Application Guide

ENVIRONMENTAL SAMPLE PREPARATION

CLEAN | QUICK | ACCURATE

phenomenex®

...breaking with tradition℠

www.phenomenex.com/EnviroSP

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guarantee

If Phenomenex products in this brochure do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND.

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Select the Appropriate Sample Prep Technique for Your Key Requirements

	QuEChERS	Solid Phase Extraction Silica-Based	Solid Phase Extraction Polymer-Based
Decrease LC-MS Down Time for Maintenance	●	●	●
Increase Column Lifetime	●	●	●
Remove Particulates	●	●	●
Remove Proteins	●	●	●
Remove Phospholipids	●	●	●
De-salt		●	●
Solvent Switching		●	●
Specifically Extract Target Analytes		●	●
Concentrate		●	●
Deconditioning Resistant			●
Product Recommendation	roQ™ QuEChERS Kits	strata® Solid Phase Extraction	strata®X Polymeric SPE
Clean-up Time (min)	< 10	< 30	< 30
Degree of Cleanliness			

Learn more about Phenomenex Sample Preparation Solutions
www.phenomenex.com/SamplePrep

QuEChERS

Quick-Easy-Cheap-Effective-Rugged-Safe

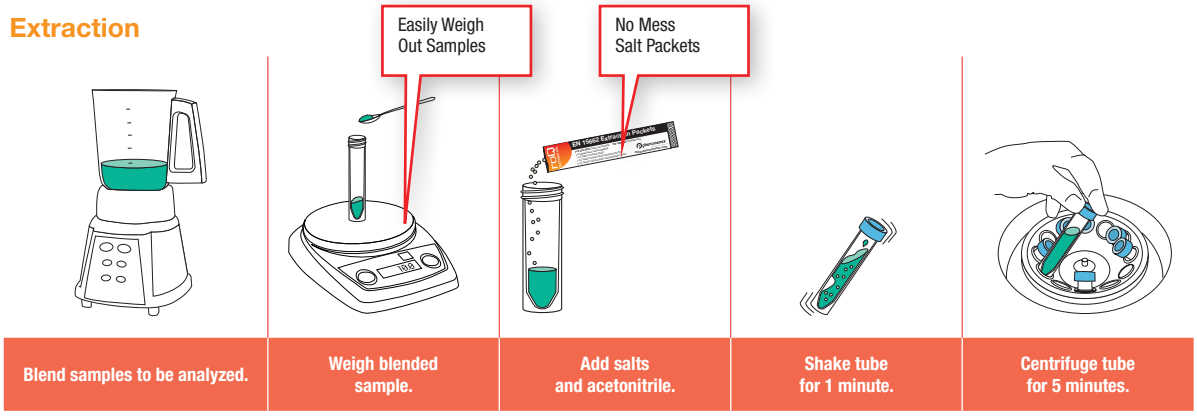
roQ™ QuEChERS Kits

The QuEChERS technique radically simplifies multi-residue analysis in food and other complex samples, decreases complicated, long extraction procedures, reduces the use of hazardous solvents, and is easy to use.

Extraction

Pesticides and analytes of interest are extracted. This process relies on the combination of organic solvent and various salts to partition the analytes from the sample into an organic layer (typically acetonitrile).

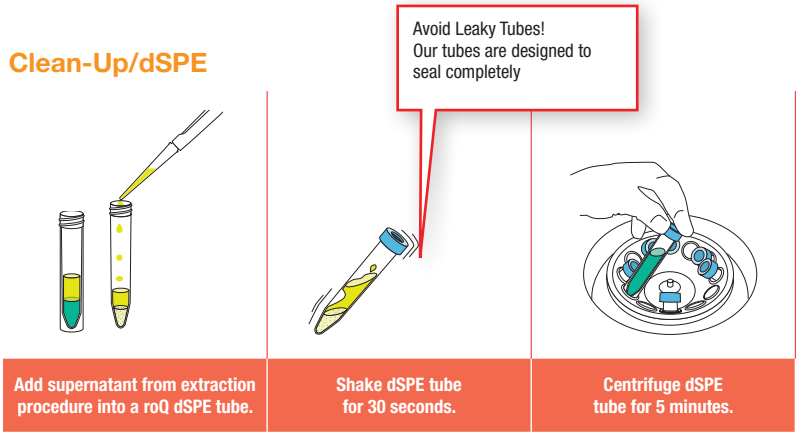
STEP 01 Extraction



Clean-Up/Dispersive SPE (dSPE)

An aliquot of the organic layer from the extraction step is subjected to further clean up by dispersive SPE. This step selectively removes unwanted interferences.

STEP 02 Clean-Up/dSPE



See How QuEChERS Works, visit
www.phenomenex.com/roQ

Hormones

Marine and Fresh Water Sediment

Steroid hormones, pyrethroids, and pharmaceutical and personal care products (PPCPs) are detected in a multitude of aquatic environments. Aside from analyzing the water source directly, the marine sediment must also be analyzed to understand the fate of these compounds. By utilizing a roQ QuEChERS sample preparation technique, a simpler and faster approach is outlined.

Modified roQ QuEChERS Protocol

Step 1

Extraction

1. Weigh 2 g of dry sediment into a 50 mL centrifuge tube
2. Spike sample with internal standards
3. Add 10 mL of reagent water and mix
4. Add 10 mL of acidified Acetonitrile (0.1 % Acetic acid) and shake for 10 seconds
5. Add Sodium acetate (1.5 g) and $MgSO_4$ (2.0 g), or weigh out (~) 3.5 g of AOAC 2007.01 roQ extraction packet (AH0-9043)
6. Shake for 10 seconds and vortex for 1 minute
7. Centrifuge at 4000 rpm for 5 minutes
8. Cool sample at – 20 °C for 1.5 hours or until frozen

Step 2

Clean-up

1. Transfer 8-9 mL of the supernatant from the previous step to a 15 mL PSA/C18 roQ dSPE tube (KS0-8926)
2. Shake for 10 seconds and vortex for 1 minute
3. Centrifuge for 10 minutes at 3000 rpm
4. Aspirate 5 mL of supernatant and filter using a Phenex™ 0.2 µm PTFE filter (AF0-2202-12) into a test tube suitable for a dry-down station
5. Evaporate sample using a dry-down station at ≤35 °C to near dryness
6. Reconstitute by first adding 50 µL of Acetone, vortexing, and then adding 950 µL of Methanol/Water (1:1)
7. Transfer the reconstituted sample to an autosampler vial for analysis

