

Thermo Scientific
Chromatography Columns
and Consumables 2016-2017

Connected chromatography solutions

Thermo
SCIENTIFIC

Samples are complex. Separating them shouldn't be.

Every breakthrough starts with a challenge. We believe that challenge should be your science, not your instrument. The **Thermo Scientific™ Vanquish™ UHPLC** delivers better separations, more results, and easier interaction than ever before. In 2010 we embraced UHPLC as the standard for all of our liquid chromatography solutions, and we have designed the Vanquish UHPLC as the instrument to solve your chromatographic challenges and achieve that breakthrough.

Vanquish UHPLC System

• Discover more at thermoscientific.com/Vanquish



**Thermo Scientific™
Accucore™ Vanquish™ C18+ Columns**
1.5 µm solid core particles for unmatched
resolution and throughput



Vanquish UHPLC with Charger
Highest throughput analysis with
added sample capacity



**Thermo Scientific™ Dionex™ Chromeleon™
Chromatography Data System**
Operational simplicity with eWorkflows
and simplified data handling



Connected solutions

Welcome to the 2016 – 2017 Chromatography Columns and Consumables Catalog. A great tool that provides a comprehensive portfolio of products delivering connected chromatography solutions across key market workflows. You can view these workflow capabilities at the start of the catalog. Look out for some of our new product innovations including SMART Digest Kits, Virtuoso Vial Identification System, Bio LC Columns, Accucore Vanquish Columns, GC Septa and the LinerGOLD Range. Technical resource pages have been introduced that will direct you to **www.thermoscientific.com/chromexpert**, an online portal that will help you in every aspect of your analysis. Finally, 2016 marks the 40th anniversary of Hypersil chromatography media, we will build on this legacy and bring to market even more innovative products which will enable our customers to make the world healthier, cleaner and safer.

www.thermoscientific.com/chromatography



Chromatography Columns and Consumables

Application and Technical Support

Do you have a question about chromatography, or are you searching for the best conditions for your analysis?

Are you looking for advice on what products to select from the catalog?

Do you require assistance when using your chromatography consumables?

We have a dedicated team of technical support specialists and application chemists available to help you with any of the above. Our experts have access to the latest chromatography technology and will act as your trusted advisors.

For application and technical support visit:

www.thermoscientific.com/chromexpert



Applications Resources for Chromatography and Sample Preparation

- **AppsLab**
Cross-technique analytical applications in a single online location
- **Sample Preparation**
A searchable database of application notes

Cross Reference Resource Tools

- **Vials and Closures**
You can enter the part number of any autosampler consumable (vial, closure or combination pack) and get the Thermo Scientific equivalent
- **GC Columns**
Look up the Thermo Scientific equivalent for a GC column
- **HPLC/UHPLC Columns**
Look up the Thermo Scientific equivalent for an LC column
- **SPE Product and Method Selection**
Simply answer the questions presented and this tool will identify the part and generic method needed

Contact our Technical Support Team

- **Product Selection**
- **Care and Use of your Chromatography Products**
- **Discuss a Method or Product Issue**

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for **biopharmaceutical markets**

A wide range of Thermo Scientific™ capability solutions which are built for biopharma.

MSIA™ D.A.R.T.s Versette™ Automated Liquid Handler

Reproducible, automated affinity purification



SMART Digest™ Kits

Facilitating perfect digestion

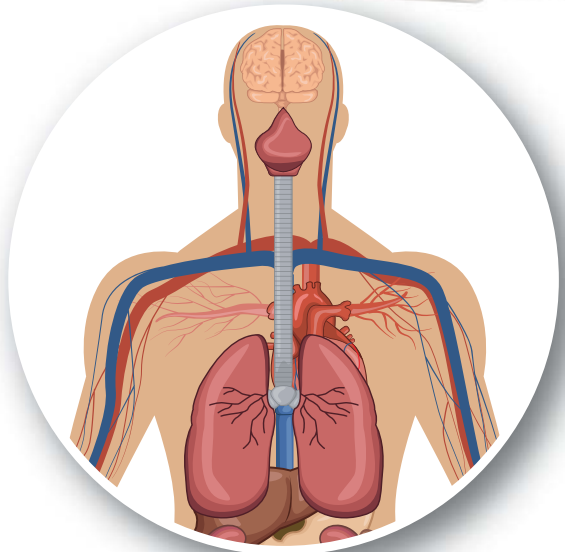


SOLAμ™ SPE Plates

Increased sensitivity



Sample Preparation



Data Management



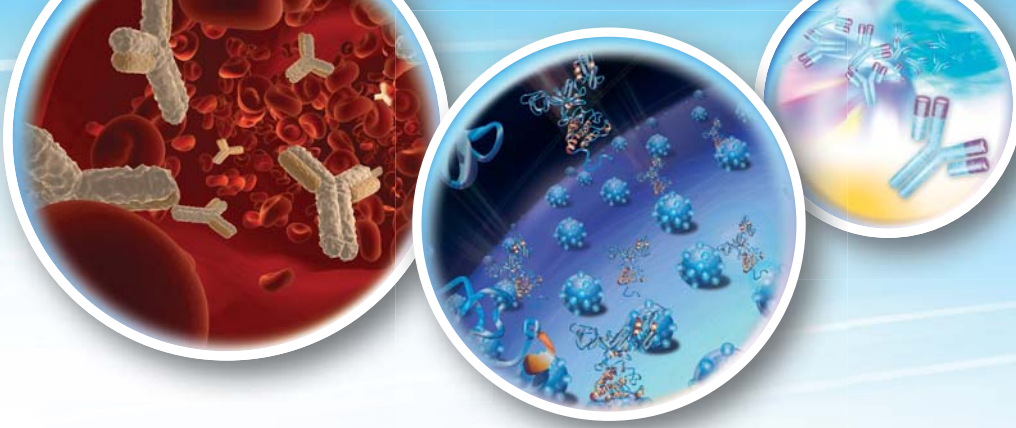
Watson LIMS™ and Data Manager

Powerful data processing, reporting and SDMS



Chromeleon™

Chromatography Data System
Streamlining laboratory workflow



WebSeal™
Sample integrity
and cleanliness



**Varioskan LUX™ Multimode
Microplate Reader**



**Orbitor™ RS
Microplate Mover**
High-throughput lab automation



Sample Handling

Separation and Detection



**BioLC/UHPLC
Columns**
Separation technologies
for every workflow



**Orbitrap Fusion™ Lumos™
Tribid™ Mass Spectrometer**
The new standard in characterization
and quantitation



Vanquish™ UHPLC Systems
Built for every biopharma workflow

for **pharmaceutical**
and **clinical markets**

Innovative, reliable and easy-to-use Thermo Scientific™ solutions to help you meet the demanding needs at every stage of your workflow.

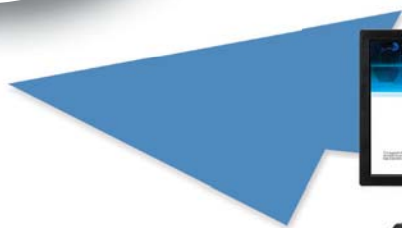
SOLA™ Products
Increased sensitivity



Sample Preparation



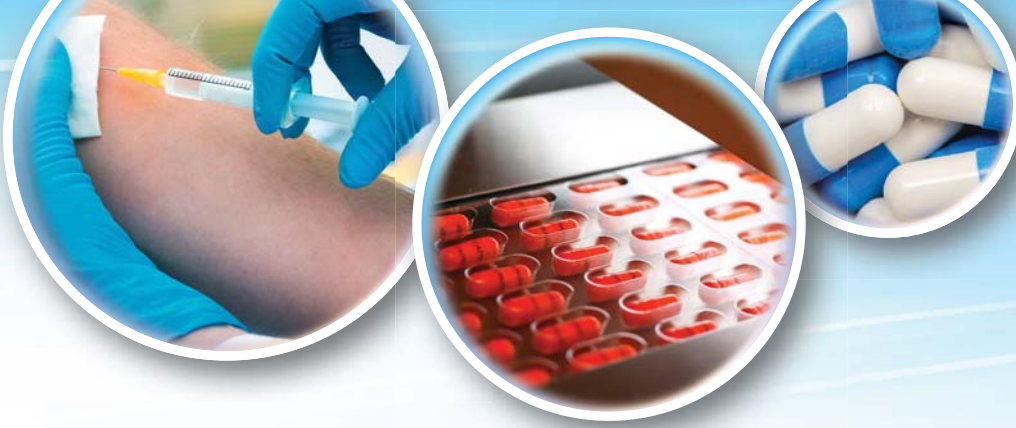
Data Management



Watson LIMS™ and Data Manager
Powerful data processing, reporting
and SDMS



**Chromeleon™
Chromatography Data System**
Streamlining laboratory workflow



Virtuoso™ Vials

The highest level of sample integrity and sample information possible



Virtuoso™ Vial Identification System



**Orbitor™ RS
Microplate Mover**
High-throughput lab automation



Sample Handling

Separation and Detection



**TSQ Quantiva™ Triple
Quadrupole Mass Spectrometer**
exceeds stringent analytical requirements with superb sensitivity, speed and dynamic range



Vanquish™ UHPLC Systems
Built for every biopharma workflow



**HPLC/UHPLC
Columns**

for food and beverage markets

Whether you are testing for contaminants or developing a new production process, we are here to help. Our innovative Thermo Scientific™ products and range of solutions allow you to deliver safe, high-quality food products that consumers expect.

QuEChERS Products

Convenient and effective approach for determining pesticide residues



Sample Preparation



Data Management



Chromeleon™
Chromatography Data System
Streamlining laboratory workflow



Virtuoso™ Vials

The highest level of sample integrity and sample information possible



Virtuoso™ Vial Identification System



HPLC/UHPLC Columns



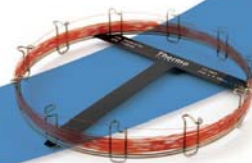
Sample Handling

Separation and Detection



Vanquish™ UHPLC Systems

Built for every biopharma workflow



GC Columns



Q Exactive™ GC Orbitrap™ GC-MS/MS System

Unprecedented depth in GC-MS analysis



TRACE™ 1300 Series GC

Simplify workflow and increase analytical performance

for environmental analysis markets

A range of Thermo Scientific™ capabilities for air, water and soil analysis that provide reliable, accurate, and precise results that can make compliance simpler and help minimize regulatory risks.

SPE Products

Reproducible and clean sample extractions



Syringe Filters

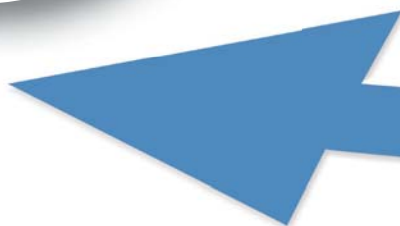
Reliable elimination of particles and micro organisms



Sample Preparation



Data Management



Chromeleon™
Chromatography Data System
Streamlining laboratory workflow



Virtuoso™ Vials

The highest level of sample integrity and sample information possible



Virtuoso™ Vial Identification System



HPLC/UHPLC Columns



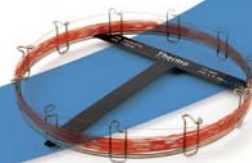
Sample Handling

Separation and Detection



Vanquish™ UHPLC Systems

Built for every biopharma workflow



GC Columns



Q Exactive™ GC Orbitrap™ GC-MS/MS System

Unprecedented depth in GC-MS analysis



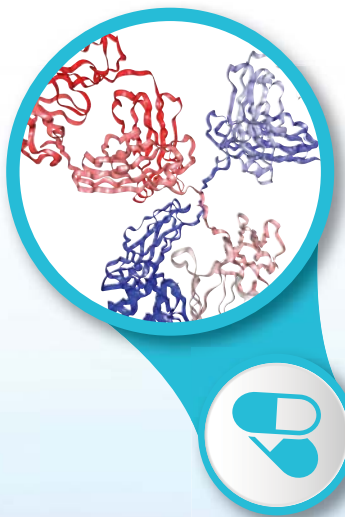
TRACE™ 1300 Series GC

Simplify workflow and increase analytical performance

Sample Preparation Products

Your sample is precious and you cannot afford failures. We have a comprehensive range of products delivering clean and consistent extractions using innovative sample preparation technologies for your analytical needs.

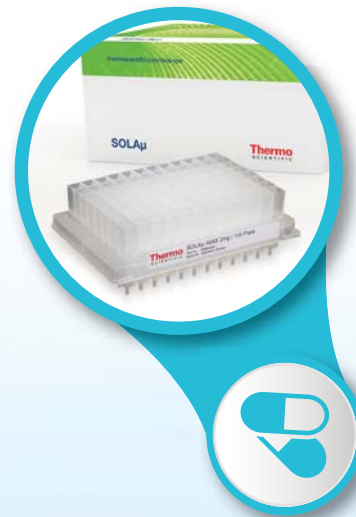
Featured Products



SMART Digest Kits

Designed for biopharmaceutical and proteomic applications that require highly reproducible, sensitive and fast analyses of proteins often in high throughput workflows.

PAGE 1-004



SOLA Products

This first fritless SPE product range which has been specifically designed for bioanalysis provides greater reproducibility with cleaner, more consistent extracts. Thermo Scientific™ SOLA™ products provide unparalleled performance characteristics compared to conventional SPE, phospholipid removal and protein precipitation products.

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QuEChERS

A quick and easy sample preparation approach for pesticide analysis. Convenient extraction and clean-up of pesticides in food and other complex matrices.

PAGE 1-030



Syringe Filters

Providing cleaner sample extracts by removing interfering materials and fine particles. Delivering high quality, robust solutions for a wide range of samples and applications.

PAGE 1-034

Sample Preparation

Technical Resources



visit www.thermoscientific.com/chromexpert
to access the following information:

- SPE Phase Selection
- SPE Phase Selection by Manufacturer
- SPE Procedure - Six Steps for a Clean Extract
- Method Development Optimization in SPE



SMART Digest Kits

Facilitating perfect digestion

Thermo Scientific™ SMART Digest™ kits are designed for biopharmaceutical and proteomic applications that require:

- High analytical reproducibility
- High sensitivity
- Fast analysis
- High throughput workflows

They achieve this due to the optimized heat stable immobilized trypsin design. It offers significant benefits over existing conventional in-solution digestion protocols:

- Simple process
- Significantly faster than in-solution digestion
- More reproducible than in-solution digestion
- Higher sensitivity
- Higher throughput
- Ability to automate

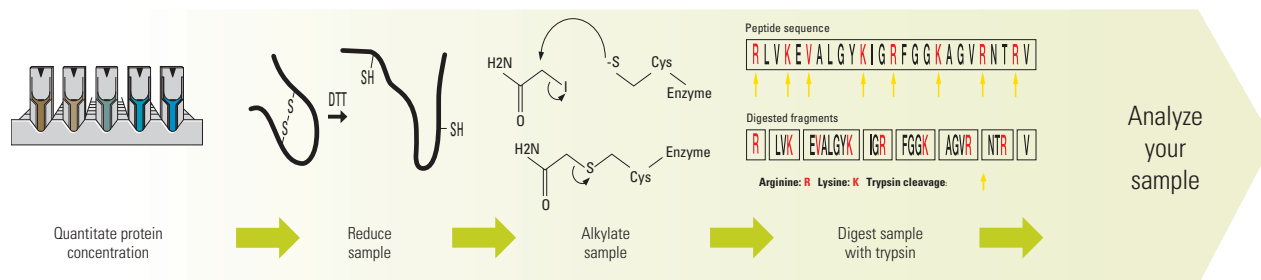


Simplicity of use with SMART Digest Kits

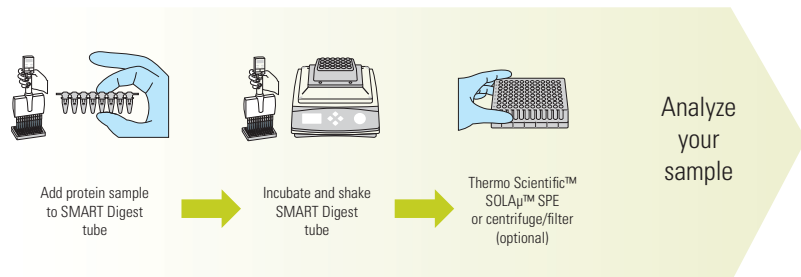
Current sample preparation protocols for the digestion of proteins are multifaceted and laborious. Without a single source solution, errors are far more likely to occur. Therefore, the overall protocol is subject to irreproducibility and significant sample processing time.

