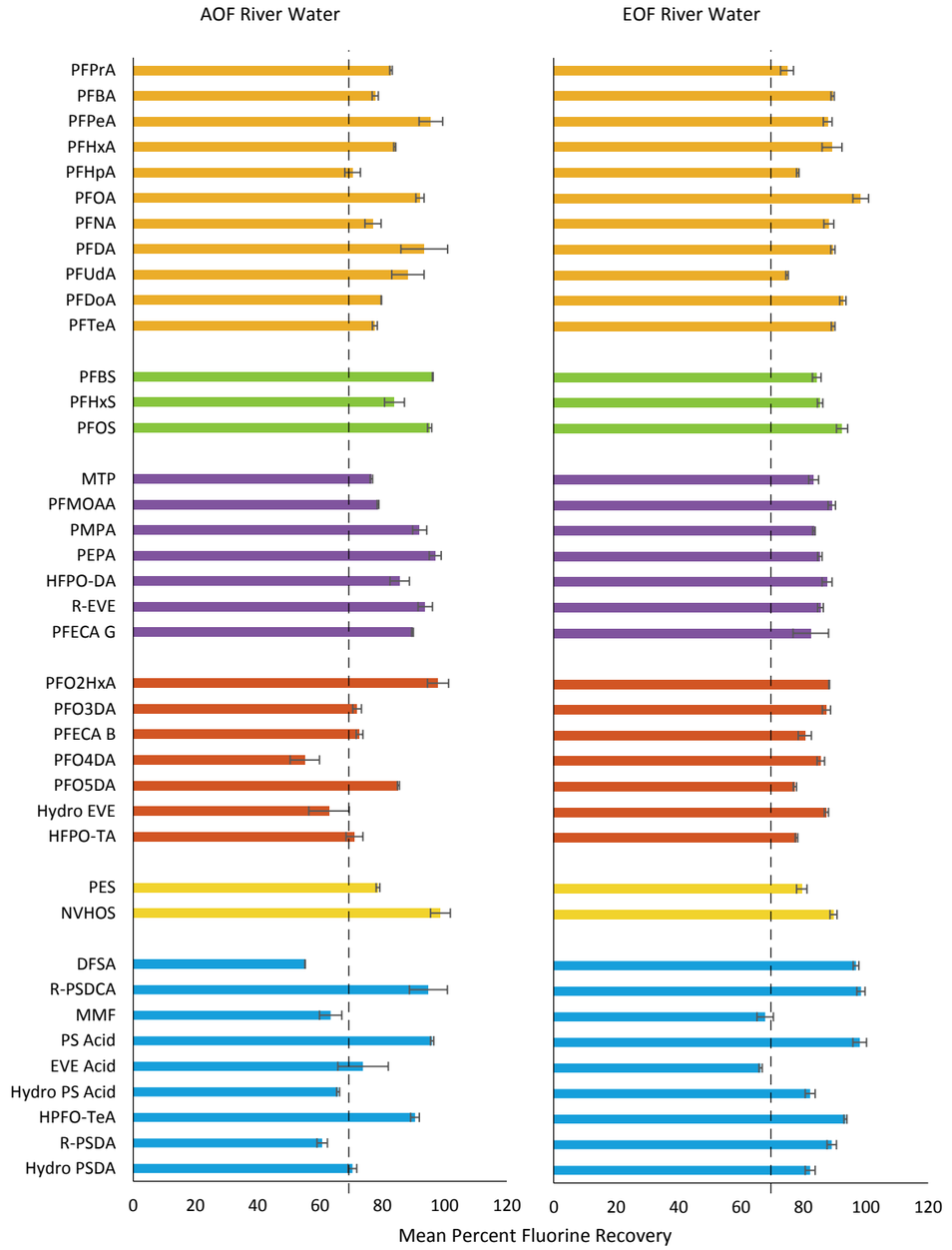
| | | Strata™ PFAS GCB/WAX | | Oasis® WAX + GCB dSPE | |
|---|---|---|---|---|---|
| **Analyte** | **Spike (ng/g)** | **% Rec.** | **%RSD** | **% Rec.** | **%RSD** |
| **PFBA** | 23 | 102 | 1.2 | 105 | 1.4 |
| **PFPeA** | 11.5 | 102 | 0.9 | 105 | 1.9 |
| **PFHxA** | 5.8 | 101 | 2 | 105 | 1.6 |
| **PFHpA** | 5.8 | 102 | 1.4 | 104 | 1.6 |
| **PFOA** | 5.8 | 100 | 2.8 | 104 | 2.4 |
| **PFNA** | 5.8 | 100 | 1.2 | 104 | 3.3 |
| **PFDA** | 5.8 | 97.3 | 1.6 | 102 | 2.7 |
| **PFUnA** | 5.8 | 100 | 3.6 | 107 | 3.1 |
| **PFDoA** | 5.8 | 102 | 1.3 | 108 | 3.3 |
| **PFTrDA** | 5.8 | 103 | 1.8 | 104 | 3.9 |
| **PFTeDA** | 5.8 | 98.4 | 0.7 | 105 | 2.3 |
| **PFHxDA** | 5.8 | 95.3 | 4.8 | 106 | 5.2 |
| **PFoDA** | 5.8 | 73.8 | 21 | 138 | 23 |
| **PFBS** | 5.1 | 101 | 0.68 | 105 | 1.4 |
| **PFPeS** | 5.4 | 101 | 2.9 | 99.6 | 2.4 |
| **PFHxS** | 5.3 | 100.6 | 2.7 | 101 | 2.4 |
| **PFHpS** | 5.5 | 100 | 4.6 | 104 | 1.5 |
| **PFOS** | 5.3 | 99.7 | 4.4 | 104 | 2.4 |
| **PFNS** | 5.5 | 101 | 5.1 | 107 | 2.8 |
| **PFDS** | 5.6 | 98.5 | 4.7 | 102 | 2.8 |
| **PFDoS** | 5.6 | 91 | 5.9 | 106 | 6 |
| **4:2-FTS** | 21.6 | 103 | 3.3 | 101 | 3.2 |
| **6:2-FTS** | 21.9 | 99.8 | 2.3 | 107 | 5 |
| **8:2-FTS** | 22.1 | 96.6 | 3.3 | 105 | 2.6 |
| **10:2-FTS** | 22.3 | 101 | 3.6 | 105 | 4.3 |
| **PFOSA** | 5.8 | 99.4 | 1.4 | 112.6 | 5.6 |
| **MeFOSA** | 5.8 | 103 | 3.4 | 115 | 8 |
| **EtFOSA** | 5.8 | 105 | 7.4 | 116 | 8.2 |
| **MeFOSAA** | 5.8 | 101 | 3.7 | 104 | 5.4 |
| **EtFOSAA** | 5.8 | 104 | 3.2 | 107 | 3.2 |
| **MeFOSE** | 57.6 | 101 | 1.4 | 109 | 4.9 |
| **EtFOSE** | 57.6 | 99.5 | 1.5 | 104 | 6.4 |
| **HFPO-DA** | 23 | 106 | 1.3 | 102 | 1.5 |
| **ADONA** | 21.8 | 106 | 1.7 | 103 | 1 |
| **PFMPA** | 11.5 | 99.3 | 2.3 | 100 | 1.6 |