LC-MS/MS Conditions

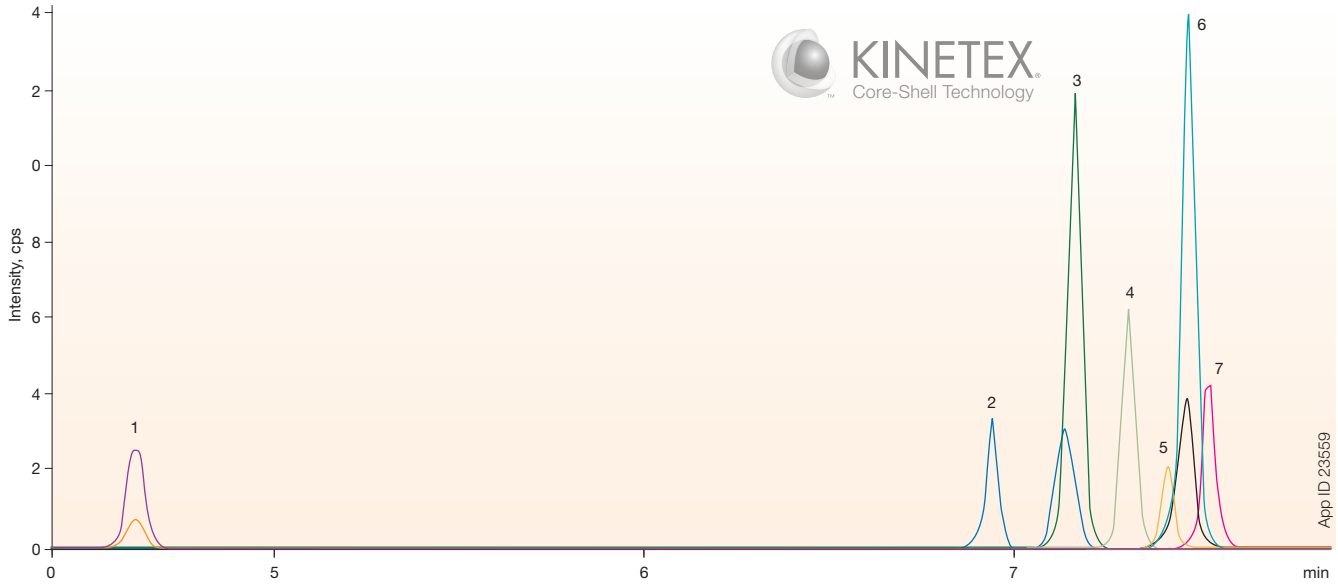
Column: Kinetex® 2.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4496-AN
Guard: SecurityGuard™ ULTRA C18 Cartridge: AJ0-8782
Mobile Phase: A: Water
B: Acetonitrile

Gradient:

Time (min)	% B
0	15
1	20
7.25	60
8	80
9.5	80
9.55	15
14	15

Injection: 12 µL
Flow Rate: 0.5 mL/min
Temperature: 22 °C
Detection: MS/MS ((SCIEX 5500 QTRAP®), ESI+ and ESI-
Sample:
1. Estriol (E3)
2. 17β Estradiol (E2)
3. Testosterone (TEST)
4. Equilin (EQ)
5. 17α-Ethinylestradiol (EE2)
6. Estrone (E1)
7. Androstenedione (AND)

LC-MS/MS Chromatogram



Pyrethroids

Marine & Fresh Water Sediment

Modified roQ QuEChERS Protocol

Step 1

Extraction

1. Weigh 2 g of dry sediment into a 50 mL centrifuge tube
2. Spike sample with internal standards
3. Add 10 mL of reagent water and mix
4. Add 10 mL of acidified Acetonitrile (0.1 % acetic acid) and shake for 10 seconds
5. Add Sodium acetate (1.5 g) and $MgSO_4$ (2.0 g), or weigh out (~) 3.5 g of AOAC 2007.01 roQ extraction packet (AH0-9043)
6. Shake for 10 seconds and vortex for 1 minute
7. Centrifuge at 4000 rpm for 5 minutes
8. Cool sample at – 20 °C for 1.5 hours or until frozen

Step 2

Clean-up

1. Transfer 8-9 mL of the supernatant from the previous step and transfer to a 15 mL PSA/C18 roQ dSPE tube (KS0-8926)
2. Shake for 10 seconds and vortex for 1 minute
3. Centrifuge for 10 minutes at 3000 rpm
4. Aspirate 5 mL of supernatant and filter using a Phenex™ 0.2 µm PTFE filter (AF0-2202-12) into a test tube suitable for a dry-down station
5. Evaporate sample using a dry-down station at ≤35 °C to near dryness
6. Reconstitute by first adding 50 µL of Acetone, vortexing, and then adding 950 µL of Methanol/Water (1:1)
7. Transfer the reconstituted sample to an autosampler vial for analysis

LC-MS/MS Conditions

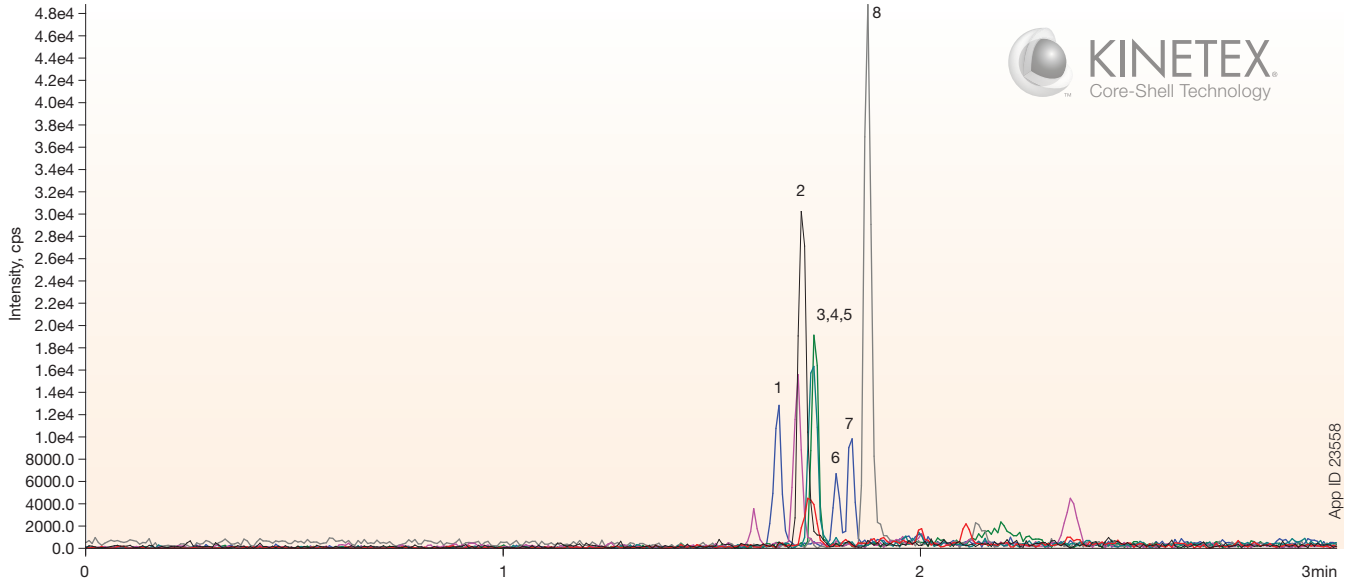
Column: Kinetex® 2.6 µm EVO C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4725-AN
Guard: SecurityGuard™ ULTRA EVO C18 Cartridge: AJ0-9298
Mobile Phase: A: 5 mM Ammonium acetate
B: Methanol

Gradient:

Time (min)	% B
0	50
1	95
3	95
3.01	50
6	50

Injection: 5 µL/min
Flow Rate: 0.7 mL/min
Temperature: 22 °C
Detection: MS/MS (SCIEX Triple Quad™ 4500)
Sample:
1. Cyfluthrin
2. Cyhalothrin
3. Cypermethrin
4. Deltamethrin
5. Esfenvalerate
6. cis-Permethrin
7. trans-Permethrin
8. Bifenthrin

LC-MS/MS Chromatogram



Learn more about roQ applications
Visit: ***www.phenomenex.com/roQ***

Pharmaceutical and Personal Care Products (PPCPs)