The SMART Digest kit overcomes these barriers by providing a simple to implement, integrated process (see the diagram below), which provides high data confidence and significantly increased reproducibility. The entire protocol can be easily automated for high throughput processing.

Standard Digest



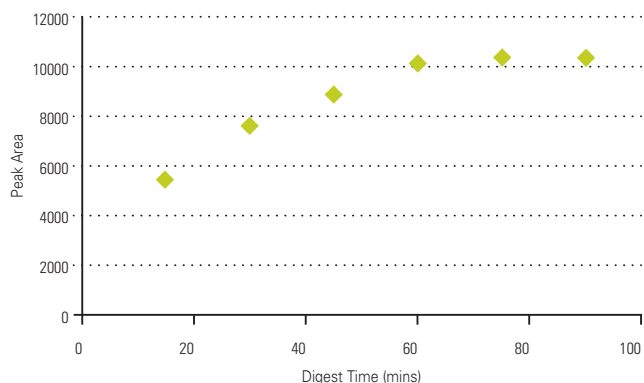
SMART Digest



Fast digestion with SMART Digest Kits

The SMART Digest process is not only simple, but significantly reduces the time from sample preparation to analysis. Typically it takes less than 60 minutes, dependent on sample complexity; to achieve full digestion as can be seen in the IgG example below, full digestion is achieved in 60 minutes.

IgG Assay m/z- 937



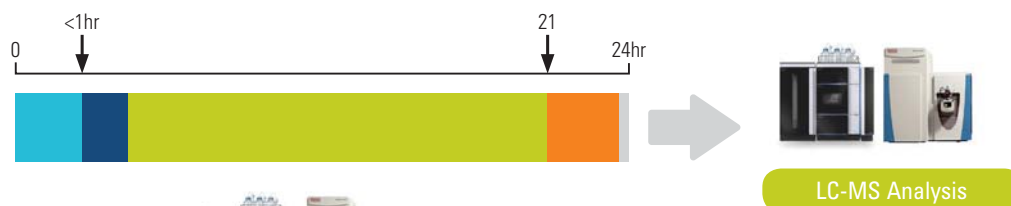
Recommended digestion starting conditions for known proteins*

Protein	Digest Time (min)
Insulin	4
BSA	< 5
Carbonic anhydrase	< 5
Lysozyme	< 5
Apo-B	30
IgG	45
IgG in 50 μ L plasma	75
Ribonuclease A	150
Thyroglobulin	240
C-reactive protein	240

*200 μ L protein solutions were used for all samples. A concentration of 100 μ g/mL was used for all samples, except IgG in plasma which used 17.5mg/mL

SMART Digest vs. conventional in-solution digest protocol

In-solution digest



SMART Digest

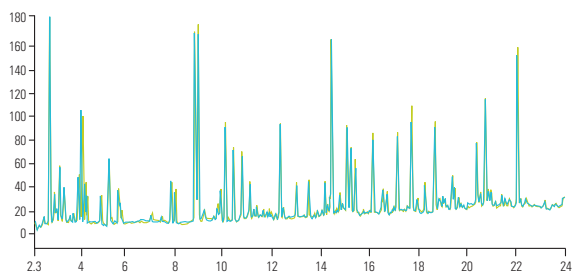


- Sample preparation
- Protein assay
- Digestion
- SPE + dry/reconstitute
- Spin down

Reproducibility of digestion with the SMART Digest Kits

The SMART Digest kit provides significant improvements in reproducibility over existing protocols, which results in fewer sample failures, higher throughput and the ability to more easily interrogate data.

The chromatogram to the right shows two overlaid traces of BSA digests produced by two separate users who had never performed a digestion protocol before.

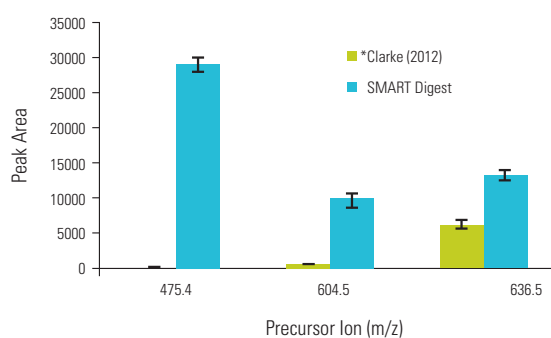


Higher sensitivity with the SMART Digest Kits

The SMART Digest kit can provide higher sequence coverage due to more efficient digestion and the reduced number of chemicals used, resulting in less ion suppression during LC-MS analysis. The reduced use of chemicals also decreases the number of chemically-induced post-translational modifications.

The mass spectrometry (MS) peak area response comparison on the right shows how Thyroglobulin, digested using the SMART Digest kit, provides higher levels of sensitivity compared to a standard in-solution digest. In addition to this the SMART Digest protocol took two hours compared to twenty hours for the in-solution protocol.

Comparison to Historical Method



*Clarke, N. J., et al.; *J. Inv. Med.* **2012**, *60*, 1157-1163

SMART Digest Kits

Description	Cat No.
Smart Digest kit	60109-101
Smart Digest kit with 96 well filter plate	60109-102
Smart Digest kit with SOLA μ HRP SPE plate	60109-103

Find out more about how SMART Digest Kits can benefit your workflow at:
www.thermoscientific.com/SMARTdigest

SOLA SPE Products

Consistent excellence for bioanalysis

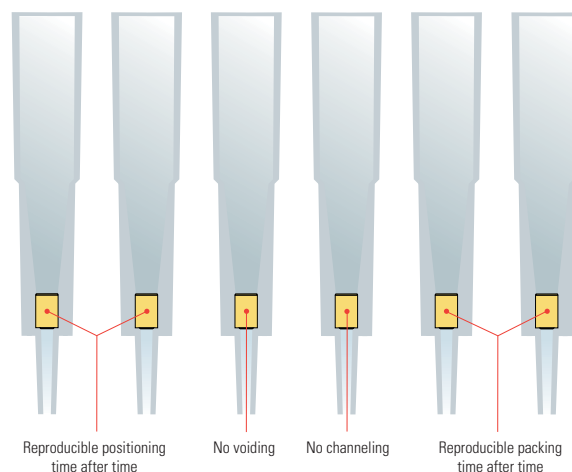
Thermo Scientific SOLA products are designed for bioanalytical and clinical research analysts who are tasked with providing high quality analytical results from complex biological samples in a high throughput environment, while complying with strict legislation. These demands are compounded by the continued push to higher efficacy drugs and long acting formulations which continue to drive sensitivity requirements to lower levels to enable accurate quantification.



In order to meet these demands, bioanalytical methods must provide:

- Robustness – low analytical failure rates
- Ability to process low sample volumes
- High sensitivity
- High reproducibility
- Ease of use
- High throughput processing
- Efficient and fast processes

The SOLA SPE range meets these demands due to the unique and innovative frit-less SPE technology which eliminates the issues with traditional loose-packed SPE formats (see figure to the right). Combining the support material and active media components into a solid, uniform sorbent bed provides stable and controllable flow through characteristics and has an added advantage when dealing with viscous biological samples, as it prevents blocking and enables high throughput processing.

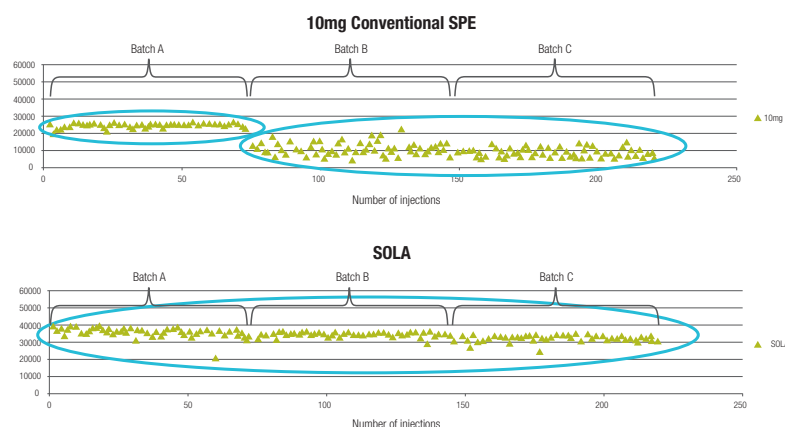


SOLA μ SPE design – limiting issues associated with conventional SPE formats

The manufacturing process also allows for high levels of reproducibility, not only from cartridge to cartridge or well to well but also batch to batch (see figure to the right).

The SOLA μ SPE range has the added benefit of being able to provide:

- Up to a 20 fold increase in sensitivity
- Ability to process samples restricted in volume
- Increased workflow efficiency and sample integrity

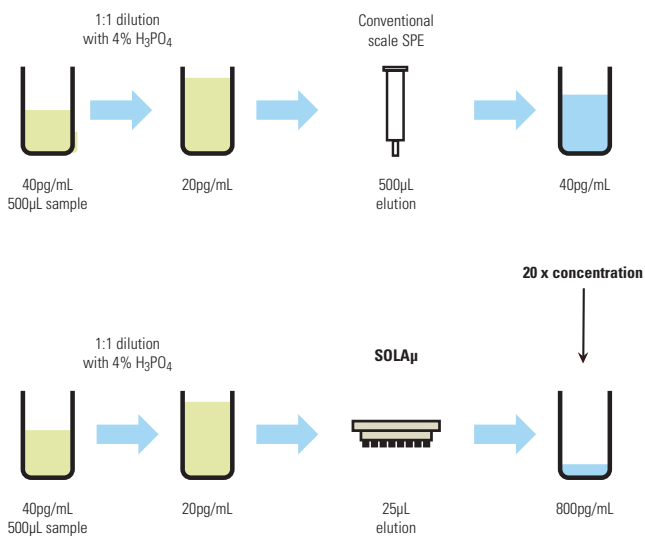


Batch to batch reproducibility of SOLA compared to a conventional SPE product

Increase your MS sensitivity

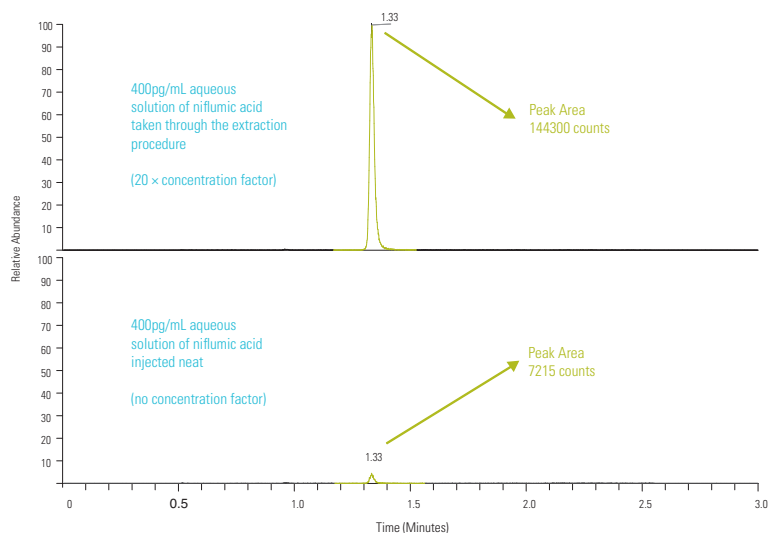
Up to 20 times increase in sensitivity can be achieved by loading a large volume of sample and eluting in a low volume.

In the following example 500µL of human plasma was loaded onto the SOLAµ plate for the analysis of niflumic acid. The compound was eluted in 25µL, providing a 20 times increase in concentration whilst maintaining excellent precision.



The problem:
improvement in assay sensitivity required

SOLAµ solution:
SOLAµ for up to 20 times increase in concentration of sample without changes to workflow

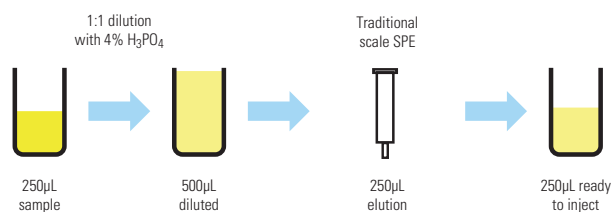


	Precision Data for Niflumic Acid Peak Area Ratio (%RSD) n = 18	Recovery of Niflumic Acid (%)	Matrix Effects (%)
QC Low (0.4ng/mL)	1.31	89.9	8.63
QC High (30ng/mL)	1.06	94.0	3.21

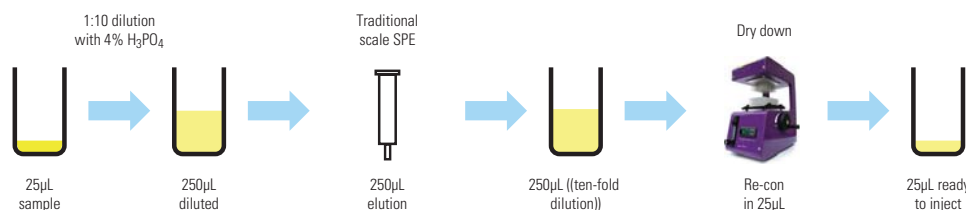
Sample limited assays

SOLA μ allows you to directly scale down the volumes used in analytical methods, allowing for a reduction in sample usage and eliminating issues caused by evaporation, without compromising the sensitivity of your assay. This is also an important consideration when sample volumes are limited.

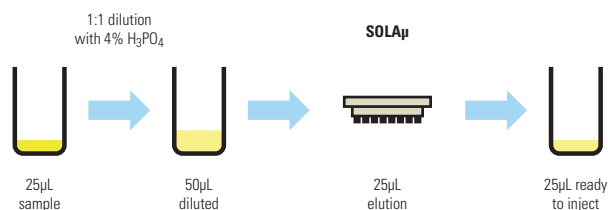
The following example shows that by loading 25 μ L of niflumic acid sample onto the SOLA μ plate and eluting in a total volume of 25 μ L, a ten-fold decrease in sample volume was achieved when compared to a traditional scale higher bed weight product. Equivalent method performance and high levels of reproducibility provided by SOLA technology were still maintained.



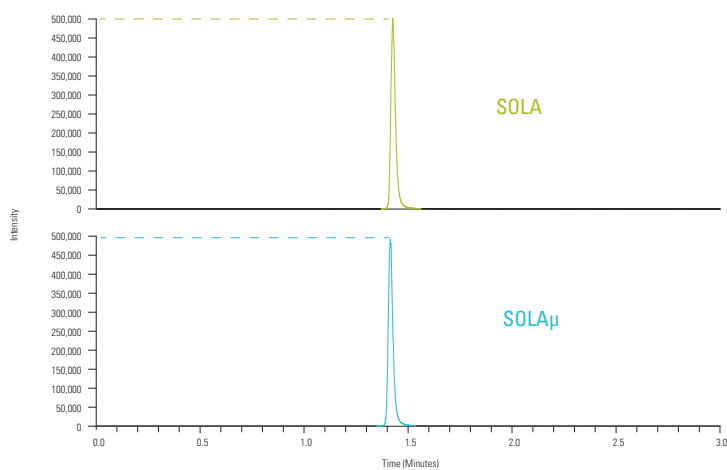
Problem:
large sample volume
requires reduction



Option 1:
introduce additional
steps with
associated issues



Option 2:
scale volumes
directly with no other
method changes



Equivalent peak response achieved for Niflumic Acid with SOLA μ using 25 μ L of sample compared with 250 μ L of sample with a 10mg SOLA SPE device

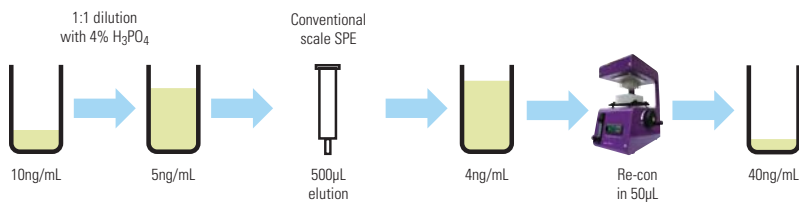
Precision Data for Niflumic Acid		
	Analyte Peak Area (%RSD)	Peak Area Ratio (%RSD)
Low QC	7.32	0.356
High QC	5.33	0.195

Increased workflow efficiency

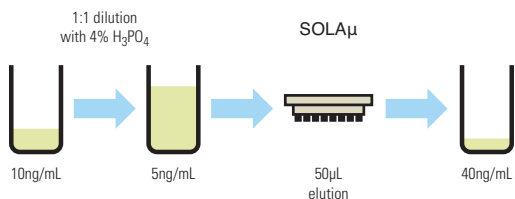
With traditional SPE the eluted sample is typically dried down to increase the concentration of the sample and thus improve the sensitivity. This causes an issue for certain compound types which can be lost during this step, resulting in reduced sensitivity.