Industry Application
Environmental: PFAS in water EPA Method 537.1
& 533 *(cont'd)*

## Mean Organic Fluorine Recovery of 39 Individual PFAS Standards Spiked into River Water

In this technical note, we report a new TOF method with improved recovery, detection limits, and quantity of PFAS studied (43 total) by implementing the Strata™ PFAS SPE cartridge.



# Polycyclic Aromatic Hydrocarbons using Strata™ PAH as Compared to EPA Method 550.1

Polycyclic aromatic hydrocarbon compounds (PAHs) are effectively extracted from water samples while humic acids, which often interfere with chromatographic separation, are removed from the sample using a SPE sorbent, Strata PAH. It was also found that Strata PAH provides consistent, high recoveries of all 16 analytes listed under EPA Method 550.1.

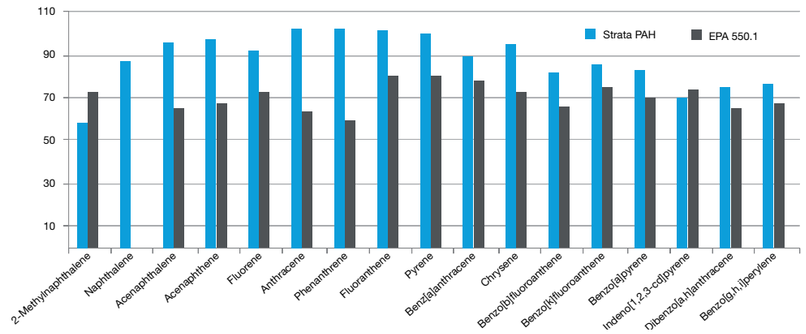
## SPE Protocol

| | Strata PAH, 1.5 g/6 mL |
|---|---|
| **Part No.** | 8B-S130-7CH |
| **Condition** | 20 mL Dichloromethane, 20 mL Methanol, 20 mL D.I. Water |
| **Load** | 100 µL PAH standards (100 µg/mL in Acetonitrile) spiked into 100 mL Water/Acetonitrile (75:25) |
| **Wash** | 5 mL Methanol/D.I. Water (50:50) |
| **Dry** | 15 seconds under 10" Hg Vacuum |
| **Elute** | 6 mL Dichloromethane |