Marine & Fresh Water Sediment

Modified roQ QuEChERS Protocol

Step 1

Extraction

1. Weigh 2.0 g of dry sediment in a 50 mL centrifuge tube
2. Spike sample with internal standards
3. Prepare a second tube (each sample needs two different clean-up steps; one for PPCP+ and PPCP- analysis)
4. To both tubes, add 1.5 mL of acidified Acetonitrile (0.1 % Acetic acid) and shake for 10 seconds
5. Add Sodium acetate (1.5 g) and $MgSO_4$ (2.0 g), or weigh out (~)3.5 g of AOAC 2007.01 roQ extraction packet (AH0-9043)
6. Shake for 10 minutes and vortex for 1 minute
7. Centrifuge at 4000 rpm for 5 minutes
8. Cool sample at – 20 ºC for 1.5 hours or until frozen

Step 2

Clean-up

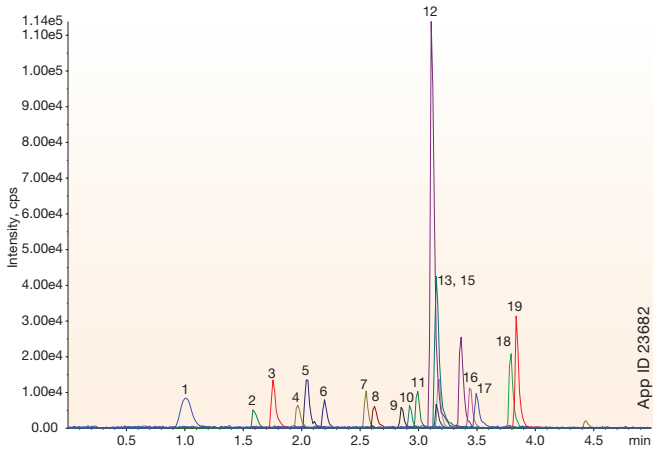
1. Transfer 8-9 mL of the supernatant from the previous step into a into a 15 mL roQ dSPE tubes. PPCP- supernatant transferred to a PSA/C18 dSPE tube (KS0-8926), PPCP+ goes to PSA only dSPE tube (KS0-8928)
2. Shake for 10 seconds and vortex for 1 minute
3. Centrifuge each tube for 10 minutes at 3000 rpm
4. Aspirate 5 mL of the supernatant in each tube and filter through a Phenex™ 0.2 µm PTFE filter (AF0-2202-12) into a test tube suitable for a dry-down station
5. Evaporate samples using a dry-down station at ≤35 ºC to near dryness
6. Reconstitute each sample by first adding 50 µL of Acetone, vortexing, and then adding 950 µL of Methanol/Water (1:1)
7. Transfer the reconstituted sample to an autosampler vial for analysis

roQ™

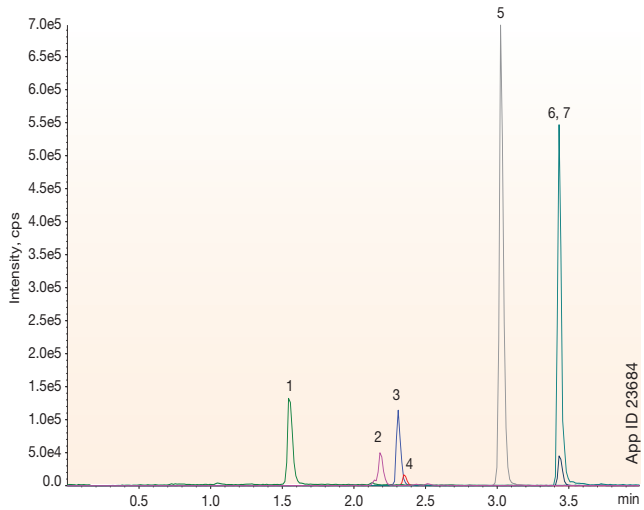
An Easier QuEChERS Solution

LC-MS/MS Chromatograms

ESI+



ESI-



ESI+ Conditions

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

Gradient:

Time (min)	% B
0	10
4	100
5	100
5.01	10
8	10

Injection: 2 µL
Flow Rate: 0.4 mL/min
Temperature: Ambient
Detection: MS/MS (SCIEX Triple Quad™ 4500), ESI+
Sample:
1. Atenolol
2. Trimethoprim
3. Caffeine
4. Sulfamethoxazole
5. Metoprolol
6. Primidone
7. Meprobamate
8. Propranolol
9. TCEP
10. Phenytoin
11. Carbamazepine
12. Erythromycin
13. DEET
14. Fluoxetine
15. Carisoprodol
16. Diazepam
17. TCPP
18. Oxybenzone
19. TDCPP

ESI- Conditions

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Guard: SecurityGuard ULTRA C18 Cartridge: AJ0-8782
Mobile Phase: A: 40 ppm Ammonium acetate
B: Methanol

Gradient:

Time (min)	% B
0	30
4	100
4.01	30
7	30

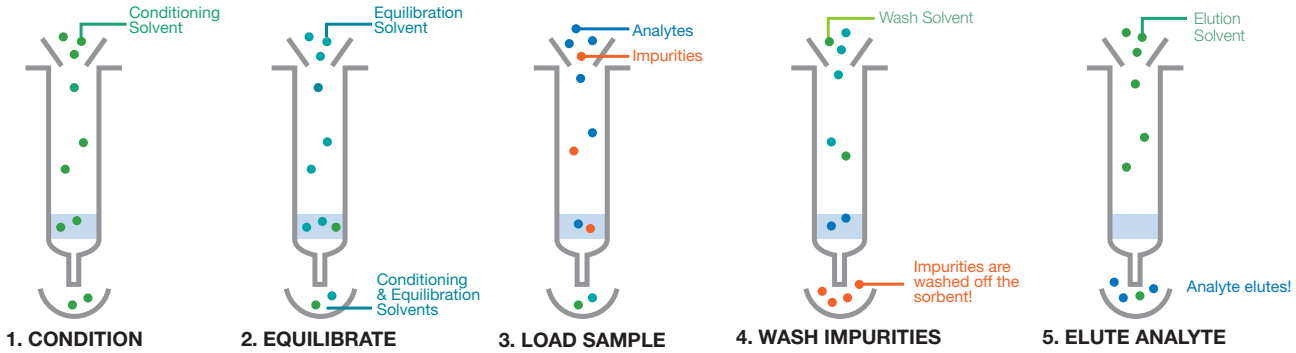
Injection: 10 µL
Flow Rate: 0.6 mL/min
Temperature: Ambient
Detection: MS/MS (SCIEX Triple Quad 4500), ESI-
Sample:
1. Naproxen
2. Diclofenac
3. Ibuprofen
4. Bisphenol A
5. Gemfibrozil
6. Triclocarban
7. Triclosan

Solid Phase Extraction (SPE)

SPE is a very targeted form of sample preparation that allows you to isolate your analyte of interest while removing any interfering compounds that may be in your sample.

- Targeted analyte extraction for cleaner analysis
- Concentration of samples for better chromatographic results
- Solvent switching for GC or LC compatibility

SPE General Protocol



A Choice for Every Analyte

OPTION 01

Acidic Compouds

Strong Acids ($pK_a < 2$)	Weak Acids (pK_a 2-4)
Strata-X-AW	*Strata-X-A*

OPTION 02

Neutral Compounds

Neutral Compounds
Strata-X

OPTION 03

Basic Compouds

Weak Bases (pK_a 8-10)	Strong Bases ($pK_a > 10$)
Strata-X-C	*Strata-X-CW*

Develop a method in under 1 minute and request a free Strata-X sample
www.phenomenex.com/mdtool

Hormones: EPA Method 539

strata™ Solid Phase Extraction

Consistently High Recoveries

EPA Method 539 was specifically developed to monitor the presence of various hormones in drinking water. This study provided an expanded list of target analytes to include compounds of current interest (e.g. progesterone) and a more modern extraction and separation method. By utilizing a SPE tube format, differing water sources can be scaled and processed more easily.