SOLA μ allows the sample to be extracted without the need for dry down and reconstitution. Not only does this maximize recovery of the analytes it also improves workflow efficiency and increases productivity.

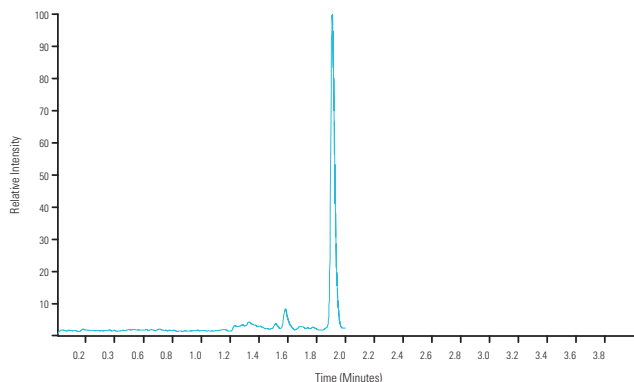
In the case of extraction of ibuprofen a four-fold pre-concentration was achieved without the need for dry down by loading 200 μ L of sample onto the SOLA μ plate and eluting in a total of 50 μ L. The results demonstrate that even with this low elution volume, excellent reproducibility was achieved.



The problem:
workflow requires dry down to achieve sensitivity



SOLA μ solution:
low elution volume allows removal of dry down



	Ibuprofen (%RSD) n=18	Ibuprofen recovery (%)
Low QC (25ng/mL)	4.00	90
High QC (750ng/mL)	1.70	95

SOLA and SOLA μ meet bioanalytical needs by providing:

- A robust low sample volume preparation platform
- Reproducibility at low sample and solvent levels
- Increased workflow efficiency and throughput
- Sample enrichment (20 times)
- Mitigation against solvation and non-specific binding issues

SOLA μ 96 Well Plates

Description	Bed Weight (mg)	Column Volume (mL)	Cat No.	Quantity
SOLA μ HRP	2	1	60209-001	1 Each
SOLA μ SCX	2	1	60209-002	1 Each
SOLA μ SAX	2	1	60209-003	1 Each
SOLA μ WCX	2	1	60209-004	1 Each
SOLA μ WAX	2	1	60209-005	1 Each

SOLA SPE Cartridges

Description	Bed Weight (mg)	Column Volume (mL)	Cat No.	Quantity
SOLA HRP	10	1	60109-001	100 Pack
SOLA SCX	10	1	60109-002	100 Pack
SOLA SAX	10	1	60109-003	100 Pack
SOLA WCX	10	1	60109-004	100 Pack
SOLA WAX	10	1	60109-005	100 Pack

SOLA 96 Well Plates

Description	Bed Weight (mg)	Well Volume (mL)	Cat No.	Quantity
SOLA HRP	10	2	60309-001	1 Each
SOLA SCX	10	2	60309-002	1 Each
SOLA SAX	10	2	60309-003	1 Each
SOLA WCX	10	2	60309-004	1 Each
SOLA WAX	10	2	60309-005	1 Each

HyperSep SLE Cartridges and Plates

Solid supported liquid/liquid extraction (SLE) is a fast and effective sample preparation technique that provides considerable benefits over liquid-liquid extraction (LLE) protocols for removal of phospholipids from biological samples.

SLE offers the following advantages:

- Greater reproducibility and recoveries compared to LLE techniques
- Prevents emulsification often associated with LLE
- Reduced solvent requirements compared to LLE
- Can be completely automated unlike LLE
- Improved cleanliness of sample extract compared to protein precipitation techniques
- Improved sensitivity compared to protein precipitation techniques



Thermo Scientific™ HyperSep™ SLE is available in cartridge and 96 well plate formats and in acidified or basified formats to help simplify the protocol when acidic or basic mobile phases are used.

HyperSep SLE Cartridges

Special treated diatomite SLE	Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
pH=7	200	3	60109-200-3-7	50 Pack
	500	3	60109-500-3-7	50 Pack
	500	6	60109-500-6-7	30 Pack
	1,000	6	60109-1000-6-7	30 Pack
	2,000	12	60109-2000-12-7	20 Pack
	4,000	25	60109-4000-25-7	15 Pack
	20,000	60	60109-20000-60-7	10 Pack
pH=9	200	3	60109-200-3-9	50 Pack
	500	3	60109-500-3-9	50 Pack
	500	6	60109-500-6-9	30 Pack
	1,000	6	60109-1000-6-9	30 Pack
	2,000	12	60109-2000-12-9	20 Pack
	4,000	25	60109-4000-25-9	15 Pack
	20,000	60	60109-20000-60-9	10 Pack

HyperSep SLE 96 Well Plates

Special treated diatomite SLE	Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
pH=7	200	2	60109-200-2-7W	1 Each
	300	2	60109-300-2-7W	1 Each
	400	2	60109-400-2-7W	1 Each
	500	2	60109-500-2-7W	1 Each
pH=9	200	2	60109-200-2-9W	1 Each
	300	2	60109-300-2-9W	1 Each
	400	2	60109-400-2-9W	1 Each
	500	2	60109-500-2-9W	1 Each

HyperSep Protein Precipitation Plate

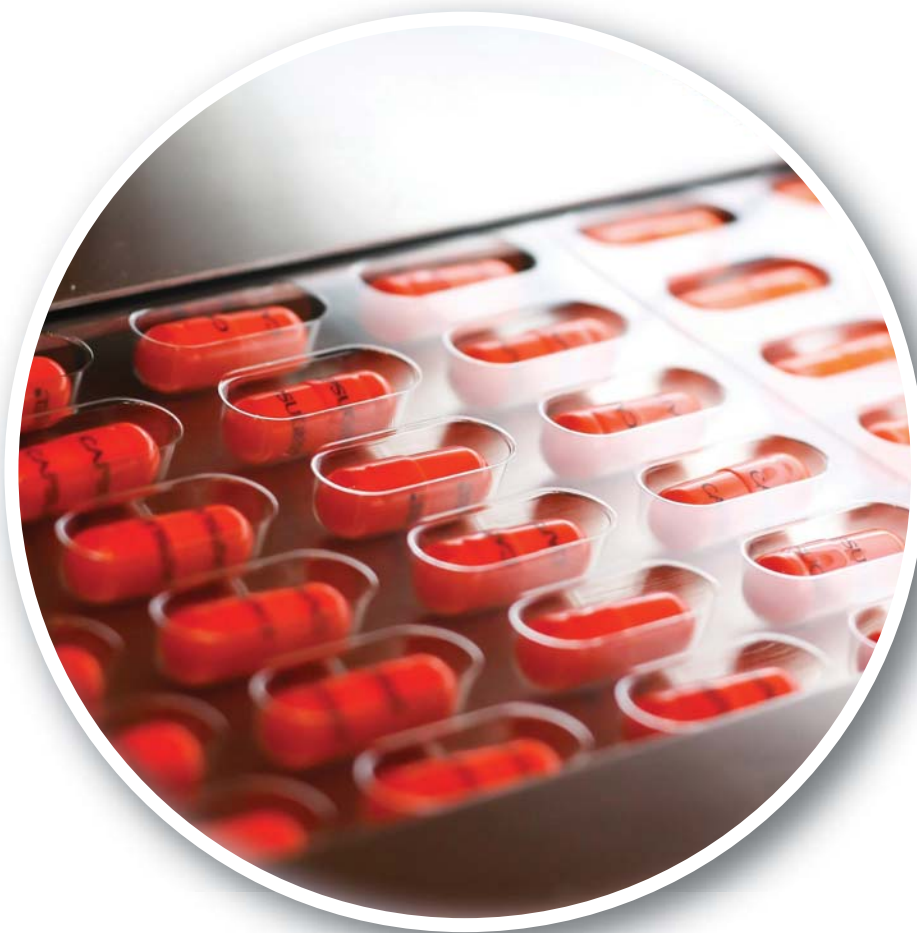
Provides a quick and effective approach for removal of proteins from biological compounds using the protein crash technique. In combination with SPE and SLE, the Protein Precipitation Plate offers a comprehensive range of options for sample preparation of biological based compounds. The 96 well plate format provides a high throughput functionality which lends itself to full automation.

- Dual frit design
- Hydrophobic/oleophobic frits to enable only precipitation of proteins
- Pore size optimized for ideal flow rate
- Specially selected polypropylene for low extractables



HyperSep Protein Precipitation Plate

Description	Cat. No.	Quantity
Protein Precipitation Plate	60304-201	1 Each



Microscale SPE Plates and Tips

HyperSep Lab Plates

For the purification and sample preparation of proteins, DNA, RNA and other biomolecules

- Sample concentration of small-scale samples
- Available in a range of chromatographic materials
- 96 well plate format with media embedded at the bottom of the plate
- Can be processed manually or using a liquid-handling robot
- Not suitable for use with a vacuum

Applications:

- Tissue culture and separation of products
- Sample concentration
- Sample clean-up
- Collection of sample after chromatography

HyperSep Lab Plates

Description	Cat. No. (Polystyrene)	Cat. No. (Polypropylene)	Quantity
C18	60110-201	60110-301	5 Pack
C8	60110-202	60110-302	5 Pack
C4	60110-203	60110-303	5 Pack
Hypercarb	60110-204	60110-304	5 Pack
Hypercarb and C18 (Mixed Mode)	60110-205	60110-305	5 Pack
Zirconium Dioxide	60110-206	60110-306	5 Pack
Titanium Dioxide	60110-207	60110-307	5 Pack
SCX	60110-208	60110-308	5 Pack
SAX	60110-209	60110-309	5 Pack

HyperSep Filter Plates

For effective clean-up of small-scale samples

- 96 well plate for the purification and separation of proteins, peptides, DNA, RNA and other biomolecules
- Clean up of microgram-level samples
- Available in a range of chromatographic materials
- Can be used under vacuum

HyperSep Filter Plates

Description	Cat. No. (5-7 μ L Bed Volume)	Cat. No. (40 μ L Bed Volume)	Quantity
C18	60110-401	60110-501	1 Each
C8	60110-402	60110-502	1 Each
C4	60110-403	60110-503	1 Each
Hypercarb	60110-404	60110-504	1 Each
Hypercarb and C18 (Mix Mode)	60110-405	60110-505	1 Each
Zirconium Dioxide	60110-406	60110-506	1 Each
Titanium Dioxide	60110-407	60110-507	1 Each
SCX	60110-408	60110-508	1 Each
SAX	60110-409	60110-509	1 Each

HyperSep Microscale Solid Phase Extraction Tips

Revolutionary micropipette tip for sample preparation

- Faster sample preparation with minimal sample loss
- Patented micropipette tip in which the chromatographic material is directly attached to its inner surface
- No contamination from the supporting matrix
- Separation in volumes as low as 100nL
- Applications include mass spectrometry, desalting, protein purification and electrophoresis



HyperSep Tip Microscale Solid Phase Extraction Tips

Description	Cat. No. (1-10µL Capacity)	Cat. No. (10-200µL Capacity)	Quantity
Thermo Scientific™ BioBasic™ 18	60109-201	60109-209	96 Pack
BioBasic 8	60109-202	60109-210	96 Pack
BioBasic 4	60109-203	60109-211	96 Pack
Hypercarb	60109-204	60109-212	96 Pack
Hypercarb and C18 (mix mode)	60109-205	60109-213	96 Pack
HILIC	60109-206	60109-214	96 Pack
Trypsin	60109-207	60109-215	96 Pack
Titanium Dioxide	60109-208	60109-216	96 Pack
Zirconium Dioxide	60109-217	60109-218	96 Pack

HyperSep SpinTip Microscale Solid Phase Extraction Tips

Revolutionary micropipette tip for sample preparation

- Pipette tips with a 1 to 2µm wide slit at the bottom that permits the liquid to pass through but retains the chromatographic material (20 to 30µm)
- Faster sample preparation with minimal sample loss
- No contamination from the supporting matrix
- Separation in volumes as low as 100nL



HyperSep SpinTip Microscale Solid Phase Extraction Tips

Description	Cat. No. (1-10µL Capacity)	Cat. No. (10-200µL Capacity)	Quantity
C18	60109-401	60109-412	96 Pack
C8	60109-402	60109-413	96 Pack
C4	60109-403	60109-414	96 Pack
Hypercarb	60109-404	60109-415	96 Pack
Hypercarb and C18 (mix mode)	60109-405	60109-416	96 Pack
HILIC	60109-406	60109-417	96 Pack
Trypsin	60109-407	60109-418	96 Pack
POROS Weak Anion Exchanger	60109-408	60109-419	96 Pack
POROS Strong Anion Exchanger	60109-409	60109-420	96 Pack
POROS Strong Cation Exchanger	60109-410	60109-421	96 Pack
Titanium Dioxide	60109-411	60109-422	96 Pack
Zirconium Dioxide	60109-424	60109-425	96 Pack

HyperSep SPE Cartridges and Plates

HyperSep Retain SPE Cartridges and Plates

Versatile polymeric materials for retention of polar, non-polar, basic and acidic drugs

- Exceptional recoveries for polar and non-polar analytes
- High and consistent recoveries
- High capacity, high purity, highly porous polystyrene DVB material modified with functional groups
 - PEP - urea for polar and non-polar analytes
 - CX - Sulfonic acid for basic analytes
 - AX - Quaternary amine for acidic analytes
- Fast and easy sample preparation and method development
- pH stable 0 to 14



HyperSep Retain PEP/CX/AX SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Retain PEP Cat No.	Retain CX Cat No.	Retain AX Cat No.	Quantity
30	1	60107-201	60107-301	60107-401	100 Pack
30	3	60107-202	60107-302	60107-402	50 Pack
60	3	60107-203	60107-303	60107-403	50 Pack
60	6	60107-208	60107-308	60107-408	30 Pack
100	3	60107-217	60107-317	60107-417	50 Pack
100	6	60107-207	60107-307	60107-407	30 Pack
150	3	60107-209	60107-309	60107-413	30 Pack
150	6	60107-211	60107-311	60107-411	30 Pack
200	3	60107-204	60107-304	60107-404	50 Pack
200	6	60107-212	60107-314	60107-412	30 Pack
500	3	60107-205	60107-305	60107-405	50 Pack
500	6	60107-206	60107-306	60107-406	30 Pack
500	15	60107-219	60107-319	60107-419	20 Pack
1,000	25	60107-215	60107-315	60107-415	20 Pack
1,000	6	60107-218	60107-318	60107-418	30 Pack
2,000	25	60107-214	60107-312	60107-414	20 Pack

Note: For bed weights less than 30mg please refer to SOLA SPE products on page 1-011.

HyperSep Retain PEP/CX/AX 96 Fixed Well Plates

Bed Weight (mg)	Well Volume (mL)	Retain PEP Cat No.	Retain CX Cat No.	Retain AX Cat No.	Quantity
30	1	60306-207	60306-303	60306-403	1 Each
60	1	60306-208	60306-304	60306-404	1 Each

Note: For bed weights less than 30mg please refer to SOLA SPE products on page 1-011.