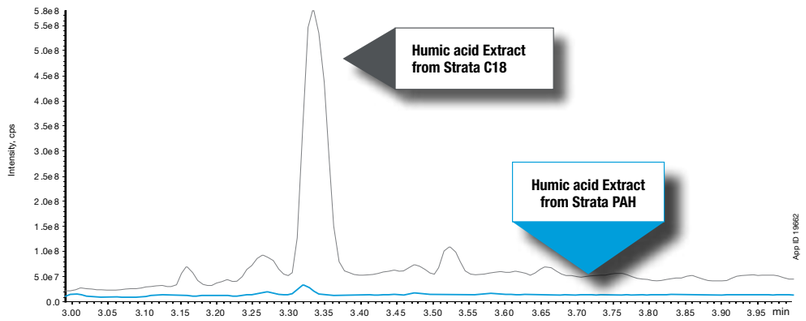
## Pretreatment Protocol

1. Using 1 minute intervals with a microwave, render poultry fat pads ensuring the sample does not exceed 100 °C
2. Weigh 1 gram of rendered fat into a 10 mL volumetric flask and bring to volume with hexane containing internal standards 1 and 2
3. Vortex or shake volumetric flasks to ensure proper mixing

## PAH % Recoveries from Tap Water




## Effective Removal of Humic Acids




**Column:** Kinetex™ 2.6 µm C8
**Dimensions:** 50 x 2.1 mm
**Part No.:** 00B-4497-AN
**Mobile Phase:** A: 5 mM Ammonium acetate
B: Methanol

| Gradient: Time (min) | % B |
|---|---|
| 0 | 15 |
| 2 | 95 |
| 6.0 | 95 |
| 6.01 | 15 |

**Flow Rate:** 0.4 mL/min
**Temperature:** Ambient
**Detection:** MS @ 580.4 amu / 536.5 amu (ambient)
**Backpressure:** 210 bar
**Sample:** Humic Acids from Suwannee River



# Ordering Information

## Strata™-X PRO SPE

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 10 mg | 8B-S536-AAK | 1 mL (100/box) |
| | 30 mg | 8B-S536-TAK | 1 mL (100/box) |
| | 30 mg | 8B-S536-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S536-UBJ | 3 mL (50/box) |
| | 200 mg | 8B-S536-FBJ | 3 mL (50/box) |
| | 100 mg | 8B-S536-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S536-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S536-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 1 g/20 mL | 8B-S536-JEG | 20/pk |

STRATA X PRO
A Rapid Solid Phase Extraction Solution

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **96-Well Plate** | | | |
| | 10 mg/well | 8E-S536-AGA | ea |
| | 30 mg/well | 8E-S536-TGA | ea |
| | 60 mg/well | 8E-S536-UGA | ea |
| **96-Well Microelution Plate** | | | |
| | 2 mg/well | 8M-S536-4GA | ea |

## Strata™-X

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S100-TAK** | 1 mL (100/box) |
| | 30 mg | 8B-S100-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S100-UBJ** | 3 mL (50/box) |
| | 100 mg | 8B-S100-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S100-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S100-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S100-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S100-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S100-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S100-HDG | 12 mL (20/box) |
| | 1 g | 8B-S100-JDG | 12 mL (20/box) |
| | 1 g | 8B-S100-JEG | 20 mL (20/box) |
| | 2 g | 8B-S100-KEG | 20 mL (20/box) |
| | 5 g | 8B-S100-LFF | 60 mL (16/box) |
| **Teflon® Tube** | | | |
| | 200 mg | 8B-S100-FBJ-T | 3 mL (50/box) |
| | 200 mg | 8B-S100-FDG-T | 12 mL (20/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S100-AGB | 2 Plates/Box |
| | 30 mg | 8E-S100-TGB | 2 Plates/Box |
| | 60 mg | 8E-S100-UGB | 2 Plates/Box |
| **96-Well Microelution Plate** | | | |
| | 2 mg | 8M-S100-4GA | ea |

## Strata-XL

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S043-TAK | 1 mL (100/box) |
| | 60 mg | 8B-S043-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S043-EBJ | 3 mL (50/box) |
| | 200 mg | 8B-S043-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S043-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S043-HCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S043-KDG | 12 mL (20/box) |
| | 2 g | 8B-S043-KEG | 20 mL (20/box) |
| | 5 g | 8B-S043-LEG | 20 mL (20/box) |
| | 5 g | 8B-S043-LFF | 60 mL (16/box) |
| | 10 g | 8B-S043-MFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 30 mg | 8E-S043-TGB | 2 Plates/Box |

strata™-X Polymeric SPE

## Strata-X

| Strata-X Microelution Peptide Screening 96-Well Plates | | |
|---|---|---|
| **Part No.** | **Description** | **Unit** |
| KS0-9528 | Strata-X-CW 2 mg/well (6 rows)<br>Strata-X-A 2 mg/well (6 rows) | ea |

| Strata-X Microelution Method Development 96-Well Plates | | |
|---|---|---|
| **Part No.** | **Description** | **Unit** |
| KS0-9529 | Strata-X-C 2 mg/well (3 rows)<br>Strata-X-AW 2 mg/well (3 rows)<br>Strata-X-CW 2 mg/well (3 rows)<br>Strata-X-A 2 mg/well (3 rows) | ea |