Sample Pre-Treatment

Per the EPA 539 method protocol, 1 L water samples are dechlorinated, preserved, collected, and stored. All standards are freshly prepared in 50% methanol in water containing 20 ng/mL of working internal standards. Samples are processed using the large volume set-up described on page 11.

SPE Protocol

Cartridge:	Strata C18-E, 1 g / 20 mL
Part No.:	8B-S001-JEG
Condition:	10 mL Methanol
Equilibrate:	10 mL Water
Load:	Pre-treated samples
Wash:	10 mL Methanol/Water (15:85)
Dry:	5 – 10 minutes under 10” Hg vacuum
Elute:	2x 6 mL Methanol
Dry Down:	Evaporate completely under a stream of N_2 @ 50 °C
Reconstitute:	Add 1mL of 50 % Methanol in Water containing 20 ng/mL of working internal standards

Extracted Matrix Recoveries

2 ng/L (Tap Water)		
ID (Neg. Ions)	**Recovery %**	**CV %**
17β-Estradiol	88.1	6.53
Estriol	109	1.00
Equilin	72.8	8.46
Estrone	89.6	7.23
17α-Ethynylestradiol	91.6	3.15
2 ng/L (Tap Water)		
ID (Pos. Ions)	**Recovery %**	**CV %**
Testosterone	100	1.24
Androstenedione	108	5.09
Progesterone	113	5.07
Norethisterone	104	2.07

LC-MS/MS Conditions

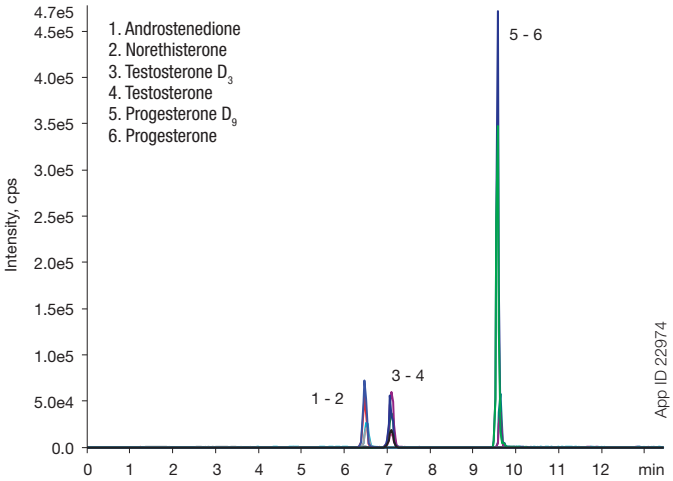
Column: Kinetex® 5 µm EVO C18
Dimensions: 100 x 2.1 mm
Part No.: 00D-4633-AN
Guard: SecurityGuard™ ULTRA EVO C18 Cartridge: AJ0-9298
Mobile Phase: A: 0.2 % Ammonium hydroxide in Water
B: 0.2 % Ammonium hydroxide in Methanol

Gradient:

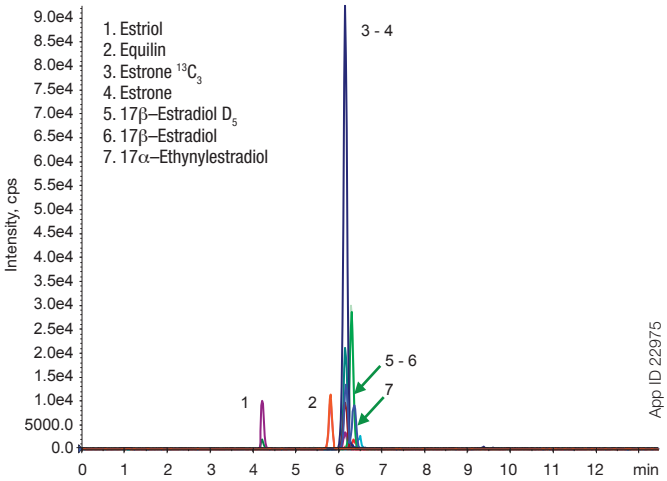
Time (min)	% B
0	30
1	65
6	65
6.5	85
10.5	85
11	30
13.5	30

Injection: 30 µL
Flow Rate: 0.2 mL/min
Detection: MS/MS (SCIEX Triple Quad™ 4500)

Representative Chromatogram – 2.0 ng/L (ESI +)



Representative Chromatogram – 2.0 ng/L (ESI -)



Polycyclic Aromatic Hydrocarbons (PAHs)

Improved Recoveries 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

Cartridge:	Strata PAH, 1.5 g / 6 mL
Part No.:	8B-S130-7CH
Condition:	10 mL Dichloromethane 10 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

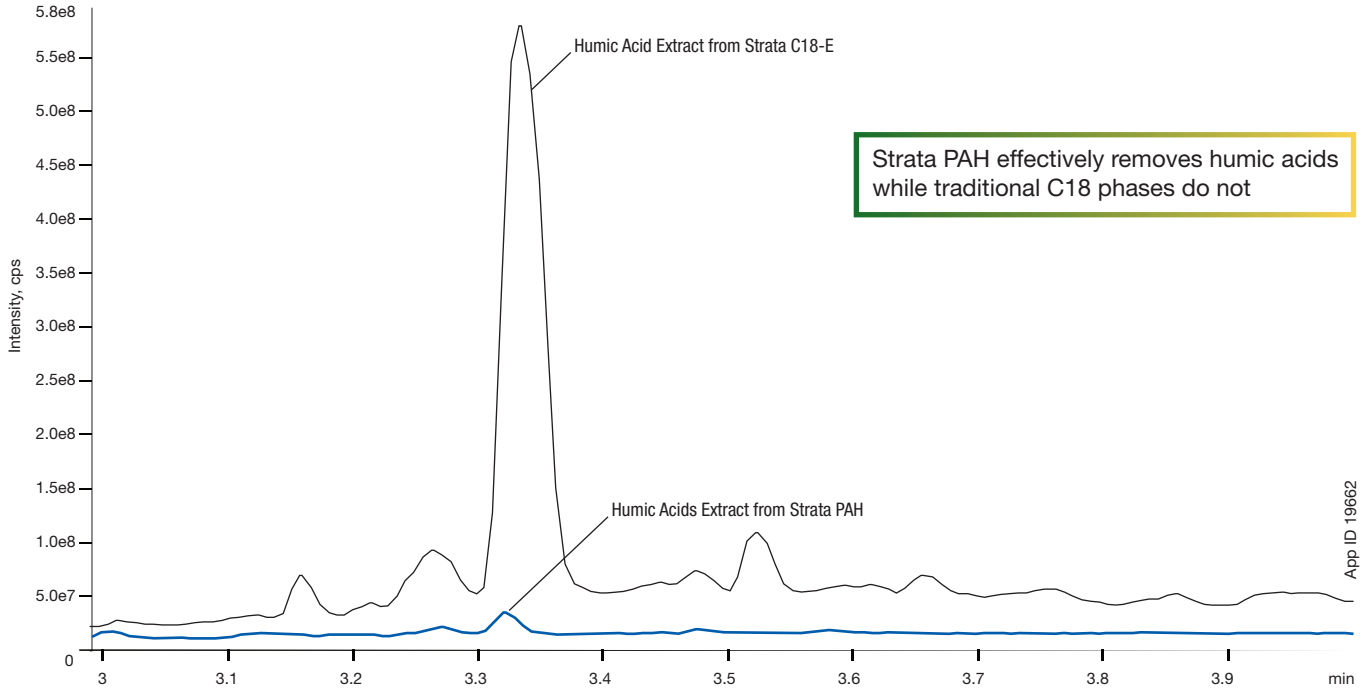
Column: Kinetex® 2.6 µm C8
Dimensions: 50 x 2.1 mm
Part No.: 00B-4497-AN
Guard: SecurityGuard™ ULTRA C8 Cartridge: AJ0-8784
Mobile Phase: A: 5 mM Ammonium acetate
B: Methanol

