SAMPLE PREPARATION

Solid Phase Extraction

Solid Phase Extraction

Solid phase extraction (SPE) is a form of step-wise chromatography designed to extract, partition, and (or) adsorb one or more components from a liquid phase (sample) onto a stationary phase (sorbent or resin). Over the last twenty years, SPE has become the most powerful technique available for the rapid and selective sample preparation prior to analytical chromatography. SPE extends the lifetime of chromatographic systems and improves qualitative and quantitative analysis. By switching sample matrices from the original matrix to a simpler matrix environment, subsequent analysis is often simplified, and the demand placed on an analytical system is considerably lessened.

Available SPE Products & Hardware

Supelco SPE products comprise of an array of sorbents, resins and hardware configurations including polypropylene tubes, glass tubes, 96-well plates, and various positive pressure cartridges. Supelco offers custom manufacturing services so you can optimize your sample processing procedure to the parameters dictated by your sample prep objectives. If there is a certain permutation of phase chemistry, bed weight and hardware configuration you require that is not listed within our standard product line, please inquire.

To request a price quote or inquire on the feasibility of Supelco **manufacturing a custom SPE product**, please contact our Order Processing representatives:

Telephone: 800-247-6628, 814-359-3441
Fax: 800-447-3044, 814-359-3044
Email: supelco@sial.com

Polypropylene SPE Tubes

Standard Design: Supelco Discovery® and Supelclean SPE tubes are comprised primarily of straight-walled serological grade polypropylene syringe barrels. Each of the 20+ available bonded phases and resins are available in an array of bed weights and volumes including 1, 3, 6, 12, 20, and 60 mL.

Reversible Design: Our reversible SPE tubes allows for both forward and reverse flow capabilities offering great utility in trace enrichment applications. The tubes consist of a female luer inlet and a male luer outlet. Reversible tubes are available in 0.5, 1, and 2 mL configurations.

Example of Polypropylene SPE tubes

Glass SPE Tubes

Inert glass tubes (3 and 6 mL) are available for preparations that demand high purity extracts and increased solvent compatibility.

PTFE and Stainless Steel Frits

Use PTFE or stainless steel frits when solvent compatibility and tube cleanliness are of concern. Stainless steel frits are not available for glass SPE tubes.

96-well SPE Plates

Process up to 96 samples at once using Discovery®, Supel-Select HLB SPE, and HybridSPE-Phospholipid 96-Well Plates. The well plates are a one-piece 2 mL polypropylene square well design which will fit most standard well plate manifolds. Available bed weights include 15 - 100 mg/well. The well plates are compatible with most robotic and automated liquid handling systems.

- TomTec Quadra 96
- Packard Multi-Probe
- Gilson SPE 215
- Hamilton MICROLAB STAR

Solid Phase Extraction

Available SPE Products & Hardware

Dispersive SPE Vials and Tubes

Dispersive SPE (dSPE) is an emerging sample prep technique that is becoming increasingly popular in the area of multi-residue pesticide analysis. Unlike traditional techniques using SPE tubes or cartridges, in dispersive SPE, bulk amounts of salts and SPE sorbents are added directly to a liquid extract of a food or agricultural sample to drive liquid-liquid phase partitioning and sample clean up. Upon extraction, the sample is centrifuged and the resulting supernatant is ready for further processing and analysis.

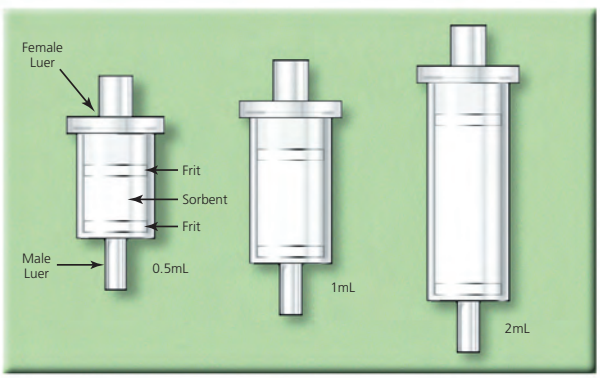
Dispersive SPE tubes consist of bulk SPE sorbents and salts pre-packed in centrifuge tubes.

Rezorian Cartridges

Our disposable Rezorian Luer-Lock syringe-tip cartridges are fast and convenient for isolating, purifying, and concentrating molecules from a variety of sample matrices. Use where positive pressure is preferred. Rezorian cartridges, pre-packed with the Supelco bonded-phase or resin of your choice, are available in 1 and 5 mL configurations.

Reversible SPE Tubes

Our reversible SPE tubes provide good utility in trace enrichment applications by permitting forward and reverse flows. These tubes consist of a female luer inlet and a male luer outlet, and are constructed of polypropylene. Reversible tubes are available in 0.5, 1, and 2 mL configurations with maximum bed weights of 175, 350, and 700 mg respectively. Tubes are available pre-packed with the Supelco bonded-phase or resin of your choice through our custom service.



Use SPE for samples that:

- Contain particulate matter causing system clogging and high back pressure
- Contain components that cause high background, misleading peaks or responses, and (or) poor sensitivity
- Require clean up, trace enrichment or concentration, or purification
- Require sample matrix or solvent exchange

Benefits of SPE:

- Switch sample matrices to a form more compatible with chromatographic analysis
- Concentrate analytes for increased sensitivity
- Remove interferences to simplify chromatography and improve quantitation
- Protect the analytical column from contaminants

Common SPE applications:

- Pharmaceutical compounds and metabolites in biological fluids
- Drugs of abuse in biological fluids
- Pesticides and antibiotics in food and agricultural matrices
- Desalting of proteins and peptides
- Water and fat soluble vitamins
- For more applications, please contact our technical service department

HybridSPE® - Phospholipid Technology

NEW PRODUCTS

HybridSPE-PL 96-well Plate & PlatePrep Vacuum Manifold

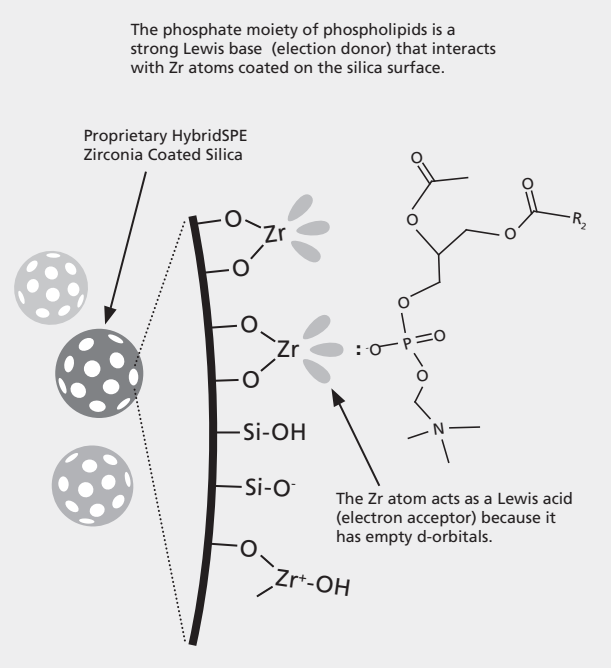
HybridSPE-Phospholipid (HybridSPE-PL) technology is a simple and generic sample prep platform designed for the gross level removal of endogenous proteins and phospholipid interferences from biological plasma and serum prior to LC-MS or LC-MS/MS analysis. Biological plasma or serum is first subjected to protein precipitation via the addition of acidified acetonitrile. Precipitated proteins are then removed by centrifugation and the resulting supernatant is loaded on the HybridSPE-PL cartridge or 96-well plate which acts a chemical filter that specifically targets the removal of endogenous sample phospholipids. The phospholipid retention mechanism is based on a highly selective Lewis acid-base interaction between the proprietary zirconia ions functionally bonded to the HybridSPE-PL stationary phase and the phosphate moiety consistent with all phospholipids. The resulting eluent is ready for immediate LC-MS or LC-MS-MS analysis.

Solid Phase Extraction

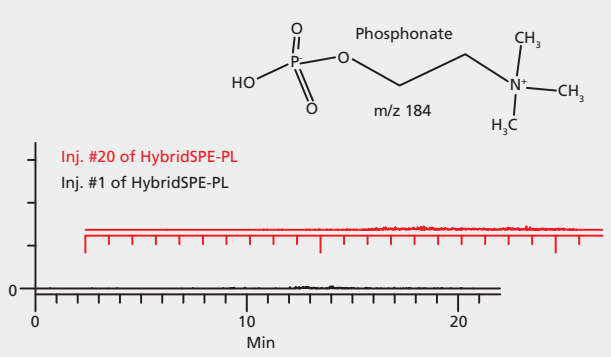
HybridSPE® - Phospholipid Technology

Features & Benefits:

- Merges the simplicity of protein precipitation and the selectivity of SPE via the targeted removal of phospholipids
- Reduce ion-suppression through the complete removal of phospholipids and precipitated proteins
- 2-3 step generic procedure
- Minimal to no method development

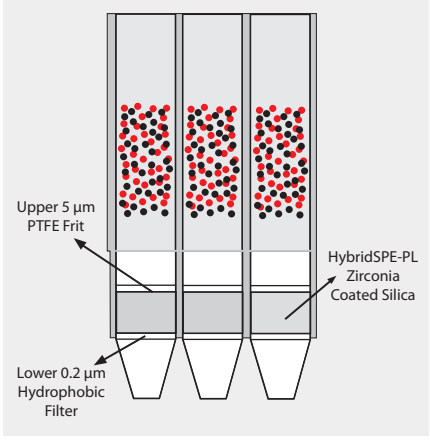


Lewis Acid Base Interaction Between HybridSPE Zirconia Ions & Phospholipids



No Accumulation of Phospholipids Using HybridSPE-PL

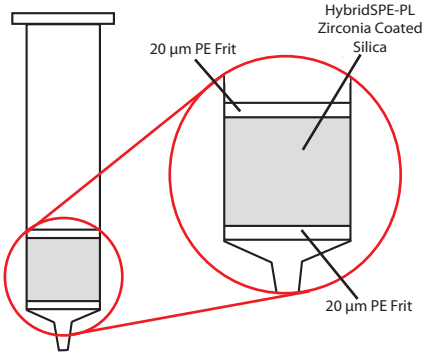
An alternative "In-well Precipitation" method is available for the HybridSPE-PL 96-well and HybridSPE-PL Ultra cartridge version in which biological plasma/serum is first added to the 96-well plate/cartridge followed by acidified acetonitrile (precipitation agent). After a brief mixing/vortexing step, vacuum is applied to the 96-well plate/cartridge. Because the 96-well version/Ultra cartridge contains a series of low porosity hydrophobic filters/frits, the packed well or Ultra cartridge filter/frit assembly acts as a depth filter facilitating the concurrent removal of both phospholipids and precipitated proteins during the extraction process.



HybridSPE-PL 96-well Plate Schematics

"In-Well Precipitation" Method for 96-well Format and Ultra cartridge:

- Apply 100 µL plasma followed by 300 µL 1% formic acid in acetonitrile to 96-well HybridSPE-PL Plate or Ultra cartridge
- Vortex / mix well-plate briefly.
- Apply vacuum to HybridSPE-PL 96-well plate or Ultra cartridge
- Resulting filtrate / eluent is ready for LC-MS analysis.



HybridSPE-PL 1 mL Cartridge Schematics

"Off-Line Precipitation" Method for Cartridge & 96-well Format:

- Combine 100 µL plasma + 300 µL 1% formic acid in acetonitrile
- Vortex for 30-60 seconds and centrifuge
- Process supernatant through HybridSPE-PL cartridge or 96-well plate via vacuum manifold
- Resulting filtrate/eluent is ready for LC-MS analysis

HybridSPE®-Phospholipid Enrichment

HybridSPE-PL can also be used to enrich phospholipids for analysis and profiling. The interaction between the HybridSPE-PL sorbent and phospholipids is based on Lewis acid-base chemistry, and can be disrupted with a strong Lewis base, such as ammonium hydroxide.

Phospholipid Enrichment Method:

- Combine 100 µL plasma + 900 µL solvent with 1% formic acid or ammonium formate
- Vortex for 30-60 seconds and centrifuge
- Process supernatant through HybridSPE-PL cartridge or 96 well plate via vacuum manifold
- Wash with solvent
- Elute with 5% Ammonium Hydroxide in ACN or Methanol
- Dry and reconstitute

HybridSPE®-Phospholipid

	Cat. No.	Qty
HybridSPE®-Phospholipid		
96-well Plate, bed wt.: 50 mg, volume 2 mL	575656-U	1 ea
Cartridge, bed wt.: 30 mg, volume 1 mL	55261-U	100 ea
96-well Plate, bed wt.: 15 mg, volume 0.8 mL	52794-U	1 ea
Cartridge, bed wt.: 500 mg, volume 6 mL	55267-U	30 ea

HybridSPE®-Phospholipid 96-Well Essentials Kit

HybridSPE®-Phospholipid

	Cat. No.	Qty
HybridSPE®-Phospholipid 96-Well Essentials Kit		
96-Well Essentials Kit	52813-U	1 kit

HybridSPE®-Phospholipid Ultra

HybridSPE®-Phospholipid

	Cat. No.	Qty
HybridSPE®-Phospholipid Ultra		
cartridge, bed wt.: 30 mg, volume 1 mL	55269-U	100 ea

96-Well Protein Precipitation Filter Plate

The 96-well protein precipitation filter plate is ideal for removing precipitated proteins from biological plasma/serum. The plate consists of a 0.2 µm hydrophobic graded filter/frit. Biological plasma is first added to the 96-well plate followed by a protein precipitating agent (e.g., acetonitrile). After a brief mixing step, vacuum is applied to the plate, and the filter/frit removes precipitated proteins from the sample. The resulting filtrate is ready for further processing and/or analysis.

hydrophobic graded filter/frit (0.2 µm porosity)

volume ..... 2 mL

55263-U 1 ea

Note: The 96-well Protein Precipitation Filter Plate (55263-U) is packed with a 0.2 µm hydrophobic graded filter/frit and is ideal for removing precipitated proteins only.

Supel™ QuE Dispersive (QuEChERS) SPE Products

NEW PRODUCTS

Dispersive SPE (dSPE), often referred to as the "QuEChERS" method (Quick, Easy, Cheap, Effective, Rugged, and Safe), is an emerging sample prep technique that is becoming increasingly popular in the area of multi-residue pesticide analysis in food and agricultural products.

The QuEChERS approach is gaining popularity not only for foodstuffs but also for other sample matrices. Analysts may want to create custom mixtures of salts and adsorbents to fit their unique sample preparation challenges better. Supelco has introduced a custom service for these tubes that enables users to easily design their own dispersive SPE tube(s). Customers can choose from five different tube dimensions/types, as well as a large selection of adsorbents from Supelco and salts from Fluka and Aldrich to create customized tubes for introduction into their routine applications.

EN 15662:2008 (12 mL centrifuge tubes)

	Cat. No.	Qty
Supel™ QuE		
Citrate/Sodium Bicarbonate Tube	55237-U	50 ea
Citrate Extraction Tube, suitable for EN 15662:2008 per BS	55227-U	50 ea
PSA Tube, suitable for EN 15662:2008 per BS	55228-U	50 ea
PSA/C18 Tube, suitable for EN 15662:2008 per BS	55229-U	50 ea
PSA/ENVI-Carb Tube 1, suitable for EN 15662:2008 per BS	55230-U	50 ea
PSA/ENVI-Carb Tube 2, suitable for EN 15662:2008 per BS	55233-U	50 ea

Solid Phase Extraction

Supel™ QuE Dispersive (QuEChERS) SPE Products: *AOAC 2007.01 (12 mL centrifuge tubes)*

AOAC 2007.01 (12 mL centrifuge tubes)

	Cat. No.	Qty
Supel™ QuE		
Acetate Tube, suitable for 2007.01 per AOAC	55234-U	50 ea
PSA Tube, suitable for 2007.01 per AOAC	55282-U	50 ea
PSA/C18 Tube, suitable for 2007.01 per AOAC	55283-U	50 ea
PSA/C18/ENVI-Carb Tube, suitable for 2007.01 per AOAC	55286-U	50 ea

AOAC 2007.01 (2 mL centrifuge tubes)

	Cat. No.	Qty
Supel™ QuE		
PSA Tube, suitable for 2007.01 per AOAC	55287-U	100 ea
PSA/C18 Tube, suitable for 2007.01 per AOAC	55288-U	100 ea
PSA/C18/ENVI-Carb Tube, suitable for 2007.01 per AOAC	55289-U	100 ea

Unbuffered Extraction Tubes

The following products contain various ratios of magnesium sulfate and sodium chloride.

- Non-Buffered Tube 1 is composed of magnesium sulfate (4 g) and sodium chloride (1 g).
- Non-Buffered Tube 2 is composed of magnesium sulfate (6 g) and sodium chloride (1.5 g).

	Cat. No.	Qty
Supel™ QuE		
Non-Buffered Tube 1	55294-U	50 ea
Non-Buffered Tube 2	55295-U	50 ea

Specialty Products for Challenging Matrices

The following products contain various ratios of the proprietary Z-Sep and/or Z-Sep+ adsorbents with or without Discovery DSC-18.

- The Z-Sep/C18 Tube is a 2 mL centrifuge tube composed of Z-Sep (20 mg) and Discovery DSC-18 (50 mg).
- The Z-Sep+ Tube is a 12 mL centrifuge tube composed of Z-Sep+ (500 mg).
- Z-Sep+ Bulk is Z-Sep+ (20 g) of bulk adsorbent shipped in a vial.

	Cat. No.	Qty
Supel™ QuE		
Z-Sep/C18 Tube	55284-U	100 ea
Z-Sep+ Tube	55296-U	50 ea
Z-Sep+ Bulk	55299-U	20 ea

Empty 50 mL Tubes for Extraction

	Cat. No.	Qty
Supel™ QuE		
Empty Centrifuge Tube with Lid, centrifuge tube volume 50 mL, suitable for EN 15662:2008 per BS	55248-U	50 ea

Dispersive SPE Bulk Adsorbents and Salts

	Cat. No.	Qty
Supelclean™ PSA SPE Bulk Packing		
-	52738-U	100 g
Supelclean™ ENVI-Carb™ SPE Bulk Packing		
-	57210-U	50 g
Discovery® DSC-18 SPE Bulk Packing		
-	52600-U	100 g
Magnesium sulfate		
purum, anhydrous, ≥97% (KT), grit, slightly gray	63135-250G-F 63135-1KG-F	250 g 1 kg
Sodium citrate dibasic		
purum p.a., ≥99.0% (T)	71635-250G 71635-1KG	250 g 1 kg
Sodium citrate tribasic		
puriss. p.a., ACS reagent, reag. ISO, reag. Ph. Eur., ≥99.5%	32320-250G-R 32320-6X250G-R 32320-500G-R 32320-6X500G-R 32320-1KG-R 32320-6X1KG-R 32320-5KG-R 32320-4X5KG-R	250 g 6 × 250 g 500 g 6 × 500 g 1 kg 6 × 1 kg 5 kg 4 × 5 kg
Sodium chloride		
puriss. p.a., ACS reagent, ≥99.5% (AT)	71379-500G 71379-1KG 71379-5KG	500 g 1 kg 5 kg
Sodium acetate		
ACS reagent, ≥99.0%	241245-5G 241245-100G 241245-500G 241245-1KG 241245-2.5KG	5 g 100 g 500 g 1 kg 2.5 kg

Supel™ Sphere Carbon/NH_2

Supel™ Sphere Carbon/NH_2 SPE Tube

Supel™ Sphere

The need for SPE cartridges with improved flow characteristics and reduced susceptibility to the formation of fines has brought about the development of a family of SPE tubes packed entirely with spherical, non-friable particles. The faster, more consistent flow produced by the spherical design produces accelerated gravity filtration, thus, eliminating the need for a vacuum manifold to process samples.

- SPE tube packed entirely with spherical, non-friable particles
- Improved flow characteristics and faster flow for gravity filtration
- Reduced susceptibility to the formation of fines

	Cat. No.	Qty
Supel™ Sphere Carbon/NH_2 SPE Tube		
-	54283-U	30 ea

Solid Phase Extraction

Supel™ Tox SPE for Mycotoxin Analysis

Supel™ Tox SPE for Mycotoxin Analysis

The need for a quick, simplistic sample cleanup approach prior to chromatographic mycotoxin analysis has brought about SPE cartridges that significantly decrease sample prep time, increase reproducibility, and are more user friendly as compared to the industry standard immunoaffinity columns. In addition the Supel Tox SPE approach requires less equipment and fewer consumables, providing an additional cost savings .

Unlike the multiple step "bind and elute" strategy implemented when using immunoaffinity columns, the Supel Tox AflaZea, DON, and Tricho SPE cartridges employ an "interference removal" strategy which saves time by eliminating wash steps prior to elution of aflatoxin, zearalenone, deoxynivalenol, and tricothecenes (type A and B), respectively. Cartridges removing interferences associated with analysis of the above and fumonisins (B1 and B2) as well as ochratoxin A are also available as a part of our Supel Tox product offering.

	Cat. No.	Qty
AflaZea		
volume 6 mL	55314-U	30 ea
DON		
volume 6 mL	55316-U	30 ea
Tricho		
volume 6 mL	55308-U	30 ea
TrichoBind		
LRC	55307-U	25 ea
FumoniBind		
LRC	55315-U	25 ea
OchraBind		
LRC	55318-U	25 ea

SupelMIP® SPE - Molecularly Imprinted Polymers

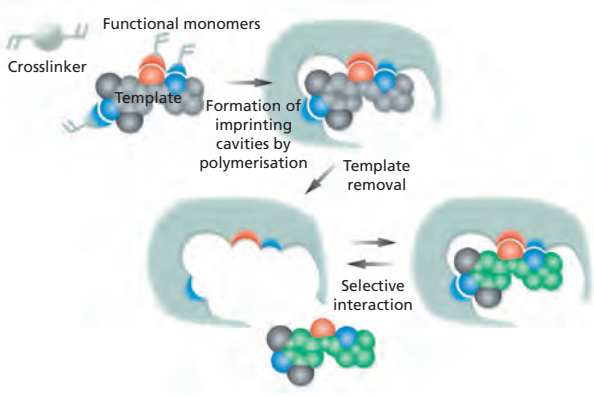
NEW PRODUCTS

SupelMIP SPE phases consist of highly cross-linked molecularly imprinted polymers (MIPs) that are engineered to extract a specific analyte of interest or a class of structurally related analytes with an extremely high degree of selectivity. This is possible because selectivity is introduced during MIP synthesis in which a template molecule, designed to mimic the analyte, guides the formation of specific cavities (imprints) that are sterically and chemically complementary to the analyte(s) of interest.