HyperSep Retain PEP/CX/AX 96 Removable Well Plate

Bed Weight (mg)	Volume (mL)	Retain PEP Cat No.	Retain CX Cat No.	Retain AX Cat No.	Quantity
30	1	60303-207	60303-307	60303-407	1 Each
60	1	60303-208	60303-308	60303-408	1 Each

Note: For bed weights less than 30mg please refer to SOLA SPE products on page 1-011.

Retain PEP Applications

- Drugs and metabolites in biological fluids
- Peptides in serum, plasma or biological fluids
- Environmental samples

Retain CX Applications

- Analysis of a wide range of drugs of abuse including basic and neutral drugs

Retain AX Applications

- Analysis of THC and its metabolites

HyperSep Hypercarb SPE Cartridges and Plates

Unique material for retention of highly polar compounds

- Thermo Scientific™ HyperSep™ Hypercarb™ SPE contains flat, 100% porous graphitic carbon (PGC) with selectivity for structurally similar compounds, offering separation of compounds with simple solvents
- pH stable 0 to 14
- High batch-to-batch reproducibility
- Strong retention properties allow use of low bed weights for concentrated extracts
- Interaction mechanism with polar molecules



HyperSep Hypercarb SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
25	1	60106-304	50 Pack
50	1	60106-303	50 Pack
100	1	60106-302	30 Pack
200	3	60106-301	30 Pack
500	6	60106-402	20 Pack
1,000	6	60106-403	10 Pack
2,000	15	60106-404	10 Pack

HyperSep Hypercarb 96 Fixed Well Plates

Bed Weight (mg)	Well Volume (mL)	Cat. No.	Quantity
10	1	60306-501	1 Each
25	1	60306-502	1 Each
50	1	60306-503	1 Each

HyperSep Hypercarb 96 Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Cat. No.	Quantity
10	1	60302-606	1 Each
25	1	60302-607	1 Each
50	1	60302-608	1 Each

HyperSep C18 SPE Cartridges and Plates

Feature a highly retentive alkyl-bonded phase for extraction of non-polar to moderately polar compounds

HyperSep C18 SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
25	1	60108-376	100 Pack
50	1	60108-390	100 Pack
100	1	60108-302	100 Pack
100	3	60108-765	50 Pack
200	3	60108-303	50 Pack
500	3	60108-304	50 Pack
500	6	60108-305	30 Pack
500	10	60108-786	50 Pack
1,000	6	60108-301	30 Pack
1,000	15	60108-776	20 Pack
2,000	15	60108-701	20 Pack
2000	25	60108-780	20 Pack
5,000	25	60108-702	20 Pack
10,000	75	60108-703	10 Pack

HyperSep C18 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-201	60300-425	1 Each
25	1	60307-202	60300-426	1 Each
50	1	60307-203	60300-427	1 Each
100	1	60307-204	60300-428	1 Each

HyperSep C8 SPE Cartridges and Plates

Less retentive alternative to C18 for polar and non-polar compounds

HyperSep C8 SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-391	100 Pack
100	1	60108-392	100 Pack
200	3	60108-393	50 Pack
500	3	60108-309	50 Pack
500	6	60108-394	30 Pack
1,000	6	60108-427	30 Pack
2,000	15	60108-704	20 Pack
5,000	25	60108-705	20 Pack
10,000	75	60108-706	10 Pack

HyperSep C8 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-211	60300-445	1 Each
25	1	60307-212	60300-446	1 Each
50	1	60307-213	60300-447	1 Each
100	1	60307-214	60300-448	1 Each

Applications:

- Retentive for non-polar compounds
- Retains most organic analytes from aqueous matrices

Applications:

- Drugs and their metabolites in biological samples
- Peptides in biological samples

HyperSep Silica SPE Cartridges and Plates

A polar sorbent primarily used to retain analytes in non-polar matrices

HyperSep Silica SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-409	100 Pack
100	1	60108-317	100 Pack
200	3	60108-410	50 Pack
500	3	60108-315	50 Pack
500	6	60108-411	30 Pack
500	10	60108-793	50 Pack
1,000	6	60108-426	30 Pack
2,000	15	60108-710	20 Pack
5,000	25	60108-711	20 Pack
10,000	25	60108-853	20 Pack
10,000	75	60108-712	10 Pack
50,000	150	60108-850	10 Pack
20,000	75	60108-851	10 Pack
70,000	150	60108-852	10 Pack

HyperSep Silica 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-231	60300-485	1 Each
25	1	60307-232	60300-486	1 Each
50	1	60307-233	60300-487	1 Each
100	1	60307-234	60300-488	1 Each

Applications:

- Extraction of polar compounds including aldehydes, amines, drugs, pesticides and herbicides
- Extraction of carotenoids, fat-soluble vitamins, aflatoxins in food matrices
- Extraction of fatty acids and phospholipids

HyperSep Acid Wash Silica SPE Cartridges and Plates

HyperSep Acid Wash Silica SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-901	100 Pack
100	1	60108-902	100 Pack
100	10	60108-903	50 Pack
200	3	60108-904	50 Pack
200	10	60108-905	50 Pack
500	3	60108-906	50 Pack
500	6	60108-907	30 Pack
500	10	60108-908	50 Pack
1,000	6	60108-909	30 Pack
2,000	15	60108-910	20 Pack
5,000	25	60108-911	20 Pack
10,000	75	60108-912	10 Pack

Applications:

- Extraction of polar compounds from ground, waste and drinking water
- Extraction of polar compounds from food and beverages

HyperSep Acid Wash Silica 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-321	60300-831	1 Each
25	1	60307-322	60300-832	1 Each
50	1	60307-323	60300-833	1 Each
100	1	60307-324	60300-834	1 Each

HyperSep Phenyl SPE Cartridges and Plates

Offer alternative selectivity for retention of basic compounds

HyperSep Phenyl SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-516	100 Pack
100	1	60108-386	100 Pack
200	3	60108-387	50 Pack
500	3	60108-388	50 Pack
500	6	60108-389	30 Pack
1,000	6	60108-517	30 Pack
2,000	15	60108-707	20 Pack
5,000	25	60108-708	20 Pack
10,000	75	60108-709	10 Pack

Applications:

- Extraction of aromatic compounds
- Extraction of basic analytes

HyperSep Phenyl 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-221	60300-685	1 Each
25	1	60307-222	60300-686	1 Each
50	1	60307-223	60300-687	1 Each
100	1	60307-224	60300-688	1 Each

HyperSep Diol SPE Cartridges and Plates

Ideal for the extraction of polar compounds

HyperSep Diol SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-571	100 Pack
100	1	60108-572	100 Pack
200	3	60108-573	50 Pack
500	3	60108-574	50 Pack
500	6	60108-575	30 Pack
1,000	6	60108-576	30 Pack
2,000	15	60108-755	20 Pack
5,000	25	60108-756	20 Pack
10,000	75	60108-757	10 Pack

Applications:

- Normal phase extraction of polar compounds
- Purification of polar compounds

HyperSep Diol 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-311	60300-630	1 Each
25	1	60307-312	60300-631	1 Each
50	1	60307-313	60300-632	1 Each
100	1	60307-314	60300-633	1 Each

HyperSep Verify CX SPE Cartridges and Plates

Features non-polar and ionic characteristics for improved analysis of drugs of abuse

HyperSep Verify CX SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-741	100 Pack
130	1	60108-719	100 Pack
130	10	60108-769	50 Pack
200	3	60108-777	50 Pack
200	6	60108-722	50 Pack
200	10	60108-742	50 Pack
300	3	60108-720	50 Pack
500	3	60108-721	50 Pack
500	6	60108-723	30 Pack
1,000	6	60108-724	30 Pack

Applications:

- Analysis of a wide range of drugs of abuse from biological matrices, including basic and neutral drugs

HyperSep Verify CX 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-261	60300-805	1 Each
25	1	60307-262	60300-806	1 Each
50	1	60307-263	60300-807	1 Each
100	1	60307-264	60300-808	1 Each

HyperSep Verify AX SPE Cartridges and Plates

Features non-polar and ionic characteristics for improved analysis of acidic drugs and metabolites

HyperSep Verify AX SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
130	1	60108-727	100 Pack
130	10	60108-767	50 Pack
200	3	60108-768	30 Pack
200	6	60108-730	50 Pack
200	10	60108-764	50 Pack
300	3	60108-728	50 Pack
500	3	60108-729	50 Pack
500	6	60108-731	30 Pack
1,000	6	60108-732	30 Pack

Applications:

- Analysis of THC and its metabolites

HyperSep Verify AX 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-271	60300-813	1 Each
25	1	60307-272	60300-814	1 Each
50	1	60307-273	60300-815	1 Each
100	1	60307-274	60300-816	1 Each

HyperSep Strong Cation Exchanger (SCX) SPE Cartridges and Plates

A strong cation exchange sorbent for extraction of charged basic compounds

HyperSep Strong Cation Exchanger (SCX) SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-420	100 Pack
100	1	60108-421	100 Pack
200	3	60108-422	50 Pack
500	3	60108-423	50 Pack
500	6	60108-520	30 Pack
1,000	6	60108-433	30 Pack
2,000	15	60108-716	20 Pack
5,000	25	60108-717	20 Pack
10,000	75	60108-718	10 Pack
20,000	75	60108-857	10 Pack
50,000	150	60108-858	10 Pack

Applications:

- Isolation of cationic compounds from complex samples
- Removal of basic drugs
- Organic bases
- Nucleic acid bases, nucleotides and surfactants

HyperSep Strong Cation Exchanger (SCX) 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-251	60300-585	1 Each
25	1	60307-252	60300-586	1 Each
50	1	60307-253	60300-587	1 Each
100	1	60307-254	60300-588	1 Each

HyperSep Strong Anion Exchanger (SAX) SPE Cartridges and Plates

Strong anion exchange sorbent for extraction of weak acids

HyperSep Strong Anion Exchanger (SAX) SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-417	100 Pack
100	1	60108-418	100 Pack
200	3	60108-419	50 Pack
500	3	60108-521	50 Pack
500	6	60108-360	30 Pack
1,000	6	60108-434	30 Pack
2,000	15	60108-713	20 Pack
5,000	25	60108-714	20 Pack
10,000	75	60108-715	10 Pack

Applications:

- Isolation of anionic compounds from complex samples
- Removal of acidic food pigments
- Isolation of phenolic compounds
- Nucleic acids, nucleotides and surfactants

HyperSep Strong Anion Exchanger (SAX) 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-241	60300-565	1 Each
25	1	60307-242	60300-566	1 Each
50	1	60307-243	60300-567	1 Each
100	1	60307-244	60300-568	1 Each

HyperSep Carboxylic Acid (WCX) SPE Cartridges and Plates

Weak cation exchange sorbent for extraction of strong bases

HyperSep Carboxylic Acid (WCX) SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-201	100 Pack
100	1	60108-202	100 Pack
200	3	60108-203	50 Pack
200	10	60108-207	50 Pack
500	3	60108-204	50 Pack
500	6	60108-205	30 Pack
1,000	6	60108-206	30 Pack
2,000	15	60108-208	20 Pack
5,000	25	60108-209	20 Pack

Applications:

- Drugs and metabolites in biological fluids
- Peptides in serum, plasma or biological fluids
- Pesticides in water, food and beverages
- Nucleic acids, nucleotides and surfactants

HyperSep Carboxylic Acid (WCX) 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-331	60300-841	1 Each
25	1	60307-332	60300-842	1 Each
50	1	60307-333	60300-843	1 Each
100	1	60307-334	60300-844	1 Each

HyperSep Aminopropyl (WAX) SPE Cartridges and Plates

Weak anion exchange sorbent for extraction of strong acids

HyperSep Aminopropyl (WAX) SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-424	100 Pack
50	3	60108-429	50 Pack
100	1	60108-364	100 Pack
200	3	60108-425	50 Pack
500	3	60108-518	50 Pack
500	6	60108-519	30 Pack
1,000	6	60108-432	30 Pack
2,000	15	60108-738	20 Pack
5,000	25	60108-739	20 Pack
10,000	75	60108-740	10 Pack

Applications:

- Separation of structural isomers
- Drugs and metabolites in biological fluids
- Separation of saccharides, phenols and petroleum products

HyperSep Aminopropyl (WAX) 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-291	60300-505	1 Each
25	1	60307-292	60300-506	1 Each
50	1	60307-293	60300-507	1 Each
100	1	60307-294	60300-508	1 Each

HyperSep Florisil SPE Cartridges and Plates

Ideal for the isolation of polar compounds from non-polar matrices

HyperSep Florisil SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-402	100 Pack
100	1	60108-403	100 Pack
200	3	60108-404	50 Pack
500	3	60108-405	50 Pack
500	6	60108-500	30 Pack
1,000	6	60108-431	30 Pack
2,000	6	60108-758	30 Pack
2,000	15	60108-735	20 Pack
5,000	25	60108-736	20 Pack
10,000	75	60108-737	10 Pack

HyperSep Florisil 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-281	60300-725	1 Each
25	1	60307-282	60300-726	1 Each
50	1	60307-283	60300-727	1 Each
100	1	60307-284	60300-728	1 Each

HyperSep Cyano SPE Cartridges and Plates

Optimized for the retention of moderately polar compounds from non-polar matrices

HyperSep Cyano SPE Cartridges

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
50	1	60108-746	100 Pack
100	1	60108-745	100 Pack
200	3	60108-747	50 Pack
500	3	60108-748	50 Pack
500	6	60108-749	30 Pack
1,000	6	60108-750	30 Pack
2,000	15	60108-751	20 Pack
5,000	25	60108-752	20 Pack
10,000	75	60108-753	10 Pack

HyperSep Cyano 96 Fixed/Removable Well Plates

Bed Weight (mg)	Well Volume (mL)	Fixed Cat. No.	Removable Cat. No.	Quantity
10	1	60307-301	60300-821	1 Each
25	1	60307-302	60300-822	1 Each
50	1	60307-303	60300-823	1 Each
100	1	60307-304	60300-824	1 Each



Applications:

- Extraction of pesticides using official methods
- Polychlorinated biphenyls in transformer oil
- Alcohol, aldehydes, amines and drugs

Applications:

- Retaining polar compounds from hexane and oils
- Reversed phase extraction of moderately polar compounds

SPE Manifolds and Accessories

A comprehensive range of accessories to improve your sample preparation workflow

HyperSep Positive Pressure Manifold

HyperSep Positive Pressure Manifold

Description	Cat. No.	Quantity
Positive Pressure Manifold with 13mm Collection Rack	60104-236	1 Each
Positive Pressure Manifold with 16mm Collection Rack	60104-274	1 Each
Adaptor Plate for 1mL Cartridges for PP Manifold	60104-265	1 Each
Adaptor Plate for 3mL Cartridges for PP Manifold	60104-266	1 Each
Adaptor Plate for 6mL Cartridges for PP Manifold	60104-267	1 Each
Adaptor Plate for 10mL/15mL Cartridges for PP Manifold	60104-271	1 Each
Collection Rack for 13mm Tubes	60104-268	1 Each
Collection Rack for 16mm Tubes	60104-269	1 Each
Pre-Drilled Waste Container	60104-270	1 Each
Installation Kit	60104-272	1 Each
In Line Air Filter	60104-273	1 Each



HyperSep Universal Vacuum Manifold

- Accommodates both SPE cartridges and 96 well plates
- System supplied with: Manifold, base/gauge, flask and stopper, tubing and spigots



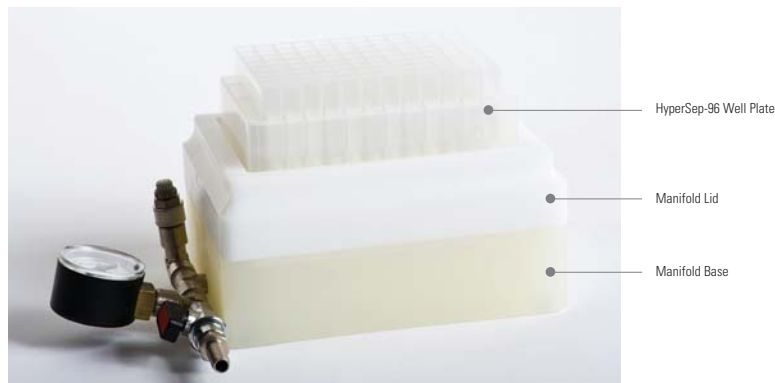
HyperSep Universal Vacuum Manifold

Description	Cat. No.	Quantity
Universal Vacuum Manifold	60104-230	1 Each
Vacuum Pump, European Version	60104-241	1 Each
Vacuum Pump, North American Version	60104-243	1 Each
24 Well Extraction Plate	60104-284	1 Each
48 Well Extraction Plate	60104-289	1 Each
Plugs for 24-position Extraction Plate	60104-234	24 Pack
Plugs for 48-position Extraction Plate	60104-235	48 Pack

HyperSep-96 Well Plate Vacuum Manifold

Included with system:

- Base
- Lid
- Waste collection tray



HyperSep-96 well plate is not included and needs to be purchased separately.