Gradient:

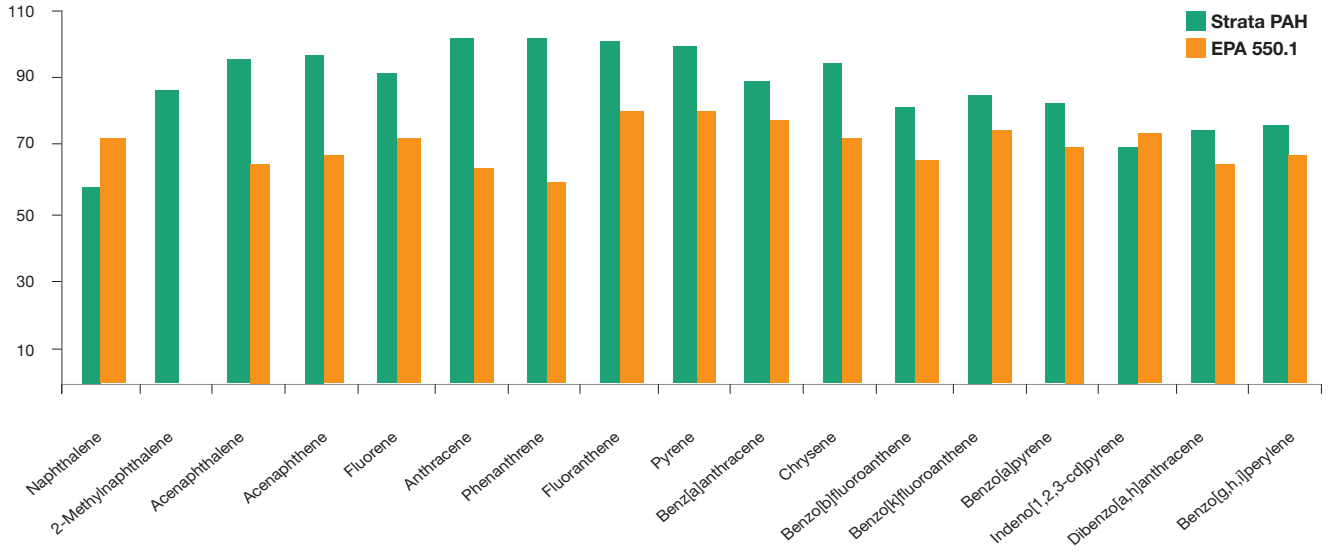
Time (min)	% B
0	15
2	95
6	95
6.01	15

Injection: 5 µL
Flow Rate: 0.4 mL/min
Temperature: Ambient
Backpressure: 210 bar
Detection: MS @ 580.4 amu / 536.5 amu (ambient) (SCIEX API 4000™)
Sample: Humic Acids from Suwannee River

Effective Removal of Humic Acids



PAH Percent Recoveries from Tap Water



Semivolatiles: EPA Method 625

strata® X Polymeric SPE

Improved Analysis using SPE

SPE, when compared to liquid-liquid extraction (LLE), is an alternative sample preparation method that can be successfully implemented for EPA Method 625 to test for a wide range of semivolatile organic pollutants in water. The improved SPE method incorporates a large-particle polymeric SPE cartridge (Strata-XL-C) and analysis by GC-MS in a rapid 17 minute run time. By utilizing large-particle SPE and GC methods, EPA 625 efficiency, reproducibility, and productivity are dramatically improved.

Optimized SPE Method

Sample Pre-treatment

2 mL concentrated HCl was spiked in 1 L of water matrix to target a pH between 1 and 3. 20 µL of each surrogate (acid and base) was spiked at 1000 µg/mL.

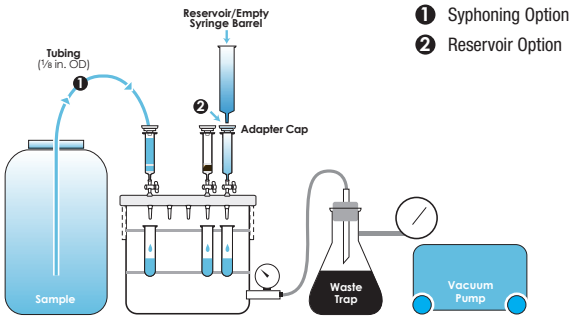
Solid Phase Extraction Protocol

Cartridge:	Strata-XL-C, 2 g / 20 mL Giga™ Tube
Part No.:	8B-S044-KEG
Condition:	SPE sorbent was conditioned with 10 mL Methanol followed by 10 mL DI Water.
Load:	The pre-treated 1 L water sample was loaded at 10 – 12 mL/min.
Dry:	Reservoir tubes used for loading the sample were removed and the SPE cartridges were dried by applying vacuum (15-20" of Hg) for 4-5 minutes.
Elution 1:	• 2 aliquots of 2 mL Acetone • 2 aliquots of 2 mL Dichloromethane/acetone (3:1) • 3 aliquots of 2 mL Dichloromethane
Elution 2:	2 aliquots of 4.5 mL Ethyl acetate/Methanol (1:1) in 1.5 % NH_4OH. To prepare the aliquots, 9.5 mL of ethyl acetate was combined with 9.5 mL of methanol and 1 mL of 30 % NH_4OH and vortexed for 30 seconds.
Water Removal:	Elution 1 and Elution 2 fractions were passed through separate Strata Sodium Sulfate 10 g / 20 mL cartridges (separately) to remove water under gravity. Concentrated Elution 1 and 2 fractions were collected in two separate test tubes. To collect residual amounts of sample from the Strata Sodium Sulfate cartridges, elution with an additional 4 mL of Dichloromethane per cartridge was performed. After the addition of dichloromethane, two layers were formed. The stopcock was opened to collect the bottom organic layer.
Dry Down:	Samples were dried using a TurboVap® under nitrogen (no heat) until the volume of Elution 1 and Elution 2 was reduced to 0.5 mL. Samples were not evaporated to complete dryness to prevent analyte loss.
Reconstitute:	Elution 1 and Elution 2 fractions were combined (total volume ~1 mL) and reconstituted to a total volume of 4 mL with dichloromethane. 50 µL of internal standard was spiked at 1000 µg/mL.