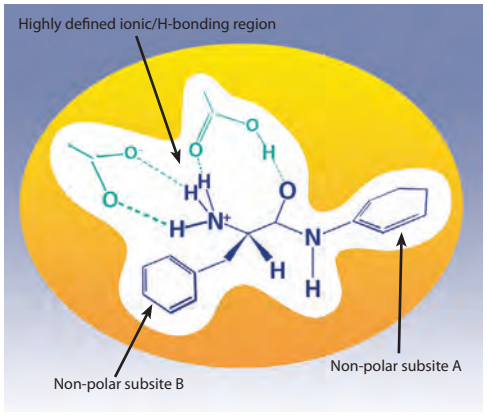
By careful design of the imprinting site, either by molecular modeling, experimental design, or screening methods, the binding cavities can be engineered to offer multiple interaction points (ion-exchange, reversed-phase, and hydrogen bonding) with the analyte(s) of interest. This leads to a stronger ineraction between the solid phase and the analytes(s). As a consequence, harsher wash conditions can be tolerated during SPE methodology resulting in cleaner extracts. Because extraction selectivity is significantly improved, lower background is observed allowing analysts to achieve lower limits of detection.

Features & Benefits:

- Achieve lower detection limits through superior selectivity
- Reduce ion-suppression
- Save time and reduce cost via robust and rapid methodology
- Minimal to no method development required
- Stringent quality control conditions



Synthesis / Formation Strategy of MIPs



Typical MIP Binding Site

Each SupelMIP phase is application specific. SupelMIP methods are available for:

- Fluoroquinolones in bovine kidney, honey, and milk
- PAHs (polyaromatic hydrocarbons) in edible oils
- Nitroimidazoles in milk, eggs, and other food matrices
- Amphetamine and related compounds in urine
- Chloramphenicol in milk, plasma, honey, urine, and shrimp/prawns
- NNAL in urine
- TSNAs in urine and tobacco
- ß-agonists and ß-blockers in tissue, urine, and waste water
- Clenbuterol in urine
- Triazines in water
- Riboflavin in milk

· To learn more visit sigma-aldrich.com/supelmip

Solid Phase Extraction

SupelMIP® SPE - Molecularly Imprinted Polymers

10 mL LRC (large reservoir cartridge) & 3 mL SPE Tubes

	Cat. No.	Qty
SupelMIP® SPE - NSAIDs		
bed wt.: 25 mg, volume 3 mL	52769-U	50 ea
SupelMIP® SPE - Nitroimidazoles		
bed wt.: 50 mg, volume 3 mL	52734-U	50 ea
SupelMIP® SPE - PAHS		
bed wt.: 50 mg, volume 3 mL	52773-U	50 ea
SupelMIP® SPE - Fluoroquinolones		
bed wt.: 25 mg, volume 3 mL	53269-U	50 ea
SupelMIP® SPE - Amphetamine		
bed wt.: 25 mg, volume 3 mL	53228-U	50 ea
SupelMIP® SPE - Clenbuterol		
bed wt.: 25 mg, volume 10 mL, (LRC)	53201-U	50 ea
SupelMIP® SPE - Beta-agonists		
bed wt.: 25 mg, volume 10 mL, (LRC)	53202-U	50 ea
bed wt.: 25 mg, volume 3 mL	53225-U	50 ea
SupelMIP® SPE - Beta-blockers		
bed wt.: 25 mg, volume 10 mL, (LRC)	53218-U	50 ea
bed wt.: 25 mg, volume 3 mL	53213-U	50 ea
SupelMIP® SPE - Full Beta-receptor (beta-blockers and beta-agonists)		
bed wt.: 25 mg, volume 10 mL, (LRC)	53223-U	50 ea
bed wt.: 25 mg, volume 3 mL	53224-U	50 ea
SupelMIP® SPE - Chloramphenicol		
bed wt.: 25 mg, volume 10 mL, (LRC)	53210-U	50 ea
bed wt.: 25 mg, volume 3 mL	53209-U	50 ea
SupelMIP® SPE - NNAL		
bed wt.: 25 mg, volume 10 mL, (LRC)	53206-U	50 ea
bed wt.: 25 mg, volume 3 mL	53203-U	50 ea
SupelMIP® SPE - TSNAs		
bed wt.: 50 mg, volume 10 mL, (LRC)	53221-U	50 ea
bed wt.: 50 mg, volume 3 mL	53222-U	50 ea
SupelMIP® SPE - Riboflavin (vitamin B2)		
bed wt.: 25 mg, volume 10 mL, (LRC)	53207-U	50 ea
SupelMIP® SPE - Triazines (class selective)		
bed wt.: 25 mg, volume 10 mL, (LRC)	53208-U	50 ea

Supel™ - Select SPE Products

NEW PRODUCTS

Supel™-Select SPE is a series of hydrophilic modified styrene based polymer SPE phases (HLB/SCX/SAX) ideal for extracting a broad range of compounds from aqueous samples. The retention mechanisms for the different phases range from reverse phase to a combination of reverse phase and ion exchange. However because the phase is hydrophilic modified, the phase is also selective for more polar compounds.

Features & Benefits

- Excellent sample prep peformance at a lower price
- Amenable to generic methodology - save time, money, and headache during method development
- Greater capacity allows for smaller bed weights = smaller elution volumes = time savings in sample processing
- Resistance to overdrying allows for more robust methodology
- Low UV and MS extractables for lower background and greater sensitivity
- Stringent production and QC guidelines offer greater lot-to-lot, tube-to-tube, and well-to-well consistency for improved accuracy and precision

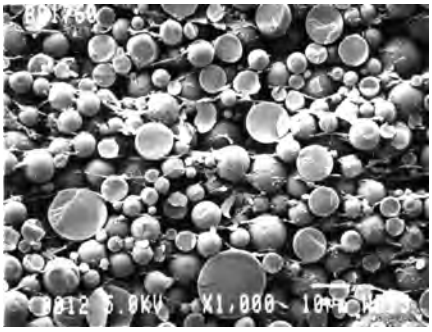
	Cat. No.	Qty
Supel™-Select HLB SPE Tube		
bed wt.: 30 mg, volume 1 mL	54181-U	100 ea
bed wt.: 200 mg, volume 6 mL	54183-U	30 ea
bed wt.: 1 g, volume 20 mL	54186-U	20 ea
bed wt.: 500 mg, volume 12 mL	54184-U	20 ea
bed wt.: 60 mg, volume 3 mL	54182-U	50 ea
Supel™-Select SCX SPE Tube		
bed wt.: 30 mg, volume 1 mL	54240-U	100 ea
bed wt.: 60 mg, volume 3 mL	54241-U	50 ea
bed wt.: 200 mg, volume 6 mL	54242-U	30 ea
bed wt.: 500 mg, volume 12 mL	54243-U	20 ea
bed wt.: 1 g, volume 20 mL	54245-U	20 ea
Supel™-Select SAX SPE Tube		
bed wt.: 30 mg, volume 1 mL	54231-U	100 ea
bed wt.: 60 mg, volume 3 mL	54233-U	50 ea
bed wt.: 200 mg, volume 6 mL	54235-U	30 ea
bed wt.: 500 mg, volume 12 mL	54236-U	20 ea
bed wt.: 1 g, volume 20 mL	54237-U	20 ea
Supel™ - Select HLB SPE 96-well Plate		
bed wt.: 30 mg/well	575661-U	1 ea
bed wt.: 60 mg/well	575662-U	1 ea
Supel™-Select SCX SPE 96-well Plate		
bed wt.: 30 mg/well	575664-U	1 ea
bed wt.: 60 mg/well	575665-U	1 ea
Supel™-Select SAX SPE 96-well Plate		
bed wt.: 30 mg/well	575660-U	1 ea
bed wt.: 60 mg/well	575663-U	1 ea

Solid Phase Extraction

Empore™ Solid Phase Extraction (SPE) Products

Empore™ Solid Phase Extraction (SPE) Products

Empore membrane SPE technology comprises of SPE particles tightly enmeshed within a network of inert PTFE fibrils. The SPE-membrane fabrication process results in a highly dense and uniform extraction medium that offers distinct advantages over traditional sorbent/packed-bed SPE products. Empore SPE technology allows for smaller bed weights, shorter analyte to pore diffusion paths, and more efficient extractions.



Empore™ SPE Products

	Cat. No.	Qty
Empore™ SPE Cartridges		
C18 (standard density), bed I.D. 4 mm, volume 1 mL	66871-U	100 ea
C18 (standard density), bed I.D. 7 mm, volume 3 mL	66872-U	50 ea
C18 (standard density), bed I.D. 10 mm, volume 6 mL	66873-U	30 ea
UR (Universal Resin), bed I.D. 7 mm, volume 3 mL	66874-U	50 ea
Empore™ SPE 96-well		
C18	66875-U	1 ea
UR (Universal Resin)	66877-U	1 ea
MPC (Mixed-Phase Cation)	66876-U	1 ea
Empore™ SPE Disks		
C18, diam. 47 mm	66883-U	20 ea
C8, diam. 47 mm	66882-U	20 ea
Oil & Grease, diam. 47 mm	66887-U	20 ea
Oil & Grease, diam. 90 mm	66898-U	10 ea
SDB-RPS (Reversed-Phase Sulfonate), diam. 47 mm	66886-U	20 ea
SDB-XC, diam. 47 mm	66884-U	20 ea
Cation Exchange-SR, diam. 47 mm	66889-U	20 ea
Anion-SR, diam. 47 mm	66888-U	20 ea
Chelation, diam. 47 mm	66894-U	20 ea
Carbon, diam. 47 mm	66896-U	20 ea
Empore™ Filter Aid 400		
-	66897-U	1 ea
Empore™ 96-well Vacuum Manifold		
-	66879-U	1 ea
Empore™ Sealing Tape for 96-well		
-	66881-U	10 ea
Empore™ 96-Well Filter Plate		
volume 1.2 mL	66878-U	1 ea

Solid Phase Extraction

Supel-Tips Pipette Tips

Supel-Tips Pipette Tips

NEW PRODUCTS

The Supel-Tips SPE product line is designed for the micro-scale extraction, concentration, and recovery of small molecules and biological macro-molecules. These 10 µL polypropylene pipette tips contain a sorbent bed bonded at the working end of the tip using an inert high-purity adhesive. The bed acts as a solid phase extraction medium to adsorb molecules of interest from the sample matrix. Subsequently, the concentrated and desalted analytes are eluted for downstream analysis.

Supel-Tips Offer:

- Superior recovery
- Exceptional binding capacity and enhanced affinity
- Excellent sorbent bed stability for cleaner samples
- Fast and effective analyte retention/elution

Supel-Tips Zr or Ti Pipette Tips

Application: microextraction of Phosphopeptides and other phosphate containing molecules

- Stationary Phase: Zirconia-silica or Titiania-silica composite
- Particle Size: 50-60 µm
- Pore Size: 300 A
- Capacity: Mono phosphopeptide 1 (MMP1) - 1 µg

Supel-Tips C18 Pipette Tips

- Application: microextraction & desalting of peptides and proteins
- Stationary Phase: C18 bonded onto spherical silica
- Particle Size: 50-60 µm
- Pore Size: 200 A
- Capacity: Insulin, Chain B, Oxidized - 17 µg; ß-amyloid - 17 µg; Bradykinin, Fragment 1-7 - 7.6 µg

Supel-Tips Carbon Pipette Tips

- Application: microextraction of Oligosaccharides and other sugar containing macromolecules
- Stationary Phase: graphitized carbon adsorbent
- Particle Size: 50-60 µm
- Pore Size: 175 A
- Capacity: Maltohexose - 10.2 µg; Glycopeptide (mol. wt. 1300-3500) - > 10 µg

	Cat. No.	Qty
Supel-Tips Zr Pipette Tips		
volume 10 µL	54266-U	96 ea
Supel-Tips Ti Pipette Tips		
volume 10 µL	54263-U	96 ea
Supel-Tips C18 Pipette Tips		
C18 bonded on spherical silica, endcapped, volume 10 µL	TPSC18-96EA	96 ea
Supel-Tips Carbon Pipette Tips		
volume 10 µL	54227-U	96 ea

Discovery® SPE

Designed to meet the exacting requirements of pharmaceutical and clinical analysis, Discovery® SPE products are ideal for all application areas including: Food and Beverage, Environmental, Petrochemical, Agriculture, Consumer Products and more...

The multitude of phase chemistries and hardware configurations available within the Discovery® SPE line offer a comprehensive level of selection and flexibility required to handle the increasingly complex and diverse sample prep challenges seen today.

Each Discovery® SPE product includes an extensive Certificate of Analysis ensuring optimal performance and reproducibility.

Discovery® SPE allows you to:

- Achieve greater and more reproducible recoveries for diverse compounds from difficult sample matrices
- Remove endogenous sample interference for improved accuracy and sensitivity
- Concentrate target analytes for increased sensitivity
- Protect analytical instruments from unwanted sample matrix components

Discovery® SPE offers the quality and performance you need to bridge the sample prep gap between sample collection and analysis.

Discovery® SPE Features and Benefits:

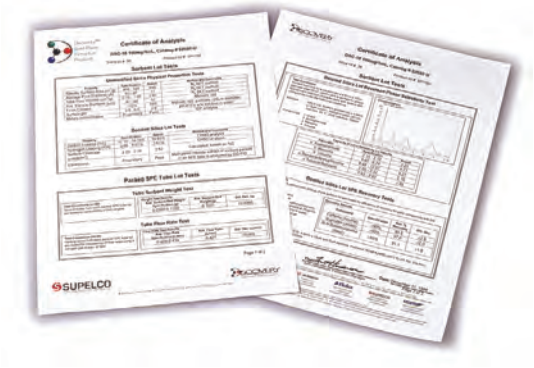
- Developed, tested and quality controlled for pharmaceutical and clinical applications
- Twelve different phase chemistries ranging from polymerically bonded C18 to polyamide adsorbents
- Available in 96-well plate configurations for high throughput parallel processing
- Ultra clean phases for highly sensitive analyses
- Narrower pore size distribution for improved extraction selectivity
- Acid washed to reduce metal chelating activity
- Consistent particle size and specific surface area coverage to ensure reproducible recoveries
- Low fines (<12 µm) content to minimize injection port fouling

Solid Phase Extraction

Discovery® SPE

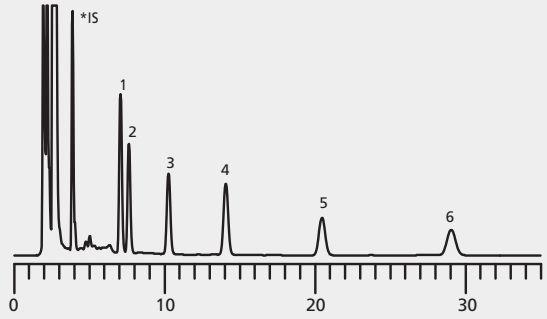
Discovery® SPE Specifications:

- Base Silica: *Irregular shape, acid washed*
- Mean Particle Size: *50 µm*
- Mean Pore Diameter: *70 Å*
- Total Pore Volume: *0.9 cm^3/g*
- Specific Surface Area: *480 m^2/g*
- Endcapped: *Yes*
- Hardware: *Polypropylene*
- Frit: *Polyethylene (PE), 20 µm porosity*



Each Discovery SPE product comes complete with an extensive Certificate of Analysis (CofA). The CofA describes tests parameters/results used to ensure quality and performance across tube to tube, and lot to lot reproducibiiy.

Barbiturates from serum, using 500 mg/3 mL Discovery DSC-18Lt SPE tubes and Zymark RapidTrace SPE Workstation.



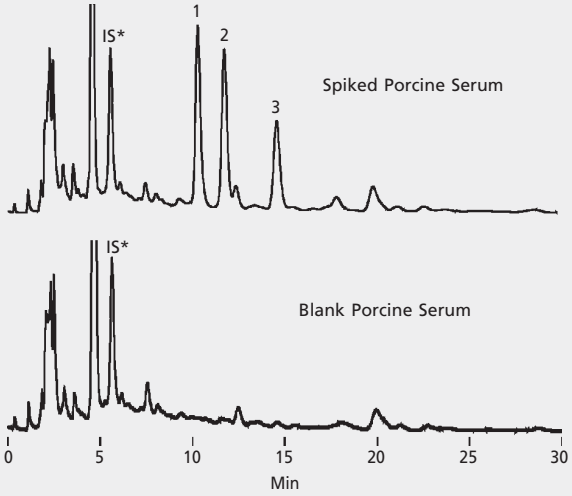
Analyzed with a Discovery C18 HPLC column, 15 cm x 4.6 mm ID, 5 µm particles.

Efficiency of Recovery

Compound	Concentration (µg/mL)	%Recovery	%RSD (n=6)
1. Phenobarbital	0.5	96.2	±1.6
	1.0	94.9	±1.7
2. Aprobarbital	0.5	98.5	±2.1
	1.0	100.8	±0.8
3. Butabarbital	0.5	97.2	±1.9
	1.0	98.7	±1.8
4. Mephobarbital	0.5	99.7	±2.4
	1.0	101.0	±2.0
5. Pentobarbital	0.5	96.4	±1.7
	1.0	96.4	±1.9
6. Secobarbital	0.5	98.2	±1.7
	1.0	97.7	±1.8

* IS = Barbital (internal standard).

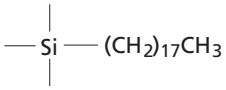
Extraction of Anti-Ulcer Compounds from Porcine Serum Using Discovery DSC-18 SPE



Compound	Concentration (µg/mL)	%Recovery ± RSD (n = 6)
1. Ranitidine	0.25	92.5 ± 5.4
	0.50	95.5 ± 5.1
2. Cimetidine	0.25	94.5 ± 5.2
	0.50	98.2 ± 3.2
3. Nizatidine	0.25	97.0 ± 7.0
	0.50	94.8 ± 3.4

Analyzed with a Discovery C18 HPLC Column, 15 cm x 4.6 mm ID, 5 µm particles
* IS = Famotidine (internal standard)

Discovery® DSC-18 SPE Products



Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (biological fluids, water)

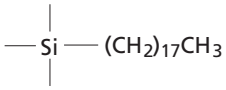
- Polymerically bonded, octadecyl, endcapped
- Higher (18% C) loading for increased binding capacities and higher recoveries
- The least selective phase: retains most organic analytes from aqueous matrices
- Can also be used for desalting aqueous matrices
- Beneficial for extracting structurally diverse analytes from the same sample

	Cat. No.	Qty
Discovery® DSC-18 SPE Tube		
bed wt.: 50 mg, volume 1 mL	52601-U	108 ea
bed wt.: 100 mg, volume 1 mL	52602-U	108 ea
bed wt.: 500 mg, volume 3 mL	52603-U	54 ea
bed wt.: 500 mg, volume 6 mL	52604-U	30 ea
bed wt.: 1 g, volume 6 mL	52606-U	30 ea
bed wt.: 2 g, volume 12 mL	52607-U	20 ea
bed wt.: 5 g, volume 20 mL	52608-U	20 ea
bed wt.: 10 g, volume 60 mL	52609-U	16 ea
bed wt.: 500 mg, volume 6 mL	52599-U	5 ea
Discovery® DSC-18 SPE 96-well Plate		
bed wt.: 100 mg/well	575603-U	1 ea
bed wt.: 25 mg/well	575601-U	1 ea
Discovery® DSC-18 SPE Bulk Packing		
-	52600-U	100 g

Solid Phase Extraction

Discovery® SPE: *Discovery® DSC-18Lt SPE Products*

Discovery® DSC-18Lt SPE Products

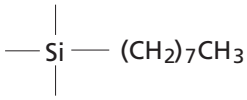


Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (biological fluids, water)

- Monomerically bonded, octadecyl (11% C), endcapped
- Increased retention for moderately polar hydrophobic molecules
- Used to elute very large hydrophobic molecules that are too strongly retained on DSC-18.
- Offers opportunity to differentiate between drug metabolites in bioanalysis applications
- Use this less retentive phase for the rapid release of hydrophobic compounds using weaker organic solvents at lower volumes

	Cat. No.	Qty
Discovery® DSC-18Lt SPE Tube		
bed wt.: 50 mg, volume 1 mL	52610-U	108 ea
bed wt.: 100 mg, volume 1 mL	52611-U	108 ea
bed wt.: 500 mg, volume 3 mL	52613-U	54 ea
bed wt.: 500 mg, volume 6 mL	52615-U	30 ea
bed wt.: 1 g, volume 6 mL	52616-U	30 ea
bed wt.: 2 g, volume 12 mL	52618-U	20 ea
bed wt.: 5 g, volume 20 mL	52621-U	20 ea
bed wt.: 10 g, volume 60 mL	52622-U	16 ea
Discovery® DSC-18Lt Bulk Packing		
-	52623-U	100 g

Discovery® DSC-8 SPE Products

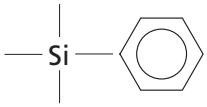


Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (biological fluids, water)

- Monomerically bonded, octyl (9% C), endcapped; lower carbon content than DSC-18Lt
- Used to elute very large hydrophobic molecules too strongly retained on DSC-18 or DSC-18Lt
- Use this less retentive phase for the rapid release of hydrophobic molecules using weaker organic solvents at lower volumes
- Inorganic buffers of sufficient ionic strength may be used for elution

	Cat. No.	Qty
Discovery® DSC-8 SPE Tube		
bed wt.: 50 mg, volume 1 mL	52703-U	108 ea
bed wt.: 100 mg, volume 1 mL	52707-U	108 ea
bed wt.: 500 mg, volume 3 mL	52713-U	54 ea
bed wt.: 500 mg, volume 6 mL	52714-U	30 ea
bed wt.: 1 g, volume 6 mL	52716-U	30 ea
bed wt.: 2 g, volume 12 mL	52717-U	20 ea
bed wt.: 5 g, volume 20 mL	52718-U	20 ea
bed wt.: 10 g, volume 60 mL	52722-U	16 ea
Discovery® DSC-8 SPE Bulk Packing		
-	57223-U	100 g

Discovery® DSC-Ph SPE Products

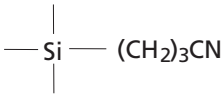


Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (biological fluids, water)

- Monomerically bonded, phenyl (7% C), endcapped
- Similar in polarity to DSC-8; however, electron dense aromatic ring offers unique selectivity and retention
- Offers improved retention of conjugated ring structures over aliphatic functional groups.

