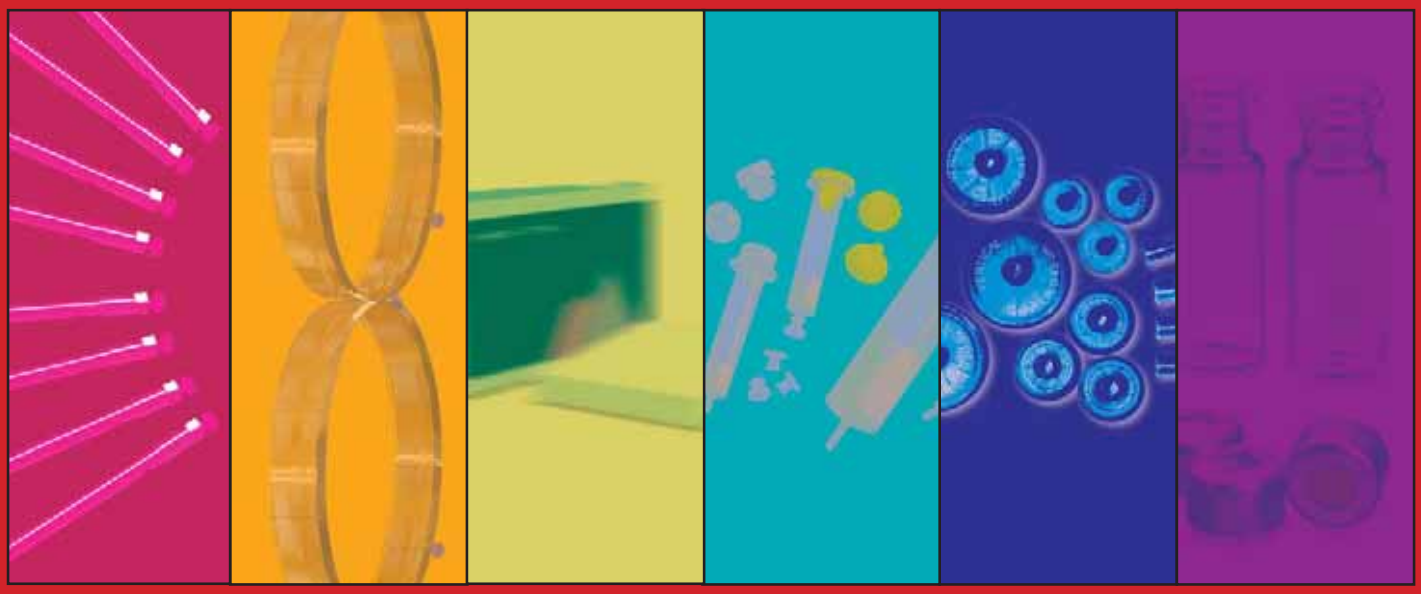

CHROMATOGRAPHY

HPLC Columns and Accessories
GC Columns and Accessories
TLC Plates and Accessories
Sample Extraction Products
Filtration Products and Accessories
Vials and Accessories
Instrument Parts and Supplies

VERTICAL®

Catalog # 007
2013/2014

Welcome to Vertical® Chromatography Catalog # 007, 2013/2014. This catalog provides a comprehensive resource for users needing chromatography products and applications. This catalog contains 7 categories; HPLC, GC, TLC, Sample Extraction, Filtration, Instrument parts/supplies and Vials with introduction, products selection guide, product informations, applications, and ordering informations.

We would like to thank you for your interest in our Vertical® products. Please feel free to contact our customer service team for inquiries, orders, technical problems and more application supports.

Vertical Chromatography Co., Ltd. Trademarks

The following trademarks and referring to herein are the best value chromatography products that we are very proud to manufacture for customer satisfaction.

Vertical®	Registered trademark
VertiSep™	HPLC Columns
VertiBond™	GC Capillary Columns
VertiPlate™	TLC plates
VertiPak™	SPE Tubes and Cartridges
VertiPure™	Certified Syringe filters
VertiClean™	Syringe filters
VertiFlash™	Silica or Alimina for FLASH Chromatography

Trademarks of Other Manufactures

The following trademarks and referring to herein are the high quality products that we also offer or correspond with.

AmyCoat™	EKA Chemicals
AT™	Grace Discovery Science, Inc.
BP™	SGE International Pty. Ltd.
BPX™	SGE International Pty. Ltd.
Carbograph™	Lara Scientific S.r.l.
Carbowax®	Union Carbide Corp.
ChiralCel™	Daicel Corporation
ChiralPak™	Daicel Corporation
CP-Al2O3™	Agilent Technologies Inc.
CP-Molseive	Agilent Technologies Inc.
CP-PoraPLOT	Agilent Technologies Inc.
CP-Sil™	Agilent Technologies Inc.
CP-Select™	Agilent Technologies Inc.
CP-Wax™	Agilent Technologies Inc.
CelluCoat™	EKA Chemicals
DB™	Agilent Technologies Inc.
EC™	Grace Discovery Science, Inc.
Equity™	Sigma-Aldrich
Florisil®	U.S. Silica Company
GS-Alumina™	Agilent Technologies Inc.
HP™	Agilent Technologies Inc.
HT™	Sigma-Aldrich
Hypersil®	Thermo Hypersil Limited Company
Kromasil®	EKA Chemicals
MDN™	Sigma-Aldrich
MET™	Agilent Technologies Inc.
MXT®	Restek Corp.
Nukol™	Sigma-Aldrich
OmegaWAX™	Sigma-Aldrich
OV®	Ohio Valley Specialty Chemical, Inc.
PTE®	Sigma-Aldrich
Rt-Alumina™	Restek Corp.
Rt-Msieve™	Restek Corp.
Rt-Q™	Restek Corp.
Rtx®	Restek Corp.
SAC	Sigma-Aldrich
SE™	General Electric Co.
Simplicity™	Sigma-Aldrich
SPB™	Sigma-Aldrich
Spherisorb®	Water Corporation
SP™	Sigma-Aldrich
Stabiwax®	Restek Corp.
SUPELCOWAX®	Sigma-Aldrich
Supel™	Sigma-Aldrich
Tygon®	Norton Company
ULTRA™	Agilent Technologies Inc.
Ultron®	Shinwa Chemicals
Waters®	Waters Corporation
Zebron™	Phenomenex, Inc.
µBondapak®	Waters Corporation

Table of Contents

About Us

Corporate Information

Vertical Chromatography Co.,Ltd. in Bangkok, Thailand is a privately owned company found in 2004. We are dedicated in manufacturing and supplying chromatography products to the chromatography world market.

Our products include
- HPLC columns and accessories,
- GC columns and accessories,
- TLC plates and accessories,
- Sample extraction products and accessories,
- Filtration products and accessories,
- Vials and accessories

Vertical Chromatography is an ISO 9001 certified company. We are committed to high standard of improvement in our company and in the products we manufacture or supply.

With our high quality products, competitive pricing and excellent technical and application support contribute to Vertical Chromatography quick growth and the territory was expanded through the global network.

By early 2012, we have started a second plant in Ho Chi Minh City, Vietnam in the name Vertical Chromatography Vietnam for sample preparation products and HPLC columns to serve increasing needs by the quick economic growth among the ASEAN countries.

We can offer a wide range of products to meet your chromatography needs from sample preparation to analysis in variety of fields e.g. pharmaceuticals, foods, drugs, chemicals, petrochemicals, environmental, natural products, biotechnolgy and etc.

We are also very proud of our full technical or application support and guarantee for customer satisfaction. We are willing to customize our products to meet any specific requirement of our customers.

Supports

Technical Support

Our technical support team will assist you for most suitable products to meet your application and your budget.

Application Support

Our application support team will support you the application to ensure the product works with you requirement. We are committed to long-term customers relationship and our application specialists are ready to support your requirements.

Application Database

Vertical®'s application database for HPLC columns, GC capillary columns and SPE method procedure for 20,000 analytes can be found on our website **www.vertichrom.com.** This application database provides you with access to a numbers of application notes with condition and chromatogram. You can :

- Browse through our extensive application notes.
- Search for compounds in application notes.
- Filter your search criteria by compounds, fields of application
- Print or save as PDF files

Vertical®'s guarantee

If our products do not perform as well or better than your current products in similar characteristics, send in your comparative data within 45 days and keep the products for FREE.

HPLC Columns

New!

VertiSep™ Integral page# 12

- New Core-Shell 2.6µm particle
- Ultra-high resolution like sub-2µm columns
- Faster separation like sub-2µm columns
- Lower back pressure than sub-2µm columns
- Compatible with exsisting HPLC or LC/MS

New!

VertiSep™ pHendure page# 16

- New Hybrid particle of silica and polymer
- long lifetimes below pH 2 (Low pH stability)
- long lifetimes above pH 8 (high pH stability)
- Long life time at high temperatures(stability of hybrid particle)
- Low bleed, ideal for both LC-MS and routine HPLC method development (stability of hybrid particle)

Best Seller

VertiSep™ UPS HPLC Columns page# 20

- Ultra performance with excellent stability, efficiency and column-to-column reproducibility
- Ultra-high surface area of silica offers high resolution for gradient elution of difficulty separation compounds
- Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes
- Phases available: C18, C8, Ph, CN, Si, HILIC and PFP

Best Value

VertiSep™ GES HPLC Columns page# 54

- High purity silica offer high stability, efficiency, reproducibility
- Moderate pore size and surface area are perfect for general purpose
- Polymeric bonding offers high stability and longer lifetime
- Phases available: C18, C8, Ph, C4, CN, NH2, Si, SAX and SCX
- Economy price

Best Seller

VertiSep™ BDS HPLC Columns page# 44

- Highly base deactivation for basic compounds while offers superior efficiency for neutral and acidic compounds
- An exellent alternative to Hypersil® BDS
- Excellent column-to-column reproducibility
- Phases available: C18, C8, Ph and CN

Best Seller

VertiSep™ SUGAR, OA HPLC Columns page# 84

- Polymer based columns for mono-, di-, polysaccharides sugar alcohols, organic acids, fatty acids and alcohols
- Wide pH stability
- Excellent efficiency and resolution
- Reproducibility lot-to-lot and column-to-column

HPLC Accessories/Parts

Fittings page# 114
Unions page# 115
Tubings page# 116

Injection valves page# 120
Switching valves page# 122
Sample Loops page# 125

Standalone vacuum degassors page# 128

New!

New!

Solvent recyclers
page# 129

Manual syringes page# 130
Autosampler syringes
page# 131

New!

Instrument parts page# 134

- Agilent
- Beckman
- Hitachi
- Jasco
- PerkinElmer
- Shimadzu
- Thermo
- Varian

Featured Products

GC Capillary Columns

VertiBond™ ms Capillary Columns

- **Ultra performance with low bleed columns for MS applications**
- **Individually tested columns**
- **Exellent peak shape**
- **Increased sensitivitye**
  - VertiBond™ 1ms page# 160
  - VertiBond™ 5ms page# 166
  - VertiBond™ 17ms page# 169
  - VertiBond™ 35ms page# 175
  - VertiBond™ WAXms page# 185

VertiBond™ Capillary Columns

- **High performance for general applications**
- **Individually tested columns**
- **Exellent peak shape**
- **Industry standard stationary phases**
  - VertiBond™ 1, 1ht page# 156
  - VertiBond™ 5, 5ht page# 162
  - VertiBond™ 17, ht page# 168
  - VertiBond™ 20 page# 171
  - VertiBond™ 35 page# 173
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  - VertiBond™ 1301 page# 179
  - VertiBond™ 1701 page# 181
  - VertiBond™ WAX, AqWAX page# 183
  - VertiBond™ Silar90 page# 188
  - VertiBond™ PLOT MoleSieve, Q, Alumina page# 189

GC Packed Columns

Packed Columns page# 192

- **Economical, excellent performance SS columns**
- **Packed with various packing materials**
- **Individually tested columns**
- **Custom-made columns and packings**

Solid Supoort and Liquid Phases page# 200

- **Most materials are available from stocks**
- **Specific materials can be customized**

GC Accessories/Parts New!

Tubings page# 219
Fittings page# 220
Tubing Cutters page# 219

Manual Syringes

- Microliter page# 223
- Microvolume page# 224
- Gas-Tight page# 225
- Needle page# 226

Gas Purifiers page# 228

Gas Sampling Bags page# 236

Instrument Parts page# 245

- Agilent
- Varian
- PerkinElmer
- Thermo
- Shimadzu

Autosampler Syringes

Septum Nuts

Merlin Microseal Nuts

Injection Liners

Inlet Seals

Ferrules

Septa

TLC Plates

VertiPlate™ TLC Plates

- **High purity adsorbents for increased sensitivity**
- **Narrow particle size distribution for faster separations and improved resolution**
- **Plate formats are available as prescored, prechanneled and preadsorbent**
- **Plate sizes are available in 20x20cm, 10x20cm and 5x20cm**
- **Adsorbents are available with or without Fluorescent Indicator**
  - VertiPlate™ Soft-layer page# 279
  - VertiPlate™ Inorganic Hard-layer page# 280
  - VertiPlate™ Organic Hard-layer page# 281
  - VertiPlate™ Specialty Silica page# 282
  - VertiPlate™ Non-Silica page# 283
  - VertiPlate™ HPTLC Unbonded-Silica page# 284
  - VertiPlate™ HPTLC Bonded-Silica page# 285
  - VertiPlate™ Prep TLC page# 286
  - VertiPlate™ Plastic & Aluminum Backed TLC page# 287

TLC Accessories

Sample Application page# 288

- Drummond Microcaps
- Drummond Wiretrol

TLC Developing page# 289

- Rectangular TLC tanks, availbale in 10x10cm, 10x20cm and 20x20cm with lid or latch-lid
- Round Developing jar, available in 5x10cm and 5x20cm with or without side-port
- Saturation pads for rapid vapour saturation, available in 10x10cm, 10x20cm and 20x20cm

TLC Visualization page# 290

- Reagent sprayer, available in 10mL, 50mL, 125mL and 250mL
- UV viewing cabinet with built-in UV window, for TLC plates upto 20x20cm
- UV lamps provide combination of short wavelength 254nm and long wavelength at 365nm, available in 4W, 6W and 8W

Solid Phase Extraction, SPE

VertiPak™ SPE

- **High purity adsorbents for increased recovery**
- **Lot-to-lot reproducibility**
- **Includes Certificate of Analysis**
- **Application supports**
- **Tube format is available in 7 tube sizes.**
- **Most phases are avilable**
  - Reversed Phase Phases includes: page# 288
    C18, C8, C4, C2, C1, CH and PH
  - Normal Phase Phases includes: page# 310
    Si, NH2, CN, Diol, PSA, DEA, FL, FL-PR, Alumina
  - Ion-Exchange Phases includes: page# 319
    SCX, SCX-2, SAX, CBA and PSA
  - Special Phase includes: page# 325
    Hydrophilic polymer New!
    Carbograph
    Mixed-Mode phase
    2-Layers phase

Vacuum Manifold page# 346

- 12- and 24-Port Manifolds
- Glass Chamber for Visual Monitoring
- Accepts Standard Male Luer Devices

Liquid-Liquid Extraction, LLE

New!

VertiPak™ LLE page# 338

- Hight purity Diatomaceous earth to yield accurate results
- Pre-packed extraction tubes are ready-to-use
- Available in various tube size and bed weight

FLASH

New! page# 340

VertiFlash™ Silica and Alumina

- Ultra-pure to guarantee uniformity and reproducibility
- Minimal fines with no impediments to flow, separations occur quickly with no loss of chromatographic performance.
- Wide range of mesh sizes allows for excellent flow rates.

QuEChERS

New!

VertiPak™ DQ page# 342

- New Method for Multi-Residue Pesitcides
- Hight purity packings to yield accurate results
- Pre-packed extraction kits and dispersive SPE kits are assembled to suit specific food types and screening protocols

Featured Products

Filtration

VertiPure™ Syringe Filters Best Seller

- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**
- **Sizes are available in 4mm, 13mm, 17mm and 25mm**
- **Membrane pore sizes are 0.2µm and 0.45µm**
- **Most membranes are available to meet the applications**
  - VertiPure™ Nylon page# 352
  - VertiPure™ PTFE page# 353
  - VertiPure™ PVDF-HL page# 354
  - VertiPure™ Cellulose Acerate page# 355
  - VertiPure™ Regenrated Cellulose page# 356
  - VertiPure™ PP page# 357
  - VertiPure™ PES page# 358
  - VertiPure™ MCE page# 359
  - VertiPure™ GMF page# 360
  - VertiPure™ X2G page# 361 New!
    2-layer Glass microfiber and membrane of choices

VertiClean™ Syringe Filters Best Value

- **Economy Price**
- **Size are available in 13mm and 25mm**
- **Membrane pore sizes are 0.2µm and 0.45µm**
- **Geneal membranes are available for general applications**
  - VertiClean™ Nylon page# 362
  - VertiPure™ MCE page# 363
  - VertiClean™ PTFE page# 364
  - VertiClean™ PVDF-HB page# 365
  - VertiClean™ Cellulose Acerate page# 366

Membrane Filters page# 367

- Economy Price
- Size are available in 13mm, 25mm and 47mm
- Membrane pore sizes are 0.2µm and 0.45µm
- Membranes are available for both aqueous and organic samples/solvents; Nylon, MCE, PVDF-HL, Cellulose Acetate, PTFE and PVDF-HB

Solvent Filtration Apparatus page# 369

- Made of 100% borosilicate glass
- Ideal for vacuum filtration of liquids and degassing of HPLC solvent

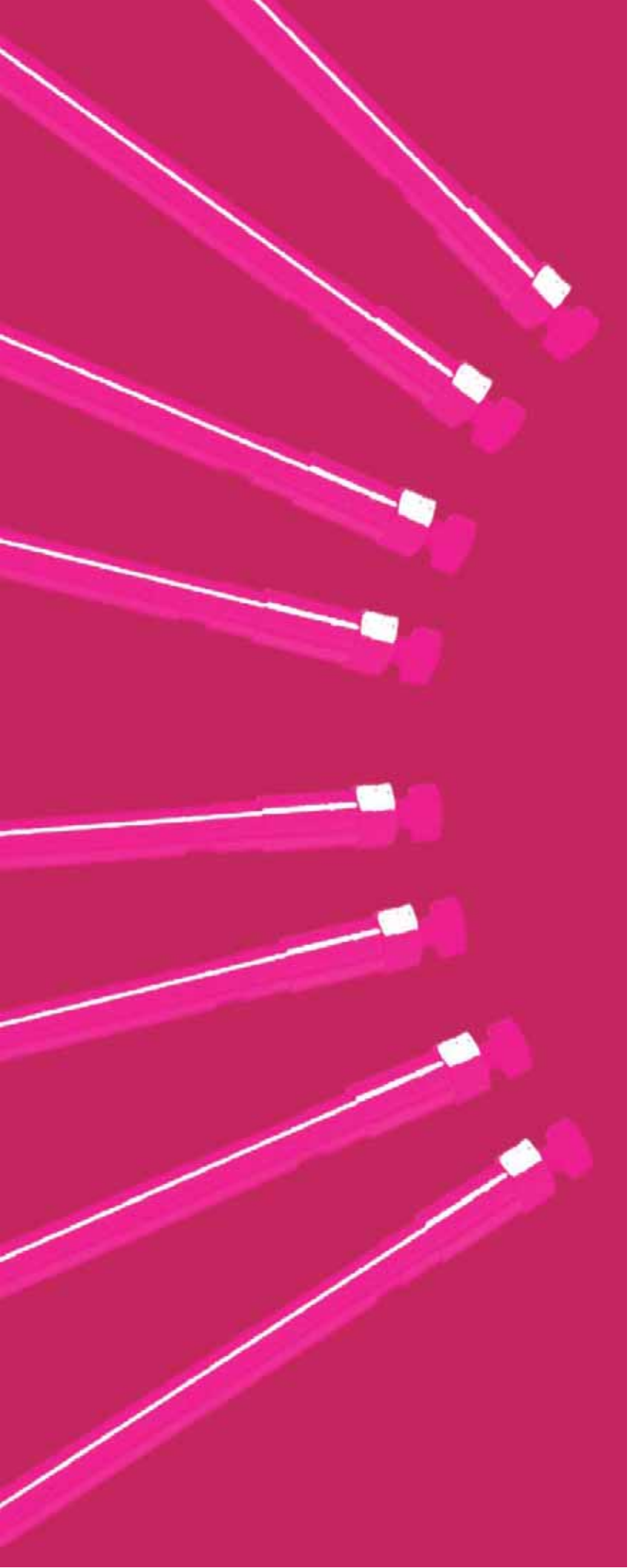
Vacuum Pump page# 369

- Oiless operation
- Motor mounted
- Rugged construction/low maintenance

Vials New!

- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Glass vials are available with or without spot
- Caps are available in screw-tread, and crimp style
- Inserts are available for microliter volume requirement
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Most sizes are available to compat with most autosamplers

- 8x40mm Shell Vials page# 374
- 12x32mm Screw Thread Standard Mouth Vials page# 375
- 12x32mm Screw Thread 9mm Mouth Vials page# 376
- 12x32mm Screw Thread Wide Mouth Vials page# 377
- 12x32mm Crimp Top Standard Mouth Vials page# 378
- 12x32mm Crimp Top Wide Mouth Vials page# 379
- 12x32mm Snap/Crimp Wide Mouth Vials page# 380
- 15x45mm Screw Thread Vials page# 381
- 15x45mm Snap/Crimp Vials page# 382
- Crimp Top Headspace Vials page# 383
- Screw Thread Headspace Vials page# 384
- EPA Vials page# 385
- Storage Vials page# 386
- Culture Tubes page# 386
- Crimpers and Decappers page# 387
- Vial Racks page# 388



HPLC Columns

Introduction

Packing materials

Base Materials

Silica-based packings are compatible with a wide range of aqueous and organic solvents. Silica-based column can withstand high pressure. Most silica are stable from pH 2-7.5 but special silica may stable from pH 1-10. Silica provides high resolution or sharp peaks with small molecules. Silica-based column are offen used for separations of low molecular weight analytes.

Polymer-based packings are compatible with most mobile phase solvents and sample with a pH 1-14. Polymer-based packing have lower efficiencies for a small molecules compared to silica-based due to smaller surface area. Polymer-based packings are offen used for ion exchange or ion exclusion chromatography.

Particle Size

Standard particle size is 5 mm. Smaller particle sizes give higher efficiency and higher resolution than larger particle sizes. Larger particle sizes offer faster flow rates and lower back-pressure.

Pore Size

In general, packing materials with a smaller pore size have higher surface areas and higher capacities than packing materials with larger pore sizes. For general purpose reverse phase application, pore size 100-120Å is recommended. For higher resolution, pore size 60-80Å is recommended. For large molecule such as proteins, pore size 300Å is recommended.

Surface Area

A larger surface offers higher capacity and greater resolution. Smaller surface areas equilibrate faster.

Phase Type

There are 2 types of bonding, polymeric and monomeric. Polymeric bonding offers better column stability under aggressive mobile phase. Monomeric bonding offers lower back pressure. However, high-purity silica phases are very stable whether monomeric or polymeric bonding.

Endcapping

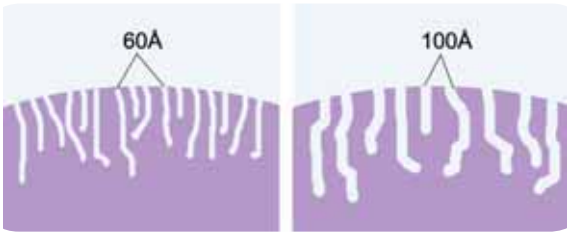
Free silanol in silica-based reversed-phase packings will interact with polar compounds. Endcapping the bonded phase with C2-C4 will minimizes these interactions. However, non-endcapped phases enhance polar selectivity and stronger retention of polar organic compounds.

Carbon Load

Lower carbon loads are more weakly hydrophobic and reduce retention times. Higher carbon load offer higher capacity and greater resolution.

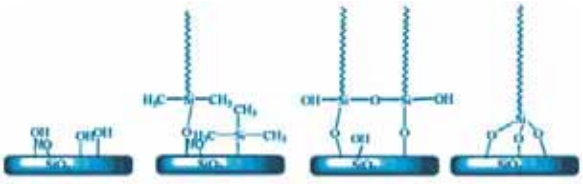
Polymer packing, 10µm

Silica packing, 5µm



Silica 60Å pore size

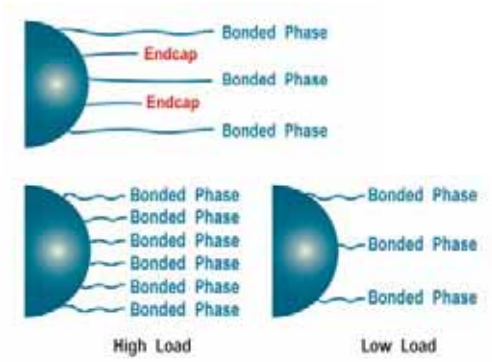
Silica 100Å pore size



Silica Surface

Monomeric bonding

Polymeric bonding



Column Formats

Column Length

Shorter columns offer faster run times. Longer columns offer greater resolution. 10-50mm length is recommended for fast separations, method development. 150mm length is recommended for general separations. 250mm length is recommended for high resolution separations.

Column i.d.

The standard column i.d. is 4.6mm. Narrower columns allow smaller sample sizes, and reduce mobile phase flow rates. Wider columns allow for larger sample sizes and minimize the system's dead volume.

HPLC Column Formats

Vertical® offers HPLC columns in several different formats for different applications.

A. Analytical Columns – 50 to 300mm lengths, 4.6mm i.d.

B. Short Columns – 10 or 50mm lengths, 4.6mm i.d.

C. Narrow-Bore Columns – 50 to 300mm lengths, 3.0mm i.d.
Smaller i.d. significantly reduces solvent usage. Compatible with both APCI and ESI.

D. Capillary and LC/MS Columns – 50 to 300mm lengths, 150mm-2.1mm i.d.
Small-bore columns compatible with LC/MS instrumentation.

E. Preparative Columns – 50 to 300mm lengths, 7-50mm i.d. High volume and mass loading capacity.

F. PEEK Columns – 50 to 300mm lengths, 2.1, 4.6mm i.d. Complete Bio-compatibilty and IC applications

G. Guard Cartridges – 7.5mm length 2.1, 3.2, 4.6mm i.d. The Guard System has disposable cartridges for quick and easy replacement.

Introduction

VertiSep™ Families

VertiSep™ columns are manufactured to the highest standards of quality and reproducibility with our technical expertise for the best columns, the best applications and the best technical support.

VertiSep™ families include both silica-based and polymer-based for reversed-phase, normal-phase, HILIC, ion-exchange and ion-exclusion chromatography.

To help select the appropriate column for your application, we describe key column families and highlight unique phases within these families. The most important factor is analysis speed, column bleed, pH stability, resolution and selectivity, VertiSep™ families offer you a column to suit your application.

VertiSep™ Families	Characteristics	Applications
Silica-Based		
VertiSep™ Integral	• New 2.6µm Core-Shell particle • Fast analysis • Ultra-high resolution > 200,000 • Compatible with Standard HPLC	• Compounds required gradient separation • Fast applications • high resolution applications by standard HPLC
VertiSep™ pHnedure	• Hybrid particle • Long life outside pH 2-8 • Low bleed for LC/MC	• Compounds required acidic mobile phase • Compounds required basic mobile phases • LC/MS applications
VertiSep™ UPS	• Premium quality columns, MS compatible • Ultra-high pure silica eliminates column bleeds and peak tailing for acidic or basic compounds • High surface area offers high performance	• Compounds required gradient separation • Compounds that are difficult to separation like basic drugs, organic acids and polar compounds
VertiSep™ AQS	• Stable from 100% organic to 100% aqueous • No phase collapse • Long column life	• Hydrophilic or polar compounds like biomolecules, metabolites, oligosaccharides, amino acids, small peptides, nucleotides and organic acids.
VertiSep™ HCS	• Highest carbon loading silica-based column for highest degree of hydrophobicity • Long column life for aggressive mobile phases	• Organic compounds that have similar structures • Nucleosides, Nucleotides, Alkaloids
VertiSep™ BDS	• Base-deactivated silica eliminates silanol effect and peak tailing for basic compounds • Direct replacement of Hypersil® BDS at lower price	• Basic drugs
VertiSep™ EPS	• Polar-enhanced silica-based columns • Unique selectivity for palar analytes	• Basic drugs, Polar organics • Positional isomers
VertiSep™ BIO	• Large-pore phases for large molecules	• Life science and proteomic applications.
VertiSep™ GES	• Broad pH stability and high efficiency • Economic price	• General applications • Preparative applications
VertiSep™ IRS	• Irregular silica-based columns • The alternative to Waters® µBondapak™	• General applications • Preparative applications
VertiSep™ MMS	• Multifuctional silica-based columns	• Specific application recommended by USP.
VertiSep™ SPS	• Spherical silica-based columns • The alternative to Waters® Spherisorb®	• General applications
Polymer-Based		
VertiSep™ PRP	• Polymer-based columns	• Applications at pH range from 1-14
VertiSep™ SUGAR	• Cationic cross-linked PSDVB columns for ion-exchange chromatography	• Sugars or carbohydrates using only water as mobile phase
VertiSep™ OA	• Hydrogen ionic cross-liked PSDVB columns for ion-exclusion chromatography	• Organic acids and alcohols
VertiSep™ IC	• Hydrophilic copolymer columns for anion or cations by ion-exchange chromatography	• Strong anions, weak anions • Moni-, divalent cations, transition metals and organic amine ions

VertiSep™ Packings Specification

Packings	Base Material	Particle Shape	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	Phase Bonding	End Capped	USP L-Code
Silica-Based Packings										
VertiSep™ Integral										
C18	Core-Shell	Spherical	2.6	13	100	-	130	Monomeric	Yes	L1
C8	Core-Shell	Spherical	2.6	7	100	-	130	Monomeric	Yes	L7
PFP	Core-Shell	Spherical	2.6	-	100	-	130	-	No	L43
VertiSep™ pHendure										
C18	Hybrid	Spherical	2.5, 5	14	100	-	350	Monomeric	Yes	L1
Phenyl-Hexyl	Hybrid	Spherical	2.5, 5	12	100	-	350	Monomeric	Yes	L11
VertiSep™ UPS										
C18	Totally Porous	Spherical	3,5,10	17	100	1.1	450	Monomeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	9	100	1.1	450	Monomeric	Yes	L7
Ph	Totally Porous	Spherical	3,5,10	9.5	100	1.1	450	Monomeric	Yes	L11
CN	Totally Porous	Spherical	3,5,10	4	100	1.1	450	Monomeric	No	L10
Si	Totally Porous	Spherical	3,5,10	-	100	1.1	450	-	No	L3
HILIC	Totally Porous	Spherical	3,5,10	-	100	1.1	450	-	No	L3
PFP	Totally Porous	Spherical	3,5,10	-	100	1.1	450	-	No	L43
VertiSep™ AQS										
C18	Totally Porous	Spherical	3,5,10	15	120	1.0	300	Monomeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	8	120	1.0	300	Monomeric	Yes	L7
Ph	Totally Porous	Spherical	3,5,10	7	120	1.0	300	Monomeric	Yes	L11
CN	Totally Porous	Spherical	3,5,10	4	120	1.0	300	Monomeric	No	L10
NH2	Totally Porous	Spherical	3,5,10	3	120	1.0	300	Monomeric	No	L8
Si	Totally Porous	Spherical	3,5,10	-	120	1.0	300	-	No	L3
Diol	Totally Porous	Spherical	3,5,10	-	120	1.0	300	Monomeric	No	L20
VertiSep™ HCS										
C18	Totally Porous	Spherical	3,5,10	23	100	1.0	350	Polymeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	13	100	1.0	350	Polymeric	Yes	L7
Ph	Totally Porous	Spherical	3,5,10	8	100	1.0	350	Polymeric	Yes	L11
C4	Totally Porous	Spherical	3,5,10	6	100	1.0	350	Polymeric	Yes	L26
C N	Totally Porous	Spherical	3,5,10	4	100	1.0	350	Polymeric	Yes	L10
VertiSep™ BDS										
C18	Totally Porous	Spherical	3,5	11	140	0.6	150	Monomeric	Yes	L1
C8	Totally Porous	Spherical	3,5	6	140	0.6	150	Monomeric	Yes	L7
Ph	Totally Porous	Spherical	3,5	5	140	0.6	150	Monomeric	Yes	L11
CN	Totally Porous	Spherical	3,5	4	140	0.6	150	Monomeric	Yes	L10
VertiSep™ EPS										
C18	Totally Porous	Spherical	3,5,10	11	100	1.1	450	Monomeric	No	L1
C8	Totally Porous	Spherical	3,5,10	6	100	1.1	450	Monomeric	No	L7
Ph	Totally Porous	Spherical	3,5,10	5	100	1.1	450	Monomeric	No	L11
CN	Totally Porous	Spherical	3,5,10	4	100	1.1	450	Monomeric	No	L10
Si	Totally Porous	Spherical	3,5,10	-	100	1.1	450	-	No	L3
VertiSep™ BIO										
C30	Totally Porous	Spherical	3,5,10	20	200	1.1	200	Monomeric	Yes	L62
C18	Totally Porous	Spherical	3,5,10	8	300	0.9	100	Monomeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	6	300	0.9	100	Monomeric	Yes	L7
C4	Totally Porous	Spherical	3,5,10	4	300	0.9	100	Monomeric	Yes	L26
VertiSep™ GES										
C18	Totally Porous	Spherical	3,5,10	17	120	1.0	300	Polymeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	13	120	1.0	300	Polymeric	Yes	L7
Ph	Totally Porous	Spherical	3,5,10	8	120	1.0	300	Polymeric	Yes	L11
C4	Totally Porous	Spherical	3,5,10	6	120	1.0	300	Polymeric	Yes	L26
CN	Totally Porous	Spherical	3,5,10	3.5	120	1.0	300	Polymeric	Yes	L10
NH2	Totally Porous	Spherical	3,5,10	3	120	1.0	300	Polymeric	No	L8
Si	Totally Porous	Spherical	3,5,10	-	120	1.0	300	-	No	L3
SAX	Totally Porous	Spherical	3,5,10	4	120	1.0	300	Polymeric	No	L14
SCX	Totally Porous	Spherical	3,5,10	4	120	1.0	300	Polymeric	No	L19

VertiSep™ Packings Specification

Silica-Based Packings										
Packings	Base Material	Particle Shape	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	Phase Bonding	End Capped	USP L-Code
VertiSep™ IRS										
C18	Totally Porous	Irregular	10	10	125	1.0	300	Monomeric	Yes	L1
Ph	Totally Porous	Irregular	10	8	125	1.0	300	Monomeric	Yes	L11
CN	Totally Porous	Irregular	10	6	125	1.0	300	Monomeric	Yes	L10
NH2	Totally Porous	Irregular	10	4	125	1.0	300	Monomeric	No	L8
Si	Totally Porous	Irregular	10	-	125	1.0	300	-	No	L3
VertiSep™ MMS										
CN/NH2	Totally Porous	Spherical	5	16	60	1.0	450	Monomeric	No	L18
C8/NH2	Totally Porous	Spherical	5	11	60	1.0	450	Monomeric	No	L28
C8/C18	Totally Porous	Spherical	5	14	60	1.0	450	Monomeric	Yes	L42
C8/SCX	Totally Porous	Spherical	5	9	60	1.0	450	Monomeric	No	L44
S8/SAX	Totally Porous	Spherical	5	9	60	1.0	450	Monomeric	No	-
Ph/C6	Totally Porous	Spherical	5	9	60	1.0	450	Monomeric	Yes	L11
VertiSep™ SPS										
ODS1	Totally Porous	Spherical	3,5,10	6	80	0.5	220	Monomeric	Yes	L1
ODS2	Totally Porous	Spherical	3,5,10	12	80	0.5	220	Monomeric	Yes	L1
C8	Totally Porous	Spherical	3,5,10	6	80	0.5	220	Monomeric	Yes	L7
C6	Totally Porous	Spherical	3,5,10	5	80	0.5	220	Monomeric	Yes	L15
Ph	Totally Porous	Spherical	3,5,10	3	80	0.5	220	Monomeric	Yes	L11
C4	Totally Porous	Spherical	3,5,10	3	80	0.5	220	Monomeric	Yes	L26
CN	Totally Porous	Spherical	3,5,10	3	80	0.5	220	Monomeric	No	L10
NH2	Totally Porous	Spherical	3,5,10	2	80	0.5	220	Monomeric	No	L8
Si	Totally Porous	Spherical	3,5,10	-	80	0.5	220	-	No	L3
SAX	Totally Porous	Spherical	5,10	4	80	0.5	220	Monomeric	No	L14
SCX	Totally Porous	Spherical	5,10	4	80	0.5	220	Monomeric	No	L9

Polymer-Based Packings							
Packings	Base Material	Ionic Form	Particle Shape	Particle Size (µm)	Carbon Load (%)	Cross Linked (%)	USP L-Code
VertiSep™ PRP							
PRP-L21	Polymer	-	Spherical	5,10	-		L21
PRP-AQ	Polymer	-	Spherical	5	-		-
PRP-C18	Polymer	-	Spherical	5	17		-
PRP-C8	Polymer	-	Spherical	5	10		-
PRP-NH2	Polymer	-	Spherical	5	6		-
VertiSep™ SUGAR							
CMP	Polymer	Calcium	Spherical	9	-	8	L19
SOP	Polymer	Silver	Spherical	10,20	-	8	-
LMP	Polymer	Lead	Spherical	8	-	8	L34
HMP	Polymer	Hydrogen	Spherical	8	-	8	L17
VertiSep™ OA							
OA	Polymer	Hydrogen	Spherical	8	-	8	L22
VertiSep™ IC							
Anion AX1	Polymer	-	Spherical	5	-		L23
Anion AX2	Polymer	-	Spherical	5	-		L31
Anion AX300	Polymer	-	Spherical	5	-		L31
Cation CX1	Polymer	-	Spherical	5	-		L53

Why Choose VertiSep™ HPLC Columns?

Choosing the right HPLC columns can be help your analysis running smoothly and accurate results.

Vertical® manufactures a variety of high quality HPLC columns to meet your needs. The reasons to choose our VertiSep™ HPLC columns are:

High performance packing materials

VertiSep™ HPLC columns are manufactured by new advanced technology. Our packings are available both silica-based and polymer-based. Both are functionalized by variety of phase. Our silica-based are available in ultra high purity providing high perfomance separation. Polymer-based are stable in pH 1-14.

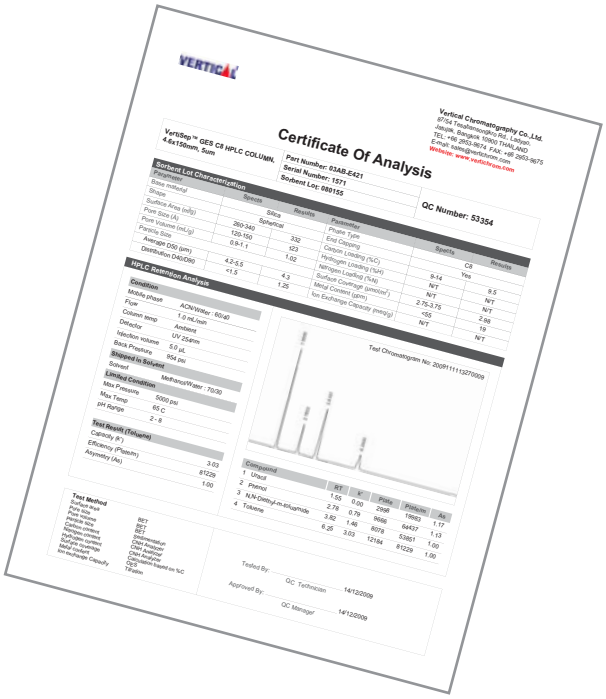
Column-to-column reproducibility

VertiSep™ HPLC column packings are chemically synthesized, functionalized with phases and QC strictly tested to assure the specifications and characteristics prior packing into columns or cartridges.

VertiSep™ HPLC columns are packed using high constant pressure pump and propriety packing technique under strict control using up-to-date statistic process control procedures to assure column-to-column reproducibility.

Certificate of Analysis

Every VertiSep™ HPLC columns are QC tested by our QC Lab for retention analysis test to assure characteristics and chromatographic performance. VertiSep™ HPLC column packing includes a Certificate of Analysis including HPLC retention analysis and test chromatogram results. With our high quality products under high quality control, you can have confidence in your analytical results.


Certificate Of Analysis

Application support

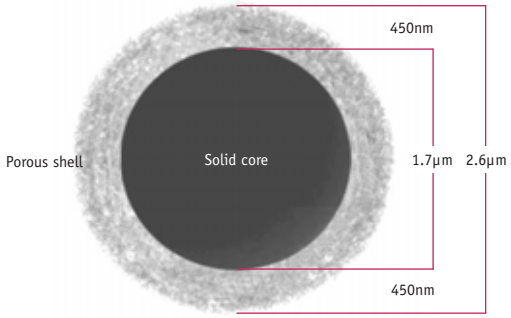
We can work with you to make sure our products meet your needs. We have the smart team application specialists to support you the methods, applications and products. We are committed to long-term customers' relationship and our application specialists are ready to response to your support requirements.

Vertical®'s guarantee

If VertiSep™ HPLC columns do not perform as well or better than your current column in similar phase, bed weight and column or cartridge size, send in your comparative data within 45 days and keep the VertiSep™ HPLC column for FREE.

VertiSep™ Integral

- **Ultra-high resolution like sub-2µm columns**
- **Faster separation like sub-2µm columns**
- **Lower back pressure than sub-2µm columns**
- **Compatible with exsisting HPLC or LC/MS**



VertiSep™ Integral columns are made with superficially porous silica microsphere (Core-shell) technolohy. The packings consist of ultra-pure silica in solid cores and thin outer shells with uniform pores. These offer excellent kinetic properties providing stable, ultra-high resolution and faster than HPLC column with conventional packings.

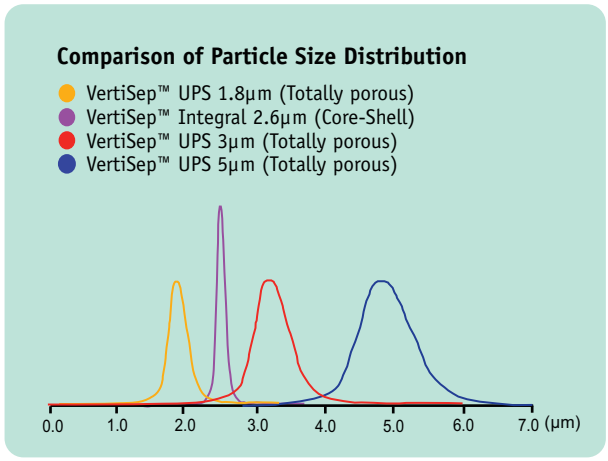
VertiSep™ Integral columns are 2.6µm in particle size, very narrow particle size distribution and the higher particle density. This provides efficiency of about at least 20,000 in which comparable to sub-2µm columns.

VertiSep™ Integral particles have a solid core of 1.7µm and 450nm thick outer shell respectively. The thin outer porous shell allows rapid solute mass transfer (fast kinetics) so that mobile phase flow rate can be increased to allows for very fast separations without sacrificing resolution like sub-2µm columns.

As only the thin outer shell of core shell particle is porous. This allows less back pressure and rapid solute diffusion in and out of the thin porous shell comparing to totally porous sub-2µm particle. VertiSep™ Integral columns limit at pressure up to at least 5,000psi that are compatible with standard HPLC and LC/MS equipments.

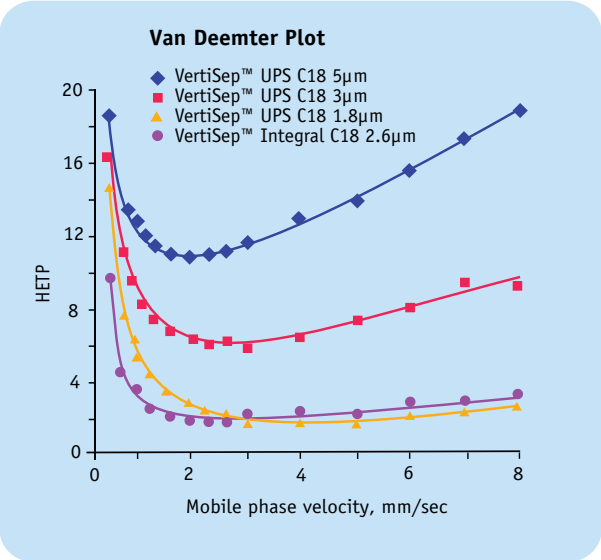
Specifications	
Silica	High Purity, Type B
Particle Size (µm)	2.6
Solid Core Size (µm)	1.7
Shell Thickness (nm)	450
Pore Diameter (Å)	100
Surface Area (m^2/g)	130
Pore Volume (cm^3/g)	0.36
Monodispersivity (D_{90}/D_{10})	1.20
pH range	1.5-10
Phases	C18, C8, PFP

Comparison of Particle Size Distribution



	D_{10}	D_{90}	D_{90}/D_{10}
VertiSep™ UPS 5µm	4.55	6.09	1.34
VertiSep™ UPS 3µm	3.03	4.42	1.46
VertiSep™ UPS 1.8µm	1.6	2.38	1.49
VertiSep™ Integral 2.6µm	2.35	2.82	1.20

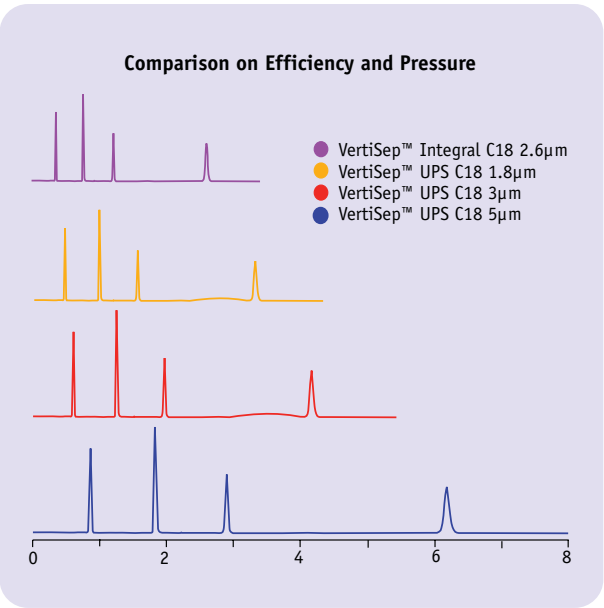
All totally porous particles (1.8µm, 3µm, and 5µm) have an acceptable particle size distribution. However, VertiSep™ Integral core- shell particle has a narrow particle size distribution, which reduces multi-path diffusion and results in high efficiency.



Column : 3.0 x 100mm
Mobile phase : Acetonitrile/water (60/40)
Flow rate : 0.5mL/min
Injection : 3µL
Temperature : 25 °C
Detection : UV 254nm
Analytes : Toluene

The Van Deemter shows that the smaller (2.6µm) particle size of VertiSep™ Integral particles results in significantly higher efficiency for toluene than 5µm and 3µm particle columns. The less increase in plate height with mobile phase velocity increase for the VertiSep™ Integral particles is also in keeping with the smaller particle size and the high kinetic properties of core shell structure.

In comparison with sub-2µm column, VertiSep™ Integral shows very similar efficiency; however, but less backpressures that flow rates can be increased to speed up analysis.



Column Column : 3.0 x 100mm
Mobile phase : Acetonitrile/water (60/40)
Flow rate : 0.5mL/min
Injection : 3µL
Temperature : 25 °C
Detection : UV 254nm
Analytes :
1 Uracil
2 Phenol
3 N,N-Diethyl-m-Toluamide
4 Toluene

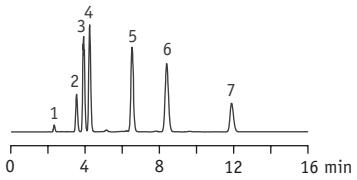
The efficiency on VertiSep™ Integral column is about more than 90% of sub-2µm columns and about 2 times the effiency of the 3µm columns.

The pressure on VertiSep™ Integral column is below 5,000psi while the pressure on sub-2µm column is above 6,000psi. VertiSep™ Integral columns are compatible with all HPLC systems.

Comparison	Plate (N)	Pressure (psi)
VertiSep™ UPS C18 5µm	6,000	708
VertiSep™ UPS C18 3µm	12,135	2,203
VertiSep™ UPS C18 1.8µm	25,120	6,614
VertiSep™ Integral C18 2.6µm	23,685	4,556

VertiSep™ Integral

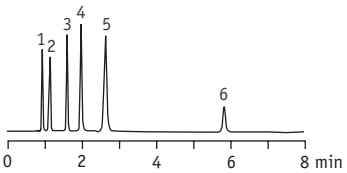
Sudan Dyes



1. Sudan Orange G-a
2. Sudan Orange G-b
3. Sudan Red G
4. Sudan I
5. Sudan II
6. Sudan III
7. Sudan IV

Column:	VertiSep™ Integral C18 2.6µm, 4.6x150mm
Mobile Phase:	0.1% TFA in Water/Acetonitrile : 10/90
Flow Rate:	1.5 mL/min
Column Temp:	50 °C
Detection:	UV 480nm

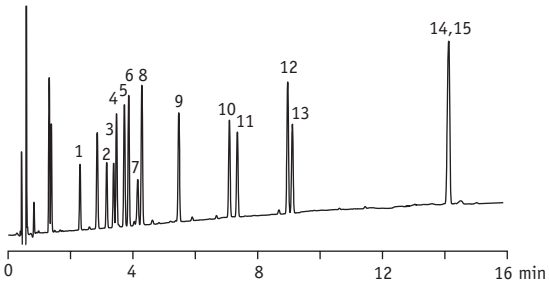
Water Soluble Vitamins



1. Thiamine
2. Ascorbic acid
3. Nicotinic Acid
4. Pyridoxine
5. Niacinamide
6. Pantothenic acid

Column:	VertiSep™ Integral C18 2.6µm, 4.6x150mm
Mobile Phase:	25mM Phosphate buffer pH 3.0/Acetonitrile : (97/3)
Flow Rate:	1.5 mL/min
Column Temp:	30 °C
Detection:	UV 212nm

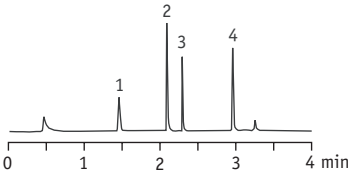
Preservatives in cosmetics



1. Benzyl alcohol
2. Phenoxyethanol
3. Sorbic acid
4. Benzoic acid
5. Methyl paraben
6. p-Anisic acid
7. Dehydroacetic acid
8. Salicylic acid
9. Ethyl paraben
10. Isopropyl paraben
11. Propyl paraben
12. Isobutyl paraben
13. Butyl paraben
14. Triclosan
15. Triclocarban

Column:	VertiSep™ Integral C18 2.6µm, 4.6x100mm
Mobile Phase:	0.1% TFA in Water/Acetonitrile : 85/15
Flow Rate:	1.5 mL/min
Column Temp:	30 °C
Detection:	UV 214nm

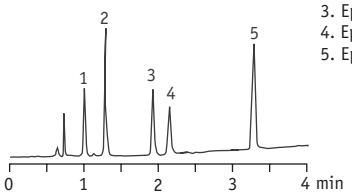
Soft Drinks Additives



1. Acesulfame K
2. Caffeine
3. Aspartame
4. Benzoic acid

Column:	VertiSep™ Integral C18 2.6µm, 4.6x100mm
Mobile Phase:	A: 0.1% Phosphoric acid in Water
	B: 0.1% Phosphoric acid in Acetonitrile
Gradient:	Time/%B: 0/5, 2.5/40
Flow Rate:	1.6 mL/min
Column Temp:	40 °C
Detection:	UV 215nm

Catechins



1. Epigallocatechin
2. Catechin
3. Epicatechin
4. Epigallocatechin gallate
5. Epicatechin gallate

Column:	VertiSep™ Integral C18 2.6µm, 4.6x100mm
Mobile Phase:	0.1% Phosphoric acid/Acetonitrile : (98/2)
Flow Rate:	1.3 mL/min
Column Temp:	30 °C
Detection:	UV 250nm

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ Integral Columns				
C18	2.6	2.1 x 30	1	034A-B0B1
		2.1 x 50	1	034A-B2B1
		2.1 x 75	1	034A-B8B1
		2.1 x 100	1	034A-B3B1
		2.1 x 150	1	034A-B4B1
		3.0 x 30	1	034A-C0B1
		3.0 x 50	1	034A-C2B1
		3.0 x 75	1	034A-C8B1
		3.0 x 100	1	034A-C3B1
		3.0 x 150	1	034A-C4B1
		4.6 x 30	1	034A-E0B1
		4.6 x 50	1	034A-E2B1
		4.6 x 75	1	034A-E8B1
		4.6 x 100	1	034A-E3B1
		4.6 x 150	1	034A-E4B1
C8	2.6	2.1 x 30	1	034B-B0B1
		2.1 x 50	1	034B-B2B1
		2.1 x 75	1	034B-B8B1
		2.1 x 100	1	034B-B3B1
		2.1 x 150	1	034B-B4B1
		3.0 x 30	1	034B-C0B1
		3.0 x 50	1	034B-C2B1
		3.0 x 75	1	034B-C8B1
		3.0 x 100	1	034B-C3B1
		3.0 x 150	1	034B-C4B1
		4.6 x 30	1	034B-E0B1
		4.6 x 50	1	034B-E2B1
		4.6 x 75	1	034B-E8B1
		4.6 x 100	1	034B-E3B1
		4.6 x 150	1	034B-E4B1
PFP	2.6	2.1 x 30	1	0345-B0B1
		2.1 x 50	1	0345-B2B1
		2.1 x 75	1	0345-B8B1
		2.1 x 100	1	0345-B3B1
		2.1 x 150	1	0345-B4B1
		3.0 x 30	1	0345-C0B1
		3.0 x 50	1	0345-C2B1
		3.0 x 75	1	0345-C8B1
		3.0 x 100	1	0345-C3B1
		3.0 x 150	1	0345-C4B1
		4.6 x 30	1	0345-E0B1
		4.6 x 50	1	0345-E2B1
		4.6 x 75	1	0345-E8B1
		4.6 x 100	1	0345-E3B1
		4.6 x 150	1	0345-E4B1

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ Integral Guard Cartridge*				
C18	2.6	2.1 x 10	2	034A-B1B3
		3.0 x 10	2	034A-C1B3
		4.6 x 10	2	034A-E1B3
C8	2.6	2.1 x 10	2	034B-B1B3
		3.0 x 10	2	034B-C1B3
		4.6 x 10	2	034B-E1B3
PFP	2.6	2.1 x 10	2	0345-B1B3
		3.0 x 10	2	0345-C1B3
		4.6 x 10	2	0345-E1B3

*Guard holder required

Ordering Information

Description	QTY	Part No.
Accessories required		
Guard holder	1	0300-0001
In-Line Filter 2µm**	1	05AB-2021
PEEK Tubing, 1/16"OD, 0.12mmID**	5'	05AD-1031

**Required when use a small internal volumes HPLC column (< 50mm Length or < 3mm ID)

VertiSep™ pHendure HPLC Columns

Practical Extreme pH in RP-HPLC Using Hybrid Particle Based Packings

Introduction

Spherical hybrid organic–inorganic particles combine the high efficiency and excellent mechanical strength of silica with the wide pH stability range and reduced silanol effects of polymers. Reversed-phase HPLC packing based on hybrid particles exhibits excellent efficiency, selectivity and long lifetimes at elevated temperatures.

The problem of extreme pH in silica column

Silica-based materials are the most widely used packings for RP-HPLC due to the high efficiency and excellent mechanical strength. However, there are some limitations on these conventional silica-base materials.

- **Short lifetimes below pH 2 (hydrolysis of bonded phase)**
- **Short lifetimes above pH 8 (dissolution of silica)**
- **Broad, tailing peaks for basic compounds**
- **Short life time at high temperatures**

Why operate outside pH 2 – 8?

The mobile phase pH is an important factor in retention, selectivity and efficiency for polar compounds. pH also influences analyte ionisation, which is necessary for LC-MS. Finally, the stability of the analyte may be improved at high or low pH. A good column for low and high pH should offers acceptable lifetime, no bleed, stable retention and efficiency.

What is Hybrid particle based packings?

The Hybrid particle contains both silica and organosiloxane and shares the advantages of both. The Hybrid particle is prepared by sol-gel synthesis using organosilanes. This particle is as hard as silica and does not swell or shrink in the presence of organic solvents. The pH stability of bonded phases based on this Hybrid particle exceeds that of silica-based bonded phases.

Specifications	C18	Phenyl-Hexyl
Particle sizes (µm)	2.5, 5	2.5, 5
Pore Sizes (Å)	100	100
Surface area (m^2/g)	350	350
Carbon load (%C)	14	12
Endcapping	propriety	propriety
pH Range	1-12	2-12
USP	L1	L11

What is VertiSep™ pHendure

The new VertiSep™ pHendure from Vertical Chromatography is a Hybrid organic-inorganic particle based packings providing extended pH Stability from 1-12, a novel solution to the problems exhibited by conventional silica-based and polymer-based packing materials.

What are the features?

- **long lifetimes below pH 2 (Low pH stability)**
- **long lifetimes above pH 8 (high pH stability)**
- **Long life time at high temperatures(stability of hybrid particle)**
- **Low bleed, ideal for both LC-MS and routine HPLC method development (stability of hybrid particle)**

VertiSep™ pHendure HPLC columns are packed with hybrid silica-organosilane particle based packings providing pH stability pH 1-12 and high resolution, a novel solution to the problems on acidic or basic conditions exhibited by conventional silica-based columns.

Hydrolysis of bonded phase will occur and causes loss of efficiency under acidic conditons with conventional silica-based column. VertiSep™ pHendure with the hybrid particle based packings solves this problem and provides excellent stability under acidic conditions offerring long lifetime.

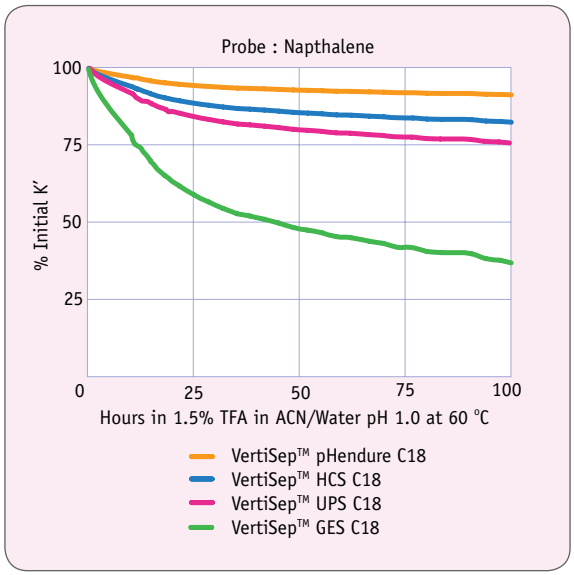
Dissolution of silica will occurs and causes tailing peaks under basic conditions with conventional silica-based column. VertiSep™ pHendure with the hybrid particle based packings solves this problem and provides excellent stability under basic conditions offering symmetrical peaks.

VertiSep™ pHendure is low bleed, ideal for both LC-MS and routine HPLC method development.

VertiSep™ pHendure C18 is 14% carbon loading offering high capacity and great resolution for all HPLC applications including USP L1.

VertiSep™ pHendure Phenyl-Hexyl is 12% carbon loading offering an alternative selectivity to C18 for analytes containing aromatic rings or USP L11.

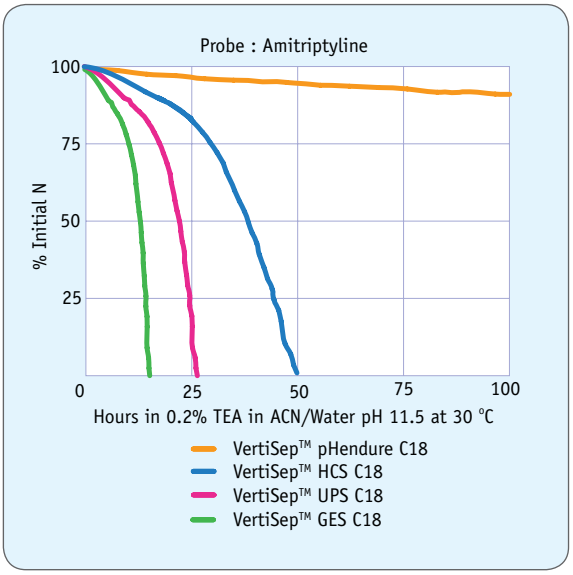
Stability under acidic and high temperature conditions

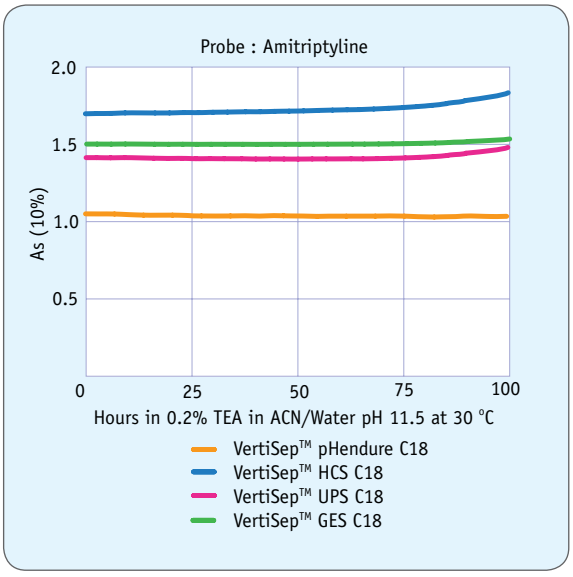


VertiSep™ pHendure C18

Hybrid Particle columns were exposed to 1.5% Trifluoroacetic acid in ACN/Water at pH 1.0 at 60 °C for 100 hours at a flow rate of 1mL/min, then tested the columns with a standardized test condition and Napthalene as test probe. VertiSep™ pHendure hybrid particle exhibits excellent stability under acidic conditions better than conventional silica-based packings.

Stability under basic conditions



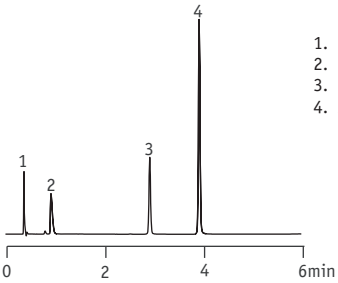


VertiSep™ pHendure C18

Hybrid Particle columns were exposed to 0.2% Triethylamine in ACN/Water at pH 11.5 at 30 °C for 100 hours at a flow rate of 1mL/min, then tested the columns with a standardized test condition and amitriptyline as test probe. VertiSep™ pHendure hybrid particle exhibits excellent stability and provides symmetrical peak for basic compounds under basic conditions better than conventional silica-based packings.

VertiSep™ pHendure

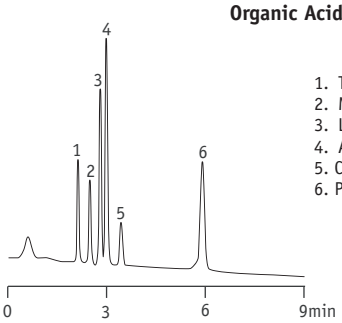
Test Mixed



1. Uracil
2. Procaine
3. Fenuron
4. 3-Nitrobenzoic acid

Column:	VertiSep™ pHendure C18 5µm 4.6x150mm
Mobile Phase:	ACN:20 mM Sodium phosphate (A:B), pH 2.1
Gradient:	0 min 10%ACN, 5.5 min 50%ACN
Flow Rate:	1.5mL/min
Detection:	UV254nm

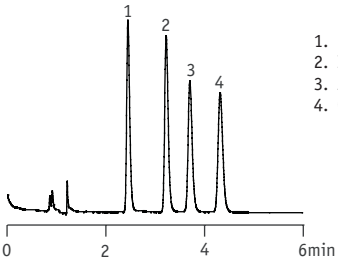
Organic Acid



1. Tartaric acid
2. Malic acid
3. Lactic acid
4. Acetic acid
5. Citric acid
6. Propionic acid

Column:	VertiSep™ pHendure Phenyl-Hexyl 5µm 4.6x150mm
Mobile Phase:	20 mM Phosphate buffer, pH 2.5:Methanol (97:3)
Flow Rate:	1.0mL/min
Detection:	UV220nm

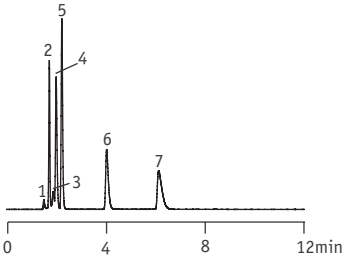
Tricyclic Antidepressants



1. Nortriptyline
2. Imipramine
3. Amitriptyline
4. Clomipramine

Column:	VertiSep™ pHendure C18 5µm 4.6x150mm
Mobile Phase:	10 mM Ammonium bicarbonate buffer pH 10.5:ACN (25:75)
Flow Rate:	1.5mL/min
Detection:	UV254nm

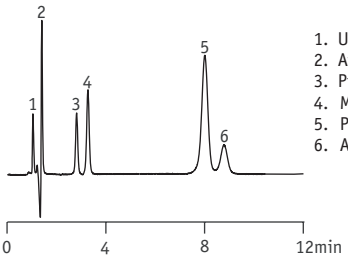
Cold Remedy Mix



1. Chloride
2. Phenylephrine
3. Bromide
4. Maleic acid
5. Acetaminophen
6. Chlorpheneramine Maleate
7. Dextromethorphan Hydrobromide

Column:	VertiSep™ pHendure C18 5µm 4.6x150mm
Mobile Phase:	Phosphate buffer, pH 2.5:Methanol:ACN (60:24:16)
Flow Rate:	1.5mL/min
Detection:	UV215nm

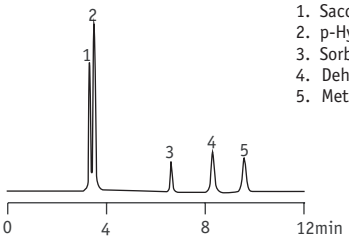
Mix of ß-Blocker



1. Uracil
2. Atenolol
3. Pindolol
4. Metoprolol
5. Propanolol
6. Alprenolol

Column:	VertiSep™ pHendure C18 5µm 4.6x150mm
Mobile Phase:	ACN:50 mM Triethylamine lamine acetate (60:40), pH 11
Flow Rate:	0.43mL/min
Temp:	20 °C
Detection:	UV230nm

Food Additives



1. Saccharin
2. p-Hydroxybenzoic Acid
3. Sorbic Acid
4. Dehydroacetic Acid
5. Methylparaben

Column:	VertiSep™ pHendure Phenyl-Hexyl 5µm 4.6x150mm
Mobile Phase:	20mM Potassium Phosphate pH 2.5:ACN/Water (25/75)
Flow Rate:	1.0mL/min
Detection:	UV220nm

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ pHendure				
C18	2.5	2.1 x 50	1	033A-B291
	2.5	2.1 x 100	1	033A-B391
	2.5	4.6 x 50	1	033A-E291
	2.5	4.6 x 100	1	033A-E391
	5	4.6 x 50	1	033A-E221
	5	4.6 x 100	1	033A-E321
	5	4.6 x 150	1	033A-E421
	5	4.6 x 250	1	033A-E521
	5	10 x 150	1	033A-H421
	5	10 x 250	1	033A-H521
	5	21.2 x 150	1	033A-I421
	5	21.2 x 250	1	033A-I521
	5	30 x 150	1	033A-J421
	5	30 x 250	1	033A-J521
Phenyl-Hexyl	2.5	2.1 x 50	1	0334-B291
	2.5	2.1 x 100	1	0334-B391
	2.5	4.6 x 50	1	0334-E291
	2.5	4.6 x 100	1	0334-E391
	5	4.6 x 50	1	0334-E221
	5	4.6 x 100	1	0334-E321
	5	4.6 x 150	1	0334-E421
	5	4.6 x 250	1	0334-E521
	5	10 x 150	1	0334-H421
	5	10 x 250	1	0334-H521
	5	21.2 x 150	1	0334-I421
	5	21.2 x 250	1	0334-I521
	5	30 x 150	1	0334-J421
	5	30 x 250	1	0334-J521

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ pHendure Guard Cartridges*				
C18	2.5	2.1 x 10	2	033A-B193
	5	4.6 x 10	2	033A-E123
	5	10 x 10	2	033A-H123
	5	21.2 x 10	2	033A-I123
Phenyl-Hexyl	2.5	2.1 x 10	2	0334-B193
	5	4.6 x 10	2	0334-E123
	5	10 x 10	2	0334-H123
	5	21.2 x 10	2	0334-I123

*Guard holder required

0300-0001

0300-0002

0300-0003

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

VertiSep™ UPS HPLC Columns

- **Ultra performance silica with excellent stability, efficiency and column-to-column reproducibility**
- **Ultra-high surface area offer ultra high resolution for gradient elution of difficulty separation compounds**
- **Fully endcapped to improve peak shape**
- **Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes.**

VertiSep™ UPS packings are ultra-high purity spherical silica which contains less amounts of metal ions and sulfate contaminants offerring ultra performance with excellent stability at pH 1.5-10.0*, excellent efficiency, column-to-column reproducibility, long lifetime and ideal for LC/MS or ELSD applications.

VertiSep™ UPS packings are ultra-high surface of 450m²/g offer greater capacity and higher resolution for gradient elution of difficult separation compounds like basic drugs, organic acids and other polar compounds.

VertiSep™ UPS reverse phase packings are fully endcapped after bonding to cover unreached silanols and improve peak symmetry for basic analytes.

VertiSep™ UPS packings are monomeric bonding resulting in lower column back pressure and high column efficiency to better resolve chemically similar analytes.

VertiSep™ UPS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

VertiSep™ UPS C18 is 17% carbon loading offering higher capacity and greater resolution for all HPLC applications.

VertiSep™ UPS C8 offers the highly degree of hydrophobicity for pharmaceuticals, nucleotides and polar compounds.

VertiSep™ UPS Ph is a reverse phase chemistry offering high hydrolytic stability for high hydrophobic compounds.

VertiSep™ UPS CN can be used both reverse phase or normal phase offfering excellent reproducibility and performance for polar compounds in accordance with USP L10.

VertiSep™ UPS Si is normal phase packings offering excellent reproducibility and performance for polar compounds in accordance with USP L3.

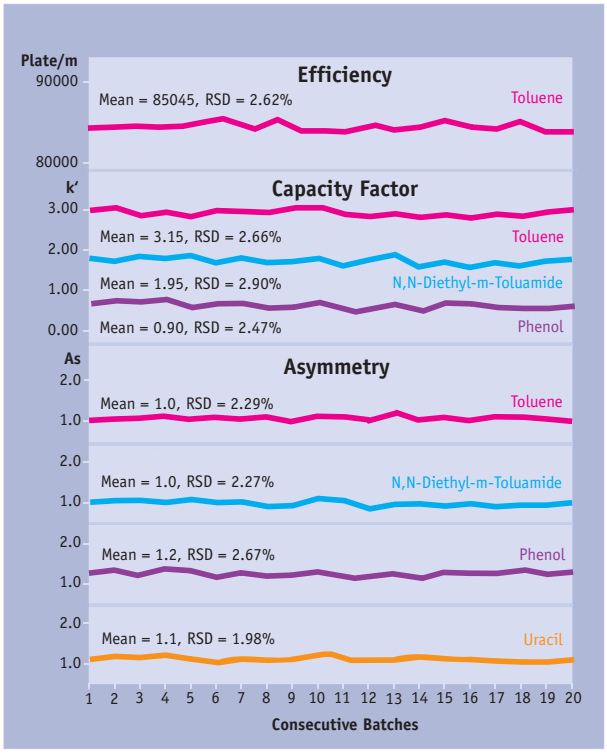
VertiSep™ UPS HILIC offers highly degree of retention for polar compounds in a highly organic mobile phase.

VertiSep™ UPS PFP, Pentafluorophenyl phase offers multiple mechanisms such as hydrogen bonding, dipole-dipole interactions, aromatic π–π interactions and hydrophobic for alternative selectivity.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C18	3,5,10	17	100	1.1	450	Yes
C8	3,5,10	9	100	1.1	450	Yes
Ph	3,5,10	9.5	100	1.1	450	Yes
CN	3,5,10	4	100	1.1	450	No
Si	3,5,10	-	100	1.1	450	No
HILIC	3,5,10	-	100	1.1	450	No
PFP	3,5,10	-	100	1.1	450	No

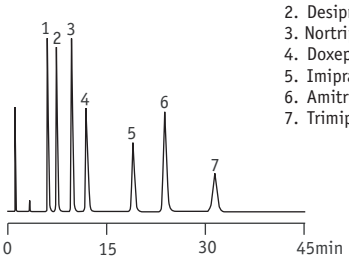
Reproducible Column Packing Method Controls



Test Conditions
Column: VertiSep™ UPS C18, 5µm, 4.6x250mm
Mobile Phase: 60:40 Acetonitrile/Water
Flow Rate: 1.0mL/min
Detector: UV254nm
Sample: Reversed phase test mix

*VertiSep™ UPS CN is stable at pH 1.5-7.0.

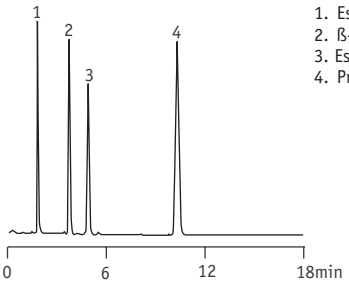
Tricyclic antidepressants



1. Protriptyline
2. Desipramine
3. Nortriptyline
4. Doxepin
5. Imipramine
6. Amitriptyline
7. Trimipramine

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	CH_3OH:20mM KH_2PO_4, pH 7.0 (70:30)
Flow Rate:	1.2mL/min
Detection:	UV240nm

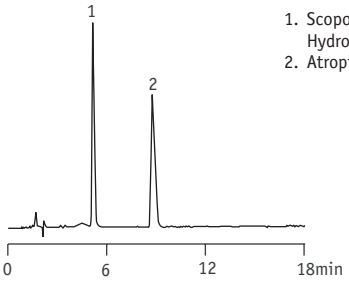
Steroids



1. Estriol
2. ß-Estradiol
3. Estrone
4. Progesterone

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	CH_3OH:H_2O (60:40)
Flow Rate:	1.0mL/min
Detection:	UV230nm

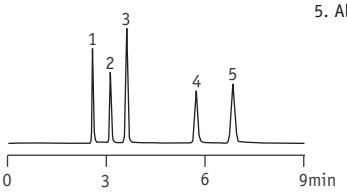
Anticholigenic drugs



1. Scopolamine Hydrobromide
2. Atropine Sulfate

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	CH_3OH:30mM NaH_2PO_4 (15:85)
Flow Rate:	1.0mL/min
Detection:	UV254nm

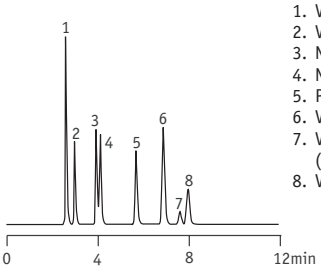
ß-Blocker



1. Atenolol
2. Nadolol
3. Metoprolol
4. Propranolol
5. Alprenolol

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	CH_3OH:20mM KH_2PO_4-K_2HPO_4, pH 7.0 (60:40)
Flow Rate:	1.0mL/min
Detection:	UV220nm

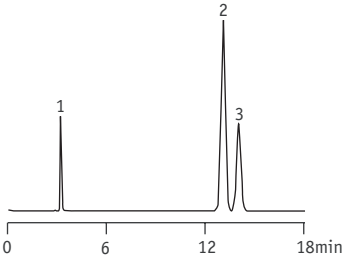
Water-Soluble Vitamins



1. Vitamin C (L-Ascorbic acid)
2. Vitamin B13 (Orotic acid)
3. Nicotinic acid
4. Nicotinamine
5. Pyridoxal
6. Vitamin B6 (Pydridoxine)
7. Vitamin B2 (Calcium pantothenate)
8. Vitamin B1 (Thiamin)

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	20mM H_2PO_4 + 5mM Sodium 1-Pentanesulfonate: CH_3CN (92:8)
Flow Rate:	1.0mL/min
Detection:	UV210nm

Antipileptics

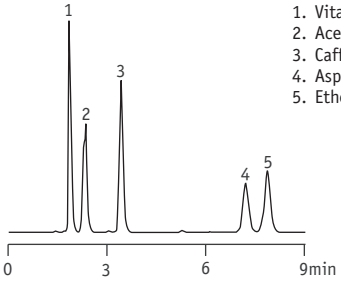


1. Primidone
2. Phenytoin
3. Carbamazepine

Column:	VertiSep™ UPS C18 5µm 4.6x150mm
Mobile Phase:	CH_3CN:20mM KH_2PO_4-K_2HPO_4, pH 7.0 (70:30)
Flow Rate:	1.0mL/min
Detection:	UV220nm

VertiSep™ UPS

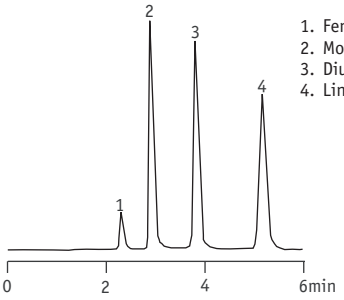
Cold Medicine Components



1. Vitamin C
2. Acetaminophen
3. Caffeine
4. Aspirin
5. Ethenzamide

Column:	VertiSep™ UPS C18 5µm 4.6x250mm
Mobile Phase:	MeOH:50mM KH_2PO_4, pH 3.0 (50:50)
Flow Rate:	1.0mL/min
Detection:	UV220nm

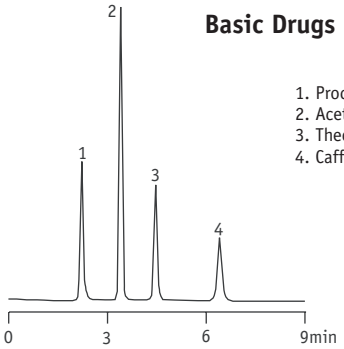
Herbicides



1. Fenuron
2. Monuron
3. Diuron
4. Linuron

Column:	VertiSep™ UPS CN 5µm 4.6x150mm
Mobile Phase:	H_2O:ACN (60:40)
Flow Rate:	1.0mL/min
Detection:	UV254nm

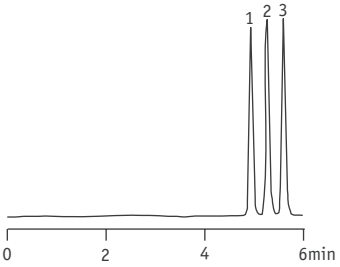
Basic Drugs



1. Procainimide
2. Acetaminophen
3. Theophylline
4. Caffeine

Column:	VertiSep™ UPS C8 5µm 4.6x150mm
Mobile Phase:	0.05M Phosphate Buffer, pH3.0:MeOH (80:20)
Flow Rate:	1.0mL/min
Detection:	UV254nm

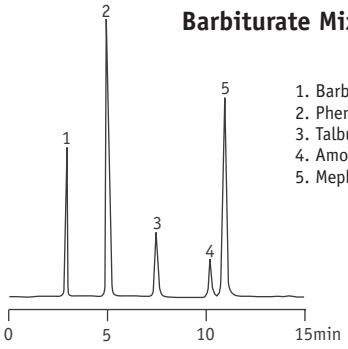
Nitroanilines



1. p-Nitroaniline
2. m-Nitroaniline
3. o-Nitroaniline

Column:	VertiSep™ UPS Ph 5µm 4.6x250mm
Mobile Phase:	MeCN:50mM K_2HPO_4, pH 3.15 (50:50)
Flow Rate:	1.0mL/min
Detection:	UV254nm

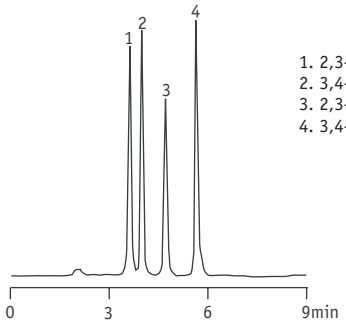
Barbiturate Mix



1. Barbital
2. Phenobarbital
3. Talbutal
4. Amobarbital
5. Mephobarbital

Column:	VertiSep™ UPS C8 5µm 4.6x250mm
Mobile Phase:	0.05M Ammonium Acetate:Acetonitrile (78:22)
Flow Rate:	1.0mL/min
Detection:	UV230nm

MDA and MDMA Analogs

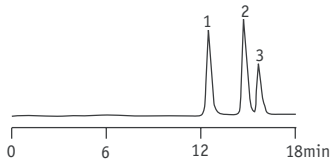


1. 2,3-MDA
2. 3,4-MDA
3. 2,3-MDMA
4. 3,4-MDMA

Column:	VertiSep™ UPS Si 5µm 4.6x150mm
Mobile Phase:	1%NH_4OH in MeOH:ACN (75:25)
Flow Rate:	1.0mL/min
Detection:	UV280nm

Insulins

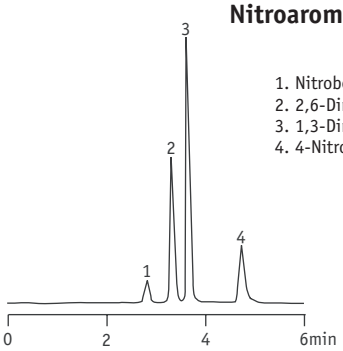
1. Bovine insulin
2. Human insulin
3. Porcine insulin



Column:	VertiSep™ UPS C18 5µm 4.6x250mm
Mobile Phase:	A. MeCN:H_2O + 0.1% TFA (29:71)
	B. MeCN:H_2O + 0.1% TFA (32:68)
Gradient:	Time/%B: 0/10, 16/90
Flow Rate:	1.0mL/min
Detection:	UV215nm

Nitroaromatics

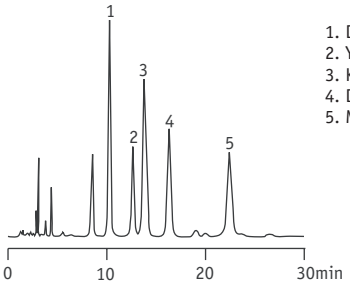
1. Nitrobenzene
2. 2,6-Dinitrotoluene
3. 1,3-Dinitrobenzene
4. 4-Nitrophenol



Column:	VertiSep™ UPS CN 5µm 4.6x150mm
Mobile Phase:	Hexane:Isopropanol (85:15)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Natural Products

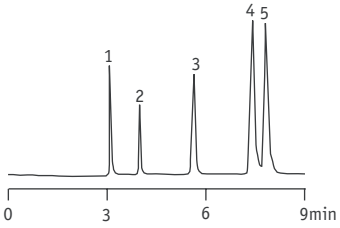
1. Dihydrokawain
2. Yangonin
3. Kawain
4. Dihydromethysticin
5. Methysticin



Column:	VertiSep™ UPS Si 5µm 4.6x150mm
Mobile Phase:	Hexane:Dioxane (85:15)
Flow Rate:	1.5mL/min
Detection:	UV230nm

Amitriptyline

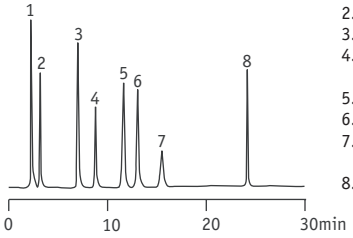
1. Norephedrine
2. Nortriptyline
3. Toluene
4. Imipramine
5. Amitriptyline



Column:	VertiSep™ UPS Ph 5µm 4.6x250mm
Mobile Phase:	0.025M KH_2PO_4, pH 6.0:MeOH (20:80)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Food Additives

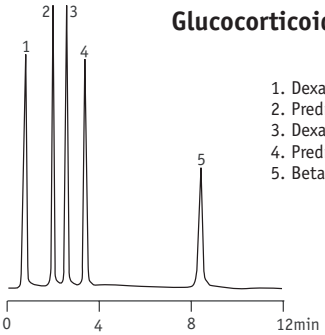
1. Saccharin
2. p-Hydroxybenzoic Acid
3. Sorbic Acid
4. p-Hydroxybenzoic Acid Methyl Ester
5. Dehydroacetic Acid
6. p-Toluic Acid
7. p-Hydroxybenzoic Acid Ethyl Ester
8. n-Propyl p-Hydroxybenzoate



Column:	VertiSep™ UPS Ph 5µm 4.6x150mm
Mobile Phase:	A: 50mM KH_2PO_4 + 0.1% H_3PO_4
	B: ACN
Gradient:	Time/%B: 0/25, 18/25, 30/75
Flow Rate:	1.0mL/min
Detection:	UV230nm

Glucocorticoids

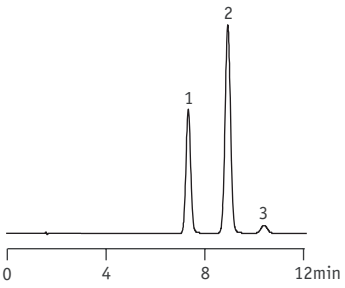
1. Dexamethasone 21-Phosphate
2. Prednisolone
3. Dexamethasone
4. Prednisolone 21-Acetate
5. Betamethasone 17-Valerate



Column:	VertiSep™ UPS C8 5µm 4.6x150mm
Mobile Phase:	H_2O/ACN - 50/50
Flow Rate:	1.0mL/min
Detection:	UV240nm

VertiSep™ UPS

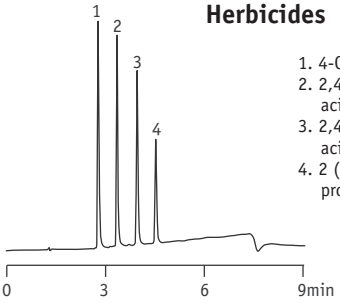
Aminopyridine Isomers



1. 3-Aminopyridine
2. 4-Aminopyridine
3. 2-Aminopyridine

Column:	VertiSep™ UPS HILIC 5µm 4.6x150mm
Mobile Phase:	MeCN/10 mM AmAc, pH 4.0 (50:50)
Flow Rate:	1.0mL/min
Detection:	UV250nm

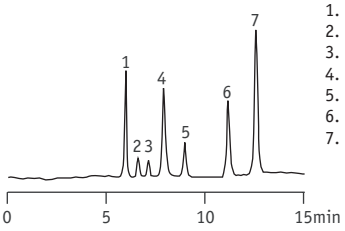
Herbicides



1. 4-Chlorophenoxyacetic acid
2. 2,4-Dichlorophenoxyacetic acid
3. 2,4,5-Trichlorophenoxyacetic acid
4. 2 (2,4,5-Trichlorophenoxy) propionic acid

Column:	VertiSep™ UPS PFP 3µm 4.6x150mm
Mobile Phase:	A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient:	Time/%B: 0/55, 6/75
Flow Rate:	1.0mL/min
Detection:	UV280nm

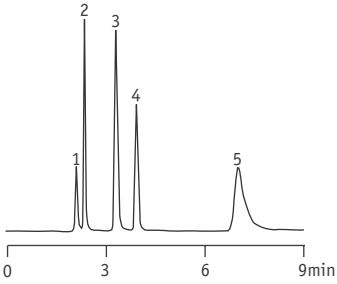
Polar Drug



1. Norphenylephrine
2. Pseudoephedrine
3. Norephedrine
4. Doxylamine
5. Pyrilamine
6. Dextromethorphan
7. Trimipramine

Column:	VertiSep™ UPS HILIC 5µm 4.6x150mm
Mobile Phase:	45% MeCN
Gradient:	Time/pH/mM: 0/5/10, 15/4/50 hold 10min
Flow Rate:	1.0mL/min
Detection:	UV270nm

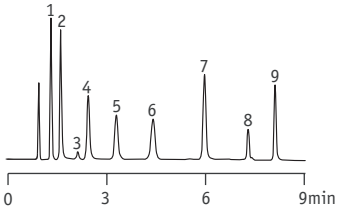
Nucleobase



1. Cytosine
2. Uracil
3. Guanine
4. Thymine
5. Adenine

Column:	VertiSep™ UPS PFP 5µm 4.6x150mm
Mobile Phase:	20mM AmAc, pH 5.0:MeOH (85:15)
Flow Rate:	1.0mL/min
Detection:	UV260nm

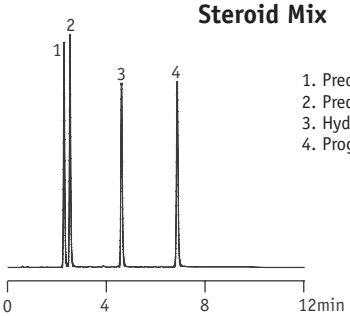
Vitamins



1. Nicotinamide
2. Pyridoxine
3. Riboflavin pKa
4. p-Aminobenzoic Acid
5. Thiamine
6. Nicotinic Acid
7. Ascorbic Acid
8. Cobalamin
9. Folic Acid

Column:	VertiSep™ UPS HILIC 5µm 4.6x150mm
Mobile Phase:	A:ACN:100 mM NH_4Acetate, pH 5.8 (90:10) B:ACN:20 mM NH_4Accetate, pH 5.8 (50:50)
Gradient:	Time/%B: 0/0, 9.5/100
Flow Rate:	2.0mL/min
Detection:	UV260nm

Steroid Mix



1. Prednisone
2. Prednisolone
3. Hydroxyprogesterone
4. Progesterone

Column:	VertiSep™ UPS PFP 5µm 4.6x150mm
Mobile Phase:	A: H_2O, B: ACN
Gradient:	Time/%B: 0/40, 8/70
Flow Rate:	1.0mL/min
Detection:	UV254nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
C18	3	Ultra-Fast	2.1 x 10	1	03CA-B111
	3	Ultra-Fast	2.1 x 20	1	03CA-B611
	3	Ultra-Fast	2.1 x 50	1	03CA-B211
	3	LC/MS	2.1 x 100	1	03CA-B311
	3	LC/MS	2.1 x 150	1	03CA-B411
	3	LC/MS	3.2 x 100	1	03CA-C311
	3	LC/MS	3.2 x 150	1	03CA-C411
	3	Hi-Speed	4.6 x 50	1	03CA-E211
	3	Analytical	4.6 x 100	1	03CA-E311
	3	Analytical	4.6 x 150	1	03CA-E411
	3	Hi-Speed	7.8 x 50	1	03CA-G211
	3	Analytical	7.8 x 100	1	03CA-G311
	5	LC/MS	2.1 x 100	1	03CA-B321
	5	LC/MS	2.1 x 150	1	03CA-B421
	5	LC/MS	2.1 x 250	1	03CA-B521
	5	LC/MS	3.2 x 100	1	03CA-C321
	5	LC/MS	3.2 x 150	1	03CA-C421
	5	LC/MS	3.2 x 250	1	03CA-C521
	5	Hi-Speed	4.6 x 50	1	03CA-E221
	5	Analytical	4.6 x 100	1	03CA-E321
	5	Analytical	4.6 x 150	1	03CA-E421
	5	Analytical	4.6 x 250	1	03CA-E521
	5	Prep	10.0 x 150	1	03CA-H421
	5	Prep	10.0 x 250	1	03CA-H521
	5	Prep	21.2 x 150	1	03CA-I421
	5	Prep	21.2 x 250	1	03CA-I521
	10	Analytical	4.6 x 250	1	03CA-E531
	10	Prep	10.0 x 150	1	03CA-H431
	10	Prep	10.0 x 250	1	03CA-H531
	10	Prep	21.2 x 150	1	03CA-I431
	10	Prep	21.2 x 250	1	03CA-I531
	10	Prep	30.0 x 150	1	03CA-J431
	10	Prep	30.0 x 250	1	03CA-J531
	10	Prep	50.0 x 150	1	03CA-K431
	10	Prep	50.0 x 250	1	03CA-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
C8	3	Ultra-Fast	2.1 x 10	1	03CB-B111
	3	Ultra-Fast	2.1 x 20	1	03CB-B611
	3	Ultra-Fast	2.1 x 50	1	03CB-B211
	3	LC/MS	2.1 x 100	1	03CB-B311
	3	LC/MS	2.1 x 150	1	03CB-B411
	3	LC/MS	3.2 x 100	1	03CB-C311
	3	LC/MS	3.2 x 150	1	03CB-C411
	3	Hi-Speed	4.6 x 50	1	03CB-E211
	3	Analytical	4.6 x 100	1	03CB-E311
	3	Analytical	4.6 x 150	1	03CB-E411
	3	Hi-Speed	7.8 x 50	1	03CB-G211
	3	Analytical	7.8 x 100	1	03CB-G311
	5	LC/MS	2.1 x 100	1	03CB-B321
	5	LC/MS	2.1 x 150	1	03CB-B421
	5	LC/MS	2.1 x 250	1	03CB-B521
	5	LC/MS	3.2 x 100	1	03CB-C321
	5	LC/MS	3.2 x 150	1	03CB-C421
	5	LC/MS	3.2 x 250	1	03CB-C521
	5	Hi-Speed	4.6 x 50	1	03CB-E221
	5	Analytical	4.6 x 100	1	03CB-E321
	5	Analytical	4.6 x 150	1	03CB-E421
	5	Analytical	4.6 x 250	1	03CB-E521
	5	Prep	10.0 x 150	1	03CB-H421
	5	Prep	10.0 x 250	1	03CB-H521
	5	Prep	21.2 x 150	1	03CB-I421
	5	Prep	21.2 x 250	1	03CB-I521
	10	Analytical	4.6 x 250	1	03CB-E531
	10	Prep	10.0 x 150	1	03CB-H431
	10	Prep	10.0 x 250	1	03CB-H531
	10	Prep	21.2 x 150	1	03CB-I431
	10	Prep	21.2 x 250	1	03CB-I531
	10	Prep	30.0 x 150	1	03CB-J431
	10	Prep	30.0 x 250	1	03CB-J531
	10	Prep	50.0 x 150	1	03CB-K431
	10	Prep	50.0 x 250	1	03CB-K531

VertiSep™ UPS

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
Ph	3	Ultra-Fast	2.1 x 10	1	03CD-B111
	3	Ultra-Fast	2.1 x 20	1	03CD-B611
	3	Ultra-Fast	2.1 x 50	1	03CD-B211
	3	LC/MS	2.1 x 100	1	03CD-B311
	3	LC/MS	2.1 x 150	1	03CD-B411
	3	LC/MS	3.2 x 100	1	03CD-C311
	3	LC/MS	3.2 x 150	1	03CD-C411
	3	Hi-Speed	4.6 x 50	1	03CD-E211
	3	Analytical	4.6 x 100	1	03CD-E311
	3	Analytical	4.6 x 150	1	03CD-E411
	3	Hi-Speed	7.8 x 50	1	03CD-G211
	3	Analytical	7.8 x 100	1	03CD-G311
	5	LC/MS	2.1 x 100	1	03CD-B321
	5	LC/MS	2.1 x 150	1	03CD-B421
	5	LC/MS	2.1 x 250	1	03CD-B521
	5	LC/MS	3.2 x 100	1	03CD-C321
	5	LC/MS	3.2 x 150	1	03CD-C421
	5	LC/MS	3.2 x 250	1	03CD-C521
	5	Hi-Speed	4.6 x 50	1	03CD-E221
	5	Analytical	4.6 x 100	1	03CD-E321
	5	Analytical	4.6 x 150	1	03CD-E421
	5	Analytical	4.6 x 250	1	03CD-E521
	5	Prep	10.0 x 150	1	03CD-H421
	5	Prep	10.0 x 250	1	03CD-H521
	5	Prep	21.2 x 150	1	03CD-I421
	5	Prep	21.2 x 250	1	03CD-I521
	10	Analytical	4.6 x 250	1	03CD-E531
	10	Prep	10.0 x 150	1	03CD-H431
	10	Prep	10.0 x 250	1	03CD-H531
	10	Prep	21.2 x 150	1	03CD-I431
	10	Prep	21.2 x 250	1	03CD-I531
	10	Prep	30.0 x 150	1	03CD-J431
	10	Prep	30.0 x 250	1	03CD-J531
	10	Prep	50.0 x 150	1	03CD-K431
	10	Prep	50.0 x 250	1	03CD-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
CN	3	Ultra-Fast	2.1 x 10	1	03CE-B111
	3	Ultra-Fast	2.1 x 20	1	03CE-B611
	3	Ultra-Fast	2.1 x 50	1	03CE-B211
	3	LC/MS	2.1 x 100	1	03CE-B311
	3	LC/MS	2.1 x 150	1	03CE-B411
	3	LC/MS	3.2 x 100	1	03CE-C311
	3	LC/MS	3.2 x 150	1	03CE-C411
	3	Hi-Speed	4.6 x 50	1	03CE-E211
	3	Analytical	4.6 x 100	1	03CE-E311
	3	Analytical	4.6 x 150	1	03CE-E411
	3	Hi-Speed	7.8 x 50	1	03CE-G211
	3	Analytical	7.8 x 100	1	03CE-G311
	5	LC/MS	2.1 x 100	1	03CE-B321
	5	LC/MS	2.1 x 150	1	03CE-B421
	5	LC/MS	2.1 x 250	1	03CE-B521
	5	LC/MS	3.2 x 100	1	03CE-C321
	5	LC/MS	3.2 x 150	1	03CE-C421
	5	LC/MS	3.2 x 250	1	03CE-C521
	5	Hi-Speed	4.6 x 50	1	03CE-E221
	5	Analytical	4.6 x 100	1	03CE-E321
	5	Analytical	4.6 x 150	1	03CE-E421
	5	Analytical	4.6 x 250	1	03CE-E521
	5	Prep	10.0 x 150	1	03CE-H421
	5	Prep	10.0 x 250	1	03CE-H521
	5	Prep	21.2 x 150	1	03CE-I421
	5	Prep	21.2 x 250	1	03CE-I521
	10	Analytical	4.6 x 250	1	03CE-E531
	10	Prep	10.0 x 150	1	03CE-H431
	10	Prep	10.0 x 250	1	03CE-H531
	10	Prep	21.2 x 150	1	03CE-I431
	10	Prep	21.2 x 250	1	03CE-I531
	10	Prep	30.0 x 150	1	03CE-J431
	10	Prep	30.0 x 250	1	03CE-J531
	10	Prep	50.0 x 150	1	03CE-K431
	10	Prep	50.0 x 250	1	03CE-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
Si	3	Ultra-Fast	2.1 x 10	1	03CG-B111
	3	Ultra-Fast	2.1 x 20	1	03CG-B611
	3	Ultra-Fast	2.1 x 50	1	03CG-B211
	3	LC/MS	2.1 x 100	1	03CG-B311
	3	LC/MS	2.1 x 150	1	03CG-B411
	3	LC/MS	3.2 x 100	1	03CG-C311
	3	LC/MS	3.2 x 150	1	03CG-C411
	3	Hi-Speed	4.6 x 50	1	03CG-E211
	3	Analytical	4.6 x 100	1	03CG-E311
	3	Analytical	4.6 x 150	1	03CG-E411
	3	Hi-Speed	7.8 x 50	1	03CG-G211
	3	Analytical	7.8 x 100	1	03CG-G311
	5	LC/MS	2.1 x 100	1	03CG-B321
	5	LC/MS	2.1 x 150	1	03CG-B421
	5	LC/MS	2.1 x 250	1	03CG-B521
	5	LC/MS	3.2 x 100	1	03CG-C321
	5	LC/MS	3.2 x 150	1	03CG-C421
	5	LC/MS	3.2 x 250	1	03CG-C521
	5	Hi-Speed	4.6 x 50	1	03CG-E221
	5	Analytical	4.6 x 100	1	03CG-E321
	5	Analytical	4.6 x 150	1	03CG-E421
	5	Analytical	4.6 x 250	1	03CG-E521
	5	Prep	10.0 x 150	1	03CG-H421
	5	Prep	10.0 x 250	1	03CG-H521
	5	Prep	21.2 x 150	1	03CG-I421
	5	Prep	21.2 x 250	1	03CG-I521
	10	Analytical	4.6 x 250	1	03CG-E531
	10	Prep	10.0 x 150	1	03CG-H431
	10	Prep	10.0 x 250	1	03CG-H531
	10	Prep	21.2 x 150	1	03CG-I431
	10	Prep	21.2 x 250	1	03CG-I531
	10	Prep	30.0 x 150	1	03CG-J431
	10	Prep	30.0 x 250	1	03CG-J531
	10	Prep	50.0 x 150	1	03CG-K431
	10	Prep	50.0 x 250	1	03CG-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
HILIC	3	Ultra-Fast	2.1 x 10	1	03C3-B111
	3	Ultra-Fast	2.1 x 20	1	03C3-B611
	3	Ultra-Fast	2.1 x 50	1	03C3-B211
	3	LC/MS	2.1 x 100	1	03C3-B311
	3	LC/MS	2.1 x 150	1	03C3-B411
	3	LC/MS	3.2 x 100	1	03C3-C311
	3	LC/MS	3.2 x 150	1	03C3-C411
	3	Hi-Speed	4.6 x 50	1	03C3-E211
	3	Analytical	4.6 x 100	1	03C3-E311
	3	Analytical	4.6 x 150	1	03C3-E411
	3	Hi-Speed	7.8 x 50	1	03C3-G211
	3	Analytical	7.8 x 100	1	03C3-G311
	5	LC/MS	2.1 x 100	1	03C3-B321
	5	LC/MS	2.1 x 150	1	03C3-B421
	5	LC/MS	2.1 x 250	1	03C3-B521
	5	LC/MS	3.2 x 100	1	03C3-C321
	5	LC/MS	3.2 x 150	1	03C3-C421
	5	LC/MS	3.2 x 250	1	03C3-C521
	5	Hi-Speed	4.6 x 50	1	03C3-E221
	5	Analytical	4.6 x 100	1	03C3-E321
	5	Analytical	4.6 x 150	1	03C3-E421
	5	Analytical	4.6 x 250	1	03C3-E521
	5	Prep	10.0 x 150	1	03C3-H421
	5	Prep	10.0 x 250	1	03C3-H521
	5	Prep	21.2 x 150	1	03C3-I421
	5	Prep	21.2 x 250	1	03C3-I521
	10	Analytical	4.6 x 250	1	03C3-E531
	10	Prep	10.0 x 150	1	03C3-H431
	10	Prep	10.0 x 250	1	03C3-H531
	10	Prep	21.2 x 150	1	03C3-I431
	10	Prep	21.2 x 250	1	03C3-I531
	10	Prep	30.0 x 150	1	03C3-J431
	10	Prep	30.0 x 250	1	03C3-J531
	10	Prep	50.0 x 150	1	03C3-K431
	10	Prep	50.0 x 250	1	03C3-K531

VertiSep™ UPS

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS					
PFP	3	Ultra-Fast	2.1 x 10	1	03C5-B111
	3	Ultra-Fast	2.1 x 20	1	03C5-B611
	3	Ultra-Fast	2.1 x 50	1	03C5-B211
	3	LC/MS	2.1 x 100	1	03C5-B311
	3	LC/MS	2.1 x 150	1	03C5-B411
	3	LC/MS	3.2 x 100	1	03C5-C311
	3	LC/MS	3.2 x 150	1	03C5-C411
	3	Hi-Speed	4.6 x 50	1	03C5-E211
	3	Analytical	4.6 x 100	1	03C5-E311
	3	Analytical	4.6 x 150	1	03C5-E411
	3	Hi-Speed	7.8 x 50	1	03C5-G211
	3	Analytical	7.8 x 100	1	03C5-G311
	5	LC/MS	2.1 x 100	1	03C5-B321
	5	LC/MS	2.1 x 150	1	03C5-B421
	5	LC/MS	2.1 x 250	1	03C5-B521
	5	LC/MS	3.2 x 100	1	03C5-C321
	5	LC/MS	3.2 x 150	1	03C5-C421
	5	LC/MS	3.2 x 250	1	03C5-C521
	5	Hi-Speed	4.6 x 50	1	03C5-E221
	5	Analytical	4.6 x 100	1	03C5-E321
	5	Analytical	4.6 x 150	1	03C5-E421
	5	Analytical	4.6 x 250	1	03C5-E521
	5	Prep	10.0 x 150	1	03C5-H421
	5	Prep	10.0 x 250	1	03C5-H521
	5	Prep	21.2 x 150	1	03C5-I421
	5	Prep	21.2 x 250	1	03C5-I521
	10	Analytical	4.6 x 250	1	03C5-E531
	10	Prep	10.0 x 150	1	03C5-H431
	10	Prep	10.0 x 250	1	03C5-H531
	10	Prep	21.2 x 150	1	03C5-I431
	10	Prep	21.2 x 250	1	03C5-I531
	10	Prep	30.0 x 150	1	03C5-J431
	10	Prep	30.0 x 250	1	03C5-J531
	10	Prep	50.0 x 150	1	03C5-K431
	10	Prep	50.0 x 250	1	03C5-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS Guard Cartridges*					
C18	3	Guard	2.1 x 10	2	03CA-B113
	3	Guard	3.2 x 10	2	03CA-C113
	3	Guard	4.6 x 10	2	03CA-E113
	5	Guard	2.1 x 10	2	03CA-B123
	5	Guard	3.2 x 10	2	03CA-C123
	5	Guard	4.6 x 10	2	03CA-E123
	5	Guard	10.0 x 10	2	03CA-H123
	5	Guard	21.2 x 10	2	03CA-I123
	10	Guard	4.6 x 10	2	03CA-E133
	10	Guard	10.0 x 10	2	03CA-H133
	10	Guard	21.2 x 10	2	03CA-I133
C8	3	Guard	2.1 x 10	2	03CB-B113
	3	Guard	3.2 x 10	2	03CB-C113
	3	Guard	4.6 x 10	2	03CB-E113
	5	Guard	2.1 x 10	2	03CB-B123
	5	Guard	3.2 x 10	2	03CB-C123
	5	Guard	4.6 x 10	2	03CB-E123
	5	Guard	10.0 x 10	2	03CB-H123
	5	Guard	21.2 x 10	2	03CB-I123
	10	Guard	4.6 x 10	2	03CB-E133
	10	Guard	10.0 x 10	2	03CB-H133
	10	Guard	21.2 x 10	2	03CB-I133
Ph	3	Guard	2.1 x 10	2	03CD-B113
	3	Guard	3.2 x 10	2	03CD-C113
	3	Guard	4.6 x 10	2	03CD-E113
	5	Guard	2.1 x 10	2	03CD-B123
	5	Guard	3.2 x 10	2	03CD-C123
	5	Guard	4.6 x 10	2	03CD-E123
	5	Guard	10.0 x 10	2	03CD-H123
	5	Guard	21.2 x 10	2	03CD-I123
	10	Guard	4.6 x 10	2	03CD-E133
	10	Guard	10.0 x 10	2	03CD-H133
	10	Guard	21.2 x 10	2	03CD-I133
CN	3	Guard	2.1 x 10	2	03CE-B113
	3	Guard	3.2 x 10	2	03CE-C113
	3	Guard	4.6 x 10	2	03CE-E113
	5	Guard	2.1 x 10	2	03CE-B123
	5	Guard	3.2 x 10	2	03CE-C123
	5	Guard	4.6 x 10	2	03CE-E123
	5	Guard	10.0 x 10	2	03CE-H123
	5	Guard	21.2 x 10	2	03CE-I123
	10	Guard	4.6 x 10	2	03CE-E133
	10	Guard	10.0 x 10	2	03CE-H133
	10	Guard	21.2 x 10	2	03CE-I133

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ UPS Guard Cartridges*					
Si	3	Guard	2.1 x 10	2	03CG-B113
	3	Guard	3.2 x 10	2	03CG-C113
	3	Guard	4.6 x 10	2	03CG-E113
	5	Guard	2.1 x 10	2	03CG-B123
	5	Guard	3.2 x 10	2	03CG-C123
	5	Guard	4.6 x 10	2	03CG-E123
	5	Guard	10.0 x 10	2	03CG-H123
	5	Guard	21.2 x 10	2	03CG-I123
	10	Guard	4.6 x 10	2	03CG-E133
	10	Guard	10.0 x 10	2	03CG-H133
	10	Guard	21.2 x 10	2	03CG-I133
HILIC	3	Guard	2.1 x 10	2	03C3-B113
	3	Guard	3.2 x 10	2	03C3-C113
	3	Guard	4.6 x 10	2	03C3-E113
	5	Guard	2.1 x 10	2	03C3-B123
	5	Guard	3.2 x 10	2	03C3-C123
	5	Guard	4.6 x 10	2	03C3-E123
	5	Guard	10.0 x 10	2	03C3-H123
	5	Guard	21.2 x 10	2	03C3-I123
	10	Guard	4.6 x 10	2	03C3-E133
	10	Guard	10.0 x 10	2	03C3-H133
	10	Guard	21.2 x 10	2	03C3-I133
PFP	3	Guard	2.1 x 10	2	03C5-B113
	3	Guard	3.2 x 10	2	03C5-C113
	3	Guard	4.6 x 10	2	03C5-E113
	5	Guard	2.1 x 10	2	03C5-B123
	5	Guard	3.2 x 10	2	03C5-C123
	5	Guard	4.6 x 10	2	03C5-E123
	5	Guard	10.0 x 10	2	03C5-H123
	5	Guard	21.2 x 10	2	03C5-I123
	10	Guard	4.6 x 10	2	03C5-E133
	10	Guard	10.0 x 10	2	03C5-H133
	10	Guard	21.2 x 10	2	03C5-I133

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

0300-0001

0300-0002

0300-0003

VertiSep™ AQS HPLC Columns

- **Ultra-high purity spherical Silica offer excellent stability, efficiency and column-to-column reproducibility**
- **Stable and strong retention in 100% aqueous mobile phase for hydrophilic or polar compounds**
- **High carbon loading C18 offers high degree of hydrophobicity**
- **High surface area offers high resolution for gradient elution of diffculty separation compounds**
- **Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes.**

VertiSep™ AQS packings are ultra-high purity silica which contains less amounts of metal ions and sulfate contaminants offer excellent stability, efficiency, column-to-column reproducibility and long lifetime at high and low pH levels at pH 1.5-10.0* and ideal for LC/MS or ELSD application.

VertiSep™ AQS packings are polar-embed to eliminated detrimental effects of phase collapse. This offers stable and strong retention in 100% aqueous mobile phase for hydrophilic or polar compounds such as Biomolecules, Metabolytes, Oligosaccharides, Amino acids, small Peptides, Nucleotides and Organic acids.

VertiSep™ AQS packings are high surface of 300m²/g offer high capacity and high resolution for fast gradient elution.

VertiSep™ AQS reverse phase C18 packings are high carbon loading of 15% offerring the high degree of hydrophobicity.

VertiSep™ AQS reverse phase C8 packings are fully endcapped an show selectivity as conventional C18 phases.

VertiSep™ AQS packings are monomeric bonding resulting in lower column back pressure and high column efficiency to better resolve chemically similar analytes.

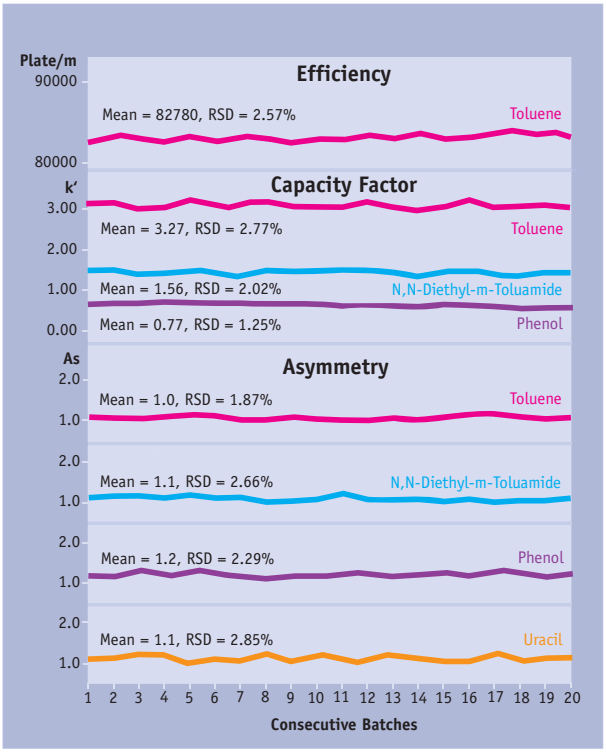
VertiSep™ AQS are manufactured by statistic process control of Silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

*VertiSep™ AQS CN is stable at pH 1.5-7.0

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m²/g)	End Capped
C18	3,5,10	15	120	1.0	300	Yes
C8	3,5,10	8	120	1.0	300	Yes
Ph	3,5,10	7	120	1.0	300	Yes
CN	3,5,10	4	120	1.0	300	Yes
NH2	3,5,10	3	120	1.0	300	No
Si	3,5,10	-	120	1.0	300	No
Diol	3,5,10	-	120	1.0	300	No

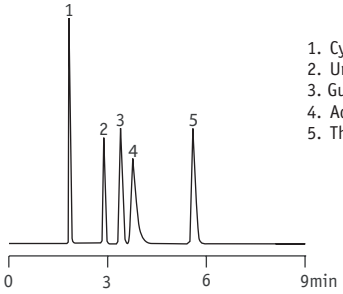
Reproducible Column Packing Method Controls



Test Conditions

Column: VertiSep™ AQS C18, 5µm, 4.6x250mm
Mobile Phase: Acetonitrile/Water (60/40)
Flow Rate: 1.0mL/min
Detector: UV254nm
Sample: Reversed phase test mix

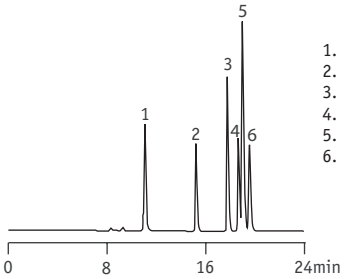
Nucleic acid Bases



1. Cytosine
2. Uracil
3. Guanine
4. Adenine
5. Thymine

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	ACN:25nM KH_2PO_4, pH 3.0 (2:98)
Flow Rate:	1.0mL/min
Detection:	UV254nm

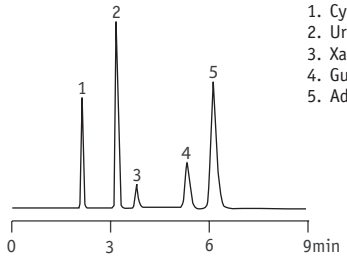
Polyphenolic Flavonoids



1. Myricetin
2. Quercetin
3. Naringenin
4. Hespheretin
5. Apigenin
6. Kaempferol

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	A: 25nM KH_2PO_4, B: ACN
Gradient:	Time:%B: 0:20, 15:40, 25:40
Flow Rate:	1mL/min
Detection:	UV280nm

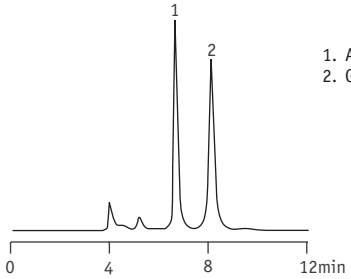
Nucleosides



1. Cytodine
2. Uridine
3. Xanthine
4. Guanosine
5. Adenosine

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	ACN:25nM KH_2PO_4, pH 3.0 (4:96)
Flow Rate:	1.0mL/min
Detection:	UV254nm

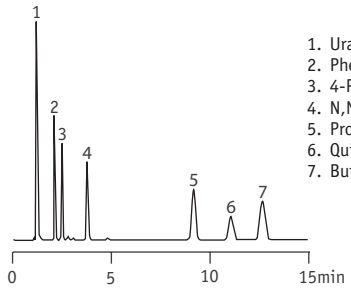
Antioxidants



1. Ascorbic acid
2. GSH

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	0.1M Phosphante, pH 3.1
Flow Rate:	1.0mL/min
Detection:	ECD

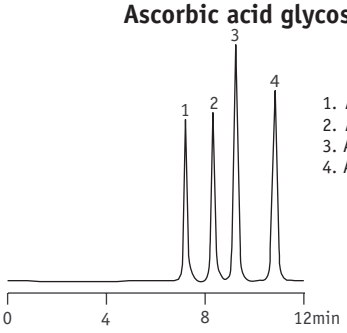
Acids, Bases & Neutrals Mix



1. Uracil
2. Phenol
3. 4-Phenylbutyric acid
4. N,N-Diethyl-m-toluamide
5. Propylbenzene
6. Quinizarin
7. Butylbenzene

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	ACN:25nM KH_2PO_4, pH 2.5 (65:35)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Ascorbic acid glycoside

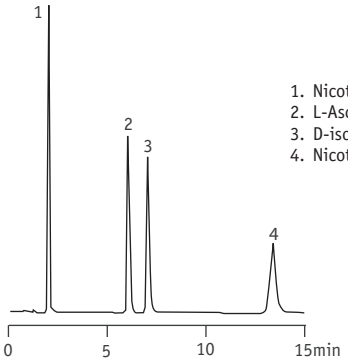


1. AA-2G
2. ASA
3. AA-5G
4. AA-6G

Column:	VertiSep™ AQS C18 5μm 4.6x150mm
Mobile Phase:	KH_2PO_4-H_3PO_4, pH 4.0
Flow Rate:	0.7mL/min
Detection:	UV240nm

VertiSep™ AQS

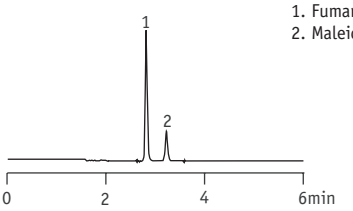
Water-soluble Vitamins



1. Nicotinamide
2. L-Ascorbic acid
3. D-iso-Ascorbic acid
4. Nicotinic acid

Column:	VertiSep™ AQS C8 5µm 4.6x150mm
Mobile Phase:	CH_3CN:5nM Cetyltrimetylammonium Br^+ + 50mM KH_2PO_4, pH4 by H_3PO_4 (5:95)
Flow Rate:	1.0mL/min
Detection:	UV254nm

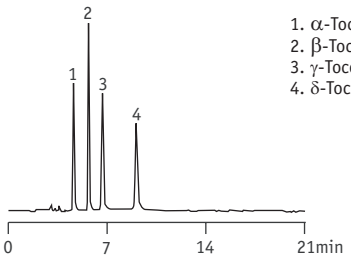
Maleic and Fumaric Acids



1. Fumaric acid
2. Maleic acid

Column:	VertiSep™ AQS C18 5µm 4.6x250mm
Mobile Phase:	50mM KH_2PO_4, pH 7.0
Flow Rate:	1.0mL/min
Detection:	UV210nm

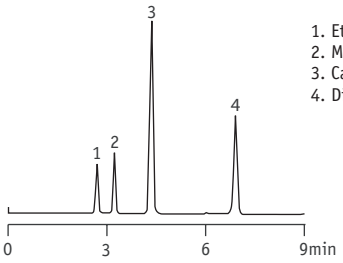
Tocopherol



1. α-Tocopherol
2. β-Tocopherol
3. γ-Tocopherol
4. δ-Tocopherol

Column:	VertiSep™ AQS NH2 5µm 4.6x250mm
Mobile Phase:	Ethyl Acetate:Hexane (30:70)
Flow Rate:	1.0mL/min
Detection:	UV290nm

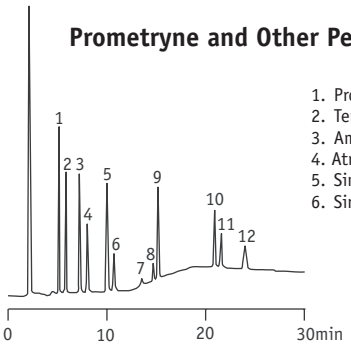
Anticonvulsants



1. Ethotoin
2. Mephenytoin
3. Carbamazepine
4. Diazepam

Column:	VertiSep™ AQS Ph 5µm 4.6x150mm
Mobile Phase:	A: Water, B: ACN
Gradient:	Time:%B: 0:25, 15:60
Flow Rate:	1.5mL/min
Detection:	UV254nm

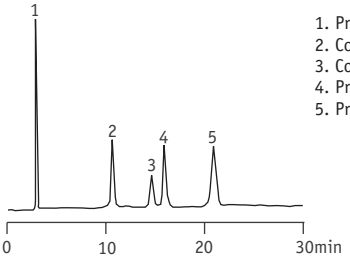
Prometryne and Other Pesticides



1. Prometryne
2. Terbutryne
3. Ametryne
4. Atrazine
5. Simetryne
6. Sinazine
7. Propoxur
8. Carbofuran
9. Carbaryl
10. Fenuron
11. Monuron
12. Methomyl

Column:	VertiSep™ AQS C18 5µm 4.6x150mm
Mobile Phase:	A: n-Hexane, B: C_2H_5OH
Gradient:	Time:%B: 0:1, 6:2
Flow Rate:	1.0mL/min
Detection:	UV230nm

Steroids



1. Progesterone
2. Corticosterone
3. Cortisone
4. Prednisone
5. Prednisolone

Column:	VertiSep™ AQS Diol 5µm 4.6x150mm
Mobile Phase:	Hexane:Ethanol (85:15)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
C18	3	Ultra-Fast	2.1 x 10	1	03DA-B111
	3	Ultra-Fast	2.1 x 20	1	03DA-B611
	3	Ultra-Fast	2.1 x 50	1	03DA-B211
	3	LC/MS	2.1 x 100	1	03DA-B311
	3	LC/MS	2.1 x 150	1	03DA-B411
	3	LC/MS	3.2 x 100	1	03DA-C311
	3	LC/MS	3.2 x 150	1	03DA-C411
	3	Hi-Speed	4.6 x 50	1	03DA-E211
	3	Analytical	4.6 x 100	1	03DA-E311
	3	Analytical	4.6 x 150	1	03DA-E411
	3	Hi-Speed	7.8 x 50	1	03DA-G211
	3	Analytical	7.8 x 100	1	03DA-G311
	5	LC/MS	2.1 x 100	1	03DA-B321
	5	LC/MS	2.1 x 150	1	03DA-B421
	5	LC/MS	3.2 x 100	1	03DA-C321
	5	LC/MS	3.2 x 150	1	03DA-C421
	5	LC/MS	3.2 x 250	1	03DA-C521
	5	Hi-Speed	4.6 x 50	1	03DA-E221
	5	Analytical	4.6 x 100	1	03DA-E321
	5	Analytical	4.6 x 150	1	03DA-E421
	5	Analytical	4.6 x 250	1	03DA-E521
	5	Prep	10.0 x 150	1	03DA-H421
	5	Prep	10.0 x 250	1	03DA-H521
	5	Prep	21.2 x 150	1	03DA-I421
	5	Prep	21.2 x 250	1	03DA-I521
	10	Analytical	4.6 x 250	1	03DA-E531
	10	Prep	10.0 x 150	1	03DA-H431
	10	Prep	10.0 x 250	1	03DA-H531
	10	Prep	21.2 x 150	1	03DA-I431
	10	Prep	21.2 x 250	1	03DA-I531
	10	Prep	30.0 x 150	1	03DA-J431
	10	Prep	30.0 x 250	1	03DA-J531
	10	Prep	50.0 x 150	1	03DA-K431
	10	Prep	50.0 x 250	1	03DA-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
C8	3	Ultra-Fast	2.1 x 10	1	03DB-B111
	3	Ultra-Fast	2.1 x 20	1	03DB-B611
	3	Ultra-Fast	2.1 x 50	1	03DB-B211
	3	LC/MS	2.1 x 100	1	03DB-B311
	3	LC/MS	2.1 x 150	1	03DB-B411
	3	LC/MS	3.2 x 100	1	03DB-C311
	3	LC/MS	3.2 x 150	1	03DB-C411
	3	Hi-Speed	4.6 x 50	1	03DB-E211
	3	Analytical	4.6 x 100	1	03DB-E311
	3	Analytical	4.6 x 150	1	03DB-E411
	3	Hi-Speed	7.8 x 50	1	03DB-G211
	3	Analytical	7.8 x 100	1	03DB-G311
	5	LC/MS	2.1 x 100	1	03DB-B321
	5	LC/MS	2.1 x 150	1	03DB-B421
	5	LC/MS	3.2 x 100	1	03DB-C321
	5	LC/MS	3.2 x 150	1	03DB-C421
	5	LC/MS	3.2 x 250	1	03DB-C521
	5	Hi-Speed	4.6 x 50	1	03DB-E221
	5	Analytical	4.6 x 100	1	03DB-E321
	5	Analytical	4.6 x 150	1	03DB-E421
	5	Analytical	4.6 x 250	1	03DB-E521
	5	Prep	10.0 x 150	1	03DB-H421
	5	Prep	10.0 x 250	1	03DB-H521
	5	Prep	21.2 x 150	1	03DB-I421
	5	Prep	21.2 x 250	1	03DB-I521
	10	Analytical	4.6 x 250	1	03DB-E531
	10	Prep	10.0 x 150	1	03DB-H431
	10	Prep	10.0 x 250	1	03DB-H531
	10	Prep	21.2 x 150	1	03DB-I431
	10	Prep	21.2 x 250	1	03DB-I531
	10	Prep	30.0 x 150	1	03DB-J431
	10	Prep	30.0 x 250	1	03DB-J531
	10	Prep	50.0 x 150	1	03DB-K431
	10	Prep	50.0 x 250	1	03DB-K531

VertiSep™ AQS

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
Ph	3	Ultra-Fast	2.1 x 10	1	03DD-B111
	3	Ultra-Fast	2.1 x 20	1	03DD-B611
	3	Ultra-Fast	2.1 x 50	1	03DD-B211
	3	LC/MS	2.1 x 100	1	03DD-B311
	3	LC/MS	2.1 x 150	1	03DD-B411
	3	LC/MS	3.2 x 100	1	03DD-C311
	3	LC/MS	3.2 x 150	1	03DD-C411
	3	Hi-Speed	4.6 x 50	1	03DD-E211
	3	Analytical	4.6 x 100	1	03DD-E311
	3	Analytical	4.6 x 150	1	03DD-E411
	3	Hi-Speed	7.8 x 50	1	03DD-G211
	3	Analytical	7.8 x 100	1	03DD-G311
	5	LC/MS	2.1 x 100	1	03DD-B321
	5	LC/MS	2.1 x 150	1	03DD-B421
	5	LC/MS	3.2 x 100	1	03DD-C321
	5	LC/MS	3.2 x 150	1	03DD-C421
	5	LC/MS	3.2 x 250	1	03DD-C521
	5	Hi-Speed	4.6 x 50	1	03DD-E221
	5	Analytical	4.6 x 100	1	03DD-E321
	5	Analytical	4.6 x 150	1	03DD-E421
	5	Analytical	4.6 x 250	1	03DD-E521
	5	Prep	10.0 x 150	1	03DD-H421
	5	Prep	10.0 x 250	1	03DD-H521
	5	Prep	21.2 x 150	1	03DD-I421
	5	Prep	21.2 x 250	1	03DD-I521
	10	Analytical	4.6 x 250	1	03DD-E531
	10	Prep	10.0 x 150	1	03DD-H431
	10	Prep	10.0 x 250	1	03DD-H531
	10	Prep	21.2 x 150	1	03DD-I431
	10	Prep	21.2 x 250	1	03DD-I531
	10	Prep	30.0 x 150	1	03DD-J431
	10	Prep	30.0 x 250	1	03DD-J531
	10	Prep	50.0 x 150	1	03DD-K431
	10	Prep	50.0 x 250	1	03DD-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
CN	3	Ultra-Fast	2.1 x 10	1	03DE-B111
	3	Ultra-Fast	2.1 x 20	1	03DE-B611
	3	Ultra-Fast	2.1 x 50	1	03DE-B211
	3	LC/MS	2.1 x 100	1	03DE-B311
	3	LC/MS	2.1 x 150	1	03DE-B411
	3	LC/MS	3.2 x 100	1	03DE-C311
	3	LC/MS	3.2 x 150	1	03DE-C411
	3	Hi-Speed	4.6 x 50	1	03DE-E211
	3	Analytical	4.6 x 100	1	03DE-E311
	3	Analytical	4.6 x 150	1	03DE-E411
	3	Hi-Speed	7.8 x 50	1	03DE-G211
	3	Analytical	7.8 x 100	1	03DE-G311
	5	LC/MS	2.1 x 100	1	03DE-B321
	5	LC/MS	2.1 x 150	1	03DE-B421
	5	LC/MS	3.2 x 100	1	03DE-C321
	5	LC/MS	3.2 x 150	1	03DE-C421
	5	LC/MS	3.2 x 250	1	03DE-C521
	5	Hi-Speed	4.6 x 50	1	03DE-E221
	5	Analytical	4.6 x 100	1	03DE-E321
	5	Analytical	4.6 x 150	1	03DE-E421
	5	Analytical	4.6 x 250	1	03DE-E521
	5	Prep	10.0 x 150	1	03DE-H421
	5	Prep	10.0 x 250	1	03DE-H521
	5	Prep	21.2 x 150	1	03DE-I421
	5	Prep	21.2 x 250	1	03DE-I521
	10	Analytical	4.6 x 250	1	03DE-E531
	10	Prep	10.0 x 150	1	03DE-H431
	10	Prep	10.0 x 250	1	03DE-H531
	10	Prep	21.2 x 150	1	03DE-I431
	10	Prep	21.2 x 250	1	03DE-I531
	10	Prep	30.0 x 150	1	03DE-J431
	10	Prep	30.0 x 250	1	03DE-J531
	10	Prep	50.0 x 150	1	03DE-K431
	10	Prep	50.0 x 250	1	03DE-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
NH2	3	Ultra-Fast	2.1 x 10	1	03DF-B111
	3	Ultra-Fast	2.1 x 20	1	03DF-B611
	3	Ultra-Fast	2.1 x 50	1	03DF-B211
	3	LC/MS	2.1 x 100	1	03DF-B311
	3	LC/MS	2.1 x 150	1	03DF-B411
	3	LC/MS	3.2 x 100	1	03DF-C311
	3	LC/MS	3.2 x 150	1	03DF-C411
	3	Hi-Speed	4.6 x 50	1	03DF-E211
	3	Analytical	4.6 x 100	1	03DF-E311
	3	Analytical	4.6 x 150	1	03DF-E411
	3	Hi-Speed	7.8 x 50	1	03DF-G211
	3	Analytical	7.8 x 100	1	03DF-G311
	5	LC/MS	2.1 x 100	1	03DF-B321
	5	LC/MS	2.1 x 150	1	03DF-B421
	5	LC/MS	3.2 x 100	1	03DF-C321
	5	LC/MS	3.2 x 150	1	03DF-C421
	5	LC/MS	3.2 x 250	1	03DF-C521
	5	Hi-Speed	4.6 x 50	1	03DF-E221
	5	Analytical	4.6 x 100	1	03DF-E321
	5	Analytical	4.6 x 150	1	03DF-E421
	5	Analytical	4.6 x 250	1	03DF-E521
	5	Prep	10.0 x 150	1	03DF-H421
	5	Prep	10.0 x 250	1	03DF-H521
	5	Prep	21.2 x 150	1	03DF-I421
	5	Prep	21.2 x 250	1	03DF-I521
	10	Analytical	4.6 x 250	1	03DF-E531
	10	Prep	10.0 x 150	1	03DF-H431
	10	Prep	10.0 x 250	1	03DF-H531
	10	Prep	21.2 x 150	1	03DF-I431
	10	Prep	21.2 x 250	1	03DF-I531
	10	Prep	30.0 x 150	1	03DF-J431
	10	Prep	30.0 x 250	1	03DF-J531
	10	Prep	50.0 x 150	1	03DF-K431
	10	Prep	50.0 x 250	1	03DF-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
Si	3	Ultra-Fast	2.1 x 10	1	03DG-B111
	3	Ultra-Fast	2.1 x 20	1	03DG-B611
	3	Ultra-Fast	2.1 x 50	1	03DG-B211
	3	LC/MS	2.1 x 100	1	03DG-B311
	3	LC/MS	2.1 x 150	1	03DG-B411
	3	LC/MS	3.2 x 100	1	03DG-C311
	3	LC/MS	3.2 x 150	1	03DG-C411
	3	Hi-Speed	4.6 x 50	1	03DG-E211
	3	Analytical	4.6 x 100	1	03DG-E311
	3	Analytical	4.6 x 150	1	03DG-E411
	3	Hi-Speed	7.8 x 50	1	03DG-G211
	3	Analytical	7.8 x 100	1	03DG-G311
	5	LC/MS	2.1 x 100	1	03DG-B321
	5	LC/MS	2.1 x 150	1	03DG-B421
	5	LC/MS	3.2 x 100	1	03DG-C321
	5	LC/MS	3.2 x 150	1	03DG-C421
	5	LC/MS	3.2 x 250	1	03DG-C521
	5	Hi-Speed	4.6 x 50	1	03DG-E221
	5	Analytical	4.6 x 100	1	03DG-E321
	5	Analytical	4.6 x 150	1	03DG-E421
	5	Analytical	4.6 x 250	1	03DG-E521
	5	Prep	10.0 x 150	1	03DG-H421
	5	Prep	10.0 x 250	1	03DG-H521
	5	Prep	21.2 x 150	1	03DG-I421
	5	Prep	21.2 x 250	1	03DG-I521
	10	Analytical	4.6 x 250	1	03DG-E531
	10	Prep	10.0 x 150	1	03DG-H431
	10	Prep	10.0 x 250	1	03DG-H531
	10	Prep	21.2 x 150	1	03DG-I431
	10	Prep	21.2 x 250	1	03DG-I531
	10	Prep	30.0 x 150	1	03DG-J431
	10	Prep	30.0 x 250	1	03DG-J531
	10	Prep	50.0 x 150	1	03DG-K431
	10	Prep	50.0 x 250	1	03DG-K531

VertiSep™ AQS

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS					
DIOL	3	Ultra-Fast	2.1 x 10	1	03DP-B111
	3	Ultra-Fast	2.1 x 20	1	03DP-B611
	3	Ultra-Fast	2.1 x 50	1	03DP-B211
	3	LC/MS	2.1 x 100	1	03DP-B311
	3	LC/MS	2.1 x 150	1	03DP-B411
	3	LC/MS	3.2 x 100	1	03DP-C311
	3	LC/MS	3.2 x 150	1	03DP-C411
	3	Hi-Speed	4.6 x 50	1	03DP-E211
	3	Analytical	4.6 x 100	1	03DP-E311
	3	Analytical	4.6 x 150	1	03DP-E411
	3	Hi-Speed	7.8 x 50	1	03DP-G211
	3	Analytical	7.8 x 100	1	03DP-G311
	5	LC/MS	2.1 x 100	1	03DP-B321
	5	LC/MS	2.1 x 150	1	03DP-B421
	5	LC/MS	3.2 x 100	1	03DP-C321
	5	LC/MS	3.2 x 150	1	03DP-C421
	5	LC/MS	3.2 x 250	1	03DP-C521
	5	Hi-Speed	4.6 x 50	1	03DP-E221
	5	Analytical	4.6 x 100	1	03DP-E321
	5	Analytical	4.6 x 150	1	03DP-E421
	5	Analytical	4.6 x 250	1	03DP-E521
	5	Prep	10.0 x 150	1	03DP-H421
	5	Prep	10.0 x 250	1	03DP-H521
	5	Prep	21.2 x 150	1	03DP-I421
	5	Prep	21.2 x 250	1	03DP-I521
	10	Analytical	4.6 x 250	1	03DP-E531
	10	Prep	10.0 x 150	1	03DP-H431
	10	Prep	10.0 x 250	1	03DP-H531
	10	Prep	21.2 x 150	1	03DP-I431
	10	Prep	21.2 x 250	1	03DP-I531
	10	Prep	30.0 x 150	1	03DP-J431
	10	Prep	30.0 x 250	1	03DP-J531
	10	Prep	50.0 x 150	1	03DP-K431
	10	Prep	50.0 x 250	1	03DP-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS Guard Cartridges*					
C18	3	Guard	2.1 x 10	2	03DA-B113
	3	Guard	3.2 x 10	2	03DA-C113
	3	Guard	4.6 x 10	2	03DA-E113
	5	Guard	2.1 x 10	2	03DA-B123
	5	Guard	3.2 x 10	2	03DA-C123
	5	Guard	4.6 x 10	2	03DA-E123
	5	Guard	10.0 x 10	2	03DA-H123
	5	Guard	21.2 x 10	2	03DA-I123
	10	Guard	4.6 x 10	2	03DA-E133
	10	Guard	10.0 x 10	2	03DA-H133
	10	Guard	21.2 x 10	2	03DA-I133
C8	3	Guard	2.1 x 10	2	03DB-B113
	3	Guard	3.2 x 10	2	03DB-C113
	3	Guard	4.6 x 10	2	03DB-E113
	5	Guard	2.1 x 10	2	03DB-B123
	5	Guard	3.2 x 10	2	03DB-C123
	5	Guard	4.6 x 10	2	03DB-E123
	5	Guard	10.0 x 10	2	03DB-H123
	5	Guard	21.2 x 10	2	03DB-I123
	10	Guard	4.6 x 10	2	03DB-E133
	10	Guard	10.0 x 10	2	03DB-H133
	10	Guard	21.2 x 10	2	03DB-I133
Ph	3	Guard	2.1 x 10	2	03DD-B113
	3	Guard	3.2 x 10	2	03DD-C113
	3	Guard	4.6 x 10	2	03DD-E113
	5	Guard	2.1 x 10	2	03DD-B123
	5	Guard	3.2 x 10	2	03DD-C123
	5	Guard	4.6 x 10	2	03DD-E123
	5	Guard	10.0 x 10	2	03DD-H123
	5	Guard	21.2 x 10	2	03DD-I123
	10	Guard	4.6 x 10	2	03DD-E133
	10	Guard	10.0 x 10	2	03DD-H133
	10	Guard	21.2 x 10	2	03DD-I133
CN	3	Guard	2.1 x 10	2	03DE-B113
	3	Guard	3.2 x 10	2	03DE-C113
	3	Guard	4.6 x 10	2	03DE-E113
	5	Guard	2.1 x 10	2	03DE-B123
	5	Guard	3.2 x 10	2	03DE-C123
	5	Guard	4.6 x 10	2	03DE-E123
	5	Guard	10.0 x 10	2	03DE-H123
	5	Guard	21.2 x 10	2	03DE-I123
	10	Guard	4.6 x 10	2	03DE-E133
	10	Guard	10.0 x 10	2	03DE-H133
	10	Guard	21.2 x 10	2	03DE-I133

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS Guard Cartridges*					
NH2	3	Guard	2.1 x 10	2	03DF-B113
	3	Guard	3.2 x 10	2	03DF-C113
	3	Guard	4.6 x 10	2	03DF-E113
	5	Guard	2.1 x 10	2	03DF-B123
	5	Guard	3.2 x 10	2	03DF-C123
	5	Guard	4.6 x 10	2	03DF-E123
	5	Guard	10.0 x 10	2	03DF-H123
	5	Guard	21.2 x 10	2	03DF-I123
	10	Guard	4.6 x 10	2	03DF-E133
	10	Guard	10.0 x 10	2	03DF-H133
	10	Guard	21.2 x 10	2	03DF-I133
Si	3	Guard	2.1 x 10	2	03DG-B113
	3	Guard	3.2 x 10	2	03DG-C113
	3	Guard	4.6 x 10	2	03DG-E113
	5	Guard	2.1 x 10	2	03DG-B123
	5	Guard	3.2 x 10	2	03DG-C123
	5	Guard	4.6 x 10	2	03DG-E123
	5	Guard	10.0 x 10	2	03DG-H123
	5	Guard	21.2 x 10	2	03DG-I123
	10	Guard	4.6 x 10	2	03DG-E133
	10	Guard	10.0 x 10	2	03DG-H133
	10	Guard	21.2 x 10	2	03DG-I133
DIOL	3	Guard	2.1 x 10	2	03DP-B113
	3	Guard	3.2 x 10	2	03DP-C113
	3	Guard	4.6 x 10	2	03DP-E113
	5	Guard	2.1 x 10	2	03DP-B123
	5	Guard	3.2 x 10	2	03DP-C123
	5	Guard	4.6 x 10	2	03DP-E123
	5	Guard	10.0 x 10	2	03DP-H123
	5	Guard	21.2 x 10	2	03DP-I123
	10	Guard	4.6 x 10	2	03DP-E133
	10	Guard	10.0 x 10	2	03DP-H133
	10	Guard	21.2 x 10	2	03DP-I133

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

0300-0001

0300-0002

0300-0003

VertiSep™ HCS HPLC Columns

- **High purity spherical silica offers high stability, efficiency and column-to-column reproducibility**
- **Highest carbon loading C18 offers highest degree of hydrophobicity for highest resolution of organic compounds that have similar structures**
- **High surface area offers high resolution for gradient elution**
- **Fully endcapped to improve peak symmetry**
- **Polymeric bonding offers high stability and longer column lifetime**

VertiSep™ HCS packings are high purity silica which contains less amonts of metal ions and sulfate contaminants offer high stability at pH 1.5-10.0 efficiency, column-to-column reproducibility and long lifetime.

VertiSep™ HCS reverse phase C18 packings are highest carbon loading of 23% offerring the highest degree of hydrophobicity for highest resolution of organic compounds that have similar structures such as Polynuclear Aromatic Hydrocarbons, Benzidines, Vitamins D2,D3, PTH and Amino acids.

VertiSep™ HCS packings are high surface of 350 m^2/g offer high capacity and high resolution for gradient elution.

VertiSep™ HCS reverse phase packings are fully endcapped and show selectivity as conventional C18 phases.

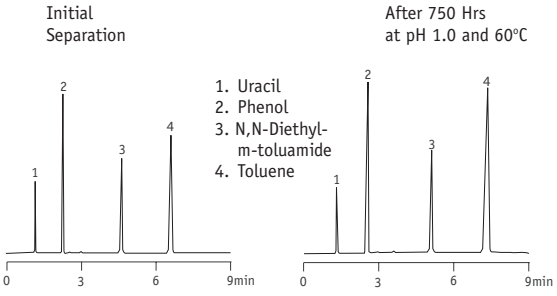
VertiSep™ HCS packings are polymeric bonding resulting high stability and longer column lifetime.