## Strata-X-C

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S029-TAK** | 1 mL (100/box) |
| | 30 mg | 8B-S029-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S029-UBJ** | 3 mL (50/box) |
| | 100 mg | 8B-S029-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S029-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S029-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S029-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S029-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S029-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S029-HDG | 12 mL (20/box) |
| | 1 g | 8B-S029-JDG | 12 mL (20/box) |
| | 1 g | 8B-S029-JEG | 20 mL (20/box) |
| | 2 g | 8B-S029-KEG | 20 mL (20/box) |
| | 5 g | 8B-S029-LFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S029-AGB | 2 Plates/Box |
| | 30 mg | 8E-S029-TGB | 2 Plates/Box |
| | 60 mg | 8E-S029-UGB | 2 Plates/Box |
| **96-Well Microelution Plate** | | | |
| | 2 mg | 8M-S029-4GA | ea |

## Strata-XL-C

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S044-TAK | 1 mL (100/box) |
| | 60 mg | 8B-S044-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S044-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S044-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S044-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S044-FCH** | 6 mL (30/box) |
| | 500 mg | 8B-S044-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S044-HCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S044-KDG | 12 mL (20/box) |
| | 2 g | 8B-S044-KEG | 20 mL (20/box) |
| | 5 g | 8B-S044-LEG | 20 mL (20/box) |
| | 5 g | 8B-S044-LFF | 60 mL (16/box) |
| | 10 g | 8B-S044-MFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 30 mg | 8E-S044-TGB | 2 Plates/Box |

# Ordering Information

## Strata™-X-CW

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S035-TAK** | 1 mL (100/box) |
| | 30 mg | 8B-S035-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S035-UBJ** | 3 mL (50/box) |
| | 100 mg | 8B-S035-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S035-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S035-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S035-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S035-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 1 g | 8B-S035-JDG | 12 mL (20/box) |
| | 1 g | 8B-S035-JEG | 20 mL (20/box) |
| | 2 g | 8B-S035-KEG | 20 mL (20/box) |
| | 5 g | 8B-S035-LFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S035-AGB | 2 Plates/Box |
| | 30 mg | 8E-S035-TGB | 2 Plates/Box |
| | 60 mg | 8E-S035-UGB | 2 Plates/Box |
| **96-Well Microelution Plate** | | | |
| | 2 mg | 8M-S035-4GA | ea |

## Strata-XL-CW

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S052-TAK | 1 mL (100/box) |
| | 60 mg | 8B-S052-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S052-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S052-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S052-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S052-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S052-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S052-HCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S052-KEG | 20 mL (20/box) |
| **96-Well Plate** | | | |
| | 30 mg | 8E-S052-TGB | 2 Plates/Box |

## Strata-X-A

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S123-TAK** | 1 mL (100/box) |
| | 30 mg | 8B-S123-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S123-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S123-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S123-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S123-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S123-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S123-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S123-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S123-HDG | 12 mL (20/box) |
| | 1 g | 8B-S123-JDG | 12 mL (20/box) |
| | 1 g | 8B-S123-JEG | 20 mL (20/box) |
| | 2 g | 8B-S123-KEG | 20 mL (20/box) |
| | 5 g | 8B-S123-LFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S123-AGB | 2 Plates/Box |
| | 30 mg | 8E-S123-TGB | 2 Plates/Box |
| | 60 mg | 8E-S123-UGB | 2 Plates/Box |
| **96-Well Microelution Plate** | | | |
| | 2 mg | 8M-S123-4GA | ea |

## Strata-XL-A

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S053-TAK | 1 mL (100/box) |
| | 60 mg | 8B-S053-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S053-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S053-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S053-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S053-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S053-HCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S053-KEG | 20 mL (20/box) |
| | 5 g | 8B-S053-LFF | 60 mL (16/box) |
| | 10 g | 8B-S053-MFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 30 mg | 8E-S053-TGB | 2 Plates/Box |