	Cat. No.	Qty
Discovery® DSC-Ph SPE Tube		
bed wt.: 50 mg, volume 1 mL	52723-U	108 ea
bed wt.: 100 mg, volume 1 mL	52725-U	108 ea
bed wt.: 500 mg, volume 3 mL	52727-U	54 ea
bed wt.: 500 mg, volume 6 mL	52728-U	30 ea
bed wt.: 1 g, volume 6 mL	52731-U	30 ea
Discovery® DSC-Ph SPE Bulk Packing		
-	57227-U	100 g

Discovery® DSC-CN SPE Products



Retention Mechanism: Reversed-phase or Normal phase
Sample Matrix Compatibility: Aqueous solutions (biological fluids, water) when used in reversed-phase; or organic solvents, oils, and lipids when used in normal phase

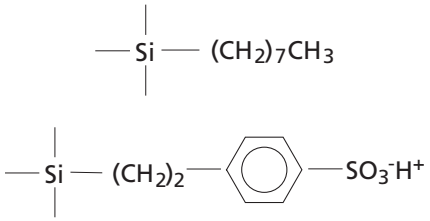
- Monomerically bonded, cyanopropyl (7 %C), endcapped
- Can be used in either reversed-phase or normal phase
- Ideal for very hydrophobic analytes that may be irreversibly retained on more hydrophobic sorbents such as DSC-18
- Less retentive than DSC-Si or DSC-Diol when used in normal phase (organic matrices such as hexane or oils)
- Allows for the rapid release of very polar molecules irreversibly retained on very polar sorbent

	Cat. No.	Qty
Discovery® DSC-CN SPE Tube		
bed wt.: 50 mg, volume 1 mL	52693-U	108 ea
bed wt.: 100 mg, volume 1 mL	52694-U	108 ea
bed wt.: 500 mg, volume 3 mL	52695-U	54 ea
bed wt.: 500 mg, volume 6 mL	52696-U	30 ea
bed wt.: 1 g, volume 6 mL	52697-U	30 ea
bed wt.: 2 g, volume 12 mL	52698-U	20 ea
bed wt.: 5 g, volume 20 mL	52699-U	20 ea
bed wt.: 10 g, volume 60 mL	52700-U	16 ea
Discovery® DSC-CN SPE Bulk Packing		
-	57222-U	100 g

Solid Phase Extraction

Discovery® SPE: *Discovery® DSC-MCAX (Mixed-Mode Cation Exchange) SPE Products*

Discovery® DSC-MCAX (Mixed-Mode Cation Exchange) SPE Products

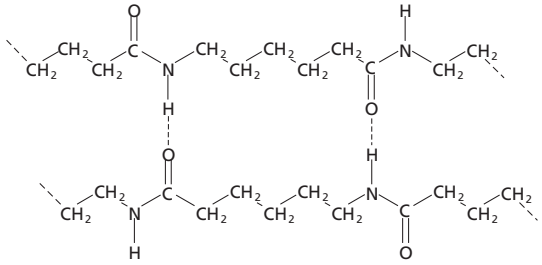


Retention Mechanism: Mixed-Mode Cation Exchange (reversed-phase and cation-exchange)
Sample Matrix Compatibility: Aqueous Solutions (biological fluids, water)

- Packed bed contains both octyl (C8) and benzene sulfonic acid (SCX) bondings
- Dual retention mechanism broadens retention for a range of neutral, basic, acidic and zwitterionic compounds
- Developed for superior selectivity/sample clean up when isolating basic compounds from biological fluids
- Greater ion-exchange capacity for isolating polar basic and zwitterionic compounds
- Can be used to fractionate basic/zwitterionic compounds from acidic and neutral compounds

	Cat. No.	Qty
Discovery® DSC-MCAX SPE Tube		
bed wt.: 50 mg, volume 1 mL	52781-U	108 ea
bed wt.: 100 mg, volume 1 mL	52782-U	108 ea
bed wt.: 100 mg, volume 3 mL	52783-U	54 ea
bed wt.: 300 mg, volume 3 mL	52784-U	54 ea
bed wt.: 300 mg, volume 6 mL	52786-U	30 ea
bed wt.: 1 g, volume 6 mL	52788-U	30 ea
Discovery® DSC-MCAX SPE 96-well Plate		
bed wt.: 25 mg/well	575639-U	1 ea
bed wt.: 50 mg/well	575640-U	1 ea
bed wt.: 100 mg/well	575641-U	1 ea

Discovery® DPA-6S SPE Products

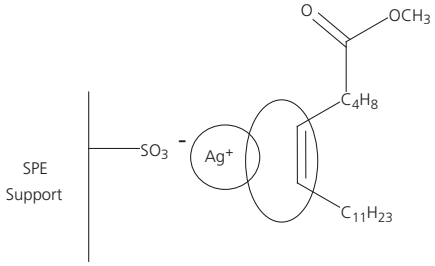


Retention Mechanisms: Reversed-phase
Sample Matrix Compatibility: Aqueous or methanolic solutions

- Polyamide Resin - particle size: 50-160 µm; surface pH: 4.5-7.5; density: 0.2-0.3 g/cm^3; water content: <5%
- Used to adsorb polar compounds containing multi-OH and -COOH groups (esp. phenolic compounds) from aqueous or methanolic solutions under reversed-phase mechanisms and strong hydrogen bonding between the compound hydroxyl groups and amide groups of the resin
- Useful for extracting tannins, chlorophyll, humic acid, pharmacologically active terpenoids, flavonoids, gallic acid, catechol A, protocatechuic acid, and phloroglucinol
- Also useful for extracting aromatic carboxylic acids and nitroaromatic compounds
- Irreversibly retains quinones

	Cat. No.	Qty
Discovery® DPA-6S SPE Tube		
bed wt.: 50 mg, volume 1 mL	52624-U	108 ea
bed wt.: 250 mg, volume 3 mL	52625-U	54 ea
bed wt.: 250 mg, volume 6 mL	52626-U	30 ea
bed wt.: 500 mg, volume 6 mL	52627-U	30 ea
bed wt.: 1 g, volume 12 mL	52629-U	20 ea
bed wt.: 2 g, volume 20 mL	52631-U	20 ea
bed wt.: 5 g, volume 60 mL	52632-U	16 ea
Discovery® DPA-6S SPE Bulk Packing		
-	52633-U	100 g

Discovery® Ag-ION SPE Products



Retention Mechanism: Normal phase (charge-transfer)
Sample Matrix Compatibility: Organic solvents, oils, and lipids

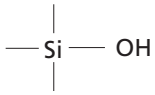
- Developed for the fractionation of FAMEs based on degree of unsaturation, and for the resolution of cis/trans isomers.
- Silver counter-ions are anchored onto an SCX support using a proprietary procedure to offer optimal resolution, performance, and capacity
- Each lot is tested and quality controlled for cis/trans FAME resolution

	Cat. No.	Qty
Discovery® Ag-Ion SPE Tube		
bed wt.: 750 mg, volume 6 mL	54225-U	30 ea
polypropylene hardware (Rezorian Cartridge), bed wt.: 750 mg, volume 1 mL	54226-U	10 ea

Solid Phase Extraction

Discovery® SPE: *Discovery® DSC-Si SPE Products*

Discovery® DSC-Si SPE Products

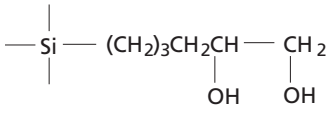


Retention Mechanism: Normal phase
Sample Matrix Compatibility: Organic solvents, oils, and lipids

- Unbonded acid washed silica sorbent ideal for normal phase SPE and other modified flash techniques
- Often used to separate or remove structurally similar molecules through successive elutions with increasingly polar solutions
- The most polar normal phase sorbent available
- Excellent capacity for purifying solution phase combinatorial chemistry reactions when removing target molecules from reaction by-products and excess reagents
- Available in Büchner Funnel configurations for easy scalability

	Cat. No.	Qty
Discovery® DSC-Si SPE Tube		
bed wt.: 50 mg, volume 1 mL	52652-U	108 ea
bed wt.: 100 mg, volume 1 mL	52653-U	108 ea
bed wt.: 500 mg, volume 3 mL	52654-U	54 ea
bed wt.: 500 mg, volume 6 mL	52655-U	30 ea
bed wt.: 1 g, volume 6 mL	52656-U	30 ea
bed wt.: 2 g, volume 12 mL	52657-U	20 ea
bed wt.: 5 g, volume 20 mL	52658-U	20 ea
bed wt.: 10 g, volume 60 mL	52659-U	16 ea
bed wt.: 20 g, volume 60 mL	1771-U	16 ea
Discovery® DSC-Si SPE 96-well Plate		
bed wt.: 100 mg/well	575609-U	1 ea
bed wt.: 50 mg/well	575608-U	1 ea
bed wt.: 25 mg/well	575607-U	1 ea
Discovery® DSC-Si SPE Bulk Packing		
-	52651-U	100 g

Discovery® DSC-Diol SPE Products

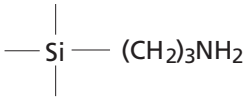


Retention Mechanism: Normal phase
Sample Matrix Compatibility: Organic solvents, oils, and lipids

- Polymerically bonded, 2,3-Dihydroxypropoxypropyl (7% C)
- Polar sorbent most commonly used for normal phase applications (polar extractions from non-polar matrices)
- The sorbent dihydroxy groups facilitate strong hydrogen bonding
- Excellent selectivity when extracting structurally similar molecules

	Cat. No.	Qty
Discovery® DSC-Diol SPE Tube		
bed wt.: 50 mg, volume 1 mL	52747-U	108 ea
bed wt.: 100 mg, volume 1 mL	52748-U	108 ea
bed wt.: 500 mg, volume 3 mL	52751-U	54 ea
bed wt.: 500 mg, volume 6 mL	52752-U	30 ea
bed wt.: 5 g, volume 20 mL	52571-U	20 ea
bed wt.: 10 g, volume 60 mL	52572-U	16 ea
Discovery® DSC-Diol SPE 96-well Plate		
bed wt.: 25 mg/well	575638-U	1 ea
Discovery® DSC-Diol SPE Bulk Packing		
-	57229-U	100 g

Discovery® DSC-NH_2 SPE Products

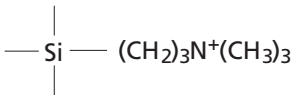


Retention Mechanism: Normal phase or Anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Polymerically bonded, aminopropyl phase that is very polar in nature (hydrogen bonding) allowing for both normal phase and ion exchange applications
- A weak anion exchanger with a pKa of 9.8. At pH 7.8 or below, the functional groups are positively charged
- Ion exchange capacity is ~ 0.43 meq/g.
- Allows the rapid release of very strong anions such as sulfonic acids that may be retained irreversibly by strong anion exchangers
- Can be used in some reversed-phase applications (due to ethyl spacer); however, it is predominately used as an ion-exchange or normal phase sorbent due to its polar nature

	Cat. No.	Qty
Discovery® DSC-NH_2 SPE Tube		
bed wt.: 50 mg, volume 1 mL	52635-U	108 ea
bed wt.: 100 mg, volume 1 mL	52636-U	108 ea
bed wt.: 500 mg, volume 3 mL	52637-U	54 ea
bed wt.: 500 mg, volume 6 mL	52638-U	30 ea
bed wt.: 1 g, volume 6 mL	52640-U	30 ea
bed wt.: 2 g, volume 12 mL	52641-U	20 ea
bed wt.: 5 g, volume 20 mL	52642-U	20 ea
bed wt.: 10 g, volume 60 mL	52644-U	16 ea
Discovery® DSC-NH_2 SPE 96-well Plate		
bed wt.: 100 mg/well	575615-U	1 ea
Discovery® DSC-NH_2 SPE Bulk Packing		
-	57212-U	100 g

Discovery® DSC-SAX SPE Products



Retention Mechanism: Anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- A polymerically bonded quaternary amine that remains positively charged at all pH levels
- Counter ion is Cl^-
- Ion exchange capacity is ~ 0.14 meq/g
- Commonly used when extracting weaker anions (e.g., carboxylic acids) that may not bind strongly enough to weaker anion-exchangers
- Selectivity can be modified by changing the counter ion with the appropriate buffer during conditioning

	Cat. No.	Qty
Discovery® DSC-SAX SPE Tube		
bed wt.: 50 mg, volume 1 mL	52661-U	108 ea
bed wt.: 100 mg, volume 1 mL	52662-U	108 ea
bed wt.: 500 mg, volume 3 mL	52664-U	54 ea
bed wt.: 500 mg, volume 6 mL	52665-U	30 ea
bed wt.: 1 g, volume 6 mL	52666-U	30 ea
bed wt.: 2 g, volume 12 mL	52667-U	20 ea
bed wt.: 5 g, volume 20 mL	52668-U	20 ea
bed wt.: 10 g, volume 60 mL	52669-U	16 ea
Discovery® DSC-SAX SPE Bulk Packing		
-	57214-U	100 g

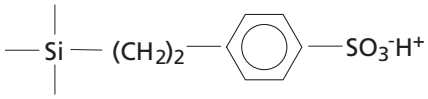
Discovery® DSC-WCX SPE Products

Retention Mechanism: Cation exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- A polymerically bonded, ethylenediamine triacetic acid phase with a pKa of 4.8
- Counter ion is K^+
- Ion exchange capacity is ~ 0.15 meq/g
- Carries a negative charge at pH 6.8 or above
- A pH of 2.8 or below neutralizes this phase for easier elution of strong cationic analytes that are neutralized only at extreme basic conditions
- Typically used when dealing with very strong cationic (high pKa) compounds that may be irreversibly retained on strong cation exchangers

	Cat. No.	Qty
Discovery® DSC-WCX SPE Tube		
bed wt.: 50 mg, volume 1 mL	52737-U	108 ea
bed wt.: 100 mg, volume 1 mL	52739-U	108 ea
bed wt.: 500 mg, volume 3 mL	52741-U	54 ea
bed wt.: 500 mg, volume 6 mL	52742-U	30 ea
bed wt.: 1 g, volume 6 mL	52743-U	30 ea
bed wt.: 2 g, volume 12 mL	52744-U	20 ea
bed wt.: 5 g, volume 20 mL	52745-U	20 ea
bed wt.: 10 g, volume 60 mL	52746-U	16 ea
Discovery® DSC-WCX SPE Bulk Packing		
-	57228-U	100 g

Discovery® DSC-SCX SPE Products



Retention Mechanism: Cation exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- A polymerically bonded, benzene sulfonic acid functional group, pKa (<1.0)
- Counter ion is H^+
- Silica support allows for use with organic solvents (no shrinking/swelling)
- Excellent capacity (0.8 meq/g) for cleaning up solution phase combinatorial chemistry reactions (removing target molecules from reaction by-products and excess reagents)
- The presence of the benzene ring offers some mixed-mode capabilities (hydrophobic interactions) that should be considered when extracting cations from aqueous matrices

	Cat. No.	Qty
Discovery® DSC-SCX SPE Tube		
bed wt.: 50 mg, volume 1 mL	52684-U	108 ea
bed wt.: 100 mg, volume 1 mL	52685-U	108 ea
bed wt.: 500 mg, volume 3 mL	52686-U	54 ea
bed wt.: 500 mg, volume 6 mL	52688-U	30 ea
bed wt.: 1 g, volume 6 mL	52689-U	30 ea
bed wt.: 2 g, volume 12 mL	52690-U	20 ea
bed wt.: 5 g, volume 20 mL	52691-U	20 ea
bed wt.: 10 g, volume 60 mL	52692-U	16 ea
bed wt.: 1 g, volume 6 mL	57167-U	1000 ea
bed wt.: 500 mg, volume 3 mL	57168-U	1000 ea
Discovery® DSC-SCX SPE Bulk Packing		
-	57221-U	100 g

Discovery® SPE 96-Well Plates

Discovery® 96-well plates answer the challenge of high throughput pharmaceutical screening and analysis. The uniform flow dynamics inherent with well plate technology offers a higher level of reproducibility and throughput while maintaining excellent recoveries and increased sensitivity. These plates are packed with the same high-quality phases used in our Discovery® SPE line.

96-well plate Specifications:

- One-piece polypropylene square well design
- 2 mL sample volume
- Polyethylene frit, 20 µm porosity
- Compatible with TomTec Quadra 96, Packard Multi-Probe, Gilson SPE 215, Hamilton MICROLAB STAR, and most other 96-well automated SPE systems

	Cat. No.	Qty
96-well SPE MD (Method Development) Plate		
- BAN, configured for extracting basic, acidic, and neutral compounds (BAN), bed wt.: 25 mg/well	577522-U	1 ea
Discovery® DSC-18 SPE 96-well Plate		
bed wt.: 100 mg/well	575603-U	1 ea
bed wt.: 25 mg/well	575601-U	1 ea
Discovery® DSC-Si SPE 96-well Plate		
bed wt.: 50 mg/well	575608-U	1 ea
Discovery® DSC-NH_2 SPE 96-well Plate		
bed wt.: 100 mg/well	575615-U	1 ea

Solid Phase Extraction

Supelclean™ ENVI and Supelclean™ SPE

Supelclean™ ENVI and Supelclean™ SPE

Supelclean ENVI SPE Features and Benefits

- Developed, highly tested, and quality controlled for environmental applications
- Over seven different phase chemistries ranging from our unique ENVI-Carb carbon adsorbents to ENVI-18 DSKs – reversed-phase SPE membranes for large volume water sample
- Available in glass tubes, PTFE, and stainless steel frit configurations for EPA compliance
- Ultra clean phases for highly sensitive analyses
- Documented applications in compliance to standardized EPA methodology
- Consistent particle size and specific surface area to ensure reproducible recoveries

Supelclean ENVI and Supelclean SPE Specifications

- Base Silica: *Irregular shape, acid washed for Supelclean ENVI*
- Mean Particle Size: *45 µm*
- Mean Pore Diameter: *60 Å*
- Total Pore Volume: *0.8 cm^3/g*
- Specific Surface Area: *475 m^2/g*
- Endcapped: *Yes (for Supelclean ENVI)*
- Hardware: *Polypropylene (unless otherwise noted)*
- Frit: *Polyethylene (unless otherwise noted), 20µm porosity*

Supelclean™ ENVI-18 SPE Products

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking, ground, waste water)

- Polymerically bonded, octadecyl (17% C), endcapped
- Excellent for cleaning, extracting and concentrating pollutants from aqueous environmental samples
- Higher 17% C loading for increased binding capacities and higher recoveries
- Higher carbon loading also offers greater resistance to extreme pH conditions
- Used for extracting herbicides, fungicides, and pesticides from waste material

	Cat. No.	Qty
Supelclean™ ENVI-18 SPE Tube		
bed wt.: 100 mg, volume 1 mL	57062	108 ea
bed wt.: 500 mg, volume 3 mL	57063	54 ea
bed wt.: 500 mg, volume 6 mL	57064	30 ea
bed wt.: 1 g, volume 6 mL	505706	30 ea
bed wt.: 2 g, volume 12 mL	57114	20 ea
bed wt.: 5 g, volume 20 mL	57137	20 ea
bed wt.: 10 g, volume 60 mL	57138	16 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	54331-U	30 ea
Supelclean™ ENVI-18 SPE Bulk Packing		
-	57219	100 g

Supelclean™ ENVI-8 SPE Products

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking, ground, waste water)

- High 14% C loading for increased binding capacities and higher recoveries
- Higher carbon loading also offers greater resistance to extreme pH conditions
- Excellent for cleaning, extracting and concentrating pollutants from aqueous environmental samples
- Used for extracting herbicides, fungicides, and pesticides from waste material

	Cat. No.	Qty
Supelclean™ ENVI-8 SPE Tube		
bed wt.: 100 mg, volume 1 mL	57230-U	108 ea
bed wt.: 500 mg, volume 3 mL	57231	54 ea
bed wt.: 500 mg, volume 6 mL	57232	30 ea
bed wt.: 1 g, volume 6 mL	57233	30 ea
bed wt.: 5 g, volume 20 mL	57139	20 ea
bed wt.: 10 g, volume 60 mL	57140-U	16 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 3 mL	57106	27 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	57107	20 ea

Supelclean™ ENVI-18 and ENVI-8 SPE Disks

ENVI-8 DSK SPE Disk, 47 mm diam. (57172)

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking water)

- The SPE membrane equivalents of ENVI-18 and ENVI-8 packed bed SPE sorbents
- Porous glass fiber membranes embedded with C18 or C8 modified silica particles
- Provides faster flow rates and exhibits less clogging than PTFE discs for the extraction of organic contaminants from drinking water samples
- Typical applications include polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), phthalates, semivolatile organics, paraquat and diquat, pesticides and herbicides

	Cat. No.	Qty
ENVI-8 DSK SPE Disk		
diam. 47 mm	57172	24 ea
ENVI-18 DSK SPE Disk		
diam. 90 mm	57170-U	12 ea
diam. 47 mm	57171	24 ea

Solid Phase Extraction

Supelclean™ ENVI and Supelclean™ SPE: *Supelclean™ ENVI-Carb SPE Products*

Supelclean™ ENVI-Carb SPE Products

Graphitized Non-Porous Carbon

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking, ground, waste water)

- Surface area: 100 m^2/g, Particle size:100-400 mesh
- Extreme affinity for organic polar and non-polar compounds from both non-polar and polar matrices when used under reversed-phase conditions
- Carbon surface comprised of hexagonal ring structures, interconnected and layered into graphitic sheets
- Non-porous nature of the carbon phase allows for rapid processing, adsorption does not require analyte dispersion into solid phase pores
- Independent investigators have found ENVI-Carb extremely useful for the rapid sample preparation of over 200 pesticides from various matrices including ground water, fruits, and vegetables

	Cat. No.	Qty
Supelclean™ ENVI-Carb™ SPE Tube		
bed wt.: 100 mg, volume 1 mL	57109-U	108 ea
bed wt.: 250 mg, volume 3 mL	57088	54 ea
bed wt.: 250 mg, volume 6 mL	57092	30 ea
bed wt.: 500 mg, volume 6 mL	57094	30 ea
bed wt.: 1 g, volume 12 mL	57127-U	20 ea
bed wt.: 2 g, volume 12 mL	57128	20 ea
bed wt.: 5 g, volume 20 mL	57129	20 ea
bed wt.: 10 g, volume 60 mL	57130	16 ea
Supelclean™ ENVI-Carb™ SPE Bulk Packing		
-	57210-U	50 g
Supelclean™ ENVI-Carb™ C SPE Tube		
bed wt.: 1 g, volume 12 mL	57149	20 ea

Supelclean™ ENVI-Carb Plus SPE Products

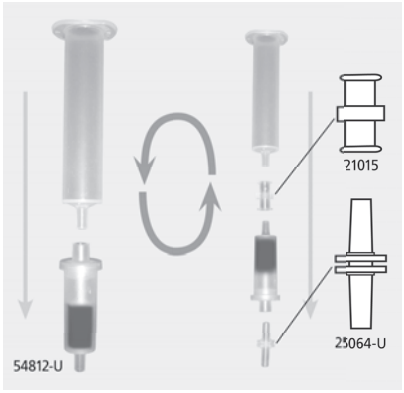
Supelclean™ ENVI-Carb™ Plus SPE Tube

Spherical Carbon Particles (Carbon Molecular Sieve)

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking, ground, waste water)

- Developed and engineered for the solid phase extraction of highly polar compounds from aqueous samples such drinking and ground water
- Extreme affinity for organic polar and non-polar compounds from both non-polar and polar matrices when used under reversed-phase conditions
- Unlike traditional graphitized carbon black (GCB) phases (e.g., Supelclean ENVI-Carb) which are granular and friable, ENVI-Carb Plus consists of strong high surface area spherical particles.
- Examples of highly polar compounds recovered (≥ 70%) using Supelclean ENVI-Carb Plus include (but not limited to) acephate (logP = -0.85), phenol (logP = 1.51), 1,4-dioxane (logP = -0.27), and oxamly (logP = -1.2).
- When used in conjunction with an SPE vacuum manifold, a male luer coupler (Cat. No. 25064-U), female luer coupler (Cat. No. 21015), and empty SPE tube(s) are required but not included.

matrix ..... Amorphous Carbon Molecular Sieve (CMS) Polymer Carbon or Graphitized Polymer Carbon (GPCs)
surface area ..... 1149 m^2/g
density ..... 2.27 g/mL
pore volume ..... 0.782 mL/g
pore size ..... 27.2 Å