VertiSep™ HCS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C18	3,5,10	23	120	1.0	350	Yes
C8	3,5,10	16	120	1.0	350	Yes
Ph	3,5,10	10	120	1.0	350	Yes
C4	3,5,10	8	120	1.0	350	Yes
CN	3,5,10	5	120	1.0	350	Yes

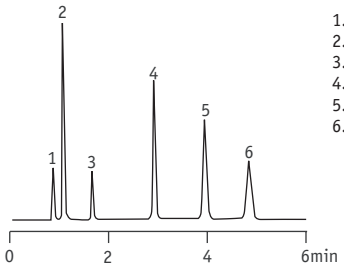
Stability Test



Column: VertiSep™ HCS C18 5µ 4.6x150mm
Mobile Phase: CH_3OH:Water (58:42)
Flow Rate: 1.0mL/min
Detection: UV230nm

* VertiSep™ HCS CN is stable at pH 1.5-7.0 packing

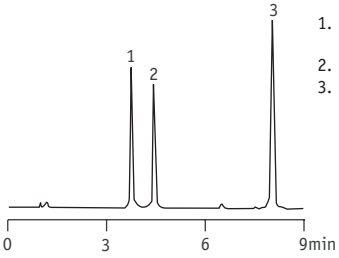
Acids, Bases and Neutrals



1. Uracil
2. Pyridine
3. Phenol
4. N,N-Dimethylaniline
5. 4-Butylbenzonic Acid
6. Toluene

Column:	VertiSep™ HCS C18 3µm 100x4.6mm
Mobile Phase:	50mM KH_2PO_4, pH 3.0:CH_3CN (40:60)
Flow Rate:	1.0mL/min
Detection:	UV254nm

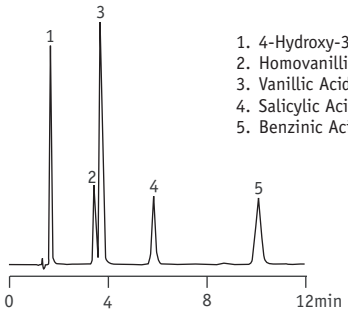
Antibacterials



1. Oxytetracycline Dihydrate
2. Tetracycline HCL
3. Meclocycline Sulfosalicylate Salt

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	A: 50mM KH_2PO_4, pH 3.0 B: CH_3CN
Gradient:	Time:%B: 0:15, 10:40
Flow Rate:	2.0mL/min
Detection:	UV254nm

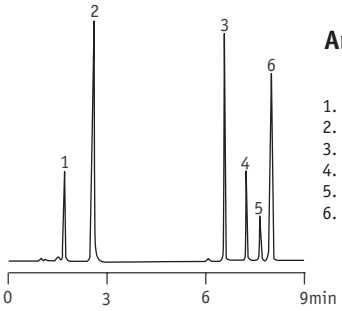
Aromatic Acids



1. 4-Hydroxy-3-methoxy-mandelic Acid
2. Homovanillic Acid
3. Vanillic Acid
4. Salicylic Acid
5. Benzinic Acid

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	50mM KH_2PO_4, pH 3.0:CH_3OH (60:40)
Flow Rate:	1.0mL/min
Detection:	UV254nm

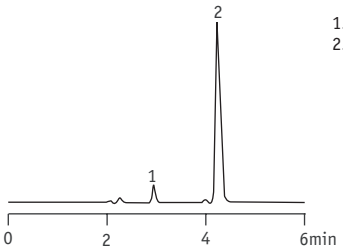
Analgesics



1. Aspirin
2. Acetaminophen
3. Naproxen
4. Fenprofen
5. Ibuprofen
6. Diclofenac

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	A: 50mM KH_2PO_4, pH 3.3 B: Menthanol C: Acetonitrile
Gradient:	Time:%B:%C: 0:10:10, 5:30:25
Flow Rate:	2.0mL/min
Detection:	UV280nm

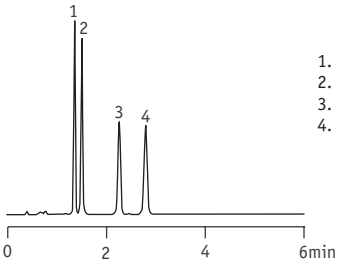
Aspartame



1. Degradant
2. Aspartame

Column:	VertiSep™ HCS C18 3µm 150x4.6mm
Mobile Phase:	50mM KH_2PO_4, pH 3.0:CH_3OH (80:20)
Flow Rate:	1.0mL/min
Detection:	UV220nm

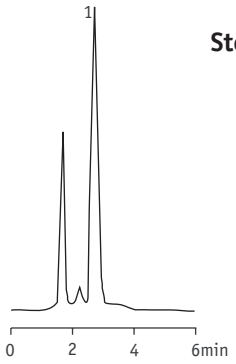
MDA & MDMA Analogs



1. 2,3-MDA
2. 3,4-MDA
3. 2,3-MDMA
4. 3,4-MDMA

Column:	VertiSep™ HCS C18 3µm 150x4.6mm
Mobile Phase:	50mM KH_2PO_4, pH 3.0:CH_3OH (80:20)
Flow Rate:	1.0mL/min
Detection:	UV280nm

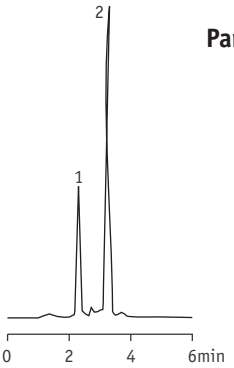
Steroids



1. Hydrocortisone

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	MeOH:H_2O (70:30)
Flow Rate:	1.0mL/min
Detection:	UV254nm

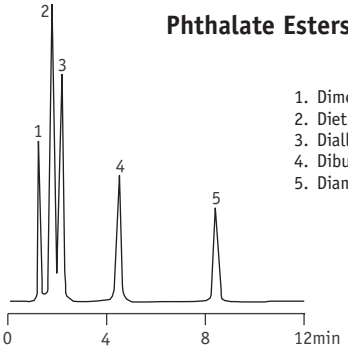
Parabens



1. Methyl paraben
2. Propyl paraben

Column:	VertiSep™ HCS C18 5µm 250x4.6mm
Mobile Phase:	ACN:Water (65:35)
Flow Rate:	1.2mL/min
Detection:	UV254nm

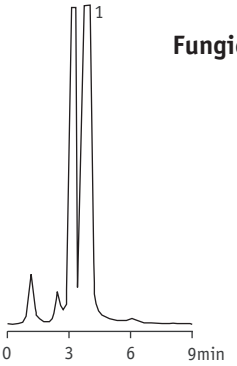
Phthalate Esters



1. Dimethyl Phthalate
2. Diethyl Phthalate
3. Diallyl Phthalate
4. Dibutyl Phthalate
5. Diamyl Phthalate

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	ACN:H_2O (70:30)
Flow Rate:	1.5mL/min
Detection:	UV254nm

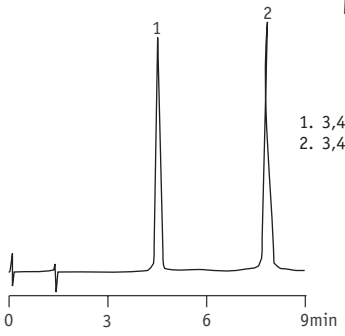
Fungicidal Dye



1. Fast Green

Column:	VertiSep™ HCS C18 5µm 150x4.6mm
Mobile Phase:	Tetrabutyl ammonium hydroxide, pH 6.5: 2-propanol (80:20)
Flow Rate:	1.5mL/min
Detection:	UV280nm

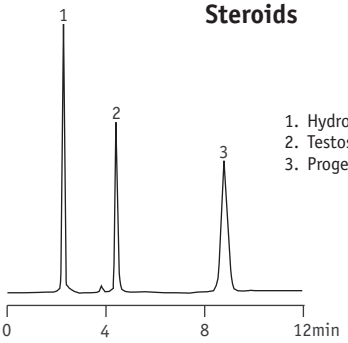
MDA



1. 3,4-MDA
2. 3,4-MDMA

Column:	VertiSep™ HCS C18 3µm 150x4.6mm
Mobile Phase:	Methylene Chloride: MeOH with 1% NH_4OH (80:20)
Flow Rate:	1.25mL/min
Detection:	UV280nm

Steroids



1. Hydrocortisone
2. Testosterone
3. Progesterone

Column:	VertiSep™ HCS C18 5µm 250x4.6mm
Mobile Phase:	MeOH:Water (70:30)
Flow Rate:	2.0mL/min
Detection:	UV254nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ HCS					
C18	3	Ultra-Fast	2.1 x 10	1	03BA-B111
	3	Ultra-Fast	2.1 x 20	1	03BA-B611
	3	Ultra-Fast	2.1 x 50	1	03BA-B211
	3	LC/MS	2.1 x 100	1	03BA-B311
	3	LC/MS	2.1 x 150	1	03BA-B411
	3	LC/MS	3.2 x 100	1	03BA-C311
	3	LC/MS	3.2 x 150	1	03BA-C411
	3	Analytical	4.6 x 100	1	03BA-E311
	3	Analytical	4.6 x 150	1	03BA-E411
	5	LC/MS	2.1 x 100	1	03BA-B321
	5	LC/MS	2.1 x 150	1	03BA-B421
	5	LC/MS	2.1 x 250	1	03BA-B521
	5	LC/MS	3.2 x 100	1	03BA-C321
	5	LC/MS	3.2 x 150	1	03BA-C421
	5	LC/MS	3.2 x 250	1	03BA-C521
	5	Analytical	4.6 x 100	1	03BA-E321
	5	Analytical	4.6 x 150	1	03BA-E421
	5	Analytical	4.6 x 250	1	03BA-E521
	5	Prep	10.0 x 150	1	03BA-H421
	5	Prep	10.0 x 250	1	03BA-H521
	5	Prep	21.2 x 150	1	03BA-I421
	5	Prep	21.2 x 250	1	03BA-I521
	10	Analytical	4.6 x 250	1	03BA-E531
	10	Prep	10.0 x 150	1	03BA-H431
	10	Prep	10.0 x 250	1	03BA-H531
	10	Prep	21.2 x 150	1	03BA-I431
	10	Prep	21.2 x 250	1	03BA-I531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ HCS					
C8	3	Ultra-Fast	2.1 x 10	1	03BB-B111
	3	Ultra-Fast	2.1 x 20	1	03BB-B611
	3	Ultra-Fast	2.1 x 50	1	03BB-B211
	3	LC/MS	2.1 x 100	1	03BB-B311
	3	LC/MS	2.1 x 150	1	03BB-B411
	3	LC/MS	3.2 x 100	1	03BB-C311
	3	LC/MS	3.2 x 150	1	03BB-C411
	3	Analytical	4.6 x 100	1	03BB-E311
	3	Analytical	4.6 x 150	1	03BB-E411
	5	LC/MS	2.1 x 100	1	03BB-B321
	5	LC/MS	2.1 x 150	1	03BB-B421
	5	LC/MS	2.1 x 250	1	03BB-B521
	5	LC/MS	3.2 x 100	1	03BB-C321
	5	LC/MS	3.2 x 150	1	03BB-C421
	5	LC/MS	3.2 x 250	1	03BB-C521
	5	Analytical	4.6 x 100	1	03BB-E321
	5	Analytical	4.6 x 150	1	03BB-E421
	5	Analytical	4.6 x 250	1	03BB-E521
	5	Prep	10.0 x 150	1	03BB-H421
	5	Prep	10.0 x 250	1	03BB-H521
	5	Prep	21.2 x 150	1	03BB-I421
	5	Prep	21.2 x 250	1	03BB-I521
	10	Analytical	4.6 x 250	1	03BB-E531
	10	Prep	10.0 x 150	1	03BB-H431
	10	Prep	10.0 x 250	1	03BB-H531
	10	Prep	21.2 x 150	1	03BB-I431
	10	Prep	21.2 x 250	1	03BB-I531

VertiSep™ HCS

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ HCS					
Ph	3	Ultra-Fast	2.1 x 10	1	03BD-B111
	3	Ultra-Fast	2.1 x 20	1	03BD-B611
	3	Ultra-Fast	2.1 x 50	1	03BD-B211
	3	LC/MS	2.1 x 100	1	03BD-B311
	3	LC/MS	2.1 x 150	1	03BD-B411
	3	LC/MS	3.2 x 100	1	03BD-C311
	3	LC/MS	3.2 x 150	1	03BD-C411
	3	Analytical	4.6 x 100	1	03BD-E311
	3	Analytical	4.6 x 150	1	03BD-E411
	5	LC/MS	2.1 x 100	1	03BD-B321
	5	LC/MS	2.1 x 150	1	03BD-B421
	5	LC/MS	2.1 x 250	1	03BD-B521
	5	LC/MS	3.2 x 100	1	03BD-C321
	5	LC/MS	3.2 x 150	1	03BD-C421
	5	LC/MS	3.2 x 250	1	03BD-C521
	5	Analytical	4.6 x 100	1	03BD-E321
	5	Analytical	4.6 x 150	1	03BD-E421
	5	Analytical	4.6 x 250	1	03BD-E521
	5	Prep	10.0 x 150	1	03BD-H421
	5	Prep	10.0 x 250	1	03BD-H521
	5	Prep	21.2 x 150	1	03BD-I421
	5	Prep	21.2 x 250	1	03BD-I521
	10	Analytical	4.6 x 250	1	03BD-E531
	10	Prep	10.0 x 150	1	03BD-H431
	10	Prep	10.0 x 250	1	03BD-H531
	10	Prep	21.2 x 150	1	03BD-I431
	10	Prep	21.2 x 250	1	03BD-I531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ HCS					
C4	3	Ultra-Fast	2.1 x 10	1	03BC-B111
	3	Ultra-Fast	2.1 x 20	1	03BC-B611
	3	Ultra-Fast	2.1 x 50	1	03BC-B211
	3	LC/MS	2.1 x 100	1	03BC-B311
	3	LC/MS	2.1 x 150	1	03BC-B411
	3	LC/MS	3.2 x 100	1	03BC-C311
	3	LC/MS	3.2 x 150	1	03BC-C411
	3	Analytical	4.6 x 100	1	03BC-E311
	3	Analytical	4.6 x 150	1	03BC-E411
	5	LC/MS	2.1 x 100	1	03BC-B321
	5	LC/MS	2.1 x 150	1	03BC-B421
	5	LC/MS	2.1 x 250	1	03BC-B521
	5	LC/MS	3.2 x 100	1	03BC-C321
	5	LC/MS	3.2 x 150	1	03BC-C421
	5	LC/MS	3.2 x 250	1	03BC-C521
	5	Analytical	4.6 x 100	1	03BC-E321
	5	Analytical	4.6 x 150	1	03BC-E421
	5	Analytical	4.6 x 250	1	03BC-E521
	5	Prep	10.0 x 150	1	03BC-H421
	5	Prep	10.0 x 250	1	03BC-H521
	5	Prep	21.2 x 150	1	03BC-I421
	5	Prep	21.2 x 250	1	03BC-I521
	10	Analytical	4.6 x 250	1	03BC-E531
	10	Prep	10.0 x 150	1	03BC-H431
	10	Prep	10.0 x 250	1	03BC-H531
	10	Prep	21.2 x 150	1	03BC-I431
	10	Prep	21.2 x 250	1	03BC-I531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ HCS					
CN	3	Ultra-Fast	2.1 x 10	1	03BE-B111
	3	Ultra-Fast	2.1 x 20	1	03BE-B611
	3	Ultra-Fast	2.1 x 50	1	03BE-B211
	3	LC/MS	2.1 x 100	1	03BE-B311
	3	LC/MS	2.1 x 150	1	03BE-B411
	3	LC/MS	3.2 x 100	1	03BE-C311
	3	LC/MS	3.2 x 150	1	03BE-C411
	3	Analytical	4.6 x 100	1	03BE-E311
	3	Analytical	4.6 x 150	1	03BE-E411
	5	LC/MS	2.1 x 100	1	03BE-B321
	5	LC/MS	2.1 x 150	1	03BE-B421
	5	LC/MS	2.1 x 250	1	03BE-B521
	5	LC/MS	3.2 x 100	1	03BE-C321
	5	LC/MS	3.2 x 150	1	03BE-C421
	5	LC/MS	3.2 x 250	1	03BE-C521
	5	Analytical	4.6 x 100	1	03BE-E321
	5	Analytical	4.6 x 150	1	03BE-E421
	5	Analytical	4.6 x 250	1	03BE-E521
	5	Prep	10.0 x 150	1	03BE-H421
	5	Prep	10.0 x 250	1	03BE-H521
	5	Prep	21.2 x 150	1	03BE-I421
	5	Prep	21.2 x 250	1	03BE-I521
	10	Analytical	4.6 x 250	1	03BE-E531
	10	Prep	10.0 x 150	1	03BE-H431
	10	Prep	10.0 x 250	1	03BE-H531
	10	Prep	21.2 x 150	1	03BE-I431
	10	Prep	21.2 x 250	1	03BE-I531

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

0300-0001

0300-0002

0300-0003

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ AQS Guard Cartridges*					
C18	3	Guard	2.1 x 10	2	03BA-B113
	3	Guard	3.2 x 10	2	03BA-C113
	3	Guard	4.6 x 10	2	03BA-E113
	5	Guard	2.1 x 10	2	03BA-B123
	5	Guard	3.2 x 10	2	03BA-C123
	5	Guard	4.6 x 10	2	03BA-E123
	5	Guard	10.0 x 10	2	03BA-H123
	5	Guard	21.2 x 10	2	03BA-I123
	10	Guard	4.6 x 10	2	03BA-E133
	10	Guard	10.0 x 10	2	03BA-H133
	10	Guard	21.2 x 10	2	03BA-I133
C8	3	Guard	2.1 x 10	2	03BB-B113
	3	Guard	3.2 x 10	2	03BB-C113
	3	Guard	4.6 x 10	2	03BB-E113
	5	Guard	2.1 x 10	2	03BB-B123
	5	Guard	3.2 x 10	2	03BB-C123
	5	Guard	4.6 x 10	2	03BB-E123
	5	Guard	10.0 x 10	2	03BB-H123
	5	Guard	21.2 x 10	2	03BB-I123
	10	Guard	4.6 x 10	2	03BB-E133
	10	Guard	10.0 x 10	2	03BB-H133
	10	Guard	21.2 x 10	2	03BB-I133
Ph	3	Guard	2.1 x 10	2	03BD-B113
	3	Guard	3.2 x 10	2	03BD-C113
	3	Guard	4.6 x 10	2	03BD-E113
	5	Guard	2.1 x 10	2	03BD-B123
	5	Guard	3.2 x 10	2	03BD-C123
	5	Guard	4.6 x 10	2	03BD-E123
	5	Guard	10.0 x 10	2	03BD-H123
	5	Guard	21.2 x 10	2	03BD-I123
	10	Guard	4.6 x 10	2	03BD-E133
	10	Guard	10.0 x 10	2	03BD-H133
	10	Guard	21.2 x 10	2	03BD-I133
C4	3	Guard	2.1 x 10	2	03BC-B113
	3	Guard	3.2 x 10	2	03BC-C113
	3	Guard	4.6 x 10	2	03BC-E113
	5	Guard	2.1 x 10	2	03BC-B123
	5	Guard	3.2 x 10	2	03BC-C123
	5	Guard	4.6 x 10	2	03BC-E123
	5	Guard	10.0 x 10	2	03BC-H123
	5	Guard	21.2 x 10	2	03BC-I123
	10	Guard	4.6 x 10	2	03BC-E133
	10	Guard	10.0 x 10	2	03BC-H133
	10	Guard	21.2 x 10	2	03BC-I133
CN	3	Guard	2.1 x 10	2	03BE-B113
	3	Guard	3.2 x 10	2	03BE-C113
	3	Guard	4.6 x 10	2	03BE-E113
	5	Guard	2.1 x 10	2	03BE-B123
	5	Guard	3.2 x 10	2	03BE-C123
	5	Guard	4.6 x 10	2	03BE-E123
	5	Guard	10.0 x 10	2	03BE-H123
	5	Guard	21.2 x 10	2	03BE-I123
	10	Guard	4.6 x 10	2	03BE-E133
	10	Guard	10.0 x 10	2	03BE-H133
	10	Guard	21.2 x 10	2	03BE-I133

*Guard holder required

VertiSep™ BDS HPLC Columns

- **An excellent alternative to Hypersil® BDS at a reasonable lower price**
- **Most methods on Hypersil® BDS can be transfered to VertiSep™ BDS**
- **Excellent Column-to-Column reproducibility**
- **Full guarantee**

VertiSep™ BDS are highly base deactivation for basic compounds while offer superior efficiency for neutral and acidic compounds. VertiSep™ BDS has four stable reverse phase packings C18, C8, Phenyl and Cyano that well suited for pharmaceutical and other biological compounds.

VertiSep™ BDS was developed to provide a physical and performance characteristics very similar to those of Hypersil® BDS.

VertiSep™ BDS provides the results indicated comparable capacity, selectivity efficiency and peak symmetry when compared to Hypersil® BDS. Most methods developed on Hypersil® BDS can be transfered to VertiSep™ BDS, even for USP applications.

VertiSep™ BDS are manufactured to minimize lot-to-lot variation with a strict QC program to ensure excellent column-to-column reproducibility.

VertiSep™ BDS are guaranteed separations of your samples will be comparable to separations with Hypersil® BDS columns. If VertiSep™ BDS does not meet your satisfaction, send in comparative data within 45 days and keep VertiSep™ BDS column for FREE.

VertiSep™ BDS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

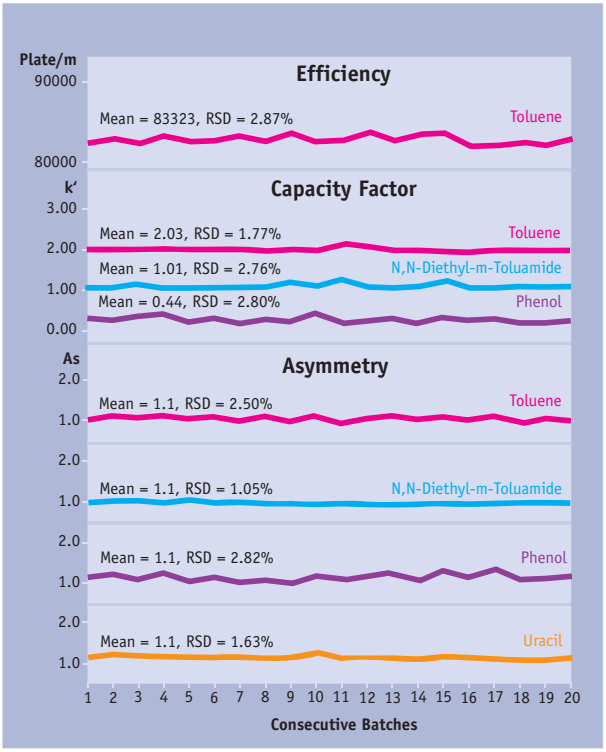
Packing Characteristics Comparision

	Hypersil® BDS	VertiSep™ BDS
Particle Shape	Spherical	Spherical
Particle Size	3,5mm	3,5mm
Pore Size	130Å	140Å
Surface Area	170m²/g	150m²/g
Pore Volumn	0.6mL/g	0.6mL/g
Endcapped	Yes	Yes

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m²/g)	End Capped
C18	3,5	11	140	0.6	150	Yes
C8	3,5	6	140	0.6	150	Yes
Ph	3,5	5	140	0.6	150	Yes
CN	3,5	4	140	0.6	150	Yes

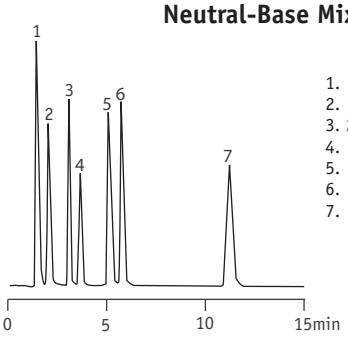
Reproducible Column Packing Method Controls



Test Conditions

Column: VertiSep™ BDS C18, 5µm, 4.6x250mm
Mobile Phase: Acetonitrile:Water (60:40)
Flow Rate: 1.0mL/min
Detector: UV254nm
Sample: Reversed phase test mix

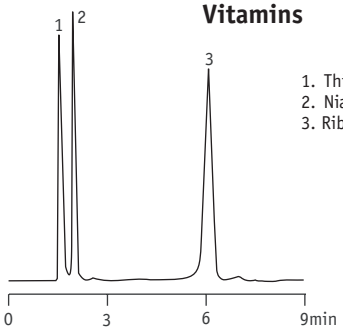
Neutral-Base Mix



1. Uracil
2. Aniline
3. 2-Nitroaniline
4. 2,4-Dinitroaniline
5. 3,5-Xylenol
6. Anisole
7. Toluene

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	MeOH:0.05M KH_2PO_4, pH 3.5 (65:35)
Flow Rate:	1.0mL/min
Detection:	UV254nm

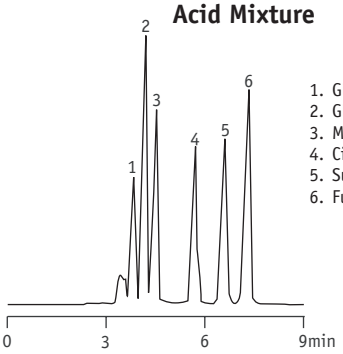
Vitamins



1. Thiamine (B1)
2. Niacinamide (B3)
3. Riboflavin (B2)

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	MeOH:0.05M KH_2PO_4, pH 3.5 (30:70)
Flow Rate:	1.0mL/min
Detection:	UV254nm

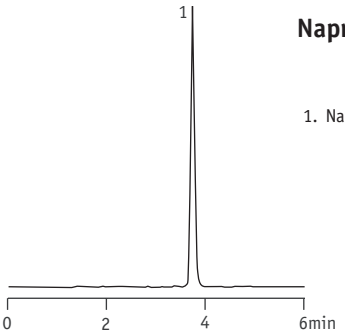
Acid Mixture



1. Glutamic Acid
2. Glycolic Acid
3. Malic Acid
4. Citric Acid
5. Succinic Acid
6. Fumaric Acid

Column:	VertiSep™ BDS C18 5µm 250x4.6mm
Mobile Phase:	0.2M H_3PO_4:MeOH (65:35)
Flow Rate:	0.8mL/min
Detection:	UV254nm

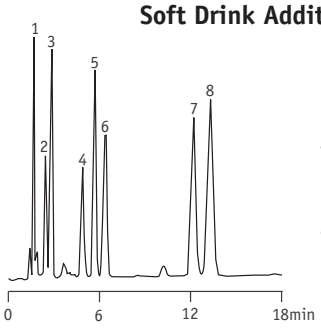
Naproxen



1. Naproxen

Column:	VertiSep™ BDS C18 5µm 250x4.6mm
Mobile Phase:	20 molar KH_2PO_4 buffer, pH 3.0: 10% ACN (90:10)
Flow Rate:	1.0mL/min
Detection:	UV254nm

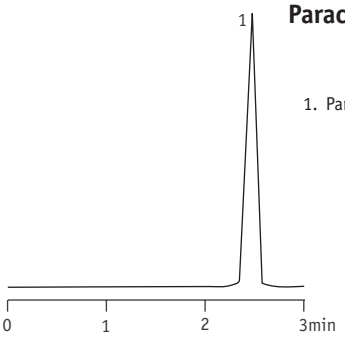
Soft Drink Additives



1. L-Ascorbic Acid
2. Succharin
3. Caffeine
4. Sodium Salicylate
5. Vanillin
6. Aspartame
7. Sorbic Acid
8. Benzonic Acid

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	MeOH:1% Acetic Acid (30:70)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Paracetamol

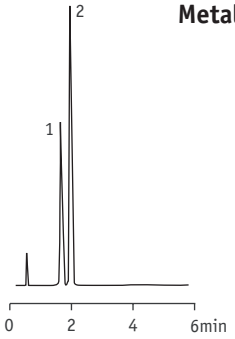


1. Paracetamol

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	ACN:0.05M KH_2PO_4, pH 4.5 (30:70)
Flow Rate:	1.0mL/min
Detection:	UV254nm

VertiSep™ BDS

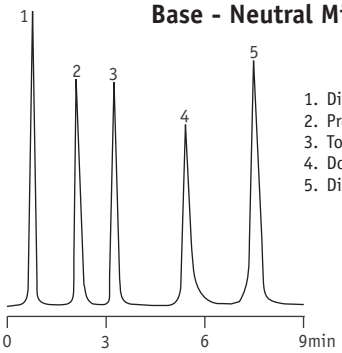
Metal Chelator



1. Pyridine
2. 2,2'Dipyridyl

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	ACN:0.05M KH_2PO_4, pH 3.0 (50:50)
Flow Rate:	1.0mL/min
Detection:	UV254nm

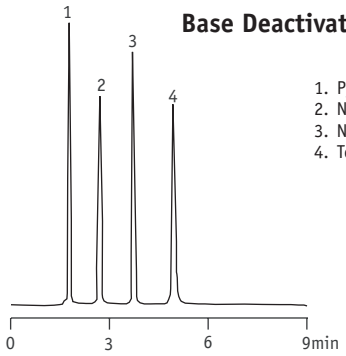
Base - Neutral Mix



1. Dihydroxyacetone
2. Propanolol
3. Toluene
4. Doxepin
5. Dibutyl Phthalate

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	MeOH:0.05M KH_2PO_4, pH7.0 (75:25)
Flow Rate:	1.0mL/min
Detection:	UV254nm

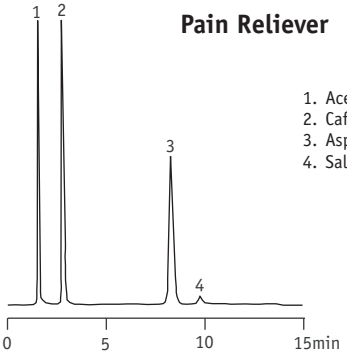
Base Deactivation



1. Pyridine
2. N-Methylaniline
3. N,N-Dimethylaniline
4. Toluene

Column:	VertiSep™ BDS C18 5µm 250x4.6mm
Mobile Phase:	ACN:0.05M KH_2PO_4, pH 4.5 (60:40)
Flow Rate:	1.0mL/min
Detection:	UV254nm

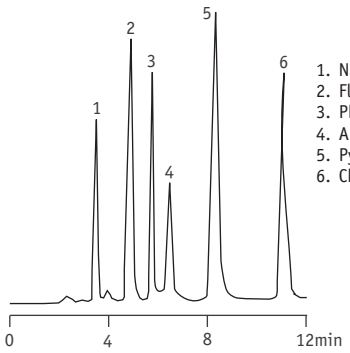
Pain Reliever



1. Acetaminophen
2. Caffeine
3. Aspirin
4. Salicylic Acid

Column:	VertiSep™ BDS C18 5µm 250x4.6mm
Mobile Phase:	H_2O:MeOH:Acetic Acid (720mL:250mL:3mL)
Flow Rate:	1.25mL/min
Detection:	UV275nm

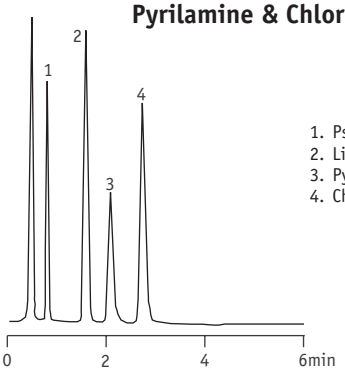
Aromatic Hydrocarbons



1. Naphthalene
2. Fluorene
3. Phenanthrene
4. Anthracene
5. Pyrene
6. Chrysene

Column:	VertiSep™ BDS C18 5µm 150x4.6mm
Mobile Phase:	ACN:Water (75:25)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Pyrilamine & Chlorpheniramine



1. Pseudophenedrine
2. Lidocaine
3. Pyrilamine
4. Chlorpheniramine

Column:	VertiSep™ BDS C18 3µm 100x4.6mm
Mobile Phase:	ACN:0.05M KH_2PO_4, pH 2.5 (20:80)
Flow Rate:	2.0mL/min
Detection:	UV220nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BDS					
C18	3	Ultra-Fast	2.1 x 50	1	03FA-B211
	3	LC/MS	2.1 x 100	1	03FA-B311
	3	LC/MS	2.1 x 150	1	03FA-B411
	3	LC/MS	3.2 x 100	1	03FA-C311
	3	LC/MS	3.2 x 150	1	03FA-C411
	3	Hi-Speed	4.6 x 50	1	03FA-E211
	3	Analytical	4.6 x 100	1	03FA-E311
	3	Analytical	4.6 x 150	1	03FA-E411
	3	Hi-Speed	7.8 x 50	1	03FA-G211
	3	Analytical	7.8 x 100	1	03FA-G311
	5	LC/MS	2.1 x 100	1	03FA-B321
	5	LC/MS	2.1 x 150	1	03FA-B421
	5	LC/MS	3.2 x 100	1	03FA-C321
	5	LC/MS	3.2 x 150	1	03FA-C421
	5	Analytical	3.9 x 150	1	03FA-L421
	5	Analytical	3.9 x 300	1	03FA-L921
	5	Hi-Speed	4.6 x 50	1	03FA-E221
	5	Analytical	4.6 x 150	1	03FA-E421
	5	Analytical	4.6 x 250	1	03FA-E521
C8	3	Ultra-Fast	2.1 x 50	1	03FB-B211
	3	LC/MS	2.1 x 100	1	03FB-B311
	3	LC/MS	2.1 x 150	1	03FB-B411
	3	LC/MS	3.2 x 100	1	03FB-C311
	3	LC/MS	3.2 x 150	1	03FB-C411
	3	Hi-Speed	4.6 x 50	1	03FB-E211
	3	Analytical	4.6 x 100	1	03FB-E311
	3	Analytical	4.6 x 150	1	03FB-E411
	3	Hi-Speed	7.8 x 50	1	03FB-G211
	3	Analytical	7.8 x 100	1	03FB-G311
	5	LC/MS	2.1 x 100	1	03FB-B321
	5	LC/MS	2.1 x 150	1	03FB-B421
	5	LC/MS	3.2 x 100	1	03FB-C321
	5	LC/MS	3.2 x 150	1	03FB-C421
	5	Analytical	3.9 x 150	1	03FB-L421
	5	Analytical	3.9 x 300	1	03FB-L921
	5	Hi-Speed	4.6 x 50	1	03FB-E221
	5	Analytical	4.6 x 150	1	03FB-E421
	5	Analytical	4.6 x 250	1	03FB-E521
Ph	3	Ultra-Fast	2.1 x 50	1	03FD-B211
	3	LC/MS	2.1 x 100	1	03FD-B311
	3	LC/MS	2.1 x 150	1	03FD-B411
	3	LC/MS	3.2 x 100	1	03FD-C311
	3	LC/MS	3.2 x 150	1	03FD-C411
	3	Hi-Speed	4.6 x 50	1	03FD-E211
	3	Analytical	4.6 x 100	1	03FD-E311
	3	Analytical	4.6 x 150	1	03FD-E411
	3	Hi-Speed	7.8 x 50	1	03FD-G211
	3	Analytical	7.8 x 100	1	03FD-G311
	5	LC/MS	2.1 x 100	1	03FD-B321
	5	LC/MS	2.1 x 150	1	03FD-B421
	5	LC/MS	3.2 x 100	1	03FD-C321
	5	LC/MS	3.2 x 150	1	03FD-C421
	5	Analytical	3.9 x 150	1	03FD-L421
	5	Analytical	3.9 x 300	1	03FD-L921
	5	Hi-Speed	4.6 x 50	1	03FD-E221
	5	Analytical	4.6 x 150	1	03FD-E421
	5	Analytical	4.6 x 250	1	03FD-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BDS					
CN	3	Ultra-FEst	2.1 x 50	1	03FE-B211
	3	LC/MS	2.1 x 100	1	03FE-B311
	3	LC/MS	2.1 x 150	1	03FE-B411
	3	LC/MS	3.2 x 100	1	03FE-C311
	3	LC/MS	3.2 x 150	1	03FE-C411
	3	Hi-Speed	4.6 x 50	1	03FE-E211
	3	Analytical	4.6 x 100	1	03FE-E311
	3	Analytical	4.6 x 150	1	03FE-E411
	3	Hi-Speed	7.8 x 50	1	03FE-G211
	3	Analytical	7.8 x 100	1	03FE-G311
	5	LC/MS	2.1 x 100	1	03FE-B321
	5	LC/MS	2.1 x 150	1	03FE-B421
	5	LC/MS	3.2 x 100	1	03FE-C321
	5	LC/MS	3.2 x 150	1	03FE-C421
	5	Analytical	3.9 x 150	1	03FE-L421
	5	Analytical	3.9 x 300	1	03FE-L921
	5	Hi-Speed	4.6 x 50	1	03FE-E221
	5	Analytical	4.6 x 150	1	03FE-E421
	5	Analytical	4.6 x 250	1	03FE-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BDS Guard Cartridges					
C18	3	Guard	2.1 x 10	2	03FA-B113
	3	Guard	3.2 x 10	2	03FA-C113
	3	Guard	4.6 x 10	2	03FA-E113
	5	Guard	2.1 x 10	2	03FA-B123
	5	Guard	3.2 x 10	2	03FA-C123
	5	Guard	4.6 x 10	2	03FA-E123
C8	3	Guard	2.1 x 10	2	03FB-B113
	3	Guard	3.2 x 10	2	03FB-C113
	3	Guard	4.6 x 10	2	03FB-E113
	5	Guard	2.1 x 10	2	03FB-B123
	5	Guard	3.2 x 10	2	03FB-C123
	5	Guard	4.6 x 10	2	03FB-E123
Ph	3	Guard	2.1 x 10	2	03FD-B113
	3	Guard	3.2 x 10	2	03FD-C113
	3	Guard	4.6 x 10	2	03FD-E113
	5	Guard	2.1 x 10	2	03FD-B123
	5	Guard	3.2 x 10	2	03FD-C123
	5	Guard	4.6 x 10	2	03FD-E123
CN	3	Guard	2.1 x 10	2	03FE-B113
	3	Guard	3.2 x 10	2	03FE-C113
	3	Guard	4.6 x 10	2	03FE-E113
	5	Guard	2.1 x 10	2	03FE-B123
	5	Guard	3.2 x 10	2	03FE-C123
	5	Guard	4.6 x 10	2	03FE-E123

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

VertiSep™ EPS HPLC Columns

- **High purity base-deactivated silica for sharp symmetrical peaks**
- **Dual retention mechanism; hydrophobic and hydrophilic with enhanced-polar selectivity**
- **Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes**
- **Exceptional efficiency and reproducibilty**

VertiSep™ EPS are high purity spherical base-deactivated silica which contains less amounts of metal ions and sulfate contaminants offerring ultra performance with excellent stability at pH 1.5-7.5 and symmetrical peak shape for sensitive metal compounds.

VertiSep™ EPS are monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes.

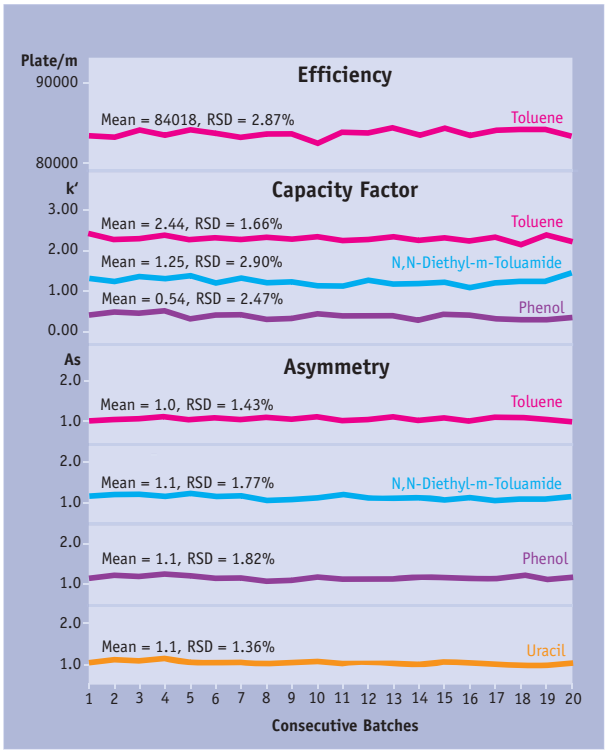
VertiSep™ EPS have both hydrophobic and hydrophilic selectivity. The polar funtional group of the compounds interact secondary with hydrophilic site and are retained primarily by reversed phase mechanism. This special design offers unique selectivity for separation of polar compounds containg amine, carboxyl, phenol, cyano, hydroxide, nitrite, brominated, fluorinate and chlorinated groups found in pharmaceutical, food and environmental applications.

VertiSep™ EPS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C18	3,5,10	7	100	1.1	200	No
C8	3,5,10	5	100	1.1	200	No
Ph	3,5,10	4	100	1.1	200	No
CN	3,5,10	3	100	1.1	200	No
Si	3,5,10	-	100	1.1	200	No
DIOL	3,5,10	-	100	1.1	200	No

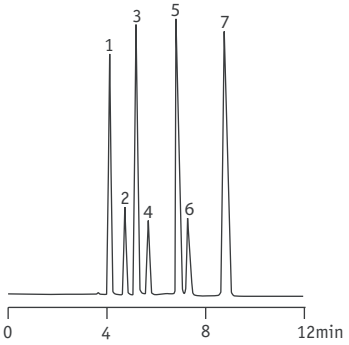
Reproducible Column Packing Method Controls



Test Conditions

Column: VertiSep™ EPS C18, 5µm, 4.6x250mm
Mobile Phase: 60:40 Acetonitrile /Water
Flow Rate: 1.0mL/min
Detector: UV 254nm
Sample: Reversed phase test mix

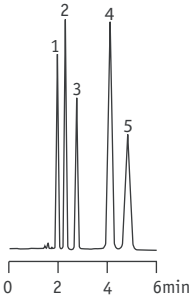
Organic acids



1. Tartaric Acid
2. Malic Acid
3. Lactic Acid
4. Diglycolic Acid
5. Maleic Acid
6. Succinic Acid
7. Fumaric Acid

Column:	VertiSep™ EPS C8 5µm 4.6x150mm
Mobile Phase:	0.025M KH_2PO_4, pH 2.5:MeOH (97:3)
Flow Rate:	0.7mL/min
Detection:	UV220nm

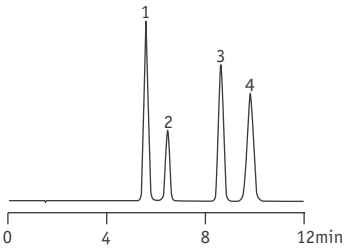
Water Soluble Vitamins



1. Ascorbic Acid
2. Nicotinic Acid
3. Pyridoxamine
4. Niacinamide
5. Folic Acid

Column:	VertiSep™ EPS C18 5µm 4.6x150mm
Mobile Phase:	A: 0.1M $NH_4H_2PO_4$, pH 4.5
	B: ACN
Gradient:	Time/%B: 0/5, 4/5, 15/40, 18/40
Flow Rate:	1.0mL/min
Detection:	UV254nm

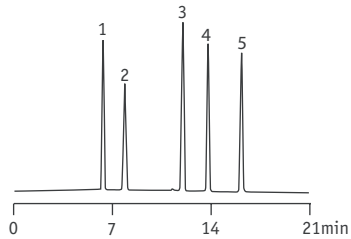
Organochlorine Pesticides



1. Methoxychlor
2. Dieldrin
3. Heptachlor
4. 4,4-DDT

Column:	VertiSep™ EPS C18 5µm 4.6x150mm
Mobile Phase:	MeOH:0.025M KH_2PO_4, pH 7.0 (75:25)
Flow Rate:	1.0mL/min
Detection:	UV220nm

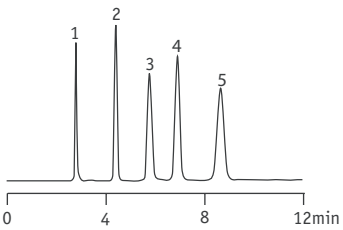
Nucleosides



1. Cytidine
2. Uridine
3. Xanthine
4. Guanosine
5. Adenosine

Column:	VertiSep™ EPS C18 5µm 4.6x250mm
Mobile Phase:	A: 0.03M KH_2PO_4, pH 3.2
	B: ACN
Gradient:	Time/%B: 0/5, 2/5, 20/30
Flow Rate:	0.7mL/min
Detection:	UV260nm

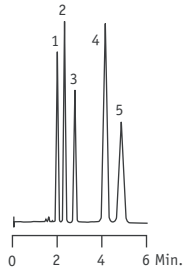
Antibacterials



1. Sulfanilimide
2. Cefaclor
3. Cefatrizine
4. Thiamphenicol
5. Cefotaxime

Column:	VertiSep™ EPS C18 5µm 4.6x150mm
Mobile Phase:	0.025M KH_2PO_4, pH 7.0:ACN (90:10)
Flow Rate:	1.0mL/min
Detection:	UV230nm

Sedatives/Hypnotics



1. Sulfanilimide
2. Cefaclor
3. Cefatrizine
4. Thiamphenicol
5. Cefotaxime

Column:	VertiSep™ EPS C18 5µm 4.6x150mm
Mobile Phase:	MeOH:ACN:0.05M $NH_4H_2PO_4$, pH 4.5 (50:10:40)
Flow Rate:	1.0mL/min
Detection:	UV230nm

VertiSep™ EPS

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
C18	3	Ultra-Fast	2.1 x 10	1	03EA-B111
	3	Ultra-Fast	2.1 x 20	1	03EA-B611
	3	Ultra-Fast	2.1 x 50	1	03EA-B211
	3	LC/MS	2.1 x 100	1	03EA-B311
	3	LC/MS	2.1 x 150	1	03EA-B411
	3	LC/MS	3.2 x 100	1	03EA-C311
	3	LC/MS	3.2 x 150	1	03EA-C411
	3	Hi-Speed	4.6 x 50	1	03EA-E211
	3	Analytical	4.6 x 100	1	03EA-E311
	3	Analytical	4.6 x 150	1	03EA-E411
	3	Hi-Speed	7.8 x 50	1	03EA-G211
	3	Analytical	7.8 x 100	1	03EA-G311
	5	LC/MS	2.1 x 100	1	03EA-B321
	5	LC/MS	2.1 x 150	1	03EA-B421
	5	LC/MS	2.1 x 250	1	03EA-B521
	5	LC/MS	3.2 x 100	1	03EA-C321
	5	LC/MS	3.2 x 150	1	03EA-C421
	5	LC/MS	3.2 x 250	1	03EA-C521
	5	Hi-Speed	4.6 x 50	1	03EA-E221
	5	Analytical	4.6 x 100	1	03EA-E321
	5	Analytical	4.6 x 150	1	03EA-E421
	5	Analytical	4.6 x 250	1	03EA-E521
	5	Prep	10.0 x 150	1	03EA-H421
	5	Prep	10.0 x 250	1	03EA-H521
	5	Prep	21.2 x 150	1	03EA-I421
	5	Prep	21.2 x 250	1	03EA-I521
	10	Analytical	4.6 x 250	1	03EA-E531
	10	Prep	10.0 x 150	1	03EA-H431
	10	Prep	10.0 x 250	1	03EA-H531
	10	Prep	21.2 x 150	1	03EA-I431
	10	Prep	21.2 x 250	1	03EA-I531
	10	Prep	30.0 x 150	1	03EA-J431
	10	Prep	30.0 x 250	1	03EA-J531
	10	Prep	50.0 x 150	1	03EA-K431
	10	Prep	50.0 x 250	1	03EA-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
C8	3	Ultra-Fast	2.1 x 10	1	03EB-B111
	3	Ultra-Fast	2.1 x 20	1	03EB-B611
	3	Ultra-Fast	2.1 x 50	1	03EB-B211
	3	LC/MS	2.1 x 100	1	03EB-B311
	3	LC/MS	2.1 x 150	1	03EB-B411
	3	LC/MS	3.2 x 100	1	03EB-C311
	3	LC/MS	3.2 x 150	1	03EB-C411
	3	Hi-Speed	4.6 x 50	1	03EB-E211
	3	Analytical	4.6 x 100	1	03EB-E311
	3	Analytical	4.6 x 150	1	03EB-E411
	3	Hi-Speed	7.8 x 50	1	03EB-G211
	3	Analytical	7.8 x 100	1	03EB-G311
	5	LC/MS	2.1 x 100	1	03EB-B321
	5	LC/MS	2.1 x 150	1	03EB-B421
	5	LC/MS	2.1 x 250	1	03EB-B521
	5	LC/MS	3.2 x 100	1	03EB-C321
	5	LC/MS	3.2 x 150	1	03EB-C421
	5	LC/MS	3.2 x 250	1	03EB-C521
	5	Hi-Speed	4.6 x 50	1	03EB-E221
	5	Analytical	4.6 x 100	1	03EB-E321
	5	Analytical	4.6 x 150	1	03EB-E421
	5	Analytical	4.6 x 250	1	03EB-E521
	5	Prep	10.0 x 150	1	03EB-H421
	5	Prep	10.0 x 250	1	03EB-H521
	5	Prep	21.2 x 150	1	03EB-I421
	5	Prep	21.2 x 250	1	03EB-I521
	10	Analytical	4.6 x 250	1	03EB-E531
	10	Prep	10.0 x 150	1	03EB-H431
	10	Prep	10.0 x 250	1	03EB-H531
	10	Prep	21.2 x 150	1	03EB-I431
	10	Prep	21.2 x 250	1	03EB-I531
	10	Prep	30.0 x 150	1	03EB-J431
	10	Prep	30.0 x 250	1	03EB-J531
	10	Prep	50.0 x 150	1	03EB-K431
	10	Prep	50.0 x 250	1	03EB-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
Ph	3	Ultra-Fast	2.1 x 10	1	03ED-B111
	3	Ultra-Fast	2.1 x 20	1	03ED-B611
	3	Ultra-Fast	2.1 x 50	1	03ED-B211
	3	LC/MS	2.1 x 100	1	03ED-B311
	3	LC/MS	2.1 x 150	1	03ED-B411
	3	LC/MS	3.2 x 100	1	03ED-C311
	3	LC/MS	3.2 x 150	1	03ED-C411
	3	Hi-Speed	4.6 x 50	1	03ED-E211
	3	Analytical	4.6 x 100	1	03ED-E311
	3	Analytical	4.6 x 150	1	03ED-E411
	3	Hi-Speed	7.8 x 50	1	03ED-G211
	3	Analytical	7.8 x 100	1	03ED-G311
	5	LC/MS	2.1 x 100	1	03ED-B321
	5	LC/MS	2.1 x 150	1	03ED-B421
	5	LC/MS	2.1 x 250	1	03ED-B521
	5	LC/MS	3.2 x 100	1	03ED-C321
	5	LC/MS	3.2 x 150	1	03ED-C421
	5	LC/MS	3.2 x 250	1	03ED-C521
	5	Hi-Speed	4.6 x 50	1	03ED-E221
	5	Analytical	4.6 x 100	1	03ED-E321
	5	Analytical	4.6 x 150	1	03ED-E421
	5	Analytical	4.6 x 250	1	03ED-E521
	5	Prep	10.0 x 150	1	03ED-H421
	5	Prep	10.0 x 250	1	03ED-H521
	5	Prep	21.2 x 150	1	03ED-I421
	5	Prep	21.2 x 250	1	03ED-I521
	10	Analytical	4.6 x 250	1	03ED-E531
	10	Prep	10.0 x 150	1	03ED-H431
	10	Prep	10.0 x 250	1	03ED-H531
	10	Prep	21.2 x 150	1	03ED-I431
	10	Prep	21.2 x 250	1	03ED-I531
	10	Prep	30.0 x 150	1	03ED-J431
	10	Prep	30.0 x 250	1	03ED-J531
	10	Prep	50.0 x 150	1	03ED-K431
	10	Prep	50.0 x 250	1	03ED-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
CN	3	Ultra-Fast	2.1 x 10	1	03EE-B111
	3	Ultra-Fast	2.1 x 20	1	03EE-B611
	3	Ultra-Fast	2.1 x 50	1	03EE-B211
	3	LC/MS	2.1 x 100	1	03EE-B311
	3	LC/MS	2.1 x 150	1	03EE-B411
	3	LC/MS	3.2 x 100	1	03EE-C311
	3	LC/MS	3.2 x 150	1	03EE-C411
	3	Hi-Speed	4.6 x 50	1	03EE-E211
	3	Analytical	4.6 x 100	1	03EE-E311
	3	Analytical	4.6 x 150	1	03EE-E411
	3	Hi-Speed	7.8 x 50	1	03EE-G211
	3	Analytical	7.8 x 100	1	03EE-G311
	5	LC/MS	2.1 x 100	1	03EE-B321
	5	LC/MS	2.1 x 150	1	03EE-B421
	5	LC/MS	2.1 x 250	1	03EE-B521
	5	LC/MS	3.2 x 100	1	03EE-C321
	5	LC/MS	3.2 x 150	1	03EE-C421
	5	LC/MS	3.2 x 250	1	03EE-C521
	5	Hi-Speed	4.6 x 50	1	03EE-E221
	5	Analytical	4.6 x 100	1	03EE-E321
	5	Analytical	4.6 x 150	1	03EE-E421
	5	Analytical	4.6 x 250	1	03EE-E521
	5	Prep	10.0 x 150	1	03EE-H421
	5	Prep	10.0 x 250	1	03EE-H521
	5	Prep	21.2 x 150	1	03EE-I421
	5	Prep	21.2 x 250	1	03EE-I521
	10	Analytical	4.6 x 250	1	03EE-E531
	10	Prep	10.0 x 150	1	03EE-H431
	10	Prep	10.0 x 250	1	03EE-H531
	10	Prep	21.2 x 150	1	03EE-I431
	10	Prep	21.2 x 250	1	03EE-I531
	10	Prep	30.0 x 150	1	03EE-J431
	10	Prep	30.0 x 250	1	03EE-J531
	10	Prep	50.0 x 150	1	03EE-K431
	10	Prep	50.0 x 250	1	03EE-K531

VertiSep™ EPS

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
Si	3	Ultra-Fast	2.1 x 10	1	03EG-B111
	3	Ultra-Fast	2.1 x 20	1	03EG-B611
	3	Ultra-Fast	2.1 x 50	1	03EG-B211
	3	LC/MS	2.1 x 100	1	03EG-B311
	3	LC/MS	2.1 x 150	1	03EG-B411
	3	LC/MS	3.2 x 100	1	03EG-C311
	3	LC/MS	3.2 x 150	1	03EG-C411
	3	Hi-Speed	4.6 x 50	1	03EG-E211
	3	Analytical	4.6 x 100	1	03EG-E311
	3	Analytical	4.6 x 150	1	03EG-E411
	3	Hi-Speed	7.8 x 50	1	03EG-G211
	3	Analytical	7.8 x 100	1	03EG-G311
	5	LC/MS	2.1 x 100	1	03EG-B321
	5	LC/MS	2.1 x 150	1	03EG-B421
	5	LC/MS	2.1 x 250	1	03EG-B521
	5	LC/MS	3.2 x 100	1	03EG-C321
	5	LC/MS	3.2 x 150	1	03EG-C421
	5	LC/MS	3.2 x 250	1	03EG-C521
	5	Hi-Speed	4.6 x 50	1	03EG-E221
	5	Analytical	4.6 x 100	1	03EG-E321
	5	Analytical	4.6 x 150	1	03EG-E421
	5	Analytical	4.6 x 250	1	03EG-E521
	5	Prep	10.0 x 150	1	03EG-H421
	5	Prep	10.0 x 250	1	03EG-H521
	5	Prep	21.2 x 150	1	03EG-I421
	5	Prep	21.2 x 250	1	03EG-I521
	10	Analytical	4.6 x 250	1	03EG-E531
	10	Prep	10.0 x 150	1	03EG-H431
	10	Prep	10.0 x 250	1	03EG-H531
	10	Prep	21.2 x 150	1	03EG-I431
	10	Prep	21.2 x 250	1	03EG-I531
	10	Prep	30.0 x 150	1	03EG-J431
	10	Prep	30.0 x 250	1	03EG-J531
	10	Prep	50.0 x 150	1	03EG-K431
	10	Prep	50.0 x 250	1	03EG-K531

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS					
DIOL	3	Ultra-Fast	2.1 x 10	1	03EP-B111
	3	Ultra-Fast	2.1 x 20	1	03EP-B611
	3	Ultra-Fast	2.1 x 50	1	03EP-B211
	3	LC/MS	2.1 x 100	1	03EP-B311
	3	LC/MS	2.1 x 150	1	03EP-B411
	3	LC/MS	3.2 x 100	1	03EP-C311
	3	LC/MS	3.2 x 150	1	03EP-C411
	3	Hi-Speed	4.6 x 50	1	03EP-E211
	3	Analytical	4.6 x 100	1	03EP-E311
	3	Analytical	4.6 x 150	1	03EP-E411
	3	Hi-Speed	7.8 x 50	1	03EP-G211
	3	Analytical	7.8 x 100	1	03EP-G311
	5	LC/MS	2.1 x 100	1	03EP-B321
	5	LC/MS	2.1 x 150	1	03EP-B421
	5	LC/MS	2.1 x 250	1	03EP-B521
	5	LC/MS	3.2 x 100	1	03EP-C321
	5	LC/MS	3.2 x 150	1	03EP-C421
	5	LC/MS	3.2 x 250	1	03EP-C521
	5	Hi-Speed	4.6 x 50	1	03EP-E221
	5	Analytical	4.6 x 100	1	03EP-E321
	5	Analytical	4.6 x 150	1	03EP-E421
	5	Analytical	4.6 x 250	1	03EP-E521
	5	Prep	10.0 x 150	1	03EP-H421
	5	Prep	10.0 x 250	1	03EP-H521
	5	Prep	21.2 x 150	1	03EP-I421
	5	Prep	21.2 x 250	1	03EP-I521
	10	Analytical	4.6 x 250	1	03EP-E531
	10	Prep	10.0 x 150	1	03EP-H431
	10	Prep	10.0 x 250	1	03EP-H531
	10	Prep	21.2 x 150	1	03EP-I431
	10	Prep	21.2 x 250	1	03EP-I531
	10	Prep	30.0 x 150	1	03EP-J431
	10	Prep	30.0 x 250	1	03EP-J531
	10	Prep	50.0 x 150	1	03EP-K431
	10	Prep	50.0 x 250	1	03EP-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS Guard Cartridges					
C18	3	Guard	2.1 x 10	2	03EA-B113
	3	Guard	3.2 x 10	2	03EA-C113
	3	Guard	4.6 x 10	2	03EA-E113
	5	Guard	2.1 x 10	2	03EA-B123
	5	Guard	3.2 x 10	2	03EA-C123
	5	Guard	4.6 x 10	2	03EA-E123
	5	Guard	10.0 x 10	2	03EA-H123
	5	Guard	21.2 x 10	2	03EA-I123
	10	Guard	4.6 x 10	2	03EA-E133
	10	Guard	10.0 x 10	2	03EA-H133
	10	Guard	21.2 x 10	2	03EA-I133
C8	3	Guard	2.1 x 10	2	03EB-B113
	3	Guard	3.2 x 10	2	03EB-C113
	3	Guard	4.6 x 10	2	03EB-E113
	5	Guard	2.1 x 10	2	03EB-B123
	5	Guard	3.2 x 10	2	03EB-C123
	5	Guard	4.6 x 10	2	03EB-E123
	5	Guard	10.0 x 10	2	03EB-H123
	5	Guard	21.2 x 10	2	03EB-I123
	10	Guard	4.6 x 10	2	03EB-E133
	10	Guard	10.0 x 10	2	03EB-H133
	10	Guard	21.2 x 10	2	03EB-I133
Ph	3	Guard	2.1 x 10	2	03ED-B113
	3	Guard	3.2 x 10	2	03ED-C113
	3	Guard	4.6 x 10	2	03ED-E113
	5	Guard	2.1 x 10	2	03ED-B123
	5	Guard	3.2 x 10	2	03ED-C123
	5	Guard	4.6 x 10	2	03ED-E123
	5	Guard	10.0 x 10	2	03ED-H123
	5	Guard	21.2 x 10	2	03ED-I123
	10	Guard	4.6 x 10	2	03ED-E133
	10	Guard	10.0 x 10	2	03ED-H133
	10	Guard	21.2 x 10	2	03ED-I133
CN	3	Guard	2.1 x 10	2	03EE-B113
	3	Guard	3.2 x 10	2	03EE-C113
	3	Guard	4.6 x 10	2	03EE-E113
	5	Guard	2.1 x 10	2	03EE-B123
	5	Guard	3.2 x 10	2	03EE-C123
	5	Guard	4.6 x 10	2	03EE-E123
	5	Guard	10.0 x 10	2	03EE-H123
	5	Guard	21.2 x 10	2	03EE-I123
	10	Guard	4.6 x 10	2	03EE-E133
	10	Guard	10.0 x 10	2	03EE-H133
	10	Guard	21.2 x 10	2	03EE-I133

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ EPS Guard Cartridges					
Si	3	Guard	2.1 x 10	2	03EG-B113
	3	Guard	3.2 x 10	2	03EG-C113
	3	Guard	4.6 x 10	2	03EG-E113
	5	Guard	2.1 x 10	2	03EG-B123
	5	Guard	3.2 x 10	2	03EG-C123
	5	Guard	4.6 x 10	2	03EG-E123
	5	Guard	10.0 x 10	2	03EG-H123
	5	Guard	21.2 x 10	2	03EG-I123
	10	Guard	4.6 x 10	2	03EG-E133
	10	Guard	10.0 x 10	2	03EG-H133
	10	Guard	21.2 x 10	2	03EG-I133
DIOL	3	Guard	2.1 x 10	2	03EP-B113
	3	Guard	3.2 x 10	2	03EP-C113
	3	Guard	4.6 x 10	2	03EP-E113
	5	Guard	2.1 x 10	2	03EP-B123
	5	Guard	3.2 x 10	2	03EP-C123
	5	Guard	4.6 x 10	2	03EP-E123
	5	Guard	10.0 x 10	2	03EP-H123
	5	Guard	21.2 x 10	2	03EP-I123
	10	Guard	4.6 x 10	2	03EP-E133
	10	Guard	10.0 x 10	2	03EP-H133
	10	Guard	21.2 x 10	2	03EP-I133

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

0300-0001

0300-0002

0300-0003

VertiSep™ GES HPLC Columns

- **High purity Silica offer high stability, efficiency, reproducibility**
- **Moderate pore size and surface area are perfect for general purpose**
- **High carbon loading C18 offers high degree of hydrophobicity for high resolution of organic compounds that have similar structures**
- **Fully endcapped to improve peak symmetry**
- **Polymeric bonding offers high stability and longer column lifetime**
- **Economic Price**

VertiSep™ GES packings are high purity Silica which contains less amounts of metal ions and sulfate contaminants offer high stability at pH 1.5-10.0*, efficiency, column-to-column reproducibility.

VertiSep™ GES packings are moderate pore size and surface area proving general purpose separations of variety of compounds.

VertiSep™ GES reverse phase C18 packings are high carbon loading of 17% offerring the high degree of hydrophobicity for high resolution of organic compounds that have similar structures such as Polynuclear Aromatic Hydrocarbons, Benzidines, Vitamins D2, D3, Amino acids.

VertiSep™ GES reverse phase packings are fully endcapped an show selectivity as conventional C18 phases.

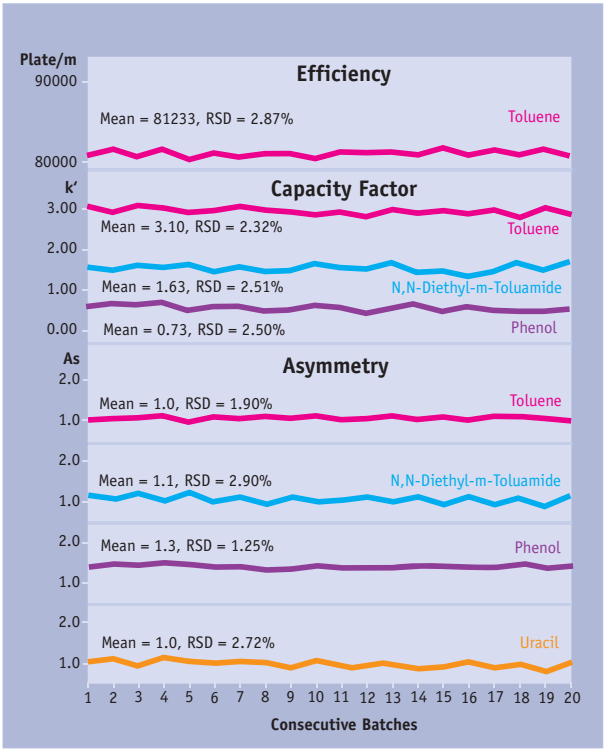
VertiSep™ GES packings are polymeric bonding resulting high stability and longer column lifetime.

VertiSep™ GES are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C18	3,5,10	17	120	1.0	300	Yes
C8	3,5,10	13	120	1.0	300	Yes
Ph	3,5,10	8	120	1.0	300	Yes
C4	3,5,10	6	120	1.0	300	Yes
CN	3,5,10	3.5	120	1.0	300	Yes
NH2	3,5,10	3	120	1.0	300	No
Si	3,5,10	-	120	1.0	300	No
SAX	5	4	120	1.0	300	No
SCX	5	4	120	1.0	300	No

Reproducible Column Packing Method Controls

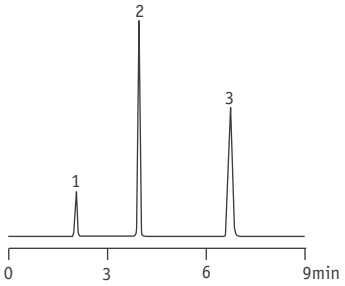


Test Conditions

Column: VertiSep™ GES C18, 5µm, 4.6x250mm
Mobile Phase: 60:40 Acetonitrile/Water
Flow Rate: 1.0mL/min
Detector: UV254nm
Sample: Reversed phase test mix

* VertiSep™ GES CN is stable at pH 1.5-7.0 packing

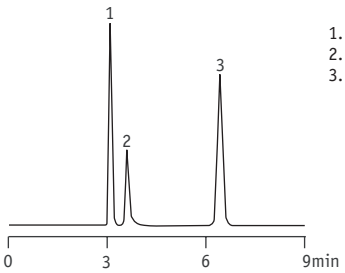
Aromatic Bases



1. Aniline
2. Dimethylaniline
3. Diethylaniline

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: Acetonitrile:Water:TEA (65:34:1)
Flow Rate: 1.0mL/min
Detection: UV254nm

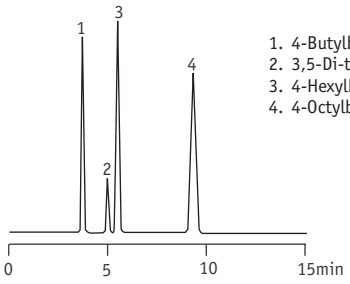
Aromatic Acid



1. Homovanilic Acid
2. Benzoic Acid
3. Salicylic Acid

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: 0.05M KH_2PO_4 (pH3.2):Methanol (60:40)
Flow Rate: 1.0mL/min
Detection: UV254nm

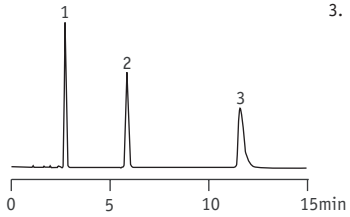
Alkyl Bensoic Acids



1. 4-Butylbenzoic Acid
2. 3,5-Di-tert-Butylbenzoic Acid
3. 4-Hexylbenzoic Acid
4. 4-Octylbenzoic Acid

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: Acetonitrile:Water:Acetic (65:34:1)
Flow Rate: 1.0mL/min
Detection: UV254nm

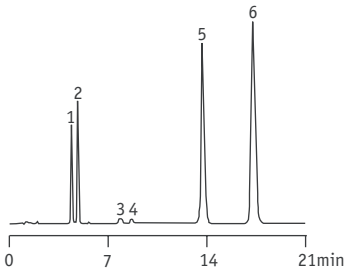
Steroids



1. Hydrocortisone
2. Testosterone
3. Progesterone

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: Methanol:Water (70:30)
Flow Rate: 1.0mL/min
Detection: UV254nm

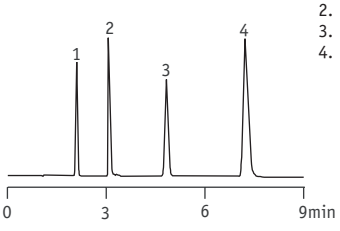
Steroids



1. Cortisone Degradant
2. Hydrocortisone-21-acetate Degradant
3. Cortisone Degradant
4. Hydrocortisone-21-acetate Degradant
5. Cortisone
6. Hydrocortisone-21-acetate

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: 50mM KH_2PO_4 (pH2.75):Acetonitrile (65:35)
Flow Rate: 1.0mL/min
Detection: UV252nm

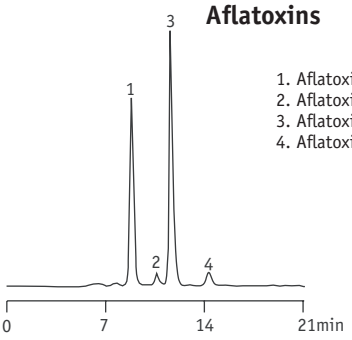
Acids and Bases



1. N,N-Diethylaniline
2. Phenylacetic Acid
3. N,N-Dimethylaniline
4. Phenylvaleric Acid

Column: VertiSep™ GES C18 5μm 150x4.6mm
Mobile Phase: Acetonitrile:0.05M Potassium Phosphate Buffer (pH3.0), (45:55)
Flow Rate: 1.0mL/min
Detection: UV254nm

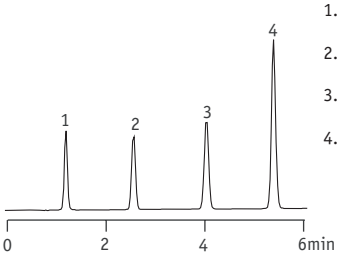
Aflatoxins



1. Aflatoxin G2 0.3µg/mL
2. Aflatoxin G1 1.0µg/mL
3. Aflatoxin B2 0.3µg/mL
4. Aflatoxin B1 1.0µg/mL

Column:	VertiSep™ GES C18 5µm 4.6x250mm
Mobile Phase:	Water:Acetonitrile:Methanol (60:20:20)
Flow Rate:	1.0mL/min
Detection:	UV365nm

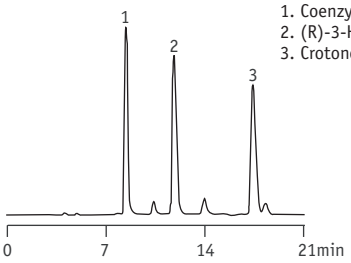
Aromatic Ketone



1. 1-hydroxy-7-aza-benzotriazole
2. 4-methylbenzene sulfonamide
3. methyl 3-amino-2-thiophenecarboxylate
4. 4-aminobenzophenone

Column:	VertiSep™ GES C18 5µm 4.6x100mm
Mobile Phase:	A: 0.1%TFA in water B: 0.08%TFA in acetonitrile
Gradient:	Time:%B: 0:0, 4:60
Flow Rate:	1.0mL/min
Detection:	UV254nm

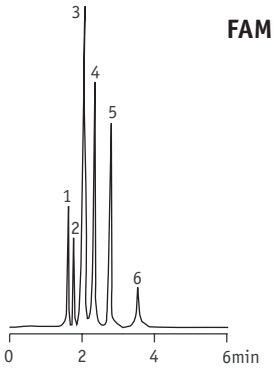
Coenzyme A



1. Coenzyme A
2. (R)-3-Hydroxybutyryl-Coenzyme A
3. Crotonoyl-Coenzyme A

Column:	VertiSep™ GES C18 5µm 4.6x250mm
Mobile Phase:	A: Methanol:10mM KH_2PO_4 (pH6.5), (0:100) B: Methanol:10mM KH_2PO_4 (pH6.5), (40:60)
Gradient:	Time/%B: 0/30, 10/80
Flow Rate:	0.8mL/min
Detection:	UV260nm

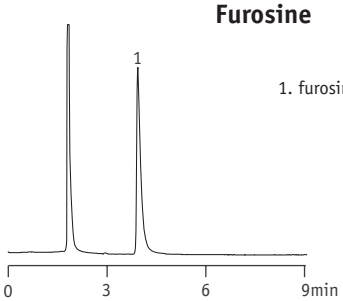
FAMEs



1. C8
2. C10
3. C12:0 + C18:3
5. C14:0
6. C18:1
8. C18:0

Column:	VertiSep™ GES C18 5µm 4.6x250mm
Mobile Phase:	Acetonitrile:Acetone (60:40)
Flow Rate:	1.0mL/min
Detection:	R401 refractometer

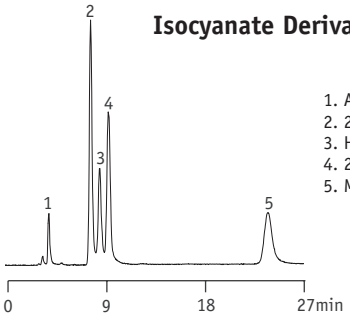
Furosine



1. furosine

Column:	VertiSep™ GES C8 5µm 4.6x250mm
Mobile Phase:	0.06M sodium acetate (pH 4.3) with acetic acid
Flow Rate:	2.0mL/min
Detection:	UV280nm, 0.1 AUFS

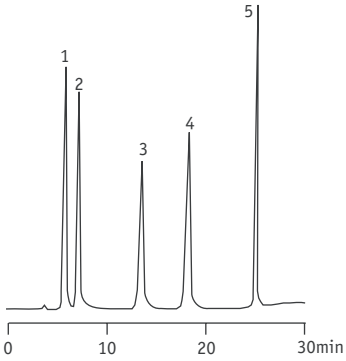
Isocyanate Derivatives Mixture



1. ACN/DMSO
2. 2,6-TDI
3. HDI
4. 2,4-TDI
5. MDI

Column:	VertiSep™ GES CN 5µm 4.6x250mm
Mobile Phase:	0.05M Ammonium acetate in Water:Acetonitrile (70:30), (pH 6.0)
Flow Rate:	0 min - 1mL/min 15 min - 2mL/min
Detection:	Fluorescence, 240nm excitation, 370nm emission

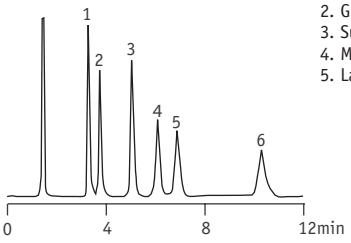
Nucleotides



1. ATP
2. ADP
3. AMP
4. NADP
5. NAD

Column:	VertiSep™ GES C18 5μm 250x4.6mm
Mobile Phase:	A: 0.1M KH_2PO_4 (pH 6)
	B: A:Methanol (90:10)
Gradient:	Time:B: 0:0, 15:25, 17.5:90, 19:100, 24:0
Flow Rate:	1.3mL/min
Detection:	UV254nm

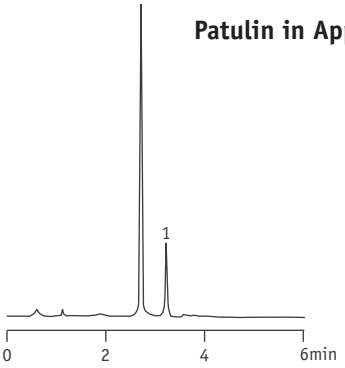
Saccharide



1. Fructose
2. Glucose
3. Sucrose
4. Maltose
5. Lactose

Column:	VertiSep™ GES NH2 5μm 250x4.6mm
Mobile Phase:	Acetonitrile:Water (80:20)
Flow Rate:	1.5mL/min
Detection:	RI

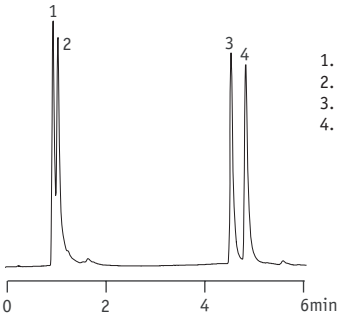
Patulin in Apple Juice



1. Patulin

Column:	VertiSep™ GES C18 5μm 250x4.6mm
Mobile Phase:	Acetonitrile:Water (5:95)
Flow Rate:	1.5mL/min
Detection:	UV275nm

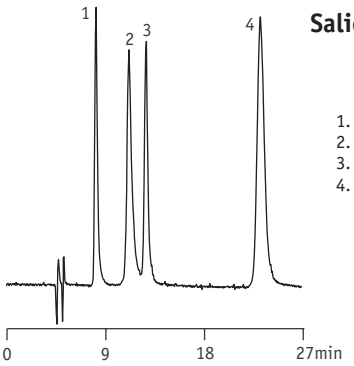
Porphyrin Isomers



1. Uroporphyrin I
2. Uroporphyrin III
3. Coproporphyrin I
4. Coproporphyrin III

Column:	VertiSep™ GES C18 3μm 250x4.6mm
Mobile Phase:	Methanol:1M Ammonium acetate (pH 5.2)
Flow Rate:	2.0mL/min
Detection:	UV406nm

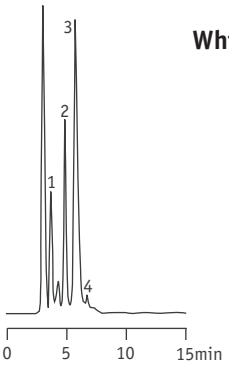
Salicylic Acid



1. 4-Hydroxybenzoic Acid
2. 4-Hydroxyisophthalic Acid
3. Phenol
4. Salicylic Acid

Column:	VertiSep™ GES C18 5μm 100x4.6mm
Mobile Phase:	Methanol:Water:Acetic acid (40:59:1)
Flow Rate:	0.5mL/min
Detection:	UV270nm

White Wine

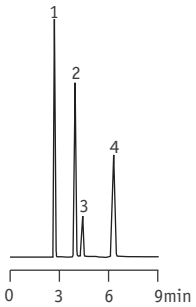


1. Maleic acid
2. Malic acid
3. Tartaric acid
4. Fumaric acid

Column:	VertiSep™ GES SAX 5μm 250x4.6mm
Mobile Phase:	Acetonitrile:50mM KH2PO4 (pH 5.50), (35:65)
Flow Rate:	1.0mL/min
Detection:	UV210nm

VertiSep™ GES

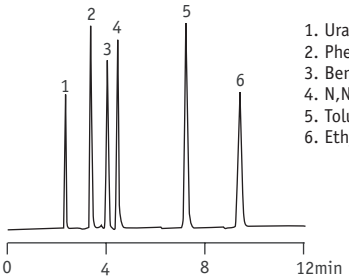
Alkyl Benzoic Acids



1. 4-Butylbenzoic Acid
2. 3,5,-di-tert-Butylbenzoic Acid
3. 4-Hexylbenzoic Acid
4. 4-Octylbenzoic Acid

Column:	VertiSep™ GES C8 5µm 4.6x150mm
Mobile Phase:	Acetonitrile:Water:Acetic Acid (65:34:1)
Flow Rate:	1.0mL/min
Detection:	UV254nm

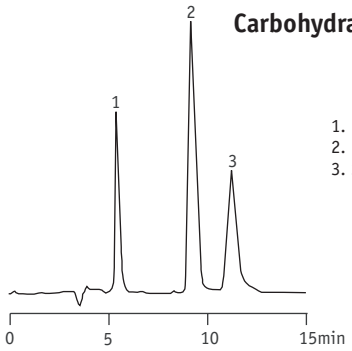
Base/Neutral Mix



1. Uracil
2. Phenol
3. Benzaldehyde
4. N,N-Diethyl-m-toluamide
5. Toluene
6. Ethylbenzene

Column:	VertiSep™ GES C18 5µm 4.6x250mm
Mobile Phase:	Acetonitrile:Water (65:35)
Flow Rate:	1.0mL/min
Detection:	UV254nm

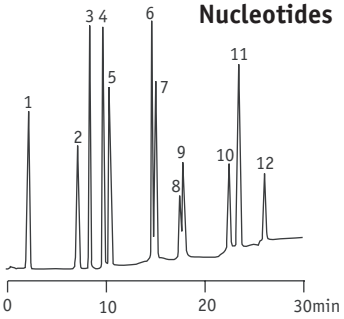
Carbohydrates from Wine



1. Ethanol
2. Glucose
3. Sucrose

Column:	VertiSep™ GES NH2 10µm 4.6x250mm
Mobile Phase:	Acetonitrile:Water (75:25)
Flow Rate:	3.0mL/min
Detection:	RI

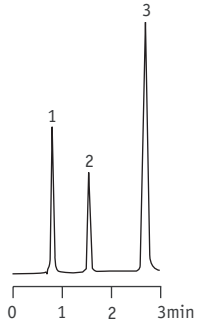
Nucleotides



1. CMP
2. AMP
3. UMP
4. GMP
5. CDP
6. ADP
7. UDP
8. CTP
9. GDP
10. ATP
11. UTP
12. GTP

Column:	VertiSep™ GES SAX 5µm 4.6x250mm
Mobile Phase:	A: 5mM $NH_4H_2PO_4$ (pH2.8) B: 750mM $NH_4H_2PO_4$ (pH 3.7)
Gradient:	Time:%B: 0:0, 3:100
Flow Rate:	1.0mL/min
Detection:	UV254nm

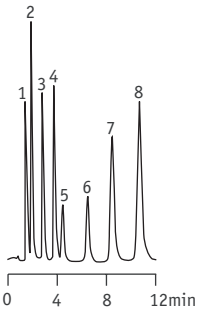
Aromatic Hydrocarbons



1. Toluene
2. Nitrobenzene
3. 2,6-Dinitrotoluene

Column:	VertiSep™ GES CN 5µm 4.6x100mm
Mobile Phase:	1% Ethyl Acetate in Hexane
Flow Rate:	2.0mL/min
Detection:	UV254nm

Aromatic Ketones



1. Benzamide
2. Benzyl Alcohol
3. Acetophenone
4. Methyl Benzoate
5. Phenetole
6. Naphthalene
7. Benzophenone
8. Biphenyl

Column:	VertiSep™ GES PH 5µm 4.6x100mm
Mobile Phase:	Methanol:Water (60:40)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
C18	3	Ultra-Fast	2.1 x 10	1	03AA-B111
	3	Ultra-Fast	2.1 x 20	1	03AA-B611
	3	Ultra-Fast	2.1 x 50	1	03AA-B211
	3	LC/MS	2.1 x 100	1	03AA-B311
	3	LC/MS	2.1 x 150	1	03AA-B411
	3	LC/MS	3.2 x 100	1	03AA-C311
	3	LC/MS	3.2 x 150	1	03AA-C411
	3	Hi-Speed	4.6 x 50	1	03AA-E211
	3	Analytical	4.6 x 100	1	03AA-E311
	3	Analytical	4.6 x 150	1	03AA-E411
	3	Hi-Speed	7.8 x 50	1	03AA-G211
	3	Analytical	7.8 x 100	1	03AA-G311
	5	LC/MS	2.1 x 100	1	03AA-B321
	5	LC/MS	2.1 x 150	1	03AA-B421
	5	LC/MS	2.1 x 250	1	03AA-B521
	5	LC/MS	3.2 x 100	1	03AA-C321
	5	LC/MS	3.2 x 150	1	03AA-C421
	5	LC/MS	3.2 x 250	1	03AA-C521
	5	Hi-Speed	4.6 x 50	1	03AA-E221
	5	Analytical	4.6 x 100	1	03AA-E321
	5	Analytical	4.6 x 150	1	03AA-E421
	5	Analytical	4.6 x 250	1	03AA-E521
	5	Prep	10.0 x 150	1	03AA-H421
	5	Prep	10.0 x 250	1	03AA-H521
	5	Prep	21.2 x 150	1	03AA-I421
	5	Prep	21.2 x 250	1	03AA-I521
	10	Analytical	4.6 x 250	1	03AA-E531
	10	Prep	10.0 x 150	1	03AA-H431
	10	Prep	10.0 x 250	1	03AA-H531
	10	Prep	21.2 x 150	1	03AA-I431
	10	Prep	21.2 x 250	1	03AA-I531
	10	Prep	30.0 x 150	1	03AA-J431
	10	Prep	30.0 x 250	1	03AA-J531
	10	Prep	50.0 x 150	1	03AA-K431
	10	Prep	50.0 x 250	1	03AA-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
C8	3	Ultra-Fast	2.1 x 10	1	03AB-B111
	3	Ultra-Fast	2.1 x 20	1	03AB-B611
	3	Ultra-Fast	2.1 x 50	1	03AB-B211
	3	LC/MS	2.1 x 100	1	03AB-B311
	3	LC/MS	2.1 x 150	1	03AB-B411
	3	LC/MS	3.2 x 100	1	03AB-C311
	3	LC/MS	3.2 x 150	1	03AB-C411
	3	Hi-Speed	4.6 x 50	1	03AB-E211
	3	Analytical	4.6 x 100	1	03AB-E311
	3	Analytical	4.6 x 150	1	03AB-E411
	3	Hi-Speed	7.8 x 50	1	03AB-G211
	3	Analytical	7.8 x 100	1	03AB-G311
	5	LC/MS	2.1 x 100	1	03AB-B321
	5	LC/MS	2.1 x 150	1	03AB-B421
	5	LC/MS	2.1 x 250	1	03AB-B521
	5	LC/MS	3.2 x 100	1	03AB-C321
	5	LC/MS	3.2 x 150	1	03AB-C421
	5	LC/MS	3.2 x 250	1	03AB-C521
	5	Hi-Speed	4.6 x 50	1	03AB-E221
	5	Analytical	4.6 x 100	1	03AB-E321
	5	Analytical	4.6 x 150	1	03AB-E421
	5	Analytical	4.6 x 250	1	03AB-E521
	5	Prep	10.0 x 150	1	03AB-H421
	5	Prep	10.0 x 250	1	03AB-H521
	5	Prep	21.2 x 150	1	03AB-I421
	5	Prep	21.2 x 250	1	03AB-I521
	10	Analytical	4.6 x 250	1	03AB-E531
	10	Prep	10.0 x 150	1	03AB-H431
	10	Prep	10.0 x 250	1	03AB-H531
	10	Prep	21.2 x 150	1	03AB-I431
	10	Prep	21.2 x 250	1	03AB-I531
	10	Prep	30.0 x 150	1	03AB-J431
	10	Prep	30.0 x 250	1	03AB-J531
	10	Prep	50.0 x 150	1	03AB-K431
	10	Prep	50.0 x 250	1	03AB-K531

VertiSep™ GES

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
Ph	3	Ultra-Fast	2.1 x 10	1	03AD-B111
	3	Ultra-Fast	2.1 x 20	1	03AD-B611
	3	Ultra-Fast	2.1 x 50	1	03AD-B211
	3	LC/MS	2.1 x 100	1	03AD-B311
	3	LC/MS	2.1 x 150	1	03AD-B411
	3	LC/MS	3.2 x 100	1	03AD-C311
	3	LC/MS	3.2 x 150	1	03AD-C411
	3	Hi-Speed	4.6 x 50	1	03AD-E211
	3	Analytical	4.6 x 100	1	03AD-E311
	3	Analytical	4.6 x 150	1	03AD-E411
	3	Hi-Speed	7.8 x 50	1	03AD-G211
	3	Analytical	7.8 x 100	1	03AD-G311
	5	LC/MS	2.1 x 100	1	03AD-B321
	5	LC/MS	2.1 x 150	1	03AD-B421
	5	LC/MS	2.1 x 250	1	03AD-B521
	5	LC/MS	3.2 x 100	1	03AD-C321
	5	LC/MS	3.2 x 150	1	03AD-C421
	5	LC/MS	3.2 x 250	1	03AD-C521
	5	Hi-Speed	4.6 x 50	1	03AD-E221
	5	Analytical	4.6 x 100	1	03AD-E321
	5	Analytical	4.6 x 150	1	03AD-E421
	5	Analytical	4.6 x 250	1	03AD-E521
	5	Prep	10.0 x 150	1	03AD-H421
	5	Prep	10.0 x 250	1	03AD-H521
	5	Prep	21.2 x 150	1	03AD-I421
	5	Prep	21.2 x 250	1	03AD-I521
	10	Analytical	4.6 x 250	1	03AD-E531
	10	Prep	10.0 x 150	1	03AD-H431
	10	Prep	10.0 x 250	1	03AD-H531
	10	Prep	21.2 x 150	1	03AD-I431
	10	Prep	21.2 x 250	1	03AD-I531
	10	Prep	30.0 x 150	1	03AD-J431
	10	Prep	30.0 x 250	1	03AD-J531
	10	Prep	50.0 x 150	1	03AD-K431
	10	Prep	50.0 x 250	1	03AD-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
C4	3	Ultra-Fast	2.1 x 10	1	03AC-B111
	3	Ultra-Fast	2.1 x 20	1	03AC-B611
	3	Ultra-Fast	2.1 x 50	1	03AC-B211
	3	LC/MS	2.1 x 100	1	03AC-B311
	3	LC/MS	2.1 x 150	1	03AC-B411
	3	LC/MS	3.2 x 100	1	03AC-C311
	3	LC/MS	3.2 x 150	1	03AC-C411
	3	Hi-Speed	4.6 x 50	1	03AC-E211
	3	Analytical	4.6 x 100	1	03AC-E311
	3	Analytical	4.6 x 150	1	03AC-E411
	3	Hi-Speed	7.8 x 50	1	03AC-G211
	3	Analytical	7.8 x 100	1	03AC-G311
	5	LC/MS	2.1 x 100	1	03AC-B321
	5	LC/MS	2.1 x 150	1	03AC-B421
	5	LC/MS	2.1 x 250	1	03AC-B521
	5	LC/MS	3.2 x 100	1	03AC-C321
	5	LC/MS	3.2 x 150	1	03AC-C421
	5	LC/MS	3.2 x 250	1	03AC-C521
	5	Hi-Speed	4.6 x 50	1	03AC-E221
	5	Analytical	4.6 x 100	1	03AC-E321
	5	Analytical	4.6 x 150	1	03AC-E421
	5	Analytical	4.6 x 250	1	03AC-E521
	5	Prep	10.0 x 150	1	03AC-H421
	5	Prep	10.0 x 250	1	03AC-H521
	5	Prep	21.2 x 150	1	03AC-I421
	5	Prep	21.2 x 250	1	03AC-I521
	10	Analytical	4.6 x 250	1	03AC-E531
	10	Prep	10.0 x 150	1	03AC-H431
	10	Prep	10.0 x 250	1	03AC-H531
	10	Prep	21.2 x 150	1	03AC-I431
	10	Prep	21.2 x 250	1	03AC-I531
	10	Prep	30.0 x 150	1	03AC-J431
	10	Prep	30.0 x 250	1	03AC-J531
	10	Prep	50.0 x 150	1	03AC-K431
	10	Prep	50.0 x 250	1	03AC-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
CN	3	Ultra-Fast	2.1 x 10	1	03AE-B111
	3	Ultra-Fast	2.1 x 20	1	03AE-B611
	3	Ultra-Fast	2.1 x 50	1	03AE-B211
	3	LC/MS	2.1 x 100	1	03AE-B311
	3	LC/MS	2.1 x 150	1	03AE-B411
	3	LC/MS	3.2 x 100	1	03AE-C311
	3	LC/MS	3.2 x 150	1	03AE-C411
	3	Hi-Speed	4.6 x 50	1	03AE-E211
	3	Analytical	4.6 x 100	1	03AE-E311
	3	Analytical	4.6 x 150	1	03AE-E411
	3	Hi-Speed	7.8 x 50	1	03AE-G211
	3	Analytical	7.8 x 100	1	03AE-G311
	5	LC/MS	2.1 x 100	1	03AE-B321
	5	LC/MS	2.1 x 150	1	03AE-B421
	5	LC/MS	2.1 x 250	1	03AE-B521
	5	LC/MS	3.2 x 100	1	03AE-C321
	5	LC/MS	3.2 x 150	1	03AE-C421
	5	LC/MS	3.2 x 250	1	03AE-C521
	5	Hi-Speed	4.6 x 50	1	03AE-E221
	5	Analytical	4.6 x 100	1	03AE-E321
	5	Analytical	4.6 x 150	1	03AE-E421
	5	Analytical	4.6 x 250	1	03AE-E521
	5	Prep	10.0 x 150	1	03AE-H421
	5	Prep	10.0 x 250	1	03AE-H521
	5	Prep	21.2 x 150	1	03AE-I421
	5	Prep	21.2 x 250	1	03AE-I521
	10	Analytical	4.6 x 250	1	03AE-E531
	10	Prep	10.0 x 150	1	03AE-H431
	10	Prep	10.0 x 250	1	03AE-H531
	10	Prep	21.2 x 150	1	03AE-I431
	10	Prep	21.2 x 250	1	03AE-I531
	10	Prep	30.0 x 150	1	03AE-J431
	10	Prep	30.0 x 250	1	03AE-J531
	10	Prep	50.0 x 150	1	03AE-K431
	10	Prep	50.0 x 250	1	03AE-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
NH2	3	Ultra-Fast	2.1 x 10	1	03AF-B111
	3	Ultra-Fast	2.1 x 20	1	03AF-B611
	3	Ultra-Fast	2.1 x 50	1	03AF-B211
	3	LC/MS	2.1 x 100	1	03AF-B311
	3	LC/MS	2.1 x 150	1	03AF-B411
	3	LC/MS	3.2 x 100	1	03AF-C311
	3	LC/MS	3.2 x 150	1	03AF-C411
	3	Hi-Speed	4.6 x 50	1	03AF-E211
	3	Analytical	4.6 x 100	1	03AF-E311
	3	Analytical	4.6 x 150	1	03AF-E411
	3	Hi-Speed	7.8 x 50	1	03AF-G211
	3	Analytical	7.8 x 100	1	03AF-G311
	5	LC/MS	2.1 x 100	1	03AF-B321
	5	LC/MS	2.1 x 150	1	03AF-B421
	5	LC/MS	2.1 x 250	1	03AF-B521
	5	LC/MS	3.2 x 100	1	03AF-C321
	5	LC/MS	3.2 x 150	1	03AF-C421
	5	LC/MS	3.2 x 250	1	03AF-C521
	5	Hi-Speed	4.6 x 50	1	03AF-E221
	5	Analytical	4.6 x 100	1	03AF-E321
	5	Analytical	4.6 x 150	1	03AF-E421
	5	Analytical	4.6 x 250	1	03AF-E521
	5	Prep	10.0 x 150	1	03AF-H421
	5	Prep	10.0 x 250	1	03AF-H521
	5	Prep	21.2 x 150	1	03AF-I421
	5	Prep	21.2 x 250	1	03AF-I521
	10	Analytical	4.6 x 250	1	03AF-E531
	10	Prep	10.0 x 150	1	03AF-H431
	10	Prep	10.0 x 250	1	03AF-H531
	10	Prep	21.2 x 150	1	03AF-I431
	10	Prep	21.2 x 250	1	03AF-I531
	10	Prep	30.0 x 150	1	03AF-J431
	10	Prep	30.0 x 250	1	03AF-J531
	10	Prep	50.0 x 150	1	03AF-K431
	10	Prep	50.0 x 250	1	03AF-K531

VertiSep™ GES

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES					
Silica	3	Ultra-Fast	2.1 x 10	1	03AG-B111
	3	Ultra-Fast	2.1 x 20	1	03AG-B611
	3	Ultra-Fast	2.1 x 50	1	03AG-B211
	3	LC/MS	2.1 x 100	1	03AG-B311
	3	LC/MS	2.1 x 150	1	03AG-B411
	3	LC/MS	3.2 x 100	1	03AG-C311
	3	LC/MS	3.2 x 150	1	03AG-C411
	3	Analytical	4.0 x 100	1	03AG-D311
	3	Analytical	4.0 x 150	1	03AG-D411
	3	Analytical	4.6 x 100	1	03AG-E311
	3	Analytical	4.6 x 150	1	03AG-E411
	3	Hi-Speed	7.8 x 50	1	03AG-G211
	3	Analytical	7.8 x 100	1	03AG-G311
	5	LC/MS	2.1 x 100	1	03AG-B321
	5	LC/MS	2.1 x 150	1	03AG-B421
	5	LC/MS	3.2 x 100	1	03AG-C321
	5	LC/MS	3.2 x 150	1	03AG-C421
	5	Analytical	4.0 x 100	1	03AG-D321
	5	Analytical	4.0 x 150	1	03AG-D421
	5	Analytical	4.0 x 250	1	03AG-D521
	5	Analytical	4.6 x 100	1	03AG-E321
	5	Analytical	4.6 x 125	1	03AG-EC21
	5	Analytical	4.6 x 150	1	03AG-E421
	5	Analytical	4.6 x 250	1	03AG-E521
	5	Analytical	7.8 x 100	1	03AG-G321
	5	Prep	10.0 x 150	1	03AG-H421
	5	Prep	10.0 x 250	1	03AG-H521
	5	Prep	21.2 x 150	1	03AG-I421
	5	Prep	21.2 x 250	1	03AG-I521
	10	Prep	10.0 x 150	1	03AG-H431
	10	Prep	10.0 x 250	1	03AG-H531
	10	Prep	21.2 x 150	1	03AG-I431
	10	Prep	21.2 x 250	1	03AG-I531
	10	Prep	30.0 x 150	1	03AG-J431
	10	Prep	30.0 x 250	1	03AG-J531
	10	Prep	50.0 x 150	1	03AG-K431
	10	Prep	50.0 x 250	1	03AG-K531
SCX	5	Analytical	4.6 x 150	1	03AI-E421
	5	Analytical	4.6 x 250	1	03AI-E521
SAX	5	Analytical	4.6 x 150	1	03AH-E421
	5	Analytical	4.6 x 250	1	03AH-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES Guard Cartridge*					
C18	3	Guard	2.1 x 10	2	03AA-B113
	3	Guard	3.2 x 10	2	03AA-C113
	3	Guard	4.0 x 10	2	03AA-D113
	3	Guard	4.6 x 10	2	03AA-E113
	5	Guard	2.1 x 10	2	03AA-B123
	5	Guard	3.2 x 10	2	03AA-C123
	5	Guard	4.0 x 10	2	03AA-D123
	5	Guard	4.6 x 10	2	03AA-E123
	5	Guard	10.0 x 10	2	03AA-H123
	5	Guard	21.2 x 10	2	03AA-I123
	10	Guard	10.0 x 10	2	03AA-H133
	10	Guard	21.2 x 10	2	03AA-I133
C8	3	Guard	2.1 x 10	2	03AB-B113
	3	Guard	3.2 x 10	2	03AB-C113
	3	Guard	4.0 x 10	2	03AB-D113
	3	Guard	4.6 x 10	2	03AB-E113
	5	Guard	2.1 x 10	2	03AB-B123
	5	Guard	3.2 x 10	2	03AB-C123
	5	Guard	4.0 x 10	2	03AB-D123
	5	Guard	4.6 x 10	2	03AB-E123
	5	Guard	10.0 x 10	2	03AB-H123
	5	Guard	21.2 x 10	2	03AB-I123
	10	Guard	10.0 x 10	2	03AB-H133
	10	Guard	21.2 x 10	2	03AB-I133
Ph	3	Guard	2.1 x 10	2	03AD-B113
	3	Guard	3.2 x 10	2	03AD-C113
	3	Guard	4.0 x 10	2	03AD-D113
	3	Guard	4.6 x 10	2	03AD-E113
	5	Guard	2.1 x 10	2	03AD-B123
	5	Guard	3.2 x 10	2	03AD-C123
	5	Guard	4.0 x 10	2	03AD-D123
	5	Guard	4.6 x 10	2	03AD-E123
	5	Guard	10.0 x 10	2	03AD-H123
	5	Guard	21.2 x 10	2	03AD-I123
	10	Guard	10.0 x 10	2	03AD-H133
	10	Guard	21.2 x 10	2	03AD-I133
C4	3	Guard	2.1 x 10	2	03AC-B113
	3	Guard	3.2 x 10	2	03AC-C113
	3	Guard	4.0 x 10	2	03AC-D113
	3	Guard	4.6 x 10	2	03AC-E113
	5	Guard	2.1 x 10	2	03AC-B123
	5	Guard	3.2 x 10	2	03AC-C123
	5	Guard	4.0 x 10	2	03AC-D123
	5	Guard	4.6 x 10	2	03AC-E123
	5	Guard	10.0 x 10	2	03AC-H123
	5	Guard	21.2 x 10	2	03AC-I123
	10	Guard	10.0 x 10	2	03AC-H133
	10	Guard	21.2 x 10	2	03AC-I133

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ GES Guard Cartridge*					
CN	3	Guard	2.1 x 10	2	03AE-B113
	3	Guard	3.2 x 10	2	03AE-C113
	3	Guard	4.0 x 10	2	03AE-D113
	3	Guard	4.6 x 10	2	03AE-E113
	5	Guard	2.1 x 10	2	03AE-B123
	5	Guard	3.2 x 10	2	03AE-C123
	5	Guard	4.0 x 10	2	03AE-D123
	5	Guard	4.6 x 10	2	03AE-E123
	5	Guard	10.0 x 10	2	03AE-H123
	5	Guard	21.2 x 10	2	03AE-I123
	10	Guard	10.0 x 10	2	03AE-H133
	10	Guard	21.2 x 10	2	03AE-I133
NH2	3	Guard	2.1 x 10	2	03AF-B113
	3	Guard	3.2 x 10	2	03AF-C113
	3	Guard	4.0 x 10	2	03AF-D113
	3	Guard	4.6 x 10	2	03AF-E113
	5	Guard	2.1 x 10	2	03AF-B123
	5	Guard	3.2 x 10	2	03AF-C123
	5	Guard	4.0 x 10	2	03AF-D123
	5	Guard	4.6 x 10	2	03AF-E123
	5	Guard	10.0 x 10	2	03AF-H123
	5	Guard	21.2 x 10	2	03AF-I123
	10	Guard	10.0 x 10	2	03AF-H133
	10	Guard	21.2 x 10	2	03AF-I133
Si	3	Guard	2.1 x 10	2	03AG-B113
	3	Guard	3.2 x 10	2	03AG-C113
	3	Guard	4.0 x 10	2	03AG-D113
	3	Guard	4.6 x 10	2	03AG-E113
	5	Guard	2.1 x 10	2	03AG-B123
	5	Guard	3.2 x 10	2	03AG-C123
	5	Guard	4.0 x 10	2	03AG-D123
	5	Guard	4.6 x 10	2	03AG-E123
	5	Guard	10.0 x 10	2	03AG-H123
	5	Guard	21.2 x 10	2	03AG-I123
	10	Guard	10.0 x 10	2	03AG-H133
	10	Guard	21.2 x 10	2	03AG-I133
SCX	5	Guard	4.6 x 10	2	03AI-B113
SAX	5	Guard	4.6 x 10	2	03AI-C113

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

0300-0001

0300-0002

0300-0003

VertiSep™ BIO HPLC Columns

- **Full endcapping**
- **Ultimate Protein and Peptide application column**
- **Acidic and Alkalic resistance for long lifetime**
- **4 Phases: C30, C18, C8, and C4 chemistries**
- **3mm, 5mm, 10mm particle sizes**

VertiSep™ BIO packings are ultra-high purity spherical Silica, full endcapping providing separation or purification of high molecular weight compounds like Protein and Peptide.

Because of the significant improvement of Acidic and Alkalic resistance, it can be used for extened period of time in acidic mobile phase condition and rinsed for recover with NaOH containing buffer.

There are 4 phases: C30, C18, C8 and C4 and 3 particle sizes: 3µm, 5µm, 10µm particle sizes.

VertiSep™ BIO are manufactured by statistic process control of Silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

VertiSep™ BIO C30 are ideal for the separation of large molecules such as Proteins and Peptides, especially Isomers in Carotenoid family of long chain molecules. VertiSep™ BIO C30 are a great equivalent to YMC C30 and are interchangeable with them for many applications.

VertiSep™ BIO C18 are ideal for the separation of high molecular weight peptides and oligonucleic acids. VertiSep™ BIO C18 are designed for biopharmaceutical, biochemical and environmental applications and for separation of food compounds as well.

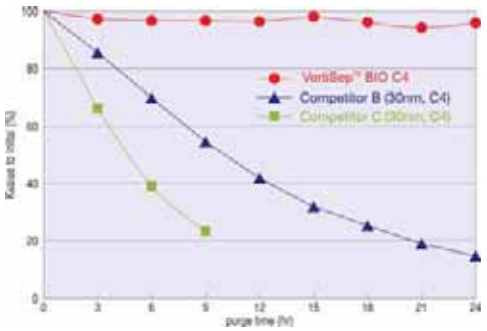
VertiSep™ BIO C8 have moderate hydrophobicity make them useful for separating compounds or samples in cases where separation optimization is difficult to achieve using C18 with relatively high hydrophobicity. VertiSep™ BIO C8 are used to separate many classes of compounds including pharmaceuticals, organic chemicals and biologicals.

VertiSep™ BIO C4 stationary phase surface hydrophobicity is lower than both C18 and C8. VertiSep™ BIO C4 achieve better separation than C18 or C8 for some type of samples. VertiSep™ BIO C4 effectively resolve many classes of proteins and biopolymers.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C30	3,5	20	200	1.1	200	No
C18	5,10	8	300	0.9	100	Yes
C8	5,10	6	300	0.9	100	Yes
C4	5,10	4	300	0.9	100	Yes

Comparison of Durability in Acidic Environment



1. Urasil
2. Methyl Benzoate
3. Toluene
4. Naphthalene

Column: VertiSep™ BIO C4 5µm 4.6x250mm

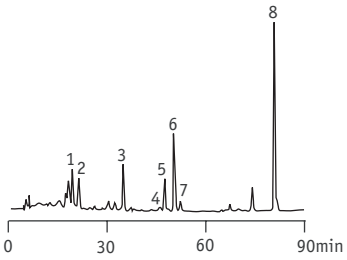
Accelerated Acidic Duration Test Condition

Mobile Phase: CH_3OH:1.0% TFA aq., pH=1.0 (10:90)
Flow Rate: 1.0mL/min
Temperature: 70°C
Purge time: 3h

Chromatographic Test Condition

Mobile Phase: CH_3OH:Water (35:65)
Flow Rate: 1.0mL/min
Temperature: 40°C
Detection: UV214nm

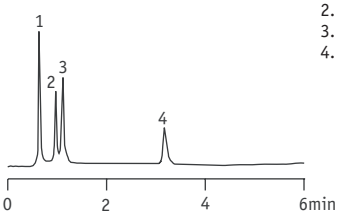
SRM 2383, NIST Food Standard



1. Lutein
2. Zeaxanthin
3. β-Cryptoxanthin
4. 13-cis β-Carotene
5. α-Carotene
6. trans β-Carotene
7. 9-cis β-Carotene
8. Lycopene

Column:	VertiSep™ BIO C30 5µm 4.6x250mm
Mobile Phase:	A: MeOH:MTBE:H_2O (81:15:4)
	B: MeOH:MTBE:H_2O (6:90:4)
Gradient:	Time:%B: 0:0, 90:100
Flow Rate:	1.0mL/min
Detection:	UV450nm

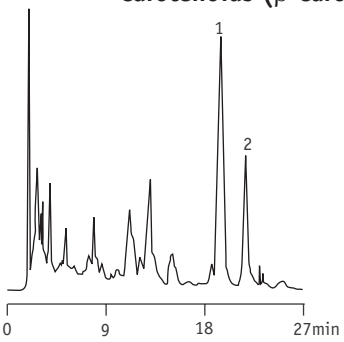
Carotenoids



1. Lutein
2. Alpha-carotene
3. Beta-carotene
4. Lycopene

Column:	VertiSep™ BIO C30 3µm 4.6x50mm
Mobile Phase:	A: MeOH
	B: 5.5% MeOH with 5% THF
Gradient:	Time:%B: 0:0, 3.5:100
Flow Rate:	1.0mL/min
Detection:	UV450nm

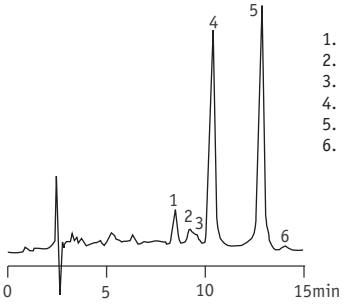
Carotenoids (β-Carotene)



1. all-trans
2. 9.cis

Column:	VertiSep™ BIO C30 5um 4.6x250mm
Mobile Phase:	MeOH:TBME (80:20)
Flow Rate:	1.0mL/min
Detection:	UV450nm

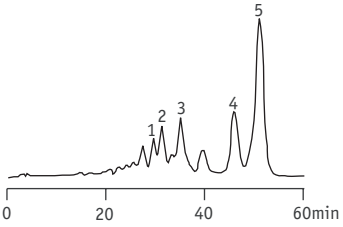
Carotene Isomers From Commercially Available Capsules



1. 15-cis β-Carotene
2. 13-cis β²-Carotene
3. 13´-cis β-Carotene
4. α-Carotene
5. β-Carotene
6. α-Carotene

Column:	VertiSep™ BIO C30 5µm 4.6x250mm
Mobile Phase:	EtOH:MeOH:THF (75:20:5)
Flow Rate:	1.0mL/min
Detection:	UV450nm

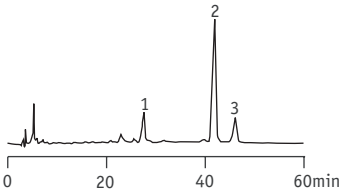
Carotenes Found In Algae



1. 15-cis β-Carotene
2. 13-cis β-Carotene
3. trans α-Carotene
4. trans β-Carotene
5. 9-cis β-Carotene

Column:	VertiSep™ BIO C30 5µm 4.6x250mm
Mobile Phase:	MeOH:TBME (80:20)
Flow Rate:	2.0mL/min
Detection:	UV450nm

Carotenoids of cassava

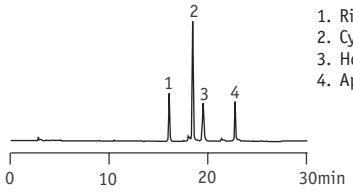


1. 13-cis β-Carotene
2. trans β-Carotene
3. 5. 9-cis β-Carotene

Column:	VertiSep™ BIO C30 5µm 4.6x250mm
Mobile Phase:	MeOH:Methyl-*tert*-butyl ether (80:20)
Flow Rate:	0.8mL/min
Detection:	UV450nm

VertiSep™ BIO

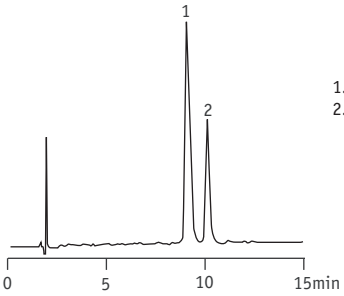
Proteins



1. Ribonclease A
2. Cytochrome C
3. Holo-transferrin
4. Apomyoglobin

Column:	VertiSep™ BIO C18 4.6x250mm
Mobile Phase:	A: 0.1% TFA in H_2O
	B: 0.1% TFA in MeCN
Gradient:	Time/%B: 0/5, 30/70
Flow Rate:	1.0mL/min
Detection:	UV280nm

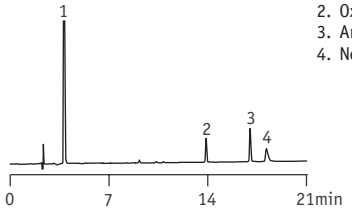
Bradykinins



1. des-Pro²-bradykinin
2. Bradykinin

Column:	VertiSep™ BIO C18 4.6x150mm
Mobile Phase:	A: 0.15% TFA in Water
	B: 0.13% TFA in Acetonitrile
Gradient	Time:%B: 0:15, 15:25
Flow Rate:	1mL/min
Detection:	UV205nm

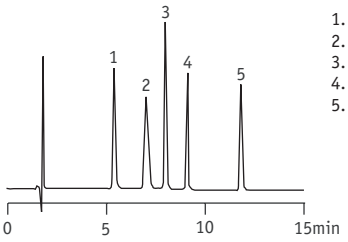
Peptides



1. Gly-Tyr
2. Oxytocin
3. Angiotensin II
4. Neurotensin

Column:	VertiSep™ BIO C18 4.6x250mm
Mobile Phase:	A: 0.1% TFA in H_2O
	B: 0.1% TFA in MeCN
Gradient:	Time:%B: 0:10, 25:40
Flow Rate:	1.0mL/min
Detection:	UV220nm

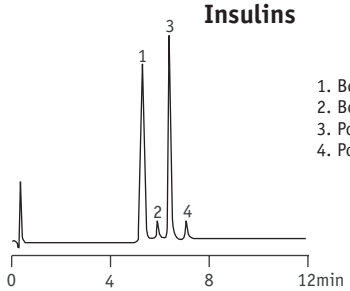
Bioactive Peptides



1. Methionine Enkephalin
2. Bradykinin
3. Leucine Enkephalin
4. Physalaemin
5. Substance P

Column:	VertiSep™ BIO C18 4.6x150mm
Mobile Phase:	A: 0.1% TFA in Water
	B: 0.085% TFA in Acetonitrile:Water (95:5)
Gradient:	Time:%B: 0:20, 20:50
Flow Rate:	1.0mL/min
Detection:	UV220nm

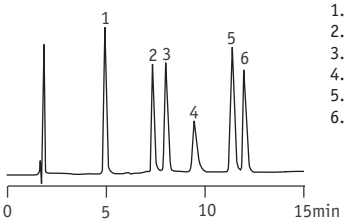
Insulins



1. Bovine Insulin
2. Bovine Insulin Impurity
3. Porcine Insulin
4. Porcine Insulin Impurity

Column:	VertiSep™ BIO C18 5µm 4.6x150mm
Mobile Phase:	A: 0.13% TFA in Water
	B: 0.10% TFA in Acetonitrile
Gradient:	Time:%B: 0:28, 12:38
Flow Rate:	1.0mL/min
Detection:	UV220nm

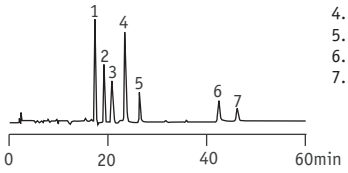
Peptide Mix



1. Methionine Enkephalin
2. Leucine Enkephalin
3. Angiotensin II
4. Neurotensin
5. Angiotensin I
6. Substance P

Column:	VertiSep™ BIO C18 5µm 4.6x250mm
Mobile Phase:	A: 0.1% TFA in Water
	B: 0.08% TFA in Acetonitrile
Gradient:	Time:%B: 0:20, 20:40
Flow Rate:	1.0mL/min
Detection:	UV220nm

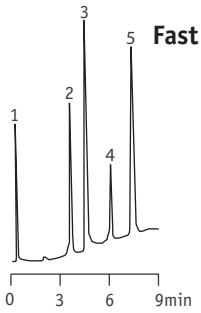
Proteins



1. Methionin Enkephalin
2. Oxytocin
3. Leucin Enkephalin
4. Angiotensin II
5. Angiotensin I
6. Insulin
7. Insulin Chain B

Column:	VertiSep™ BIO C8 5µm 4.6x250mm
Mobile Phase:	A: 0.05% Formic Acid (0.05% Formic Acid in Solvent B)
	B: ACN:Water (90:10)
Gradient:	Time:%B: 0:10, 60:40
Flow Rate:	1.0mL/min
Detection:	UV280nm

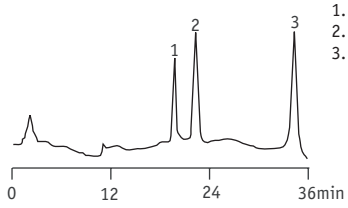
Fast protein analysis



1. Ribonuclease A
2. Insulin
3. Lysozyme
4. BSA

Column:	VertiSep™ BIO C8 5µm 4.6x50mm
Mobile Phase:	A: Trifluoroacetic acid:Water (0.1:99.9)
	B: Trifluoroacetic acid:Water:Acetonitrile (0.1:4.9:95)
Gradient:	Time:%B: 0:25, 10:65
Flow Rate:	2.5mL/min
Detection:	UV220nm

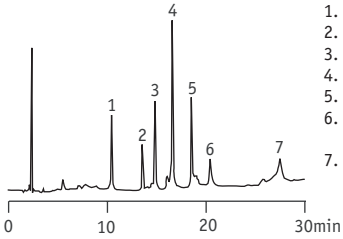
Basic Protein



1. RNA polymerase
2. Chymotrypsinogen
3. Lysozyme

Column:	VertiSep™ BIO C8 5µm 4.6x100mm
Mobile Phase:	A: 0.02 M tris, pH 7.0
	B: 0.02 M tris in 0.5 M sodium acetate, pH 7.0
Gradient:	Time:%B: 0:0, 30:100
Flow Rate:	1.0mL/min
Detection:	UV254nm

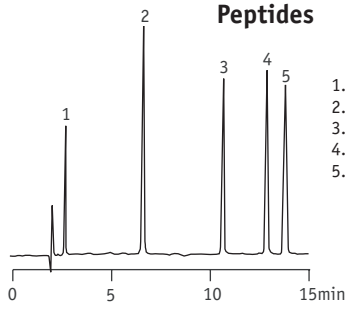
Polypeptides



1. Ribonuclease
2. Insulin
3. Cytochrome
4. Lysozyme
5. BSA
6. Trypsin Inhibitor from Soybean
7. Ovalbumin

Column:	VertiSep™ BIO C8 5µm 4.6x150mm
Mobile Phase:	A: 0.1% TFA
	B: MeCN:0.1% TFA (90:10)
Gradient:	Time:%B: 0:20, 25:60
Flow Rate:	1.0mL/min
Detection:	UV280nm

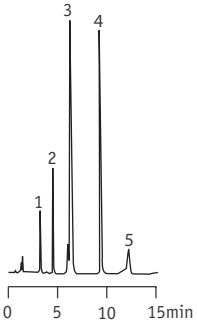
Peptides



1. GLY-TYR
2. VAL-TYR-VAL
3. Methionine Enkephalin
4. Leucine Enkephalin
5. Angiotensin II

Column:	VertiSep™ BIO C8 5µm 4.6x150mm
Mobile Phase:	A: 0.15% TFA in H_2O
	B: 0.13% TFA in ACN
Gradient:	Time:%B: 0:10, 15:30
Flow Rate:	1.0mL/min
Detection:	UV220nm

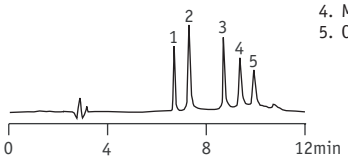
Proteins



1. Ribonuclease A
2. Insulin
3. Lysozyme
4. Myoglobin
5. Ovalbumin

Column:	VertiSep™ BIO C8 5µm 4.6x250mm
Mobile Phase:	A: 0.1% TFA in H_2O
	B: 0.1% TFA in ACN
Gradient:	Time:%B: 0:25, 30:100
Flow Rate:	1.5mL/min
Detection:	UV254 nm

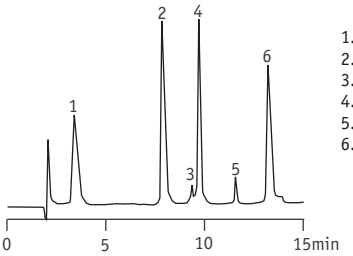
Proteins



1. Insulin
2. Trypsinogen
3. Lactalbumin
4. Myoglobin
5. Carbonic anhydrase

Column:	VertiSep™ BIO C4 5µm 4.6x250mm
Mobile Phase:	A: 0.01% TFA in H_2O
	B: 0.01% TFA in ACN
Gradient:	Time:%B: 0:25, 20:95
Flow Rate:	1.0mL/min
Detection:	UV214nm

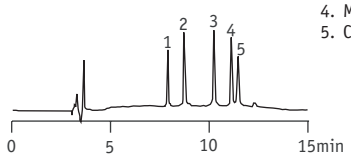
Proteins Mix



1. Ribonuclease A
2. Cytochrome C
3. Lysozyme Impurity
4. Lysozyme
5. Myoglobin Impurity
6. Myoglobin

Column:	VertiSep™ BIO C4 5µm 4.6x150mm
Mobile Phase:	A: 0.15% TFA
	B: 0.13% TFA in ACN:H_2O (95:5)
Gradient:	Time:%B: 0:30, 15:60
Flow Rate:	1.0mL/min
Detection:	UV220nm

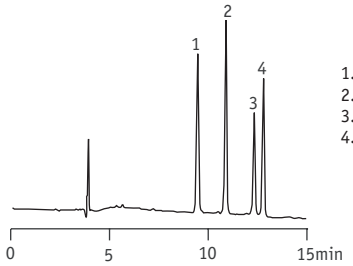
Proteins



1. Insulin
2. Trypsinogen
3. Lactalbumin
4. Myoglobin
5. Carbonic anhydrase

Column:	VertiSep™ BIO C4 5µm 4.6x250mm
Mobile Phase:	A: 0.1% TFA in H_2O
	B: 0.1% TFA in ACN
Gradient:	Time:%B: 0:25, 20:95
Flow Rate:	1.0mL/min
Detection:	UV214nm

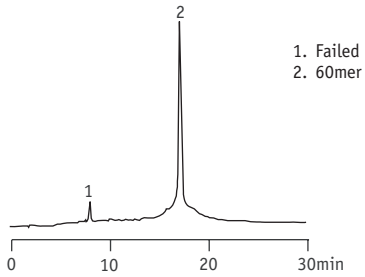
Peptide Hormones



1. [Arg_8]-Vasotocin
2. [Arg_8]-VasoPressin
3. Isotocin
4. Oxytocin

Column:	VertiSep™ BIO C4 5µm 4.6x250mm
Mobile Phase:	A: 0.1% TFA in H_2O
	B: 0.1% TFA in ACN:H_2O (90:10)
Gradient:	Time:%B: 0:10, 8:26, 14:30
Flow Rate:	1.0mL/min
Detection:	UV214nm

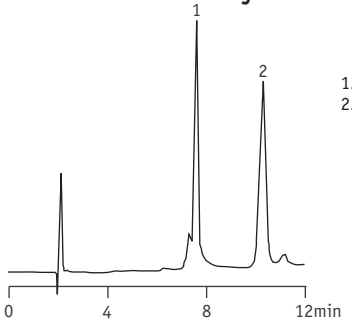
60mer Oligonucleotide Separation



1. Failed sequence contaminant
2. 60mer Oligonucleotide

Column:	VertiSep™ BIO C4 5µm 4.6x250mm
Mobile Phase:	A: 100mM TEAA in H_2O, pH 7.0
	B: 100mM TEAA in ACN, pH7.0
Gradient:	Time:%B: 0:4, 30;15
Flow Rate:	1.0mL/min
Detection:	UV260nm

Enzymes



1. α-Chymotrypsinogen
2. Carbonic Anhydrase

Column:	VertiSep™ BIO C4 5µm 4.6x150mm
Mobile Phase:	A: 0.15% TFA in H_2O
	B: 0.13% TFA in ACN
Gradient:	Time:%B: 0:40, 15:55
Flow Rate:	1.0mL/min
Detection:	UV220nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C30	3	Ultra-Fast	2.1 x 50	1	03HQ-B211
	3	LC/MS	2.1 x 100	1	03HQ-B311
	3	LC/MS	2.1 x 150	1	03HQ-B411
	3	Ultra-Fast	3.2 x 50	1	03HQ-C211
	3	LC/MS	3.2 x 100	1	03HQ-C311
	3	LC/MS	3.2 x 150	1	03HQ-C411
	3	Hi-Speed	4.6 x 50	1	03HQ-E211
	3	Analytical	4.6 x 100	1	03HQ-E311
	3	Analytical	4.6 x 150	1	03HQ-E411
	5	Ultra-Fast	2.1 x 50	1	03HQ-B221
	5	LC/MS	2.1 x 100	1	03HQ-B321
	5	LC/MS	2.1 x 150	1	03HQ-B421
	5	LC/MS	2.1 x 250	1	03HQ-B521
	5	Ultra-Fast	3.2 x 50	1	03HQ-C221
	5	LC/MS	3.2 x 100	1	03HQ-C321
	5	LC/MS	3.2 x 150	1	03HQ-C421
	5	LC/MS	3.2 x 250	1	03HQ-C521
	5	Hi-Speed	4.6 x 50	1	03HQ-E221
	5	Analytical	4.6 x 100	1	03HQ-E321
	5	Analytical	4.6 x 150	1	03HQ-E421
	5	Analytical	4.6 x 250	1	03HQ-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C18	5	LC/MS	2.1 x 100	1	03HA-B321
	5	LC/MS	2.1 x 150	1	03HA-B421
	5	LC/MS	3.2 x 150	1	03HA-C421
	5	Analytical	4.6 x 100	1	03HA-E321
	5	Analytical	4.6 x 150	1	03HA-E421
	5	Analytical	4.6 x 250	1	03HA-E521
	5	Prep	10.0 x 150	1	03HA-H421
	5	Prep	10.0 x 250	1	03HA-H521
	5	Prep	22.0 x 150	1	03HA-I421
	5	Prep	22.0 x 250	1	03HA-I521
	10	Analytical	4.6 x 100	1	03HA-E331
	10	Analytical	4.6 x 150	1	03HA-E431
	10	Analytical	4.6 x 250	1	03HA-E531
	10	Prep	10.0 x 100	1	03HA-H331
	10	Prep	10.0 x 150	1	03HA-H431
	10	Prep	10.0 x 250	1	03HA-H531
	10	Prep	21.2 x 100	1	03HA-I331
	10	Prep	21.2 x 150	1	03HA-I431
	10	Prep	21.2 x 250	1	03HA-I531
	10	Prep	30.0 x 150	1	03HA-J431
	10	Prep	30.0 x 250	1	03HA-J531
	10	Prep	50.0 x 150	1	03HA-K431
	10	Prep	50.0 x 250	1	03HA-K531

VertiSep™ BIO

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C8	5	LC/MS	2.1 x 100	1	03HB-B321
	5	LC/MS	2.1 x 150	1	03HB-B421
	5	LC/MS	3.2 x 150	1	03HB-C421
	5	Analytical	4.6 x 100	1	03HB-E321
	5	Analytical	4.6 x 150	1	03HB-E421
	5	Analytical	4.6 x 250	1	03HB-E521
	5	Prep	10.0 x 150	1	03HB-H421
	5	Prep	10.0 x 250	1	03HB-H521
	5	Prep	22.0 x 150	1	03HB-I421
	5	Prep	22.0 x 250	1	03HB-I521
	10	Analytical	4.6 x 100	1	03HB-E331
	10	Analytical	4.6 x 150	1	03HB-E431
	10	Analytical	4.6 x 250	1	03HB-E531
	10	Prep	10.0 x 100	1	03HB-H331
	10	Prep	10.0 x 150	1	03HB-H431
	10	Prep	10.0 x 250	1	03HB-H531
	10	Prep	21.2 x 100	1	03HB-I331
	10	Prep	21.2 x 150	1	03HB-I431
	10	Prep	21.2 x 250	1	03HB-I531
	10	Prep	30.0 x 150	1	03HB-J431
	10	Prep	30.0 x 250	1	03HB-J531
	10	Prep	50.0 x 150	1	03HB-K431
	10	Prep	50.0 x 250	1	03HB-K531

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C4	5	LC/MS	2.1 x 100	1	03HC-B321
	5	LC/MS	2.1 x 150	1	03HC-B421
	5	LC/MS	3.2 x 150	1	03HC-C421
	5	Analytical	4.6 x 100	1	03HC-E321
	5	Analytical	4.6 x 150	1	03HC-E421
	5	Analytical	4.6 x 250	1	03HC-E521
	5	Prep	10.0 x 150	1	03HC-H421
	5	Prep	10.0 x 250	1	03HC-H521
	5	Prep	22.0 x 150	1	03HC-I421
	5	Prep	22.0 x 250	1	03HC-I521
	10	Analytical	4.6 x 100	1	03HC-E331
	10	Analytical	4.6 x 150	1	03HC-E431
	10	Analytical	4.6 x 250	1	03HC-E531
	10	Prep	10.0 x 100	1	03HC-H331
	10	Prep	10.0 x 150	1	03HC-H431
	10	Prep	10.0 x 250	1	03HC-H531
	10	Prep	21.2 x 100	1	03HC-I331
	10	Prep	21.2 x 150	1	03HC-I431
	10	Prep	21.2 x 250	1	03HC-I531
	10	Prep	30.0 x 150	1	03HC-J431
	10	Prep	30.0 x 250	1	03HC-J531
	10	Prep	50.0 x 150	1	03HC-K431
	10	Prep	50.0 x 250	1	03HC-K531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO Guard Cartridges*					
C30	3	Guard	2.1 x 10	2	03HQ-B113
	3	Guard	3.2 x 10	2	03HQ-C113
	3	Guard	4.6 x 10	2	03HQ-E113
	5	Guard	2.1 x 10	2	03HQ-B123
	5	Guard	3.2 x 10	2	03HQ-C123
	5	Guard	4.6 x 10	2	03HQ-E123
C18	5	Guard	2.1 x 10	2	03HA-B123
	5	Guard	3.2 x 10	2	03HA-C123
	5	Guard	4.6 x 10	2	03HA-E123
	5	Guard	10.0 x 10	2	03HA-H123
	5	Guard	21.2 x 10	2	03HA-I123
	10	Guard	4.6 x 10	2	03HA-E133
	10	Guard	10.0 x 10	2	03HA-H133
	10	Guard	21.2 x 10	2	03HA-I133
C8	5	Guard	2.1 x 10	2	03HB-B123
	5	Guard	3.2 x 10	2	03HB-C123
	5	Guard	4.6 x 10	2	03HB-E123
	5	Guard	10.0 x 10	2	03HB-H123
	5	Guard	21.2 x 10	2	03HB-I123
	10	Guard	4.6 x 10	2	03HB-E133
	10	Guard	10.0 x 10	2	03HB-H133
	10	Guard	21.2 x 10	2	03HB-I133
C4	5	Guard	2.1 x 10	2	03HC-B123
	5	Guard	3.2 x 10	2	03HC-C123
	5	Guard	4.6 x 10	2	03HC-E123
	5	Guard	10.0 x 10	2	03HC-H123
	5	Guard	21.2 x 10	2	03HC-I123
	10	Guard	4.6 x 10	2	03HC-E133
	10	Guard	10.0 x 10	2	03HC-H133
	10	Guard	21.2 x 10	2	03HC-I133

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003


0300-0001


0300-0002


0300-0003

VertiSep™ IRS HPLC Columns

- An excellent alternative to Waters® µBondapak™ at a reasonable lower price
- Most methods on µBondapak™ can be transfered to VertiSep™ IRS
- Excellent Column-to-Column reproducibility
- Full guarantee

VertiSep™ IRS packings were developed to provide a physical and performance characteristics very similar to those of Waters® µBondapak™.

VertiSep™ IRS packings provide the results indicated comparable capacity, selectivity efficiency and peak symmetry when compared to µBondapak™. Most methods developed on µBondapak™ can be transfered to VertiSep™ IRS, even for USP applications.

VertiSep™ IRS packings are manufactured to minimize lot-to-lot variation with a strict QC program to ensure excellent column-to-column reproducibility.

VertiSep™ IRS packings are guaranteed separations of your samples will be comparable to separations with µBondapak™ columns. If VertiSep™ IRS does not meet your satisfaction, send in comparative data within 45 days and keep VertiSep™ IRS column for FREE.

VertiSep™ IRS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

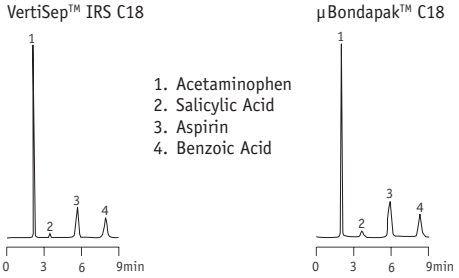
Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
C18	10	10	125	1.0	300	Yes
Ph	10	9	125	1.0	300	Yes
CN	10	6	125	1.0	300	Yes
NH2	10	4	125	1.0	300	No
Si	10	-	125	1.0	300	No

Packing Characteristics Comparision

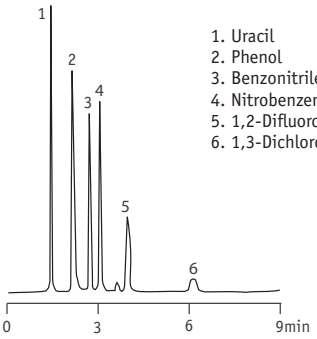
	µBondapak™ C18	VertiSep™ IRS C18
Particle Shape	Irregular	Irregular
Particle Size	10mm	10 mm
Pore Size	125Å	125Å
Surface Area	300m^2/g	300m^2/g
Carbon Load	10%	10%
Endcapped	Yes	Yes

USP XXII Acetaminophen and Aspirin Tablets Method



Column: 10µm, 3.9x300mm
Mobile Phase: 0.225% Tetramethylammonium Hydroxide Pentahydrate in a mixture of Water: Methanol:Acetonitrile:Acetic Acid (75:12.5:12.5:0.1)
Flowrate: 2mL/min
Detection: UV280nm

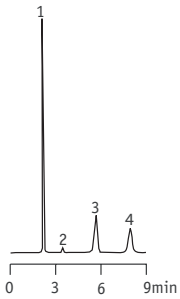
Organic Test Mix



1. Uracil
2. Phenol
3. Benzonitrile
4. Nitrobenzene
5. 1,2-Difluorobenzene
6. 1,3-Dichloro-4,6-dinitrobenzene

Column: VertiSep™ IRS C18 10µm, 3.9x300mm
Mobile Phase: ACN:Water (65:35)
Flow Rate: 1.5mL/min
Detection: UV254nm

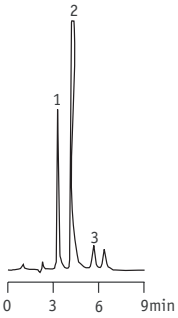
USSP XXII Acetaminophen



1. Acetaminophen
2. Salicylic acid
3. Aspirin
4. Benzoic acid

Column: VertiSep™ IRS C18 10µm, 3.9x300mm
Mobile Phase: Water:MeOH:ACN:CH_3COOH (75:12.5:12.5:0.1)
Flow Rate: 2.0mL/min
Detection: UV280nm

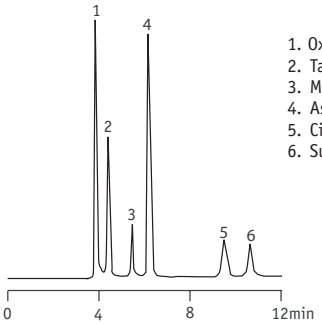
Plant Growth Regulators



1. Methyl-2, 7-dichloro-9-hydroxyfluorene-9-carboxylate
2. Methyl-2-chloro-9-hydroxyfluorene-9-carboxylate
3. Methyl-9-hydroxyfluorene-9-carboxylate

Column: VertiSep™ IRS C18 10µm, 3.9x300mm
Mobile Phase: ACN:Water (55:45)
Flow Rate: 1.5mL/min
Detection: UV254nm

Organic Acids



1. Oxalic acid
2. Tartaric acid
3. Malic acid
4. Ascorbic acid
5. Citric acid
6. Succinic acid

Column: VertiSep™ IRS C18 10µm, 3.9x300mm
Mobile Phase: 0.05M KH_2PO_4, pH2.5
Flow Rate: 0.7mL/min
Temp: 25°C
Detection: UV215nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ IRS					
C18	10	Analytical	3.9 x 150	1	03GA-L432
	10	Analytical	3.9 x 300	1	03GA-L932
Ph	10	Analytical	3.9 x 150	1	03GD-L432
	10	Analytical	3.9 x 300	1	03GD-L932
CN	10	Analytical	3.9 x 150	1	03GE-L432
	10	Analytical	3.9 x 300	1	03GE-L932
NH2	10	Analytical	3.9 x 150	1	03GF-L432
	10	Analytical	3.9 x 300	1	03GF-L932
Si	10	Analytical	3.9 x 150	1	03GG-L432
	10	Analytical	3.9 x 300	1	03GG-L932

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ IRS Guard Cartridges*					
C18	10	Guard	3.9 x 10	2	03GA-L132
Ph	10	Guard	3.9 x 10	2	03GD-L132
CN	10	Guard	3.9 x 10	2	03GE-L132
NH2	10	Guard	3.9 x 10	2	03GF-L132
Si	10	Guard	3.9 x 10	2	03GG-L132

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

VertiSep™ MMS HPLC Columns

- **Multifunctional silica-based column**
- **Used in specific applications and recommended by USP**
- **High surface area offers high resolution for gradient elution of difficulty separation compounds**
- **Polymeric bonding offers high stability and longer column life time**
- **Excellent Column-to-Column reproducibility**
- **Available in 5 phases : CN/NH2, C8/NH2, C8/C18, C8/SCX, C8/SAX and Ph/C6**

VertiSep™ MMS columns are multifunctional Silica based columns used as alternative to single phase for specific applications. VertiSep™ MMS are high surface of 450 m^2/g offer high capacity and high resolution for gradient elution. VertiSep™ MMS columns are manufactured to minimize lot-to-lot variation with a strict QC program to ensure excellent column-to-column reproducibility.

VertiSep™ MMS CN/NH2 is a multifunctional phases of Cyano and Amine offering reversed phase, normal phase and weak anion exchange interactions for good thermal and chemical stabilities. Selectivity and rapid equilibrium allow a range of separation mechanisms to be used, including adsorption, reversed phase and weak anion exchange depending on mobile phase used. VertiSep™ MMS CN/NH2 is a good choice for Carbohydrate separations and recommended for USP L18.

VertiSep™ MMS C8/NH2 column is a multifunctional phase of C8 and Amine offering both reversed phase and normal phase interaction. VertiSep™ MMS C8/NH2 is used for difficult applications i.e. hydrophobic as well as ionic compounds which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier composition. VertiSep™ MMS C8/NH2 is recommended for USP L28.

VertiSep™ MMS C8/C18 column is multifunctional phase of C8 and C18 groups for the reversed phase separation of basic molecules. VertiSep™ MMS C8/C18 offers more excellent gradient separation to C18 or C8 only for applications especially pharmaceutical applications and recommended for USP L42.

VertiSep™ MMS C8/SCX is a multifunctional phase of C8 and SCX (Strong Cationic Exchanger) offering both reversed phase and strong cationic interactions. VertiSep™ MMS C8/SCX is used for separation of basic drugs and metabolites from physiological fluids. VertiSep™ MMS C8/SCX is recommended for USP L44. Difficult applications which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier composition.

VertiSep™ MMS C8/SAX is multifunctional phase of C8 and SAX (Strong Anionic Exchanger) offering both reversed phase and strong anionic interactions. VertiSep™ MMS C8/SAX is used for acidic drugs and metabolites from physiological fluids. Difficult applications which previously required special conditions can be developed by controlling ionization via mobile phase adjustments, buffer strength and organic modifier compositions.

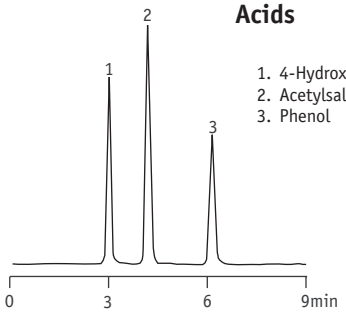
Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
CN/NH2	5	16	100	1.0	450	No
C8/NH2	5	11	100	1.0	450	No
C8/C18	5	14	100	1.0	450	Yes
C8/SCX	5	9	100	1.0	450	No
C8/SAX	5	9	100	1.0	450	No
Ph/C6	5	9	100	1.0	450	Yes

VertiSep™ MMS Ph/C6 is multifunctional phase of Phenyl and Hexyl (C6) offering both Phenyl and a short Alkyl phase interactions, dense bonding and endcapping to minimize silanol effect and increases chemical stability. VertiSep™ MMS Ph/C6 offers dual selectivity of Phenyl ring and Hexyl chain for Aromatic and Amine compounds and recommended for USP L11.

VertiSep™ MMS are manufactured by statistic process control of Silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

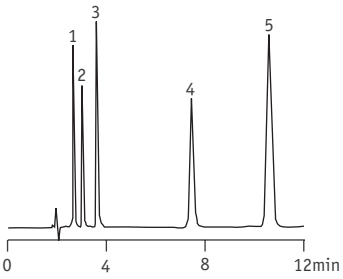
Acids



1. 4-Hydroxy-3-methoxy-mandelic Acid
2. Acetylsalicylic Acid
3. Phenol

Column:	VertiSep™ MMS C8/NH2, 5µm, 4.6 x 150mm
Mobile Phase:	MeOH:100mM K_2HPO_4, pH 7 (30:70)
Flow Rate:	1.0mL/min
Temp:	30°C
Detection:	UV254nm

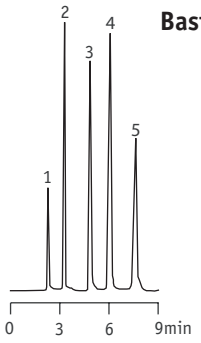
Acidic and basic molecules



1. Acetylsalicylic acid
2. p-Acetophenetidide
3. Salicylic acid
4. Phenylbutazone
5. Indomethacin

Column:	VertiSep™ MMS C8/C18 5µm, 4.6 x 250mm
Mobile Phase:	CH_3OH:0.004M KH_2PO_4, pH 3.0 (70:30)
Flow Rate:	1.0mL/min
Detection:	UV254nm

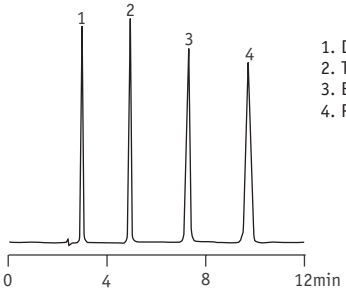
Basic drug mixture



1. Unretained peak
2. Chlorpheniramine
3. Procainamide
4. Amiloride
5. N-Acetylprocainamide

Column:	VertiSep™ MMS C8/C18 5µm, 4.6 x 250mm
Mobile Phase:	CH_3CN:0.05M KH_2PO_4, pH 3.5 (10:90)
Flow Rate:	1.0mL/min
Detection:	UV254nm

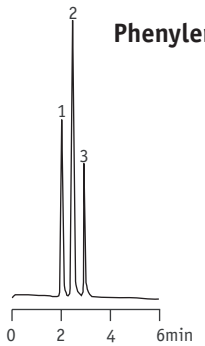
Acidic and basic molecules



1. Dimethyl phthalate
2. Toluene
3. Biphenyl
4. Phenanthrene

Column:	VertiSep™ C8/C18 MMS 5µm, 4.6 x 150mm
Mobile Phase:	CH_3OH:H_2O (80:20)
Flow Rate:	1.0mL/min
Temp:	Ambient
Detection:	UV254nm

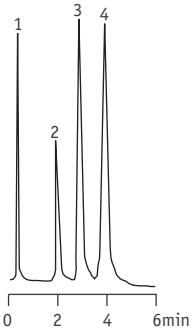
Phenylenediamine Isomers



1. p-Phenylenediamine
2. m-Phenylenediamine
3. o-Phenylenediamine

Column:	VertiSep™ MMS C8/SCX 5µm, 4.6 x 150mm
Mobile Phase:	H_3PO_4 adjusted to pH 3.2 with NH_4OH : CH_3OH (90:10)
Flow Rate:	1.0mL/min
Detection:	UV254nm

Aromatic Carboxylic Acids

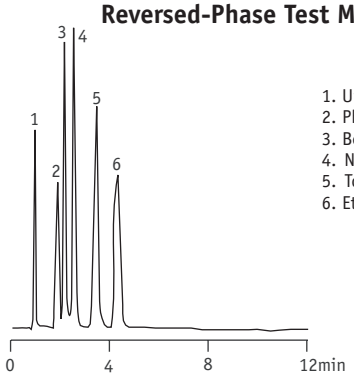


1. Nictotinic Acid
2. Benzoic Acid
3. o-Toluic Acid
4. m-Toluic Acid

Column:	VertiSep™ MMS C18/SAX 5µm, 4.6 x 250mm
Mobile Phase:	H_2O, pH 2.6:MeOH (90:10)
Flow Rate:	1.5mL/min
Detection:	UV254nm

VertiSep™ MMS

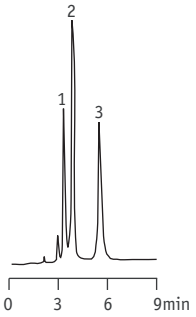
Reversed-Phase Test Mixture



1. Uracil
2. Phenol
3. Benzaldehyde
4. N,N-Diethyl-o-toulamide
5. Toluene
6. Ethylbenzene

Column:	VertiSep™ MMS C8/NH2 5μm, 4.6 x 100mm
Mobile Phase:	ACN:H_2O (50:50)
Flow Rate:	1.0mL/min
Detection:	1.0 AUFS, UV254nm

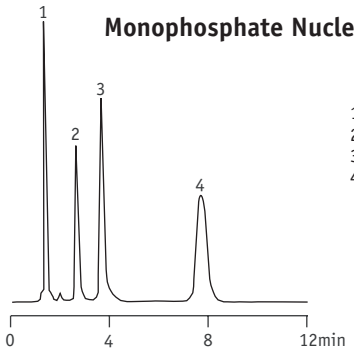
Tetracyclines



1. Oxytetracycline
2. Tetracycline
3. Demeclocycline

Column:	VertiSep™ MMS C8/SCX 5μm, 4.6 x 100mm
Mobile Phase:	0.04M KH_2PO_4, pH 2.5:ACN (90:10)
Flow Rate:	1.0mL/min
Detection:	UV280nm

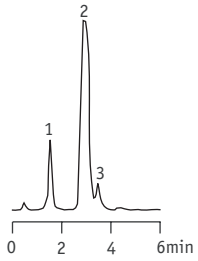
Monophosphate Nucleotides



1. CMP
2. UMP
3. AMP
4. GMP

Column:	VertiSep™ MMS C8/NH2 5μm, 4.6 x 100mm
Mobile Phase:	0.2M KH_2PO_4, pH 3.5:ACN (90:10)
Flow Rate:	1.0mL/min
Detection:	1.0 AUFS, UV254nm

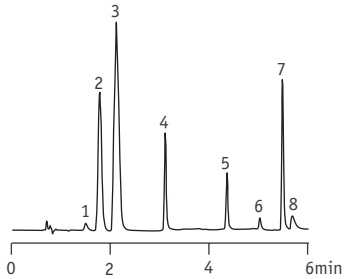
Tripelennamine



1. Methyl paraben
2. Tripelennamine
3. Propyl paraben

Column:	VertiSep™ C8/SCX MMS 5μm, 4.6 x 100mm
Mobile Phase:	0.05M KH_2PO_4, pH 4.5:CH_3OH (50:50)
Flow Rate:	1.5mL/min
Detection:	1.0 AUFS, UV254nm

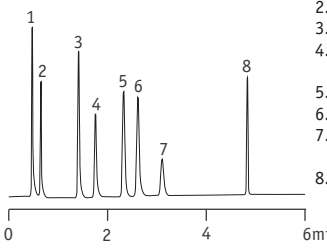
Cough and Cold Medicine



1. p-Aminophenol
2. Benzoic acid
3. Acetaminophen
4. Pseudoephedrine
5. Butyl paraben
6. Chlorphenaramine
7. Diphenhydramine
8. Dextromethorphan

Column:	VertiSep™ MMS Ph/C6 5μm, 4.6 x 100mm
Mobile Phase:	A: ACN, B: CH_3OH:20mM KH_2PO_4 ,pH 9.0 (80:20)
Gradient:	Time/%B: 0/100, 5/20
Flow Rate:	1.0mL/min
Detection:	UV214nm

Food Additives



1. Saccharin
2. p-Hydroxybenzoic acid
3. Sorbic acid
4. p-Hydroxybenzoic acid methyl ester
5. Dehydroacetic acid
6. p-Toluic acid
7. p-Hydroxybenzoic acid ethyl ester
8. n-Propyl p-hydroxybenzoate

Column:	VertiSep™ MMS Ph/C6 5μm, 4.6 x 150mm
Mobile Phase:	A: 50mM KH_2PO_4+ 0.1%H_3PO_4, B: ACN
Flow Rate:	1.0mL/min
Gradient:	Time/%B: 0/25, 18/75 hold 12 min
Detection:	UV230nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ MMS					
CN/NH2	5	Ultra-Fast	3.2 x 50	1	03NR-C221
	5	LC/MS	3.2 x 100	1	03NR-C321
	5	LC/MS	3.2 x 150	1	03NR-C421
	5	Hi-Speed	4.0 x 50	1	03NR-D221
	5	Analytical	4.0 x 100	1	03NR-D321
	5	Analytical	4.0 x 150	1	03NR-D421
	5	Analytical	4.0 x 250	1	03NR-D521
	5	Hi-Speed	4.6 x 50	1	03NR-E221
	5	Analytical	4.6 x 100	1	03NR-E321
	5	Analytical	4.6 x 150	1	03NR-E421
	5	Analytical	4.6 x 250	1	03NR-E521
C8/NH2	5	Ultra-Fast	3.2 x 50	1	03NS-C221
	5	LC/MS	3.2 x 100	1	03NS-C321
	5	LC/MS	3.2 x 150	1	03NS-C421
	5	Hi-Speed	4.0 x 50	1	03NS-D221
	5	Analytical	4.0 x 100	1	03NS-D321
	5	Analytical	4.0 x 150	1	03NS-D421
	5	Analytical	4.0 x 250	1	03NS-D521
	5	Hi-Speed	4.6 x 50	1	03NS-E221
	5	Analytical	4.6 x 100	1	03NS-E321
	5	Analytical	4.6 x 150	1	03NS-E421
	5	Analytical	4.6 x 250	1	03NS-E521
C8/C18	5	Ultra-Fast	3.2 x 50	1	03NT-C221
	5	LC/MS	3.2 x 100	1	03NT-C321
	5	LC/MS	3.2 x 150	1	03NT-C421
	5	Hi-Speed	4.0 x 50	1	03NT-D221
	5	Analytical	4.0 x 100	1	03NT-D321
	5	Analytical	4.0 x 150	1	03NT-D421
	5	Analytical	4.0 x 250	1	03NT-D521
	5	Hi-Speed	4.6 x 50	1	03NT-E221
	5	Analytical	4.6 x 100	1	03NT-E321
	5	Analytical	4.6 x 150	1	03NT-E421
	5	Analytical	4.6 x 250	1	03NT-E521
C8/SCX	5	Ultra-Fast	3.2 x 50	1	03NU-C221
	5	LC/MS	3.2 x 100	1	03NU-C321
	5	LC/MS	3.2 x 150	1	03NU-C421
	5	Hi-Speed	4.0 x 50	1	03NU-D221
	5	Analytical	4.0 x 100	1	03NU-D321
	5	Analytical	4.0 x 150	1	03NU-D421
	5	Analytical	4.0 x 250	1	03NU-D521
	5	Hi-Speed	4.6 x 50	1	03NU-E221
	5	Analytical	4.6 x 100	1	03NU-E321
	5	Analytical	4.6 x 150	1	03NU-E421
	5	Analytical	4.6 x 250	1	03NU-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ MMS					
C8/SAX	5	Ultra-Fast	3.2 x 50	1	03NV-C221
	5	LC/MS	3.2 x 100	1	03NV-C321
	5	LC/MS	3.2 x 150	1	03NV-C421
	5	Hi-Speed	4.0 x 50	1	03NV-D221
	5	Analytical	4.0 x 100	1	03NV-D321
	5	Analytical	4.0 x 150	1	03NV-D421
	5	Analytical	4.0 x 250	1	03NV-D521
	5	Hi-Speed	4.6 x 50	1	03NV-E221
	5	Analytical	4.6 x 100	1	03NV-E321
	5	Analytical	4.6 x 150	1	03NV-E421
	5	Analytical	4.6 x 250	1	03NV-E521
Ph/C6	5	Ultra-Fast	3.2 x 50	1	03N4-C221
	5	LC/MS	3.2 x 100	1	03N4-C321
	5	LC/MS	3.2 x 150	1	03N4-C421
	5	Hi-Speed	4.0 x 50	1	03N4-D221
	5	Analytical	4.0 x 100	1	03N4-D321
	5	Analytical	4.0 x 150	1	03N4-D421
	5	Analytical	4.0 x 250	1	03N4-D521
	5	Hi-Speed	4.6 x 50	1	03N4-E221
	5	Analytical	4.6 x 100	1	03N4-E321
	5	Analytical	4.6 x 150	1	03N4-E421
	5	Analytical	4.6 x 250	1	03N4-E521

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ MMS Guard Cartridges*					
CN/NH2	5	Guard	3.2 x 10	1	03NR-C123
	5	Guard	4.6 x 10	1	03NR-E123
C8/NH2	5	Guard	3.2 x 10	1	03NS-C123
	5	Guard	4.6 x 10	1	03NS-E123
C8/C18	5	Guard	3.2 x 10	1	03NT-C123
	5	Guard	4.6 x 10	1	03NT-E123
C8/SCX	5	Guard	3.2 x 10	1	03NU-C123
	5	Guard	4.6 x 10	1	03NU-E123
C8/SAX	5	Guard	3.2 x 10	1	03NV-C123
	5	Guard	4.6 x 10	1	03NV-E123
Ph/C6	5	Guard	3.2 x 10	1	03N4-C123
	5	Guard	4.6 x 10	1	03N4-E123

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

VertiSep™ SPS HPLC Columns

- **High purity silica for high stability, efficiency and reproducibility**
- **Smal pore size and surface area, perfect for general purpose and method development**
- **Fully endcapped to improve peak symmetry**
- **Polymeric bonding offerring high stability at pH range 1.5 - 10 and longer column lifetime**
- **Direct replacement to Waters® Spherisorb®, Agilent® Zorbax® and Eclipse XDB**

VertiSep™ SPS packings are high purity silica which contains less amounts of metal ions and sulfate contaminants offerrring high stability, efficiency, column-to-column reproducibility.