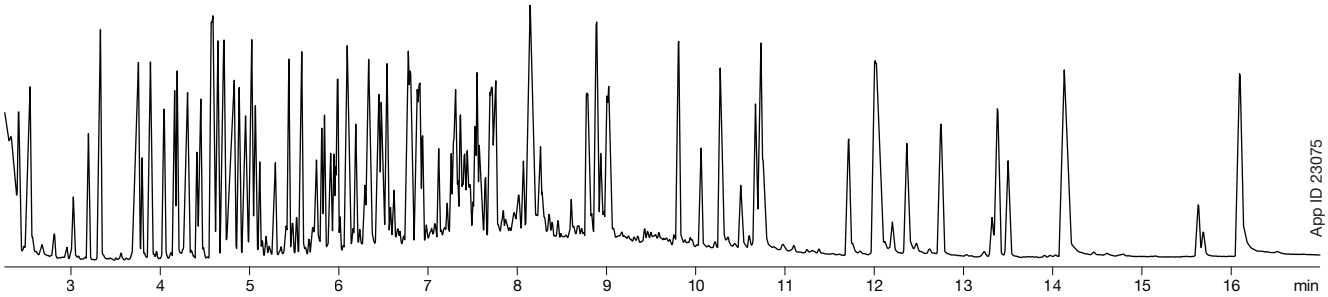
GC Conditions

Column:	Zebron™ ZB-SemiVolatiles
Dimensions:	30 meter x 0.25 mm x 0.25 µm
Part No.:	7HG-G027-11
Injection:	Splitless @ 250 °C, 1 µL
Recommended Liner:	Zebron PLUS Single Taper Z-Liner™
Liner Part No.:	AG2-0A13-05 (For Agilent® Systems)
Carrier Gas:	Helium @ 1.6 mL/min (constant flow)
Oven Program:	40 °C for 0.66 min to 260 °C @ 30 °C/min to 295 °C @ 6 °C/min to 325 °C @ 25 °C/min for 2 min
Detector:	MSD @ 300 °C, 40-500 amu

SPE Accessories and Set-up used for Large Volume Sample Processing



Waste Water Matrix Extraction on a ZB-SemiVolatiles GC Column



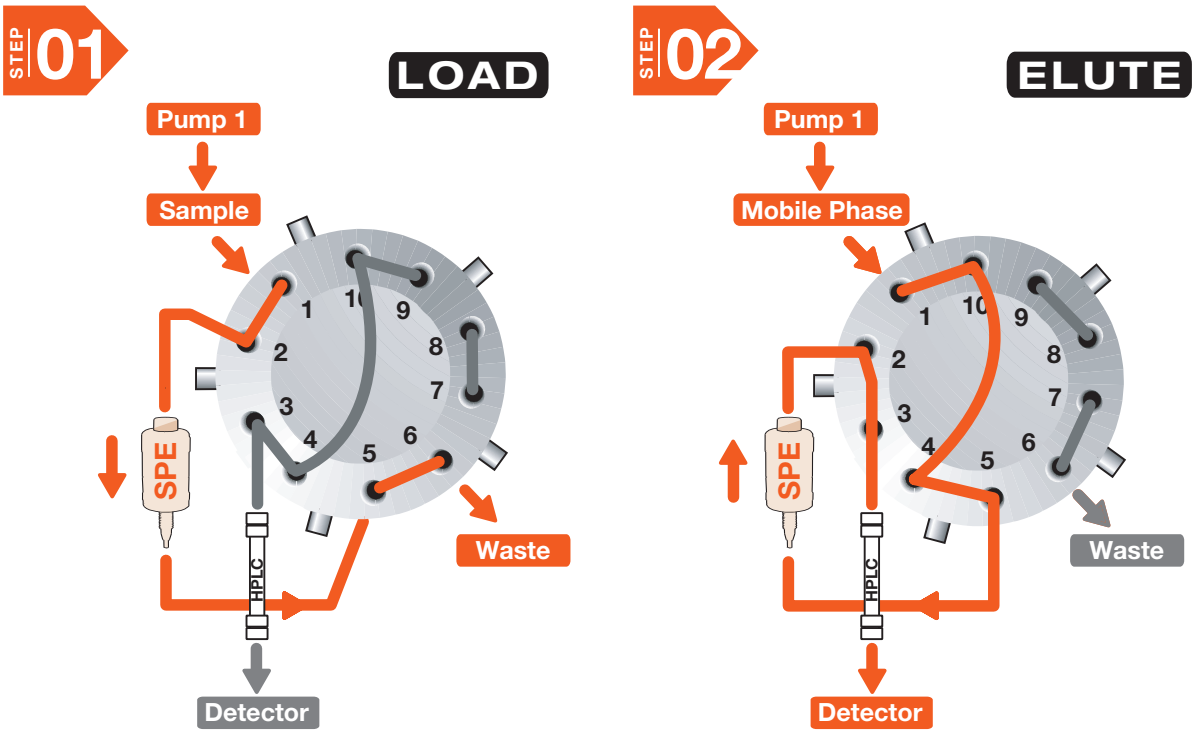
To learn more at
www.phenomenex.com/SPE

On-line SPE

An Alternative to Traditional SPE Formats

On-line SPE is an alternative to other traditional SPE formats, but offers a less labor intensive and time consuming extraction method which allows samples to be cleaned up in line with the LC analysis. This approach allows for improved sample throughput without compromising sensitivity. It's primary goal is to run the sample through the sorbent in a direct flow pathway retaining the target analytes and removing interferences out of the system and then reversing the flow back into the SPE sorbent to elute directly into the LC column.

Standard 10 Port-2 Position On-line SPE Set-up



On-line SPE is available in

- Strata C18, C8
- Strata-X, X-C, X-CW, X-A, X-AW

Perfluorinated Compounds

In Aqueous Matrices Using On-line SPE

The analysis of perfluorinated compounds (PFCs) in aqueous matrices, especially drinking water and ground water, has received much attention in recent years. The US EPA has issued health advisories specifically for PFOA and PFOS and the occurrence data from the third Unregulated Contaminant Monitoring Rule (UCMR3) indicates a continuing need for this specific analysis using EPA Method 537, which uses a large volume of water passed through a SPE cartridge containing polystyrenedivinylbenzene (SDVB). Improvements can be made from the original method using on-line SPE to reduce the downtime and for comparable sensitivity. Presented is a sensitive, accurate and precise on-line SPE method using a weak anion-exchange polymeric SPE sorbent (Strata X-AW) coupled with a Kinetex® EVO C18 core-shell HPLC column.

Sample Preparation Procedure

1. Samples are collected in polypropylene bottles and preserved with 0.5 g/L Trizma®.
2. A 10 mL aliquot is spiked with surrogates at a concentration of 50 ng/L.
3. If necessary, filter using a 10 mL syringe fitted to a 1.2 µm glass fiber syringe filter.
4. The filtered sample is spiked with internal standard at 50 ng/L.
5. The filtered sample is loaded and analyzed using a 5.0 mL injection volume.
6. The on-line SPE is completely automated; it includes a sample wash step (2.1 to 4.1 min) to wash Trizma preservative from the media.

On-line SPE Program

Time (min)	Water %	MeOH %	ACN %	Flow (mL/min)	Comments
0	100	0	0	2.5	Sample Loading
2	100	0	0	2.5	Sample Loading
2	100	0	0	2.5	SPE Wash
4	100	0	0	2.5	SPE Wash
4.11	30	70	0	0	Idle (Elution into LC)
9	30	70	0	0	Idle (Elution into LC)
9.01	0	0	100	2.0	ACN Wash
9.49	0	0	100	2.0	ACN Wash
9.5	2.0	98	0	3.0	MeOH Wash
11.5	2.0	98	0	3.0	MeOH Wash
11.51	100	0	0	3.0	Cond: Water
14	100	0	0	3.0	Cond: Water

Chemical Abbreviations: Methanol (MeOH); Acetonitrile (ACN)

On-line SPE

On-line SPE: Strata-X-AW 33 µm Polymeric Weak Anion-Exchange
Dimensions: 20 x 2.0 mm
Part No.: 00M-S038-B0-CB
On-line SPE Cartridge Holder: 20 mm Cartridge Holder
Part No.: CH0-5845
Sample Filters: Phenex™ Glass Fiber 1.2 µm 28 mm

LC-MS/MS Conditions

Column: Kinetex 5 µm EVO C18 100Å
Dimensions: 100 x 2.1 mm
Part No.: 00D-4633-AN
Guard: SecurityGuard™ ULTRA Cartridge: AJ0-9298
Mobile Phase: A: 0.4 % v/v Ammonium hydroxide in Water
B: Methanol