Reversible Tube, bed wt.: 400 mg, volume 1 mL

54812-U	30 ea

Supelclean™ Coconut Charcoal SPE Products

Supelclean™ Coconut Charcoal SPE Tube

bed wt.: 2 g, volume 6 mL

Retention Mechanism: Reversed-phase
Sample Matrix Compatibility: Aqueous solutions (drinking, ground, waste water)

- Particle Sz.: 80/120 mesh
- Developed specifically for EPA Method 521 - "Determination of Nitrosamines in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography with Large Volume Injection and Chemical Ionization Tandem Mass Spectrometry (MS/MS)"

57144-U	30 ea

Supelclean™ ENVI-Chrom P SPE Products

Styrene/divinylbenzene co-polymer

Retention Mechanism: Reversed-phase or Adsorption
Sample Matrix Compatibility: Aqueous solutions

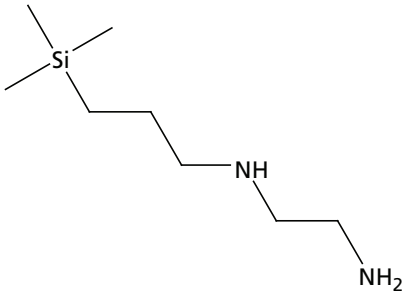
- Particle Size: 80-160 µm, Spherical Shape, Pore Size: 110- 175 Å, Surface Area: 900 m^2/g
- Highly crosslinked, neutral, specially cleaned styrene/ divinylbenzene resin used to retain hydrophobic compounds with some hydrophilic functionality under reversed phase conditions
- Highly resistant to extreme pH conditions
- Typical applications include aromatics and phenolic compounds from aqueous sample matrices
- Used for priority pollutant phenols from aqueous samples

	Cat. No.	Qty
Supelclean™ ENVI-Chrom P SPE Bulk Packing		
-	57217	50 g
Supelclean™ ENVI-Chrom P SPE Tube		
bed wt.: 100 mg, volume 1 mL	57143	108 ea
bed wt.: 250 mg, volume 3 mL	57224	54 ea
bed wt.: 250 mg, volume 6 mL	57225-U	30 ea
bed wt.: 500 mg, volume 6 mL	57226	30 ea
volume 6 mL, bed wt.: 500 mg, for use with Gerstel® MPS 3	57239-U	30 ea

Solid Phase Extraction

Supelclean™ ENVI and Supelclean™ SPE: *Supelclean™ PSA SPE Products*

Supelclean™ PSA SPE Products



Retention Mechanism: Normal-phase and anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Polymerically bonded, ethylenediamine-N-propyl phase that contains both primary and secondary amines
- A weak anion exchanger with a pKa of 10.1 and 10.9
- Similar to aminopropyl SPE phases (NH_2) in terms of selectivity, but has a much higher capacity due to presence of secondary amine (0.98-1.05 meq/g)
- Strong affinity and high capacity for removing fatty acids, organic acids, and some polar pigments and sugars when conducting multi-residue pesticide analysis in foods
- Has been shown to significantly reduce matrix-enhancement effects encountered during the GC analysis of food products
- Tested for superior cleanliness using GC-FID and GC-MS
- Bidentate nature of ligand allows chelation

	Cat. No.	Qty
Supelclean™ PSA SPE Tube		
bed wt.: 200 mg, volume 3 mL	52578-U	54 ea
bed wt.: 500 mg, volume 6 mL	52579-U	30 ea
Supelclean™ PSA SPE Bulk Packing		
-	52738-U	100 g

Supelclean™ ENVI-Florisil® SPE Products

Magnesium Silicate

Retention Mechanism: Normal phase or Adsorption
Sample Matrix Compatibility: Organic solutions

- Mesh: 100/200, Available with PTFE or stainless steel frits
- Tested for US Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) statement of work for pesticides
- Highly polar material that strongly adsorbs to polar compounds from nonpolar matrices under normal phase conditions
- Typical applications include alcohols, aldehydes, amines, herbicides, pesticides, PCBs, ketones, nitro compounds, organic acids, and phenols

	Cat. No.	Qty
Supelclean™ ENVI-Florisil® SPE Tubes		
PTFE frit, bed wt.: 500 mg, volume 3 mL	57058	54 ea
stainless steel frit, bed wt.: 500 mg, volume 6 mL	57046	30 ea
stainless steel frit, bed wt.: 1 g, volume 6 mL	57053	30 ea

Supelclean™ ENVI-Carb-II/PSA SPE Products

Retention Mechanism: Reversed-phase and anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Dual layer SPE tube that contains both Supelclean ENVI-Carb (upper layer) & PSA (lower layer) SPE sorbents (separated by PE frit)
- Developed to offer superior clean up when conducting multi-residue pesticide analysis from food (e.g. agricultural products, meats, etc.).
- ENVI-carb has a strong affinity towards planar molecules, and can isolate/remove pigments (e.g., chlorophyll and carotinoids) and sterols commonly present in foods and natural products
- Supelclean PSA is a polymerically bonded, ethyklenediamine-N-propyl phase that contains both primary and secondary amines
- Supelclean PSA has a strong affinity and high capacity for fatty acids, organic acids, and some polar pigments and sugars
- Tested for superior cleanliness using GC-FID and GC-MS

	Cat. No.	Qty
Supelclean™ ENVI-Carb™ II/PSA SPE Tube		
bed B: 600 mg, bed A: 300 mg, volume 6 mL	54058-U	30 ea
bed A: 500 mg, bed B: 500 mg, volume 6 mL	54067-U	30 ea
bed B: 300 mg, bed A: 500 mg, volume 6 mL	55119-U	30 ea
bed B: 500 mg, bed A: 500 mg, volume 20 mL	54217-U	20 ea
bed A: 500 mg, bed B: 500 mg, volume 6 mL	54103-U	300 ea

Supelclean™ ENVI-Carb/NH_2 SPE Products

Retention Mechanism: Reversed-phase and anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Dual layer SPE tube that contains both Supelclean ENVI-Carb (upper layer) & LC-NH_2 (lower layer) SPE sorbents (separated by PE frit)
- Developed to offer superior clean up when conducting multi-residue pesticide analysis from food (e.g. agricultural products, meats, etc.).
- ENVI-carb has a strong affinity towards planar molecules, and can isolate/remove pigments (e.g., chlorophyll and carotinoids) and sterols commonly present in foods and natural products
- Supelclean LC-NH_2 is an aminopropyl phase that retains fatty acids, organic acids, and some polar pigments and sugars common in food matrices

	Cat. No.	Qty
Supelclean™ ENVI-Carb/NH_2 SPE Tube		
bed B: 500 mg, bed A: 500 mg, volume 6 mL	54035-U	30 ea
bed B: 500 mg, bed A: 500 mg, volume 20 mL	54216-U	20 ea
bed B: 500 mg, bed A: 500 mg, volume 6 mL	54024-U	300 ea
bed B: 500 mg, bed A: 500 mg, volume 20 mL	54096-U	200 ea
bed A: 1000 mg, bed B: 500 mg, volume 6 mL	54117-U	30 ea
bed B: 500 mg, bed A: 1000 mg, volume 12 mL	54118-U	20 ea
bed B: 200 mg, bed A: 200 mg, volume 6 mL	54104-U	20 ea

Solid Phase Extraction

Supelclean™ ENVI and Supelclean™ SPE: *Supelclean™ ENVI-Carb-II/SAX/PSA SPE Products*

Supelclean™ ENVI-Carb-II/SAX/PSA SPE Products

Supelclean™ ENVI-Carb-II/SAX/PSA SPE Tube

Retention Mechanism: Reversed-phase and anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Tri-layer SPE tube that contains Supelclean ENVI-Carb (upper layer), SAX (middle layer) & PSA (lower layer) SPE sorbents (separated by PE frit)
- Developed to offer superior clean up when conducting multi-residue pesticide analysis from food (e.g. agricultural products, meats, etc.).
- ENVI-carb has a strong affinity towards planar molecules, and can isolate/remove pigments (e.g., chlorophyll and carotinoids) and sterols commonly present in foods and natural products
- Supelclean PSA has a strong affinity and high capacity for fatty acids, organic acids, and some polar pigments and sugars
- Supelclean SAX offers additional ion-exchange exchange capacity for removing matrix components that may induce ion-suppression or enhancement during GC analysis.

PE frit (20 µm porosity)
polypropylene hardware

bed B: 500 mg, bed C: 500 mg, bed A: 500 mg, volume 12 mL

52574-U	20 ea

Supelclean™ SAX/PSA SPE Products

Retention Mechanism: Normal-phase and anion-exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- Dual layer SPE tube that contains both Supelclean SAX (upper layer) and PSA (lower layer) SPE sorbents (separated by PE frit)
- Supelclean SAX is a quarternary amine, Cl^- counter-ion.
- Supelclean PSA is an ethylenediamine-N-propyl phase that contains both primary and secondary amines.
- Ideal for removing matrix components (fatty acids, organic acids, polar pigments, and some sugars) when conducting multi-residue pesticide analysis in foods
- In compliance with the Luke II method which uses SPE to remove matrix interference and enhancement of pesticides from food for GC-ITMS analysis

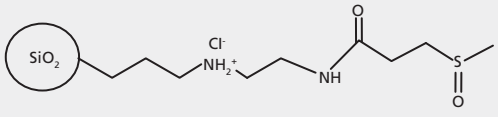
	Cat. No.	Qty
Supelclean™ SAX/PSA SPE Tube		
bed A: 250 mg, bed B: 250 mg, volume 6 mL	52576-U	30 ea
bed A: 500 mg, bed B: 500 mg, volume 6 mL	52577-U	30 ea

Supelclean™ Sulfoxide SPE Products

Supelclean™ Sulfoxide SPE

Retention Mechanism: Normal-Phase
Sample Matrix Compatibility: Hexane extracts of transformer, waste, and mineral oil

- Consists of a patent pending silica-bonded sulfoxide (-SO) SPE phase
- Developed specifically for the extraction of polychlorinated biphenyls (PCBs) from transformer, waste and mineral oil
- PCB retention is facilitated via interaction between the SPE phase's electrophilic sulfur atom and the pi-electron cloud formed from aromatic rings inherent with PCBs.
- This unique SPE phase offers a simple and efficient sample prep method for identifying PCBs at quantitation limits of 0.5 ppm
- When using the polypropylene SPE tube version, a large volume reservoir is recommended for increasing SPE volume headspace
- The glass SPE version is of unique design and is threaded on the mouth of the SPE tube. This allows for a screw-top cap and female luer plug to reduce moisture contamination during shipment and storage.



Supelclean Sulfoxide SPE Bonded Phase

Supelclean Sulfoxide SPE Glass Tube, 6g/20 mL (55252-U)

	Cat. No.	Qty
Supelclean™ Sulfoxide SPE Tube		
glass hardware, PE frit, bed wt.: 6 g, volume 20 mL	55252-U	5 ea
PE frit, bed wt.: 3 g, volume 6 mL	55253-U	30 ea
Supelclean™ Sulfoxide SPE Bulk Packing		
-	55254-U	100 g
Glass SPE Tube w/Frits		
for use with Supelclean Sulfoxide Glass SPE Tube (55252-U)., I.D. 15.6 mm × O.D. 190 mm	55255-U	5 ea
Large Volume SPE Reservoir		
polypropylene body, for use with 6 mL polypropylene SPE tubes, volume 25 mL	54258-U	30 ea
PTFE body, for use with 6 mL polypropylene SPE tubes, volume 25 mL	54259-U	3 ea

Supelclean™ LC-Florisil®/Si SPE Products

Supelclean™ Florisil®/Si SPE Tube

bed B: 2 g, bed A: 2 g, volume 12 mL

Retention Mechanism: Normal-phase or adsorption
Sample Matrix Compatibility: Organic solutions

- Dual layer SPE tube that contains Supelclean LC-Florisil (magnesium silicate; upper layer) and Supelclean LC-Si (silica; lower layer) separated and packed with PE frits (PP tubes)
- Developed specifically for Japan Electric Association Committee Method (JEAC 1201-1901) - "PCBs in Oil"

polypropylene hardware
PE frit

57154-U	20 ea

Solid Phase Extraction

Supelclean™ ENVI and Supelclean™ SPE: *Dual Layer Florisil®/Sodium Sulfate SPE Products*

Dual Layer Florisil®/Sodium Sulfate SPE Products

Dual Layer Florisil®/Na_2SO_4 SPE Tube

Retention Mechanism: Normal-phase or adsorption
Sample Matrix Compatibility: Organic solutions

- Dual layer SPE tube that contains Na_2SO_4 (upper layer) and Florisil (magnesium silicate; lower layer) separated and packed with PTFE frits (glass tubes) or PE frits (PP tubes)
- Florisil particle size- 60/100 mesh (150-200µm); Na_2SO_4 Purity- 99.99+%, density- 2.68 g/mL
- Excellent for removing/isolating polar compounds from organic matrices
- Na_2SO_4 layer aids in removing aqueous sample residues that may hinder Florisil performance and/or subsequent GC analysis
- Available in glass SPE hardware allowing users to reactivate Florisil through heating at 140°C, 16 hours
- Use in conjunction with Visiprep Large Volume Sampler (Cat No. 57275) and Visiprep SPE Vacuum Manifolds for processing larger volume samples

	Cat. No.	Qty
Dual Layer Florisil®/Na_2SO_4 SPE Tube		
glass hardware, PTFE frit, bed A: 2 g, bed B: 2 g, volume 6 mL	52582-U	48 ea
polypropylene hardware, PE frit, bed A: 2 g, bed B: 2 g, volume 6 mL	54116-U	48 ea

Multi-Layer SPE Products for US EPA Method 8290

Multi-Layer SPE for US EPA Method 8290

Developed specifically for use with US EPA Method 8290 - "Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS)"

The sample clean-up employed in EPA Method 8290 requires a series of hand-packed glass chromatography steps involving: 1) a mult-layer silica gel class column, 2) a sodium sulfate/alumina glass column, and 3) a multi-layer celite 545-activated carbon glass column.

Cat. No. 52732-U can be used in place of the required multi-layer silica gel glass column, and Cat. No. 52733-U can be used in place of the required multi-layer celite 545-activated carbon glass column.

Note that the bed weights packed into these SPE tubes are smaller than what is described in EPA Method 8290. Therefore, to use these SPE tubes, sample volumes need to be scaled down accordingly.

	Cat. No.	Qty
Multi-Layer Celite/Activated Carbon SPE Tube		
configured for US EPA Method 8290, PTFE frit, glass hardware, volume 6 mL	52733-U	30 ea
Multi-Layer Silica Gel SPE Tube		
configured for US EPA Method 8290, PTFE frit, glass hardware, volume 6 mL, bed A: 0.1 g	52732-U	30 ea

Glass SPE Products

Glass SPE Tubes with PTFE Frits

A select line of our Supelclean SPE phase chemistries is also available in inert glass and PTFE hardware configurations.

Features & Benefits:

- Resistant to harsh chemicals and aggressive solvents
- Absence of leachables such as pthalates and plasticizers
- Hygroscopic adsorbents (e.g. Florisil) can be easily heat treated/activated (e.g., 105-120 °C oven, overnight) prior to use

	Cat. No.	Qty
Supelclean™ ENVI-18 SPE Tube		
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	54331-U	30 ea
Supelclean™ ENVI-8 SPE Tube		
glass hardware, PTFE frit, bed wt.: 500 mg, volume 3 mL	57106	27 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	57107	20 ea
Dual Layer Florisil®/Na_2SO_4 SPE Tube		
glass hardware, PTFE frit, bed B: 2 g, bed A: 2 g, volume 6 mL	52582-U	48 ea
Supelclean™ LC-Florisil® SPE Tube		
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	54333-U	30 ea
glass hardware, PTFE frit, bed wt.: 1 g, volume 6 mL	54334-U	30 ea
Supelclean™ LC-Si SPE Tube		
glass hardware, PTFE frit, bed wt.: 1 g, volume 6 mL	54335-U	30 ea
Supelclean™ ENVI-Florisil® SPE Tubes		
glass hardware, PTFE frit, bed wt.: 1 g, volume 6 mL	54095-U	30 ea

Reversed-Phase Supelclean™ SPE Products

Used to extract non-polar to moderately polar compounds from aqueous samples.

Supelclean™ LC-18 SPE

- Octadecyl, monomerically bonded
- Loading ~11.5% C
- Endcapped

	Cat. No.	Qty
Supelclean™ LC-18 SPE Tube		
bed wt.: 100 mg, volume 1 mL	504270	108 ea
bed wt.: 500 mg, volume 3 mL	57012	54 ea
bed wt.: 500 mg, volume 6 mL	57054	30 ea
bed wt.: 1 g, volume 6 mL	505471	30 ea
bed wt.: 2 g, volume 12 mL	57117	20 ea
bed wt.: 5 g, volume 20 mL	57135-U	20 ea
bed wt.: 10 g, volume 60 mL	57136	16 ea
Supelclean™ LC-18 SPE Bulk Packing		
-	57202	100 g

Supelclean™ LC-8 SPE

- Octyl, monomerically bonded
- Loading ~7% C
- Endcapped

	Cat. No.	Qty
Supelclean™ LC-8 SPE Bulk Packing		
-	57201	100 g
Supelclean™ LC-8 SPE Tube		
bed wt.: 100 mg, volume 1 mL	504157	108 ea
bed wt.: 500 mg, volume 3 mL	505145	54 ea
bed wt.: 500 mg, volume 6 mL	57052	30 ea

Supelclean™ LC-4 (Wide Pore) SPE

Supelclean™ LC-4 SPE Tube

- Larger pore size to accommodate larger macromolecules (e.g. proteins and peptide)
- Commonly used for desalting and extracting proteins/peptides in aqueous samples

polypropylene hardware
PE frit (20 µm porosity)

base material	silica gel (irregularly shaped)
bonding	butyldimethyl
endcapped	Yes
particle size	45 µm
pore size	500 Å

Wide Pore, bed wt.: 500 mg, volume 3 mL

57089	54 ea

Supelclean™ HISEP SPE

Supelclean™ Hisep™ SPE Tube

- Hydrophobic sites shielded by a hydrophilic surface for protein exclusion
- Hydrophobicity similar to C8 SPE phases

bed wt.: 500 mg, volume 3 mL

57076-U	54 ea

Supelclean™ LC-Ph SPE

- Phenyl, monomerically bonded
- Loading ~5.5% C
- Endcapped

	Cat. No.	Qty
Supelclean™ LC-Ph SPE Tube		
bed wt.: 100 mg, volume 1 mL	504599	108 ea
bed wt.: 500 mg, volume 3 mL	505269	54 ea

Normal-Phase Supelclean™ SPE Products

Used to extract moderately polar to polar compounds from nonaqueous samples.

Supelclean™ LC-CN SPE

- Cyanopropyl, monomerically bonded
- Loading ~7% C
- Endcapped

	Cat. No.	Qty
Supelclean™ LC-CN SPE Tube		
bed wt.: 100 mg, volume 1 mL	504386	108 ea
bed wt.: 500 mg, volume 3 mL	57013	54 ea
bed wt.: 500 mg, volume 6 mL	57056	30 ea
bed wt.: 5 g, volume 20 mL	57141	20 ea
Supelclean™ LC-CN, 100g		
-	57218	100 g

Supelclean™ LC-Diol SPE

- Diol, monomerically bonded
- Loading ~7% C

	Cat. No.	Qty
Supelclean™ LC-Diol SPE Tube		
bed wt.: 100 mg, volume 1 mL	504718	108 ea
bed wt.: 500 mg, volume 3 mL	57016	54 ea

Supelclean™ LC-NH_2 SPE

- Aminopropyl, monomerically bonded
- Loading ~5% C

	Cat. No.	Qty
Supelclean™ LC-NH_2 SPE Bulk Packing		
-	57205	100 g
Supelclean™ LC-NH_2 SPE Tube		
bed wt.: 100 mg, volume 1 mL	504483	108 ea
bed wt.: 500 mg, volume 3 mL	57014	54 ea
bed wt.: 500 mg, volume 6 mL	54059-U	30 ea

Solid Phase Extraction

Adsorption Supelclean™ SPE Products

Adsorption Supelclean™ SPE Products

No bonded phase; used to adsorb moderately polar to polar compounds from nonaqueous samples.

Supelclean™ LC-Alumina A SPE

- Alumina for acidic pH (~5), 60/325 mesh
- Brockman Act. I

	Cat. No.	Qty
Supelclean™ LC-Alumina A SPE Bulk Packing		
-	57206	100 g
Supelclean™ LC-Alumina-A SPE Tube		
bed wt.: 1 g, volume 3 mL	57082-U	54 ea
bed wt.: 2 g, volume 6 mL	57083-U	30 ea

Supelclean™ LC-Alumina B SPE

- Alumina for basic pH (~8.5), 60/325 mesh
- Brockman Act. I

	Cat. No.	Qty
Supelclean™ LC-Alumina-B SPE Bulk Packing		
-	57207	100 g
Supelclean™ LC-Alumina-B SPE Tube		
bed wt.: 1 g, volume 3 mL	57084	54 ea
bed wt.: 2 g, volume 6 mL	57085	30 ea

Supelclean™ LC-Alumina-N SPE

- Alumina for neutral pH (~6.5), 60/325 mesh
- Brockman Act. I

	Cat. No.	Qty
Supelclean™ LC-Alumina SPE Bulk Packing		
-	57208	100 g
Supelclean™ LC-Alumina-N SPE Tube		
bed wt.: 1 g, volume 3 mL	57086	54 ea
bed wt.: 2 g, volume 6 mL	57087	30 ea

Supelclean™ LC-Florisil® SPE

- Magnesium silicate, 100/120 mesh

	Cat. No.	Qty
Supelclean™ LC-Florisil® SPE Tube		
bed wt.: 1 g, volume 6 mL	57057	30 ea
bed wt.: 2 g, volume 12 mL	57115	20 ea
bed wt.: 5 g, volume 20 mL	57131	20 ea
bed wt.: 10 g, volume 60 mL	57132	16 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	54333-U	30 ea
glass hardware, PTFE frit, bed wt.: 1 g, volume 6 mL	54334-U	30 ea
Supelclean™ LC-Florisil® SPE Bulk Packing		
-	57209	100 g

Supelclean™ LC-Si SPE

- Silica gel

	Cat. No.	Qty
12mL Si/1G-44%H2SO4/Si SPE Tube		
-	57145-U	20 ea
12mL Si-5G-44%H2SO4/Si SPE Tube		
-	57148-U	20 ea
Supelclean™ LC-Si Bulk Packing		
-	57200	100 g
Supelclean™ LC-Si SPE Tube		
bed wt.: 100 mg, volume 1 mL	504041	108 ea
bed wt.: 500 mg, volume 3 mL	505048	54 ea
bed wt.: 500 mg, volume 6 mL	505374	30 ea
bed wt.: 1 g, volume 6 mL	57051	30 ea
bed wt.: 2 g, volume 12 mL	57116	20 ea
bed wt.: 5 g, volume 20 mL	57133	20 ea
packing: 10 g, volume 60 mL	57134	16 ea
glass hardware, PTFE frit, bed wt.: 1 g, volume 6 mL	54335-U	30 ea
glass hardware, PTFE frit, bed wt.: 500 mg, volume 6 mL	54046-U	30 ea

Ion Exchange Supelclean™ SPE Products

Interaction based on ionic attraction.