VertiSep™ SPS packings are small pore size and surface area proving general purpose separations of variety of smale compounds and also method developement

VertiSep™ SPS reverse phase packings are fully endcapped and shows selectivity as conventional C18 phase.

VertiSep™ SPS packings are polymeric bonding resulting high stability at pH 1.5-10.0* and longer column lifetime.

VertiSep™ SPS packings provide the results indicated comparable capacity, selectivity efficiency and peak symmetry when compared to Waters® Spherisorb®, Agilent® Zorbax® and Eclipse XDB. Almost methods developed on those can be transfered to VertiSep™ SPS, even for USP applications.

VertiSep™ SPS packings are manufactured to minimize lot-to-lot variation with a strict QC program to ensure excellent column-to-column reproducibility.

VertiSep™ SPS packings are guaranteed separations of your samples will be comparable to separations with Waters® Spherisorb®, Agilent® Zorbax® and Eclipse XDB columns. If VertiSep™ SPS does not meet your satisfaction, send in comparative data within 45 days and keep VertiSep™ SPS column for FREE.

VertiSep™ SPS are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Specifications

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m^2/g)	End Capped
ODS1	3,5,10	6	80	0.5	220	Yes
ODS2	3,5,10	12	80	0.5	220	Yes
C8	3,5,10	6	80	0.5	220	Yes
C6	3,5,10	5	80	0.5	220	Yes
Ph	3,5,10	3	80	0.5	220	Yes
C4	3,5,10	3	80	0.5	220	Yes
CN	3,5,10	3	80	0.5	220	No
NH2	3,5,10	2	80	0.5	220	No
Si	3,5,10	-	80	0.5	220	No
SAX	5,10	4	80	0.5	220	No
SCX	5,10	4	80	0.5	220	No

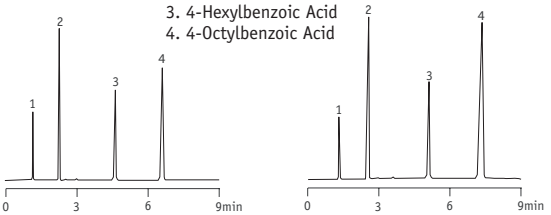
Packing Characteristics Comparison

	Spherisorb® ODS2	VertiSep™ SPS ODS2
Particle Shape	Spherical	Spherical
Particle Size	3,5,10µm	3,5,10µm
Pore Size	80Å	80Å
Surface Area	220m^2/g	220m^2/g
Carbon Load	12%	12%
Endcapped	Yes	Yes

Alkyl Benzoic Acids

VertiSep™ SPS C8 | Spherisorb® C8

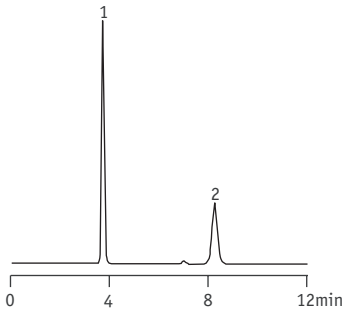
1. 4-Butylbenzoic Acid
2. 3,5,-di-tert-Butylbenzoic Acid
3. 4-Hexylbenzoic Acid
4. 4-Octylbenzoic Acid



Column: VertiSep™ SPS C8, 5µ, 4.6 x 150 mm
Mobile Phase: ACN:H_2O:CH_3COOH (65:34:1)
Flowrate: 1.0mL/min
Detector: UV254nm

* VertiSep™ SPS CN is stable at pH 1.5-7.0 packing

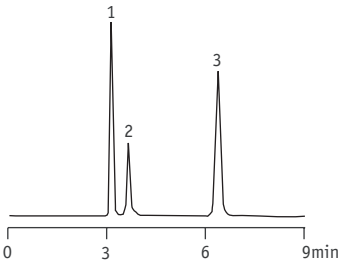
Acetaminophen and Guaifenisen



1. Acetaminophen
2. Guaifenisen

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	H_2O:MeOH (65:35)
Flow Rate:	1.0mL/min
Detection:	UV 254nm

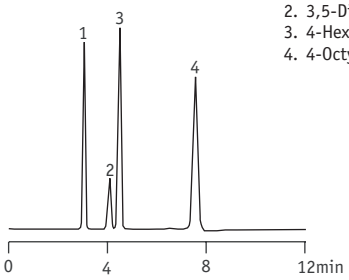
Aromatic Acids



1. Homovanillic acid
2. Benzoic acid
3. Salicylic acid

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	0.05M KH_2PO_4, pH 3.2:MeOH (60:40)
Flow Rate:	1.0mL/min
Detection:	UV254nm

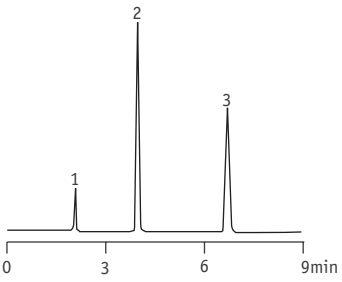
Alkyl Benzonic Acids



1. 4-Butylbenzoic Acid
2. 3,5-Di-tert-Butylbenzoic Acid
3. 4-Hexylbenzoic Acid
4. 4-Octylbenzoic Acid

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	ACN:H_2O:CH_3COOH (65:34:1)
Flow Rate:	1.0mL/min
Detection:	UV254nm

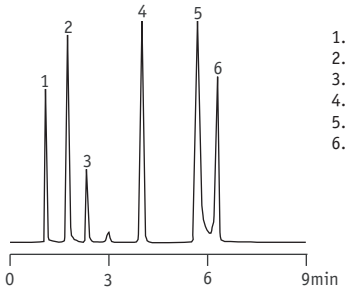
Aromatic Bases



1. Aniline
2. Dimethylaniline
3. Diethylaniline

Column:	VertiSep™ SPS ODS2 5µm 4.6 x 150 mm
Mobile Phase:	ACN:H_2O:TEA (65:34:1)
Flow Rate:	1.0mL/min
Detection:	UV252nm

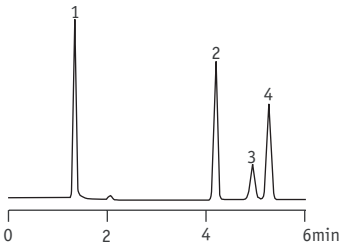
Acids, Bases and Neutrals



1. Uracil
2. Pyradine
3. Phenol
4. N,N Dimethylaniline
5. 4-Butylbenzoic acid
6. Toluene

Column:	VertiSep™ SPS C8 5µm 4.6 x 150 mm
Mobile Phase:	ACN:0.05M KH_2PO_4, pH 3.2 (50:50)
Flow Rate:	1.0mL/min
Temp:	ambient
Detection:	UV254nm

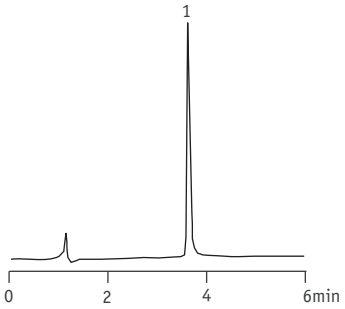
Neutral Aromatics



1. Uracil
2. Toluene
3. Naphthalene
4. p-Xylene

Column:	VertiSep™ SPS C8 5µm 4.6 x 150 mm
Mobile Phase:	ACN:H_2O (60:40)
Flow Rate:	1.0mL/min
Temp:	ambient
Detection:	UV254nm

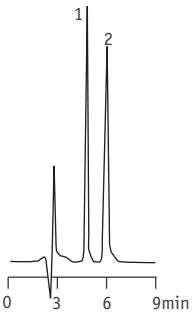
Antitumor Drug



1. Paclitaxel (Taxol)

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	H_2O:ACN
Gradient:	Time/%B: 0/50, 10/90
Flow Rate:	1.0mL/min
Detection:	UV204nm

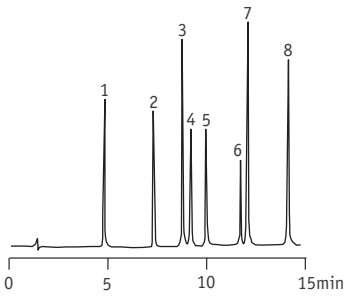
Stanozolol



1. 4-Acetylbiphenyl
2. Stanozolol

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 250 mm
Mobile Phase:	MeOH: 0.05M Ammonium (85:15)
Flow Rate:	1.0mL/min
Detection:	UV230nm

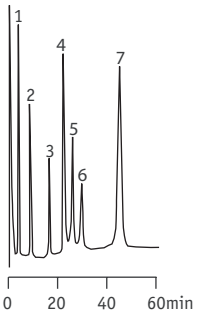
Hypnotic Drug



1 Barbital
2 Allobarbital
3 Phenobarbital
4 Butabarbital
5 Butalbital
6 Amobarbital
7 Mephobarbital
8 Flunitrazepam

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	A:H_2O, B:ACN
Gradient:	Time/%B: 0/10, 16/50
Flow Rate:	1.0mL/min
Detection:	UV204nm

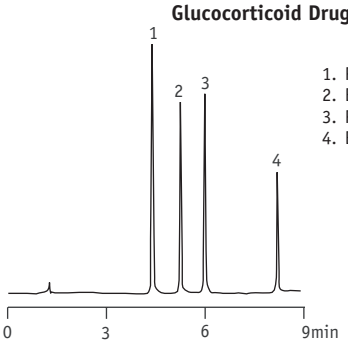
Peptides



1. Cycloguanil
2. 4-Chlorophenyl-Biguanide
3. Quinine
4. Proguanil
5. Desethylchloroquine
6. Chloroquine
7. Chloroproguanil

Column:	VertiSep™ SPS ODS2 5µm 2.1 x 100 mm
Mobile Phase:	ACN: 0.02M KH_2PO4, pH 2.5 (50:50) containing 60mM SLS and 10 mM TBA
Flow Rate:	1.0mL/min
Detection:	UV254nm

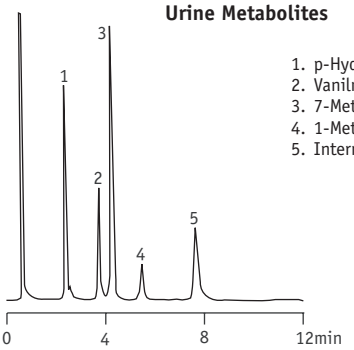
Glucocorticoid Drugs



1. Prednisolone
2. Betamethasone
3. Prednisolone acetate
4. Betamethasone valerate

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	A:H_2O, B:ACN
Flow Rate:	Time/%B: 0/20, 10/80
Gradient:	ambient
Detection:	UV254nm

Urine Metabolites



1. p-Hydroxymandelic Acid
2. Vanilmandelic Acid
3. 7-Methyluric Acid
4. 1-Methyluric Acid
5. Internal Standard

Column:	VertiSep™ SPS ODS1 5µm 4.6 x 150 mm
Mobile Phase:	0.8% EtOH in 10mM KH_2PO_4, pH2.3
Flow Rate:	2.0mL/min
Detection:	UV280nm

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS					
ODS1	3	LC/MS	3.2 x 100	1	03PX-C311
	3	LC/MS	3.2 x 150	1	03PX-C411
	3	Analytical	4.0 x 100	1	03PX-D311
	3	Analytical	4.0 x 150	1	03PX-D411
	3	Analytical	4.6 x 100	1	03PX-E311
	3	Analytical	4.6 x 150	1	03PX-E411
	3	Hi-speed	7.8 x 50	1	03PX-G211
	3	Analytical	7.8 x 100	1	03PX-G311
	5	LC/MS	2.1 x 100	1	03PX-B321
	5	LC/MS	2.1 x 150	1	03PX-B421
	5	LC/MS	3.2 x 100	1	03PX-C321
	5	LC/MS	3.2 x 150	1	03PX-C421
	5	Analytical	4.0 x 100	1	03PX-D321
	5	Analytical	4.0 x 150	1	03PX-D421
	5	Analytical	4.0 x 250	1	03PX-D521
	5	Analytical	4.6 x 100	1	03PX-E321
	5	Analytical	4.6 x 125	1	03PX-EC21
	5	Analytical	4.6 x 150	1	03PX-E421
	5	Analytical	4.6 x 250	1	03PX-E521
	10	Analytical	4.6 x 250	1	03PX-E531
ODS2	3	LC/MS	3.2 x 100	1	03PY-C311
	3	LC/MS	3.2 x 150	1	03PY-C411
	3	Analytical	4.0 x 100	1	03PY-D311
	3	Analytical	4.0 x 150	1	03PY-D411
	3	Analytical	4.6 x 100	1	03PY-E311
	3	Analytical	4.6 x 150	1	03PY-E411
	3	Hi-speed	7.8 x 50	1	03PY-G211
	3	Analytical	7.8 x 100	1	03PY-G311
	5	LC/MS	2.1 x 100	1	03PY-B321
	5	LC/MS	2.1 x 150	1	03PY-B421
	5	LC/MS	3.2 x 100	1	03PY-C321
	5	LC/MS	3.2 x 150	1	03PY-C421
	5	Analytical	4.0 x 100	1	03PY-D321
	5	Analytical	4.0 x 150	1	03PY-D421
	5	Analytical	4.0 x 250	1	03PY-D521
	5	Analytical	4.6 x 100	1	03PY-E321
	5	Analytical	4.6 x 125	1	03PY-EC21
	5	Analytical	4.6 x 150	1	03PY-E421
	5	Analytical	4.6 x 250	1	03PY-E521
	10	Analytical	4.6 x 250	1	03PY-E531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS					
C8	3	LC/MS	3.2 x 100	1	03PB-C311
	3	LC/MS	3.2 x 150	1	03PB-C411
	3	Analytical	4.0 x 100	1	03PB-D311
	3	Analytical	4.0 x 150	1	03PB-D411
	3	Analytical	4.6 x 100	1	03PB-E311
	3	Analytical	4.6 x 150	1	03PB-E411
	3	Hi-speed	7.8 x 50	1	03PB-G211
	3	Analytical	7.8 x 100	1	03PB-G311
	5	LC/MS	2.1 x 100	1	03PB-B321
	5	LC/MS	2.1 x 150	1	03PB-B421
	5	LC/MS	3.2 x 100	1	03PB-C321
	5	LC/MS	3.2 x 150	1	03PB-C421
	5	Analytical	4.0 x 100	1	03PB-D321
	5	Analytical	4.0 x 150	1	03PB-D421
	5	Analytical	4.0 x 250	1	03PB-D521
	5	Analytical	4.6 x 100	1	03PB-E321
	5	Analytical	4.6 x 125	1	03PB-EC21
	5	Analytical	4.6 x 150	1	03PB-E421
	5	Analytical	4.6 x 250	1	03PB-E521
	10	Analytical	4.6 x 250	1	03PB-E531
C6	3	LC/MS	3.2 x 100	1	03PW-C311
	3	LC/MS	3.2 x 150	1	03PW-C411
	3	Analytical	4.0 x 100	1	03PW-D311
	3	Analytical	4.0 x 150	1	03PW-D411
	3	Analytical	4.6 x 100	1	03PW-E311
	3	Analytical	4.6 x 150	1	03PW-E411
	3	Hi-speed	7.8 x 50	1	03PW-G211
	3	Analytical	7.8 x 100	1	03PW-G311
	5	LC/MS	2.1 x 100	1	03PW-B321
	5	LC/MS	2.1 x 150	1	03PW-B421
	5	LC/MS	3.2 x 100	1	03PW-C321
	5	LC/MS	3.2 x 150	1	03PW-C421
	5	Analytical	4.0 x 100	1	03PW-D321
	5	Analytical	4.0 x 150	1	03PW-D421
	5	Analytical	4.0 x 250	1	03PW-D521
	5	Analytical	4.6 x 100	1	03PW-E321
	5	Analytical	4.6 x 125	1	03PW-EC21
	5	Analytical	4.6 x 150	1	03PW-E421
	5	Analytical	4.6 x 250	1	03PW-E521
	10	Analytical	4.6 x 250	1	03PW-E531

VertiSep™ SPS

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS					
Ph	3	LC/MS	3.2 x 100	1	03PD-C311
	3	LC/MS	3.2 x 150	1	03PD-C411
	3	Analytical	4.0 x 100	1	03PD-D311
	3	Analytical	4.0 x 150	1	03PD-D411
	3	Analytical	4.6 x 100	1	03PD-E311
	3	Analytical	4.6 x 150	1	03PD-E411
	3	Hi-speed	7.8 x 50	1	03PD-G211
	3	Analytical	7.8 x 100	1	03PD-G311
	5	LC/MS	2.1 x 100	1	03PD-B321
	5	LC/MS	2.1 x 150	1	03PD-B421
	5	LC/MS	3.2 x 100	1	03PD-C321
	5	LC/MS	3.2 x 150	1	03PD-C421
	5	Analytical	4.0 x 100	1	03PD-D321
	5	Analytical	4.0 x 150	1	03PD-D421
	5	Analytical	4.0 x 250	1	03PD-D521
	5	Analytical	4.6 x 100	1	03PD-E321
	5	Analytical	4.6 x 125	1	03PD-EC21
	5	Analytical	4.6 x 150	1	03PD-E421
	5	Analytical	4.6 x 250	1	03PD-E521
	10	Analytical	4.6 x 250	1	03PD-E531
C4	3	LC/MS	3.2 x 100	1	03PC-C311
	3	LC/MS	3.2 x 150	1	03PC-C411
	3	Analytical	4.0 x 100	1	03PC-D311
	3	Analytical	4.0 x 150	1	03PC-D411
	3	Analytical	4.6 x 100	1	03PC-E311
	3	Analytical	4.6 x 150	1	03PC-E411
	3	Hi-speed	7.8 x 50	1	03PC-G211
	3	Analytical	7.8 x 100	1	03PC-G311
	5	LC/MS	2.1 x 100	1	03PC-B321
	5	LC/MS	2.1 x 150	1	03PC-B421
	5	LC/MS	3.2 x 100	1	03PC-C321
	5	LC/MS	3.2 x 150	1	03PC-C421
	5	Analytical	4.0 x 100	1	03PC-D321
	5	Analytical	4.0 x 150	1	03PC-D421
	5	Analytical	4.0 x 250	1	03PC-D521
	5	Analytical	4.6 x 100	1	03PC-E321
	5	Analytical	4.6 x 125	1	03PC-EC21
	5	Analytical	4.6 x 150	1	03PC-E421
	5	Analytical	4.6 x 250	1	03PC-E521
	10	Analytical	4.6 x 250	1	03PC-E531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS					
CN	3	LC/MS	3.2 x 100	1	03PE-C311
	3	LC/MS	3.2 x 150	1	03PE-C411
	3	Analytical	4.0 x 100	1	03PE-D311
	3	Analytical	4.0 x 150	1	03PE-D411
	3	Analytical	4.6 x 100	1	03PE-E311
	3	Analytical	4.6 x 150	1	03PE-E411
	3	Hi-speed	7.8 x 50	1	03PE-G211
	3	Analytical	7.8 x 100	1	03PE-G311
	5	LC/MS	2.1 x 100	1	03PE-B321
	5	LC/MS	2.1 x 150	1	03PE-B421
	5	LC/MS	3.2 x 100	1	03PE-C321
	5	LC/MS	3.2 x 150	1	03PE-C421
	5	Analytical	4.0 x 100	1	03PE-D321
	5	Analytical	4.0 x 150	1	03PE-D421
	5	Analytical	4.0 x 250	1	03PE-D521
	5	Analytical	4.6 x 100	1	03PE-E321
	5	Analytical	4.6 x 125	1	03PE-EC21
	5	Analytical	4.6 x 150	1	03PE-E421
	5	Analytical	4.6 x 250	1	03PE-E521
	10	Analytical	4.6 x 250	1	03PE-E531
NH2	3	LC/MS	3.2 x 100	1	03PF-C311
	3	LC/MS	3.2 x 150	1	03PF-C411
	3	Analytical	4.0 x 100	1	03PF-D311
	3	Analytical	4.0 x 150	1	03PF-D411
	3	Analytical	4.6 x 100	1	03PF-E311
	3	Analytical	4.6 x 150	1	03PF-E411
	3	Hi-speed	7.8 x 50	1	03PF-G211
	3	Analytical	7.8 x 100	1	03PF-G311
	5	LC/MS	2.1 x 100	1	03PF-B321
	5	LC/MS	2.1 x 150	1	03PF-B421
	5	LC/MS	3.2 x 100	1	03PF-C321
	5	LC/MS	3.2 x 150	1	03PF-C421
	5	Analytical	4.0 x 100	1	03PF-D321
	5	Analytical	4.0 x 150	1	03PF-D421
	5	Analytical	4.0 x 250	1	03PF-D521
	5	Analytical	4.6 x 100	1	03PF-E321
	5	Analytical	4.6 x 125	1	03PF-EC21
	5	Analytical	4.6 x 150	1	03PF-E421
	5	Analytical	4.6 x 250	1	03PF-E521
	10	Analytical	4.6 x 250	1	03PF-E531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS					
Si	3	LC/MS	3.2 x 100	1	03PG-C311
	3	LC/MS	3.2 x 150	1	03PG-C411
	3	Analytical	4.0 x 100	1	03PG-D311
	3	Analytical	4.0 x 150	1	03PG-D411
	3	Analytical	4.6 x 100	1	03PG-E311
	3	Analytical	4.6 x 150	1	03PG-E411
	3	Hi-speed	7.8 x 50	1	03PG-G211
	3	Analytical	7.8 x 100	1	03PG-G311
	5	LC/MS	2.1 x 100	1	03PG-B321
	5	LC/MS	2.1 x 150	1	03PG-B421
	5	LC/MS	3.2 x 100	1	03PG-C321
	5	LC/MS	3.2 x 150	1	03PG-C421
	5	Analytical	4.0 x 100	1	03PG-D321
	5	Analytical	4.0 x 150	1	03PG-D421
	5	Analytical	4.0 x 250	1	03PG-D521
	5	Analytical	4.6 x 100	1	03PG-E321
	5	Analytical	4.6 x 125	1	03PG-EC21
	5	Analytical	4.6 x 150	1	03PG-E421
	5	Analytical	4.6 x 250	1	03PG-E521
	10	Analytical	4.6 x 250	1	03PG-E531
SCX	5	Analytical	4.6 x 150	1	03PI-E421
	5	Analytical	4.6 x 250	1	03PI-E521
	10	Analytical	4.6 x 250	1	03PI-E531
SAX	5	Analytical	4.6 x 150	1	03PH-E421
	5	Analytical	4.6 x 250	1	03PH-E521
	10	Analytical	4.6 x 250	1	03PH-E531

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS Guard Cartridge*					
ODS1	3	Guard	3.2 x 10	2	03PX-C113
	3	Guard	4.6 x 10	2	03PX-E113
	5	Guard	2.1 x 10	2	03PX-B123
	5	Guard	3.2 x 10	2	03PX-C123
	5	Guard	4.6 x 10	2	03PX-E123
	10	Guard	4.6 x 10	2	03PX-E133
ODS2	3	Guard	3.2 x 10	2	03PY-C113
	3	Guard	4.6 x 10	2	03PY-E113
	5	Guard	2.1 x 10	2	03PY-B123
	5	Guard	3.2 x 10	2	03PY-C123
	5	Guard	4.6 x 10	2	03PY-E123
	10	Guard	4.6 x 10	2	03PY-E133
C8	3	Guard	3.2 x 10	2	03PB-C113
	3	Guard	4.6 x 10	2	03PB-E113
	5	Guard	2.1 x 10	2	03PB-B123
	5	Guard	3.2 x 10	2	03PB-C123
	5	Guard	4.6 x 10	2	03PB-E123
	10	Guard	4.6 x 10	2	03PB-E133

Ordering Information

Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ SPS Guard Cartridge*					
C6	3	Guard	3.2 x 10	2	03PW-C113
	3	Guard	4.6 x 10	2	03PW-E113
	5	Guard	2.1 x 10	2	03PW-B123
	5	Guard	3.2 x 10	2	03PW-C123
	5	Guard	4.6 x 10	2	03PW-E123
	10	Guard	4.6 x 10	2	03PW-E133
Ph	3	Guard	3.2 x 10	2	03PD-C113
	3	Guard	4.6 x 10	2	03PD-E113
	5	Guard	2.1 x 10	2	03PD-B123
	5	Guard	3.2 x 10	2	03PD-C123
	5	Guard	4.6 x 10	2	03PD-E123
	10	Guard	4.6 x 10	2	03PD-E133
C4	3	Guard	3.2 x 10	2	03PC-C113
	3	Guard	4.6 x 10	2	03PC-E113
	5	Guard	2.1 x 10	2	03PC-B123
	5	Guard	3.2 x 10	2	03PC-C123
	5	Guard	4.6 x 10	2	03PC-E123
	10	Guard	4.6 x 10	2	03PC-E133
CN	3	Guard	3.2 x 10	2	03PE-C113
	3	Guard	4.6 x 10	2	03PE-E113
	5	Guard	2.1 x 10	2	03PE-B123
	5	Guard	3.2 x 10	2	03PE-C123
	5	Guard	4.6 x 10	2	03PE-E123
	10	Guard	4.6 x 10	2	03PE-E133
NH2	3	Guard	3.2 x 10	2	03PF-C113
	3	Guard	4.6 x 10	2	03PF-E113
	5	Guard	2.1 x 10	2	03PF-B123
	5	Guard	3.2 x 10	2	03PF-C123
	5	Guard	4.6 x 10	2	03PF-E123
	10	Guard	4.6 x 10	2	03PF-E133
Si	3	Guard	3.2 x 10	2	03PG-C113
	3	Guard	4.6 x 10	2	03PG-E113
	5	Guard	2.1 x 10	2	03PG-B123
	5	Guard	3.2 x 10	2	03PG-C123
	5	Guard	4.6 x 10	2	03PG-E123
	10	Guard	4.6 x 10	2	03PG-E133
SCX	5	Guard	4.6 x 10	2	03PI-E123
	10	Guard	4.6 x 10	2	03PI-E133
SAX	5	Guard	4.6 x 10	2	03PH-E123
	10	Guard	4.6 x 10	2	03PH-E133

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

VertiSep™ SUGAR HPLC Columns

- **Polymer based column**
- **Wide pH stability**
- **Excellent efficiency and resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Use only water as mobile phase**

VertiSep™ SUGAR CMP columns contain 8% cross-linked spherical Polystyrene Divinylbenzene (PS-DVB) Copolymer with calcium ionic form. Available in 9µm particle size. VertiSep™ SUGAR CMP columns are useful for analysis of mono-, disaccharides and sugar alcohols by only water as the mobile phase. The dimension of 4.0x250 mm is recommended for **USP L-19** for separation of sugar alcohols such as sorbitol and manitol. Typical applications include fruit juices, soft drinks, dairy products, vegetables and medical source.

VertiSep™ SUGAR SOP columns contain 8% cross-linked spherical Polystyrene Divinylbenzen (PS-DVB) Copolymer with silver ionic form. Available in 10 and 20µm particle size. They provide rapid oligosaccharides separation. Particle size of 10µm can resolve saccharides as large as DP-7 and the 20µm can resolve saccharides as large as DP-12. VertiSep™ SUGAR SOP columns are also useful in the carbohydrate industry to determine hydrolyzates in the conversion of corn syrup to fermentable carbohydrates.

VertiSep™ SUGAR LMP columns contain 8% cross-linked spherical Polystyrene Divinylbenzene (PS-DVB) Copolymer with lead ionic form. Available in 8µm particle size. They provide highest resolution and selectivity for monosccharides and disaccharides. VertiSep™ SUGAR LMP columns also can resolve pentoses and hexoses found in cellulose products especially glucose, xylose, galactose, cellobiose, arabinose and mannose which are not completely resolved on the calcium form. In addition, VertiSep™ SUGAR LMP columns can resolve sucrose and lactose well if these two sugars are present in excess in some samples. Typical applications include dairy and meat industries, cereals and plant fibers.

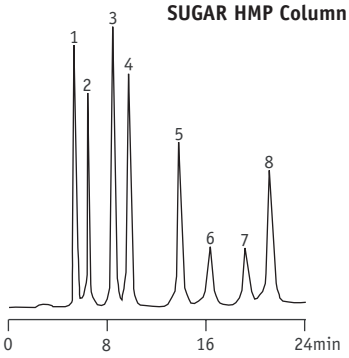
VertiSep™ SUGAR HMP columns contain 8% cross-linked spherical Polystyrene Divinylbenzene (PS-DVB) Copolymer with hydrogen ionic form. Available in 8µm particle size. They are useful for analysis of samples containing monosaccharides in combination with organic acids, fatty acids and alcohols by using only a dilute sulfuric acid as mobile phase at ambient temperatures. Typical applications include wine industries, dairy industries, bio-reactions and medical science.

VertiSep™ SUGAR are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Specifications

Packing	Form	Cross Linking (%)	Particle Size (µm)	Typical Mobile Phase	Max Temp (°C)
VertiSep™ SUGAR CMP	calcium	8	9	water	85
VertiSep™ SUGAR SOP	silver	8	10,20	water	85
VertiSep™ SUGAR LMP	lead	8	8	water	85
VertiSep™ SUGAR HMP	hydrogen	8	8	0.005 N Sulfuric acid	85

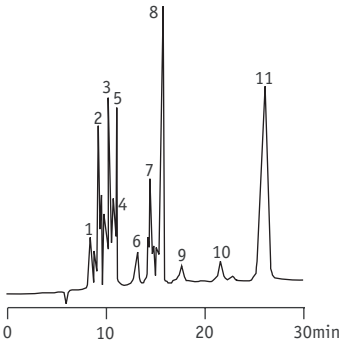
SUGAR HMP Column



1. Maltotriose
2. Maltose
3. Glucose
4. Fructose
5. Glycerol
6. Acetic Acid
7. Methanol
8. Ethanol

Column:	VertiSep™ SUGAR HMP 8µm 7.8x300mm
Mobile Phase:	2.5mM H_2SO_4
Flow Rate:	0.4mL/min
Temp:	Ambient
Detection:	RI

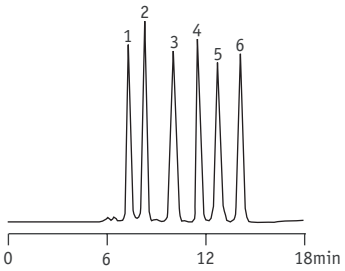
SUGAR HMP Column



1. Citric Acid
2. Tartaric Acid
3. Glucose
4. Malic Acid
5. Fructose
6. Succinic Acid
7. Lactic Acid
8. Glycerin
9. Acetic Acid
10. 2,3 Butanediol
11. Ethanol

Column:	VertiSep™ SUGAR HMP 8µm 7.8x300mm
Mobile Phase:	2.5mM H_2SO_4
Flow Rate:	0.4mL/min
Temp:	60°C
Detection:	RI

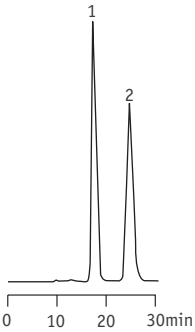
SUGAR and Sugar Alcohols



1. Maltotriose
2. Maltose
3. Glucose
4. Mannase
5. Fructose
6. Ribitol

Column:	VertiSep™ SUGAR CMP 9µm 7.8x300mm
Mobile Phase:	DI H_2O
Flow Rate:	0.6mL/min
Temp:	85°C
Detection:	RI

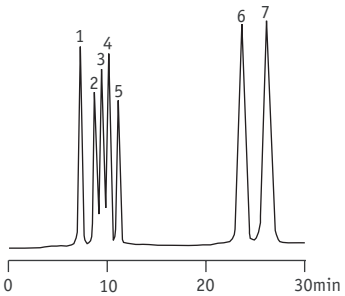
Mannitol and Sorbital for USP L-19



1. Mannitol
2. Sorbital

Column:	VertiSep™ SUGAR CMP 9µm 4.0x250mm
Mobile Phase:	H_2O
Flow Rate:	0.2mL/min
Temp:	30°C
Detection:	RI

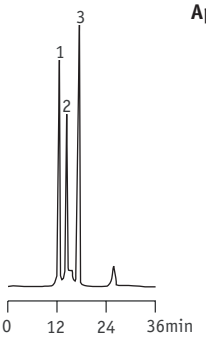
SUGAR and Sugar Alcohols



1. Cellobiose
2. Glucose
3. Xylose
4. Galactose
5. Arabinose
6. Xylitol
7. Sorbitol

Column:	VertiSep™ SUGAR LMP 8µm 7.8x300mm
Mobile Phase:	DI H_2O
Flow Rate:	1.0mL/min
Temp:	85°C
Detection:	RI

Apple Juice

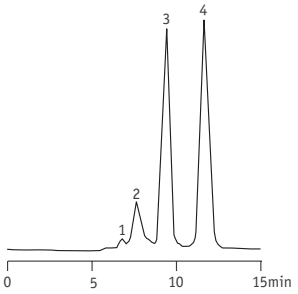


1. Sucrose
2. Glucose
3. Fructose

Column:	VertiSep™ SUGAR CMP 9µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.6mL/min
Temp:	75°C
Detection:	RI

VertiSep™ SUGAR

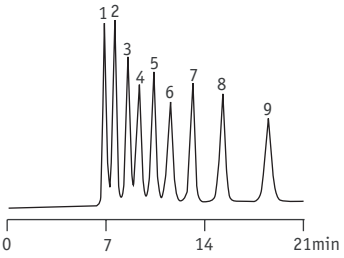
Honey



1. DP3
2. DP2
3. Glucose
4. Fructose

Column:	VertiSep™ SUGAR CMP 9µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.6mL/min
Temp:	85°C
Detection:	RI

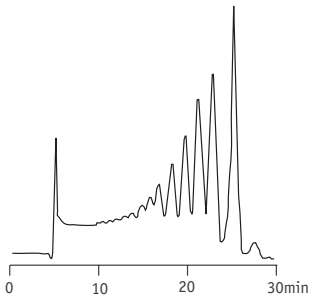
Sugars and Sugar Alcohols



1. Raffinose
2. Sucrose
3. Lactolose
4. Glucose
5. Galactose
6. Fructose
7. Ribital
8. Mannitol
9. Sorbital

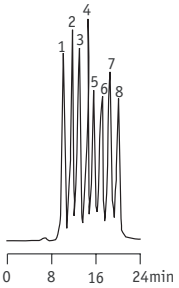
Column:	VertiSep™ SUGAR CMP 9µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.6mL/min
Temp:	85°C
Detection:	RI

Corn Syrup



Column:	VertiSep™ SUGAR SOP 20µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.4mL/min
Temp:	75°C
Detection:	RI

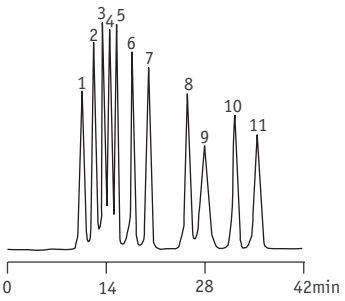
SUGAR LDP Column



1. Melezitose
2. Sucrose
3. Lactose
4. Glucose
5. Lactulose
6. Galactose
7. Fucose
8. Fructose

Column:	VertiSep™ SUGAR LMP 8µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.4mL/min
Temp:	85°C
Detection:	RI

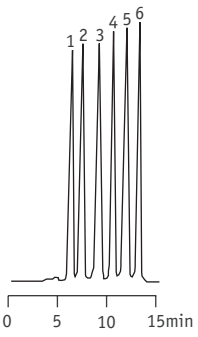
Saccharides



1. Stachyose
2. Maltose
3. Glucose
4. Xylose
5. Galactose
6. Fructose
7. Meso-Erythritol
8. Mannitol
9. Salicin
10. Xylitol
11. Sorbital

Column:	VertiSep™ SUGAR LMP 8µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.6mL/min
Temp:	75°C
Detection:	RI

Saccharides



1. Melezitose
2. Maltose
3. Glucose
4. Mannose
5. Fructose
6. Ribitol

Column:	VertiSep™ SUGAR CMP 9µm 7.8x300mm
Mobile Phase:	H_2O
Flow Rate:	0.6mL/min
Temp:	85°C
Detection:	RI

Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ SUGAR				
CMP	9	4.0 x 250	1	03IJ-D561
	9	7.8 x 100	1	03IJ-G361
	9	7.8 x 300	1	03IJ-G961
SOP	10	7.8 x 300	1	03IM-G931
	20	7.8 x 300	1	03IM-G971
LMP	8	7.8 x 300	1	03IK-G951
HMP	8	4.6 x 250	1	03IL-E551
	8	7.8 x 300	1	03IL-G951

Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ SUGAR Guard Catridges*				
CMP	9	4.6 x 10	2	03IJ-E153
SOP	9	4.6 x 10	2	03IM-E153
LMP	8	4.6 x 10	2	03IK-E153
HMP	8	4.6 x 10	2	03IL-E153

*Guard holder required

Ordering Information			
Description		QTY	Part No.
Guard Holder with Coupler			
For column I.D. 2.1-7.8 mm		1	0300-0001

VertiSep™ OA HPLC Columns

- **Polymeric-based column for organic acids**
- **pH stability 0-14**
- **Excellent efficiency and resolution**
- **Reproducibility lot-to-lot and column-to-column**

VertiSep™ OA columns contain 8% cross-linked spherical Polystyrene Divinylbenzene (PS-DVB) Copolymer with hydrogen ionic form. Available in 8µm particle size.

VertiSep™ OA columns are useful for analysis of a wide range of organic acids (such as acetate, formate, oxalate and etc.) alone or in combination with carbohydrates, alcohols, fatty acids, and neutral compounds by ion exclusion. Water or dilute acids can be used as mobile phase. Acids are eluted usually in order of acid strength or in order of increasing pK_a values. Retention times of the organic acids may be controlled through adjustment of the mobile phase pH.

For rapid separation of alcohols like methanol, ethanol, propanol, butanol and glycerol in less than 6 minutes, dimension of 7.8 x 100mm is recommended.

Typical applications include biological fluids, foods, industrial chemicals and fermentation process.

VertiSep™ OA are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ OA				
OA	8	4.6 x 250	1	03JL-E551
	8	7.8 x 100	1	03JL-G351
	8	7.8 x 300	1	03JL-G951

Ordering Information

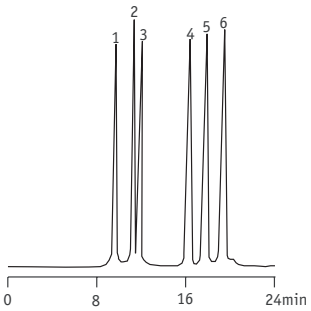
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ OA Guard Catridges*				
OA	8	4.6 x 10	2	03JL-E153

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

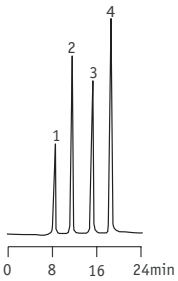
Organic Acids



1. Oxalic
2. Citric
3. Tartaric
4. Succinic
5. Formic
6. Acetic

Column:	VertiSep™ OA
Mobile Phase:	0.005N Sulfuric Acid
Flow Rate:	0.5mL/min
Temp:	55°C
Detection:	UV

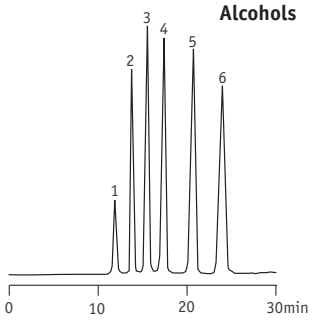
Carboxylic Acids



1. Acetylene Carboxyric Acid
2. Maleic Acid
3. Succinic Acid
4. Fumaric Acid

Column:	VertiSep™ OA
Mobile Phase:	Water + 0.5% Trifluroacetic Acid
Flow Rate:	1.0mL/min
Temp:	40°C
Detection:	RI

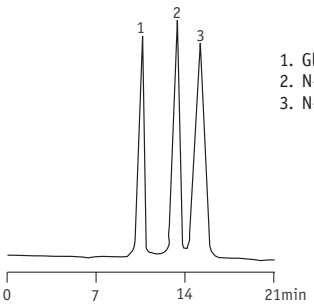
Alcohols



1. Methanol
2. Ethanol
3. Isopropanol
4. *n*-Propanol
5. *sec*-Butanol
6. *n*-Butanol

Column:	VertiSep™ OA
Mobile Phase:	Water
Flow Rate:	0.6mL/min
Temp:	60°C
Detection:	RI

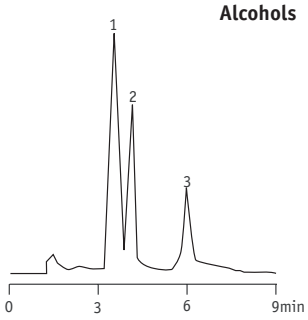
Amino Sugars



1. Glucose
2. N-Acetylglucose
3. N-Acetylgalactosamine

Column:	VertiSep™ OA
Mobile Phase:	1% Phosphoric Acid
Flow Rate:	0.6mL/min
Temp:	Ambient
Detection:	RI

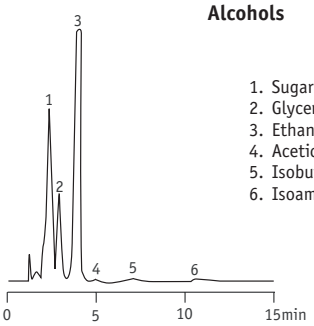
Alcohols



1. Glycerol
2. Acetic Acid
3. Ethanol

Column:	VertiSep™ OA
Mobile Phase:	0.003N Sulfuric Acid
Flow Rate:	0.7mL/min
Temp:	50°C
Detection:	RI

Alcohols



1. Sugars and Non-Volatile Acids
2. Glycerol
3. Ethanol
4. Acetic Acid
5. Isobutanol
6. Isoamyl Alcohol

Column:	VertiSep™ OA
Mobile Phase:	0.003N Sulfuric Acid
Flow Rate:	0.7mL/min
Temp:	50°C
Detection:	RI

VertiSep™ PRP HPLC Columns

- **pH stable range 1-14**
- **Excellent analyte recovery**
- **Very rugged, long lasting materials**
- **Great peak shape for all types on compounds**
- **Good reproducibility from column to column**

VertiSep™ PRP-L21 HPLC columns are 100% Polystyrene Divinylbenzene (PS-DVB) Copolymer for compatibility with equivalent high efficiency as silica-based C18 columns and pH stable range 1-14. VertiSep™ PRP-L21 columns comply with **USP L21** specification and ideal for reversed phase separation of biopharmaceutical and pharmaceutical applications.

VertiSep™ PRP-AQ HPLC columns are Hydoxylated Polystyrene Divinylbenzene (PS-DVB-OH) Copolymer for difference selectivity by reversed phase or normal phase chromatography. VertiSep™ PRP-AQ columns can be used with 100% water with minimum shrinkage. VertiSep™ PRP-AQ columns are ideal for polar compounds.

VertiSep™ PRP-C18 HPLC columns are Polyvinylaclohol-based C18 for replacement of silica-based C18 columns due to the same separation efficiency and logical elution order. VertiSep™ PRP-C18 columns are stable in pH range 2-13 solutions not possible on silica. Polyvinylalcohol offers minimum shrinkage and swelling. VertiSep™ PRP-C18 columns are ideal for small analytes, peptides and small proteins.

Specifications

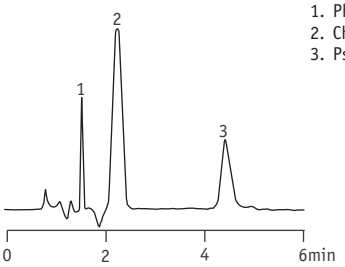
Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Surface Area (m^2/g)	pH Range
PRP-L21	5,10	-	100	500	1-14
PRP-AQ	5	-	100	500	1-14
PRP-C18	5	17	100	500	2-13
PRP-C8	5	10	100	500	2-13
PRP-NH2	5	6	100	500	2-13

VertiSep™ PRP-C8 HPLC columns are polyvinylaclohol-based C8 for replacement of silica-based C8 columns due to the same separation efficiency and logical elution order. VertiSep™ PRP-C8 columns are stable in pH range 2-13 solutions not possible on silica. Polyvinylalcohol offers minimum shrinkage and swelling. VertiSep™ PRP-C8 columns are ideal for small analytes, peptides and small proteins.

VertiSep™ PRP-NH2 HPLC columns are polyvinylalcohol-based NH2 for replacement of silica-based NH2 columns due to the same separation efficiency and logical elution order. VertiSep™ PRP-NH2 columns are stable in pH range 2-13 solutions not possible on silica. Polyvinylalcohol offers minimum shrinkage and swelling. VertiSep™ PRP-NH2 columns are ideal for analysis of saccharides in normal phase like silica-based NH2 columns but longer life-time.

VertiSep™ PRP are manufactured by statistic process control of silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

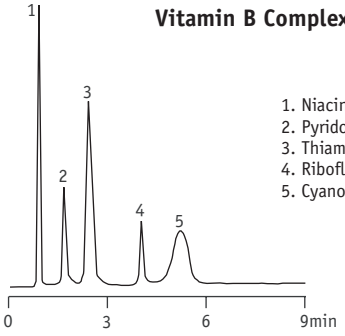
Phenoylpropanolamine



1. Phenoylpropanolamine
2. Chlorpheniramine
3. Psudoephedrine

Column:	VertiSep™ PRP-L21 5µm 4.6x150mm
Mobile Phase:	ACN:Water (35:65) (with 0.1% TFA)
Flow Rate:	1.0mL/min
Detection:	UV220nm

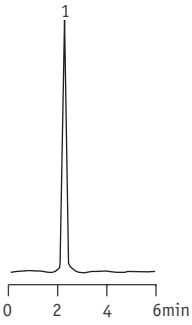
Vitamin B Complex



1. Niacinamide 10 mg
2. Pyridoxine (B6) 10 mg
3. Thiamine (B1) 10 mg
4. Riboflavin (B2) 10 mg
5. Cyanocobalamine (B12) 10 mg

Column:	VertiSep™ PRP-L21 5µm 4.6x150mm
Mobile Phase:	A: 0.1 N Perchloric Acid
	B: ACN
Gradient:	Time/%B: 0/5, 10/50
FlowH_2O Rate:	2.0mL/min
Detection:	UV210 nm

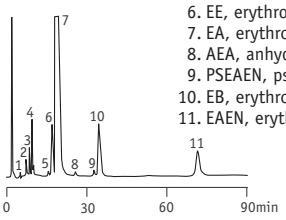
Promethazine (in Syrup)



1. Promethazine

Column:	VertiSep™ PRP-L21 5µm 4.6x150mm
Mobile Phase:	ACN:Water (35:65) (with 0.1% TFA)
Flow Rate:	1.0mL/min
Detection:	UV220nm

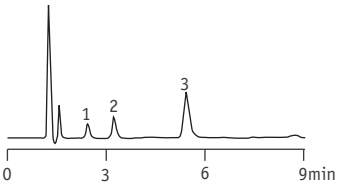
Erythromycin



1. EANO, erythromycin A N-oxide
2. EF, erythromycin F
3. NdMeEA, N-demethylerythromycin A
4. EC, erythromycin C
5. ED, erythromycin D
6. EE, erythromycin E
7. EA, erythromycin A
8. AEA, anhydroerythromycin A
9. PSEAEN, pseudoerythromycin A enol ether
10. EB, erythromycin B
11. EAEN, erythromycin A enol ether

Column:	VertiSep™ PRP-L21 5µm 4.6x250mm
Mobile Phase:	A:ACN, B:0.2M K_2HPO_4, pH9.0, C:H_2O
Gradient:	Time/%B/%C: 0/6/64, 50/6/44
Flow Rate:	1.0mL/min
Temp:	50°C
Detection:	UV210nm

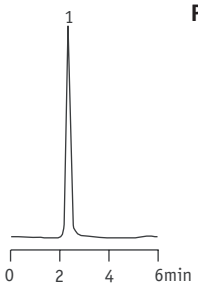
Promethazine, Codeine, Ethedrine



1. Promethazine
2. Codeine
3. Ethedrine

Column:	VertiSep™ PRP-L21 5µm 4.6x150mm
Mobile Phase:	ACN:Water (35:65) (with 0.1% TFA)
Flow Rate:	1.0mL/min
Detection:	UV220nm

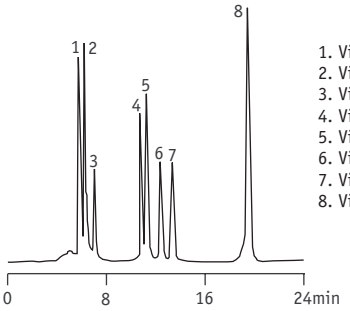
Pyridinoline



1. Pyridinoline,3 mg/mL

Column:	VertiSep™ PRP-L21 5µm 4.6x150mm
Mobile Phase:	Acetonitrile:Deionized Water (1:9)
	with 0.1% Heptafluorobutyric Acid
Flow Rate:	2.0mL/min
Temp:	Ambient
Detection:	UV280nm

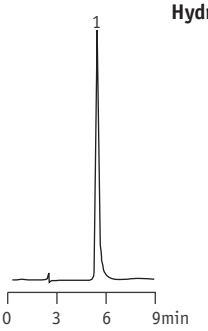
Fat-soluble Vitamins



1. Vitamin K3
2. Vitamin A
3. Vitamin A acetate
4. Vitamin D2
5. Vitamin D3
6. Vitamin E acetate
7. Vitamin E
8. Vitamin K1

Column:	VertiSep™ PRP-C18 5μm 4.6x250mm
Mobile Phase:	CH_3CN:CH_3OH (50:50)
Flow Rate:	0.6mL/min
Temp:	30°C
Detection:	UV280nm

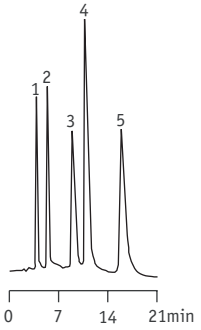
Hydrochlorothiazide



1. Hydrochlorothiazide

Column:	VertiSep™ PRP-C18 5μm 4.6x150mm
Mobile Phase:	25mM Sodium Phosphate buffer, pH7.0:CH3CN (60:40)
Flow Rate:	0.6mL/min
Temp:	30°C
Detection:	UV254nm

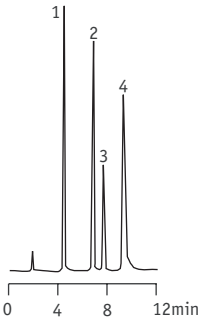
Steroids



1. Estriol
2. 16-Epiestriol
3. 17α-Estradiol
4. Esterone
5. Progesterone

Column:	VertiSep™ PRP-C18 5μm 4.6x150mm
Mobile Phase:	ACN:H_2O (65:35)
Flow Rate:	0.7mL/min
Temp:	25°C
Detection:	UV215nm

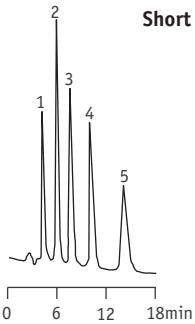
Drugs



1. 5-Fluorouracil
2. Propranolol
3. Diphenhydramine
4. Hydrocortisone

Column:	VertiSep™ PRP-C18 5μm 4.6x150mm
Mobile Phase:	25mM Sodium Phosphate buffer, pH3.0:CH_3CN (70:30)
Flow Rate:	0.6mL/min
Temp:	30°C
Detection:	UV254nm

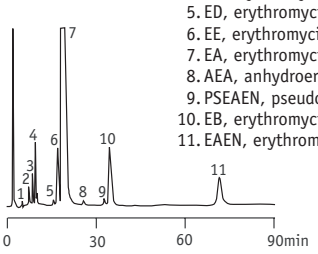
Short Chain Fatty Acids



1. Propionic Acid
2. Valeric Acid
3. Caproic Acid
4. Enanthic Acid
5. Caprylic Acid

Column:	VertiSep™ PRP-C18 5μm 4.6x150mm
Mobile Phase:	ACN&H_2O:H_3PO_4 (50:50)
Flow Rate:	0.7mL/min
Temp:	25°C
Detection:	UV210nm

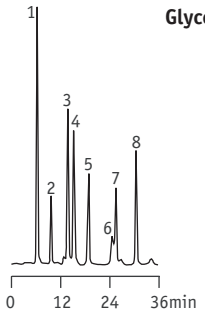
Erythromycins



1. EANO, erythromycin A N-oxide
2. EF, erythromycin F
3. NdMeEA, N-demethylerythromycin A
4. EC, erythromycin C
5. ED, erythromycin D
6. EE, erythromycin E
7. EA, erythromycin A
8. AEA, anhydroerythromycin A
9. PSEAEN, pseudoerythromycin A enol ether
10. EB, erythromycin B
11. EAEN, erythromycin A enol ether

Column:	VertiSep™ PRP-L21 5μm 4.6x250mm
Mobile Phase:	A:ACN, B:0.2M K_2HPO_4, pH9.0, C:H_2O
Gradient:	Time/%B/%C: 0/6/64, 50/6/44
Temp:	50°C
Flow Rate:	1.0mL/min
Detection:	UV210nm

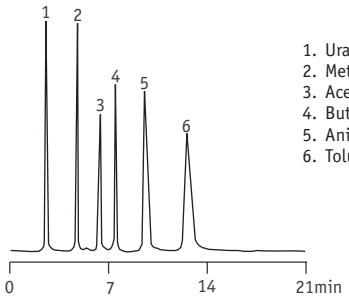
Glycerol monoesters



1. Glyceryl Monoricinoleate
2. Glyceryl Monomyristate
3. Glyceryl Monorpalmitate
4. Glyceryl Monooleate
5. Glyceryl Monostearate
6. Glyceryl Monoricinoleate
7. Glyceryl Monoricinoleate
8. Glyceryl Monolaurate

Column:	VertiSep™ PRP-AQ 5µm 4.6x250mm
Mobile Phase:	A: ACN, B: H2O
Gradient:	Time/%B: 0/22, 30/0
Flow Rate:	1.0mL/min
Temp:	80°C
Detection:	UV200nm

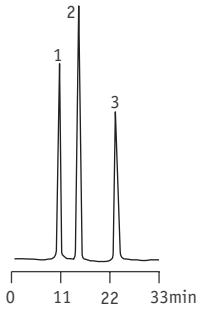
Reverse Phase Standard Mix



1. Uracil
2. Methylparaben
3. Acetophenone
4. Butylparaben
5. Anisole
6. Toluene

Column:	VertiSep™ PRP-AQ 5µm 4.6x250mm
Mobile Phase:	THF:ACN:H_2O (30:30:40)
Flow Rate:	1.0mL/min
Temp:	Ambient
Detection:	UV254nm

Slip Agents

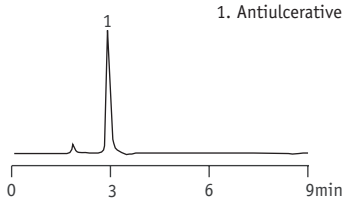


1. Oleamide
2. Stearamide
3. Erucamide

Column:	VertiSep™ PRP-AQ 5µm 4.6x250mm
Mobile Phase:	A: ACN, B: H2O
Gradient:	Time/%B: 0/22, 30/0
Flow Rate:	1.0mL/min
Temp:	80°C
Detection:	ELSD

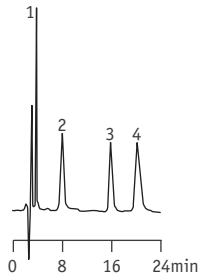
Antiulcerative Omeprazole

1. Antiulcerative Omeprazole



Column:	VertiSep™ PRP-AQ 5µm 4.6x150mm
Mobile Phase:	MeoH:ACN:THF:H_2O (10:20:20:50)
Flow Rate:	1.0mL/min
Temp:	50°C
Detection:	UV254nm

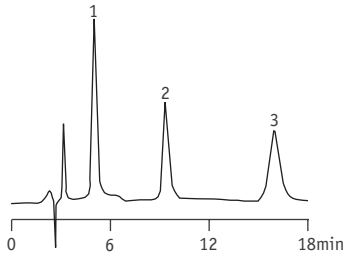
Peptides



1. Substance P
2. ß-Endorphin
3. Insulin B chain
4. Insulin

Column:	VertiSep™ PRP-C8 5µm 4.6x150mm
Mobile Phase:	0.5% TFA:CH_3CN (73:27)
Flow Rate:	0.6mL/min
Temp:	30°C
Detection:	UV220nm

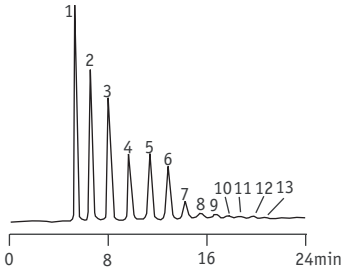
Gastrin



1. ß-Endorphine
2. Insulin
3. Big gastrin

Column:	VertiSep™ PRP-C8 5µm 4.6x150mm
Mobile Phase:	0.5% TFA:CH_3CN (72:28)
Flow Rate:	0.6mL/min
Temp:	30°C
Detection:	UV220nm

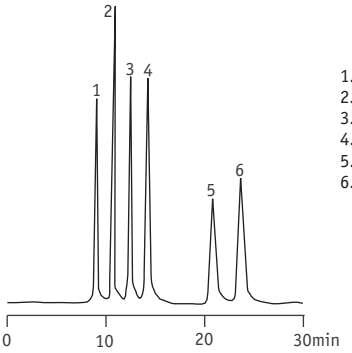
Corn Syrup Solids



1. Dextrose
2. Maltose
3. Maltotriose
4. Maltotetraose
5. Maltopentaose
6. Maltohexaose
7. Maltoheptaose
8. Maltooctaose
9. Maltononaose
10. Maltodecaose
11. Maltoundecaose
12. Maltododecaose
13. Maltotridecaose

Column:	VertiSep™ PRP-NH2 5µm 4.6x250mm
Mobile Phase:	A: ACN, B: H_2O
Gradient:	Time/%B, 0/35, 15/50
Flow Rate:	1.0mL/min
Detection:	UV220nm

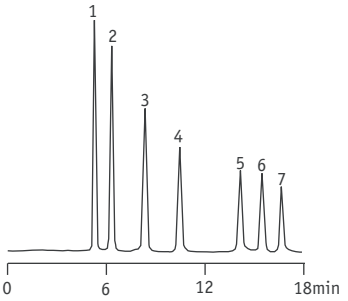
Sugar and Sugar Alcohols



1. L-Rhamnose
2. D(+)-Arabitol
3. Sorbitol
4. d-Galactose
5. Sucrose
6. Lactose

Column:	VertiSep™ PRP-NH2 5µm 4.6x250mm
Mobile Phase:	$CH_3CN:H_2O$ (75:25)
Flow Rate:	0.9mL/min
Detection:	RI

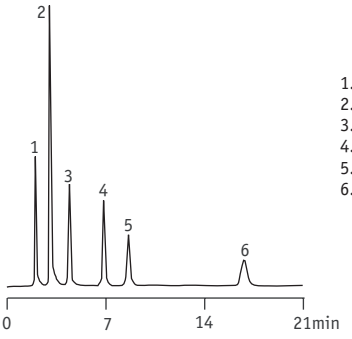
Beer Standards Modified Mobile Phase



1. Fructose
2. Glucose
3. Sucrose
4. Maltose
5. Maltotriose
6. Maltotetraose
7. Maltopentaose

Column:	VertiSep™ PRP-NH2 5µm 4.6x150mm
Mobile Phase:	A: Acetonitrile:Acetone (75:25), B: Water
Gradient:	Time/%B, 0/24, 18/50
Flow Rate:	1.0mL/min
Detection:	ELSD

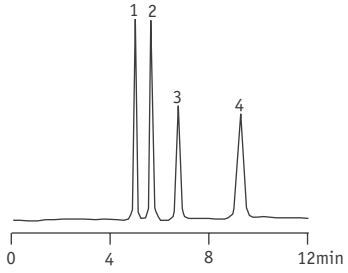
Separation of Mono to Trisaccharide



1. Ribose
2. Fructose
3. Glucose
4. Sucrose
5. Maltose
6. Maltotriose

Column:	VertiSep™ PRP-NH2 5µm 4.6x250mm
Mobile Phase:	$CH_3CN:H_2O$ (75:25)
Flow Rate:	0.9mL/min
Detection:	RI

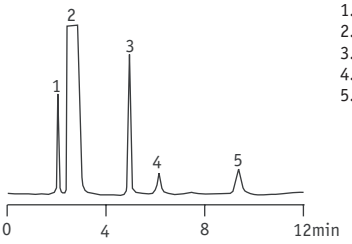
Sugar Alcohols



1. Iso-erythritol
2. Xylitol
3. Mannitol
4. Maltitol

Column:	VertiSep™ PRP-NH2 5µm 4.6x250mm
Mobile Phase:	ACN:H_2O (70:30)
Flow Rate:	1.0mL/min
Detection:	RI

OTC Antihistamine and Excipients



1. Diphenhydramine
2. PEG, Gelatin
3. Sorbitan
4. Glycerol
5. Sorbitol

Column:	VertiSep™ PRP-NH2 5µm 4.6x250mm
Mobile Phase:	ACN:0.1% Ammonium Carbonate, pH6.5 (80:20)
Flow Rate:	1.0mL/min
Detection:	RI

Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ PRP				
L21	5	4.6 x 150	1	03LN-E421
	5	4.6 x 250	1	03LN-E521
	10	4.6 x 150	1	03LN-E431
	10	4.6 x 250	1	03LN-E531
AQ	5	4.6 x 150	1	03LO-E421
	5	4.6 x 250	1	03LO-E521
C18	5	4.6 x 150	1	03LA-E421
	5	4.6 x 250	1	03LA-E521
C8	5	4.6 x 150	1	03LB-E421
	5	4.6 x 250	1	03LB-E521
NH2	5	4.6 x 150	1	03LF-E421
	5	4.6 x 250	1	03LF-E521

Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ PRP Guard Cartridge*				
PRP-L21	5	4.6 x 10	2	03LN-E421
PRP-AQ	5	4.6 x 10	2	03LB-E421
PRP-C18	5	4.6 x 10	2	03LB-E521
PRP-C8	5	4.6 x 10	2	03LF-E421
PRP-NH2	5	4.6 x 10	2	03LF-E521

*Guard holder required

Ordering Information			
Description		QTY	Part No.
Guard Holder with Coupler			
For column I.D. 2.1-7.8 mm		1	0300-0001

VertiSep™ Anion AX1

- **Provide symetrical peak shapes for inoganic and organic anions by both Suppressed and Nonsuppressed IC**
- **Compatible with common mobile phases**
- **Separate Fluoride away from the water dip**

VertiSep™ Anion AX1 column is packed with hydrophilic copolymer with quaternary ammonium functional group providing symmetrical peak shapes for inoganic and organic anions by both Suppressed and Nonsuppressed IC.

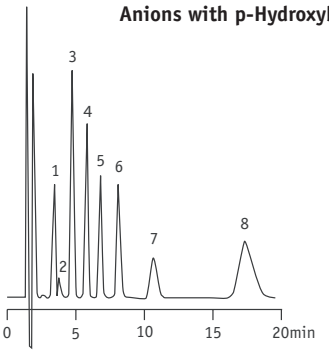
VertiSep™ Anion AX1 column is compatible with common mobile phases: p-hydroxybenzoate, sodium hydroxide, and Sodium Carbonate/bicarbonate. The p-hydroxybenzoate mobile phase is best used for bicarbonate and the seven common inorganic anions. Sodium hydroxide mobile phase is best used for weak acid anions such as Silicate, Borate, Sulfide, Cyanide, Formate, and Acetate.

VertiSep™ Anion AX1 column can separate Fluoride away from the water dip and is a good choice for Fluoride analysis.

Specifications	
Base material	Hydrophilic copolymer
Functional group	Quaternary Ammonium
Particle Size	5µm
Mobile phase limits	pH 2-10, 0-100% Organic modifier

Ordering Information		
Description	QTY	Part No.
VertiSep™ Anion AX1 Columns		
4.6x100mm, PEEK	1	03R6-E322
4.6x150mm, PEEK	1	03R6-E422
4.6x250mm, PEEK	1	03R6-E522
VertiSep™ Anion AX1 Guards		
Guard Cartridge, 4.6x10mm, PEEK	2	03R6-E113
Guard Holder	1	0300-0001

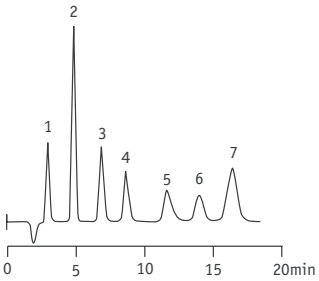
Anions with p-Hydroxybenzoic acid



1. Fluoride
2. Carbonate
3. Chloride
4. Nitrite
5. Bromide
6. Nitrate
7. Phosphate
8. Sulfate

Column: VertiSep™ Anion AX1, 4.6x150mm
Mobile Phase: 4mM p-Hydroxybenzoic acid, pH 7.5, with LiOH
Flow Rate: 1.0mL/min
Temp: 35 °C
Detection: Conductivity

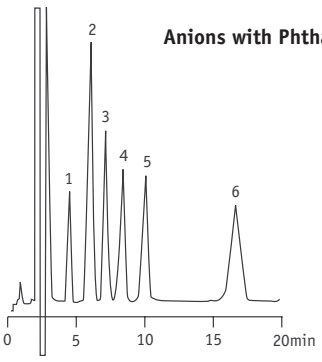
Anions By Suppressor



1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Phosphate
7. Sulfate

Column: VertiSep™ Anion AX1, 4.6x150mm
Mobile Phase: 0.85mM $NaHCO_3$/0.9mM Na_2CO_3
Flow Rate: 1.2mL/min
Detection: Suppressed Conductivity

Anions with Phthalic acid



1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Sulfate

Column: VertiSep™ Anion AX1, 4.6x250mm
Mobile Phase: 4mM Phthalic Acid, pH 4.2 with LiOH
Flow Rate: 1.0mL/min
Temp: 35 °C
Detection: Conductivity

VertiSep™ Anion AX2

- **Separates Common Anions and Strongly Retained Hydrophobic Anions**
- **Separates weak organic acids anions**
- **Hydrophilic Packing for Maximum Efficiency**
- **Ideal for Gradient Separations with Carbonate/carbonate Mobile Phases**

VertiSep™ Anion AX2 column is packed with hydrophilic copolymer with Quaternary Ammonium functional groups providing symmetrical peak shapes for all anions by Suppressed IC.

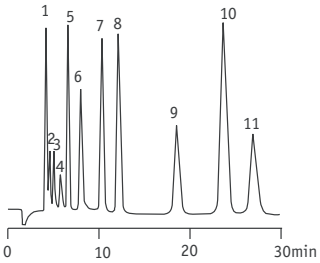
VertiSep™ Anion AX2 column is ideal for routine common anions analysis and for determining other strongly retained hydrophobic anions such as Iodide, Thiosulfate, and Thiocyanate. Carbonate/Bicarbonate gradients offer a powerful tool for separating anions that have a wide range of affinities for the column.

VertiSep™ Anion AX2 column can also be used to determine weak organic anions such as Acetate and Formate without the interference from Fluoride and Chloride.

Specifications	
Base material	Hydrophilic copolymer
Functional group	Quaternary Ammonium
Particle Size	5µm
Mobile phase limits	pH 3-12, 0-100% Organic modifier

Ordering Information		
Description	QTY	Part No.
VertiSep™ Anion AX2 Columns		
4.6x250mm, PEEK	1	03R7-D522
VertiSep™ Anion AX2 Guards		
Guard Cartridge, 4.0x10mm, PEEK	2	03R7-D113
Guard Holder	1	0300-0001

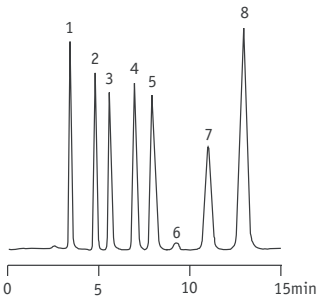
Anions and Organic acids



1. Fluoride
2. Acetic acid
3. Formic acid
4. Methacrylic acid
5. Chloride
6. Nitrite
7. Bromide
8. Nitrate
9. Phosphate
10. Sulfate
11. Oxalic acid

Column: VertiSep™ Anion AX2, 4.0x250mm
Mobile Phase: 12mM $NaHCO_3$
Flow Rate: 1.0mL/min
Temp: 30 °C
Detection: Suppressed Conductivity

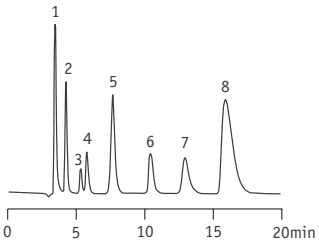
Anions Standards



1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Carbonate
7. Phosphate
8. Sulfate

Column: VertiSep™ Anion AX2, 4.0x250mm
Mobile Phase: 1.7mM $NaHCO_3$/1.8mM Na_2CO_3
Flow Rate: 1.0mL/min
Detection: Suppressed Conductivity

Strong anions and Hydrophorbic anions



1. Fluoride
2. Chloride
3. Nitrite
4. Phosphate
5. Sulfate
6. Iodide
7. Thiocyanate
8. Thiosulfate

Column: VertiSep™ Anion AX2, 4.0x250mm
Mobile Phase: 5.5mM Na_2CO_3
Flow Rate: 1.0mL/min
Temp: 35 °C
Detection: Suppressed Conductivity

VertiSep™ Anion AX300

- **Meets the Requirements of US EPA Methods 300.1, 300.0, and 317.0.**
- **Separates Common Inorganic Anions and Oxyhalide Anions**
- **New 5µm resin particle impoves efficiency**

VertiSep™ Anion AX300 column is packed with hydrophilic copolymer with Quaternary Ammonium functional groups providing symmetrical peak shapes for all anions by Suppressed IC.

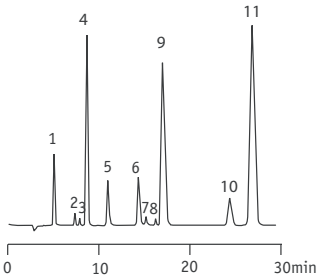
VertiSep™ Anion AX300 column ideals for separation of 10 inorganic anions by suppressed IC using US EPA Method 300.1. The seven common anions (Fluoride, Chloride, Bromide, Nitrite, Nitrate, Sulfate, and Phosphate), Three Oxyhalide Anions (Chlorite, Chlorate, and Bromate), and Surrogate Analyte Anion (dichloroacetate) can be separated in one run.

VertiSep™ Anion AX300 column can also be used to determine inorganic anions in drinking water using US EPA Method 300.0 and trace bromate in drinking water using US EPA Method 317.0.

Specifications	
Base material	Hydrophilic copolymer
Functional group	Quaternary Ammonium
Particle Size	5µm
Mobile phase limits	pH 3-12, 0-100% Organic modifier

Ordering Information		
Description	QTY	Part No.
VertiSep™ Anion AX300 Columns		
4.6x250mm, PEEK	1	03R8-D522
VertiSep™ Anion AX300 Guards		
Guard Cartridge, 4.0x10mm, PEEK	2	03R8-D113
Guard Holder	1	0300-0001

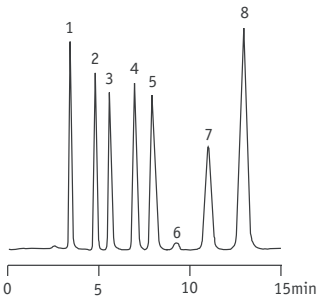
Anions by EPA Method 300.1



1. Fluoride
2. Chlorite
3. Bromate
4. Chloride
5. Nitrite-N
6. Bromide
7. Chlorate
8. Dichloroacetate
9. Nitrate-N
10. Phosphate-P
11. Sulfate

Column: VertiSep™ Anion AX300, 4.0x250mm
Mobile Phase: 3.6mM Na_2CO_3
Flow Rate: 0.8mL/min
Temp: 45 °C
Detection: Suppressed Conductivity

Anions Standards

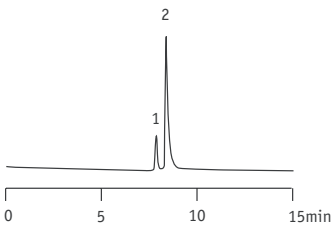


1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Carbonate
7. Phosphate
8. Sulfate

Column: VertiSep™ Anion AX300, 4.0x250mm
Mobile Phase: 1.7mM $NaHCO_3$/1.8mM Na_2CO_3
Flow Rate: 1.0mL/min
Detection: Suppressed Conductivity

Bromate by EPA Method 317.0

1. Chlorite
2. Bromate



Column: VertiSep™ Anion AX300, 4.0x250mm
Mobile Phase: 3.6mM Na_2CO_3
Flow Rate: 0.8mL/min
Temp: 45 °C
Detection: UV450nm

VertiSep™ Cation CX1

- **Separate Mono and Divalent Cations on Nonsuppressed or Suppressed IC**
- **Separate Transition Metals without Post Column Reaction**
- **Separate alkylamines**
- **Compatible with Variety of Mobile Phases**

VertiSep™ Cation CX1 column is packed with hydrophilic copolymer with carboxyl functional groups providing higher pH stability on very low pH eluents over silica-based cation columns.

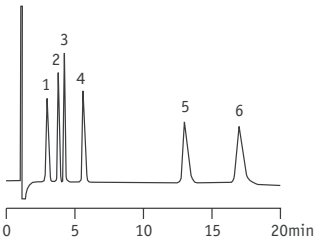
VertiSep™ Cation CX1 column separates Group I and Group II cations in one run under isocratic conditions. It can separates transition metals without post column reaction and UV detection. It can also separates various Alkylamines such as Methylamine, Trimethylamine and Triethylamine.

VertiSep™ Cation CX1 column is compatible with a variety of mobile phases including complexing acids (Citric Acid, Tartaric Acid, Oxalic Acid), mineral acids (Nitric Acid, Hydrochloric Acid, Sulfuric Acid) and Noncomplexing Organic Acids (Methanesulfonic Acid).

Specifications	
Base material	Hydrophilic copolymer
Functional group	Carboxyl
Particle Size	5µm
Mobile phase limits	pH 3-12, 0-100% Organic modifier

Ordering Information		
Description	QTY	Part No.
VertiSep™ Cation CX1 Columns		
4.6x125mm	1	03R9-EC21
VertiSep™ Cation CX1 Guards		
Guard Cartridge, 4.0x10mm, PEEK	2	03R9-D113
Guard Holder	1	0300-0001

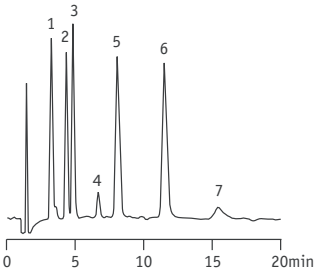
Monovalent and Divalent Cations



1. Lithium 2ppm
2. Sodium 10ppm
3. Ammonium 10ppm
4. Potassium 20ppm
5. Magnesium 10ppm
6. Calcium10ppm

Column: VertiSep™ Cation CX1, 4.6x125mm
Mobile Phase: 4mM Methanesulfonic acid
Flow Rate: 1.0mL/min
Temp: 40 °C
Detection: Nonsuppressed Conductivity

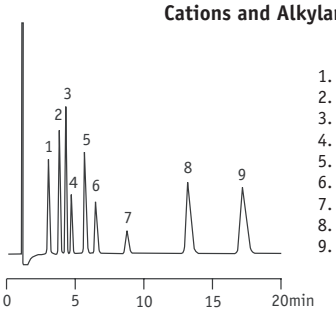
Transition Metals



1. Ni 10ppm
2. Zn 10ppm
3. Cu 10ppm
4. Fe 10ppm
5. Mn 10ppm
6. Cd 10ppm
7. Pb 30ppm

Column: VertiSep™ Cation CX1, 4.6x125mm
Mobile Phase: 6mM Tartaric acid + 4mM Oxalic acid
Flow Rate: 1.0mL/min
Temp: 40 °C
Detection: Nonsuppressed Conductivity

Cations and Alkylamines

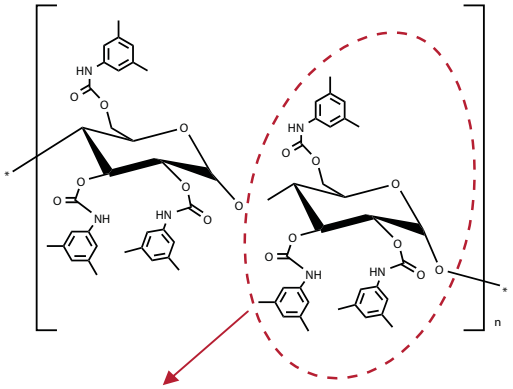


1. Lithium 1ppm
2. Sodium 5ppm
3. Ammonium 5ppm
4. Methylamine 5ppm
5. Potassium 20ppm
6. Trimethylamine 10ppm
7. Triethylamine 10ppm
8. Magnesium 10ppm
9. Calcium 20ppm

Column: VertiSep™ Cation CX1, 4.6x125mm
Mobile Phase: 4mM Methanesulfonic acid
Flow Rate: 1.0mL/min
Temp: 40 °C
Detection: Nonsuppressed Conductivity

Kromasil® AmyCoat™

- **Polysaccharide-based chiral HPLC phases for better performance**
- **The silica is based on an in-house developed matrix and coated with tris-(3,5-dimethylphenyl) carbamoyl amylose.**
- **Better results and fast results**
- **High resolution with excellent selectivity**
- **No pressure limits and stable performance**
- **Short equilibration time**



tris-(3,5-dimethylphenyl)carbamoyl amylose

Better results

Kromasil AmyCoat with 3µm particle size enables a higher plate count and resolution for analytical chromatography. Combined with great selectivity, this facilitates the separation of the enantiomers.

Fast results

Not only you can get better results with Kromasil AmyCoat, you also get them faster. Thanks to a product characteristic like the absence of pressure limits, you can run analytical chromatography at very high flow rates and save time.

Excellent selectivity

The high selectivity and 3µm particles are also important factors in speeding up the method. You achieve an improved resolution, which, in turn, allows a higher flow rate.

No pressure limits

Kromasil AmyCoat withstands flow rates equivalent to pressures up to 400 bar which is about the limit for the HPLC system itself. This makes it possible to run analytical chromatography a lot faster.

Stable performance

From a stability perspective, you can run Kromasil AmyCoat using compatible normal, polar organic and reversed mobile phases. Switching between compatible normal to polar organic mobile phases will not lead to any degradation in performance, no need for solvent dedicated columns.

Short equilibration time

Column equilibration is a time-consuming activity when running chiral chromatography. Higher flow rates allow Kromasil AmyCoat to show substantially shorter equilibration times than other coated phases on the market.

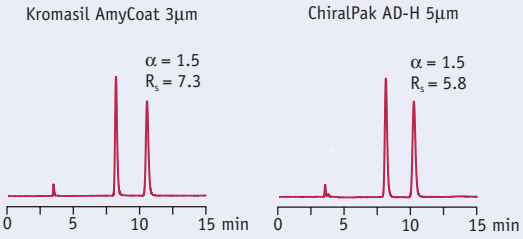
In general, long equilibration times are most pronounced when switching mobile phases containing basic additives to acidic additives or the other way around. The test with a Kromasil AmyCoat 3 µm column switching between two compatible mobile phases shows how short equilibration times you can get. There are also two tests illustrating short equilibration times and additive switch for Kromasil AmyCoat with absolutely no sign of memory effects.

Applications

Typical applications include:
Acids,
Amines,
Alcohols,
Amides.

Specifications		
Support		Spherical Silica
Particle Size (µm)		3, 5, 10, 16, 25
Pore Diameter (Å)		> 1000
Stationary phase		tris-(3,5-dimethylphenyl) carbamoyl amylose
Chiral selector		Amylose
Packed density		0.6g/mL
USP		L-51
Equivalent	3µm	ChiralPak AD-3
	5µm	ChiralPak AD-H
	10µm	ChiralPak AD

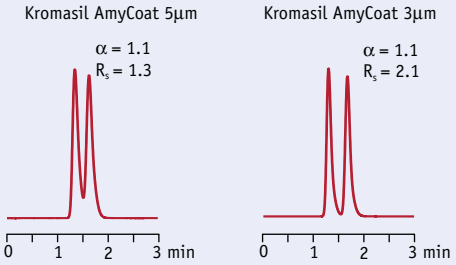
Selectivity and Resolution Comparison



Solute: Carbinoxamine
Column: 4.6 x 150mm
Mobile Phase: Heptane/2-Propanol/DEA (90/10/0.1)
Flow Rate: 0.5mL/min
Column Temp: 22 °C
Detection: UV 226nm

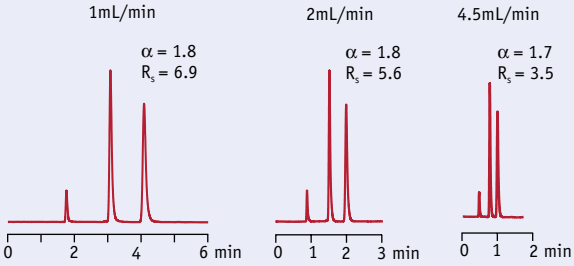
Solute	AmyCoat 3µm		ChiralPak AD-H 5µm	
	a	R_s	a	R_s
Ambucetamide	1.4	4.8	1.4	4.2
Carbinoxamine	1.5	7.3	1.5	5.8
Ketoprofen	1.4	4.6	1.3	4.3
Naproxen	1.2	3.4	1.2	3.1
Oxamniquine	1.2	3.3	1.2	3.1
Proglumide	2.7	11.8	2.8	9.0
Sulindac	1.3	4.8	1.3	3.9

Difference in Resolution



Solute: trans-2-Phenyl-1-cyclohexanol
Column: Kromasil AmyCoat 4.6 x 150mm
Mobile Phase: Heptane/2-Propanol (95/5)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

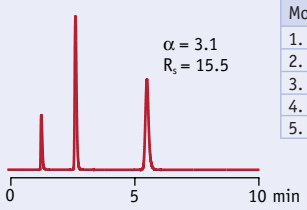
Difference in Fast Analysis



Solute: Tröger's base
Column: Kromasil AmyCoat 4.6 x 150mm, 3µm
Mobile Phase: Heptane/2-Propanol/DEA (90/10/0.1)
Column Temp: 25 °C
Detection: UV 226nm

Stable Performance - No Pressure Limits - Freedom to Switch Solvents

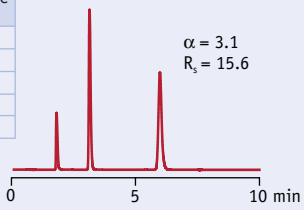
Before



Test Sequence

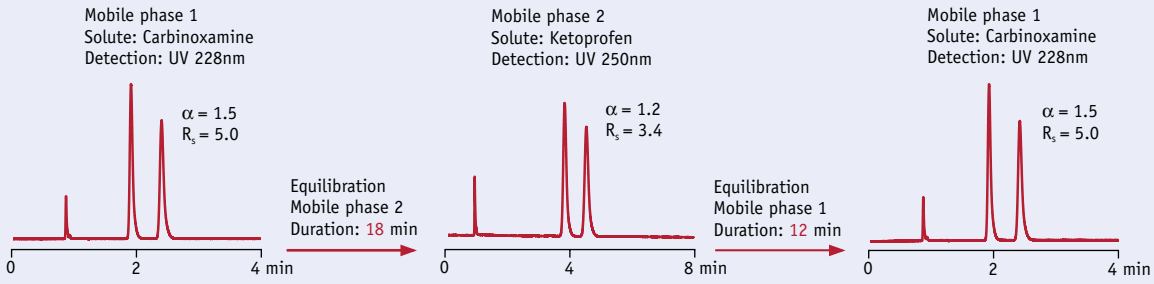
Mobile phase	Flow Rate (mL/min)	Run Time (hour)	Total Back-Pressure (bar)
1. Heptane/2-Propanol (90/10)	4.3	2	345
2. 2-Propanol	0.7	2	260
3. Acetonitrile	1	2	58
4. Ethanol	1	2	188
5. Heptane/2-Propanol (90/10)	1	2	72

After



Solute: trans-Stilbene oxide
Column: Kromasil AmyCoat 4.6 x 150mm, 3µm
Mobile Phase: Heptane/2-Propanol (90/10)
Flow Rate 1mL/min
Column Temp: 25 °C
Detection: UV 229nm

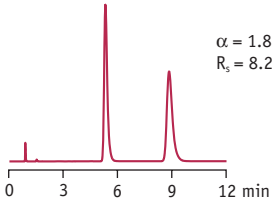
Short Equilibration Time - Freedom to Switch Additives

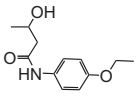


Column: Kromasil AmyCoat 4.6 x 150mm, 3µm
Mobile Phase 1: Heptane/2-Propanol/DEA (90/10/0.1)
Mobile Phase 2: Heptane/2-Propanol/TFA (90/10/0.1)
Flow Rate: 2mL/min
Column Temp: 25 °C

Kromasil® Chiral Columns

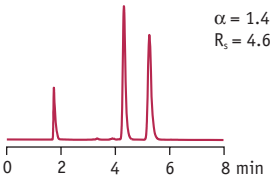
Bucetin

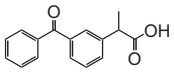




Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Heptane/2-Propanol (90/10)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 254nm

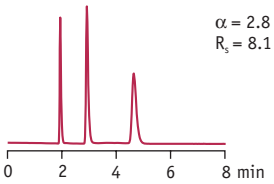
Ketoprofen

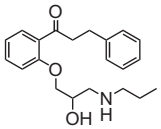




Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Heptane/2-Propanol/TFA (90/10/0.1)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 215nm

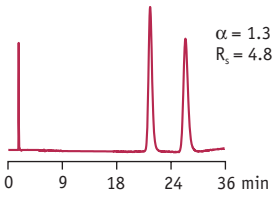
Propafenone

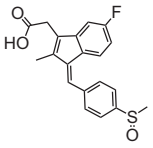




Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Methanol/DEA (100/0.1)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 221nm

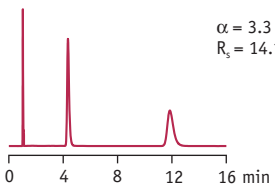
Sulindac

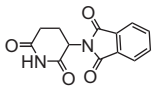




Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Heptane/2-Propanol/TFA (90/10/0.1)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 226nm

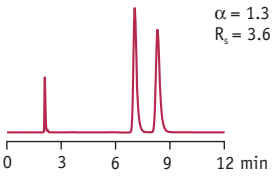
Thalidomide

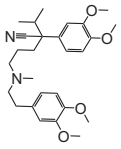




Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Methanol
Flow Rate: 2mL/min
Column Temp: 22 °C
Detection: UV 220nm

Verapamil





Column: Kromasil AmyCoat 3µm, 4.6x150mm
Mobile Phase: Heptane/2-Propanol/DEA (90/10/0.1)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 230nm

0300-0001 0300-0002 0300-0003

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Kromasil AmyCoat Chiral Columns				
AmyCoat	3	4.6 x 50	1	03S11-E211
		4.6 x 150	1	03S11-E411
	5	4.6 x 50	1	03S11-E221
		4.6 x 150	1	03S11-E421
		4.6 x 250	1	03S11-E521
		10 x 250	1	03S11-H521
		21.2 x 150	1	03S11-I421
		21.2 x 250	1	03S11-I521
		30 x 250	1	03S11-J521
		50 x 250	1	03S11-K521
	10	4.6 x 50	1	03S11-E231
		4.6 x 150	1	03S11-E431
		4.6 x 250	1	03S11-E531
		10 x 250	1	03S11-H531
		21.2 x 150	1	03S11-I431
		21.2 x 250	1	03S11-I531
		30 x 250	1	03S11-J531
		50 x 250	1	03S11-K531
	16	4.6 x 50	1	03S11-E2D1
		4.6 x 150	1	03S11-E4D1
		4.6 x 250	1	03S11-E5D1
	25	10 x 250	1	03S11-H5E1
		21.2 x 150	1	03S11-I4E1
		21.2 x 250	1	03S11-I5E1
		30 x 250	1	03S11-J5E1
		50 x 250	1	03S11-K5E1

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Kromasil AmyCoat Chiral Guard Cartridge*				
AmyCoat	3	4.6 x 10	2	03S11-E113
	5	4.6 x 10	2	03S11-E123
	10	4.6 x 10	2	03S11-E133
		10 x 10	2	03S11-H133
		21.2 x 10	2	03S11-I133
		30 x 10	2	03S11-J133
	25	10 x 10	2	03S11-H1D3
		21.2 x 10	2	03S11-I1D3
		30 x 10	2	03S11-J1D3

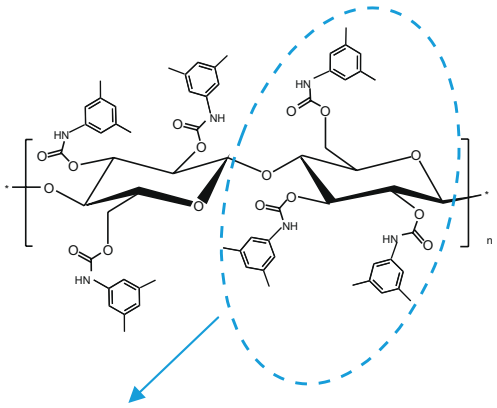
*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003
For column I.D. 30 mm	1	0300-0004

Kromasil® CelluCoat™

- **Polysaccharide-based chiral HPLC phases for better performance**
- **The silica is based on an in-house developed matrix and coated with tris-(3,5-dimethylphenyl) carbamoyl cellulose.**
- **Better results and fast results**
- **High resolution with excellent selectivity**
- **No pressure limits and stable performance**
- **Short equilibration time**



tris-(3,5-dimethylphenyl)carbamoyl cellulose

Better results

Kromasil CelluCoat with 3µm particle size enables a higher plate count and resolution for analytical chromatography. Combined with great selectivity, this facilitates the separation of the enantiomers.

Fast results

Not only you can get better results with Kromasil CelluCoat, you also get them faster. Thanks to a product characteristic like the absence of pressure limits, you can run analytical chromatography at very high flow rates and save time.

Excellent selectivity

The high selectivity and 3µm particles are also important factors in speeding up the method. You achieve an improved resolution, which, in turn, allows a higher flow rate.

No pressure limits

Kromasil CelluCoat withstands flow rates equivalent to pressures up to 400 bar which is about the limit for the HPLC system itself. This makes it possible to run analytical chromatography a lot faster.

Stable performance

From a stability perspective, you can run Kromasil CelluCoat using compatible normal, polar organic and reversed mobile phases. Switching between compatible normal to polar organic mobile phases will not lead to any degradation in performance, no need for solvent dedicated columns.

Short equilibration time

Column equilibration is a time-consuming activity when running chiral chromatography. Higher flow rates allow Kromasil CelluCoat to show substantially shorter equilibration times than other coated phases on the market.

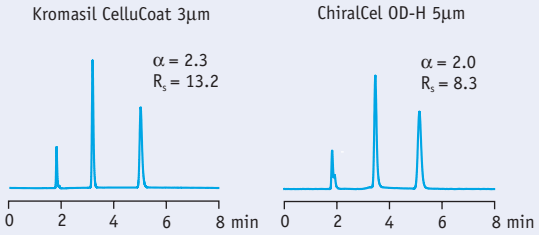
In general, long equilibration times are most pronounced when switching mobile phases containing basic additives to acidic additives or the other way around. The test with a Kromasil CelluCoat 3 µm column switching between two compatible mobile phases shows how short equilibration times you can get. There are also two tests illustrating short equilibration times and additive switch for Kromasil CelluCoat with absolutely no sign of memory effects.

Applications

Typical applications include:
Acids,
Amines,
Alcohols,
Amides,
Esters,
β-Lactams,
Lactones,
Cyclic ketones,
Alkaloids,
Dihydropyridines,
NSAIDs.

Specifications		
Support		Spherical Silica
Particle Size (µm)		3, 5, 10, 16, 25
Pore Diameter (Å)		> 1000
Stationary phase		tris-(3,5-dimethylphenyl) carbamoyl cellulose
Chiral selector		Cellulose
Packed density		0.6g/mL
USP		L-40
Equivalent	3µm	ChiralCel OD-3
	5µm	ChiralCel OD-H
	10µm	ChiralCel OD

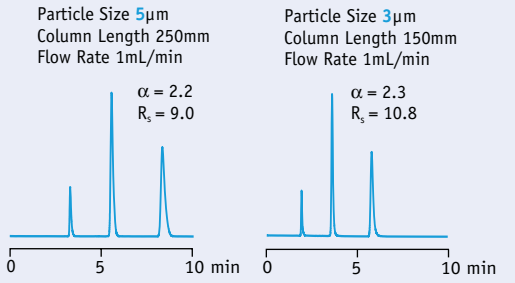
Selectivity and Resolution Comparison



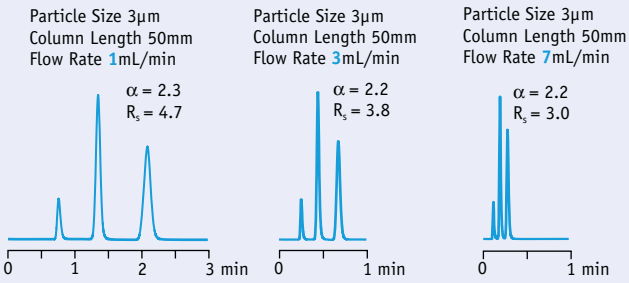
Solute: trans-Stilbene oxide
Column: 4.6 x 150mm
Mobile Phase: Heptane/2-Propanol (90/10)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 229nm

Solute	CelluCoat 3µm		ChiralCel OD-H 5µm	
	a	R_s	a	R_s
Trans-Stilbene oxide	2.3	13.2	2.0	8.3
Benzoin	1.5	8.6	1.5	5.7
TFAE	2.9	14.7	2.9	11.0
Tröger's base	1.4	3.7	1.4	2.7
Oxprenolol	5.6	18.1	5.5	15.1
Naproxen	1.2	2.9	1.2	2.2
Proglumide	2.0	7.5	2.0	3.2

Difference in Resolution

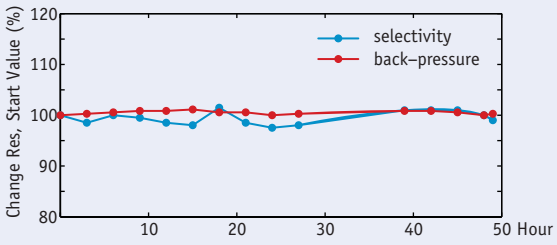


Difference in Fast Analysis

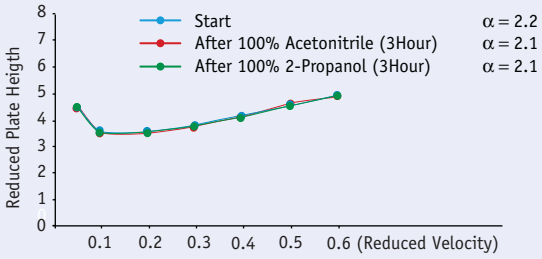


Solute:	trans-Stilbene oxide
Column:	Kromasil CelluCoat 4.6 x 150mm
Mobile Phase:	Heptane/2-Propanol (90/10)
Column ID:	4.6mm
Column Temp:	25 °C
Detection:	UV 229nm

Stable Performance - No Pressure Limits - Freedom to Switch Solvents

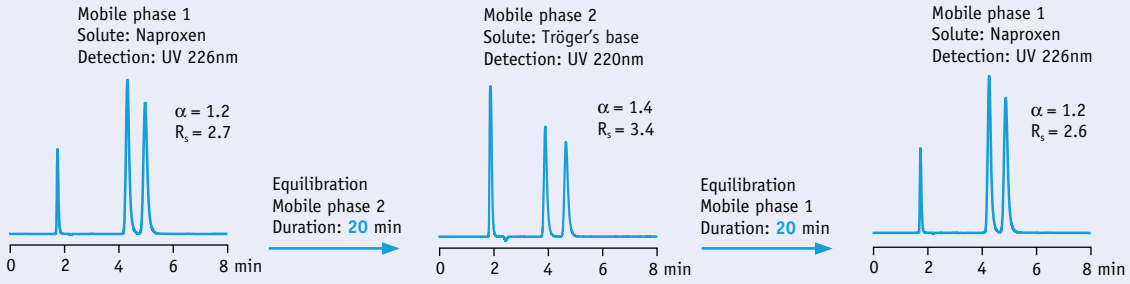


Solute:	trans-Stilbene oxide
Column:	Kromasil CelluCoat 4.6 x 150mm, 3µm
Mobile Phase:	Heptane/2-Propanol (90/10)
Flow Rate	7mL/min
Column Temp:	25 °C
Detection:	UV 229nm



Solute:	trans-Stilbene oxide
Column:	Kromasil CelluCoat 4.6 x 150mm, 5µm
Mobile Phase:	Heptane/2-Propanol (90/10)
Flow Rate	0.1-1.2mL/min
Column Temp:	25 °C
Detection:	UV 229nm

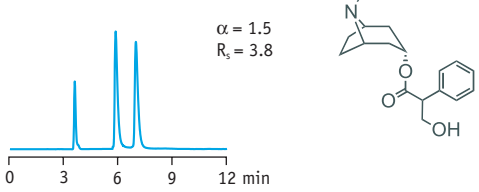
Short Equilibration Time - Freedom to Switch Additives

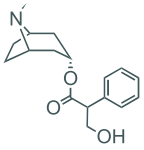


Column:	Kromasil CelluCoat 4.6 x 150mm, 3µm
Mobile Phase 1:	Heptane/2-Propanol/TFA (90/10/0.1)
Mobile Phase 2:	Heptane/2-Propanol/DEA (90/10/0.1)
Flow Rate:	1mL/min
Column Temp:	25 °C

Kromasil® Chiral Columns

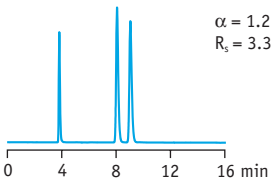
Atropine

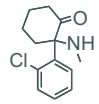




Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/Ethanol/DEA (80/20/0.1)
Flow Rate: 0.5mL/min
Column Temp: 22 °C
Detection: UV 215nm

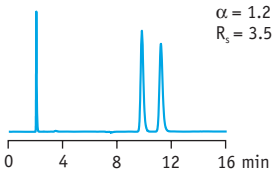
Ketamine

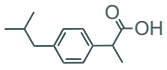




Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/2-Propanol/DEA (90/10/0.1)
Flow Rate: 0.5mL/min
Column Temp: 22 °C
Detection: UV 223nm

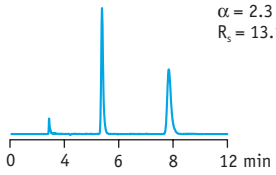
Ibuprofen

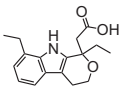




Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/2-Propanol/DEA (99/1/0.1)
Flow Rate: 1mL/min
Column Temp: 22 °C
Detection: UV 222nm

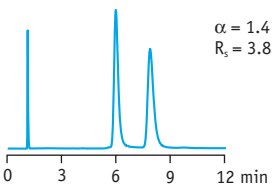
Etodolac

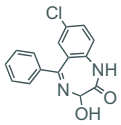




Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/Ethanol/TFA (95/5/0.1)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 254nm

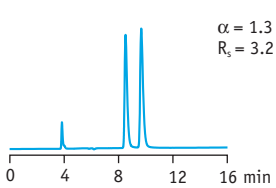
Oxazepam





Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/2-Propanol/DEA (85/15/0.1)
Flow Rate: 2mL/min
Column Temp: 22 °C
Detection: UV 228nm

1-Phenylethylamine



Column: Kromasil CelluCoat, 3 µm, 4.6 x 150 mm
Mobile Phase: Heptane/Ethanol/TFA (90/10/0.1)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 228nm

0300-0001 0300-0002 0300-0003

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Kromasil CelluCoat Chiral Columns				
AmyCoat	3	4.6 x 50	1	03S13-E211
		4.6 x 150	1	03S13-E411
	5	4.6 x 50	1	03S13-E221
		4.6 x 150	1	03S13-E421
		4.6 x 250	1	03S13-E521
		10 x 250	1	03S13-H521
		21.2 x 150	1	03S13-I421
		21.2 x 250	1	03S13-I521
		30 x 250	1	03S13-J521
		50 x 250	1	03S13-K521
	10	4.6 x 50	1	03S13-E231
		4.6 x 150	1	03S13-E431
		4.6 x 250	1	03S13-E531
		10 x 250	1	03S13-H531
		21.2 x 150	1	03S13-I431
		21.2 x 250	1	03S13-I531
		30 x 250	1	03S13-J531
		50 x 250	1	03S13-K531
	16	4.6 x 50	1	03S13-E2D1
		4.6 x 150	1	03S13-E4D1
		4.6 x 250	1	03S13-E5D1
	25	10 x 250	1	03S13-H5E1
		21.2 x 150	1	03S13-I4E1
		21.2 x 250	1	03S13-I5E1
		30 x 250	1	03S13-J5E1
		50 x 250	1	03S13-K5E1

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Kromasil CelluCoat Chiral Guard Cartridge*				
AmyCoat	3	4.6 x 10	2	03S13-E113
	5	4.6 x 10	2	03S13-E123
	10	4.6 x 10	2	03S13-E133
		10 x 10	2	03S13-H133
		21.2 x 10	2	03S13-I133
		30 x 10	2	03S13-J133
	25	10 x 10	2	03S13-H1D3
		21.2 x 10	2	03S13-I1D3
		30 x 10	2	03S13-J1D3

*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003
For column I.D. 30 mm	1	0300-0004

Ultron® ES Chiral Columns

Ultron® ES-OVM

- **Protein-based chiral HPLC phases for better performance**
- **A wide range of chiral applications**
- **No deriveatization required**
- **Aqueous mobile phase can be used in the separation.**

Ultron ES-OVM is a chiral separation column immobilized with ovomucoid which is strong protein for denaturation. (US PATENT 6027648 Eisai Co., LTD.) that has numerous chiral recognition sites, making it applicable to a wide range of enantiomeric compounds.

This column recognizes hydrogen-bonding, polar, ionic, and hydrophobic sites, as well as the three-dimensional structure of sample molecules.

Ultron ES-OVM columns are compatible with aqueous and many of the commonly used organic solvents (for example, methanol, ethanol, and acetonitrile). Organic solvent concentrations greater than 50% are not recommended.

Typical applications include acidic and basic pharmaceuticals, pesticides and organic compounds.

Specifications	
Support	Spherical Silica
Particle Size (µm)	5
Pore Diameter (Å)	120
Chiral Stationary phase	Ovomucoid
USP	L-57

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Ultron ES-OVM Chiral Columns				
ES-OVM	5	2.1 x 150	1	03S15-B421
		4.6 x 150	1	03S15-E421
		6.0 x 150	1	03S15-F421
	10	4.6 x 250	1	03S15-E531
		21.2 x 250	1	03S15-I531

Ordering Information

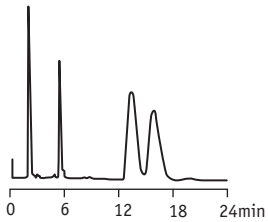
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Ultron ES-OVM Chiral Guard Columns				
ES-OVM	5	4.0 x 10	1	03S15-D121
	10	7.8 x 15	1	03S15-GA21
Ultron ES-OVM Chiral Guard Cartridge*				
ES-OVM	5	2.1 x 5	2	03S15-BF23
		4.6 x 10	2	03S15-E123

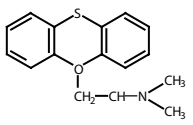
*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

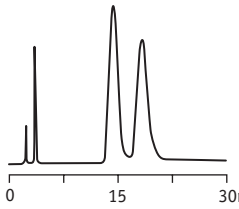
Promethazine

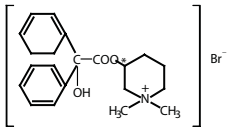




Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20mM KH_2PO_4 (pH3.0)/C_2H_5OH (100/5)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

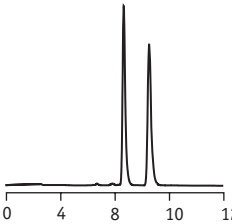
Mepenzolate Bromide

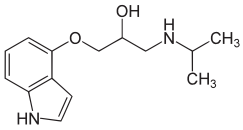




Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20 mM KH_2PO_4 (pH = 4.6)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

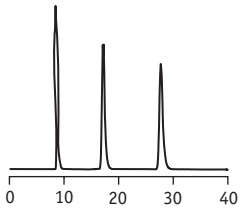
Pindolol

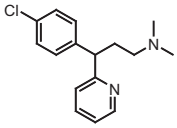




Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20mM KH_2PO_4 (pH5.5)/C_2H_5OH (100/30)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

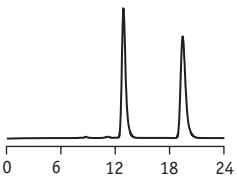
Chlorphenamine

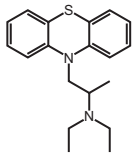




Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20mM KH_2PO_4 (pH5.0)/CH_3CN (100/5)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

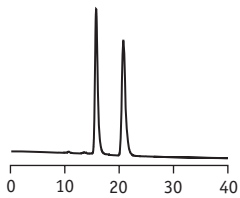
Profenamine

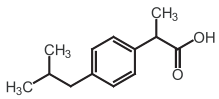




Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/C_2H_5OH (100/25)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

Ibuprofen





Column: Ultron ES-OVM 3μm, 4.6x150mm
Mobile Phase: 20mM KH_2PO_4 (pH3.0)/CH_3CN (100/5)
Flow Rate: 1mL/min
Column Temp: 25 °C
Detection: UV 220nm

Ultron® ES-CD
Ultron® ES-PhCD

- **Cyclodextrin-based chiral HPLC phases for better performance**
- **For the enantiomeric separation of hydrophobic cyclic compounds**
- **Mobile phase of both reversed phase and normal phase can be used.**
- **Excellent stability and durability**

Ultron ES-CD and Ultron ES-PhCD are chemically bonded with β-cyclodextrin (CD) and phenylcarbamated β-cyclodextrin (PhCD), respectively.

Typical applications include acidic and basic pharmaceuticals, pesticides and organic compounds.

Specifications	
Support	Spherical Silica
Particle Size (µm)	5
Pore Diameter (Å)	120
Chiral Stationary phase	β-cyclodextrin
	Phenylcarbamated β-cyclodextrin
USP	L-45

Ordering Information

Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Ultron ES-CD, ES-pHCD Chiral Columns				
ES-CD	5	2.1 x 150	1	03S16-B421
		4.6 x 150	1	03S16-E421
		6.0 x 150	1	03S16-F421
ES-PhCD	5	2.1 x 150	1	03S17-B421
		4.6 x 150	1	03S17-E421
		6.0 x 150	1	03S17-F421

Ordering Information

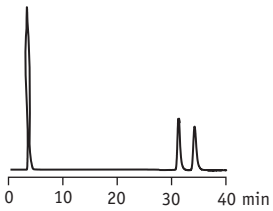
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
Ultron ES-CD, ES-pHCD Chiral Guard Columns				
ES-CD	5	4.0 x 10	1	03S16-D121
ES-PhCD	5	4.0 x 10	1	03S17-D121
Ultron ES-CD, ES-pHCD Chiral Guard Cartridge*				
ES-CD	5	2.1 x 5	2	03S16-BF23
		4.6 x 10	2	03S16-E123
ES-PhCD	5	2.1 x 5	2	03S17-BF23
		4.6 x 10	2	03S17-E123

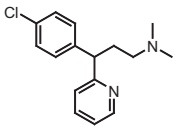
*Guard holder required

Ordering Information

Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001

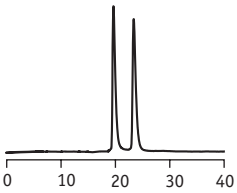
Chlorpheniramine

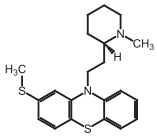




Column: Ultron ES-CD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH5.0)/CH_3CN (83/17)
Flow Rate: 1.0mL/min
Column Temp: 15 °C
Detection: UV 220nm

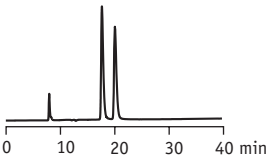
Thioridazine

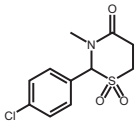




Column: Ultron ES-CD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/CH_3CN (75/25)
Flow Rate: 1.2mL/min
Column Temp: 25 °C
Detection: UV 220nm

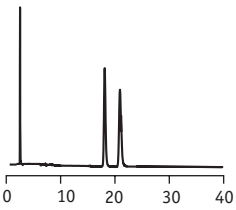
Chlormezanone

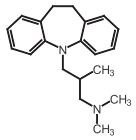




Column: Ultron ES-CD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/CH_3CN (93/7)
Flow Rate: 1.2mL/min
Column Temp: 25 °C
Detection: UV 220nm

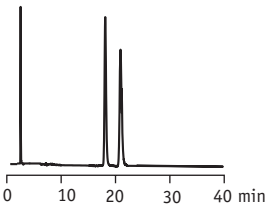
Trimipramin

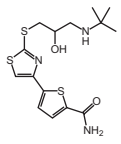




Column: Ultron ES-CD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/CH_3CN (75/25)
Flow Rate: 1.2mL/min
Column Temp: 25 °C
Detection: UV 220nm

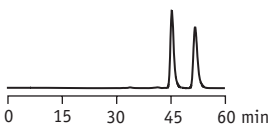
Arotinolol

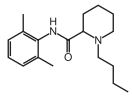




Column: Ultron ES-PhCD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/CH_3CN (80/20)
Flow Rate: 1.2mL/min
Column Temp: 25 °C
Detection: UV 220nm

Bupivacaine





Column: Ultron ES-PhCD 3µm, 6.0 x 150mm
Mobile Phase: 20mM KH_2PO_4 (pH4.6)/CH_3CN (80/20)
Flow Rate: 1.2mL/min
Column Temp: 25 °C
Detection: UV 220nm

Prefilters and Inline filters

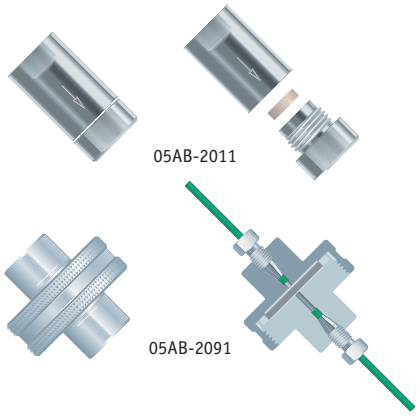
Prefilters

- Placed between injection valve and HPLC column protects the column from particles originating in the sample and from valve seal wear.
- Stainless steel Prefilters, pressure rated to 9,000 psi
- Biocompatible PEEK polymer versions pressure rated to 5,000 psi
- Choose either the 0.5µm or 2µm version to filter particulates from flow path.
- Ultra-Low Volume version has lowest swept volumes (0.61µL), ensuring maximum protection with no band broadening with pressure rated to 9,000 psi

Ordering Information		
Description	QTY	Part No.
Prefilters		
2µm Prefilter, SS Frit	1	05AB-1011
0.5µm Prefilter, SS Frit	1	05AB-1021
2µm Prefilter, PEEK Frit	1	05AB-1031
0.5µm Prefilter, PEEK Frit	1	05AB-1041
0.5µm Ultra-Low Volume Prefilter, SS Frit	1	05AB-1051
2µm Replacement Frits, SS	10	05AB-1067
0.5µm Replacement Frits, SS	10	05AB-1077
2µm Replacement Frit, PEEK	1	05AB-1081
0.5µm Replacement Frit, PEEK	1	05AB-1091

Inline Filters

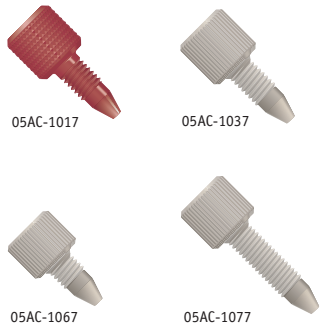
- Placed between the pump and sample injection valve protects valve seal wear and column from particles released through normal piston seal wear.
- Uses a 2µm stainless steel frit with a PEEK ring.
- Analytical Inline Filters, pressure rated to 8,500 psi and use a 2µm stainless steel frit.
- Semi-Prep Inline Filters, pressure rated to 7,500 psi and is designed for use with standard 10-32 coned fittings and 1/16" OD tubing.
- Inlet and outlet connections are compatible with Upchurch, Swagelok, or Parker.
- All materials are type 316 stainless steel and PEEK.



Ordering Information		
Description	QTY	Part No.
Analytical Inline Filters		
20µm Analytical Inline Filter, SS Frit	1	05AB-2011
2µm Analytical Inline Filter, SS Frit	1	05AB-2021
2µm Analytical Inline Filter, PEEK Frit	1	05AB-2031
0.5µm Analytical Inline Filter, PEEK Frit	1	05AB-2041
20µm Replacement Frit, SS	1	05AB-2051
2µm Replacement Frit, SS	10	05AB-2067
2µm Replacement Frit, PEEK	10	05AB-2077
0.5µm Replacement Frit, PEEK	10	05AB-2087
Semi-Prep Inline Filters		
10µm Semi-Prep Inline Filter, SS Frit	1	05AB-2091
2µm Semi-Prep Inline Filter, PEEK Frit	1	05AB-2101
10µm Semi-Prep Inline Filter, PEEK Frit	1	05AB-2111
5µm Semi-Prep Inline Filter, PEEK Frit	1	05AB-2121
10µm Replacement Frit, SS	10	05AB-2137
2µm Replacement Frit, PEEK	1	05AB-2141
10µm Replacement Frit, PEEK	1	05AB-2151
5µm Replacement Frit, PEEK	1	05AB-2161

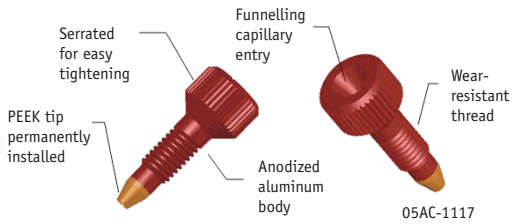
Upchurch One-Piece Fittings

- Upchurch Scientific®'s original One-Piece Fingertight Fittings have 10-32 threads and are designed to be used with 1/16" OD tubing,
- Works with all 1/16" OD Tubing and female 10-32 ports
- Finger tight without tools PEEK and Kel-F are chemically inert and biocompatible
- PEEK, pressure rated to 6,000 psi
- Kel-F, pressure rated to 4,000 psi



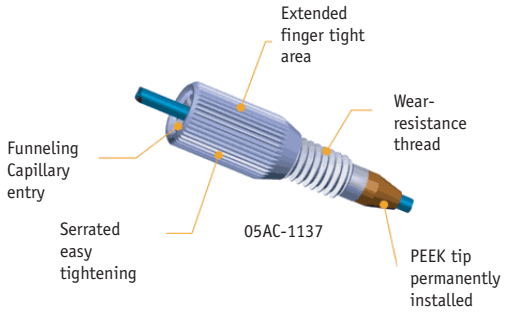
SieLC One-Piece Fittings

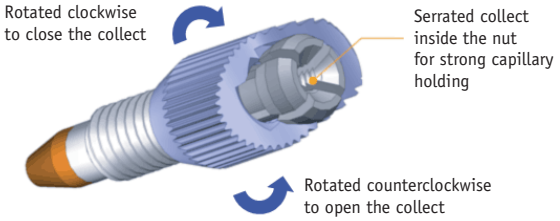
- Aluminum construction is price savings.
- Strong anodized aluminum thread allows many more use-cycles
- Finger-tight installation. PEEK tip installs permanently and cannot be lost during installation
- Pressure rating over 5,000 psi, suitable for ultra-fast chromatography applications
- Several color options, including red, black, blue, gold, and gray.
- Break-resistant — when a normal column is accidentally dropped with the fitting in, the PEEK fitting usually breaks, leaving hard-to-remove pieces inside the column. Aluminum can bend — but it won't break, and thus it can be simply replaced with another fitting, saving the expensive column.



SieLC UHP One-Piece Fittings

- Strong stainless steel thread allows many more use-cycles than a one-piece PEEK design
- Finger-tight installation. PEEK tip installs permanently and cannot be lost. Pressure rating up to 14,000psi
- One-size-fits-most applications, including columns, valves, and instrument ports.
- Break-resistant
- Improves heat transfer
- Special capillary tube gripping mechanism allows strong holding effect of the tube, even with very gentle tightening forces. Patent-pending design.



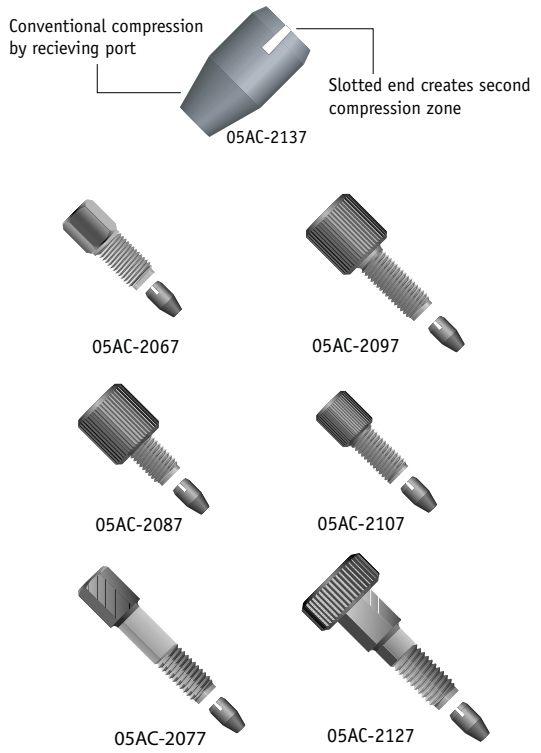


Ordering Information		
Description	QTY	Part No.
Upchurch One-Piece Fittings		
Kel-F, Red	10	05AC-1017
Kel-F, Natural	10	05AC-1027
PEEK, Natural	10	05AC-1037
PEEK, Black	1	05AC-1041
PEEK, Assorted Colors*	6	05AC-1056
PEEK, Natural, Short	10	05AC-1067
PEEK, Natural, Long	10	05AC-1077
SieLC One-Piece Fiitings		
Aluminum, Gold	10	05AC-1087
Aluminum, Black	10	05AC-1097
Aluminum, Navy	10	05AC-1107
Aluminum, Red	10	05AC-1117
SieLC UHP One-Piece Fiitings		
Aluminum, UHP	1	05AC-1121
Aluminum, UHP	10	05AC-1137

** Natural, Blue, Black, Green, Red and Yellow*

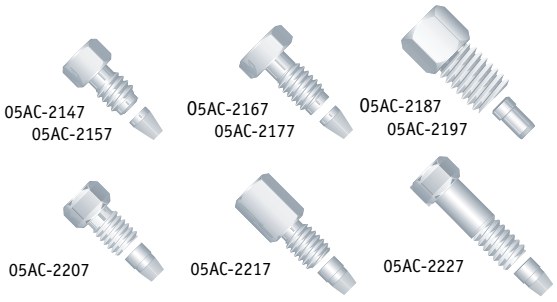
SealTight™ Two-Piece Fittings

- Upchurch Scientific®' SealTight™ Two-Piece Fingertight, pressure rated to 9,000 psi
- All SealTight Nuts are for use with 1/16" OD tubing, 10-32 port and are designed to be used exclusively with the SealTight™ Ferrule



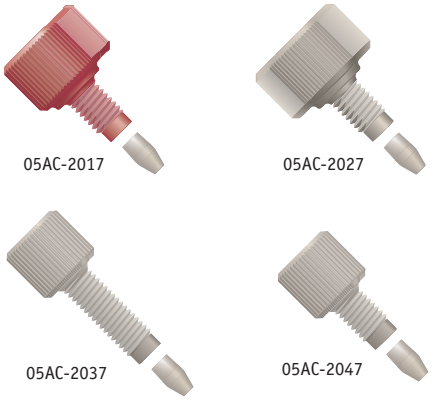
SS Two-Piece Fittings

- 316 Stainless Steel Fittings are rated to 10,000 psi when wrench tightened
- Works with 1/16" OD Tubing and female 10-32 ports



Two-Piece Fittings

- Upchurch Scientific®'s original Two-Piece Fingertight
- Works with 1/16" OD Tubing and female 10-32 ports
- Fingertight without tools
- Pressure rated to 6,000 psi



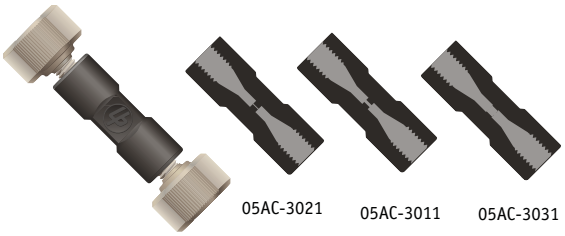
Ordering Information		
Description	QTY	Part No.
Two-Piece Fittings with Ferrules		
Derlin Wing Nuts, Red	10	05AC-2017
PEEK Wing Nuts, Natural	10	05AC-2027
PEEK Long Nuts, Natural	10	05AC-2037
PEEK Short Nuts, Natural	10	05AC-2047
PEEK Ferrules, Natural	10	05AC-2057
SealTight™ Two-Piece Fittings with Ferrules		
PEEK Short Nuts, Hex Head, Black	10	05AC-2067
PEEK Long Nuts, Heax Head, Black	10	05AC-2077
PEEK Short Nuts, Standard Head, Black	10	05AC-2087
PEEK Long Nuts, Standard Head, Black	10	05AC-2097
PEEK Short Nuts, Headless, Black	10	05AC-2107
PEEK Longt Nuts, Headless, Black	10	05AC-2117
PEEK Longt Nuts, Knurl/Hex Head, Black	10	05AC-2127
PEEK SealTight™ Ferrules, Black	10	05AC-2137
SS Fittings with Ferrules		
Standard Nuts	10	05AC-2147
Standard Ferrules	10	05AC-2157
Waters® Nuts	10	05AC-2167
Waters® Ferrules	10	05AC-2177
SSI Nuts	10	05AC-2187
SSI Ferrules	10	05AC-2297
Rheodyne® Nuts with Ferrules	10	05AC-2207
Rheodyne® Long Nuts with Ferrules	10	05AC-2217
Rheodyne® Extra-Long Nuts with Ferrules	10	05AC-2227
Rheodyne® Ferrules	10	05AC-2237

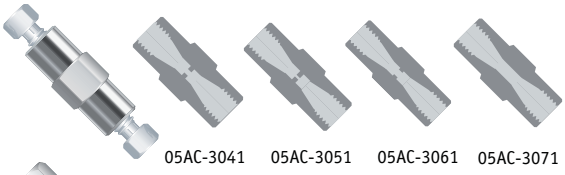
Unions

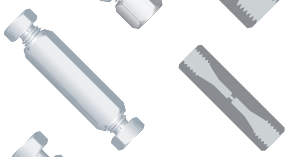
- Upchurch Scientific® PEEK Zero-Dead Volume (ZDV) Unions come complete with two Fingertight Fittings for 1/16" OD tubing and 10-32 port and are pressure rated to 6,000 psi
- SS Zero-Dead Volume (ZDV) unions are precision machined from 316 stainless steel, carefully passivated, then thoroughly rinsed. Each comes complete with stainless steel nuts and ferrules, and is rated to 10,000 psi when wrench tightened.

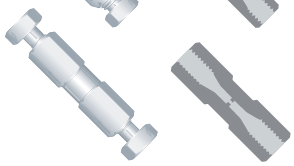
Tees & Crosses

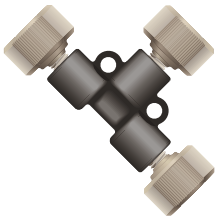
- PEEK Tees and Crosses include high pressure PEEK Fingertight Fittings — allowing maximum operating pressures to 3,500 psi when used with 1/16" OD PEEK, titanium or stainless steel tubing. They can also operate in lower pressure applications using other tubing such as Teflon® or Tefzel® (ETFE).
- 316 stainless steel Tees and Crosses come complete with 10-32 fittings for use with 1/16" OD tubing and 10-32 port and are rated to 10,000 psi. They are also compatible with Parker, Valco, and Swagelok® male fittings.

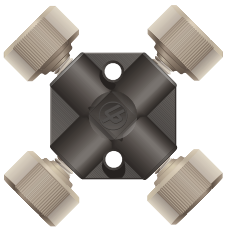


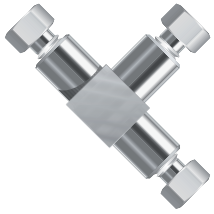


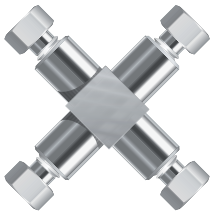








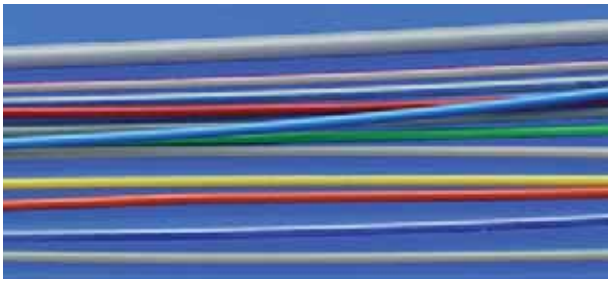




Ordering Information		
Description	QTY	Part No.
Unions with Fittings		
PEEK Unions, 0.020" Thru-hole	1	05AC-3011
PEEK Unions, 0.010" Thru-hole	1	05AC-3021
PEEK Unions, 0.050" Thru-hole	1	05AC-3031
SS Unions, 0.020" Thru-hole	1	05AC-3041
SS Unions, 0.010" Thru-hole	1	05AC-3051
SS Unions, 0.050" Thru-hole	1	05AC-3061
SS Unions, 0.067" Thru-hole	1	05AC-3071
SSI SS Unions, 0.020" Thru-hole	1	05AC-3081
VICI® SS Unions, 0.020" Thru-hole	1	05AC-3091
Waters® SS Unions, 0.020" Thru-hole	1	05AC-3101
Tees and Crosses with Fittings		
PEEK Tees, 0.020" Thru-hole	1	05AC-3111
PEEK Tees, 0.050" Thru-hole	1	05AC-3121
PEEK Crosses, 0.020" Thru-hole	1	05AC-3131
PEEK Crosses, 0.050" Thru-hole	1	05AC-3141
SS Tees, 0.020" Thru-hole	1	05AC-3151
SS Crosses, 0.050" Thru-hole	1	05AC-3161

PEEK Tubings

- **PEEK is inert to almost all organic solvents; methylene chloride, THF, concentrated nitric or concentrated sulfuric acids will affect PEEK. For continuous use of the PEEK tubing, we recommend temperatures below 100°C. Above 100°C, the tubing will hold to lower pressure.**
- **PEEK tubing can be used with either SS nuts and ferrules, flangeless fittings, or any universal fingertight fittings. This tubing is extremely flexible and can be cut to your desired length using tubing cutter or a straight edge razor.**



PEEK Burst Pressure

PEEK tubing will burst at a lower pressure when:

- Increase the inside diameter
- Increase the temperature
- Increase the time of exposure
- Increase the conc. of organic solvent

The table below shows the pressure at which various 1/16" OD tubes burst during a three-week test while exposed to different solvents at room temperature. At 500 psi below these pressures the tubing did not burst during the test.

Warning! The tubing failed at the pressures listed in the table. Operate routinely at much lower pressure.

Tubing ID	0.007"	0.010"	0.020"	0.030"
H_2O	>7,000	>7,000	>6,000	>6,000
ACN:H_2O	>5,500	5,500	4,500	3,500
ACN	4,000	3,500	3,000	3,000
IPA	>5,000	5,000	4,000	4,000
THF	2,500	2,500	1,500	1,500

Ordering Information

Description	QTY	Part No.
PEEK Tubing, 1/16" OD x 5'		
0.0025"(65µm) ID, Natural, 7,000psi	1	05AD-1011
0.004"(100µm) ID, Black, 7,000psi	1	05AD-1021
0.005"(125µm) ID, Red, 7,000psi	1	05AD-1031
0.006"(150µm) ID, Purple, 7,000psi	1	05AD-1041
0.007"(175µm) ID, Yellow, 7,000psi	1	05AD-1051
0.010"(.25mm) ID, Natural, 7,000psi	1	05AD-1061
0.010"(.25mm) ID, Blue, 7,000psi	1	05AD-1071
0.015"(.40mm) ID, Gray, 7,000psi	1	05AD-1081
0.020"(.50mm) ID, Orange, 7,000psi	1	05AD-1091
0.030"(.75mm) ID, Green, 7,000psi	1	05AD-1101
0.040"(1.0mm) ID, Natural, 5,000psi	1	05AD-1111
0.055"(1.40mm) ID, Natural, 500psi	1	05AD-1121
PEEK Tubing, 1/8" OD x 5'		
0.062" (1.60mm) ID, Natural, 4,000psi	1	05AD-1131
0.080" (2.00mm) ID, Natural, 3,000psi	1	05AD-1141
PEEK Tubing, 1.8mm OD x 5' (for Pharmacia)		
0.010" (.25mm) ID, Natural, 7,000psi	1	05AD-1151
0.020" (.50mm) ID, Natural, 7,000psi	1	05AD-1161
0.030" (.75mm) ID, Natural, 7,000psi	1	05AD-1171
0.042" (1.05mm) ID, Natural, 5,000psi	1	05AD-1181
0.055" (1.40mm) ID, Natural, 500psi	1	05AD-1191
Capillary PEEK Tubing, 360µm (.0145") OD x 5'		
0.002" (50µm) ID, Natural, 2,000psi	1	05AD-1201
0.003" (75µm) ID, Black, 2,000psi	1	05AD-1211
0.004" (100µm) ID, Red,, 2,000psi	1	05AD-1221
0.006" (150µm) ID, Yellow, 2,000psi	1	05AD-1231
Capillary PEEK Tubing, 510µm (.020") OD x 5'		
0.0025" (65µm) ID, Natural, 2,000psi	1	05AD-1241
0.005" (125µm) ID, Natural, 2,000psi	1	05AD-1251
0.010" (255µm) ID, Natural, 2,000psi	1	05AD-1261
PEEK Tubing, 1/32" OD x 5'		
0.0025" (65µm) ID, Natural, 5,000psi	1	05AD-1271
0.0035" (90µm) ID, Black, 5,000psi	1	05AD-1281
0.005" (125µm) ID, Red, 5,000psi	1	05AD-1291
0.007" (175µm) ID, Yellow, 5,000psi	1	05AD-1301
0.008" (200µm) ID, Natural, 5,000psi	1	05AD-1311
0.009" (230µm) ID, Gray, 5,000psi	1	05AD-1321
0.010" (.25mm) ID, Blue, 5,000psi	1	05AD-1331
0.015" (.40mm) ID, Natural, 5,000psi	1	05AD-1341
0.020" (.50mm) ID, Orange, 3,000psi	1	05AD-1351

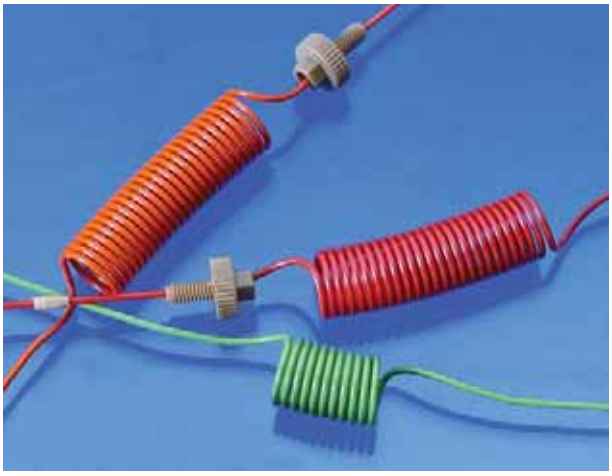
- **Related products**

See page 107

for PEEK Tubing Cutter.

Spiral PEEK Tubings

- Self-adjusting length
- Will not bend or kink
- Spiral tubing expands and contracts and is made of PEEK polymer, a biocompatible, chemically inert material
- The coiled format springs back to keep excess tubing out of your way



Ordering Information		
Description	QTY	Part No.
Spiral Tubing, 1/16" OD x 0.005" ID, Red		
20cm, 0.47" Coil span	1	05AD-1361
40cm, 2.4" Coil span	1	05AD-1371
50cm, 3.0" Coil span	1	05AD-1381
100cm, 7.0" Coil span	1	05AD-1391
200cm, 13.0" Coil span	1	05AD-1401
Spiral Tubing, 1/16" OD x 0.010" ID, Blue		
20cm, 0.47" Coil span	1	05AD-1411
40cm, 2.4" Coil span	1	05AD-1421
50cm, 3.0" Coil span	1	05AD-1431
100cm, 7.0" Coil span	1	05AD-1441
200cm, 13.0" Coil span	1	05AD-1451
Spiral Tubing, 1/16" OD x 0.020" ID, Orange		
20cm, 0.47" Coil span	1	05AD-1461
40cm, 2.4" Coil span	1	05AD-1471
50cm, 3.0" Coil span	1	05AD-1481
100cm, 7.0" Coil span	1	05AD-1491
200cm, 13.0" Coil span	1	05AD-1501
Spiral Tubing, 1/16" OD x 0.030" ID, Green		
20cm, 0.47" Coil span	1	05AD-1511
40cm, 2.4" Coil span	1	05AD-1521
50cm, 3.0" Coil span	1	05AD-1531
100cm, 7.0" Coil span	1	05AD-1541
200cm, 13.0" Coil span	1	05AD-1551

SGE PEEKsil™ Tubings

- Ideal for LC systems where conventional 1/16" OD fittings are used
- Constructed from a core of smooth precision bore fused silica tubing bonded to a 1/16" OD PEEK™ outer sheath
- All PEEKsil tubing is pressure rated to 8,500 psi
- Resistant to strong acids and has an effective pH range of 0-10
- Not compatible with hydrofluoric acid

Ordering Information		
Description	QTY	Part No.
PEEKsil™ Tubing, 1/16" OD 25uL, Orange		
10cm	5	05AD-1565
15cm	5	05AD-1575
25cm	5	05AD-1585
50cm	2	05AD-1592
PEEKsil™ Tubing, 1/16" OD 50uL, Natural		
10cm	5	05AD-1605
15cm	5	05AD-1615
25cm	5	05AD-1625
50cm	2	05AD-1632
PEEKsil™ Tubing, 1/16" OD 75uL, Black		
10cm	5	05AD-1645
15cm	5	05AD-1655
25cm	5	05AD-1665
50cm	2	05AD-1672
PEEKsil™ Tubing, 1/16" OD 150uL, Red		
10cm	5	05AD-1685
15cm	5	05AD-1695
25cm	5	05AD-1705
50cm	2	05AD-1712
PEEKsil™ Tubing, 1/16" OD 175uL, Yellow		
10cm	5	05AD-1725
15cm	5	05AD-1735
25cm	5	05AD-1745
50cm	2	05AD-1782
PEEKsil™ Tubing, 1/16" OD 200uL, Blue		
10cm	5	05AD-1795
15cm	5	05AD-1775
25cm	5	05AD-1785
50cm	2	05AD-1792

Stainless Steel Tubings

- **Presize cut 316 SS tubing**
- **Square , burr-free ends**

Ordering Information		
Description	QTY	Part No.
0.005" x 1/16" (Red)		
5cm	1	05AD-2011
10cm	1	05AD-2021
20cm	1	05AD-2031
30cm	1	05AD-2041
50cm	1	05AD-2051
1m	1	05AD-2061
5feet	1	05AD-2071
25feet	1	05AD-2081
0.007" x 1/16" (Black)		
5cm	1	05AD-2091
10cm	1	05AD-2101
20cm	1	05AD-2111
30cm	1	05AD-2121
50cm	1	05AD-2131
1m	1	05AD-2141
5feet	1	05AD-2151
25feet	1	05AD-2161
0.010" x 1/16" (Blue)		
5cm	1	05AD-2171
10cm	1	05AD-2181
20cm	1	05AD-2191
30cm	1	05AD-2201
50cm	1	05AD-2211
1m	1	05AD-2221
5feet	1	05AD-2231
25feet	1	05AD-2241
0.020" x 1/16" (Yellow)		
5cm	1	05AD-2251
10cm	1	05AD-2261
20cm	1	05AD-2271
30cm	1	05AD-2281
50cm	1	05AD-2291
1m	1	05AD-2301
5feet	1	05AD-2311
25feet	1	05AD-2321

Ordering Information		
Description	QTY	Part No.
0.030" x 1/16" (White)		
5cm	1	05AD-2331
10cm	1	05AD-2341
20cm	1	05AD-2351
30cm	1	05AD-2361
50cm	1	05AD-2371
1m	1	05AD-2381
5feet	1	05AD-2391
25feet	1	05AD-2401
0.040" x 1/16"		
5cm	1	05AD-2411
10cm	1	05AD-2421
20cm	1	05AD-2431
30cm	1	05AD-2441
50cm	1	05AD-2451
1m	1	05AD-2461
5feet	1	05AD-2471
25feet	1	05AD-2481
0.046" x 1/16"		
5cm	1	05AD-2491
10cm	1	05AD-2501
20cm	1	05AD-2511
30cm	1	05AD-2521
50cm	1	05AD-2531
1m	1	05AD-2541
5feet	1	05AD-2551
25feet	1	05AD-2561
0.080" x 1/16"		
15cm	1	05AD-2571
25cm	1	05AD-2581
1m	1	05AD-2591
3m	1	05AD-2601
5m	1	05AD-2611

Stainless Steel Tubings

- **These SS tubing kits include 10 pieces – 5cm long,**
- **10 pieces – 10cm long**

Ordering Information		
Description	QTY	Part No.
SS Tubing Kits		
Tubing kit 0.010" ID	1	05AD-2621
Tubing kit 0.007" ID	1	05AD-2631
Tubing kit 0.005" ID	1	05AD-2641
Tubing kit 0.020" ID	1	05AD-2651
Assorted 1/16" OD tubing kit, includes 10 x 05AD-2251, 10 x 05AD-2261, 5 x 05AD-2271, 10 x 05AD-2171, 10 x 05AD-2181 and 5 x 05AD-2191	1	05AD-2661

Cut-Off Machine Model TC-20

- **Cuts 1/16", 1/8", or 1/4" tubing with inside diameter as small as 0.008"**
- **Electrically operated bench-top model**
- **Handy dressing tool on the swing arm removes burrs and reams tubing**
- **Voltage selectable 110-120/220-240 volts, 50-60Hz.**

Clean, square cuts:

The TC-20 tube cutter assures a zero dead volume connection. The tubing is held securely in a clamp vice on the vertical swing arm. This swing arm is then lowered against the abrasive cutting wheel, producing a perfectly square cut. No lubricant or cutting fluid is required.

Cuts 3 common sizes of HPLC tubing:

1/16", 1/8" and 1/4" outside diameter (OD) tubing with inside diameters as small as 0.008" can be smooth-cut and dressed without distortion.

Dressing tool included:

The precision ground dressing tool for 1/16" OD tubing is attached directly to the swing arm; it cannot be misplaced or lost! Simply place the cut tubing end in the tool and rotate the knurled handle to finish both the internal and external diameters of the tubing in one operation. Dressing tools in other sizes are also available.

Safe, simple operation:

A shield on the swing arm covers the abrasive wheel, making the operation safe and simple.

Ordering Information		
Description	QTY	Part No.
Tube Cut-Off Machine, Model TC-20		
Model TC-20, 120-240V, 50-60 Hz	1	05AD-3011
Replacement cutting wheel	3	05AD-3023
Dressing tool, 1/16" for TC-20	1	05AD-3031
Needle insert for 1/16" dressing tool	1	05AD-3041
Dressing tool, 1/8" for TC-20	1	05AD-3051
Needle insert for 1/8" dressing tool	1	05AD-3061
Dressing tool, 1/4" for TC-20 (needle insert not required)	1	05AD-3071

SS Tubing Cutter

- **Easily cut 1/16" OD Stainless Steel tubing**
- **Leaves tubing ID open**

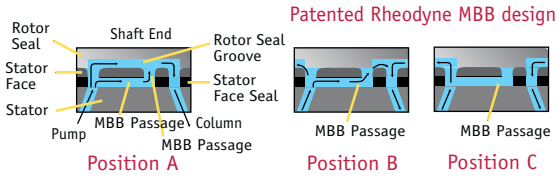
PEEK Tubing Cutter

- **For 1/16" and 1/8" OD tubing**
- **Has guide holes to ensure precise cutting**
- **Durable, reliable and easy to operate.**
- **Five replacement blades are included**

Ordering Information		
Description	QTY	Part No.
SS Tubing Cutter		
SS Tubing Cutter	1	05AD-3081
Replacement cutting wheel	3	05AD-3093
PEEK Tubing Cutter		
PEEK Tubing Cutter	1	05AD-3101
Blades	1	05AD-3111

Rheodyne® Model 7725 and 9725 Sample Injectors

- "Make-Before-Break" (MBB) switching for uninterrupted flow
- A front-end pressure screw – for easy seal adjustment
- Wide port angles – for improved access to fittings
- Internal position sensing switch – ("i" version)
- Capability of reproducible 2µL sample injection with a 2µL internal sample loop
- Inject from 1µL to 5mL



These valves feature the new Make-Before-Break system, which prevents flow interruptions while switching. This protects any columns, detectors, or pumps which might be affected by flow or pressure fluctuations.

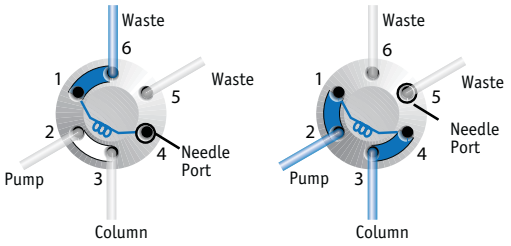
The 7725 and 7725i are capable of injecting volumes of 1µL to 5mL with high precision. The 7725i features a built-in positionsensing switch, providing the chromatograph with a reproducible start signal. The 7725 and 7725i come with a 20µL sample loop. Other loops are available including a 2µL internal sample loop, providing greater versatility in your sample size.

The 9725 and 9725i are biocompatible versions of the 7725 and 7725i injectors. Wetted materials are PEEK and Tefzel®, making it ideal for applications requiring a biocompatible or metal-free flow path. A 20µL PEEK sample loop is included. Also available is the Suction Needle Adaptor which eliminates exposure of the sample to the metal of a syringe needle.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Model 7725 and 9725		
Model 7725, SS	1	05AE-1011
Model 7725i, SS, with sensing switch	1	05AE-1021
Model 9725i, PEEK	1	05AE-1031
Model 9725i, PEEK, with sensing switch	1	05AE-1041

Rheodyne® Model 8125 Micro-Scale Injector

- Versatile! - Works with Microbore (1mm, 2mm) and
- Conventional (2-6mm) ID Columns
- 0.25mm (0.010") Flow Passages
- Built-In Position Sensing Switch
- Rated to 5,000psig



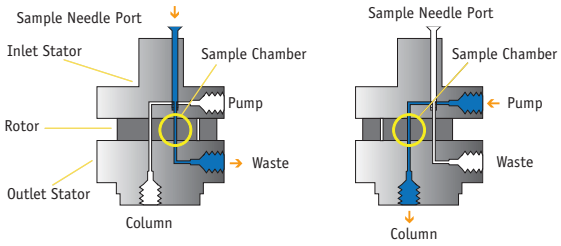
The 8125 is a low-dispersion analog of Rheodyne®'s 7125 valve. It features reduced diameter flow passages, a new port geometry for easier loop attachment, and a built-in position sensing switch.

Flow passages in the 8125 are only 0.25mm in diameter, resulting in a significant reduction in dispersion. The lower dispersion makes the 8125 valve suitable for use with conventional analytical columns (2 to 6mm ID) as well as with microbore (1mm and 2mm ID) columns where minimum extracolumn volume is critical. The 8125 valve has unique "dual size" ports for tubing connections. This allows either 1/16" OD or 0.02" OD tubing to be used. Connections to 1/16" column end fittings are facilitated with a connecting tube supplied with the valve. The smaller flow passages also result in more resistance to flow. This makes it harder to load large sample volumes. The maximum recommended sample volume for the 8125 valve is 500µL. All sample loops are externally plumbed.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Model 8125		
Model 8125	1	05AE-1051

Rheodyne® Model 7520 Sample Chamber Micro-Scale Injector

- Designed for Narrow Bore (1-2mm) Columns
- 0.2µL to 1µL Interchangeable Sample Chamber
- 0.13mm (0.005") Flow Passages
- Built-in Needle Port with 0.2µL Hold up Volume
- Rated to 7,000psig



Position A (LOAD) Position B (INJECT)

The Model 7520 uses a small hole drilled in a flat rotor as an internal sample chamber for precise sample injection. The rotor, which is sandwiched between two stators, is available in 0.2, 0.5, and 1µL volumes; 0.5µL is standard. The 7520 requires the complete-filling method of loading the internal sample chamber. Excess sample is required to completely flush mobile phase from the chamber.

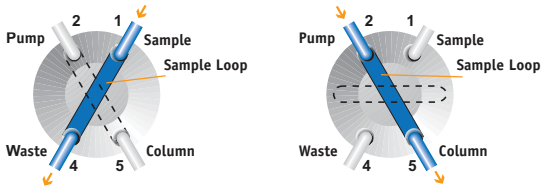
The schematic diagram shows the rotor in the LOAD position. The sample chamber is loaded by inserting a syringe needle into the built-in needle port. The space between the needle tip and rotor surface contains only 0.3¼L so there is very little sample wastage. Rotating the handle to the INJECT position places the sample chamber into the mobile phase stream.