HyperSep-96 Well Plate Manifolds

Description	Cat. No.	Quantity
HyperSep-96 Vacuum Manifold	60103-351	1 Each
Vacuum Pump, European Version	60104-241	1 Each
Vacuum Pump, North American Version	60104-243	1 Each

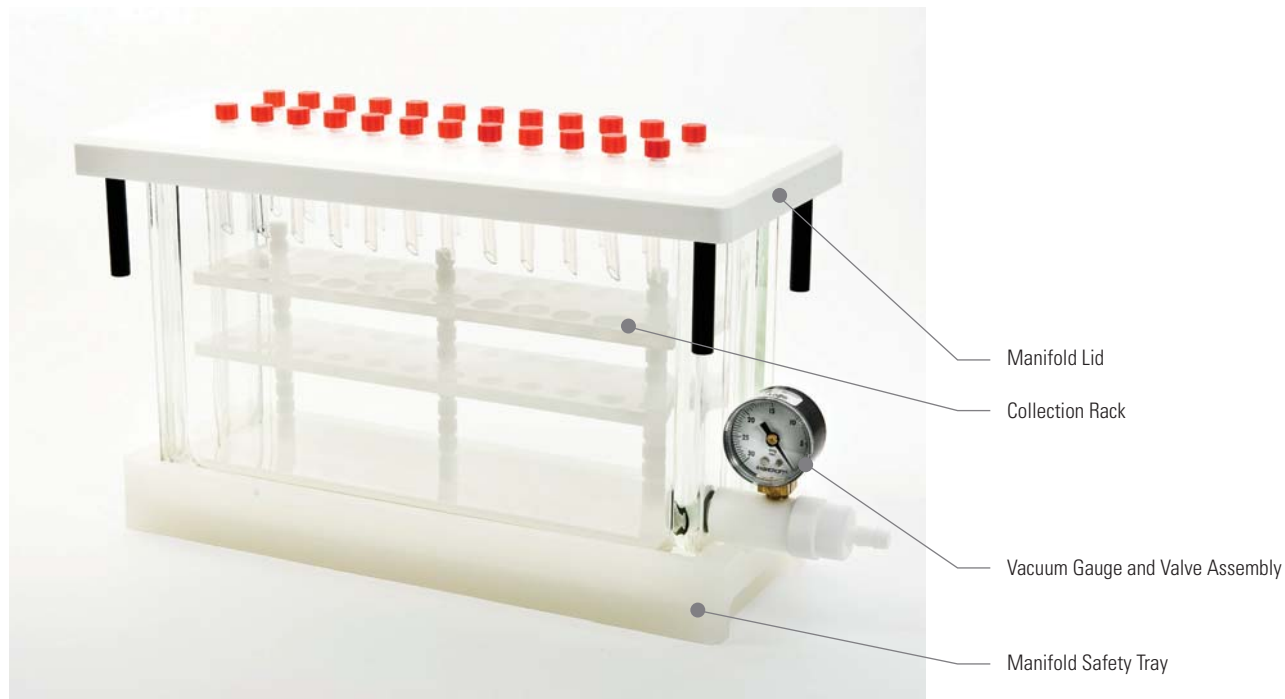
HyperSep Glass Block Manifolds

16-Port Vacuum Manifold:

- Glass Block, Corian Manifold Lid, Cover Gasket, Vacuum Gauge and Valve Assembly, 16 Tips, Adjustable Collection Rack, Bulkhead Luer Fittings, 16 Plugs and Manifold Safety Tray

24-Port Vacuum Manifold:

- Glass Block, Corian Manifold Lid, Cover Gasket, Vacuum Gauge and Valve Assembly, 24 Tips, Adjustable Collection Rack, Bulkhead Luer Fittings, 24 Plugs and Manifold Safety Tray



Luer Lock Plugs
(Cat. No. 60104-258)



Retaining Clips for Collection Rack
(Cat. No. 60104-255)



Bulkhead Luer Fittings
(Cat. No. 60104-256)



Collection Rack
(Cat. No. 60104-251 (16 port),
60104-252 (24 port))



Vacuum Gauge
(Cat. No. 60104-240)



Valve Assembly
(Cat. No. 60104-261)



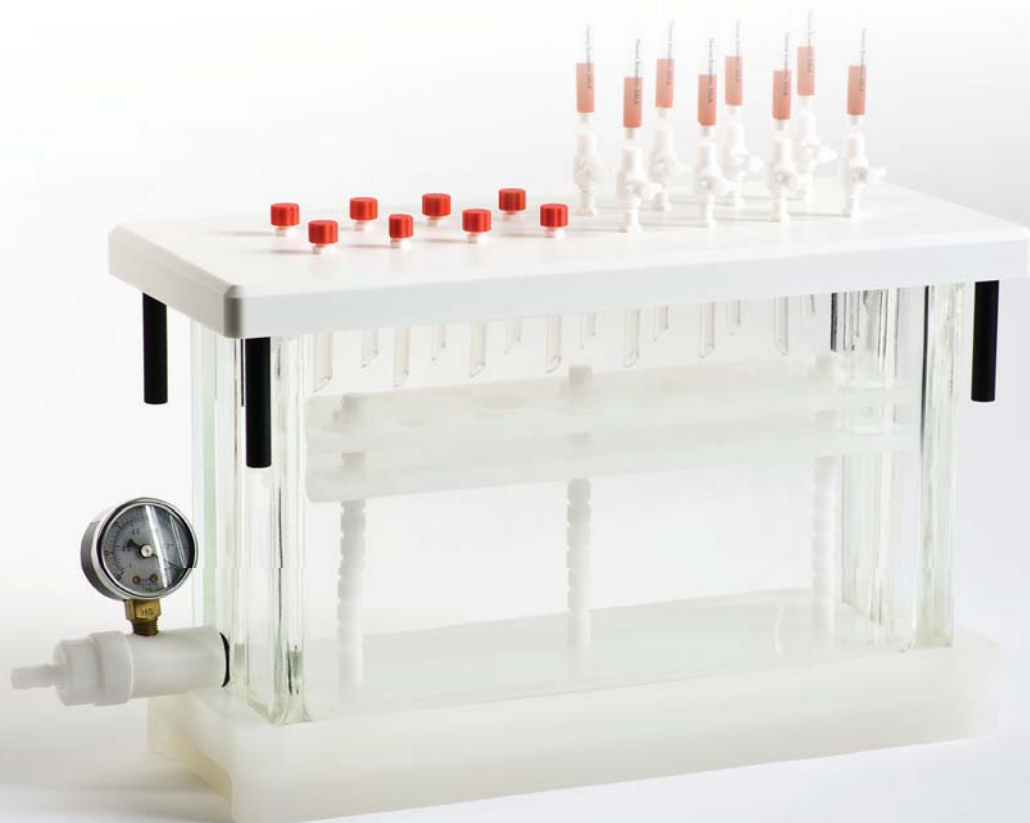
Tips
(Cat. No. 60104-245)



Manifold Lid Legs
(Cat. No. 60104-257)

HyperSep Glass Block Manifolds

Description	Cat. No.	Quantity
16-port Vacuum Manifold	60104-232	1 Each
24-port Vacuum Manifold	60104-233	1 Each
Vacuum Pump, European Version	60104-241	1 Each
Vacuum Pump, North American Version	60104-243	1 Each
Replacement Parts		
Vacuum Gauge	60104-240	1 Each
Stopcocks for 16-port Vacuum Manifold	60104-242	16 Pack
Stopcocks for 24-port Vacuum Manifold	60104-244	24 Pack
Tips for Vacuum Manifold	60104-245	12 Pack
Lid for 16-port Glass Block Manifold	60104-262	1 Each
Lid for 24-port Glass Block Manifold	60104-248	1 Each
Gasket for 16-port Manifold	60104-249	1 Each
Gasket for 24-port Manifold	60104-250	1 Each
Collection Rack for 16-port Vacuum Manifold	60104-251	1 Each
Collection Rack for 24-port Vacuum Manifold	60104-252	1 Each
Glass Block for 16-port Vacuum Manifold	60104-253	1 Each
Glass Block for 24-port Vacuum Manifold	60104-254	1 Each
Retaining Clips for Collection Rack	60104-255	12 Pack
Bulkhead Luer Fittings	60104-256	12 Pack
Manifold Lid Legs	60104-257	4 Pack
Luer Lock Plugs	60104-258	12 Pack
Column Adaptors	60104-259	15 Pack
Manifold Safety Tray	60104-260	1 Each
Vacuum Gauge and Valve Assembly	60104-261	1 Each
Collection Rack Posts	60104-264	3 Pack



HyperSep Online SPE Products

Retain specific analytes in a sample matrix when used with an appropriate HPLC column



- Effective removal of contaminants such as proteins from samples
- Compatible with conventional HPLC systems
- Fast and effective clean-up and concentration of target compounds

HyperSep Javelin Direct-Connect Online SPE Columns

ID (mm)	Length (mm)	Retain PEP	Retain CX	Retain AX	Hypercarb	Quantity
2.1	10	60310-201	60310-301	60310-401	60310-501	4 Pack
3.0	10	60310-202	60310-302	60310-402	60310-502	4 Pack

HyperSep UNIGUARD Direct-Connect Online SPE Cartridges

ID (mm)	Length (mm)	Retain PEP	Retain CX	Retain AX	Hypercarb	Quantity
2.1	10	60311-201	60311-301	60311-401	60311-501	4 Pack
3.0	10	60311-202	60311-302	60311-402	60311-502	4 Pack

HyperSep HPLC Columns for Online SPE

ID (mm)	Length (mm)	Retain PEP	Retain CX	Retain AX	Hypercarb	Quantity
2.1	20	60312-201	60312-301	60312-401	60312-501	1 Each
3.0	20	60312-202	60312-302	60312-402	60312-502	1 Each

Perform Better. Live Longer.

Discover our Accucore Solid Core LC Columns

 Visit **PAGE 4-005**





HyperSep Dispersive SPE (QuEChERS)

Fast, easy and robust sample preparation of food for pesticide analysis

QuEChERS dispersive SPE products provide a Quick, Easy, Cheap, Effective, Rugged and Safe sample preparation technique for multi-residue pesticide analysis. Products are available in a wide range of formats to meet application requirements.

QuEChERS methods overcome problems associated with time consuming, expensive and labor intensive multi-residue methods (MRM).

- **Fast and Easy Sample Preparation**
- **Robust and Reproducible Process**
- **High Recovery and Reproducibility**



Learn more about HyperSep Dispersive SPE at
www.thermoscientific.com/samplepreparation

HyperSep Dispersive SPE

Considerations in method development

- Determine the properties of the pesticides of interest:
 - Base sensitive compounds - use extraction product with sodium acetate
 - pH dependent
 - Non-base sensitive compounds - use extraction product with sodium chloride or sodium citrate
- Determine the properties of the sample matrix:
 - General
 - Fatty
 - Pigmented
 - Highly pigmented

Product Selection – Sample Cleanup

Matrix Type	Examples	Sorbent Requirements
General Matrices	Apples Cucumber Melon	Magnesium sulfate, PSA
Fatty Matrices	Milk Cereals Fish	Magnesium sulfate, PSA, C18
Pigmented Matrices	Lettuce Carrot Wine	Magnesium sulfate, PSA, C18, GCB
High Pigmented Matrices	Spinach Red Peppers	Magnesium sulfate, PSA, C18, GCB



QuEChERS Troubleshooting

Problem	Causes	Recommended Solutions
Loss of planar pesticides	Presence of GCB may result in a loss of planar compounds	Use a product with less GCB Use the Dual Phase QuEChERS product
Loss of acidic compounds e.g. 2,4-D from starting matrix	Presence of PSA will extract acidic compounds from matrix	Use a product containing magnesium sulfate and C18
Loss of compounds during subsequent analysis	Some compounds are unstable and can break down during analysis	Use an analyte protectant e.g. toluene or sorbitol
Addition of sample to QuEChERS extraction tube containing sorbent causes an exothermic reaction	Exothermic reaction between water in sample and magnesium sulfate	Add the sample to the tube, then the solvents, then the sorbent materials
Poor recovery of pesticide compounds	Sample not in appropriate homogenization state	Wrong products used in method Ensure sample is hydrated to 80% or higher Verify nature of pesticides e.g. are base sensitive compounds present

HyperSep Dispersive SPE Extraction Products

HyperSep Dispersive SPE Pre-Packed Extraction Products

Description	Capacity (mL)	Cat. No. (250 Pack)	Cat. No. (25 Pack)
6000mg anhydrous magnesium sulfate, 1500mg anhydrous sodium acetate	50	60105-210	60105-310
4000mg anhydrous magnesium sulfate, 1000mg anhydrous sodium chloride	50	60105-211	60105-311
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride, 1000mg sodium citrate tribasic dihydrate, 500mg disodium citrate sesquihydrate	50	60105-216	60105-316
6000mg anhydrous magnesium sulfate, 1500mg sodium chloride, 1500mg sodium citrate tribasic dihydrate, 750mg disodium citrate sesquihydrate	50	60105-212	60105-312
1500mg magnesium sulfate, 500mg C18	50	60105-234	–

Each pack contains centrifuge tubes pre-packed with sorbents

HyperSep Dispersive SPE Multipacks

Description	Cat. No.	Quantity
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride	60105-332	50 Pack
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride, 500mg sodium citrate dibasic sesquihydrate, 1000mg sodium citrate tribasic	60105-333	50 Pack
4000mg anhydrous magnesium sulfate, 1000mg sodium acetate	60105-334	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg sodium acetate	60105-335	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg sodium chloride	60105-336	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg magnesium sulfate, 1500mg sodium citrate dihydrate, 750mg disodium citrate sesquihydrate	60105-337	50 Pack
8000mg anhydrous magnesium sulfate, 2000mg of sodium chloride	60105-338	50 Pack
8000mg anhydrous magnesium sulfate, 3500mg of sodium chloride	60105-339	50 Pack

Each pack contains centrifuge tubes and sorbents packaged in mylar pouches

HyperSep Dispersive SPE Mylar Pouches

Description	Cat. No.	Quantity
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride	60105-340	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg sodium acetate (anhydrous)	60105-341	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg sodium chloride	60105-342	50 Pack
6000mg anhydrous magnesium sulfate, 1500mg sodium chloride, 1500mg sodium citrate dihydrate, 750mg disodium citrate sesquihydrate	60105-343	50 Pack
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride, 500mg sodium citrate dibasic sesquihydrate, 1000mg sodium citrate tribasic	60105-344	50 Pack
1200mg sodium chloride	60105-345	50 Pack
4000mg sodium sulfate and 500mg anhydrous magnesium sulfate	60105-346	50 Pack
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride, 1500mg sodium citrate dibasic dihydrate	60105-347	100 Pack
4000mg anhydrous magnesium sulfate, 2000mg sodium chloride, 1500mg sodium citrate dibasic dihydrate	60105-348	100 Pack

Each pack contains sorbents packaged in mylar pouches (no centrifuge tubes provided)