## Strata-X-AW

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S038-TAK** | 1 mL (100/box) |
| | 30 mg | 8B-S038-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S038-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S038-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S038-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S038-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S038-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S038-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S038-HCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S038-HDG | 12 mL (20/box) |
| | 1 g | 8B-S038-JDG | 12 mL (20/box) |
| | 1 g | 8B-S038-JEG | 20 mL (20/box) |
| | 5 g | 8B-S038-LFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S038-AGB | 2 Plates/Box |
| | 30 mg | 8E-S038-TGB | 2 Plates/Box |
| | 60 mg | 8E-S038-UGB | 2 Plates/Box |
| **96-Well Microelution Plate** | | | |
| | 2 mg | 8M-S038-4GA | ea |

## Strata-XL-AW

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S051-TAK | 1 mL (100/box) |
| | 60 mg | 8B-S051-UBJ | 3 mL (50/box) |
| | 100 mg | 8B-S051-EBJ | 3 mL (50/box) |
| | 100 mg | 8B-S051-ECH | 6 mL (30/box) |
| | 200 mg | 8B-S051-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S051-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S051-HCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S051-KEG | 20 mL (20/box) |



# Ordering Information

## Strata™-X-Drug B

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 10 mg | 8B-S128-AAK | 1 mL (100/box) |
| | 30 mg | 8B-S128-TAK | 1 mL (100/box) |
| | 30 mg | 8B-S128-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S128-UBJ | 3 mL (50/box) |
| | 60 mg | 8B-S128-UCH | 6 mL (30/box) |
| | 60 mg | 8B-S128-UCL | 6 mL (200/bag) |
| **Giga™ Tube** | | | |
| | 100 mg | 8B-S128-EDG | 12 mL (20/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S128-AGB | 2 Plates/box |
| | 30 mg | 8E-S128-TGB | 2 Plates/box |
| | 60 mg | 8E-S128-UGB | 2 Plates/box |

## Strata-X-Drug B Plus

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **96-Well Plate** | | | |
| | 10 mg | 8E-S128-AGB-P | 2 Plates/box |
| | 30 mg | 8E-S128-TGB-P | 2 Plates/box |

## C18-E

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 50 mg | 8B-S001-DAK | 1 mL (100/box) |
| | 100 mg | 8B-S001-EAK** | 1 mL (100/box) |
| | 100 mg | 8B-S001-EBJ | 3 mL (50/box) |
| | 200 mg | 8B-S001-FBJ** | 3 mL (50/box) |
| | 200 mg | 8B-S001-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S001-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S001-HCH | 6 mL (30/box) |
| | 1 g | 8B-S001-JEG | 20 mL (20/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S001-HDG | 12 mL (20/box) |
| | 2 g | 8B-S001-KDG | 12 mL (20/box) |
| | 5 g | 8B-S001-LEG | 20 mL (20/box) |
| | 10 g | 8B-S001-MFF | 60 mL (16/box) |
| | 20 g | 8B-S001-VFF | 60 mL (16/box) |
| | 50 g | 8B-S001-YSN | 150 mL (8/box) |
| | 70 g | 8B-S001-ZSN | 150 mL (8/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S001-CGB | 2 Plates/Box |
| | 50 mg | 8E-S001-DGB | 2 Plates/Box |
| | 100 mg | 8E-S001-EGB | 2 Plates/Box |

## C8

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S005-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S005-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S005-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S005-HCH | 6 mL (30/box) |
| | 1 g | 8B-S005-JCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 2 g | 8B-S005-KDG | 12 mL (20/box) |
| | 5 g | 8B-S005-LEG | 20 mL (20/box) |
| | 10 g | 8B-S005-MFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S005-CGB | 2 Plates/Box |

## Strata-X-Drug N

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 30 mg | 8B-S129-TAK | 1 mL (100/box) |
| | 30 mg | 8B-S129-TBJ | 3 mL (50/box) |
| | 60 mg | 8B-S129-UBJ | 3 mL (50/box) |
| | 60 mg | 8B-S129-UCH | 6 mL (30/box) |
| | 60 mg | 8B-S129-UCL | 6 mL (200/bag) |
| | 100 mg | 8B-S129-ECH | 6 mL (30/box) |
| **96-Well Plate** | | | |
| | 10 mg | 8E-S129-AGB | 2 Plates/box |
| | 30 mg | 8E-S129-TGB | 2 Plates/box |

## C18-U

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S002-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S002-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S002-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S002-HCH | 6 mL (30/box) |
| | 1 g | 8B-S002-JCH | 6 mL (30/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S002-DGB | 2 Plates/Box |
| | 100 mg | 8E-S002-EGB | 2 Plates/Box |

## C18-T

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S004-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S004-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S004-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S004-HCH | 6 mL (30/box) |
| | 1 g | 8B-S004-JCH | 6 mL (30/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S004-DGB | 2 Plates/Box |