The outlet stator passage is 0.13mm (.005 inch) diameter. A column connecting tube of matching I.D. is supplied installed in the outlet port. The 1/16 inch O.D., 5cm long tube makes it easy to connect microbore columns of various designs.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Model 7520		
Model 7520	1	05AE-1061
0.2µL Rotor	1	05AE-1071
0.5µL Rotor	1	05AE-1081
1.0µL Rotor	1	05AE-1091

Rheodyne® Model 7410 Low-Dispersion Micro-Scale Injector

- 0.5µL to 5µL Removable Internal Sample Loops
- Designed for 1-2mm ID Columns
- High Volumetric Precision
- Rated to 5,000psig



Position A (LOAD) Position B (INJECT)

Model 7410 Sample Injection Valve is a single mode injector where by sample is loaded by the complete filling method using a loop filter port. Interchangeable internal loop discs of 0.5-1-, 2-, and 5µL are ideal for micro-LC work. This injector can be used with Rheodyne loop filler port accessories, position sensing switches, and mounting panels.

The valve has four ports which are threaded to accept Rheodyne® male nuts and ferrules (compression-type tube fittings) for 1/16" OD stainless steel tubing.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Model 7410		
Model 7410	1	05AE-1101
0.2µL Loop Disc	1	05AE-1111
1µL Loop Disc	1	05AE-1121
2µL Loop Disc	1	05AE-1131
5µL Loop Disc	1	05AE-1141
Loop filter port	1	05AE-1151
Needle port	1	05AE-1161

Rheodyne® Model 3725 Preparative Scale Injectors

- **Sample Range 100µL to 20mL**
- **Flow rates from 10 to 800mL/min; Pressure 5,000psig**
- **Available in PEEK or SS**
- **Uses 16 guage Needle**
- **1.0mm (0.04") Flow Pressure**

These injectors are used with preparative HPLC columns from 1 to 10cm diameter. They have the ease of use and versatility of Rheodyne's analytical-scale sample injectors, plus the capacity for large sample volumes and flow rates.

The Model 3725 Valves are available in SS or PEEK, and with a built-in position sensing switch (Model 3725i-038 or 3725i). Each model is supplied with a 10mL loop and 1/8" fittings must be used. An optional port adaptor can be used to connect 1/16" tubing.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Model 3725		
Model 3725, PEEK	1	05AE-1171
Model 3725i, PEEK, with switch	1	05AE-1181
Model 3725-038, SS	1	05AE-1191
Model 3725-038, PEEK, with switch	1	05AE-1201

Rheodyne® Model 7000 Switching Valves

- **Available in 6-Port and 10-Port**
- **Two-Position, 3-Way, 4-Way and 6-Position Versions**
- **5,000psig (500bar) Rating**
- **Large-bore Version for Prep**

Rheodyne® Model 7000 HPLC Switching Valves offer an endless variety of ways to simplify switching and injecting. A flat polymer rotor with connecting flow passages bears against a stator under spring pressure sufficient to hold leak-tight at 7,000psig. Standard valves are supplied with 0.024" internal flow passages and are suitable for use with analytical and semi-preparative applications. Large bore valves with 0.040" internal flow passages are available for use at high flow rates (greater than 50mL/min).

A spring detent mechanism included in the 6-position selection valve permits full circle rotation in either direction and ensures that the rotor "falls into" each of the six positions at the precise 60° spacing.

Typical applications include two column selection, pre-column backflushing, column programing, column backflushing, tandem five columns selection.

Ordering Information		
Description	QTY	Part No.
Two-Position, 6-port, 1/16"		
Model 7000, SS	1	05AE-1211
Model 7000L, SS, Large bore	1	05AE-1221
Two-Position, 10-port, 1/16"		
Model 7610-400, SS	1	05AE-1231
Model 7610-600, PEEK	1	05AE-1241
Two-Position, 3-Way, 6-port , 1/16"		
Model 7030, SS	1	05AE-1251
Model 7030L, SS, Large bore	1	05AE-1261
Model 9030, PEEK	1	05AE-1271
Two-Position, 4-Way, 6-port , 1/16"		
Model 7040, SS	1	05AE-1281
Model 7040L, SS, Large bore	1	05AE-1291
6-Position, 6-Port, Selection Valve, 1/16"		
Model 7060, SS	1	05AE-1301
Model 7060L, SS, Large bore	1	05AE-1311
Model 9060, PEEK	1	05AE-1321

Rheodyne® MX Series II™ Automated Module

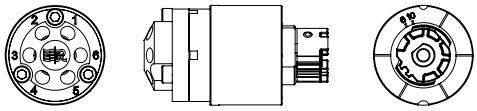
The MX Series II modular valves are flexible to meet changing needs. Several options are available for connecting the valves to your analytical instrument or PC, including contact closure, BCD, serial and USB. Commands can be sent to the MX Series II valves using your chromatography software or TitanMX™ software (included) for timed-events programmability. MX Series II valves can be controlled remotely or operated manually using the pushbutton front panel with LED position indicator.

The MX Series II modules are available in a variety of flow paths including options for Nano, Semi-prep, Low Pressure and Fast Chromatography applications up to 15,000 psi. These modules feature the reliable automation of Titan valves, saving valuable resource time and increasing overall productivity.

The High Pressure and Fast Chromatography MX Series II modular valves feature the Rapid Replacement Pod™ design for easy maintenance. The Rapid Replacement Pod is a complete, factory assembled and tested liquid-end, providing virtually zero downtime maintenance. The Low Pressure MX Series II modular valves make changing fluidic connections quick and easy with patented TitanEX™ fitting-less tubing connection system. These long-life polymer valves meet the reliability needs of demanding applications.

Ordering Information	
Description	Part No.
MXT for Fast Chromatography, 15,000 psi	
2-position 6-port Switching Valve, SS	05AE-1331
6-position 7-port Selector Valve, SS	05AE-1341
MXP for High Pressure, 6000 psi	
2-position 6-port Switching Valve, SS	05AE-1351
2-position 6-port Vertical Port Valve, SS	05AE-1361
2-position 6-port Switching Valve, PEEK	05AE-1371
2-position 10-port Switching Valve, SS	05AE-1381
6-position 7-port Selection Valve, SS	05AE-1391
2-position 10-port Switching Valve, PEEK	05AE-1401
2-position 6-port Nano Switching Valve, Ti	05AE-1411
2-position 10-port Nano Switching Valve, Ti	05AE-1421
MXX for Low Pressure, 125 psi	
2-position 6-port Switching Valve, Polymer	05AE-1431
2-position Double Three-way Valve, Polymer	05AE-1441
6-position 7-port Selection Valve, Polymer	05AE-1451
2-position 6-port Switching Valve, Polymer	05AE-1461
6-position 7-port Switching Valve, Polymer	05AE-1471
10-positon 11-port Selection Valve, Polymer	05AE-1481

Rheodyne® Rapid Replacement Pod™



- Rapid Replacement Pod™

Rapid Replacement Pod™ Design for Easy Maintenance The Rapid Replacement Pod design of the TitanHP liquidend lends itself to two easy methods of field maintenance. The entire Pod can be purchased separately and replaced as a unit, with virtually no instrument downtime for repair. Or, genuine Rheodyne RheBuild® Kits are available for replacement of just the liquid-end rotor seal component.

Ordering Information	
Description	Part No.
Rapid Replacement Pods™	
2/6 Injector, SS	05AE-1491
2/6 Injector, PEEK	05AE-1501
2/10 Switching Valve, SS	05AE-1511
2/10 Switching Valve, PEEK	05AE-1521
2/6 Vertical Port Injector, SS	05AE-1531
6/7 Selector, Titanium	05AE-1541
2/6 Nano Injector, Titanium	05AE-1551
2-/10 Nano Switching Valve, Titanium	05AE-1561

Rheodyne® Rhebuild® Kit for Injection valves

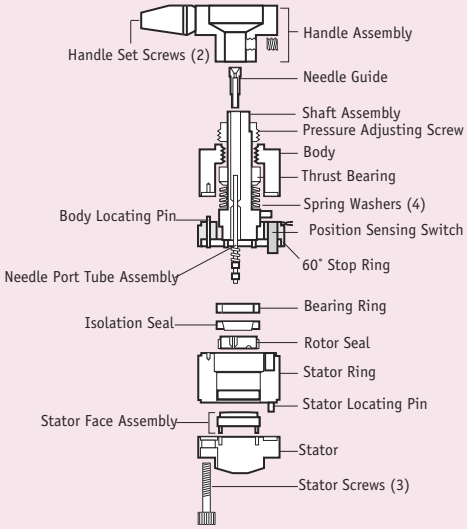
RheBuild® Kits are a complete selection of all the parts you need for general valve maintenance. All are genuine Rheodyne® parts selected for your specific valve.

Kits for Standard Front-loading Injection Valves contain: Standard Rotor Seal, Stator Face Assembly, Isolation Seal, Needle Guide, Needle Port Cleaner, Hex Keys and Instructions. Kits for Models 7520 and 7526 contain: Inlet Stator, Rotor, Needle Guide, Needle Port Cleaner, Hex Key, Rotor Removal Tool and Instructions.

Kits for Rear-Loading Injection Valves contain: Standard Rotor Seal, Isolation Seal, Hex Keys, and Instructions.

Ordering Information		
Description	QTY	Part No.
Rheodyne® Rhebuilt Kit		
for 3725, 3725i, 3725-038, 3725i-038	1	05AE-2011
Kit to include stator for 7010	1	05AE-2021
for 7010, 7000	1	05AE-2031
for 7125, 7126	1	05AE-2041
for 7125-081	1	05AE-2051
for 7410	1	05AE-2061
for 7520, 7526	1	05AE-2071
for 7725, 7725i, 7726	1	05AE-2081
for 7750TPMV series	1	05AE-2091
for 8125, 8126	1	05AE-2101
for 9010, 9040	1	05AE-2111
for 9125, 9126	1	05AE-2121
for 9725, 9725i, 9726	1	05AE-2131
for 9750TPMV series	1	05AE-2141

Rheodyne® Replacement Parts



Ordering Information		
Description	QTY	Part No.
Rotor Seals		
Tefzel, for 7010, 7010-087, 7000, 7040	1	05AE-2151
Tefzel, for 7030	1	05AE-2161
Tefzel, for 7060, 7066, 9060	1	05AE-2171
Tefzel, for 7125, 7725	1	05AE-2181
Tefzel, for 7410	1	05AE-2191
Tefzel, for 7413	1	05AE-2201
Tefzel, for 8125	1	05AE-2211
Tefzel, for 9010	1	05AE-2221
Tefzel, for 9125, 9725	1	05AE-2231
PEEK, for 3725, 3725-038	1	05AE-2241
PEEK, for 7610-400, 7610-600	1	05AE-2251
PEEK, for 7125, 7725, 9125, 9725	1	05AE-2261
Stators		
for 3725, 3710-038, PEEK	1	05AE-2271
for 3725-038, 3710-038	1	05AE-2281
for 7125, 7010, 7000, 7030, 7040	1	05AE-2291
for 7125-081, 7010-087	1	05AE-2301
for 7060, 7066	1	05AE-2311
for 7410, 7413	1	05AE-2321
for 7610-600	1	05AE-2331
for 7725	1	05AE-2341
for 8125, 8126	1	05AE-2351
for 9125, 9010, 9030, 9725	1	05AE-2361
for 9060	1	05AE-2371
Stator Face Assemblies		
for 7125, 7126	1	05AE-2381
for 7725	1	05AE-2391
for 8125, 8126	1	05AE-2401
for 9125, 9010, 9030	1	05AE-2411
for 9060	1	05AE-2421
Miscellanious Replacement Parts		
Needle guide (for front loading injectors)	1	05AE-2431
Isolation seal	1	05AE-2441

Rheodyne® Sample Loops

External loops are supplied with unattached fittings so the tube can be completely bottomed in the injector port before the ferrule is swaged on. This allows for different port depths. The depth of the tubing holes may vary slightly from port to port and from valve to valve. It is good practice to label loops so that they will be replaced in the same orientation and the same valve. PEEK loops do not require this precaution because the ferrule can slide and reposition itself along the tube when the fitting is reinserted into a port. Size designations are nominal. Sizes vary from nominal values usually less than 15%. Accuracy and precision in partial filling require that no more than half the loop volume be loaded. Precision in complete filling requires that at least two loop volumes be loaded.

PEEK Sample Loops

Unlike metals, plastics are viscoelastic and therefore the yield strengths are not well defined. Many factors may affect the burst pressure of PEEK tubing.

Stainless Steel and Titanium Sample Loops

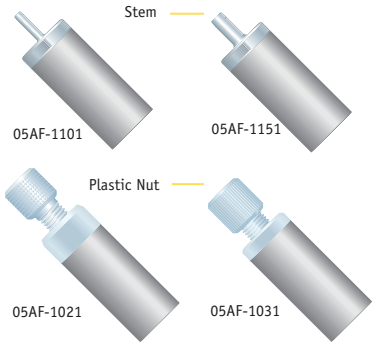
Metal sample loops are supplied with unswaged fittings so they can be completely bottomed in the injector port before the ferrule is swaged on. Size designations of the metal loops are nominal. Actual volumes can differ due to the tolerances of the tubing. Precise volumes may be injected by the "partial-filling" method if you are using a dual-mode injector.

Note: Loops for the 7725 and 7125 injectors are NOT interchangeable.

Ordering Information		
Description	QTY	Part No.
PEEK Loops for 9725 and 9010 Injectors		
2µL	1	05AE-3011
5µL	1	05AE-3021
10µL	1	05AE-3031
20µL	1	05AE-3041
50µL	1	05AE-3051
100µL	1	05AE-3061
200µL	1	05AE-3071
500µL	1	05AE-3081
1mL	1	05AE-3091
2mL	1	05AE-3101
5mL	1	05AE-3111
10mL	1	05AE-3121
PEEK Loops for 3725 Injectors		
2mL	1	05AE-3131
5mL	1	05AE-3141
10mL	1	05AE-3151
20mL	1	05AE-3161
SS Loops for 7125 and 7010 Injectors		
5µL	1	05AE-3171
10µL	1	05AE-3181
20µL	1	05AE-3191
50µL	1	05AE-3201
100µL	1	05AE-3211
200µL	1	05AE-3221
500µL	1	05AE-3231
1mL	1	05AE-3241
2mL	1	05AE-3251
5mL	1	05AE-3261
SS Loops for 7725 and 7750 Injectors		
5µL	1	05AE-3271
10µL	1	05AE-3281
20µL	1	05AE-3291
50µL	1	05AE-3301
100µL	1	05AE-3311
200µL	1	05AE-3321
500µL	1	05AE-3331
1mL	1	05AE-3341
2mL	1	05AE-3351
5mL	1	05AE-3361
SS Loops for 8125 Injectors		
5µL	1	05AE-3371
10µL	1	05AE-3381
20µL	1	05AE-3391
50µL	1	05AE-3401
SS Loops for 3725-038 Injectors		
2mL	1	05AE-3411
5mL	1	05AE-3421
10mL	1	05AE-3431
20mL	1	05AE-3441

Inlet Solvent Filters

General Use Inlet Solvent Filters



General Use and Prep Inlet Filters are good practice to filter your solvents to prevent pump damage. These 316 stainless steel filters provide that protection. Their large surface areas also mean longer life without pump cavitation. Because filters should be changed periodically, we make it easy to replace them, with no tools needed. For those filters using a plastic nut, thread the nut into the filter and finger tighten. Other filters have stems, allowing easy insertion directly into your inlet tubing.

Ordering Information		
Description	QTY	Part No.
Filters w/Plastic Nut for Analytical Systems		
10µm filter 1/8" OD	1	05AF-1011
10µm filter 1/8" OD	1	05AF-1015
2µm filter 1/8" OD	1	05AF-1021
2µm filter 1/8" OD	1	05AF-1025
10µm filter 1/8" OD (with Flangeless Nuts & Ferrules)	1	05AF-1031
Filters w/Plastic Nut for Prep Systems		
10µm filter 1/8" OD	1	05AF-1041
20µm filter 1/8" OD	1	05AF-1051
10µm filter 1/4" OD	1	05AF-1061
20µm B.O.B. 1/4" OD	1	05AF-1071
20µm filter 3/16" OD	1	05AF-1081
10µm filter 5/16" OD	1	05AF-1091
Filters w/Stem for Analytical Systems		
10µm filter 1/16" ID	1	05AF-1101
10µm B.O.B. 1/16" ID	1	05AF-1111
10µm filter 1/16" ID	1	05AF-1121
20µm filter 1/16" ID	1	05AF-1131
2µm filter 1/8" ID (Waters)	1	05AF-1141
10µm filter 1/8" ID (Waters)	1	05AF-1151
Inlet Solvent Filter Kits		
10µm kit: (5) 05AF-1011, (3') tubing, Fitting	1	05AF-1161
2µm kit: (5) 05AF-1021, (3') tubing, Fitting	1	05AF-1171
Fitting and 3' Teflon (1/8" OD) tubing	1	05AF-1181

Bottom-of-the-Bottle Inlet Solvent Filters

Stainless Steel Bottom-of-the-Bottle Solvent Filter Assemblies feature replaceable stainless steel filter cup and a design that allows solvent to be drawn to within 1/8" of the bottom of solvent bottle. The filter cups are inexpensive and easy to replace, making this an economical, trouble-free choice.

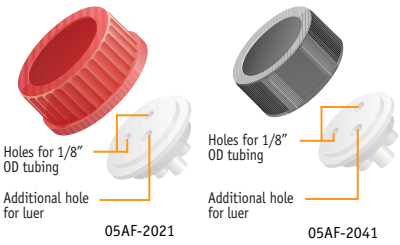
PEEK biocompatible Bottom-of-the-Bottle Solvent Filter has two PEEK frits. The bottom frit (2µm or 10µm) will draw solvents to within 0.08" (2mm) of the bottom of the solvent bottle. The 2µm frit on the side may be used for a 1/8" OD helium sparging line.

UHMWPE Bottom-of-the-Bottle Solvent Filter comes with a disposable 10µm ultra-high molecular weight polyethylene (UHMWPE) filter cup. These filter cups thread directly into the inert Tefzel® (ETFE) body, creating a good seal that ensures all mobile phase is properly filtered. Choose from versions designed for use with 1/16", 1/8", 1/4" and 5/16" OD tubing.

Ordering Information		
Description	QTY	Part No.
SS Bottom-of-the-Bottle Solvent Filters		
2µm filter 1/8" OD	1	05AF-1191
10µm filter 1/8" OD	1	05AF-1205
2µm filter 3/16" OD*	1	05AF-1211
10µm filter 3/16" OD*	1	05AF-1225
2µm filter replacement cups	1	05AF-1231
10µm filter replacement cups	1	05AF-1241
PEEK Bottom-of-the-Bottle Filter		
2µm filter 1/8" OD	1	05AF-1251
2µm filter, for small neck bottles 1/8" OD	1	05AF-1261
10µm filter 1/8" OD	1	05AF-1271
10µm filter, for small neck bottles 1/8" OD	1	05AF-1281
2µm filter 3/16" OD*	1	05AF-1291
10µm filter 3/16" OD*	1	05AF-1301
UHMWPE Bottom-of-the-Bottle Filter		
10µm Filter 1/16" OD	1	05AF-1311
10µm Filter 1/8" OD	1	05AF-1321
10µm Filter 1/4", 5/16" OD	1	05AF-1331
Replacement 10µm solvent filter cups	1	05AF-1345

**Typically for Waters® systems*

Upchurch® Bottle Caps



Bottle caps are manufactured of inert Tefzel® and polypropylene. They fit standard GL-45 or smaller-neck GL-38 glass bottles.

Each cap has three holes. With two of the holes you simply push your tubing straight through. The third hole, with a luer taper, can be used for a number of options. Any male luer will fit snugly in this hole, or you can use our 05AF-2121 or 05AF-2131 Plug.

Omnifit® Bottle Caps

Omnifit® bottle caps are made from a single PTFE block built into a Polypropylene threaded cap. The anti-twist design enables the central block to turn independently when the cap is being connected onto the bottle. This prevents tubing from being twisted and tangled. The 1/4-28 ports have non-wetted stainless steel threaded inserts to ensure an accurate, reliable connection time and time again. Omnifit caps are available with or without Kel-F® turn-key valves which provides a completely closed system whenever necessary.

Ordering Information		
Description	QTY	Part No.
Upchurch® Bottle Caps for GL-45 Bottles		
For 3/16" OD tubing, red	1	05AF-2011
For 1/8" OD tubing, red	1	05AF-2021
For 1/16" OD tubing, red	1	05AF-2031
Upchurch® Bottle Caps for GL-38 Bottles		
For 1/8" OD tubing, black	1	05AF-2041
For 1/16" OD tubing, black	1	05AF-2051
Omnifit® Solvent Reservoir Bottle Caps, GL45		
Bottle cap, with 2 ports	1	05AF-2061
Bottle cap, with 3 ports	1	05AF-2071
Bottle cap, with 4 ports	1	05AF-2081
Bottle cap, with 2 valves	1	05AF-2091
Bottle cap, with 3 valves	1	05AF-2101
Bottle cap, with 4 valves	1	05AF-2111

Bottle Cap Plugs and Adaptors

Use 05AF-2121 Bottle Cap Plug to seal the third "tapered" luer hole. Or, use 05AF-2141 Plug to seal unused 1/16" or 1/8" bottle cap holes. Alternatively, try 05AF-2131 or 05AF-2151 Filter Bottle Cap Plug for an extra cap hole. The 20µm SS frit prevents foreign matter from contaminating solvent while leaving the bottle open to the atmosphere, thus allowing fluid to be pulled out without creating a vacuum.

All plug bodies are ultra-high molecular weight polyethylene (UHMWPE). 05AF-2161 Bottle Cap Adapter allows use of 1/32" OD tubing with caps.

Ordering Information		
Description	QTY	Part No.
Bottle Cap Plugs		
Tapered hole	1	05AF-2121
Filter, Tapered hole, 20µm Frit	1	05AF-2131
1/8" hole	1	05AF-2141
Filter, 1/8" hole, 20µm SS frit	1	05AF-2151
Male luer	1	05AF-2161

Glass Bottles

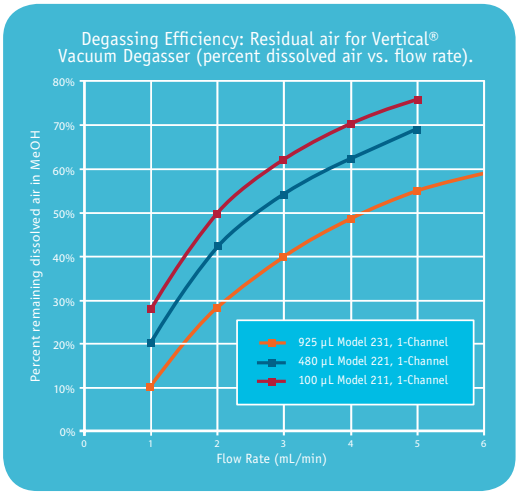
Economical glass mobile phase bottles with Teflon®-lined screw caps are available in 500mL, and 1000mL sizes. These graduated borosilicate glass bottles can be ordered individually or by the case.

Ordering Information		
Description	QTY	Part No.
Gaduated Glass Bottles w/Cap		
500 mL, 33-430 Thread	1	05AF-2171
500 mL, 33-430 Thread	1	05AF-2176
500 mL, GL45 Thread	1	05AF-2181
500 mL, GL45 Thread	1	05AF-2186
1,000mL, 38-430 Thread	1	05AF-2191
1,000mL, 38-430 Thread	1	05AF-2196
1,000mL, GL45 Thread	1	05AF-2201
1,000mL, GL45 Thread	1	05AF-2206

Vertical® Vacuum Degassers

- **Ultra-high degassing efficiency**
- **Low volume, easy to prime**
- **Eliminates baseline fluctuations**
- **Up to 4 Channels**
- **Inert flow path**
- **4 years warranty**

The Vertical® Stand Alone vacuum degassing system for HPLC is a high efficiency in line module that removes dissolved gasses from HPLC mobile phases. Its unique design assures reliable continuous operation and the highest level of continuous performance available without the need for helium degassing. Up to four solvent lines may be degassed simultaneously by one unit.



Plot shows remaining dissolved air in methanol using a selection of Vertical®Degassers.
* Water and Methanol mixtures between 30% and 70% methanol will outgas when more than 38% dissolved air remains in each of the solvents. Other water and organic mobile phases being mixed using a low pressure gradient system will undergo similar outgassing.

Specifications	Series 100	Series 200
Teflon AF Memebrane	•	•
Continueous-Run	•	•
Self-adjustable speed		•
Low-Permeation Tubing	•	•
Vacuum Sensor		•
Validation output		•
Warranty/year	1	4
Gradient Flow Range*/Internal volume		
Capillary : 0-0.5mL/min/(100µL)	•	•
Analytical : 0-2mL/min/(480µL)	•	•
Semi-Prep : 0-5mL/min/(920µL)	•	•
Prep : 0-20mL/min/(8.4mL)	•	•
Universal Power Supply	•	•
Dimension 13x8x25cmHWD	•	•

* The flow rates given are for a gradient mixture of 50/50 MeOH/H_2O, with a typical low pressure gradient mixing valve. Higher flow rates are possible with high pressure mixing.

Built-in Test Diagnostics

Microcontroller self-test vacuum sensor validation power-up Continuous vacuum system monitoring to ensure optimum operational conditions are maintained Vacuum system fault detection and shutdown function indicators

Teflon AF Membrane

Flow-through vacuum degassing chamber with a single amorphous perfluorinated copolymer degassing membrane (Teflon AF), enabling degassing efficiency 50 times that of PTFE.

Continueous Run Vacuum Pump

Continuous Run Vacuum Pump employs a closed-loop, micro-stepping RPM control strategy permitting the pump to run with continuously variable speed, providing quick pull-down at high RPM, and then sustaining a consistent vacuum level at low RPM.

Fluctuations in detector baseline due to changes in vacuum level are eliminated by not having to repeatedly stop and start a single-speed pump. This also greatly reduces wear and noise.

Validation Output

The validation output records vacuum level to compile ISO and system validation requirement.

Ordering Information		
Description	QTY	Part No.
Vacuum Degassers, Serries 100		
Model 112, Capillary Flow, 2 Channel	1	05AF-3011
Model 114, Capillary Flow, 4 Channel	1	05AF-3021
Model 121, Analytical Flow, 1 Channel	1	05AF-3031
Model 122, Analytical Flow, 2 Channel	1	05AF-3041
Model 123, Analytical Flow, 3 Channel	1	05AF-3051
Model 124, Analytical Flow, 4 Channel	1	05AF-3061
Model 132, Semi-Prep Flow, 2 Channel	1	05AF-3071
Model 133, Semi-Prep Flow, 3 Channel	1	05AF-3081
Model 134, Semi-Prep Flow, 4 Channel	1	05AF-3091
Model 141, Prep Flow, 1 Channel	1	05AF-3101
Model 142, Prep Flow, 2 Channel	1	05AF-3111
Vacuum Degassers, Serries 200		
Model 212, Capillary Flow, 2 Channel	1	05AF-3121
Model 214, Capillary Flow, 4 Channel	1	05AF-3131
Model 221, Analytical Flow, 1 Channel	1	05AF-3141
Model 222, Analytical Flow, 2 Channel	1	05AF-3151
Model 223, Analytical Flow, 3 Channel	1	05AF-3161
Model 224, Analytical Flow, 4 Channel	1	05AF-3171
Model 232, Semi-Prep Flow, 2 Channel	1	05AF-3181
Model 233, Semi-Prep Flow, 3 Channel	1	05AF-3191
Model 234, Semi-Prep Flow, 4 Channel	1	05AF-3201
Model 241, Prep Flow, 1 Channel	1	05AF-3211
Model 242, Prep Flow, 2 Channel	1	05AF-3221

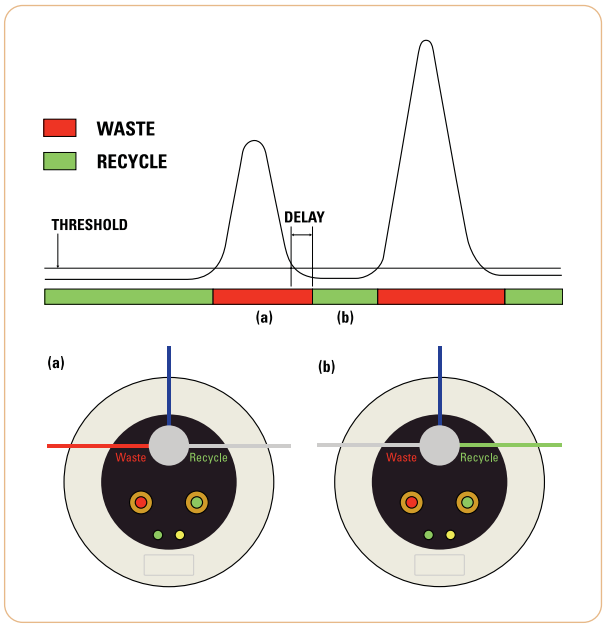
Biotech SmartSaver

- **Modern, compact design**
- **Powered from PC USB port**
- **LED indication of WASTE/RECYCLE positions**
- **Manual WASTE/RECYCLE control**
- **Compatible with any HPLC detector**
- **Easy Plug & Play Installation**
- **Drivers and Software Included**

SmartSaver recycler saves up to 90% of mobile phase by redirection of the pure solvent to the solvent reservoir during the isocratic HPLC. SmartSaver brings quite new approach to solvent recycler design.

Very compact instrument is powered directly from chromatography data system PC, no power adapter is required. User friendly software is provided to configure the parameters, and to perform on-line monitoring/audit trail. Analog input allows unipolar or bipolar operation within range of ± 1V. TTL/contact closure can be configured as start, auto-zero or valve position control input.

SmartSaver continuously monitors output signal of the chromatographic detector. Analog-to-digital converter produces digital data for further evaluation in build-in processor. If the input signal level exceeds the preset value (threshold), SmartSaver redirects the flow to the waste, respecting the transport time from detector to the switching valve. When signal goes down SmartSaver is waiting for transport delay again and then switch the mobile phase back to the reservoir. Autosampler injection marker connected to the SmartSaver may ensure the zeroing of signal input at the moment of injection



Specifications

- Powered from PC USB port
- Input range ±1V, optimized for "integrator" detector output
- 12 bit analog-to-digital converter
- 1 Hz data rate
- LED indication of WASTE/RECYCLE positions
- Manual WASTE/RECYCLE control
- User configurable TTL/contact closure input (start, valve position, zero ...)
- Compatible with any HPLC detector
- Wetted material: PEEK
- Connection: ¼ -28 Flat Bottom
- Maximum pressure: 30 psi/0.2 MPa
- Only two operating parameters – Threshold, Transport Delay
- Easy Plug&Play Installation
- Drivers and Software Included

SmartSaver comes with Standard Universal Cables, Instrument signal connections, BNC Coaxial connector for Agilent Detectors Output, LC connection tubing (PTFE & PEEK), LC connectors, LC Ferrules and Operations Manual with System CD

Ordering Information

Description	QTY	Part No.
Biotech SmartSaver		
Model SmartSaver	1	05AF-4011

Hamilton Syringes for Manual Injection

Syringes for Rheodyne® Injection Valves

Ordering Information				
Volume, Termination[1], Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Hamilton Fixed Needle Syringes				
10µL, N, 22s, 51mm, 3	1	701SNR	80365	24-80365
25µL, N, 22s, 51mm, 3	1	702SNR	80465	24-80465
50µL, N, 22s, 51mm, 3	1	705SNR	80565	24-80565
100µL, N, 22s, 51mm, 3	1	710SNR	80665	24-80665
250µL, N, 22s, 51mm, 3	1	725SNR	80765	24-80765
500µL, N, 22s, 51mm, 3	1	750SNR	80865	24-80865
Hamilton Fixed Needle, Small Bore, GASTIGHT Syringes				
25µL, N, 22s, 51mm, 3	1	1702N	80275	24-80275
50µL, N, 22s, 51mm, 3	1	1705N	80975	24-80975
100µL, N, 22s, 51mm, 3	1	1710N	81075	24-81075
250µL, N, 22s, 51mm, 3	1	1725N	81175	24-81175
Hamilton Fixed Needle, Large Bore, GASTIGHT Syringes				
25µL, N, 22, 51mm, 3	1	1702N	80285	24-80285
50µL, N, 22, 51mm, 3	1	1705N	80985	24-80985
100µL, N, 22, 51mm, 3	1	1710N	81085	24-81085
250µL, N, 22, 51mm, 3	1	1725N	81185	24-81185
500µL, N, 22, 51mm, 3	1	1750LTN	81216	24-81216
1mL, N, 22, 51mm, 3	1	1001LTN	81316	24-81316
2.5mL, N, 22, 51mm, 3	1	1002LTN	81416	24-81416
5.0mL, N, 22, 51mm, 3	1	1005LTN	81516	24-81516
Hamilton Removable Needle, GASTIGHT Syringes				
10µL, RN, 22s, 51mm, 3	1	1701RNR	80065	24-80065
25µL, RN, 22s, 51mm, 3	1	1702RNR	80265	24-80265
50µL, RN, 22s, 51mm, 3	1	1705RNR	80965	24-80965
100µL, RN, 22s, 51mm, 3	1	1710RNR	81065	24-81065
250µL, RN, 22s, 51mm, 3	1	1725RNR	81165	24-81165
500µL, RN, 22s, 51mm, 3	1	1750RSNR	81265	24-81265
1mL, RN, 22s, 51mm, 3	1	1001RNR	81365	24-81365
Replacement Needles				
10-100µL RN Needles, 22s, 51mm, 3	6		7770-01	24-7770-01
10-100µL RN Needles, 22, 51mm, 3	6		7770-02	24-7770-02
250µL-5.0mL RN Needles, 22s, 51mm, 3	6		7780-03	24-7780-03
250µL-5.0mL RN Needles, 22, 51mm, 3	6		7780-04	24-7780-04

Point Style #3
Blunt needle tip
Blunt needle point for use with HPLC injection valves and for sample pipetting

Needle Gauge

Guage	Norminal OD (mm)	Norminal ID (mm)
25s	0.51	0.25
25s	0.72	0.15
22	0.72	0.41

Syringes for Waters® U6K Injection Valves

Ordering Information				
Volume, Termination[1], Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Hamilton Removable Needle, GASTIGHT Syringes				
25µL, N, 25s, 50mm, 3	1	1702RNW	80238	24-80238
50µL, N, 25s, 50mm, 3	1	1705RNW	80938	24-80938
100µL, N, 25s, 50mm, 3	1	1710RNW	81038	24-81038
250µL, N, 25s, 50mm, 3	1	1725RNW	81138	24-81138
Hamilton Removable Needle, GASTIGHT Syringes with Reinforce Plunger				
25µL, N, 25s, 50mm, 3	1	1802RNW	84980	24-84980
50µL, N, 25s, 50mm, 3	1	1805RNW	84983	24-84983
100µL, N, 25s, 50mm, 3	1	1810RNW	84986	24-84986
250µL, N, 25s, 50mm, 3	1	1825RNW	84989	24-84989
Replacement Needles				
RN Needles, 25s, 50mm, 3	1		8647-01	24-8647-01

SGE Syringes for Autosamplers

05BG-1011

05GG-1031

05IG-1011

05KG-1011

Ordering Information			
Description	QTY	OEM No.	Part No.
Agilent 1090, 1100			
SGE 25D-HP1090, 25µL GASTIGHT, 1/4-32 UNEF	1	003670	21-003670
SGE 250D-HP1090, 250µL GASTIGHT, 1/4-32 UNEF	1	006670	21-006670
Replacement pluger for Syringe 25µL	1	0318181	21-0318181
Replacement pluger for Syringe 250µL	1	031829	21-031829
Perkin-Elmer L-200			
SGE 50D-CX, 50µL GASTIGHT, 1/4-28 UNF	1	004995	21-004995
SGE 100D-CX-GT 100µL GASTIGHT, 1/4-28 UNF	1	005990	21-005990
SGE 250D-CX-GT 250µL GASTIGHT, 1/4-28 UNF	1	006995	21-006995
SGE 500D-CX-GT 500µL GASTIGHT, 1/4-28 UNF	1	007995	21-007995
SGE 1MD-C-GT 1mL GASTIGHT, 1/4-28 UNF	1	008185	21-008185
SGE 2.5MD-C-GT 2.5mL GASTIGHT, 1/4-28 UNF	1	008687	21-008687
Replacement plunger for 50µL	1	0318221	21-0318221
Replacement plunger for 100µL	1	0318271	21-0318271
Replacement plunger for 250µL	1	0318341	21-0318341
Replacement plunger for 500µL	1	0318381	21-0318381
Replacement plunger for 1mL	1	0318441	21-0318441
Replacement plunger for 2.5mL	1	031854	21-031854
Thermo Finnigan, AS300, AS 100, AS3000, AS1000			
SGE 250C-TS 250µL gas tight, 1/4-28 UNF	1	006660	21-006660
SGE 500C-TS 500µL gas tight, 1/4-28 UNF	1	007680	21-007680
SGE 1MC-TS 1mL gas tight, 1/4-28 UNF	1	008180	21-008180
SGE 2.5MTS 2.5mL gas tight, 1/4-28 UNF	1	008660	21-008660
SGE 5MC-TS 5mL gas tight, 1/4-28 UNF	1	008780	21-008780
Replacement plunger for 250µL	1	031833	21-031833
Replacement plunger for 500µL	1	031838	21-031838
Replacement plunger for 1mL	1	031844	21-031844
Replacement plunger for 2.5mL	1	031853	21-031853
Replacement plunger for 5mL	1	031856	21-031856
Waters/WISP/Alliance			
SGE 25D-WISP 25µL, 1/4-28 UNF	1	003990	21-003990
SGE 250D-WISP 250µL, 1/4-28 UNF	1	006690	21-006690
Replacement plunger for 25µL	1	031819	21-031819
Replacement plunger for 250µL	1	031834	21-031834
WISP Dipper Needle	1	038265	21-038265

Syringe Cleaners

Ordering Information		
Description	QTY	Part No.
Syringe Cleaners		
120 VAC	1	24-76610
220 VAC	1	24-76615
Replacement Septa, 5mm Diameter	12	24-76620A
Needle Cleaning Kit		
Kit, Includes: cleaning wires (listed below) and 70mL of Cleaning concentrate, 500mL	1	24-76620
Cleaning Wires, 7" Length		
.00300" OD, for Gauge 23s, 26s, 31-33	1	24-18306
.00350" OD for Gauge 26s, 31-33	10	24-18300
.00497" OD for Gauge 22s, 25s, 28-30	10	24-18301
.00659" OD for Gauge 27	10	24-18302
.00815" OD for Gauge 24-26	10	24-18303
.01207" OD for Gauge 22, 23	10	24-18304

SGT Super-Clean™ Filter System

05AJ-0011

- **Remove impurities to deliver 99.9999% pure gas**
- **Exchange filters in seconds, without introducing air into the system**
- **Diffusion-proof with glass and metal construction**
- **Pressure resistant up to 160psi and Max Flow 20L/min**
- **Estimated lifetime 3-6 months**

Nitrogen gas for LC/MS is needed to remove moisture, hydrocarbons and other contaminants, to minimize detector noise or drift and eliminate ghost peaks.

Moisture purifiers are typically packed with molecular sieve that absorb water preventing degradation of hydrocarbon putifiers and detector noise.

Hydrocarbon purifiers are packed with an activated charcoal that absorb hydrocarbons larger than methane, which cause baseline noise or drift or ghost peaks.

Indicating hydrocarbon purifiers are packed an activated charcoal with indicator that remove hydrocarbons from gas and changes color to warn of system saturation.

To meet the high flow needs of the LC/MS system, the hydrocarbon or moisture filled cartridges are positioned and placed in parallel. The incoming gas stream is split equally between the cartridges and the two streams are rejoined after purification but before the gas exits the base plate.

Capacity				
Filters	**Usable for**	**Moisture**	**Hydrocarbon[1]**	**Indicator/Color change**
Moisture	He N2 H2 Air Ar	7.2g	-	Orange to clear
Hydrocarbon	N2	-	24g	-
Indicating Hydrocarbon	N2	-	24g	Orange to clear

[1]As *n*-butane

05AJ-0032 05AJ-0042 05AJ-0052

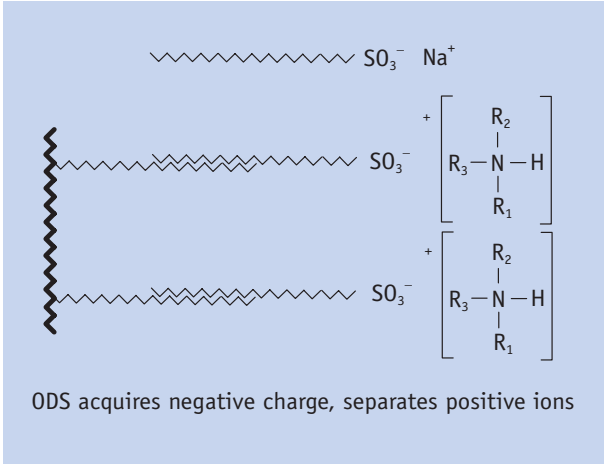
05AJ-0061

05AJ-0061 05AJ-0102 05AJ-0094

Ordering Information		
Description	QTY	Part No.
Super-Clean™ Filter Kit with Filters and Baseplate, 1/4" Fitting		
2-Position, 2-Hydrocarbon Filters, 1-Particle Filter	1	05AJ-0011
2-Position, 2-Moisture Filters, 1-Particle Filter	1	05AJ-0021
Replacement Filters		
Hydrocarbon Filter	2	05AJ-0032
Indicating Hydrocarbon Filter	2	05AJ-0042
Moisture Filter	2	05AJ-0052
Replacement Parts		
2-Position Baseplate with 0.5um Particle Filter	1	05AJ-0061
0.5um Particle Filter	1	05AJ-0071
0.5um Particle Filter Cup	10	05AJ-0086
Connector, 1/4"	4	05AJ-0094
Flush Cap	2	05AJ-0102

Regis S-Series (for Cations)

The sulfonates are sodium salts that act as an anionic counterion for the separation and resolution of positively charged analytes. The sulfonates are available as ion pair concentrates: premixed 0.5 M solutions of alkyl sulfonates. When diluted to 1 L with HPLC-grade water, a 10mL bottle forms a 0.005 M solution



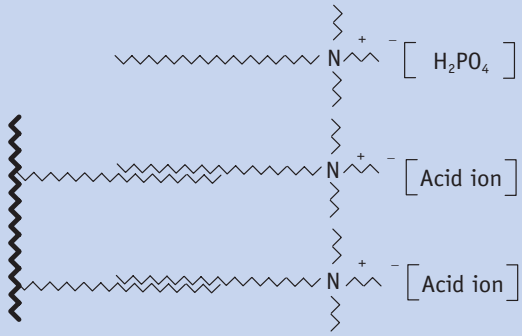
ODS acquires negative charge, separates positive ions

Ordering Information				
Description	Size	QTY	OEM No.	Part No.
Regis S-Series (for Cations)				
S5 Pentanesulfonate	10mL	5	405025	05AI-0115
	100mL	1	405035	05AI-0221
S6 Hexanesulfonate	10mL	5	405036	05AI-0315
	100mL	1	405036	05AI-0421
S7 Heptanesulfonate	10mL	5	405027	05AI-0515
	100mL	1	405037	05AI-0621
S8 Octanesulfonate	10mL	5	405028	05AI-0715
	100mL	1	405038	05AI-0821
S12 Dodecanesulfonate	10mL	5	405021	05AI-0915
	100mL	1	405031	05AI-1021
Regis Bulk Reagents (for Cations)				
Pentanesulfonate,	25g	1	403025	05AI-1151
sodium salt	100g	1	403125	05AI-1261
Hexanesulfonate,	25g	1	403026	05AI-2351
sodium salt	100g	1	403126	05AI-1461
Heptanesulfonate,	25g	1	403027	05AI-1551
sodium salt	100g	1	403127	05AI-1661
Octanesulfonate,	25g	1	403028	05AI-1751
sodium salt	100g	1	403128	05AI-1861
Dodecanesulfonate,	5g	1	403021	05AI-1941
sodium salt	25g	1	403022	05AI-2051

Regis Q-Series (for Anions)

The Q-series is comprised of quaternary alkyltriethylamines that can be used for the resolution of negatively charged species. This unique set of cationic reagents was developed to complement the Sulfonate Series (S-series).

The Quaternary Alkyltriethylamines are available as ion pair concentrates: premixed 0.5 M solutions of alkyl amines. When diluted to 1 L with HPLC-grade water, a 10mL bottle forms a 0.005 M buffered solution.



ODS acquires positive charge, separates negative ions

Ordering Information				
Description	Size	QTY	OEM No.	Part No.
Regis Q-Series (for Anions)				
Q5 Pentyl (TEA)	10mL	5	404025	05AI-2115
	100mL	1	404035	05AI-2221
Q6 Hexyl (TEA)	10mL	5	404036	05AI-2315
	100mL	1	404036	05AI-2421
Q7 Heptyl (TEA)	10mL	5	404027	05AI-2515
	100mL	1	404037	05AI-2621
Q8 Octyl (TEA)	10mL	5	404028	05AI-2715
	100mL	1	404038	05AI-2821
Q12 Dodecyl (TEA)	10mL	5	404021	05AI-2915
	100mL	1	404031	05AI-3021
Regis Bulk Reagents (for Anions)				
Tetrabutylammonium-	10mL	1	680502	05AI-3111
Posphate, 0.5M, pH 7.5	500mL	1	680503	05AI-3231

Agilent HPLC 1050


05BH-0011


05BH-0161


05BH-0171


05BH-0052


05BH-0062


05BH-0181


05BH-0151


05BH-0241


05BH-0261

Ordering Information			
Description	QTY	Agilent No.	Part No.
Pump parts			
Outlet ball valve Assembly	1	G1311-60012	05BH-0011
Replace Cartridge for ball valve	2		05BH-0022
Active inlet valve	1	01018-60010	05BH-0031
Cartridge for active inlet valve	1	5062-2486	05BH-0041
Seal, UHMW-PE	2	0905-1420	05BH-0052
Seal, Black Teflon	2	5063-6589	05BH-0062
Wash Seal, UHMW-PE	1	0905-1175	05BH-0071
Wash Seal, Black Teflon	1		05BH-0081
Wash Seal kit	1	01018-68722	05BH-0091
Gasket, wash seal	6	5062-2484	05BH-0106
PTFE frits	5	01018-22707	05BH-0115
2-in-1 Outlet cap	1	5062-2485	05BH-0121
Sapphire piston (plunger)	1	5063-6586	05BH-0131
Pump maintenance kit includes 1 cartridge active inlet valve, 10 PTFE frits, 4 outlet gold seals, 10 wear retainers, 4 outlet caps, 4 piston seals	1	01018-68724	05BH-0141
Autosampler parts			
Needle seat	1	79846-67101	05BH-0151
Needle assembly	1	01078-67200	05BH-0161
Seat capillary	1	01078-87303	05BH-0171
Vespel rotor seal	1	0101-0626	05BH-0181
Maintenance kit, includes 2 needle seats, 2 needles, seat capillary, vespel rotor seal	1	01078-68724	05BH-0191
1050 Module Flow Capillary Connector			
Pump to valve, 70cm, 0.25mmID	1	01078-87306	05BH-0201
Autosampler to column, 80cm, 0.17mmID	1	01078-87305	05BH-0211
Column to detector, 60cm, 0.17mmID	1	01048-87302	05BH-0221
Pump to waste, corrugated tubing, 5m	1	5062-2463	05BH-0231
Detector parts			
Deuterium lamp	1	79883-60002	05BH-0241
Window, quartz	1	1000-0488	05BH-0251

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Agilent HPLC 1090


05BH-0151


05BH-0241

Ordering Information			
Description	QTY	Agilent No.	Part No.
Pump parts			
Check valve Housing	1	79835-25211	05BH-0261
Replacement Cartridge	2	79835-67101	05BH-0272
Replacement Sieve	1	79835-65216	05BH-0281
Seal, Black Teflon	4	5062-2494	05BH-0294
Sapphire piston (plunger)	1	3980-0672	05BH-0301
Valve parts			
Rotor seal	1	1535-4048	05BH-0311
Needle Seat	1	79846-67101	05BH-0321
Detector parts			
Deuterium lamp	1	79883-60002	05BH-0241

Agilent HPLC 1100/1200


05BH-0011


05BH-0411


05BH-0421


05BH-0052


05BH-0062


05BH-0131


05BH-0601


05BH-0551


05BH-0561

Ordering Information			
Description	QTY	Agilent No.	Part No.
Pump parts			
Outlet ball valve (quaternary, isocratic)	1	G1311-60012	05BH-0011
Outlet ball valve (binary)	2	G1312-60012	05BH-0332
Replace Cartridge for ball valve	2		05BH-0342
Active inlet valve	4	01018-60010	05BH-0034
Cartridge for active inlet valve	1	5062-2486	05BH-0041
Seal, UHMW-PE	2	0905-1420	05BH-0052
Seal, Black Teflon	2	5063-6589	05BH-0062
Wash Seal, UHMW-PE	1	0905-1175	05BH-0071
Wash Seal, Black Teflon	1		05BH-0081
Wash Seal kit	1	01018-68722	05BH-0091
Gasket, wash seal	6	5062-2484	05BH-0106
Seal Keeper	1	5001-3743	05BH-0111
Purge valve	1	G1311-60009	05BH-0351
PTFE frits	5	01018-22707	05BH-0365
2-in-1 Outlet cap	1	5062-2485	05BH-0121
Sapphire piston (plunger)	1	5063-6586	05BH-0131
Pump maintenance kit includes 1 cartridge active inlet valve, 10 PTFE frits, 4 outlet gold seals, 10 wear retainers, 4 outlet caps, 4 piston seals	1	G1311-68710	05BH-0371
Solvent Inlet Filters			
Frit adapter, 3mm, PTFE	4	5062-8517	05BH-0384
Glass filter, solvent inlet	1	5041-2168	05BH-0391
SS filter, solvent inlet	1	01018-60025	05BH-0401
1100 Autosampler Maintenance Parts			
Needle	1	G1313-87201	05BH-0411
Needle Seat assembly	1	G1313-87101	05BH-0421
Needle seat, 0.12mm ID capillary	1	G1313-87103	05BH-0431
Needle arm kit (clamp and 2 screws)	1	G1313-68713	05BH-0441
Vial gripper maintenance finger caps	10	5063-6506	05BH-0457
Rotor, Vespel, pH 2.3 to 9.5	1	0100-1853	05BH-0461
Rotor, Tefzel, extreme pH ranges > 10	1	0100-1849	05BH-0471
Stator head	1	0100-1850	05BH-0481
Stator face	1	0100-1851	05BH-0491
Isolation seal	1	0100-1852	05BH-0501
Preventive Maintenance kit, includes rotor seal, needle assembly and needle seat	1	G1313-68709	05BH-0511
Detector parts			
Deuterium lamp	1	G1314-60100	05BH-0521
Standard flow cell, 14µL, 10mm path length	1	G1314-60086	05BH-0531
Standard flow cell kit for G1314-60086	1	G1314-65061	05BH-0541
Deuterium lamp, long life	1	5181-1530	05BH-0551
Deuterium lamp, shine through	1	2140-0590	05BH-0561
Tungsten lamp	1	G1103-60001	05BH-0571
Standard flow cell, 13µL, 10mm path length	1	G1315-60012	05BH-0581
Cell repair kit for standard flow cell	1	G1315-68712	05BH-0591
Xenon flash lamp	1	2140-0600	05BH-0601
Flow cell	1	G1321-60005	05BH-0611
Calibration sample, glycogen, 1 gram	1	5063-6597	05BH-0621
Deuterium lamp for Agilent 8452A	1	08452-60104	05BH-0771

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Agilent HPLC 1100/1200

- **Made of flexible stainless steel with 1/16" fittings for both ends**
- **Pre-swaged (p-s) fittings are assembled according to Swagelok specifications**
- **Non-swaged (n-s) capillaries include fittings, but are not assembled**

05BH-0651

Ordering Information			
Description	QTY	Agilent No.	Part No.
Universal Connecting Capillaries			
130mm x 0.25mmID, p-s to p-s, Pump to Autosampler	1	01090-87308	05BH-0631
160mm x 0.25mmID, p-s to p-s	1	G1313-87301	05BH-0641
90mm x 0.17mmID, n-s to n-s	1	G1316-87300	05BH-0651
130mm x 0.17mmID, p-s to n-s	1	01090-87305	05BH-0661
180mm x 0.17mmID, p-s to n-s Autosampler to Column	1	G1313-87305	05BH-0671
280mm x 0.17mmID, p-s to n-s Autosampler to Column	1	01090-87304	05BH-0681
380mm x 0.17mmID, p-s to n-s Column to DAD	1	G1315-87311	05BH-0691
500mm x 0.17mmID, n-s to n-s	1	G1328-87600	05BH-0701
600mm x 0.17mmID, p-s to n-s Pump to Autosampler	1	G1312-67305	05BH-0711
800mm x 0.17mmID, p-s to n-s Autosampler to Column	1	01048-87302	05BH-0721
35mm x 0.12mmID, p-s to p-s	1	79841-87609*	05BH-0731
70mm x 0.12mmID, n-s to n-s Column to Universal	1	G1316-87303	05BH-0741
105mm x 0.12mmID, p-s to n-s	1	01090-87611	05BH-0751
280mm x 0.12mmID, p-s to n-s Autosampler to Column	1	01090-87610	05BH-0761

*Made of 1.58mm (rigid) OD tubing

Beckman/Altex HPLC Systems

05CH-0011

05CH-0021

05CH-0081

05CH-0154

05CH-0181

05CH-0161

05CH-0171

05CH-0061

05CH-0041

05CH-0031

05CH-0071

Ordering Information			
Description	QTY	Beckman No.	Part No.
Replacement parts for Beckman HPLC Systems			
Inlet Check Valve Assembly	1	240720	05CH-0011
Outlet Check Valve Assembly	1	240721	05CH-0021
Inlet Check Valve Cartridge for Check Valve Assembly	1	240620	05CH-0031
Outlet Check Valve Cartridge for Check Valve Assembly	1	240621	05CH-0041
Guide Sleeve for Graphite Plunger Guide	1	243713	05CH-0051
Outlet Check Filter Frit Assembly	1	240619	05CH-0061
Piston Guide Assembly	1	243045	05CH-0071
Plunger, for 100A/110A/110B/112/112M	1	243053	05CH-0081
Plunger Seal, UHMW-PE, for 100A/110A/110B	1	887138	05CH-0091
Plunger Seal, Black Teflon, for 100A/110A/110B	1	887138	05CH-0101
Plunger Seal, UHMW-PE, for 105/110 PREP	1	887139	05CH-0111
Plunger Seal, Black Teflon, for 105/110 PREP	1	887139	05CH-0121
Plunger Seal, UHMW-PE, for 112/112M	1	236797	05CH-0131
Plunger Seal, Black Teflon, for 112/112M	1	236797	05CH-0141
Plunger, for 114/114M/116/126	1	240714	05CH-0151
Plunger Seal, UHMW-PE, for 114/114M/116/126	1	241037	05CH-0161
Plunger Seal, Black Teflon, for 114/114M/116/126	1	241037	05CH-0171
Deuterium Lamp	1	596791	05CH-0181

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Dionex HPLC Systems


05DH-0011


05DH-0087


05DH-0097


05DH-0031


05DH-0061


05DH-0101

Ordering Information

Description	QTY	Dionex No.	Part No.
Replacement parts for Dionex HPLC Systems			
Inlet check valve assembly	1	38273	05DH-0011
Replacement inlet check valve cartridge	1		05DH-0021
Outlet check valve assembly	1	42761	05DH-0031
Replacement outlet check valve cartridge	1		05DH-0041
Replacement 2µm Titanium filters	10		05DH-0057
Ruby sapphire piston	1	36904	05DH-0061
UHMW-PE seals (Elastomer O-ring)	10	35686	05DH-0077
UHMW-PE seals (Hastelloy C Spring)	10	40859	05DH-0087
Backup seals	10	36901	05DH-0097
Rotor Seal (RheBuild®) kit for Dionex Ultimate 3000	1	6722.9012	05DH-0141
D2 lamp for DSA-1, VDM-1	1		05DH-0101
D2 lamp for AD20, PDA20	1		05DH-0111
D2 for UVD160, 170S, 170U, 320, 340S, 340U	1		05DH-0121
D2 lamp for Dionex VWD3000	1	6074.1110	05DH-0131

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Hitachi/Merck HPLC Systems


05EH-0021


05EH-0031


05EH-0041


05EH-0051


05EH-0061


05EH-0081


05EH-0112


05EH-0071

05EH-0111

Ordering Information

Description	QTY	Hitachi No.	Part No.
Replacement parts for Hitachi/Merck HPLC Systems			
SS Check Valve Cartridges, 1/16" Ball, for L-6000/6200	2	AN0-085	05EH-0012
Inlet Check Valve Assembly, for L-6000/6200	1	AN0-0833	05EH-0021
Outlet Check Valve Assembly, for L-6000/6200	1	AN0-0834	05EH-0031
Inlet Check Valve Assembly, for L-7100	1	AN0-0836	05EH-0041
Outlet Check Valve Assembly, for L-7100	1	AN0-0837	05EH-0051
Plunger Assembly	1	810-1033	05EH-0061
Plunger Seal, Black Teflon	1	655-1080	05EH-0071
Plunger Seal, UHMW-PE	1	655-1080	05EH-0081
Plunger Seal, UHMW-PE with Hastelloy C Spring	1	655-1080	05EH-0091
Rotor Assembly for Dilutor	1	810-3085	05EH-0101
Rotor Seal Kit	1	AN0-0818	05EH-0111
Deuterium Lamp, Prealigned	1	AN0-0424	05EH-0121
Deuterium Lamp, Prealigned for Hitachi-Merck L7400/ L7420/L7450/L7455/L2400	1	885-3570	05EH-0131

JASCO HPLC Systems


05FH-0031


05FH-0041


05FH-0081


05FH-0071

Ordering Information			
Description	QTY	Jasco No.	Part No.
Replacement parts for JASCO HPLC Systems			
Inlet check valve assembly for BIP1	1	6260-H101A	05FH-0011
Outlet check valve assembly for BIP1	1	6260-H102A	05FH-0021
Replacement check valve cartridge	2		05FH-0032
Inlet check valve assembly for 880/890	1	6560-H405A	05FH-0041
Outlet check valve assembly for 880/890	1	6560-H404A	05FH-0051
Replacement check valve cartridge	2		05FH-0062
Sapphire piston	1	2305-0005A	05FH-0071
Seals, UHMW-PE	1	H149A	05FH-0081
Seals, Black Teflon	1	H149A	05FH-0091
D2 lamp for 870/875/975 A-series	1		05FH-0101
D2 Lamp for 970/UV-1570/1575/975 B/C Series	1		05FH-1111

PerkinElmer HPLC Systems


05GH-0031


05GH-0041


05GH-0081

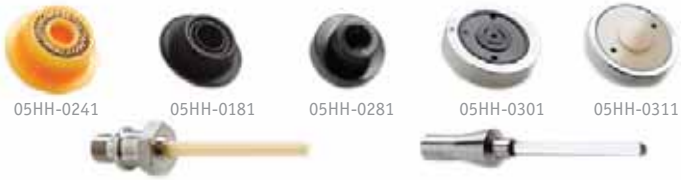

05GH-0171


05GH-0031


05GH-0141

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
Replacement parts for Perkin Elmer HPLC Systems			
Inlet check valve assembly for Series 1/2/3/3B/10	1	0254-0546	05GH-0011
Outlet check valve assembly for Series 1/2/3/3B/10	1	0254-0547	05GH-0021
Replacement check valve cartridge, 2/Pk	1		05GH-0031
Inlet check valve assembly for Series 200/400/620/4000	1	0254-0177	05GH-0041
Outlet check valve assemblyfor Series 200/400/620/4000	1	0254-0197	05GH-0051
Replacement check valve cartridge, 2/Pk	1		05GH-0061
Piston, High pressure	1	N260-0124	05GH-0071
Piston, Low pressure	1	N260-0104	05GH-0081
Seals, UHMW-PE, High pressure	1	0990-7324	05GH-0091
Seals, Black Teflon, High pressure	1	0990-7328	05GH-0101
Seals, UHMW-PE, Low pressure	1	0990-7330	05GH-0111
Seals, Black Teflon, Low pressure	1	0990-7330	05GH-0121
Needle	1	N293-0023	05GH-0131
D2 lamp for PE 200/785A	1	N292-0149	05GH-0141
D2 Lamp for PE 15/16/17/18/19/20/40/800/900	1	B016-0917	05GH-0151
D2 Lamp for PE 200 DAD	1	N292-2046	05GH-0161

Shimadzu HPLC Systems



Ordering Information

Description	QTY	Shimadzu No.	Part No.
Replacement parts for Shimadzu HPLC Systems			
Inlet check valve assembly for LC-10AT/10ATVP	1	228-32166-91	05HH-0011
Outlet check valve assembly for LC-10AT/10ATVP	1	228-32531-91	05HH-0021
Replacement check valve cartridge, 2/Pk	2		05HH-0032
Inlet check valve assembly for LC-10ADVP/20AD/20AB	1	228-39093-92	05HH-0041
Outlet check valve assembly for LC-10ADVP/20AD/20AB	1	228-34976-91	05HH-0051
Replacement check valve cartridge, 2/Pk	2		05HH-0062
Inlet check valve assembly for LC-10AD/600/9A	1	228-18522-91	05HH-0071
Outlet check valve assembly for LC-10AD/600/9A	1	228-18522-92	05HH-0081
Replacement check valve cartridge, 2/Pk	2		05HH-0092
Inlet check valve assembly for LC-10AS/6A	1	228-12353-91	05HH-0101
Outlet check valve assembly for LC-10AS/6A	1	228-09054-93	05HH-0111
Replacement valve cartridge, 2/Pk	2		05HH-0122
Inlet check valve assembly for LC-8A	1	228-20256-91	05HH-0131
Outlet check valve assembly for LC-8A	1	228-09054-93	05HH-0141
Inlet check valve assembly for Prominence LC-20AD/B	1	228-48249-91, 228-45704-91	05HH-0371
Replacement check valve cartridge, 2/Pk	2		05HH-0152
PEEK Frit for Inline Filter for LC-10AD/ATvp/20AD/ AT/AB	1	228-48607-91	05HH-0391
Sapphire Piston for LC-10ADVP/2010	1	228-35601-91	05HH-0161
Seals, UHMW-PE for LC-10ADVP/2010	1	228-32628-00	05HH-0171
Seals, Black Teflon for LC-10ADVP/2010	1	228-35146-00	05HH-0181
Sapphire Piston for LC-6A	1	228-12904-93	05HH-0191
Sapphire Piston for LC-10AS	1	228-17019-93	05HH-0201
Sapphire Piston for LC-10AT	1	228-32654-91	05HH-0211
Sapphire Piston for LC-10ATVP	1	228-35009-92	05HH-0221
Plunger assembly for LC-10ADVP/2010	1	228-35601-93	05HH-0381
Seals, UHMW-PE for LC-6A/7A/10AS/10AT/10ATVP	1	228-21975-00	05HH-0231
Seals, Black Teflon for LC-6A/7A/10AS/10AT/10ATVP	1	228-11999-00	05HH-0241
Sapphire Piston for LC-600/9A/10AD	1	228-18523-91	05HH-0251
Seals, UHMW-PE for LC-6A/7A/10AS/10AT/10ATVP	1	228-18745-00	05HH-0261
Seals, Black Teflon for LC-6A/7A/10AS/10AT/10ATVP	1	228-35146-00	05HH-0271
Needle Seal for SIL-10A/10XL/10ADVP	1	228-33355-04	05HH-0281
Rotor Seal for SIL-10A/10XL/10ADVP	1	228-21217-97	05HH-0291
Rotor Seal Assembly for SIL-10A/10XL/10ADVP	1	228-21217-91	05HH-0301
Stator Assembly for SIL-10A/10XL/10ADVP	1	228-21220-91	05HH-0311
D2 lamp for SPD-10A/10AV/M10A	1	228-34016-02	05HH-0321
D2 Lamp for SPD-2A/6A	1	062-65056-03	05HH-0331
D2 Lamp for UV-1700	1	062-65055-05	05HH-0351
Xenon Lamp for RF-10A, 10AD, 10AXL, 535, 540, 551, 1501, 5000, 5301	1	228-34216-00	05HH-0341
Tungsten lamp for SPD-10A/10AV/M10A	1	228-34110-91	05HH-0361

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

HPLC Instrument Parts

Themo: LDC/Milton Roy HPLC Systems


05IH-0041


05IH-0051


05IH-0071


05IH-0111


05IH-0061


05IH-0151

Ordering Information			
Description	QTY	Thermo No.	Part No.
Replacement parts for Thermo: LDC/Milton Roy HPLC Systems			
Inlet check valve assembly	1	900947001	05IH-0011
Outlet check valve assembly	1	900947002	05IH-0021
Replacement check valve cartridge	1		05IH-0032
1/8" Nut with Ferrule for Suction Tube	1	1960066976	05IH-0041
1/16" Nut with Ferrule for Discharge Tube	1	1960066975	05IH-0051
Sapphire piston	1	801306	05IH-0061
Seal, UHMW-PE	1	206234	05IH-0071
Seal UHMW-PE Replacement Kit	1	801598	05IH-0081
Seal, UHMW-PE, Gold	1	206234	05IH-0091
Seal UHMW-PE Gold Replacement Kit	1	801892001	05IH-0101
Seals, Black Teflon	1	206129001	05IH-0111
Seal Black Teflon Replacement Kit	1	801598	05IH-0121
Crosshead Spring, Constramatic II/Mini-pump	1	916208000	05IH-0131
Crosshead Spring, Minimetric	1	204040	05IH-0141
D2 lamp for 3100/3200/4000/4100/4200	1		05IH-0151
D2 lamp for Thermo UV 6000 (DAD)	1	108052	05IH-0301

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Thermo: Spectra-Physics HPLC Systems


05IH-0161


05IH-0171


05IH-0281


05IH-0211


05IH-0201

Ordering Information			
Description	QTY	Thermo No.	Part No.
Replacement parts for Thermo: Spectra-Physics HPLC			
Inlet check valve assmb. 8700/8800/8810/ISOCHROM/P	1	A3495-010	05IH-0161
Outlet check valve assmb. 8700/8800/8810/ISOCHROM/P	1	A3490-010	05IH-0171
Transducer valve assmb. 8700/8800/8810/ISOCHROM/P	1	A3499-010	05IH-0181
Replacement check valve cartridge, 2/Pk	1		05IH-0191
Sapphire Piston	1	A3102-010	05IH-0201
Seal, UHMW-PE for 8800/8810/ISOCHROM/P	1	A2962-010	05IH-0211
Seal, Black Teflon for 8800/8810/ISOCHROM/P	1	A2962-010	05IH-0221
Back-up Seal, Kel-F for 8800/8810/ISOCHROM/P	1	A2973-010	05IH-0231
Push Seal, UHMW-PE for 8800/8810/ISOCHROM/P	1	A2963-010	05IH-0241
Push Seal, Black Teflon for 8800/8810/ISOCHROM/P	1	A2963-010	05IH-0251
Seal, UHMW-PE for 8700/8700XR/8750	1	A1703-020	05IH-0261
Seal, Black Teflon for 8700/8700XR/8750	1	A1703-020	05IH-0271
D2 lamp for Focus	1	9551-0023	05IH-0281
D2 Lamp Hight Intensity	1	9551-0202	05IH-0291

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Varian, Gilson/Rainin HPLC Systems


05JH-0121


05JH-0131


05JH-0141

Ordering Information

Description	QTY	Varian No.	Part No.
Replacement parts for Varian, Gilson/Rainin HPLC Systems			
Inlet check valve, Sapphire for Rainin 5,10&25ML Heads	1	R007101616	05JH-0011
Inlet check valve, Ceramic for Rainin 5,10&25ML Heads	1	R007101678	05JH-0011
Outlet check valve, Sapphire for Rainin 5,10&25ML Heads	1	R007101617	05JH-0021
Outlet check valve, Ceramic for Rainin 5,10&25ML Heads	1	R007101679	05JH-0021
Replacement check valve cartridge	2		05JH-0032
Inlet check valve, Sapphire for Varian Prostar 210/215	1	R007101616	05JH-0011
Inlet check valve, Ceramic for Varian Prostar 210/215	1	R007101678	05JH-0011
Outlet check valve, Sapphire for Varian Prostar 210/215	1	R007101617	05JH-0021
Outlet check valve, Ceramic for Varian Prostar 210/215	1	R007101679	05JH-0021
Replacement check valve cartridge	2		05JH-0032
Inlet check valve assembly for Varian 2010	1	00-997261-09	05JH-0041
Outlet check valve assembly for Varian 2010	1	00-997261-10	05JH-0051
Replacement check valve cartridge	2		05JH-0062
Inlet check valve assembly for Varian 2510	1	00-997554-19	05JH-0071
Outlet check valve assembly for Varian 2510	1	00-997554-18	05JH-0081
Replacement check valve cartridge	2		05JH-0092
Outlet check valve assembly for Varian 9010/9012	1	03-919465-90	05JH-0101
Replacement check valve cartridge	2		05JH-0112
Seal, UHMW-PE for Gilson 10mL S/SC heads	1	5463125895	05JH-0121
Seal, UHMW-PE for Rainin 10mL S/SC heads	1	R007101637	05JH-0121
Seal, Black Teflon for Gilson 10mL S/SC heads	1	5463125095	05JH-0131
Seal, Black Teflon for Rainin 10mL S/SC heads	1	R007101636	05JH-0131
Piston for Gilson 10mL S/SC heads	1	365009	05JH-0141
Piston for Rainin 10mL S/SC heads	1	R007101658	05JH-0141
Seal, UHMW-PE for Gilson 5mL S/SC heads	1	5463088863	05JH-0151
Seal, UHMW-PE for Rainin 5mL S/SC heads	1	R007101634	05JH-0151
Seal, Black Teflon for Gilson 5mL S/SC heads	1	5463088863	05JH-0161
Seal, Black Teflon for Rainin 5mL S/SC heads	1	R007101633	05JH-0161
Piston for Gilson 5mL S/SC heads	1	365008	05JH-0171
Piston for Rainin 5mL S/SC heads	1	R007101657	05JH-0181
Seal, UHMW-PE for Varian 2010/2510	1	00-997261-37	05JH-0191
Seal, Black Teflon for Varian 2010/2510	1	00-997261-37	05JH-0201
Piston for Varian 2010/2510	1	00-997261-08	05JH-0211
Seal, UHMW-PE for Varian 9012/9012	1	03-919397-00	05JH-0221
Seal, Black Teflon for Varian 9012/9012	1	03-919397-00	05JH-0231
Piston for Varian 2010/2510	1	03-919102-90	05JH-0241
Hydraulic Module with Damper, Purge Valve and Outlet Manifold	1	212-LC	05JH-0311
D2 lamp for Gilson/Rainin 112	1		05JH-0251
D2 Lamp for Gilson/Rainin DAD	1		05JH-0261
D2 lamp for Varian 2550	1		05JH-0271
D2 Lamp for Varian 2050	1		05JH-0281
D2 lamp for Varian Prostar 330 DAD	1		05JH-0291
D2 Lamp for Varian Prostar 310/UV-50/100/200/9050	1		05JH-0301

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Waters HPLC Systems


05KH-0111


05KH-0121


05KH-0101


05KH-0111


05KH-0371


05KH-0381


05KH-0452


05KH-0054


05KH-0071


05KH-0701


05KH-0091

Ordering Information			
Description	QTY	Waters No.	Part No.
Pump parts, Alliance 2690/2695/2790/2795			
Check valve housing	1	700002332	05KH-0011
Replacement check valve cartridge	2	WAT270941	05KH-0022
Piston seal, UHMW-PE	2	WAT0270938	05KH-0032
Piston seal, Black Teflon	2	WAT0271066	05KH-0042
Face seal	4	WAT0270939	05KH-0054
Seal wash face seal reaplacement kit	1	WAT0271017	05KH-0061
Seal wash tube seals reaplacement kit	1	WAT0270940	05KH-0071
Seal wash piston seals reaplacement kit	1	WAT0271018	05KH-0081
Sapphire piston	1	WAT0270959	05KH-0091
Pump parts, 100µL Head, MK6A/M45/510/515/600/610			
Inlet check valve assembly	1	WAT033679	05KH-0101
Outlet check valve assembly, Ball & Seat style	1	WAT025216	05KH-0111
Outlet check valve assembly, Actuator style	1	WAT025028	05KH-0121
Replacement check valve cartridge	2	700000254	05KH-0132
Piston seal, UHMW-PE	1	WAT022934	05KH-0141
Piston seal, Black Teflon	1	WAT026613	05KH-0151
Sapphire Piston for 510/590/600/600E/610/M6KA	1	WAT025656	05KH-0161
Sapphire Piston for M45/45G/M501	1	WAT026524	05KH-0171
Piston indicator Rod & Spring Kit	2	WAT069583	05KH-0182
Sapphire piston for 1515/1525/515	1	WAS207069	05KH-0191
Insert seal parts kit for 510	1	WAT060012	05KH-0201
Pressure Transducer	1	WAT060329	05KH-0211
Draw-off Tube assembly	1	WAT060476	05KH-0221
Single solvent manifold	1	WAT060034	05KH-0231
Tube, Left inlet pigtail	1	WAT060037	05KH-0241
Tube, Right inlet pigtail	1	WAT060038	05KH-0251
Tube, Left Outlet pigtail	1	WAT060069	05KH-0261
Tube, Right Outlet pigtail	1	WAT075550	05KH-0271
Oil seal	1	WAT025669	05KH-0281
Reference Valve Rebuild Kit	1	WAT025746	05KH-0291
Round Pump Head with Actuator Outlet Check valve	1	WAT060058	05KH-0301
Pump parts, 225µL Head, 1525EF/510/515/600/610			
Inlet check valve assembly, Extened Flow 225 uL	1	WAT060307	05KH-0311
Outlet check valve assembly	1	WAT025216	05KH-0321
Replacement check valve cartridge	2	700000254	05KH-0332
Piston seal, UHMW-PE	1	WAT026644	05KH-0341
Piston seal, Black Teflon	1	WAT026644	05KH-0351
Sapphire Piston	1	WAT060304	05KH-0361
Pump parts, 400 & 900µL Head, Delta-Prep 3000/4000			
Inlet check valve assembly	1	WAT033325	05KH-0371
Outlet check valve assembly	1	WAT033326	05KH-0381
Replacement check valve cartridge	2		05KH-0392
Pump parts, 616/625/626			
Inlet check valve housing, PEEK for 625/626	1	WAT030541	05KH-0401
Outlet check valve housing, PEEK for 625/626	1	WAT030543	05KH-0411
Replacement check valve cartridge PEEK 625/626	2	WAT024120	05KH-0422
Inlet check valve assembly for 616	1		05KH-0431
Outlet check valve assembly for 616	1	WAT055845	05KH-0441
Replacement check valve cartridge for 616	2	WAT270941	05KH-0452
Seal Kit for 616/625/626	1	WAT034515	05KH-0461
Seal Rebuild Kit for 616/625/626	1	WAT031790	05KH-0471
Piston and spring for 616/625/626	1	WAT031788	05KH-0481

Waters HPLC Systems

Ordering Information			
Description	QTY	Waters No.	Part No.
Pump Maintenance or Upgrade Kit			
Preventive maintenance kit for Alliance 2690/2695 1 x Sparge diffuser, 1 x Filter insert, 1 x compression screws, 1 x SS ferrule, 1 x Battery for 2690/717, 1 x 250uL WISP syringe 2 x Seal wash plunger seal kits 4 x Wash tube seal kits 1 x 2690 seal pack rebuild kit 2 x 2690 head plunger seal kits 4 x Solvent reservoir 20um filters 2 x Alliance check valve cartridges 2 x Alliance plunger assemblies 4 x 2690 face seals	1	WAT270944	05KH-0491
Preventive maintenance kit for 600E, includes 4 x Solvent Reservoir Filter, 10 micron 2 x Performance PLUS Check Valves 2 x Sapphire Plungers 2 x Plunger Seal 4 x Sparge Diffuser 1 x Reference Valve Rebuild Kit 1 x Inlet Manifold Kit	1	WAT052675	05KH-0501
Preventive maintenance kit for 616 2 x Sapphire Plungers 4 x Sparge Diffuser 4 x Solvent Reservoir Filter, 10 micron 1 x Pump Seal Kit 4 x Check Valve Cartridges	1	WAT052672	05KH-0511
Preventive maintenance kit for 626 2 x Sapphire Plungers 4 x Sparge Diffuser 4 x Solvent Reservoir Filter, 10 micron 1 x Pump Seal Kit 4 x Check Valve Cartridges	1	WAT052673	05KH-0521
Preventive maintenance kit for 515, includes 1 x Solvent Reservoir Filter, 10 micron 2 x Performance PLUS Check Valves 2 x Sapphire Plungers 2 x Plunger Seal 1 x Sparge Diffuser	1	WAT052587	05KH-0531
Preventive maintenance kit for 510, includes 1 x Actuator Outlet Rebuild Kit 2 x Performance PLUS Check Valves 2 x Plunger Seal 1 x Solvent Reservoir Filter, 10 micron 2 x Sapphire Plungers 1 x Reference Valve Rebuild Kit 1 x Inlet Manifold Kit	1	WAT052670	05KH-0541

- Black Teflon seals are PTFE with a carbon fill, this seal is a very good general purpose seal for any solvent.
- Gold plunger seals are made of UHMW-PE (Ultra High Molecular Weight Polyenthylene) with fill that gives it a gold appearance. The seal provides good seal life and does not shed particles like that of other seals. The gold seal is inert to all common HPLC solvent mixes.

Waters HPLC Systems


05KH-0651


05KH-0621


05KH-0261


05KH-0781

Ordering Information			
Description	QTY	Waters No.	Part No.
Detectors			
Window Gasket for 484, 486, 490	1	WAT080335	05KH-0551
Lamp Side Gasket for 484, 486, 490	1	WAT080336	05KH-0561
Quartz Lens for 486	1	WAT080687	05KH-0571
Optics Cover Window	1	WAT080244	05KH-0581
Xenon Lamp for (w/o holder or mirror) 470	1		05KH-0591
Xenon Lamp for 474	1		05KH-0601
Deuterium Lamp (UV/Vis) for 480, 481	1	WAT099499	05KH-0611
Deuterium Lamp (UV/Vis) for 484	1	WAT080357	05KH-0621
Deuterium Lamp (UV/Vis) for 486	1	WAT080678	05KH-0631
Deuterium Lamp for 996, 2996	1	WAT052586	05KH-0641
Deuterium Lamp for 2487	1	WAS081142	05KH-0651
Deuterium Lamp, long life (2,000 hours)* for 486	1	700000356	05KH-0661
**Standard lamps have nominal 1,000-hour life.*			
Autosamplers			
Valve 4, TFE 3-way for 715/717/2690	1	WAT045407	05KH-0671
Seal Pack with Needle for 717	1	WAT045559	05KH-0681
Spool, WISP, HPMW for 710/712/715/717	1	WAT072036	05KH-0691
250uL Syringe	1	WAT073109	05KH-0701
Syringe Tip, 250 uL	1	WAT073195	05KH-0711
Syringe Seal 250 uL, 2500uL	1	WAT077347	05KH-0721
Needl Wash Frit for 710/712	1	WAT072324	05KH-0731
Seal, High Pressure Valve Injector for 712	1	WAT077230	05KH-0741
Needle Assembly, Polished	1	WAT077233	05KH-0751
Valve 3 Solenoid Assembly for 717	1	WAT025893	05KH-0761
Preventive maintenace Kit for 717, includes 1 x Seal pack Kit with Needle 1 x Filter Insert 1 x 250uL WISP Syringe	1	WAT052669	05KH-0771
Seal Pack Kit Assembly for 2690/2695, includes 1 x Lower Seal Wash Assembly 1 x Wash Tube Seal 1 x Washer, TFE 1 x Seal Wash Tube 1 x Filter Retainer 1 x Lower Seal Wash Frit 1 x Needle Wash Frit 1 x Ferrule, SS 1 x Compression Screw 1 x Washer, TFE, Small 1 x Injection Needle 1 x Upper Seal Wash Assembly 1 x High Pressure Seal Body 3 x Screws 1 x Frit Retainer	1	WAT270942	05KH-0781

GC Columns

By Manufacturers

Phase	Vertical	Restek	Agilent	Supelco
Dimethylpolysiloxane	VertiBond™ 1 VertiBond™ 1ms VertiBond™ 1ht	Rtx-1 Rtx-1ms Rtx-1PONA MXT-1 Rtx-1 F&F	HP-1 HP-1ms MET-1 HP-101 HP-PONA	SPB-1 MDN-1 SPB-1 TG Simplicity-1 SPB-1-Sulfer SPB-HAP
5% Phenyl, **95% Dimethylpolysiloxane**	VertiBond™ 5 VertiBond™ 5ms VertiBond™ 5ht	Rtx-5 MXT-5 XTI-5 Rtx-5ms	HP-5 HP-5ms HP-PAS-5	MDN-5 SPB-5 PTE-5 Simplicity-5 MDN-5S HT-5 SAC-5
35% Phenyl, **65% Dimethylpolysiloxane**	VertiBond™ 35 VertiBond™ 35ms	Rtx-35 MXT-35	HP-35 HP-35ms	MDN-35 SPB-35 SPB-608
50% Phenyl, **50% Dimethylpolysiloxane**	VertiBond™ 17 VertiBond™ 17ms VertiBond™ 17ht	Rtx-50 MXT-50	HP-17 HP-50+	SP-2250 SPB-17 SPB-50
50% Cyanopropylphenyl, **50% Dimethylpolysiloxane**	VertiBond™ 225	Rtx-225		
14% Cyanopropylphenyl, **86% Dimethylpolysiloxane**	VertiBond™ 1701	Rtx-1701 MXT-1701	HP-1701 HP-PAS-1701	SPB-1701
6% Cyanopropylphenyl, **94% Dimethylpolysiloxane**	VertiBond™ 1301 VertiBond™ 624	Rtx-1301 Rtx-624 MXT-1301 MXT-624	HP-1301 HP-624	SPB-1301 SPB-624
Polyethylene glycol	VertiBond™ WAX VertiBond™ WAXms	Stabilwax Rtx-Wax MXT-Wax Stabilwax-DB	HP-20M HP-Wax HP-INNOwax HP-Basic Wax	Supelcowax 10 Omegawax Simplicity Wax Carbowax Amine
Nitroterephthalic acid-modified **polyethylene glycol**	VertiBond™ AqWAX	Stabilwax-DA	HP-FFAP	Nukol SPB-1000
20%-Phenyl, **80%-Dimethylpolysiloxane**	VertiBond™ 20	Rtx-20 MTX-20		
50% Trifluoropropyl, **50% Methylpolysiloxane**	VertiBond™ 210	Rtx-200		
10% Cyanopropylphenyl, **90% bis Cyanopropylpolysiloxane**	VertiBond™ Silar90	Rtx-2330 Rtx-2340	HP-88	SP-2340 SP-2380
Molecular sieve 5A	VertiBond™ Molsieve	Rt-Msieve 5A	HP-PLOT/Molsieve	Molsieve 5A
Porous Divinylbenzene Polymer	VertiBond™ Q	Rt-QPLOT	HP-PLOT/Q	Supel-Q-PLOT
Deactivated Aluminum Oxide	VertiBond™ Alumina	Rt-AluminaPLOT	GS-Alumina	Alumina-PLOT

Alltech	SGE	Varian	OV	Phenomenex	J&W
AT-1 AT-sulfur EC-1	BP1 BP1-PONA BPX1-SimD	CP-Sil 5 CB CP-Sil 5 CB MS	OV-1	ZEBRON ZB-1	DB-1 DB-1ms DB-1ht SE-30 DB-2887 DB-1EVDX
AT-5 EC-5	BP5 BPX5 BPHT5	CB-Sil 8 CB CB-Sil 8 CB MS	OV-5	ZEBRON ZB-5	DB-5 DB-5ms DB-5ht DB-5.625 SE-54 SE-52 DB-5msEVDX
AT-35	BPX35 BPX608		OV-11	ZEBRON ZB-35	DB-35 DB-35ms
AT-50	BPX50	CP-Sil 24 CB	OV-17	ZEBRON ZB-50	DB-17,DB-17ht DB-17ms DB-17EVDX
AT-225	BP225	CP-Sil 43 CB	OV-225		DB-225
AT-1701	BP10	CP-Sil 19 CB	OV-1701	ZEBRON ZE-1701	DB-1701
AT-624 AT-1301	BP624	CP-1301 CP-Select-624 CB	OV-624 OV-1301	ZEBRON ZB-624	DB-1301 DB-624 DB-VRX
AT-Wax EC-Wax	BP20	CP-Wax 52 CB CP-Wax 57 CB	Carbowax 20M	ZEBRON ZB-WAX	DB-Wax Carbowax-20M DB-WAXetr CAM
AT-1000 EC-1000	BP21	CP-Wax 58 CB	OV-351	ZEBRON ZB-FFAP	DB-FFAP
AT-20 EC-20			OV-20		
AT-210			OV-210		DB-210 DB-200
AT-Silar-90	BP70	CP-SIL188			DB-23
AT-Molesieve		CP-Molsieve 5A			GS-Molsieve
AT-Q		CP-PoraPLOT Q			GS-Q
AT-Alumina		CP-AL2CO3/Na2SO4			GS-Alumina

By USP

USP Column Classification			
USP	**Phase Composition**	**Vertical® Recommend**	**Page**
G1	Dimethylpolysiloxane oil	VertiBond™ 1, 1ms, 1ht	136, 140, 141
G2	Dimethylpolysiloxane gum	VertiBond™ 1, 1ms, 1ht	136, 140, 141
G3	50% Phynyl-50% methylpolysiloxane	VertiBond™ 17, 17ms, 17HT	148, 149, 150
G5	3-Cyanopropylpolysiloxane	VertiBond™ Silar90	168
G6	Trifluoropropylmethylpolysiloxane	VertiBond™ 210	156
G7	50% 3-Cyanopropyl-50% phenylmethylsilicone	VertiBond™ 225	157
G14	Polyethylene glycol (average MW 950-1,050)	VertiBond™ WAX, WAXms	163
G15	Polyethylene glycol (average MW 3,000-3,700)	VertiBond™ WAX, WAXms	163
G16	Polyethylene glycol (average MW 15,000)	VertiBond™ WAX, WAXms	163
G17	75% Phenyl-25% methylpolysiloxane	VertiBond™ 17	148
G19	25% Phenyl-25% cyanopropylmethylsiloxane	VertiBond™ 225	157
G20	Polyethylene glycol (average MW of 380-420)	VertiBond™ WAX	163
G25	Polyethylene glycol TPA (Carbowax 20M terephthalic acid)	VertiBond™ AqWAX	166
G27	5% Phenyl-95% methylpolysiloxane	VertiBond™ 5, 5ms	142, 146
G28	25% Phenyl-75% methylpolysiloxane	VertiBond™ 20, 35	151, 153
G32	20% Phenylmethyl-80% dimethylpolysiloxane	VertiBond™ 20, 35	151, 153
G35	Polyethylene glycol (Nitroterephthalic acid modified)	VertiBond™ AqWAX	166
G36	1% Vinyl-5% phenylmethylpolysiloxane	VertiBond™ 5, 5ms	142, 146
G38	Phase G1 plus a tailing inhibitor	VertiBond™ 1, 1ms, 1ht	136, 140, 141
G39	Polyethylene glycol (average MW 1,500)	VertiBond™ WAX, WAXms	163
G41	Phenylmethyldimethylsilicone (10% phenyl substituted)	VertiBond™ 5	142
G42	35% Phenyl-65% dimethylpolysiloxane	VertiBond™ 35	153
G43	6% Cyanopropylphenyl-94% dimethylpolysiloxane	VertiBond™ 624, 1301	158, 159
G46	14% Cyanopropylphenyl-86% dimethylpolysiloxane	VertiBond™ 1701	161

By EPA

EPA Drinking Water Test Method			
Method	**Description**	**Vertical® Recommend**	Page
501.3	Measurement of trihalomethanes in drinking water with GC/MS and SIM	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
502.1/502.2*	Volatile halogenated organic compounds in water	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
503.1	Volatile aromatics and unsaturated organic compounds in water by purge and trap GC	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
504/504.1*	1,2-dibromoethane (EDB) and 1,2-dibromo-3-chloropropane (DBCP) in water by microextraction and gas chromatography	VertiBond™ 1, 30m x 0.32mm df = 0.25µm	137
		VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
505*	Analysis of organohalide pesticides and Arochlors in drinking water by microextration and gas chromatography	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
		VertiBond™ 17ms, 30m x 0.32mm df = 0.5µm	149
		VertiBond™ 17ms, 30m x 0.25mm df = 0.25µm	149
507*	Determination of nitrogen and phosphorus containing pesticides in water by GC with a nitrogen-phosphorus detector (NPD)	VertiBond™ 5, 30m x 0.25mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
		VertiBond™ 1701, 30m x 0.25mm df = 0.25µm	161
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
508*	Determination of chlorinated pesticides in water by GC with an electron capture detector	VertiBond™ 5, 30m x 0.25mm df = 0.25µm	143
		VertiBond™ 1701, 30m x 0.25mm df = 0.25µm	161
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
513*	2,3,7,8-tetrachlorodibenzo-p-dioxin	VertiBond™ Silar90, 50m x 0.25mm df = 0.2µm	168
		VertiBond™ 5ms, 60m x 0.25mm df = 0.1µm	146
515/515.2	Determination of chlorinated acids in water using liquid-solid extraction and gas chromatography with an electron capture detector (ECD)	VertiBond™ 1, 30m x 0.32mm df = 0.25µm	137
		VertiBond™ 5, 30m x 0.32mm df = 0.25µm	143
		VertiBond™ 1701, 30m x 0.32mm df = 0.25µm	161
		VertiBond™ 5ms, 30m x 0.32mm df = 0.25µm	146
524.2*	Measurement of purgeable organic compounds in water by purge and trap capillary column GC/MS	VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
		VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 5ms, 30m x 0.25mm df = 0.1µm	146
525*	Determination of organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	VertiBond™ 5, 30m x 0.32mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
551	Chlorination Solvents & Disinfection By-Products in Drinking Water by Liquid-Liquid Extraction	VertiBond™ 1, 30m x 0.32mm df = 1µm	137
		VertiBond™ 210, 30m x 0.32mm df = 0.5µm	156
552/552.1	Haloacetic Acids & Dalapon in Drinking Water by Ion Exchange Liquid-Solid Extraction & GC with ECD	VertiBond™ 1701, 30m x 0.32mm df = 0.25µm	161
		VertiBond™ 210, 30m x 0.32mm df = 0.5µm	156

*These EPA-methods are considered to be the most important ones (ref.: Environ Sci Technol Vol 25 no. 6 1991 p 998-1006)

By EPA

EPA Waste Water Test Method			
Method	**Description**	**Vertical® Recommend**	Page
601	Purgeable halocarbons	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.0µm	158
602	Purgeable aromatics	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.0µm	158
603	Acrolein and acrylonitrile	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.0µm	158
604/605	Phenols & benzidines	VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
606	Phthalate esters	VertiBond™ 1, 15m x 0.53mm df = 1.5µm	137
		VertiBond™ 5, 15m x 0.53mm df = 1.2µm	142
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
607	Nitrosamines	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
608	Organochlorine pesticides and PCBs	VertiBond™ 5ms, 50m x 0.25mm df = 0.1µm	146
609	Nitroaromatics and isophorone	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
610	Polycyclic Aromatic Hydrocarbons	VertiBond™ 5, 30m x 0.32mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.32mm df = 0.10µm	146
611	Haloethers	VertiBond™ 5, 15m x 0.53mm df = 1.5µm	142
		VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
612*	Chlorinated hydrocarbons	VertiBond™ 5, 30m x 0.32mm df = 1.0µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 1.0µm	146
613	2,3,7,8-tetrachlorodibenzo-p-dioxin	VertiBond™ Silar90, 50m x 0.25mm df = 0.2µm	168
		VertiBond™ 5ms, 60m x 0.25mm df = 0.1µm	146
615	Chlorinated herbicides	VertiBond™ 1, 30m x 0.32mm df = 0.25µm	137
		VertiBond™ 1701, 30m x 0.53mm df = 1.0µm	162
		VertiBond™ 1701, 30m x 0.25mm df = 0.25µm	161
619	Triazine herbicides	VertiBond™ 17, 30m x 0.53mm df = 1.0µm	148
		VertiBond™ 5, 30m x 0.53mm df = 1.0µm	143
		VertiBond™ 17ms, 30m x 0.25mm df = 0.5µm	149
624	Purgeables	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
625	Base/neutrals and acids	VertiBond™ 5ms, 30m x 0.32mm df = 0.25µm	146
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
680	Pesticides and PCBs in water and soil/sediment	VertiBond™ 5, 30m x 0.32mm df = 0.25µm	142
		VertiBond™ 5ms, 30m x 0.32mm df = 0.25µm	146
1618	Organophosphorus Pesticides, Organohalide Pescitides, Phenoxyacid Herbicides	VertiBond™ 1, 30m x 0.53mm df = 1.2µm	137
		VertiBond™ 1701, 30m x 0.53mm df = 1.2µm	162
1624	Volatile org. comp. by isotope dilution GC/MS	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
1625	Semivolatile org. comp. by isotope dilution	VertiBond™ 5, 30m x 0.25mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
1653	Chlorinated phenols in waste water by in-situ MS acylation and GC low bleed/MS	VertiBond™ 5, 30m x 0.32mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.32mm df = 0.25µm	146

*These EPA-methods are considered to be the most important ones (ref.: Environ Sci Technol Vol 25 no. 6 1991 p 998-1006)

By EPA

EPA Solid Waste Test Method			
Method	**Description**	**Vertical® Recommend**	Page
8010	Halogenated volatile organics	VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
8015	Non-halogenated volatile organics	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
8020/8021	Aromatic volatile organics	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
8030/8031	Acrolein, acrylonitrile, acetonitrile	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.4µm	158
8040/8041	Phenols	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
8060/8061	Phthalate esters	VertiBond™ 1, 15m x 0.53mm df = 1.5µm	137
8080	Organochlorine pesticides and PCBs	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
8081/8082	Organochlorine pesticides and PCBs as Arochlor	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 1701, 30m x 0.53mm df = 1.0µm	162
8090/8091	Nitroaromatics and cyclic ketones	VertiBond™ 5, 30m x 0.53mm df = 1.5µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
8100	Polynuclear aromatic hydrocarbons	VertiBond™ 5, 30m x 0.32mm df = 0.25µm	143
		VertiBond™ 5ms, 30m x 0.32mm df = 0.25µm	146
8120/8121	Chlorinates hydrocarbons	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
		VertiBond™ 1ms, 30m x 0.32mm df = 1.0µm	140
8140	Organophosphorus pesticides	VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
		VertiBond™ 1701, 30m x 0.53mm df = 1.5µm	162
		VertiBond™ 1ms, 30m x 0.25mm df = 0.25µm	140
8141	Organophosphorus pesticides	VertiBond™ 5, 15m x 0.53mm df = 1.5µm	142
		VertiBond™ 5ms, 15m x 0.25mm df = 0.25µm	146
8150/8151	Chlorinated herbicides	VertiBond™ 5, 25m x 0.53mm df = 1.0µm	143
		VertiBond™ 1701, 30m x 0.53mm df = 1.0µm	162
		VertiBond™ 5ms, 30m x 0.25mm df = 0.25µm	146
8240	GC/MS for volatile organics	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.0µm	158
8250	GC/MS for semi-volatile organics	VertiBond™ 5ms, 30m x 0.25mm df = 0.5µm	146
8260	GC/MS method for volatile organics capillary techniques	VertiBond™ 624, 30m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 75m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 105m x 0.53mm df = 3.0µm	158
		VertiBond™ 624, 30m x 0.25mm df = 1.0µm	158
8270	GC/MS method for semivolatile organics: capillary techniques	VertiBond™ 5, 30m x 0.25mm df = 1.0µm	143
		VertiBond™ 5ms, 30m x 0.25mm df = 1.0µm	146
8280	Analysis of polychlorinated dibenzofurans	VertiBond™ 5, 30m x 0.25mm df = 0.25µm	143
		VertiBond™ 5ms, 60m x 0.25mm df = 0.1µm	146
		VertiBond™ Silar90, 50m x 0.25mm df = 0.2µm	168

By ASTM

ASTM Method			
Method	**Description**	**Vertical® Recommend**	Page
D 1945	Natural gas	VertiBond™ MolSieve, 30m x 0.53mm df = 50µm	169
		VertiBond™ Q, 15m x 0.53mm df = 40µm	170
D 1946	Reformed gas	VertiBond™ MolSieve, 30m x 0.53mm df = 50µm	169
D 1983	FAME analysis	VertiBond™ Silar90, 30m x 0.25mm df = 0.2µm	168
D 2163	Liquified petroleum gases and propylene concentrations	VertiBond™ Alumina, 50m x 0.53mm df = 10µm	171
D 2245	Oils and oil acids in solvent-reducible paints	VertiBond™ Silar90, 30m x 0.25mm df = 0.2µm	168
D 2306	Xylene isomers	VertiBond™ WAX, 60m x 0.32mm df = 0.5µm	164
D 2426	Butadiene and styrene in butadiene concentrates	VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 2427	C2-C5 hydrocarbons in gasolines	VertiBond™ Alumina, 50m x 0.53mm df = 10µm	171
D 2456	Polyhydric alcohols in alkyd resins	VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 2504	Non-condensable gases in C1-C3 hydrocarbons	VertiBond™ MolSieve, 30m x 0.53mm df = 50µm	169
D 2580	Phenols in water	VertiBond™ 5ms, 25m x 0.32mm df = 0.5µm	146
		VertiBond™ AqWAX, 25m x 0.53mm df = 1.0µm	166
D 2593	Butadiene purity and hydrocarbon impurity	VertiBond™ Alumina, 50m x 0.53mm df = 10µm	171
D 2600	Aromatic traces in light saturated hydrocarbons	VertiBond™ WAX, 25m x 0.32mm df = 1.2µm	163
D 2743	Oil and oil acids	VertiBond™ Silar90, 30m x 0.25mm df = 0.2µm	168
D 2800	FAME analysis	VertiBond™ Silar90, 50m x 0.25mm df = 0.2µm	168
D 2804	Purity of methyl ethyl ketone	VertiBond™ WAX, 30m x 0.32mm df = 0.5µm	164
		VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 2908	Volatile organics in water	VertiBond™ 624, 30m x 0.32mm df = 1.8µm	158
		VertiBond™ WAX, 30m x 0.32mm df = 0.5µm	164
		VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 2998	Polyhydric alcohols in alkyd resins	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
D 2999	Monopentaerythritol in commercial pentaerythritol	VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 3009	Composition of turpentine	VertiBond™ WAX, 30m x 0.32mm df = 0.5µm	164
		VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 3086	Organochlorine pesticides in water	VertiBond™ 5, 50m x 0.25mm df = 0.12µm	143
D 3168	Polymers in emulsion paints	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
		VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 3271	Solvent analysis in paints	VertiBond™ Q, 30m x 0.53mm df = 20µm	170
		VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 3304	PCBs in environmental materials	VertiBond™ 5, 50m x 0.25mm df = 0.1µm	143
D 3328	Comparison of waterborne petroleum oils	VertiBond™ 1, 30m x 0.32mm df = 3.0µm	137
		VertiBond™ 1, 30m x 0.53mm df = 3.0µm	137
D 3329	Purity of methyl isobutyl ketone	VertiBond™ WAX, 60m x 0.53mm df = 1.0µm	164
D 3416	Total hydrocarbons, methane, and CO in air	VertiBond™ Q, 30m x 0.53mm df = 20µm	170
		VertiBond™ MolSieve, 30m x 0.53mm df = 50µm	169
D 3432	Toluene diisocyanates in urethane prepolymers	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
		VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 3447	Purity of trichlorotrifluoroethane (CFC-113)	VertiBond™ 1, 50m x 0.53mm df = 5.0µm	137
D 3452	Identification of rubber	VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 3457	FAME analysis	VertiBond™ Silar90, 30m x 0.25mm df = 0.2µm	168
D 3465	Purity of monomeric plasticizers	VertiBond™ 1, 25m x 0.32mm df = 0.5µm	137
		VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137

By ASTM

ASTM Method			
Method	**Description**	**Vertical® Recommend**	Page
D 3534	PCBs in water	VertiBond™ 5, 50m x 0.25mm df = 0.25µm	143
D 3606	Benzene and toluene in gasoline	VertiBond™ 1ms, 15m x 0.25mm df = 0.1µm	136
D 3687	Volatile organic compounds	VertiBond™ WAX, 30m x 0.32mm df = 0.5µm	164
		VertiBond™ WAX, 30m x 0.53mm df = 1.0µm	164
D 3725	Fatty acids in drying oils	VertiBond™ AqWAX, 25m x 0.53mm df = 1.0µm	166
D 3760	Analysis of cumene	VertiBond™ WAX, 50m x 0.53mm	164
D 3797	Analysis of o-xylene	VertiBond™ WAX, 50m x 0.53mm	166
D 3798	Analysis of p-xylene impurities	VertiBond™ WAX, 50m x 0.53mm	166
D 3876	Methoxyl and hydroxypropyl substitution in cellulose ether products	VertiBond™ 1, 30m x 0.32mm df = 1.0µm	137
		VertiBond™ 1, 30m x 0.53mm df = 1.5µm	137
D 3962	Impurities in styrene	VertiBond™ AqWAX, 25m x 0.53mm df = 1.0µm	166
D 4059	PCBs in insulating liquids	VertiBond™ 5, 50m x 0.25mm df = 0.25µm	143
D 4275	Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymeres	VertiBond™ 1, 30m x 0.32mm df = 3.0µm	137
		VertiBond™ 1, 30m x 0.53mm df = 3.0µm	137
D 4367	Benzene in hydrocarbon solvent	VertiBond™ 1ms, 15m x 0.25mm df = 0.1µm	136
D 4384	Acrylonitrile monomer (residual)	VertiBond™ Q, 25m x 0.53mm df = 20µm	170
D 4420	Aromatics in gasoline	VertiBond™ 1ms, 15m x 0.25mm df = 0.1µm	136
D 4424	Butylene analysis	VertiBond™ Alumina, 30m x 0.53mm df = 10µm	171
D 4735	Thiophene impurities in benzene	VertiBond™ AqWAX, 25m x 0.53mm df = 1.0µm	166
D 4768	Phenol and cresol inhibitors in insulating oils	VertiBond™ AqWAX, 25m x 0.53mm df = 1.0µm	166
D 5060	Impurities in ethylbenzene	VertiBond™ WAX, 60m x 0.32mm df = 0.5µm	164
D 5135	Analysis of styrene	VertiBond™ WAX, 60m x 0.32mm df = 0.5µm	164
D 5580	Aromatics in finished gasoline	VertiBond™ 1ms, 15m x 0.25mm	136
E 0202	Analysis of glycols	VertiBond™ WAX, 25m x 0.25mm df = 0.2µm	163
E 1100	Analysis of denaturated ethanol	VertiBond™ WAX, 25m x 0.53mm df = 0.5µm	163

Selection Guide

Tubing

VertiBond™ offer an excellent flexibility and high degree of inertness. The apparent of **VertiBond™** has expands the advantage of capillary columns that can be used in many applications. **VertiBond™** can be durable of breakage at any operating temperature and resist to abrasion and scratches, and theses columns can be coiled into a smaller diameter to fit into portable equipment. When you need to identify non-volatile contamination inside the column and breakage is less of a concern (stationary bench-top equipment), **VertiBond™** is the best selection. Furthermore, these columns are much more suitable to the addition of a guard column too.

Stationary Phase

The stationary phase have many interactions that can occur between the analyses and the functional groups of the stationary phase which more provide affect to the results of analysis than any other factor in the column. This is the reason for the important to understand as much about your column and sample as possible.

Changing in selectivity can be observed by using a column with difference functional groups as well as increasing the percentage of substitution of those functional groups. The non-polar phase will preferentially retain non-polar compounds compared to polar compounds such as alcohols. As non-polar methyl units are substituted with polar functionalities such as phenyl and cyanopropyl units, the selectivity of the column shifts towards more polar compounds. In turn, non-polar compound are retained less as there are less overall methyl units for the non-polar compounds to interact with. The stationary phase contains trifluoropropyl units which provide high selectivity for analyses containing lone pair electrons, such as nitro and carbonyl groups. Polyethylene glycol columns are polar and highly selective towards polar compounds such as alcohols.

ID (Internal Diameter)

Sample concentration and instrumentation must be considered for selecting an ID (Internal Diameter). Because, ID has important relation with sample capacity and resolution, that is, when the ID increase, sample capacity will increase but the resolution power will decrease, on the other hand, when ID decrease or narrow ID, sample capacity will decrease but resolution will increase. Therefore, the complex sample should be choose a narrow column ID and for the large volume sample should be choose the larger one. If sample concentration is exceeds or mismatch the column's capacity, then will result in less resolution, poor reproducibility, and peak distortion.

The type of instrument has an important thing for choosing column ID too; therefore the inlet suggests the optimum column ID. Example for narrow bore columns (0.18 mm ID<50ng) versus high capacity of 0.53 mm ID columns (200ng), also 0.53 mm ID columns are recommended in high flow situations, such as with a purge-and-trap unit. Conversely, narrow bore columns can be installed directly into a mass spectrometry detector because of the limited flow at optimum linear velocity. Furthermore, in GC/MS system or MSD with direct source coupling may require a column with a lower flow rate (0.20-0.25 mm ID).

Length

The benefits of using longer columns differ depending on whether isothermal or temperature programmed analyses are being performed, and the requirement of speed, time and resolution. For an isothermal analysis, column's length is direct proportional analysis time, if the column length is doubled; the analysis time will double as too. However, resolution is proportional to square root of the length. Longer column provide more resolving power, increase analysis times, and cost more. Often an analyst must determine whether the amount of resolution increase is worth the extra time an expense.

For common column's length used, almost laboratory used 30 m columns, The 15 m columns are used for fast, simple mixtures or extremely high molecular weight compounds, and 50, 60 and 105 m are used for extremely complex mixture.

Length effects

Length affects resolution and speed of analysis

$$\text{Resolution} = \frac{1}{4}\sqrt{\frac{L}{H}} \times \frac{k}{k+1} \times \frac{\alpha}{\alpha+1}$$

L = lenght
h = HETP
k = capacity factor
α = selectivity

In the case of temperature-programmed analyses, retention times are more dependent on temperature than column length. The increase in resolution is the same as an isothermal run, but there is only a marginal increase in analysis time. When using temperature programming, 60-meter columns provide better resolution than 30-meter columns without a significant increase in analysis time.

Film Thickness

Film Thickness has a direct effect on the retention time and elution temperature. Thicker-film retains compounds longer and increase temperature required for elutes the compounds, in the other hand, thinner-films will quickly elute and require lower temperature. Therefore, extremely volatile compounds or low-boiling compounds (gases, solvents and purgeables) should be analyzed on thick-film columns to increase the time the compounds spend in the column and allow them to separate near the room temperature. For high molecular weight compounds, such as triglycerides, must be analyzed on thin film columns, this minimizes the amount of time the analytes stay in the column and provides low bleed at elevated temperature.

Film thickness directly effects phase ratio (β), which is an important consideration when changing internal diameter. When internal diameter increase, film thickness (df) must increase in order to provide similar resolution and retention.

Reasons to Choose VertiBond™

Vertical® manufactures high quality capillary columns. We have variety of phase, i.d., length and film thickness to meet your needs. The reasons to choose our VertiBond™ capillary columns are:

Application support

We can work with you to make sure our products meet your needs. We have the smart team application specialists to support you the methods, applications and products. We are committed to long-term customers relationship and our application specialists are ready to response to your support requirements.

Lot-to-lot reproducibility

VertiBond™ stationary phases are chemically synthesized from high quality polymer and coated on the inner-wall deactivated surface of fused silica tubing under strict control using up-to-date statistic process control procedures to assure lot-to-lot reproducibility.

Performance report

Every VertiBond™ capillary column is individually tested by our QC Lab for characteristics and chromatographic performance. VertiBond™ capillary column includes a **Performace Report** with efficiency and maximum allowed operation temperature, MAOT.

With our high quality products under high quality control, you can have confidence in your analytical results.

Vertical®'s guarantee

If VertiBond™ capillary columns do not perform as well or better than your current capillary column of similar stationary phase, i.d., length and film thickenss, send in your comparative data within 45 days and keep the VertiBond™ capillary column for FREE.

VertiBond™ 1 Capillary Columns

- **100% Dimethylpolysiloxane**
- **Non-polar stationary phase**
- **Excellent general purpose columns**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 1 column contains 100% Dimethylpolysiloxane stationary phase. This is the most popular non-polar stationary phase in use. Separation is almost entirely based on boiling points, making the columns suitable for a wide range of applications with a broad temperature range.

VertiBond™ 1 Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar
USP Designation:	G1, G2, G38
Ideal for:	General Purpose

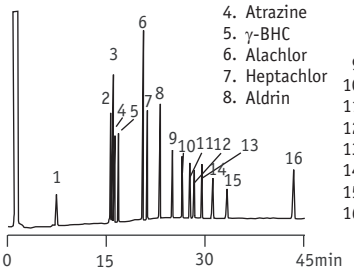
VertiBond™ 1 Eqvivalence	
Restek	Rtx-1
Agilent	HP-1, HP-101, ULTRA-1, DB-1, DB-2887
Supelco	SPB-1, Equity-1, SPB-Sulfur
Alltech	AT-1
SGE	BP-1
Varian	CP-Sil 5CB
Ohio Valley	OV-1
Phenomenex	ZB-1

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.10	360/370	0400-2000
		0.20	360/370	0400-2040
		0.25	360/370	0400-2050
	0.32	0.10	360/370	0400-3000
		0.25	360/370	0400-3050
		0.30	360/370	0400-3060
	0.53	0.25	360/370	0400-5050
		1.20	340/360	0400-5120
		2.65	340/360	0400-5180
		5.00	340/360	0400-5210
15	0.25	0.10	360/370	0400-2001
		0.20	360/370	0400-2041
		0.25	360/370	0400-2051
		0.50	360/370	0400-2091
		1.00	340/360	0400-2111
	0.32	0.10	360/370	0400-3001
		0.25	360/370	0400-3051
		0.30	360/370	0400-3061
		0.50	360/370	0400-3091
		1.00	340/360	0400-3111
		1.50	320/340	0400-3151
		3.00	310/330	0400-3191
		5.00	260/280	0400-3211
	0.45	0.13	340/360	0400-4011
		0.42	300/320	0400-4071
		1.00	350/350	0400-4111
		1.27	300/320	0400-4131
		2.55	270/290	0400-4171
		4.25	270/290	0400-4201

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.53	0.10	360/370	0400-5001
		0.15	360/370	0400-5021
		0.25	360/370	0400-5051
		0.50	360/370	0400-5091
		1.00	340/360	0400-5111
		1.20	340/360	0400-5121
		1.50	340/360	0400-5151
		2.65	340/360	0400-5181
		3.00	340/360	0400-5191
		5.00	340/360	0400-5211
25	0.25	0.20	360/370	0400-2042
	0.32	0.30	360/370	0400-3062
		0.50	360/370	0400-3092
	0.53	1.20	340/360	0400-5122
30	0.25	0.10	360/370	0400-2003
		0.20	360/370	0400-2043
		0.25	360/370	0400-2053
		0.50	360/370	0400-2093
		1.00	360/370	0400-2113
	0.32	0.10	360/370	0400-3003
		0.25	360/370	0400-3053
		0.30	360/370	0400-3063
		0.50	360/370	0400-3093
		1.00	340/360	0400-3113
		1.50	320/340	0400-3153
		3.00	310/330	0400-3193
		5.00	260/280	0400-3213
	0.45	0.42	300/320	0400-4073
		1.00	350/350	0400-4113
		1.27	300/320	0400-4133
		2.55	270/290	0400-4173
		4.25	270/290	0400-4203
	0.53	0.10	360/370	0400-5003
		0.25	360/370	0400-5053
		0.50	360/370	0400-5093
		1.00	340/360	0400-5113
		1.20	340/360	0400-5123
		1.50	340/360	0400-5153
		2.65	340/360	0400-5183
		3.00	340/360	0400-5193
		5.00	340/360	0400-5213
50	0.25	0.20	360/370	0400-2044
	0.32	0.30	360/370	0400-3064
	0.53	1.20	340/360	0400-5124
		5.00	340/360	0400-5214

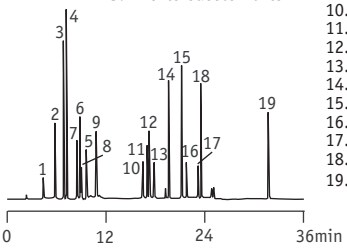
EPA 505 Organohalide pesticides



1. Hexachlorocyclopentadiene
2. Hexachlorobenzene
3. Simazine
4. Atrazine
5. γ-BHC
6. Alachlor
7. Heptachlor
8. Aldrin
9. Heptachlor Epoxide (B)
10. γ-Chlordane
11. α-Chlordane
12. trans-Nonachlor
13. Dieldrin
14. Endrin
15. cis-Nonachlor
16. Methoxychlor

Column: VertiBond™ 1, 30m x 0.32mm, 5.0µm
Temp: 150-240°C 4 °C/min, 240°C (hold 30min)
Injector: Splitless at 200°C
Detector: FID
Carrier gas: Helium 25cm/sec at 150°C

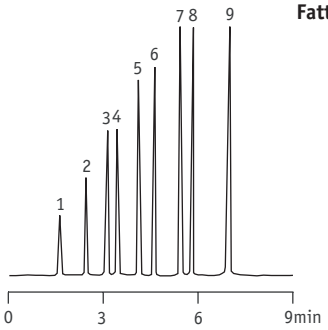
EPA Method 551



1. Chloroform
2. 1,1,1-Trichloroethane
3. Carbon tetrachloride
4. Trichloroacetonitrile
5. Dichloroacetonitrile
6. Bromodichloromethane
7. Trichlorothane
8. Chloral hydrate
9. 1,1-Dichloro-2-propanone
10. Chloropicrin
11. Dibromochloromethane
12. Bromochloroacetonitrile
13. 1,2-Dibromoethane
14. Tetrachloroethane
15. 1,1,1-Trichloropropane
16. 1,2-Dibromopropane (IS)
17. Bromoform
18. Dibromoacetonitrile
19. 1,2-Dibromo-3-chloropropane

Column: VertiBond™ 1, 30 m x 0.25 mm, 1.0µm
Temp: 35°C for 9 min, 35-40°C at 10°/min, 40°C for 3 min, 40-150°C at 6°/min, 150°C for 1min
Injector: Splitless at 200°C
Detector: ECD 300°C
Carrier gas: Helium 24.8cm/sec at 150°C

Fatty Acids (Free)



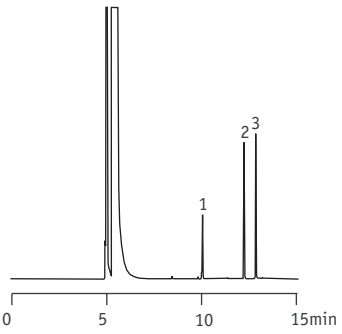
1. Acetic acid
2. Propionic acid
3. Isobutyric acid
4. *n*-Butyric acid
5. Isovaleric acid
6. *n*-Valeric acid
7. Isocaproic acid
8. Caproic acid
9. Heptanoic acid

Column: VertiBond™ 1, 30 m x 0.53 mm, 5.0µm
Temp: 60°C to 180°C at 15°C/min,
Injector: 0.2µL Free Fatty Acid standard in water, 250 °C
Detector: FID
Carrier Gas: Hydrogen 50cm/sec (flow rate: 6cc/min)

VertiBond™ 1

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
60	0.25	0.10	360/370	0400-2005
		0.25	360/370	0400-2055
		0.50	360/370	0400-2095
		1.00	340/360	0400-2115
	0.32	0.10	360/370	0400-3005
		0.25	360/370	0400-3055
		0.50	360/370	0400-3095
		1.00	340/360	0400-3115
		1.50	320/340	0400-3155
		3.00	310/330	0400-3195
		5.00	300/300	0400-3215
	0.45	1.27	300/320	0400-4135
	0.53	0.10	360/370	0400-5005
		0.25	360/370	0400-5055
		0.50	360/370	0400-5095
		1.00	340/360	0400-5115
		1.20	340/360	0400-5125
		1.50	340/360	0400-5155
		3.00	340/360	0400-5195
		5.00	340/360	0400-5215
105	0.25	0.10	360/370	0400-2007
		0.25	360/370	0400-2057
		0.50	360/370	0400-2097
		1.00	340/360	0400-2117
	0.32	0.10	360/370	0400-3007
		0.25	360/370	0400-3057
		0.50	360/370	0400-3097
		1.00	340/360	0400-3117
		1.50	320/340	0400-3157
		3.00	310/330	0400-3197
	0.53	1.20	340/360	0400-5127
		3.00	340/360	0400-5197
		5.00	340/360	0400-5217

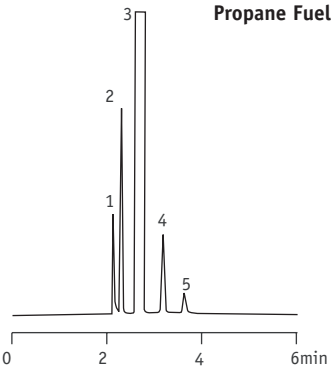
Personal Care Product Fragrances



1. Eucalyptol
2. Camphor
3. Menthol

Column: VertiBond™ 1, 60m x 0.25mm, 0.25µm
Temp: 80°C to 180°C at 5°C/min,
Injector: 1.0µL split at 275°C (split ratio 20:1)
Detector: FID at 300°C
Carrier gas: Hydrogen constant flow (flow rate: 0.6mL/min)

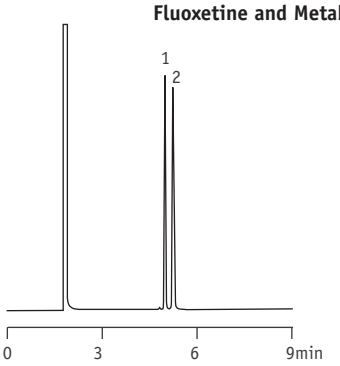
Propane Fuel



1. Methane
2. Ethane
3. Propane
4. Isobutane
5. Butane

Column: VertiBond™ 1, 60m x 0.53mm, 5.0µm
Temp: 40°C
Injector: 1.0µL direct injection at 200°C
Detector: FID
Carrier gas: Hydrogen 80cm/sec (flow rate: 10cc/min)

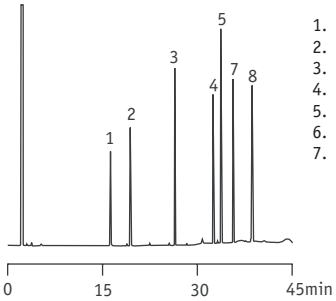
Fluoxetine and Metabolite



1. Norfluoxetine
2. Fluoxetine

Column: VertiBond™ 1, 30m x 0.32mm, 0.25µm
Temp: 200°C
Detector: FID
Carrier Gas: Helium at 1.06mL/min

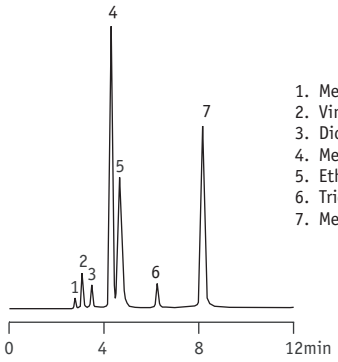
Phthalate and Adipate Esters



1. Dimethyl Phthalate
2. Diethyl Phthalate
3. Di-n-Butyl Phthalate
4. Butylbenzyl Phthalate
5. Di(2-ethylhexyl) Adipate
6. Di(2-ethylhexyl) Phthalate
7. Di-n-Octyl Phthalate

Column: VertiBond™ 1, 30m x 0.32mm, 0.25µm
Temp: 60°C (1 min hold) to 260°C at 6°C/min
Detector: FID at 295°C
Carrier Gas: Helium at 32cm/sec

Purgeable Halocarbons

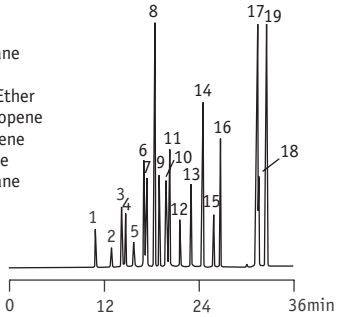


1. Methyl Chloride
2. Vinyl Chloride
3. Dichlorofluoromethane
4. Methyl Bromide
5. Ethyl Chloride
6. Trichlorofluoromethane
7. Methylene Chloride

Column: VertiBond™ 1, 30m x 0.53mm, 5.00µm
Temp: 35°C
Detector: FID
Carrier Gas: Helium at 3mL/min

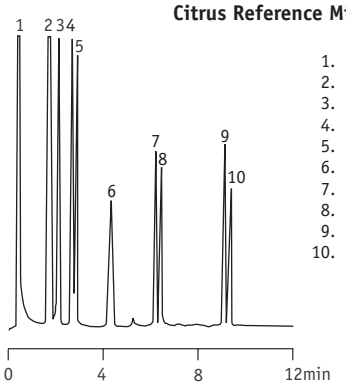
Halocarbons

1. 1,1-Dichloroethane
2. Chloroform
3. 1,2-Dichloroethane
4. 1,1,1-Trichloroethane
5. Carbon Tetrachloride
6. 1,2-Dichloropropane
7. Bromodichloromethane +Trichloroethene
8. 2-Chloroethyl Vinyl Ether
9. *trans*-1,3-Dichloropropene
10. *cis*-1,3-Dichloropropene
11. 1,2,2-Trichloroethane
12. Dibromochloromethane
13. Tetrachloroethene
14. Chlorobenzene
15. Bromoform
16. 1,1,2,2-Tetrachloroethane
17. *m*-Dichlorobenzene
18. *p*-Dichlorobenzene
19. *o*-Dichlorobenzene



Column: VertiBond™ 1, 30m x 0.53mm, 5.00µm
Temp: 40°C (5 min hold) to 200°C/min at 5°C/min
Detector: FID
Carrier Gas: Helium at 3mL/min

Citrus Reference Mix

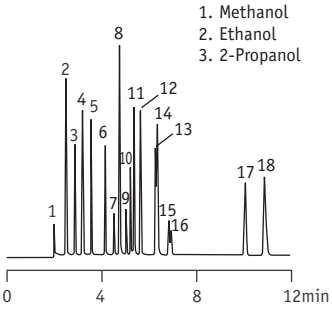


1. α-Pinene
2. Camphene
3. β-Pinene
4. *p*-Cymene
5. Limonene
6. Nonanal + Linalool
7. Terpen-4-ol
8. γ-Terpineol
9. Neryl Acetate
10. Geranyl Acetate

Column: VertiBond™ 1, 10m x 0.53mm, 1.20µm
Temp: 75°C (5min hold) to 150°C at 10°C/min
Detector: FID
Carrier Gas: Helium 5mL/min

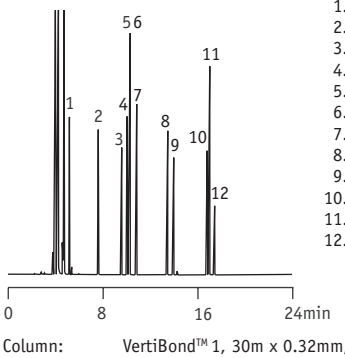
C1-C6 Alcohols

1. Methanol
2. Ethanol
3. 2-Propanol
4. 2-Methyl-2-propanol
5. 1-Propanol
6. 2-Butanol
7. 2-Methyl-1-propanol
8. 2-Methyl-2-butanol
9. 1-Butanol
10. 2,2-Dimethyl-1-propanol
11. 3-Methyl-2-butanol
12. 2-Pentanol + 3-Pentanol
13. 3-Methyl-1-butanol
14. 2-Methyl-1-butanol
15. 4-Methyl-2-pentanol
16. 1-Pentanol
17. 1-Hexanol
18. Cyclohexanol



Column: VertiBond™ 1, 30m x 0.53mm, 5.00µm
Temp: 35°C to 100°C at 5°C/min
Detector: FID
Carrier Gas: Helium at 3mL/min

Aromatic



1. Benzene
2. Toluene
3. Chlorobenzene
4. Ethylbenzene
5. *m*-Xylene
6. *p*-Xylene
7. *o*-Xylene
8. 1,4-Dichlorobenzene
9. 1,2-Dichlorobenzene
10. 1,2,4-Trichlorobenzene
11. Napthalene
12. 1,2,3-Trichlorobenzene

Column: VertiBond™ 1, 30m x 0.32mm, 1.00µm
Temp: 60°C (4min hold) to 200°C at 10°C/min
Detector: FID
Carrier Gas: Helium at 1.3mL/min

VertiBond™ 1ms Capillary Columns

- **100% Dimethylpolysiloxane**
- **Non-polar stationary phase**
- **Low-Bleed for MS application or trace analysis**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 1ms contains 100% Dimethylpolysiloxane stationary phase column with excellent thermal stability and low-bleed. This non-polar stationary phase improves signal to noise ratio for MS, ECD, NPD detectors and provides greater precision in trace analysis.

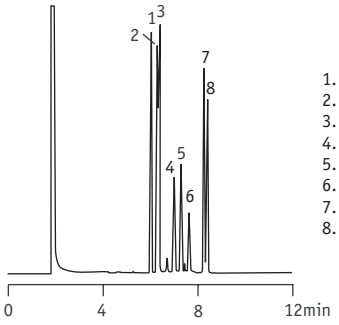
VertiBond™ 1ms Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar
USP Designation:	G1, G2, G38
Ideal for:	Mass Spec Analysis for Environmental, PAH, CLP, Pesticides, Steroids and Drugs

VertiBond™ 1ms Specifications	
Restek	Rtx-1ms
Agilent	HP-1ms, DB-1ms
Supelco	SPB-1, Equity-1, SPB-Sulfur
Alltech	AT-1ms
Varian	CP-Sil 5CBms

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	340/360	0401-2001
		0.25	340/360	0401-2051
		0.50	340/360	0401-2091
	0.32	0.10	340/360	0401-3001
		0.25	340/360	0401-3051
		0.50	340/360	0401-3091
	0.53	0.50	340/360	0401-5091
30	0.25	0.10	340/360	0401-2003
		0.25	340/360	0401-2053
		0.50	340/360	0401-2093
	0.32	0.10	340/360	0401-3003
		0.25	340/360	0401-3053
		0.50	340/360	0401-3093
		1.00	340/360	0401-3113
	0.53	0.50	340/360	0401-5093
60	0.25	0.25	340/360	0401-2055
	0.32	0.25	340/360	0401-3055

Volatile Amines



1. Coprostanol
2. Cholesterol
3. Cholestanol
4. Ergosterol
5. Campesterol
6. Stigmasterol
7. β-Sitosterol
8. Stigmastanol

Column: VertiBond™ 1ms, 30m x 0.25mm, 0.25µm
Temp: 305°C
Injector: split at 315°C
(50:1 split ratio w/split flow of 32.4mL/min)
Detector: FID at 315°C
Carrier Gas: Helium at 0.7mL/min

VertiBond™ 1ht Capillary Columns

- **100% Dimethylpolysiloxane**
- **Non-polar stationary phase**
- **Excellent general purpose columns**
- **High temperature to 400 °C**
- **High efficiency, high inertness columns**

VertiBond™ 1ht column contains 100% Dimethylpolysiloxane stationary phase column with high temperature to 400°C. This result in shorten analysis time and ideal for the analysis of high boiling compounds like waxes, crude oils or triglycerides.

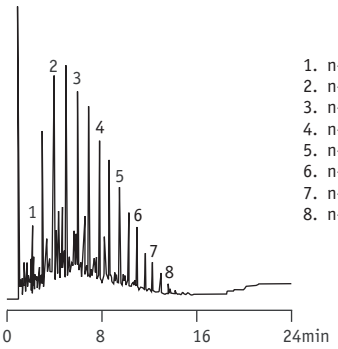
VertiBond™ 1ht Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar
USP Designation:	G1, G2, G38
Ideal for:	High Boiling Compounds, Waxes, Crude Oils, Triglycerides

VertiBond™ 1ht Specifications	
Restek	Rtx-1mht
Agilent	DB-1ht
Alltech	AT-1ht

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	380/400	0407-2001
30	0.25	0.10	380/400	0407-2003
60	0.25	0.10	380/400	0407-2005

Diesel Fuel



1. n-Decane
2. n-Dodecane
3. n-Tetradecane
4. n-Hexadecane
5. n-Octadecane
6. n-Eicosane
7. n-Docosane
8. n-Tetracosane

Column: VertiBond™ 1ht, 15m x 0.25mm, 0.1µm
Temp: 5°C (1 min hold), 75°C-340°C at 15°C/min, 340°C (3 min hold)
Injector: Split at 330°C (61:1 split ratio w/split flow of 65mL/min)
Detector: FID at 350°C
Carrier Gas: Helium at 33cm/sec

VertiBond™ 5 Capillary Columns

- **5% Phenyl, 95% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 5 column is contains 5% Phenyl and 95% Dimethylpolysiloxane stationary phase. VertiBond™ 5 has a slightly higher polarity than VertiBond™ 1, results in better selectivity for aromatic compounds, acidic and basic compounds and is generally the best choice when developing a method.

VertiBond™ 5 Specifications	
Phase:	5% Phenyl, 95% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G27, G36
Ideal for:	General Applications

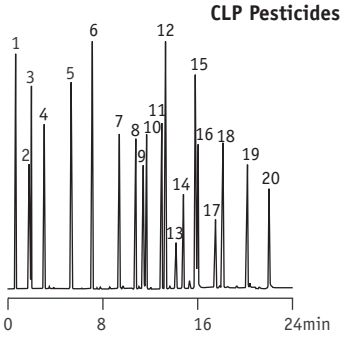
VertiBond™ 5 Specifications	
Restek	Rtx-5, RTX-XTI
Agilent	HP-5, ULTRA-2, DB-5
Supelco	SPB-5, Equity-5, PTE-5
Alltech	AT-5
SGE	BP-5
Varian	CP-SIL8CB
Ohio Valley	OV-5

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.20	360/370	0402-2040
	0.32	0.30	360/370	0402-3060
	0.53	0.25	360/370	0402-5050
		1.20	340/360	0402-5120
		2.65	340/360	0402-5180
		5.00	340/360	0402-5210
15	0.25	0.10	360/370	0402-2001
		0.20	360/370	0402-2041
		0.25	360/370	0402-2051
		0.50	360/370	0402-2091
		1.00	340/360	0402-2111
	0.32	0.10	360/370	0402-3001
		0.25	360/370	0402-3051
		0.30	360/370	0402-3061
		0.50	360/370	0402-3091
		1.00	340/360	0402-3111
		1.50	340/360	0402-3151
	0.45	0.42	300/320	0402-4071
		1.27	300/320	0402-4131
	0.53	0.10	360/370	0402-5001
		0.25	360/370	0402-5051
		0.50	360/370	0402-5091
		1.00	340/360	0402-5111
		1.20	340/360	0402-5121
		1.50	340/360	0402-5151
		3.00	340/360	0402-5191
		5.00	340/360	0402-5211

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
25	0.25	0.20	360/370	0402-2042
	0.32	0.30	360/370	0402-3062
	0.53	1.00	340/360	0402-5112
		1.20	340/360	0402-5122
30	0.25	0.10	360/370	0402-2003
		0.25	360/370	0402-2053
		0.50	360/370	0402-2093
		1.00	340/360	0402-2113
	0.32	0.10	360/370	0402-3003
		0.25	360/370	0402-3053
		0.30	360/370	0402-3063
		0.50	360/370	0402-3093
		1.00	340/360	0402-3113
		1.50	340/360	0402-3153
	0.45	0.42	300/320	0402-4073
		1.27	300/320	0402-4133
	0.53	0.10	360/370	0402-5003
		0.25	360/370	0402-5053
		0.50	360/370	0402-5093
		1.00	340/360	0402-5113
		1.20	340/360	0402-5123
		1.50	340/360	0402-5153
		2.65	340/360	0402-5183
		3.00	340/360	0402-5193
		5.00	340/360	0402-5213
50	0.25	0.10	360/370	0402-2004
		0.20	360/370	0402-2044
		0.25	360/370	0402-2054
	0.32	0.30	360/370	0402-3064
	0.53	1.00	340/360	0402-5114
		1.20	340/360	0402-5124
60	0.25	0.10	360/370	0402-2005
		0.20	360/370	0402-2045
		0.25	360/370	0402-2055
		0.50	360/370	0402-2095
		1.00	340/360	0402-2115
	0.32	0.10	360/370	0402-3005
		0.25	360/370	0402-3055
		0.30	360/370	0402-3065
		0.50	360/370	0402-3095
		1.00	340/360	0402-3115
		1.50	340/360	0402-3155

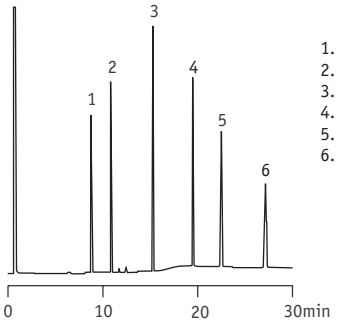
CLP Pesticides



1. α–BHC
2. β-BHC
3. γ-BHC
4. δ-BHC
5. Heptachlor
6. Aldrin
7. Heptachlor epoxide
8. γ-Chlordane
9. Endosulfan I
10. α-Chlordane
11. Dieldrin
12. *p,p'*-DDE
13. Endrin
14. Endosulfan II
15. *p,p'*-DDT
16. Endrin aldehyde
17. Endosulfan sulfate
18. *p,p'*-DDT
19. Endrin ketone
20. Methoxychlor

Column: VertiBond™ 5, 15m x 0.32mm x 0.32µm
Temp: 50°C (hold 1 min), 50-150°C at 25°/min, 150-230°C at 4°/min
Injector: Splitless at 250°C
Detector: FID at 300°C
Carrier Gas: Helium at 37.2cm/sec

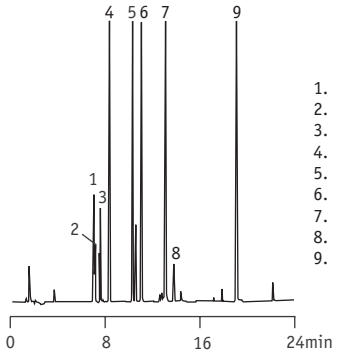
EPA Method 606-Phthalates



1. Dimethylphthalate
2. Diethylphthalate
3. Di-n-butylphthalate
4. Butylbenzyl Phthalate
5. Bis(2-ethylhexyl) phthalate
6. Di-n-octylphthalate

Column: VertiBond™ 5, 15m x 0.53mm, 1.0µm
Temp: 115°C (4 min hold), 115°C-250°C at 10°C/min, 250°C (11 min hold)
Injector: Split at 250°C (5:1 split ratio w/ split flow of 17 mL/min)
Detector: FID at 275°C
Carrier Gas: Helium at 35cm/sec

Chlorinated Hydrocarbons US EPA Method 612



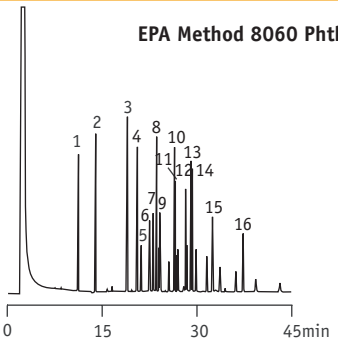
1. 1,3-dichlorobenzene
2. 1,4-dichlorobenzene
3. 1,2-dichlorobenzene
4. Hexachloroethane
5. 1,2,4-Trichlorobenzene
6. Hexachlorobutadiene
7. Hexachlorocyclopentadiene
8. Chloronaphthalene
9. Hexachlorobenzene

Column: VertiBond™ 5, 30m x 0.53mm, 0.50µm
Temp: 40°C to 250°C at 8°C/min (5 min hold)
Injector: 1.0µL direct injection at 250°C/300°C
Detector: FID
Carrier Gas: Helium at 35cm/sec

VertiBond™ 5

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
60	0.53	0.10	360/370	0402-5005
		0.25	360/370	0402-5055
		0.50	360/370	0402-5095
		1.00	340/360	0402-5115
		1.20	340/360	0402-5125
		1.50	340/360	0402-5155
		3.00	340/360	0402-5195
		5.00	340/360	0402-5215
105	0.25	0.10	360/370	0402-2007
		0.25	360/370	0402-2057
		0.50	360/370	0402-2097
		1.00	340/360	0402-2117
	0.32	0.10	360/370	0402-3007
		0.25	360/370	0402-3057
		0.50	360/370	0402-3097
		1.00	340/360	0402-3117
		1.50	340/360	0402-3157
	0.53	1.20	340/360	0402-5127
		5.00	340/360	0402-5217

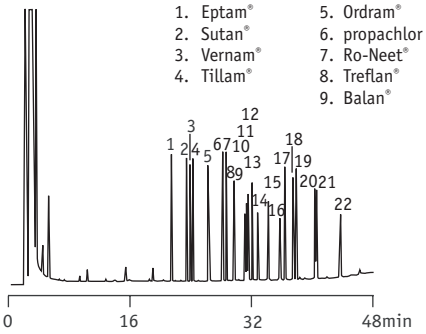
EPA Method 8060 Phthalate Esters



1. dimethyl phthalate
2. diethyl phthalate
3. diisobutyl phthalate
4. di-*n*-butyl phthalate
5. bis(methoxyethyl) phthalate
6. bis(4-methyl,2-pentyl) phthalate
7. bis(ethoxyethyl) phthalate
8. di-amyl phthalate
9. hexyl-2-ethylhexyl phthalate
10. di-*n*-hexyl phthalate
11. butylbenzyl phthalate
12. bis(2-*n*-butoxyethyl) phthalate
13. dicyclohexyl phthalate
14. bis(2-ethylhexyl) phthalate
15. di-*n*-octyl phthalate
16. di-nonyl phthalate

Column: VertiBond™ 5, 30m x 0.53mm, 0.50µm
Temp: 60°C to 290°C (1 min hold)
Injector: 0.5µL direct injection at 290°
Detector: FID
Carrier gas: Helium at 20cm/sec

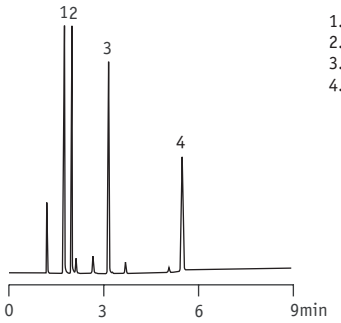
Nitrogen-Containing Herbicides



1. Eptam®
2. Sutan®
3. Vernam®
4. Tillam®
5. Ordram®
6. propachlor
7. Ro-Neet®
8. Treflan®
9. Balan®
10. simazine
11. atrazine
12. propazine
13. Tolban®
14. terbacil
15. Sencor®
16. bromacil
17. Dual®
18. Parrlan®
19. Prowl®
20. oxadiazon
21. Goal®
22. hexazinone

Column: VertiBond™ 5, 30m x 0.53mm, 0.50µm
Temp: 60°C (1 min hold) to 290°C at 15°C/min (hold 5min)
Injector: 2.0µL direct injection at 290°
Detector: FID
Carrier gas: Helium at 40cm/sec

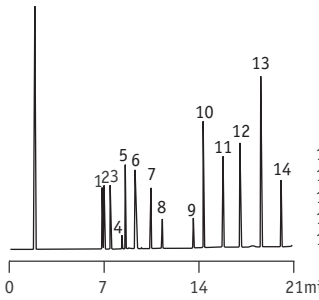
EPA Method 551: Chlorinated Disinfection



1. Trichloroacetonitrile
2. Dichloroacetonitrile
3. Bromochloroacetonitrile
4. Dibromoacetonitrile

Column: VertiBond™ 5, 30m x 0.32mm, 0.25µm
Temp: 55°C (2 min hold) to 75°C at 5°C/min
Detector: NPD
Carrier Gas: Helium at 2.2mL/min

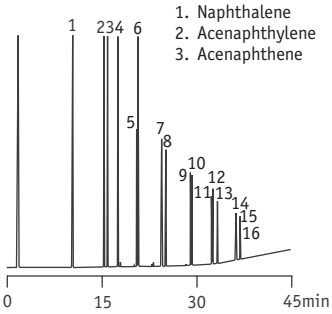
Base/Neutral Mix



1. 1,3-Dichlorobenzene
2. 1,4-Dichlorobenzene
3. 1,2-Dichlorobenzene
4. Hexachloroethane
5. Nitrobenzene
6. Isophorone
7. 1,2,4-Trichlorobenzene
8. Hexachlorobutadiene
9. Hexachlorocyclopentadiene
10. 2-Chloronaphthalene
11. 2,6-Dinitrotoluene
12. 2,4-Dinitrotoluene
13. Azobenzene
14. Hexachlorobenzene

Column: VertiBond™ 5, 30m x 0.32mm, 0.25µm
Temp: 60°C (2min hold) to 205°C at 8°C/min
Detector: FID
Carrier Gas: Helium at 2.2mL/min

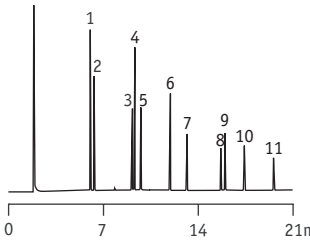
Polynuclear Aromatic Hydrocarbons



1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benz[a]anthracene
10. Chrysene
11. Benzo[b]fluoranthene
12. Benzo[k]fluoranthene
13. Benzo[a]pyrene
14. Indeno[1,2,3-c,d]pyrene
15. Dibenz[a,h]anthracene
16. Benzo[g,h,i]perylene

Column: VertiBond™ 5, 30m x 0.32mm, 0.25µm
Temp: 60°C (2min hold) to 315°C at 8°C/min
Detector: FID
Carrier Gas: Helium at 1.6mL/min

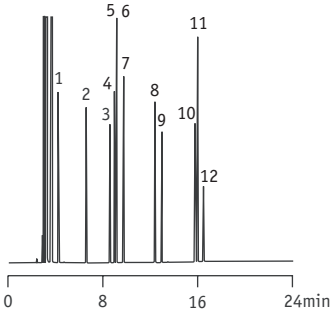
Phenols



1. Phenol
2. 2-Chlorophenol
3. 2-Nitrophenol
4. 2,4-Dimethylphenol
5. 2,4-Dichlorophenol
6. 4-Chloro-3-Methylphenol
7. 2,4,6-Trichlorophenol
8. 2,4-Dinitrophenol
9. 4-Nitrophenol
10. 2-Methyl-4,6-Dinitrophenol
11. Pentachlorophenol

Column: VertiBond™ 5, 30m x 0.25mm, 0.25µm
Temp: 70°C (2 min hold) to 230°C at 8°C/min
Detector: FID
Carrier Gas: Helium at 0.8mL/min

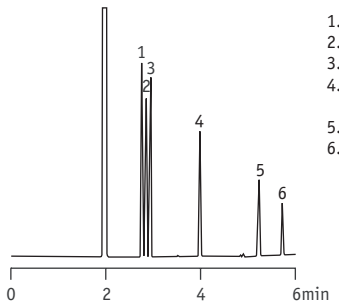
Aromatic Solvents



1. Benzene
2. Toluene
3. Chlorobenzene
4. Ethylbenzene
5. *m*-Xylene
6. *p*-Xylene
7. *o*-Xylene
8. 1,4-Dichlorobenzene
9. 1,2-Dichlorobenzene
10. 1,2,4-Trichlorobenzene
11. Napthalene
12. 1,2,3-Trichlorobenzene

Column: VertiBond™ 5, 30m x 0.32mm, 1.00µm
Temp: 60°C (4min hold) to 200°C at 10°C/min
Detector: FID
Carrier Gas: Helium at 1.3mL/min (24cm/sec)

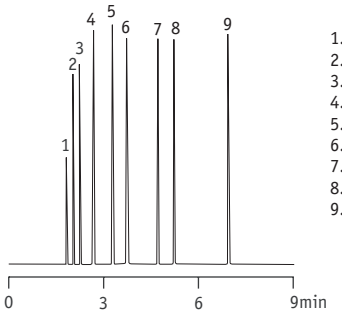
Phenolic Antioxidants



1. BHA
2. BHT
3. TBHQ
4. 3,5-Di-*tert*-butyl-4-Hydroxybenzyl Alcohol
5. THBP
6. Propyl Gallate

Column: VertiBond™ 5, 30m x 0.25 mm, 0.25µm
Temp: 220°C (3min hold) to 265°C at 15°C/min
Detector: FID
Carrier Gas: Helium at 0.74mL/min

C1-C6 Alcohols



1. Methanol
2. Ethanol
3. 2-Propanol
4. 1-Propanol
5. 2-Methyl-1-propanol
6. 1-Butanol
7. 3-Methyl-1-butanol
8. 1-Pentanol
9. 1-Hexanol

Column: VertiBond™ 5, 30m x 0.32mm, 1.00µm
Temp: 40°C to 120°C at 10°C/min
Detector: FID at 275°C
Carrier Gas: Helium at 1.2mL/min (25cm/sec)

VertiBond™ 5ms Capillary Columns

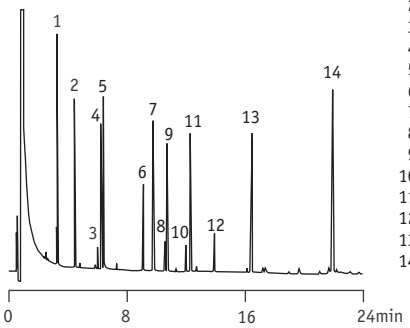
- **5% Phenyl, 95% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **Low-Bleed for MS application or trace analysis**
- **Excellent general purpose columns**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 5ms column contains 5% Diphenyl and 95% Dimethylpolysiloxane stationary phase with excellent thermal stability or low-bleed. This intermediate polar stationary phase provides higher precision, especially for trace analysis, and increased analytical productivity due to faster stabilization times and less instrument downtime.