Supelclean™ LC-SAX SPE

- Quarternary amine, Cl^- counter-ion

	Cat. No.	Qty
Supelclean™ LC-SAX SPE Bulk Packing		
-	57203	100 g
Supelclean™ LC-SAX SPE Tube		
bed wt.: 100 mg, volume 1 mL	504815	108 ea
bed wt.: 500 mg, volume 3 mL	57017	54 ea

Supelclean™ LC-SCX SPE

- Aliphatic sulfonic acid, Na^+ counter-ion
- Endcapped

	Cat. No.	Qty
Supelclean™ LC-SCX SPE Bulk Packing		
-	57204	100 g
Supelclean™ LC-SCX SPE Tube		
bed wt.: 100 mg, volume 1 mL	504920	108 ea
bed wt.: 500 mg, volume 3 mL	57018	54 ea

Supelclean™ LC-WCX SPE

- Carboxylic acid, Na^+ counter-ion

	Cat. No.	Qty
Supelclean™ LC-WCX SPE Tube		
bed wt.: 100 mg, volume 1 mL	505595	108 ea
bed wt.: 500 mg, volume 3 mL	57061	54 ea

SPE Method Development Kits

Supelclean™ SPE Method Development Kit

Supelclean SPE Method Development Kits consist of an assortment of SPE phase chemistries and cartridge configurations ideal for SPE method development. The range of phase chemistries available for each kit allows the user to profile for compound retention, elution and sample matrix selectivity.

	Cat. No.	Qty
Supelclean™ SPE Method Development Kit		
Kit A	57019	1 ea
Kit B	57009-U	1 ea
Kit C	57075-U	1 ea
Kit NP-3	57074-U	1 ea
Kit IX-3	57073	1 ea

Note: Please see below table for Supelclean SPE Method Development Kit descriptions

Supelclean SPE Method Development Kits

SPE Method Development Kit	Kit A	Kit B	Kit C	Kit NP-3	Kit IX-3
Cat. No.	57019	57009-U	57075-U	57074-U	57073
Qty. Ea. Tube	6	12	3	6	12
Supelclean Packing	——— Sorbent Qty./Tube Size ———				
LC-Si	500 mg/3 mL	100 mg/1 mL	500 mg/6 mL	500 mg/3 mL	
			1 g/6 mL		
LC-8	500 mg/3 mL	100 mg/1 mL	500 mg/6 mL		
LC-18	500 mg/3 mL	100 mg/1 mL	500 mg/6 mL		
LC-CN	500 mg/3 mL	100 mg/1 mL	500 mg/6 mL		500 mg/3 mL
LC-Diol	500 mg/3 mL	100 mg/1 mL		500 mg/3 mL	
LC-NH2	500 mg/3 mL	100 mg/1 mL		500 mg/3 mL	500 mg/3 mL
LC-Ph	500 mg/3 mL	100 mg/1 mL			
LC-SAX	500 mg/3 mL	100 mg/1 mL			500 mg/3 mL
LC-SCX	500 mg/3 mL	100 mg/1 mL			500 mg/3 mL
LC-WCX	500 mg/3 mL	100 mg/1 mL			500 mg/3 mL
LC-Alumina-A			2 g/6 mL	1 g/3 mL	
LC-Alumina-B			2 g/6 mL	1 g/3 mL	
LC-Alumina-N			2 g/6 mL	1 g/3 mL	
LC-Florisil			1 g/6 mL		

Solid Phase Extraction

SPE Method Development Kits

96-well SPE MD (Method Development) Plate

Supelco 96-well SPE Method Development Plates contain an assortment of SPE phase chemistries ideally suited for method development. The mix of phase chemistries contained within this 96-well SPE plate allows researchers to screen for analyte retention, recovery, and selectivity when achieving one's sample prep objectives.

- BAN, configured for extracting basic, acidic, and neutral compounds (BAN), bed wt.: 25 mg/well

	1	2	3	4	5	6	7	8	9	10	11	12
A	Discovery® DSC-PS/DVB (polystyrene divinyl benzene)[1]											
B	Discovery DSC-18 (tC18)[1]											
C	Discovery DSC-8 (C8)[1]											
D	Discovery DSC-CN (cyanopropyl)[1]											
E	Discovery DSC-MCAX (mixed-mode cation exchange)[2]											
F	Discovery DSC-WCX (weak cation exchange)[2]											
G	Discovery DSC-SAX (strong anion exchange)[3]											
H	Discovery DSC-NH_2 (aminopropyl weak anion exchange)[3]											

[1]Reversed-phase; [2]Cation-exchange; [3]Anion-exchange

577522-U	1 ea

Free SPE MultiPaks for Method Development

FREE SPE MultiPaks for Method Development

SPE MultiPaks consist of an assortment of SPE phase chemistries and tube dimensions ideally suited for method development. The mix of phase chemistries available in these MultiPaks allows you to screen for optimal retention and selectivity required to achieve your sample prep objectives.

Available SPE MultiPaks

- Supel-Select HLB SPE MultiPaks
- SupelMIP SPE MultiPaks
- HybridSPE-PL MultiPaks
- Supel™ QuE Dispersive & Dual-Layer SPE MultiPaks
- Discovery® Ag-ION SPE MultiPaks
- Discovery® Reversed-Phase SPE MultiPaks
- Discovery® Normal-Phase SPE MultiPaks
- Discovery® Ion-Exchange SPE MultiPaks
- Discovery® DSC-MCAX (Mixed-Mode Cation Exchange) SPE MultiPak
- Discovery® DPA-6S (Polyamide) SPE MultiPak
- Supelclean ENVI-Carb (Graphitized Carbon) SPE MultiPak
- Supel™ Sphere Carbon/NH_2 SPE MultiPak
- Supelclean PSA SPE MultiPaks

SPE Products For Combinatorial Chemistry

In recent years, advances in combinatorial chemistry (CombiChem) have made a tremendous impact on the pharmaceutical industry by dramatically accelerating the drug discovery process. However, for each synthesis a purification step is required to remove the target molecule from reaction by-products and excess reagents. Because many reactions contain polar to moderately polar reagents, by-products, and products that can be selectively extracted with normal phase SPE, modified flash techniques utilizing silica packed SPE hardware have become a routine procedure for purifying solution-phase combinatorial reactions.

Discovery® SPE products offer combinatorial chemists an excellent opportunity for developing a simple and standardized high throughput purification method for their combinatorial libraries.

In normal phase SPE, polar compounds are retained or adsorbed onto the sorbent via polar-polar interactions when loaded in the presence of an organic sample matrix. Provided that the products, by-products, and reagents display varying polarities, choosing solvents with increasing polarity will allow for sequential elution of key compounds. In most combinatorial flash purification techniques, compounds not of interest are retained on the stationary phase. The products are then collected for analysis in the load flow through, or if weakly adsorbed, they can be selectively removed with a subsequent wash step.

Many combinatorial chemistry labs are synthesizing and characterizing extensive drug libraries. Chemists are therefore employing modified flash chromatography techniques in a 96-well SPE format for the purpose of sample clean-up and baseline impurity removal. In many combinatorial chemistry labs, capacity is a primary concern for such applications. In our studies, we have determined the binding capacity of 4-Fluoro-3-nitro-benzoic acid when loaded into a DSC-Si SPE 96-well plate (100mg/well). Our results show that ~12.5mg of the Fluoro compound can be loaded onto 100mg DSC-Si before beakthrough occurs. Breakthrough determination was analyzed via HPLC analysis.

Results:

Load Amount*	Breakthrough Amount
2.5 mg	No Breakthrough
5.0 mg	No Breakthrough
10.0 mg	No Breakthrough
12.5 mg	No Breakthrough
15.0 mg	0.10% Breakthrough Occurred

* Sample Matrix in 200 µL Methylene Chloride

n = 3 for each load amount

Discovery® DSC-Si SPE Products

	Cat. No.	Qty
Discovery® DSC-Si SPE Tube		
bed wt.: 50 mg, volume 1 mL	52652-U	108 ea
bed wt.: 100 mg, volume 1 mL	52653-U	108 ea
bed wt.: 500 mg, volume 3 mL	52654-U	54 ea
bed wt.: 500 mg, volume 6 mL	52655-U	30 ea
bed wt.: 1 g, volume 6 mL	52656-U	30 ea
bed wt.: 2 g, volume 12 mL	52657-U	20 ea
bed wt.: 5 g, volume 20 mL	52658-U	20 ea
bed wt.: 10 g, volume 60 mL	52659-U	16 ea
bed wt.: 20 g, volume 60 mL	1771-U	16 ea
Discovery® DSC-Si SPE 96-well Plate		
bed wt.: 100 mg/well	575609-U	1 ea
bed wt.: 50 mg/well	575608-U	1 ea
bed wt.: 25 mg/well	575607-U	1 ea
Discovery® DSC-Si SPE Bulk Packing		
-	52651-U	100 g

Solid Phase Extraction

SPE Products For Combinatorial Chemistry: *Empty Glass Reaction (SPE) Tubes & Accessories*

Empty Glass Reaction (SPE) Tubes & Accessories

Inert Glass Tubes, PTFE Frits and PTFE Closures

- Reduce interferences and contamination of your reaction mixtures
- Resistant to aggressive solvents and chemical solutions
- High flow frit porosity allows for gravity or rapid vacuum rinsing

Description	Cat. No.	Qty
SPE Tube Cap (encloses top of SPE tubes), PTFE solid, for use with 6mL glass SPE tube	504343	24 ea
Male Luer Plug, configured for plugging luer holes	504351	12 ea
Empty glass SPE Tube with PTFE frits, 20 µm porosity, volume 6 mL	504394	24 ea
SPE Tube Adapter, PTFE (with female luer port), for use with 6 mL glass SPE tubes	504335	24 ea
PTFE Frit, 20 µm porosity, for use with 6mL glass SPE tubes	504327	60 ea
Female Luer Cap, polypropylene, configured for capping luer tips	57098	12 ea

High Capacity Support and Ion-Exchange Resins

Combigel™ XE-305

Support for combinatorial chemistry.
Adsoprbent for liquid separations.

- Underivatized polystyrene, mesh size 50-100
- Our answer to Amberlite® XE-305
- Unique swelling properties.

matrix ..... underivatized polystyrene
particle size ..... 50-100 mesh

502537B	50 g

Polymer SAX Rezorian™ Cartridge

Retention Mechanism: Anion exchange
Sample Matrix Compatibility: Organic or aqueous samples

- A quarternary amine functional group bonded to styrene gel, 200/400 mesh (Dowex 1x8)
- Offers high capacity (3.5 meq/g) for extracting acidic compounds
- OH^- counter ion; 8% cross linking; ~42% moisture; max temp. 99°C
- Excellent resistance to extreme pH conditions

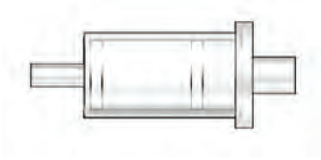
store at: 2-8°C

	Cat. No.	Qty
Polymer SAX Rezorian™ Cartridge		
bed wt.: 6 g, volume 5 mL	2832-U	10 ea
bed wt.: 14.4 g, volume 13 mL	2833-U	10 ea

Polymer SCX Reversible SPE Tube

Retention Mechanism: Cation exchange
Sample Matrix Compatibility: Organic or aqueous solutions

- A sulfonic acid functional group bonded to styrene gel, 200/400 mesh (Dowex 50Wx8)
- Offers high capacity (4.8 meq/g) for extracting basic compounds
- H^+ counter ion; 8% cross linking; ~54% moisture; max temp. 150 °C
- Excellent resistance to extreme pH conditions (1-14)



bed wt.: 700 mg, volume 1 mL

54037-U	54 ea

Solid Phase Extraction

SPE Tube Components & Tube Accessories: *SPE Tube Components*

SPE Tube Components & Tube Accessories

SPE Tube Components

Note: PE, PTFE, and stainless steel frits for use with polypropylene SPE tubes unless otherwise noted

	Cat. No.	Qty
Empty polypropylene SPE Tube with PE frits, 20 µm porosity		
volume 1 mL	57023	108 ea
volume 1 mL, pre-fritted	54220-U	100 ea
volume 3 mL	57024	54 ea
volume 3 mL, pre-fritted	54221-U	100 ea
volume 6 mL	57026	30 ea
volume 6 mL, pre-fritted	54222-U	100 ea
volume 12 mL	57176	20 ea
volume 12 mL, pre-fritted	54223-U	100 ea
volume 20 mL	57177	20 ea
volume 20 mL, pre-fritted	57118-U	20 ea
volume 60 mL	57178	16 ea
volume 60 mL, pre-fritted	57119-U	16 ea
Empty SPE Tube (no frits)		
volume 1 mL	57240-U	108 ea
volume 3 mL	57241	54 ea
volume 6 mL	57242	30 ea
volume 12 mL	57179	20 ea
volume 20 mL	57021	12 ea
volume 60 mL	57022	12 ea
Empty glass SPE Tube with PTFE frits, 20 µm porosity		
volume 6 mL	504394	24 ea
Empty Reversible SPE Tube, non-fluorous polypropylene		
volume 0.5 mL, PE frit included	57602-U	50 ea
volume 1 mL, PE frit included	57607-U	50 ea
volume 2 mL, PE frit included	57608-U	50 ea
Empty Rezorian™ Tube Kit with PE frits		
volume 1 mL, luer plugs and caps included	57609-U	50 ea
volume 5 mL, luer caps and plugs included	57613-U	50 ea
Polyethylene (PE) Frit, 20 µm porosity		
for use with 1mL SPE Tube	57244	216 ea
for use with 3mL SPE Tube	57180-U	108 ea
for use with 6mL SPE Tube	57181	60 ea
for use with 12mL SPE Tube	57182-U	40 ea
for use with 20mL SPE Tube	57183	40 ea
for use with 60mL SPE Tube	57184	32 ea
PTFE Frit, 20 µm porosity		
for use with 1mL SPE tubes	57185	216 ea
for use with 3mL SPE tubes	57186	108 ea
for use with 6mL SPE tubes	57187	60 ea
for use with 6mL glass SPE tubes	504327	60 ea
for use with 12mL SPE tubes	57188	40 ea
for use with 60mL SPE tubes	57190-U	32 ea
Stainless Steel Frit, 20 µm porosity		
for use with 6mL polypropylene SPE tubes	57246-U	60 ea
SPE Tube Cap (encloses top of SPE tubes)		
for use with 1mL SPE tube	52171-U	108 ea
for use with 3mL SPE tube	52172-U	30 ea
for use with 6mL SPE tube	52173-U	30 ea
for use with 12mL SPE tube	52174-U	20 ea
for use with 20mL SPE tube	52175-U	20 ea
for use with 60mL SPE tube	52176-U	20 ea
Female Luer Cap		
polypropylene, configured for capping luer tips	57098	12 ea
Male Luer Plug		
configured for plugging luer holes	504351	12 ea

Large Volume SPE Reservoirs

Large Volume SPE Reservoir

Large volume SPE reservoirs are designed to increase the head space volume of standard polypropylene SPE tubes. Because these reservoirs are designed to connect directly to the mouth of the SPE tube, they are ideal for gravity applicatioins where increased headspace volume is required.

polypropylene body, for use with 6 mL polypropylene SPE tubes, volume 25 mL

54258-U	30 ea

PTFE body, for use with 6 mL polypropylene SPE tubes, volume 25 mL

54259-U	3 ea

Frit Insertion Tool and Tube Adapters

SPE Frit Insertion Tool

Used to tighten or insert frits into SPE tubes.
polypropylene material

	Cat. No.	Qty
SPE Frit Insertion Tool		
for use with 1 mL SPE tubes	55217-U	1 ea
for use with 3 mL SPE tubes	55218-U	1 ea
for use with 6 mL PP SPE tubes	55219-U	1 ea

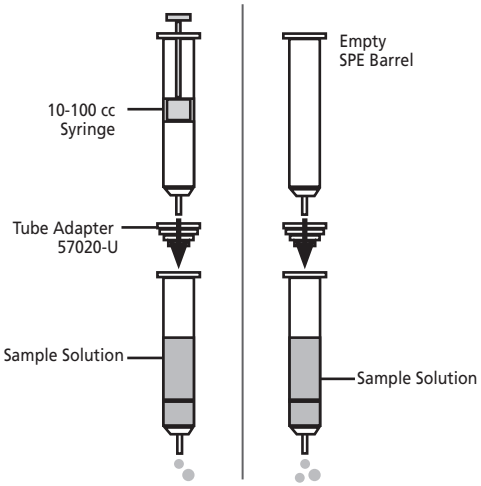
Solid Phase Extraction

SPE Tube Components & Tube Accessories: *Frit Insertion Tool and Tube Adapters*

	Cat. No.	Qty
for use with 12 mL SPE tubes	55221-U	1 ea
for use with 20 and 60 mL SPE tubes	55224-U	1 ea
includes 1, 3, 6, 12, and 20/60 mL SPE frit insertion tools	55226-U	5 ea

SPE Tube Adapter

Tube adapters serve many purposes. They can be used to stack one SPE tube on top of another to provide different selectivities. A larger empty syringe barrel can be stacked on top of a smaller SPE tube to act as a larger load reservoir. Or, they can serve as an adapter for positive pressure methods (e.g. from a syringe or air/ N_2 line).



Left to Right: SPE Tube Adapter for 12, 20, 60 mL SPE Tubes(57267); SPE Tube Adapter for 1, 3, 6 mL SPE tubes (57020-U)

	Cat. No.	Qty
SPE Tube Adapter		
for use with 1, 3, & 6 mL tubes	57020-U	12 ea
configured for AutoTrace Automated Systems, for use with 3mL tubes	57123	6 ea
configured for AutoTrace Automated Systems, for use with 6mL tubes	57126	6 ea
PTFE (with female luer port), for use with 6 mL glass SPE tubes	504335	24 ea

Cartridge Adapter for H300 Cartridges

for use with 12, 20, & 60 mL SPE tubes

57267	6 ea

SPE Vacuum Manifolds & Replacement Parts

Visiprep™ SPE Vacuum Manifold

SPE is a form of chromatography, and, as with other chromatographic techniques, control of flow rate is critical for maintaining reproducible extractions. Unlike other vacuum manifolds, the Visiprep system contains a patented valve system that allows for precise flow control through each SPE tube via rotating, independent, screw-type valves situated in each port within the manifold cover. Visiprep vacuum manifolds allow you to process up to 12 (12-port version) or 24 (24-port version) SPE samples simultaneously. Spacing between ports are slightly smaller on the 24-port versions than the 12-port versions so consideration of tube sizes is recommended.

Features and Benefits

- Patented screw-type valves within each SPE port for precise flow control
- Glass basin will not dissolve, fog, or discolor when exposed to solvents
- Legs on cover allow user to easily rest cover on work surface when removed from the manifold
- Screw-type solvent-resistant vacuum bleed gauge and valve offer better sealing and vacuum control. Valve takes ¼" vacuum tubing.
- PP collection vessel rack accommodates autosampler vials; small scintillation vials (22.75 mm O.D. recommended); 10 and 16 mm test tubes; and 1, 2, 5, and 10 mL volumetric flasks. An optional plate for 20 mL scintillation vials is available for 12-port models.

DL (Disposable Liner), 12-port model

The Visiprep DL (Disposable Liner) Vacuum Manifold eliminates the possibility of cross-contamination when processing a new sample on the same port. The liner consists of a PP female luer hub that attaches to the SPE, and thin-walled PTFE tubing that is threaded through the SPE port. This ensures that all SPE port and valve surfaces coming in contact with the sample can be replaced following each extraction.

Visiprep DL (Disposable Liner), 12-port model (57044)

57044	1 ea

Solid Phase Extraction

SPE Vacuum Manifolds & Replacement Parts

Visiprep™ SPE Vacuum Manifold *(continued)*

DL (Disposable Liner), 24-port model

The Visiprep DL (Disposable Liner) Vacuum Manifold eliminates the possibility of cross-contamination when processing a new sample on the same port. The liner consists of a PP female luer hub that attaches to the SPE, and thin-walled PTFE tubing that is threaded through the SPE port. This ensures that all SPE port and valve surfaces coming in contact with the sample can be replaced following each extraction.

Visiprep DL (Disposable Liner), 24-port model (57265)

57265	1 ea

standard, 12-port model

57030-U	1 ea

standard, 24-port model

Visiprep 24-Port Vacuum Manifold (57250-U)

57250-U	1 ea

Long Stem Flow Control Valves

Equip alternative valves in your 12-port or 24-port standard Visiprep vacuum manifold with these long stem flow control valves if you intend to use all ports of the manifold with 12, 20, or 60 mL SPE tubes.