HyperSep Dispersive SPE Clean-Up Products

HyperSep Dispersive SPE Clean-Up Products

Description	Capacity (mL)	Cat. No. (100 Pack)	Cat. No. (10 Pack)
150mg anhydrous magnesium sulfate, 50mg PSA, 50mg GCB	2	60105-202	60105-302
150mg anhydrous magnesium sulfate, 50mg PSA	2	60105-203	60105-303
150mg anhydrous magnesium sulfate, 50mg PSA, 50mg C18	2	60105-204	60105-304
150mg anhydrous magnesium sulfate, 25mg PSA	2	60105-219	60105-319
150mg anhydrous magnesium sulfate, 25mg PSA, 25mg C18	2	60105-220	60105-320
150mg anhydrous magnesium sulfate, 25mg PSA, 2.5mg GCB	2	60105-221	60105-321
150mg anhydrous magnesium sulfate, 25mg PSA, 7.5mg GCB	2	60105-222	60105-322
150mg anhydrous magnesium sulfate, 50mg PSA, 50mg C18, 50mg GCB	2	60105-223	60105-323
150mg anhydrous magnesium sulfate, 50mg PSA, 50mg chlorofiltr™	2	60105-232	-
150mg anhydrous magnesium sulfate, 150mg PSA	2	-	60105-350

Description	Capacity (mL)	Cat. No. (100 Pack)	Cat. No. (10 Pack)
900mg anhydrous magnesium sulfate, 300mg PSA, 150mg GCB	15	60105-205	60105-305
900mg anhydrous magnesium sulfate, 300mg PSA, 150mg C18	15	60105-206	60105-306
750mg anhydrous magnesium sulfate, 250mg PSA, 250mg C18, 250mg GCB	15	60105-213	60105-313
900mg anhydrous magnesium sulfate, 300mg PSA	15	60105-214	60105-314
900mg anhydrous magnesium sulfate, 150mg PSA	15	60105-215	60105-315
900mg anhydrous magnesium sulfate, 150mg PSA, 45mg GCB	15	60105-217	60105-317
900mg anhydrous magnesium sulfate, 150mg PSA, 15mg GCB	15	60105-218	60105-318
1200mg anhydrous magnesium sulfate, 400mg PSA	15	60105-224	60105-324
1200mg anhydrous magnesium sulfate, 400mg PSA, 400mg C18	15	60105-225	60105-325
1200mg anhydrous magnesium sulfate, 400mg PSA, 400mg C18, 400mg GCB	15	60105-226	60105-326
900mg anhydrous magnesium sulfate, 150mg PSA, 150mg C18	15	60105-227	60105-327
150mg anhydrous magnesium sulfate, 50mg PSA, 50mg GCB	15	60105-230	60105-330
150mg anhydrous magnesium sulfate, 300mg PSA, 150mg chlorofiltr	15	60105-231	60105-331
1200mg anhydrous magnesium sulfate, 900mg PSA	15	60105-235	-
4000mg anhydrous magnesium sulfate, 1000mg sodium chloride, 1000mg sodium citrate tribasic dihydrate, 500mg sodium citrate dibasic sesquihydrate	15	60105-236	-
150mg anhydrous magnesium sulfate, 150mg PSA, 50mg C18	15	60105-238	-

Each pack contains centrifuge tubes pre-packed with sorbents

Homogenizers

Description	Cat. No.	Quantity
Homogenizers for 15mL QuEChERS tubes	60106-421	50 Pack
Homogenizers for 50mL QuEChERS tubes	60106-422	50 Pack

HyperSep Dispersive SPE Clean-Up Products for Schenck Method

Description	Capacity (mL)	Cat. No.	Quantity
400mg PSA on bottom, 200mg GCB on top, separated by a frit	6	60105-207	30 Pack
500mg PSA on bottom, 250mg GCB on top, separated by a frit	6	60105-208	30 Pack
500mg PSA on bottom, 500mg GCB on top, separated by a frit	6	60105-209	30 Pack



Syringes and Filtration

Providing high quality filtration solutions for a variety of samples and applications

Choose from a variety of syringe filter sizes, membranes and housings for a wide range of laboratory applications.

- **High Quality Filtration**
Low extractable membranes and solvent-resistant housing
- **Titan3 Color Coded Ring**
For easy selection of correct membrane and pore size
- **High Burst Pressures**
For enhanced robustness in sample processing



The syringe filter web page contains the latest news, applications and downloads for the range.
Visit www.thermoscientific.com/syringefilters

Syringes and Filtration

Technical Resources



visit www.thermoscientific.com/chromexpert
to access the following information:

- Membrane Selection Guide
- Membrane Compatibility Chart



Titan3 Syringe Filters

- Low extractable membranes and housing
- HPLC performance tested
- Color coding for easy selection of the correct membrane and pore size
- Enhanced Luer Lock inlet which prevents leakage
- Most 30mm devices are provided with a 1mm boro-silicate glass pre-filter
This is of benefit for high solids samples with larger size particulates
- Integral ring provides greater strength to the housing preventing leakage and bursting
- 30mm products pressure rated to 120psi
- Packed in re-usable rigid transparent color coded containers



Titan3 Nylon Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	42204-NN	100 Pack
	0.45	No	44504-NN	100 Pack
17	0.2	No	42213-NN	200 Pack
	0.45	No	44513-NN	200 Pack
30	0.2	Yes	42225-NN	100 Pack
	0.45	Yes	44525-NN	100 Pack
	0.45	No	44526-NN	100 Pack
	1.5	No	41225-NN	100 Pack
	5	No	45025-NN	100 Pack

Titan3 PTFE (Hydrophobic) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	42204-NP	100 Pack
	0.45	No	44504-NP	100 Pack
17	0.2	No	42213-NP	200 Pack
	0.45	No	44513-NP	200 Pack
30	0.2	Yes	42225-NP	100 Pack
	0.45	Yes	44525-NP	100 Pack
	1.0	No	41025-NP	100 Pack

Titan3 PTFE (Hydrophilic) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
17	0.2	No	42213-NPL	200 Pack
	0.45	No	44513-NPL	200 Pack
30	0.2	No	42225-NPL	100 Pack
	0.45	No	44525-NPL	100 Pack

Titan3 PVDF Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	42204-PV	100 Pack
	0.45	No	44504-PV	100 Pack
17	0.2	Yes	42213-PV	200 Pack
	0.45	No	44513-PV	200 Pack
30	0.2	Yes	42225-PV	100 Pack
	0.45	No	44525-PV	100 Pack

Applications:

- General laboratory filtration
- Filtration for most HPLC samples

Applications:

- Filtration of aggressive organic, highly basic or hot solutions, transducer protectors
- Filter aqueous solutions after prewetting with an alcohol

Applications:

- Filtration of aggressive organic, highly basic or hot solutions, without the need pre-wet membrane
- Filter aqueous solutions without prewetting with an alcohol

Applications:

- General biological filtration
- Filtration of samples where high protein recovery is desired

Titan3 Regenerated Cellulose Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	52204-RC	100 Pack
	0.45	No	54504-RC	100 Pack
17	0.2	Yes	52213-RC	200 Pack
	0.45	No	54513-RC	200 Pack
30	0.2	Yes	52225-RC	100 Pack
	0.45	No	54525-RC	100 Pack

Titan3 PES (Polyethersulfone) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
17	0.2	No	42213-PS	200 Pack
	0.45	No	44513-PS	200 Pack
30	0.2	Yes	42225-PS	100 Pack
	0.45	No	44525-PS	100 Pack

Titan3 GMF (Glass Microfiber) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
30	0.7	No	40725-GM	100 Pack
	1.2	No	41225-GM	100 Pack
	3.1	No	42725-GM	100 Pack

Titan3 Polypropylene Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
17	0.2	No	42213-PP	200 Pack
	0.45	No	44513-PP	200 Pack
30	0.2	No	42225-PP	100 Pack
	0.45	No	44525-PP	100 Pack

Titan3 Cellulose Acetate Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	42204-CA	100 Pack
	0.45	No	44502-CA	100 Pack
17	0.2	No	42213-CA	100 Pack
	0.45	No	44513-CA	100 Pack
30	0.2	No	42225-CA	100 Pack
	0.45	No	44525-CA	100 Pack

Applications:

- Low non-specific binding applications
- Tissue culture media filtration and general biological sample filtration

Applications:

- Ion chromatography
- Tissue culture filtration, filtration of proteins and nucleic acids
- High-temperature liquids

Applications:

- Dissolution testing
- General filtration

Applications:

- Filtration of biological samples
- Filtration of aggressive organic solutions

Applications:

- Tissue culture media filtration, sensitive biological samples



Target2 Syringe Filters

- Low extractable membranes and housing
- HPLC performance tested
- Plain polypropylene housing
- 30mm products pressure rated to 100psi
- Enhanced Luer Lock inlet which prevents leakage



Target2 Nylon Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-2	100 Pack
	0.45	No	F2504-1	100 Pack
17	0.2	No	F2513-2	100 Pack
	0.45	No	F2513-1	100 Pack
30	0.2	No	F2500-2	100 Pack
		Yes	F2502-2	100 Pack
	0.45	No	F2500-1	100 Pack
		Yes	F2502-1	100 Pack
	1.5	No	F2500-12	100 Pack
	5.0	No	F2500-50	100 Pack

Target2 PTFE Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-4	100 Pack
	0.45	No	F2504-3	100 Pack
17	0.2	No	F2513-4	100 Pack
	0.45	No	F2513-3	100 Pack
30	0.2	No	F2500-4	100 Pack
		No	F2500-3	100 Pack
	Yes	F2502-3	100 Pack	
	1.0	No	F2500-13	100 Pack

Target2 PVDF Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-6	100 Pack
	0.45	No	F2504-5	100 Pack
17	0.2	No	F2513-6	100 Pack
	0.45	No	F2513-5	100 Pack
30	0.2	No	F2500-6	100 Pack
	0.45	No	F2500-5	100 Pack

Applications:

- General laboratory filtration
- Filtration for most HPLC samples

Applications:

- Filtration of aggressive organic, highly basic or hot solutions, transducer protectors
- Filter aqueous solutions after prewetting with an alcohol

Applications:

- General biological filtration
- Filtration of samples where high protein recovery is desired

Target2 Regenerated Cellulose Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-8	100 Pack
	0.45	No	F2504-7	100 Pack
17	0.2	No	F2513-8	100 Pack
	0.45	No	F2513-7	100 Pack
30	0.2	No	F2500-8	100 Pack
	0.45	No	F2500-7	100 Pack

Target2 PES (Polyethersulfone) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
17	0.2	No	F2513-17	100 Pack
	0.45	No	F2513-14	100 Pack
30	0.2	No	F2500-17	100 Pack
	0.45	No	F2500-14	100 Pack

Target2 GMF (Glass Microfiber) Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
30	0.7	No	F2500-18	100 Pack
	1.2	No	F2500-19	100 Pack
	3.1	No	F2500-20	100 Pack

Target2 Polypropylene Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-10	100 Pack
	0.45	No	F2504-9	100 Pack
17	0.2	No	F2513-10	100 Pack
	0.45	No	F2513-9	100 Pack
30	0.2	No	F2500-10	100 Pack
	0.45	No	F2500-9	100 Pack
		Yes	F2502-9	100 Pack

Target2 Cellulose Acetate Syringe Filters

Diameter (mm)	Pore Size (µm)	PreFilter	Cat. No.	Quantity
4	0.2	No	F2504-16	100 Pack
	0.45	No	F2504-15	100 Pack
17	0.2	No	F2513-16	100 Pack
	0.45	No	F2513-15	100 Pack
30	0.2	No	F2500-16	100 Pack
	0.45	No	F2500-15	100 Pack

Applications:

- Low non-specific binding applications
- Tissue culture media filtration and general biological sample filtration

Applications:

- Ion chromatography
- Tissue culture filtration, filtration of proteins and nucleic acids
- High-temperature liquids

Applications:

- Dissolution testing
- General filtration

Applications:

- Filtration of biological samples
- Filtration of aggressive organic solutions

Applications:

- Tissue culture media filtration, sensitive biological samples

All-Plastic Disposable Syringes

Disposable syringes with polyethylene barrels and polypropylene plungers; use for all syringe filter applications

- Two-part, all-plastic construction eliminates the need for rubber or synthetic plunger gaskets
- No silicone or oil lubricant is required in the barrel
- Choose Luer-Slip or Luer Lock syringes, in capacities ranging from 1 to 50mL



All-Plastic Disposable Syringes

Capacity (mL)	Cat. No.	Quantity
Luer-Slip Syringes		
1	S7510-1	100 Pack
3	S7510-3	100 Pack
5	S7510-5	100 Pack
10	S7510-10	100 Pack
20	S7510-20	100 Pack
30	S7510-30	50 Pack
50	S7510-50	30 Pack
Luer Lock Syringes		
3	S7515-3	100 Pack
5	S7515-5	100 Pack
10	S7515-10	100 Pack
20	S7515-20	100 Pack

750µL Micro-Centrifugal Filters, Non-Sterile

Filter volumes as low as 50µL with low hold-up volume

- Filter volumes as low as 50µL up to 750µL with low hold-up volume
- Use with any laboratory microcentrifuge
- Virgin polypropylene filter housing with tapered 2mL, capped receiver tube
- 10,000xG maximum centrifugal force



750µL Micro-Centrifugal Filters, Non-Sterile

Material	Pore Size (µm)	Cat. No.	Quantity
Cellulose Acetate	0.2	F2517-1	100 Pack
Cellulose Acetate	0.45	F2517-2	100 Pack
Nylon	0.2	F2517-3	100 Pack
Nylon	0.45	F2517-4	100 Pack
PVDF	0.2	F2517-5	100 Pack
PVDF	0.45	F2517-6	100 Pack
Regenerated Cellulose	0.2	F2517-7	100 Pack
Regenerated Cellulose	0.45	F2517-8	100 Pack
PTFE	0.2	F2517-9	100 Pack
PTFE	0.45	F2517-10	100 Pack

2mL Centrifugal Filters, Non-Sterile

- Filter sample volumes up to 2mL
- Virgin polypropylene filter housing with tapered 5mL, capped receiver tube
- Use with benchtop or floor model centrifuges
- 5,000xG maximum centrifugal force



2mL Centrifugal Filters, Non-Sterile

Material	Pore Size (µm)	Cat. No.	Quantity
Cellulose Acetate	0.2	F2520-1	25 Pack
Cellulose Acetate	0.45	F2520-2	25 Pack
Nylon	0.2	F2520-3	25 Pack
Nylon	0.45	F2520-4	25 Pack
PVDF	0.2	F2520-5	25 Pack
PVDF	0.45	F2520-6	25 Pack
PTFE	0.2	F2520-7	25 Pack
PTFE	0.45	F2520-8	25 Pack

25mL Centrifugal Filters, Non-Sterile

- Filter sample volumes up to 25mL
- Virgin polypropylene filter housing with conical receiver
- Use with benchtop or floor model centrifuges
- 2,500xG maximum centrifugal force



25mL Centrifugal Filters, Non-Sterile

Material	Pore Size (µm)	Cat. No.	Quantity
Cellulose Acetate	0.2	F2519-1	50 Pack
Cellulose Acetate	0.45	F2519-2	50 Pack
Nylon	0.2	F2519-3	50 Pack
Nylon	0.45	F2519-4	50 Pack
PVDF	0.2	F2519-5	50 Pack
PVDF	0.45	F2519-6	50 Pack

Sample Handling Products

Our portfolio includes over 850 Thermo Scientific vials and closures products designed for any instrument and any application. Our pages have been arranged by product line and vial size, allowing you to quickly find the most appropriate products for your lab.

Featured Products



SureStop 9mm Vials

Removing any subjectivity around achieving the optimal compression when sealing a vial. Analytical results are improved as a result of the elimination of evaporation differences between samples.

PAGE 2-005



Virtuoso Vial Identification System

A fast sample identity and security system that provides reliable and accurate customized sample information printed directly onto a vial.