Gradient:

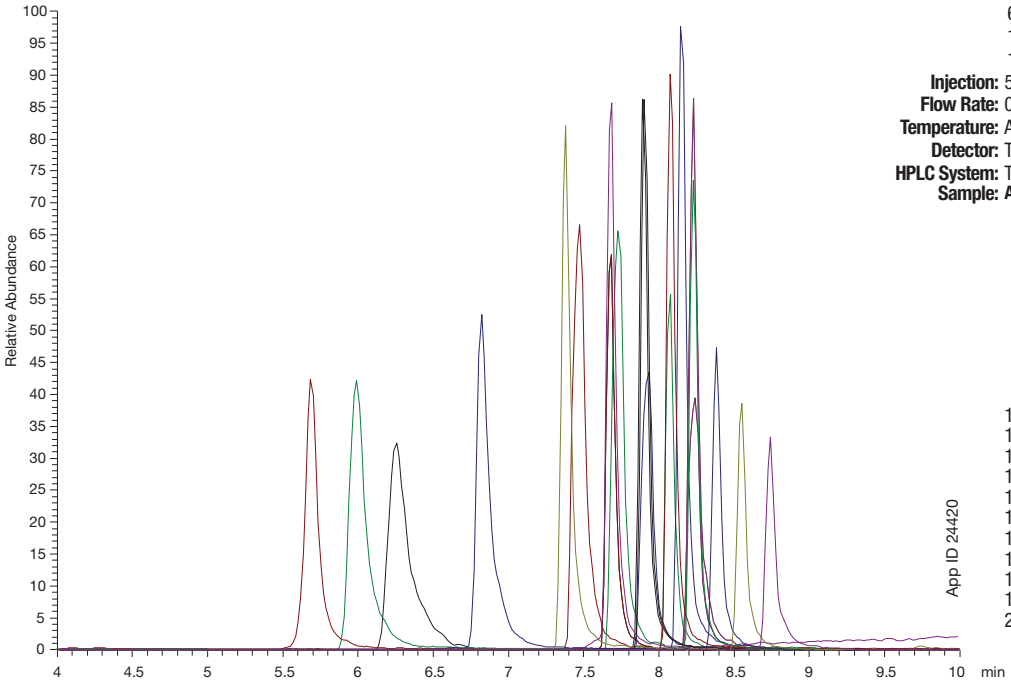
Time (min)	% B
0	90
3.1	20
4.5	20
6.1	90
11	90
14	90

Injection: 5 mL
Flow Rate: 0.3 mL/min
Temperature: Ambient
Detector: Thermo TSQ Quantum® Ultra QQQ
HPLC System: Thermo Accela® 1250

Sample:

Analyte	Retention Time (Min)
1. PFBA	5.69
2. PFPeA	6
3. PFBS	6.3
4. PFHxA	6.83
5. PFHpA	7.39
6. PFHxS	7.5
7. 6:2 FTS	7.68
8. PFOA	7.7
9. PFOS	7.7
10. PFNA	7.92
11. PFNS	7.9
12. 8:2 FTS	8.08
13. PFDA	8.09
14. N-MeFOSAA	8.15
15. PFDS	8.2
16. N-EtFOSAA	8.23
17. PFUnDA	8.25
18. PFDoDA	8.4
19. PFTrDA	8.56
20. PFTeDA	8.74

PFCs Chromatogram



roQ QuEChERS Kits

roQ Extraction Kits

Extraction kits contain fifty easy-pour salt packets and fifty 50 mL stand-alone centrifuge tubes

Description	Unit	Part No.
AOAC 2007.01 Method Extraction Kits		
6.0 g $MgSO_4$, 1.5 g NaOAc	50/pk	KS0-8911*
EN 15662 Method Extraction Kits		
4.0 g $MgSO_4$, 1.0 g NaCl, 1.0 g SCTD, 0.5 g SCDS	50/pk	KS0-8909*
Original Non-buffered Method Extraction Kits		
4.0 g $MgSO_4$, 1.0 g NaCl	50/pk	KS0-8910
6.0 g $MgSO_4$, 1.5 g NaCl	50/pk	KS0-8912

*AOAC and EN Extraction Kits also available in traditional non-collared 50 mL centrifuge tubes, Part No.: KS0-8911-NC and KS0-8909-NC

roQ dSPE Kits

dSPE kits contain pre-weighed sorbents/salts inside 2 mL or 15 mL centrifuge tubes

Description	Unit	Part No.
2 mL dSPE Kits		
150 mg $MgSO_4$, 25 mg PSA, 25 mg C18E	100/pk	KS0-8913
150 mg $MgSO_4$, 25 mg PSA, 2.5 mg GCB	100/pk	KS0-8914
150 mg, $MgSO_4$, 25 mg PSA, 7.5 mg GCB	100/pk	KS0-8915
150 mg $MgSO_4$, 25 mg PSA	100/pk	KS0-8916
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18E, 50 mg GCB	100/pk	KS0-8917
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18E	100/pk	KS0-8918
150 mg $MgSO_4$, 50 mg PSA, 50 mg GCB	100/pk	KS0-8919
150 mg $MgSO_4$, 50 mg PSA	100/pk	KS0-8920
15 mL dSPE Kits		
900 mg $MgSO_4$, 150 mg PSA, 150 mg C18E	50/pk	KS0-8921
900 mg $MgSO_4$, 150 mg PSA, 15 mg GCB	50/pk	KS0-8922
900 mg $MgSO_4$, 150 mg PSA, 45 mg GCB	50/pk	KS0-8923
900 mg $MgSO_4$, 150 mg PSA	50/pk	KS0-8924
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18E, 400 mg GCB	50/pk	KS0-8925
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18E	50/pk	KS0-8926
1200 mg $MgSO_4$, 400 mg PSA, 400 mg GCB	50/pk	KS0-8927
1200 mg $MgSO_4$, 400 mg PSA	50/pk	KS0-8928

roQ Extraction Salt Packets

Salt packets only. Centrifuge tubes not included.

Description	Unit	Part No.
AOAC 2007.01 Method Extraction Packets		
6.0 g $MgSO_4$, 1.5 g NaOAc	50/pk	AH0-9043
EN 15662 Method Extraction Packets		
4.0 g $MgSO_4$, 1.0 g NaCl, 1.0 g SCTD, 0.5 g SCDS	50/pk	AH0-9041
Original Non-Buffered Method Extraction Packets		
4.0 g $MgSO_4$, 1.0 g NaCl	50/pk	AH0-9042
6.0 g $MgSO_4$, 1.5 g NaCl	50/pk	AH0-9044

Bulk roQ QuEChERS Sorbents

Phase	10 g	100 g
C18-E	—	04G-4348
GCB (Graphitized Carbon Black)	04D-4615	04G-4615
PSA	—	04G-4610

Zebron™ GC Columns

Zebron ZB-SemiVolatiles GC Columns

ID (mm)	df (µm)	Temperature Limits (°C)	Part No.
20-Meter			
0.18	0.18	-60 to 325/350	7FD-G027-08
0.18	0.36	-60 to 325/350	7FD-G027-53
30-Meter			
0.25	0.25	-60 to 325/350	7HG-G027-11
0.25	0.50	-60 to 325/350	7HG-G027-17
30-Meter with 5-Meter Guardian™ Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGA
30-Meter with 10-Meter Guardian Integrated Guard			
0.25	0.25	-60 to 325/350	7HG-G027-11-GGC
60-Meter			
0.25	0.25	-60 to 325/350	7KG-G027-11