VertiBond™ 5ms Specifications	
Phase:	5% Phenyl, 95% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G27, G36
Ideal for:	Mass Spec Analysis-General Application

VertiBond™ 5ms Specifications	
Restek	Rtx-5ms, RTX-XTI
Agilent	HP-5ms, DB-5ms
Supelco	Equity-5, PTE-5
Alltech	AT-5ms
SGE	BP-5ms
Varian	CP-SIL8CB MS
Ohio Valley	OV-5MS

Herbicides



1. Metamidofos
2. Acephate
3. Diphenylamine
4. Monocrophos
5. Sulfotep
6. Tolclofos-methyl
7. Fenitrothion
8. Triadimefon
9. Trichloronate
10. Triadimenol
11. Bromophos-ethyl
12. Bupirimate
13. Carbophenothion
14. Dialifos

Column: VertiBond™ 5ms, 30m x 0.25mm, 0.25µm
Temp: 90°C (hold 1min), 90°C-180°C at 30°C/min, 180°C-260°C at 5°C/min, 260°C (hold 10 min)
Injector: Split
Detector: NPD
Carrier Gas: Helium

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	330/360	0403-2001
		0.25	330/360	0403-2051
		0.50	330/360	0403-2091
	0.32	0.10	330/360	0403-3001
		0.25	330/360	0403-3051
		0.50	330/360	0403-3091
	0.53	0.50	330/360	0403-5091
25	0.32	0.50	330/360	0403-3092
30	0.25	0.10	330/360	0403-2003
		0.25	330/360	0403-2053
		0.50	330/360	0403-2093
		1.00	330/360	0403-2113
	0.32	0.10	330/360	0403-3003
		0.25	330/360	0403-3053
		0.50	330/360	0403-3093
		1.00	330/360	0403-3113
	0.53	0.50	330/360	0403-5093
50	0.25	0.10	330/360	0403-2004
60	0.25	0.10	330/360	0403-2005
		0.25	330/360	0403-2055
		1.00	330/360	0403-2115
	0.32	0.25	330/360	0403-3055

VertiBond™ 5ht Capillary Columns

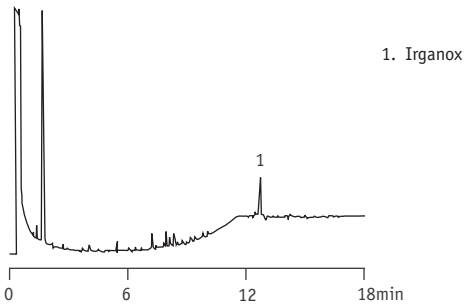
- **5% Phenyl, 95% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **Excellent general purpose columns**
- **High temperature to 400 °C**
- **High efficiency, high inertness columns**

VertiBond™ 5ht column contains 5% Phenyl, 95% Dimethyl-polysiloxane stationary phase with high temperature to 395 °C. VertiBond™ 5ht column suited for waxes, sterol esters, simulated distillation and other petroleum applications.

VertiBond™ 5ht Specifications	
Phase:	5% Phenyl, 95% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G27, G36
Ideal for:	Simulated Distillation and Other Petroleum Applications

VertiBond™ 5ht Specifications	
Agilent	HP-5ht
SGE	BP-HT5

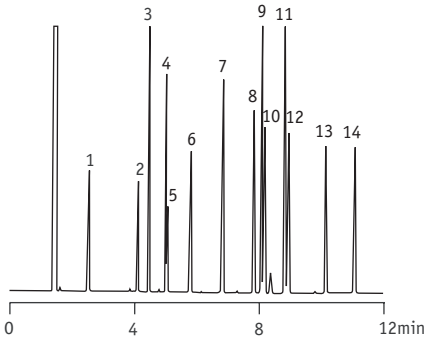
IRGANOX 1010



Column: VertiBond™ 5ht, 15m x 0.25mm, 0.1µm
Temp: 150°C-380°C at 30°C/min, 380°C (hold 10min)
Injector: Split (1:60) at 370°C
Detector: FID at 390°C
Carrier Gas: Hydrogen

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.32	0.10	380/395	0418-3000
	0.53	0.15	380/395	0418-5020
15	0.25	0.10	380/395	0418-2001
	0.32	0.50	380/395	0418-3091
	0.53	0.50	380/395	0418-5091
25	0.32	0.10	380/395	0418-3002
	0.53	0.15	380/395	0418-5022
30	0.25	0.25	380/395	0418-2053
	0.32	0.50	380/395	0418-3093
	0.53	0.50	380/395	0418-5093

Substituted Benzenes



1. Toluene
2. Ethylbenzene
3. *m & p*-Xylene
4. Styrene
5. o-Xylene
6. *iso*-Propylbenzene
7. n-Propylbenzene
8. 1, 3, 5-Trimethylbenzene
9. α-Methylstyrene
10. *tert*-Butylbenzene
11. 1, 2, 4-trimethylbenzene & *iso*-butybenzene
12. *sec*-Butylbenzene
13. β-Methylstyrene
14. n-Butylbenzene

Column: VertiBond™ 5ht, 25m x 0.32mm, 0.1µm
Temp: 0°C (hold 2min), 40°C-70°C at 4°C/min, 70°C (hold 4min)
Injector: Split
Detector: FID
Carrier Gas: Hydrogen

VertiBond™ 17 Capillary Columns

- **50% Phenyl, 50% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

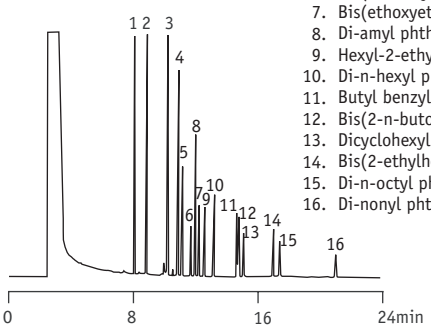
VertiBond™ 17 column contains 50% Phenyl, 50% Dimethyl-polysiloxane stationary phases. This intermediate polarity phase are used for the analysis of polar compounds like chlorinated pesticides, herbicides, and basic drugs.

VertiBond™ 17 Specifications	
Phase:	50% Phenyl, 50% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G3
Ideal for:	Pesticides, Herbicides, Phthalate Esters, Free Phenols, and Basic Drugs

VertiBond™ 17 Specifications	
Restek	Rtx-50
Agilent	HP-17, DB-17
Supelco	SPB-50
Alltech	AT-50
SGE	BPX-50
Varian	CP-SIL24CB
Ohio Valley	OV-17
Phenomenex	ZB-50

Phthalate Esters

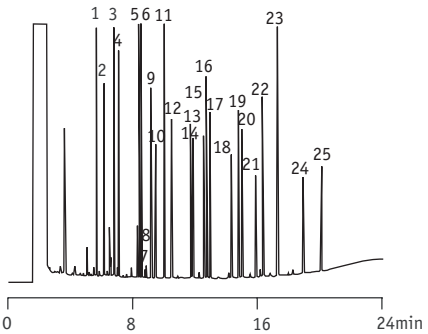
1. Dimethyl phthalate
2. Diethyl phthalate
3. Diisobutyl phthalate
4. Di-n-butyl phthalate
5. Bis(methoxyethyl) phthalate
6. Bis(4-methyl,2-pentyl)
7. Bis(ethoxyethyl) phthalate
8. Di-amyl phthalate
9. Hexyl-2-ethylhexyl phthalate
10. Di-n-hexyl phthalate
11. Butyl benzyl phthalate
12. Bis(2-n-butoxyethyl)
13. Dicyclohexyl phthalate
14. Bis(2-ethylhexyl) phthalate
15. Di-n-octyl phthalate
16. Di-nonyl phthalate



Column:	VertiBond™ 17, 30m x 0.53mm, 0.5µm
Temp:	100°C to 275°C at 15°C/min
Injector:	Direct injection
Detector:	FID
Carrier Gas:	Helium

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.25	325/340	0408-2051
	0.32	0.25	325/340	0408-3051
	0.53	1.00	325/340	0408-5111
30	0.25	0.25	325/340	0408-2053
	0.32	0.25	325/340	0408-3053
	0.53	0.50	325/340	0408-5093
		1.00	325/340	0408-5113

Organophosphorous pesticides



Column:	VertiBond™ 17, 30m x 0.25mm, 0.25µm
Temp:	50°C (hold 1min), 50°C-200°C at 30°C/min 50°C-200°C (hold 3 min), 200°C-310°C at 10°C/min 310°C (hold 2min)
Injector:	Splitless
Detector:	FID at 320°C
Carrier Gas:	Helium

1. 4-Chloro-3-nitrobenzo-trifluoride
2. Dichlorvos
3. 1-Bromo-2-nitrobenzene
4. α-Mervinphos
5. Tributylphosphate(IS)
6. Ethoprop
7. Sulfotepp
8. Naled
9. Phorate
10. Demeton
11. Diazinon
12. Disulfoton
13. Methyl Parathion
14. Ronnel
15. Chlorpyrifos
16. Fenthion
17. Trichlorinate
18. Tetrachlorvinphos
19. Tokuthion
20. Impurity
21. Fensulfothion
22. Impurity
23. Triphenylphosphate(IS)
24. Guthion
25. Coumaphos

VertiBond™ 17ms Capillary Columns

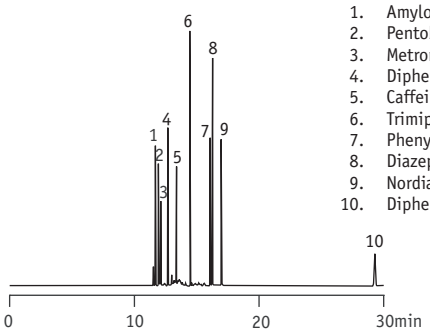
- **50% Phenyl, 50% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **Low-Bleed for MS application or trace analysis**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 17ms column contains 50% Phenyl, 50% Dimethyl-polysiloxane stationary phases with low-bleed. This highly stabilized intermediated polarity offers lower bleed at higher temperature. VertiBond™ 17ms column provides higher precision, especially for trace analysis with MS and other detectors like FID, ECD, and NPD detector.

VertiBond™ 17ms Specifications	
Phase:	50% Phenyl, 50% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G3
Ideal for:	Mass Spec Applications

VertiBond™ 17ms Specifications	
Restek	Rtx-50
Agilent	HP-50+, DB-17ms
Alltech	AT-50ms

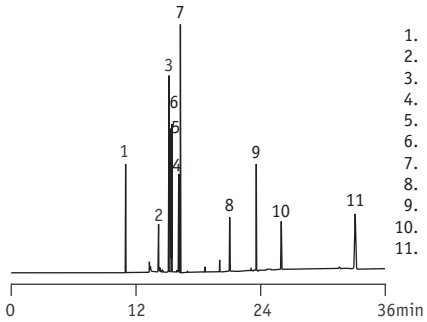
Horse Racing Drug Standard



1. Amylobarbitone
2. Pentobarbitone
3. Metronidazole
4. Diphenhydramine
5. Caffeine
6. Trimipramine
7. Phenytoin
8. Diazepam
9. Nordiazepam
10. Diphenoxylate

Column: VertiBond™ 17ms, 30m x 0.25mm, 0.25µm
Temp: 75°C (hold 2min), 75°C-300°C at 15°C/min, 300°C-320°C at 20°C/min, 320°C (hold 14min)
Injector: Splitless
Detector: MSD
Carrier Gas: Helium at 1.5mL/min

Hallucinogens



1. 4-Methylaminorex
2. Mescaline
3. Dimethyltryptamine
4. Ketimine
5. TCP (Tenocyclidine)
6. PCP
7. Diethyltryptamine
8. Bufotenine
9. Fentanyl
10. Ibogaine
11. LSD

Column: VertiBond™ 17ms, 30m x 0.25mm, 0.25µm
Temp: 50°C (hold 0.5min), 50-125°C at 25°/min, 125-255°C at 10°/min, 255-320°C at 25°/min, 320°C (hold 16min)
Injector: Splitless
Detector: MSD
Carrier Gas: Helium at 30cm/sec

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.25	340/360	0409-2051
	0.32	0.25	340/360	0409-3051
30	0.25	0.25	340/360	0409-2053
		0.50	340/360	0409-2093
	0.32	0.25	340/360	0409-3053
		0.50	340/360	0409-3093
60	0.25	0.25	340/360	0409-2055

VertiBond™ 17ht Capillary Columns

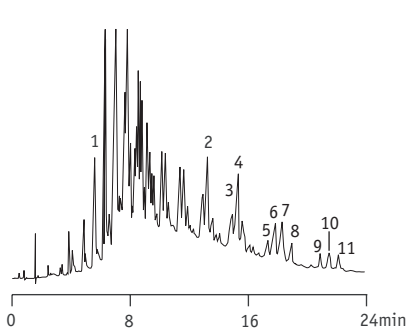
- **50% Phenyl, 50% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature to 400 °C**
- **High efficiency, high inertness columns**

VertiBond™ 17ht column contains 50% Phenyl, 50% Dimethylpolysiloxane stationary phases with hight temperature stability to 400 °C. This intermediate polarity phase provides better separation of high boiling and aromatic compounds because of column's high stability and selectivity.

VertiBond™ 17ht Specifications	
Phase:	50% Phenyl, 50% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G3
Ideal for:	High Boiling Compounds

VertiBond™ 17ht Specifications	
Restek	Rtx-65
Agilent	DB-17ht

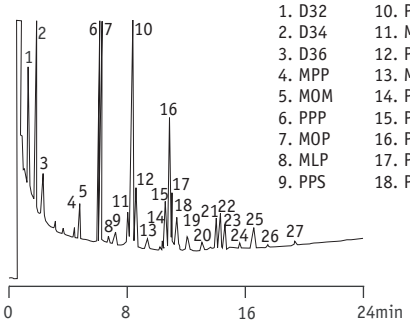
Butter Triglycerides



1. Cholesterol
2. PPP
3. PPS
4. PPO
5. PSS
6. PSO
7. POO
8. SSS
9. SSO
10. SOO
11. OOO

Column: VertiBond™ 17ht, 30m x 0.32mm, 0.15µm
Temp: 250-365°C at 5°/min, 365°C (hold 1 min)
Injector: Cool On-column 1mL of 9mg/mL in toluene (approx 1% w/w solution)
Detector: FID at 400°C
Carrier gas: Nitrogen at 30mL/min

Triglycerides



1. D32
2. D34
3. D36
4. MPP
5. MOM
6. PPP
7. MOP
8. MLP
9. PPS
10. POP
11. MOO
12. PLP
13. MLO
14. PSS
15. POS
16. POO
17. PLS
18. PLO
19. PLL
20. SOS
21. SOO
22. OOO
23. SLO
24. OLO
25. OLL
26. SOA
27. AOO

Column: VertiBond™ 17ht, 15m x 0.25mm, 0.15µm
Temp: 340°C (hold 1min), 340°C-355°C, 0.5°C/min, 355°C (hold 5 min)
Injector: Splitless at 380°C (high temp.septum)
Detector: FID at 380°C
Carrier Gas: Hydrogen

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.15	380/400	0410-2021
	0.32	0.15	380/400	0410-3021
	0.53	0.15	380/400	0410-5021
30	0.25	0.15	380/400	0410-2023
	0.32	0.15	380/400	0410-3023
	0.53	0.15	380/400	0410-5023
60	0.32	0.15	380/400	0410-3025

VertiBond™ 20 Capillary Columns

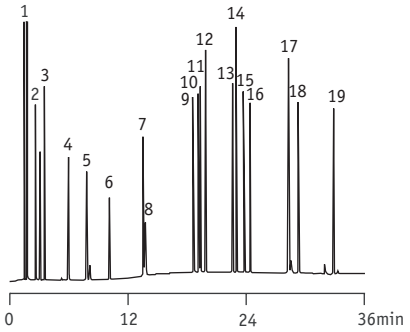
- **20% Phenyl, 80% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 20 contains 20% Phenyl, 80% Dimethyl- polysiloxane stationary phases. This intermediate polarity phase offers unique polarity to give balance between low and mid polarity.

VertiBond™ 20 Specifications	
Phase:	20% Phenyl, 80% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G28, G32
Ideal for:	Volatile Compounds and Solvents

VertiBond™ 20 Specifications	
Restek	Rtx-20
Supelco	SPB-20, VOCOL
Alltech	AT-20
Ohio Valley	OV-20

Mushroom Aroma (Synthetic)



1. Acetone
2. Ethyl acetate
3. 1-Butanol
4. 3-Methyl-1-butanol
5. 1-Pentanol
6. Hexanal
7. Furfural
8. Amyl acetate
9. 1-Octen-3-ol
10. 3-Octanol
11. 3-Octanone
12. Benzaldehyde
13. Octyl alcohol
14. Benzyl alcohol
15. Phenylacetaldehyde
16. Nanonal
17. α-Terpineol
18. 2,4-Nonadienal
19. 2,4-Decadienal

Column:	VertiBond™ 20, 30m x 0.32mm, 1.0µm
Temp:	45 (hold 8 min) to 250°C at 4°C/min
Injector:	1µL split injection at 260°C (split ratio: 100:1)
Detector:	FID
Carrier Gas:	Hydrogen 40cm/sec

Ordering Information

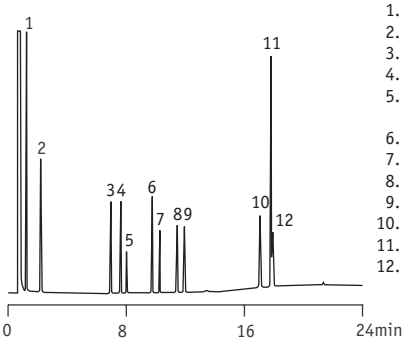
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	300/320	0404-2001
		0.25	300/320	0404-2051
		0.50	290/310	0404-2091
		1.00	280/300	0404-2111
	0.32	0.10	300/320	0404-3001
		0.25	300/320	0404-3051
		0.50	290/310	0404-3091
		1.00	280/300	0404-3111
		3.00	250/270	0404-3191
	0.53	0.10	260/280	0404-5001
		0.25	260/280	0404-5051
		0.50	260/280	0404-5091
		1.00	260/280	0404-5111
		1.20	260/280	0404-5121
		1.50	250/270	0404-5151
		3.00	240/260	0404-5191
25	0.53	1.20	260/280	0404-5122
30	0.25	0.10	300/320	0404-2003
		0.25	300/320	0404-2053
		0.50	290/310	0404-2093
		1.00	280/300	0404-2113
	0.32	0.10	300/320	0404-3003
		0.25	300/320	0404-3053
		0.50	290/310	0404-3093
		1.00	280/300	0404-3113
		3.00	250/270	0404-3193
	0.53	0.10	260/280	0404-5003
		0.25	260/280	0404-5053
		0.50	260/280	0404-5093

VertiBond™ 20

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.53	1.00	260/280	0404-5113
		1.20	260/280	0404-5123
		1.50	250/270	0404-5153
		3.00	240/260	0404-5193
60	0.25	0.10	300/320	0404-2005
		0.25	300/320	0404-2055
		0.50	290/310	0404-2095
		1.00	280/300	0404-2115
	0.32	0.10	300/320	0404-3005
		0.25	300/320	0404-3055
		0.50	290/310	0404-3095
		1.00	280/300	0404-3115
		3.00	250/270	0404-3195
	0.53	0.10	260/280	0404-5005
		0.25	260/280	0404-5055
		0.50	260/280	0404-5095
		1.00	260/280	0404-5115
		1.50	250/270	0404-5155
		3.00	240/260	0404-5195
105	0.25	0.25	300/320	0404-2057

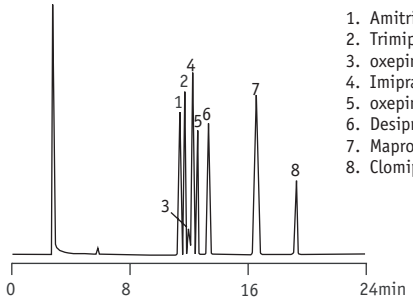
Underivatized Antiepileptics



1. Valproic acid
2. Ethosuximide
3. Methsuximide
4. Phensuximide
5. Desmethyl methsuximide
6. Mephenytoin
7. Ethotoin
8. PEMA
9. Phenobarbital
10. Primidone
11. Carbamazepine
12. Diphenylhydantoin

Column: VertiBond™ 20, 15m x 0.32mm, 0.50µm
Temp: 150 to 280°C at 7°C/min (hold 5 min)
Injector: 1µL split injection of antiepileptic drugs at 250°C/270°C (split ratio: 30:1)
Detector: FID
Carrier Gas: Helium 30cm/sec set at 150°C

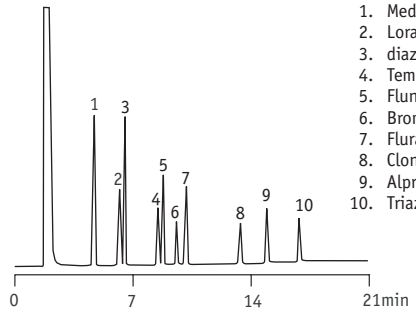
Antidepressants



1. Amitriptyline
2. Trimipramine
3. oxepin (*cis*-Doxepin)
4. Imipramine
5. oxepin (*trans*-Doxepin)
6. Desipramine
7. Maprotyline
8. Clomipramine

Column: VertiBond™ 20, 30m x 0.32mm, 0.25µm
Temp: 235°C
Detector: FID
Carrier Gas: Helium at 22cm/sec

Benzodiazepines



1. Medazepam
2. Lorazepam
3. diazepam
4. Temazepam
5. Flunitzepam
6. Bromazepam
7. Flurazepam
8. Clonazepam
9. Alprazolam
10. Triazolam

Column: VertiBond™ 20, 30m x 0.32mm, 0.25µm
Temp: 260°C to 300°C at 3°C/min
Detector: FID
Carrier Gas: Helium at 35cm/sec

VertiBond™ 35 Capillary Columns

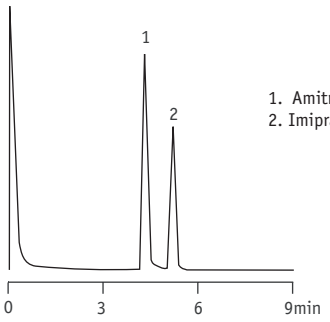
- **35% Phenyl, 65% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 35 column contains 35% phenyl, 65% Dimethyl-polysiloxane stationary phases. This intermediate polarity phase provides significant elution order and retention time changes.

VertiBond™ 35 Specifications	
Phase:	35% Phenyl, 65% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G42
Ideal for:	Pesticides, Herbicides, Drugs, Aromatics

VertiBond™ 35 Specifications	
Restek	Rtx-35
Agilent	HP-35, DB-35
Supelco	SPB-35
Alltech	AT-35
SGE	BPX-35
Varian	CP-SIL24CB
Ohio Valley	OV-11
Phenomenex	ZB-35

Tricyclic Antidepressants



Column:	VertiBond™ 35, 10m x 0.53mm, 1.2µm
Temp:	200°C
Injector:	Splitless
Detector:	FID
Carrier Gas:	Helium 1.2mL/min

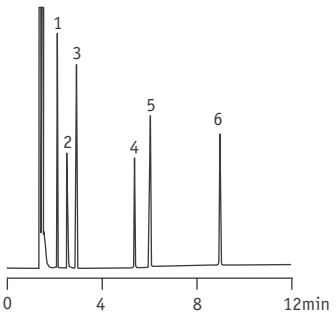
Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.53	1.20	280/300	0405-5120
		2.65	260/280	0405-5180
15	0.25	0.10	300/320	0405-2001
		0.25	300/320	0405-2051
		0.50	300/320	0405-2091
		1.00	280/300	0405-2111
	0.32	0.10	300/320	0405-3001
		0.15	300/320	0405-3021
		0.25	300/320	0405-3051
		0.50	300/320	0405-3091
		1.00	300/320	0405-3111
		1.50	280/300	0405-3151
	0.45	0.85	280/300	0405-4101
	0.53	0.10	280/300	0405-5001
		0.25	280/300	0405-5051
		0.50	280/300	0405-5091
		1.00	280/300	0405-5111
		1.20	280/300	0405-5121
		1.50	260/280	0405-5151
25	0.25	0.20	300/320	0405-2042
	0.32	0.30	300/320	0405-3062
	0.53	1.20	280/300	0405-5122
30	0.25	0.10	300/320	0405-2003
		0.15	300/320	0405-2023
		0.20	300/320	0405-2043
		0.25	300/320	0405-2053
		0.50	300/320	0405-2093
		1.00	280/300	0405-2113

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.32	0.10	300/320	0405-3003
		0.15	300/320	0405-3023
		0.25	300/320	0405-3053
		0.50	300/320	0405-3093
		1.00	300/320	0405-3113
		1.50	280/300	0405-3153
	0.45	0.42	300/320	0405-4073
		0.85	280/300	0405-4103
	0.53	0.10	280/300	0405-5003
		0.25	280/300	0405-5053
		0.50	280/300	0405-5093
		1.00	280/300	0405-5113
		1.20	280/300	0405-5123
		1.50	260/280	0405-5153
		2.65	260/280	0405-5183
		3.00	260/280	0405-5193
50	0.25	0.20	300/320	0405-2044
	0.32	0.30	300/320	0405-3064
60	0.25	0.10	300/320	0405-2005
		0.20	300/320	0405-2045
		0.25	300/320	0405-2055
		0.50	300/320	0405-2095
		1.00	280/300	0405-2115
	0.32	0.10	300/320	0405-3005
		0.25	300/320	0405-3055
		0.50	300/320	0405-3095
		1.00	300/320	0405-3115
		1.50	280/300	0405-3155
	0.53	0.10	280/300	0405-5005
		0.25	280/300	0405-5055
		0.50	280/300	0405-5095
		1.00	280/300	0405-5115
		1.50	260/280	0405-5155

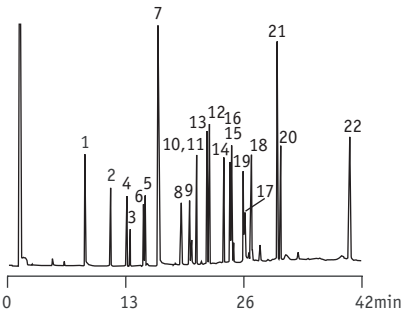
Amine Test Mix



1. Pyridine
2. 1,2-Butanediol
3. C10
4. 2-Nonanol
5. C12
6. 2,6-Dimethylaniline

Column: Vertibond™ 35, 30m x 0.53mm, 1.0µm
Temp: 110°C (hold 4min.), 110°C-200°C at 8°C/min 200°C (hold 5min.)
Injector: split (10:1), 1.0µL, 4mm base-deactivated
Detector: FID at 300°C
Carrier Gas: Helium

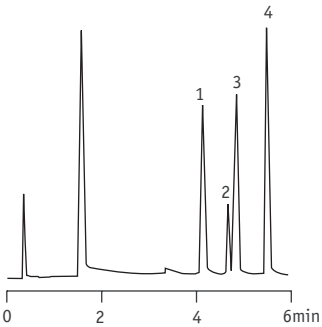
Organochlorine Pesticides



1. 2,4,5,6-Tetrachloro-m-xylene (IS)
2. α-BHC
3. β-BHC
4. γ-BHC
5. δ-BHC
6. Heptachlor
7. Aldrin
8. Heptachlor epoxide
9. γ-Chlordane
10. Endosulfan I
11. α-Chlordane
12. Dieldrin
13. p,p'-DDE
14. Endrin
15. Endosulfan II
16. p,p'-DDD
17. Endrin aldehyde
18. Endosulfan sulfate
19. p,p'-DDT
20. Endrin ketone
21. Methoxychlor
22. Decachlorobiphenyl (IS)

Column: Vertibond™ 35, 30m x 0.53mm, 0.5µm
Temp: 150-275°C at 4°C/min, 275°C (hold 30min)
Injector: Megabore Direct
Detector: ECD at 300°C
Carrier Gas: Nitrogen at 30mL/min

Tocopherols



1. δ–δ–Tocopherol
2. δ–β–Tocopherol
3. δ–γ–Tocopherol
4. δ–α–Tocopherol

Column: Vertibond™ 35, 25m x 0.25mm, 0.2µm
Temp: 310°C
Injector: Megabore Direct
Detector: FID
Carrier Gas: Hydrogen at 40cm/sec

VertiBond™ 35ms Capillary Columns

- **35% Phenyl, 65% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **Low-Bleed for MS application or trace analysis**
- **High temperature range**
- **High efficiency, high inertness columns**

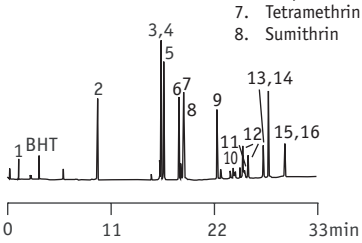
VertiBond™ 35ms column contains 35% Phenyl, 65% Dimethyl-polysiloxane stationary phases with low-bleed. This intermediate polarity phase offers significant elution order and retention time changes by MS applications.

VertiBond™ 35ms Specifications	
Phase:	35% Phenyl, 65% Dimethylpolysiloxane
Polarity:	Intermediate polar
USP Designation:	G42
Ideal for:	Pesticides, Herbicides, Drugs, Aromatics

VertiBond™ 35ms Specifications	
Agilent	HP-35ms, DB-35ms

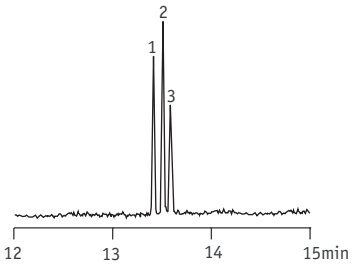
Synthetic Pyrethroid Cypermethrin

1. Natural Pyrethrums
2. Allenthrin
3. Bioresmethrin
4. Resmethrin
5. Bifenthrin
6. Fenprorathrin
7. Tetramethrin
8. Sumithrin
9. Permethrin
10. Cyfluthrin
11. Cypermethrin
12. Flucythrinate
13. Fenvalerate
14. Esfenvalerate
15. Tralomethrin
16. Deltamethrin



Column: VertiBond™ 35ms, 30m x 0.25mm, 0.25µm
Temp: 50°C (hold 1 min), 50°C-200°C at 30°C/min, 200°C-300°C at 4°C/min
Injector: Splitless
Detector: MSD
Carrier Gas: Helium

Triazine Herbicides



1. Propazine
2. Atrazine
3. Simazine

Column: VertiBond™ 35ms, 30m x 0.25mm, 0.25µm
Temp: 60°C (hold 1 min), 60°C-340°C at 15°/min
Injector: Hot On-column, 250°C 1 µL of a 10ng/mL
Detector: MSD
Carrier Gas: Helium at 33cm/sec

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.25	340/360	0406-2051
30	0.25	0.25	340/360	0406-2053
60	0.25	0.25	340/360	0406-2055

VertiBond™ 210 Capillary Columns

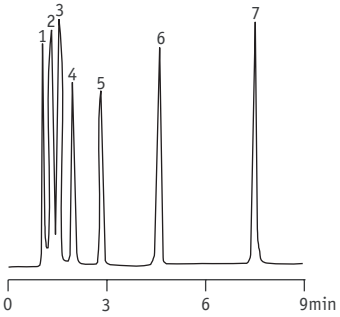
- **50% Trifluoropropyl, 50% Methylpolysiloxane**
- **High polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 210 column contains 50% Trifluoropropyl, 50% Methylpolysiloxane stationary phase. This high polarity phase excellent for EPA Methods 8140 and 609 and Solvent rinsable. Typical applications include nitro- or chloro-containing compounds, PNAs, unsaturated compounds, and CFCs. VertiBond™ 210 is also an excellent confirmation to VertiBond™ 5 for phenols, nitrosamines, chlorinated pesticides, chlorinated hydrocarbons, and chlorophenoxy herbicides.

VertiBond™ 210 Specifications	
Phase:	50% Trifluoropropyl, 50% Methylpolysiloxane
Polarity:	High Polar
USP Designation:	G6
Ideal for:	Ketones, Aldehydes, Silanes, Glycols, Nitro Aromatics, Herbicides, and Method 8140 and 609

VertiBond™ 210 Specifications	
Restek	Rtx-200
Agilent	DB-210, DB-200
Alltech	AT-210

Synthetic Pyrethroid Cypermethrin



1. Methanol
2. Ethanol
3. 2-Propanol
4. 1-Propanol
5. Acetone
6. Methyl Ethyl Ketone
7. Methyl Isobutyl Ketone

Column: VertiBond™ 210, 10m x 0.53mm, 1.2µm
Temp: 30°C (hold 3 min), 30°C-80°C at 10°C/min
Injector: Splitless
Detector: FID
Carrier Gas: Helium at 1mL/min

Ordering Information

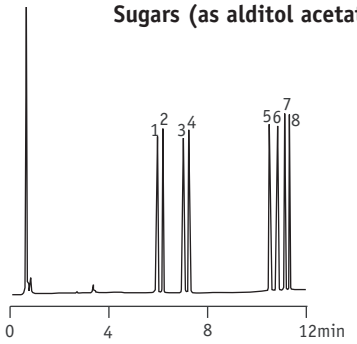
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.20	240/260	0419-2040
	0.53	1.20	220/240	0419-5120
15	0.25	0.20	240/260	0419-2041
		0.25	240/260	0419-2051
		0.50	240/260	0419-2091
	0.32	0.15	240/260	0419-3021
		0.25	240/260	0419-3051
	0.53	1.00	220/240	0419-5111
		1.20	220/240	0419-5121
25	0.53	1.20	220/240	0419-5122
30	0.25	0.25	240/260	0419-2053
		0.50	240/260	0419-2093
	0.32	0.15	240/260	0419-3023
		0.25	240/260	0419-3053
		0.50	240/260	0419-3093
	0.53	1.00	220/240	0419-5113
		1.20	220/240	0419-5123
60	0.25	0.25	240/260	0419-2055
	0.32	0.30	240/260	0419-3065

VertiBond™ 225 Capillary Columns

- **50% Cyanopropylphenyl, 50% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 225 column contains 50% Cyanopropylphenyl, 50% Methylpolysiloxane stationary phases. This large number of cyano groups provides high polarity and slightly lower temperature. VertiBond™ 225 ideals for separating cis- and trans-FAMES.

Sugars (as alditol acetates)



1. Rhamnitol
2. Fucitol
3. Ribitol
4. Arabinitol
5. Mannitol
6. Galactitol
7. Glucitol
8. Inositol

Column:	VertiBond™ 225, 15m x 0.25mm, 0.25µm
Temp:	190°C (hold 5 min), 190°C-250°C at 8°C/min, 250°C (hold 5 min)
Injector:	0.5 mL split injection
Detector:	FID
Carrier Gas:	Hydrogen

VertiBond™ 225 Specifications	
Phase:	50% Cyanopropylphenyl, 50% Dimethylpolysiloxane
Polarity:	Intermidiate Polar
USP Designation:	G19
Ideal for:	Carbohydrates and Solvents

VertiBond™ 225 Specifications	
Restek	Rtx-225
Agilent	HP-225, DB-225
Supelco	SPB-2250, SPB-50
Alltech	AT-225
SGE	BPX-50
Varian	CP-SIL24CB, CP-SIL43CB
Ohio Valley	OV-225
Phenomenex	ZB-50

Ordering Information

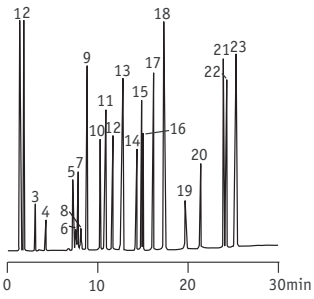
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	220/240	0413-2001
		0.15	220/240	0413-2021
		0.20	220/240	0413-2041
		0.25	220/240	0413-2051
		0.50	220/240	0413-2091
	0.32	0.10	220/240	0413-3001
		0.15	220/240	0413-3021
		0.25	220/240	0413-3051
		0.50	220/240	0413-3091
	0.45	0.85	200/220	0413-4101
	0.53	0.10	200/220	0413-5001
		0.25	200/220	0413-5051
		0.50	200/220	0413-5091
		1.00	200/220	0413-5111
25	0.25	0.20	220/240	0413-2042
	0.53	1.20	200/220	0413-5122
30	0.25	0.10	200/220	0413-2003
		0.15	200/220	0413-2023
		0.25	200/220	0413-2053
		0.50	200/220	0413-2093
	0.32	0.10	200/220	0413-3003
		0.15	200/220	0413-3023
		0.25	200/220	0413-3053
		0.30	220/240	0413-3063
		0.50	220/240	0413-3093
	0.45	0.85	200/220	0413-4103
	0.53	0.10	200/220	0413-5003
		0.25	200/220	0413-5053
		0.50	200/220	0413-5093
		1.00	200/220	0413-5113
		1.20	200/220	0413-5123

VertiBond™ 624 Capillary Columns

- **6% Cyanopropylphenyl, 94% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 624 column contains 6% Cyanopropylphenyl, 94% Dimethylpolysiloxane stationary phases. This intermediate polar stationary phase is developed specially and tested for volatile organic compounds, making it an excellent choice for several EPA methods like 501.3, 502.2, 524.2, 601, 602, 8010, 8015, 8020, 8221, 8240 and 8260.

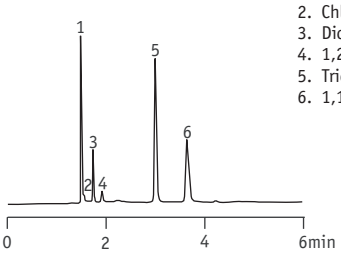
Priority Pollutant Analysis



Column:	VertiBond™ 624, 30m x 0.53mm, 3.0µm
Temp:	35°C (5min hold), 140°C at 5° C/min
Injector:	Splitless
Detector:	FID
Carrier Gas:	Helium at 5mL/min

1. Methane
2. Chloromethane
3. Chloroethane
4. Methylene Chloride
5. Bromochloromethane
6. Chloroform
7. 1,1,1-Trichloroethane
8. Carbon Tetrachloride
9. 1,2-Dichloroethane
10. Trichloroethylene
11. 1,2-Dichloropropane
12. Bromodichloromethane
13. *cis*-1,3-Dichloropropene
14. *trans*-1,3-Dichloropropene
15. 1,1,2-Trichloroethane
16. Tetrachloroethene
17. Chlorodibromomethane
18. Chlorobenzene
19. Bromoform
20. 1,1,2,2-Tetrachloroethane
21. *m*-Dichlorobenzene
22. *p*-Dichlorobenzene
23. *o*-Dichlorobenzene

Chlorofluorocarbons



Column:	VertiBond™ 624, 30m x 0.53mm, 3.0µm
Temp:	35°C (hold 4 min), 35°C-45°C at 10°C/min
Injector:	Split 1:10, 100µL
Detector:	ECD at 350°C
Carrier Gas:	Nitrogen at 35mL/min

1. Oxygen
2. Chloropentafluoroethane
3. Dichlorodifluoromethane
4. 1,2-Dichlorotetrafluoroethane
5. Trichlorofluoromethane
6. 1,1,2-Trichlorotrifluoroethane

VertiBond™ 624 Specifications	
Phase:	6% Cyanopropylphenyl, 94% Dimethylpolysiloxane
Polarity:	Intermidiate Polar
USP Designation:	G43
Ideal for:	EPA Methods 524, 601, 602, 624, 8240 and 8260 and Solvent Analysis

VertiBond™ 624 Specifications	
Restek	Rtx-1301, Rtx-624
Agilent	HP-1301, HP-624, DB-1301, DB-624
Supelco	SPB-1301, OVI-G43
Alltech	AT-624
SGE	BPX-624
Varian	CP-1301, CP-624CB
Ohio Valley	OV-624
Phenomenex	ZB-624

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.25	0.10	265/280	0414-2143
	0.32	0.15	265/280	0414-3163
		0.20	265/280	0414-3193
	0.45	0.25	265/280	0414-4173
	0.53	0.50	265/280	0414-5193
60	0.25	0.10	265/280	0414-2145
	0.32	0.15	265/280	0414-3165
	0.53	0.25	265/280	0414-5195
75	0.53	0.50	265/280	0414-5196
105	0.53	0.85	265/280	0414-5197

VertiBond™ 1301 Capillary Columns

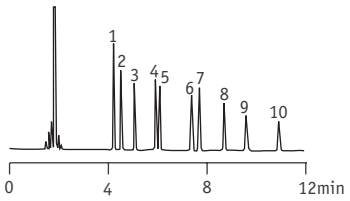
- **6% Cyanopropylphenyl, 94% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **Equivalent to USP G43**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 1301 column contains 6% Cyanopropylphenyl, 94% Dimethylpolysiloxane stationary phases. This intermediate polarity phase is specially developed to equivalent to USP G43 for analysis of residual solvents (OVI) in pharmaceutical products. VertiBond™ 1301 also ideals for acidic and basic compounds with a wide range of polarity like pesticides or herbicides.

VertiBond™ 1301 Specifications	
Phase:	6% Cyanopropylphenyl, 94% Dimethylpolysiloxane
Polarity:	Intermidiate Polar
USP Designation:	G43
Ideal for:	Volatile Organics, Pharmaceutical Products, and EPA Method 612

VertiBond™ 1301 Specifications	
Restek	Rtx-1301
Agilent	HP-1301, DB-1301, DB-624
Supelco	SPB-1301, OVI-G43
Alltech	AT-1301
SGE	BPX-624
Varian	CP-1301

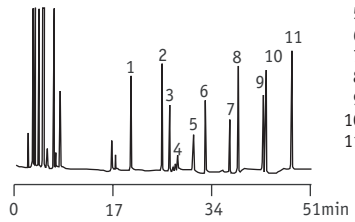
Test mixture



1. n-Undecane
2. 1-Octanol
3. Methyl octanoate
4. n-Dodecane
5. 2,6-Dimethylphenol
6. 2,6-Dimethylaniline
7. Naphthalene
8. n-Tridecane
9. 1-Decanol
10. Methyl decanoate

Column: VertiBond™ 1301, 30m x 0.25 mm, 1.0µm
Temp: 150°C
Injector: Split 100ml at 250°C
Detector: FID 280°C
Carrier Gas: Hydrogen

Grob test mixture



1. n-decane
2. n-undecane
3. 1-octanol
4. nonanal
5. 2,6-dimethylphenol
6. 2,6-dimethylaniline
7. unknown
8. methyl decanoate
9. N,N-dicyclohexylamine
10. methyl undecanoate
11. methyl dodecanoate

Column: VertiBond™ 1301, 30m x 0.25mm, 1.0µm
Temp: 40°C to190°C, 3°C/min
Injector: Split 100ml/min at 250°C
Detector: FID
Carrier Gas: Hydrogen

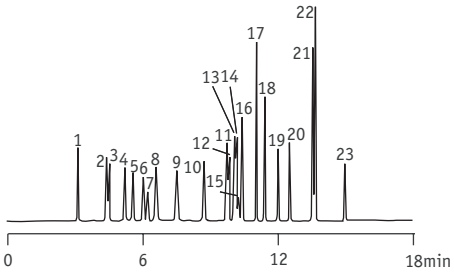
Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.10	280/300	0411-2001
		0.25	280/300	0411-2051
		0.50	280/300	0411-2091
		1.00	280/300	0411-2111
	0.32	0.10	280/300	0411-3001
		0.25	280/300	0411-3051
		0.50	280/300	0411-3091
		1.00	280/300	0411-3111
	0.53	0.10	260/280	0411-5001
		0.25	260/280	0411-5051
		0.50	260/280	0411-5091
		1.00	260/280	0411-5111
		1.50	260/280	0411-5151
		3.00	260/280	0411-5191
30	0.25	0.10	280/300	0411-2003
		0.25	280/300	0411-2053
		0.50	280/300	0411-2093
		1.00	280/300	0411-2113
	0.32	0.10	280/300	0411-3003
		0.25	280/300	0411-3053
		0.50	280/300	0411-3093
		1.00	280/300	0411-3113
	0.53	0.10	260/280	0411-5003
		0.25	260/280	0411-5053
		0.50	260/280	0411-5093
		1.00	260/280	0411-5113
		1.50	260/280	0411-5153
		3.00	260/280	0411-5193

VertiBond™ 1301

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
60	0.25	0.10	280/300	0411-2005
		0.25	280/300	0411-2055
		0.50	280/300	0411-2095
		1.00	280/300	0411-2115
	0.32	0.10	280/300	0411-3005
		0.25	280/300	0411-3055
		0.50	280/300	0411-3095
		1.00	280/300	0411-3115
	0.53	0.10	260/280	0411-5005
		0.25	260/280	0411-5055
		0.50	260/280	0411-5095
		1.00	260/280	0411-5115
		1.50	260/280	0411-5155
		3.00	260/280	0411-5195

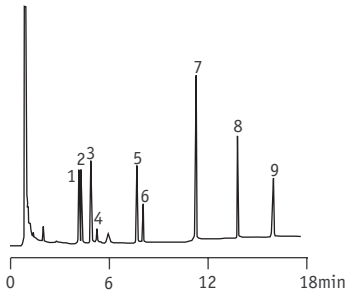
Organic Volatile Impurities



1. Methanol
2. Ethanol
3. Ether
4. Acetone
5. Isopropanol
6. Acetonitrile
7. Methylene chloride
8. *tert*-Butanol
9. Hexane
10. n-Propanol
11. Methyl ethyl ketone
12. Ethyl acetate
13. Tetrahydrofuran
14. sec-Butanol
15. Chloroform
16. Cyclohexane
17. Benzene
18. Heptane
19. Trichloroethylene
20. 1,4-Dioxane
21. Pyridine
22. Toluene
23. Dimethylformamide

Column: VertiBond™ 1301, 30 m x 0.53 mm, 3.0µm
Temp: 35°C (hold 8 min) to 240°C at 20°C/min
Injector: 0.5µL Split injection of residual solvents at 180°C/260°C (split ratio: 30:1)
Detector: FID
Carrier Gas: Helium 25cm/sec at 35°C

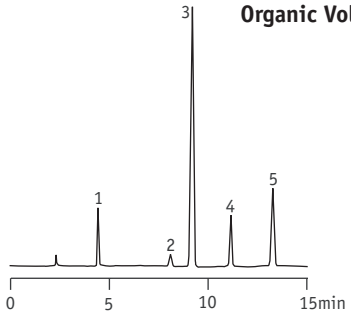
EPA Method 612: Chlorinated Hydrocarbons



1. 1,3-Dichlorobenzene
2. 1,4-Dichlorobenzene
3. 1,2-Dichlorobenzene
4. Hexachloroethane
5. 1,2,4-Trichlorobenzene
6. Hexachlorobutadiene
7. Hexachlorocyclopentadiene
8. 2-Chloronaphthalene
9. Hexachlorobenzene

Column: VertiBond™ 1301, 30m x 0.53mm, 3.0µm
Temp: 90°C (4 min hold) to190°C at 10°C/min
Detector: FID
Carrier Gas: Helium at 8.1mL/min

Organic Volatile



1. Methylene chloride
2. Chloroform
3. Benzene
4. Trichloroethylene
5. 1,4-Dioxane

Column: VertiBond™ 1301, 30m x 0.53mm, 3.0µm
Temp: 40°C
Injector: 1µL direct 140°C
Detector: FID 260°C
Carrier Gas: Helium 35cc/sec

VertiBond™ 1701 Capillary Columns

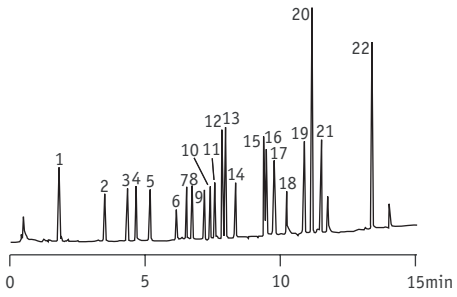
- **14% Cyanopropylphenyl, 86% Dimethylpolysiloxane**
- **Intermediate polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ 1701 column contains 14% Cyanopropylphenyl, 86% Dimethylpolysiloxane stationary phases. This intermediate polarity phase offers high selectivity for environmental, food and beverage, and pharmaceutical applications.

VertiBond™ 1701 Specifications	
Phase:	14% Cyanopropylphenyl, 86% Dimethylpolysiloxane
Polarity:	Intermidiate Polar
USP Designation:	n/a
Ideal for:	Pesticides, PCBs, Drugs, Herbicides, and TMS Sugars

VertiBond™ 1701 Specifications	
Restek	Rtx-1701
Agilent	HP-1701, DB-1701
Supelco	SPB-1701
Alltech	AT-1701
SGE	BP-10
Varian	CP-SIL19CB3
Ohio Valley	OV-1701
Phenomenex	ZB-1701

Organochlorine Pesticides



Column: VertiBond™ 1701, 30 m x 0.53 mm, 0.25µm
Temp: 150°C (hold 5 min) to 275°C at 4°C/min (hold 5 min)
Injector: 1µL direct injection at 200°C/275°C
Detector: ECD
Carrier Gas: Helium 40cm/sec

1. 2,4,5,6-Tetrachloro-*m*-xylene (surrogate)
2. α-BHC
3. γ-BHC
4. Heptachlor
5. Aldrin
6. β-BHC
7. δ-BHC
8. Heptachlorepoxide
9. Endosulfan I
10. γ-Chlordane
11. α-Chlordane
12. 4,4'-DDE
13. Dieldrin
14. Endrin
15. 4,4'-DDD
16. Endosulfan II
17. 4,4'-DDT
18. Endrin aldehyde
19. Endosulfan sulfate
20. Methoxychlor
21. Endrin ketone
22. Decachlorobiphenyl (Surrogate)

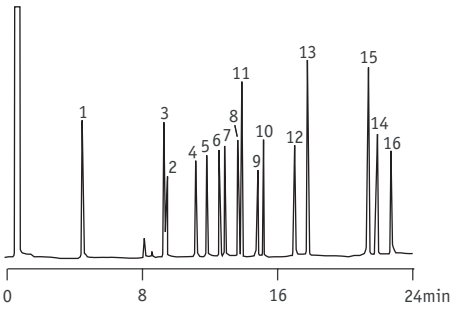
Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.20	280/300	0412-2040
	0.53	1.20	260/280	0412-5120
15	0.25	0.10	280/300	0412-2001
		0.15	280/300	0412-2021
		0.20	280/300	0412-2041
		0.25	280/300	0412-2051
		0.50	280/300	0412-2091
		1.00	280/300	0412-2111
	0.32	0.10	280/300	0412-3001
		0.15	280/300	0412-3021
		0.25	280/300	0412-3051
		0.50	280/300	0412-3091
		1.00	280/300	0412-3111
	0.53	0.10	260/280	0412-5001
		0.25	260/280	0412-5051
		0.50	260/280	0412-5091
		1.00	260/280	0412-5111
		1.20	260/280	0412-5121
		1.50	260/280	0412-5151
25	0.25	0.15	280/300	0412-2022
		0.20	280/300	0412-2042
	0.32	0.30	280/300	0412-3062
	0.53	1.20	260/280	0412-5122
30	0.25	0.10	280/300	0412-2003
		0.15	280/300	0412-2023
		0.25	280/300	0412-2053
		0.50	280/300	0412-2093
		1.00	280/300	0412-2113
	0.32	0.10	280/300	0412-3003
		0.15	280/300	0412-3023
		0.25	280/300	0412-3053
		0.50	280/300	0412-3093

VertiBond™ 1701

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.32	1.00	280/300	0412-3113
	0.53	0.10	260/280	0412-5003
		0.25	260/280	0412-5053
		0.50	260/280	0412-5093
		1.00	260/280	0412-5113
		1.20	260/280	0412-5123
		1.50	260/280	0412-5153
50	0.25	0.20	280/300	0412-2044
	0.32	0.30	280/300	0412-3064
60	0.25	0.10	280/300	0412-2005
		0.15	280/300	0412-2025
		0.25	280/300	0412-2055
		0.50	280/300	0412-2095
		1.00	280/300	0412-2115
	0.32	0.10	280/300	0412-3005
		0.15	280/300	0412-3025
		0.25	280/300	0412-3055
		0.50	280/300	0412-3095
		1.00	280/300	0412-3115
	0.53	0.10	260/280	0412-5005
		0.25	260/280	0412-5055
		0.50	260/280	0412-5095
		1.00	260/280	0412-5115
		1.50	260/280	0412-5155

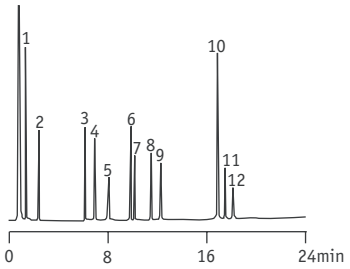
Underivatized Barbiturates



1. Ethosuximide
2. Barbital
3. Methyprylon
4. Aprobarbital
5. Butalbital
6. Amobarbital
7. Pentobarbital
8. Secobarbital
9. Meprobamate
10. Carisoprodal
11. Glutethimide
12. Phenobarbital
13. Methaqualone
14. Primidone
15. Carbamazepine
16. Diphenylhydantoin

Column: VertiBond™ 1701, 15m x 0.53mm, 0.50µm
Temp: 150°C (hold 5 min) to 275°C at 4°C/min (hold 5 min)
Injector: 1µL splitess injection, at 250°C/275°C (0.5 min hold)
Detector: FID
Carrier Gas: Helium 40cm/sec set at 100°C

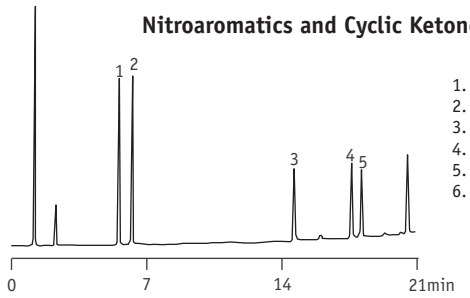
Underivatized Antiepileptics



1. Valproic acid
2. Ethosuximide
3. Methsuximide
4. Phensuximide
5. Desmethyl methsuximide
6. Mephenytoin
7. Ethotoin
8. PEMA
9. Phenobarbital
10. Primidone
11. Carbamazepine
12. Diphenylhydantoin

Column: VertiBond™ 1701, 15m x 0.32mm, 0.50µm
Temp: 150°C to 280°C at 7°C/min (hold 5min)
Injector: 1µL split injection at 250°C/270°C (Split ratio: 30:1)
Detector: FID
Carrier Gas: Helium 30cm/sec set at 150°C

Nitroaromatics and Cyclic Ketones



1. Isophorone
2. Nitrobenzene
3. 1,4-Napthoquinone
4. 2,6-Dinitrotoluene
5. 1,3-Dinitrobenzene
6. 2,4-Dinitrotoluene

Column: VertiBond™ 1701, 30m x 0.53mm, 1.0µm
Temp: 120°C to 200°C at 3°C/min (hold 2min)
Injector: 1µL split injection (Split ratio: 30:1)
Detector: FID
Carrier Gas: Helium at 44cm/sec

VertiBond™ WAX Capillary Columns

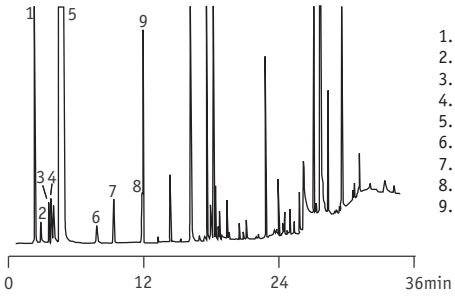
- **100% Polyethylene Glycol (PEG)**
- **High polar stationary phase**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ WAX column contains 100% Polyethylene Glycol (PEG) stationary phase. This high polar phase offers a wide range of working temperatures (270°C) and ideals for alcohols, aldehydes, ketones, and aromatic isomers.

VertiBond™ WAX Specifications	
Phase:	100% Polyethylene Glycol
Polarity:	High Polar
USP Designation:	G14, G15, G16, G39
Ideal for:	FAMEs, Polar Solvents, BTEX, Flavor and Fragranced, Glycols, Alcohols, and Aromatics

VertiBond™ WAX Specifications	
Restek	Rtx-WAX, Stabilwax
Agilent	HP-20M, HP-WAX, HP-INNOwax, HP Basic-WAX, DB-WAX, CAM
Supelco	Supelcowax 10, Omega-Wax
Alltech	AT-WAX
SGE	BP-20
Varian	CP-WAX52CB, CP-WAX57CB
Ohio Valley	Carbowax 20M
Phenomenex	ZB-WAX

White Wine



1. Acetaldehyde
2. Methyl acetate
3. Ethyl acetate
4. Methanol
5. Ethanol
6. 1-Propanol
7. Isobutanol
8. 2-Methyl-1-butanol
9. 3-Methyl-1-butanol

Column: VertiBond™ WAX, 30m x 0.25mm, 0.25µm
Temp: 35°C (hold 5 min), 35-230°C at 6°/min, 230°C (hold 5min)
Injector: Split 1:20, 1.5µL
Detector: FID
Carrier Gas: Nitrogen at 30mL/min

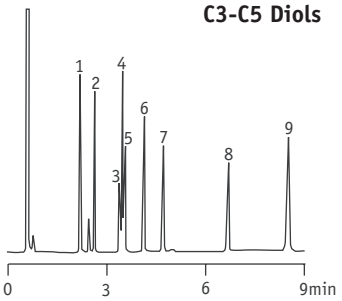
Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.20	250/260	0415-2040
		0.25	250/260	0415-2050
	0.53	1.20	250/260	0415-5120
15	0.25	0.10	250/260	0415-2001
		0.15	250/260	0415-2021
		0.20	250/260	0415-2041
		0.25	250/260	0415-2051
		0.50	250/260	0415-2091
		1.00	250/260	0415-2111
	0.32	0.10	250/260	0415-3001
		0.15	250/260	0415-3021
		0.25	250/260	0415-3051
		0.30	250/260	0415-3061
		0.50	240/250	0415-3091
		1.00	240/250	0415-3111
		2.50	240/250	0415-3221
	0.53	0.25	250/260	0415-5051
		0.50	250/260	0415-5091
		1.00	250/260	0415-5111
		1.20	250/260	0415-5121
		1.50	250/260	0415-5151
		2.50	240/250	0415-5221
		5.00	240/250	0415-5211
25	0.25	0.20	250/260	0415-2042
	0.32	0.30	250/260	0415-3062
	0.53	0.50	250/260	0415-5092
		1.20	250/260	0415-5122
30	0.25	0.10	250/260	0415-2003
		0.15	250/260	0415-2023
		0.20	250/260	0415-2043

VertiBond™ WAX

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.25	0.25	250/260	0415-2053
		0.50	250/260	0415-2093
		1.00	250/260	0415-2113
	0.32	0.10	250/260	0415-3003
		0.15	250/260	0415-3023
		0.25	250/260	0415-3053
		0.30	250/260	0415-3063
		0.50	240/250	0415-3093
		1.00	240/250	0415-3113
	0.53	0.25	250/260	0415-5053
		0.50	250/260	0415-5093
		1.00	250/260	0415-5113
		1.20	250/260	0415-5123
		1.50	250/260	0415-5153
		2.00	240/250	0415-5233
		2.50	240/250	0415-5223
		5.00	240/250	0415-5213
50	0.25	0.20	250/260	0415-2044
	0.32	0.30	250/260	0415-3064
	0.53	1.20	250/260	0415-5124
60	0.25	0.10	250/260	0415-2005
		0.15	250/260	0415-2025
		0.20	250/260	0415-2045
		0.25	250/260	0415-2055
		0.50	250/260	0415-2095
		1.00	250/260	0415-2115
	0.32	0.10	250/260	0415-3005
		0.15	250/260	0415-3025
		0.25	250/260	0415-3055
		0.30	250/260	0415-3065
		0.50	240/250	0415-3095
		1.00	240/250	0415-3115
	0.53	0.25	250/260	0415-5055
		0.50	250/260	0415-5095
		1.00	250/260	0415-5115
		1.20	250/260	0415-5125
		1.50	250/260	0415-5155

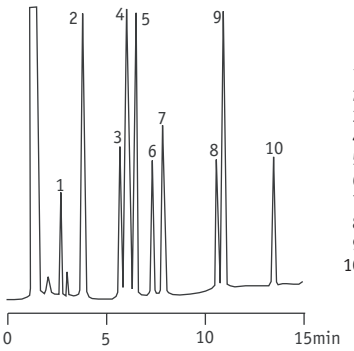
C3-C5 Diols



1. 2,3-Butanediol
2. 1,2-Propanediol
3. Unknown
4. 1,2-Butanediol
5. 2,4-Pentanediol
6. 1,3-Butanediol
7. 1,3-Propanediol
8. 1,4-Butanediol
9. 1,5-Pentanediol

Column: VertiBond™ WAX, 15m x 0.25 mm, 0.25µm
Temp: 110°C, 110°C-170°C at 8°C/min
Injector: Split
Detector: FID
Carrier Gas: Hydrogen

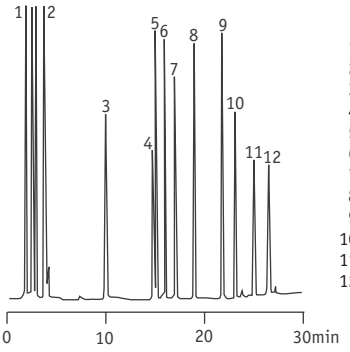
C14-C24 Fatty Acid Methyl Esters



1. Methyl Myristate
2. Methyl Palmitate
3. Methyl Stearate
4. Methyl Oleate
5. Methyl Linoleate
6. Methyl Linolenate
7. Methyl Arachidate
8. Methyl Behenate
9. Methyl Erucate
10. Methyl Lignocerate

Column: VertiBond™ WAX, 25m x 0.25mm, 0.20µm
Temp: 180°C-240°C at 5°C/min
Injector: Splitless
Detector: FID
Carrier Gas: Hydrogen at 0.8mL/min

Grob Test Mixture



1. Decane
2. Undecane
3. Nonanal
4. 2,3-Butanediol
5. 1-Octanol
6. Methyl Decanoate
7. Dicyclohexylamine
8. Methyl Undecanoate
9. Methyl Dodecanoate
10. 2,6-Dimethylaniline
11. 2,6-Dimethylphenol
12. 2-Ethylhexanoic acid

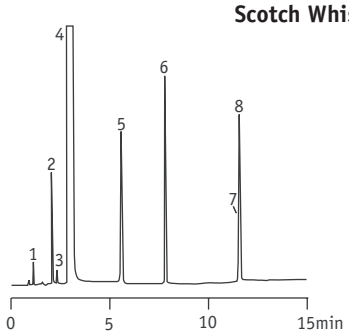
Column: VertiBond™ WAX, 50m x 0.32mm, 0.3µm
Temp: 60°C-220°C at 3°C/min
Injector: Splitless
Detector: FID
Carrier Gas: Hydrogen at 40cm/sec

VertiBond™ WAXms Capillary Columns

- **100% Polyethylene Glycol (PEG)**
- **High polar stationary phase**
- **Low-Bleed for MS application or trace analysis**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ WAXms column contains 100% Polyethylene Glycol (PEG) stationary phase with low-bleed. This special WAX phase is for MS applications.

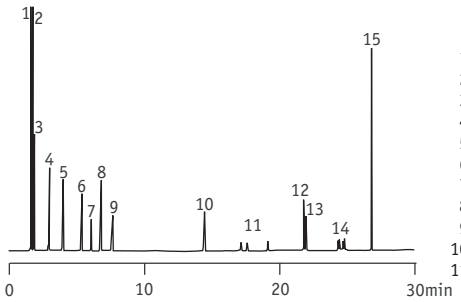
Scotch Whisky



1. Acetaldehyde
2. Ethyl acetate
3. Methanol
4. Ethanol
5. 1-Propanol
6. 3-Pentanol
7. 2-Methyl-1-butanol
8. 3-Methyl-1-butanol

Column:	VertiBond™ WAXms, 30m x 0.25mm, 0.25µm
Temp:	30°C (hold 5 min), 30°C-80°C at 1°/min
Injector:	Split 1:50
Detector:	FID
Carrier Gas:	Nitrogen at 30mL/min

Cleaning Solvents



1. Methanol
2. *iso*-Propanol
3. Ethanol
4. n-Propanol
5. *iso*-Butanol
6. n-Butanol
7. Methyl Cellosolve
8. Limonene
9. Cellosolve
10. Butyl Cellosolve
11. Dipropylene Glycol Monomethyl Ether
12. Diethylene Glycol Ethyl Ether
13. Ethylene Glycol
14. Tripropylene Glycol Monomethyl Ether
15. Phenyl Cellosolve

Column:	VertiBond™ WAXms, 30 m x 0.32 mm, 0.25 µm
Temp:	35°C (hold 4 min), 35°C-85°C at 3°C/min, 85°C-200°C at 15°C/min, 200°C (hold 2 min)
Injector:	Split 1:100
Detector:	FID at 250°C
Carrier Gas:	Hydrogen

VertiBond™ WAXms Specifications	
Phase:	100% Polyethylene Glycol
Polarity:	High Polar
USP Designation:	G14, G15, G16, G39
Ideal for:	Mass Spec Analysis

VertiBond™ WAXms Specifications	
Restek	Rtx-WAX, Stabilwax
Agilent	HP-20M, HP-WAX, HP-INNOwax, HP Basic WAX, DB-WAX, CAM
Supelco	Supelcowax 10, Omega-Wax
Alltech	AT-WAX
SGE	BP-20
Varian	CP-WAX52CB, CP-WAX57CB
Ohio Valley	Carbowax 20M
Phenomenex	ZB-WAX

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.25	280/280	0416-2051
	0.32	0.25	280/280	0416-3051
	0.53	1.00	260/260	0416-5111
30	0.25	0.25	280/280	0416-2053
	0.32	0.25	280/280	0416-3053
	0.53	1.00	260/260	0416-5113
60	0.25	0.25	280/280	0416-2055
	0.32	0.25	280/280	0416-3055

VertiBond™ AqWAX Capillary Columns

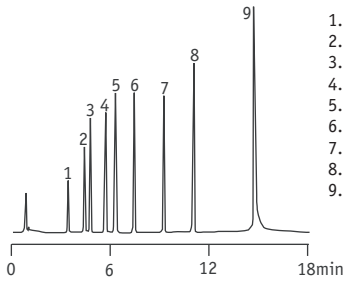
- **Nitroterephthalic acid-modified Polyethylene glycol (PEG)**
- **High polar stationary phase**
- **High temperature to 250°C**
- **High efficiency, high inertness columns**

VertiBond™ AqWAX column contains Nitroterephthalic acid-modified Polyethylene Glycol stationary phase. This modified high polar phase resists damage by water-based samples and ideal for the analysis of acidic compounds, such as phenols, and derivatized or un-derivatized free fatty acids.

VertiBond™ AqWAX Specifications	
Phase:	Nitroterephthalic acid-modified Polyethylene glycol (PEG)
Polarity:	High Polar
USP Designation:	G25, G35
Ideal for:	Free Fatty Acids

VertiBond™ AqWAX Specifications	
Restek	Stabilwax-DA
Agilent	HP-FFAP, DB-FFAP, DB-WAXetr
Supelco	SP-1000, Nukol
Alltech	AT-1000, AT-AquaWax
SGE	BP-21
Varian	CP-WAX58CB
Ohio Valley	Carbowax 20M
Ohio Valley	OV-351
Phenomenex	ZB-FFAP

Organic Acids in Water



1. Acetic Acid
2. Propanoic Acid
3. iso-Butyric Acid
4. n-Butyric Acid
5. iso-Valeric Acid
6. n-Valeric Acid
7. n-Caproic Acid
8. n-Heptanoic Acid
9. Lactic Acid

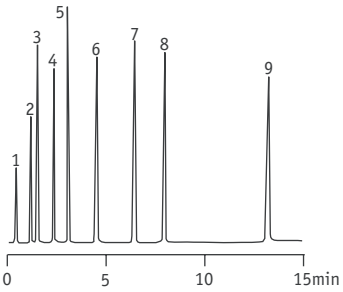
Column: VertiBond™ AqWAX, 30m x 0.53mm, 0.5µm
Temp: 85°C-180°C at 6°C/min
Injector: On-Column
Detector: FID

Ordering Information

Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
10	0.25	0.20	260/275	0417-2040
	0.32	0.30	260/275	0417-3060
	0.53	1.20	260/275	0417-5120
15	0.25	0.10	260/275	0417-2001
		0.20	260/275	0417-2041
		0.25	260/275	0417-2051
		0.50	260/275	0417-2091
	0.32	0.10	260/275	0417-3001
		0.25	260/275	0417-3051
		0.30	260/275	0417-3061
		0.50	260/275	0417-3091
		1.00	260/275	0417-3111
	0.53	0.10	260/275	0417-5001
		0.25	260/275	0417-5051
		0.50	260/275	0417-5091
		1.00	260/275	0417-5111
		1.20	260/275	0417-5121
		1.50	260/275	0417-5151
25	0.25	0.20	260/275	0417-2042
	0.32	0.30	260/275	0417-3062
	0.53	1.00	260/275	0417-5112
		1.20	260/275	0417-5122
30	0.25	0.10	260/275	0417-2003
		0.20	260/275	0417-2043
		0.25	260/275	0417-2053
		0.50	260/275	0417-2093
	0.32	0.10	260/275	0417-3003
		0.25	260/275	0417-3053
		0.50	260/275	0417-3093
		1.00	260/275	0417-3113
	0.53	0.10	260/275	0417-5003
		0.25	260/275	0417-5053

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.53	0.50	260/275	0417-5093
		1.00	260/275	0417-5113
		1.20	260/275	0417-5123
		1.50	260/275	0417-5153
		2.00	260/275	0417-5233
50	0.25	0.20	260/275	0417-2044
	0.32	0.30	260/275	0417-3064
60	0.25	0.10	260/275	0417-2005
		0.20	260/275	0417-2045
		0.25	260/275	0417-2055
		0.50	260/275	0417-2095
	0.32	0.10	260/275	0417-3005
		0.25	260/275	0417-3055
		0.30	260/275	0417-3065
		0.50	260/275	0417-3095
		1.00	260/275	0417-3115
	0.53	0.10	260/275	0417-5005
		0.25	260/275	0417-5055
		0.50	260/275	0417-5095
		1.00	260/275	0417-5115
		1.50	260/275	0417-5155

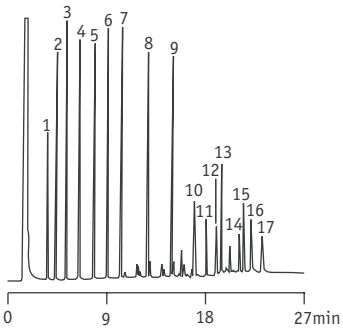
Fatty Acids (Free)



1. Acetic acid
2. Propionic acid
3. Isobutyric acid
4. n-Butyric acid
5. Isovaleric acid
6. n-Valeric acid
7. Isocaproic acid
8. Caproic acid
9. Heptanoic acid

Column: VertiBond™ AqWAX, 30m x 0.25mm, 0.25µm
Temp: 145°C
Injector: 1µL split injection at 250°C (split ratio 50:1)
Detector: FID
Carrier Gas: Hydrogen 40cm/sec

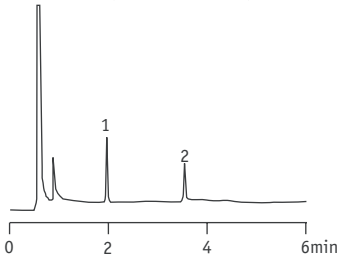
Organic Acids Free Fatty Acids



1. C2:0-acetic acid
2. C3:0-propionic acid
3. C4:0-butyric acid
4. C5:0-valeric acid
5. C6:0-caproic acid
6. C7:0-enanthic acid
7. C8:0-capric acid
8. C10:0-capric acid
9. C12:0-lauric acid
10. C14:0-myristic acid
11. C15:0-pentadecanoic acid
12. C16:0-palmitic acid
13. C16:1-palmitoleic acid
14. C17:0-stearic acid
15. C18:1-oleic acid
16. C18:2-linoleic acid
17. C18:3-linoleic acid

Column: VertiBond™ AqWAX, 30m x 0.53mm, 0.25µm
Temp: 100°C (2 min) - 250°C at 8°C/min
Injector: 0.5µL direct injection of a 5mg/mL standard at 280°C
Detector: FID
Carrier Gas: Helium 40cm/sec (flow rate: 5.2cc/min)

Aspirin and Ibuprofen in Methanol



1. Aspirin
2. Ibuprofen

Column: VertiBond™ AqWAX, 30m x 0.25mm, 0.25µm
Temp: 180°C
Injector: Split 1:50, 250°C
Detector: FID 300°C
Carrier Gas: Hydrogen at 24cm/sec, measured at 180°C

VertiBond™ Silar90 Capillary Columns

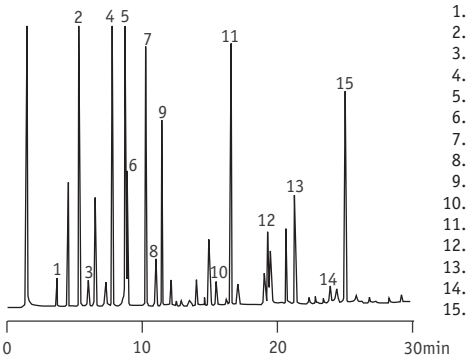
- **10% Cyanopropylphenyl, 90% bis Cyanopropyl polysiloxane**
- **High polar stationary phase**
- **Tested for FAME isomers**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ Silar90 column contains 10% Cyanopropylphenyl, 90% bis Cyanopropylpolysiloxane stationary phases. This high polarity phase is especially tested for FAME isomers and ideals for cis/trans compounds or compounds with conjugated double bonds.

VertiBond™ Silar90 Specifications	
Phase:	10% Cyanopropylphenyl
	90% bis Cyanopropyl polysiloxane
Polarity:	High Polar
USP Designation:	G5, G8
Ideal for:	FAME isomers

VertiBond™ Silar90 Specifications	
Restek	Rtx-2330, Rtx-2340
Agilent	HP-88, DB-23
Supelco	SP-2340, SP-2380
Alltech	AT-Silar-90
SGE	BP-70
Varian	CP-SIL88

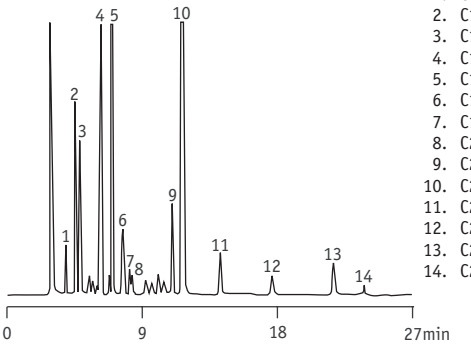
FAMEs (PUFA, animal source)



1. C14:0
2. C16:0
3. C16:1n7
4. C18:0
5. C18:1n9
6. C18:1n7
7. C18:2n6
8. C18:3n6
9. C18:3n3
10. C20:3n6
11. C20:4n6
12. C20:5n3
13. C22:4n6
14. C22:5n3
15. C22:6n3

Column: VertiBond™ Silar90, 30m x 0.32mm, 0.2µm
Temp: 160°C, 160°C-250°C at 2°C/min
Injector: Split 20:1
Detector: FID
Carrier Gas: Hydrogen

Fatty Acid Methyl Esters



1. C14:0
2. C16:0
3. C16:1
4. C18:1-n9c
5. C18:2-n6c
6. C18:3-n6
7. C18:3-n3
8. C20:1-n9
9. C20:3-n6
10. C20:4-n6
11. C20:5-n3
12. C22:4-n6
13. C22:5-n3
14. C22:6-n3

Column: VertiBond™ Silar90,30m x 0.32mm, 0.2µm
Temp: 200 °C
Injector: Split 100:1 at 250 °C
Detector: FID at 250 °C
Carrier Gas: Helium at 20cm/sec

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.25	0.20	250/260	0420-2041
	0.32	0.20	250/260	0420-3041
30	0.25	0.20	250/260	0420-2043
	0.32	0.20	250/260	0420-3043
50	0.25	0.20	250/260	0420-2044
105	0.25	0.20	250/260	0420-2047

VertiBond™ MolSieve Capillary Columns

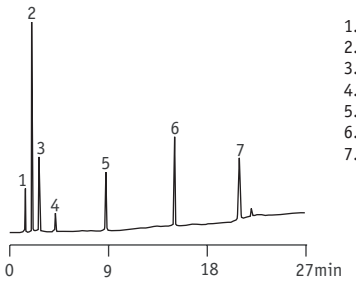
- **Molecular sieve 5A**
- **PLOT columns**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ MolSieve column contains Molecular Sieve 5A stationary phase. This PLOT column ideals for separation of permanent gases at ambient temperatures in less than 5 min.

VertiBond™ Molsieve Specifications	
Phase:	Molecular Sieve 5A
Polarity:	
USP Designation:	n/a
Ideal for:	Separates permanent gases, noble gases, SF6, nitrogen, oxygen, carbon monoxide and methane resolved in less than 5 minutes

VertiBond™ Molsieve Specifications	
Restek	Rt-Msieve 5A
Agilent	GS-Molsieve, HP-PLOT/Molsieve
Supelco	Molsieve 5A
Alltech	AT-Molesieve
Varian	CP-Molsieve 5A

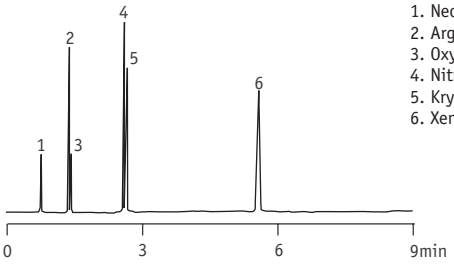
Hydrocarbon Gases



1. Argon/Oxygen
2. Nitrogen
3. C1
4. Carbon monoxide
5. C2
6. C3
7. C4

Column: VertiBond™ MolSieve, 30m x 0.53m, 50.00µm
Temp: 0°C (hold 2 min.), 30°C-300°C at 15°C/min, 300°C (hold 10 min)
Injector: Splitless
Detector: FID
Carrier Gas: Hydrogen 30cm/sec

Noble Gases



1. Neon
2. Argon
3. Oxygen
4. Nitrogen
5. Krypton
6. Xenon

Column: VertiBond™ MolSieve, 30m x 0.53mm, 50.00µm
Temp: 35°C (hold 3 min.), 35°C-120°C at 25°C/min, 120°C (hold 5 min.)
Injector: Splitless
Detector: TCD
Carrier Gas: Helium at 4mL/min

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.32	12.00	300/300	0422-3271
		25.00	300/300	0422-3301
	0.53	25.00	300/300	0422-5301
		50.00	300/300	0422-5401
30	0.32	12.00	300/300	0422-3273
		25.00	300/300	0422-3303
	0.53	25.00	300/300	0422-5303
		50.00	300/300	0422-5403

VertiBond™ Q Capillary Columns

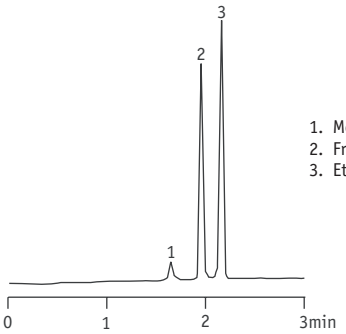
- **Porous divinylbenzene polymer**
- **PLOT columns**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ Q column contains Porous divinylbenzene polymer stationary phase. This PLOT column offers perfect elution of polar and apolar volatile compounds in very short times and ideals for many gases and light hydrocarbons.

VertiBond™ Q Specifications	
Phase:	Porous Divinylbenzene Polymer
Polarity:	
USP Designation:	n/a
Ideal for:	Many gases and light hydrocarbons, and other applications currently using packed porous polymer columns

VertiBond™ Q Specifications	
Restek	Rt-QPLOT
Agilent	GS-Q, HP-PLOT/Q
Supelco	Supel-Q-PLOT
Alltech	AT-Q
Varian	CP-PoraPLOT Q

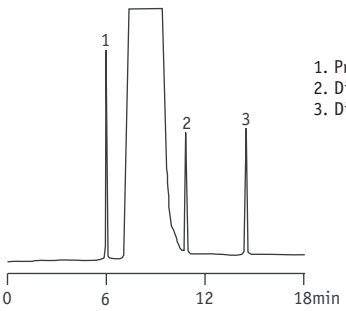
Chlorofluorcarbons and Ethylene Oxide



1. Methane
2. Freon 12
3. Ethylene Oxide

Column: VertiBond™ Q, 30m x 0.53 mm, 40.00µm
Temp: 180°C
Injector: Splitless
Detector: FID
Carrier Gas: Hydrogen at 4mL/min

Sulfur Compound in Hexane



1. Propyl mercaptan
2. Dimethyl Disulfide
3. Diethyl Disulfide

Column: VertiBond™ Q, 30m x 0.53mm, 40.00µm
Temp: 10°C (hold 2 min), 10°C-250°C at 15°C/min
Injector: Splitless
Detector: FID
Carrier Gas: Helium

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
15	0.32	20.00	270/290	0423-3291
	0.53	40.00	270/290	0423-5351
25	0.53	20.00	270/290	0423-5292
30	0.32	20.00	270/290	0423-3293
	0.53	40.00	270/290	0423-5353

VertiBond™ Alumina Capillary Columns

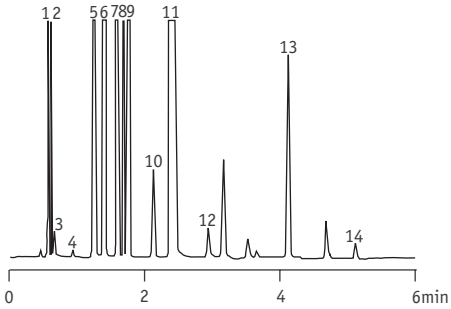
- **Deactivated Aluminum oxide**
- **PLOT columns**
- **High temperature range**
- **High efficiency, high inertness columns**

VertiBond™ Alumina column contains deactivated Aluminum oxide stationary phase. This PLOT column ideals for light hydrocarbons in the chemical and petrochemical industry.

VertiBond™ Alumina Specifications	
Phase:	Deactivated Aluminum oxide
Polarity:	
USP Designation:	n/a
Ideal for:	Light hydrocarbon analysis, separation of C1-C4 saturated and unsaturated hydrocarbons

VertiBond™ Alumina Specifications	
Restek	Rt-AluminaPLOT
Agilent	GS-Alumina
Supelco	Alumina-PLOT
Alltech	AT-Alumina
Varian	CP-AL2CO3/Na2SO4

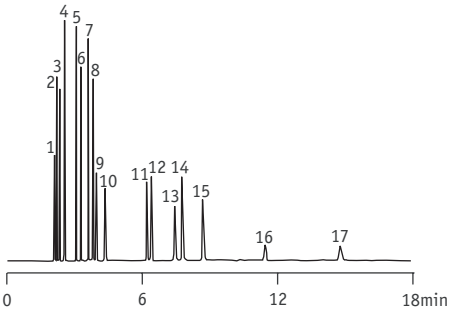
Crude 1,3-Butadiene



1. Isobutane
2. n-Butane
3. Acetylene
4. Methylcyclopentane
5. *trans*-3-Butene
6. 1-Butene
7. Isobutylene
8. *cis*-2-Butene
9. Isopentane
10. 1,2-Butadiene
11. 1,3-Butadiene
12. Propyne
13. Vinyl Acetylene
14. Butyne

Column: VertiBond™ Alumina, 30m x 0.53mm, 10.00µm
Temp: 95°C (hold 5 min), 95°C-130°C at 5°C/min, 130°C (hold 10 min)
Injector: 1:10 split ratio at 250°C
Detector: FID at 250°C
Carrier Gas: Helium at 6.8mL/min

Crude 1,3-Butadiene



1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. Isobutane
8. n-butane
9. Propadiene
10. Acetylene
11. *trans*-2-Butene
12. 1-Butene
13. *cis*-2-Butene
14. Isopentane
15. n-Pentane
16. 1,3-Butadiene
17. Propyne

Column: VertiBond™ Alumina, 50m x 0.53mm, 15.00µm
Temp: 80°C
Injector: 50mL gas-tight syringe injection
Detector: FID
Carrier Gas: Helium 5.6mL/min

Ordering Information				
Length (m)	I.D. (mm)	Film (µm)	Temp. (°C)	Part No.
30	0.53	15.00	200/200	0424-5283
50	0.32	8.00	200/200	0424-3244
	0.53	10.00	200/200	0424-5254
		15.00	200/200	0424-5284

Solid Supports By USP

USP Column Classification		
USP	**Phase Composition**	**Vertical® Recommend**
S1	Siliceous earth for gas chromatography. Unless otherwise specified, it has been flux-calcined by mixing diatomite with Na_2CO_3, flux and calcining above 900°C, then washed with water and acid and/or base (as needed) to neutrality and silanized by treating with an agent such as dimethyldichlorosilane to mask surface silanol groups. Alternative treatments, as defined below, are required where the letter indicated appears as a suffix in the designation (e.g., S1C).	Chromosorb® WHP
S1A	Siliceous earth from gas chromatography has been flux-calcined by mixing diatomite with Na_2CO_3, flux and calcining above 900°C. The siliceous earth is acid-washed, then water-washed until neutral, but not base-washed. The siliceous earth may be silanized by treating with an agent such as dimethyldichlorosilane to mask surface silanol groups.	Chromosorb® WAW-DMCS Chromosorb® WHP
S1AB	The siliceous earth as described above is both acid and base washed.	Chromosorb® W both acid and base wash (Not a direct equivalent)
S1C	A support prepared from crushed firebrick and calcined or burned with a clay binder above 900 degs. with subsequent acid-wash. It may be silanized.	Chromosorb® PAW or Chromosorb® PAW-DMCS/ stated in method[1]
S1NS	The siliceous earth is untreated.	Chromosorb® NAW
S2	Styrene-divinylbenzene copolymer having a nominal surface area of less than 50 m^2/g and an average pore diameter of 0.3 to 0.4 µm.	Chromosorb® 101
S3	Copolymer of ethylvinylbenzene and divinylbenzene having a nominal surface area of 500 to 600 m2/g and an average pore diameter of 0.0075 µm.	HayeSep® Q Porapak® Q
S4	Styrene-divinylbenzene copolymer with aromatic -O and -N groups, having a nominal surface area of 400 to 600 m^2/g and an average pore diameter of 0.0076 µm.	HayeSep® R Porapak® R
S5	40/60 mesh high molecular weight tetrafluoroethylene polymer.	Chromosorb® T
S6	Styrene-divinylbenzene copolymer having a nominal surface area of 250 to 350 m^2/g and an average pore diameter of 0.0091 µm.	Chromosorb® 102
S7	Graphitized carbon having a nominal surface area of 12 m^2/g.	Carbograph™ 2
S8	Copolymer of 4-vinyl-pyridine and styrene-divinylbenzene.	HayeSep® S Porapak® S
S9	Porous polymer based on 2,6-diphenyl-p-phenylene oxide.	Tenax® TA
S10	Highly polar cross-linked copolymer of acrylonitrile and divinylbenzene.	HayeSep® C
S11	Graphitized carbon having a nominal surface area of 100 m^2/g	3% Carbowax 20M-TPA on 80/120 Carbograph™ 1
S12	modified with small amounts of petrolatum and polyethylene glycol. Graphitized carbon having a nominal surface area of 100 m^2/g.	Carbograph™ 1

[1] Some methods designate silanized or non-silanized.

Liquid Phases By USP

USP Column Classification		
USP	**Phase Composition**	**Vertical® Recommend**
G1	Dimethylpolysiloxane oil	OV®-101
G2	Dimethylpolysiloxane gum	OV®-1
G3	50% phenyl - 50%methylpolysiloxane	OV®-17
G4	Diethylene glycol succinate polyester	DEGS
G5	2-cyanopropylpolysiloxane	Silar®-10 CP
G6	Trifluoropropylmethylpolysiloxane	OV®-210
G7	50% 3-cyanopropyl - 50% phenylmethylsilicone	Silar®-5 CP
G8	90% 3-cyanopropyl - 10% phenylmethylsilicone	OV®-275
G9	Methylvinylpolysiloxane	OV®-101
G10	Polyamide	Poly A-103
G11	Bis(2-ethylhexyl) sebacate polyester	Di(2-ethylhexyl) Sebacate
G12	Phenyldiethanolamine succinate polyester	
G13	Sorbitol	
G14	Polyethylene glycol (av. mol. wt. of 950 to 1050)	Carbowax 1000
G15	Polyethylene glycol (av. mol. wt. of 3000 to 3700)	Carbowax 4000
G16	Polyethylene glycol compound (av. mol. wt. about 15,000 to 20,000). A high molecular weight compound of polyethylene glycol and a diepoxide.	Carbowax 20M
G17	75% phenyl - 25% methylpolysiloxane	OV®-25
G18	Polyalkylene glycol	UCON® LB 550X UCON® LB 1800X
G19	25% phenyl - 25% cyanopropyl - 50% methylsilicone	OV®-225
G20	polyethylene glycol (av. mol. wt. 380 - 420)	Carbowax 400
G21	Neopentyl glycol succinate	
G22	Bis(2-ethylhexyl) phthalate	
G23	Polyethylene glycol adipate	
G24	Diisodecyl phthalate	

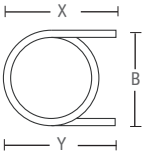
Liquid Phases By USP

USP Column Classification		
USP	**Phase Composition**	**Vertical® Recommend**
G25	Polyethylene glycol compound TPA. A high molecular weight compound of a polyethylene glycol and a diepoxide that is esterified with terephthalic acid.	Carbowax 20M-TPA
G26	25% 2-cyanoethyl - 75% methylpolysiloxane	OV®-225
G27	5% phenyl - 95% methylpolysiloxane	GE-SE®-52
G28	25% phenyl - 75% methylpolysiloxane	DC-550
G29	β-β-thiodipropionitrile	
G30	Tetraethylene glycol dimethyl ether	
G31	Monylphenoxypoly(ethyleneoxy)ethanol (av. ethyleneoxy chain length is 30); Nonoxynol 30	Igepal® CO-880
G32	20% phenylmethyl - 80% dimethylpolysiloxane	OV®-7
G33	20% carborane - 80% methylsilicone	Dexsil® 300
G34	Diethylene glycol succinate polyester stabilized with phosphoric acid	DEGS-PS
G35	A high molecular weight compound of a polyethylene glycol and a diepoxide that is esterified with nitro-terephthalic acid.	FFAP
G36	1% vinyl - 5% phenylmethylpolysiloxane	GE-SE®-54
G37	Polyimide	Poly-I-110
G38	Phase G1 containing a small percentage of a tailing inhibitor.	0.2% Carbowax 1500
G39	Polyethylene glycol (av. mol. wt. about 1500)	Carbowax 1500
G40	Ethylene glycol adipate	
G41	phenylmethyldimethylsilicone (10% phenyl substituted)	OV®-3
G42	35% phenyl - 65% dimethylvinylsiloxane (percentages refer to molar substitution)	OV®-11
G43	6% cyanopropylphenyl - 94% dimethylpolysiloxane (percentages refer to molar substitution)	OV®-1301
G44	2% low molecular weight petrolatum hydrogrease and 1% solution of potassium hydroxide	2% Apiezon® L/1% KOH
G45	Divinylbenzene - ethylene glycol - dimethacrylate	HayeSep® N Porapak® N HayeSep® A (high purity HayeSep® N)
G46	14% cyanopropylphenyl / 86%polysiloxane	OV®-1701

Column tubing materials

Materials	Properties
Stainless steel	works well with most applications for nonreactive compounds.
Nickel	Used for analyses of caustic or oxidizing compounds or gases.
Copper	General purpose tubing that is only recommended for nonactive compounds.
Teflon®	Often used for reactive compounds or other special applications. Note that this tubing is permeable to gases.

Column instruments configurations



X = Column inlet
Y = Detector inlet
B = Span

Diagram	Configuration	Dimensions	Instruments
	S	X=8″ Y=8″ B=6″	General instruments
	A	X=11.02″ Y=9.05″ B=9″	Agilent 5880, 5890, 5987, 6890, 7890 Configuration “A” On-Column injection, FID
	B	X=11.02″ Y=7.09″ B=9″	Agilent 5880, 5890, 5987, 6890, 7890 Configuration “B” On-Column injection, TCD
	C	X=9.05″ Y=9.05″ B=9″	Agilent 5880, 5890, 5987, 6890, 7890 Configuration “C” Not On-Column injection, All detectors
	D	X=9″ Y=9″ B=8.75″	PerkinElmer 115, 300, 900, 910, 990, F30, 2000, 2100, 3920 Sigma Series Not On-Column injection, All detectors
	E	X=12.62″ Y=7.09″ B=6.5″	PerkinElmer Sigma Series On-Column injection, All detectors Position “A” only
	F	X=6.75″ Y=6.75″ B=6.5″	PerkinElmer 8300, 8400, 8500, 8700, 9000, AutoSystem Not On-Column injection
	G	X=9.05″ Y=12″ B=6.5″	PerkinElmer 8300, 8400, 8500, 8700, 9000, AutoSystem On-Column injection
	H	X=9″ Y=9″ B=6″	Shimadzu 8A, RIA, 8A8IF
	I	X=10.69″ Y=12.81″ B=1.57″	Shimadzu 7A, 9A, 12A, 14A, 14B, 15A, 2010
	J	X=9.5″ Y=8.1″ B=5.5″	Varian 3300, 3400, 3600, 3700, 4400, 6000, Vista Series FID
	K	X=9.5″ Y=5.5″ B=5.5″	Varian 3800 FID

Popular GC Packed Columns

- **Longer column lifetime**
- **QC Chromatogram of packing included**
- **Preconditioned packings**
- **All columns are 6'x 1/8"OD 304 premium grade stainless steel**
- **All columns are configured to standard for general instruments**
- **For columns not listed, see next page for custom columns**

Ordering Information		
Description	QTY	Part No.
Popular GC Packed Columns		
10% Apiezon L on Chromosorb W-HP 80/100	1	09SE-A039
10% Carbowax 400 on Chromosorb W-HP 80/100	1	09SE-A040
10% Carbowax 1500 on Chromosorb W-HP 80/100	1	09SE-A041
10% Carbowax 20M on Chromosorb W-HP 80/100	1	09SE-A042
10% Carbowax 20M on Chromosorb W-AW 80/100	1	09SE-A043
10% Carbowax 20M-TPA on Chromosorb W-AW 80/100	1	09SE-A044
10% DEGS on Chromosorb W-AW 80/100	1	09SE-A045
15% DEGS on Chromosorb W-AW 80/100	1	09SE-A046
5% FFAP on Chromosorb W-HP 80/100	1	09SE-A047
5% FFAP on Chromosorb W-AW 80/100	1	09SE-A048
3% OV-1 on Chromosorb W-HP 80/100	1	09SE-A049
3% OV-1 on Chromosorb W-HP 100/120	1	09SE-A050
10% OV-1 on Chromosorb W-HP 80/100	1	09SE-A051
3% OV-17 on Chromosorb W-HP 80/100	1	09SE-A052
3% OV-17 on Chromosorb W-HP 100/120	1	09SE-A053
10% OV-17 on Chromosorb W-HP 80/100	1	09SE-A054
10% OV-17 on Chromosorb W-HP 100/120	1	09SE-A055
3% OV-101 on Chromosorb W-HP 80/100	1	09SE-A056
3% OV-101 on Chromosorb W-HP 100/120	1	09SE-A057
10% OV-101 on Chromosorb W-HP 80/100	1	09SE-A058
3% OV-210 on Chromosorb W-HP 80/100	1	09SE-A059
3% OV-225 on Chromosorb W-HP 80/100	1	09SE-A060
10% OV-225 on Chromosorb W-HP 80/100	1	09SE-A061
3% OV-275 on Chromosorb W-HP 80/100	1	09SE-A062
3% SE-30 on Chromosorb W-HP 80/100	1	09SE-A063
1.5% OV-17 + 1.95% QF-1 on Chromosorb W-HP 80/100	1	09SE-A064
4% SE-30 + 6% OV-210 on Chromosorb W-HP 80/100	1	09SE-A065
Chromosorb 101, 80/100	1	09SE-B002
Chromosorb 102, 80/100	1	09SE-B005
Chromosorb 103, 80/100	1	09SE-B008
Chromosorb 105, 80/100	1	09SE-B011
Chromosorb 106, 80/100	1	09SE-B014
Chromosorb 107, 80/100	1	09SE-B017
Chromosorb 108, 80/100	1	09SE-B020
Porapak Q 80/100	1	09SE-D002
Porapak P 80/100	1	09SE-D005
Porapak R 80/100	1	09SE-D008
Porapak S 80/100	1	09SE-D011
Porapak T 80/100	1	09SE-D014
Porapak T 100/120	1	09SE-D015
Porapak N 80/100	1	09SE-D017
Porapak QS 80/100	1	09SE-D020
Porapak PS 80/100	1	09SE-D023

- **Tubing materials are 304 premium grade stainless steel, Nickel, Copper and Teflon**
- **Almost solid supports and liquid phases are available**
- **Complete with brass nut and ferrules**
- **100% Satisfaction guarantee!**

Ordering Instructions Example	
Description	Requirement
Tubing specification	
1. Instrument and model	Agilent 7890
2. Configuration: S, A-K (see previous page)	A
3. Column length in ft or m	6m
4. Column i.d. in mm	2mm
5. Column o.d. in mm or inch	1/8"
6. Tubing material: Stainless Steel, Nickel, Copper ,Teflon	Stainless Steel
7. Injection port design: On-column or Not On-column	On-column
Packings	
8. Solid support	Chromosorb W-HP
9. Mesh size	80/100
10. Liquid phase A: and % Loading	OV-1 10%
11. Liquid phase B: and % Loading	-
12. Liquid phase C: and % Loading	-
13. Precondition: Yes or No	Yes

Ordering Instructions	
Description	Requirement
Tubing specification	
1. Instrument and model	
2. Configuration: S, A-K (see previous page)	
3. Column length in ft or m	
4. Column i.d. in mm	
5. Column o.d. in mm or inch	
6. Tubing material: Stainless Steel, Nickel, Copper ,Teflon	
7. Injection port design: on-column or not on-column	
Packings	
8. Solid support	
9. Mesh size	
10. Liquid phase A: and % Loading	
11. Liquid phase B: and % Loading	
12. Liquid phase C: and % Loading	
13. Precondition: Yes or No	

Popular GC Packings

- **QC Chromatogram of packings included**
- **Preconditioned packings**
- **For packings not listed, see next page for custom packing**
- **100% Satisfaction guarantee!**

Ordering Information		
Description	QTY	Part No.
Popular GC Packings		
10% Apiezon L on Chromosorb W-HP 80/100	20g	0900-A038
10% Carbowax 400 on Chromosorb W-HP 80/100	20g	0900-A039
10% Carbowax 1500 on Chromosorb W-HP 80/100	20g	0900-A040
10% Carbowax 20M on Chromosorb W-HP 80/100	20g	0900-A041
10% Carbowax 20M on Chromosorb W-AW 80/100	20g	0900-A042
10% Carbowax 20M-TPA on Chromosorb W-AW 80/100	20g	0900-A043
10% DEGS on Chromosorb W-AW 80/100	20g	0900-A044
15% DEGS on Chromosorb W-AW 80/100	20g	0900-A045
5% FFAP on Chromosorb W-HP 80/100	20g	0900-A046
5% FFAP on Chromosorb W-AW 80/100	20g	0900-A047
3% OV-1 on Chromosorb W-HP 80/100	20g	0900-A048
3% OV-1 on Chromosorb W-HP 100/120	20g	0900-A049
10% OV-1 on Chromosorb W-HP 80/100	20g	0900-A050
3% OV-17 on Chromosorb W-HP 80/100	20g	0900-A051
3% OV-17 on Chromosorb W-HP 100/120	20g	0900-A052
10% OV-17 on Chromosorb W-HP 80/100	20g	0900-A053
10% OV-17 on Chromosorb W-HP 100/120	20g	0900-A054
3% OV-101 on Chromosorb W-HP 80/100	20g	0900-A055
3% OV-101 on Chromosorb W-HP 100/120	20g	0900-A056
10% OV-101 on Chromosorb W-HP 80/100	20g	0900-A057
3% OV-210 on Chromosorb W-HP 80/100	20g	0900-A058
3% OV-225 on Chromosorb W-HP 80/100	20g	0900-A059
10% OV-225 on Chromosorb W-HP 80/100	20g	0900-A060
3% OV-275 on Chromosorb W-HP 80/100	20g	0900-A061
3% SE-30 on Chromosorb W-HP 80/100	20g	0900-A062
1.5% OV-17 + 1.95% QF-1 on Chromosorb W-HP 80/100	20g	0900-A063
4% SE-30 + 6% OV-210 on Chromosorb W-HP 80/100	20g	0900-A064
Chromosorb 101, 80/100	50g	0900-B002
Chromosorb 102, 80/100	50g	0900-B005
Chromosorb 103, 80/100	50g	0900-B008
Chromosorb 105, 80/100	50g	0900-B011
Chromosorb 106, 80/100	50g	0900-B014
Chromosorb 107, 80/100	50g	0900-B017
Chromosorb 108, 80/100	50g	0900-B020
Porapak Q 80/100	20g	0900-D002
Porapak P 80/100	20g	0900-D005
Porapak R 80/100	20g	0900-D008
Porapak S 80/100	20g	0900-D011
Porapak T 80/100	20g	0900-D014
Porapak T 100/120	20g	0900-D015
Porapak N 80/100	20g	0900-D017
Porapak QS 80/100	20g	0900-D020
Porapak PS 80/100	20g	0900-D023

- **QC Chromatogram of packings included**
- **Preconditioned packings**
- **For packings not listed, see next page for custom packing**
- **100% Satisfaction guarantee!**

Chart Listing Equivalent Solid Supports

Make	Non-acid wash	Acid wash	Acid wash DMCS Treated	Acid wash DMCS Treated High Performance
Analab		Anakrom A	Anakrom AS	Anakrom Q
Alltech	Gas Chrom S	Gas Chrom A	Gas Chrom Z	Gas Chrom Q
	Gas Chrom R	Gas Chrom RA	Gas Chrom RZ	
Celite	Chromosorb WNAW	Chromosorb WAW	Chromosorb WAW DMCS	Chromosorb WHP
	Chromosorb GNAW	Chromosorb GAW	Chromosorb GAW DMCS	Chromosorb GHP
Supelco				Supelcoport

Solid Support with Liquid Phase Loading Characterization*

Solid Support	Mesh	Max Loading
Anakrom A	80/100,100/120	15%
Anakrom AS, Q	80/100,100/120	15%
Chromosorb G-HP	80/100,100/120	15%
Chromosorb W-HP	60/80,80/100,100/120,120/140	5%
Chromosorb 750	60/80,80/100,100/120	12%
Chromosorb 100 Series	60/80,80/100,100/120	2%
Chromosorb P(NAW),(AW)	60/80,80/100,100/120	30%
Chromosorb G(NAW),(AW)	60/80,80/100,100/120	5%
Chromosorb W(NAW),(AW)	60/80,80/100,100/120	15%
Chromosorb P(HMDS),(AW-DMCS)	60/80,80/100,100/120	30%
Chromosorb G(AW),(AW-DMCS)	60/80,80/100,100/120	5%
Chromosorb W(HMDS),(AW-DMCS)	60/80,80/100,100/120	15%
Chromosorb T	30/60,40/60	12%
Gas Chrom Q	60/80,80/100,100/120,120/140	15%
Gas Chrom P, Z, A, RA, RZ	60/80,80/100,100/120	15%
Glass Beads	60/80,80/100,100/120	0.5%
Porapak	50/80,80/100,100/120	2%
Hayesep	50/80,80/100,100/120	2%
Supelcoport	60/80,80/100,100/120	15%

*See next pages for a list Liquid phases

Ordering Instructions

Description	Requirement
Packings	
1. Solid support	
2. Mesh size	
3. Liquid phase A: and % Loading	
4. Liquid phase B: and % Loading	
5. Liquid phase C: and % Loading	
6. Precondition: Yes or No	
7. Quantity in grams, (Choices of 20g, 50g, 100g)	
8. Special requirement	

Liquid Phases

Ordering Information				
Description	Solvent*	Temp	QTY	Part No.
Liquid Phases				
Apiezon L	C	20/100	25g	0900-0101
Bentone 34	T,C	20/200	50g	0900-0102
Bis(2-butoxyethyl) Phthalate	M	20/175	20g	0900-0103
N, N-bis(2-cyanoethyl) formamide	M	20/125	10g	0900-0104
Butane 1,4 diol Succinate			25g	0900-0105
Carbowax 400	C	20/100	50g	0900-0106
Carbowax 550	C	20/110	50g	0900-0107
Carbowax 600	C	20/120	50g	0900-0108
Carbowax 750	C	25/130	50g	0900-0109
Carbowax 1000	M	40/150	50g	0900-0110
Carbowax 1500	C	40/200	50g	0900-0111
Carbowax 1540	C	40/200	50g	0900-0112
Carbowax 4000	C	60/200	50g	0900-0113
Carbowax 6000	C	60/200	50g	0900-0114
Carbowax 20M	C	60/250	50g	0900-0115
Carbowax 20M-Terephthalic Acid	C	60/250	50g	0900-0116
Citroflex A-4 (acetyl tributyl citrate)	A	-25/180	50g	0900-0117
Citroflex 4 (tributyl citrate)	M	-15/150	50g	0900-0118
Cyanoethylsucrose	A	20/125	50g	0900-0119
Dexsil 300	C	20/450	5g	0900-0120
Dexsil 400	C	20/450	5g	0900-0121
Dexsil 410	C	20/450	5g	0900-0122
Dibutyl Phthalate	M	-20/100	50g	0900-0123
Didecyl Phthalate	A	20/150	25g	0900-0124
Diethylene Glycol Adipate	A	20/190	25g	0900-0125
Diethylene Glycol Succinate	A	20/200	25g	0900-0126
Di(2-ethylhexyl) Sebacate	A	-20/125	50g	0900-0127
Diglycerol	M	20/120	10g	0900-0128
Diisodecyl Adipate	M	-20/125	50g	0900-0129
Diisodecyl Phthalate	A	20/150	50g	0900-0130
Dilauryl Phthalate	M	20/150	10g	0900-0131
Dimethylformamide	M	-20/20	50g	0900-0132
Dimethylsulfolane	M	20/50	50g	0900-0133
Dimethyl Sufoxide	A	20/30	50g	0900-0134
Dinonyl Phthalate	A	20/150	50g	0900-0135
EGSS-X	C	90/225	10g	0900-0136
EPON 1001 (epoxy resin)	C	65/200	50g	0900-0137
Ethofat 60/25	C	50/125	50g	0900-0138
Ethylene Glycol Adipate	C	100/200	50g	0900-0139
Ethylene Glycol Succinate	C	100/200	25g	0900-0140
FFAP	C	00/275	25g	0900-0141
Formamide	M	20/50	50g	0900-0142
Glycerol	M	20/100	50g	0900-0143
Halocarbon Oil 14-25	C	20/150	50g	0900-0144
Hallcomid M-18 OL	M,C	8/150	50g	0900-0145
Hexamethylphosphoramide (HMPA)	M	20/35	50g	0900-0146
Hi-EFF-1AP	C	20/210	25g	0900-0147

***Solvent Code:**
A = Acetone
C = Chloroform
E = Ethyl Acetate
T = Toluene
M = Methanol

Ordering Information				
Description	Solvent*	Temp	QTY	Part No.
Liquid Phases				
Hi-EFF-2AP	C	100/210	25g	0900-0148
Hi-EFF-1BP	C	20/200	25g	0900-0149
Hi-EFF-2BP	C	100/200	25g	0900-0150
Igepal CO-630	M	100/200	50g	0900-0151
Igepal CO-880	C	170/200	50g	0900-0152
Igepal CO-990	C	100/220	50g	0900-0153
β,β,-Iminodipropionitrile	M	1100	25g	0900-0154
Kel-F Oil No. 10	A	20/100	50g	0900-0155
Lexan (polycarbonate resin)	C	220/270	25g	0900-0156
Mannitol		170/200	25g	0900-0157
Neopentyl Glycol Adipate	C	50/225	25g	0900-0158
Neopentyl Glycol Succinate	C	50/225	10g	0900-0159
Nujol (paraffin oil)	T	20/100	50g	0900-0160
β,β,-Oxydipropionitrile	M	20/100	25g	0900-0161
Phenyldiethanolamine	A	0/150	25g	0900-0162
Poly-A-103	C	70/275	10g	0900-0163
Poly-I-110	C	90/275	10g	0900-0164
Poly-S-176	C	150/400	3g	0900-0165
Poly-S-179	C	200/400	3g	0900-0166
Polyphenyl Ether (5 rings) OS-124	C	20/200	25g	0900-0167
Polypropylene Glycol	M	0/150	50g	0900-0168
Polyvinylpyrrolidinone (PVP)	M	20/200	50g	0900-0169
Propylene Glycol	C	0/50	50g	0900-0170
Reoplex 400 (polyester)	A	20/220	50g	0900-0171
Sebaconitrile	C	0/150	20g	0900-0172
Silicone DC-11	C	20/300	50g	0900-0173
Silicone DC-200, 350cstk	C	20/220	50g	0900-0174
Silicone DC-200, 12,500 cstk	C,T	0/200	50g	0900-0175
Silicone DC-410	C	20/250	50g	0900-0176
Silicone DC-401			50g	0900-0177
Silicone DC-550	C	20/225	50g	0900-0178
Silicone DC-704	A	20/250	50g	0900-0179
Silicone DC-710	A	20/225	50g	0900-0180
Silicone DC-HiVac Grease			50g	0900-0181
Silicone DC-QF-1	A	20/250	50g	0900-0182
Silicone DC-FS-1265	A	20/225	50g	0900-0183
Silicone GE-SE-30	C	50/300	50g	0900-0184
Silicone GE-SE-30 GC Grade	C	50/350	10g	0900-0185
Silicone GE-SE-52	C	50/300	50g	0900-0186
Silicone GE-SE-54	C	100/300	50g	0900-0187
Silicone GE-SF-96	C	20/250	50g	0900-0188
Silicone GE-XE-60	A	20/250	10g	0900-0189
Silicone GE-XF-1150		20/250	25g	0900-0190
Silicone OV-1	T	100/350	10g	0900-0191
Silicone OV-3	A	20/350	25g	0900-0192
Silicone OV-7	A	20/350	25g	0900-0193
Hi-EFF-1AP	A	0/350	20g	0900-0194

***Solvent Code:**
A = Acetone
C = Chloroform
E = Ethyl Acetate
T = Toluene
M = Methanol

Liquid phases

Ordering Information				
Description	Solvent*	Temp	QTY	Part No.
Liquid Phases				
Silicone OV-17	A	20/350	25g	0900-0195
Silicone OV-22	A	20/350	10g	0900-0196
Silicone OV-25	A	20/350	10g	0900-0197
Silicone OV-61	A	20/350	10g	0900-0198
Silicone OV-73	T	20/350	10g	0900-0199
Silicone OV-101	T	20/350	20g	0900-0200
Silicone OV-105	A	120/250	10g	0900-0201
Silicone OV-202	C	20/275	10g	0900-0202
Silicone OV-210	C	20/275	25g	0900-0203
Silicone OV-215	E	20/275	10g	0900-0204
Silicone OV-225	A	20/275	10g	0900-0205
Silicone OV-275	A	20/275	5g	0900-0206
Silicone OV-330	A	30/250	5g	0900-0207
OV-351 (Replaces FFAP)	C	50/250	10g	0900-0208
Silicone OV-1701	A	20/325	3g	0900-0209
Silicone Silar 5CP	C	50/275	5g	0900-0210
Silicone Silar 7CP	C	50/275	5g	0900-0211
Silicone Silar 9CP	C	50/275	5g	0900-0212
Silicone Silar 10C	C	50/275	5g	0900-0213
SP-2100	T	20/350	50g	0900-0214
SP-2250	A	20/350	50g	0900-0215
SP-2401	C	0/275	50g	0900-0216
SP-1000	C	50/250	50g	0900-0217
SP-2300	C,A	50/275	50g	0900-0218
SP-2310	A	50/275	50g	0900-0219
SP-2330	A	50/275	50g	0900-0220
SP-2340	A	50/275	50g	0900-0221
Silicone UCC L-45			50g	0900-0222
Silicone UCC W-98		0/300	50g	0900-0223
Span 80 (sorbitan monooleate)	T	20/150	25g	0900-0224
Squalene	T	20/150	50g	0900-0225
Sucrose Acetate Isobutyrate (SAIB)	T	30/200	25g	0900-0226
Tergitol NPX	C	10/175	50g	0900-0227
THEED	M	20/125	25g	0900-0228
Tricresyl Phosphate	M	20/125	50g	0900-0229
Triethanolamine	M	25/75	50g	0900-0230
1,2,3-Tris(2-cyanoethoxy)propane (TCEP)	M	29/150	50g	0900-0231
Triton X-100	A	20/190	50g	0900-0232
Triton X-305	A	20/250	50g	0900-0233
Tween 80	M	20/160	50g	0900-0234
UCON LB-550-X	M	20/200	50g	0900-0235
UCON 50-HB-280-X	M	20/200	50g	0900-0236
UCON 50-HB-2000	A	20/200	50g	0900-0237
UCON 50-HB-5100	M	20/200	50g	0900-0238
Versamid 900	A	190/275	50g	0900-0239

***Solvent Code:**
A = Acetone
C = Chloroform
E = Ethyl Acetate
T = Toluene
M = Methanol

Chromosorb® Diatomaceous Earth

Chromosorb® Specifications				
Series	**Type**	**Surface area**		**Specific Applications**
P	Diatomite	4.0m²/g	30%	
W	Diatomite	1.0m²/g	15%	
G	Diatomite	0.5m²/g	5%	
750	Diatomite	0.75m²/g	12%	Biomedical and pesticides
T	Teflon®	7-8m²/g	12%	

Treatment	
NAW	Non-acid washed
AW	Acid washed
DMCS	Dimethyldichlorosilane (Silanized)
HP	High performance QC (Acid washed, silanized, flux-calcined)

Ordering Information		
Mesh size, Treatment	QTY	Part No.
Chromosorb® P		
60/80, NAW	454g	0900-A001
80/100, NAW	454g	0900-A002
100/120, NAW	454g	0900-A003
60/80, AW	454g	0900-A004
80/100, AW	454g	0900-A005
100/120, AW	454g	0900-A006
60/80, AW-DMCS	454g	0900-A007
80/100, AW-DMCS	454g	0900-A008
100/120, AW-DMCS	454g	0900-A009
Chromosorb® W		
60/80, NAW	150g	0900-A010
80/100, NAW	150g	0900-A011
100/120, NAW	150g	0900-A012
60/80, AW	150g	0900-A013
80/100, AW	150g	0900-A014
100/120, AW	150g	0900-A015
60/80, AW-DMCS	150g	0900-A016
80/100, AW-DMCS	150g	0900-A017
100/120, AW-DMCS	150g	0900-A018
60/80, HP	150g	0900-A019
80/100, HP	150g	0900-A020
100/120, HP	150g	0900-A021
Chromosorb® G		
60/80, NAW	225g	0900-A022
80/100, NAW	225g	0900-A023
100/120, NAW	225g	0900-A024
60/80, AW	225g	0900-A025
80/100, AW	225g	0900-A026
100/120, AW	225g	0900-A027
60/80, AW-DMCS	225g	0900-A028
80/100, AW-DMCS	225g	0900-A029
100/120, AW-DMCS	225g	0900-A030
60/80, HP	225g	0900-A031
80/100, HP	225g	0900-A032
100/120, HP	225g	0900-A033
Chromosorb® 750		
60/80, AW-DMCS	100g	0900-A034
80/100, AW-DMCS	100g	0900-A035
100/120, AW-DMCS	100g	0900-A036
Chromosorb® T		
30/60	225g	0900-A037
40/60	225g	0900-A038

Chromosorb® 100 Series Porous Polymers

Chromosorb® 100 Series is porous polymers and have a rigid structure and distinct pore size. They are packed into columns in the normal manner and do not require a liquid coating. Seven different Chromosorb® polymer materials are available. We recommend preconditioning all porous polymers before packing columns.

Chromosorb® 100 Specifications

Series	Polymer	Surface area	Polarity
101	Divinylbenzene/Styrene	>50m²/g	Non-Polar
102	Divinylbenzene/Styrene	300-400m²/g	Slightly Polar
103	Cross-linked Polystyrene	15-25m²/g	Non-Polar
105	Polyaromatic	600-700m²/g	Moderate Polar
106	Cross-linked Polystyrene	700-800m²/g	Non-Polar
107	Cross-linked Acrylic Ester	400-500m²/g	Polar
108	Cross-linked Acrylic	100-200m²/g	Polar

Ordering Information

Mesh size, Treatment	QTY	Part No.
Chromosorb® 101		
60/80	50g	0900-B001
80/100	50g	0900-B002
100/120	50g	0900-B003
Chromosorb® 102		
60/80	50g	0900-B004
80/100	50g	0900-B005
100/120	50g	0900-B006
Chromosorb® 103		
60/80	50g	0900-B007
80/100	50g	0900-B008
100/120	50g	0900-B009
Chromosorb® 105		
60/80	50g	0900-B010
80/100	50g	0900-B011
100/120	50g	0900-B012
Chromosorb® 106		
60/80	50g	0900-B013
80/100	50g	0900-B014
100/120	50g	0900-B015
Chromosorb® 107		
60/80	50g	0900-B016
80/100	50g	0900-B017
100/120	50g	0900-B018
Chromosorb® 108		
60/80	50g	0900-B019
80/100	50g	0900-B020
100/120	50g	0900-B021

Porapak® Porous Polymers

Porapak® GC packings are cross-linked polymers which may be used directly in GC columns without a stationary phase coating. Acetone washing of Porapaks® has been shown to improve their performance by removing surface adsorbed moisture and residual monomers.

Porapak® Specifications

Series	Polymer	Surface area	Polarity
Q	DVB*/Ethylvinylbenzene	500-600m²/g	Slightly Polar
P	DVB*/Styrene	100-200m²/g	Non-Polar
R	DVB*/Vinyl pyrrolidinone	450-600m²/g	Moderately Polar
S	DVB*/Vinyl pyridine	300-450m²/g	Moderately Polar
T	EGDM**	225-350m²/g	Polar
N	DVB*/Vinyl pyrrolidinone	250-350m²/g	Very Polar

* Divinylbenzene, ** Ethyleneglycoldimethacrylate

Ordering Information

Mesh size, Treatment	QTY	Part No.
Porapak® Q		
50/80	26g	0900-D001
80/100	26g	0900-D002
100/120	26g	0900-D003
Porapak® P		
50/80	20g	0900-D004
80/100	20g	0900-D005
100/120	20g	0900-D006
Porapak® R		
50/80	24g	0900-D007
80/100	24g	0900-D008
100/120	24g	0900-D009
Porapak® S		
50/80	26g	0900-D010
80/100	26g	0900-D011
100/120	26g	0900-D012
Porapak® T		
50/80	31g	0900-D013
80/100	31g	0900-D014
100/120	31g	0900-D015
Porapak® N		
50/80	29g	0900-D016
80/100	29g	0900-D017
100/120	29g	0900-D018
Porapak® QS		
50/80	26g	0900-D019
80/100	26g	0900-D020
100/120	26g	0900-D021
Porapak® PS,		
50/80	20g	0900-D022
80/100	20g	0900-D023
100/120	20g	0900-D024

Tenax® Porous Polymers

Tenax®-TA is a porous polymer based on 2,6-Diphenyl-*p*-phenylene Oxide. Tenax®-TA is a low bleeding material with a very low level of impurities. Tenax®-TA can be used as both a column packing material and as a trapping adsorbent for organic volatile and semi-volatile compounds. Both the EPA and NIOSH specify the use of Tenax® in their standard methods. Tenax® is particularly useful for the analysis of high boiling compounds such as alcohols, polyethylene glycols, diols, phenols, monoamines and diamines, ethanolamines, aldehydes, ketones and chlorinated aromatics. Surface area is 35m²/g. Density is 0.25g/cc. Maximum temperature limit is 350°C

Tenax®-GR contains 23% graphitized carbon as an integral part of the material. The resulting material gives higher break-through volumes for most materials, yet is less water retentive than Tenax®-TA. This makes it an ideal material for the preparation of adsorbent traps. When using this material for packing GC columns, better peak symmetry is observed. Surface area is 24.1m²/g. Density is 0.55g/cc. Maximum temperature limit is 350°C.

Breakthrough Volumes at 20°C

	Tenax®-TA		Tenax®-GR	
Test compounds	**mL/g**	**mL/mL**	**mL/g**	**mL/mL**
Methane	5.7	1.1	2.2	1.2
Ethane	19.7	3.9	14.4	8.0
Bromotrifluoromethane	56.0	11.2	18.2	10.0
Water	55	11	47	26
Methyl Chloride	190	37.9	182	100
Butane	676	135	395	217
Vinyl Chloride	345	69	506	278
Benzene	44,400	8,880	33,800	18,600
1,1,2-Trichloroethane	110,000	21,900	105,000	57,700

Ordering Information

Packings, Mesh size	QTY	Part No.
Tenax®-TA		
20/35	10g	0900-F001
35/60	10g	0900-F002
60/80	10g	0900-F003
80/100	10g	0900-F004
Tenax®-GR		
20/35	10g	0900-F005
35/60	10g	0900-F006
60/80	10g	0900-F007
80/100	10g	0900-F008

HayeSep® Porous Polymers

- **Pre-Purified Porous Polymers for GC**
- **Less Bleed and Shrinkage than Other Porous Polymers**
- **Conditioned**

HayeSep® manufactures polymers with guaranteed consistent batch to batch performance, no shrinkage and minimum bleed. These polymers are thoroughly cleaned and conditioned to 200°C (165°C for N and T) under oxygen-free nitrogen before packaging.

Several HayeSep® polymers were developed to solve specific separation problems. These include the room temperature separation of N_2, O_2, Ar and CO with HayeSep® A; ppm H_2O in the presence of HCl, Cl_2 etc. with HayeSep® R; and many others. The HayeSep® D series better separates the fixed gases to the C2 hydrocarbons. Small differences in pore sizes between the members of this series can make dramatic differences in the separations.

Porapak® Specifications

Series	Polymer	Surface area	Polarity
Q	DVB*	582m²/g	Non-polar
P	DVB*/Styrene	165m²/g	Slightly Polar
R	DVB*/*N*-Vinyl-2-pyrrolidinone	344m²/g	Moderately Polar
S	DVB*/4-Vinyl-pyridine	583m²/g	Moderately Polar
T	EGDM**	250m²/g	Very Polar
N	DVB*/EGDM**	405m²/g	Very Polar
A	DVB*/EGDM** (high purity)	526m²/g	Moderately Polar
B	DVB*/Polyethyleneimine	608m²/g	Very Polar
C	DVB*/Acrylonitrile	442m²/g	Moderately Polar
D	DVB* (high purity)	795m²/g	Non-Polar

* Divinylbenzene, ** Ethyleneglycoldimethacrylate

Comparison of HayeSep® "D" Formulations

Retention time (minute)*

Series	Air	CH_4	CO_2	C_2H_4	C_2H_4	C_2H_6	H_2O
DIP	0.9	1.7	3.1	5.4	5.8	8.3	9.0
D	0.9	1.7	3.1	5.8	6.1	8.4	8.6
DB	0.9	1.6	3.1	6.1	6.6	8.7	8.1

* Retention data based on 10ft x 1/8" SS at 45°C, 30mL/min.

HayeSep® Porous Polymers

Ordering Information		
Mesh size	QTY	Part No.
HayeSep® Q		
60/80	75cc	0900-E001
80/100	75cc	0900-E002
100/120	75cc	0900-E003
HayeSep® P		
60/80	75cc	0900-E004
80/100	75cc	0900-E005
100/120	75cc	0900-E006
HayeSep® R		
60/80	75cc	0900-E007
80/100	75cc	0900-E008
100/120	75cc	0900-E009
HayeSep® S		
60/80	75cc	0900-E010
80/100	75cc	0900-E011
100/120	75cc	0900-E012
HayeSep® T		
60/80	75cc	0900-E013
80/100	75cc	0900-E014
100/120	75cc	0900-E015
HayeSep® N		
60/80	75cc	0900-E016
80/100	75cc	0900-E017
100/120	75cc	0900-E018
HayeSep® A		
60/80	75cc	0900-E019
80/100	75cc	0900-E020
100/120	75cc	0900-E021
120/140	75cc	0900-E022
HayeSep® B		
60/80	75cc	0900-E023
80/100	75cc	0900-E024
100/120	75cc	0900-E025
HayeSep® C		
60/80	75cc	0900-E026
80/100	75cc	0900-E027
100/120	75cc	0900-E028
HayeSep® D		
60/80	75cc	0900-E029
80/100	75cc	0900-E030
100/120	75cc	0900-E031
HayeSep® DIP		
60/80	75cc	0900-E032
80/100	75cc	0900-E033
100/120	75cc	0900-E034
HayeSep® DB		
60/80	75cc	0900-E035
80/100	75cc	0900-E036
100/120	75cc	0900-E037

Carbograph™ Graphitized Carbon Blacks

- **High Speed Analysis**
- **Optimum Peak Symmetry**
- **Wide Range of Applications**
- **Extremely Hydrophobic - Ideal for Aqueous Injections**
- **Less Expensive than other Equivalents**

Carbograph™ packings are graphitized carbon blacks equivalent to the Carbopack packings. There are three different types of graphitized carbon blacks (Carbograph™ 1 and 2). Unlike diatomites that must have a stationary phase, Carbograph™ packings possess partitioning properties without any surface modifications. Carbograph™ packings can also be modified with a stationary phase giving them unique selectivities.

Carbograph™ 1 Equivalent to Carbopack™ B. Obtained by graphitization and granulation. It has a surface area of 100m^2/g. Carbograph™ 1-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Carbograph™ 1SC Similar to Carbopack™ BHT. It is a type of Carbograph™ 1 that is manufactured specifically for the separation of sulfur compounds SF_6, SO_2, H_2S, COS, mercaptans, and disulfides. It is also suitable for analysis of sulfurs in oil products. Maximum temperature 225°C.

Carbograph™ 2 Equivalent to Carbopack™ C. It has a specific surface of 10m^2/g. It can be used alone as an uncoated adsorbent packing for the separation of volatile organic compounds. Carbograph™ 2-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Ordering Information		
Packings, Mesh size	QTY	Part No.
Uncoated Carbograph™		
Carbograph™ 1-TD, 20/40	15g	0900-K001
Carbograph™ 1, 60/80	10g	0900-K002
Carbograph™ 1, 80/120	10g	0900-K003
Carbograph™ 2-TD, 20/40	10g	0900-K004
Carbograph™ 2, 60/80	10g	0900-K005
Carbograph™ 2, 80/100	10g	0900-K006
Carbograph™ 1-SC, 40/60	10g	0900-K007
Coated Carbograph™		
4% Carbowax® 20M on Carbograph™ 1 DA	15g	0900-K008
0.2% Carbowax® 1500 on Carbograph™ 2, 60/80	15g	0900-K009
0.2% Carbowax® 1500 on Carbograph™ 2, 80/100	15g	0900-K010
5% Carbowax® 20M on Carbograph™ 1 AW	15g	0900-K011
6.6% Carbowax® 20M on Carbograph™ 1 AW	15g	0900-K012
4% Carbowax® 20M + 0.8% KOH on Carbograph™ 1	15g	0900-K013

Molecular Sieves

Molecular sieves are synthetic alkali metal aluminosilicates with various cations. They are primarily used for the separation of fixed gases and drying of liquid or gas streams. Molecules are adsorbed primarily because their molecular diameter matches the pore diameter of the molecular sieve. They can be reactivated by heating at 250°C for 12 hours; 300°C for 4 hours; or 350°C for 2 hours.

Ordering Information		
Mesh size	QTY	Part No.
Molecular Sieve 3A		
40/60	100g	0900-C001
60/80	100g	0900-C002
80/100	100g	0900-C003
100/120	100g	0900-C004
Molecular Sieve 4A		
40/60	100g	0900-C005
60/80	100g	0900-C006
80/100	100g	0900-C007
100/120	100g	0900-C008
Molecular Sieve 5A		
40/60	100g	0900-C009
60/80	100g	0900-C010
80/100	100g	0900-C011
100/120	100g	0900-C012
Molecular Sieve 13X		
40/60	100g	0900-C013
60/80	100g	0900-C014
80/100	100g	0900-C015
100/120	100g	0900-C016

Activated Alumina

Activated alumina is useful for the analysis of light hydrocarbons. Unsaturated hydrocarbons are retained longer than saturated ones. They dry and “sweeten” liquid or gas streams.

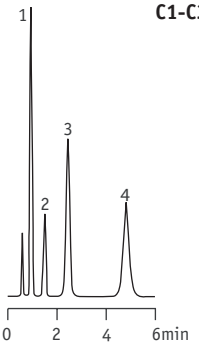
Ordering Information		
Mesh size	QTY	Part No.
Activated Alumina, Type F-1		
40/60	100g	0900-G001
60/80	100g	0900-G002
80/100	100g	0900-G003
100/120	100g	0900-G004

Silica Gel

Silica Gel is commonly used for the analysis of fixed gases and light hydrocarbons. It is also useful for dehydration of gases and liquids. Silica Gel also strongly adsorbs hydrogenbonding compounds.

Ordering Information		
Mesh size	QTY	Part No.
Activated Alumina, Grade 12		
40/60	100g	0900-H001
60/80	100g	0900-H002
80/100	100g	0900-H003
100/120	100g	0900-H004

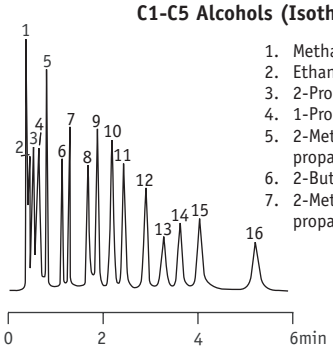
C1-C3 Acids (Aqueous)



1. Water
2. Formic Acid
3. Acetic acid
4. Propionic acid

Column: 6ft x 2mm SS
Packing: Porapak QS 80/100
Temp: 175°C
Detector: TCD
Carrier Gas: Helium at 25mL/min

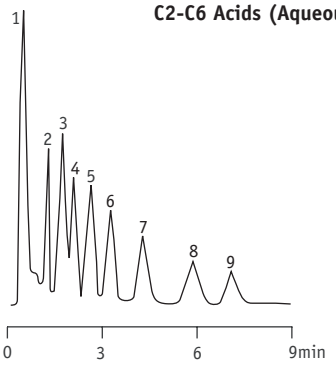
C1-C5 Alcohols (Isothermal)



1. Methanol
2. Ethanol
3. 2-Propanol
4. 1-Propanol
5. 2-Methyl-2-propanol
6. 2-Butanol
7. 2-Methyl-1-propanol
8. 1-Butanol
9. 2-Methyl-2-butanol
10. 2,2-Dimethyl-1-propanol
11. 3-Methyl-2-butanol
12. 3-Pentanol
13. 2-Pentanol
14. 2-Methyl-1-butanol
15. 3-Methyl-1-butanol
16. 1-Pentanol

Column: 6ft x 2mm SS
Packing: 0.2% Carbowax 1500 on Carbograph 1, 80/100
Temp: 115°C
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

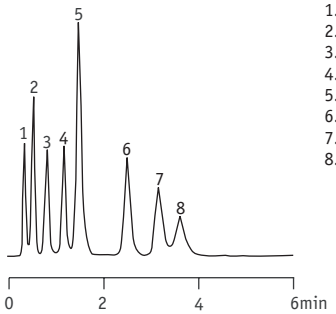
C2-C6 Acids (Aqueous)



1. Water
2. Acetic acid
3. Propionic acid
4. Isobutyric acid
5. n-Butyric acid
6. Isovaleric acid
7. n-Valeric acid
8. Isocaproic acid
9. n-Caproic acid

Column: 6ft x 2mm SS
Packing: Carbowax 20M-TPA 30/60
Temp: 120°C
Detector: TCD
Carrier Gas: Helium at 20mL/min

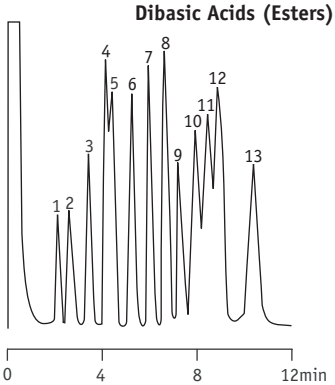
Glycols



1. Ethylene glycol
2. 1,2-Propanediol
3. 2,3-Butanediol
4. 1,3-Propanediol
5. 1,3-Butanediol
6. 1,4-Butanediol
7. Diethylene glycol
8. Glycerol

Column: 4ft x 3mm SS
Packing: Chromosorb 101 100/120
Temp: 210°C
Detector: FID
Carrier Gas: Helium at 50mL/min

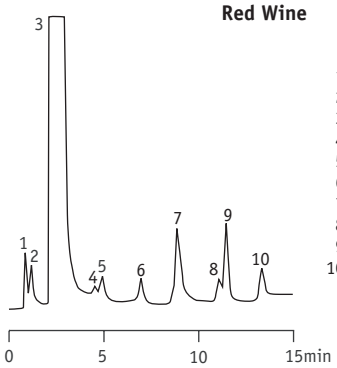
Dibasic Acids (Esters)



1. Dimethyl oxalate
2. Dimethyl malonate
3. Dimethyl succinate
4. Dimethyl maleate
5. Dimethyl glutarate
6. Dimethyl adipate
7. Dimethyl pimelate
8. Dimethyl suberate
9. Dimethyl azalate
10. Dimethyl sebacate
11. Dimethyl terephthalate
12. Dimethyl isophthalate
13. Dimethyl phthalate

Column: 6ft x 2mm SS
Packing: 10% Silar-10C on Chromosorb WAW 100/120
Temp: 130°C to 200°C (10°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

Red Wine

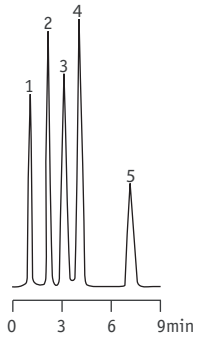


1. Methanol
2. Acetaldehyde
3. Ethanol
4. 1-Propanol
5. Ethyl acetate
6. Isobutanol
7. Acetic acid
8. 2-Methyl-1-butanol
9. Isoamyl alcohol
10. unknown

Column: 6ft x 2mm SS
Packing: 5% Carbowax 20M on Carbograph 1, 80/120
Temp: 70°C to 170°C (5°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

GC Packed Column Application

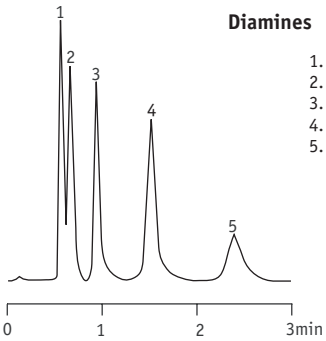
Ethyl Amines



1. Ammonia
2. Ethylamine
3. Ethanol
4. Diethylamine
5. Triethylamine

Column: 6ft x 4mm SS
Packing: 28% Phenyldiethanolamine + 4% KOH on Chromosorb G-NAW 80/100
Temp: 130°C
Detector: FID
Carrier Gas: Helium at 75mL/min

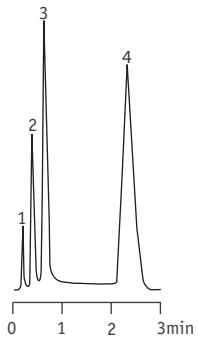
Diamines



1. Ethylenediamine
2. 1,2-Propanediamine
3. 1,3-Propanediamine
4. 1,4-Butanediamine
5. 1,5-Pentanediamine

Column: 4ft x 4mm SS
Packing: Chromosorb 103 80/100
Temp: 240°C
Detector: FID
Carrier Gas: Nitrogen at 50mL/min

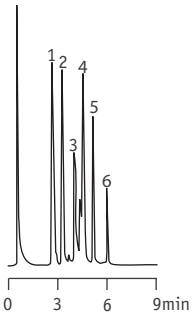
Ammonia



1. Air
2. Carbon dioxide
3. Ammonia
4. Water

Column: 3ft x 1/8" SS
Packing: Porapak N 80/100
Temp: 120°C
Detector: TCD
Carrier Gas: Helium at 25mL/min

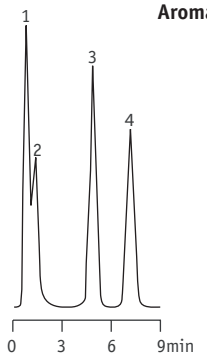
TMS Sugars



1. L-Arabinose
2. D-Xylose
3. β-D-Fructose
4. α-D-Fructose
5. β-D-Glucose
6. D-Galactose

Column: 6ft x 2mm SS
Packing: 3% OV-101 on Chromosorb W-HP 80/100
Temp: 160°C to 250°C (10°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

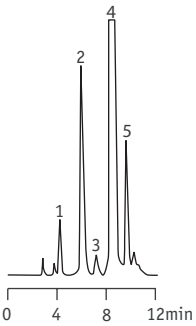
Aromatic Amines



1. Pyridine
2. Morpholine
3. Aniline
4. Toluidine

Column: 2ft x 2mm SS
Packing: Tenax 60/80
Temp: 150°C to 230°C (6°C /min)
Detector: FID
Carrier Gas: Nitrogen at 15mL/min

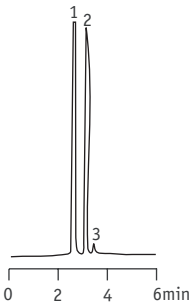
Distilled Lemon Oil



1. α-Pinene
2. β-Pinene
3. Myrcene
4. Limonene
5. γ-Terpiene

Column: 6ft x 2mm SS
Packing: 10% Carbowax 20M-TPA on Chromosorb W-HP 80/100
Temp: 75°C (4min) to 120°C (5°C/min)
Detector: FID
Carrier Gas: Nitrogen at 15mL/min

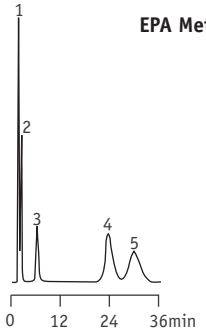
Room Air



1. Nitrogen
2. Oxygen
3. Argon

Column: 30ft x 1/8" SS
Packing: HayeSep DB 100/120
Temp: -66°C
Detector: TCD
Carrier Gas: Helium at 30mL/min

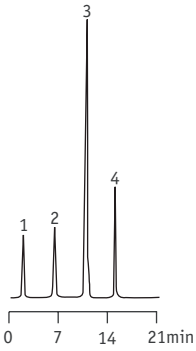
EPA Method 606, Phthalates



1. Dimethyl phthalate
2. Diethyl phthalate
3. Di-n-butyl phthalate
4. Butyl benzyl phthalate
5. Bis (2-Ethylhexyl) phthalate

Column: 6ft x 4mm SS
Packing: 1.5% OV-17 + 1.95% DC-QF-1 on Chromosorb W-HP 100/120
Temp: 220°C
Detector: ECD
Carrier Gas: Nitrogen at 60mL/min

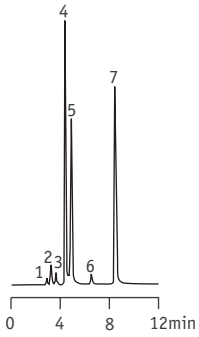
EPA Method 501, Trihalomethanes



1. Chloroform
2. Bromodichloromethane
3. Chlorodibromomethane
4. Bromoform

Column: 8ft x 1/8" SS
Packing: 1% Carbowax 20M-TPA on Carbograph 1 60/80
Temp: 450°C to 220°C (8°C/min)
Detector: FID
Carrier Gas: Helium at 40mL/min

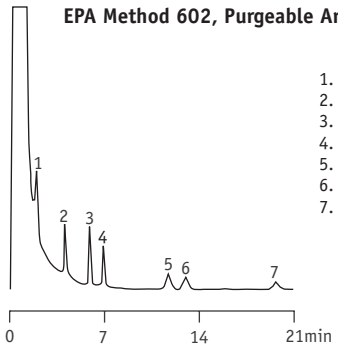
EPA Method 601, Purgeable Halocarbons



1. Methyl chloride
2. Vinyl chloride
3. Dichlorofluoromethane
4. Methyl bromide
5. Ethyl chloride
6. Trichlorofluoromethane
7. Metylene chloride

Column: 30m x 0.53mm SS
Packing: OV-1 5µ
Temp: 35°C
Detector: FID
Carrier Gas: Helium at 3mL/min

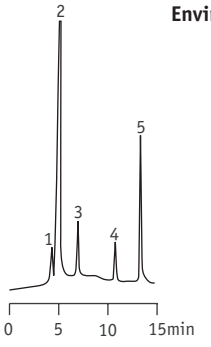
EPA Method 602, Purgeable Aromatics



1. Benzene
2. Toluene
3. Ethylbenzene
4. Chlorobenzene
5. 1,4-Dichlorobenzene
6. 1,3-Dichlorobenzene
7. 1,2-Dichlorobenzene

Column: 6ft x 1/8" SS
Packing: 1% Carbowax 20M-TPA + 1.75% Diisoocyl Phthalate on Chromosorb® W-AW 100/120
Temp: 50°C (2 min) to 95°C (8°C/min)
Detector: FID
Carrier Gas: Helium at 36mL/min

Environmental Gases

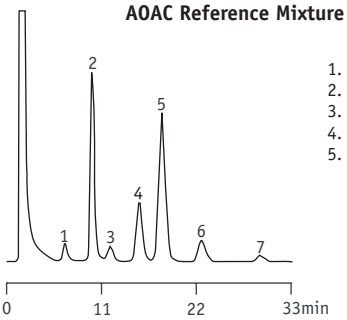


1. Oxygen
2. Nitrogen (balance)
3. Carbon monoxide
4. Methane
5. Carbon dioxide

Column: 10ft x 1/8" SS
Packing: Molecular Sieve 5A 80/100
Temp: 30°C (3 min) to 225°C (30°C/min)
Detector: TCD
Carrier Gas: Helium at 15mL/min

GC Packed Column Application

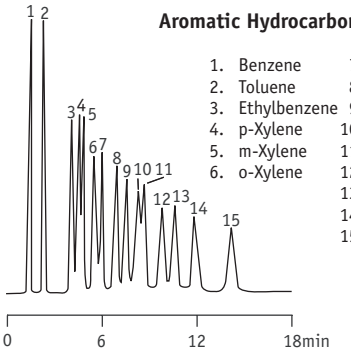
AOAC Reference Mixture



1. Methyl myristate
2. Methyl stearate
3. Methyl oleate
4. Methyl linoleate
5. Methyl linolenate

Column: 10ft x 2mm SS
Packing: 10% Silar-10CP on Chromosorb W-HP 100/120
Temp: 185°C
Detector: FID
Carrier Gas: Helium at 13mL/min

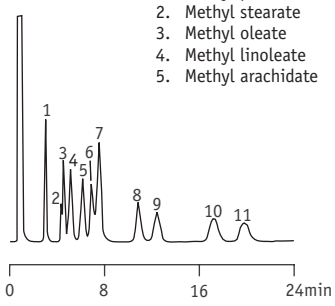
Aromatic Hydrocarbons



1. Benzene
2. Toluene
3. Ethylbenzene
4. p-Xylene
5. m-Xylene
6. o-Xylene
7. Isopropylbenzene
8. Styrene
9. n-Propylbenzene
10. p-Ethyltoluene
11. m-Ethyltoluene
12. o-Ethyltoluene
13. 1,3,5-Trimethylbenzene
14. 1,2,4-Trimethylbenzene
15. 1,2,3-Trimethylbenzene

Column: 6ft x 1/8" SS
Packing: 5% Carbowax 20M-TPA + 1.75% Diisodecyl Phthalate on Chromosorb WAW 100/120
Temp: 75°C
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

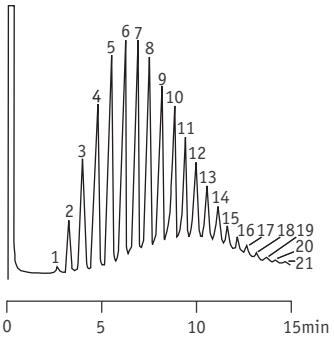
C16-C24 FAME



1. Methyl palmitate
2. Methyl stearate
3. Methyl oleate
4. Methyl linoleate
5. Methyl arachidate
6. Methyl linolenate
7. Methyl cis-11-eicosenoate
8. Methyl behenate
9. Methyl erucate
10. Methyl lignocerate
11. Methyl nervonate

Column: 6ft x 4mm SS
Packing: 10% Silar-7CP on Chromosorb WHP 100/120
Temp: 220°C
Detector: FID
Carrier Gas: Nitrogen at 10mL/min

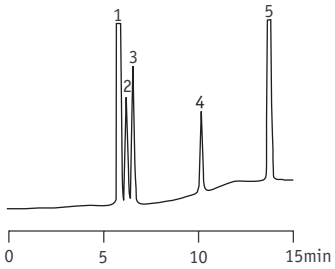
Paraffin Wax



1. C20
2. C21
3. C22
4. C23
5. C24
6. C25
7. C26
8. C27
9. C28
10. C29
11. C30
12. C31
13. C32
14. C33
15. C34
16. C35
17. C36
18. C37
19. C38
20. C39
21. C40

Column: 4ft x 2mm SS
Packing: 1% Dexsil 300 on Chromosorb WHP 100/120
Temp: 150°C to 320°C (10°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

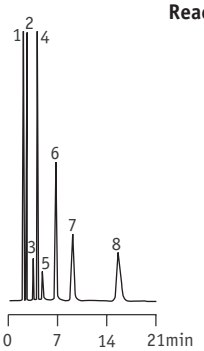
Environmental Gases



1. Nitrogen (balance)
2. Oxygen
3. Carbon monoxide
4. Methane
5. Carbon dioxide

Column: 30ft x 1/8" SS
Packing: Chromosorb W-HP 100/120
Temp: 30°C (6.8 min) to 175°C (30°C/min)
Detector: TCD
Carrier Gas: Helium at 20mL/min

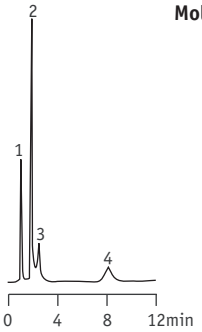
Reactive Gas Mixture



1. Air
2. Methane
3. Carbon dioxide
4. Nitrous oxide
5. Ammonia
6. Ethane
7. Hydrogen sulfide
8. Carbonyl sulfide

Column: 8ft x 1/8" SS
Packing: HayeSep Q 80/100
Temp: 50°C
Detector: TCD
Carrier Gas: Helium at 30mL/min

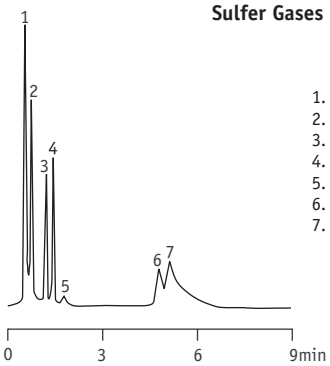
Molecular Sieve 5A



1. Oxygen
2. Nitrogen
3. Methane
4. Carbon monoxide

Column: 6ft x 1/8" SS
Packing: Molecular Sieve 5A 80/100
Temp: 35°C
Detector: TCD
Carrier Gas: Helium at 30mL/min

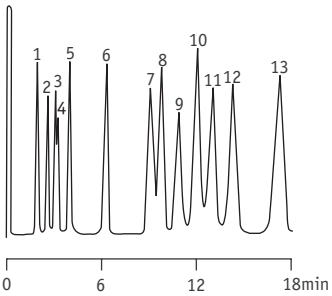
Sulfer Gases



1. Air
2. Carbon dioxide
3. Hydrogen sulfide
4. Carbonyl sulfide
5. Propane
6. Sulfur dioxide
7. Water

Column: 30ft x 1/8" Teflon
Packing: Chromosorb 107 80/100
Temp: 80°C
Detector: TCD
Carrier Gas: Helium at 30mL/min

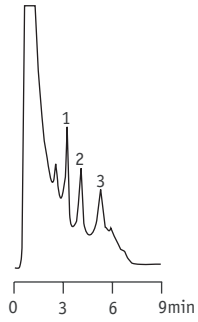
Chlorinated Pesticides



1. α-BHC
2. Lindane
3. β-BHC
4. Haptachlor
5. Aldrin
6. Heptachlor epoxide
7. p,p'-DDE
8. Dieldrin
9. o,p'-DDD
10. Endrin
11. o,p'-DDT
12. o,p'-DDD
13. p,p'-DDT

Column: 6ft x 4mm SS
Packing: 1.5% OV-17 + 1.95% QF-1 on Chromosorb W-HP 80/100
Temp: 200°C
Detector: ECD
Carrier Gas: Nitrogen at 65mL/min

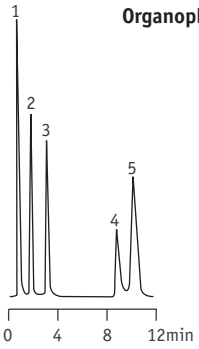
Triazines



1. Propazine
2. Altrazine
3. Simazine

Column: 3ft x 2mm SS
Packing: 5% Carbowax 20M-TPA on Chromosorb WHP 60/80
Temp: 195°C
Detector: FID
Carrier Gas: Nitrogen at 30mL/min

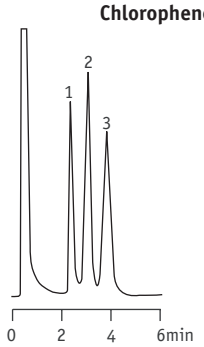
Organophosphorous Pesticides



1. Diazinon
2. Methyl parathion
3. Parathion
4. Ethion
5. Methyl trithion

Column: 6ft x 2mm SS
Packing: 5% SE-30 on Chromosorb W-HP 80/100
Temp: 215°C
Detector: NPD
Carrier Gas: Nitrogen at 80mL/min

Chlorophenoxy Acid Herbicides

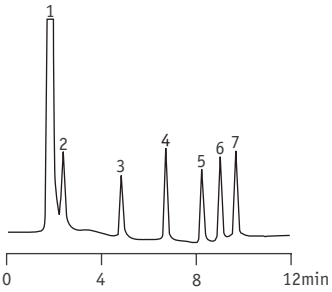


1. 2,4-D, methyl ester
2. Silvex, methyl ester
3. 2,4,5-T, methyl ester

Column: 4ft x 2mm SS
Packing: 5% OV-210 on Chromosorb W-HP 80/100
Temp: 140°C
Detector: FID
Carrier Gas: Nitrogen at 10mL/min

GC Packed Column Application

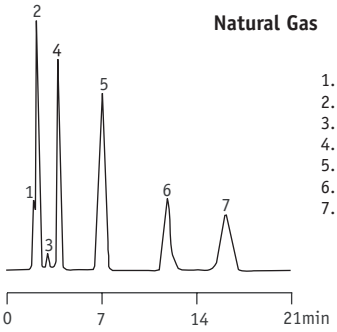
Fast Environmental Analysis



1. Nitrogen (balance)
2. Carbon monoxide
3. Methane
4. Carbon dioxide
5. Acetylene
6. Ethylene
7. Ethane

Column:	15ft x 1/16" SS
Packing:	Molecular Sieve 5A 80/100
Temp:	30°C (3 min) to 225°C (30°C/min)
Detector:	TCD
Carrier Gas:	Helium at 15mL/min

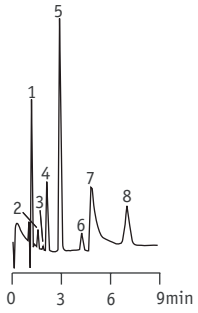
Natural Gas



1. Nitrogen
2. Methane
3. Carbon dioxide
4. Ethane
5. Propane
6. Isobutane
7. n-Butane

Column:	30ft x 1/8" SS
Packing:	30% DC-200, 500cstks on Chromosorb P-AW 60/80
Temp:	40°C
Detector:	TCD
Carrier Gas:	Helium at 23mL/min

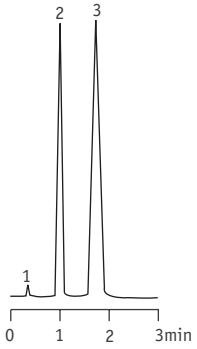
Fuel Gas Sample



1. Carbon dioxide
2. Hydrogen
3. C2
4. Oxygen
5. Nitrogen
6. Methane
7. Water
8. Carbon monoxide

Column:	7ft x 1/8" SS, 5ft x 1/8" SS
Injection:	10-Port Valve, 250µL Sampling Loop
Packing:	Porapak S 60/80, Molecular sieve 13X 60/80
Temp:	80°C
Detector:	HWD
Carrier Gas:	Helium at 35mL/min

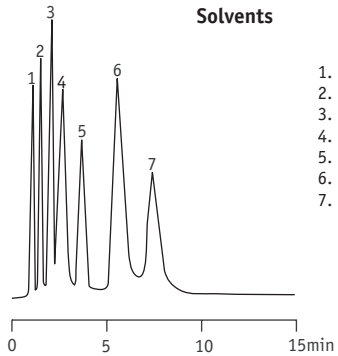
Ammonia



1. Air
2. Ammonia
3. Water

Column:	8ft x 1/8" SS
Packing:	HayeSep P 60/80
Temp:	80°C
Detector:	TCD
Carrier Gas:	Helium at 30mL/min

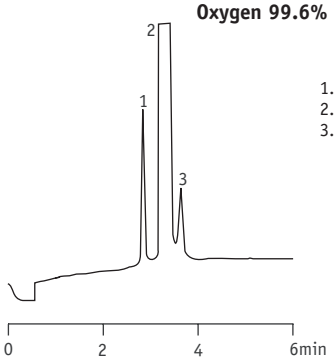
Solvents



1. Methyl formate
2. Ethanol
3. Acetone
4. n-Hexane
5. Isopropyl ether
6. Isobutanol
7. Propyl acetate

Column:	4ft x 3mm SS
Packing:	Chromosorb 107 80/100
Temp:	200°C
Detector:	FID
Carrier Gas:	Helium at 40mL/min

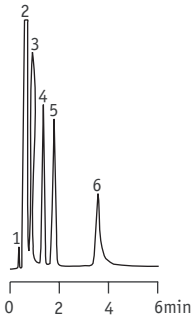
Oxygen 99.6%



1. Nitrogen
2. Oxygen
3. Argon

Column:	30ft x 1/8" SS
Packing:	HayeSep DB 100/120
Temp:	-66°C
Detector:	TCD
Carrier Gas:	Helium at 30mL/min

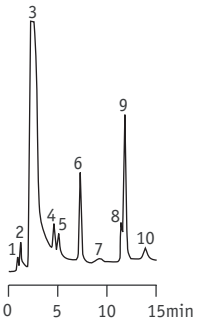
Amines



1. Air
2. Water
3. Methylamine
4. Dimethylamine
5. Trimethylamine
6. Ethylenediamine

Column: 5ft x 1/8" SS
Packing: Hayesep B 80/100
Temp: 140°C to 190°C (16°C/min)
Detector: TCD
Carrier Gas: Helium at 30mL/min

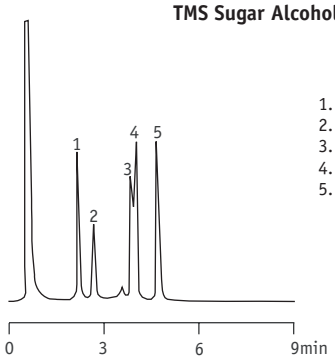
Brandy



1. Methanol
2. Acetaldehyde
3. Ethanol
4. 1-Propanol
5. Ethyl acetate
6. Isobutanol
7. Acetic acid
8. 2-Methyl-1-butanol
9. Isoamyl alcohol
10. unknown

Column: 6ft x 2mm SS
Packing: 5% Carbowax 20M-TPA on Carbograph 1, 80/120
Temp: 70°C to 170°C (5°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

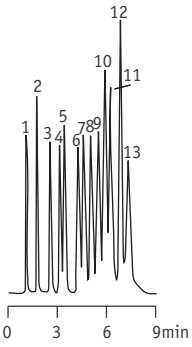
TMS Sugar Alcohols



1. L-Arainose
2. Xylitol
3. Sorbitol
4. β-D-Glucode
5. meso-Inositol

Column: 6ft x 2mm SS
Packing: 3% OV-101 on Chromosorb W-HP 80/100
Temp: 160°C to 250°C (10°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

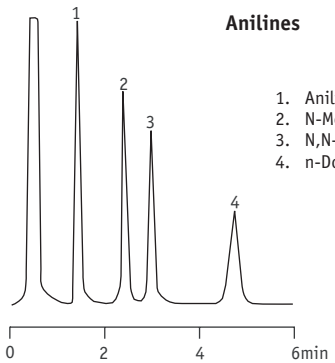
C_1-C_5 Alcohols



1. Methanol
2. Ethanol
3. 2-Propanol
4. 2-Methyl-2-propanol
5. 1-Propanol
6. 2-Butanol
7. 2-Methyl-1-propanol
8. 2-Methyl-1-propanol + 1-Butanol
9. 2,2-Dimethyl-1-propanol
10. 3-Methyl-2-butanol
11. 2-Pentanol + 3-Pentanol
12. 3-Methyl-1-butanol + 2-Methyl-1-butanol
13. 1-Pentanol

Column: 6ft x 1/8" SS
Packing: Chromosorb 101, 80/100
Temp: 140°C to 180°C (5°C/min)
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

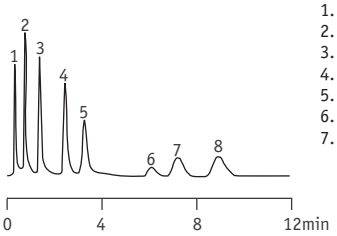
Anilines



1. Aniline
2. N-Methylaniline
3. N,N-Dimethylaniline
4. n-Dodecane

Column: 6ft x 1/8" SS
Packing: 10% Apiezon L + 2% KOH on Chromosorb W-AW 80/100
Temp: 135°C
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

C_2-C_5 Acids

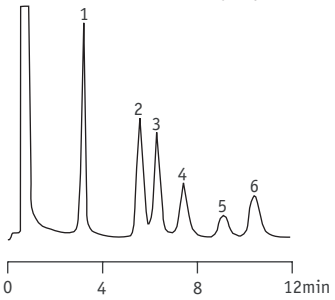


1. Acetic acid
2. Propionic acid
3. Isobutyric acid
4. n-Butyric acid
5. 2-Methylbutyric acid
6. 3-Methylbutyric acid
7. Valeric acid

Column: 6ft x 4mm SS
Packing: 0.3% Carbowax 20M + 0.1% H_3PO_4 on Carbograph™ 1, 60/80
Temp: 120°C
Detector: FID
Carrier Gas: Nitrogen at 60mL/min

GC Packed Column Application

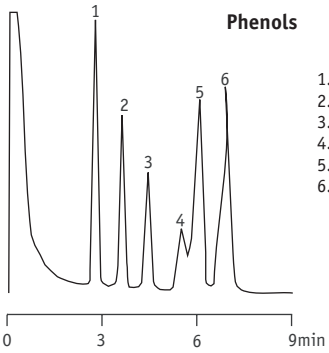
C_{16}-C_{20} FAME



1. Methyl palmitate
2. Methyl stearate
3. Methyl oleate
4. Methyl linoleate
5. Methyl linolenate
6. Methyl arachidate

Column: 6ft x 4mm SS
Packing: 10% Silar-5CP on Chromosorb W-HP, 80/100
Temp: 180°C
Detector: FID
Carrier Gas: Nitrogen at 40mL/min

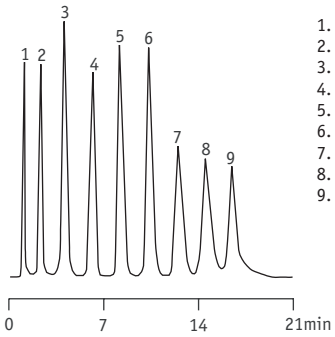
Phenols



1. 2,6-Dimethylphenol
2. Phenol
3. 2,5-Dimethylphenol
4. 2,4-Dimethylphenol
5. 2,3-Dimethylphenol
6. 3,4-Dimethylphenol

Column: 6ft x 2mm SS
Packing: 10% Carbowax 20M-TPA on Chromosorb W-AW 80/100
Temp: 190°C
Detector: FID
Carrier Gas: Nitrogen at 20mL/min

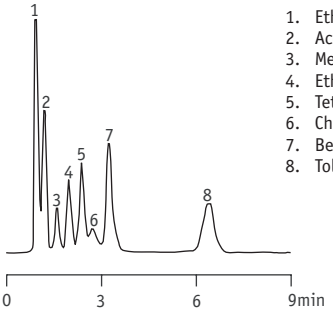
Diol



1. Ethylene glycol
2. 1,3-Propanediol
3. 1,4-Butanediol
4. 1,5-Pentanediol
5. 1,6-Hexanediol
6. 1,7-Heptanediol
7. 1,8-Octanediol
8. 1,9-Nonanediol
9. 1,10-Decanediol

Column: 2ft x 2mm SS
Packing: Tenax GC 60/80
Temp: 150°C to 270°C (6°C/min)
Detector: FID
Carrier Gas: Nitrogen at 15mL/min

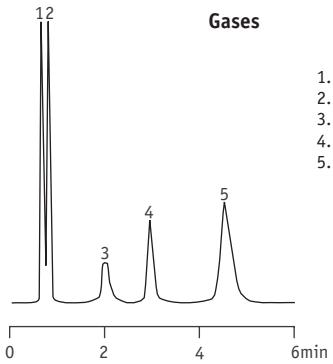
Solvents



1. Ethyl ether
2. Acetone
3. Methylene chloride
4. Ethyl acetate
5. Tetrahydrofuran
6. Chloroform
7. Benzene
8. Toluene

Column: 6ft x 4mm SS
Packing: 10% Phenyldiethanolamine + 4% KOH on Chromosorb® G-NAW 80/100
Temp: 100°C
Detector: FID
Carrier Gas: Nitrogen at 50mL/min

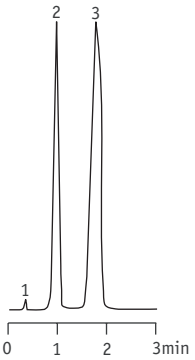
Gases



1. Air, Carbon monoxide
2. Carbon dioxide
3. Water
4. Carbonyl sulfide
5. Sulfur dioxide

Column: 6ft x 2mm SS
Packing: Porapak Q 80/100
Temp: 75°C
Detector: TCD
Carrier Gas: Helium at 20mL/min

Ammonia



1. Air
2. Ammonia
3. Water

Column: 8ft x 1/8" SS
Packing: Hayesep B 60/80
Temp: 80°C
Detector: ECD
Carrier Gas: Helium at 30mL/min

GC Tubing


Stainless Steel Tubing


Copper Tubing


TFE Tubing

When install a gas line for GC, choosing the proper tubing material is very important and will help to eliminate future problems and improve the overall quality of the gas system. Tubing can contain residual hydrocarbon contamination. These contaminants can migrate into the gas stream causing elevated background noise and increase instrument down time. Tubing can be solvent rinsed with methanol or other various solvents that do not provide a response on the detector being used.