PAGE 2-007



Section Contents

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Tools and Accessories

Crimpers and decrimpers (manual and electronic) providing an adjustable crimp with reproducible results

PAGE 2-092



Webseal Well Plates

A comprehensive range of well plate solutions for high density sample handling in chromatography

PAGE 2-094

Sample Handling

Technical Resources



visit www.thermoscientific.com/chromexpert
to access the following information:

- MS Certified Vials Technical Information
- Septum Selection Guide
- Deactivated Glass Vials and Inserts
- Seal Hardness
- Solvent Compatibility
- Chemical Resistance Reference Chart
- Properties of Glass
- Autosampler Compatibility Chart





Vials and Closures

Our portfolio contains the most comprehensive selection of vials and closures from microsampling to headspace to match all of your application and autosampler requirements. The portfolio focuses on improved sample security and integrity with the Thermo Scientific™ AVCS™ 9mm closures and the Thermo Scientific™ SureStop™ 9mm screw top vial range. Our portfolio of vials and closures offer you the assurance of uninterrupted productivity on every separation and analysis.

- **AVCS Closures and SureStop Vials**

AVCS Closures together with SureStop vials significantly reduce the error rate of analysis that results from evaporation of solvent in vials which are not sealed correctly.

- **Virtuoso Vial Identification System**

Bringing time savings, greater productivity and increased sample security to your laboratory by eliminating manual vial labeling.

- **National Vials and Closures**

Choose from a large selection of Thermo Scientific™ National™ vials and closures to match your application and autosampler requirements.

- **MS Certified Vials**

The first and only pre-cleaned, low particle, low background chromatography vial.

- **Chromacol Vials and Closures**

Choose from a large selection of Thermo Scientific™ Chromacol™ vials and closures to match your application and autosampler requirements.

- **Crimping and Decrimping Tools**

Speed up your workflow with our tools for opening, closing and disposing of vials.

The vials and closures web page contains the latest news, applications and downloads for the range. Visit www.thermoscientific.com/vials



AVCS Closures and SureStop Vials

Thermo Scientific™ AVCS Closures and SureStop™ Vials – The next generation of sample handling

Top reasons why chemists should consider Advanced Vial Closure System (AVCS) closures and SureStop vials

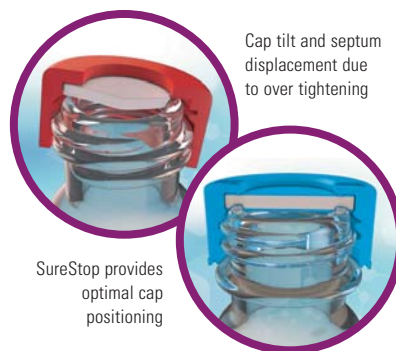
Features of 9mm wide opening, integral membrane and solid top closures:

1. AVCS closures along with SureStop vials significantly reduce the error rate of analysis that results from evaporation of solvent in improperly sealed vials
2. Re-analysis costs are reduced, sample data integrity and sample throughput increases
3. No need to use bulky crimpers – AVCS closures with SureStop vials seal as well as crimp top vials
4. The leveling feature of AVCS designed vials gives more autosampler compatibility with less autosampler interruptions, due to mishandled vials
5. AVCS design allows for consistent sealing, eliminating user-to-user variance
6. SureStop design provides a positive feedback closure that creates more consistent data, which for a researcher is almost as important as the actual result

A study of the effects of the typical operator response to evaporative sample loss and septum dislodging during the use of 9 mm screw thread and 11 mm crimp vials and closures was conducted. Sample losses were measured for both overtightened vials and for vials perceived to be optimally tightened and these were compared to losses from new vials designed to provide a definite sealing point.



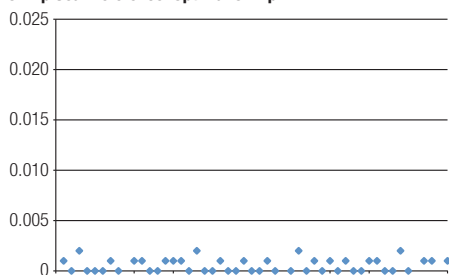
Examples of vial and closure misalignment/deformation. (A) SureStop vial self aligning cap; (B) generic vial, cap tilt; (C) generic vial, septum dislodged; and (D) generic vial, deformed top.



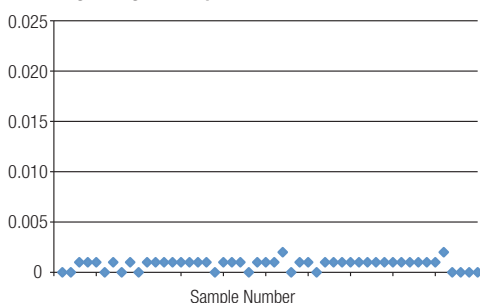
Test conditions

- 1.3 mL of pure methanol was added to each vial (always 50 in total)
- All vials were incubated at a temperature of 40 °C for 72 hours
- After 72 hours the final weight was taken and subtracted from the initial 40 °C temperature weight to yield the sample loss in grams

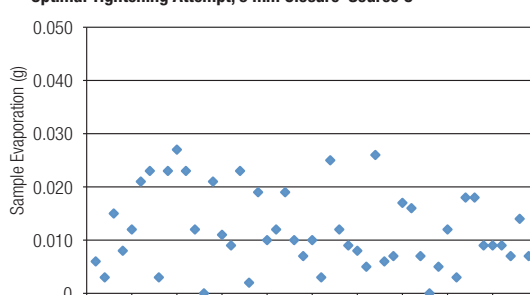
Crimp Seal Reference: Optimal Crimp



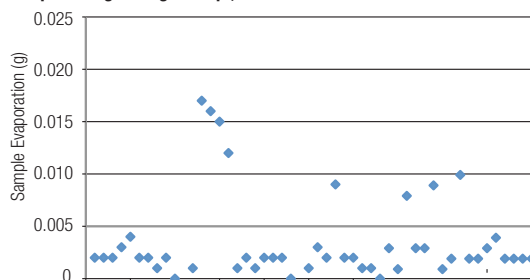
Normal Tightening, SureStop Vial/AVCS Closure

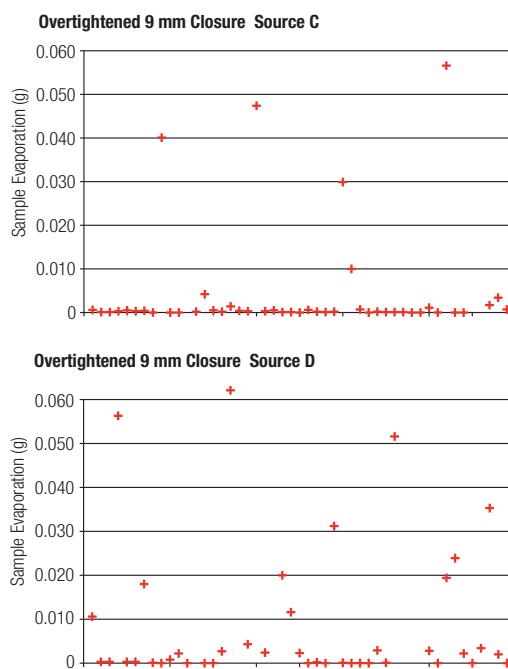
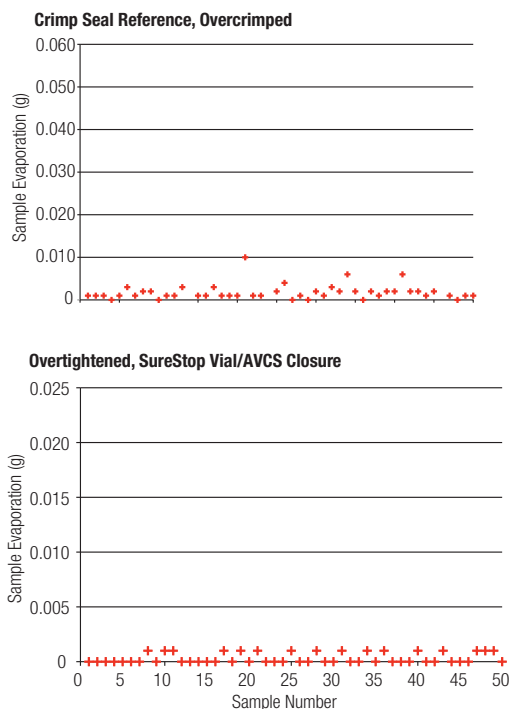


Optimal Tightening Attempt, 9 mm Closure Source C



Optimal Tightening Attempt, 9 mm Closure Source D





Are you currently using crimp caps?

Changing to AVCS closures and SureStop vials will provide the following benefits:

- The hassle of crimping is removed; crimping and de-capping tools are not required. Screw thread closures are easier to attach and remove reducing time required for sample prep. Additionally, there can be repetitive stress issues related to high volume crimping that will be alleviated with screw thread vials
- AVCS closures and SureStop vials offer identical performance to crimp caps (based on solvent loss studies), which make SureStop products a viable alternative for GC use
- AVCS and SureStop provides a “like crimped” product tightness and reliable quantification even for low boiling compounds; you remove user-to-user vial/closure sealing variability that results from user subjectivity of when they “think” the vial is properly sealed

Are you currently using snap caps?

Changing to AVCS closures and SureStop vials will provide the following benefits:

- Positive feedback makes AVCS and SureStop as convenient to use as snap cap
- Provides a fast closing alternative for volatile solvents/compounds of interest
- Eliminates variable evaporation rates that can be caused by environmental conditions

Are you currently using expensive bonded caps?

Changing to AVCS closures and SureStop vials and will provide the following benefits:

- Septum push through is eliminated with the AVCS screw-top closure and SureStop vial design. (See illustration below)
- Multiple septa qualities available (bonded caps very limited in septa offering)
- AVCS closures and SureStop vials seal more securely than bonded caps
- AVCS closures and SureStop vials are considerably less expensive than bonded caps and vials



Non-AVCS push through examples

AVCS no push through

Virtuoso Vial Identification System

Providing the next generation in sample security

From sample entry to final reports, everything an analytical lab does revolves around ensuring accurate data and reliable results. Chromatography vial sample identification can be complicated, because once the sample is in the vial, there is no easy way to identify it. Current methods, like hand written or adhesive labels, can be illegible or time consuming, and no accurate, reliable and efficient system for vial sample identification existed...until now.

The Thermo Scientific™ Virtuoso™ Vial Identification System is the most innovative device for ensuring sample identity and sample security ever developed. By providing a fast, accurate, detailed and reproducible system for producing customized sample information directly onto a vial, Virtuoso has revolutionized vial identification.



Load a single vial, or up to 10 with the included multi-vial sleeve

File management made easy

Virtuoso's network connectivity allows you to transfer label information from your files

Add text and barcodes

Virtuoso comes loaded with templates to make accurate labeling quick and easy, or easily create your own custom format

Input data instantly from the touch screen interface, or via the Pi Gateway Software interface

Start-to-finish in 5 seconds

Fully labeled vial completed in just 5 seconds

Virtuoso Vial Identification System

Virtuoso vials and accessories designed exclusively for use with the Virtuoso enabling the highest level of sample integrity available for chromatographers

Virtuoso Vial Identification System

Description	Cat. No.	Pack of
Virtuoso Vial Identification System	60180-VT100	1
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, 2mL, Clear Glass with V-Patch	60180-VT300	100
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, 2mL, Amber Glass with V-Patch	60180-VT301	100
Virtuoso 11mm Wide Opening Crimp Top Vial, 2mL, Clear Glass with V-Patch	60180-VT302	100
Virtuoso 11mm Wide Opening Crimp Top Vial, 2mL, Amber Glass with V-Patch	60180-VT302A	100
Virtuoso 11mm Wide Opening Snap-It Vial, 2mL, Clear Glass with V-Patch	60180-VT303	100
Virtuoso 11mm Wide Opening Snap-It Vial, 2mL, Amber Glass with V-Patch	60180-VT303A	100
Virtuoso 9mm SureStop Screw Thread High Recovery Vial 2mL, Clear Glass with V-Patch	60180-VT309	100
Virtuoso 9mm SureStop Screw Thread Total Recovery Vial 2mL, Clear Glass with V-Patch	60180-VT309TR	100
Virtuoso 9mm SureStop Screw Thread Fused Insert MacroVial, 350uL, Clear Glass with V-Patch	60180-VT310	100
Virtuoso 9mm SureStop Screw Thread Fused Insert MacroVial, 350uL, Amber Glass with V-Patch	60180-VT310A	100
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, Convenience Kit Kit Contains 60180-VT300 & C5000-53B	60180-VT400	100
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, Convenience Kit Kit Contains 60180-VT300 & C5000-51B	60180-VT401	100
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, Convenience Kit Kit Contains 60180-VT300 & C5000-54B	60180-VT402	100
Virtuoso 11mm Wide Opening Crimp Top Vial, Convenience Kit Kit Contains 60180-VT302 & C4011-1AP	60180-VT403	100
Virtuoso 11mm Wide Opening Snap-It Vial Convenience Kit, Kit Contains 60180-VT303A & C4011-54	60180-VT404A	100
Virtuoso 9mm Wide Opening SureStop Screw Thread Vial, Convenience Kit Kit Contains 60180-VT300 & C5000-55B	60180-VT405	100
Virtuoso Mass Spec Certified 9mm SureStop Kit, Kit Contains 60180-VT310A & C5000-64B	60180-VTMSC72LV	100
Virtuoso Mass Spec Certified 9mm SureStop Kit, Kit Contains MSCERT60180-VT301 & MSC5000-44B	60180-VTMSC402A	100
Virtuoso Replacement Tape	60180-VT500	1
Virtuoso Multi Vial Holder	60180-VT501	5
Virtuoso Vial Collection Tray	60180-VT502	3
Virtuoso Screen Protector	60180-VT503	1
Virtuoso Multi Vial Guide	60180-VT504	1

Innovative Vial Unmatched Performance

AVCS
Advanced Vial Closure System

- Consistent sealing
- Optimal cap alignment
- Advanced Vial Closure System (AVCS)
- AVCS improves autosampler compatibility

SureStop™ Vials with AVCS Closures

Premium Vials and Closures

8mm Screw Vials and Closures

8-425 thread finish, standard opening, 2mL, 12x32mm

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN
- Open top caps are designed to be used with any of our 8mm septa
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Flanged caps are particularly suitable for many Japanese autosamplers
- Pre-assembled caps and septa are convenient and minimize contamination from handling



Recommended for the following instruments:

- Thermo Scientific™ Dionex™ Ultimate™ 3000 HPLC
- Thermo Scientific Accela HPLC
- Thermo Scientific™ Surveyor™ LC autosampler
- Beckman
- CTC
- Gilson
- Knauer
- Shimadzu
- Spark
- Varian
- VWR (Merck)/Hitachi

For autosampler compatibility visit www.thermoscientific.com/chromexpert

8mm, 2mL, 12x32mm Standard Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
8-425 Screw Thread Vial	Clear	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-508	100
	Amber	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-560	100

8-425 Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8mm Open Top Screw Cap, 8-425 thread, 5.5mm hole	Black	Polypropylene	–	–	–	60180-514	100
8mm Open Top Screw Cap, flanged, 8-425 thread, 5.5mm hole	Pink	Polypropylene	–	–	–	60180-660	100
Septum for 8-425 Screw Caps	–	–	Blue Silicone/PTFE	30	1.1	60180-515	500
	–	–	White Silicone/Red PTFE	50	1.5	60180-562	100
8mm Open Top Screw Cap with flange, 8-425 thread, 5.5mm hole	Pink	Polypropylene	Red PTFE/White Silicone	45	1.3	60180-661	100
	Pink	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	0.9	60180-662	100
8mm Open Top Screw Cap, 8-425 thread, 5.5mm hole	Pink	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	60180-665	100
	Pink	Polypropylene	Red PTFE/White Silicone/Red PTFE	45	1.0	60180-666	100
	Pink	Polypropylene	Red PTFE/White Silicone	45	1.3	60180-667	100

For 8mm screw vial convenience kits look on page **2-010**

8mm Standard Opening Screw Thread Vial Convenience Kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Caps feature pre-inserted septa for added convenience during sample preparation