Easy Liner Selection
www.phenomenex.com/FindLiner

KINETEX Core-Shell Technology

Kinetex 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**
EVO C18	00A-4725-AN	00B-4725-AN	—	00D-4725-AN	00F-4725-AN	AJ0-9298
XB-C18	00A-4496-AN	00B-4496-AN	00C-4496-AN	00D-4496-AN	00F-4496-AN	AJ0-8782
C18	00A-4462-AN	00B-4462-AN	00C-4462-AN	00D-4462-AN	00F-4462-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

Kinetex 5 µm Minibore Columns (mm)

					SecurityGuard ULTRA Cartridges‡
Phases	**30 x 2.1**	**50 x 2.1**	**100 x 2.1**	**150 x 2.1**	**3/pk**
EVO C18	00A-4633-AN	00B-4633-AN	00D-4633-AN	00F-4633-AN	AJ0-9298
Phenyl-Hexyl	—	00B-4603-AN	00D-4603-AN	—	AJ0-8788

for 2.1 mm ID

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

Strata Silica-Based Sorbents

Tubes	1 mL (100/box)		3 mL (50/box)			6 mL (30/box)		
Phase	50 mg	100 mg	100 mg	200 mg	500 mg	200 mg	500 mg	1 g
C18-E	8B-S001-DAK	8B-S001-EAK	8B-S001-EBJ	8B-S001-FBJ	8B-S001-HBJ	8B-S001-FCH	8B-S001-HCH	8B-S001-JCH
C18-U	—	8B-S002-EAK	—	8B-S002-FBJ	8B-S002-HBJ	—	8B-S002-HCH	8B-S002-JCH
C18-T	—	8B-S004-EAK	—	8B-S004-FBJ	8B-S004-HBJ	—	8B-S004-HCH	8B-S004-JCH
C8	—	8B-S005-EAK	—	8B-S005-FBJ	8B-S005-HBJ	—	8B-S005-HCH	8B-S005-JCH
Phenyl	—	8B-S006-EAK	—	8B-S006-FBJ	8B-S006-HBJ	—	8B-S006-HCH	8B-S006-JCH
SCX	—	8B-S010-EAK	8B-S010-EBJ	8B-S010-FBJ	8B-S010-HBJ	—	8B-S010-HCH	8B-S010-JCH
WCX	—	8B-S027-EAK	—	8B-S027-FBJ	8B-S027-HBJ	—	8B-S027-HCH	8B-S027-JCH
SAX	—	8B-S008-EAK	8B-S008-EBJ	8B-S008-FBJ	8B-S008-HBJ	—	8B-S008-HCH	8B-S008-JCH
NH_2	—	8B-S009-EAK	—	8B-S009-FBJ	8B-S009-HBJ	—	8B-S009-HCH	8B-S009-JCH
CN	—	8B-S007-EAK	—	8B-S007-FBJ	8B-S007-HBJ	—	8B-S007-HCH	8B-S007-JCH
Si-1	—	8B-S012-EAK	—	8B-S012-FBJ	8B-S012-HBJ	—	8B-S012-HCH	8B-S012-JCH
Florisil®	—	—	—	—	8B-S013-HBJ	—	8B-S013-HCH	8B-S013-JCH
EPH	—	—	—	—	8B-S031-HBJ	—	—	—
AL-N	—	—	—	—	8B-S313-HBJ	—	—	8B-S313-JCH
SDB-L (Polymeric)	8B-S014-DAK	8B-S014-EAK	—	8B-S014-FBJ	8B-S014-HBJ	8B-S014-FCH	8B-S014-HCH	8B-S014-JCH

Strata-X Polymer-Based Sorbents

Tubes	1 mL (100/box)		3 mL (50/box)			6 mL (30/box)		
Phase	30 mg	60 mg	60 mg	200 mg	500 mg	100 mg	200 mg	500 mg
Strata-X	8B-S100-TAK	8B-S100-UAK	8B-S100-UBJ	8B-S100-FBJ	8B-S100-HBJ	8B-S100-ECH	8B-S100-FCH	8B-S100-HCH
Strata-X-C	8B-S029-TAK	—	8B-S029-UBJ	8B-S029-FBJ	8B-S029-HBJ	8B-S029-ECH	8B-S029-FCH	8B-S029-HCH
Strata-X-CW	8B-S035-TAK	—	8B-S035-UBJ	8B-S035-FBJ	8B-S035-HBJ	8B-S035-ECH	8B-S035-FCH	8B-S035-HCH
Strata-X-A	8B-S123-TAK	—	8B-S123-UBJ	8B-S123-FBJ	8B-S123-HBJ	8B-S123-ECH	8B-S123-FCH	8B-S123-HCH
Strata-X-AW	8B-S038-TAK	—	8B-S038-UBJ	8B-S038-FBJ	8B-S038-HBJ	8B-S038-ECH	8B-S038-FCH	8B-S038-HCH
Strata-XL	8B-S043-TAK	—	8B-S043-UBJ	8B-S043-FBJ	8B-S043-HBJ	8B-S043-ECH	8B-S043-FCH	8B-S043-HCH
Strata-XL-C	8B-S044-TAK	—	8B-S044-UBJ	8B-S044-FBJ	8B-S044-HBJ	8B-S044-ECH	8B-S044-FCH	8B-S044-HCH
Strata-XL-CW	8B-S052-TAK	—	8B-S052-UBJ	8B-S052-FBJ	8B-S052-HBJ	8B-S052-ECH	8B-S052-FCH	8B-S052-HCH
Strata-XL-A	8B-S053-TAK	—	8B-S053-UBJ	8B-S053-FBJ	8B-S053-HBJ	8B-S053-ECH	8B-S053-FCH	8B-S053-HCH
Strata-XL-AW	8B-S051-TAK	—	8B-S051-UBJ	8B-S051-FBJ	8B-S051-HBJ	8B-S051-ECH	8B-S051-FCH	8B-S051-HCH

On-line SPE

On-line Extraction Cartridges	Dimensions	Part No.
Strata C18	20 x 2.0 mm	00M-S039-B0-CB
Strata C8	20 x 2.0 mm	00M-S101-B0-CB
Strata-X	20 x 2.0 mm	00M-S033-B0-CB
Strata-X-A	20 x 2.0 mm	00M-S132-B0-CB
Strata-X-AW	20 x 2.0 mm	00M-S038-B0-CB
Strata-X-C	20 x 2.0 mm	00M-S048-B0-CB
Strata-X-CW	20 x 2.0 mm	00M-S036-B0-CB
Cartridge Holder	20 mm	CH0-5845

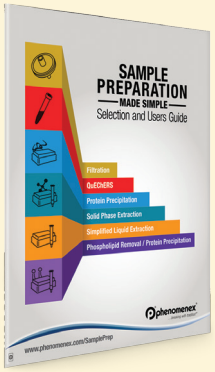
guarantee

If Phenomenex products in this brochure do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND.

Sample Preparation Selection and Users Guide

Over 50 pages to assist you in selecting and using the appropriate technique.

Request Your Copy:
www.phenomenex.com/SPguide



Application Guide

ENVIRONMENTAL SAMPLE PREPARATION

CLEAN | QUICK | ACCURATE

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Strata-X is patented by Phenomenex. U.S. Patent No. 7,119,145.

Kinetex EVO is patented by Phenomenex. U.S. Patent Nos. 7,563,367 and 8,658,038 and foreign counterparts.

SecurityGuard is patented by Phenomenex. U.S. Patent No. 6,162,362.

Caution: this patent only applies to the analytical-sized guard cartridge holder, and does not apply to SemiPrep, PREP or ULTRA holders, or to any cartridges.

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