TFE tubing is used for non critical applications, such as pressurizing pneumatic lines.

Cleaned Copper tubing is solvent-washed and can be used for most applications, except those requiring the highest purity gas delivery system.

Premium Grade 304 Stainless Steel tubing is solvent-washed and can be used for all applications. it is a special tempered grade for easy bending.

Ordering Information		
Description	QTY	Part No.
Premiun Grade 304 Stainless Steel Tubing		
1/16" OD, 0.010" ID, 50FT Coil	1	061Q-1011
1/16" OD, 0.020" ID, 50FT Coil	1	061Q-1021
1/16" OD, 0.030" ID, 50FT Coil	1	061Q-1031
1/16" OD, 0.040" ID, 50FT Coil	1	061Q-1041
1/8" OD, 0.085" ID, 50FT Coil	1	061Q-1051
1/4" OD, 0.210" ID, 50FT Coil	1	061Q-1061
Cleaned Copper Tubing		
1/8" OD, 0.065" ID, 50FT Coil	1	061Q-1071
1/4" OD, 0.190" ID, 50FT Coil	1	061Q-1081
TFE Tubing		
1/16" OD, 0.038" ID, 25FT Coil	1	061Q-1091
1/8" OD, 0.098" ID, 25FT Coil	1	061Q-1101
1/4" OD, 0.125" ID, 25FT Coil	1	061Q-1111

Tubing Cutters


Rotary Tubing Cutter


Ridgid Tubing Cutter


TC-20 Tube Cutting Machine


Dressing Tool


Tubing reamer

Rotary Tubing Cutter
- Cuts 1/16" to 1/8" OD Tubing
- Leaves Tubing ID Open
- No deburring or reaming necessary

Ridgid Tubing Cutter
- Cuts 1/8" to 1-1/8" OD tubing
- Includes Knob and Pin for quicker cutting and wheel replacement.

TC-20 Tube Cutting Machine
- Cuts 1/16", 1/8", or 1/4" tubing with inside diameter as small as 0.008".
- Electrically operated bench-top model, Voltage selectable 110–120/220–240 volts, 50–60Hz.

Ordering Information		
Description	QTY	Part No.
Rotary Tubing Cutter		
Rotary Tubing Cutter	1	061Q-1121
Repl. Cutting Wheels	1	061Q-1133
Ridgid Tubing Cutter		
Ridgid Tubing Cutter	1	061Q-1141
Repl. Cutting Wheels	1	061Q-1153
TC-20 Tube Cutting Machine		
TC-20 Tube Cutting Machine*	1	061Q-1161
Cutting Wheels	1	061Q-1173
Dressing Tool, 1/16" Tubing	1	061Q-1181
Needle Insert, 1/16" Dressing Tool	1	061Q-1191
Dressing Tool, 1/8" Tubing	1	061Q-1201
Needle Insert, 1/8" Dressing Tool	1	061Q-1211
Tubing reamer for 1/4" or 1/8" tubing	1	061Q-1221

*Includes dressing tool for 1/16" tubing

Swagelok® Fittings


Nut


Front Ferrule


Back Ferrule


Union


Reducing Union


Cross


Tee


Male Connector


Female Connector


Plug


Tube End Reducer

Ordering Information			
Description	QTY	Brass, Part No.	SS, Part No.
Nuts			
1/16″	1	061N-1016	061N-2016
1/8″	1	061N-1026	061N-2026
1/4″	1	061N-1036	061N-2036
Nuts and Ferrules (Front and back)			
1/16″	1	061N-1046	061N-2046
1/8″	1	061N-1056	061N-2056
1/4″	1	061N-1066	061N-2066
Front Ferrules			
1/16″	1	061N-1076	061N-2076
1/8″	1	061N-1086	061N-2086
1/4″	1	061N-1096	061N-2096
Back Ferrules			
1/16″	1	061N-1106	061N-2106
1/8″	1	061N-1116	061N-2116
1/4″	1	061N-1126	061N-2126
Union			
1/16″	1	061N-1131	061N-2131
1/8″	1	061N-1141	061N-2141
1/4″	1	061N-1151	061N-2151
Reducing Union			
1/8″ to 1/16″	1	061N-1161	061N-2161
1/4″ to 1/16″	1	061N-1171	061N-2171
1/4″ to 1/8″	1	061N-1181	061N-2181
Cross			
1/8″	1	061N-1191	061N-2191
1/4″	1	061N-1201	061N-2201
Tee			
1/16″	1	061N-1211	061N-2211
1/8″	1	061N-1221	061N-2221
1/4″	1	061N-1231	061N-2231
Male Connector			
1/8″ to 1/8″ NPT	1	061N-1241	061N-2241
1/4″ to 1/4″ NPT	1	061N-1251	061N-2251
1/16″ to 1/8″ NPT	1	061N-1261	061N-2261
1/8″ to 1/4″ NPT	1	061N-1271	061N-2271
1/4″ to 1/8″ NPT	1	061N-1281	061N-2281
Female Connector			
1/8″ to 1/8″ NPT	1	061N-1291	061N-2291
1/4″ to 1/4″ NPT	1	061N-1301	061N-2301
1/4″ to 1/8″ NPT	1	061N-1311	061N-2311
Plug			
1/16″	1	061N-1321	061N-2321
1/8″	1	061N-1331	061N-2331
1/4″	1	061N-1341	061N-2341
Tube End Reducer			
1/8″ to 1/16″	1	061N-1351	061N-2351
1/4″ to 1/16″	1	061N-1361	061N-2361
1/4″ to 1/8″	1	061N-1371	061N-2371
1/8″ to 1/4″	1	061N-1381	061N-2381

Parker® Fittings


Nut


Front Ferrule


Back Ferrule


Union


Reducing Union


Cross


Tee


Male Connector


Female Connector

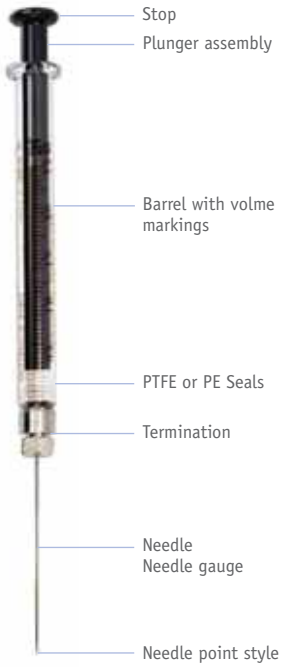

Plug


Tube End Reducer

Ordering Information			
Description	QTY	Brass, Part No.	SS, Part No.
Nuts			
1/16″	10	061N-3016	061N-4016
1/8″	10	061N-3026	061N-4026
1/4″	10	061N-3036	061N-4036
Nuts and Ferrules (Front and back)			
1/16″	10	061N-3046	061N-4046
1/8″	10	061N-3056	061N-4056
1/4″	10	061N-3066	061N-4066
Front Ferrules			
1/16″	10	061N-3076	061N-4076
1/8″	10	061N-3086	061N-4086
1/4″	10	061N-3096	061N-4096
Back Ferrules			
1/16″	10	061N-3106	061N-4106
1/8″	10	061N-3116	061N-4116
1/4″	10	061N-3126	061N-4126
Union			
1/16″	1	061N-3131	061N-4131
1/8″	1	061N-3141	061N-4141
1/4″	1	061N-3151	061N-4151
Reducing Union			
1/8″ to 1/16″	1	061N-3161	061N-4161
1/4″ to 1/16″	1	061N-3171	061N-4171
1/4″ to 1/8″	1	061N-3181	061N-4181
Cross			
1/8″	1	061N-3191	061N-4191
1/4″	1	061N-3201	061N-4201
Tee			
1/16″	1	061N-3211	061N-4211
1/8″	1	061N-3221	061N-4221
1/4″	1	061N-3231	061N-4231
Male Connector			
1/8″ to 1/8″ NPT	1	061N-3241	061N-4241
1/4″ to 1/4″ NPT	1	061N-3251	061N-4251
1/16″ to 1/8″ NPT	1	061N-3261	061N-4261
1/8″ to 1/4″ NPT	1	061N-3271	061N-4271
1/4″ to 1/8″ NPT	1	061N-3281	061N-4281
Female Connector			
1/8″ to 1/8″ NPT	1	061N-3291	061N-4291
1/4″ to 1/4″ NPT	1	061N-3301	061N-4301
1/4″ to 1/8″ NPT	1	061N-3311	061N-4311
Plug			
1/16″	1	061N-3321	061N-4321
1/8″	1	061N-3331	061N-4331
1/4″	1	061N-3341	061N-4341
Tube End Reducer			
1/8″ to 1/16″	1	061N-3351	061N-4351
1/4″ to 1/16″	1	061N-3361	061N-4361
1/4″ to 1/8″	1	061N-3371	061N-4371
1/8″ to 1/4″	1	061N-3381	061N-4381

General Information

Syringe Anatomy



Needle Point Style

Point Style Agilent/Cone tip
Special conical style needle point used on autosampler syringes.

Point Style #2 Beveled needle tip
Sharp, beveled, curved, non-coring needle point recommended for septum penetration.

Point Style #3 Blunt needle tip
Blunt needle point for use with HPLC injection valves and for sample pipetting.

Point Style #5 Side-hole cone tip
Conical needle with side port for penetration of septa, thin-gauged vinyls and plastics without coring.

Needle Gauge

Gauge	Norminal OD (mm)	Norminal ID (mm)
26s	0.47	0.13
26	0.46	0.26
25	0.51	0.26
23s	0.64	0.15
23	0.64	0.34
22s	0.72	0.15
22	0.72	0.41

Terminations

F or N, Cemented Fixed Needle
For low volume syringes the needles are cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Dead volume is limited to the internal volume of the needle. Not autoclavable. Needle gauge is determined by the syringe volume.

LT, Luer Tip
The needles are removable and fit over a ground glass hub which is tapered in the shape of a male luer. It accepts most hypodermic needles but was designed specifically for use with Kel-F needles. Dead volume is increased in the syringe. Autoclavable when disassembled.

LTN, Luer Tip Cemented Needle
For mid volume syringes the needles are cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Dead volume is limited to the internal volume of the needle. Not autoclavable. Needle gauge is determined by the syringe volume.

R or RN, Removable Needle
The needles are removable. The design allows the needles to seat precisely at the zero graduation mark of the syringe. Users can select the needle gauge, length, and point style. Ideal when there is a risk of the needle clogging. Autoclavable when disassembled.

KH, Knurled Hub
The hub handles up to 6000 psig maximum injection pressure. The needle is removable but with a limited number of gauges available because the plunger is fitted inside the needle. Autoclavable when disassembled. Repeated autoclaving will shorten syringe life.

TLL, PTFE® Luer Lock
This termination has a PTFE, male Luer taper with nickelplated brass locking hub for use with Kel-F needles, metal hub needles, and universal connectors. Autoclavable when disassembled, except on 25 mL and greater syringes. Repeated autoclaving will shorten syringe life.

Microliter Syringes

24-80300 24-80330 24-80360

21-002000 21-002100 21-002400

Ordering Information				
Volume, Termination, Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Hamilton Economy Syringes				
5µL, N, 26s, 51mm, 2	1	75N	87900	24-87900
5µL, RN, 26s, 51mm, 2	1	75RN	87930	24-87930
10µL, N, 26s, 51mm, 2	1	701N	80300	24-80300
10µL, N, 26s, 51mm, 2	6	701N	80366	24-80366
10µL, RN, 26s, 51mm, 2	1	701RN	80330	24-80330
25µL, N, 22s, 51mm, 2	1	702N	80400	24-80400
10µL, N, 26s, 51mm, 5	1	701NPT5	80339	24-80339
25µL, RN, 22s, 51mm, 2	1	702RN	80430	24-80430
50µL, N, 22s, 51mm, 2	1	705N	80500	24-80500
50µL, RN, 22s, 51mm, 2	1	705RN	80530	24-80530
100µL N, 22s, 51mm, 2	1	710N	80600	24-80600
100µL, RN, 22s, 51mm, 2	1	710RN	80630	24-80630
250µL N, 22s, 51mm, 2	1	725N	80700	24-80700
250µL, RN, 22s, 51mm, 2	1	725RN	80730	24-80730
500µL N, 22, 51mm, 2	1	750N	80800	24-80800
500µL, RN, 22, 51mm, 2	1	750RN	80830	24-80830
Hamilton Reinforced Plunger Syringes				
5µL, N, 26s, 51mm, 2	1	95	87920	24-87920
5µL, RN, 26s, 51mm, 2	1	95	87925	24-87925
10µL, N, 26s, 51mm, 2	1	901	80360	24-80360
10µL, RN, 26s, 51mm, 2	1	901	80370	24-80370
SGE Economy Syringes				
5µL, F, 26, 50mm, 2	1	5F	001000	21-001000
5µL, R, 26, 50mm, 2	1	5R	001050	21-001050
10µL, F, 26, 50mm, 2	1	10F	002000	21-002000
10µL, F, 26, 50mm, 2	6	SK-10F	002030	21-002030
10µL, R, 26, 50mm, 2	1	10R	002050	21-002050
10µL, R, 26, 50mm, 2	6	SK-10R	002080	21-002080
25µL, F, 25, 50mm, 2	1	25F	003000	21-003000
25µL, R, 25, 50mm, 2	1	25R	003050	21-003050
50µL, F, 25, 50mm, 2	1	50F	004000	21-004000
50µL, R, 25, 50mm, 2	1	50R	004050	21-004050
100µL, F, 25, 50mm, 2	1	100F	005000	21-005000
100µL, R, 25, 50mm, 2	1	100R	005050	21-005050
250µL, F, 25, 50mm, 2	1	250F	006000	21-006000
250µL, R, 25, 50mm, 2	1	250R	006050	21-006050
500µL, F, 25, 50mm, 2	1	500F	007000	21-007000
500µL, R, 25, 50mm, 2	1	500R	007050	21-007050
SGE SuperFlex Flexible Plunger Syringes				
5µL, F, 26, 50mm, 2	1	5FX	001100	21-001100
5µL, R, 26, 50mm, 2	1	5RX	001150	21-001150
10µL, F, 26, 50mm, 2	1	10FX	002100	21-002100
10µL, F, 26, 50mm, 2	6	SK-10FX	002130	21-002130
10µL, R, 26, 50mm, 2	1	10RX	002150	21-002150
10µL, R, 26, 50mm, 2	6	SK-10RX	002180	21-002180
SGE Reinforced Plunger Syringes				
5µL, F, 26, 50mm, 2	1	5F-GP	001400	21-001400
5µL, R, 26, 50mm, 2	1	5R-GP	001450	21-001450
10µL, F, 26, 50mm, 2	1	10F-GP	002400	21-002400
10µL, R, 26, 50mm, 2	1	10R-GP	002450	21-002450

Micro-Volume Syringes

- Sample is contained in the needle with full plunger displacement, no dead volume
- High precision and accuracy down to 0.1µL
- Seal between plunger and needle can be tightened for high-pressure injection
- Replaceable needle/plunger kits and barrels

24-88000 21-000803

Ordering Information				
Volume, Termination, Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Hamilton Syringes				
0.5µL, KH, 25, 70mm, 2	1	7000.5	86259	24-86259
0.5µL, KH, 25, 70mm, 3	1	7000.5	86250	24-86250
1.0µL, KH, 22s, 70mm, 2	1	7101	86211	24-86211
1.0µL, KH, 25s, 70mm, 2	1	7001	80135	24-80135
1.0µL, KH, 25s, 70mm, 3	1	7001	80100	24-80100
2.0µL, KH, 25, 70mm, 2	1	7002	88411	24-88411
5.0µL, KH, 24, 70mm, 2	1	7105	88011	24-88011
5.0µL, KH, 24, 70mm, 3	1	7105	88000	24-88000
SGE Syringes				
0.5µL, R, 23, 70mm, 2	1	0.5BR-7BV	000311	21-000311
0.5µL, R, 23, 70mm, Cone	1	0.5BR-7	000310	21-000310
0.5µL, R, 26, 70mm, Cone	1	0.5BR-OC-7/0.47	000376	21-000376
1.0µL, R, 23, 70mm, 2	1	1BR-7BV	000506	21-000506
1.0µL, R, 23, 70mm, Cone	1	1BR-7	000505	21-000505
1.0µL, R, 23, 50mm, Cone	1	1BR-5	000500	21-000500
1.0µL, R, 26, 70mm, Cone	1	1BR-7/0.47	000570	21-000570
5.0µL, R, 23, 70mm, 2	1	5BR-7BV	000803	21-000803
5.0µL, R, 23, 70mm, Cone	1	5BR-7	000802	21-000802
5.0µL, R, 23, 50mm, Cone	1	5BR-5	000800	21-000800
SGE Replacement Plunger-in-Needle Kits				
0.5µL, 23, 70mm, 2	1	NP0.5B-7BV	033060	21-033060
0.5µL, 23, 70mm, Cone	1	NP0.5B-7C	033057	21-033057
0.5µL, 26, 70mm, Cone	1	NP0.5B-OC-7	033630	21-033630
1.0µL, 23, 70mm, 2	1	NP1B-7BV	034060	21-034060
1.0µL, 23, 70mm, Cone	1	NP1B-7C	034057	21-034057
1.0µL, 23, 50mm, Cone	1	NP1B-5C	034055	21-034055
1.0µL, 26, 70mm, Cone	1	NP1B-OC-7/0.47	034610	21-034610
5.0µL, 23, 70mm, 2	1	NP5B-7BV	035058	21-035058
5.0µL, 23, 70mm, Cone	1	NP5B-7C	035057	21-035057
5.0µL, 23, 50mm, Cone	1	NP5B-5C	035055	21-035055

Gas-Tight Syringes

- Ideal for gases or liquids
- High accuracy of dispensed volumes
- Interchangeable barrels, plungers, and Teflon tips

24-80030

21-003250

Ordering Information				
Volume, Termination, Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Hamilton Syringes				
10µL, N, 26s, 51mm, 2	1	1701	80000	24-80000
10µL, RN, 26s, 51mm, 2	1	1701	80030	24-80030
25µL, N, 22s, 51mm, 2	1	1702	80200	24-80200
25µL, RN, 22s, 51mm, 2	1	1702	80230	24-80230
50µL, N, 22s, 51mm, 2	1	1705	80900	24-80900
50µL, RN, 22s, 51mm, 2	1	1705	80930	24-80930
100µL, N, 22s, 51mm, 2	1	1710	81000	24-81000
100µL, RN, 22s, 51mm, 2	1	1710	81030	24-81030
250µL, N, 22s, 51mm, 2	1	1725	81100	24-81100
250µL, RN, 22s, 51mm, 2	1	1725	81130	24-81130
500µL, LTN, 22, 51mm, 2	1	1750	81217	24-81217
500µL, RN, 22, 51mm, 2	1	1750	81230	24-81230
1mL, LTN, 22, 51mm, 2	1	1001	81317	24-81317
1mL, RN, 22, 51mm, 2	1	1001	81330	24-81330
1mL, TLL, *, *, without slots	1	1001	81320	24-81320
2.5mL, TLL, *, *, without slots	1	1002	81420	24-81420
2.5mL, RN, 22, 51mm, 2	1	1002	81430	24-81430
2.5mL, N, 22, 51mm, 2	1	1002	81417	24-81417
5mL, TLL, *, *, without slots	1	1005	81520	24-81520
10mL, TLL, *, *, without slots	1	1010	81620	24-81620
25mL, TLL, *, *, without slots	1	1025	82520	24-82520
50mL, TLL, *, *, without slots	1	1050	85020	24-85020
SGE Syringes				
10µL, F, 26, 50mm, 2	1	10F-GT	002200	21-002200
10µL, R, 26, 50mm, 2	1	10R-GT	002250	21-002250
25µL, F, 25, 50mm, 2	1	25F-GT	003200	21-003200
25µL, R, 25, 50mm, 2	1	25R-GT	003250	21-003250
50µL, F, 25, 50mm, 2	1	50F-GT	004200	21-004200
50µL, R, 25, 50mm, 2	1	50R-GT	004250	21-004250
100µL, F, 25, 50mm, 2	1	100F-GT	005200	21-005200
100µL, R, 25, 50mm, 2	1	100R-GT	005250	21-005250
100µL, LL, *, *, *	1	100F-LL-GT	005230	21-005230
250µL, F, 25, 50mm, 2	1	250F-GT	006200	21-006200
250µL, R, 25, 50mm, 2	1	250R-GT	006250	21-006250
250µL, LL, *, *, *	1	250F-LL-GT	006230	21-006230
500µL, F, 25, 50mm, 2	1	500F-GT	007200	21-007200
500µL, R, 25, 50mm, 2	1	500R-GT	007250	21-007250
1mL, R, 23, 50mm, 2	1	1MR-GT	008100	21-008100
1mL, LL, *, *, *	1	1MDF-LL-GT	008025	21-008025
2.5mL, LL, *, *, *	1	2.5MDF-LL-GT	008425	21-008425
5mL, LL, *, *, *	1	5MDR-LL-GT	008760	21-008760
10mL, LL, *, *, *	1	10MDR-LL-GT	008960	21-008960
25mL, LL, *, *, *	1	25MDR-LL-GT	009462	21-009462
50mL, LL, *, *, *	1	50MR-LL-GT	009660	21-009660
100mL, LL, *, *, *	1	100MR-LL-GT	009760	21-009760

* Needles sold separately. See next page.

Teflon-Tip Needles for Gas-Tight Syringes

24-7758-03

21-038111

Ordering Information			
Syringe Volume, Gauge, Length, PS#	QTY	OEM No.	Part No.
Needles for Hamilton Syringes			
5-100µL, 26s, 51mm, 2	6	7758-02	24-7758-02
5-100µL, 22s, 51mm, 2	6	7758-03	24-7758-03
250µL-10mL, 22, 51mm, 2	6	7779-01	24-7779-01
250µL-10mL, 26s, 51mm, 2	6	7779-02	24-7779-02
250µL-10mL, 22s, 51mm, 2	6	7779-03	24-7779-03
Needles for SGE Syringes			
5µL, 26, 50mm, 2	5	036110	21-036110
10µL, 23, 50mm, 2	5	037111	21-037111
10µL, 26, 50mm, 2	5	037110	21-037110
25-500µL, 23, 50mm, 2	5	038111	21-038111
25-500µL, 25, 50mm, 2	5	038110	21-038110
1-2.5mL, 23, 50mm, 2	5	039110	21-039110

Teflon-Tip Plunger

24-13205

Ordering Information			
Syringe Volume, Needle Termination	QTY	OEM No.	Part No.
Plunger for Hamilton Syringes			
10µL, N/RN/LT/LTN	1	13205	24-13205

Needles for Luer-Lock Syringes

24-90053 21-039842

Ordering Information			
Hub material, Gauge, Length, PS#	QTY	OEM No.	Part No.
Needles for Hamilton Syringes			
metal, 26s, 51mm, 2	6	90053	24-90053
metal, 25s, 50mm, 3	6	90049	24-90049
metal, 22s, 51mm, 2	6	90051	24-90051
Kel-F (Teflon tip), 26s, 51mm, 2	6	90153	24-90153
Kel-F (Teflon tip), 25s, 50mm, 3	6	90149	24-90149
Kel-F (Teflon tip), 22s, 51mm, 2	6	90151	24-90151
Needles for SGE Syringes			
metal, 23, 50mm, 2	5	039802	21-039802
metal, 22, 51mm, 3	2	039895	21-039895
metal, 18, 50mm, 2	5	039842	21-039842

Gas-Tight Syringes with Shut-Off Valves

25-050025

21-008560 21-008970 21-004279

- **Ideal for sample storage and transportation**
- **Push-pull shut-off valve**
- **Use VICI A-2 for VOC gas sampling from a high-pressure cylinder through a high purity VOC single stage regulator**

Ordering Information				
Syringe Volume	QTY	OEM Model	OEM No.	Part No.
VICI A-2 Syringe with Push Botton Valve				
25µL	1		050023	25-050023
50µL	1		050024	25-050024
100µL	1		050025	25-050025
250µL	1		050031	25-050031
500µL	1		050032	25-050032
1mL	1		050033	25-050033
2mL	1		050034	25-050034
5mL	1		050035	25-050035
10mL	1		050036	25-050036
SGE Syringe with Luer-Lock Valve*				
1mL	1	1MR-VLL-GT	008160	21-008160
2.5mL	1	2.5MDR-VLL-GT	008560	21-008560
5mL	1	5MDR-VLLMA-GT	008770	21-008770
10mL	1	10MDR-VLLMA-GT	008970	21-008970
25mL	1	25MDR-VLLMA-GT	009472	21-009472
50mL	1	50MR-VLLMA-GT	009670	21-009670
100mL	1	100MR-VLLMA-GT	009770	21-009770
SGE Syringe with Removable Needle and Valve				
50µL	1	50R-V-GT	004279	21-004279
100µL	1	100R-V-GT	005279	21-005279
250µL	1	250R-V-GT	006279	21-006279
500µL	1	500R-V-GT	007279	21-007279
1mL	1	1MDR-V-GT	008110	21-008110
2.5mL	1	2.5MDR-V-GT	008510	21-008510

* Needles sold separately. See next page.

Needles for Syringes with Shut-Off Valves

Ordering Information				
Syringe Volume, Gauge, Length, PS#	QTY	OEM Model	OEM No.	Part No.
Needles for VICI A-2 Syringe with Push Botton Valve				
1mL–100mL, 26, 50mm, 2	3		943050	25-943050
1mL–100mL, 26s, 50mm, 2	3		943051	25-943051
Needles for SGE Syringe with Luer-Lock Valve				
1mL–100mL, 23, 50mm, 2	5	NLL-5/23	039802	21-039802
1mL–100mL, 18, 50mm, 2	5	NLL-5/18	039842	21-039842
1mL–100mL, 22, 51mm, 3	2	NLL-LC	039895	21-039895
Needles for SGE Syringe with Removable Needle and Valve				
25µL–2.5mL, 23, 50mm, Cone	1		031905	21-031905

General Information

Requirement

Carrier or fuel gases are needed to remove oxygen, water vapor, hydrocarbons and other contaminants, to prolong column lifetime, minimize detector noise or drift and eliminate ghost peaks.

Purifiers

Moisture purifiers are typically packed with molecular sieves that absorb water preventing degradation of oxygen and hydrocarbon purifiers and detector noise.

Hydrocarbon purifiers are packed with an activated charcoal that absorb hydrocarbons larger than methane, which cause baseline noise or drift or ghost peaks.

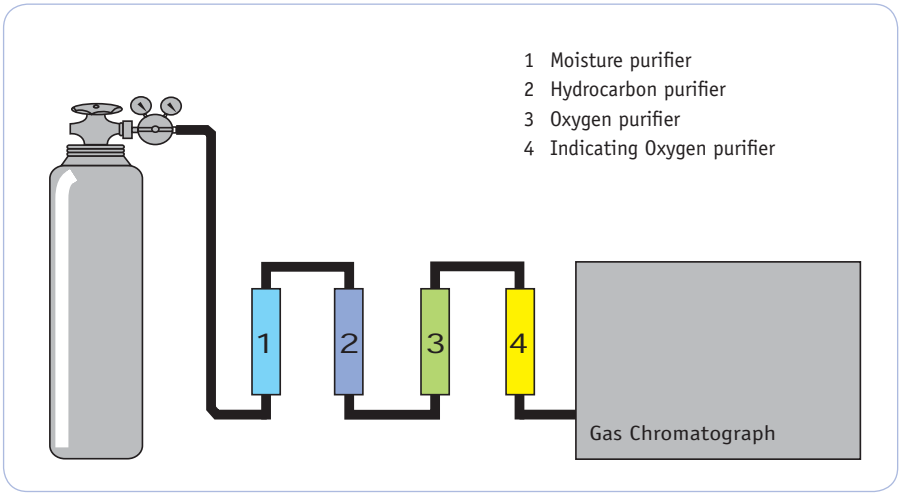
Oxygen purifiers are packed with a metal catalyst that remove oxygen from carrier gas to prevent column damage particularly to polar stationary phases.

Indicating oxygen purifiers are packed with a metal catalyst that remove oxygen from carrier gas and changes color to warn of system saturation.

Recommendations

GC System	Detector	Gas	Recommended purifiers
with Packed column			
	All	Carrier gas	Moisture purifier, Hydrocarbon purifier, Oxygen purifier, Indicating Oxygen purifier
with Capillary column			
	All	Carrier gas	Moisture purifier, Hydrocarbon purifier, Oxygen purifier, Indicating Oxygen purifier
	ECD	Make-up gas	Moisture purifier, Oxygen purifier
	FID	Make-up gas	
	FID	Air for FID	Moisture purifier,
	FID	Hydrogen for FID	Hydrocarbon purifier
	ELCD	ELCD Reaction gas	

Setting Up Carrier Gas Purifiers



SGT Super-Clean™ Filter System


061P-1011

- **Remove impurities to deliver 99.9999% pure gas**
- **Exchange filters in seconds, without introducing air into the system**
- **Diffusion-proof with glass and metal construction**
- **Pressure resistant up to 150psi and Max Flow 7L/min**
- **Estimated lifetime of more than 2 years**

SGT Super-Clean™ filters are designed to be used on all of GC gas lines to deliver 99.9999% pure gas. The system is tested for leak-tightness and the glass and metal construction of the cartridges eliminates diffusion of contaminants into the gas stream. Filters are available for oxygen, moisture and hydrocarbons. The Fuel filter removes both moisture and hydrocarbons. The Triple filter removes moisture, hydrocarbons and oxygen and available purged with Argon for standard applications or purged with Helium or Hydrogen for MS applications. Estimated lifetime is typical more than 2 years.

Filter with a dimension of 24 x 4.4cm features a quick change baseplate/cartridge design. During cartridge replacement, check valves close off the system to the atmosphere, further minimizing the entry of contaminants. Cartridges can be exchanged within seconds, during analysis, and without tools. 1-, 2-, 3-, or 4-position baseplates are available and will accept any of the GC filter cartridges.


061P-1071


061P-1091


061P-1101


061P-1111


061P-1121


061P-1131


061P-1151 061P-1161


061P-1171


061P-1192


061P-1209


061P-1215

Capacity				
Filters	**Moisture**	**Oxygen**	**Hydrocarbon[3]**	**Indicator/Color change**
Moisture	7.2g	-	-	Orange to clear
Hydrocarbon	-	-	24g	-
Indicating Hydrocarbon	-	-	24g	Orange to green
Oxygen	-	1000mL	-	Green to gray
Fuel[1]	3.5g	-	12g	H_2O : Orange to clear, HC: Orange to green
Triple[2]	1.8g	500mL	7g	H_2O : Orange to clear,
Triple[2], Helium packed	1.8g	500mL	7g	HC: Orange to green,
Triple[2], Hydrogen packed	1.8g	500mL	7g	O_2 : Green to gray

[1]Moisture/Hydrocarbon, [2]Moisture/Hydrocarbon/Oxygen, [3]As *n*-butane

Ordering Information		
Description	QTY	Part No.
Super-Clean™ Filter System with Filters and Baseplate, 1/8" Fitting		
1-Position, 1-Triple Kit	1	061P-1011
1-Position, 1-Triple, Helium packed Kit	1	061P-1021
1-Position, 1-Triple, Hydrogen packed Kit	1	061P-1031
2-Position, 2-Fuel Kit	1	061P-1041
3-Position, 1-Triple and 2-Fuel Kit	1	061P-1051
4-Position, 1-Moisture, 1-Oxygen, 2-Hydrocarbon Kit	1	061P-1061
Replacement Filters		
Moisture Filter	1	061P-1071
Oxygen Filter	1	061P-1081
Hydrocarbon Filter	1	061P-1091
Indicating Hydrocarbon Filter	1	061P-1101
Fuel Filter	1	061P-1111
Triple Filter	1	061P-1121
Triple, Helium packed Filter	1	061P-1131
Triple, Hydrogen packed Filter	1	061P-1141
Replacement Parts		
1-Position	1	061P-1151
2-Position	1	061P-1161
3-Position	1	061P-1171
4-Position	1	061P-1181
Flush cap for Base Plate	2	061P-1192
O-Ring for Base Plate	20	061P-1209
Connector , 1/8"	6	061P-1215

SGT E-Line Super-Clean™ Filters


061P-2051

- **Economical and Efficient**
- **Exchange filters in seconds, without introducing air into the system**
- **"Quick connect" fittings for easy, leak tight cartridge changes**
- **Diffusion-proof with glass and metal construction**
- **Pressure resistant up to 160psi and Max Flow 7L/min**
- **Estimated lifetime of more than 1 years**

SGT E-Line Super-Clean™ filters are designed for all of GC gas lines to deliver 99.9999% pure gas. The system is tested for leak-tightness and the glass and metal construction of the cartridges eliminates diffusion of contaminants into the gas stream. Filters are available for oxygen, moisture and hydrocarbons. The Combi filter removes both moisture and hydrocarbons. The Triple filter removes moisture, hydrocarbons and oxygen and is available purged with Argon for standard applications or purged with Helium for MS applications. Estimated lifetime is typical more than one year.

Filter with a dimension of 14.5 x 3cm features a quick change baseplate/cartridge design. During cartridge replacement, check valves close off the system to the atmosphere, further minimizing the entry of contaminants. Cartridges can be exchanged within seconds, during analysis, and without tools.


061P-2101


061P-2081


061P-2091


061P-2141


061P-2131


061P-2111


061P-2131


061P-2142


061P-1209

061P-1215

Capacity

Filters	Moisture	Oxygen	Hydrocarbon[3]	Indicator/Color change
Moisture	0.8g	-	-	Orange to clear
Hydrocarbon	-	-	2.3g	Orange to green
Oxygen	-	160mL	-	Green to gray
Fuel[1]	0.5g	-	1g	H_2O : Orange to clear, HC: Orange to green
Triple[2]	0.17g	130mL	0.5g	H_2O : Orange to clear,
Triple[2], Helium packed	0.17g	130mL	0.5g	HC: Orange to green,
Triple[2], Hydrogen packed	0.17g	130mL	0.5g	O_2 : Green to gray

[1]Moisture/Hydrocarbon, [2]Moisture/Hydrocarbon/Oxygen, [3]As *n*-butane

Ordering Information

Description	QTY	Part No.
E-Line Super-Clean™ Filter Kit with Baseplate, 1/8" Fitting		
Moisture Kit	1	061P-2011
Hydrocarbon Kit	1	061P-2021
Oxygen Kit	1	061P-2031
Fuel Kit	1	061P-2041
Triple Kit	1	061P-2051
Triple, Helium packed Kit	1	061P-2061
Triple, Hydrogen packed Kit	1	061P-2071
Replacement Filters		
Moisture Filter	1	061P-2081
Hydrocarbon Filter	1	061P-2091
Oxygen Filter	1	061P-2101
Fuel Filter	1	061P-2111
Triple Filter	1	061P-2121
Triple, Helium packed Filter	1	061P-2131
Triple, Hydrogen packed Filter	1	061P-2141
Replacement Parts		
Base Plate, 1/8"	1	061P-2151
Flush cap for Base Plate	2	061P-2162
O-Ring for Base Plate	20	061P-1209
Connector , 1/8"	6	061P-1215

SGT Click-On Inline Traps

- **Remove impurities to deliver 99.9999% pure gas**
- **No open gas line when changing the trap**
- **Diffusion-proof with glass and metal or Glass construction**
- **Pressure resistant up to 160psi and maximum flow 25L/min**
- **Estimated lifetime of more than 2 years**

SGT Click-On Inline Traps are inline traps designed with Click-On adaptor connectors which allows inline cartridges to be exchanged without introducing oxygen. Spring loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. Click-On Inline Traps measure 20 x 3.2cm.

061P-3161

061P-3151

061P-3181

Capacity

Click-On Inline Traps	Moisture	Oxygen	Hydrocarbon[4]	Indicator/Color change
Moisture	21g	-	-	-
Hydrocarbon	-	-	36g	-
Oxygen	-	3000mL	-	-
Fuel[1]	10g	-	18g	-
Combi[2]	10g	1500mL	-	-
Triple[3]	6g	1000mL	12g	-
Triple[3], He packed	6g	1000mL	12g	-
Triple[3], H_2 packed	6g	1000mL	12g	-
Triple[3], Indicator, He packed	0.1g	100mL	0.07g	H_2O : Orange to clear, HC: Orange to green, O_2 : Green to gray

[1]Moisture/Hydrocarbon, [2]Moisture/Oxygen, [3]Moisture/Hydrocarbon/Oxygen, [4]As *n*-butane

061P-3192

061P-3211

061P-3224

061P-3239

Ordering Information

Description	QTY	Part No.
Click-On Inline Super-Clean™ Traps Kit with 1/8" Connector		
Moisture Trap Kit	1	061P-3011
Oxygen Trap Kit	1	061P-3021
Hydrocarbon Trap Kit	1	061P-3031
Fuel Trap Kit	1	061P-3041
Combi Trap Kit	1	061P-3051
Triple Trap Kit	1	061P-3061
Triple, Helium packed Trap Kit	1	061P-3071
Triple, Hydrogen packed Trap Kit	1	061P-3081
Triple, Indicator, He packed Kit	1	061P-3091
Replacement Traps		
Moisture Trap	1	061P-3101
Oxygen Trap	1	061P-3111
Hydrocarbon Trap	1	061P-3121
Fuel Trap	1	061P-3131
Combi Trap	1	061P-3141
Triple Trap	1	061P-3151
Triple, Helium packed Trap	1	061P-3161
Triple, Hydrogen packed Trap	1	061P-3171
Triple, Indicator, He packed	1	061P-3181
Connectors and Accessories		
Brass Connectors, 1/8"	1	061P-3192
SS Connectors, 1/8"	1	061P-3202
SS Double Connector, 1/8"	1	061P-3211
Wall-Mounting Clamp	1	061P-3224
O-rings includes 10 large and 10 small	1	061P-3239

SGT Click-On Inline Indicating Traps

- **Remove impurities to deliver 99.9999% pure gas**
- **No open gas line when changing the trap**
- **Diffusion-proof with glass and metal construction**
- **Pressure resistant up to 160psi and maximum flow 25L/min**
- **Estimated lifetime of more than 2 years**

SGT Click-On Inline Indicating Traps are inline indiating traps designed with Click-On adaptor connectors which allows inline cartridges to be exchanged without introducing oxygen. Spring loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. Click-On Inline Indicating Traps measure 20 x 3.2cm.

061P-4041

061P-4061

Capacity				
Click-On Inline Indicator Traps	**Moisture**	**Oxygen**	**Hydrocarbon[4]**	**Indicator/Color change**
Moisture	6g	-	-	Orange to clear
Hydrocarbon	-	-	15g	Orange to green
Oxygen	-	850mL	-	Green to gray
Fuel[1]	3g	-	7g	H_2O : Orange to clear, HC: Orange to green
Combi[2]	3g	415mL	-	H_2O : Orange to clear, O_2 : Green to gray
Triple[3], He packed	2g	400mL	1.5g	H_2O : Orange to clear,
Triple[3], H_2 packed[3]	2g	400mL	1.5g	HC: Orange to green, O_2 : Green to gray

[1]Moisture/Hydrocarbon, [2]Moisture/Oxygen, [3]Moisture/Hydrocarbon/Oxygen, [4]As *n*-butane

061P-3192

061P-3211

061P-3224

061P-3239

Ordering Information		
Description	QTY	Part No.
Click-On Inline Indicator Trap Kits with 1/8" Connector		
Moisture Trap Kit	1	061P-4011
Oxygen Trap Kit	1	061P-4021
Hydrocarbon Trap Kit	1	061P-4031
Fuel Trap Kit	1	061P-4041
Combi Trap Kit	1	061P-4051
Triple, Helium packed Trap Kit	1	061P-4061
Triple, Hydrogen packed Trap	1	061P-4071
Replacement Traps		
Moisture Trap	1	061P-4081
Oxygen Trap	1	061P-4091
Hydrocarbon Trap	1	061P-4101
Fuel Trap	1	061P-4111
Combi Trap	1	061P-4121
Triple, Helium packed Trap	1	061P-4131
Triple, Hydrogen packed Trap	1	061P-4141
Connectors and Accessories		
Brass Connectors, 1/8"	2	061P-3192
SS Connectors, 1/8"	2	061P-3202
SS Double Connector, 1/8"	1	061P-3211
Wall-Mounting Clamp	4	061P-3224
O-rings includes 10 large and 10 small	20	061P-3239

Advanced Filter System

061P-5031 061P-5011

- **Excellent capacity and efficiency in one cartridge**
- **Improves 99.995% gas purity to 99.9995% purity**
- **Visible indicators for both oxygen and moisture**
- **Expected life of more than one year in typical use with up to 4 GCs**

The Advanced Filter System provides very high capacity with visual indicators in a single system capable of removing oxygen, moisture and hydrocarbon to low ppb levels. It consists of a single aluminum cartridge containing high-capacity adsorbent and a sightglass with visual indicators for moisture and oxygen. The cartridge design features double seals at all joints, and a sealed polycarbonate shield provides protection in the event of sight-glass breakage. A stainless-steel manifold with check valves to protect the gas lines from exposure during cartridge changes is included, with hardware for bench or wall mounting. Cartridges are designed to be reconditioned when they are depleted, and used cartridges can be exchanged for reconditioned cartridges upon depletion.

Contaminants	Capacity	Efficiency
Oxygen	850CC	< 1ppb
Moisture	12g	< 10ppb
Hydrocarbons	8g	< 1ppb

Ordering Information		
Description	QTY	Part No.
Advanced Filter System		
Advanced Filter System, 1/8" Fitting	1	061P-5011
Replacement Cartridge, with indicators	1	061P-5021
Manifold and mounting, 1/8" Fitting	1	061P-5031
Manifold and mounting, 1/4" Fitting	1	061P-5041

Single-Filter System

061P-6011

- **Stainless steel cartridges are easy to replace**
- **High capacity**
- **Wall bracket gets the system up and out of the way**

The Single-Filter System is designed for contamination removal for specific applications. The purifier comes with hardware for bench or wall mounting. Wall mounting is preferred where feasible, because cartridges are more easily replaced in this orientation.

Contaminants	Capacity	Efficiency
Oxygen	450CC	< 1ppb
Moisture	6g	< 30ppb
Hydrocarbons	5.2g	< 1ppb

Ordering Information		
Description	QTY	Part No.
Single-Filter System		
Single-Filter System, Moisture/Hydrocarbon/Oxygen, 1/8" Fitting	1	061P-6011
Single-Filter System, Moisture/Hydrocarbon, 1/8" Fitting	1	061P-6021
Single-Filter System, Moisture, 1/8" Fitting	1	061P-6031
Single-Filter System, Hydrocarbon, 1/8" Fitting	1	061P-6041
Single-Filter System, Oxygen, 1/8" Fitting	1	061P-6051
Single-Filter System, Indicating Oxygen, 1/8" Fitting	1	061P-6061
Replacement Moisture/Hydrocarbon/Oxygen Cartridge	1	061P-6071
Replacement Moisture/Hydrocarbon Cartridge	1	061P-6081
Replacement Moisture Cartridge	1	061P-6091
Replacement Hydrocarbon Cartridge	1	061P-6101
Replacement Oxygen Cartridge	1	061P-6111
Replacement Indicating Oxygen Cartridge	1	061P-6121

Gas In-Line Traps


061P-7011


061P-7031


061P-7051


061P-7081


061P-7101


061P-7121

Moisture Traps

Moisture trap in acrylic tube removes moisture, oil, and dust from gas. It consists of a clear acrylic tube containing molecular sieve 5A and indicating Drierite® which changes color from blue to pink. The trap's o-ring design allows hand-removal of the cartridge without disconnecting the fittings from the line. Available in 400cc total volume. Maximum pressure is 100 psig. It measures 2¼"x17". A refill kit also available.

Safe-Glass Moisture trap contains molecular sieve 5A and indicating Drierite® packed in glass which is enclosed in a safety plastic tube in the event the glass breaks. Designed for use with ELCD and ECD that require high-purity gases in which moisture and contamination are a problem. Maximum pressure is 100 psig. It measures 1½"x10¼".

CoFree™ Moisture trap contains molecular sieve 5A and cobalt free CoFree™ indicator in a clear acrylic tube. The CoFree changes from yellow to green at low relative humidity. It can also be used to purify hydrogen in flame ionization detectors. Available in 400cc total volume. Maximum pressure is 100 psig. It measures 2¼"x17".

Hydrocarbon Traps

Hydrocarbon trap removes gaseous hydrocarbons from carrier gas supply or fuel gas to FID to minimize noise and extraneous peaks in the signal. It consists of high-pressure metal cylinder filled with 500cc of activated charcoal. Highest efficiency is obtained using flow rates below 500 cc/min. Frits at the end prevent any particles from entering the gas stream. The trap is delivered filled with helium; it should be purged before use. Maximum pressure is 1000 psig. It measures 2"x14".

Oxygen Traps

Oxygen trap has a capacity of 2.5 liters of oxygen at room temperature. It consists of high-pressure metal cylinder filled with 500 cc of active oxygen adsorbent. It is also effective for removing sulphur compounds such as hydrogen sulfide and mercaptans. This oxygen trap is for use with non-oxidizing gases such as; He, Ar, N2, and CH4 containing less than 1% oxygen. Oxygen removal to below 70 ppb using normal GC flow rates. The catalyst is a copper-based material that forms copper oxide in the presence of oxygen; no gas is produced from this reaction. The trap is delivered active purged with helium. Maximum pressure 1000 psig. It measures 2"x14".

Indicating Oxygen trap has a capacity of 40 cc of pure oxygen. It is recommended that the trap be used downstream of the high capacity oxygen trap. It turns from green to gray when adsorption capacity is depleted. The trap is shipped in the active state purged with hydrogen. Maximum pressure is 100 psig. It measures 1½"x10¼".

Ordering Information		
Description	QTY	Part No.
Moisture trap		
Moisture trap, 400cc, 1/8" Fitting	1	061P-7011
Moisture trap, 400cc, 1/4" Fitting	1	061P-7021
Safe-Glass Moisture trap, 1/8" Fitting	1	061P-7031
Safe-Glass Moisture trap, 1/4" Fitting	1	061P-7041
CoFree™ Moisture trap, 1/8" Fitting	1	061P-7051
CoFree™ Moisture trap, 1/4" Fitting	1	061P-7061
Refill Kit, 800cc	1	061P-7071
Hydrocarbon trap		
Hydrocarbon trap, 1/8" Fitting	1	061P-7081
Hydrocarbon trap, 1/4" Fitting	1	061P-7091
Oxygen trap		
Oxygen trap, 1/8" Fitting	1	061P-7101
Oxygen trap, 1/4" Fitting	1	061P-7111
Indicating Oxygen trap, 1/8" Fitting	1	061P-7121
Indicating Oxygen trap, 1/4" Fitting	1	061P-7131

VICI® Gas-Specific Purifiers

- **Reduce gas impurities from high PPM to low PPB levels**
- **Decrease baseline noise and increase GC/MS sensitivity**
- **Replace three traps with one purifier**

Two very high capacity hydrocarbon and moisture sorbents at the inlet for effective contaminant removal

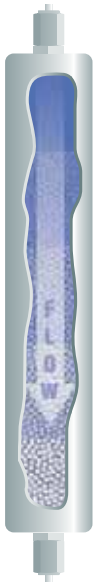
Unique proprietary broad spectrum sorbent material for multiple contaminant removal

Two oxygen scavenging materials for both high capacity and high efficiency oxygen removal

Multiple bed format to allow several step reduction in contaminants

Removal of H_2O, O_2, halocarbons, hydrocarbons, CO, CO_2, H_2, and sulfur containing compounds with a single purifier

Very high efficiency sorbents at the outlet for trace contaminant removal



Specification	
Dimensions	400cc, 21" L x 1.5" o.d. (52.3cm x 3.8cm)
Max. Flow	500mL/min
Max. Pressure	1000psig
Max. Temp	80°C
Mounting	Purifier must be mounted in vertical position

Purity specification[1]

Purifiers	CO	CO_2	O_2	H_2O	Sulfur Compounds	NMHC[2]
Helium Purifier	<1	<1	<1	<1	<1	<3
Hydrogen Purifier	<1	<1	<1	<1	<1	<3
Nitrogen Purifier	<1	<1	<1	<1	<1	<3
Air Purifier				<1		<3
Moisture Trap				<1		
Hydrocarbon Trap						<3
Oxygen Trap			<1	<1		

[1]Outlet levels listed indicate ppb concentration based on 50ppm nominal inlet concentration level.
[2]Non-Methane Hydrocarbons

Ordering Information		
Description	QTY	Part No.
Gas Specific Purifiers		
Helium Purifier, 1/8"	1	061P-8011
Helium Purifier, 1/4"	1	061P-8021
Hydrogen Purifier, 1/8"	1	061P-8031
Hydrogen Purifier, 1/4"	1	061P-8041
Nitrogen Purifier, 1/8"	1	061P-8051
Nitrogen Purifier, 1/4"	1	061P-8061
Air Purifier, 1/8"	1	061P-8071
Air Purifier, 1/4"	1	061P-8081
Traps		
Moisture Trap, 1/8"	1	061P-8091
Moisture Trap, 1/4"	1	061P-8101
Oxygen Trap, 1/8"	1	061P-8111
Oxygen Trap, 1/4"	1	061P-8121
Hydrocarbon Trap, 1/8"	1	061P-8131
Hydrocarbon Trap, 1/4"	1	061P-8141

Gas Sampling Bags

General Information

Gas Sampling Bags

Stardard Sizes	
Size (inches)	**Capacity (L)**
6 x 6	0.6
7 x 7	1.0
6 x 10	1.2
6 x 12	1.5
9 x 9	2.0
10 x 10	3.0
12 x 12	5.0
12 x 17	8.0
12 x 18	9.5
12 x 19	10.0
12 x 21	12.0
18 x 18	16.0
18 x 24	25.0
24 x 24	40.0
24 x 36	73.0
30 x 30	80.0
30 x 36	100.0
24 x 48	120.0

Vertical® offers convenient, reliable, economical gas sampling bags for collecting airborne chemical hazards. They are chemically inert, leak tested, mechanically strong, reusable, and non-contaminating. Gas Sampling Bags are available in ALTEF®, FEP, and Multi-Layer Foil with a variety of standard and custom fittings as well as optional metal eyelets for easy holding and storage.

Common applications include

- Assessing exposure from spills and leaks
- Calibrating Gas Standards
- Gas Blending
- Grab Sampling
- Magnetic Imaging
- Groundwater Testing
- Measuring Peak Concentrations
- Indoor Air Sampling
- Vent Sampling
- Soil Gas Sampling
- Hazardous Waste Site Sampling

ALTEF® Bags

ALTEF is a proprietary fluoropolymer film developed specially for the air sampling market. ALTEF has many of the desired characteristics of Tedlar® at a significantly lower cost. ALTEF is not recommended for ketones or esters in high concentrations (>30%) and is not suitable for storing H2S. Our Multi-Layer Foil bags are the best choice for collecting and storing H2S.

FEP Bags

FEP is one of the most chemically inert materials available for making gas sampling bags. It works well in extreme temperatures ranging from -400° to +400°F; allowing it to be used in all stack sampling conditions. 5 mil FEP film is completely resistant to the most severe corrosives. Relatively low permeability results in minimal sample loss. FEP bags can be specified for applications involving rough handling.

Multi-Layer Foil Bags

Multi-Layer Foil bags are available for sampling low molecular weight compounds such as Hydrogen, and inert gases which are not stable in ALTEF or FEP. Water and vapor proof, these flexible bags protect light sensitive compounds. Bags are available in 1, 2, 3, 5, and 10 liter capacities, with all fitting and valve options. They provide up to 5 day sample stability with minimal adsorption.

Choice of Fittings and Valves

PP Screw-Cap Combo Valve with Septum

PP Locking Combo Valve with Septum

SS EPA TCLP Fitting with Septum

SS Combo Valve with Septum

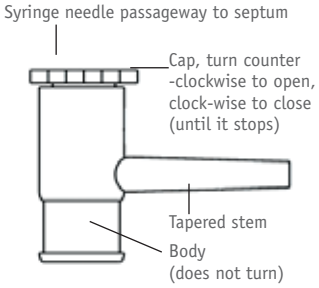
PP JACO® Fitting for Septum/Tubing

Nickel Plate HR® Barbed On/Off Valve

Swagelog® SS Fitting for Septum/Tubing

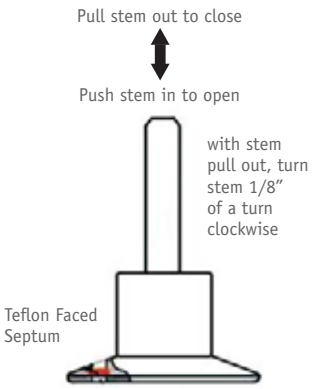
PFA Fitting for Septum/Tubing

Gas Sampling Bags with PP Screw Cap Combo Valve with Septum



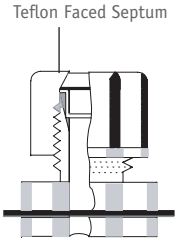
Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-1101
7 x 7 inch, 1.0 L	1	061R-1102
9 x 9 inch, 2.0 L	1	061R-1103
10 x 10 inch, 3.0 L	1	061R-1104
12 x 12 inch, 5.0 L	1	061R-1105
12 x 17 inch, 8.0 L	1	061R-1106
12 x 18 inch, 9.5 L	1	061R-1107
12 x 19 inch, 10.0 L	1	061R-1108
12 x 21 inch, 12.0 L	1	061R-1109
18 x 18 inch, 16.0 L	1	061R-1110
18 x 24 inch, 25.0 L	1	061R-1111
24 x 24 inch, 40.0 L	1	061R-1112
24 x 30 inch, 56.0 L	1	061R-1113
24 x 36 inch, 73.0 L	1	061R-1114
30 x 30 inch, 80.0 L	1	061R-1115
30 x 36 inch, 100.0 L	1	061R-1116
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-1201
7 x 7 inch, 1.0 L	1	061R-1202
6 x 10 inch, 1.2 L	1	061R-1203
6 x 12 inch, 1.5 L	1	061R-1204
9 x 9 inch, 2.0 L	1	061R-1205
10 x 10 inch, 3.0 L	1	061R-1206
12 x 12 inch, 5.0 L	1	061R-1207
12 x 18 inch, 9.5 L	1	061R-1208
12 x 19 inch, 10.0 L	1	061R-1209
18 x 18 inch, 16.0 L	1	061R-1210
18 x 24 inch, 25.0 L	1	061R-1211
24 x 24 inch, 40.0 L	1	061R-1212
24 x 30 inch, 56.0 L	1	061R-1213
24 x 36 inch, 73.0 L	1	061R-1214
30 x 30 inch, 80.0 L	1	061R-1215
Multi-Layer Foil Bags		
7 x 7 inch, 1.0 L	1	061R-1301
9 x 9 inch, 2.0 L	1	061R-1302
10 x 10 inch, 3.0 L	1	061R-1303
12 x 12 inch, 5.0 L	1	061R-1304
12 x 19 inch, 10.0 L	1	061R-1305
12 x 21 inch, 12.0 L	1	061R-1306

Gas Sampling Bags with PP Locking Combo Valve with Septum



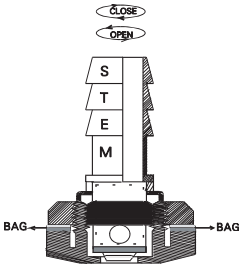
Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-2101
7 x 7 inch, 1.0 L	1	061R-2102
9 x 9 inch, 2.0 L	1	061R-2103
10 x 10 inch, 3.0 L	1	061R-2104
12 x 12 inch, 5.0 L	1	061R-2105
12 x 17 inch, 8.0 L	1	061R-2106
12 x 18 inch, 9.5 L	1	061R-2107
12 x 19 inch, 10.0 L	1	061R-2108
12 x 21 inch, 12.0 L	1	061R-2109
18 x 18 inch, 16.0 L	1	061R-2110
18 x 24 inch, 25.0 L	1	061R-2111
24 x 24 inch, 40.0 L	1	061R-2112
24 x 30 inch, 56.0 L	1	061R-2113
24 x 36 inch, 73.0 L	1	061R-2114
30 x 30 inch, 80.0 L	1	061R-2115
30 x 36 inch, 100.0 L	1	061R-2116
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-2201
7 x 7 inch, 1.0 L	1	061R-2202
6 x 10 inch, 1.2 L	1	061R-2203
6 x 12 inch, 1.5 L	1	061R-2204
9 x 9 inch, 2.0 L	1	061R-2205
10 x 10 inch, 3.0 L	1	061R-2206
12 x 12 inch, 5.0 L	1	061R-2207
12 x 18 inch, 9.5 L	1	061R-2208
12 x 19 inch, 10.0 L	1	061R-2209
18 x 18 inch, 16.0 L	1	061R-2210
18 x 24 inch, 25.0 L	1	061R-2211
24 x 24 inch, 40.0 L	1	061R-2212
24 x 30 inch, 56.0 L	1	061R-2213
24 x 36 inch, 73.0 L	1	061R-2214
30 x 30 inch, 80.0 L	1	061R-2215
Multi-Layer Foil Bags		
7 x 7 inch, 1.0 L	1	061R-2301
9 x 9 inch, 2.0 L	1	061R-2302
10 x 10 inch, 3.0 L	1	061R-2303
12 x 12 inch, 5.0 L	1	061R-2304
12 x 19 inch, 10.0 L	1	061R-2305
12 x 21 inch, 12.0 L	1	061R-2306

Gas Sampling Bags with PP JACO® Fitting for Septum/Tubing



Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-3101
6 x 10 inch, 1.2 L	1	061R-3102
6 x 12 inch, 1.5 L	1	061R-3103
9 x 9 inch, 2.0 L	1	061R-3104
12 x 12 inch, 5.0 L	1	061R-3105
12 x 17 inch, 8.0 L	1	061R-3106
12 x 18 inch, 9.5 L	1	061R-3107
12 x 19 inch, 10.0 L	1	061R-3108
18 x 18 inch, 16.0 L	1	061R-3109
18 x 24 inch, 25.0 L	1	061R-3110
24 x 24 inch, 40.0 L	1	061R-3111
24 x 30 inch, 56.0 L	1	061R-3112
24 x 36 inch, 73.0 L	1	061R-3113
30 x 30 inch, 80.0 L	1	061R-3114
24 x 48 inch, 120.0 L	1	061R-3115
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-3201
7 x 7 inch, 1.0 L	1	061R-3202
6 x 10 inch, 1.2 L	1	061R-3203
6 x 12 inch, 1.5 L	1	061R-3204
9 x 9 inch, 2.0 L	1	061R-3205
12 x 12 inch, 5.0 L	1	061R-3206
12 x 18 inch, 9.5 L	1	061R-3207
12 x 19 inch, 10.0 L	1	061R-3208
18 x 18 inch, 16.0 L	1	061R-3209
18 x 24 inch, 25.0 L	1	061R-3210
24 x 24 inch, 40.0 L	1	061R-3211
24 x 30 inch, 56.0 L	1	061R-3212
24 x 36 inch, 73.0 L	1	061R-3213
30 x 30 inch, 80.0 L	1	061R-3214

Gas Sampling Bags with Nickel Plate HR® Barbed On/Off Valve

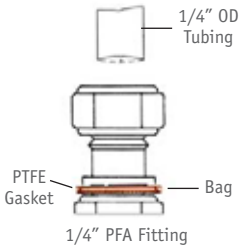


Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-8101
6 x 10 inch, 1.2 L	1	061R-8102
6 x 12 inch, 1.5 L	1	061R-8103
9 x 9 inch, 2.0 L	1	061R-8104
12 x 12 inch, 5.0 L	1	061R-8105
12 x 17 inch, 8.0 L	1	061R-8106
12 x 18 inch, 9.5 L	1	061R-8107
12 x 19 inch, 10.0 L	1	061R-8108
18 x 18 inch, 16.0 L	1	061R-8109
18 x 24 inch, 25.0 L	1	061R-8110
24 x 24 inch, 40.0 L	1	061R-8111
24 x 30 inch, 56.0 L	1	061R-8112
24 x 36 inch, 73.0 L	1	061R-8113
30 x 30 inch, 80.0 L	1	061R-8114
30 x 36 inch, 100.0 L	1	061R-8115
24 x 48 inch, 120.0 L	1	061R-8116
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-8201
7 x 7 inch, 1.0 L	1	061R-8202
6 x 10 inch, 1.2 L	1	061R-8203
6 x 12 inch, 1.5 L	1	061R-8204
9 x 9 inch, 2.0 L	1	061R-8205
12 x 12 inch, 5.0 L	1	061R-8206
12 x 18 inch, 9.5 L	1	061R-8207
12 x 19 inch, 10.0 L	1	061R-8208
18 x 18 inch, 16.0 L	1	061R-8209
18 x 24 inch, 25.0 L	1	061R-8210
24 x 24 inch, 40.0 L	1	061R-8211
24 x 30 inch, 56.0 L	1	061R-8212
24 x 36 inch, 73.0 L	1	061R-8213
30 x 30 inch, 80.0 L	1	061R-8214

Gas Sampling Bags with SS EPA TCLP Fitting with Septum

Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-5101
7 x 7 inch, 1.0 L	1	061R-5102
9 x 9 inch, 2.0 L	1	061R-5103
10 x 10 inch, 3.0 L	1	061R-5104
12 x 12 inch, 5.0 L	1	061R-5105
12 x 17 inch, 8.0 L	1	061R-5106
12 x 18 inch, 9.5 L	1	061R-5107
12 x 19 inch, 10.0 L	1	061R-5108
12 x 21 inch, 12.0 L	1	061R-5109
18 x 18 inch, 16.0 L	1	061R-5110
18 x 24 inch, 25.0 L	1	061R-5111
24 x 24 inch, 40.0 L	1	061R-5112
24 x 30 inch, 56.0 L	1	061R-5113
24 x 36 inch, 73.0 L	1	061R-5114
30 x 30 inch, 80.0 L	1	061R-5115
30 x 36 inch, 100.0 L	1	061R-5116

Gas Sampling Bags with PFA Fitting for Septum/Tubing



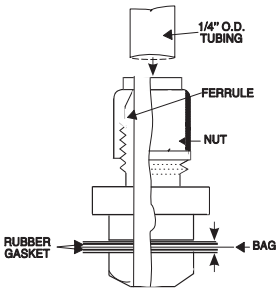
1/4" PFA Fitting

Ordering Information		
Description	QTY	Part No.
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-4201
6 x 10 inch, 1.2 L	1	061R-4202
6 x 12 inch, 1.5 L	1	061R-4203
9 x 9 inch, 2.0 L	1	061R-4204
10 x 10 inch, 3.0 L	1	061R-4205
12 x 12 inch, 5.0 L	1	061R-4206
12 x 18 inch, 9.5 L	1	061R-4207
12 x 19 inch, 10.0 L	1	061R-4208
18 x 18 inch, 16.0 L	1	061R-4209
18 x 24 inch, 25.0 L	1	061R-4210
24 x 24 inch, 40.0 L	1	061R-4211
24 x 30 inch, 56.0 L	1	061R-4212
24 x 36 inch, 73.0 L	1	061R-4213
30 x 30 inch, 80.0 L	1	061R-4214
24 x 48 inch, 120.0 L	1	061R-4215

Gas Sampling Bags with SS Combo Valve with Septum

Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-6101
7 x 7 inch, 1.0 L	1	061R-6102
9 x 9 inch, 2.0 L	1	061R-6103
10 x 10 inch, 3.0 L	1	061R-6104
12 x 12 inch, 5.0 L	1	061R-6105
12 x 17 inch, 8.0 L	1	061R-6106
12 x 18 inch, 9.5 L	1	061R-6107
12 x 19 inch, 10.0 L	1	061R-6108
12 x 21 inch, 12.0 L	1	061R-6109
18 x 18 inch, 16.0 L	1	061R-6110
18 x 24 inch, 25.0 L	1	061R-6111
24 x 24 inch, 40.0 L	1	061R-6112
24 x 30 inch, 56.0 L	1	061R-6113
24 x 36 inch, 73.0 L	1	061R-6114
30 x 30 inch, 80.0 L	1	061R-6115
30 x 36 inch, 100.0 L	1	061R-6116
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-6201
7 x 7 inch, 1.0 L	1	061R-6202
6 x 10 inch, 1.2 L	1	061R-6203
6 x 12 inch, 1.5 L	1	061R-6204
9 x 9 inch, 2.0 L	1	061R-6205
10 x 10 inch, 3.0 L	1	061R-6206
12 x 12 inch, 5.0 L	1	061R-6207
12 x 18 inch, 9.5 L	1	061R-6208
12 x 19 inch, 10.0 L	1	061R-6209
18 x 18 inch, 16.0 L	1	061R-6210
18 x 24 inch, 25.0 L	1	061R-6211
24 x 24 inch, 40.0 L	1	061R-6212
24 x 30 inch, 56.0 L	1	061R-6213
24 x 36 inch, 73.0 L	1	061R-6214
30 x 30 inch, 80.0 L	1	061R-6215
Multi-Layer Foil Bags		
7 x 7 inch, 1.0 L	1	061R-6301
9 x 9 inch, 2.0 L	1	061R-6302
10 x 10 inch, 3.0 L	1	061R-6303
12 x 12 inch, 5.0 L	1	061R-6304
12 x 19 inch, 10.0 L	1	061R-6305

Gas Sampling Bags with Swagelok® SS Fitting for Septum/Tubing



Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-7101
7 x 7 inch, 1.0 L	1	061R-7102
6 x 10 inch, 1.2 L	1	061R-7103
6 x 12 inch, 1.5 L	1	061R-7104
9 x 9 inch, 2.0 L	1	061R-7105
12 x 12 inch, 5.0 L	1	061R-7106
12 x 17 inch, 8.0 L	1	061R-7107
12 x 19 inch, 10.0 L	1	061R-7108
18 x 18 inch, 16.0 L	1	061R-7109
18 x 24 inch, 25.0 L	1	061R-7110
24 x 24 inch, 40.0 L	1	061R-7111
24 x 30 inch, 56.0 L	1	061R-7112
24 x 36 inch, 73.0 L	1	061R-7113
30 x 30 inch, 80.0 L	1	061R-7114
30 x 36 inch, 100.0 L	1	061R-7115
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-7201
7 x 7 inch, 1.0 L	1	061R-7202
6 x 10 inch, 1.2 L	1	061R-7203
6 x 12 inch, 1.5 L	1	061R-7204
9 x 9 inch, 2.0 L	1	061R-7205
10 x 10 inch, 3.0 L	1	061R-7206
12 x 12 inch, 5.0 L	1	061R-7207
12 x 18 inch, 9.5 L	1	061R-7208
12 x 19 inch, 10.0 L	1	061R-7209
18 x 18 inch, 16.0 L	1	061R-7210
24 x 24 inch, 40.0 L	1	061R-7211
24 x 30 inch, 56.0 L	1	061R-7212
24 x 36 inch, 73.0 L	1	061R-7213
30 x 30 inch, 80.0 L	1	061R-7214

Gas Sampling Bags with Nickel Plate HR® Barbed On/Off Valve and PP JACO® Fitting for Septum

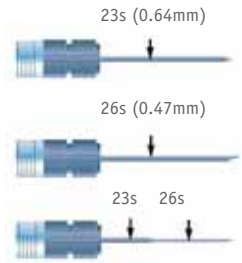
Ordering Information		
Description	QTY	Part No.
ALTEF® Bags		
6 x 6 inch, 0.6 L	1	061R-9101
7 x 7 inch, 1.0 L	1	061R-9102
6 x 10 inch, 1.2 L	1	061R-9103
6 x 12 inch, 1.5 L	1	061R-9104
9 x 9 inch, 2.0 L	1	061R-9105
12 x 12 inch, 5.0 L	1	061R-9106
12 x 17 inch, 8.0 L	1	061R-9107
12 x 18 inch, 9.5 L	1	061R-9108
12 x 19 inch, 10.0 L	1	061R-9109
18 x 18 inch, 16.0 L	1	061R-9110
18 x 24 inch, 25.0 L	1	061R-9111
24 x 24 inch, 40.0 L	1	061R-9112
24 x 30 inch, 56.0 L	1	061R-9113
24 x 36 inch, 73.0 L	1	061R-9114
30 x 30 inch, 80.0 L	1	061R-9115
30 x 36 inch, 100.0 L	1	061R-9116
24 x 48 inch, 120.0 L	1	061R-9117
TEFLON® FEP Bags		
6 x 6 inch, 0.6 L	1	061R-9201
7 x 7 inch, 1.0 L	1	061R-9202
6 x 10 inch, 1.2 L	1	061R-9203
6 x 12 inch, 1.5 L	1	061R-9204
9 x 9 inch, 2.0 L	1	061R-9205
12 x 12 inch, 5.0 L	1	061R-9206
12 x 17 inch, 8.0 L	1	061R-9207
12 x 18 inch, 9.5 L	1	061R-9208
12 x 19 inch, 10.0 L	1	061R-9209
18 x 18 inch, 16.0 L	1	061R-9210
18 x 24 inch, 25.0 L	1	061R-9211
24 x 24 inch, 40.0 L	1	061R-9212
24 x 30 inch, 56.0 L	1	061R-9213
24 x 36 inch, 73.0 L	1	061R-9214
30 x 30 inch, 80.0 L	1	061R-9215

Autosampler Syringes

062A-8111 062A-9101

062A-8236

Needle Termination Codes	
Hamilton	
ASN	Autosampler Cemented Needle
ASRN	Autosampler Removable Needle
SGE	
F	Fixed Needle
R	Removable Needle



Point Style
Agilent/Cone tip

Ordering Information				
Volume, Code, Gauge, Length, Point Style	QTY	OEM No.	Agilent No.	Part No.
Hamilton Syringes				
5µL, ASRN, 23s, 42mm, Cone	1	87957	5182-0834	24-87957
5µL, ASN, 23s, 42mm, Cone	1	87987	9301-0892	24-87987
5µL, ASN, 23s, 42mm, Cone	6	87990	5182-0875	24-87990
5µL, ASN, 23s, GAS-TIGHT, 42mm, Cone	1	80074		24-80074
5µL, ASN, 26s, 42mm, Cone	1	87988	9301-0891	24-87988
5µL, ASN, 26s, 42mm, Cone	6	87989		24-87989
5µL, ASRN, 23s-26s, 42mm, Cone	1	87959	5182-0835	24-87959
5µL, ASN, 23s-26s, 42mm, Cone	1	87993	5181-1273	24-87993
5µL, ASN, 23s-26s, 42mm, Cone	6	87994		24-87994
10µL, ASRN, 23s, 42mm, Cone	1	80357		24-80357
10µL, ASN, 23s, 42mm, Cone	1	80387	9301-0713	24-80387
10µL, ASN, 23s, 42mm, Cone	6	80390	9301-0725	24-80390
10µL, ASRN, 26s, 42mm, Cone	1	80358		24-80358
10µL, ASN, 23s, GAS-TIGHT, 42mm, Cone	1	80080	5181-8809	24-80080
10µL, ASRN, 23s, GAS-TIGHT, 42mm, Cone	1	80087	5181-8813	24-80087
10µL, ASRN, 26s, GAS-TIGHT, 42mm, Cone	1	80088		24-80088
10µL, ASN, 26s, 42mm, Cone	1	80388	9301-0714	24-80388
10µL, ASN, 26s, 42mm, Cone	6	80389		24-80389
10µL, ASRN, 23s-26s, 42mm, Cone	1	80359	5181-3321	24-80359
10µL, ASRN, 23s-26s, GAS-TIGHT, 42mm, Cone	1	80089		24-80089
10µL, ASN, 23s-26s, 42mm, Cone	1	80393	5181-1267	24-80393
10µL, ASN, 23s-26s, 42mm, Cone	6	80391	5181-3360	24-80391
Needles 5-10µL, 23s, 42mm, Cone	6	7786-01	5181-8811	24-7786-01
Needles 5-10µL, 26s, 42mm, Cone	6	7786-02		24-7786-02
Needles 5-10µL, 23s-26s, 42mm, Cone	6	7785-01	5181-3319	24-7785-01
SGE Syringes				
5µL, R, 23s, 42mm, Cone	1	001815	5182-0834	21-001815
5µL, F, 23s, 42mm, Cone	1	001810	9301-0892	21-001810
5µL, F, 23s, 42mm, Cone	6	001814	5182-0875	21-001814
5µL, F, 26s, 42mm, Cone	1	001800	9301-0891	21-001800
5µL, F, 26s, 42mm, Cone	6	001804		21-001804
5µL, R, 23s-26s, 42mm, Cone	1	001825	5182-0835	21-001825
5µL, F, 23s-26s, 42mm, Cone	1	001821	5181-1273	21-001821
5µL, F, 23s-26s, 42mm, Cone	6	001822		21-001822
10µL, R, 23s, 42mm, Cone	1	002815		21-002815
10µL, F, 23s, 42mm, Cone	1	002810	9301-0713	21-002810
10µL, F, 23s, 42mm, Cone	6	002814	9301-0725	21-002814
10µL, F, 23s, GAS-TIGHT, 42mm, Cone	1	002812	5181-8809	21-002812
10µL, R, 23s, GAS-TIGHT, 42mm, Cone	1	002818	5181-8813	21-002818
10µL, R, 26s, 42mm, Cone	1	002805		21-002805
10µL, F, 26s, 42mm, Cone	1	002800	9301-0714	21-002800
10µL, F, 26s, 42mm, Cone	6	002804		21-002804
10µL, R, 23s-26s, 42mm, Cone	1	002825	5181-3321	21-002825
10µL, F, 23s-26s, 42mm, Cone	1	002821	5181-1267	21-002821
10µL, F, 23s-26s, 42mm, Cone	6	002822	5181-3360	21-002822
10µL, R, 23s-26s, GAS-TIGHT, 42mm, Cone	1	002819		21-002819
25µL, R, 23s, 42mm, Cone	1	003665		21-003665
50µL, R, 23s, 42mm, Cone	1	004665		21-004665
100µL, R, 23s, 42mm, Cone	1	005665		21-005665
Needles 5µL, 23s, 42mm, Cone	2	036720		21-036720
Needles 10µL, 23s, 42mm, Cone	2	037717	5181-8811	21-037717
Needles 10µL, 26s, 42mm, Cone	2	037715		21-037715
Needles 25-100µL, 23s, 42mm, Cone	2	038717		21-038717

Septum Nut

Septum nut provides consistent septum tightness, fewer bent needles, and easy leak detection. The nut contains a needle guide, ensuring that the needle consistently penetrates the septum in the same place, prolonging septum life. The guide also prevents the needle from striking the edge of the column or bending during insertion.

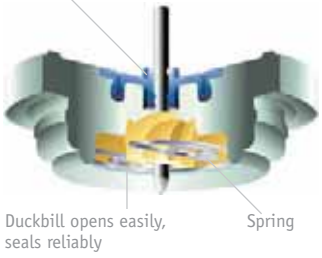
Septum Nuts for Agilent 5890/6850/6890/7890 GCs

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Needle guide allows easy penetration and prevents septum coring.
- Manual injection septum nut allows use of 26-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Ordering Information

Description	QTY	Agilent No.	Part No.
Septum Nut for Agilent 5890/6850/6890/7890			
Autosampler & PTV Septum Nut	1	18740-60835	062B-0011
Manual Injection Septum Nut	1	18740-60835	062B-0021

Merlin Microseal™ Kit



The Merlin Microseal™ Septum is a long-life replacement for the standard septum on the Capillary Inlet System or the Purged-Packed Inlet System of Agilent GC (not useable with the non-purged packed column inlet system). The Merlin Microseal is a patented dual-seal inlet assembly featuring an O-ring and "duckbill" seal. Because the syringe needle does not pierce any septum material, seal lifetime is typically greater than one year with normal GC use. Complete Kit includes the nut, two Microseal™ septa, and a PTFE liner.

The Merlin Microseal™ system can be used manually with Agilent / HP 5700, 5830, 5840, 5880, 5890, 5890 Series II and 6890 gas chromatographs. However, for autosampler use it is compatible only with the Agilent 7673 / 7683.

Microseal™ Septa has a lifetime of more than 2,000 injections depending on samples and operating condition. The Microseal™ Septum last longest when a syringe needle with a truncated cone shaped tip is used. It may also be used with the standard 0.63mm diameter (0.026", 23-gauge) needle recommended for use with the HP 7673 Autosampler for many years. A sharp pointed or beveled syringe needle should not be used as it will cut or pierce the duckbill seal.

Ordering Information

Description	QTY	Agilent No.	Part No.
Microseal Septa Kit, 30psi			
Standard kit (nut and 2 septa)	1	5181-8833	062B-0031
Standard kit (nut and 1 septum)	1	5181-8816	062B-0041
Replacement septum	1	5181-8815	062B-0051
Replacement nut	1	5182-3445	062B-0061
Microseal Septa Kit, 100psi			
Standard kit (nut and 2 septa)	1		
Standard kit (nut and 1 septum)	1	5182-3442	062B-0071
Replacement septum	1	5182-3444	062B-0081
Replacement nut	1	5182-3445	062B-0061

Septa

062C-0018 062C-0028 062C-0038

062C-0048

062C-0058

Premium CenterGuide™ Septa

Premium CenterGuide™ septa are premium silicone rubber precision molded for a more accurate fit in the injection port than inferior stamped septa. A small recess, the "CenterGuide", is added in the center of the disk, as well as a small indentation around the outside diameter. The CenterGuide focuses the needle to the same point for each injection providing easy penetration, reduced needle bending and minimizing coring. The proprietary cleaning process after molding is used to provide lowest bleed. Premium septa offer the longest average injection lifetime at the highest injection port temperatures. Septa are carefully processed, then packaged in glass vials.

- **BTO® - Bleed and Temperature Optimized** - For highest temperature use, with lowest bleed and outstanding injection life. Ideal for use with "Mass Spec" capillary columns.
- **Marathon™** - For long injection life, minimal coring. Soft, 45 durometer, easy on autosampler
- **Advanced Green 3™** - Long life, plasma coating eliminates sticking in the injection port

General Purpose Septa

General Purpose Septa are made from an enhanced injection-molded silicone rubber material. The septa material is specified to withstand over 200 automatic injections.

- **Ultrsep® R** septa are good low-bleed with a temperature setpoint of 350°C.
- **Economy Blue** Septa are designed for non-demanding, routine applications. Maximum temperature setpoint is 250°C.

Selection Guide

Agilent	Diameter
4890	11mm
5700	9.5mm
5790 OCI	5mm
5800	9.5mm
5880	11mm
5880 OCI	5mm
5890	11mm
5900	9.5mm
5890 OCI	5mm
6850	11mm
6890	11mm
7620 OCI	5mm
7890	11mm

Specification

Septa	Temp Max	Color	Injections	Durometer*	Low Bleed
BTO	400°C	Red	>300	50-55	Excellent
Marathon	350°C	Brick red	>400	45-50	Good
Advanced Green 3	350°C	Green	>350	55-60	Very good
Ultrasep R	350°C	Red	>200	45-55	Good
Economy Blue	250°C	Blue	>200	40-45	Good

* Durometer : Hardness of the silicone material. The lower the number, the softer the material.

Ordering Information

Description	QTY	Agilent No.	Part No.
Agilent 4890/5880/5890/6850/6890/7890			
BTO 11mm(7/16")	50	5183-4757	062C-0018
Marathon 11mm(7/16")	50	5183-4761	062C-0028
Advanced Green 11mm(7/16")	50	5183-4759	062C-0038
Ultrasep R 11mm(7/16")	50	5080-8896-50	062C-0048
Economy Blue 11mm(7/16")	50	5181-1263-50	062C-0058
Agilent 7620/5790/5880/5890 with OCI			
BTO 5mm(3/16")	50	5183-4758	062C-0068
Marathon 5mm(3/16")	50	5183-4762	062C-0078
Advanced Green 5mm(3/16")	50	5183-4760	062C-0088
Agilent 5700/5800/5900			
BTO 9.5mm(3/8")	50		062C-0098
Marathon 9.5mm(3/8")	50		062C-0108
Advanced Green 9.5mm(3/8")	50		062C-0118
Ultrasep R 9.5mm(3/8")	50	5080-8728-50	062C-0128
Economy Blue 9.5mm(3/8")	50	5181-1283-50	062C-0138

Inlet Seals


062E-0032


062E-0012


062E-0052


062E-0072


062E-0106

Inlet seals are gold-plated and stainless steel c for the Agilent 7890/6890/68500 GC systems. Two different types are available Splitless Single Groove and Split Double Groove (Cross), for high-flow split applications. Both are supplied with washers.

Inlet seals should be changed often because they come in contact with the sample. You will want to prevent absorption of active compounds and the buildup of sample residue and septum fragments on the disc surface.

By using inlet seals, oxygen is unable to pass into the carrier gas, which will increase the capillary column lifetime. Inlet seals also reduce detector noise of high-sensitivity detectors. We recommend using the gold-plated inlet seal to reduce the absorption of active compounds. Also, the gold-plated inlet seal is ideal for Mass Spec, trace level analyses and for use in toxicology and drugs of abuse labs.

Ordering Information			
Description	QTY	Agilent No.	Part No.
Splitless Single Groove Inlet Seals 0.8mm for Agilents			
Gold-plated with Gold-plated washers	2	5188-5367	062E-0012
Gold-plated with Gold-plated washers	10	5190-2209	062E-0026
Stainless Steel with Stainless Steel washers	2	18740-20880	062E-0032
Stainless Steel with Stainless Steel washers	10		062E-0046
Split Double Groove Inlet Seals 0.8mm for Agilents			
Gold-plated with Gold-plated washers	2	5182-9652	062E-0052
Gold-plated with Gold-plated washers	10	5182-9652	062E-0066
Stainless Steel with Stainless Steel washers	2		062E-0072
Stainless Steel with Stainless Steel washers	10		062E-0086
Replacement Washers			
Gold-plated washers	10		062E-0096
Stainless Steel washers	10	5061-5869	062E-0106

Liners

Vertical® GC Liners

The Vertical® GC liners are made of borosilicate glass and designed to obtain the maximum performance to ensure no loss of sample and accurate quantitation of thermally labile or reactive compounds.

- **Wide selection ranges**
- **Fit standard instrument manufacturer's inlets**
- **High temperature deactivation to ensure inertness**

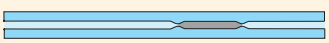
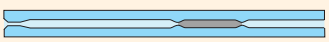
SGE® FocusLiner™ GC Liners

The SGE® FocusLiner™ overcomes the quartz wool shifting problem. The quartz wool is held in the correct position by means of two tapered sections in the liner. The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residue liquid sample from the needle tip while providing sufficient surface area for volatilisation. With the SGE FocusLiner™, a good RSD is easily achievable showing the effectiveness of the secured quartz wool.

Liner O-Rings

- Viton O-rings can be used to 200°C with low bleed and good durability.
- Graphite O-rings can be used to 450°C with non bleed and superb durability.

Ordering Information

Description, ID, OD and Length	Diagram	Application	QTY	Agilent No.	Part No.
Vertical® GC Liners					
Splitless, Straight 2mmID, 6.5mmOD, 78.5mmLength		trace analytes < 2µL	5	5183-4703	062G-0015
			25	5183-4704	062G-0017
Splitless, Straight 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	210-3003-5	062G-0025
			25		062G-0027
Splitless, Straight, w/Wool 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	5183-4691	062G-0035
			25	5183-4692	062G-0037
Splitless, Taper 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	5183-4695	062G-0045
			25	5183-4696	062G-0047
Splitless, Taper, w/Wool 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	5183-4693	062G-0055
			25	5183-4694	062G-0057
Splitless, Double Taper 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	5183-4705	062G-0065
			25	5183-4706	062G-0067
Split, Cup Splitter 4mmID, 6.3mmOD, 78.5mmLength		high and low MW analytes	5	5183-4699	062G-0075
			25	5183-4700	062G-0077
Split, Cup Splitter, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		high and low MW analytes	5	5183-4697	062G-0085
			25	5183-4798	062G-0087
Split/Spitless, Taper, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		universal Agilent 6890	5	5183-4701	062G-0095
			25	5183-4702	062G-0097
SGE® FocusLiner™ GC Liners					
Split/Splitless, Straight 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	210-4004-5	062G-0105
			25		062G-0107
Split/Splitless, Taper 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	210-4022-5	062G-0115
			25		062G-0117
Split/Splitless, Fast 2.3mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5		062G-0125
			25		062G-0127
Split/Splitless, Taper, Fast 2.3mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5		062G-0135
			25		062G-0137
Liner O-Rings					
Viton O-rings for Split (6.3mmOD) or Splitless (6.5mmOD) Liners			10	5180-4182	062G-0146
Graphite O-rings for Split (6.3mmOD) Liners			10	5180-4168	062G-0156
Graphite O-rings for Splitless (6.5mmOD) Liners			10	5180-4173	062G-0166

Ferrules

Ferrule Properties			
Material	**Temp Limit**	**Advantages**	**Limitations**
Graphite (100%)	450°C	• Recommened for hight temperature and cool on-column application	• Not for MS • Easily deformed • Possible system contamination
Vespel/Graphite (85%/15%)	350°C	• Exellent sealing • Recommended for MS	• Must re-tighten frequently • Flows at elevated temperature
Vespel (100%)	280°C	• Durable, Long lifetime • Leak-tight	• For isothermal analysis only • Must re-tighten frequently

Graphite ferrules

2-hole ferrules

Straight ferrules

Reducing ferrules

Ordering Information			
Description	QTY	Agilent No.	Part No.
Graphite Ferrules			
1/16" to 0.4mm, short, for 0.25mmID columns	10	500-2114	062M-1016
1/16" to 0.5mm, short, for 0.32mmID columns	10	5080-8853	062M-1026
1/16" to 0.8mm, short, for 0.53mmID columns	10	500-2118	062M-1036
1/16" to 1.0mm, short, for 0.65mmID columns	10	5080-8773	062M-1046
1/16" 2-hold, 0.5mm, for 0.32mmID columns	10		062M-1056
1/16" ID Straight	10	0100-1326	062M-1066
1/8" ID Straight	10	0100-1325	062M-1076
1/4" ID Straight	10	0100-1324	062M-1086
1/8" Reducing to 1/16" for 1/16"OD columns	10		062M-1096
1/4" Reducing to 1/16", for 1/16"OD tubing	10		062M-1106
1/4" Reducing to 1/8", for 1/8"OD tubing	10		062M-1116
1/16" Blank, no holes	10		062M-1126
1/8" Blank, no holes	10		062M-1136
1/4" Blank, no holes	10		062M-1146
85% Vespel, 15% Graphite Ferrules			
1/16" to 0.3mm Short, for 0.18mmID columns	10		062M-2016
1/16" to 0.4mm Short, for 0.25mmID columns	10	5181-3323	062M-2026
1/16" to 0.5mm Short, for 0.32mmID columns	10	5062-3514	062M-2036
1/16" to 0.8mm Short, for 0.53mmID columns	10	5062-3512	062M-2046
1/16" to 0.3mm, for 0.18mmID columns	10	5062-3507	062M-2056
1/16" to 0.4mm, for 0.25mmID columns	10	5062-3508	062M-2066
1/16" to 0.5mm, for 0.32mmID columns	10	5062-3506	062M-2076
1/16" to 0.8mm, for 0.53mmID columns	10	5062-3538	062M-2086
1/16" to 1.0mm, for 0.65mmID columns	10		062M-2096
1/16" to 1.2mm, for 0.75mmID columns	10		062M-2106
1/16" 2-hole, 0.4mm, for 0.25mmID columns	10	5062-3580	062M-2116
1/16" 2-hole, 0.5mm, for 0.32mmID columns	10	5062-3518	062M-2126
1/16" Straight	10		062M-2136
1/8" Straight	10		062M-2146
1/4" Straight	10	0100-1332	062M-2156
1/8" Reducing to 0.4mm, for 0.25mmID columns	10	0100-1331	062M-2166
1/8" Reducing to 0.5mm, for 0.32mmID columns	10		062M-2176
1/8" Reducing to 0.8mm, for 0.53mmID columns	10		062M-2186
1/8" Reducing to 1/16" for 1/16"OD columns	10	0100-1344	062M-2196
1/8" Reducing to 2-hole, 0.5mm, for 0.32mmID columns	10		062M-2206
1/4" Reducing to 0.5mm, for 0.32mmID columns	10		062M-2216
1/4" Reducing to 6mm, for 16mm OD tubing	10		062M-2226
1/4" Reducing to 0.8mm, for 0.53mmID columns	10		062M-2236
1/4" Reducing to 1/16", for 1/16"OD tubing	10		062M-2246
1/4" Reducing to 1/8", for 1/8"OD tubing	10		062M-2256
1/16" Blank, no holes	10	5181-3308	062M-2266
1/8" Blank, no holes	10		062M-2276
1/4" Blank, no holes	10		062M-2286

Vespel ferrules

Ordering Information			
Description	QTY	Agilent No.	Part No.
Vespel Ferrules			
1/16" to 0.4mm, short, for 0.25mmID columns	10	5181-3322	062M-4016
1/16" to 0.5mm, short, for 0.32mmID columns	10	5062-3513	062M-4026
1/16" to 0.8mm, short, for 0.53mmID columns	10	5062-3511	062M-4036
1/16" to 0.4mm, for 0.25mmID columns	10	5182-0740	062M-4046
1/16" to 0.5mm, for 0.32mmID columns	10	5182-0741	062M-4056
1/16" to 0.8mm, for 0.53mmID columns	10	5182-0742	062M-4066
1/16" 2-hold, 0.5mm, for 0.32mmID columns	10		062M-4076
1/16" ID Straight	10		062M-4086
1/8" ID Straight	10		062M-4096
1/4" ID Straight	10	0700-1327	062M-4106
1/8" Reducing to 1/16" for 1/16"OD columns	10		062M-4116
1/4" Reducing to 1/16", for 1/16"OD tubing	10		062M-4126
1/4" Reducing to 1/8", for 1/8"OD tubing	10		062M-4136
1/16" Blank, no holes	10	5021-7133	062M-4146
1/8" Blank, no holes	10		062M-4156
1/4" Blank, no holes	10		062M-4166

Capillary Nuts

Capillary column nuts

Ordering Information			
Description	QTY	Agilent No.	Part No.
Capillary Nuts			
Stainless steel capillary nut for short ferrules	2	5181-8830	062M-5012
Stainless steel capillary nut for standard ferrules	2	05921-21170	062M-5022

SilTite Ferrules

- **Metal ferrules for fused silica GC columns and tubing**
- **Ideal for GC/MS**
- **Eliminate contamination from vespel or graphite**
- **Eliminate annoying leaks**
- **Reduce air background**
- **No more retightening of Vespel ferrules after temperature cycling**
- **Reduce GC and MS down time**

SilTite nuts and ferrules

Ordering Information			
Description	QTY	Agilent No.	Part No.
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts			
For MSD, 0.10 to 0.25mmID Columns	1	5181-8361	062M-6011
For MSD, 0.32mmID Columns	1	5181-8362	062M-6021
For MSD, 0.45 to 0.53mmID Columns	1	5181-8363	062M-6031
For Split/Spliless, 0.10 to 0.25mmID Columns	1		062M-6041
For Split/Spliless, 0.32mmID Columns	1		062M-6051
For Split/Spliless, 0.45 to 0.53mmID Columns	1		062M-6061
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts, 2 Inlet Base Seals			
For Split/Spliless, 0.10 to 0.25mmID Columns	1		062M-6071
For Split/Spliless, 0.32mmID Columns	1		062M-6081
For Split/Spliless, 0.45 to 0.53mmID Columns	1		062M-6091
Replacement			
SilTite Ferrules 0.4mm for 0.1 to 0.25mmID Columns	10	5188-5361	062M-6106
SilTite Ferrules 0.5mm for 0.32mmID Columns	10	5188-5362	062M-6116
SilTite Ferrules 0.8mm for 0.53mmID Columns	10	5188-5363	062M-6126
SilTite Nuts	5		062M-6135

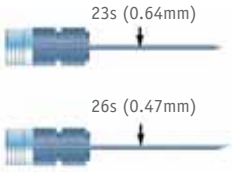
Autosampler Syringes

063A-1011 063A-2031

063A-1056

Ordering Information				
Volume, Code, Gauge, Length, Point Style	QTY	OEM No.	Varian No.	Part No.
Hamilton Syringes				
10µL, RN, 26s, 50mm, #5 for 8100/8200	1	202880		24-202880
5µL, N, 26s, 50mm, #2 for 8400/9000	1	87900	HM87900	24-87900
10µL, N, 26s, 50mm, #2 for 8400/9000	1	80300		24-80300
10µL, N, 26s, 50mm, #2 for 8400/9000	6	80366	HM80366	24-80366
Needles 5-10µL, 23s, 50mm, #5	6	202903		24-202903
SGE Syringes				
10µL, F, 26s, GT, 50mm, #5 for 8100/8200	1	002923		21-002923
10µL, R, GT, 26s, 50mm, #5 for 8100/8200	1	002924		21-002924
100µL, R, 26s, 50mm, #5 for CP 8100/8200	1	005921		21-005921
10µL, F, 26s, 50mm, Cone, for CP 8400/9000	1	001800		21-001800
10µL, F, 26s, 50mm, #2, for CP 8400/9000	1	001804		21-001804
Needles 10µL, 23s, 50mm, #5	2	037779		21-037779
Needles 10µL, 26s, 50mm, #5	1	037780		21-037780
Needles 10µL, 26s, 50mm, #2	2	037776		21-037776

Needle Termination Codes	
Hamilton	
N	Cemented Needle
RN	Removable Needle
SGE	
F	Fixed Needle
R	Removable Needle
GT	Gas-Tight



Point Style #5
Side-hole cone tip

Point Style #2
Beveled needle tip

Point Style Cone
Cone tip

Septum Nut

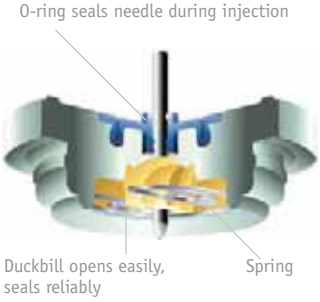
Septum nut provides consistent septum tightness, fewer bent needles, and easy leak detection. The nut contains a needle guide, ensuring that the needle consistently penetrates the septum in the same place, prolonging septum life. The guide also prevents the needle from striking the edge of the column or bending during insertion.

Septum Nuts for Varian GCs

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Needle guide allows easy penetration and prevents septum coring.
- Manual injection septum nut allows use of 23-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Ordering Information			
Description	QTY	Varian No.	Part No.
Septum Nut for Varian			
Septum Nut (for 23-Gauge Needles)	1	03-949666-01	063B-0011

Merlin Microseal™ Kit



The Merlin Microseal™ Septum is a long-life replacement for the standard septum on the Capillary Inlet System or the Purged-Packed Inlet System of Varian GC (not useable with the non-purged packed column inlet system). The Merlin Microseal™ is a patented dual-seal inlet assembly featuring an O-ring and "duckbill" seal. Because the syringe needle does not pierce any septum material, seal lifetime is typically greater than one year with normal GC use. Complete Kit includes the nut, two Microseal™ septa, and a PTFE liner.

The Varian kit adapts Varian Model 1078 and 1079 inlets system with SPME injectors for use with a Merlin Microseal™ Septum replacing conventional septum. It is much more abrasion resistant than conventional septum and will not shed particles into the injector port liner during use. This virtually eliminates the contamination of the inlet with septum particles, which produce septum bleed, and "ghost peaks" and may adsorb sensitive sample components.

Microseal™ Septa has a lifetime of more than 2,000 injections depending on samples and operating condition. The Microseal™ Septum last longest when a syringe needle with a truncated cone shaped tip is used. It may also be used with the standard 0.63mm diameter (0.026", 23-gauge) needle. A sharp pointed or beveled syringe needle should not be used as it will cut or pierce the duckbill seal. Pressure ranges from 0 to 100 psi and injection port temperature up to 325 ^{0}C. Easy installation on Varian GCs.

Ordering Information			
Description	QTY	Varian No.	Part No.
Microseal Septa Kit, Varian 1078/1079			
Standard kit (nut and 1 septum)	1		063B-0021
Replacement septum	1		063B-0031
Microseal Septa Kit, Varian 1177			
Standard kit (nut and 1 septum)	1		063B-0041
Replacement septum	1		063B-0031

Septa

063C-0018

063C-0028

063C-0038

Premium CenterGuide™ Septa

Premium CenterGuide™ septa are premium silicone rubber precision molded for a more accurate fit in the injection port than inferior stamped septa. A small recess, the "CenterGuide", is added in the center of the disk, as well as a small indentation around the outside diameter. The CenterGuide focuses the needle to the same point for each injection providing easy penetration, reduced needle bending and minimizing coring. The proprietary cleaning process after molding is used to provide lowest bleed. Premium septa offer the longest average injection lifetime at the highest injection port temperatures. Septa are carefully processed, then packaged in glass vials.

- **BTO® - Bleed and Temperature Optimized** - For highest temperature use, with lowest bleed and outstanding injection life. Ideal for use with "Mass Spec" capillary columns.
- **Marathon™** - For long injection life, minimal coring. Soft, 45 durometer, easy on autosampler
- **Advanced Green 3™** - Long life, plasma coating eliminates sticking in the injection port

General Purpose Septa

General Purpose Septa are made from an enhanced injection-molded silicone rubber material. The septa material is specified to withstand over 200 automatic injections.

- **Ultrsep® R** septa are good low-bleed with a temperature setpoint of 350°C.
- **Economy Blue** Septa are designed for non-demanding, routine applications. Maximum temperature setpoint is 250°C.

Selection Guide

Varian	Diameter
1040	9.5mm
1041	9.5mm
1060	9.5mm
1061	9.5mm
1075	11.5mm
1077	11.5mm
1078	11.5mm
1079	11.5mm
1093	11.5mm
1094	11.5mm
1177	9mm

Specification

Septa	Temp Max	Color	Injections	Durometer*	Low Bleed
BTO	400°C	Red	>300	50-55	Excellent
Marathon	350°C	Brick red	>400	45-50	Good
Advanced Green 3	350°C	Green	>350	55-60	Very good
Ultrasep R	350°C	Red	>200	45-55	Good
Economy Blue	250°C	Blue	>200	40-45	Good

* Durometer : Hardness of the silicone material. The lower the number, the softer the material.

Ordering Information

Description	QTY	Varian No.	Part No.
Varian 1040/1041/1060/1061			
BTO 9.5mm(3/8")	50	8010-0219	063C-0018
Marathon 9.5mm(3/8")	50	8010-0235	063C-0028
Advanced Green 9.5mm(3/8")	50	8010-0203	063C-0038
Ultrasep R 9.5mm(3/8")	50		063C-0048
Economy Blue 9.5mm(3/8")	50		063C-0058
Varian 1075/1077/1078/1079/1093/1094			
BTO 11.5mm	50	8010-0225	063C-0068
Marathon 11.5mm	50	8010-0241	063C-0078
Advanced Green 11.5mm	50	8010-0209	063C-0088
Varian 1177			
BTO 9mm	50	8010-0217	063C-0098
Marathon 9mm	50	8010-0233	063C-0108
Advanced Green 9mm	50	8010-0201	063C-0118

Liners

Vertical® GC Liners

The Vertical® GC liners are made of borosilicate glass and designed to obtain the maximum performance to ensure no loss of sample and accurate quantitation of thermally labile or reactive compounds.

- **Wide selection ranges**
- **Fit standard instrument manufacturer's inlets**
- **High temperature deactivation to ensure inertness**

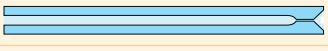
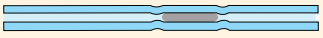
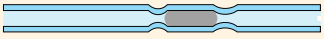
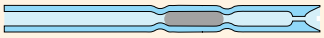
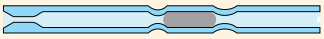
SGE® FocusLiner™ GC Liners

The SGE® FocusLiner™ overcomes the quartz wool shifting problem. The quartz wool is held in the correct position by means of two tapered sections in the liner. The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residue liquid sample from the needle tip while providing sufficient surface area for volatilisation. With the SGE FocusLiner™, a good RSD is easily achievable showing the effectiveness of the secured quartz wool.

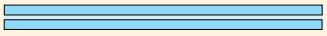
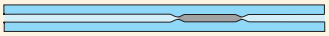
Liner O-Rings

- Viton O-rings can be used to 200°C with low bleed and good durability.
- Graphite O-rings can be used to 450°C with non bleed and superb durability.

Ordering Information

Description, ID, OD and Length	Diagram	Application	QTY	Varian No.	Part No.
Vertical® GC Liners for Varian 1075/1077					
Splitless, Gooseneck 2mmID, 6.3mmOD, 74mmLength		trace analytes < 2µL	5	190010905	063G-0015
			25		063G-0017
Split, Gooseneck 4mmID, 6.3mmOD, 72mmLength		trace analytes > 2µL	5	392611942	063G-0025
			25	SG092022	063G-0027
Split, Gooseneck, w/Wool 4mmID, 6.3mmOD, 72mmLength		trace analytes > 2µL	5		063G-0035
			25		063G-0037
Split, Gooseneck, w/Frit 4mmID, 6.3mmOD, 72mmLength		dirty samples non-active	5	190010903	063G-0045
			25		063G-0047
Split, w/Laminar Cap 4mmID, 6.3mmOD, 72mmLength		high MW analytes	5		063G-0055
			25		063G-0057
Split, w/Baffle 4mmID, 6.3mmOD, 72mmLength		Close BP Compounds	5	190010904	063G-0065
			25		063G-0067
SGE® FocusLiner™ GC Liners for Varian 1075/1077					
Split, w/Wool 2mmID, 6.3mmOD, 74mmLength		trace analytes < 2µL	5		063G-0075
			25		063G-0077
Split, w/Wool 4mmID, 6.3mmOD, 72mmLength		trace analytes > 2µL	5	SG092022	063G-0085
			25		063G-0087
Split, Gooseneck, w/Wool 4mmID, 6.3mmOD, 72mmLength		trace analytes > 2µL	5	SG092028	063G-0095
			25		063G-0097
Split, Tapered, w/Wool 4mmID, 6.3mmOD, 72mmLength		trace analytes > 2µL	5	SG092025	063G-0105
			25		063G-0107
Liner O-Rings					
Viton O-rings for Split (6.3mmOD) or Splitless (6.5mmOD) Liners			10	8850103100	063G-0146
Graphite O-rings for Split (6.3mmOD) Liners			10	392611935	063G-0156
Graphite O-rings for Splitless (6.5mmOD) Liners			10	392611940	063G-0166

Ordering Information					
Description, ID, OD and Length	Diagram	Application	QTY	Varian No.	Part No.
Vertical® GC Liners for Varian 1078/1079					
SPME, Straight-Throgh 0.8mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	392611948	063G-0115
			25		063G-0117
Splitless, Straight-Throgh 0.5mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	392611949	063G-0125
			25		063G-0127
Splitless, Gooseneck 2.0mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	392611947	063G-0135
			25		063G-0137
Split, Gooseneck 3.4mmID, 5mmOD, 54mmLength		trace analytes > 2µL	5	392611945	063G-0145
			25		063G-0147
Split, Gooseneck, w/Frit 3.4mmID, 5mmOD, 54mmLength		dirty sample non-active	5	392611946	063G-0155
			25		063G-0157
Split/Spitless, Gooseneck, w/Wool 2.0mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	392611953	063G-0165
			25		063G-0167
SGE® FocusLiner™ GC Liners for Varian 1078/1079					
Direct, Staright-Throgh 0.5mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5		063G-0175
			25		063G-0177
LVI, Gooseneck, Sintered Glass 1mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	SG092245	063G-0185
			25		063G-0187
Split/Splitless, w/Wool 3.4mmID, 5mmOD, 54mmLength		trace analytes > 2µL	5	SG092037	063G-0195
			25		063G-0197
Split/Splitless, Gooseneck 3.4mmID, 5mmOD, 54mmLength		trace analytes > 2µL	5	SG092038	063G-0205
			25		063G-0207
Split/Splitless, Tapered, w/Wool 3.4mmID, 5mmOD, 54mmLength		trace analytes > 2µL	5	SG092036	063G-0215
			25		063G-0217
Splitless, Gooseneck 2mmID, 5mmOD, 54mmLength		trace analytes < 2µL	5	SG092039	063G-0225
			25		063G-0227
Vertical® GC Liners for Varian 1093/1094 SPI					
SPI, Direct, Taper, 0.8mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	392611950	063G-0235
			25		063G-0237
SPI, For 0.25-0.32mmID Columns, 0.8mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	190010906	063G-0245
			25		063G-0247
SPI, For 0.53mmID Columns, 0.8mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	190010907	063G-0255
			25		063G-0257
SGE® GC Liners for Varian 1093/1094 SPI					
SPI, Direct, Taper, 0.5mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	SG092027	063G-0265
			25		063G-0267
SPI, For 0.25-0.32mmID Columns, 0.8mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	SG092030	063G-0275
			25		063G-0277
SPI, For 0.53mmID Columns, 0.8mmID, 4.6mmOD, 54mmLength		trace analytes < 2µL	5	SG092034	063G-0285
			25		063G-0287
Liner O-Rings					
Viton O-rings for Split (6.3mmOD) or Splitless (6.5mmOD) Liners			10	8850103100	063G-0146
Graphite O-rings for Split (6.3mmOD) Liners			10	392611935	063G-0156
Graphite O-rings for Splitless (6.5mmOD) Liners			10	392611940	063G-0166

Ordering Information					
Description, ID, OD and Length	Diagram	Application	QTY	Varian No.	Part No.
Vertical® GC Liners for Varian 1177					
Direct, Straight-Through 1mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	392611999	063G-0295
			25		063G-0297
Split, Cup-Splitter, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	392611932	063G-0305
			25		063G-0307
Split, Cup-Splitter, 4mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	392611931	063G-0315
			25		063G-0317
Split, Straight-Through, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	392611934	063G-0325
			25		063G-0327
Split/Spitless, Gooseneck, 2mmID, 6.5mmOD, 78.5mmLength		trace analytes < 2µL	5	392611926	063G-0335
			25		063G-0337
Splitless, Straight-Through, w/Wool 2mmID, 6.5mmOD, 78.5mmLength		trace analytes < 2µL	5	392599903	063G-0345
			25		063G-0347
Splitless, Straight-Through, 2mmID, 6.5mmOD, 78.5mmLength		trace analytes < 2µL	5	392611924	063G-0355
			25		063G-0357
Splitless, Double-Gooseneck, 4mmID, 6.5mmOD, 78.5mmLength		trace analytes < 2µL	5	392611929	063G-0365
			25		063G-0367
Splitless, Gooseneck, w/Silica Wool 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	392611928	063G-0375
			25		063G-0377
Splitless, Gooseneck, w/Glass Wool 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	392611936	063G-0385
			25		063G-0387
Splitless, Gooseneck, 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	392611927	063G-0395
			25		063G-0397
Splitless, Straight-Through, w/Wool 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	392611937	063G-0405
			25		063G-0407
Splitless, Straight-Through 4mmID, 6.5mmOD, 78.5mmLength		trace analytes > 2µL	5	392611925	063G-0415
			25		063G-0417
SGE® GC Liners for Varian 1177					
Direct, Straight-Through 1.2mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	SG092016	063G-0425
			25	SG092224	063G-0427
Split, Straight-Through, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092001	063G-0435
			25	SG092220	063G-0437
Split, Straight-Through, 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092007	063G-0445
			25	SG092222	063G-0447
Split/Splitless, Fast, FocusLiner 2.3mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	SG092005	063G-0455
			25	SG092008	063G-0457
Split/Splitless, Tapered, FocusLiner 2.3mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	SG092111	063G-0465
			25	SG092115	063G-0467
Split/Splitless, Double Gooseneck 4mmID, 6.3mmOD, 78.5mmLength		trace analytes < 2µL	5	SG092018	063G-0475
			25	SG092230	063G-0477
Split/Splitless, FocusLiner 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092002	063G-0485
			25	SG092219	063G-0487
Split/Splitless, Gooseneck, w/Wool 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092019	063G-0495
			25	SG092218	063G-0497
Split/Splitless, Gooseneck, 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092017	063G-0505
			25	SG092229	063G-0507
Split/Splitless, Recessed Gooseneck, 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092010	063G-0515
			25	SG092223	063G-0517
Splitless, Tapered, FocusLiner 4mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092003	063G-0525
			25	SG092011	063G-0527
Splitless, Recessed Gooseneck, 2mmID, 6.3mmOD, 78.5mmLength		trace analytes > 2µL	5	SG092013	063G-0535
			25		063G-0537
Liner O-Rings					
Viton O-rings for Split (6.3mmOD) or Splitless (6.5mmOD) Liners			10	8850103100	063G-0146
Graphite O-rings for Split (6.3mmOD) Liners			10	392611935	063G-0156
Graphite O-rings for Splitless (6.5mmOD) Liners			10	392611940	063G-0166

Ferrules

Ferrule Properties			
Material	**Temp Limit**	**Advantages**	**Limitations**
Graphite (100%)	450°C	• Recommened for hight temperature and cool on-column application	• Not for MS • Easily deformed • Possible system contamination
Vespel/Graphite (85%/15%)	350°C	• Exellent sealing • Recommended for MS	• Must re-tighten frequently • Flows at elevated temperature
Vespel (100%)	280°C	• Durable, Long lifetime • Leak-tight	• For isothermal analysis only • Must re-tighten frequently
Teflon	250°C	• Economical choice • Conform well to the shape	• For isothermal analysis only

Short ferrules

2-hole ferrules

Straight ferrules

Reducing ferrules

Ordering Information			
Description	QTY	Varian No.	Part No.
Graphite Ferrules			
1/16" to 0.3mm, for 0.18mm and smaller ID columns	10		063M-1016
1/16" to 0.425mm, for 0.25mmID columns	10	CR211104	063M-1026
1/16" to 0.5mm, for 0.32mmID columns	10	CR211105	063M-1036
1/16" to 0.8mm, for 0.53mmID columns	10	CR211108	063M-1046
1/16" to 1.0mm, for 0.65mmID columns	10		063M-1056
1/16" to 1.2mm, for 0.75mmID columns	10		063M-1066
1/16" 2-hole, 0.425mm, for 0.25mmID columns	10		063M-1076
1/16" 2-hole, 0.5mm, for 0.32mmID columns	10	CR211125	063M-1086
1/16" to 0.425mm Short, for 0.25mmID columns	10		063M-1096
1/16" to 0.5mm Short, for 0.32mmID columns	10	CR211165	063M-1106
1/16" to 0.8mm Short, for 0.53mmID columns	10	CR211168	063M-1116
1/16" Straight	10		063M-1126
1/8" Straight	10	CR211200	063M-1136
1/4" Straight	10	CR211400	063M-1146
1/8" Reducing to 0.425mm, for 0.25mmID columns	10		063M-1156
1/8" Reducing to 0.5mm, for 0.32mmID columns	10	CR211205	063M-1166
1/8" Reducing to 0.8mm, for 0.53mmID columns	10	CR211208	063M-1176
1/8" Reducing to 1/16" for 1/16"OD columns	10	CR214210	063M-1186
1/8" Reducing to 2-hole, 0.5mm, for 0.32mmID columns	10		063M-1196
1/4" Reducing to 0.5mm, for 0.32mmID columns	10		063M-1206
1/4" Reducing to 6mm, for 1/16"OD tubing	10		063M-1216
1/4" Reducing to 0.8mm, for 0.53mmID columns	10		063M-1226
1/4" Reducing to 1/16", for 1/16"OD tubing	10		063M-1236
1/4" Reducing to 1/8", for 1/8"OD tubing	10		063M-1246
1/4" Reducing to 4mmOD, for 4mmOD tubing	10		063M-1256
1/16" Blank, no holes	10	CR2111XX	063M-1266
1/8" Blank, no holes	10		063M-1276
1/4" Blank, no holes	10		063M-1286

Short ferrules

Straight ferrules

Reducing ferrules

Vespel ferrules

Ordering Information			
Description	QTY	Varian No.	Part No.
40% Graphite/ 60% Vespel Ferrules			
1/16" to 0.3mm, for 0.18mm and smaller ID columns	10	CR213103	063M-3016
1/16" to 0.425mm, for 0.25mmID columns	10	CR213104	063M-3026
1/16" to 0.5mm, for 0.32mmID columns	10	CR213105	063M-3036
1/16" to 0.8mm, for 0.53mmID columns	10	CR213108	063M-3046
1/16" to 1.0mm, for 0.65mmID columns	10	CR213110	063M-3056
1/16" to 1.2mm, for 0.75mmID columns	10	CR213112	063M-3066
1/16" 2-hole, 0.425mm, for 0.25mmID columns	10	CR213124	063M-3076
1/16" 2-hole, 0.5mm, for 0.32mmID columns	10	CR213125	063M-3086
1/16" to 0.425mm Short, for 0.25mmID columns	10	CR213164	063M-3096
1/16" to 0.5mm Short, for 0.32mmID columns	10	CR213165	063M-3106
1/16" to 0.8mm Short, for 0.53mmID columns	10	CR213168	063M-3116
1/16" Straight	10		063M-3126
1/8" Straight	10	CR213200	063M-3136
1/4" Straight	10	CR213400	063M-3146
1/8" Reducing to 0.425mm, for 0.25mmID columns	10	CR213204	063M-3156
1/8" Reducing to 0.5mm, for 0.32mmID columns	10	CR213205	063M-3166
1/8" Reducing to 0.8mm, for 0.53mmID columns	10	CR213208	063M-3176
1/8" Reducing to 1/16" for 1/16"OD columns	10		063M-3186
1/8" Reducing to 2-hole, 0.5mm, for 0.32mmID columns	10		063M-3196
1/4" Reducing to 0.5mm, for 0.32mmID columns	10	CR213405	063M-3206
1/4" Reducing to 6mm, for 1/16"OD tubing	10		063M-3216
1/4" Reducing to 0.8mm, for 0.53mmID columns	10		063M-3226
1/4" Reducing to 1/16", for 1/16"OD tubing	10		063M-3236
1/4" Reducing to 1/8", for 1/8"OD tubing	10		063M-3246
1/16" Blank, no holes	10	CR2131XX	063M-3256
1/8" Blank, no holes	10		063M-3266
1/4" Blank, no holes	10		063M-3276
Vespel Ferrules			
1/16" to 0.3mm, for 0.18mm and smaller ID columns	10	CR212103	063M-4016
1/16" to 0.425mm, for 0.25mmID columns	10	CR212104	063M-4026
1/16" to 0.5mm, for 0.32mmID columns	10	CR212105	063M-4036
1/16" to 0.8mm, for 0.53mmID columns	10	CR212108	063M-4046
1/16" to 1.0mm, for 0.65mmID columns	10		063M-4056
1/16" to 1.2mm, for 0.75mmID columns	10		063M-4066
1/16" 2-hole, 0.425mm, for 0.25mmID columns	10		063M-4076
1/16" 2-hole, 0.5mm, for 0.32mmID columns	10	CR212125	063M-4086
1/16" Straight	10		063M-4096
1/8" Straight	10		063M-4106
1/4" Straight	10		063M-4116
1/8" Reducing to 0.425mm, for 0.25mmID columns	10		063M-4126
1/8" Reducing to 0.5mm, for 0.32mmID columns	10		063M-4136
1/8" Reducing to 0.8mm, for 0.53mmID columns	10		063M-4146
1/8" Reducing to 1/16" for 1/16"OD columns	10		063M-4156
1/8" Reducing to 2-hole, 0.5mm, for 0.32mmID columns	10		063M-4166
1/4" Reducing to 0.5mm, for 0.32mmID columns	10		063M-4176
1/4" Reducing to 6mm, for 1/16"OD tubing	10		063M-4186
1/4" Reducing to 0.8mm, for 0.53mmID columns	10		063M-4196
1/4" Reducing to 1/16", for 1/16"OD tubing	10		063M-4206
1/4" Reducing to 1/8", for 1/8"OD tubing	10		063M-4216
1/16" Blank, no holes	10		063M-4226
1/8" Blank, no holes	10		063M-4236
1/4" Blank, no holes	10		063M-4246

Teflon ferrules

Ordering Information			
Description	QTY	Varian No.	Part No.
Teflon Ferrules			
1/16" to 0.3mm, for 0.18mm and smaller ID columns	10		063M-7016
1/16" to 0.425mm, for 0.25mmID columns	10		063M-7026
1/16" to 0.5mm, for 0.32mmID columns	10		063M-7036
1/16" to 0.8mm, for 0.53mmID columns	10		063M-7046
1/16" to 1.0mm, for 0.65mmID columns	10		063M-7056
1/16" to 1.2mm, for 0.75mmID columns	10		063M-7066
1/16" Straight	10		063M-7076
1/8" Straight	10		063M-7086
3/16" Straight	10		063M-7096
1/4" Straight	10	CR214400	063M-7106
1/8" Reducing to 0.425mm, for 0.25mmID columns	10		063M-7116
1/8" Reducing to 0.5mm, for 0.32mmID columns	10		063M-7126
1/8" Reducing to 0.8mm, for 0.53mmID columns	10		063M-7136
1/8" Reducing to 1/16" for 1/16"OD columns	10		063M-7146
1/8" Reducing to 2-hole, 0.5mm, for 0.32mmID columns	10		063M-7156
1/4" Reducing to 6mm, for 1/16"OD tubing	10		063M-7166
1/4" Reducing to 1/16", for 1/16"OD tubing	10		063M-7176
1/4" Reducing to 1/8", for 1/8"OD tubing	10		063M-7186
1/4" Reducing to 3/16", for 3/16"OD tubing	10		063M-7196
1/16" Blank, no holes	10		063M-7206
1/8" Blank, no holes	10		063M-7216
1/4" Blank, no holes	10		063M-7226

Capillary Nuts

Capillary Nuts

Ordering Information			
Description	QTY	Varian No.	Part No.
Capillary Nuts			
Brass Capillary Nut	2	394955100	063M-5012
Stainless Steel Capillary Nut	2	CP743117	063M-5022

SilTite Ferrules

- **Metal ferrules for fused silica GC columns and tubing**
- **Ideal for GC/MS**
- **Eliminate contamination from vespel or graphite**
- **Eliminate annoying leaks**
- **Reduce air background**
- **No more retightening of Vespel ferrules after temperature cycling**
- **Reduce GC and MS down time**

SilTite nuts and ferrules

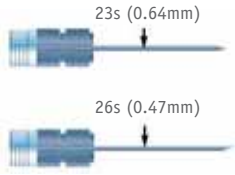
Ordering Information			
Description	QTY	Varian No.	Part No.
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts			
For 0.10 to 0.25mmID Columns	1	SG073300	063M-6011
For 0.32mmID Columns	1	SG073301	063M-6021
For 0.45 to 0.53mmID Columns	1	SG073302	063M-6031
Replacement			
SilTite Ferrules 0.4mm for 0.1 to 0.25mmID Columns	10	SG073220	063M-6046
SilTite Ferrules 0.5mm for 0.32mmID Columns	10	SG073221	063M-6056
SilTite Nuts	5	SG073224	063M-6065

Autosampler Syringes

064A-1011 064A-2031

Ordering Information				
Volume, Code, Gauge, Length, Point Style	QTY	OEM No.	PerkinElmer No.	Part No.
Hamilton Syringes				
5µL, ASN, 23s, 70mm, #3	1	88035	N6101390	24-88035
5µL, ASN, 26s, 70mm, #3	1	88040	N6101380	24-88040
SGE Syringes				
0.5µL, R, 23s, 70mm, Cone	1	000478	N6101252	21-000478
0.5µL, R, 26s, 70mm, Cone	1	000475		21-000475
5µL, F, 23s, 70mm, Cone	1	001954	N6101390	21-001954
5µL, F, 23s, GT, 70mm, Cone	1	001957		21-001957
5µL, F, 26s, 70mm, Cone	1	001953	N6101380	21-001953
5µL, F, 26s, GT, 70mm, Cone	1	001955		21-001955
50µL, F, 23s, 70mm, Cone	1	004670	N6101760	21-004670
Needles & Plunger 0.5µL, 23s, 70mm, Cone	1	037765	N6101469	21-037765
Needles & Plunger 0.5µL, 26s, 70mm, Cone	1	037750		21-037750

Needle Termination Codes	
Hamilton	
ASN	Autosampler Cemented Needle
SGE	
F	Fixed Needle
R	Removable Needle
GT	Gas-Tight



Point Style #3
Blunt needle tip

Point Style Cone
Cone tip

Septum Nut

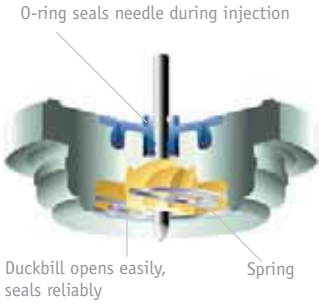
Septum nut provides consistent septum tightness, fewer bent needles, and easy leak detection. The nut contains a needle guide, ensuring that the needle consistently penetrates the septum in the same place, prolonging septum life. The guide also prevents the needle from striking the edge of the column or bending during insertion.

Septum Nuts for PerkinElmer GC

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Needle guide allows easy penetration and prevents septum coring.
- Manual injection septum nut allows use of 23-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
Septum Nut for PerkinElmer			
Septum Nut (for 23-Gauge Needles)	1	N6100153	064B-0011

Merlin Microseal™ Kit



The Merlin Microseal™ Septum is a long-life replacement for the standard septum on the Capillary Inlet System or the Purged-Packed Inlet System of PerkinElmer GC (not useable with the non-purged packed column inlet system). The Merlin Microseal™ is a patented dual-seal inlet assembly featuring an O-ring and "duckbill" seal. Because the syringe needle does not pierce any septum material, seal lifetime is typically greater than one year with normal GC use. Complete Kit includes the nut, two Microseal™ septa, and a PTFE liner.

Microseal™ Septa has a lifetime of more than 2,000 injedctions depending on samples and operting condition. The Microseal™ Septum last longest when a syringe needle with a truncated cone shaped tip is used. It may also be used with the standard 0.63mm diameter (0.026", 23-gauge) needle. A sharp pointed or beveled syringe needle should not be used as it will cut or pierce the duckbill seal. Pressure ranges from 0 to 100 psi and injection port temperature up to 325 ^{0}C. Easy installation on PerkinElmer GCs.

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
Microseal Septa Kit, PerinElmer Auto SYS™ XL			
Standard kit (nut and 2 septa)	1	N9303344	064B-0021
Replacement septum	1	N9303345	064B-0031

Septa

064C-0018

064C-0028

064C-0038

Premium CenterGuide™ Septa

Premium CenterGuide™ septa are premium silicone rubber precision molded for a more accurate fit in the injection port than inferior stamped septa. A small recess, the "CenterGuide", is added in the center of the disk, as well as a small indentation around the outside diameter. The CenterGuide focuses the needle to the same point for each injection providing easy penetration, reduced needle bending and minimizing coring. The proprietary cleaning process after molding is used to provide lowest bleed. Premium septa offer the longest average injection lifetime at the highest injection port temperatures. Septa are carefully processed, then packaged in glass vials.

- **BTO®** - **Bleed and Temperature Optimized** - For highest temperature use, with lowest bleed and outstanding injection life. Ideal for use with "Mass Spec" capillary columns.
- **Marathon™** - For long injection life, minimal coring. Soft, 45 durometer, easy on autosampler
- **Advanced Green 3™** - Long life, plasma coating eliminates sticking in the injection port

General Purpose Septa

General Purpose Septa are made from an enhanced injection-molded silicone rubber material. The septa material is specified to withstand over 200 automatic injections.

- **Ultrsep® R** septa are good low-bleed with a temperature setpoint of 350°C.
- **Economy Blue** Septa are designed for non-demanding, routine applications. Maximum temperature setpoint is 250°C.

Selection Guide

Perkin Elmer	Diameter
Sigma series	11mm
8000 series	11mm
AutoSytem	11mm
AutoSystem XL	11mm
Clarus	11mm

Specification

Septa	Temp Max	Color	Injections	Durometer*	Low Bleed
BTO	400°C	Red	>300	50-55	Excellent
Marathon	350°C	Brick red	>400	45-50	Good
Advanced Green 3	350°C	Green	>350	55-60	Very good
Ultrasep R	350°C	Red	>200	45-55	Good
Economy Blue	250°C	Blue	>200	40-45	Good

* Durometer : Hardness of the silicone material. The lower the number, the softer the material.

Ordering Information

Description	QTY	PerkinElmer No.	Part No.
Perkin Elmer Sigma/8000/AutoSytem/Clarus			
BTO 11mm(7/16")	50	N9302972	064C-0018
Marathon 11mm(7/16")	50		064C-0028
Advanced Green 11mm(7/16")	50	N6621028	064C-0038
Ultrasep R 11mm(7/16")	50		064C-0048
Economy Blue 11mm(7/16")	50	54019985	064C-0058

Liners

Vertical® GC Liners

The Vertcal® GC liners are made of borosilicate glass and designed to obtain the maximum performance to ensure no loss of sample and accurate quantitation of thermally labile or reactive compounds.

- **Wide selection ranges**
- **Fit standard instrument manufacturer's inlets**
- **High temperature deactivation to ensure inertness**

SGE® FocusLiner™ GC Liners

The SGE® FocusLiner™ overcomes the quartz wool shifting problem. The quartz wool is held in the correct position by means of two tapered sections in the liner. The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residue liquid sample from the needle tip while providing sufficient surface area for volatilisation. With the SGE FocusLiner™, a good RSD is easily achievable showing the effectiveness of the secured quartz wool.

Liner O-Rings

- Viton O-rings can be used to 200°C with low bleed and good durability.
- Graphite O-rings can be used to 450°C with non bleed and superb durability.
- Silicone O-rings can be used to 230°C with medium bleed and moderate durability.

Ordering Information

Description, ID, OD and Length	Diagram	Application	QTY	PerkinElmer No.	Part No.
Vertical® GC Liners					
Split, Baffle 3.5mmID, 5mmOD, 100mmLength		general analytes	5	N6502008	064G-0015
			25		064G-0017
Splitless, Taper 2mmID, 5mmOD, 100mmLength		trace analytes < 2µL	5		064G-0025
			25		064G-0027
Split, Baffle, w/Wool 4mmID, 6.2mmOD, 92.1mmLength		general analytes	5		064G-0035
			25		064G-0037
Split, Cup Splitter 4mmID, 6.2mmOD, 92.1mmLength		high and low MW compounds	5		064G-0045
			25		064G-0047
Splitless, 2mmID, 6.2mmOD, 92.1mmLength		trace analytes < 2µL	5	N6121021	064G-0055
			25		064G-0057
SGE® FocusLiner™ GC Liners					
Split, w/Wool 4mmID, 6.2mmOD, 92.1mmLength		trace analytes dirty samples	5	N6121020	064G-0065
			25		064G-0067
Splitless, Taper, w/Wool 4mmID, 6.2mmOD, 92.1mmLength		trace analytes > 2µL	5	N6502003	064G-0075
			25		064G-0077
Split/Splitless, PSS, w/Wool 2mmID, 4.0mmOD, 86.2mmLength		general analytes	5	N6121004	064G-0085
			25		064G-0087
Liner O-Rings					
Viton O-rings for Split (6.3mmOD) or Splitless (6.5mmOD) Liners			10	N6101751	064G-0096
Graphite O-rings for Split (6.3mmOD) Liners			10	N6101747	064G-0106
Graphite O-rings for Splitless (6.5mmOD) Liners			10	N6101374	064G-0116

Ferrules

Ferrule Properties			
Material	**Temp Limit**	**Advantages**	**Limitations**
Graphite (100%)	450°C	• Recommened for hight temperature and cool on-column application	• Not for MS • Easily deformed • Possible system contamination
Vespel/Graphite (85%/15%)	350°C	• Exellent sealing • Recommended for MS	• Must re-tighten frequently • Flows at elevated temperature
Vespel (100%)	280°C	• Durable, Long lifetime • Leak-tight	• For isothermal analysis only • Must re-tighten frequently

Graphite ferrules

2-hole ferrules

Straight ferrules

Vespel ferrules

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
Graphite Ferrules			
1/16" to 0.4mm, short, for 0.25mmID columns	10		064M-1016
1/16" to 0.5mm, short, for 0.32mmID columns	10	09903700	064M-1026
1/16" to 0.8mm, short, for 0.53mmID columns	10	09920141	064M-1036
1/16" to 1.0mm, short, for 0.65mmID columns	10		064M-1046
1/16" 2-hold, 0.5mm, for 0.32mmID columns	10	N9306001	064M-1056
1/16" ID Straight	10	02450972	064M-1066
1/8" ID Straight	10	09903915	064M-1076
1/4" ID Straight	10	09920140	064M-1086
1/8" Reducing to 1/16" for 1/16"OD columns	10		064M-1096
1/8" Reducing to 1.0mm for for 0.53mmID columns	10	09903394	064M-1106
1/8" Reducing to 0.5mm for for 0.32mmID columns	10	09903981	064M-1116
1/4" Reducing to 1/16", for 1/16"OD tubing	10		064M-1126
1/4" Reducing to 1/8", for 1/8"OD tubing	10		064M-1136
1/16" Blank, no holes	10		064M-1146
1/8" Blank, no holes	10		064M-1156
1/4" Blank, no holes	10		064M-1166
85% Vespel, 15% Graphite Ferrules			
1/16" to 0.4mm, for 0.25mmID columns	10	09920104	064M-2016
1/16" to 0.5mm, for 0.32mmID columns	10	09920105	064M-2026
1/16" to 0.8mm, for 0.53mmID columns	10	09920107	064M-2036
1/16" 2-hole, 0.4mm, for 0.25mmID columns	10	04972392	064M-2046
1/16" 2-hole, 0.5mm, for 0.32mmID columns	10		064M-2056
1/16" Straight	10	09920127	064M-2066
1/8" Straight	10	N9302081	064M-2076
1/4" Straight	10	09903739	064M-2086
1/8" Reducing to 0.4mm, for 0.25mmID columns	10		064M-2096
1/8" Reducing to 0.5mm, for 0.32mmID columns	10		064M-2106
1/8" Reducing to 0.8mm, for 0.53mmID columns	10		064M-2116
1/8" Reducing to 2-hole, 0.8mm, for 0.53mmID columns	10		064M-2126
1/16" Blank, no holes	10		064M-2136
1/8" Blank, no holes	10		064M-2146
Vespel Ferrules			
1/8" ID Straight	10	N9301360	064M-4016
1/4" ID Straight	10	N9301361	064M-4026

Capillary Adaptors

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts			
For detectors, PerkinElmer style	1	N6120020	064M-8011
For detectors, Swagelog style	1		064M-8021
For injectors, PerkinElmer style	1	N6100157	064M-8031
For injectors, Swagelog style	1		064M-8041

SilTite Ferrules

- **Metal ferrules for fused silica GC columns and tubing**
- **Ideal for GC/MS**
- **Eliminate contamination from vespel or graphite**
- **Eliminate annoying leaks**
- **Reduce air background**
- **No more retightening of Vespel ferrules after temperature cycling**
- **Reduce GC and MS down time**

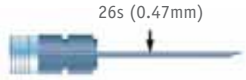
SilTite nuts and ferrules

Ordering Information			
Description	QTY	PerkinElmer No.	Part No.
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts			
For MSD, 0.10 to 0.25mmID Columns	1		064M-6011
For MSD, 0.32mmID Columns	1		064M-6021
For MSD, 0.45 to 0.53mmID Columns	1		064M-6031
Replacement			
SilTite Ferrules 0.4mm for 0.1 to 0.25mmID Columns	10		064M-6046
SilTite Ferrules 0.5mm for 0.32mmID Columns	10		064M-6056
SilTite Ferrules 0.8mm for 0.53mmID Columns	10		064M-6066
SilTite Nuts	5		064M-6075

Autosampler Syringes

Ordering Information				
Volume, Code, Gauge, Length, Point Style	QTY	OEM No.	Thermo No.	Part No.
Hamilton Syringes				
10µL, N, 26s, 80mm, Cone for AS 200, TriPlus	1	202066	36502019	24-202066
5µL, N, 26s, 50mm, Cone for AS 2000/3000	1	204051	36500505	24-204051
10µL, N, 26s, 50mm, Cone for AS 2000/3000	1	204052	365D3711	24-204052
SGE Syringes				
10µL, F, 26s, 80mm, Cone for AS 200, TriPlus	1	002992	36502019	21-002992
10µL, R, 26s, 80mm, Cone for AS 200/800	1	002993		21-002993
10µL, F, 26s, 50mm, Cone for AS 2000/3000	1	002980	365D3711	21-002980
10µL, R, 26s, 50mm, Cone for AS 2000/3000	1	002982	365D1841	21-002982
Needles 10µL, 26s, 80mmm, Cone	1	031535		21-031535
Needles 10µL, 26s, 50mm, Cone	1	037785		21-037785

Needle Termination Codes	
Hamilton	
N	Cemented Needle
SGE	
F	Fixed Needle
R	Removable Needle



Point Style Cone
Cone tip

Septum Nut

Septum nut provides consistent septum tightness, fewer bent needles, and easy leak detection. The nut contains a needle guide, ensuring that the needle consistently penetrates the septum in the same place, prolonging septum life. The guide also prevents the needle from striking the edge of the column or bending during insertion.