Note: Not for use with Visiprep DL (Disposable Liner) models

57048	6 ea

Solid Phase Extraction

SPE Vacuum Manifolds & Replacement Parts

Visiprep™ Manifold Components

Bottom left- Retaining Clips for Visiprep Collection Racks (57041); **Bottom center-** Visiprep DL (Disposable Liner) Replacement Liner Guide Needles, stainless steel (57027); **Left center-** Visiprep Standard Solvent Guide Needles, PTFE (57047); **Top center-** Visiprep Standard Solvent Guide Needles, stainless steel (57036); **Top right-** Visiprep Manifold Replacement Flow Control Valve, for use with DL (Disposable Liner) models (57028); **Right center-** Pyrex disposable culture (collection) tubes: 10 mm I.D., 4 mL (Z281026) and 16 mm I.D., 15 mL (Z281069)

	Cat. No.	Qty
Visiprep™ Manifold Cover (flow control valves and gasket included)		
for use with standard, 12-port model	57031-U	1 ea
for use with DL (Disposable Liner), 12-port model	57029	1 ea
for use with standard, 24-port model	57251	1 ea
for use with DL (Disposable Liner), 24-port model	57266	1 ea
Visiprep™ Manifold Replacement Gasket		
for use with 12-port model (standard and DL)	57033	2 ea
for use with 24-port model (standard and DL)	57254	2 ea
Visiprep™ Manifold Replacement Glass Basin		
for use with 24-port model (standard and DL), vacuum gauge and bleed valve included	57252	1 ea
for use with 24-port model (standard and DL)	57253	1 ea

	Cat. No.	Qty
Visiprep™ Manifold Collection Rack (included with standard and DL models)		
for use with 12-port model, includes base, 3 support rods, center plate, plate for 10 mm test tubes, 12 retaining clips	57037	1 ea
for use with 24-port model, includes base, 2 support rods, center plate, plate for 10 mm test tubes, 8 retaining clips	57255	1 ea
Visiprep™ Manifold Plate (included with standard and DL models unless otherwise noted)		
for use with 12-port model (standard and DL), 16 mm test tubes	57039	1 ea
for use with 12-port model, 2 mL autosampler vials	57040-U	1 ea
for use with 12-port model, 20 mL scintillation vials, not included with standard and DL models	57043	1 ea
for use with 24-port model, 16 mm test tubes	57257	1 ea
for use with 24-port model, 2 mL autosampler vials	57258	1 ea
Visiprep™ Manifold Flow Control Valve		
for use with standard 12- and 24-port models	57032	2 ea
for use with DL (Disposable Liner) 12- and 24-port models	57028	2 ea
Visiprep™ Manifold Replacement Flow Control Valve Stem		
for use with DL (Disposable Liner) 12- and 24-port models	57146-U	24 ea
for use with standard 12- and 24-port models	57147-U	24 ea
Visiprep™ SPE Manifold Replacement Solvent Guide Needles		
for use with standard, 12- and 24-port models (included with 57030-U & 57250-U)), PTFE	57047	12 ea
for use with standard, 12- and 24-port models (optional use with 57030-U & 57250-U), stainless steel	57036	12 ea
SPE Manifold Gauge/Bleed Valve		
for use with Visiprep 12-port and 24-port models	57035-U	1 ea
Disposable Liners for Visiprep DL Manifolds (included with 57044 and 57265)		
PTFE	57059	100 ea
Gum rubber laboratory tubing		
tubing I.D. $\frac{1}{4}$ in. × O.D. 1 in.	Z255998-1PAK	10 ft
Retaining Clips For Visiprep™ SPE Manifold Collection Racks		
included with standard and DL, 12- and 24-port models	57041	12 ea
Visiprep™ DL (Disposable Liner) Replacement Liner Guide Needles (included with 57044 and 57265)		
for use with DL (Disposable Liner), 12- and 24-port models, stainless steel	57027	12 ea
Visprep Manifold Splash Guard (not included with standard and DL models)		
for use with standard and DL, 12-port model	57045-U	1 ea

Solid Phase Extraction

SPE Vacuum Manifolds & Replacement Parts

Visiprep™ 5-port Flask Vacuum Manifold

The Visiprep 5-Port Flask Vacuum Manifold enables analysts using Supelco solid phase extraction tubes to simultaneously prepare up to 5 samples. Unlike conventional vacuum manifolds, the Visiprep 5-Port Flask Manifold allows users to collect their SPE eluate directly into 50 mL round or flat bottom flasks for direct Rotovap evaporation. The manifold consists of a chemical resistant 5-port cover (DL or standard available), gasket, base, a glass basin, vacuum gauge and bleed valve, 5 flow control valves, 5 replaceable solvent guide needles, and a base plate that supports up to five 50 mL round or flat bottom flasks.

Each port on both the standard and DL Visiprep models are equipped with flow control valves.

Recommended Flasks: Aldrich™ single-neck flask, 50 mL, joint: ST/NS 24/40

- Round Bottom (Cat. No. Z414484)
- Flat Bottom (Cat. No. Z418773)

Visiprep 5-Port Vacuum Manifold Conversion Kit - upper left (57105-U); and Visiprep standard 5-port Flask Vacuum Manifold (57103-U)

	Cat. No.	Qty
Visiprep™ 5-port Flask Vacuum Manifold		
DL (Disposable Liner)	57101-U	1 ea
standard	57103-U	1 ea

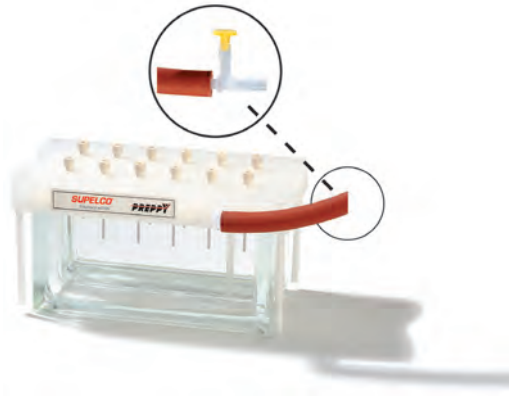
Visiprep™ 5-Port Vacuum Manifold Conversion Kit

	Cat. No.	Qty
Visiprep™ 5-Port Vacuum Manifold Conversion Kit		
for converting 24-port model into DL 5-port flask model, includes DL 5-port lid and flask base plate	57104-U	1 kit
for converting 24-port model into standard 5-port flask model, includes standard 5-port lid and flask base plate	57105-U	1 kit

Preppy™ 12-Port Vacuum Manifold

The Preppy manifold is our simplest and most economical manifold. It too enables the analyst to simultaneously prepare up to 12 samples. It consists of a chemical-resistant cover and gasket, a glass basin, a vacuum release vent, 12 individual control valves with knurled tops, and stainless steel solvent guide needles.

Two optional collection racks are available; one holds both 2 and 4 mL autosampler vials, and the other holds 15 and 20 mL vials. An optional vacuum gauge/bleed valve assembly can be installed to allow precise control of the vacuum used with the Preppy manifold.



Preppy 12-port Vacuum Manifold

57160-U		1 ea

Preppy™ Vacuum Manifold Replacement Parts

	Cat. No.	Qty
Preppy™ Vacuum Manifold Replacement Cover		
polypropylene, includes solvent needle guides	57158-U	1 ea
Preppy™ Vacuum Manifold Collection Rack		
for use with 2 mL (12 mm OD x 32 mm H) or 4 mL (15 mm OD x 45 mm H) vials	57159-U	1 ea
for use with 15 mL (21 mm OD x 70 mm H) or 20 mL (28 mm OD x 61 mm H) vials.	57162-U	1 ea
SPE Manifold Gauge/Bleed Valve		
Remote In-Line Design	57161-U	1 ea

PlatePrep 96-well Vacuum Manifold

The PlatePrep vacuum manifold consists of a clear acrylic top allowing for easier inspection of flow rates during SPE 96-well plate processing. The polypropylene base offers excellent chemical resistance while a single remote vacuum gauge/bleed valve controls flow through all the wells.

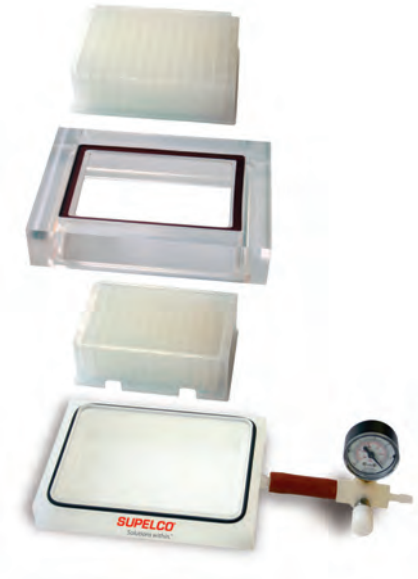
Use this compact vacuum manifold in conjunction with a Discovery SPE 96-well plate to process up to 96 samples concurrently. The single valve control, parallel processing capabilities, and uniform flow dynamics allow for easier method development, reduce clutter, and improve reproducibility. Unused wells can be covered and used at a later date.

Solid Phase Extraction

SPE Vacuum Manifolds & Replacement Parts

A PlatePrep 96-Well Starter Kit (Cat. No. 575650-U) is available to anaysts new to 96-well SPE technology. Included with the Starter Kit is PlatePrep Vacuum Manifold and sample units of key accessory items necessary for 96-well SPE.

PlatePrep 96-Well Vacuum Manifold Starter Kit (575650-U)



Schematic of PlatePrep Vacuum Manifold with 96-well SPE Plate & Deep 96-well Collection Plate

Starter kit

Starter Kit includes:

- 1 PlatePrep vacuum manifold
- 1 96 square well collection plate, 2 mL, polypropylene
- 2 disposable reservoir/waste trays, PVC
- 1 96 sq. well pierceable cap mat
- 5 reagent reservoirs
- 1 cluster tube rack

575650-U	1 ea

Manifold only

57192-U	1 ea

PlatePrep Vacuum Manifold Replacement Parts

	Cat. No.	Qty
Replacement Gaskets, Connectors and Tubing		
for use with Supelco Plateprep Vacuum Manifold	57195-U	1 ea
SPE Manifold Gauge/Bleed Valve		
Remote In-Line Design	57161-U	1 ea

96-well SPE Accessory Items

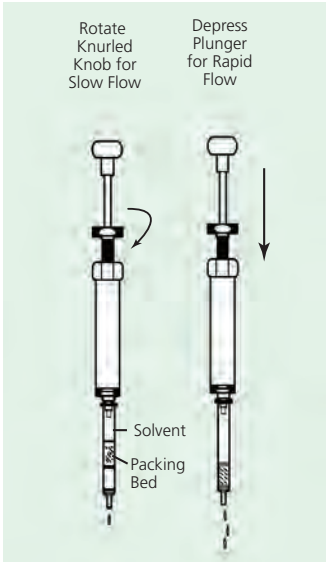
	Cat. No.	Qty
Disposable Reservoir / Waste Tray		
configured for collecing eluate waste during PlatePrep SPE processing, PVC	575654-U	25 ea
96 Square Well Pierceable Cap Mats		
configured for sealing Discovery SPE and square well collection plates	575655-U	50 ea
SPE 96-Deep Square Well Collection Plate		
well volume 0.35 mL, polypropylene	575651-U	50 ea
well volume 1 mL, polypropylene	575652-U	50 ea
well volume 2 mL, polypropylene	575653-U	50 ea
Texan™ reagent reservoir for multichannel pipettes		
without lid, non-sterile	R9259-100EA	100 ea

Visi-1 Single SPE Tube Processor

Visi-1 processor provides two rates of flow control

Our Visi-1 Single SPE Tube Processor provides precise flow control through a single 1mL, 3mL, or 6mL SPE tube.
There is no faster, more convenient, or more reliable method for processing one or a few samples.

Simply fill the SPE tube with the appropriate solution, attach it to the Visi-1 processor, and rotate the knurled knob clockwise. The solution will pass through the tube in a slow, uniform rate, consistent with the most reproducible results for SPE. Use the plunger to expel the last drop of solvent from the tip of the tube. Remove the tube from the processor, introduce the next solution, and repeat the process.



7130539

57080-U	1 ea

Solid Phase Extraction

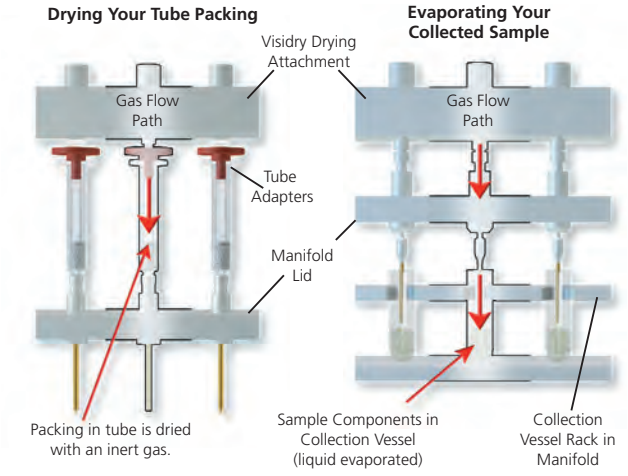
Vacuum Manifold Accessories

Vacuum Manifold Accessories

Visidry™ Drying Attachment

The Visidry Drying Attachment was designed for our Visiprep Vacuum Manifold (Cat. No. 57100-U also fits our economical Preppy manifold). The Visidry unit installs in minutes, dries up 12 or up to 24 SPE tubes at one time, and can be used with any inert gas supply. It is also useful for evaporating and concentrating recovered samples. Gas flow to each port can be independently adjusted.

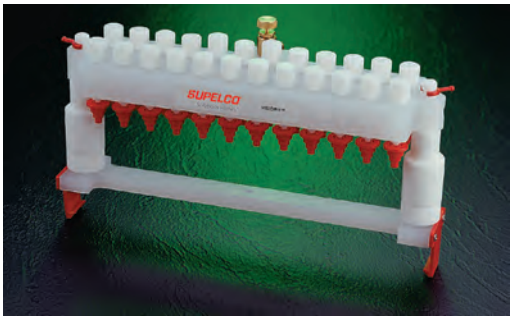
Note: The Visidry drying attachment cannot be used to dry 12mL, 20mL, or 60mL SPE tubes.



for use with Visiprep 12-port model

57100-U	1 ea

for use with Visiprep 24-port model



57124	1 ea

Universal Elution Rack for LpDNPH Cartridges

for use with LpDNPH Cartridges

21043-U	1 ea

Replacement Parts for Visidry™ Drying Attachment

	Cat. No.	Qty
Control Knobs For Visidry™ Drying Attachment		
-	57095	2 ea
Female Luer Cap		
polypropylene, configured for capping luer tips	57098	12 ea
Visidry™ Retaining C-clips		
-	57096	2 ea

Visidry™ Long Stem Flow Control Knob

If you have equipped your Visiprep Vacuum Manifold with long stem flow control valves (57048), these control knobs will enable you to attach the Visidry Drying Attachment without removing the long stem valves.

Note: These knobs cannot be used with a 24-port manifold being used to process 12mL, 20mL, or 60mL tubes.

57093	6 ea

Visiprep™ Large Volume Sampler

For continuous "hands off" direct transfer of multiple liquid samples

A Visiprep large volume sampler enables you to transfer low viscosity samples directly from any sample container to conventional solid phase extraction tubes on a Visiprep SPE vacuum manifold.

Two samplers are available. One sampler has three tube adapters compatible with 12mL, 20mL, or 60mL polypropylene SPE tubes. Simultaneous extraction of 12 samples on a 12-port Visiprep manifold requires four of these samplers. The other sampler has four tube adapters for 3mL or 6mL SPE tubes. To simultaneously extract 12 samples, three samplers are required.

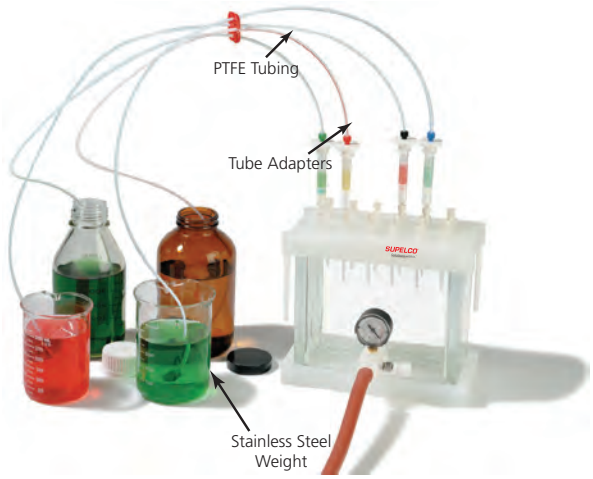
Solid Phase Extraction

Vacuum Manifold Accessories

The samplers consist of 1/8-inch PTFE tubing with a screw fitting at one end and a stainless steel weight at the other end. To use the sampler, feed the weighted end into a sample container until it touches the bottom. Insert the tube adapters into the conditioned SPE tubes on your Visiprep manifold. Turn on the vacuum to the Visiprep manifold and open the manifold flow control valves, and the samples will be delivered to the SPE tubes. The flow rate of sample through each tube can be independently controlled by using the flow control valves. Both the screw fittings and the PTFE tubing on the samplers are colorcoded for easy sample identification.

Also fits Preppy SPE Vacuum Manifold.

Note: The Visiprep Large Volume Sampler can only be used with polypropylene SPE tubes. You must equip alternate manifold valves with long stem flow control knobs to accommodate 12 mL, 20 mL, or 60 mL SPE tubes.



	Cat. No.	Qty
Visiprep™ Large Volume Sampler		
for use with 3 or 6 mL SPE tubes (includes 4 adapters)	57275	1 ea
for use with 12, 20, or 60mL SPE tubes (includes 3 adapters)	57272	1 ea

Replacement Parts For Visiprep™ Large Volume Sampler

	Cat. No.	Qty
1/8" PTFE tubes, Color Coded		
for use with Supelco Visiprep Large Volume Sampler	57276	4 ea
Ferrules/Nuts for Visiprep™ Large Volume Sampler		
color-coded	57277	4 ea
Stainless Steel Weights For Visiprep™ Large Volume Sampler		
weight fitting, for tubing 1/8 in. O.D.	57278	4 ea
Visiprep™ Large Volume Sampler Tube Adapters, 1/4-28 Threads		
for use with 3 or 6 mL SPE tubes	57273-U	4 ea
for use with 12, 20, or 60mL SPE tubes	57274-U	3 ea

SPE Vacuum Pump Trap Kit

When installed between a Visiprep SPE vacuum manifold and the vacuum source, a Supelco SPE Vacuum Pump Trap collects all liquids that are aspirated through the SPE tubes, preventing contamination of the vacuum pump. The easily assembled kit contains a polypropylene filtering flask, a one-hole rubber stopper, 4 in. (10 cm) of polypropylene tubing and 5 ft. (1.5 m) of red rubber vacuum hose. The volume capacity of the Trap is approximately 1 L.

When installed between a Visiprep SPE vacuum manifold and the vacuum source, a Supelco SPE Vacuum Pump Trap collects all liquids that are aspirated through the SPE tubes, preventing contamination of the vacuum pump. The easily assembled kit contains a polypropylene filtering flask, a one-hole rubber stopper, 4 in. (10 cm) of polypropylene tubing and 5 ft. (1.5 m) of red rubber vacuum hose. The volume capacity of the Trap is approximately 1 L.

57120-U 1 ea

SPE Manifold Gauge/Bleed Valve

Remote In-Line Design

57161-U 1 ea

Visprep SPE Manifold Test Tubes, 10 x 75 mm

size ..... 10 mm × 75 mm

57042 12 ea

Solid Phase Extraction

ENVI-Disk Holder & Accessories

ENVI-Disk Holder & Accessories

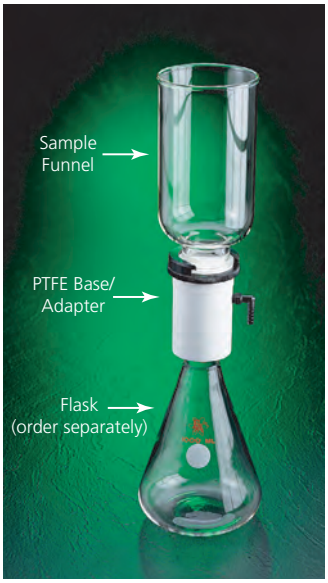
ENVI-Disk™ Holder

Use the ENVI-Disk Holder with 47 mm ENVI-DSK SPE disks.

The unique design of the holder allows each disk to be installed and held firmly in place without wrinkling and tearing. A screw clamp provides uniform pressure on the disk and the sealing surfaces to prevent troublesome leaks - spring-loaded clamps cannot offer the sealing integrity of the ENVI-Disk Holder.

The unit consists of a 1 L sample funnel, a threaded screw clamp, a PTFE disk support, and a PTFE filter base/adapter with a vacuum attachment fitting. The filter base fits onto any 1 L flask that has a 40/35 tapered ground glass neck. Use 25 x 250 mm test tubes to collect disk eluates.

To use the holder, place the base/adapter on the 1 L flask and center an ENVI-DSK on the disk support in the base. Loosen the screw clamp to install the funnel, then tighten to secure the unit. Attach the base/adapter to a vacuum source, and the unit is ready to use.



for use with 47 mm ENVI-Disk disks

57173	1 ea

Required ENVI-Disk™ Holder Accessories

Collection flask and collection tube not included with ENVI-Disk Holder. They must be ordered separately.

	Cat. No.	Qty
Vacuum filtration assembly flasks		
Collection flask, 1000 mL	Z290610-1EA	1 ea
Collection Tube		
I.D. 25 mm × L 250 mm, borosilicate glass	57175	1 ea

ENVI-Disk™ Holder Manifold

The ENVI-Disk Holder Manifold holds one to six ENVI-Disk Holders with flasks, allowing you to simultaneously extract up to six 1-liter samples. Each of the six stations is controlled through an independent flow control valve. These valves are designed to vent the flask to the atmosphere when moved from the open to the closed position. The flow rate is controlled by the needle valve on the manifold.

The unit includes a sturdy polymer base with six stations, six flow control valves, a needle valve, a vacuum gauge, and vacuum tubing. A 1-liter glass bottle in the manifold acts as a trap, to protect the vacuum source in the event of an overflow from one of the sample flasks.

Process up to 6x 1L samples simultaneously

57174	1 ea

ENVI-Disk™ 47 mm Filter Clamp and Stage

When used with a standard 47mm glass filtration apparatus, the ENVI-Disk Clamp creates a better seal, eliminating leaks with SPE extraction disks or when filtering HPLC mobile phase solvents.

Use only with a filtration glassware funnel base that has a removable filtration stage, such as Supelco Mobile Phase Filtration Apparatus 1 (Cat. No. 58061) or 2 (Cat. No. 58062-U), or with a funnel base (Cat. No. 58064 or 58068). It cannot be used with a permanent fritted glass filtration stage or stainless steel holder screen.

Features and Benefits

- Eliminates leaks
- Attaches to any 34/45 tapered flasks

Solid Phase Extraction

ENVI-Disk Holder & Accessories

57260-U	1 ea

Replacement PTFE Stage for 47 mm ENVI-Disk™ Clamp

PTFE stage

57261	1 ea

Vacuum Manifold Pumps

KNF Laboport® solid PTFE vacuum pump

Quiet, high performance diaphragm vacuum pumps can be used alone or as the center of a modular laboratory vacuum system. Replaces noisy rotary-vane pumps for vacuum distillation, drying, filtration, rotary evaporation, degassing of liquids, and applications where water aspirators are used.

- Solid PTFE heads
- Molded PTFE diaphragm
- Kalrez® parts eliminate chemical attack to the pump
- Oil-free operation ensures pumped medium will stay pure
- New multi-port valve system with Kalrez disks improves flow and reliability
- Two stages
- 10 mm I.D. hose barbs on ports

CE compliant

Pumping Speed (L/min)	AC	Cat. No.	Qty
vacuum ≤6 torr			
10	115 V	Z262250-1EA	1 ea
10	230 V	Z262285EU-1EA	1 ea
		Z262285-1EA	1 ea
20	115 V	Z262269-1EA	1 ea
20	230 V	Z262293EU-1EA	1 ea
		Z262293-1EA	1 ea
34	115 V	Z262277-1EA	1 ea
34	230 V	Z262307-1EA	1 ea
vacuum ≤1.5 torr			
34	115 V	Z288209-1EA	1 ea
34	230 V	Z288217-1EA	1 ea

KNF Laboport® mini-pump

The ideal pump for vacuum and pressure filtration, solid phase extraction, and blotting. High performance diaphragm vacuum/pressure pumps for moderately corrosive applications and any filtration or procedure that requires clean evacuation, transfer and compression of air, gases, and vapors. Pumps are available with gauges and regulators for precise control of vacuum and pressure.