## Phenyl

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S006-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S006-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S006-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S006-HCH | 6 mL (30/box) |
| | 1 g | 8B-S006-JCH | 6 mL (30/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S006-CGB | 2 Plates/Box |
| | 100 mg | 8E-S006-EGB | 2 Plates/Box |

# Ordering Information

strata™ Solid Phase Extraction

## Silica (Si-1)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S012-EAK** | 1 mL (100/box) |
| | 200 mg | 8B-S012-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S012-HBJ** | 3 mL (50/box) |
| | 500 mg | 8B-S012-HCH | 6 mL (30/box) |
| | 1 g | 8B-S012-JCH** | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S012-HDG | 12 mL (20/box) |
| | 1 g | 8B-S012-JDG | 12 mL (20/box) |
| | 2 g | 8B-S012-KDG | 12 mL (20/box) |
| | 5 g | 8B-S012-LEG | 20 mL (20/box) |
| | 10 g | 8B-S012-MFF | 60 mL (16/box) |
| | 20 g | 8B-S012-VFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S012-DGB | 2 Plates/Box |
| | 100 mg | 8E-S012-EGB | 2 Plates/Box |

## $NH_2$/WAX

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S009-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S009-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S009-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S009-HCH | 6 mL (30/box) |
| | 1 g | 8B-S009-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 500 mg | 8B-S009-HDG | 12 mL (20/box) |
| | 2 g | 8B-S009-KDG | 12 mL (20/box) |
| | 5 g | 8B-S009-LEG | 20 mL (20/box) |
| | 10 g | 8B-S009-MFF | 60 mL (16/box) |
| | 20 g | 8B-S009-VFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S009-CGB | 2 Plates/Box |
| | 50 mg | 8E-S009-DGB | 2 Plates/Box |
| | 100 mg | 8E-S009-EGB | 2 Plates/Box |

## Cyano (CN)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S007-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S007-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S007-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S007-HCH | 6 mL (30/box) |
| | 1 g | 8B-S007-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S007-KDG | 12 mL (20/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S007-DGB | 2 Plates/Box |

## SAX (strong anion-exchange)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S008-EAK | 1 mL (100/box) |
| | 100 mg | 8B-S008-EBJ | 3 mL (50/box) |
| | 200 mg | 8B-S008-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S008-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S008-HCH | 6 mL (30/box) |
| | 1 g | 8B-S008-JCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 500 mg | 8B-S008-HDG | 12 mL (20/box) |
| | 2 g | 8B-S008-KDG | 12 mL (20/box) |
| | 5 g | 8B-S008-LEG | 20 mL (20/box) |
| | 20 g | 8B-S008-VFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S008-CGB | 2 Plates/Box |
| | 50 mg | 8E-S008-DGB | 2 Plates/Box |
| | 100 mg | 8E-S008-EGB | 2 Plates/Box |

## WCX (weak cation-exchange)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S027-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S027-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S027-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S027-HCH | 6 mL (30/box) |
| | 1 g | 8B-S027-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S027-KDG | 12 mL (20/box) |
| | 5 g | 8B-S027-LEG | 20 mL (20/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S027-CGB | 2 Plates/Box |
| | 50 mg | 8E-S027-DGB | 2 Plates/Box |

## SCX (strong cation-exchange)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S010-EAK | 1 mL (100/box) |
| | 100 mg | 8B-S010-EBJ | 3 mL (50/box) |
| | 200 mg | 8B-S010-FBJ | 3 mL (50/box) |
| | 500 mg | 8B-S010-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S010-HCH | 6 mL (30/box) |
| | 1 g | 8B-S010-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S010-KDG | 12 mL (20/box) |
| | 5 g | 8B-S010-LEG | 20 mL (20/box) |
| | 10 g | 8B-S010-MFF | 60 mL (16/box) |
| | 20 g | 8B-S010-VFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 25 mg | 8E-S010-CGB | 2 Plates/Box |
| | 50 mg | 8E-S010-DGB | 2 Plates/Box |
| | 100 mg | 8E-S010-EGB | 2 Plates/Box |



# Ordering Information

strata™ Solid Phase Extraction

## Screen-C

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S016-EAK** | 1 mL (100/box) |
| | 100 mg | 8B-S016-EBJ | 3 mL (50/box) |
| | 150 mg | 8B-S016-SBJ | 3 mL (50/box) |
| | 150 mg | 8B-S016-SCH | 6 mL (30/box) |
| | 200 mg | 8B-S016-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S016-FCH | 6 mL (30/box) |
| | 300 mg | 8B-S016-RBJ | 3 mL (50/box) |
| | 300 mg | 8B-S016-RCH | 6 mL (30/box) |
| | 500 mg | 8B-S016-HCH | 6 mL (30/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S016-DGB | 2 Plates/Box |