Septum Nuts for Thermo Trace GCs

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Needle guide allows easy penetration and prevents septum coring.
- Manual injection septum nut allows use of 23-gauge needles for on-column injections.
- Made of high-quality stainless steel.
- Include septum port and holder.

Ordering Information			
Description	QTY	Thermo No.	Part No.
Septum Nut for Varian			
Septum Nut (for 23-Gauge Needles)	1		065B-0011

Septa

Premium CenterGuide™ Septa

Premium CenterGuide™ septa are premium silicone rubber precision molded for a more accurate fit in the injection port than inferior stamped septa. A small recess, the "CenterGuide", is added in the center of the disk, as well as a small indentation around the outside diameter. The CenterGuide focuses the needle to the same point for each injection providing easy penetration, reduced needle bending and minimizing coring. The proprietary cleaning process after molding is used to provide lowest bleed. Premium septa offer the longest average injection lifetime at the highest injection port temperatures. Septa are carefully processed, then packaged in glass vials.

- **BTO® - Bleed and Temperature Optimized** - For highest temperature use, with lowest bleed and outstanding injection life. Ideal for use with "Mass Spec" capillary columns.
- **Marathon™** - For long injection life, minimal coring. Soft, 45 durometer, easy on autosampler
- **Advanced Green 3™** - Long life, plasma coating eliminates sticking in the injection port

General Purpose Septa

General Purpose Septa are made from an enhanced injection-molded silicone rubber material. The septa material is specified to withstand over 200 automatic injections.

- **Ultrsep® R** septa are good low-bleed with a temperature setpoint of 350°C.
- **Economy Blue** Septa are designed for non-demanding, routine applications. Maximum temperature setpoint is 250°C.

Selection Guide

Thermo	Diameter
TRACE GC	17mm
GCQ/TRACE,PTV	17mm
8000 Series	9.5mm
GC 9001	9.5mm
GCQ	9.5mm
QCQ	9.5mm
TRACE 2000	9.5mm

Specification

Septa	Temp Max	Color	Injections	Durometer*	Low Bleed
BTO	400°C	Red	>300	50-55	Excellent
Marathon	350°C	Brick red	>400	45-50	Good
Advanced Green 3	350°C	Green	>350	55-60	Very good
Ultrasep R	350°C	Red	>200	45-55	Good
Economy Blue	250°C	Blue	>200	40-45	Good

* Durometer : Hardness of the silicone material. The lower the number, the softer the material.

Ordering Information

Description	QTY	Thermo No.	Part No.
Themo TRACE GC/GCQ/TRACE, PTV/8000 Series			
BTO 17mm(21/32")	50	31303211	065C-0018
Marathon 17mm(21/32")	50		065C-0028
Advanced Green 17mm(21/32")	50	313A170T	065C-0038
Thermo GC 9001/GCQ/QCQ/TRACE 2000			
BTO 9.5mm(3/8")	50	31303240	065C-0048
Marathon 9.5mm(3/8")	50		065C-0058
Advanced Green 9.5mm(3/8")	50		065C-0068
Ultrasep R 9.5mm(3/8")	50	313S125A	065C-0078
Economy Blue 9.5mm(3/8")	50		065C-0088

Liners

Vertical® GC Liners

The Vertical® GC liners are made of borosilicate glass and designed to obtain the maximum performance to ensure no loss of sample and accurate quantitation of thermally labile or reactive compounds.

- **Wide selection ranges**
- **Fit standard instrument manufacturer's inlets**
- **High temperature deactivation to ensure inertness**

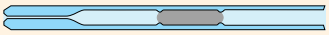
SGE® FocusLiner™ GC Liners

The SGE® FocusLiner™ overcomes the quartz wool shifting problem. The quartz wool is held in the correct position by means of two tapered sections in the liner. The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residue liquid sample from the needle tip while providing sufficient surface area for volatilisation. With the SGE FocusLiner™, a good RSD is easily achievable showing the effectiveness of the secured quartz wool.

Liner O-Rings

- Graphite O-rings can be used to 450°C with non bleed and superb durability.

Ordering Information

Description, ID, OD and Length	Diagram	Application	QTY	Thermo No.	Part No.
ThermoQuest 8000, FOCUS, TRACE/ULTRA					
Splitless, FocusLiner™, 70mm Needle 5mmID, 8mmOD, 105mmLength		trace analytes > 2µL	5	453T2895	065G-0015
			25	453T4895	065G-0017
Splitless, FocusLiner™, 50mm Needle 5mmID, 8mmOD, 105mmLength		trace analytes > 2µL	5	453T2999	065G-0025
			25	453T4995	065G-0027
Split, FocusLiner™, 50mm Needle 5mmID, 8mmOD, 105mmLength		trace analytes > 2µL	5	453T2905	065G-0035
			25	453T4905	065G-0037
Split, Straight-Through 3mmID, 8mmOD, 105mmLength		trace analytes < 2µL	5	45350031	065G-0045
			25	45354031	065G-0047
Split, Straight-Through 5mmID, 8mmOD, 105mmLength		trace analytes > 2µL	5	45350030	065G-0055
			25	45354030	065G-0057
Splitless, Single-Taper 3mmID, 8mmOD, 105mmLength		trace analytes < 2µL	5	45350032	065G-0065
			25	45354032	065G-0067
Splitless, Single-Taper 5mmID, 8mmOD, 105mmLength		trace analytes > 2µL	5	45350033	065G-0075
			25	45354033	065G-0077
TRACE 2000 PTV					
PTV, LVI 2mmID, 2.75mmOD, 120mmLength		general analytes	5	45352060	065G-0085
			25		065G-0087
PTV, 2mmID, 2.75mmOD, 120mmLength		general analytes	5	45352057	065G-0095
			25	45354057	065G-0097
MEGA 4000/5000/6000					
Split, Straight-Through 3mmID, 5mmOD, 79.5mmLength		general analytes	5	45350400	065G-0105
			25		065G-0107
Split/Splitless, Recessed Gosseneck 3mmID, 5mmOD, 79.5mmLength		general analytes	5	453T2955	065G-0115
			25		065G-0117
Split, Straight-Through 2mmID, 5mmOD, 79.5mmLength		general analytes	5	45350300	065G-0125
			25		065G-0127
Liner O-Rings					
Graphite Rings and Washers for 8000 and Trace			10	29033460	065G-0146

Ferrules

Ferrule Properties			
Material	**Temp Limit**	**Advantages**	**Limitations**
Graphite (100%)	450°C	• Recommened for hight temperature and cool on-column application	• Not for MS • Easily deformed • Possible system contamination
Vespel/Graphite (85%/15%)	350°C	• Exellent sealing • Recommended for MS	• Must re-tighten frequently • Flows at elevated temperature

M4 Graphite ferrules

M8 Graphite ferrules

85% Vespel, 15% Graphite ferrules

Ordering Information			
Description	QTY	Thermo No.	Part No.
Graphite Ferrules			
TRACE & FOCUS, M4 0.3mm, for 0.15mmID columns	10		065M-1016
TRACE & FOCUS, M4 0.4mm, for 0.25mmID columns	10	29053488	065M-1026
TRACE & FOCUS, M4 0.5mm, for 0.32mmID columns	10	29053487	065M-1036
TRACE & FOCUS, M4 0.8mm, for 0.53mmID columns	10	29053486	065M-1046
TRACE & FOCUS, M8 0.4mm, for 0.25mmID columns	10		065M-1056
TRACE & FOCUS, M8 0.5mm, for 0.32mmID columns	10		065M-1066
TRACE & FOCUS, M8 0.8mm, for 0.53mmID columns	10		065M-1076
1/8" Straight	10		065M-1086
1/4" Straight	10		065M-1096
85% Vespel, 15% Graphite Ferrules			
1/16" to 0.4mm, Short, for 0.1-0.25mmID columns	10	29033461	065M-2016
1/16" to 0.5mm, Short, for 0.32mmID columns	10	29033460	065M-2026
1/16" to 0.8mm, Short, for 0.53mmID columns	10	29033471	065M-2036
1/8" Straight	10	290VT168	065M-2046
1/4" Straight	10	290VT165	065M-2056
1/16" to 0.4mm, for 0.25mmID columns	10	290VT186	065M-2066
1/16" to 0.5mm, for 0.32mmID columns	10	290VT187	065M-2076
1/16" to 0.8mm, for 0.53mmID columns	10	290VT188	065M-2086
Brass nut	2	290BT239	065M-2092

SilTite Ferrules

- **Metal ferrules for fused silica GC columns and tubing**
- **Ideal for GC/MS**
- **Eliminate contamination from vespel or graphite**
- **Eliminate annoying leaks**
- **Reduce air background**
- **No more retightening of Vespel ferrules after temperature cycling**
- **Reduce GC and MS down time**

SilTite nuts and ferrules

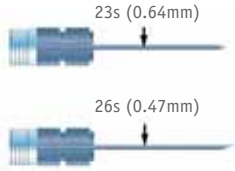
Ordering Information			
Description	QTY	Thermo No.	Part No.
SilTite Ferrules Kit : 10 Ferrules, 2 Nuts			
For 0.10 to 0.25mmID Columns	1	290MT229	065M-6011
For 0.32mmID Columns	1	290MT230	065M-6021
For 0.45 to 0.53mmID Columns	1	290MT231	065M-6031
Replacement			
SilTite Ferrules 0.4mm for 0.1 to 0.25mmID Columns	10	290MT221	065M-6046
SilTite Ferrules 0.5mm for 0.32mmID Columns	10	290MT222	065M-6056
SilTite Ferrules 0.8mm for 0.53mmID Columns	10	290MT223	065M-6066
SilTite Nuts	5	290MT211	063M-6075

Autosampler Syringes

066A-8011 066A-9031

Ordering Information				
Volume, Code, Gauge, Length, Point Style	QTY	OEM No.	Shimadzu No.	Part No.
Hamilton Syringes for AOC-9				
5µL, N, 26s, 51mm, #2	1	87900		24-87900
5µL, RN, 26s, 51mm, #2	1	87930		24-87930
10µL, RN, 26s, 51mm, #2	1	80330		24-80330
Needles, 26s, 51mm, #2	6	7758-02		24-7758-02
SGE Syringes for AOC-14/17/20/20i				
0.5µL, R, 23s, 42mm, Cone	1	000445		21-000445
0.5µL, R, 26s, 42mm, Cone	1	000440		21-000440
5µL, F, 23s, 42mm, Cone	1	001988		21-001988
5µL, F, 26s, 42mm, Cone	1	001987		21-001987
10µL, R, 23s, 42mm, Cone	1	002898		21-002898
10µL, R, 26s, 42mm, Cone	1	002897		21-002897
10µL, R, GT, 23s, 42mm, Cone	1	002902		21-002902
250µL, F, GT, 26s, 42mm, Cone	1	006682		21-006682
Needles, 23s, 42mm, Cone for 0.5µL syringes	1	033745		21-033745
Needles, 26s, 42mm, Cone for 0.5µL syringes	1	033738		21-033738
Needles, 23s, 42mm, Cone for 10µL syringes	2	037747		21-037747
Needles, 26s, 42mm, Cone for 10µL syringes	2	037745		21-037745

Needle Termination Codes	
Hamilton	
N	Cemented Needle
RN	Removable Needle
SGE	
F	Fixed Needle
R	Removable Needle
GT	Gas-Tight



Point Style #2
Beveled needle tip

Point Style Cone
Cone tip

Septum Nut

Septum nut provides consistent septum tightness, fewer bent needles, and easy leak detection. The nut contains a needle guide, ensuring that the needle consistently penetrates the septum in the same place, prolonging septum life. The guide also prevents the needle from striking the edge of the column or bending during insertion.

Septum Nuts for Shimadzu GCs

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Needle guide allows easy penetration and prevents septum coring.
- Manual injection septum nut allows use of 23-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Ordering Information			
Description	QTY	Shimadzu No.	Part No.
Septum Nut for Shimadzu 17A, 2010, and 2014 GCs			
Septum Nut (for 23-Gauge Needles)	1	221-41286-00	066B-0011

Septa


066C-0018


066C-0038


066C-0028

Premium CenterGuide™ Septa

Premium CenterGuide™ septa are premium silicone rubber precision molded for a more accurate fit in the injection port than inferior stamped septa. A small recess, the "CenterGuide", is added in the center of the disk, as well as a small indentation around the outside diameter. The CenterGuide focuses the needle to the same point for each injection providing easy penetration, reduced needle bending and minimizing coring. The proprietary cleaning process after molding is used to provide lowest bleed. Premium septa offer the longest average injection lifetime at the highest injection port temperatures. Septa are carefully processed, then packaged in glass vials.

- **BTO® - Bleed and Temperature Optimized** - For highest temperature use, with lowest bleed and outstanding injection life. Ideal for use with "Mass Spec" capillary columns.
- **Marathon™** - For long injection life, minimal coring. Soft, 45 durometer, easy on autosampler
- **Advanced Green 3™** - Long life, plasma coating eliminates sticking in the injection port

Specification

Septa	Temp Max	Color	Injections	Durometer*	Low Bleed
BTO	400°C	Red	>300	50-55	Excellent
Marathon	350°C	Brick red	>400	45-50	Good
Advanced Green 3	350°C	Green	>350	55-60	Very good

* Durometer : Hardness of the silicone material. The lower the number, the softer the material.

Ordering Information

Description	QTY	Shimadzu No.	Part No.
Shimadzu All Models			
BTO plug	50	CS298735	066C-0018
Marathon plug	50	CS239498	066C-0028
Advanced Green plug	50	CS246424	066C-0038

Liners

Vertical® GC Liners

The Vertical® GC liners are made of borosilicate glass and designed to obtain the maximum performance to ensure no loss of sample and accurate quantitation of thermally labile or reactive compounds.

- **Wide selection ranges**
- **Fit standard instrument manufacturer's inlets**
- **High temperature deactivation to ensure inertness**

SGE® FocusLiner™ GC Liners

The SGE® FocusLiner™ overcomes the quartz wool shifting problem. The quartz wool is held in the correct position by means of two tapered sections in the liner. The tapered sections are located to ensure that the needle tip penetrates the secured quartz wool plug wiping any residue liquid sample from the needle tip while providing sufficient surface area for volatilisation. With the SGE FocusLiner™, a good RSD is easily achievable showing the effectiveness of the secured quartz wool.

Liner O-Rings

- Viton O-rings can be used to 200°C with low bleed and good durability.
- Graphite O-rings can be used to 450°C with non bleed and superb durability.

Ordering Information

Description, ID, OD and Length	Diagram	Application	QTY	Shimadzu No.	Part No.
14A/15A/16(SPL-14)					
Split/Splitless, FocusLiner 3.4mmID, 5.0mmOD, 99mmLength		trace analytes > 2µL	5		066G-0015
			25		066G-0017
Split/Splitless, FocusLiner, Tapered 3.4mmID, 5.0mmOD, 99mmLength		trace analytes > 2µL	5		066G-0025
			25		066G-0027
Split/Splitless, Middle Gooseneck 3.4mmID, 5.0mmOD, 99mmLength		trace analytes > 2µL	5		066G-0035
			25		066G-0037
Split/Splitless, Tapered 3.4mmID, 5.0mmOD, 99mmLength		trace analytes < 2µL	5	221-32544-01	066G-0045
			25		066G-0047
Spitless, Direct, Wire Bore 3.4mmID, 5.0mmOD, 139mmLength		trace analytes > 2µL	5		066G-0055
			25		066G-0057
17A(SP-17) & 2010/2014(SPL-2010)					
Split/Splitless, FocusLiner 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	092062SH	066G-0065
			25		066G-0067
Split/Splitless, FocusLiner, Tapered 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	092068SH	066G-0075
			25		066G-0077
Split/Splitless, Recessed oosseneck, 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	092061SH	066G-0085
			25		066G-0087
Split, Straight-Though 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	221-41444-00	066G-0095
			25		066G-0097
Split/Spitless, Middle Gooseneck 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	221-41444-01	066G-0105
			25		066G-0107
Split, Straight-Though 2.6mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	221-41544-00	066G-0115
			25		066G-0117
Direct for 0.53mm ID Column 2.6mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	220-94768-00	066G-0125
			25		066G-0127
SPME Liner 0.75mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	220-94769-00	066G-0135
			25		066G-0137
Split/Splitless, Tapered 3.4mmID, 5.0mmOD, 95mmLength		trace analytes > 2µL	5	221-48335-01	066G-0145
			25		066G-0147
Liner O-Rings					
Viton O-rings for 2010 (SPL 2010) and 2014 Liners			10		066G-0156
Graphite O-rings for 14/15/16 (SPL 14) Liners			10		066G-0166
Graphite O-rings for 17A (SPL 17) Liners			10		066G-0176

Ferrules

Ferrule Properties			
Material	**Temp Limit**	**Advantages**	**Limitations**
Graphite (100%)	450°C	• Recommened for hight temperature and cool on-column application	• Not for MS • Easily deformed • Possible system contamination
Vespel/Graphite (85%/15%)	350°C	• Exellent sealing • Recommended for MS	• Must re-tighten frequently • Flows at elevated temperature

Graphite ferrules

85% Vespel, 15% Graphite ferrules

Ordering Information			
Description	QTY	Shimadzu No.	Part No.
Graphite Ferrules for 14A/17A/2010/2014			
1/16" to 0.5mm, for 0.25-0.32mmID columns	10	221-32126-05	066M-1016
1/16" to 0.8mm, for 0.53mmID columns	10	221-32126-08	066M-1026
5mmOD for packed columns	10	221-15563-91	066M-1036
85% Vespel, 15% Graphite Ferrules For QP-5000-I MS			
1/16" to 0.4mm, for 0.1-0.25mmID columns	10		066M-2016
1/16" to 0.5mm, for 0.32mmID columns	10		066M-2026
85% Vespel, 15% Graphite Ferrules For QP-5000-II MS			
1/16" to 0.4mm, for 0.1-0.25mmID columns	10		066M-2036
1/16" to 0.5mm, for 0.32mmID columns	10		066M-2046
85% Vespel, 15% Graphite Ferrules For 2010 GCMS			
1/16" to 0.4mm, for 0.1-0.25mmID columns	10		066M-2056
1/16" to 0.5mm, for 0.32mmID columns	10		066M-2066
1/16" to 0.8mm, for 0.53mmID columns	10		066M-2076

Capillary Nuts

Capillary Nuts

Ordering Information			
Description	QTY	Shimadzu No.	Part No.
Capillary Nuts			
Nut with Slit	2	221-32705	066M-5012
Nut without Slit	2	221-1635-81	066M-5022

SilTite Ferrules

- **Metal ferrules for fused silica GC columns and tubing**
- **Ideal for GC/MS**
- **Eliminate contamination from vespel or graphite**
- **Eliminate annoying leaks**
- **Reduce air background**
- **No more retightening of Vespel ferrules after temperature cycling**
- **Reduce GC and MS down time**

SilTite nuts and ferrules

Ordering Information			
Description	QTY	Shimadzu No.	Part No.
SilTite Ferrules Kit For QP-5000 MSD, 10 Ferrules, 2 Nuts			
Siltite Kit for 0.10 to 0.25mmID Columns	1		066M-6011
Siltite Ferrule 0.10 to 0.25mmID Columns	10		066M-6026
Siltite Kit for 0.32mmID Columns	1		066M-6031
Siltite Ferrule 0.32mmID Columns	10		066M-6046
Siltite Kit for 0.45-0.53mmID Columns	1		066M-6051
Ferrule for 0.45-0.53mmID Columns	10		066M-6066
SilTite Ferrules Kit For QP2010, 10 Ferrules, 2 Nuts			
Siltite Kit for 0.10 to 0.25mmID Columns	1		066M-6071
Siltite Ferrule 0.10 to 0.25mmID Columns	10		066M-6086
Siltite Kit for 0.32mmID Columns	1		066M-6091
Siltite Ferrule 0.32mmID Columns	10		066M-6106
Siltite Kit for 0.45-0.53mmID Columns	1		066M-6111
Siltite Ferrule for 0.45-0.53mmID Columns	10		066M-6126
Replacement Siltite Nuts			
Siltite Nut For 201/2014 QP-5000 with Jet Separator	5		066M-6135
Siltite Nut For QP-5000 with Direct MS Interface	5		066M-6145

TLC

General Information

Principles

Thin Layer Chromatography has long been over 100 years one of the most useful forms of chromatography. In TLC, an aliquot of sample solution is spotted on a porous layer of adsorbent material. This sample mixture is then resolved into its individual components by their differential migration as they are carried through the adsorbent by the developing solvent. The developing solvent wicks through the adsorbent by capillary action alone; no external source of pressure is required.

The best TLC separation media are produced by spreading a concentrated slurry of adsorbent particles as a layer of uniform thickness on the flat surface of an inert backing material (usually glass, but aluminum and plastic are also used). Careful evaporation of the slurry solvent produces a highly uniform adsorbent layer. In addition to providing an inert support for preparing the thin adsorbent layer, the backing material also contributes strength for ease of handling.

In principle, a wide variety of adsorbent materials can be used for the production of TLC layers. In practice, the versatility of silica gel has led to its acceptance as the adsorbent of choice for the great majority of TLC separations. The steps in performing TLC are simple, yet can be considered fields of study by themselves. They are - sample preparation, sample application, chromatographic development, and evaluation of the chromatogram.

Sample Preparation

This step involves, in the words of Dr. Joseph Touchstone, "favorably increasing the analyte/'junk' ratio." Although the most important issue here may appear to be cleaning up your sample, it also may involve physically crushing a sample. Other processes that may occur in this step are sampling, extraction steps, and filtration or concentration of components of interest Thorough preparation of samples is an important prerequisite to a successful TLC separation.

Sample Application

The objective of the chromatographic separation will typically specify how the sample should be applied.The most common method is by way of a glass capillary. With a capillary the sample can be applied as either a circular spot or series of smaller adjacent spots creating a band. A much longer band referred to as a streak is also commonly used but only on preparative thickness TLC plates. It is always beneficial to keep the sample spot or band as small as possible or resolution will be adversely affected. A special TLC plate option that can help with all manual sample application but especially with large volumes of very dilute samples is the concentration or preadsorbent zone.

Chromatographic Development

The most commonly used separation technique is by way of a TLC plate standing vertically in a glass developing chamber. This is known as ascending chromatography. A separation may also be performed in a specially designed horizontal chamber. Solvent flowing across the plate is still achieved by capillary action with this method, however, gravity does not slow the speed of the separation as much. Another specialized method of separation is 2-dimensional development. With this a single spot is applied near a corner of the plates. After chromatography in the first direction, the plate is dried, rotated 90° and developed in the second dimension.with another mobile phase.

Evaluation of the Chromatogram

Evaluation can be as simple as a visual inspection under ultra violet light to determine the existence of a component. Or it could be as complicated as exposing the plate to a chemical spray, followed by heat charring and densitometric scanning to compare the sample to standards on the plate and achieve an accurate measurement of how much of a component is on the plate. Anyway you look at evaluation, the one constant is the calculation of the retention factor (Rf value). This value is measured as the relative distance traveled from the spot origin to the mobile phase solvent front. As long as all other variables are kept constant, the Rf value of a sample component should remain constant and be reproducible.

Inherent Advantages of TLC

TLC permits the simultaneous analysis of many samples in the same time period required for one HPLC analysis. Samples and standards are analyzed under exactly the same conditions rather than serially as in HPLC. TLC uses a fresh, new adsorbent for each analysis. This insures reproducible results and eliminates the HPLC problems of adsorbent contamination from previous analyses and lost efficiency from worn columns. Also, with the use of smaller developing tanks, the amount of developing solvent required is much less than with HPLC. TLC does not require complex, costly maintained instrumentation. The investment for performing successful TLC can be ten to one hundred times less than for HPLC. TLC simplifies methods development. Unlike chromatography performed on columns, the sample components remain in the adsorbent and can always be located and retrieved for further experimentation.

Applications of TLC

TLC is generally used for one of three purposes.

1) QUALITATIVE Analysis : To determine the presence or absence of a particular substance in a mixture. A rough estimation of the level of the substance may also be performed.

2) QUANTITATIVE Analysis : To determine, precisely and accurately, the amount of a particular substance in a sample mix.

3) PREPARATIVE Analysis : To purify and isolate a particular substance by separating it from any contaminants.

All three cases share the common procedures of sample application, chromatographic separation, and sample component visualization. The conditions under which these procedures are performed vary according to the required end result. Some typical requirements and conditions are shown below.

Factor	Qualitative	Quantitative	Preparative
Sample Volume	2-50µL	0.1-0.5µL	50-1000µL
Sample Amount	10-200g	50-500ng	5-500mg
Sample Appl.Precision	±10%	±1%	NA
Layer Thickness	250µm	150µm	500-2000µm
Development Distance	12cm	5cm	15cm
Development Time	15-30min	4-8min	25-60min
Visualization Type	Visual	Visual & Densitometric	Visual

TLC Plate Formats

Layer Thickness

TLC plates are 250µm thick for regular analytical TLC and between 500 and 2000µm for preparative TLC. HPTLC plates have a thinner layer of adsorbent between 150-200µm. All thickness designations are nominal. Actual thicknesses may vary but are consistent from batch to batch.

Plate Size

TLC plates are available in the following standard sizes: 20x20cm, 10x20cm, 5x20cm, 2.5x10cm and 2.5x7.5cm. The standard size for HPTLC is 10x10cm.

Preadsorbent plates

Preadsorbent plates have an inert spotting zone along the bottom edge of the plate. This sample application region serves as a "holding zone" for sample spots until development of the plate is initiated. There is no significant resolution of sample components by the stationary phase in this region. All soluble components migrate with the solvent front, concentrating diffuse sample spots into vertically narrow bands.

The adsorbent zone extends from the upper edge of the preadsorbent zone and covers the remaining area of the TLC plate. This zone exhibits the selective retention of sample components characteristic of the adsorbent employed. Separation of sample components occurs in the adsorbent zone in the same way as on a standard TLC plate.

Preconcentration of the sample results in compact zones at the beginning of the separation. Also, resolution and sensitivity are less dependent on sample application technique since all samples are concentrated to narrow bands regardless of the size or position in the zone of the sample spots.

Prechanneled plates

Prechanneled plates are available in a variety of adsorbents and plate sizes including the preadsorbent format. These plates have 9mm wide adsorbent tracks which are separated by 1mm wide channels where the adsorbent layer has been removed. Prechanneled plates prevent cross contamination and the spreading of the sample components during development.

Prescored TLC Plates

TLC plates can be supplied with the glass backing scored at specific locations to permit convenient "snapping" into smaller plates. This feature provides increased versatility and can mean cost savings over plates already cut to smaller sizes.

A plate can be spotted, developed, then snapped into several smaller plates, and then subjected to different visualization techniques. Scored TLC plates are available in two standard formats:

1) 20x20cm scored TLC plates have three score marks 5cm apart. Each plate can be snapped to produce four 5x20cm plates or any multiple of 5cm width.

2) 10x20cm scored TLC plates have seven score marks 2.5cm apart. Each can be snapped to produce eight 2.5x10cm plates or any multiple of 2.5cm width.

TLC Backing

Comparison of flexible backings to glass

Physical Property	Glass	Plastic	Aluminum
Thickness	1.5mm	0.2mm	0.15mm
Weight	high	low	low
Torsional strength	ideal	low	high
Temperature stability	high	185°C	high
Susceptible to breakage	yes	no	no
Can be cut with scissors	no	yes	yes
Solvents resistance	high	high	high
Mineral acids resistance	high	high	high
Conc. ammonia resistance	high	high	low
Binder stability in water	depends on phase use	very suitable	limited suitability

TLC Identification

Adsorbent

S	Silica gel, 10-15µm particle size, 60Å pore size for general TLC
HPS	Silica, 5-8µm particle size, 60Å pore size for HPTLC
ALN	Alumina, neutral, 60Å pore size
ALB	Alumina, basis
MC	Microcrystalline Cellulose
MC-PEI	Cellulose with polyethyleneimine
DC	DEAE Cellulose
MDC	Mixed DEAE Cellulose and unmodified cellulose, 7.5:1
NYLON	Aminopolycaprolactame, NYLON 6

Modified silica

S-NaOH	Silica modified with 0.1N Sodium Hydroxide
S-AGNO3	Silica impregnated with 10% Silver Nitrate
S-NHSO4	Silica modified with Ammonium Sulfate
S-MGA	Silica modified with 7.5% Magnesium Acetate
S-KOX	Silica modified with 1% Potassium Oxalate

Bonded compounds

C18	Octadecyl Bonded-silica gel
C8	Octyl Bonded-silica gel
C2	Ethyl Bonded-silica gel
NH2	Aminopropyl Bonded-silica gel
CN	Cyanopropyl Bonded-silica gel

Binder

G	(Gypsum) Calcium Sulfate Hemihydrate binder
GH	Inorganic Hard-layer plus Gypsum binder
HL	Organic Hard-layer binder

Visualization

F254	Fluorescent Indicator 254nm

Plate Pretreatment

PS	Prescored
PC	Prechanneled
PA	Preadsorbent

VertiPlate™ Soft-layer

- **High Purity Silica Gel for Increased Sensitivity**
- **Narrow Particle Size Distribution for faster Separations and Improved Resolution**
- **Plate formats are available as Prescored, Prechanneled and Preadsorbent**
- **Plate sizes are available in 20x20cm, 10x20cm and 5x20cm**
- **Soft-layer Gypsum binder**
- **Adsorbents are available with or without Fluorescent Indicator**

S-G, VertiPlate™ Soft-layer TLC plates are the kind of most widley used when recovery of the separated compounds is desirable. No organic substances have been added to these products. They are compatible with all organic solvents except solvent containing greather than 20% water.

PS, Prescored plates are an economical alternative to having many different size plates. Prescored 20x20cm plate has 3 score markes 5cm apart. Plates can be easily snapped apart to provide four 5x20cm plates. Prescored 10x20cm plate provides four 2.5x10cm plates.

PC, Prechanneled plates help prevent cross contamination by separating multiple samples. More sample can be separated on a plate and the spot zones can be determined more readility. Prechanneled 20x20cm plates have 19 channels. Prechanneled 10x20cm plates have 9 channels. Prechanneled 5x20cm plates have 4 channels.

PA, Preadsorbent plates have a nonadsorbent layer at the bottom of the plate. This band of innert material reshapes and concentrates the spots into narrow bands which improve separation. It allows the loading of large volumes of sample without loss of resolution.

Specifications	
Base	Silica gel, 15µm particle size, 60Å pore size
Binder	Gypsum, Calcium Sulfate Hemihydrate
Indicator	Fluorescent at 254nm
Layer Thickness	250µm
Plate material	Glass
Plate size	20x20cm, 10x20cm, 5x10cm
Prescored	20x20cm plate to four 5x20cm plates. 10x20cm plate to four 2.5x10cm plates.
Prechanneled	20x20cm plate has 19 channels. 10x20cm plate has 9 channels. 5x20cm plate has 4 channels.
Preadsorbent	innert material on 3cm band bottom edge

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Soft-Layer		
S-G, 20x20cm	25	0820-0365
S-G, 10x20cm	25	0820-0355
S-G, 5x20cm	25	0820-0335
S-G, PS, 20x20cm	25	0820-1365
S-G, PS, 10x20cm	25	0820-1355
S-G, PC, 20x20cm	25	0820-2365
S-G, PC, 10x20cm	25	0820-2355
S-G, PC, 5x20cm	25	0820-2335
S-G, PA, 20x20cm	25	0820-3365
S-G, PA, 10x20cm	25	0820-3355
S-G, PA, 5x20cm	25	0820-3335
S-G, PS, PC, 20x20cm	25	0820-4365
S-G, PS, PC, 10x20cm	25	0820-4355
S-G, PS, PA, 20x20cm	25	0820-5365
S-G, PC, PA, 20x20cm	25	0820-6365
S-G, PC, PA, 10x20cm	25	0820-6355
S-G, PS, PC, PA, 20x20cm	25	0820-7365
S-G, F254, 20x20cm	25	0821-0365
S-G, F254, 10x20cm	25	0821-0355
S-G, F254, 5x20cm	25	0821-0335
S-G, F254, PS, 20x20cm	25	0821-1365
S-G, F254, PS, 10x20cm	25	0821-1355
S-G, F254, PC, 20x20cm	25	0821-2365
S-G, F254, PC, 10x20cm	25	0821-2355
S-G, F254, PC, 5x10cm	25	0821-2335
S-G, F254, PA, 20x20cm	25	0821-3365
S-G, F254, PA, 10x20cm	25	0821-3355
S-G, F254, PA, 5x20cm	25	0821-3335
S-G, F254, PS, PC, 20x20cm	25	0821-4365
S-G, F254, PS, PC, 10x20cm	25	0821-4355
S-G, F254, PS, PA, 20x20cm	25	0821-5365
S-G, F254, PC, PA, 20x20cm	25	0821-6365
S-G, F254, PC, PA, 10x20cm	25	0821-6355
S-G, F254, PS, PC, PA, 20x20cm	25	0821-7365

S	Silica gel 60Å
G	Soft-layer binder, (Gypsum) Calcium Sulfate Hemihydrate
F254	Fluorescent Indicator 254nm
PS	Prescored
PC	Prechanneled
PA	Preadsorbent

VertiPlate™ Inorganic Hard-layer

- **High Purity Silica Gel for Increased Sensitivity**
- **Narrow Particle Size Distribution for faster Separations and Improved Resolution**
- **Plate formats are available as Prescored, Prechanneled and Preadsorbent**
- **Plate sizes are available in 20x20cm, 10x20cm and 5x20cm**
- **Hard-layer special inorganic binder plus gypsum**
- **Adsorbents are available with or without Fluorescent Indicator**

Specifications	
Base	Silica gel, 15µm particle size, 60Å pore size
Binder	Special inorganic Hard-layer plus Gypsum
Indicator	Fluorescent at 254nm
Layer Thickness	250µm
Plate material	Glass
Plate size	20x20cm, 10x20cm, 5x10cm
Prescored	20x20cm plate to four 5x20cm plates. 10x20cm plate to four 2.5x10cm plates.
Prechanneled	20x20cm plate has 19 channels. 10x20cm plate has 9 channels. 5x20cm plate has 4 channels.
Preadsorbent	innert material on 3cm band bottom edge

S-GH, VertiPlate™ Inorganic Hard-layer TLC plates contain a special inorganic binder plus gypsum that stabilizes the layer to make it more abrasion resistant. They provide improved handling and sample application compared to Soft-layer plates and are tough enough to write on with a soft pencil, if required. They are also 100% water resistant and are compatible with aqueous developing solvent. They are recommended for all applications including those where visualization occurs through strong charring procedures or in any case in which reagent interaction with an organic binder occurs.

PS, Prescored plates are an economical alternative to having many different size plates. Prescored 20x20cm plate has 3 score markes 5cm apart. Plates can be easily snapped apart to provide four 5x20cm plates. Prescored 10x20cm plate provides four 2.5x10cm plates.

PC, Prechanneled plates help prevent cross contamination by separating multiple samples. More sample can be separated on a plate and the spot zones can be determined more readility. Prechanneled 20x20cm plates have 19 channels. Prechanneled 10x20cm plates have 9 channels. Prechanneled 5x20cm plates have 4 channels.

PA, Preadsorbent plates have a nonadsorbent layer at the bottom of the plate. This band of innert material reshapes and concentrates the spots into narrow bands which improve separation. It allows the loading of large volumes of sample without loss of resolution.

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Inorganic Hard-Layer, 250µm Thickness		
S-GH, 20x20cm	25	0830-0365
S-GH, 10x20cm	25	0830-0355
S-GH, 5x20cm	25	0830-0335
S-GH, PS, 20x20cm	25	0830-1365
S-GH, PS, 10x20cm	25	0830-1355
S-GH, PC, 20x20cm	25	0830-2365
S-GH, PC, 10x20cm	25	0830-2355
S-GH, PC, 5x20cm	25	0830-2335
S-GH, PA, 20x20cm	25	0830-3365
S-GH, PA, 10x20cm	25	0830-3355
S-GH, PA, 5x20cm	25	0830-3335
S-GH, PS, PC, 20x20cm	25	0830-4365
S-GH, PS, PA, 20x20cm	25	0830-5365
S-GH, PC, PA, 20x20cm	25	0830-6365
S-GH, PC, PA, 10x20cm	25	0830-6355
S-GH, PS, PC, PA, 20x20cm	25	0830-7365
S-GH, F254, 20x20cm	25	0831-0365
S-GH, F254, 10x20cm	25	0831-0355
S-GH, F254, 5x20cm	25	0831-0335
S-GH, F254, PS, 20x20cm	25	0831-1365
S-GH, F254, PS, 10x20cm	25	0831-1355
S-GH, F254, PC, 20x20cm	25	0831-2365
S-GH, F254, PC, 10x20cm	25	0831-2355
S-GH, F254, PC, 5x20cm	25	0831-2335
S-GH, F254, PA, 20x20cm	25	0831-3365
S-GH, F254, PA, 10x20cm	25	0831-3355
S-GH, F254, PA, 5x20cm	25	0831-3335
S-GH, F254, PS, PC, 20x20cm	25	0831-4365
S-GH, F254, PS, PA, 20x20cm	25	0831-5365
S-GH, F254, PC, PA, 20x20cm	25	0831-6365
S-GH, F254, PC, PA, 10x20cm	25	0831-6355
S-GH, F254, PS, PC, PA, 20x20cm	25	0831-7365

S	Silica gel 60Å
GH	Hard-layer inorganic binder plus Gypsum
F254	Fluorescent Indicator 254nm
PS	Prescored
PC	Prechanneled
PA	Preadsorbent

VertiPlate™ Organic Hard-layer

- **High Purity Silica Gel for Increased Sensitivity**
- **Narrow Particle Size Distribution for faster Separations and Improved Resolution**
- **Plate formats are available as Prescored, Prechanneled and Preadsorbent**
- **Plate sizes are available in 20x20cm, 10x20cm and 5x20cm**
- **Hard-layer organic binder enhanced abrasion resistance and compatible with organic solvents**
- **Adsorbents are available with or without Fluorescent Indicator**

S-HL, VertiPlate™ Organic Hard-layer TLC are plates the most rugged silica gel plates available. They not only ease handling and sample application, but also permit the use of up to 80% water in the developing solvent without loss of adherence of the adsorbent layer to the glass plate. Organic binder plates are recommended for all TLC applications except those that use vigorous charring for visualization. Virtually all other visualization methods are free from interference from the organic binder. Special high performance silica gel with 10µm particle size result in separations 25% to 30% faster than with most other TLC plates.

Prescored plates are an economical alternative to having many different size plates. Prescored 20x20cm plate has 3 score markes 5cm apart. Plates can be easily snapped apart to provide four 5x20cm plates. Prescored 10x20cm plate provides four 2.5x10cm plates.

Prechanneled plates help prevent cross contamination by separating multiple samples. More sample can be separated on a plate and the spot zones can be determined more readility. Prechanneled 20x20cm plates have 19 channels. Prechanneled 10x20cm plates have 9 channels. Prechanneled 5x10cm plates have 4 channels.

Preadsorbent plates have a nonadsorbent layer at the bottom of the plate. This band of innert material reshapes and concentrates the spots into narrow bands which improve separation. It allows the loading of large volumes of sample without loss of resolution.

Specifications	
Base	Silica gel, 10µm particle size, 60Å pore size
Binder	Organic Hard-layer
Indicator	Fluorescent at 254nm
Layer Thickness	250µm
Plate material	Glass
Plate size	20x20cm, 10x20cm, 5x10cm
Prescored	20x20cm plate to four 5x20cm plates. 10x20cm plate to four 2.5x10cm plates.
Prechanneled	20x20cm plate has 19 channels. 10x20cm plate has 9 channels. 5x20cm plate has 4 channels.
Preadsorbent	innert material on 3cm band bottom edge

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Organic Hard-Layer, 250µm Thickness		
S-HL, 20x20cm	25	0840-0365
S-HL, 10x20cm	25	0840-0355
S-HL, 5x20cm	25	0840-0335
S-HL, PS, 20x20cm	25	0840-1365
S-HL, PS, 10x20cm	25	0840-1355
S-HL, PC, 20x20cm	25	0840-2365
S-HL, PC, 10x20cm	25	0840-2355
S-HL, PC, 5x10cm	25	0840-2335
S-HL, PA, 20x20cm	25	0840-3365
S-HL, PA, 10x20cm	25	0840-3355
S-HL, PA, 5x10cm	25	0840-3335
S-HL, PS, PC, 20x20cm	25	0840-4365
S-HL, PS, PA, 20x20cm	25	0840-5365
S-HL, PC, PA, 20x20cm	25	0840-6365
S-HL, PC, PA, 10x20cm	25	0840-6355
S-HL, PS, PC, PA, 20x20cm	25	0840-7365
S-HL, F254, 20x20cm	25	0841-0365
S-HL, F254, 10x20cm	25	0841-0355
S-HL, F254, 5x20cm	25	0841-0335
S-HL, F254, PS, 20x20cm	25	0841-1365
S-HL, F254, PS, 10x20cm	25	0841-1355
S-HL, F254, PC, 20x20cm	25	0841-2365
S-HL, F254, PC, 10x20cm	25	0841-2355
S-HL, F254, PC, 5x10cm	25	0841-2335
S-HL, F254, PA, 20x20cm	25	0841-3365
S-HL, F254, PA, 10x20cm	25	0841-3355
S-HL, F254, PA, 5x10cm	25	0841-3335
S-HL, F254, PS, PC, 20x20cm	25	0841-4365
S-HL, F254, PS, PA, 20x20cm	25	0841-5365
S-HL, F254, PC, PA, 20x20cm	25	0841-6365
S-HL, F254, PC, PA, 10x20cm	25	0841-6355
S-HL, F254, PS, PC, PA, 20x20cm	25	0841-7365

S	Silica gel 60Å
HL	Organic Hard-layer binder
F254	Fluorescent Indicator 254nm
PS	Prescored
PC	Prechanneled
PA	Preadsorbent

VertiPlate™ Specialty Silica

- **High Purity Silica Gel for Increased Sensitivity**
- **Narrow Particle Size Distribution for faster Separations and Improved Resolution**
- **Specialty silica gels are availble as Binder free, Sodium Hydroxide, Silver Nitrate, Ammonium Sulfate, Magnesium Acetate and Potassium Oxalate.**
- **Adsorbents are available with or without Fluorescent Indicator**

VertiPlate™ Specialty Silica TLC plates are used for special applications.

S, Binder Free Silica contain niether inorganic nor organic binders. They are best for inorganic TLC. Activates plates at 110°C for 30min before use. A few eluents will cause the adsorbent to separate slightly from the plate in the submerged part of the layer.

S-NaOH-G, Silica modified with 0.1N Sodium Hydroxide TLC plates increase basicity of plates to improve separation of organometallics or some acidic compounds.

S-AGNO3, Silica impregnated with 10% Silver Nitrate TLC plates permit increased discrimination of certain compounds, particularly those containing carbon-carbon double bonds. More double or triple bonds (unsaturation) give lower R_f values. The product is light sensitive and should be stored in the dark. Activated plates at 110°C for 60min before use for improved separations.

S-NHSO4, Silica modified with Ammonium Sulfate TLC plates eliminate the need to use messy sulfuric acid for charring. Just evaporate the developing solvent until the plate is completely dry, then heat at 150-200°C for 30-60min to achieve charring.

S-MGA, Silica modified with 7.5% Magnesium Acetate TLC plates decreases the acidity of the layer and allows increased discrimination of phospholipids.

S-KOX, Silica modified with 1% Potassium Oxalate TLC plates acquire a separation characteristic which aids in the discrimination of polyphosphoinositides.

S	Silica gel 60Å
S-NaOH	Silica modified with 0.1N Sodium Hydroxide
S-AGNO3	Silica impregnated with 10% Silver Nitrate
S-NHSO4	Silica modified with Ammonium Sulfate
S-MGA	Silica modified with 7.5% Magnesium Acetate
S-KOX	Silica modified with 1% Potassium Oxalate
G	(Gypsum) Calcium Sulfate Hemihydrate binder
F254	Fluorescent Indicator 254nm
PS	Prescored

Specifications	
Base	Silica gel, 15µm particle size, 60Å pore size
Binder	Binder free Gypsum, Calcium Sulfate Hemihydrate
Indicator	Fluorescent at 254nm
Layer Thickness	250µm
Plate material	Glass
Plate size	20x20cm, 10x20cm, 5x20cm

Ordering Information		
Description	QTY	Part No.
Binder Free Silica		
S, 20x20cm	25	0810-0365
S, 10x20cm	25	0810-0355
S, 5x20cm	25	0810-0335
S, PS, 20x20cm	25	0810-1365
S, F254, 20x20cm	25	0811-0365
S, F254, 10x20cm	25	0811-0355
S, F254, 5x20cm	25	0811-0335
S, F254, PS, 20x20cm	25	0811-1365
0.1N Sodium Hydroxide Modified Silica		
S-NaOH-G, 20x20cm	25	0850-0365
S-NaOH-G, 10x20cm	25	0850-0355
S-NaOH-G, 5x20cm	25	0850-0335
S-NaOH-G, F254, 20x20cm	25	0851-0365
S-NaOH-G, F254, 10x20cm	25	0851-0355
S-NaOH-G, F254, 5x20cm	25	0851-0335
10% Silver Nitrate Impregnated Silica		
S-AGNO3, 20x20cm	25	0860-0365
S-AGNO3, 10x20cm	25	0860-0355
S-AGNO3, 5x20cm	25	0860-0335
S-AGNO3, F254, 20x20cm	25	0861-0365
S-AGNO3, F254, 10x20cm	25	0861-0355
S-AGNO3, F254, 5x20cm	25	0861-0335
Ammonium Sulfate Modified Silica		
S-NHSO4, 20x20cm	25	0890-0365
S-NHSO4, 10x20cm	25	0890-0355
S-NHSO4, 5x20cm	25	0890-0335
S-NHSO4, F254, 20x20cm	25	0891-0365
S-NHSO4, F254, 10x20cm	25	0891-0355
S-NHSO4, F254, 5x20cm	25	0891-0335
7.5% Magnesium Acetate Modified Silica		
S-MGA, 20x20cm	25	0880-0365
S-MGA, 10x20cm	25	0880-0355
S-MGA, 5x20cm	25	0880-0335
S-MGA, F254, 20x20cm	25	0881-0365
S-MGA, F254, 10x20cm	25	0881-0355
S-MGA, F254, 5x20cm	25	0881-0335
1% Potassium Oxalate Modified Silica		
S-KOX, 20x20cm	25	08A0-0365
S-KOX, 10x20cm	25	08A0-0355
S-KOX, 5x20cm	25	08A0-0335
S-KOX, F254, 20x20cm	25	08A1-0365
S-KOX, F254, 10x20cm	25	08A1-0355
S-KOX, F254, 5x20cm	25	08A1-0335

VertiPlate™ Non-Silica

- **Adsorbents are available with Alumina B, Alumina N, Microcrystalline Cellulose and DEAE cellulose with or without Fluorescent Indicator**

Specifications	
Adsorbent	Aluminum oxide, 10µm, 60Å pore size with Gypsum, Calcium Sulfate Hemihydrate
	Microcrystalline Cellulose
	DEAE cellulose
Indicator	Fluorescent at 254nm
Layer Thickness	250µm
Plate material	Glass
Plate size	20x20cm, 10x20cm, 5x20cm

ALB, Alumina B TLC plates are basic aluminium oxide. TLC plates are recommended for terpenes, alkaloids, steroids, aliphatic and aromatic compounds. Activated plates at 120°C for 10min before use for improved separations.

ALN-G, Alumina N Inorganic Hard-layer TLC plates are neutral aluminium oxide containing calcium sulfate hemihydrate as a binder. These TLC plates are recommended for terpenes, alkaloids, steroids, aliphatic and aromatic compounds. Activated plates at 120°C for 10min before use for improved separations.

MC, Microcrystalline Cellulose TLC plates are coated with microcrystalline cellulose (Avicel®). The adsorbent consists of regenerated alpha cellulose particles of nearly spherical shape and 50µm particle size. Layer are binder free and abrasion resistant. Compounds separated on this cellulose tend to form more compact spots than on fibrous cellulose layers. Recommended for carboxilic acids, lower alcohols, urea and purine derivatives.

DC, DEAE Cellulose TLC plates are coated with Diethylaminoethyl (DEAE) Cellulose. They are positive charges at neutral and acidic pH for separation of negatively charged molecules by ion exchange chromatography. Hydrophilic nature of the cellulose substrate makes it well suited to ion exchange separations of delicate biomolecules such as protiens ,hormones and enzymes. Plates are available with mixed layers containing both DEAE Cellulose and unmodified cellulose. Mixed-layer plates have lower ion exchange capacity and may be expected to provide higher chromatographic mobility for negatively charged molecules.

MDC, Mixed Cellulose TLC plates are mixed layers containing both DEAE Cellulose and unmodified cellulose, 7.5:1. Mixed-layer plates have lower ion exchange capacity and may be expected to provide higher chromatographic mobility for negatively charged molecules.

ALB	Alumina, basis
ALN	Alumina, neutral
G	(Gypsum) Calcium Sulfate Hemihydrate binder
MC	Microcrystalline Cellulose
DC	DEAE Cellulose
MDC	Mixed DEAE Cellulose and unmodified cellulose, 7.5:1
F254	Fluorescent Indicator 254nm

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Alumina B		
ALB, 20x20cm	25	08C0-0365
ALB, 10x20cm	25	08C0-0355
ALB, 5x20cm	25	08C0-0335
ALB, F254, 20x20cm	25	08C1-0365
ALB, F254, 10x20cm	25	08C1-0355
ALB, F254, 5x20cm	25	08C1-0335
VertiPlate™ Alumina A		
ALA, 20x20cm	25	08D0-0365
ALA, 10x20cm	25	08D0-0355
ALA, 5x20cm	25	08D0-0335
ALA, F254, 20x20cm	25	08D1-0365
ALA, F254, 10x20cm	25	08D1-0355
ALA, F254, 5x20cm	25	08D1-0335
VertiPlate™ Alumina Inorganic Hard-layer		
ALN-G, 20x20cm	25	08E0-0365
ALN-G, 10x20cm	25	08E0-0355
ALN-G, 5x20cm	25	08E0-0335
ALN-G, F254, 20x20cm	25	08E1-0365
ALN-G, F254, 10x20cm	25	08E1-0355
ALN-G, F254, 5x20cm	25	08E1-0335
VertiPlate™ Microcrystalline Cellulose		
MC, 20x20cm	25	08F0-0365
MC, 10x20cm	25	08F0-0355
MC, 5x20cm	25	08F0-0335
MC, F254, 20x20cm	25	08F1-0365
MC, F254, 10x20cm	25	08F1-0355
MC, F254, 5x20cm	25	08F1-0335
VertiPlate™ DEAE Cellulose		
DC, 20x20cm	25	08H0-0365
DC, 10x20cm	25	08H0-0355
DC, 5x20cm	25	08H0-0335
DC, F254, 20x20cm	25	08H1-0365
DC, F254, 10x20cm	25	08H1-0355
DC, F254, 5x20cm	25	08H1-0335
VertiPlate™ Mixed Cellulose		
MDC, 20x20cm	25	08B0-0365
MDC, 10x20cm	25	08B0-0355
MDC, 5x20cm	25	08B0-0335
MDC, F254, 20x20cm	25	08B1-0365
MDC, F254, 10x20cm	25	08B1-0355
MDC, F254, 5x20cm	25	08B1-0335

VertiPlate™ HPTLC Unbonded-Silica

- **High performance plates provide high resolution and faster Separations in less than 5min**
- **5µm High Purity Silica Gel**
- **Thinner layer optimized for nanolitre samples**
- **Smooth adsorbent surface, ideal for noise free HPTLC scanning**
- **Plate formats are available as Prescored and Preadsorbent**

Specifications	
Base	Silica, 5-8µm particle size, 60Å pore size
Binder	Organic Hard-layer Inorganic Hard-layer plus Gypsum binder
Indicator	Fluorescent at 254nm
Layer Thickness	150µm
Plate size	20x20cm, 10x20cm, x10cm
Prescored	10x10cm plate to four 2.5x10cm plates. 10x20cm plate to eight 2.5x10cm plates.
Preadsorbent	innert material on 1.5cm band bottom edge

VertiPlate™ HPTLC plates with unbonded-silca are available with Organic Hard-layer binder and Inorganic hard-layer binder.

HPS-HL, Organic Hard-layer binder HPTLC plates have little effect on the separation characteristics of the sorbent but most durable silica gel plates. These plates allow use of 80% water in the solvent system. They are used to avoid the problems of binder interference but cannot be used for visualization.

HPS-GH, Inorganic Hard-layer binder HPTLC plates have little effect on the separation characteristics of the sorbent but it does make the layer hard and abrasive resistant. These plates allow use of 100% water in the solvent system. They are used when strong acid charring is used for visualization or when the presence of an organic binder interacts with the solvent system.

Prescored plates are an economical alternative to having many different size plates. Prescored 20x20cm plate has 3 score markes 5cm apart. Plates can be easily snapped apart to provide four 5x20cm plates. Prescored 10x20cm plate provides eight 2.5x10cm plates.

Preadsorbent plates have a nonadsorbent layer at the bottom of the plate. This band of innert material reshapes and concentrates the spots into narrow bands which improve separation. It allows the loading of large volumes of sample without loss of resolution.

Ordering Information		
Description	QTY	Part No.
VertiPlate™ HPTLC, Organic Hard-layer		
HPS-HL, 20x20cm	25	08K0-0165
HPS-HL, 10x20cm	25	08K0-0155
HPS-HL, 10x10cm	25	08K0-0145
HPS-HL, PS, 10x20cm	25	08K0-1155
HPS-HL, PS, 10x10cm	25	08K0-1145
HPS-HL, PA, 20x20cm	25	08K0-2165
HPS-HL, PA, 10x20cm	25	08K0-2155
HPS-HL, PA, 10x10cm	25	08K0-2145
HPS-HL, F254, 20x20cm	25	08K1-0165
HPS-HL, F254, 10x20cm	25	08K1-0155
HPS-HL, F254, 10x10cm	25	08K1-0145
HPS-HL, F254, PS, 10x20cm	25	08K1-1155
HPS-HL, F254, PS, 10x10cm	25	08K1-1145
HPS-HL, F254, PA, 20x20cm	25	08K1-2165
HPS-HL, F254, PA, 10x20cm	25	08K1-2155
HPS-HL, F254, PA, 10x10cm	25	08K1-2145
VertiPlate™ HPTLC, Inorganic Hard-layer		
HPS-GH, 20x20cm	25	08L0-0165
HPS-GH, 10x20cm	25	08L0-0155
HPS-GH, 10x10cm	25	08L0-0145
HPS-GH, PS, 10x20cm	25	08L0-1155
HPS-GH, PS, 10x10cm	25	08L0-1145
HPS-GH, F254, 20x20cm	25	08L1-0165
HPS-GH, F254, 10x20cm	25	08L1-0155
HPS-GH, F254, 10x10cm	25	08L1-0145
HPS-GH, F254, PS, 10x20cm	25	08L1-1155
HPS-GH, F254, PS, 10x10cm	25	08L1-1145

HPS	Silica, 5-8µm particle size, 60Å pore size
HL	Organic Hard-layer binder
GH	Inorganic Hard-layer binder plus Gypsum
F254	Fluorescent Indicator UV254
PS	Prescored
PC	Prechanneled
PA	Preadsorbent

VertiPlate™ HPTLC Bonded-Silica

- **High performance plates provide high resolution and faster Separations in less than 5min**
- **5μm High Purity Silica Gel**
- **Thinner layer optimized for nanolitre samples**
- **Smooth adsorbent surface, ideal for noise free HPTLC scanning**
- **Adsorbent available in reversed phase, cyano and amino bonded-silica**
- **Prescored formats are available**

Specifications	
Base	Silica, 5-8μm particle size, 60Å pore size
Bonded group	C18, C8, C2, NH2, CN
Binder	Hard-layer organic binder
Indicator	Fluorescent at 254nm
Layer Thickness	150μm
Plate size	20x20cm, 10x20cm, 10x10cm
Prescored	10x10cm plate to four 5x5cm plates. 10x20cm plate to eight 2.5x10cm plates.

VertiPlate™ HPTLC plates with bonded-silca are available with Hard-layer organic binder. Organic binder has little effect on the separation characteristics of the sorbent but most durable silica gel plates. These plates allow use of 80% water in the solvent system. They are used to avoid the problems of binder interference but cannot be used for visualization.

VertiPlate™ HPTLC plates with reversed phase bonded-silca are 3 types: C18, C8 and C2. They are used to separated both polar and non-polar compounds by adjusting the solvent system.

VertiPlate™ HPTLC plates with cyano bonded-silica are moderately polar for both normal and reversed phase systems.

VertiPlate™ HPTLC plates with amino bonded-silica are weak basic anion exchange characteristics with special selectivity for charged compounds.

Prescored plates are an economical alternative to having many different size plates. Prescored 20x20cm plate has 3 score markes 5cm apart. Plates can be easily snapped apart to provide four 5x20cm plates. Prescored 10x20cm plate provides eight 2.5x10cm plates.

Ordering Information		
Description	QTY	Part No.
VertiPlate™ HPTLC Reversed Phase		
HPS-C18-HL, 20x20cm	25	08M0-0165
HPS-C18-HL, 10x20cm	25	08M0-0155
HPS-C18-HL, 10x10cm	25	08M0-0145
HPS-C18-HL, PS, 10x20cm	25	08M0-1155
HPS-C18-HL, F254, 20x20cm	25	08M1-0165
HPS-C18-HL, F254, 10x20cm	25	08M1-0155
HPS-C18-HL, F254, 10x10cm	25	08M1-0145
HPS-C18-HL, F254, PS, 10x20cm	25	08M1-1155
HPS-C8-HL, F254, 20x20cm	25	08N1-0165
HPS-C8-HL, F254, 10x20cm	25	08N1-0155
HPS-C8-HL, F254, 10x10cm	25	08N1-0145
HPS-C8-HL, F254, PS, 10x20cm	25	08N1-1155
HPS-C2-HL, F254, 20x20cm	25	08P1-0165
HPS-C2-HL, F254, 10x20cm	25	08P1-0155
HPS-C2-HL, F254, 10x10cm	25	08P1-0145
HPS-C2-HL, F254, PS, 10x20cm	25	08P1-1155
VertiPlate™ HPTLC Amino (NH2)		
HPS-NH2-HL, F254, 20x20cm	25	08Q1-0165
HPS-NH2-HL, F254, 10x20cm	25	08Q1-0155
HPS-NH2-HL, F254, 10x10cm	25	08Q1-0145
HPS-NH2-HL, F254, PS, 10x20cm	25	08Q1-1155
VertiPlate™ HPTLC Cyano (CN)		
HPS-CN-HL, F254, 20x20cm	25	08R1-0165
HPS-CN-HL, F254, 10x20cm	25	08R1-0155
HPS-CN-HL, F254, 10x10cm	25	08R1-0145
HPS-CN-HL, F254, PS, 10x20cm	25	08R1-1155

HPS	Silica, 5-8μm particle size, 60Å pore size
HL	Organic Hard-layer binder
F254	Fluorescent Indicator UV254
C18	Octadecyl Bonded-silica gel
C8	Octyl Bonded-silica gel
C2	Ethyl Bonded-silica gel
NH2	Aminopropyl Bonded-silica gel
CN	Cyanopropyl Bonded-silica gel
PS	Prescored

VertiPlate™ Prep TLC

- **Thicker layers for higher capacity**
- **Available as 500, 1000, 1500 or 2000µm**
- **Plate sizes are vailable in 20x20cm, 10x20cm and 5x20cm**
- **Adsorbents are available as silica or non-silica with or without Fluorescent Indicator**

Specifications	
Adsorbent	Silica gel, 10µm, 60Å pore size with Gypsum, Calcium Sulfate Hemihydrate binder
	Alumina 10µm, 60Å pore size with Gypsum, Calcium Sulfate Hemihydrate binder
	Microcrystalline Cellulose
Indicator	Fluorescent at 254nm
Layer Thickness	500, 1000, 1500, 2000µm
Plate material	Glass
Plate size	20x20cm

Preparative TLC plates have adsorbent layers thicker than the 250 microns. Thus, preparative plates can be used for separation of larger quantities of materials.

The loading capacity for a given degree of sample component resolution increases roughly as the square root of the adsorbent layer thickness. In preparative TLC, materials to be separated are often applied as long streaks rather than spots. After development, specific compounds may be recovered by scraping the adsorbent layers from the plate in the region of interest and eluting the separated material from the adsorbent using a strong solvent.

Soft-layer Silica plates are the kind of most widely used when recovery of the separated compounds is desirable. No organic substances have been added to these products. They are compatible with all organic solvents except solvent containing greather than 20% water.

Binder Free Silica plates contain neither inorganic nor organic binders. They are best for inorganic TLC. Activates plates at 110°C for 30min before use. A few eluents will cause the adsorbent to separate slightly from the plate in the submerged part of the layer.

Reversed phase plates are C18 bonded-silca. They are used to separated both polar and non-polar compounds by adjusting the solvent system.

Silica impregnated with 10% Silver Nitrate plates permit increased discrimination of certain compounds, particularly those containing carbon-carbon double bonds. More double or triple bonds (unsaturation) give lower R_f values. The product is light sensitive and should be stored in the dark. Activated plates at 110°C for 60min before use for improved separations.

Silica modified with 7.5% Magnesium Acetate plates decrease the acidity of the layer and allows increased discrimination of phospholipids.

Alumina TLC plates are aluminium oxide containing calcium sulfate hemihydrate as a binder. These TLC plates are recommended for terpenes, alkaloids, steroids, aliphatic and aromatic compounds. Activated plates at 120°C for 10min before use for improved separations.

Microcrystalline Cellulose TLC plates are coated with microcrystalline cellulose (Avicel®). The adsorbent consists of regenerated alpha cellulose particles of nearly spherical shape and 50µm particle size. Layer are binder free and abrasion resistant. Compounds separated on this cellulose tend to form more compact spots than on fibrous cellulose layers. Recommended for carboxilic acids, lower alcohols, urea and purine derivatives.

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Prep Soft-Layer Silica		
S-G, 500µm, 20x20cm	25	0820-0465
S-G, 1000µm, 20x20cm	25	0820-0565
S-G, 2000µm, 20x20cm	25	0820-0665
S-G, F254, 500µm, 20x20cm	25	0821-0465
S-G, F254, 1000µm, 20x20cm	25	0821-0565
S-G, F254, 2000µm, 20x20cm	25	0821-0665
VertiPlate™ Prep Binder Free Silica		
S, 500µm, 20x20cm	25	0810-0465
S, F254, 500µm, 20x20cm	25	0811-0465
VertiPlate™ Prep Reversed Phase		
S-C18-G, 500µm, 20x20cm	25	0870-0465
S-C18-G, 1000µm, 20x20cm	25	0870-0565
S-C18-G, F254, 500µm, 20x20cm	25	0871-0465
S-C18-G, F254, 1000µm, 20x20cm	25	0871-0565
VertiPlate™ Prep Silver Nitrate		
S-AGNO3, 500µm, 20x20cm	25	0860-0465
S-AGNO3, 1000µm, 20x20cm	25	0860-0565
S-AGNO3, F254, 500µm, 20x20cm	25	0861-0465
S-AGNO3, F254, 1000µm, 20x20cm	25	0861-0565
VertiPlate™ Prep Magnesium Acetate		
S-MGA, 500µm, 20x20cm	25	0880-0465
S-MGA, F254, 500µm, 20x20cm	25	0881-0465
VertiPlate™ Prep Alumina		
ALN-G, 500µm, 20x20cm	25	08E0-0465
ALN-G, 1000µm, 20x20cm	25	08E0-0565
ALN-G, F254, 500µm, 20x20cm	25	08E1-0465
ALN-G, F254, 1000µm, 20x20cm	25	08E1-0565
VertiPlate™ Prep Microcrystalline Cellulose		
MC, 500µm, 20x20cm	25	08F0-0465
MC, 1000µm, 20x20cm	25	08F0-0565
MC, F254, 500µm, 20x20cm	25	08F1-0465
MC, F254, 1000µm, 20x20cm	25	08F1-0565

G	Soft-layer, (Gypsum) Calcium Sulfate Hemihydrate binder
S	Binder Free Silica
C18	Octadecyl Bonded-silica gel
AGNO3	Silver Nitrate
MGA	Magnesium Acetate
ALN	Alumina, neutral
MC	Microcrystalline Cellulose
F254	Fluorescent Indicator UV254

VertiPlate™ Plastic & Aluminum Backed TLC

- **Flexible and Unbreakable**
- **Cut Plates to Size Needed**
- **Less Expensive than Glass**
- **Available with Polyester or Aluminum backing**

It is easy to extract substances from the plastic layer. Simply cut out the sample area and place into suitable solvent. This eliminates the dust of the scraping step and is often important in studies with radioactive materials.

Plastic backed plates can also be used for electrophoresis work. The backing is polyester platic. Activate sheets at 65-70°C for 30min.

S-GH, Silica plates contain a special inorganic Hard-layer plus gypsum binder that stabilizes the layer to make it more abrasion resistant. They provide improved handling. They are also 100% water resistant and are compatible with aqueous developing solvent. They are recommended for all applications including those where visualization occurs through strong charring procedures or in any case in which reagent interaction with an organic binder occurs.

ALN-G, Alumina TLC plates are neutral aluminium oxide containing calcium sulfate hemihydrate as a binder. These TLC plates are recommended for terpenes, alkaloids, steroids, aliphatic and aromatic compounds. Activated plates at 120°C for 10min before use for improved separations.

MC, Microcrystalline Cellulose plates are coated with Microcrystalline Cellulose (Avicel®). The adsorbent consists of regenerated alpha cellulose particles of nearly spherical shape and 50µm particle size. Layer are binder free and abrasion resistant. Compounds separated on this cellulose tend to form more compact spots than on fibrous cellulose layers. Recommended for carboxilic acids, lower alcohols, urea and purine derivatives.

MC-PEI, Cellulose with polyethyleneimine plates are cellulose anion-exchanger. Recommended for analysis of nucleic acids, and of mutagenic substances with the 32P postlabelling procedure.

S-C18-G plates are C18 bonded-silca containing Gypsum or Calcium Sulfate hemihydrate as a binder. They are used to separated both polar and non-polar compounds by adjusting the solvent system.

Specifications	
Adsorbent	Silcia gel, 10µm, 60Å pore size with Inorganic Hard-layer plus Gypsum binder
	Alumina 10µm, 60Å pore size with Gypsum, Calcium Sulfate Hemihydrate binder
	Microcrystalline Cellulose
Indicator	Fluorescent at 254nm
Layer Thickness	100, 150, 200µm
Plate material	Polyester
	Aluminum
Plate size	20x20cm

Comparison of flexible backings to glass			
Physical Property	**Glass**	**Plastic**	**Aluminum**
Thickness	1.5mm	0.2mm	0.15mm
Weight	high	low	low
Torsional strength	ideal	low	high
Temperature stability	high	185°C	high
Susceptible to breakage	yes	no	no
Can be cut with scissors	no	yes	yes
Solvents resistance	high	high	high
Mineral acids resistance	high	high	high
Conc. ammonia resistance	high	high	low
Binder stability in water	depends on phase use	very suitable	limited suitability

Ordering Information		
Description	QTY	Part No.
VertiPlate™ Polyester Backed		
S-GH, 200µm, 20x20cm	25	0832-0265
S-GH, F254, 200µm, 20x20cm	25	0833-0265
ALN-G, 200µm, 20x20cm	25	08E2-0265
ALN-G, F254, 200µm, 20x20cm	25	08E3-0265
MC, 100µm, 20x20cm	25	08F2-0065
MC, F254, 100µm, 20x20cm	25	08F3-0065
MC-PEI, 100µm, 20x20cm	25	08G2-0065
MC-PEI, F254, 100µm, 20x20cm	25	08G3-0065
NYLON, 100µm, 20x20cm	25	08J2-0065
NYLON, F254, 100µm, 20x20cm	25	08J3-0065
VertiPlate™ Aluminum Backed		
S-GH, 200µm, 20x20cm	25	0834-0265
S-GH, F254, 200µm, 20x20cm	25	0835-0265
ALN-G, 200µm, 20x20cm	25	08E4-0265
ALN-G, F254, 200µm, 20x20cm	25	08E5-0265
MC, 150µm, 20x20cm	25	08F4-0165
MC, F254, 150µm, 20x20cm	25	08F5-0165
S-C18-G, F254, 150µm, 20x20cm	25	0875-0165

S	Binder Free Silica
G	Soft-layer, (Gypsum) Calcium Sulfate Hemihydrate binder
GH	Inorganic Hard-layer plus Gypsum binder
C18	Octadecyl Bonded-silica gel
AL N	Alumina, neutral, 60Å pore size
MC	Microcrystalline Cellulose
NYLON	Aminopolycaprolactame, NYLON 6
MC-PEI	Cellulose with polyethyleneimine
F254	Fluorescent Indicator UV254

Sample Application

TLC Autospotter™

TLC Autospotter™ is a semi-automated device used to apply up to 18 samples on a TLC plate at a time. The unit has been designed for use TLC syringes with blunt Teflon tipped needles. These special needles minimize sample "creep back" and enhance reproducibility. The syringes also feature Teflon plunger tips to help eliminate the problem of metal-to-glass contamination. Syringes are available in 10, 25, 50, 100 and 250µL volumes.

The device can apply samples at variable rates ranging from 3min (fastest speed) to 30min (slowest speed.) An intergral heater strip runs beneath the TLC plate at the point of sample delivery to aid in solvent evaporation. By adjusting the delivery rate and temperature of the heater strip, the smallest possible sample zone can be obtained.

TLC Spotting Guide

Spotting Guide may be used with plates up to 20x20 cm. The guide rests above the surface of the plate without contacting the adsorbent layer, avoiding damage to the layer. It accurately positions micropipettes and syringes, even when the plate is removed for drying between applications. The metric scale on the Spotting Guide facilitates reading of Rf values. Standard area circles of 3-255mm² aid in estimating spot sizes.

Ordering Information		
Description	QTY	Part No.
TLC Autospotter™		
TLC Autospotter™, 230V (w/o syringes)	1	0801-1011
Autospotter Scored Adapter Kit	1	0801-1021
Autospotter Channeled Adapter Kit	1	0801-1031
10µL Syringe	1	0801-1041
25µL Syringe	1	0801-1051
50µL Syringe	1	0801-1061
100µL Syringe	1	0801-1071
250µL Syringe	1	0801-1081
TLC Spotting Guide		
TLC Spotting Guide	1	0801-1091

Drummond® Microcaps

The Drummond® Microcap gives accurate of ±1% and reproducible TLC plate spotting. Precision bore glass capillary tubes are cut to predetermined length so that each tube will hold a know volume when filled. The tube fills by capillary action and is dispensed completely by squeezing the dispenser bulb. Bulb is included with the unit

Drummond® Wiretrol Micropipettes

- Provides the accuracy and high speed action.
- Unique combination of a disposable precision bore calibrated micropipet and a stainless steel plunger.
- Accept both high and low viscosity liquids.

Disposable Glass Micropipettes

- For rapid qualitative sample application on TLC plates.
- Thick walls, strong and easy to handle.
- 3 inches length, capacity 2-8µL.

Ordering Information		
Description	QTY	Part No.
Drummond® Microcap		
0.5µL	100	0801-7017
1.0µL	100	0801-7027
2.0µL	100	0801-7037
3.0µL	100	0801-7047
5.0µL	100	0801-7057
10.0µL	100	0801-7067
15.0µL	100	0801-7077
20.0µL	100	0801-7087
25.0µL	100	0801-7097
50.0µL	100	0801-7107
100.0µL	100	0801-7117
Bulb Dispensor	5	0801-7122
Drummond® Wiretrol		
1.0 to 5.0 µL (Calibrated)	100	0801-7137
3.0µL	100	0801-7147
5.0µL	100	0801-7157
10.0µL	100	0801-7167
20.0µL	100	0801-7177
25.0µL	100	0801-7187
50.0µL	100	0801-7197
100.0µL	100	0801-7207
Disposable Glass Micropipettes		
Glass Micropipettes	200	0801-6018
	1000	0801-6019

Rectangular TLC Tanks

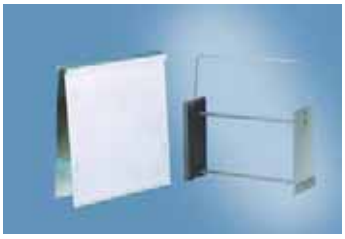
These Rectangular TLC Tanks are Heavy duty, molded, clear glass block with flat surface walls. The top has been ground to a uniform flatness for perfect lid fit. In addition the edges have been beveled inside and out to remove any sharp edges. There is a raised ridge on the center of the inside walls. Lids are polished glass in sizes to match the tank dimensions. Tank is supplied complete with lid.

Thinline Tank for 10x10cm Plates are 12x6.4x11.5cm(WxDxH)
Standard Tank for 10x10cm Plates are 12x8.6x11.5cm(WxDxH)
Standard Tank for 10x20cm Plates are 27x7x13cm(WxDxH)
Standard Tank for 20x20cm Plates are 27x7x26cm(WxDxH)

Latch-lid Chromatotank™

Latch-Lid™ units are heavy duty, molded TLC developing tank for use with plates up to 20x20 cm. The unique latching system holds the matching ground surfaces of the lid and tank firmly in place, enhancing stability of the saturated atmosphere for the developing TLC plates. Glass tank features flat ground tops, inner and outer rims beveled for safety.

Development Racks

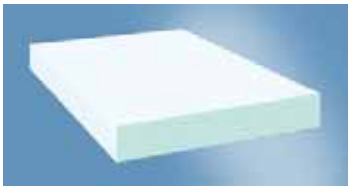


SS Plate support rack holds plate in proper position. Teflon coated multi-plate TLC racks hold simultaneous development of up to six TLC plates.

Round Developing Jars

Round developing tanks require ninimal solvent use. It consists of a borosilicate glass with flat bottom round developing tank and a press-on lid. Three sizes are available 5x20cm plates, 5x10cm plates, and 10x20cm plates. Side Port Chromatojar™ has a side port for removal or addition of solvents while maintaining appropriate atmosphere.

Saturation pads



Saturation pads are made from textured paper providing greater surface to assist in rapid vapor saturation of a TLC chamber air space. This improves Rf reproducibility and reduce "edge affect" on separations. Available in 10x10cm, 10x20cm and 20x20cm.

Ordering Information		
Description	QTY	Part No.
Round Developing Jars		
Jar for Two 5x20cm plates	1	0802-2011
Jar for Two 5x10cm plates	1	0802-2021
Jar for Two 10x20cm plates	1	0802-2031
Side Port Chromatojar™		
For Two 5x20cm plates	1	0802-2041
For Two 5x10cm plates	1	0802-2051
For Two 10x20cm plates	1	0802-2061
Rectangular TLC Tanks		
Thinline Tank for 10x10cm Plates	1	0802-2071
Standard Tank for 10x10cm Plates	1	0802-2081
Standard Tank for 10x20cm Plates	1	0802-2091
Standard Tank for 20x20cm Plates	1	0802-2101
Latch-Lid Chromatotank™		
Thinline Tank for 10x10cm Plates	1	0802-2111
Standard Tank for 10x10cm Plates	1	0802-2121
Standard Tank for 10x20cm Plates	1	0802-2131
Standard Tank for 20x20cm Plates	1	0802-2141
Development Racks		
SS Plate support rack	1	0802-2151
Teflon coated multi-plate rack for 10x10cm	1	0802-2161
Teflon coated multi-plate rack for 20x20cm	1	0802-2171
Saturation Pads		
Saturation Pads 10x10cm	100	0802-2187
Saturation Pads 10x20cm	100	0802-2197
Saturation Pads 20x20cm	100	0802-2207

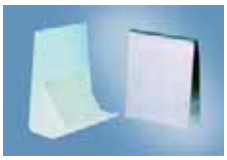
TLC Reagent Sprayers

Reagent Sprayers provide uniform spray mist of visualization reagents. They are made from borosilicate glass.The connection between the sprayer head and the flask is made with a special screw thread ground joint, connecting cap and loosening ring. Connecting cap can be unscrewed to loosen the ground joint if it "freezes" from reagent crystallization or residue build-up.

Sprayer Stands

Stainless steel sprayer stand with size of 7.5x2.75" holds plate in proper position for spraying.

Polypropylene sprayer stand ideal for use in fume hood.

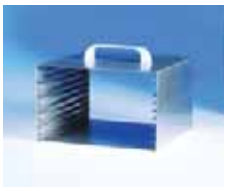


Desiccating Cabinet

Featuring a carrying handle, this 20 gauge stainless steel cabinet has a removable desiccant tray and gasketed door with positive lock door latch. This unit holds a stainless steel drying rack, (not supplied with unit). Cabinet measures 25x25x30cm(DxWxH)

Plate Drying Rack

Plate dring rack is made from stainless steel with a carrying handle and backstop to prevent plate from falling out. Unit holds up to ten 20x20cm plates or equivalent number of narrower plates.



Ordering Information		
Description	QTY	Part No.
TLC Reagent Sprayers		
10mL	1	0803-2011
50mL	1	0803-2021
125mL	1	0803-2031
250mL	1	0803-2041
Sprayer Stands		
SS Sprayer stand	1	0803-2051
PP Sprayer stand	1	0803-2061
Desiccating Cabinet		
Desiccating Cabinet	1	0803-2071
Plate Drying Rack	1	0803-2081

UV Viewing Cabinet

Spectroline® UV viewing cabinet accommodates TLC plates up to 20x20cm and any of 4 watt or 6 watt UV lamps. Cabinet has a flexible, contoured viewer for built-in UV-absorbing window, easy-access felt curtains, and removable bottoms for placement over transilluminators for greater intensity and contrast. Cabinets are Lightweight, aluminum construction and transportable with dimesion of 9×12×6.5"(W×L×H).

UV Lamps

Spectroline® **E-series** SW-LW lamps provide combination of short wavelength at 254nm and long wavelength at 365nm. A corrosion-resistant, specular-aluminum reflector optimizes UV irradiance. Lamp comes includes a filter glass for higher initial UV transmission and maximum resistance to solarization. The chice of 4W, 6W and 8W allow selection of lamp intensity and applications

Ordering Information		
Description	QTY	Part No.
UV Viewing Cabinets		
Model CM-10, without lamps	1	0803-3011
Model CM-24 with 4W SW&LW lamp, 230V	1	0803-3021
Model CM-26 with 6W SW&LW lamp, 230V	1	0803-3031
UV Lamps, E-Series		
4-Watt SW&LW Lamp, 230V	1	0803-3041
Tube Replacement, 4-Watt, SW	1	0803-3051
Tube Replacement, 4-Watt, LW	1	0803-3061
Filter Replacement, 4-Watt, SW&LW	1	0803-3071
6-Watt SW&LW Lamp, 230V	1	0803-3081
Tube Replacement, 6-Watt, SW	1	0803-3091
Tube Replacement, 6-Watt, LW	1	0803-3101
Filter Replacement, 6-Watt, SW&LW	1	0803-3111
8-Watt SW&LW Lamp, 230V	1	0803-3121
Tube Replacement, 8-Watt, SW	1	0803-3131
Tube Replacement, 8-Watt, LW	1	0803-3141
Filter Replacement, 8-Watt, SW&LW	1	0803-3151
Lamp Stand	1	0803-3161

Sample Extraction

Principle

Powerful Technique

Solid phase extraction (SPE) is the powerful technique for rapid, selective sample preparation before analysis. Compare to liquid-liquid extraction, SPE is faster use less solvent, eliminate emulsion. SPE can be used for purification, trace enrichment, solvent exchange desalting, derivatisation and class fractionation. SPE offers many benefits and advantages including high recoveries of the analytes, concentration of the analytes, highly purified extracts, ability to simultaneously extract analytes of wide polarity range, ease of automation, compatibility with instrumental analysis and reduction in organic solvent.

Simple, Inexpensive Techniques

SPE is a very simple technique to use, employing inexpensive, disposable extraction columns that are available in a multitude of column sizes and sorbents. In principle, a sample is loaded onto a SPE column. The sample matrix and interferences pass through the column while analytes are retained onto the sorbent material in the column. Interferences can then be selectively removed from the column through the correct choice of 'wash' solvents. Finally, the analytes may be selectively recovered from the column by an elution solvent, resulting in a highly purified extract. This extract is often significantly more concentrated than the original sample. Alternatively, an extraction column may be selected which retains the interferences in the sample, but allows the analytes to pass through unretained.

Ease of Use

Most SPE columns contain sorbents with an average particle size of 45-65 µm base material. Most organic solvents will flow through the columns under gravity, but for aqueous and other viscous samples and solvents, liquids must be passed through the columns using vacuum applied to the column outlet or pressure applied to the column inlet or centrifugation. Vacuum Manifold is the most commonly employed. The use of pressure applied to the column inlet is applicable to single sample manual processing as well as to full automation of the SPE procedures.

Sorbents

SPE is performed using either silica-based or polymer-based sorbents. The nature of the base material and the functional groups both affect the way that the sorbents are used.

Silica-based has a number of advantages including rigid support that do not shrink or swell, larger selection of phases. Polymer-based has different advantages including no need for acidic/basic elution modifiers, no pH limitations (stable from pH 1-14) and high capacity.

There are a numbers of phases for selection to suit the applications e.g. C18, C8, CH, PH, C4, C2, C1, NH2, CN, DIOL, Silica, Florisil, Alumina, SCX, SAX, CBA, PSA etc.

C18, C8, CH, PH, C4 C2 and C1 are non-polar phases for reversed phase interaction. Their alkyl funtional groups interact with almost non-polar analytes and isolate them by difference non-polar structure.

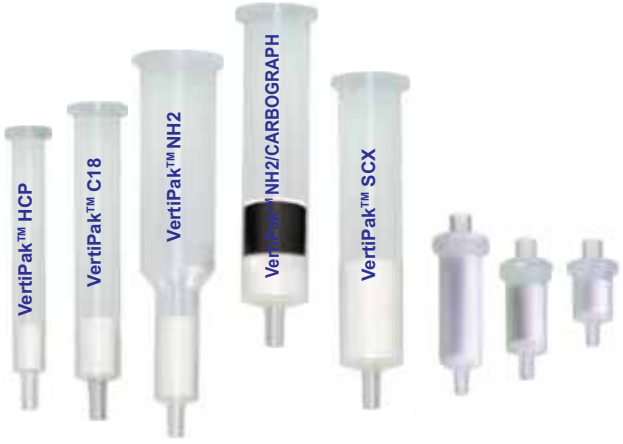
NH2, CN, DIOL, Silica, Florisil and Alumina are polar phases for normal phase interaction. Their hydrogen bonds or dipole-dipole and p-p bonds of sorbents or funtional groups interact with almost polar analytes and isolate them by difference polar structure.

SCX, SAX, CBA and PSA are ion exchangers for ionic interaction. Their charge of sorbents with a funtional groups interact with opposite charged analytes and isolate them by difference ionic strength.

Formats

SPE materials are available in variety of formats to meet most extraction requirements. In general, there are 2 formats; tube and cartridge.

12-Port Vacuum Manifold



SPE formats

General Procedures

The most common goals of an extraction protocol are clean-up, concentrate and solvent exchange prior to analysis. Solid Phase Extraction achieves these goals in 4 steps:

1. Conditioning:

An appropriate solvent is passed through the column to wet the sorbent followed by a volume of a liquid similar in nature to the sample matrix. The sorbent bed should not be allowed to dry out after solvation. A typical volume of equilibration solvent is 0.5-2mL/100mg of sorbent.

2. Sample Loading:

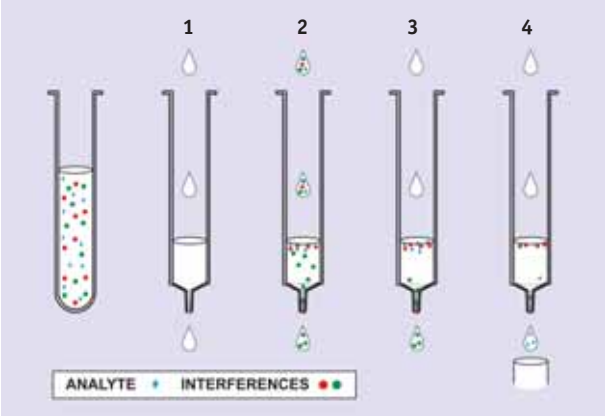
Optimisation of sample loading flow rate is important. A good starting point is 1mL/min for a 1mL cartridge, 3mL/min for a 3mL column and 7mL/min for a 6mL column. The flow rate can be increased after the method chemistry is optimised. Flow rate is increased until some sample breakthrough is seen (as indicated by a drop in recovery).

3. Washing:

The purpose of washing is to selectively remove undesired compounds from the sorbent without eluting the analytes. Ideally, a solvent is selected which is miscible with the sample matrix and in which the analytes are poorly soluble. A typical volume of washing solvent is 1-2mL/100mg of sorbent.

4. Elution:

Passing an appropriate solvent through the cartridge which is specifically chosen to disturb the analyte-sorbent interaction, results in selective elution of the analyte. The elution solvent should be one in which the analytes are soluble and should be compatible with the final analysis technique. For example, for HPLC analysis, a solvent similar to the mobile phase is a good choice of elution solvent. A typical minimum elution volume is 250µL/100mg of sorbent. The use of two small aliquots of solvent with a 1-4 minute soak step between elution volumes is often more efficient than one large aliquot.



Reversed-Phase

To isolate relatively non-polar compounds from a polar matrix

1. Conditioning
Rinse tube with 3-5mL of methanol followed by 3-5mL of deionized water/buffer (do not allow tube to dry before next step).

2. Sample Loading
Load sample to the top of the tube and draw through the packing bed (flows of 1-5mL/min are optimal).

3. Washing
Wash with 5mL of a polar solvent if analyte is to be retained (deionized water, buffer or aqueous/organic mixtures are most often used).

4. Elution
Elute analyte into a collection tube with 1-5mL of a non-polar solvent.

Normal-Phase

To isolate polar compounds from a non-polar matrix

1. Conditioning
Rinse tube with 3-5mL of non-polar solvent.

2. Sample Loading
Load sample to the top of the tube and draw through the packing bed (1-5mL/min).

3. Washing
Wash with 5mL of a non-polar solvent if analyte is to be retained.

4. Elution
Elute analyte into a collection tube with 1-5mL of a polar solvent.

Ion-Exchange

To isolate charged or potentially charged compounds

1. Conditioning
Rinse tube with 3-5mL of deionized water or low ionic strength buffer (0.01M).

2. Sample Loading
Load sample to the top of the tube and draw through the packing bed (ion exchange kinetics are slower than reverse or normal phase, keep flow slow).

3. Washing
Wash with 5mL of deionized water or low ionic strength buffer.

4. Elution
Elute analyte into a collection tube with 1-5mL of buffer at high ionic strength (0.1-1M) or modified pH (pH such that analyte is uncharged).

General Guide

1. Characterize the sample. Factors such as the analyte's polarity relative to the matrix, the presence of charged functional groups, solubility, molecular weight, etc., determine how strongly the analyte is retained by the packed bed.

2. Select a retention strategy. Two approaches are possible: retain interfering compounds while the analyte passes through, or retain the analyte while interfering compounds pass through. This second approach allows concentration of the sample during analyte elution.

3. Select proper packing type and bed size. Choosing the packing material with the proper selectivity results in the cleanest extract with the highest recovery. Poor sample recovery often occurs when the packed bed dimensions are not optimized. Too large a bed results in incomplete elution while too small a bed results in incomplete retention. Due to unknown composition of many samples, experimentation may be required to determine the optimum bed dimension for an application. Start with an intermediate bed size, such as 200mg or 500mg. If you observe complete retention, you may be able to use a smaller bed size and elution volume. If you observe incomplete retention, you need a larger bed size and elution volume.

4. Select suitable conditioning, wash, and elution solvents. Consider the solvent strength relative to the packing material. The final conditioning solvent should be weak, so as not to act as an eluting solvent. Buffers should be used to control ionization of potentially charged compounds. Wash solvents should remove weakly retained interferences without being strong enough to elute the analyte. Elution solvents should be strong enough to completely elute an analyte in a small volume (1-2mL).

Choosing Sorbent by Analyte Properties

Analyte properties or Analyte functional group	Non Ionic		Ionic	
Analyte properties or Analyte functional group	Hydrophobic	Hydrophilic	Cations	Anions
Matrix Properties	Aqueous	Organic	Aqueous	Aqueous
Interactions	Reversed Phase	Normal Phase	Cation Exchange	Anion Exchange
Example of Sorbent to be tested	C18 C8 C4 C2 CH PH HBP HCP Carbograph	CN DIOL SI NH2 PSA AL-N AL-B AL-A FL	SCX SCX-2 CBA HCP-SC HCP-WC C8/SCX	SAX NH2 PSA HCP-SA HCP-WA C8/SAX NH2/Carbograph SAX/Carbograph PSA/Carbograph

Choosing Sorbent by Specification

Phase	Base	Particle Size (µm)	Pore Size (Å)	Surface (m^2/g)	Carbon %	Bonding	Endcap	pH
Reversed Phases (Non-Polar)								
C18 (Octadecyl)	Silica	50	60	500	17	Trifunctional	Yes	2-9
C18-HF (Octadecyl-High Flow)	Silica	90	60	500	17	Trifunctional	Yes	2-9
C18-HL (Octadecyl-High Load)	Silica	50	60	500	23	Trifunctional	Yes	2-9
C18-LP (Octadecyl-Large Pore)	Silica	90	140	350	17	Trifunctional	Yes	2-9
C18-LL (Octadecyl-Low Load	Silica	50	60	500	6	Trifunctional	Yes	2-9
C18-EP (Octadecyl-Extended Polar)	Silica	50	140	350	6	Trifunctional	No	2-9
C8 (Octyl)	Silica	50	60	500	12	Trifunctional	Yes	2-9
PH (Phenyl)	Silica	50	60	500	9	Trifunctional	Yes	2-9
C4 (Butyl)	Silica	50	60	500	8	Trifunctional	Yes	2-9
C2 (Ethyl)	Silica	50	60	500	6	Trifunctional	Yes	2-9
C1 (Methyl)	Silica	50	60	500	4	Trifunctional	Yes	2-9
CH (Cyclohexyl)	Silica	50	60	500	10	Trifunctional	Yes	2-9
Normal Phases (Polar)								
Si (Silica)	Silica	50	60	500	-	-	No	2-9
NH2 (Aminopropyl)	Silica	50	60	500	7	Trifunctional	No	2-9
CN (Cyanopropyl)	Silica	50	60	500	8	Trifunctional	No	2-7
Diol (2,3 Dihydroxypropoxypropyl)	Silica	50	60	500	7	Trifunctional	No	2-9
PSA (Primary, secondary amine)	Silica	50	60	500	7	Trifunctional	No	2-9
DEA (Diethylaminopropyl)	Silica	50	60	500	8.5	Trifunctional	No	2-9
FL (Florisil)	Magnesium Silicate	110	70	300	-	No	No	-
FL-PR (Florisil-Pesticide grade)	Magnesium Silicate	200	70	300	-	No	No	-
AL-N (Alumina-N)	Alumina Neutral	100	100-120	175	-	No	No	7.5
AL-A (Alumina-A)	Alumina Acid	100	100-120	175	-	No	No	4.5
AL-B (Alumina-B)	Alumina Basic	100	100-120	175	-	No	No	10
Ion Exchange								
SCX	Silica	50	60	500	11	Trifunctional	No	2-9
SCX-2	Silica	50	60	500	2	Trifunctional	No	2-9
SAX	Silica	50	60	500	7	Trifunctional	No	2-8
CBA	Silica	50	60	500	7	Trifunctional	No	2-9
PSA	Silica	50	60	500	7	Trifunctional	No	2-9
Specialty								
Carbograph	GCB*	100	-	110	-	-	No	-
NH2/Carbograph	Silica/GCB	50/100	60/-	500/110	-	-	No	-
PSA/Carbograph	Silica/GCB	50/100	60/-	500/110	-	-	No	-
SAX/Carbograph	Silica/GCB	50/100	60/-	500/110	-	-	No	-
FL-PR/Carbograph	Silica/GCB	110/100	60/-	300/110	-	-	-	-
C8/SCX	Silica	50	60	500	9	Trifunctional	-	2-9
C8/SAX	Silica	50	60	500	9	Trifunctional	No	2-9
HBP	Hydrophobic polymer	35	90	800	-	-	No	1-14
HCP	Hydrophilic polymer	35	90	800	-	-	No	1-14
HCP-SC	Hydrophilic polymer	35	90	800	-	-	No	1-14
HCP-SA	Hydrophilic polymer	35	90	800	-	-	No	1-14
HCP-WC	Hydrophilic polymer	35	90	800	-	-	No	1-14
HCP-WA	Hydrophilic Copolymer	35	90	800	-	-	No	1-14

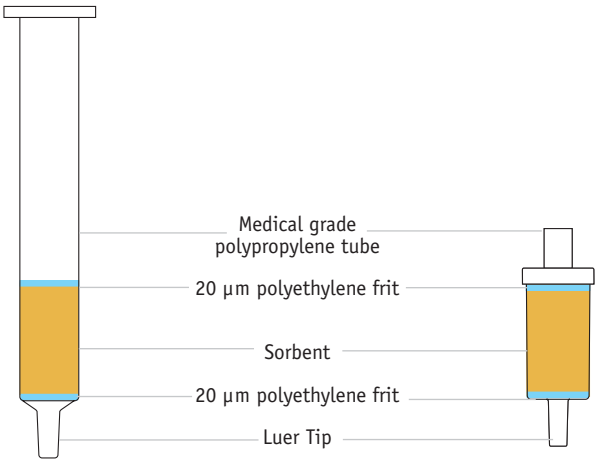
*GCB: Graphitized Carbon Black

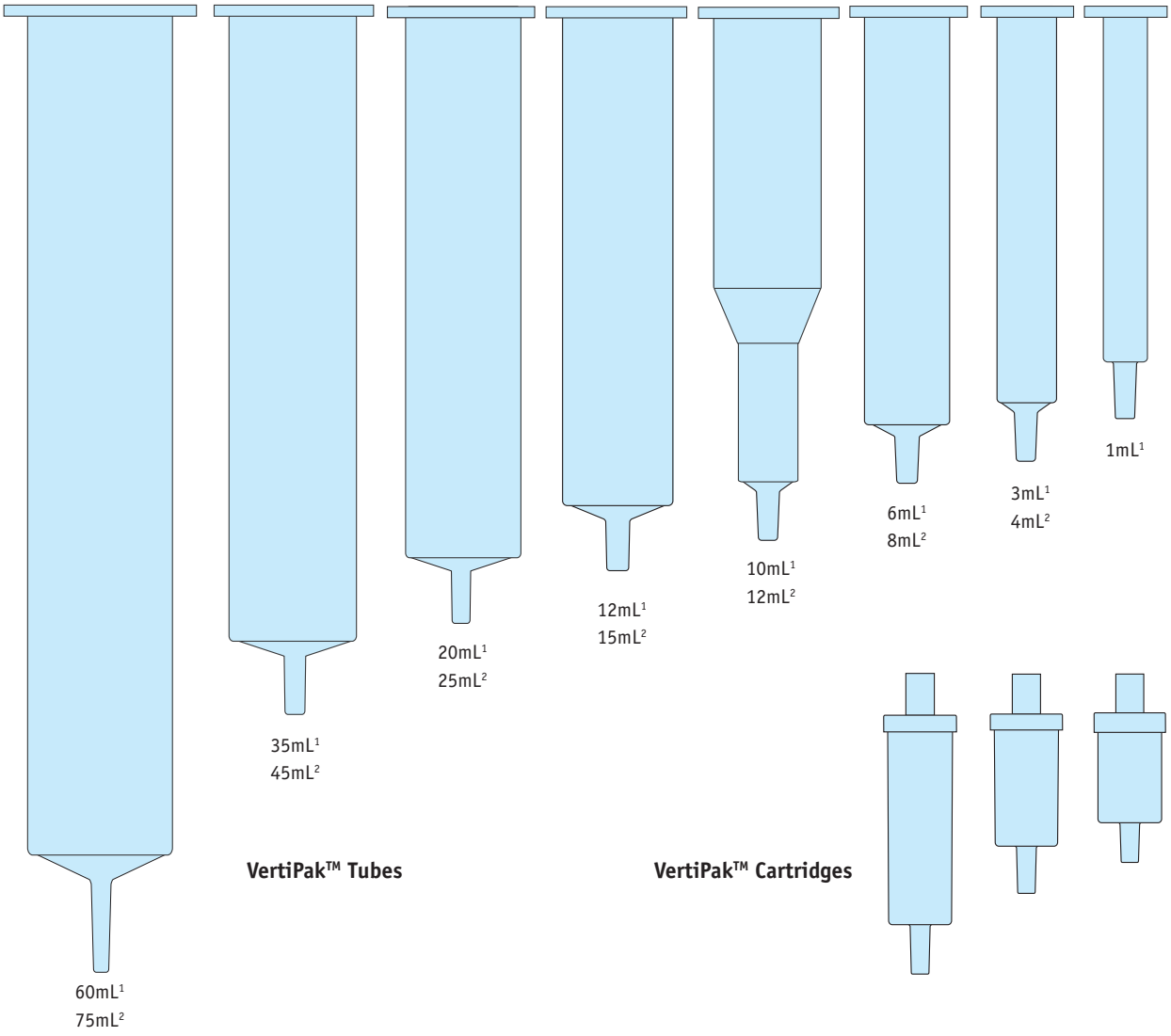
Choosing SPE format

Vertical® has a wide range of SPE formats for a wide range of sample types and volumes. There are two industrial standard formats; tube and cartridge.

VertiPak™ Tubes are normally packed in straight-walled syringe barrel tubes. Medical grade polypropylene tubes and 20 µm polyethylene frits are used in standard manufacturer of our high quality SPE. There are several different phases to choose from.

VertiPak™ Cartridges are stackable and single shot alternative. Medical grade polypropylene tubes and 20 µm polyethylene frits are used in standard manufacturer of our high quality SPE. Capping with a male and female Luer fitting provides the capability to do single-shot extractions with a syringe and no adapters required. There are also several different phases to choose from.





[1]Sample size, [2]Tube size

Why choose VertiPak™ SPE ?

Solid Phase Extraction (SPE) has continued to be the fast growing sample preparation technique due to safety benefits, ease of use, lower costs, wider range of sorbent, size and solvents options over other preparation techniques.

Vertical® manufactures high quality SPE. We have variety of SPE products to meet your needs. The reasons to choose our VertiPak™ SPE are:

Application support

We can work with you to make sure our products meet your needs. We have the smart team application specialists to support you the methods, applications and products. We are committed to long-term customers relationship and our application specialists are ready to response to your support requirements.

Lot-to-lot reproducibility

VertiPak™ SPE sorbents are chemically synthesized, bonded with phases and QC strictly tested to assure the specifications and characteristics prior to packing into SPE tubes or cartridges.

VertiPak™ SPE products are packed using propriety electromechanical equipments under strict control using up-to-date statistic process control procedures to assure lot-to-lot reproducibility.

Certificate of Analysis

Every lot of VertiPak™ SPE products are QC tested by our QC Lab for GC extractables and recovery test to assure cleanliness, characteristics and chromatographic performance. VertiPak™ SPE includes a **Certificate of Analysis** with sorbent specification results, GC extractables analysis, HPLC test chromatogram and recovery test results.

With our high quality products under high quality control, you can have confidence in your analytical results.

Vertical®'s guarantee

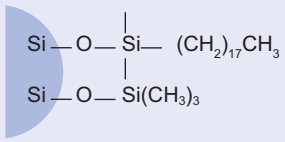
If VertiPak™ SPE products do not perform as well or better than your current SPE product of similar phase, bed weight and tube or cartridge size, send in your comparative data within 45 days and keep the VertiPak™ SPE products for FREE.

Reversed Phase SPE

VertiPak™ C18

- VertiPak™ C18 SPE is non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups
- Standard pore size 60Å offers optimized recovery
- Typical applications includes nonpolar compounds, antibiotics, drugs, fatty acid, pesticides, vitamins and etc
- Tube format is available in 7 tube sizes.
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

Specifications	
Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	17
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

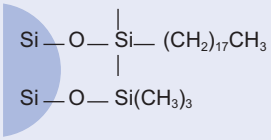
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18 SPE Tubes			
50mg	1mL	100	0101-0236
50mg	3mL	50	0101-0245
100mg	1mL	100	0101-0336
100mg	3mL	50	0101-0345
100mg	10mL	30	0101-0364
200mg	3mL	50	0101-0445
200mg	10mL	30	0101-0464
500mg	3mL	50	0101-0645
500mg	6mL	30	0101-0654
500mg	10mL	30	0101-0664
1,000mg	6mL	30	0101-0954
2,000mg	12mL	30	0101-1074
5,000mg	25mL	20	0101-12A2
5,000mg	35mL	20	0101-1282
10,000mg	60mL	16	0101-1391
VertiPak™ C18 SPE Cartridges			
300mg		25	0101-0503
300mg		50	0101-0505
300mg		100	0101-0506
600mg		25	0101-0713
600mg		50	0101-0715
600mg		100	0101-0716
900mg		25	0101-0823
900mg		50	0101-0825
900mg		100	0101-0826

VertiPak™ C18-HF (High Flow)

- VertiPak™ C18-HF SPE is non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups
- Particle size of 60-120 µm offers high flow rate solvent for viscous samples
- Typical applications includes nonpolar compounds antibiotics, drugs, fatty acid, pesticides, vitamins and etc
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

Specifications

Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	90
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	17
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

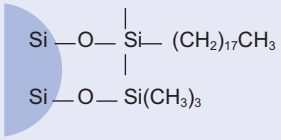
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18-HF SPE Tubes			
50mg	1mL	100	0103-0236
50mg	3mL	50	0103-0245
100mg	1mL	100	0103-0336
100mg	3mL	50	0103-0345
100mg	10mL	30	0103-0364
200mg	3mL	50	0103-0445
200mg	10mL	30	0103-0464
500mg	3mL	50	0103-0645
500mg	6mL	30	0103-0654
500mg	10mL	30	0103-0664
1,000mg	6mL	30	0103-0954
2,000mg	12mL	30	0103-1074
5,000mg	25mL	20	0103-12A2
5,000mg	35mL	20	0103-1282
10,000mg	60mL	16	0103-1391
VertiPak™ C18-HF SPE Cartridges			
300mg		25	0103-0503
300mg		50	0103-0505
300mg		100	0103-0506
600mg		25	0103-0713
600mg		50	0103-0715
600mg		100	0103-0716
900mg		25	0103-0823
900mg		50	0103-0825
900mg		100	0103-0826

VertiPak™ C18-HL (High Load)

- **VertiPak™ C18-HL SPE is non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups**
- **High carbon loading of 23% offers stronger retention**
- **Typical applications includes nonpolar compounds antibiotics, drugs, fatty acid, pesticides, vitamins and etc**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

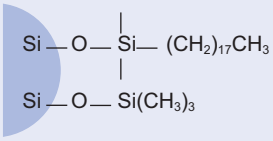
Specifications	
Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	23
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18-HL SPE Tubes			
50mg	1mL	100	0102-0236
50mg	3mL	50	0102-0245
100mg	1mL	100	0102-0336
100mg	3mL	50	0102-0345
100mg	10mL	30	0102-0364
200mg	3mL	50	0102-0445
200mg	10mL	30	0102-0464
500mg	3mL	50	0102-0645
500mg	6mL	30	0102-0654
500mg	10mL	30	0102-0664
1,000mg	6mL	30	0102-0954
2,000mg	12mL	30	0102-1074
5,000mg	25mL	20	0102-12A2
5,000mg	35mL	20	0102-1282
10,000mg	60mL	16	0102-1391
VertiPak™ C18-HL SPE Cartridges			
300mg		25	0102-0503
300mg		50	0102-0505
300mg		100	0102-0506
600mg		25	0102-0713
600mg		50	0102-0715
600mg		100	0102-0716
900mg		25	0102-0823
900mg		50	0102-0825
900mg		100	0102-0826

VertiPak™ C18-LP (Large Pore)

- **VertiPak™ C18-LP SPE is non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups.**
- **Large pore size of 120-140 Å offers high recovery for macromolecules.**
- **Typical applications includes nonpolar compounds antibiotics, drugs, fatty acid, pesticides, vitamins and etc.**
- **Tube format is available in 7 tube sizes.**
- **Cartridge format is available in 300mg, 600mg and 900mg size.**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light.**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

Specifications

Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	90
Pore Size (Å)	140
Surface Area (m^2/g)	350
Carbon Load (%)	17
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

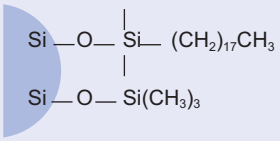
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18-LP SPE Tubes			
50mg	1mL	100	0104-0236
50mg	3mL	50	0104-0245
100mg	1mL	100	0104-0336
100mg	3mL	50	0104-0345
100mg	10mL	30	0104-0364
200mg	3mL	50	0104-0445
200mg	10mL	30	0104-0464
500mg	3mL	50	0104-0645
500mg	6mL	30	0104-0654
500mg	10mL	30	0104-0664
1,000mg	6mL	30	0104-0954
2,000mg	12mL	30	0104-1074
5,000mg	25mL	20	0104-12A2
5,000mg	35mL	20	0104-1282
10,000mg	60mL	16	0104-1391
VertiPak™ C18-LP SPE Cartridges			
300mg		25	0104-0503
300mg		50	0104-0505
300mg		100	0104-0506
600mg		25	0104-0713
600mg		50	0104-0715
600mg		100	0104-0716
900mg		25	0104-0823
900mg		50	0104-0825
900mg		100	0104-0826

VertiPak™ C18-LL (Low Load)

- **VertiPak™ C18-HL SPE is non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups.**
- **Low carbon loading of 6% offers unique selectivities over stanard C18.**
- **Typical applications includes for polar analtyes extraction from environmental matrices.**
- **Tube format is available in 7 tube sizes.**
- **Cartridge format is available in 300mg, 600mg and 900mg size.**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light.**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

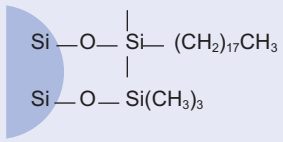
Specifications	
Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	6
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18-LL SPE Tubes			
50mg	1mL	100	0159-0236
50mg	3mL	50	0159-0245
100mg	1mL	100	0159-0336
100mg	3mL	50	0159-0345
100mg	10mL	30	0159-0364
200mg	3mL	50	0159-0445
200mg	10mL	30	0159-0464
500mg	3mL	50	0159-0645
500mg	6mL	30	0159-0654
500mg	10mL	30	0159-0664
1,000mg	6mL	30	0159-0954
2,000mg	12mL	30	0159-1074
5,000mg	25mL	20	0159-12A2
5,000mg	35mL	20	0159-1282
10,000mg	60mL	16	0159-1391
VertiPak™ C18-LL SPE Cartridges			
300mg		25	0159-0503
300mg		50	0159-0505
300mg		100	0159-0506
600mg		25	0159-0713
600mg		50	0159-0715
600mg		100	0159-0716
900mg		25	0159-0823
900mg		50	0159-0825
900mg		100	0159-0826

VertiPak™ C18-EP (Enhanced Polar)

- VertiPak™ C18-EP SPE is moderately non-polar, hydrophobic sorbent, plus polar secondary interactions
- Large pore size of 130Å offers high recovery for intermediate macromolecules
- Typical applications includes basic compounds, antibiotics drugs, vitamins and etc
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of C18 (Octadecyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

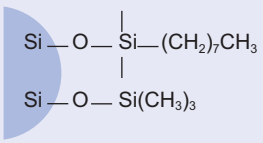
Specifications	
Phase	C18 (Octadecyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	130
Surface Area (m^2/g)	350
Carbon Load (%)	6
Bonding	Trifunctional
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C18-EP SPE Tubes			
50mg	1mL	100	0160-0236
50mg	3mL	50	0160-0245
100mg	1mL	100	0160-0336
100mg	3mL	50	0160-0345
100mg	10mL	30	0160-0364
200mg	3mL	50	0160-0445
200mg	10mL	30	0160-0464
500mg	3mL	50	0160-0645
500mg	6mL	30	0160-0654
500mg	10mL	30	0160-0664
1,000mg	6mL	30	0160-0954
2,000mg	12mL	30	0160-1074
5,000mg	25mL	20	0160-12A2
5,000mg	35mL	20	0160-1282
10,000mg	60mL	16	0160-1391
VertiPak™ C18-EP SPE Cartridges			
300mg		25	0160-0503
300mg		50	0160-0505
300mg		100	0160-0506
600mg		25	0160-0713
600mg		50	0160-0715
600mg		100	0160-0716
900mg		25	0160-0823
900mg		50	0160-0825
900mg		100	0160-0826

VertiPak™ C8

- VertiPak™ C8 SPE is moderately non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups
- Less retentive than VertiPak™ C18 based on non-polar interaction
- Typical applications include molecules of wide range of polarity in water or aqueous biological samples e.g. pesticides or PCBs in water, vitamins in serum
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of C8 (Octyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

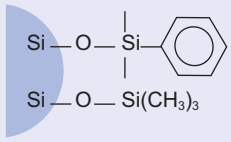
Specifications	
Phase	C8 (Octyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	12
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C8 SPE Tubes			
50mg	1mL	100	0106-0236
50mg	3mL	50	0106-0245
100mg	1mL	100	0106-0336
100mg	3mL	50	0106-0345
100mg	10mL	30	0106-0364
200mg	3mL	50	0106-0445
200mg	10mL	30	0106-0464
500mg	3mL	50	0106-0645
500mg	6mL	30	0106-0654
500mg	10mL	30	0106-0664
1,000mg	6mL	30	0106-0954
2,000mg	12mL	30	0106-1074
5,000mg	25mL	20	0106-12A2
5,000mg	35mL	20	0106-1282
10,000mg	60mL	16	0106-1391
VertiPak™ C8 SPE Cartridges			
300mg		25	0106-0503
300mg		50	0106-0505
300mg		100	0106-0506
600mg		25	0106-0713
600mg		50	0106-0715
600mg		100	0106-0716
900mg		25	0106-0823
900mg		50	0106-0825
900mg		100	0106-0826

VertiPak™ PH

- VertiPak™ PH SPE is moderately non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups
- Less retentive than VertiPak™ C18 and exhibits a different selectivity from VertiPak™ C18 or VertiPak™ C8 due to the electron density of the phenyl ring
- Typical applications includes molecules of wide range of polarity in water or aqueous biolgical samples e.g aflatoxins in foods, caffeine in serum, phenols in water
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of PH (Phenyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

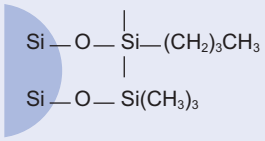
Specifications	
Phase	PH (Phenyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	9
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ PH SPE Tubes			
50mg	1mL	100	0109-0236
50mg	3mL	50	0109-0245
100mg	1mL	100	0109-0336
100mg	3mL	50	0109-0345
100mg	10mL	30	0109-0364
200mg	3mL	50	0109-0445
200mg	10mL	30	0109-0464
500mg	3mL	50	0109-0645
500mg	6mL	30	0109-0654
500mg	10mL	30	0109-0664
1,000mg	6mL	30	0109-0954
2,000mg	12mL	30	0109-1074
5,000mg	25mL	20	0109-12A2
5,000mg	35mL	20	0109-1282
10,000mg	60mL	16	0109-1391
VertiPak™ PH SPE Cartridges			
300mg		25	0109-0503
300mg		50	0109-0505
300mg		100	0109-0506
600mg		25	0109-0713
600mg		50	0109-0715
600mg		100	0109-0716
900mg		25	0109-0823
900mg		50	0109-0825
900mg		100	0109-0826

VertiPak™ C4

- **VertiPak™ C4 SPE is moderately non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups**
- **Less retentive than VertiPak™ C8 based on non-polar interaction and slightly more polar than C18 or C8 due to short chain length of C4**
- **Typical applications include compounds which are too strongly retained on C18 or C8 e.g. analgetics in blood**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C4 (Butyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

Specifications	
Phase	C4 (Butyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	8
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

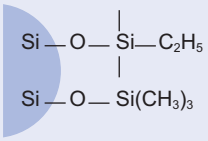
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C4 SPE Tubes			
50mg	1mL	100	0128-0236
50mg	3mL	50	0128-0245
100mg	1mL	100	0128-0336
100mg	3mL	50	0128-0345
100mg	10mL	30	0128-0364
200mg	3mL	50	0128-0445
200mg	10mL	30	0128-0464
500mg	3mL	50	0128-0645
500mg	6mL	30	0128-0654
500mg	10mL	30	0128-0664
1,000mg	6mL	30	0128-0954
2,000mg	12mL	30	0128-1074
5,000mg	25mL	20	0128-12A2
5,000mg	35mL	20	0128-1282
10,000mg	60mL	16	0128-1391
VertiPak™ C4 SPE Cartridges			
300mg		25	0128-0503
300mg		50	0128-0505
300mg		100	0128-0506
600mg		25	0128-0713
600mg		50	0128-0715
600mg		100	0128-0716
900mg		25	0128-0823
900mg		50	0128-0825
900mg		100	0128-0826

VertiPak™ C2

- **VertiPak™ C2 SPE is weakly non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups**
- **Slightly more polar than C18 or C8 due to short chain length of C2 provides less retentive than C8 and reduce the volume of elution solvent, a more concentrated and cleaner extract can be achived**
- **Typical applications include compounds which are too strongly retained on C18 or C8 e.g. drugs from plasma or serum**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C2 (Ethyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

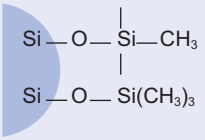
Specifications	
Phase	C2 (Ethyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	6
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C2 SPE Tubes			
50mg	1mL	100	0108-0236
50mg	3mL	50	0108-0245
100mg	1mL	100	0108-0336
100mg	3mL	50	0108-0345
100mg	10mL	30	0108-0364
200mg	3mL	50	0108-0445
200mg	10mL	30	0108-0464
500mg	3mL	50	0108-0645
500mg	6mL	30	0108-0654
500mg	10mL	30	0108-0664
1,000mg	6mL	30	0108-0954
2,000mg	12mL	30	0108-1074
5,000mg	25mL	20	0108-12A2
5,000mg	35mL	20	0108-1282
10,000mg	60mL	16	0108-1391
VertiPak™ C2 SPE Cartridges			
300mg		25	0108-0503
300mg		50	0108-0505
300mg		100	0108-0506
600mg		25	0108-0713
600mg		50	0108-0715
600mg		100	0108-0716
900mg		25	0108-0823
900mg		50	0108-0825
900mg		100	0108-0826

VertiPak™ C1

- **VertiPak™ C1 SPE is very weakly non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups**
- **Least retentive of all alky sorbents for non-polar compounds**
- **Typical applications include polar and multifuctional compounds in plasma, urine, aqueous samples e.g corticosteroids in urine**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of C1 (Methyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

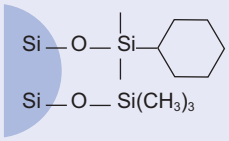
Specifications	
Phase	C1 (Methyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	4
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C1 SPE Tubes			
50mg	1mL	100	0131-0236
50mg	3mL	50	0131-0245
100mg	1mL	100	0131-0336
100mg	3mL	50	0131-0345
100mg	10mL	30	0131-0364
200mg	3mL	50	0131-0445
200mg	10mL	30	0131-0464
500mg	3mL	50	0131-0645
500mg	6mL	30	0131-0654
500mg	10mL	30	0131-0664
1,000mg	6mL	30	0131-0954
2,000mg	12mL	30	0131-1074
5,000mg	25mL	20	0131-12A2
5,000mg	35mL	20	0131-1282
10,000mg	60mL	16	0131-1391
VertiPak™ C1 SPE Cartridges			
300mg		25	0131-0503
300mg		50	0131-0505
300mg		100	0131-0506
600mg		25	0131-0713
600mg		50	0131-0715
600mg		100	0131-0716
900mg		25	0131-0823
900mg		50	0131-0825
900mg		100	0131-0826

VertiPak™ CH

- **VertiPak™ CH SPE is medium non-polar, hydrophobic sorbent, manufactured using a trifunctional silane and endcapped to reduce the polar secondary interactions associated with surface silanol groups**
- **Exhibits unique selectivity that C18, C8 and C2 do not provide the desired selectivity**
- **Typical applications include polar compounds in tissue and aqueous samples e.g. chloroanilines in lotion, anthelmintic in tissue and phenols in water**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of CH (Cyclohexyl) silane and trimethyl silyl group, covalently bonded to the surface of a silica particle.

Specifications

Phase	CH (Cyclohexyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	10
Bonding	Trifunctional
Endcap	Yes
pH Stability	2-9

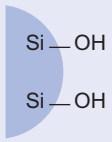
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ CH SPE Tubes			
50mg	1mL	100	0110-0236
50mg	3mL	50	0110-0245
100mg	1mL	100	0110-0336
100mg	3mL	50	0110-0345
100mg	10mL	30	0110-0364
200mg	3mL	50	0110-0445
200mg	10mL	30	0110-0464
500mg	3mL	50	0110-0645
500mg	6mL	30	0110-0654
500mg	10mL	30	0110-0664
1,000mg	6mL	30	0110-0954
2,000mg	12mL	30	0110-1074
5,000mg	25mL	20	0110-12A2
5,000mg	35mL	20	0110-1282
10,000mg	60mL	16	0110-1391
VertiPak™ CH SPE Cartridges			
300mg		25	0110-0503
300mg		50	0110-0505
300mg		100	0110-0506
600mg		25	0110-0713
600mg		50	0110-0715
600mg		100	0110-0716
900mg		25	0110-0823
900mg		50	0110-0825
900mg		100	0110-0826

VertiPak™ Si

- **VertiPak™ Si SPE is strongly polar, unfunctionalized silica sorbent**
- **Ideal for selective separation of polar compounds of very similar structure**
- **Typical applications include aflatoxins, chloramphenicol, pesticides, steroids, vitamins**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of Silanol group on the surface of a silica particle.

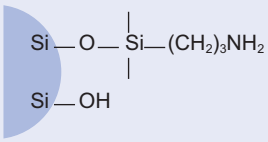
Specifications	
Phase	Si
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ Si SPE Tubes			
50mg	1mL	100	0111-0236
50mg	3mL	50	0111-0245
100mg	1mL	100	0111-0336
100mg	3mL	50	0111-0345
100mg	10mL	30	0111-0364
200mg	3mL	50	0111-0445
200mg	10mL	30	0111-0464
500mg	3mL	50	0111-0645
500mg	6mL	30	0111-0654
500mg	10mL	30	0111-0664
1,000mg	6mL	30	0111-0954
2,000mg	12mL	30	0111-1074
5,000mg	25mL	20	0111-12A2
5,000mg	35mL	20	0111-1282
10,000mg	60mL	16	0111-1391
VertiPak™ Si SPE Cartridges			
300mg		25	0111-0503
300mg		50	0111-0505
300mg		100	0111-0506
600mg		25	0111-0713
600mg		50	0111-0715
600mg		100	0111-0716
900mg		25	0111-0823
900mg		50	0111-0825
900mg		100	0111-0826

VertiPak™ NH2

- VertiPak™ NH2 SPE is polar or weak anion exchange sorbent
- As a polar sorbent, NH2 is excellent for separation of structural isomers. As weak anion exchanger sorbent, NH2 is Good for retention of very strong acids
- Typical applications include lipids, micotoxins
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of NH2 (Aminopropyl) silane, covalently bonded to the surface of a silica particle.

Specifications

Phase	NH2 (Aminopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Endcap	No
pH Stability	2-9

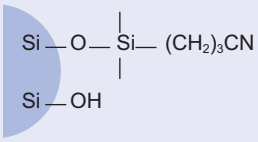
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ NH2 SPE Tubes			
50mg	1mL	100	0112-0236
50mg	3mL	50	0112-0245
100mg	1mL	100	0112-0336
100mg	3mL	50	0112-0345
100mg	10mL	30	0112-0364
200mg	3mL	50	0112-0445
200mg	10mL	30	0112-0464
500mg	3mL	50	0112-0645
500mg	6mL	30	0112-0654
500mg	10mL	30	0112-0664
1,000mg	6mL	30	0112-0954
2,000mg	12mL	30	0112-1074
5,000mg	25mL	20	0112-12A2
5,000mg	35mL	20	0112-1282
10,000mg	60mL	16	0112-1391
VertiPak™ NH2 SPE Cartridges			
300mg		25	0112-0503
300mg		50	0112-0505
300mg		100	0112-0506
600mg		25	0112-0713
600mg		50	0112-0715
600mg		100	0112-0716
900mg		25	0112-0823
900mg		50	0112-0825
900mg		100	0112-0826

VertiPak™ CN

- VertiPak™ CN SPE is medium polar sorbent that exhibits both normal phase and reversed phase interactions
- Less retentive than Silica, or Diol for polar compounds
- Typical applications include both polar and nonpolar molecules from aqueous samples, polar molecules from relatively non-polar solvents using the dipole interactions between polar functional groups on the analyte and the cyano group on the sorbent e.g. carbohydrates, cyclosporins
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of CN (Cyanopropyl) silane, covalently bonded to the surface of a silica particle.

Specifications

Phase	CN (Cyanopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	8
Bonding	Trifunctional
Endcap	No
pH Stability	2-9

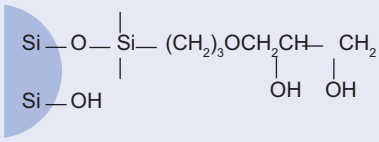
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ CN SPE Tubes			
50mg	1mL	100	0113-0236
50mg	3mL	50	0113-0245
100mg	1mL	100	0113-0336
100mg	3mL	50	0113-0345
100mg	10mL	30	0113-0364
200mg	3mL	50	0113-0445
200mg	10mL	30	0113-0464
500mg	3mL	50	0113-0645
500mg	6mL	30	0113-0654
500mg	10mL	30	0113-0664
1,000mg	6mL	30	0113-0954
2,000mg	12mL	30	0113-1074
5,000mg	25mL	20	0113-12A2
5,000mg	35mL	20	0113-1282
10,000mg	60mL	16	0113-1391
VertiPak™ CN SPE Cartridges			
300mg		25	0113-0503
300mg		50	0113-0505
300mg		100	0113-0506
600mg		25	0113-0713
600mg		50	0113-0715
600mg		100	0113-0716
900mg		25	0113-0823
900mg		50	0113-0825
900mg		100	0113-0826

VertiPak™ Diol

- VertiPak™ Diol SPE is polar sorbent that exhibits both polar and non-polar interactions, depending on the preparation of the column and the nature of the sample matrix
- As polar interaction, Diol is more reproducible than Silica. As non-polar interaction, Diol can extract relatively non-polar molecules from aqueous samples
- Typical applications include anitibiotics, prostagladins, THC in urine
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of Diol (2,3-Dihydroxypropoxypropyl) silane, covalently bonded to the surface of a silica particle.

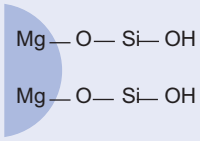
Specifications	
Phase	Diol (2,3-Dihydroxypropoxypropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ Diol SPE Tubes			
50mg	1mL	100	0114-0236
50mg	3mL	50	0114-0245
100mg	1mL	100	0114-0336
100mg	3mL	50	0114-0345
100mg	10mL	30	0114-0364
200mg	3mL	50	0114-0445
200mg	10mL	30	0114-0464
500mg	3mL	50	0114-0645
500mg	6mL	30	0114-0654
500mg	10mL	30	0114-0664
1,000mg	6mL	30	0114-0954
2,000mg	12mL	30	0114-1074
5,000mg	25mL	20	0114-12A2
5,000mg	35mL	20	0114-1282
10,000mg	60mL	16	0114-1391
VertiPak™ Diol SPE Cartridges			
300mg		25	0114-0503
300mg		50	0114-0505
300mg		100	0114-0506
600mg		25	0114-0713
600mg		50	0114-0715
600mg		100	0114-0716
900mg		25	0114-0823
900mg		50	0114-0825
900mg		100	0114-0826

VertiPak™ FL

- **VertiPak™ FL is Florisil®, magnesium silicate, extremely polar sorbent for polar compounds in non-polar matrixs**
- **Larger particle size offers fast flow of large volume of samples or viscous samples**
- **Typical applications include pesticides, metal organics, aliphatic carboxylic acids, PCBs and PAHs**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of silanol group, covalently bonded to the surface of a magnesia particle.

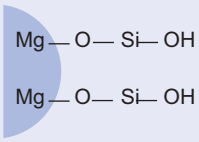
Specifications	
Phase	FL
Base	Florisil®, magnesium silicate
Particle Size (µm)	110
Pore Size (Å)	70
Surface Area (m^2/g)	300
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ FL SPE Tubes			
50mg	1mL	100	0115-0236
50mg	3mL	50	0115-0245
100mg	1mL	100	0115-0336
100mg	3mL	50	0115-0345
100mg	10mL	30	0115-0364
200mg	3mL	50	0115-0445
200mg	10mL	30	0115-0464
500mg	3mL	50	0115-0645
500mg	6mL	30	0115-0654
500mg	10mL	30	0115-0664
1,000mg	6mL	30	0115-0954
2,000mg	12mL	30	0115-1074
5,000mg	25mL	20	0115-12A2
5,000mg	35mL	20	0115-1282
10,000mg	60mL	16	0115-1391
VertiPak™ FL SPE Cartridges			
300mg		25	0115-0503
300mg		50	0115-0505
300mg		100	0115-0506
600mg		25	0115-0713
600mg		50	0115-0715
600mg		100	0115-0716
900mg		25	0115-0823
900mg		50	0115-0825
900mg		100	0115-0826

VertiPak™ FL-PR

- **VertiPak™ FL-PR is Florisil®-PR, magnesium silicate, extremely polar sorbent for pesticides residue**
- **Specially processed and activated to give consistent results when used for pesticides residue, especially, chlorinated pesticides**
- **Typical applications include chlorinated pesticides**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of silanol group, covalently bonded to the surface of a magnesia particle.

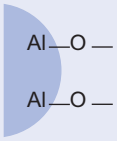
Specifications	
Phase	FL-PR
Base	Florisil®-PR, magnesium silicate
Particle Size (µm)	200
Pore Size (Å)	70
Surface Area (m^2/g)	300
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ FL-PR SPE Tubes			
50mg	1mL	100	0116-0236
50mg	3mL	50	0116-0245
100mg	1mL	100	0116-0336
100mg	3mL	50	0116-0345
100mg	10mL	30	0116-0364
200mg	3mL	50	0116-0445
200mg	10mL	30	0116-0464
500mg	3mL	50	0116-0645
500mg	6mL	30	0116-0654
500mg	10mL	30	0116-0664
1,000mg	6mL	30	0116-0954
2,000mg	12mL	30	0116-1074
5,000mg	25mL	20	0116-12A2
5,000mg	35mL	20	0116-1282
10,000mg	60mL	16	0116-1391
VertiPak™ FL-PR SPE Cartridges			
300mg		25	0116-0503
300mg		50	0116-0505
300mg		100	0116-0506
600mg		25	0116-0713
600mg		50	0116-0715
600mg		100	0116-0716
900mg		25	0116-0823
900mg		50	0116-0825
900mg		100	0116-0826

VertiPak™ AL-N

- VertiPak™ AL-N SPE is neutral alumina, extremely polar sorbent and more stable under high pH conditions than silica
- The neutralised surface allows interaction of the aluminium metal centre with compounds whose heteroatoms are electronegative (e.g. N, O, P, S) or whose highly aromatic structure make them "electron rich"
- Typical applications include aliphatic amines, aromatic species, compounds contaning N, O, P, S functional group, and from either aqueous or non-aqueous matrix
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of AL-N (Neutral Alumina)

Specifications

Phase	AL-N
Base	Neutral Alumina
Particle Size (µm)	100
Pore Size (Å)	110
Surface Area (m^2/g)	175
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	7.5

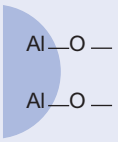
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ AL-N SPE Tubes			
50mg	1mL	100	0119-0236
50mg	3mL	50	0119-0245
100mg	1mL	100	0119-0336
100mg	3mL	50	0119-0345
100mg	10mL	30	0119-0364
200mg	3mL	50	0119-0445
200mg	10mL	30	0119-0464
500mg	3mL	50	0119-0645
500mg	6mL	30	0119-0654
500mg	10mL	30	0119-0664
1,000mg	6mL	30	0119-0954
2,000mg	12mL	30	0119-1074
5,000mg	25mL	20	0119-12A2
5,000mg	35mL	20	0119-1282
10,000mg	60mL	16	0119-1391
VertiPak™ AL-N SPE Cartridges			
300mg		25	0119-0503
300mg		50	0119-0505
300mg		100	0119-0506
600mg		25	0119-0713
600mg		50	0119-0715
600mg		100	0119-0716
900mg		25	0119-0823
900mg		50	0119-0825
900mg		100	0119-0826

VertiPak™ AL-A

- VertiPak™ AL-A SPE is acidic alumina, extremely polar sorbent and more stable under high pH conditions than silica
- Acid washing of Alumina results in a cationic surface with decreased capacity for basic compounds.
- Compounds are retained by ion exchange with the positively charged surface or by specific interactions with the metal centre.
- Typical applications include neutral acids, anionic compounds.
- Tube format is available in 7 tube sizes.
- Cartridge format is available in 300mg, 600mg and 900mg size.
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light.
- Includes Certificate of Analysis

Chemical structure



Chemical structure of AL-A (Acidic Alumina)

Specifications	
Phase	AL-A
Base	Acidic Alumina
Particle Size (µm)	100
Pore Size (Å)	110
Surface Area (m^2/g)	175
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	4.5

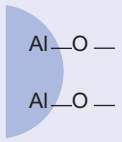
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ AL-A SPE Tubes			
50mg	1mL	100	0117-0236
50mg	3mL	50	0117-0245
100mg	1mL	100	0117-0336
100mg	3mL	50	0117-0345
100mg	10mL	30	0117-0364
200mg	3mL	50	0117-0445
200mg	10mL	30	0117-0464
500mg	3mL	50	0117-0645
500mg	6mL	30	0117-0654
500mg	10mL	30	0117-0664
1,000mg	6mL	30	0117-0954
2,000mg	12mL	30	0117-1074
5,000mg	25mL	20	0117-12A2
5,000mg	35mL	20	0117-1282
10,000mg	60mL	16	0117-1391
VertiPak™ AL-A SPE Cartridges			
300mg		25	0117-0503
300mg		50	0117-0505
300mg		100	0117-0506
600mg		25	0117-0713
600mg		50	0117-0715
600mg		100	0117-0716
900mg		25	0117-0823
900mg		50	0117-0825
900mg		100	0117-0826

VertiPak™ AL-B

- VertiPak™ AL-B SPE is basic alumina, extremely polar sorbent and more stable under high pH conditions than silica
- Basic washing of Alumina results in a anionic surface with decreased capacity for acidic compounds
- Compounds are retained by ion exchange with the negatively charged surface or by specific interactions with the metal centre
- Typical applications include neutral amines, cationic compounds
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of AL-B (Basic Alumina)

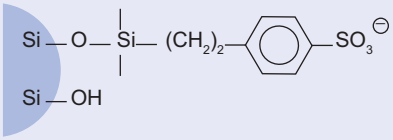
Specifications	
Phase	AL-B
Base	Basic Alumina
Particle Size (µm)	100
Pore Size (Å)	110
Surface Area (m^2/g)	175
Carbon Load (%)	-
Bonding	-
Endcap	No
pH Stability	10

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ AL-N SPE Tubes			
50mg	1mL	100	0118-0236
50mg	3mL	50	0118-0245
100mg	1mL	100	0118-0336
100mg	3mL	50	0118-0345
100mg	10mL	30	0118-0364
200mg	3mL	50	0118-0445
200mg	10mL	30	0118-0464
500mg	3mL	50	0118-0645
500mg	6mL	30	0118-0654
500mg	10mL	30	0118-0664
1,000mg	6mL	30	0118-0954
2,000mg	12mL	30	0118-1074
5,000mg	25mL	20	0118-12A2
5,000mg	35mL	20	0118-1282
10,000mg	60mL	16	0118-1391
VertiPak™ AL-N SPE Cartridges			
300mg		25	0118-0503
300mg		50	0118-0505
300mg		100	0118-0506
600mg		25	0118-0713
600mg		50	0118-0715
600mg		100	0118-0716
900mg		25	0118-0823
900mg		50	0118-0825
900mg		100	0118-0826

VertiPak™ SCX

- VertiPak™ SCX SPE is strong cation-exchanger that exhibits both strong cation-exchange primary interaction and strong non-polar secondary interaction
- Exhibits as the mixed-mode sorbent for organic compounds from aqueous matrix
- Typical applications include positively charged basic compounds e.g. amino acids in urine, chlorophyll, PCBs
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size.
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light.
- Includes Certificate of Analysis

Chemical structure



Chemical structure of SCX (Benzenesulfonic acid) silane, covalently bonded to the surface of a silica particle.

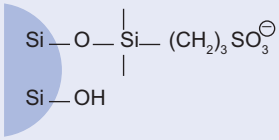
Specifications	
Phase	SCX (Benzenesulfonic acid)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	11
Bonding	Trifunctional
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ SCX SPE Tubes			
50mg	1mL	100	0126-0236
50mg	3mL	50	0126-0245
100mg	1mL	100	0126-0336
100mg	3mL	50	0126-0345
100mg	10mL	30	0126-0364
200mg	3mL	50	0126-0445
200mg	10mL	30	0126-0464
500mg	3mL	50	0126-0645
500mg	6mL	30	0126-0654
500mg	10mL	30	0126-0664
1,000mg	6mL	30	0126-0954
2,000mg	12mL	30	0126-1074
5,000mg	25mL	20	0126-12A2
5,000mg	35mL	20	0126-1282
10,000mg	60mL	16	0126-1391
VertiPak™ SCX SPE Cartridges			
300mg		25	0126-0503
300mg		50	0126-0505
300mg		100	0126-0506
600mg		25	0126-0713
600mg		50	0126-0715
600mg		100	0126-0716
900mg		25	0126-0823
900mg		50	0126-0825
900mg		100	0126-0826

VertiPak™ SCX-2

- VertiPak™ SCX-2 SPE is very strong cation-exchanger that exhibits strong cation-exchange primary interaction and very weak non-polar secondary interaction
- Low capacity of 0.18 meq/g offers a unique set of selectivity properties
- Typical applications include weak cations e.g. histidine in plasma
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light

Chemical structure



Chemical structure of PSR (Propylsulfonic acid) silane, covalently bonded to the surface of a silica particle.

Specifications	
Phase	SCX-2 (Propylsulfonic acid)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	2
Bonding	Trifunctional
Capacity (meq/g)	0.28
Endcap	No
pH Stability	2-9

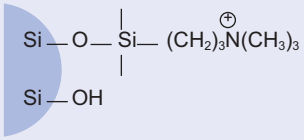
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ SCX-2 SPE Tubes			
50mg	1mL	100	0132-0236
50mg	3mL	50	0132-0245
100mg	1mL	100	0132-0336
100mg	3mL	50	0132-0345
100mg	10mL	30	0132-0364
200mg	3mL	50	0132-0445
200mg	10mL	30	0132-0464
500mg	3mL	50	0132-0645
500mg	6mL	30	0132-0654
500mg	10mL	30	0132-0664
1,000mg	6mL	30	0132-0954
2,000mg	12mL	30	0132-1074
5,000mg	25mL	20	0132-12A2
5,000mg	35mL	20	0132-1282
10,000mg	60mL	16	0132-1391
VertiPak™ SCX-2 SPE Cartridges			
300mg		25	0132-0503
300mg		50	0132-0505
300mg		100	0132-0506
600mg		25	0132-0713
600mg		50	0132-0715
600mg		100	0132-0716
900mg		25	0132-0823
900mg		50	0132-0825
900mg		100	0132-0826

VertiPak™ SAX

- VertiPak™ SAX SPE is the strongest anion-exchanger that offer minimum non-polar secondary interaction
- Sorbent is always charged because functional group is a quaternary amine
- Excellent choice for weak acids from both aqueous and non-aqueous samples
- Typical applications include organic acids, caffeine, saccharin, vitamins, multiresidue pesticides
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of SAX (Trimethylaminopropyl) silane, covalently bonded to the surface of a silica particle.

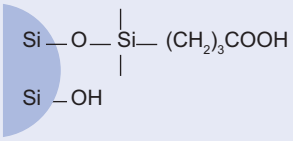
Specifications	
Phase	SAX (Trimethylaminopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	0.6
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ SAX SPE Tubes			
50mg	1mL	100	0124-0236
50mg	3mL	50	0124-0245
100mg	1mL	100	0124-0336
100mg	3mL	50	0124-0345
100mg	10mL	30	0124-0364
200mg	3mL	50	0124-0445
200mg	10mL	30	0124-0464
500mg	3mL	50	0124-0645
500mg	6mL	30	0124-0654
500mg	10mL	30	0124-0664
1,000mg	6mL	30	0124-0954
2,000mg	12mL	30	0124-1074
5,000mg	25mL	20	0124-12A2
5,000mg	35mL	20	0124-1282
10,000mg	60mL	16	0124-1391
VertiPak™ SAX SPE Cartridges			
300mg		25	0124-0503
300mg		50	0124-0505
300mg		100	0124-0506
600mg		25	0124-0713
600mg		50	0124-0715
600mg		100	0124-0716
900mg		25	0124-0823
900mg		50	0124-0825
900mg		100	0124-0826

VertiPak™ CBA

- VertiPak™ CBA SPE is medium polar weak cation-exchanger that exhibits weak cation-exchange primary interaction and polar or non-polar secondary interaction
- Exhibits as the mixed-mode sorbent for basic polar compounds from aqueous matrix without base modifiers
- Typical applications include positively charged basic compounds e.g. amino acids in urine, angiotensins in plasma, vasopressin in urine
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag

Chemical structure



Chemical structure of CBA (Carboxylic acid) silane, covalently bonded to the surface of a silica particle.

Specifications

Phase	CBA (Carboxylic acid)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	0.3
Endcap	No
pH Stability	2-9

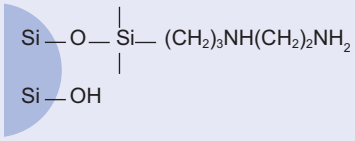
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ CBA SPE Tubes			
50mg	1mL	100	0137-0236
50mg	3mL	50	0137-0245
100mg	1mL	100	0137-0336
100mg	3mL	50	0137-0345
100mg	10mL	30	0137-0364
200mg	3mL	50	0137-0445
200mg	10mL	30	0137-0464
500mg	3mL	50	0137-0645
500mg	6mL	30	0137-0654
500mg	10mL	30	0137-0664
1,000mg	6mL	30	0137-0954
2,000mg	12mL	30	0137-1074
5,000mg	25mL	20	0137-12A2
5,000mg	35mL	20	0137-1282
10,000mg	60mL	16	0137-1391
VertiPak™ CBA SPE Cartridges			
300mg		25	0137-0503
300mg		50	0137-0505
300mg		100	0137-0506
600mg		25	0137-0713
600mg		50	0137-0715
600mg		100	0137-0716
900mg		25	0137-0823
900mg		50	0137-0825
900mg		100	0137-0826

VertiPak™ PSA

- VertiPak™ PSA (Primary, Secondary Amine) SPE is dual purpose sorbent that exhibits both as a weak anion exchanger and polar phase
- As a weak anion exchanger, PSA has 2 amine groups that offer higher ionic capacity than NH2. PSA also is a very good bidentage ligand, excellent for chealation with a number of metal ions. As a polar sorbent, the PSA sorbent can hydrogen bond with any molecule containing an -OH, -NH or –SH functional group when conditioned with a non-polar solvent such as hexane
- Typical applications include multiresidue pesticides, PAH
- Tube format is available in 7 tube sizes.
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



VertiPak™ PSA (Ethylenediamine-N-propyl) silane, covalently bonded to the surface of a silica particle.

Specifications

Phase	PSA (Ethylenediamine-N-propyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	1.2
Endcap	No
pH Stability	2-9

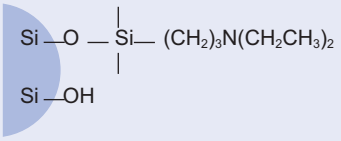
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ PSA SPE Tubes			
50mg	1mL	100	0107-0236
50mg	3mL	50	0107-0245
100mg	1mL	100	0107-0336
100mg	3mL	50	0107-0345
100mg	10mL	30	0107-0364
200mg	3mL	50	0107-0445
200mg	10mL	30	0107-0464
500mg	3mL	50	0107-0645
500mg	6mL	30	0107-0654
500mg	10mL	30	0107-0664
1,000mg	6mL	30	0107-0954
2,000mg	12mL	30	0107-1074
5,000mg	25mL	20	0107-12A2
5,000mg	35mL	20	0107-1282
10,000mg	60mL	16	0107-1391
VertiPak™ PSA SPE Cartridges			
300mg		25	0107-0503
300mg		50	0107-0505
300mg		100	0107-0506
600mg		25	0107-0713
600mg		50	0107-0715
600mg		100	0107-0716
900mg		25	0107-0823
900mg		50	0107-0825
900mg		100	0107-0826

VertiPak™ DEA

- VertiPak™ DEA (Diethylaminopropyl) SPE is dual purpose sorbent that can act both as a weak anion exchanger and polar phase
- As a weak anion exchanger, DEA bears some resemblance to NH2 in its properties. It has slightly lower capacity as an anion exchange sorbent, and a more non-polar character due to the additional carbon chain on the functional group
- As a polar sorbent, the carbon chains make DEA a medium polarity sorbent, even with the presence of the main functionality
- DEA is somewhat more polar than C8, but less polar than C2 or CN
- Typical applications include water, biological fluids, non-polar extracts.
- Tube format is available in 7 tube sizes
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



VertiPak™ DEA (Diethylaminopropyl) silane, covalently bonded to the surface of a silica particle.

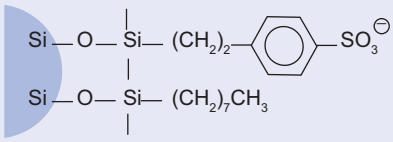
Specifications	
Phase	DEA (Diethylaminopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	1.0
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ DEA SPE Tubes			
50mg	1mL	100	0105-0236
50mg	3mL	50	0105-0245
100mg	1mL	100	0105-0336
100mg	3mL	50	0105-0345
100mg	10mL	30	0105-0364
200mg	3mL	50	0105-0445
200mg	10mL	30	0105-0464
500mg	3mL	50	0105-0645
500mg	6mL	30	0105-0654
500mg	10mL	30	0105-0664
1,000mg	6mL	30	0105-0954
2,000mg	12mL	30	0105-1074
5,000mg	25mL	20	0105-12A2
5,000mg	35mL	20	0105-1282
10,000mg	60mL	16	0105-1391
VertiPak™ DEA SPE Cartridges			
300mg		25	0105-0503
300mg		50	0105-0505
300mg		100	0105-0506
600mg		25	0105-0713
600mg		50	0105-0715
600mg		100	0105-0716
900mg		25	0105-0823
900mg		50	0105-0825
900mg		100	0105-0826

VertiPak™ C8/SCX

- **VertiPak™ C8/SCX SPE is C8 and SCX covalently bonded to the surface of a silica particle**
- **Exhibits as the mixed-mode sorbent for both reversed phase and cation-exchange interaction for basic compounds from biological fluids**
- **Typical applications include basic drugs in urine, serum and blood e.g. amphetamine, methamphetamine, opiate, barbiturate, cocaine, THC**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of SCX (Benzenesulfonic acid) silane and C8 (Octyl) silane, covalently bonded to the surface of a silica particle.

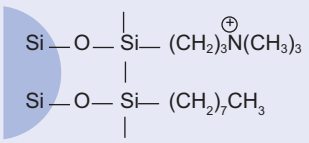
Specifications	
Phase	SCX (Benzenesulfonic acid) C8 (Octyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	9
Bonding	Trifunctional
Capacity (meq/g)	0.6
Endcap	No
pH Stability	2-8

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C8/SCX SPE Tubes			
50mg	1mL	100	0130-0236
50mg	3mL	50	0130-0245
100mg	1mL	100	0130-0336
100mg	3mL	50	0130-0345
100mg	10mL	30	0130-0364
200mg	3mL	50	0130-0445
200mg	10mL	30	0130-0464
500mg	3mL	50	0130-0645
500mg	6mL	30	0130-0654
500mg	10mL	30	0130-0664
1,000mg	6mL	30	0130-0954
2,000mg	12mL	30	0130-1074
5,000mg	25mL	20	0130-12A2
5,000mg	35mL	20	0130-1282
10,000mg	60mL	16	0130-1391
VertiPak™ C8/SCX SPE Cartridges			
300mg		25	0130-0503
300mg		50	0130-0505
300mg		100	0130-0506
600mg		25	0130-0713
600mg		50	0130-0715
600mg		100	0130-0716
900mg		25	0130-0823
900mg		50	0130-0825
900mg		100	0130-0826

VertiPak™ C8/SAX

- **VertiPak™ C8/SAX SPE is C8 and SAX covalently bonded to the surface of a silica particle**
- **Exhibits as the mixed-mode sorbent for both reversed phase and strong anion-exchange interaction for acidic compounds from biological fluids**
- **Typical applications include acidic drugs in urine, serum and blood e.g. salicylic acid, ibuprofen, acetaminophen, 11-nor-delta-9-tetrahydrocannabinol-9-carboxilic acid**
- **Tube format is available in 7 tube sizes**
- **Cartridge format is available in 300mg, 600mg and 900mg size**
- **Tubes or cartridges are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



Chemical structure of SAX (Trimethylaminopropyl) silane and C8 (Octyl) silane, covalently bonded to the surface of a silica particle.