- Portable
- Oil-free
- Quiet operation
- Maintenance-free, Ryton® pump head
- Molded PTFE diaphragm
- Kalrez® multi-port valves
- Single stage

CE compliant
vacuum ~120 torr
pumping speed 5.5 L/min
max. pressure 35 psig
weight 4.2 lb

	Cat. No.	Qty
KNF Laboport® mini-pump		
Pump only, 230 V	Z288292-1EA	1 ea
	Z288292EU-1EA	1 ea
	Z288292GB-1EA	1 ea
Pump with vacuum gauge and regulator, 230 V	Z288268-1EA	1 ea
Pump with pressure gauge and regulator, 230 V	Z288314EU-1EA	1 ea
	Z288314-1EA	1 ea

Dioxin Sample Prep System

Dioxin Sample Prep System

The Dioxin Sample Prep System provides an efficient means for extracting and isolating dioxins, furans, and co-planar PCBs from stack gases, water (waste, industrial, and surface), soil, blood, food, and milk. Designed to meet the Japanese Industrial Standards (JIS) Methods K-0311 and K-0312, the prep system consists of three key components: a multi-layer silica gel dioxin column, a dual layer carbon reversible SPE tube connected in series with the multi-layer silica gel column, and integrated glassware/hardware to support a variety of application modes.

The modular glassware and hardware design permits you to select a few pieces or the entire prep system for your specific extraction needs. A vacuum manifold and adapter provide the option of running single or multiple samples at one time, using vacuum or gravity feed.

Features and Benefits:

- Remove GC interferences
- Concentrate and classify coplanar PCBs, dioxins, and furans
- Obtain extraction recoveries greater than 85%
- Decrease prep time by 1-2 days
- Minimize solvent usage

Multi-layer Silica Gel Dioxin Column

The multi-layer silica gel column is key to the Dioxin Prep sample prep process. Seven layers of treated silica gel remove compounds from the extract which would interfere with the gas chromatographic analysis of the dioxin sample. Sulfuric acid-treated layers prevent chars from plugging the column while removing unsaturated hydrocarbons, phthalates, organo-chlorides, pigment, and polynuclear aromatic hydrocarbons (PAHs) from the sample. A potassium hydroxide treated layer removes lipids, proteins, phenols, and acidic compounds, while a silver nitrate treated layer removes sulfur compounds, elemental sulfur, pesticides, and aliphatic hydrocarbons. Dioxins, furans, and PCBs pass through the column unretained.

The column design includes an elongated tapered end that slips inside the dual-layer carbon reversible tube, preventing leakage of solvent and sample as well as contamination by the PTFE fittings.

Dual-layer Carbon Reversible Tube

The dual-layer carbon reversible tube isolates and concentrates the coplanar PCBS, dioxins, and furans with a minimum of hexane and toluene solvents. Performance is based on the unique selectivities of two different carbon adsorbents, Carboxen® 1016 with a low surface area (75 m^2/g) and Carboxen 1000 which has a high surface area (1200 m^2/g).

The dual-layer carbon reversible tube may be used alone or directly connected in series to the multi-layer silica gel column. Dioxins, furans, and coplanar PCBs are trapped on the Carboxen® 1016 bed. Some PCBs elute through to the second bed, Carboxen® 1000, depending upon solvent elution conditions. Aliphatic hydrocarbons and non-coplanar PCBs pass completely through the carbon tube and can be collected for analysis. The carbon tube is then removed and flushed in reverse direction with toluene to collect the dioxins, furans, and coplanar PCBs.

Dual-layer Carbon Reversible Tube

Dioxin Prep System – Florisil® Version

In 1998, the World Health Organization has identified 12 polychlorinated biphenyls (PCBs) exhibiting dioxin-like activities. These WHO-12 PCBs are now included as part of the overall dioxin concentration and should be systematically investigated in industrial emissions.

Although the original Dioxin Sample Prep System (Multi-layer Silica Gel Dioxin Column plus Dual-layer Carbon Reversible Tube) is ideal for the rapid clean-up and isolation of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs), the extraction of PCBs can prove more difficult. Because the Carboxen® layers packed within the Dual-layer Carbon Reversible tubes offer varying affinities to the different classes of PCBs, isolation of PCBs requires multiple fractionation steps during elution and often co-elute with PCDD/Fs.

In a collaborative effort with Corus Research, Development and Technology, Rotherham, UK, and Hall Analytical Laboratories, Manchester, UK, a "Dioxin Prep System – Florisil® Version" was developed to address this issue. This new system is based on the original Dioxin Prep System; however, the Dual-Layer Carbon Reversible Tube is replaced with a micro-column (reversible tube) packed with Pre-Activated Florisil®. As sample extracts pass through the multi-layer silica gel column into the Florisil® micro-column, PCBs are only weakly retained on the Florisil® bed and can be further eluted with n-hexane and/or n-hexane/dichloromethane. Subsequent elution of the Florisil® micro-column with dichloromethane is used to collect PCDD/F fractions. As a result, the new "Dioxin Prep System – Florisil® Version" can rapidly fractionate PCBs from PCDD/Fs prior to analysis for simpler quantitative determination.

Dioxin Sample Prep System

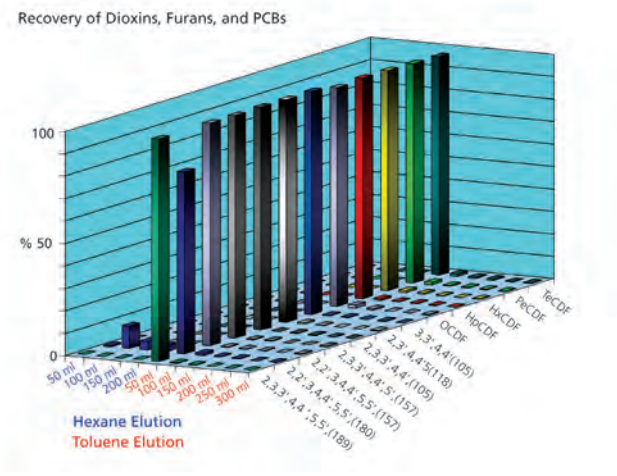
For your convenience, the Pre-Activated Florisil® is thermally activated and ampoulized prior to shipment to maintain Florisil® activity during storage. To use with the Dioxin Prep System, the Florisil® ampoule is snapped open and emptied into an Empty Micro-Column (reversible tube), 6.35/10 mm O.D.

Pre-Activated Florisil (48924-U)

Empty Glass Micro-Column (reversible tube) (28309-U)

Extraction Recoveries

The multi-layer silica gel column in series with the dual-layer carbon reversible tube provides extraction recoveries of 85% or better with less than 200 mL of toluene as illustrated below. For more information or extraction recoveries on additional dioxins, furans, and PCBs, please e-mail the Technical Service department at techservice@sial.com.



Acknowledgements: We wish to thank Koji Takayana *et al.* from Kawaju Techno Service Corporation and Masaaki Maeoka *et al.* from the Japan Quality Assurance Organization (JQA) for their involvement in the development and evaluation of the Dioxin Prep System.

System Components

Dioxin Sample Preparation Kit

Kit includes all glassware and connectors.

Note: Requires, but does not include, Multi-Layer Silica Gel Dioxin Column (28397-U) and Dual-Layer Carbon Reversible Tubes (28399-U) for "Standard Version", and Pre-Activated Florisil (48924-U) and Empty Micro-Column (Reversible Tube) (28309-U) for "Florisil Version".

28423-U	1 ea

Required Consumables for Standard Version

glass hardware

Description	Cat. No.	Qty
Multi-Layer Silica Gel Dioxin Column, for use with Dioxin Sample Preparation Kit, O. D. 6.35 mm × L 35 cm	28397-U	5 ea
Dual-Layer Carbon Reversible Tube (Micro-Column), for use with Dioxin Sample Preparation Kit, O.D. 6.35-10 mm	28399-U	10 ea

Required Consumables for Florisil® Version

Description	Cat. No.	Qty
Pre-Activated Florisil®, ampulized, 1 g, for use with Dioxin Sample Preparation Kit, particle size 60-100 mesh	48924-U	10 ea
Empty Glass Micro-Column (Reversible Tube), for use with Dioxin Sample Preparation Kit, O.D. 6.35-10 mm	28309-U	10 ea
Multi-Layer Silica Gel Dioxin Column, for use with Dioxin Sample Preparation Kit, O. D. 6.35 mm × L 35 cm	28397-U	5 ea

Replacement Kit Parts

Instructions included with the Dioxin Sample Prep System include detail and descriptions of the following replacement parts. Please refer to the instructions with your kit for details and descriptions of the following replacement parts

Glassware

Description	Cat. No.	Qty
Dioxin Vacuum Manifold	28403-U	1 ea
Vacuum Adapter, I.D. 10 mm	28408-U	1 ea
Top Flask with Stopcock, volume 250 mL, neck 24 mm	28449-U	1 ea
Empty Dioxin Column, O.D. 6.35 mm × L 35 cm	28404-U	5 ea
Syringe Luer Adapter, I.D. 10 mm	28405-U	3 ea
Collection Flask/Beaker, flat bottom, volume 300 mL	21266-U	3 ea
Collection Flask, round bottom, volume 250 mL	21269-U	3 ea
Long Stem Stopcock, I.D. 10 mm	28425-U	3 ea

Dioxin Sample Prep System

Replacement Kit Parts

Connectors

Description	Cat. No.	Qty
6.35 mm/6.35 mm Union, PTFE	28411-U	3 ea
6.35 mm/10 mm Reducing Union, PTFE	28398-U	3 ea
10 mm/10 mm Union, PTFE	28412-U	3 ea
24 mm/24 mm Polypropylene Viton® Connector	28432-U	6 ea

Optional components (not included with kit)

Description	Cat. No.	Qty
Clear Seal Top Flask Adapter, neck 24 mm	21002-U	3 ea
Short Stem Stop Cock, I.D. 10 mm	28402-U	3 ea
Empty Dioxin Column, I.D. 6.35-10 mm × L 20 cm, to be used with 6.35/10mm Reducing Union (Cat. No. 28398-U)	28409-U	5 ea

Bulk Treated Silica Gels/Sodium Sulfate

The same treated silica gels found in the pre packed multi-layer silica gel columns are available in bulk packages. These materials are useful for customizing your own columns to more efficiently clean very dirty samples, or to prepare shorter columns when samples are relatively clean, i.e. drinking water.

Description	Cat. No.	Qty
Sodium sulfate, ACS reagent, ≥99.0%, anhydrous, granular	239313-500G 239313-6X500G 239313-1KG 239313-2.5KG 239313-4X2.5KG 239313-5KG 239313-12KG 239313-50KG	500 g 6 × 500 g 1 kg 2.5 kg 4 × 2.5 kg 5 kg 12 kg 50 kg
10% $AgNO_3$ Coated Silica Gel	21319-U	100 g
22% H_2SO_4 Coated Silica Gel	21341-U	100 g
44% H_2SO_4 Coated Silica Gel	21334-U	100 g
2% KOH Coated Silica Gel	21318-U	100 g
Washed Silica Gel	21342-U	250 g

Purge and Trap

Tubes used in purge and trap analyses generally are packed with multiple beds of adsorbent materials (see figure), so that a broad range of polar and nonpolar, high and low molecular weight compounds can be trapped in a single tube. Each bed protects the next, increasingly active bed, by preventing compounds from being held so strongly that they cannot be desorbed quickly without decomposition. During the purge phase of sampling, lower molecular weight compounds pass through the initial adsorbent beds, but are trapped by succeeding beds. During desorption, the carrier gas passes through the trap in the reverse direction of purge flow, so that higher molecular weight compounds never come in contact with the stronger (innermost) adsorbents.

In selecting adsorbents, the primary concern is the ability of the materials to efficiently trap and release the compounds to be monitored. An adsorbent material that traps and then releases a group of compounds efficiently will help provide high recoveries, sharp peaks, and good resolution, allowing accurate quantification of those analytes. Absence of interference by contaminants or water vapor also is essential for accurate quantification.

VOCARB 3000 purge traps efficiently trap analytes in US EPA Methods 502.2 and 524. Use higher desorption temperatures (250°C) than other traps listed for these methods (180°C), for more rapid transfer of analytes and improved chromatography.

VOCARB 4000 purge traps offer the same general advantages as VOCARB 3000 traps, but can be used with samples containing larger molecular size compounds.

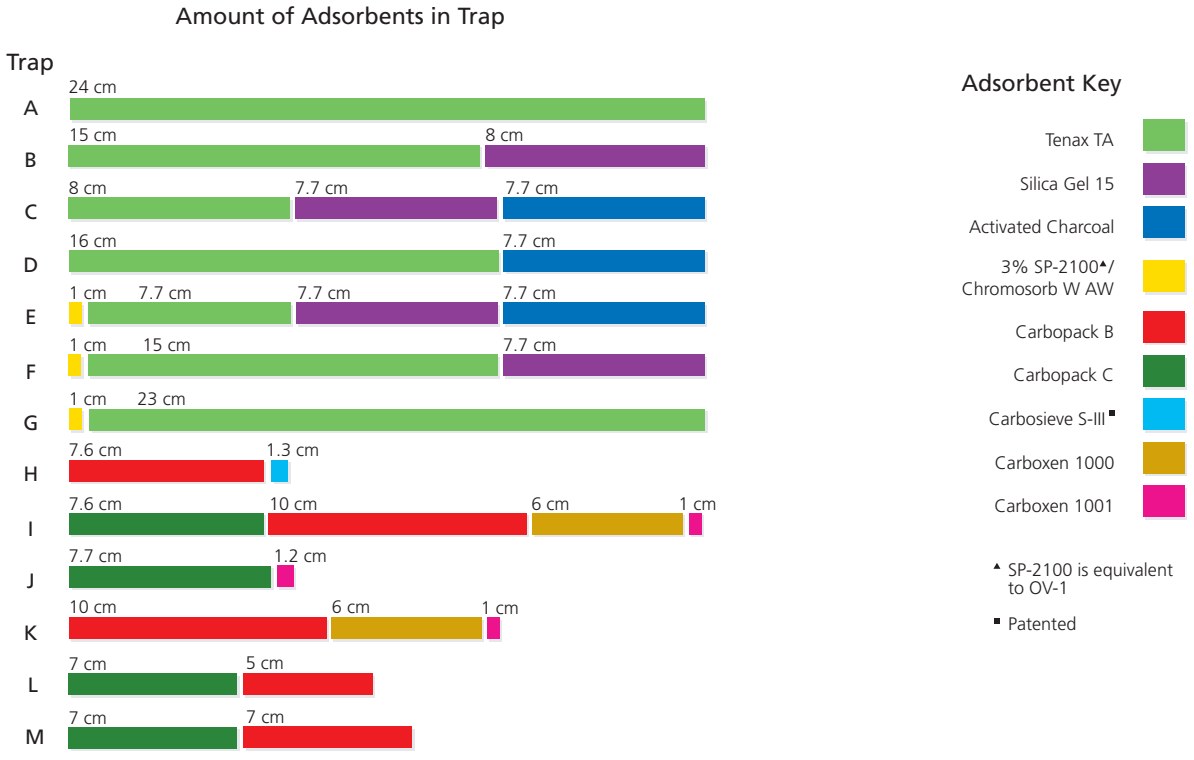
BTEXTRAP purge traps are for analyses of benzene, toluene, ethylbenzene, and xylene. The trap can be baked at high temperatures, making for easier cleanup. Adsorbents in the trap are very stable and do not bleed potentially interfering compounds.

Modified BTEXTRAP purge traps are for analyses of benzene, toluene, ethylbenzene, xylene, and MTBE. Use an M trap for analytes as small as pentane.

VOCARB and BTEXTRAP purge traps contain hydrophobic adsorbents, which significantly reduce the dry purge time needed to remove moisture.

Purge/Trap Apparatus: Manufacturer and Model All traps are constructed of 1/8 in. O.D. stainless steel and each is produced to the instrument manufacturer's specifications. Each trap is stamped with a letter designation for easy identification of contents.

Purge Traps



Purge and Trap

Purge Traps

Vocarb® 4000 Purge Trap I, CDS

Purge/Trap I Vocarb® 4000

for use with CDS Peakmaster

stainless steel purge trap

composition

Carbopack B 10 cm
Carbopack C 8.5 cm
Carboxen 1000 6 cm
Carboxen 1001 1 cm

VOCARB 4000 Purge Trap I

purge trap L ..... 11¼ in. (28.6 cm)

21156	1 ea

Purge/Trap Apparatus: Manufacturer and Model

	Tekmar		OI Analytical		Dynatech	CDS
Trap	Velocity XPT LSC-1, LSC-2, LSC-2000, 4000[1]	3000, 3100[2]	4460[3]	Eclipse 4660, 4560[4]	"Dyna" Models[5]	Peak Master
A	21059-U	24910-U	21135	24930-U	21075-U	21148
B	21060-U	–	–	24931	21076	–
C	21061-U	24912-U	21137	24932	21077	–
D	21062-U	24913-U	21138	24933	–	–
E	20294	24914	21139	24934	21079-U	–
F	20293	24915	21140	–	21080-U	–
G	20295	24916	21141	24936	21081	–
H	20321	24917	21142-U	24937	21082	–
I- VOCARB 4000	20308	24918	21143	24938	21083	21156
J- BTEXTRAP	21064	24919	21145	24939	21084	21158
K- VOCARB 3000	21066-U	24920-U	21131-U	24940-U	21085-U	21159
L- Modified BTEX	20076-U	20078-U	–	–	–	–
M- Modified BTEX	20077-U	20079-U	–	–	–	–

[1]Straight, 12 in./30.5 cm, Swagelok fitting
[2]Straight, 12 in./30.5 cm, Valco fitting
[3]U-shaped, 11.5 in./29.2 cm, attached thermocouple
[4]Coiled, attached thermocouple
[5]Straight, 12 in./30.5 cm, attached thermocouple

Related Information

Ask for our free "Purge and Trap System Guide" (Bulletin 916), with troubleshooting guide.

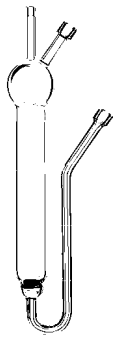
EPA Method	Specified Trap	Supelco-Recommended Trap
502.1	E	I, K (VOCARB 3000)
502.2	E	K
503.1	G	K
524.1	E	K
601	E	K
602	G	J (BTEXTRAP)
603	G	G
624	F	K
1624	F	K
8010	E	K
8015	—	K, J
8020	G	K
8021	G	K
8030	G	G, I (VOCARB 4000)
8031	G	K
8240	E	K
8260	E	K
CLP[6]	B	B

[6]Contract Laboratory Program

Glassware and Accessories

Fritted Purge Samplers for LSC-2 & LSC-3 Concentrators

For standard aqueous analysis.
for use with Tekmar LSC-2 and LSC-3



Description	Cat. No.	Qty
5 mL, product of Tekmar, 14-0042-024	22425	1 ea
25 mL, product of Tekmar, 14-0043-024	22426	1 ea

Purge and Trap

Glassware and Accessories

Fritted Purge Sampler with Injection Port

Optional injection port is built into the glassware, allowing standard injections in either liquid or gas form.

Fritted Sparge Sampler

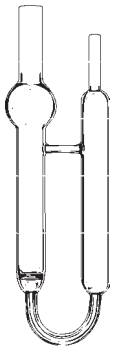
with injection port, 5 mL

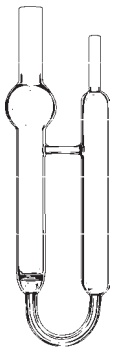
for use with 2000/3000 & Velocity XPT

22783	1 ea

Fritted Purge Samplers for 2000/3000 & Velocity XPT Concentrators

for use with standard aqueous analysis





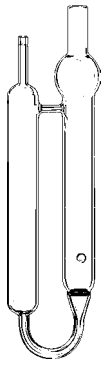
Description	Cat. No.	Qty
5 mL, product of Tekmar, 14-2337-024	22781	1 ea
25 mL, product of Tekmar, 14-2334-024	22789	1 ea

Fritless Purge Sampler Glassware

for use with Tekmar 2000/3000

Description	Cat. No.	Qty
5 mL, product of Tekmar, 14-2336-024	22780	1 ea
25 mL, product of Tekmar, 14-2333-024	22788-U	1 ea
5 mL, with Injection Port	22782	1 ea
25 mL, with Injection Port	22790-U	1 ea

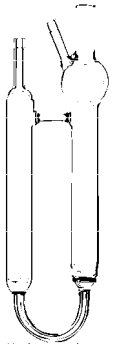
Fritted Purge Samplers for AQUATek™ 50 & 2050 Autosamplers



Description	Cat. No.	Qty
5 mL, right stem, product of Tekmar, 14-3544-124	22742-U	1 ea
25 mL, sparge, left stem, product of Tekmar, 14-6546-024	22745	1 ea
25 mL, right stem, product of Tekmar, 14-3546-124	22744	1 ea

Fritted Purge Samplers for EPA Method 603

Instrument: Aquatek 50 & 2050 Autosamplers
suitable for 603 per US EPA



Description	Cat. No.	Qty
5 mL, top stem, product of Tekmar, 14-4006-024	22748	1 ea
25 mL, top stem, product of Tekmar, 14-4007-024	22749	1 ea

Purge and Trap

Glassware and Accessories

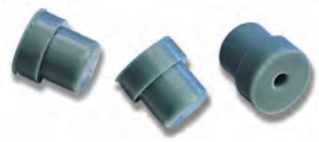
Fritted Purge Samplers for ALS Autosampler

Description	Cat. No.	Qty
25 mL, product of Tekmar, 14-0957-024	22430	1 ea

Septum for Purge Samplers with Injection Port

Thermogreen® LB-1 Septa, cylindrical

For use in Shimadzu GCs that require plug septa, glass gas sampling bulbs, and purge & trap glassware.



septum type cylindrical with half-hole

diam. × L ..... ~6 mm × 9 mm

20668	100 ea

Needle Sparge Glassware, One-Piece Design

for use with Tekmar LSC-2, LSC-3, 4000, and ALS Concentrators

one-piece design ..... Yes

Description	Cat. No.	Qty
5 mL × 6 in., product of Tekmar, 14-2052-024	22724	1 ea
25 mL × 8.25 in., product of Tekmar, 14-2053-024	22725-U	1 ea
5 mL × 5.5 in., short style	22682	1 ea

Glassware for ALS 2016/2032 & Velocity XPT Samplers

Description	Cat. No.	Qty
Needle Purge Tube, 223 mm × 6 mm, product of Tekmar, 14-3913-024	21996	1 ea
Soil Sampler, 150 mm × 19 mm, product of Tekmar, 12-0507-024	22718-U	1 ea

Concentrator Sample Valve

Order female & male luer connectors separately

Description	Cat. No.	Qty
Sample Valve for Tekmar® concentrator, Hamilton Purge and Trap (HVP) plug valve, Distribution flow path, 2 ports, product of Tekmar, 14-0036-050	20971	1 ea
Female Luer Connector, Tekmar® equivalent 14-0216-016, Female Luer connector, product of Hamilton Tekmar®„ 14-0216-016, Kel-F™ (CTFE) fitting, thread, 1/4-28, port diam. 0.059 in.	20942-U	1 ea
Male Luer Connector, Tekmar® equivalent 14-0122-016, Male Luer connector, product of Hamilton Tekmar®„ 14-0122-016, Kel-F™ (CTFE) fitting, port diam. 0.059 in., thread, 1/4-28	20941	1 ea

Purge and Trap Syringes

The Hamilton 1005SLPT is the purge and trap version of the SampleLock syringe designed for analyzing drinking water samples according US EPA purge and trap concentration techniques (EPA methods 502.1, 502.2, 503.1, 524.1, and 524.2).