## ABW

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 200 mg | 8B-S030-FBJ | 3 mL (50/box) |
| | 1 g | 8B-S030-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S030-KDG | 12 mL (20/box) |
| | 5 g | 8B-S030-LEG | 20 mL (20/box) |

## Screen-A

| | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S019-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S019-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S019-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S019-HCH | 6 mL (30/box) |

## Screen-C GF

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 500 mg | 8B-S026-HBJ | 3 mL (50/box) |

## Basic Screen Large Reservoir Cartridge (LRC)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| Large Reservoir Cartridge | 200 mg | 8B-S327-FTH | 10 mL (30/box) |

## Alumina-N (AL-N)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 500 mg | 8B-S313-HBJ | 3 mL (50/box) |
| | 1 g | 8B-S313-JCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 2 g | 8B-S313-KDG | 12 mL (20/box) |

## Florisil® (FL)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 500 mg | 8B-S013-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S013-HCH | 6 mL (30/box) |
| | 1 g | 8B-S013-JCH | 6 mL (30/box) |
| | 2.5 g | 8B-S013-8CH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 2 g | 8B-S013-KDG | 12 mL (20/box) |
| | 5 g | 8B-S013-LEG | 20 mL (20/box) |
| | 10 g | 8B-S013-MFF | 60 mL (16/box) |

## Eco-Screen

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 1 g | 8B-S046-JBJ | 3 mL (50/box) |

## Melamine

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S049-EBJ | 3 mL (50/box) |
| | 200 mg | 8B-S049-FBJ | 3 mL (50/box) |

## GCB (graphitized carbon black)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 200 mg | 8B-S528-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S528-HCH | 6 mL (30/box) |

## PFAS (WAX/GCB)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 200 mg / 50 mg | CS0-9207 | 6 mL (30/box) |
| | 500 mg/ 50 mg | CS0-9208 | 6 mL (200/box) |
| | 50 mg / 200 mg | CS0-9214 | 6 mL (300/box) |

## Activated Carbon

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 400 mg | CS0-9210 | Pass Through Cartridge (50/box) |
| | 2 g | CS0-9209 | 6 mL (30/box) |

strata™ Solid Phase Extraction

## SDB-L (styrene-divinylbenzene)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 100 mg | 8B-S014-EAK | 1 mL (100/box) |
| | 200 mg | 8B-S014-FBJ | 3 mL (50/box) |
| | 200 mg | 8B-S014-FCH | 6 mL (30/box) |
| | 500 mg | 8B-S014-HBJ | 3 mL (50/box) |
| | 500 mg | 8B-S014-HCH | 6 mL (30/box) |
| | 1 g | 8B-S014-JCH | 6 mL (30/box) |
| **Giga™ Tube** | | | |
| | 10 g | 8B-S014-MFF | 60 mL (16/box) |
| **96-Well Plate** | | | |
| | 50 mg | 8E-S014-DGB | 2 Plates/Box |

## EPH (Extractable Petroleum Hydrocarbons)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 500 mg | 8B-S031-HBJ | 3 mL (50/box) |
| **Giga Tube** | | | |
| | 5 g | 8B-S031-LEG | 20 mL (20/box) |
| **Teflon® Giga Tube** | | | |
| | 5 g | 8B-S031-LEG-T | 20 mL (20/box) |

## PAH (Polycyclic Aromatic Hydrocarbons)

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 500 mg | 8B-S130-HCH | 6 mL (30/box) |
| | 750 mg | 8B-S130-WCH | 6 mL (30/box) |
| | 1.5 g | 8B-S130-7CH | 6 mL (30/box) |

## Sodium Sulfate

| Format | Sorbent Mass | Part Number | Unit |
|---|---|---|---|
| **Tube** | | | |
| | 1 g | 8B-S124-JCH | 6 mL (30/box) |
| **Giga Tube** | | | |
| | 5 g | 8B-S124-LEG | 20 mL (20/box) |

## Round Well Collection Plates (polypropylene)

| Part No. | Well Bottom | Well Volume | Unit | Suggested Sealing Mats |
|---|---|---|---|---|
| AH0-7279 | Round | 1 mL | 50/pk | AH0-8631<br>AH0-8632 |
| AH0-8636 | Round | 2 mL | 50/pk | AH0-8633<br>AH0-8634 |