Specifications	
Phase	SAX (Trimethylaminopropyl) C8 (Octyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	9
Bonding	Trifunctional
Capacity (meq/g)	0.6
Endcap	No
pH Stability	2-9

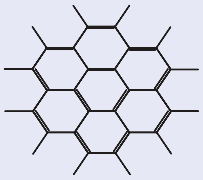
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ C8/SAX SPE Tubes			
50mg	1mL	100	0129-0236
50mg	3mL	50	0129-0245
100mg	1mL	100	0129-0336
100mg	3mL	50	0129-0345
100mg	10mL	30	0129-0364
200mg	3mL	50	0129-0445
200mg	10mL	30	0129-0464
500mg	3mL	50	0129-0645
500mg	6mL	30	0129-0654
500mg	10mL	30	0129-0664
1,000mg	6mL	30	0129-0954
2,000mg	12mL	30	0129-1074
5,000mg	25mL	20	0129-12A2
5,000mg	35mL	20	0129-1282
10,000mg	60mL	16	0129-1391
VertiPak™ C8/SAX SPE Cartridges			
300mg		25	0129-0503
300mg		50	0129-0505
300mg		100	0129-0506
600mg		25	0129-0713
600mg		50	0129-0715
600mg		100	0129-0716
900mg		25	0129-0823
900mg		50	0129-0825
900mg		100	0129-0826

VertiPak™ Carbograph

- VertiPak™ Carbograph SPE is non-porous graphitized carbon black. Its surface contains oxygen complexes forming positively charged chemical heterogeneities on surface offering rapid both primary reversed-phase and secondary anion-exchange interaction
- Exhibits strong affinity than C18 for acidic organic polar and non-polar compounds from both non-polar and polar samples
- Typical applications include pigments (chlorophyll, carotinoids), sterols in foods, phenolic compounds in natural products, pesticides in ground water, fruits, and vegetables
- Tube format is available in 7 tube sizes.
- Cartridge format is available in 300mg, 600mg and 900mg size
- Tubes or cartridges are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



Chemical structure of Carbograph (Non-Porous Graphitized Carbon Black) particle.

Specifications	
Base	Non-Porous Graphitized Carbon
Particle Size (µm)	100
Pore Size (Å)	-
Surface Area (m^2/g)	110
Carbon Load (%)	-
Endcap	No
pH Stability	-

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ Carbograph SPE Tubes			
50mg	1mL	100	0129-0236
50mg	3mL	50	0129-0245
100mg	1mL	100	0129-0336
100mg	3mL	50	0129-0345
100mg	10mL	30	0129-0364
200mg	3mL	50	0129-0445
200mg	10mL	30	0129-0464
500mg	3mL	50	0129-0645
500mg	6mL	30	0129-0654
500mg	10mL	30	0129-0664
1,000mg	6mL	30	0129-0954
2,000mg	12mL	30	0129-1074
5,000mg	25mL	20	0129-12A2
5,000mg	35mL	20	0129-1282
10,000mg	60mL	16	0129-1391
VertiPak™Carbograph SPE Cartridges			
300mg		25	0129-0503
300mg		50	0129-0505
300mg		100	0129-0506
600mg		25	0129-0713
600mg		50	0129-0715
600mg		100	0129-0716
900mg		25	0129-0823
900mg		50	0129-0825
900mg		100	0129-0826

VertiPak™ NH2/Carbograph

- **VertiPak™ NH2/Carbograph SPE is 2-layer SPE tube that contains both VertiPak™ Carbograph (upper layer) and VertiPak™ NH2 (lower layer) sorbents that separated by PE frit**
- **Specially used for multi-residue pesticides in foods e.g. vegetables, meats**
- **VertiPak™ Carbograph is non-porous graphitized carbon black that contains oxygen complexes forming positively charged chemical heterogeneities on surface offering rapid primary reversed-phase interaction for removing of organic pigments, organic acids, chlorophyll**
- **VertiPak™ NH2 is an aminopropyl phase that exhibits as weak anion exchanger for multi-residue pesticides**
- **Tube format is available in 7 tube sizes**
- **Tubes are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Carbograph Specifications	
Base	Non-Porous Graphitized Carbon Black
Particle Size (µm)	100
Pore Size (Å)	-
Surface Area (m^2/g)	110
Carbon Load (%)	-
Endcap	No
pH Stability	-

NH2 Specifications	
Phase	NH2 (Aminopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	1.0
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ NH2/Carbograph SPE Tubes			
25/25mg	1mL	100	0123-0236
25/25mg	3mL	50	0123-0245
50/50mg	1mL	100	0123-0336
50/50mg	3mL	50	0123-0345
50/50mg	10mL	30	0123-0364
100/100mg	3mL	50	0123-0445
100/100mg	10mL	30	0123-0464
250/250mg	3mL	50	0123-0645
250/250mg	6mL	30	0123-0654
250/250mg	10mL	30	0123-0664
500/500mg	6mL	30	0123-0954
500/500mg	12mL	30	0123-0974
1,000/1,000mg	12mL	30	0123-1074
2,500/2,500mg	25mL	20	0123-12A2
2,500/2,500mg	35mL	20	0123-1282
5,000/5,000mg	60mL	16	0123-1391

VertiPak™ PSA/Carbograph

- VertiPak™ PSA/Carbograph SPE is 2-layer SPE tube that contains both VertiPak™ Carbograph (upper layer) and VertiPak™ PSA (lower layer) sorbents that separated by PE frit
- Specially used for multi-residue pesticides in foods e.g. vegetables, meats
- VertiPak™ Carbograph is non-porous graphitized carbon black that contains oxygen complexs forming positively charged chemical heterogeneities on surface offering rapid primary reversed-phase interaction for removing of organic pigments, organic acids, chlorophyll
- VertiPak™ PSA is a weak anion exchanger that has 2 amine groups offering higher ionic capacity than NH2 for multi-residue pesticides
- Tube format is available in 7 tube sizes
- Tubes are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Carbograph Specifications	
Base	Non-Porous Graphitized Carbon Black
Particle Size (µm)	100
Pore Size (Å)	-
Surface Area (m^2/g)	110
Carbon Load (%)	-
Endcap	No
pH Stability	-

PSA Specifications	
Phase	PSA (Ethylenediamine-N-propyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	1.2
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ PSA/Carbograph SPE Tubes			
25/25mg	1mL	100	0135-0236
25/25mg	3mL	50	0135-0245
50/50mg	1mL	100	0135-0336
50/50mg	3mL	50	0135-0345
50/50mg	10mL	30	0135-0364
100/100mg	3mL	50	0135-0445
100/100mg	10mL	30	0135-0464
250/250mg	3mL	50	0135-0645
250/250mg	6mL	30	0135-0654
250/250mg	10mL	30	0135-0664
500/500mg	6mL	30	0135-0954
500/500mg	12mL	30	0135-0974
1,000/1,000mg	12mL	30	0135-1074
2,500/2,500mg	25mL	20	0135-12A2
2,500/2,500mg	35mL	20	0135-1282
5,000/5,000mg	60mL	16	0135-1391

VertiPak™ SAX/Carbograph

- VertiPak™ SAX/Carbograph SPE is 2-layer SPE tube that contains both VertiPak™ Carbograph (upper layer) and VertiPak™ SAX (lower layer) sorbents that separated by PE frit
- Specially used for multi-residue pesticides in foods e.g. vegetables, fruits
- VertiPak™ Carbograph is non-porous graphitized carbon black that contains oxygen complexes forming positively charged chemical heterogeneities on surface offering rapid primary reversed-phase interaction for removing of organic pigments, organic acids, chlorophyll
- VertiPak™ SAX is the strongest anion-exchanger due to always charged quaternary amine functional group that is excellent choice for multi-residue pesticides
- Tube format is available in 7 tube sizes
- Tubes are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Carbograph Specifications	
Base	Non-Porous Graphitized Carbon Black
Particle Size (µm)	100
Pore Size (Å)	-
Surface Area (m^2/g)	110
Carbon Load (%)	-
Endcap	No
pH Stability	-

SAX Specifications	
Phase	SAX (Trimethylaminopropyl)
Base	Irregular-shaped Silica
Particle Size (µm)	50
Pore Size (Å)	60
Surface Area (m^2/g)	500
Carbon Load (%)	7
Bonding	Trifunctional
Capacity (meq/g)	0.6
Endcap	No
pH Stability	2-9

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ PSA/Carbograph SPE Tubes			
25/25mg	1mL	100	0127-0236
25/25mg	3mL	50	0127-0245
50/50mg	1mL	100	0127-0336
50/50mg	3mL	50	0127-0345
50/50mg	10mL	30	0127-0364
100/100mg	3mL	50	0127-0445
100/100mg	10mL	30	0127-0464
250/250mg	3mL	50	0127-0645
250/250mg	6mL	30	0127-0654
250/250mg	10mL	30	0127-0664
500/500mg	6mL	30	0127-0954
500/500mg	12mL	30	0127-0974
1,000/1,000mg	12mL	30	0127-1074
2,500/2,500mg	25mL	20	0127-12A2
2,500/2,500mg	35mL	20	0127-1282
5,000/5,000mg	60mL	16	0127-1391

VertiPak™ FL-PR/Carbograph

- **VertiPak™ FL-PR/Carbograph SPE is double-layer SPE tube that contains both VertiPak™ Carbograph (upper layer) and VertiPak™ FL-PR (lower layer) sorbents that separated by PE frit.**
- **Specially used for multi-residue pesticides in foods e.g. fruits, vegetables.**
- **VertiPak™ Carbograph is non-porous graphitized carbon black that contains oxygen complexs forming positively charged chemical heterogeneities on surface offering rapid primary reversed-phase interaction for removing of organic pigments, organic acids, chlorophyll**
- **VertiPak™ FL-PR is highly polar sorbent for multi-residue pesticides**
- **Tube format is available in 7 tube sizes.**
- **Tubes are packaged in zip sealing bag protective from moisture and light.**
- **Includes Certificate of Analysis**

Carbograph Specifications	
Base	Non-Porous Graphitized Carbon Black
Particle Size (µm)	100
Pore Size (Å)	-
Surface Area (m^2/g)	110
Carbon Load (%)	-
Endcap	No
pH Stability	-

FL-PR Specifications	
Phase	Florisil®-PR
Base	Magnesium Silicate
Particle Size (µm)	150-250
Pore Size (Å)	60-80
Surface Area (m^2/g)	300-450
Carbon Load (%)	-
Endcap	No
pH Stability	-

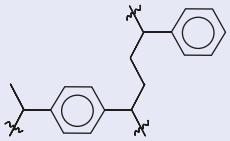
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ FL-PR/Carbograph SPE Tubes			
25/25mg	1mL	100	0125-0236
25/25mg	3mL	50	0125-0245
50/50mg	1mL	100	0125-0336
50/50mg	3mL	50	0125-0345
50/50mg	10mL	30	0125-0364
100/100mg	3mL	50	0125-0445
100/100mg	10mL	30	0125-0464
250/250mg	3mL	50	0125-0645
250/250mg	6mL	30	0125-0654
250/250mg	10mL	30	0125-0664
500/500mg	6mL	30	0125-0954
500/500mg	12mL	30	0125-0974
1,000/1,000mg	12mL	30	0125-1074
2,500/2,500mg	25mL	20	0125-12A2
2,500/2,500mg	35mL	20	0125-1282
5,000/5,000mg	60mL	16	0125-1391

VertiPak™ HBP

- **VertiPak™ HBP SPE is highly cross-linked polystyrene divinylbenzene copolymer (PS-DVB) hydrophobic polymeric sorbent offering 100% reversed phase interaction and interference-free extraction, compatability with LC-MS or GC-MS**
- **Exhibits very high binding capacity over silica, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in better analyte concentration**
- **Needs no addition of amine modifiers, buffers and acids due to no silanol in PS-DVB**
- **Typical applications include aromatics compounds, phenols from water, nitroaromatics from water, pesticides from environmental samples, PAHs from oil**
- **Tube format is available in 4 tube sizes**
- **Tubes are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



VertiPak™ HBP (Polystyrene-Divinylbenzene Copolymer, PS-DVB)

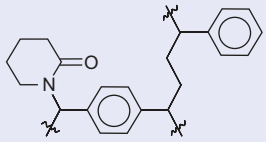
Specifications	
Base	HBP (Polystyrene-Divinylbenzene copolymer, PS-DVB)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HBP SPE Tubes			
30mg	1mL	100	0120-0136
30mg	3mL	50	0120-0145
60mg	1mL	100	0120-1536
60mg	3mL	50	0120-1545
60mg	10mL	30	0120-1564
100mg	1mL	100	0120-0336
100mg	3mL	50	0120-0345
100mg	10mL	30	0120-0364
200mg	3mL	50	0120-0445
200mg	6mL	30	0120-0454
200mg	10mL	30	0120-0464
500mg	3mL	50	0120-0645
500mg	6mL	30	0120-0654
500mg	10mL	30	0120-0664

VertiPak™ HCP

- VertiPak™ HCP SPE is Polyamide-Divinylbenzene copolymer (PA-DVB) hydrophilic polymeric sorbent offering primary strong reversed phase interaction and secondary strong anion-exchange interaction with interference-free extraction, compatability with LC-MS or GC-MS
- Exhibits very high binding capacity over silica-C18 sorbent, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in high, reproducible recoveries and less solvent usage
- Exhibits excellent mass transfer and mechanical strength for polar and non-polar compounds in an aqueous sample or a biological fluid sample
- Typical applications include aromatics compounds, phenols from water, nitroaromatics from water, pesticides from environmental samples, drugs and metabolites from biological fluids
- Tube format is available in 4 tube sizes
- Tubes are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



VertiPak™ HCP (Polyamide-Divinylbenzene Copolymer, PA-DVB)

Specifications

Base	HCP (Polyamide-Divinylbenzene Copolymer, PA-DVB)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

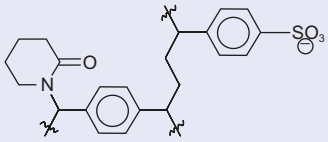
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HCP SPE Tubes			
30mg	1mL	100	0142-0136
30mg	3mL	50	0142-0145
60mg	1mL	100	0142-1536
60mg	3mL	50	0142-1545
60mg	10mL	30	0142-1564
100mg	1mL	100	0142-0336
100mg	3mL	50	0142-0345
100mg	10mL	30	0142-0364
200mg	3mL	50	0142-0445
200mg	6mL	30	0142-0454
200mg	10mL	30	0142-0464
500mg	3mL	50	0142-0645
500mg	6mL	30	0142-0654
500mg	10mL	30	0142-0664

VertiPak™ HCP-SC

- **VertiPak™ HCP-SC SPE is Polyamide-Divinylbenzene Copolymer-Sulfonate, (PA-DVBS) mixed-mode polymeric sorbent offering both strong reverse phase interaction and strong cation-exchange interaction with interference-free extraction, compatability with LC-MS or GC-MS**
- **Exhibits very high binding capacity over mixed-mode silica-C8/SCX sorbent, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in high, reproducible recoveries and less solvent usage**
- **Exhibits excellent mass transfer and mechanical strength for basic polar compounds in an aqueous sample or a bioloical fluid sample**
- **Typical applications include basic drugs and metabolites from biological fluids, environmetal pollutants from water, drugs of abuse and metabolites from urine e.g. amphetamine, methamphetamine, opiate, barbiturate, cocaine, THC**
- **Tube format is available in 4 tube sizes**
- **Tubes are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



VertiPak™ HCP-SC (Polyamide-divinylbenzene Copolymer-Sulfonate, PA-DVBS)

Specifications

Base	HCP-SC (Polyamide-divinylbenzene Copolymer-Sulfonate, PA-DVBS)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

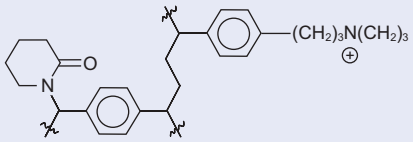
Ordering Information

Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HCP-SC SPE Tubes			
30mg	1mL	100	0143-0136
30mg	3mL	50	0143-0145
60mg	1mL	100	0143-1536
60mg	3mL	50	0143-1545
60mg	10mL	30	0143-1564
100mg	1mL	100	0143-0336
100mg	3mL	50	0143-0345
100mg	10mL	30	0143-0364
200mg	3mL	50	0143-0445
200mg	6mL	30	0143-0454
200mg	10mL	30	0143-0464
500mg	3mL	50	0143-0645
500mg	6mL	30	0143-0654
500mg	10mL	30	0143-0664

VertiPak™ HCP-SA

- VertiPak™ HCP-SA SPE is Polyamide-Divinylbenzene Copolymer-Trimethylaminopropyl (PA-DVBT), mixed-mode polymeric sorbent offering both strong reversed phase interaction and strong anion-exchange interaction with interference-free extraction, compatability with LC-MS or GC-MS
- Exhibits very high binding capacity over mixed-mode silica-C8/SAX sorbent, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in high, reproducible recoveries and less solvent usage
- Exhibits excellent mass transfer and mechanical strength for acidic polar compounds in an aqueous sample or a bioloical fluid sample
- Typical applications include acidic drugs and metabolites from biological fluids, environmetal pollutants from water, drugs of abuse and metabolites from urine e.g. salicylic acid, ibuprofen, acetaminophen, 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid
- Tube format is available in 4 tube sizes
- Tubes are packaged in zip sealing bag protective from moisture and light
- Includes Certificate of Analysis

Chemical structure



VertiPak™ HCP-SA (Polyamide-divinylbenzene Copolymer-Trimethylaminopropyl, PA-DVBT)

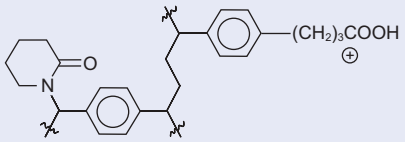
Specifications	
Base	HCP-SA (Polyamide-Divinylbenzene Copolymer-Trimethylaminopropyl, PA-DVBT)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HCP-SA SPE Tubes			
30mg	1mL	100	0144-0136
30mg	3mL	50	0144-0145
60mg	1mL	100	0144-1536
60mg	3mL	50	0144-1545
60mg	10mL	30	0144-1564
100mg	1mL	100	0144-0336
100mg	3mL	50	0144-0345
100mg	10mL	30	0144-0364
200mg	3mL	50	0144-0445
200mg	6mL	30	0144-0454
200mg	10mL	30	0144-0464
500mg	3mL	50	0144-0645
500mg	6mL	30	0144-0654
500mg	10mL	30	0144-0664

VertiPak™ HCP-WC

- **VertiPak™ HCP-WC SPE is Polyamide-Divinylbenzene Copolymer-Carboxzypropyl, (PA-DVBC) mixed-mode polymeric sorbent offering both strong reversed phase interaction and weak cation-exchange interaction with interference-free extraction, compatability with LC-MS or GC-MS**
- **Exhibits very high binding capacity over mixed-mode silica-based sorbent, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in high, reproducible recoveries and less solvent usage**
- **Exhibits excellent mass transfer and mechanical strength for basic polar compounds in an aqueous sample or a biological fluid sample without base modifiers**
- **Typical applications include basic drugs and metabolites from biologial fluids, environmetal pollutants from water, drugs of abuse and metabolites from urine e.g. amphetamine, methamphetamine, opiate, barbiturate, cocaine, THC**
- **Tube format is available in 4 tube sizes**
- **Tubes are packaged in zip sealing bag protective from moisture and light**
- **Includes Certificate of Analysis**

Chemical structure



VertiPak™ HCP-WC (Polyamide-Divinylbenzene Copolymer-Carboxypropyl, PA-DVBC)

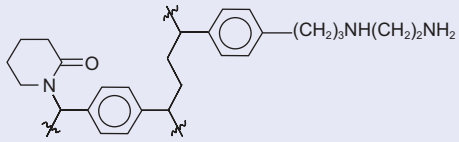
Specifications	
Base	HCP-WC (Polyamide-Divinylbenzene Copolymer-Carboxzypropyl, PA-DVBC)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HCP-WC SPE Tubes			
30mg	1mL	100	0145-0136
30mg	3mL	50	0145-0145
60mg	1mL	100	0145-1536
60mg	3mL	50	0145-1545
60mg	10mL	30	0145-1564
100mg	1mL	100	0145-0336
100mg	3mL	50	0145-0345
100mg	10mL	30	0145-0364
200mg	3mL	50	0145-0445
200mg	6mL	30	0145-0454
200mg	10mL	30	0145-0464
500mg	3mL	50	0145-0645
500mg	6mL	30	0145-0654
500mg	10mL	30	0145-0664

VertiPak™ HCP-WA

- **VertiPak™ HCP-WA SPE is Polyamide-Divinylbenzene Copolymer-Ethylenediamine-N-propyl (PA-DVBE) mixed-mode polymeric sorbent offering both strong reverse phase interaction and weak anion-exchange interaction with interference-free extraction, compatability with LC-MS or GC-MS.**
- **Exhibits very high binding capacity over mixed-mode silica-based sorbent, up to 30% of sorbent weight allowing larger sample loads or a smaller sorbent bed resulting in high, reproducible recoveries and less solvent usage.**
- **Exhibits excellent mass transfer and mechanical strength for acidic polar compounds in an aqueous sample or a bioloical fluid sample.**
- **Typical applications include acidic drugs and metabolites from biological fluids, environmetal pollutants from water, drugs of abuse and metabolites from urine e.g. salicylic acid, ibuprofen, acetaminophen, 11-nor-delta-9-tetrahydrocannabinol-9-carboxilic acid without acid modifiers.**
- **Tube format is available in 4 tube sizes.**
- **Tubes are packaged in zip sealing bag protective from moisture and light.**
- **Includes Certificate of Analysis**

Chemical structure



VertiPak™ HCP-WA (Polyamide-Divinylbenzene Copolymer-Ethylenediamine-N-propyl, PA-DVBE)

Specifications	
Base	HCP-WA (Polyamide-Divinylbenzene Copolymer-Ethylenediamine, PA-DVBE)
Particle Size (µm)	30-50
Pore Size (Å)	80-90
Surface Area (m^2/g)	700-800
Carbon Load (%)	-
Endcap	No
pH Stability	1-14

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ HCP-WA SPE Tubes			
30mg	1mL	100	0146-0136
30mg	3mL	50	0146-0145
60mg	1mL	100	0146-1536
60mg	3mL	50	0146-1545
60mg	10mL	30	0146-1564
100mg	1mL	100	0146-0336
100mg	3mL	50	0146-0345
100mg	10mL	30	0146-0364
200mg	3mL	50	0146-0445
200mg	6mL	30	0146-0454
200mg	10mL	30	0146-0464
500mg	3mL	50	0146-0645
500mg	6mL	30	0146-0654
500mg	10mL	30	0146-0664

VertiPak™ LLE

General Information

Liquid–liquid extraction (LLE), also known as solvent extraction, has long been an effective method for clean-up lipophilic compounds in a complex aqueous matrix like e.g. biological fluids. Liquid-liquid extractions with traditional separating funnel are often used. There are some disadvantages; multiple extractions required for high recovery rates, formation of emulsions, poor phase separation and high solvent consumption.

VertiPak™ LLE tube is packed with high purity and high surface area diatomaceous earth (also know as Kieselguhr material). Diatomaceous earth acts as an extraction enhancer by dispersing of sample and adsorbing of water. VertPak™ LLE can be used within pH range of 1-13. VertPak™ LLE is a fast, reproducible and economical alternative to classical liquid-liquid extractions, with the following benefits:

- **simultaneous preparation of many samples**
- **no problems with phase separation**
- **no formation of emulsions**
- **high recovery rates**
- **saving of time and solvents**
- **organic solutions need not to be dried after separation**

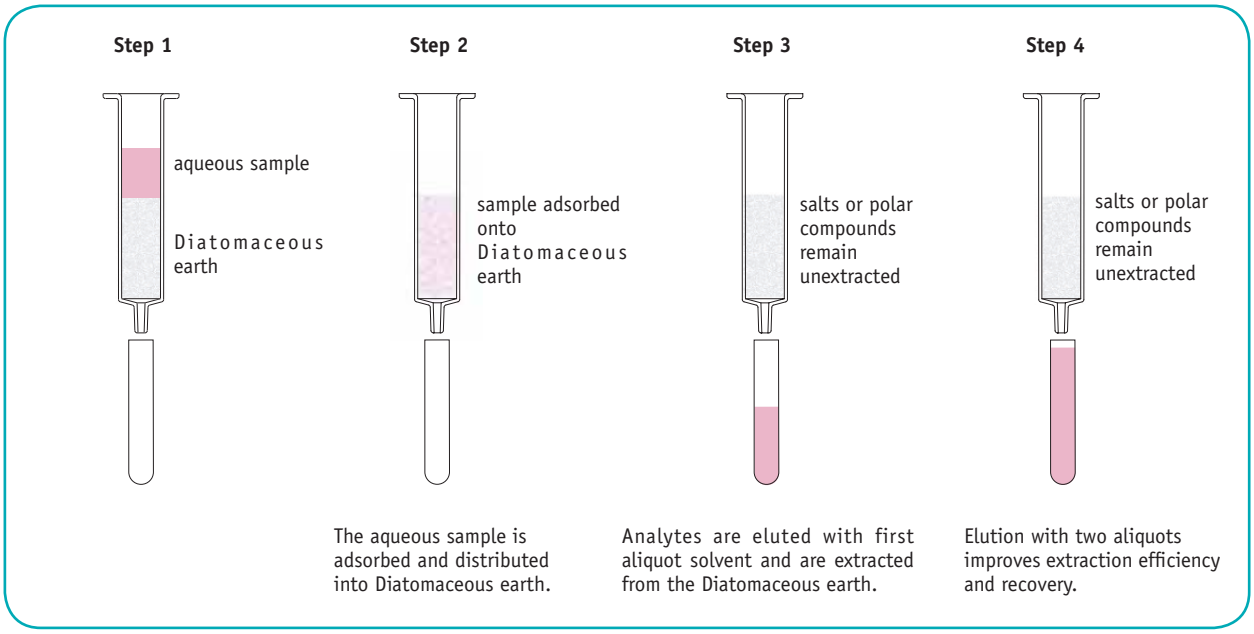
Applications

VertiPak™ LLE has a broad range of applications for or the extraction of physiological fluids, such as urine, blood, serum, plasma, or others, in clinical chemistry. Other applications are the analysis of dyes in textiles, environmental and food analysis. A fractionated elution of acidic and basic compounds can be applied in the analysis of pharmaceuticals and their metabolites. VertiPak™ LLE is also ideally suited for removing small amounts of water from solvents which are not miscible with water.

Extraction Procedures

There are 4 steps :

1. Add the aqueous sample to the dry VertiPak™ LLE tube.
2. Wait 3-5 minutes
3. Add the first aliquot of organic extraction solvent and collect.
4. Add the second aliquot of organic extraction solvent and collect.



VertiPak™ LLE

- **Hight purity Diatomaceous earth to yield accurate results**
- **Pre-packed extraction tubes are ready-to-use**
- **Uniform bacth-to bacth quality**
- **Simultaneous preparation of many samples**
- **No problems with phase separation**
- **No formation of emulsions**
- **High recovery rates**
- **Saving of time and solvents**
- **Organic solutions need not to be dried after separation**

Specifications	
Name	Diatomaceous earth
Others names	Kieselguhr, Celite
Description	Flux-Calcined filter aid
Color	White
Particle Size (μm)	150-250
Specific gravity	2.3
Moisture (%)	0.3

General parameters				
Volume	**Bed Weight**	**Sample Volume**	**Waiting time**	**Elution volume**
1mL	250mg	0.25mL	5min	3mL
3mL	500mg	0.5mL	5min	6mL
6mL	1g	1mL	5-10min	8mL
12mL	3g	3mL	5-10min	12mL
20mL	4g	5mL	5-10min	16mL
35mL	8g	10mL	10-15min	24mL
60mL	14g	20mL	10-15min	40mL

Ordering Information			
Bed Weight	Tube Size	QTY	Part No.
VertiPak™ LLE Tubes			
250mg	1mL	100	0149-2036
500mg	3mL	50	0149-0645
1g	6mL	50	0149-0955
3g	12mL	30	0149-2174
4g	20mL	30	0149-11A4
8g	35mL	30	0149-2284
14g	60mL	10	0149-1490

VertiFlash™ Silica

- **Ultra-pure to guarantee uniformity and reproducibility**
- **Minimal fines with no impediments to flow, separations occur quickly with no loss of chromatographic performance.**
- **Wide range of mesh sizes allows for excellent flow rates.**
- **Narrow particle size distribution eliminates any guesswork in scaling separation.**

VertiFlash™ Silica Gel is a very high-purity gel for preparative chromatography that provides uniformity and reproducibility for high resolution and excellent flow rates.

VertiFlash™ Silica Gel is a minimal fines with no impediments to flow, separations occur quickly with no loss of chromatographic performance.

VertiFlash™ Silica Gel is available in a wide range of particle sizes and pore sizes to accommodate any separation need for all types of low-pressure, medium-pressure and flash column chromatography. They can be applied for the cleanup and purification of a wide range of synthetic and natural compounds.

Typical applications include:
- Small molecule purification (less than 2,000 MW)
- lipids
- polymers
- nucleotides
- peptides
- Flash or general column chromatography

Specifications	
Iron content (%)	< 0.01
Chloride content (%)	< 0.02
Loss on drying (%)	< 7
pH	5.5 - 7.5
Pore volume (mL/g)	0.7 - 0.9
Surface area (m^2/g)	450 - 600

Ordering Information

Pore size (A)	Particle Size (µm)	QTY (kg)	Part No.
VertiFlash™ Silica			
30	75-150[1]	1	1001-0701
		5	1001-0705
		25	1001-0725
	75-700[2]	1	1001-0801
		5	1001-0805
		25	1001-0825
	250-500[3]	1	1001-0901
		5	1001-0905
		25	1001-0925
60	40-63	1	1001-1101
		5	1001-1105
		25	1001-1125
	60-120	1	1001-1201
		5	1001-1205
		25	1001-1225
	120-200	1	1001-1301
		5	1001-1305
		25	1001-1325
	60-200	1	1001-1401
		5	1001-1405
		25	1001-1425
	200-500	1	1001-1501
		5	1001-1505
		25	1001-1525
	500-1000	1	1001-1601
		5	1001-1605
		25	1001-1625
90	40-63	1	1001-2101
		5	1001-2105
		25	1001-2125
	60-200	1	1001-2401
		5	1001-2405
		25	1001-2425
	200-500	1	1001-2501
		5	1001-2505
		25	1001-2525
	500-1000	1	1001-2601
		5	1001-2605
		25	1001-2625
150	60-120	1	1001-3201
		5	1001-3205
		25	1001-3225
	120-200	1	1001-3301
		5	1001-3305
		25	1001-3325
	200-500	1	1001-3501
		5	1001-3505
		25	1001-3525
300	40-63	1	1001-4101
		5	1001-4105
		25	1001-4125
	60-200	1	1001-4401
		5	1001-4405
		25	1001-4425

ASTM or EPA Method

[1]75-150 ASTM D1319: Petroleum Products by FIA
ASTM D2549: Aromatics/Non-Aromatics from Oils
EPA Method 1664: N-Hexane Extraction Method
[2]75-700 ASTM D2007: Rubber Extender/Processing Oils
[3]250-500 EPA Method 601/624: Purgeable Halocarbons

VertiFlash™ Alumina

- **Ultra-pure to guarantee uniformity and reproducibility**
- **Minimal fines With no impediments to flow, separations occur quickly with no loss of chromatographic performance.**
- **Wide range of mesh sizes allows for excellent flow rates.**
- **Narrow particle size distribution eliminates any guesswork in scaling separation.**

VertiFlash™ Alumina is good for isolation and purification of many kinds of polar compounds like alkaloids, antiobiotics, glycosides, enzymes, plant extracts and etc. There are 3 kinds of surface modifications available; "A" (Acid), "B" (Basic), and "N" (Neutral).

Alumina PCB is a chemically and physically modified Alumina for the analysis and removal of PCB's. This material will find wide use and application in/for Environmental Clean-Up, Solvent Purification, Electric Utilities: Transformer Oil, Soil, Water Studies

Alumina Pyrogen is used specifically for removal of pyrogens in solution. Pyrogens are typically complex carbohydrates which preferentially adsorb to Alumina Pyrogen. Ideal for antibiotic production and other types of bio-technology products, natural product extraction, purification & de-colorization, heavy metal removal, clean-up, and more.

Alumina Biomass is used for removing biomass in nutraceutical or natural product purification.

Alumina Process is used for process scale removal of impurities. Its high macroporosity improves diffusion rates and the high surface area provides enhanced capacity.

Alumina Decolor is good for removal of color, dyes and clean-up of water.

Alumina Dioxin is developed to meet the high recovery level required for the analysis of polychlorinated dibenzodioxins and dibenzofurans according to VDI-Regulation 3499, part I.

Specifications

Alumina	pH	Loss on drying (%)	Water matter %	Density (g/mL)	Surface area (m^2/g)
Alumina A	4.75	< 1.3	< 0.1	0.8	200
Alumina B	10	< 1	< 0.1	0.8	200
Alumina N	7.5	< 1	< 0.1	0.8	200
Alumina PCB		< 1	< 0.1	0.8	200
Alumina Pyrogen		< 1	< 0.1	0.8	200
Alumina Biomass		< 1	< 0.1	0.8	200
Alumina Process		< 1	< 0.1	0.8	200
Alumina Decolor		< 1	< 0.1	0.8	200
Alumina Dioxin		< 1	< 0.1	0.8	200

Ordering Information

Pore size (A)	Particle Size (µm)	QTY (kg)	Part No.
VertiFlash™ Alumina A			
90	50-200	1	1002-2401
		5	1002-2405
		50	1002-2450
VertiFlash™ Alumina B			
90	50-200	1	1003-2401
		5	1003-2405
		50	1003-2450
VertiFlash™ Alumina N			
90	50-200	1	1004-2401
		5	1004-2405
		50	1004-2450
VertiFlash™ Alumina PCB			
90	50-200	1	1005-2401
		5	1005-2405
		50	1005-2450
VertiFlash™ Alumina Pyrogen			
90	50-200	1	1006-2401
		5	1006-2405
		50	1006-2450
VertiFlash™ Alumina Biomass			
90	50-200	1	1007-2401
		5	1007-2405
		50	1007-2450
VertiFlash™ Alumina Process			
90	150-600	1	1008-2401
		5	1008-2405
		25	1008-2425
VertiFlash™ Alumina Decolor			
90	30-200	1	1009-2401
		5	1009-2405
		25	1009-2425
		50	1009-2450
VertiFlash™ Alumina Dioxin			
90	50-200	1	1010-2401
		5	1010-2405
		25	1010-2425

VertiPak™ DQ

QuEChERS, the New Method for Multi-Residue Pesitcides

QuEChERS (pronounced "Catchers"), an acronym for **Qu**ick, **E**asy, **Ch**eap, **E**ffective, **R**ugged and **S**afe, is a new sample preparation and clean-up method for analysis of multi-residue pesticides in friuts and vegetables samples by combination of liquid-liquid extraction and matrix dispersion SPE technique. QuEChERS offers the broad adventages over conventional SPE for multi-residue pesticides analysis

- **Qu**ick : high sample throughput
- **E**asy : a few easy steps
- **Ch**eap : reduces reagent costs and labor costs
- **E**ffective : high recoveries and accurate results
- **R**ugged : reduce glassware usage and required small and less bench space
- **S**afe : low non-chlorinated solvent usage

An Easy Operating Procedure

Operating Procedure		
1. Sample preparation	**2. Liquid-Liquid Extraction**	**3. Dispersive SPE Clean-up**
1.1. Homoginize 10g or 15g sample	2.1. load homoginized sample to 50mL extraction tube	3.1. Load aliquot 1mL or 6mL to 2mL or 15mL SPE tube
1.2. Add 15mL of 1% acetic acid in acetonitrile	2.2. Add internal standard	3.2. Shake for 1min
	2.3. Shake for 1min	3.3. Sentrifuge at >3500xg
	2.4. Centrifuge at >1500xg	3.4. Aliquot 1mL to vial for anlysis by GC/MS or LC/MS
	2.5. Aliquot* 1mL or 6mL	

*For pesticides with acidic groups (phenoxyalcanoic acids), skip the dispersive SPE clean-up and analyze directly by LC/MS/MS.

Selection guide

Selection Guide for LLE (Liquid-Liquid Extraction)

Method	Sample Size	Tube Content					Tube volume	VertiPak™
		$MgSO_4$	NaCl	Acetate[a]	Citrate[b]	Citrate[c]		
Original QuEChERS[1]	15g	6g	1.5g	-	-	-	50mL	**DQ-1**
Original QuEChERS	10g	4g	1g	-	-	-	50mL	**DQ-2**
AOAC 2007.01[2]	15g	6g	-	1.5g	-	-	50mL	**DQ-3**
EN 15662[3,4]	10g	4g	1g	-	1g	0.5g	50mL	**DQ-4**
For Acrylamides[d]	10g	4g	0.5g	-	-	-	50mL	**DQ-5**

[a] Sodium acetate, [b] Trisodium citrate, [c] Disodium citrate, [d] In potato chips and other fried foods

Selection Guide for dSPE (Dispersive Solid Phase Extraction)

Fruits/Vegetables	Method	Tube Content				Tube volume	VertiPak™
		PSA	$MgSO_4$	C18EC	GCB		
General	AOAC 2007.01	50mg	150mg	-	-	2mL	**DQ-6**
		400mg	1200mg	-	-	15mL	**DQ-7**
	EN 15662	25mg	150mg	-	-	2mL	**DQ-8**
		150mg	900mg	-	-	15mL	**DQ-9**
Fats and waxes	AOAC 2007.01	50mg	150mg	50mg	-	2mL	**DQ-10**
		400mg	1200mg	400mg	-	15mL	**DQ-11**
	EN 15662	25mg	150mg	25mg	-	2mL	**DQ-12**
		150mg	900mg	150mg	-	15mL	**DQ-13**
Pigment	AOAC 2007.01	50mg	150mg	-	50mg	2mL	**DQ-14**
		400mg	1200mg	-	400mg	15mL	**DQ-15**
	EN 15662	25mg	150mg	-	2.5mg	2mL	**DQ-16**
		150mg	900mg	-	15mg	15mL	**DQ-17**
High Pigment	AOAC 2007.01	50mg	150mg	50mg	50mg	2mL	**DQ-18**
	EN 15662	25mg	150mg	-	7.5mg	2mL	**DQ-19**
		150mg	900mg	-	45mg	15mL	**DQ-20**
Pigment and Fats	AOAC 2007.01	50mg	150mg	50mg	50mg	2mL	**DQ-21**
		400mg	1200mg	400mg	400mg	15mL	**DQ-22**

References:
1. M. Anastassiades, S. J. Lehotay, D.Stajnbaher, F.J. Schenck, Journal of AOAC International (JAOAC) 86, p. 412-31, 2003.
2. AOAC Official Method 2007.01, Pesticide Residues in Foods by Acetonitrile Extraction and Partitioning with Magnesium Sulfate.
3. QuEChERS: A Mini-Multiresidue Method for the Analysis of Pesticide Residues in Low-fat Products. www.Quechers.com, 2009.
4. EN 15662 Version 2007-10 – 24, Foods of Plant Origin – Determination of Pesticide Residues Using GC-MS and/or LC-MS/MS Following Acetonitrile Extraction/Partitioning and Clean-up by Dispersive SPE (QuEChERS method).

VertiPak™ DQ

- Hight purity packings to yield accurate results
- Pre-packed extraction kits and dispersive SPE kits are assembled to suit specific food types and screening protocols
- Dispersive SPE are supplied in 2mL or 15mL centrifuge tubes, for 1 mL, 6 mL aliquot volumes as specified by the various QuEChERS methodologies

Ordering Information		
Description	QTY	Part No.
VertiPak™ DQ for QuEChERS, LLE		
DQ-1, 6g $MgSO_4$, 1.5g NaCl, 50mL	50	0163-01C5
DQ-2, 4g $MgSO_4$, 1g NaCl, 50mL	50	0163-02C5
DQ-3, 6g $MgSO_4$, 1.5g Sodium acetate, 50mL	50	0163-03C5
DQ-4, 4g $MgSO_4$, 1g NaCl, 1g Trisodium citrate, 0.5g Disodium citrate, 50mL	50	0163-04C5
DQ-5, 4g $MgSO_4$, 0.5g NaCl, 50mL	50	0163-05C5
VertiPak™ DQ for QuEChERS, dSPE		
DQ-6, 50mg PSA, 150mg $MgSO_4$, 2mL	100	0163-06A6
DQ-7, 400mg PSA, 1200mg $MgSO_4$, 15mL	50	0163-07B5
DQ-8, 25mg PSA, 150mg $MgSO_4$, 2mL	100	0163-08A6
DQ-9, 150mg PSA, 900mg $MgSO_4$, 15mL	50	0163-09B5
DQ-10, 50mg PSA, 150mg $MgSO_4$, 50mg C18EC, 2mL	100	0163-10A6
DQ-11, 400mg PSA, 1200mg $MgSO_4$, 400mg C18EC, 15mL	50	0163-11B5
DQ-12, 25mg PSA, 150mg $MgSO_4$, 25mg C18EC, 2mL	100	0163-12A6
DQ-13, 150mg PSA, 900mg $MgSO_4$, 150mg C18EC, 15mL	50	0163-13B5
DQ-14, 50mg PSA, 150mg $MgSO_4$, 50mg GCB, 2mL	100	0163-14A6
DQ-15, 400mg PSA, 1200mg $MgSO_4$, 400mg GCB, 15mL	50	0163-15B5
DQ-16, 25mg PSA, 150mg $MgSO_4$, 2.5mg GCB, 2mL	100	0163-16A6
DQ-17, 150mg PSA, 900mg $MgSO_4$, 15mg GCB, 15mL	50	0163-17B5
DQ-18, 50mg PSA, 150mg $MgSO_4$, 50mg C18EC, 50mg GCB, 2mL	100	0163-18A6
DQ-19, 25mg PSA, 150mg $MgSO_4$, 7.5mg GCB, 2mL	100	0163-19A6
DQ-20, 150mg PSA, 900mg $MgSO_4$, 45mg GCB, 15mL	50	0163-20B5
DQ-21, 50mg PSA, 150mg $MgSO_4$, 50mg C18EC, 50mg GCB, 2mL	100	0163-21A6
DQ-22, 400mg PSA, 1200mg $MgSO_4$, 400mg C18EC, 400mg GCB, 15mL	50	0163-22B5
VertiPak™ PSA/GCB for Schenck Variation of QuEChERS		
250mg PSA, 500mg GCB, 6mL	30	0135-0654
500mg PSA, 500mg GCB, 6mL	30	0135-0954
Bulk Sorbent for QuEChERS		
Magnesium sulfate	100g	0133-0052
Sodium chloride	100g	0133-0053
Sodium acetate	100g	0133-0054
Trisodium citrate	100g	0133-0055
Disodium citrate	100g	0133-0056
PSA (Primary and Secondaty Amine)	100g	0133-0050
C18EC	100g	0133-0031
GCB (Graphitized Carbon Black), Carbograph™	100g	0133-0041
Ceramic homoginizers		
Ceramic homoginizers for tube 2 ml	200	0163-25A7
Ceramic homoginizers for tube 15 ml	100	0163-26B6
Ceramic homoginizers for tube 50 ml	100	0163-27C6

VertiPak™ Custom SPE

VertiPak™ Custom SPE can be made to order to your specification for special applications. Please specify packing type, bed weight tube volume and quantity/pack.

Ordering Instructions Example				
Requirement :	**Packing type**	: 3-Layer Carbograph/Florisil/C18		
	Bed weight	: 500/250/250mg		
	Tube Volume	: 6mL		
	Quantity/PK	: 30		
Packings		**1st Layer**	**2nd Layer**	**3rd Layer**
1. Base (See page)		Carbograph	Florisil-PR	Silica
2. Particle Size (µm)		35-200	150-250	60-120
3. Pore size (Å)		-	60-80	120-140
4. Surface area (m^2/g)		100-200	300-450	300-400
5. Phase type (see page 275)		-	-	C18-LP
6. End capping (Yes or No)		-	-	Yes
7. Carbon Loading (%)		-	-	17
8. Nitrogen Loading (%)		-	-	-
9. Hydrogen Loading (%)		-	-	-
10. Bonding				Trifunctional
11. Surface coverage (µmol/m^2)		-	-	3
12. Ion-exchange capacity (meq/g)		-	-	-
13. Bed weight (mg)		500	250	250
Tubing specification				
1. Tube format (see page 276)		Tube		
2. Tube volume (see page 276)		6mL		
3. Quantity per pack		30		

Ordering Instructions				
Requirement :	**Packing type**	:		
	Bed weight	:		
	Tube Volume	:		
	Quantity/PK	:		
Packings		**1st Layer**	**2nd Layer**	**3rd Layer**
1. Base (See page)				
2. Particle Size (µm)				
3. Pore size (Å)				
4. Surface area (m^2/g)				
5. Phase type (see page 275)				
6. End capping (Yes or No)				
7. Carbon Loading (%)				
8. Nitrogen Loading (%)				
9. Hydrogen Loading (%)				
10. Bonding				
11. Surface coverage (µmol/m^2)				
12. Ion-exchange capacity (meq/g)				
13. Bed weight (mg)				
Tubing specification				
1. Tube format (see page 276)				
2. Tube volume (see page 276)				
3. Quantity per pack				

SPE Empty Tube and Frits

VertiPak™ empty tube are polypropylene with male luer outlets. Frits are 20µm polyethylene. Select empty tube and loose frits to pack your own custom SPE tubes. Empty tubes with 2 bottom frits installed work well as filter tubes to remove particulates down to 20µm.

Ordering Information		
Description	QTY	Part No.
Empty Tube		
1 mL	100	0133-0001
1 mL	500	0133-0002
3 mL	100	0133-0003
6 mL	100	0133-0004
10 mL	100	0133-0005
12 mL	100	0133-0006
35 mL	100	0133-0007
60 mL	50	0133-0008
20µm Loose Frits		
For 1 mL Reservoir	100	0133-0009
For 3 and 10 mL Reservoir	100	0133-0010
For 6 mL Reservoir	100	0133-0011
For 12 mL Reservoir	100	0133-0012
For 35 mL Reservoir	100	0133-0013
For 60 mL Reservoir	100	0133-0014

SPE Caps and Adaptors

Ordering Information		
Description	QTY	Part No.
SPE Caps and Adaptors		
Inlet Caps for Cartridges	50	0133-0019
Inlet Caps for 1 mL	50	0133-0020
Inlet Caps for 3 mL	50	0133-0021
Inlet Caps for 6 mL	50	0133-0022
Inlet Caps for 12 mL	50	0133-0023
Inlet Caps for 35 mL	50	0133-0024
Inlet Caps for 60 mL	50	0133-0025
Outlet Caps for Male Luers	50	0133-0026
Adaptors for 1,3,6,12mL Tubes	5	0133-0027
Adaptors for 35,60 mL Tubes	5	0133-0028

Bulk SPE Packings

Ordering Information		
Description	QTY	Part No.
Bulk SPE Packings		
C18 (17%)	100g	0133-0031
C8	100g	0133-0032
C2	100g	0133-0033
Phenyl	100g	0133-0034
Silica	100g	0133-0035
NH2	100g	0133-0036
PSA	100g	0133-0050
CN	100g	0133-0044
Diol	100g	0133-0037
Florisil	100g	0133-0038
Florisil-PR	100g	0133-0045
AL-N	100g	0133-0046
AL-A	100g	0133-0047
AL-B	100g	0133-0048
SCX	100g	0133-0039
SCX-2	100g	0133-0051
CBA	100g	0133-0049
SAX	100g	0133-0040
Carbograph	100g	0133-0041
C8/SCX	100g	0133-0042
C8/SAX	100g	0133-0043

Vacuum Manifolds and Accessories

Vacuum Manifold Components

A. Glass Chamber
B. Vacuum Valve and Gauge
C. Polypropylene Lid
D. Stopcock Valves
E. Collection Rack Plates
F. Support Posts for Collection Racks
G. Retaining Clips for Collection Racks
H. Lid Legs
I. Manifold Inlet Caps
J. Polypropylene Needles
K. SPE Reservoirs (sold separately)

- **12- and 24-Port Manifolds**
- **Glass Chamber for Visual Monitoring**
- **Accepts Standard Male Luer Devices**

Vacuum manifolds allow you to process multiple samples simultaneously, saving time and effort. Manifold systems come complete with the components listed below. Stainless steel or Teflon® needles are available separately.

Includes Glass Chamber, Vacuum Valve and Gauge, Polypropylene Lid, Stopcock Valves, Collection Racks, Support Posts, Retaining Clips, Manifold Inlet Caps, Lid Legs, and Polypropylene Needles.

The 12-Port Manifold also includes a waste container.

12-Port Manifold

24-Port Manifold

12-Port Manifold

- **For up to 12 Samples**
- **Includes one waste container**

Ordering Information		
Description	QTY	Part No.
12-Port Vacuum Manifold		
12-Port Vacuum Manifold	1	0134-0100
Replacement Parts		
Lid, Gaskets, and 12 Stopcocks	1	0134-0102
Glass Chamber	1	0134-0103
Vacuum Gauge, Valve and Glass Chamber	1	0134-0104
Collection Rack, 12-Port Size*	1	0134-0105
Gaskets, 12-Port Size	2	0134-0106
One-Way Stopcocks	12	0134-0107
Waste Container	2	0134-0108

* 12-Port Collection Rack consists of 3 support posts, bottom plate, 13 and 16mm plates, autosampler vial plate, volumetric plate, and 12 retaining clips

24-Port Manifold

- **Process up to 24 Samples**

Ordering Information		
Description	QTY	Part No.
24-Port Vacuum Manifold		
24-Port Vacuum Manifold	1	0134-0300
Replacement Parts		
Lid, Gaskets, and 24 Stopcocks	1	0134-0301
Glass Chamber	1	0134-0302
Vacuum Gauge, Valve and Glass Chamber	1	0134-0303
Collection Rack, 24-Port Size**	1	0134-0304
Gaskets, 24-Port Size	2	0134-0205
One-Way Stopcocks	24	0134-0306

**24-Port Collection Racks consist of 3 support posts, bottom plate, dimple plate, 13- and 16mm plates, and 12 retaining clips.

Drying Attachments

Use these special drying lids to direct a gas flow into collection tubes to dry eluants. Barb is 1/4".

Ordering Information		
Description	QTY	Part No.
Drying Attachments		
12-Port Drying Attachment	1	0134-0421
24-Port Drying Attachment	1	0134-0423

Large Volume Samplers

Allows for easy "In-Line" transfer of large volumes of low viscosity liquid samples directly from any sample container to SPE tubes. The Large volume samplers consist of 1/8" PTFE tubing and a screw-fitted SPE tube adapter. Vacuum pressure delivered from the vacuum manifold is used to pull the sample through the PTFE tubing into the SPE tube.

Ordering Information		
Description	QTY	Part No.
Large volume samplers		
Large volume sampler, including 1/8"x10ft PTFE Tubes and 5 x Adpators		
for 35,60mL SPE Tubes	1	0134-1001
for 1,3,6,12mL SPE Tubes	1	0134-1002
Replacement Parts		
1/8"x 10ft PTFE Tube	1	0134-1003
Adaptor for 35,60mL SPE Tubes	5	0134-0027
Adaptor for 1,3,6,12mL SPE Tubes	5	0134-0028

Replacement Parts

Manifolds come complete with all neccessary gauges and accessories. Individual replacement parts may be sold separately.

Ordering Information		
Description	QTY	Part No.
Replacement Parts for All Size Manifolds		
Vacuum Gauge and Valve	1	0134-0401
Female Luer Inlet, Polypropylene	2	0134-0402
Female Luer Inlet, Polypropylene	24	0134-0403
Male Luer Outlet, Polypropylene	2	0134-0404
Male Luer Outlet, Polypropylene	24	0134-0405
Caps for Lid Inlets	50	0134-0406
Lid Legs	4	0134-0407
Collection Rack Posts	3	0134-0408

Manifold Needles

Teflon® needles are disposable, fit many different manifold types, and eliminate cross contamination by extending into the collection tube. They also provide a complete Teflon® fluid path for samples to virtually eliminate extractables. Available plain or with a valve. Stainless Steel and Polypropylene needles are also available.

Ordering Information		
Description	QTY	Part No.
Manifold Needles		
Teflon® Needles	100	0134-0409
Valved Teflon® Needles	25	0134-0410
Valved Teflon® Needles	50	0134-0411
Stainless Steel Needles	12	0134-0412
Stainless Steel Needles	24	0134-0414
Polypropylene Needles	12	0134-0415
Polypropylene Needles	24	0134-0417

Vacuum/Pressure Station

- **Pulls Vacuum to 20" Hg, Pressure to 18 psig**
- **Extended Life Diaphragm**
- **An Economical Choice**

Vacuum/pressure station features a built-in bronze and brass vacuum/pressure gauge and stainless steel regulator. Use the auxiliary port to evacuate or pressurize systems simultaneously. Includes a 9" piece vinyl tubing to connect pump to the regulator. Recommended for Vacuum manifold 12 port.

Vacuum/Pressure Pump Specification	
Max vacuum	20" Hg
Max pressure	18 psi
Free-air capacity	0.5 cfm (14.1 L/min)
Noise level	73 dB(A)
Dimensions	7-1/2"L x 8"W x 8-3/4"H
Max temperature	95°F (35°C)
Motor type	1/45 hp, TEFC
Duty cycle	6-hr cycle for diaphragms; motors

Ordering Information		
Description	QTY	Part No.
Vacuum/Pressure StationPump		
115V	1	0209-0051
220V	1	0209-0052
Vacuum/pressure Station Partskit		
Vacuum/Pressure Gauge Connector Kit, Includes Vacuum Regulation Valve Assembly, Pressure Regulation Valve Assembly, Manifold Chamber	1	0209-0060
Service Kit, Includes Plastic Top with Retainers, Valves, Nitrile Diaphragm Eccentric Assembly	1	0209-0061

High-Capacity Vacuum/Pressure Pump

- **Pulls Vacuum to 25.5" Hg, Pressure to 60 psi**
- **Piston type pump for long life operation**
- **High capacity vacuum and pressure**

Free-air capacities up to 1.1 cfm (31.2 L/min). Shaded-pole fan-cooled motor has thermal overload switch to protect your pump system. Includes gauges, regulators, and valves. Recommended for Vacuum manifold 12 port or 24 port.

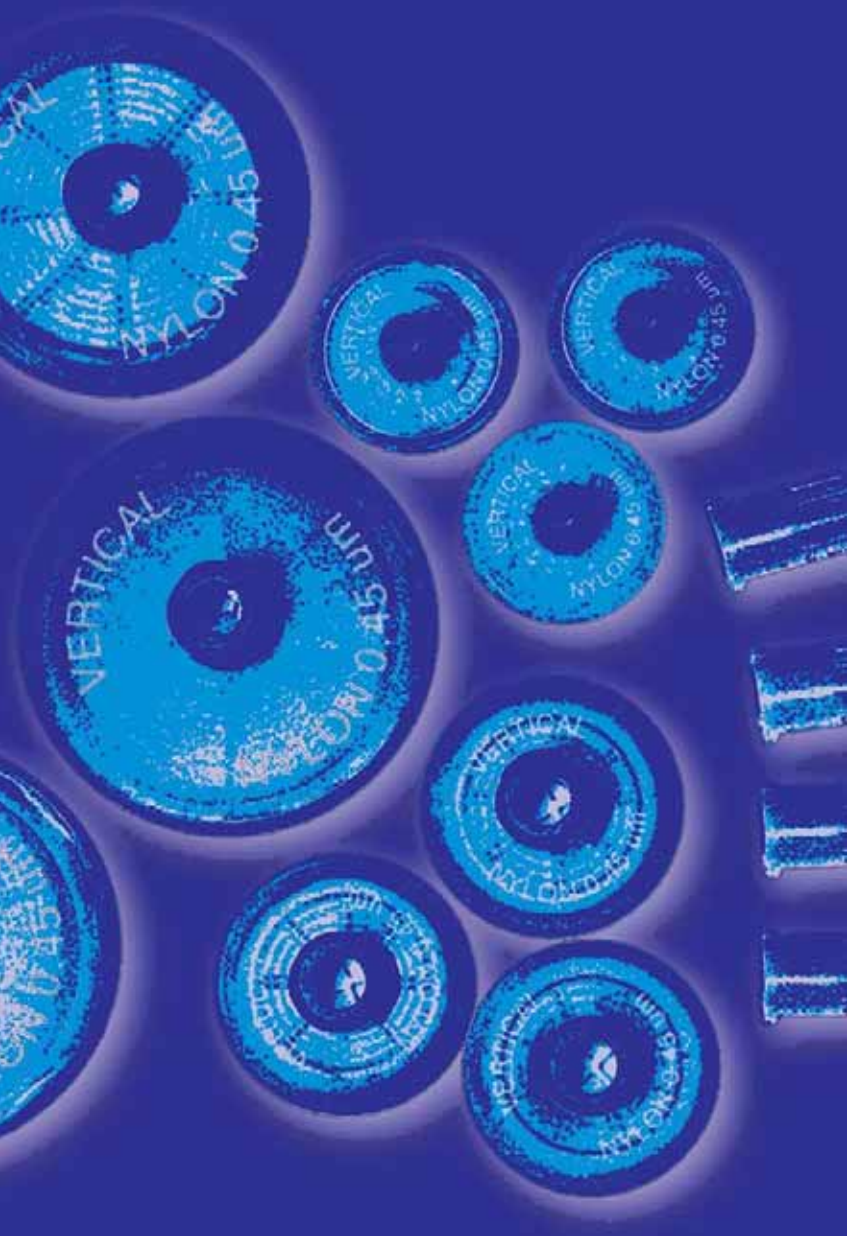
High-Capacity Vacuum/Pressure Pump Specification	
Max vacuum	25.5" Hg
Max pressure	60 psi
Free-air capacity	1.1 cfm (31.2 L/min)
Noise level	68 dB(A)
Dimensions	7-5/8"L x 5-1/8"W x 10-1/4"H
Max temperature	100°F (38°C)
Motor type	1/8 hp, permanent split capacitor
Duty cycle	continuous

Ordering Information		
Description	QTY	Part No.
High-Capacity Vacuum/Pressure Pump		
115V	1	0209-0071
220V	1	0210-0010
Replacement parts and Service kit		
Replacement diaphragm		0209-0073
Service kit		0209-0074

Tygon® Tubing

Tygon® vacuum tubing is heavy walled and flexible. It withstands 29.9" Hg at 75°F (24°C). It is not non-toxic, non-oxidizing and transparanet. Recommended for use with vacuum gauge and valve for vacuum manifold and vacuum pump.

Ordering Information		
Description	QTY	Part No.
Tygon® Vacuum Tubing		
3/8" ID, 7/8" OD	10ft	0134-0431



Filtration

Choosing Filters

There are many different types of filters available from **Vertical**®. Generally there are four main points to consider when choosing the filters. These are :

Burst Pressure (the more burst pressure the more housing integrity and prevent leakage)

Sample volume

Membrane type

Solvent/Membrane compatibility.

Syringe Filter Housing Specification

Size	Burst Pressure[1]	Retain Volume[2]	Sample Volume
4mm	75psi	10µL	≤ 2mL
13mm	100psi	30µL	≤ 10mL
17mm	95psi	45µL	≤ 30mL
25mm	80psi	125µL	≤ 150mL

1. Burst pressure is the maximum pressure to force air through a closed outlet end casing.
2. Retain volume is a volume of solvent retained inside the casing.

Membrane Selection Guide

Membrane Type	Applications
Nylon Nylon (Polyamide) is hydrophilic, good solvent resistance and medium protein binding.	• Filtration of all aqueous and most solvent based samples • Use with care for biological compounds
PTFE PTFE (Polytetrafluoroethylene) is hydrophobic, highest solvent resistance and high protein binding.	• Filtration of non-aqueous or solvent based samples • Good for filtering and degassing chromatography
PVDF-HL, hydrophilic Hydrophilic PVDF (Polyvinylidene difluoride) is high solvent resistance, low protein binding and good flow rate characteristics.	• Filtration of all aqueous and most solvent based samples • General filtration of biological samples
PVDF-HB, hydrophobic Hydrophobic PVDF (Polyvinylidene Fluoride) is high solvent resistance, low protein binding and good flow rate characteristics.	• Filtration of non-aqueous and most solvent based samples • General filtration of biological samples
CA CA (Cellulose Acetate) is hydrophilic, limited solvent resistance and very low protein binding.	• Ideal for aqueous based samples • Ideal for tissue culture and sensitive biological samples
RC RC (Regenerated Cellulose) is hydrophilic, high solvent resistance and lowest protein binding.	• Ideal for aqueous based and organic samples • General filtration of biological samples
MCE MCE (Mixed Cellulose Ester) is hydrophilic, limit solvent resistance, high protein binding and excellent flow rate characteristics.	• Ideal for aqueous based samples • Specifically filtration of trace protein contamination
PP PP (Polypropylene) is hydrophobic, high solvent resistance and lower protein binding than PVDF.	• Filtration of all aqueous and most solvent based samples • General filtration of biological samples
PES PES (Polyethersulfone) is hydrophilic, limited solvent resistance, low protein binding and good flow rate characteristics.	• Ideal for aqueous based samples • Ideal for tissue culture and sensitive biological samples
GMF GMF (Glass microfiber) is commonly used as pre-filters to remove large particulates and minimized sample loss.	• General filtration of biological samples • Used in a variety of sample clean-up and prefiltration

Solvent/Membrane Compatibility

Solvent/Membrane Compatibility

Solvents	NYLON	PTFE	PVDF-HL	PP	PES	CELLULOSE ACETATE	REG.CELLULOSE	MCE
Acids								
Acetic, Glacial	L	C	C	C	C	N	C	N
Acetic, 25%	C	C	C	C	C	C	C	N
Formic, 25%	N	C	C	C	C	L	C	-
Hydrochloric, 25%	N	C	C	C	C	N	N	L
Nitric, 25%	N	C	C	C	L	N	N	N
Phosphoric, 25%	N	C	C	C	C	C	L	N
Sulfuric, 25%	N	C	C	C	C	N	N	-
Trichloroacetic, 10%	N	C	-	C	C	C	C	-
Alkalides								
Ammonium Hydroxide, 25%	C	C	C	C	C	C	L	N
Sodium Hydroxide 3 Normal	C	C	C	N	C	N	L	N
Alcohols								
Amyl Alcohol, Butanol	C	C	L	C	C	C	C	N
Benzyl Alcohol	C	C	C	C	N	L	C	N
Ethanol, 70%	C	C	C	C	L	C	C	C
Ethanol, 98%	C	C	C	C	C	C	C	C
Ethylene Glycol	C	C	C	C	C	C	C	C
Glycerol	C	C	C	C	C	C	C	C
Isopropal, n-Propanol	C	C	C	C	C	C	C	C
Methanol, 98%	C	C	C	C	C	C	C	N
Propylene Glycol	C	C	C	C	C	L	C	C
Hydrocarbons								
Hexane	C	C	C	L	N	C	C	C
Xylene	C	C	C	L	N	C	C	C
Toluene, Benzene	C	C	C	L	N	C	C	C
Halogenated hydrocarbon								
Carbon Tetrachloride	C	C	C	L	N	L	C	C
Chloroform	C	C	C	L	N	N	C	C
Methylene Chloride	L	C	C	L	N	N	C	C
Monochlorobenzene, Freon	C	C	C	L	L	C	C	C
Trichloroethylene	C	C	C	L	N	C	C	C

Solvent/Membrane Compatibility

Solvents	NYLON	PTFE	PVDF-HL	PP	PES	CELLULOSE ACETATE	REG.CELLULOSE	MCE
Ketones								
Acetone,	C	C	C	C	N	N	C	C
Cyclohexanone	C	C	C	C	N	N	C	N
Isopropylacetone	C	C	N	-	N	C	-	C
Methyl Ethyl Ketone	C	C	L	C	N	L	C	N
Methyl Isobutyl Ketone	C	C	N	L	N	C	C	C
Esters								
2-Ethoxylate Acetate	L	L	L	-	N	L	C	L
Amyl Acetate	C	C	C	L	N	L	C	N
Benzyl Benzoate	C	C	-	-	N	C	C	C
Butyl Acetate	C	C	C	L	N	L	C	N
Ethyl acetate	C	C	C	L	N	N	C	N
Isopropyl Myristate	C	C	-	-	N	C	C	C
Methyl Acetate	L	C	L	L	N	N	C	L
Methyl Cellulose Acetate	L	N	C	L	N	N	C	L
Propyl Acetate	L	C	-	L	N	N	C	L
Propylene Glycol Acetate	C	C	C	C	N	N	C	C
Tricresyl Phosphate	-	C	-	-	N	C	C	-
Oxides – Ethers								
Acetonitrile (Methyl Cyanide)	C	C	C	C	N	N	C	C
Aniline	L	C	C	L	N	N	C	L
Diethyl Acetamide	C	C	C	-	-	N	C	C
Dimethyl Formamide	C	C	N	C	N	N	L	C
Dimethyl Sulfoxide (DMSO)	L	C	C	C	N	N	L	N
Dioxane	C	C	L	C	N	N	L	C
Ethyl Ether	C	C	C	L	C	L	C	C
Isopropyl Ether	C	C	N	C	C	C	-	C
Pyridine	C	C	L	L	N	N	C	C
Solvents with Nitrogen								
Tetrahydrofuran	C	C	L	C	N	N	L	N
Triethanolamine	C	C	C	-	-	C	C	C
Miscellaneous								
Formaldehyde Solution, 30%	C	C	C	C	C	L	L	C
Hydrogen Peroxide, 30%	N	C	C	C	C	C	C	C
Phenol, Aqueous, 10%	N	C	L	C	N	N	C	C
Silicone Oil & Mineral Oil	C	C	C	C	C	C	C	C

N = Not Compatible
C = Compatible
L = Limited Compatibility
- = No data Available

VertiPure™ Nylon Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **Use with aqueous and organic solvents**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ Nylon (Polyamide) is hydrophilic, good solvent resistance and medium protein binding. VertiPure™ Nylon ideals for filtration of all aqueous and most solvent based samples. Use with care for bilological compounds.

VertiPure™ Nylon Syringe Filter with 1.0µm Glass Microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	50			
	0.45µm	30			
Typical Flow rate[2]	0.2µm	10			
(mL/min/cm²)	0.45µm	27			
Membrane Material		Polyamide			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ Nylon Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-0201
		500	0201-0205
		1000	0201-0210
	0.45µm	100	0201-0401
		500	0201-0405
		1000	0201-0410
17mm	0.2µm	100	0202-0201
		500	0202-0205
		1000	0202-0210
	0.45µm	100	0202-0401
		500	0202-0405
		1000	0202-0410
25mm	0.2µm	100	0203-0201
		500	0203-0205
		1000	0203-0210
	0.45µm	100	0203-0401
		500	0203-0405
		1000	0203-0410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ Nylon Syringe Filters			
4mm	0.2µm	100	0200-0101
		500	0200-0105
		1000	0200-0110
	0.45µm	100	0200-0301
		500	0200-0305
		1000	0200-0310
13mm	0.2µm	100	0201-0101
		500	0201-0105
		1000	0201-0110
	0.45µm	100	0201-0301
		500	0201-0305
		1000	0201-0310
17mm	0.2µm	100	0202-0101
		500	0202-0105
		1000	0202-0110
	0.45µm	100	0202-0301
		500	0202-0305
		1000	0202-0310
25mm	0.2µm	100	0203-0101
		500	0203-0105
		1000	0203-0110
	0.45µm	100	0203-0301
		500	0203-0305
		1000	0203-0310

VertiPure™ PTFE Syringe Filters

- **Filtration of non-aqueous or solvent based samples**
- **Prewetting with methanol or ethanol prior to aqueous samples filtration**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ PTFE (Polytetrafluoroethylene) is hydrophobic, highest solvent resistance and high protein binding. VertiPure™ PTFE ideals for filtration of non-aqueous or solvent based samples and degassing chromatography.

VertiPure™ PTFE Syringe Filter with 1.0µm Glass Microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	14			
	0.45µm	8			
Typical Flow rate[2] (mL/min/cm²)	0.2µm	50			
	0.45µm	100			
Membrane Material		Polytetrafluoroethylene			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PTFE Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-2201
		500	0201-2205
		1000	0201-2210
	0.45µm	100	0201-2401
		500	0201-2405
		1000	0201-2410
17mm	0.2µm	100	0202-2201
		500	0202-2205
		1000	0202-2210
	0.45µm	100	0202-2401
		500	0202-2405
		1000	0202-2410
25mm	0.2µm	100	0203-2201
		500	0203-2205
		1000	0203-2210
	0.45µm	100	0203-2401
		500	0203-2405
		1000	0203-2410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PTFE Syringe Filters			
4mm	0.2µm	100	0200-2101
		500	0200-2105
		1000	0200-2110
	0.45µm	100	0200-2301
		500	0200-2305
		1000	0200-2310
13mm	0.2µm	100	0201-2101
		500	0201-2105
		1000	0201-2110
	0.45µm	100	0201-2301
		500	0201-2305
		1000	0201-2310
17mm	0.2µm	100	0202-2101
		500	0202-2105
		1000	0202-2110
	0.45µm	100	0202-2301
		500	0202-2305
		1000	0202-2310
25mm	0.2µm	100	0203-2101
		500	0203-2105
		1000	0203-2110
	0.45µm	100	0203-2301
		500	0203-2305
		1000	0203-2310

VertiPure™ PVDF-HL Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **General filtration of biological samples**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ PVDF-HL (Hydrophilic polyvinylidene fluoride) is low UV absorbing extractables and highly resistance to most solvents and low protein binding. VertiPure™ PVDF ideals for filtration of all aqueous or most solvent based samples and biological samples.

VertiPure™ PVDF-HL Syringe Filter with 1.0µm Glass Microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	45			
	0.45µm	30			
Typical Flow rate[2]	0.2µm	22			
(mL/min/cm²)	0.45µm	48			
Membrane Material		Hydrophilic polyvinylidene fluoride			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PVDF-HL Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-3201
		500	0201-3205
		1000	0201-3210
	0.45µm	100	0201-3401
		500	0201-3405
		1000	0201-3410
17mm	0.2µm	100	0202-3201
		500	0202-3205
		1000	0202-3210
	0.45µm	100	0202-3401
		500	0202-3405
		1000	0202-3410
25mm	0.2µm	100	0203-3201
		500	0203-3205
		1000	0203-3210
	0.45µm	100	0203-3401
		500	0203-3405
		1000	0203-3410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PVDF-HL Syringe Filters			
4mm	0.2µm	100	0200-3101
		500	0200-3105
		1000	0200-3110
	0.45µm	100	0200-3301
		500	0200-3305
		1000	0200-3310
13mm	0.2µm	100	0201-3101
		500	0201-3105
		1000	0201-3110
	0.45µm	100	0201-3301
		500	0201-3305
		1000	0201-3310
17mm	0.2µm	100	0202-3101
		500	0202-3105
		1000	0202-3110
	0.45µm	100	0202-3301
		500	0202-3305
		1000	0202-3310
25mm	0.2µm	100	0203-3101
		500	0203-3105
		1000	0203-3110
	0.45µm	100	0203-3301
		500	0203-3305
		1000	0203-3310

VertiPure™ CA Syringe Filters

- **For aqueous based samples and biological samples.**
- **Available in 4mm, 13mm, 17mm, and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ CA (Cellulose Acetate) is hydrophilic, limited solvent resistance, very low protein binding. The pre-filter increases yield. VertiPure™ CA ideals for aqueous based samples and tissue culture and sensitive biological samples.

VertiPure™ CA Syringe Filter with 1.0µm Glass Microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	50			
	0.45µm	30			
Typical Flow rate[2] (mL/min/cm²)	0.2µm	16			
	0.45µm	54			
Membrane Material		Cellulose Acetate			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ CA Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-1201
		500	0201-1205
		1000	0201-1210
	0.45µm	100	0201-1401
		500	0201-1405
		1000	0201-1410
17mm	0.2µm	100	0202-1201
		500	0202-1205
		1000	0202-1210
	0.45µm	100	0202-1401
		500	0202-1405
		1000	0202-1410
25mm	0.2µm	100	0203-1201
		500	0203-1205
		1000	0203-1210
	0.45µm	100	0203-1401
		500	0203-1405
		1000	0203-1410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ CA Syringe Filters			
4mm	0.2µm	100	0200-1101
		500	0200-1105
		1000	0200-1110
	0.45µm	100	0200-1301
		500	0200-1305
		1000	0200-1310
13mm	0.2µm	100	0201-1101
		500	0201-1105
		1000	0201-1110
	0.45µm	100	0201-1301
		500	0201-1305
		1000	0201-1310
17mm	0.2µm	100	0202-1101
		500	0202-1105
		1000	0202-1110
	0.45µm	100	0202-1301
		500	0202-1305
		1000	0202-1310
25mm	0.2µm	100	0203-1101
		500	0203-1105
		1000	0203-1110
	0.45µm	100	0203-1301
		500	0203-1305
		1000	0203-1310

VertiPure™ RC Syringe Filters

- **Ideal for aqueous based samples**
- **General filtration of biological samples**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ RC (Regenerated Cellulose) is hydrophilic, high solvent resistance and lowest protein binding. VertiPure™ RC ideals for aqueous based samples and biological samples.

VertiPure™ RC Syringe Filter with 1.0µm Glass microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	35			
	0.45µm	24			
Typical Flow rate[2]	0.2µm	27			
(mL/min/cm²)	0.45µm	37			
Membrane Material		Regenerated Cellulose			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ RC Syringe Filters with GMF Prefilter			
13mm	0.2µm	100	0201-5201
		500	0201-5205
		1000	0201-5210
	0.45µm	100	0201-5401
		500	0201-5405
		1000	0201-5410
17mm	0.2µm	100	0202-5201
		500	0202-5205
		1000	0202-5210
	0.45µm	100	0202-5401
		500	0202-5405
		1000	0202-5410
25mm	0.2µm	100	0203-5201
		500	0203-5205
		1000	0203-5210
	0.45µm	100	0203-5401
		500	0203-5405
		1000	0203-5410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ RC Syringe Filters			
4mm	0.2µm	100	0200-5101
		500	0200-5105
		1000	0200-5110
	0.45µm	100	0200-5301
		500	0200-5305
		1000	0200-5310
13mm	0.2µm	100	0201-5101
		500	0201-5105
		1000	0201-5110
	0.45µm	100	0201-5301
		500	0201-5305
		1000	0201-5310
17mm	0.2µm	100	0202-5101
		500	0202-5105
		1000	0202-5110
	0.45µm	100	0202-5301
		500	0202-5305
		1000	0202-5310
25mm	0.2µm	100	0203-5101
		500	0203-5105
		1000	0203-5110
	0.45µm	100	0203-5301
		500	0203-5305
		1000	0203-5310

VertiPure™ PP Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **General filtration of biological samples**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ PP (Polypropylene) is hydrophobic, high solvent resistance, lower protein binding than PVDF. VertiPure™ PP ideals for all aqueous or most solvent based samples and biological samples.

VertiPure™ PP Syringe Filter with 1.0µm Glass microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	35			
	0.45µm	24			
Typical Flow rate[2] (mL/min/cm²)	0.2µm	24			
	0.45µm	60			
Membrane Material		Prolypropylene			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PP Syringe Filters with GMF Prefilter			
13mm	0.2µm	100	0201-4201
		500	0201-4205
		1000	0201-4210
	0.45µm	100	0201-4401
		500	0201-4405
		1000	0201-4410
17mm	0.2µm	100	0202-4201
		500	0202-4205
		1000	0202-4210
	0.45µm	100	0202-4401
		500	0202-4405
		1000	0202-4410
25mm	0.2µm	100	0203-4201
		500	0203-4205
		1000	0203-4210
	0.45µm	100	0203-4401
		500	0203-4405
		1000	0203-4410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PP Syringe Filters			
4mm	0.2µm	100	0200-4101
		500	0200-4105
		1000	0200-4110
	0.45µm	100	0200-4301
		500	0200-4305
		1000	0200-4310
13mm	0.2µm	100	0201-4101
		500	0201-4105
		1000	0201-4110
	0.45µm	100	0201-4301
		500	0201-4305
		1000	0201-4310
17mm	0.2µm	100	0202-4101
		500	0202-4105
		1000	0202-4110
	0.45µm	100	0202-4301
		500	0202-4305
		1000	0202-4310
25mm	0.2µm	100	0203-4101
		500	0203-4105
		1000	0203-4110
	0.45µm	100	0203-4301
		500	0203-4305
		1000	0203-4310

VertiPure™ PES Syringe Filters

- **Ideal for aqueous based samples**
- **General filtration of biological samples**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ PES (Polyethersulfone) is hydrophilic, limited solvent resistance, low protein binding and good flow rate characteristics. VertiPure™ PES ideals for aqueous based samples and biological samples.

VertiPure™ PES Syringe Filter with 1.0µm Glass microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	50			
	0.45µm	35			
Typical Flow rate[2]	0.2µm	33			
(mL/min/cm²)	0.45µm	58			
Membrane Material		Polyethersulfone			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PES Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-6201
		500	0201-6205
		1000	0201-6210
	0.45µm	100	0201-6401
		500	0201-6405
		1000	0201-6410
17mm	0.2µm	100	0202-6201
		500	0202-6205
		1000	0202-6210
	0.45µm	100	0202-6401
		500	0202-6405
		1000	0202-6410
25mm	0.2µm	100	0203-6201
		500	0203-6205
		1000	0203-6210
	0.45µm	100	0203-6401
		500	0203-6405
		1000	0203-6410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ PES Syringe Filters			
4mm	0.2µm	100	0200-6101
		500	0200-6105
		1000	0200-6110
	0.45µm	100	0200-6301
		500	0200-6305
		1000	0200-6310
13mm	0.2µm	100	0201-6101
		500	0201-6105
		1000	0201-6110
	0.45µm	100	0201-6301
		500	0201-6305
		1000	0201-6310
17mm	0.2µm	100	0202-6101
		500	0202-6105
		1000	0202-6110
	0.45µm	100	0202-6301
		500	0202-6305
		1000	0202-6310
25mm	0.2µm	100	0203-6101
		500	0203-6105
		1000	0203-6110
	0.45µm	100	0203-6301
		500	0203-6305
		1000	0203-6310

VertiPure™ MCE Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **Use with aqueous and organic solvents**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ MCE (Mixed Cellulose Acetate) is hydrophilic, good solvent resistance and high protein binding. VertiPure™ MCE ideals for filtration of all aqueous and most solvent based samples and specifically filtration of trace protein contamination.

VertiPure™ MCE Syringe Filter with 1.0µm Glass microfilter Prefilter offers excellent for filtration of viscous or particle laden samples without clogging.

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Bubble point[1](psi)	0.2µm	52			
	0.45µm	30			
Typical Flow rate[2] (mL/min/cm²)	0.2µm	19			
	0.45µm	51			
Membrane Material		Mixed Cellulose Acetate			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ MCE Syringe Filters with 1.0µm GMF Prefilter			
13mm	0.2µm	100	0201-8201
		500	0201-8205
		1000	0201-8210
	0.45µm	100	0201-8401
		500	0201-8405
		1000	0201-8410
17mm	0.2µm	100	0202-8201
		500	0202-8205
		1000	0202-8210
	0.45µm	100	0202-8401
		500	0202-8405
		1000	0202-8410
25mm	0.2µm	100	0203-8201
		500	0203-8205
		1000	0203-8210
	0.45µm	100	0203-8401
		500	0203-8405
		1000	0203-8410

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ MCE Syringe Filters			
4mm	0.2µm	100	0200-8101
		500	0200-8105
		1000	0200-8110
	0.45µm	100	0200-8301
		500	0200-8305
		1000	0200-8310
13mm	0.2µm	100	0201-8101
		500	0201-8105
		1000	0201-8110
	0.45µm	100	0201-8301
		500	0201-8305
		1000	0201-8310
17mm	0.2µm	100	0202-8101
		500	0202-8105
		1000	0202-8110
	0.45µm	100	0202-8301
		500	0202-8305
		1000	0202-8310
25mm	0.2µm	100	0203-8101
		500	0203-8105
		1000	0203-8110
	0.45µm	100	0203-8301
		500	0203-8305
		1000	0203-8310

VertiPure™ GMF Syringe Filters

- **Ideal for aqueous based samples**
- **General filtration of biological samples**
- **Available in 4mm, 13mm, 17mm and 25mm diameter membranes**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

VertiPure™ GMF (Glass Microfiber) is borosilicate glass fiber, high solvent resistant, inert to protein and good flowrate characteristics. VertiPure™ GMF ideals for sample clean-up, prefiltration, and analytical testing applications. aqueous based samples and biological samples

Specifications

Properties		Diameter(mm)			
		4	13	17	25
Flow rate[1] (mL/min/cm²)		60			
Membrane Material		Glass Microfilter			
Housing Material		Pigment-free Polypropylene			
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip			
Burst Pressure[3](psi)		75	100	90	80
Retain Volume[4](µL)		10	30	45	125
Sample Volume(mL)		2	10	30	150
Packaging	4, 13, 17mm	PP Thread Bottle			
	25mm	Corrugated Box			

[1] Flow rate is initial flow rate at 10 psi using water.
[2] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[3] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiPure™ GMF Syringe Filters			
4mm	1.0µm	100	0200-7501
		500	0200-7505
		1000	0200-7510
13mm	1.0µm	100	0201-7501
		500	0201-7505
		1000	0201-7510
17mm	1.0µm	100	0202-7501
		500	0202-7505
		1000	0202-7510
25mm	1.0µm	100	0203-7501
		500	0203-7505
		1000	0203-7510

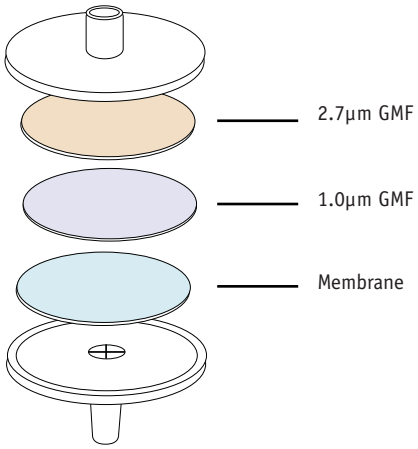
VertiPure™ X2G Syringe Filters

- **Excellent for filtration of viscous or particle laden samples coupled with broad range of chemical compatibility**
- **Contains 2 layers of Borosilicate Glass Micro Fiber and 1 layer of Filter membrane of choices**
- **Membrane filters are available as NYLON, PTFE, PVDF and CA(Cellolose acetate)**
- **Membrane diameters are available in 13mm, 17mm and 25mm**
- **Includes Certificate of Analysis for leakage, extractables and particle size distribution**

Specifications

Properties		Diameter(mm)		
		4	13	17
Housing Material		Pigment-free Polypropylene		
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip		
Burst Pressure[3](psi)		100	90	75
Retain Volume[4](µL)		60	80	230
Sample Volume(mL)		10	30	150
Membrane, Layer 1		2.7µm Glass Micro Fiber		
Membrane, Layer 2		1.0µm Glass Micro Fiber		
Membrane, Layer 3		Nylon, PTFE, PVDF, CA		
Packaging	4, 13, 17mm	PP Thread Bottle		
	25mm	Corrugated Box		

[1] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[2] Retention volume is a volume of solvent retained inside the housing.



Ordering Information

Membrane	Size	Pore Size	QTY	Part No.
VertiPure™ X2G Syringe Filters				
NYLON	13mm	0.2µm	100	0201-0601
		0.45µm	100	0201-0701
	17mm	0.2µm	100	0202-0601
		0.45µm	100	0202-0701
	25mm	0.2µm	100	0203-0601
		0.45µm	100	0203-0701
PTFE	13mm	0.2µm	100	0201-2601
		0.45µm	100	0201-2701
	17mm	0.2µm	100	0202-2601
		0.45µm	100	0202-2701
	25mm	0.2µm	100	0203-2601
		0.45µm	100	0203-2701
PVDF	13mm	0.2µm	100	0201-3601
		0.45µm	100	0201-3701
	17mm	0.2µm	100	0202-3601
		0.45µm	100	0202-3701
	25mm	0.2µm	100	0203-3601
		0.45µm	100	0203-3701
CA	13mm	0.2µm	100	0201-1601
		0.45µm	100	0201-1701
	17mm	0.2µm	100	0202-1601
		0.45µm	100	0202-1701
	25mm	0.2µm	100	0203-1601
		0.45µm	100	0203-1701

VertiClean™ Nylon Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **Use with aqueous and organic solvents**
- **Available in 13mm and 25mm diameter membranes**
- **Economic price**

VertiClean™ Nylon (Polyamide) is hydrophilic, good solvent resistance and medium protein binding. VertiClean™ Nylon ideals for filtration of all aqueous and most solvent based samples. Use with care for biological compounds.

Specifications

Properties		Diameter(mm)	
		13	25
Bubble point[1](psi)	0.2µm	46	
	0.45µm	29	
Typical Flow rate[2] (mL/min/cm²)	0.2µm	10	
	0.45µm	27	
Membrane material		Polyamide	
Housing Material		Pigment-free Polypropylene	
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip	
Burst Pressure[3](psi)		100	80
Retain Volume[4](µL)		30	125
Sample Volume(mL)		10	150
Packaging	13mm	PP Thread Bottle	
	25mm	Corrugated Box	

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10 psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiClean™ Nylon Syringe Filters			
13mm	0.2µm	100	0221-0101
		500	0221-0105
		1000	0221-0110
	0.45µm	100	0221-0301
		500	0221-0305
		1000	0221-0310
25mm	0.2µm	100	0223-0101
		500	0223-0105
		1000	0223-0110
	0.45µm	100	0223-0301
		500	0223-0305
		1000	0223-0310

VertiClean™ MCE Syringe Filters

- **Filtration of all aqueous and most solvent based samples**
- **Use with aqueous and organic solvents**
- **Available in 13mm and 25mm diameter membranes**
- **Economic price**

VertiClean™ MCE (Mixed Cellulose Acetate) is hydrophilic, good solvent resistance and high protein binding. VertiClean™ MCE ideals for filtration of all aqueous and most solvent based samples and specifically filtration of trace protein contamination.

Specifications

Properties		Diameter(mm)	
		13	25
Bubble point[1](psi)	0.2μm	52	
	0.45μm	30	
Typical Flow rate[2] (mL/min/cm²)	0.2μm	19	
	0.45μm	51	
Membrane material		Mixed Cellulose Acetate	
Housing Material		Pigment-free Polypropylene	
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip	
Burst Pressure[3](psi)		100	80
Retain Volume[4](μL)		30	125
Sample Volume(mL)		10	150
Packaging	13mm	PP Thread Bottle	
	25mm	Corrugated Box	

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10 psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiClean™ MCE Syringe Filters			
13mm	0.2μm	100	0221-8101
		500	0221-8105
		1000	0221-8110
	0.45μm	100	0221-8301
		500	0221-8305
		1000	0221-8310
25mm	0.2μm	100	0223-8101
		500	0223-8105
		1000	0223-8110
	0.45μm	100	0223-8301
		500	0223-8305
		1000	0223-8310

VertiClean™ PTFE Syringe Filters

- **Filtration of non-aqueous or solvent based samples**
- **Prewetting with methanol or ethanol prior to aqueous samples filtration**
- **Available in 13mm and 25mm diameter membranes**
- **Economic price**

VertiClean™ PTFE (Polytetrafluoroethylene) is hydrophobic, highest solvent resistance and high protein binding. VertiClean™ PTFE ideals for filtration of non-aqueous or solvent based samples and degassing chromatography.

Specifications

Properties		Diameter(mm)	
		13	25
Bubble point[1](psi)	0.2μm	14	
	0.45μm	8	
Typical Flow rate[2] (mL/min/cm²)	0.2μm	55	
	0.45μm	100	
Membrane material		Polytetrafluoroethylene	
Housing Material		Pigment-free Polypropylene	
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip	
Burst Pressure[3](psi)		100	80
Retain Volume[4](μL)		30	125
Sample Volume(mL)		10	150
Packaging	13mm	PP Thread Bottle	
	25mm	Corrugated Box	

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10 psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiClean™ PTFE Syringe Filters			
13mm	0.2μm	100	0221-8101
		500	0221-8105
		1000	0221-8110
	0.45μm	100	0221-8301
		500	0221-8305
		1000	0221-8310
25mm	0.2μm	100	0223-8101
		500	0223-8105
		1000	0223-8110
	0.45μm	100	0223-8301
		500	0223-8305
		1000	0223-8310

VertiClean™ PVDF-HB Syringe Filters

- **Filtration of all non-aqueous and solvent based samples**
- **General filtration of biological samples**
- **Available in 13mm and 25mm diameter membranes**
- **Economic price**

VertiClean™ PVDF-HB (Hydrophobic Polyvinylidene Fluoride) is low UV absorbing extractables and highly resistance to most solvents and low protein binding. VertiClean™ PVDF ideals for filtration of non-aqueous or solvent based samples and biological samples.

Specifications

Properties		Diameter(mm)	
		13	25
Bubble point[1](psi)	0.2μm	35	
	0.45μm	24	
Typical Flow rate[2] (mL/min/cm²)	0.2μm	12	
	0.45μm	29	
Membrane material		Hydrophobic Polyvinylidenefluoride	
Housing Material		Pigment-free Polypropylene	
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip	
Burst Pressure[3](psi)		100	80
Retain Volume[4](μL)		30	125
Sample Volume(mL)		10	150
Packaging	13mm	PP Thread Bottle	
	25mm	Corrugated Box	

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10 psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiClean™ PVDF-HB Syringe Filters			
13mm	0.2μm	100	0221-9101
		500	0221-9105
		1000	0221-9110
	0.45μm	100	0221-9301
		500	0221-9305
		1000	0221-9310
25mm	0.2μm	100	0223-9101
		500	0223-9105
		1000	0223-9110
	0.45μm	100	0223-9301
		500	0223-9305
		1000	0223-9310

VertiClean™ CA Syringe Filters

- **For aqueous based samples and biological samples.**
- **Available in 13mm and 25mm diameter membranes**

VertiClean™ CA (Cellulose Acetate) is hydrophilic, limited solvent resistance, very low protein binding. The pre-filter increases yield. VertiClean™ CA ideals for aqueous based samples and tissue culture and sensitive biological samples.

Specifications

Properties		Diameter(mm)	
		13	25
Bubble point[1](psi)	0.2µm	50	
	0.45µm	30	
Typical Flow rate[2] (mL/min/cm²)	0.2µm	16	
	0.45µm	54	
Membrane material		Cellulose Acetate	
Housing Material		Pigment-free Polypropylene	
Connector (inlet/outlet)		Female Luer Lock/Male Luer Slip	
Burst Pressure[3](psi)		100	80
Retain Volume[4](µL)		30	125
Sample Volume(mL)		10	150
Packaging	13mm	PP Thread Bottle	
	25mm	Corrugated Box	

[1] Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.
[2] Flow rate is initial flow rate at 10 psi using water.
[3] Burst pressure is the maximum pressure to force air through a closed outlet end housing.
[4] Retention volume is a volume of solvent retained inside the housing.

Ordering Information

Size	Pore Size	QTY	Part No.
VertiClean™ CA Syringe Filters			
13mm	0.2µm	100	0221-1101
		500	0221-1105
		1000	0221-1110
	0.45µm	100	0221-1301
		500	0221-1305
		1000	0221-1310
25mm	0.2µm	100	0223-1101
		500	0223-1105
		1000	0223-1110
	0.45µm	100	0223-1301
		500	0223-1305
		1000	0223-1310

Membrane Filters

- Variety of Pore Sizes and Membrane Materials
- Non-Sterile

Hydrophilic : Aqueous and organic solvent

Ordering Information			
Size	Pore Size	QTY	Part No.
NYLON Membrane Filters			
13mm	0.2µm	100	0231-0101
	0.45µm	100	0231-0301
25mm	0.2µm	100	0233-0101
	0.45µm	100	0233-0301
47mm	0.2µm	100	0235-0101
	0.45µm	100	0235-0301
CA Membrane Filters			
13mm	0.2µm	100	0231-1101
	0.45µm	100	0231-1301
25mm	0.2µm	100	0233-1101
	0.45µm	100	0233-1301
47mm	0.2µm	100	0235-1101
	0.45µm	100	0235-1301
MCE Membrane Filters			
13mm	0.2µm	100	0231-8101
	0.45µm	100	0231-8301
25mm	0.2µm	100	0233-8101
	0.45 µm	100	0233-8301
47mm	0.2 µm	100	0235-8101
	0.45 µm	100	0235-8301
PVDF-HL Membrane Filters			
13mm	0.2µm	100	0231-3101
	0.45µm	100	0231-3301
25mm	0.2µm	100	0233-3101
	0.45µm	100	0233-3301
47mm	0.2µm	100	0235-3101
	0.45µm	100	0235-3301

Hydrophobic : Non-Aqueous, organic and high solvent resistant

Ordering Information			
Size	Pore Size	QTY	Part No.
PTFE Membrane Filters			
13mm	0.2µm	100	0231-2101
	0.45µm	100	0231-2301
25mm	0.2µm	100	0233-2101
	0.45µm	100	0233-2301
47mm	0.2µm	100	0235-2101
	0.45µm	100	0235-2301
PVDF-HB Membrane Filters			
13mm	0.2µm	100	0231-9101
	0.45µm	100	0231-9301
25mm	0.2µm	100	0233-9101
	0.45µm	100	0233-9301
47mm	0.2µm	100	0235-9101
	0.45µm	100	0235-9301

Syringe Filter Holder

Use this reusable syringe filter housing with disposable filter membranes to filter samples or small quantities of mobile phases. The stainless steel or polypropylene filter housing holds your choice of membrane. The outlet accepts any standard luer-hub needle.

Ordering Information		
Description	QTY	Part No.
Syringe Filter Holder		
13mm Stainless Steel	1	0210-0001
25mm Stainless Steel	1	0210-0002
13mm Polypropylene Steel	10	0210-0003
25mm Polypropylene Steel	12	0210-0004

Glass Syringes

- Reinforced flanges with two flat sides to prevent rolling
- All borosilicate glass plunger and barrel for accurate, leak-proof performance and resistance to chemicals and thermal shock.
- Graduations are fused on to the syringe barrel
- Interchangeable plungers

5mL Glass syringe with glass luer slip tip

20mL Glass syringe with metal luer lock tip

Ordering Information		
Size	QTY	Part No.
Glass Syringe, Luer-Tip		
2mL	1	0211-1211
	12	0211-1213
5mL	1	0211-1411
	12	0211-1413
10mL	1	0211-1511
	12	0211-1513
20mL	1	0211-1611
	12	0211-1613
50mL	1	0211-1811
	12	0211-1813
Glass Syringe, Luer-Lock		
2mL	1	0211-2211
	12	0211-2213
5mL	1	0211-2411
	12	0211-2413
10mL	1	0211-2511
	12	0211-2513
20mL	1	0211-2611
	12	0211-2613
50mL	1	0211-2811
	12	0211-2813

Plastic Syringes

- Made of medical-grade polypropylene
- Sterile Disposable
- Ideal for use with syringe filters and general purpose applications
- Come in an easy-to-open sealed package
- Eliminate Ion Contamination in IC Applications

Ordering Information		
Size	QTY	Part No.
Plastic Syringe, Luer-Tip		
1mL	100	0211-1125
3mL	100	0211-1325
5mL	100	0211-1425
10mL	100	0211-1525
20mL	50	0211-1624
Plastic Syringe, Luer-Lock		
3mL	100	0211-2325
5mL	100	0211-2425
10mL	100	0211-2525
20mL	50	0211-2624

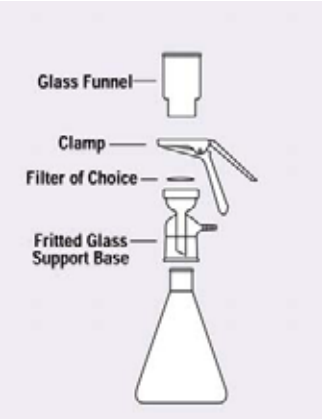
Solvent Filtration Apparatus

- **Made of 100% borosilicate glass**
- **Ideal for vacuum filtration of liquids and degassing of HPLC solvent**

Liquids come in contact only with borosilicate glass, assure resistance to even the most aggressive solvents.

Support base design has integral vacuum connection located above filtrate drip to prevent contamination of vacuum line with droplets.

Includes glass reservoir, funnel, support base with joint 40/35, and aluminium clamp.



Specification	
Material of construction	All parts are 100% borosilicate glass. Clamp is aluminum.
Filtration area	9.6cm²
Filter size	47mm
Funnel capacity	300mL
Flask capacity	1L, 40/35 ground joint

Ordering Information		
Description	QTY	Part No.
Solvent Filtration Apparatus		
Solvent Filtration Apparatus, includes 1L Flask 40/35, 300mL Funnel, Frited glass support base 40/35, 47mm Clamp	1	0210-0005
Replacement Parts/Accessories		
Glass funnel, 300mL	1	0210-0006
Fritted glass support base, 40/35	1	0210-0007
Flask, 1L, 40/35	1	0210-0008
Aluminum clamp, 47mm	1	0210-0009

Vacuum/Pressure Pump

- **Oiless operation**
- **Motor mounted**
- **Rugged construction/ low maintenance**

Oiless operation reduce the risk of sample contamination from oil, dust and helps maintain a clean laboratory environment in which to produce reliable, reproducible data every time.

Free-air capacities up to 1.0cfm (28.3L/min). Shaded-pole fan-cooled motor has thermal overload switch to protect your pump system. Includes gauges, regulators, and valves, and tube.

Ideal addition to any busy laboratory that requires a vacuum and/or pressure source for various applications.

Specification	
Max vacuum	24.0"Hg
Max pressure	60psi
Free-air capacity	1.0cfm (28.3L/min)
Dimensions	7-5/8"L x 5-1/8"W x 10-1/4"H
Weight	7.3kg
Motor type	1/8hp, shaded-pole fan-cooled

Ordering Information		
Description	QTY	Part No.
Vacuum/Pressure Pump		
Vacuum/Pressure Pump, 220V/50Hz	1	0210-0010

Centrifuge Filter Tubes

2mL Filter Tubes

- **For up to 850µL sample volumes**
- **Polypropylene housings**

Quickly and easily clarify small sample volumes with 2mL centrifuge filter tubes. These devices fit in any standard microcentrifuge, and allow to process multiple samples simultaneously. Less than 5µL hold-up volume provides near quantitative volumetric recovery. Maximum G-Force: 10,000xG. 2mL centrifuge filter tubes include glass prefilters.

Ordering Information		
Description	QTY	Part No.
2mL Filter Tubes, Cellulose Acetate		
0.2µm	100	0256-1101
0.45µm	100	0256-1301
2mL Filter Tubes, Nylon		
0.2µm	100	0256-0101
0.45µm	100	0256-0301
2mL Filter Tubes, PVDF-HB (Hydrophobic)		
0.2µm	100	0256-9101
0.45µm	100	0256-9301
2mL Filter Tubes, Regenerated Cellulose		
0.2µm	100	0256-5101
0.45µm	100	0256-5301

Forensic Filter Tubes

- **600µL Capacity**
- **Extracts fluids from cloth samples**
- **Polypropylene housing**

The 1.4mm mesh acts as a sieve to retain cloth samples and pass fluids to the receiver tube.

Ordering Information		
Description	QTY	Part No.
Forensic Filter Tubes		
Forensic Filter Tubes	100	0256-7901
Forensic Filter Tubes	1000	0256-7910

50mL Filter Tubes

- **For up to 25mL sample volumes**
- **Polypropylene housings**
- **Used with fixed angle rotor centrifuge**

50 centrifuge filter tubes remove particulates from larger sample sizes with any centrifuge that holds 50mL conical tubes. They should only be used with a fixed-angle rotor centrifuge to prevent premature clogging of the membrane. Maximum operating temperature: 50° C. Maximum G-force: 2,500xG.

Ordering Information		
Description	QTY	Part No.
50mL Filter Tubes, Cellulose Acetate		
0.2µm	50	0256-1101
0.45µm	50	0256-1301
50mL Filter Tubes, Nylon		
0.2µm	50	0256-0101
0.45µm	50	0256-0301
50mL Filter Tubes, PVDF-HB (Hydrophobic)		
0.2µm	50	0256-9101
0.45µm	50	0256-9301
50mL Filter Tubes, Regenerated Cellulose		
0.2µm	50	0256-5101
0.45µm	50	0256-5301

Vials

Vial Selection by Instrument

Manufacturer	Model	Vial size (mm) Neck Style	8x40 Shell Plug	12x32 Screw 8/425	12x32 Screw 9mm	12x32 Screw 10/425	12x32 Crimp 11mm	15x45 Screw 13/425	15x45 Crimp 13mm	Head Space 20mm
Agilent	1050				•		•			
	1100/1200				•		•			
	1090A			•	•		•			
	1100/1200 Wellplate				•		•			
	6850ALS				•		•			
	7673A/7683				•		•			
	7680A SFE/7694/G1888									•
Alcot	718AL/719D			•	•		•			
	738			•	•		•			
Alpha M.O.S.	Fox/Prometheus			•	•		•		M	
	Kronos			•	•		•			
Antec Leyden	ALEXYS AS 100			•	•		•		M	
Beckman	501/502/507			•	•		•			
	System Gold			•	•		•			
	508			•	•	•	•			
Bruker	Map II			•	•	•	•			
	LC51							•	•	
Carlo Erba	see Fisions									
CTC	see Leap Technologies									
Dani	ALS-1000/39.80/86.80				•		•			
	HSS 39.50/86.50/SPT 37.50									•
Dionex	ASI-100/A550			•	•	•	•	•	•	
	AS-40			•				•		
	FAMOS			•	•		•			
DynaTech	LC-241			•	•		•			
Eksigent	NanoLC-AS1				•		•			
ESA	540			•	•	•	•			
	540-MT			•	•	•	•			
Fisons	A-200S/AS 150/800/8000			•	•					
	AS 200		•							
GBC	LC 1650			•	•	•	•	•	•	
GE Healthcare	Ettan A-950			•	•		•			
Gerstel	MPS-2		•	•	•	•	•		M	
	MPS-3		•	•	•	•	•			
Gilson	234			•	•		•			
	235			•	•		•			
	231 XL/232 XL/233 XL		•	•	•		•			
	215			•	•		•			
	250			•	•		•			
	Asted/Aspec			•	•					
Hitachi	AS-1000			•	•		•			
	AS-2000			•	•		•			
	AS-4000			•	•		•			
	Lachrom L-7200/7250			•	•		•			
	Lachrom Elite L-2200			•	•		•			
Jasco	851/AS950/1550/1555			•						
	AS-2059/AS2059Plus			•		•				
	AS-2055/AS-2057		•	•		•				
	AS-2059SF		•		•					
Leap Technologies	CLPAL/GC PAL		•	•	•	•	•			
	Combi PAL		•	•	•	•	•			
	HTC PAL/HTS PAL		•	•	•	•	•			
	Twin PAL			•	•					

M = Magnetic Seal

Vial Selection by Instrument

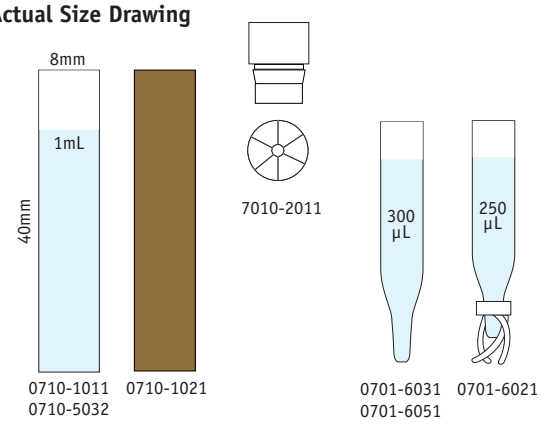
Manufacturer	Model	Vial size (mm) Neck Style	8x40 Shell Plug	12x32 Screw 8/425	12x32 Screw 9mm	12x32 Screw 10/425	12x32 Crimp 11mm	15x45 Screw 13/425	15x45 Crimp 13mm	Head Space 20mm
LDC	Marathon				•		•			
	Promis				•		•			
	Others			•		•	•			•
Metrohm	Triathlon			•	•	•	•	•	•	
Perkin Elmer	Autosystem/AS-2000/XL			•	•		•	•		
	Clarus 500/600				•		•			
	Integral 4000			•	•		•			
	TurboMatrix 40/110									•
	ISS-100/200/series 200		•	•	•		•			
	HS16/40									•
	LC Plus		•	•	•		•			
Pharmacia LKB	2157-010			•	•		•			
Phillips/Pye Unicam	LC-XP			•	•		•	•		
	4247			•	•		•			
	4710			•	•		•			
Polymer Labs	GPC 110/210/220				•		•			
Selerity	3100			•	•	•	•			
Shimadzu	AOC-8B/9, AOC-14/1400			•	•		•			
	AOC-5000		•	•	•		•			
	AOC-20				•		•	•		
	HSS-2B/4B									•
	SIL-6A/6B/9A					•				
	SIL-10A			•	•	•	•			
	SIL-HT/10ADVP		•	•	•	•	•			
	SIL-20/20-AC			•	•		•			
	LC-2010		•	•	•	•	•			
	Prominence			•	•		•			
Spark-Holland	Symbiosys/Reliance			•	•	•	•			
	Marathon/Midas			•	•		•			•
	Triathlon			•	•	•	•			•
Thermo Scientific	Serveyor LC			•	•		•			
	AS3000/Trace GC				•		•			
	Focus LC				•		•			
	TriPlus AS			•	•	•	•			
	TriPLus HS									•
Tosoh	TSK-6080/AS-8010/AS-8020				•		•	•	•	
Teledyne/Tekmar	7000/7050									•
	HT3A									•
Varian	CP-8410			•	•	•	•	•	•	
	CombiPAL		•	•	•	•	•			M
	8034/8035/8100/8200			•	•		•			
	9095/9100			•	•		•			
	Prostar 400/410/420			•	•	•	•			
	Prostar 430			•	•	•				
	Genesis									•
Waters	WISP 96		•							
	WISP 48							•	•	
	717Plus		•	•						
	Alliance 2690			•	•	•	•			
	Model 2767			•	•	•	•			
	Model 2777						•			
	Acquity			•	•	•	•			
	CapLC			•	•		•			

M = Magnetic Seal

8x40mm Shell Vials

- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Usable Volume of 1mL for Flat Bottom style and 700µL for PP limited volume
- Polyethylene Snap plug with Starburst for easy needle penetration
- Limited volume inserts are available for small volume samples
- A kit includes shell vials and polyethylene snap plug with Starburst
- For Waters® WISP™ 96 Style autosampler

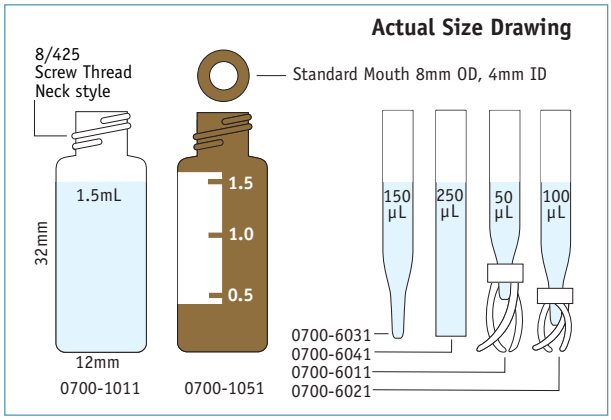
Actual Size Drawing



Ordering Information		
Description	QTY	Part No.
8x40mm Shell Vials		
Clear glass, Flat Bottom, 1mL	100	0710-1011
Amber glass, Flat Bottom, 1mL	100	0710-1021
Snap plug with Starbusrt, 8mm		
Clear PE Plug	100	0710-2011
8x40mm Shell Vials kit with plugs		
Clear glass, Flat Bottom, 1mL	100	0710-5011
Amber glass, Flat Bottom, 1mL	100	0710-5021
Polypropylene, Flat Bottom, 1mL	250	0710-5032
Polypropylene, Limited Volume, 700µL	250	0710-5042
Inserts		
Glass, 250µL, w/Bottom Spring	100	0701-6021
Glass, 300µL	100	0701-6031
Polypropylene, 300µL	100	0701-6051

12x32mm Screw Thread Standard Mouth Vials

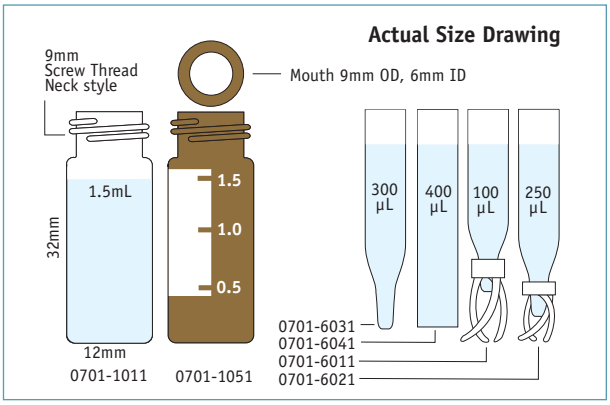
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 2 mL and usable volume of 1.5mL
- Glass vials are available with or without spot
- Standard mouth with 8/425 Screw Thread
- Polypropylene open-top screw caps with choices of septa
- Limited volume inserts are available for small volume samples
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Compatible with Waters® Alliance®, Shimadzu, Hitachi, Jasco and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Screw Thread Standard Mouth Vials		
Clear glass	100	0700-1011
Clear glass, spot	100	0700-1021
Clear glass, silanized, spot	100	0700-1031
Amber glass	100	0700-1041
Amber glass, spot	100	0700-1051
Amber glass, silanized, spot	100	0700-1061
PP	100	0700-1071
8/425 Open-Top PP Caps		
Black	100	0700-2011
Red	100	0700-2021
Green	100	0700-2031
Yellow	100	0700-2041
Septa for 8/425 Caps		
PTFE/Red Rubber, 0.04" Thickness	100	0700-3011
PTFE/White Silicone, 0.06" Thickness	100	0700-3021
PTFE/Silicone/PTFE, 0.06" Thickness	100	0700-3031
PTFE/Silicone, 0.06" Thickness with Slit	100	0700-3041
PTFE, 0.01" Thickness	100	0700-3051
Caps with Septa		
Black Open-Top Cap, PTFE/Red Rubber	100	0700-4011
Black Open-Top Cap, PTFE/White Silicone	100	0700-4021
Black Open-Top Cap, PTFE/Silicone/PTFE	100	0700-4031
Black Open-Top Cap, PTFE/Silicone, Slit	100	0700-4041
Yellow Open-Top Cap, PTFE/Silicone	100	0700-4051
Black Solid-Top Cap, PTFE/Silicone	100	0700-4061
Vial Kits in Gridded Box		
Clear glass spot vials with black open-top caps and PTFE/White Silicone Septa	100	0700-5011
Amber glass spot vials with black open-top caps and PTFE/White Silicone Septa	100	0700-5021
Clear glass spot vials with yellow open-top caps and PTFE/White Silicone Septa	100	0700-5031
Amber glass spot vials with yellow open-top caps and PTFE/White Silicone Septa	100	0700-5041
Inserts		
Glass, 50µL, w/Bottom Spring	100	0700-6011
Glass, 100µL, w/Bottom Spring	100	0700-6021
Glass, 150µL	100	0700-6031
Glass, 250µL, Flat Bottom	100	0700-6041

12x32mm Screw Thread 9mm Mouth Vials

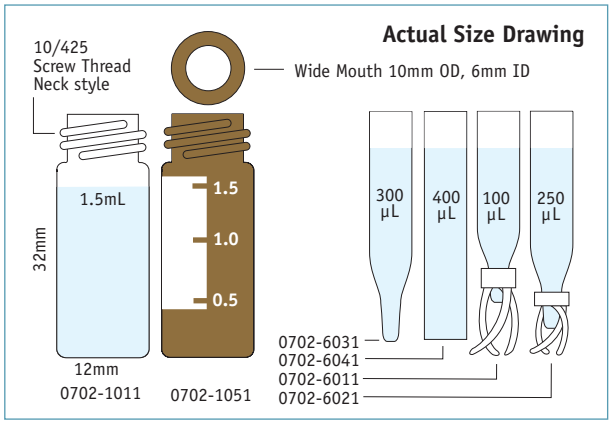
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 2 mL and usable volume of 1.5mL
- Glass vials are available with or without spot
- 9mm mouth with 9mm Screw Thread
- Polypropylene open-top screw caps with choices of septa
- Limited volume inserts are available for small volume samples
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Compatible with Agilent, Waters®, HTA, Shimadzu, Thermo and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Screw Thread Standard Mouth Vials		
Clear glass	100	0701-1011
Clear glass, spot	100	0701-1021
Clear glass, silanized, spot	100	0701-1031
Amber glass	100	0701-1041
Amber glass, spot	100	0701-1051
Amber glass, silanized, spot	100	0701-1061
PP 1.5mL	100	0701-1071
9mm Open-Top PP Screw Caps		
Red, Rib Sided	100	0701-2011
Green, Rib Sided	100	0701-2021
Yellow, Rib Sided	100	0701-2031
Blue, Rib Sided	100	0701-2041
Septa for 9mm Caps		
PTFE/Red Rubber, 0.04" Thickness	100	0701-3011
PTFE/White Silicone, 0.04" Thickness	100	0701-3021
PTFE/Silicone/PTFE, 0.04" Thickness	100	0701-3031
PTFE/Silicone, 0.04" Thickness, with Slit	100	0701-3041
PTFE, 0.01" Thickness	100	0701-3051
PTFE/White Silicone for Agilent Cap	100	0701-3061
PTFE/Red Silicone for Agilent Cap	100	0701-3071
Caps with Septa		
Blue Open-Top Cap, PTFE/Red Rubber	100	0701-4011
Blue Open-Top Cap, PTFE/White Silicone	100	0701-4021
Blue Open-Top Cap, PTFE/Silicone/PTFE	100	0701-4031
Blue Open-Top Cap, PTFE/Silicone, Slit	100	0701-4041
Blue Open-Top Cap, Bonded Interseal PTFE/Silicone	100	0701-4051
Blue Open-Top Cap, Bonded Interseal PTFE/Silicone, Slit	100	0701-4061
Blue Solid-Top Cap, PTFE/White Silicone	100	0701-4071
Vial Kits in Gridded Box		
Clear glass spot vials with blue caps and PTFE/White Silicone Septa	100	0701-5011
Amber glass spot vials with blue caps and PTFE/White Silicone Septa	100	0701-5021
PP vials with blue caps and PTFE/White Silicone Slit Septa	100	0701-5031
Inserts		
Glass, 100µL, w/Bottom Spring	100	0701-6011
Glass, 250µL, w/Bottom Spring	100	0701-6021
Glass, 300µL	100	0701-6031
Glass, 400µL, Flat Bottom	100	0701-6041

12x32mm Screw Thread Wide Mouth Vials

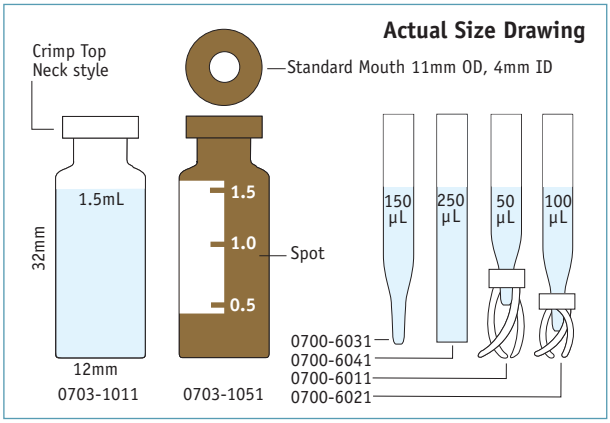
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 2mL and usable volume of 1.5mL
- Glass vials are available with or without spot
- Wide mouth with 10/425 Screw Thread
- Polypropylene open-top screw caps with choices of septa
- Limited volume inserts are available for small volume samples
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Compatible with Waters®, Shimadzu, Perkin Elmer, Jasco and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Screw Thread Wide Mouth Vials		
Clear glass	100	0702-1011
Clear glass, spot	100	0702-1021
Clear glass, silanized, spot	100	0702-1031
Amber glass	100	0702-1041
Amber glass, spot	100	0702-1051
Amber glass, silanized, spot	100	0702-1061
PP	100	0702-1071
10/425 Open-Top PP Screw Caps		
Black	100	0702-2011
Red	100	0702-2021
Septa for 10/425 Caps		
PTFE/Red Rubber, 0.04" Thickness	100	0702-3011
PTFE/White Silicone, 0.06" Thickness	100	0702-3021
PTFE/Silicone/PTFE, 0.06" Thickness	100	0702-3031
PTFE/Silicone, 0.06" Thickness, with Slit	100	0702-3041
PTFE, 0.01" Thickness	100	0702-3051
Caps with Septa		
Black open-top caps, PTFE/Red Rubber	100	0702-4011
Black open-top caps, PTFE/White Silicone	100	0702-4021
Black open-top caps, PTFE/Silicone/PTFE	100	0702-4031
Black open-top caps, PTFE/Silicone, Slit	100	0702-4041
White Solid-top phenolic caps, PTFE/silicone	100	0702-4051
Clear Solid-top integral caps with septa	100	0702-4061
Vial Kits in Gridded Box		
Clear glass spot vials with black caps and PTFE/White Silicone Septa	100	0702-5011
Amber glass spot vials with black caps and PTFE/White Silicone Septa	100	0702-5021
Inserts		
Glass, 100µL, w/Bottom Spring	100	0701-6011
Glass, 250 µL, w/Bottom Spring	100	0701-6021
Glass, 300 µL	100	0701-6031
Glass, 400 µL, Flat Bottom	100	0701-6041

12x32mm Crimp Top Standard Mouth Vials

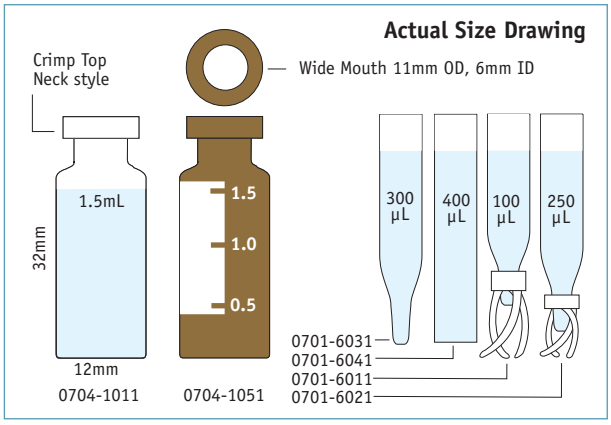
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 2mL and useable volume 1.5mL
- Glass vials are available with or without spot
- Standard mouth with Crimp Top neck
- Aluminum or Polypropylene open-top crimp caps with choices of septa
- Limited volume inserts are available for small volume samples
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Compatible with Agilent, Waters®, HTA, Shimadzu, Thermo and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Crimp Top Standard Mouth Vials		
Clear glass, spot	100	0703-1011
Amber glass, spot	100	0703-1051
Crimp Seals with Septa		
Al seals, PTFE/Red Rubber	100	0703-4011
Al seals, PTFE/White Silicone	100	0703-4021
Al seals, PTFE/Silicone/PTFE	100	0703-4031
Al seals, PTFE/Silicone, Slit	100	0703-4041
Vial Kits in Gridded Box		
Clear glass spot vials with Al seals and PTFE/Red Rubber Septa	100	0703-5011
Amber glass spot vials with Al seals and PTFE/Red Rubber Septa	100	0703-5021
Clear glass spot vials with Al seals and PTFE/White Silicone Septa	100	0703-5031
Amber glass spot vials with Al seals and PTFE/White Silicone Septa	100	0703-5041
Inserts		
Glass, 50µL, w/Bottom Spring	100	0700-6011
Glass, 100µL, w/Bottom Spring	100	0700-6021
Glass, 150µL	100	0700-6031
Glass, 250µL, Flat Bottom	100	0700-6041

12x32mm Crimp Top Wide Mouth Vials

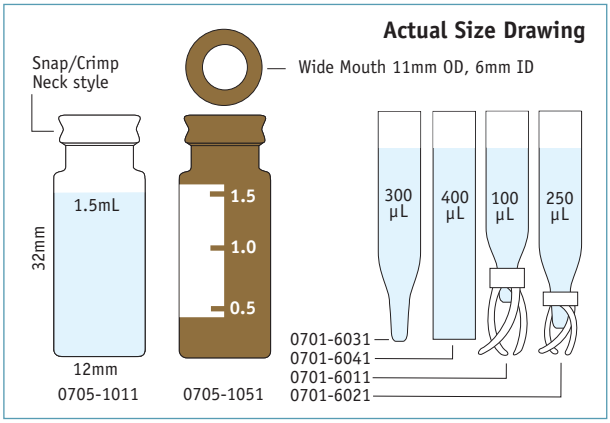
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total Volume of 2mL and useable volume of 1.5mL
- Glass vials are available with or without spot
- Wide mouth with Crimp Top neck
- Aluminum or Polypropylene open-top crimp seals with choices of septa
- Limited volume inserts are available for small volume samples
- A vial kit in PP Gridded Box includes vials, Caps with septa
- Compatible with Agilent, Waters®, HTA, Shimadzu, Thermo and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Crimp Top Wide Mouth Vials		
Clear glass	100	0704-1011
Clear glass, spot	100	0704-1021
Amber glass	100	0704-1041
Amber glass, spot	100	0704-1051
Crimp Seals with Septa		
Al seals, PTFE/Red Rubber	100	0703-4011
Al seals, PTFE/White Silicone	100	0703-4021
Al seals, PTFE/Silicone/PTFE	100	0703-4031
Al seals, PTFE/Silicone, Slit	100	0703-4041
Vial Kits in Gridded Box		
Clear glass spot vials with Al seals and PTFE/Red Rubber Septa	100	0704-5011
Amber glass spot vials with Al seals and PTFE/Red Rubber Septa	100	0704-5021
Clear glass spot vials with Al seals and PTFE/White Silicone Septa	100	0704-5031
Amber glass spot vials with Al seals and PTFE/White Silicone Septa	100	0704-5041
Inserts		
Glass, 100µL, w/Bottom Spring	100	0701-6011
Glass, 250µL, w/Bottom Spring	100	0701-6021
Glass, 300µL	100	0701-6031
Glass, 400µL, Flat Bottom	100	0701-6041

12x32mm Snap/Crimp Wide Mouth Vials

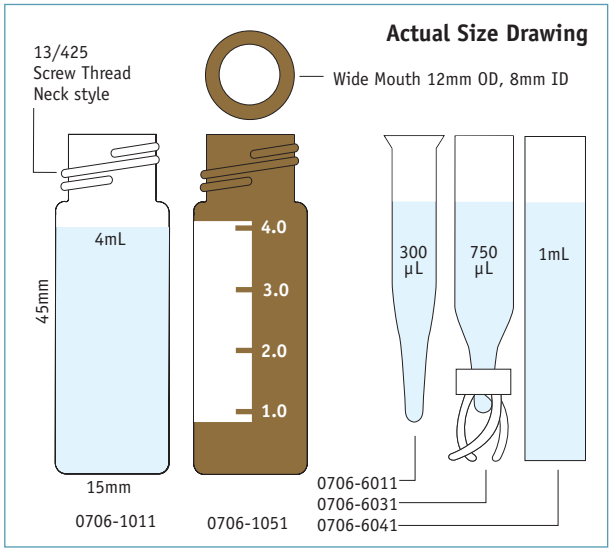
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 2mL and usabale volume of 1.5mL
- Glass vials are available with or without spot
- Wide mouth with Snap/Crimp neck
- Aluminum or Polypropylene open-top crimp seals with choices of septa
- Limited volume inserts are available for small volume samples
- Pre-assembled vial kits include vials, caps with septa and a PP gridded box
- Compatible with Agilent, Waters®, HTA, Shimadzu, Thermo and Varian autosampler



Ordering Information		
Description	QTY	Part No.
12x32mm Snap/Crimp Wide Mouth Vials		
Clear glass	100	0705-1011
Clear glass, spot	100	0705-1021
Amber glass	100	0705-1041
Amber glass, spot	100	0705-1051
Crimp Seals with Septa		
Al seals, PTFE/Red Rubber	100	0703-4011
Al seals, PTFE/White Silicone	100	0703-4021
Al seals, PTFE/Silicone/PTFE	100	0703-4031
Al seals, PTFE/Silicone, Slit	100	0703-4041
PP clear seals, PTFE/Red Rubber	100	0705-4011
PP clear seals, PTFE/White Silicone	100	0705-4021
PP clear seals, PTFE/Silicone/PTFE	100	0705-4031
PP clear seals, PTFE/Silicone, Slit	100	0705-4041
Vial Kits in Gridded Box		
Clear glass vials with PP seals and PTFE/Red Rubber Septa	100	0705-5011
Amber glass vials with PP seals and PTFE/Red Rubber Septa	100	0705-5021
Clear glass vials with PP seals and PTFE/White Silicone Septa	100	0705-5031
Amber glass vials with PP seals and PTFE/White Silicone Septa	100	0705-5041
Inserts		
Glass, 100µL, w/Bottom Spring	100	0701-6011
Glass, 250µL, w/Bottom Spring	100	0701-6021
Glass, 300µL	100	0701-6031
Glass, 400µL, Flat Bottom	100	0701-6041

15x45mm Screw Thread Vials

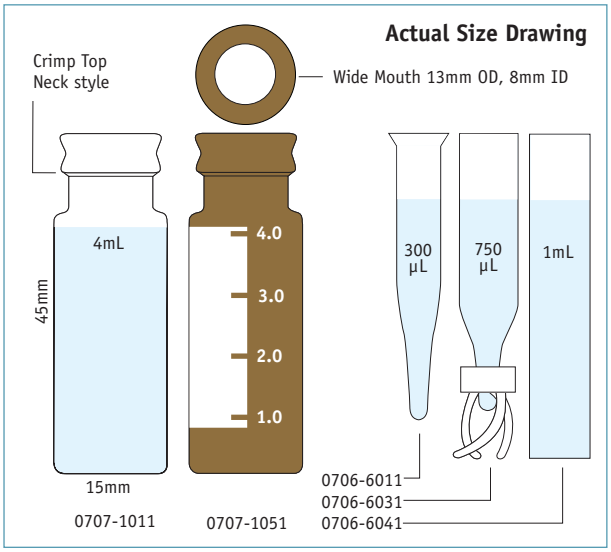
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene
- Total volume of 5.2mL and useable volume of 4mL
- Glass vials are available with or without spot
- Wide mouth with 13/425 Screw Thread
- Polypropylene open-top screw caps with choices of septa
- Limited volume inserts are available for small volume samples
- Pre-assembled vial kits include vials and Caps with septa
- Compatible with Waters®, Shimadzu, Perkin Elmer, Jasco and Varian autosampler



Ordering Information		
Description	QTY	Part No.
15x45mm Screw Thread Vials		
Clear glass	100	0706-1011
Clear glass, spot	100	0706-1021
Clear glass, silanized, spot	100	0706-1031
Amber glass	100	0706-1041
Amber glass, spot	100	0706-1051
Amber glass, silanized, spot	100	0706-1061
PP, Well Base, 2mL	100	0706-1071
13/425 Screw Caps		
Black, PP, Open-Top	100	0706-2011
White, PP, Open-Top	100	0706-2021
Septa for 13/425 Screw Caps		
PTFE/Red Rubber	100	0706-3011
PTFE/White Silicone	100	0706-3021
PTFE/Silicone/PTFE	100	0706-3031
PTFE/Silicone with Slit	100	0706-3041
PTFE 10mil	100	0706-3041
Caps with Septa		
Black Open-Top PP Caps, PTFE/Red Rubber	100	0706-4011
Black Open-Top PP Caps, PTFE/Silicone	100	0706-4021
Black Open-Top PP Caps, PTFE/Silicone/PTFE	100	0706-4031
Black Open-Top Caps, PTFE/Silicone	100	0706-4041
Black Solid-Top Phenolic Caps, PTFE/Silicone	100	0706-4051
Vial Kits		
Clear glass spot vials with black caps and PTFE/White Silicone Septa	100	0706-5011
Amber glass spot vials with black caps and PTFE/White Silicone Septa	100	0706-5021
Inserts		
Glass, 300µL, Flanged	100	0706-6011
PP, 300µL, Flanged	100	0706-6021
Glass, 750µL, w/Bottom Spring	100	0706-6031
Glass, 1mL, Flat Bottom	100	0706-6041

15x45mm Snap/Crimp Vials

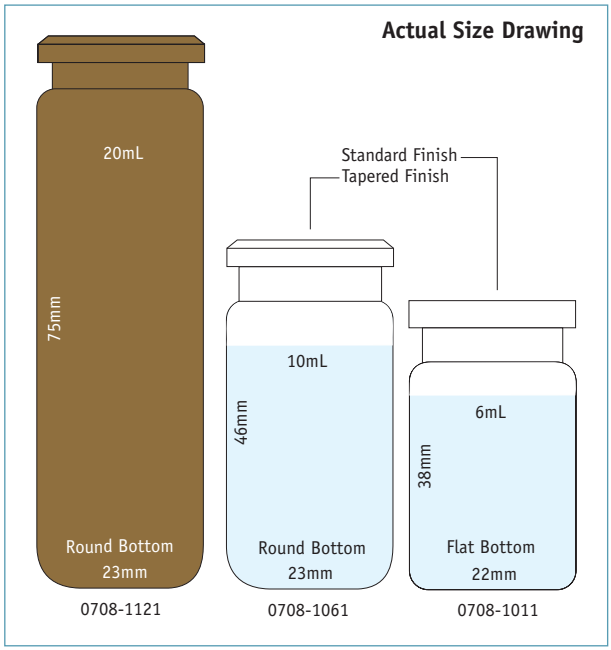
- **Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass or high quality polypropylene**
- **Total volume of 5.2mL and useable volume of 4mL**
- **Glass vials are available with or without spot**
- **Wide mouth with snap/crimp neck style**
- **Snap/crimp seals with choices of septa**
- **Limited volume inserts are available for small volume samples**
- **Pre-assembled vial kits include vials and Caps with septa**
- **Compatible with Waters® WISP™ 48 Style and Shimadzu autosampler**



Ordering Information		
Description	QTY	Part No.
15x45mm Snap/Crimp Vials		
Clear glass	100	0707-1011
Clear glass, spot	100	0707-1021
Amber glass	100	0707-1041
Amber glass, spot	100	0707-1051
PP, Well Base, 2mL	100	0707-1071
Snap/Crimp Seals with Septa		
Al seals, PTFE/Red Rubber	100	0707-4011
Al seals, PTFE/White Silicone	100	0707-4021
Al seals, PTFE/Silicone/PTFE	100	0707-4031
Al seals, PTFE/Silicone, Slit	100	0707-4041
PP clear seals, PTFE/Red Rubber	100	0707-4051
PP clear seals, PTFE/White Silicone	100	0707-4061
PP clear seals, PTFE/Silicone/PTFE	100	0707-4071
PP clear seals, PTFE/Silicone, Slit	100	0707-4081
Vial Kits in Gridded Box		
Clear glass vials with Al seals and PTFE/White Silicone Septa	100	0707-5011
Amber glass vials with Al seals and PTFE/White Silicone Septa	100	0707-5021
Clear glass vials with PP seals and PTFE/White Silicone Septa	100	0707-5031
Amber glass vials with PP seals and PTFE/White Silicone Septa	100	0707-5041
Inserts		
Glass, 300µL, Flanged	100	0706-6011
PP, 300µL, Flanged	100	0706-6021
Glass, 750µL, w/Bottom Spring	100	0706-6031
Glass, 1mL, Flat Bottom	100	0706-6041

Crimp Top Headspace Vials

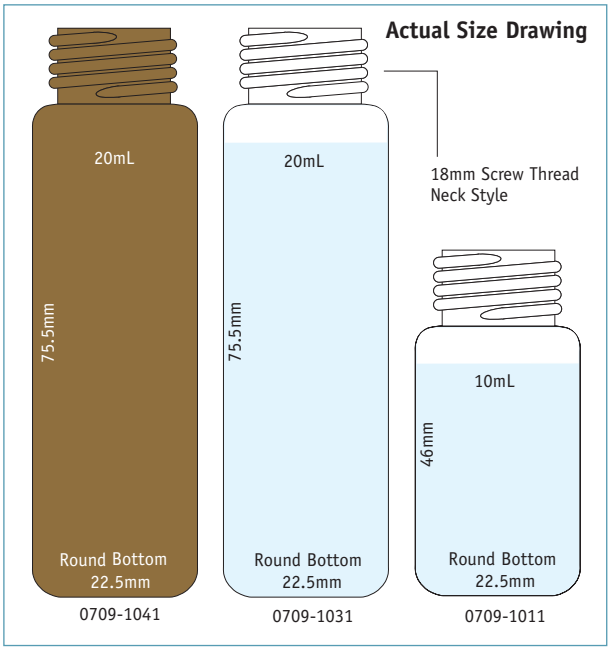
- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass with standard or tapered 20mm finish
- Choice of 6mL, 10 mL and 20mL
- Round bottom vials are compatible with most autosampler
- Flat bottom vials are prefered for manual headspace applications
- Pre-assembled vial kits include vials and seals with septa
- Compatible with Waters®, Shimadzu, PerkinElmer, Jasco and Varian autosampler



Ordering Information		
Description	QTY	Part No.
Crimp Top Headspace Vials		
6mL Clear Glass, Flat Bottom, Standard	100	0708-1011
6mL Clear Glass, Flat Bottom, Tapered	100	0708-1021
6mL Clear Glass, Round Bottom, Tapered	100	0708-1031
10mL Clear Glass, Flat Bottom, Standard	100	0708-1041
10mL Clear Glass, Flat Bottom, Tapered	100	0708-1051
10mL Clear Glass, Round Bottom, Tapered	100	0708-1061
10mL Amber Glass, Round Bottom, Tapered	100	0708-1071
20mL Clear Glass, Flat Bottom, stanadard	100	0708-1081
20mL Clear Glass, Flat Bottom, Tapered	100	0708-1091
20mL Clear Glass, Round Bottom, Tapered	100	0708-1101
20mL Amber Glass, Round Bottom, Tapered	100	0708-1111
20mm Crimp Seals		
Al, Center Hole	100	0708-2011
Al, Center Pressure Release	100	0708-2021
Al, Center Tear-Off	100	0708-2031
Al, Center Tear-Away	100	0708-2041
Al, Center Hole, Magnetic	100	0708-2051
20mm Septa and Stopper		
PTFE/Gray Butyl	100	0708-3011
PTFE/Red Rubber	100	0708-3021
PTFE/White Silicone	100	0708-3031
PTFE/Clear Silicone	100	0708-3041
PTFE/Gray Butyl, Molded Pharmafix	100	0708-3051
Red Rubber Stopper	100	0708-3061
Gray Butyl Stopper	100	0708-3071
20mm Crimp Seals with Septa		
Al, Center Hole with PTFE/Red Rubber	100	0708-4011
Al, Center Hole with PTFE/White Silicone	100	0708-4021
Al, Center Pressure Release with PTFE/White Silicone	100	0708-4031
Al, Gold Magnetic with PTFE/White Silicone	100	0708-4041

Screw Thread Headspace Vials

- Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass with 18mm screw thread
- Not require crimper nor decapper
- Multiple turn threading offer a tight seal
- Choice of 10 mL and 20mL
- Round bottom vials are compatible with most autosampler
- Pre-assembled magnetic caps and septa minimize contamination
- Compatible with Waters®, Shimadzu, Perkin Elmer, Jasco and Varian autosampler



Ordering Information		
Description	QTY	Part No.
18mm Screw Thread Headspace Vials		
10mL Clear Glass, Round Bottom	100	0709-1011
10mL Amber Glass, Round Bottom	100	0709-1021
20mL Clear Glass, Round Bottom	100	0709-1031
20mL Amber Glass, Round Bottom	100	0709-1041
18mm Magnetic Caps and Septa		
Cap with 0.115" Natural PTFE/Blue Silicone	100	0709-4011
Cap with 0.045" White PTFE/Blue Silicone	100	0709-4021
Cap with 0.120" White PTFE/Chlorobutyl	100	0709-4031
Septa		
Blue PTFE/White Silicone	100	0709-3011

EPA Vials

- **Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass with 24/400 screw thread finish**
- **For EPA CFR Part 136 an EPA 40 CFR 141 for Volatile organic analysis**
- **Choice of 20, 30, 40 and 60mL**
- **Vial kit includes vials, caps and 0.125" PTFE/White Silicone septa or top-hat septa**
- **Open-Top caps are white or black polypropylene for sampling though the septa**
- **Solid-Top caps are white polypropylene for sample storage**

Ordering Information		
Description	QTY	Part No.
EPA Vial Kit		
20mL[1] Clear, Black cap and septa	72	0712-1011
20mL Amber, Black cap and septa	72	0712-1021
20mL Clear, Black cap and Top-hat septa	72	0712-1031
20mL Amber, Black cap and Top-hat septa	72	0712-1041
20mL Clear, White Solid-Top cap and septa	72	0712-1051
20mL Amber, White Solid-Top cap and septa	72	0712-1061
30mL[2] Clear, White cap and septa	100	0712-1071
30mL Amber, White cap and septa	100	0712-1081
30mL Clear, Black cap and Top-hat septa	100	0712-1091
30mL Amber, Black cap and Top-hat septa	100	0712-1101
30mL Clear, White Solid-Top cap and septa	100	0712-1111
30mL Amber, White Solid-Top cap and septa	100	0712-1121
40mL[3] Clear, White cap and septa	100	0712-1131
40mL Amber, White cap and septa	100	0712-1141
40mL Clear, Black cap and Top-hat septa	72	0712-1151
40mL Amber, Black cap and Top-hat septa	72	0712-1161
40mL Clear, White Solid-Top cap and septa	100	0712-1171
40mL Amber, White Solid-Top cap and septa	100	0712-1181
60mL[4] Clear, White cap and septa	100	0712-1191
60mL Amber, White cap and septa	100	0712-1201
60mL Clear, Black cap and Top-hat septa	100	0712-1211
60mL Amber, Black cap and Top-hat septa	100	0712-1221
60mL Clear, White Solid-Top cap and septa	100	0712-1231
60mL Amber, White Solid-Top cap and septa	100	0712-1241
Caps		
Black Open-Top PP Cap	100	0712-2011
White Solid-Top PP Cap with PTFE Septa	100	0712-2021
White Solid-Top PP Cap with PTFE/Silicone Septa	100	0712-2031
Septa		
0.060" PTFE/Silicone Septa	100	0712-3011
0.125" PTFE/Silicone Septa	100	0712-3021
Caps with Septa		
White Open-Top PP Cap, 0.060" PTFE/Silicone	100	0712-4011
White Open-Top PP Cap, 0.125" PTFE/Silicone	100	0712-4021

[1] 20ml vail measure 28x57mm with 24/400 Finish
[2] 30ml vail measure 28x73mm with 24/400 Finish
[3] 40ml vail measure 28x95mm with 24/400 Finish
[4] 60ml vail measure 28x140mm with 24/400 Finish

Storage Vials

- **Available in clear, Type I Class A or amber, Type I Class B Borosilicate glass with screw thread finish**
- **Choice of 2mL, 4mL, 8mL, 12mL, 16mL and 24mL**
- **Solid Top caps are phenolic or PP with liners**
- **Caps are autoclavable**

Ordering Information		
Description	QTY	Part No.
Screw Thread Storage Vials		
2mL Clear Glass, 12x32mm, 8/425 Finish	100	0700-1011
2mL Amber Glass, 12x32 mm, 8/425 Finish	100	0700-1041
4mL Clear Glass, 15x45mm, 13/425 Finish	100	0706-1011
4mL Amber Glass, 15x45mm, 13/425 Finish	100	0706-1041
8mL Clear Glass, 17x60mm, 15/425 Finish	100	0711-1011
8mL Amber Glass, 17x60mm, 15/425 Finish	100	0711-1021
12mL Clear Glass, 19x65mm, 15/425 Finish	100	0711-1031
12mL Amber Glass,19x65mm, 15/425 Finish	100	0711-1041
16mL Clear Glass, 21x70mm, 18/400 Finish	100	0711-1051
16mL Amber Glass, 21x70mm, 18/400 Finish	100	0711-1061
24mL Clear Glass, 23x85mm, 20/400 Finish	100	0711-1071
24mL Amber Glass, 23x85mm, 20/400 Finish	100	0711-1081
Solid Top Screw Caps with Liners		
PP, 8/425 with PTFE Liners	100	0711-4011
PP, 13/425 with PTFE Liners	100	0711-4021
PP, 15/425 with PTFE Liners	100	0711-4031
PP, 18/400 with PTFE Liners	100	0711-4041
PP, 20/400 with PTFE Liners	100	0711-4051
Phenolic, 8/425 with PTFE/F217 Liners	100	0711-4061
Phenolic, 13/425 with PTFE/F217 Liners	100	0711-4071
Phenolic, 15/425 with PTFE/F217 Liners	100	0711-4081
Phenolic, 18/400 with PTFE/F217 Liners	100	0711-4091
Phenolic, 20/400 with PTFE/F217 Liners	100	0711-4101

Culture Tubes

- **Round-Bottom Screw-Top Tubes, Type I Class A Borosilicate glass**
- **Phenolic Cap with Teflon-Faced Rubber or White Rubber**
- **For tissue culture and general bacteriology laboratory use**

Ordering Information		
Description	QTY	Part No.
Round-Bottom Screw-Top Culture Tubes		
8mL, Clear Glass, 13x100mm, 13/415 Finish	250	0714-1012
10mL, Clear Glass, 16x100mm, 15/415 Finish	250	0714-1022
15mL, Clear Glass, 16x125mm, 15/415 Finish	250	0714-1032
Phenolic Cap		
Cap with Teflon-Faced Rubber, 13/415 Finish	250	0714-2012
Cap with Teflon-Faced Rubber, 15/415 Finish	250	0714-2022
Cap with White Rubber, 15/415 Finish	250	0714-2032

Electronic Crimper and Decapper

- Weighs less than 1-1/2lbs
- Crimps hundreds of crimp top vials per battery charge
- Easy to use, with a comfortable, ergonomic grip
- Consistent and reproducible crimping
- Settings are saved when not in use
- Available for use with crimp styles vials sizes of 11mm, 13mm and 20mm
- Provided with universal power supply/recharger

0716-7020

Hand Crimper and Decapper

- Solid construction, combined with quality components manufactured to precise tolerances, provide consistent, dependable performance.
- Built-in adjustable stop allows the user to repeatedly achieve an optimum seal.
- Use to crimp or decap vials and bottles in one quick, easy motion
- Available for use with crimp styles vials sizes of 8mm, 11mm, 13mm and 20mm

0716-7080

0716-7120

Plier Decapper

- Solid stainless construction
- Low cost hand tool which allows crimped aluminum seals to be removed quickly and easily from vials and bottles.
- Available for use with crimp styles vials sizes of 8mm, 11mm, 13mm and 20mm

0716-7170

Ordering Information		
Description	QTY	Part No.
Electronic Crimpers for Crimp Top Vials		
11mm Electronic Crimper	1	0716-7010
13mm Electronic Crimper	1	0716-7020
20mm Electronic Crimper	1	0716-7030
Electronic Decappers for Crimp Top Vials		
11mm Electronic Decapper	1	0716-7040
13mm Electronic Decapper	1	0716-7050
20mm Electronic Decapper	1	0716-7060
Hand Crimpers for Crimp Top Vials		
8mm Hand Crimper	1	0716-7070
11mm Hand Crimper	1	0716-7080
13mm Hand Crimper	1	0716-7090
20mm Hand Crimper	1	0716-7100
Hand Decappers for Crimp Top Vials		
8mm Hand Decapper	1	0716-7110
11mm Hand Decapper	1	0716-7120
13mm Hand Decapper	1	0716-7130
20mm Hand Decapper	1	0716-7140
Plier Decappers for Crimp Top Vials		
8mm Plier Decapper	1	0716-7150
11mm Plier Decapper	1	0716-7160
13mm Plier Decapper	1	0716-7170
20mm Plier Decapper	1	0716-7180

Vial Racks

Stackable Racks

- Ideal for storing and transporting 8-28mm diameter chromatography vials
- 50-96 indexed positions for easy sample identification
- Stackable and autoclavable polypropylene

0713-1031

Snap Racks

- Ideal for storing and transporting 8-28mm diameter chromatography vials
- 50-96 indexed positions for easy sample identification
- Stackable and autoclavable polypropylene

0713-2031

Storage Boxes

- Hold 100 12x32mm vials
- Clear polypropylene
- Available in Blue, Red, Yellow, Violet, Green and Natural
- Raised edge provides non-slip, stackable storage with writing panel on lid front for ID
- Hinged lid with secure snap clasp
- Temp range -70 - 140°C, ideal for freezer or room storage
- Autoclavable
- Dimension of 5.5"L x 6.0"W x 2.1"H

0713-3075

Ordering Information		
Description	QTY	Part No.
Stackable Racks		
8mm, 96holds, 185x127x23mm	1	0713-1011
8mm, 96holds, 185x127x23mm	5	0713-1025
12mm, 50holds, 194x100x23mm	1	0713-1031
12mm, 50holds, 194x100x23mm	5	0713-1045
15mm, 48holds, 270x97x30mm	1	0713-1051
15mm, 48holds, 270x97x30mm	5	0713-1065
15mm, 90holds, 327x172x30mm	1	0713-1071
15mm, 90holds, 327x172x30mm	5	0713-1085
28mm, 50holds, 325x171x30mm	1	0713-1091
28mm, 50holds, 325x171x30mm	5	0713-1105
Snap Racks		
8mm, 96holds, White	1	0713-2011
8mm, 96holds, Blue	1	0713-2021
12mm, 50holds, White	1	0713-2031
12mm, 50holds, Blue	1	0713-2041
Storage Boxes		
12mm, 100holds, Blue	5	0713-3015
12mm, 100holds, Red	5	0713-3025
12mm, 100holds, Violet	5	0713-3035
12mm, 100holds, Yellow	5	0713-3045
12mm, 100holds, Natural	5	0713-3055
12mm, 100holds, Green	5	0713-3065
12mm, 100holds, Assorted, 1 of EA/5 Colors	5	0713-3075

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Sales Terms and Conditions

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To Order

Please provide your purchase order number, catalog number and description, quantity desired, “Ship to” and “Bill to” address, and the name and telephone number of a person to contact if clarification is required.

Condition of Sales

Our minimum order is US$100. Payment is net 30 days after credit approval. All prices are FOB Bangkok, Thailand. Orders are shipped via FedEx or common carrier unless otherwise instructed. Freight and insurance charges will be prepaid unless othewise instructed. Prices are subject to change without notice.

Shipping

Orders are normally processed and shipped within 1 weeks for in-stock items and 2-3 weeks for out-stocks items.

Order Cancellation

Cancellation of orders is subject to approval by Vertical Chromatography Co.,Ltd.. Service charges may be applied.

Warranty

All products we are warranted to be free from defects in material and workmanship. Vertical Chromatography Co.,Ltd. will replace without cost any materials whic carry such defect. Products are sold without any implied warranty of fitness to a particular use. In all instance, the liability of Vertical Chromatography Co.,Ltd. is limited soley at its option to replacement of the product or refund of its original purchase price. Under no circumstance shall Vetical be liable for consequential damages. All special applications of the products should be pre-tested for verification of results.

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No return will be accept more than 30 days after shipment for any reason. Before 30 days, no returns will be accepted without prior authorization. Please contact our sales department for a return authorization number and forwarding instructions. Inspect shipments upon reciept and report shortages and incorrect or damage material to us immediately. Important! Damage shipments must remain with the original packaging for freight company inspection.

Use of Our Products

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