The Hamilton 1005 TLL and 1025 TLL do not have a valve attachment. Only the Hamilton 1701N comes with a needle - 26s gauge, bevel tip - to be used for standard calibration.

Left to right: Sample Valve (20971), 1005SLPT, 1005TLL, 1701N

Volume	Description	Needle	Needle	Hamilton No.	Cat. No.	Qty
5.0 mL	1005TLL	(not included)	L (n/a)	81520	20999	1 ea
25.0 mL	1025TLL	(not included)	L (n/a)	82520	20683	1 ea
-	1005SLPT	(not included)	volume 5.0 mL	81570	26294	1 ea
10 µL	1701N	26s ga (bevel tip)	L 51 mm (2 in.)	80000	20972	1 ea

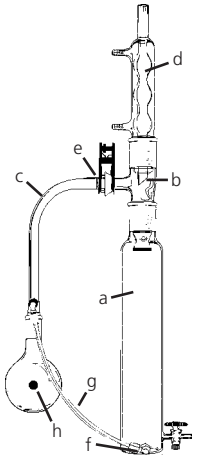
Extraction Glassware

Liquid/Liquid Extraction

US EPA methods specify solvent extraction procedures for semivolatile, pesticide, PCB, and dioxin contaminants in water and hazardous waste samples. Although analysts encounter a wide range of sample matrices and compounds of interest, the various solvent extraction and concentration techniques depend on the same basic principles.

Choice of glassware depends on many factors: sample matrix, analyte characteristics, economy, ease of assembly and cleaning, and compatibility with other glassware. Our selection of glassware includes products for a number of extraction techniques as well as accessories for sample cleanup and solvent recovery. We offer a range of sizes, modular designs for ease of cleaning, and a choice of connector types.

Modular LLE Replacement Components



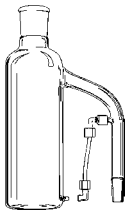
(a) Extraction chamber; (b) Fritted drip spout union; (c) Side arm elbow; (d) Condenser (e) Ball and socket clamp, number 35; (f) Elbow union, PTFE; (g) Tubing, PTFE; (h) Round bottom flask (all components glass, unless noted)

Kit contains items a-h.

Description	Cat. No.	Qty
Drip Spout Union, fritted	64771	1 ea
Extraction Chamber	64770-U	1 ea
Side Arm Elbow	64772-U	1 ea
Condenser, 250 mL	64739	1 ea
Round Bottom Flask, 500 mL	64678-U	1 ea
Stopcock Plug, PTFE	64779-U	1 ea
Elbow Union 1/4 in. × 1/4 in.	64775-U	1 ea
PTFE Tubing 1/4 in. × 13 in.	64776	2 ea
PTFE Sleeve, for use with 24/40 ⧩	64761	5 ea
Plastic Clip, for use with 24/40 ⧩	64764	5 ea

Liquid/Liquid Extractor

Order support base, flask, and condenser separately.

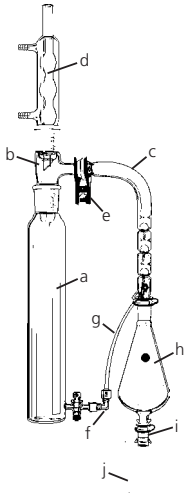


Description	Cat. No.	Qty
Condenser, 250 mL	64739	1 ea
Plastic Clip, for use with 24/40 ⧩	64764	5 ea
Round Bottom Flask, 500 mL	64678-U	1 ea
PTFE Sleeve, for use with 24/40 ⧩	64761	5 ea
PTFE Sleeve, for use with 45/50 ST	64789	2 ea

Extractor-concentrator Kit

Combine extraction and concentration functions in one device - This apparatus provides efficient, continuous extraction of organic compounds from a 1-liter water sample into a heavier-than-water solvent such as methylene chloride. The extracted sample then can be concentrated for analysis.

- Eliminates the need to transfer extracted sample for concentration
- Saves set-up and clean-up time
- Allows recovery of extraction solvent for proper disposal
- Specially designed heating block included (requires heat source)



(a) Extraction chamber; (b) Drip spout union; (c) Side arm elbow; (d) Condenser; (e) Ball and socket clamp, number 35; (f) Elbow union, PTFE; (g) Tubing, PTFE; (h) K-D flask; (i) Receiving flask; (j) Heating block (all components glass, unless noted)

Kit contains items a-j.

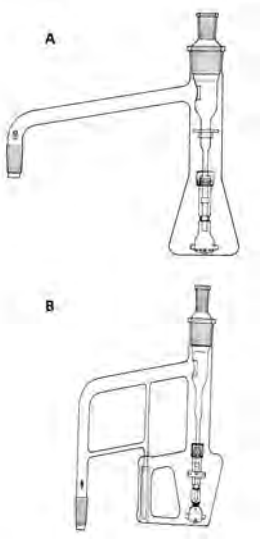
Description	Cat. No.	Qty
Condenser, 250 mL	64739	1 ea
Drip Spout Union	64809-U	1 ea
Extraction Chamber	64808	1 ea
Flask for Kuderna-Danish, 500 mL, ground joint	64710-U	1 ea
Liquid/Liquid Extractor-Concentrator Kit	64807-U	1 ea
Plastic Clip, for use with ST 19/22 ground joint	64763	5 ea
Plastic Clip, for use with 24/40 ⧩	64764	5 ea
Receiving Vessel, 10 mL, ground joint	64695	1 ea
Side Arm Elbow	64810-U	1 ea
Elbow Union 1/4 in. × 1/4 in.	64775-U	1 ea
PTFE Tubing 1/4 in. × 13 in.	64776	2 ea
Liquid/Liquid Heater Block	64811-U	1 ea

Extraction Glassware

Liquid/Liquid Extraction

Normag™ liquid-liquid extractor

A rotating distributor in the extractor vessel is driven by a magnetic stirring plate. The extractor solvent fed from the condenser to the distributor is centrifugally forced through the small holes in the distributor ring as fine droplets into the liquid to be extracted, producing optimum exchange of matter. The liquid to be extracted also rotates in the extractor. The process is continuous and extraction is performed much more quickly than in traditional equipment. The rotary distributor on the inlet tube has a magnetic agitating rod, pivot nipple, bearings, antislip lock and separating ring with retaining ring.



A. Solvents lighter than water
B. Solvents heavier than water

	Cat. No.	Qty
Normag™ liquid-liquid extractor		
capacity 500 mL, For solvents lighter than water	Z124230-1EA	1 ea
capacity 1,000 mL, For solvents heavier than water	Z124249-1EA	1 ea

MIXXOR Liquid-Liquid Extraction Systems

MIXXOR liquid-liquid extraction system

For the quantitative extraction of organics from aqueous solutions and separations in immunoassays. The MIXXOR system has been applied successfully in many laboratory solvent extraction operations and is ideal for the rapid screening of alternative solvents for specific extraction problems. System includes plastic support stand. See the website at sigma-aldrich.com/labware for a listing of replacement parts.

Sample Prep Benefits

- For sample volumes from 2 to 50 mL
- Minimal amount of solvent required
- Rapid, simple-to-use
- Safe, closed system prevents spills
- Precise, allows for easy separation of phases
- Flexible, comes in five sizes and will fit in interlocking stands

The MIXXOR Concept (seven easy steps)

1. Introduce sample and extraction solvent into reservoir A (Fig. 1)
2. Insert mixer-separator piston B into reservoir A, tighten cap S.
3. Pump four or more times to mix (Fig. 2)
4. Pull mixer-separator up slightly above liquid level and secure with holder spacer H. Loosen cap.
5. After separation, slide down the mixer-separator to transfer the upper phase into collection chamber E.
6. Adjust lower phase to top of axial channel C. (Fig. 1 and 3) Use fine adjustment on holder-spacer to secure setting.
7. Top phase can now be decanted safely, while lower phase stays in the axial chamber.

Figure 1 Figure 2 Figure 3

	Cat. No.	Qty
MIXXOR liquid-liquid extraction system		
capacity 2 mL	Z408956-1EA	1 ea
capacity 5 mL	Z408964-1EA	1 ea
capacity 20 mL	Z408980-1EA	1 ea
capacity 50 mL	Z408999-1EA	1 ea

MIXXOR system replacement parts

Description	Cat. No.	Qty
capacity 5 mL	Z420689-1EA	1 ea
capacity 20 mL	Z420972-1EA	1 ea

Extraction Glassware

Separatory Funnel, Soxhlet Extraction

Separatory Funnel, Soxhlet Extraction

Separatory Funnel

Squibb-type, with glass or PTFE stopcock plug.

Description	Cat. No.	Qty
glass stopcock plug, 250 mL	64803-U	1 ea
glass stopcock plug, 2000 mL	64804-U	1 ea
PTFE stopcock, 250 mL	64805-U	1 ea
PTFE stopcock, 2000 mL	64806	1 ea

Thimble

High-purity cellulose, approximately 1.5mm wall thickness, or high-quality borosilicate glass, 40-60µm porous disk.

Description	Cat. No.	Qty
cellulose, 25 mm × 80 mm	64840-U	25 ea
cellulose, 33 mm × 94 mm	64841-U	25 ea
cellulose, 43 mm × 123 mm	64842	25 ea
glass, 25 mm × 85 mm	64836-U	1 ea
glass, 35 mm × 90 mm	64837	1 ea
glass, 45 mm × 130 mm	64838	1 ea

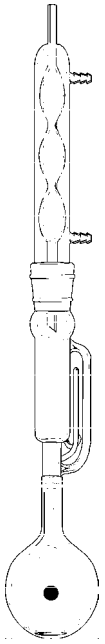
Soxhlet Extraction Apparatus

For continuous solvent extraction of semivolatile analytes from solid matrices.

Use this inert all-glass system for extracting semivolatile compounds from a solid or semi-solid sample matrix - soil, for example - into an organic extraction solvent, such as hexane, acetone, or methylene chloride. The Soxhlet apparatus is simple to set up and use, and it features ground glass joints for easy dismantling and cleaning.

Soxhlet Apparatus Kits

Order glass or cellulose thimbles separately.



Size	Cat. No.	Qty
Soxhlet Extraction Apparatus		
small *extractor volume 50 mL* *extractor I.D. 30 mm* *flask volume 125 mL*	64824	1 ea
medium *extractor I.D. 38 mm* *extractor volume 85 mL* *flask volume 250 mL*	64825	1 ea
large *extractor I.D. 50 mm* *extractor volume 200 mL* *flask volume 300 mL*	64826	1 ea

Soxhlet Apparatus Replacement Components

	Cat. No.	Qty
Condenser		
size small	64815-U	1 ea
size medium	64816-U	1 ea
size large	64817-U	1 ea
Extractor		
size small	64818	1 ea
size medium	64819-U	1 ea
size large	64820-U	1 ea
Flat Bottom Flask		
125 mL	64821-U	1 ea
250 mL	64822-U	1 ea
300 mL	64823	1 ea

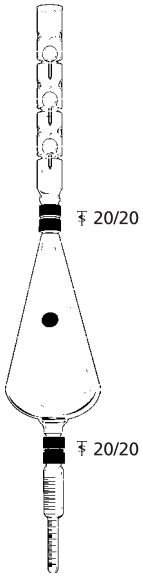
Extraction Glassware

Sample Concentration Apparatus

Sample Concentration Apparatus

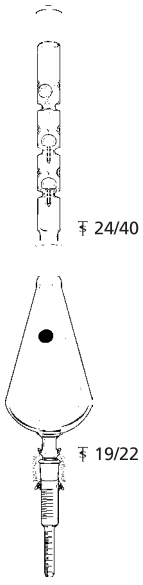
Macro Kuderna-Danish Sample Concentrators

Macro



64704-U

Macro



64685-U

	Cat. No.	Qty
Flask for Kuderna-Danish		
250 mL, threaded joint	64708-U	1 ea
250 mL, ground joint	64729	1 ea
500 mL, ground joint	64710-U	1 ea
500 mL, threaded joint	64706-U	1 ea
Glass Stopper		
Joint: 19/22	64644	1 ea
Kuderna-Danish Sample Concentrator		
Macro design, ground joint	64685-U	1 ea
Macro design, threaded joint	64704-U	1 ea
Receiving Vessel		
4 mL, ground joint	64687-U	1 ea
10 mL, ground joint	64695	1 ea
4 mL, threaded joint	64702	1 ea
10 mL, threaded joint	64703	1 ea
25 mL, threaded joint	64726	1 ea
25 mL, ground joint	64731-U	1 ea
15 mL, ground joint	64684-U	1 ea
15 mL, threaded joint	64707	1 ea
Snyder Column		
2-ball design, ground joint	64727-U	1 ea
3-ball design, ground joint	64693-U	1 ea
3-ball design, threaded joint	64705-U	1 ea

Widely used in semivolatile and pesticide analysis
For US EPA protocol
Developed for concentrating compounds dissolved in volatile solvents
Made in our own glass shop

Macro ground kit (64685-U) includes: 64693-U, 64710-U, and 64684-U.

Macro threaded kit (64704-U) includes: 64705-U, 64706-U, 64707-U, and 64700-U.

Micro Kuderna-Danish Sample Concentrators

Micro

64688-U

Extraction Glassware

Sample Concentration Apparatus

64718

	Cat. No.	Qty
Flask for Kuderna-Danish		
250 mL, threaded joint	64708-U	1 ea
250 mL, ground joint	64719-U	1 ea
40 mL, ground joint	64722	1 ea
40 mL, threaded joint	64698	1 ea
Kuderna-Danish Sample Concentrator		
Micro design, threaded joint	64688-U	1 ea
Micro design, ground joint	64718	1 ea
Receiving Vessel		
4 mL, ground joint	64687-U	1 ea
10 mL, ground joint	64695	1 ea
4 mL, threaded joint	64702	1 ea
10 mL, threaded joint	64703	1 ea
2 mL, ground joint	64723	1 ea
2 mL, threaded joint	64689-U	1 ea
Snyder Column		
2-ball design, ground joint	64694	1 ea
3-ball design, threaded joint	64696	1 ea
3-ball design, ground joint	64720-U	1 ea
0-ball design, ground joint	64721	1 ea

Widely used in semivolatile and pesticide analysis
For US EPA protocol
Developed for concentrating compounds dissolved in volatile solvents
Made in our own glass shop

Micro ground kit (64718-U) includes: 64721, 64722, and 64723.

Micro threaded kit (64688-U) includes: 64698, 64689-U, 64700-U, and 64699-U.

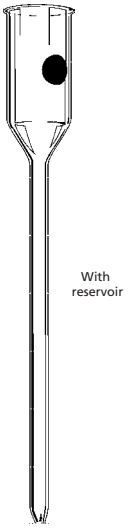
Kuderna-Danish Sample Concentrator Accessories

	Cat. No.	Qty
Micro Connector		
for connecting 13mm to 13mm threaded joint	64699-U	6 ea
for connecting 13mm to 20mm threaded joint	64701-U	6 ea
for connecting 20mm to 20mm threaded joint	64700-U	6 ea
Plastic Clip		
for use with ST 19/22 ground joint	64763	5 ea
for use with 24/40 ⅎ	64764	5 ea
Springs, 1/2 in.		
ground joint	64711	20 ea
PTFE Sleeve		
for use with 24/40 ⅎ	64761	5 ea
for use with ST 19/22 ground joint	64762	5 ea

Sample Cleanup Apparatus

Described in US EPA Protocol - Fill these columns with appropriate adsorbents when cleaning or drying environmental samples for pesticide or priority pollutant analyses.

Column With Reservoir



64747

Column L × O.D. × I.D. (mm)	Cat. No.	Qty
200 × 9 × 7 (280mm overall)	64748	1 ea
200 × 11 × 9 (280mm overall)	64747	1 ea

Column With Coarse Frit

Specialty Glass Column

Features and Benefits

Described in US EPA Protocol - Fill these columns with appropriate adsorbents when cleaning or drying environmental samples for pesticide or priority pollutant analyses.
for use with US EPA Protocol

L × O.D. (mm)	Cat. No.	Qty
300 × 10	64749	1 ea
400 × 22	64750	1 ea
400 × 19	64751	1 ea

Extraction Glassware

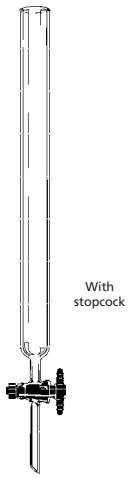
Sample Cleanup Apparatus

Specialty Glass Column

Features and Benefits

Described in US EPA Protocol - Fill these columns with appropriate adsorbents when cleaning or drying environmental samples for pesticide or priority pollutant analyses.
for use with US EPA Protocol

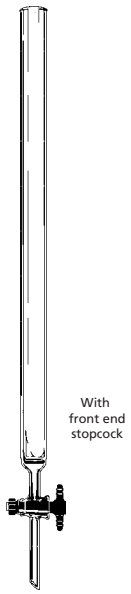
- **PTFE stopcock, column L 300 mm × O.D. 25 mm × I.D. 22 mm, 415mm overall**



64760-U

64760-U	1 ea

Column With Coarse Frit and PTFE Stopcock

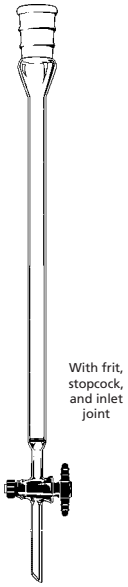


64752

Column L × O.D. × I.D. (mm)	Cat. No.	Qty
300 × 13 × 10.5 (415mm overall)	64752	1 ea
400 × 22 × 19 (515mm overall)	64753-U	1 ea
300 × 25 × 22 (415mm overall)	64754	1 ea
400 × 25 × 22 (515mm overall)	64755	1 ea

Column With Coarse Frit, PTFE Stopcock and Inlet Joint

Replacement PTFE stopcock plug (64779-U)



64756

Column L × O.D. × I.D. (mm)	Cat. No.	Qty
300 × 13 × 10.5 (415mm overall)	64756	1 ea
300 × 25 × 22 (415mm overall)	64758-U	1 ea
400 × 25 × 22 (515mm overall)	64759-U	1 ea

Drying/Cleanup Columns

64785-U

Description	Cat. No.	Qty
Drying Column with Reservoir, 100mm x 19mm x 60mL, Reservoir/Drying design	64785-U	1 ea
Reusable Sample Cleanup Columns, Champagne Design	58099	6 ea
Specialty Glass Column, Miniature Champagne design	58098	10 ea

Extraction Glassware

Sample Cleanup Apparatus

Each of these glass "champagne" columns consists of a reservoir and a stem ending in a ground tip. The reservoir of the large columns (Cat. No. 58099, 160mm long, 36mm I.D., 6mm stem I.D.) is approximately 30mL; minicolumns (Cat. No. 58098, 81mm long, 17.5mm I.D., 3.5mm stem I.D.) have a 4mL reservoir.

Helpful Hints

For materials to use in these columns, see Adsorbents in the index or visit the website at **sigma-aldrich.com/adsorbents**.

Sample Concentration/Extraction Accessories

Static Dilution Bottle

- Two-liter, round-bottom flask with a threaded neck
- Accommodates a Mininert valve

Use the static dilution bottle to prepare gaseous volatile organic standards, using a technique developed by the US EPA for air analyses. Simply inject neat compound through the valve and allow it to vaporize; then withdraw the aliquots using a gas-tight syringe. Multicomponent standards are conveniently prepared and may be stored for at least one week.

21992 cork base not included

Description	Cat. No.	Qty
Static Dilution Bottle w/ Mininert® Valve	21992	1 ea
Septum inserter for Mininert® Valve, Tool for inserting septa	33311	1 ea
Replacement septa for Mininert® valves, Replacement Mininert Septa, L 0.308 in. × O.D. 0.125 in.	33310-U	50 ea
Mininert® Valve, screw thread, for use with 24/400 mm thread	33304	12 ea

Liquid/Liquid Extraction Flasks

Heat resistant borosilicate glass flasks, excellent for extracting trihalomethanes from drinking water. Also useful for collecting samples, preparing solutions, derivatization reactions, extractions, and many other applications.

Left to right: 64715, 64716-U

Description	Cat. No.	Qty
Mininert® Valve, screw thread, for use with 20/400 mm thread	33303	12 ea
Screw Top Mini Flask with Hole Cap and Septum, 10 mL	64715	12 ea
Screw Top Mini Flask with Hole Cap and Septum, 25 mL	64716-U	12 ea
Septa, tan PTFE/silicone, white tan PTFE/silicone, diam. 18 mm × total thickness 0.060 in. × PTFE thickness 5 mil, for use with 22 mL vial	27177	100 ea

Glass Marking Pen

Writes on virtually any surface, even glass, without fading or smearing. The 0.33mm fineline marker uses a permanent oilbased black ink that is waterproof, and fade and bleed resistant.

64800-U	1 ea

Liquid/Liquid Heater Block

Order hot plate separately.
for use with Liquid/Liquid Extractor-Concentrator Kit

64811-U	1 ea

Extraction Glassware

Custom Glassware Fabrication

Custom Glassware Fabrication

If you need a unique creation to fit a special job, just let us know about it. We can make a one-of-a-kind piece of apparatus or meet any other unusual request. We will be pleased to provide you with a quote on custom glassware. All we need is a dimensional drawing or sketch, details of any special design requirements, and your name, address, and phone number.

Eliminate Analyte Adsorption and Decomposition—have us deactivate your glassware and containers

High concentrations of silanol groups (Si–O–H) on untreated glass surfaces can catalyze decomposition of unstable compounds or adsorb polar compounds through hydrogen bonding. Quantitative analyses of these sensitive compounds become unreliable: recoveries are reduced and analyses can be complicated by decomposition by-products.

Our elevated temperature organosilanization process derivatizes many of the surface groups, creating a more inert surface. Remaining active groups are shielded from contact with the chemicals in the container. Sigma-Aldrich has approved our process for their demanding biological products; we use it to treat the containers for all of our quantitative standards.

Our process is environmentally friendly – it does not require solvents for diluting the silanization reagent or rinsing the deactivated surface, and an elaborate trapping system confines the reagent vapors. The process also is highly mechanized, making the cost very reasonable.

We offer our deactivation treatment for all of your glassware, vials, and other glass storage containers. Simply send us your glassware – or request silanol deactivation when you purchase Supelco glassware. We will have a quote to you within two days. If you wish, we can provide a certificate of treatment with your deactivated glassware.

Glassware Repairs — save up to 75% of the cost of replacement

Our staff of talented and experienced glassblowers will consider any glass repair job, regardless of size or complexity. Just ask, and within two days (normally) we will give you our repair quotation. You can save as much as 75% compared to the cost of a new purchase.

If you do not agree the savings are worthwhile, your package will be returned. Your only cost will be to pay the return shipping charges.

Important Note About Glass Item Repairs

Some glass items shipped to us for repair are damaged during shipment. Original damage also can be a result of extensive heating and cooling during use. Items damaged in these ways may be deemed unrepairable and, at your option, will be returned in their existing condition. **There will be no charge for examining these items – you pay the return postage only.** Supelco cannot assume responsibility for any such damage, nor for further damage while attempting to repair the item; nor will we replace the item.