## Square Well Collection Plates (polypropylene)

| Part No. | Well Bottom | Well Volume | Unit | Suggested Sealing Mats |
|---|---|---|---|---|
| AH0-7192 | Conical | 350 µL | 50/pk | AH0-8597<br>AH0-8598<br>AH0-8199<br>AH0-7195 |
| AH0-7193 | Conical | 1 mL | 50/pk | AH0-8597<br>AH0-8598<br>AH0-8199<br>AH0-7195 |
| AH0-7194 | Conical | 2 mL | 50/pk | AH0-8597<br>AH0-8598<br>AH0-8199<br>AH0-7195 |
| AH0-8635 | Round-Conical | 2 mL | 50/pk | AH0-8597<br>AH0-8598<br>AH0-8199<br>AH0-7195 |





presston™ 1000

## Presston 100 Manifold

| 96-Well Positive Pressure Manifold | |
|---|---|
| **Part No.** | **Description** |
| AH0-9334 | Presston 100 Positive Pressure Manifold, 96-Well Plate |
| AH0-9342 | Presston 100 Positive Pressure Manifold, 1 mL Tube Complete Assembly |
| AH0-9347 | Presston 100 Positive Pressure Manifold, 3 mL Tube Complete Assembly |
| AH0-9343 | Presston 100 Positive Pressure Manifold, 6 mL Tube Complete Assembly |

The Presston 100 96-Well Positive Pressure Manifold can also process 1, 3, and 6 mL tubes using the following adapter kits.

Phenomenex warrants that for a period of 12 months following delivery, the Presston 100 Positive Pressure Manifold you have purchased will perform in accordance with the published specifications and will be free from defects in materials or workmanship. In the event that the Presston 100 Positive Pressure Manifold does not meet this warranty, Phenomenex will repair or replace defective parts.

Please visit **www.phenomenex.com/Presston** for complete warranty information.

## Presston 100 Tube Adapter Kits

| Tube Adapter Kits (for AH0-9334) | |
|---|---|
| **Part No.** | **Description** |
| AH0-9344 | 1 mL Tube Adapter Kit |
| AH0-9345 | 3 mL Tube Adapter Kit |
| AH0-9346 | 6 mL Tube Adapter Kit |



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# Ordering Information

KINETEX Core-Shell Technology

## Kinetex Columns

| 2.6 µm Minibore Columns (mm) | | | | | | SecurityGuard™ ULTRA Cartridges‡ |
|---|---|---|---|---|---|---|
| Phases | 30 x 2.1 | 50 x 2.1 | 75 x 2.1 | 100 x 2.1 | 150 x 2.1 | 3/pk |
| Biphenyl | 00A-4622-AN | 00B-4622-AN | — | 00D-4622-AN | 00F-4622-AN | AJ0-9209 |
| XB-C18 | 00A-4496-AN | 00B-4496-AN | 00C-4496-AN | 00D-4496-AN | 00F-4496-AN | AJ0-8782 |
| C8 | 00A-4497-AN | 00B-4497-AN | 00C-4497-AN | 00D-4497-AN | 00F-4497-AN | AJ0-8784 |

for 2.1 mm ID

| 2.6 µm Analytical Columns (mm) | | | | | | SecurityGuard™ ULTRA Cartridges‡ |
|---|---|---|---|---|---|---|
| Phases | 30 x 4.6 | 50 x 4.6 | 75 x 4.6 | 100 x 4.6 | 150 x 4.6 | 3/pk |
| C18 | 00A-4462-E0 | 00B-4462-E0 | 00C-4462-E0 | 00D-4462-E0 | 00F-4462-E0 | AJ0-8788 |

for 4.6 mm ID

| 5 µm Minibore Columns (mm) | | | SecurityGuard™ ULTRA Cartridges‡ |
|---|---|---|---|
| Phases | 50 x 2.1 | 100 x 2.1 | 3/pk |
| C8 | 00B-4608-AN | 00D-4608-AN | AJ0-8784 |

for 2.1 mm ID

| 5 µm Analytical Columns (mm) | | | | | SecurityGuard™ ULTRA Cartridges‡ |
|---|---|---|---|---|---|
| Phases | 50 x 4.6 | 100 x 4.6 | 150 x 4.6 | 250 x 4.6 | 3/pk |
| C8 | 00B-4608-E0 | 00D-4608-E0 | 00F-4608-E0 | 00G-4608-E0 | AJ0-8770 |

for 4.6 mm ID

SecurityGuard ULTRA Cartridges required holder, Part No.: AJ0-9000.

Zebron™ GC Columns

## Zebron GC Columns

| ZB-MultiResidue™ -1 | | | |
|---|---|---|---|
| ID(mm) | df(µm) | Temp. Limits °C | Part No. |
| 20-Meter | | | |
| 0.18 | 0.18 | -60 to 320/340 | 7FD-G016-08 |
| 30-Meter | | | |
| 0.25 | 0.25 | -60 to 320/340 | 7HG-G016-11 |
| 0.32 | 0.25 | -60 to 320/340 | 7HM-G016-11 |
| 0.32 | 0.50 | -60 to 320/340 | 7HM-G016-17 |
| 0.53 | 0.50 | -60 to 320/340 | 7HK-G016-17 |



# Tools and Resources


# The Complete Guide

## to Solid Phase Extraction (SPE)

### A method development and application guide

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