8mm Standard Opening Screw Thread Vial Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
Convenience Kit, Standard Opening Screw Vial	Clear	Yes	Black	Blue Silicone/PTFE	60180-508	60180-514/60180-515	60180-596	1000
	Clear	Yes	Black	Red PTFE/White Silicone	60180-508	60180-514/60180-562	60180-600	100

9mm Wide Opening Screw Thread Vials and Closures

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Easy-on, easy-off convenience with just one turn
- Caps with bonded septa resist dislodging during injection when using large diameter blunt needles
- Closures have the profile of a crimp or snap closure for compatibility with robotic autosamplers

Compatible with:

- Thermo Scientific TRACE 1300 GC
- Thermo Scientific TriPlus RSH autosampler
- Most other HPLC and GC autosamplers

For autosampler compatibility visit www.thermoscientific.com/chromexpert



* This vial fits Thermo Scientific AS 3000 and TriPlus only

9mm Wide Opening Screw Thread Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (μL)	Cat. No.	Pack of
9mm Screw Thread Thermo Scientific™ Micro+™ Vial 300μL, Fused Insert	Clear	Yes	12x32	Insert Vial	0.3	250μL	<3	60180-507	100
9mm Screw Thread Vial	Clear	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-509	100
	Clear	No	12x32	Flat Bottom	2.0	1.5	<170	60180-723	1000
	Amber	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-561	100
	Amber	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-724	1000
	Clear	No	15x46	Flat Bottom	4.0	3.5	<500	60180-510	125



9mm Short Screw Thread Vial Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
9mm Open Top Short Screw Cap, 6mm hole	Blue	Polypropylene	Clear PTFE/Blue Silicone	30	1.0	60180-516	100
	Blue	Polypropylene	Red PTFE/White Silicone	55	1.0	60180-729	1000
	Blue	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	60180-728	1000
	Pink	Polypropylene	Red PTFE/White Silicone	55	1.0	60180-671	100
	Pink	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	60180-669	100
	Pink	Polypropylene	Red PTFE/White Silicone/Red PTFE	45	1.0	60180-670	100
	Pink	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	60180-672	100

9mm Convenience Kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Caps feature pre-inserted septa for added convenience during sample preparation



Items not shown to scale

9mm Wide Opening Screw Thread Vials Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Open Short Screw Vial	Clear	Yes	Blue	Blue Silicone/PTFE	60180-509	60180-516	60180-599	100
	Clear	Yes	Pink	Red PTFE/White Silicone	60180-723	60180-671	60180-694	100
	Amber	No	Pink	Red PTFE/White Silicone	60180-724	60180-671	60180-698	100

11mm Wide Opening Crimp Top Vials, 2mL, 12x32mm and Closures

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber meets all requirements of Pharm. US, EU, JPN
- Aluminum crimp seals with prefitted septa for all 11mm crimp top and snap cap vials
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Aluminum seals must be applied with a crimping tool



Compatible with:

Most HPLC and GC autosamplers
For autosampler compatibility visit
www.thermoscientific.com/chromexpert

11mm Wide Opening Crimp Top Vials, 2mL, 12x32mm

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
11mm Crimp Top Vial, Wide Opening	Clear	Yes	12x32	Flat Bottom	2.0	1.5	<170	60180-502	100

11mm Crimp Top Vial Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Crimp Cap, 6mm center hole	Blue	Aluminum	Blue Silicone/Red PTFE	20	1.4	60180-526	100
11mm Crimp Cap, 5.5mm center hole	Silver	Aluminum	Red PTFE/White Silicone	45	1.3	60180-706	1000

11mm Crimp Top Convenience Kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Caps feature pre-assembled septa for added convenience during sample preparation

11mm Crimp Top Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Opening Crimp Top Vial	Clear	Yes	Blue	Blue Silicone/Red PTFE	60180-502	60180-526	60180-597	100
	Clear	Yes	Silver	White Silicone/Red PTFE	60180-502	60180-706	60180-598	100

11mm Crimping Tool

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 11mm aluminum crimp seals	60180-543	1

We offer electronic crimping options

➤ Visit **PAGE 2-092**



11mm Snap Cap Vials, Wide Opening, 2mL, 12x32mm and Closures

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN
- Crimp/Snap vials can be used with snap caps or aluminum crimp seal closures
- Snap Caps eliminate the need for crimping or decrimping tools
- Polyethylene caps are chemically inert and suitable for most chromatography applications

Compatible with:

Most HPLC and GC autosamplers

For autosampler compatibility visit

www.thermoscientific.com/chromexpert



11mm Snap Cap Vials, Wide Opening, 2mL, 12x32mm

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
11mm Crimp/Snap Vial	Clear	No	12x32	Flat Bottom	2.0	1.5	<170	60180-710	1000

11mm Snap Cap Vial Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Snap Cap, 6mm hole	Blue	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	60180-712	1000
	Pink	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	60180-676	100
	Pink	Polyethylene	Red PTFE/White Silicone	45	1.3	60180-677	100
	Pink	Polyethylene	Red PTFE/White Silicone, Star-slit	45	1.3	60180-678	100

11mm Wide Opening Snap Cap Convenience Kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Caps feature pre-assembled septa for added convenience during sample preparation

11mm Snap Cap Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Opening Snap Cap Vial	Clear	No	Pink	Clear PTFE/Red Rubber	60180-710	60180-676	60180-679	100
	Clear	No	Pink	Red PTFE/White Silicone	60180-710	60180-677	60180-680	100

20mm Headspace Crimp Top Vials and Closures

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN



Applications:

Recommended for operation of Thermo Scientific TriPlus HS Autosampler

Clear glass vials with 20mm crimp seal finish are designed to fit most headspace autosamplers

For autosampler compatibility visit

www.thermoscientific.com/chromexpert

Images shown are 70% to scale

20mm Crimp Top Headspace Vials

Description	Glass	Patched	Dimension (mm)	Finish	Profile	Total Volume (mL)	Usable Volume (mL)	Cat. No.	Pack of
20mm Headspace Crimp Vial	Clear	Yes	22.5x46	Beveled Edge	Round Bottom	12	10	60180-504	125
	Amber	No	22.5x46	Beveled Edge	Round Bottom	12	10	60180-505	125
	Clear	Yes	22.5x75	Beveled Edge	Round Bottom	21	20	60180-506	125
	Clear	No	22.5x75	Beveled Edge	Round Bottom	21	20	60180-741	1000



Images shown are 70% to scale

20mm Crimp Top Vial Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	–	–	–	60180-512	100
20mm Composite Magnetic Crimp Cap, 8mm hole	Blue	Alu/Tinplate	–	–	–	60180-519	100
Stopper for 20mm Crimp Caps	–	–	20mm Gray Butyl Stopper	37	3.0	60180-744	1000
Septum for 20mm Crimp Caps	–	–	Natural PTFE/Blue Silicone	45	3.2	60180-521	100
20mm Crimp Cap, 8mm hole	Silver	Aluminum	20mm Gray Chlorobutyl/Gray PTFE	52	3.0	60180-513	100
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	Natural PTFE/Blue Silicone	45	3.2	60180-511	100
20mm Composite Magnetic Crimp Cap, 8mm hole	Blue	Alu/Tinplate	Natural PTFE/Blue Silicone	45	3.2	60180-520	100

20mm Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 20mm crimp seals	60180-544	1
Manual Decrimper	Removes 20mm crimp seals without vial damage	60180-557	1

For electronic crimpers and decrimpers look on page **2-092**

National Vials and Closures

More laboratory professionals look to Thermo Scientific National products to meet their critical sampling needs than any other company

- Comprehensive instrument compatibility, "correct fit"
- The industry's widest selection of vials and closures for every application, from economical to high end products
- Innovative products for challenging applications
- Quality products in glass (1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN)
- Certified and Mass Spec Certified Vial Kits
- The leading manufacturer of vials and closures in North America since 1986
- In-house product development team
- Leading company in convenience and assembled kits



MS Certified Vials

The first and only pre-cleaned, low particle, low background chromatography vial

When your instrumentation, sample handling and methodology is pushing the limits, a chromatography vial that can keep up is essential

- The only chromatography vials pre-cleaned to provide unmatched consistency
- The first low particle, low background chromatography vials
- Pre-cleaned vial packaging protects the product integrity
- Tested and certified for up to 15 critical physical characteristics affecting vial performance
- Positive ESI LC-MS and GC-MS chromatograms included in each pack

Low particle background

The presence of inorganic sub-micron particles in all glass vials as a byproduct of the manufacturing process is a little known phenomenon that has not been extensively studied. Gas chromatographers depend on injection port liners to act as traps for particulates while the HPLC chromatographer takes extensive steps to eliminate them during sample preparation. This has been an effective strategy for routine analytical methods, but the need to work with even lower concentrations of analytes creates the possibility of interactions with compounds of interest.

Thermo Scientific MS Certified Vials undergo a proprietary cleaning process that greatly reduces the background particulates along with their potential effect on high sensitivity chromatography. The table gives a comparison of the particle distribution obtained from an analysis of standard vials versus the Thermo Scientific MS Certified Vials. All MS Certified Vials are processed and tested for background particulates. A typical vial that has not been processed can exhibit particle counts exceeding 5000 particles per mL with the highest counts occurring in the range below 0.5 μ m. This has traditionally been of little concern when GC inlet liners or HPLC guard

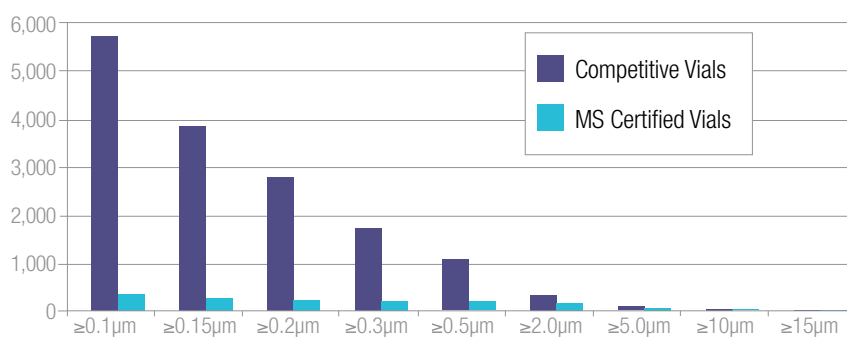
columns are used. GC techniques employing on-column injection create the need for a sample vial with minimal background particulates to prevent an accumulation of foreign material at the head of the column that might adversely affect a separation. Similarly newer techniques employing finely packed HPLC columns, capillary columns and direct connection of the analytical column to the

sample valve also require the elimination of as much particulate matter as possible from the sample stream.

The table below shows the results obtained from particulate analysis of a typical unprocessed vial compared to the Thermo Scientific MS Certified Vials. The processed vial shows a significant reduction in total particle counts.

VIAL	$\geq 0.1\mu\text{m}$	$\geq 0.15\mu\text{m}$	$\geq 0.2\mu\text{m}$	$\geq 0.2\mu\text{m}$	$\geq 0.5\mu\text{m}$	$\geq 2.0\mu\text{m}$	$\geq 5.0\mu\text{m}$	$\geq 10\mu\text{m}$	$\geq 15\mu\text{m}$
Competitive Vials	5,677	3,809	2,755	1,709	1,051	307	76	4	0
Thermo Scientific Vials	356	264	218	192	176	160	45	8	3

Typical Cumulative Particle Counts



MS Certified Vials Kits

Unassembled and Assembled Vial Kits

Kit Type	Glass	Patched	Cap Color	Septum	Cat. No.	Pack of
Convenience Kit, 9mm SureStop Screw Vial, 2mL with AVCS Closure	Clear	Yes	Blue	Blue Silicone/PTFE	MSCERT5000-34W	100
	Amber	Yes	Blue	Blue Silicone/PTFE	MSCERT5000-35W	100
	Clear	Yes	Blue	Blue Silicone/PTFE, Pre-slit	MSCERT5000-40W	100
	Amber	Yes	Blue	Blue Silicone/PTFE, Pre-slit	MSCERT5000-41W	100
Convenience Kit, 9mm 200µL Fused Insert Screw Vial	Clear	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-30LVW	100
Convenience Kit, 9mm 350µL Fused Insert Screw Vial	Clear	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-31LVW	100
Convenience Kit, 9mm Wide Opening 1.7mL High Recovery Screw Vial with 30µL Reservoir	Clear	No	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-32	100
Convenience Kit, 9mm Wide Opening 1.5mL Total Recovery Screw Vial with 10µL Reservoir	Clear	No	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-33TR	100
Convenience Kit, 9mm Wide Opening Screw Vial, 2mL	Clear	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-341W	100
	Amber	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-351W	100
Convenience Kit, 9mm 200µL Fused Insert Screw Vial	Clear	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-36LVW	100
Convenience Kit, 9mm 350µL Fused Insert Screw Vial	Clear	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-37LVW	100
Convenience Kit, 9mm Wide Opening 1.7mL High Recovery Screw Vial with 30µL Reservoir	Clear	No	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-38	100
Convenience Kit, 9mm Wide Opening 1.5mL Total Recovery Screw Vial with 10µL Reservoir	Clear	No	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-39TR	100
Convenience Kit, 9mm Wide Opening Screw Vial, 2mL	Clear	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-401W	100
	Amber	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-411W	100
Convenience Kit, 9mm Wide Opening Screw Vial, 2mL, silanized	Clear	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-S34W	100
	Amber	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-S35W	100
	Clear	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-S40W	100
	Amber	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	MSCERT5000-S41W	100
Convenience Kit, 11mm Snap Top Vial, 2mL	Clear	Yes	Red	Clear PTFE/Clear Silicone, Pre-slit	MSCERT4011-74W	100
Assembled Kit, 9mm Wide Opening Screw Vial, 2mL	Clear	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-134W	100
	Amber	Yes	Blue	Bonded Clear PTFE/Clear Silicone	MSCERT5000-135W	100
Assembled Kit, 13-425 Screw Vial, 4mL	Clear	Yes	Black	Bonded Clear PTFE/Clear Silicone	MSCERT4015-135W	100
	Amber	Yes	Black	Bonded Clear PTFE/Clear Silicone	MSCERT4015-136W	100



National Certified Vials and Closures Convenience Kits

- National Certified Vial Kits are fully lot-tested including HPLC and GC analysis for 15 critical parameters
- Certificate of Conformance included in every pack
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Fixed insert or conical base vials for limited volume sampling

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closures while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers



National Certified Vials and Closures Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Certified 9mm Wide Opening SureStop Vial, 2mL	Clear	Yes	Blue	Ivory PTFE/Red Rubber	C5000-1W	C5000-51B	CERT5000-580W	100
	Amber	Yes	Blue	Ivory PTFE/Red Rubber	C5000-2W	C5000-51B	CERT5000-582W	100
	Clear	Yes	Blue	Red PTFE/White Silicone	C5000-1W	C5000-54B	CERT5000-578W	100
	Amber	Yes	Blue	Red PTFE/White Silicone	C5000-2W	C5000-54B	CERT5000-575W	100
	Clear	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C5000-1W	C5000-55B	CERT5000-593W	100
	Amber	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C5000-2W	C5000-55B	CERT5000-576W	100
Convenience Kit, Certified 9mm Wide Opening Screw Vial, 2mL	Clear	No	Blue	Ivory PTFE/Red Rubber	C4000-1	C5000-51B	CERT5000-80	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber	C4000-1W	C5000-51B	CERT5000-80W	100
	Amber	Yes	Blue	Ivory PTFE/Red Rubber	C4000-2W	C5000-51B	CERT5000-82W	100
	Clear	Yes	Blue	Red PTFE/White Silicone	C4000-1W	C5000-54B	CERT5000-92W	100
Convenience Kit, Certified 9mm Wide Opening High Recovery Screw Vial, 1.7mL	Clear	No	Black	Bonded Red PTFE/White Silicone	C4000-9	C5000-64B	CERT5000-992	100
Convenience Kit, Certified 9mm Wide Opening Screw Vial, 2mL	Clear	Yes	Black	Bonded Red PTFE/White Silicone	C4000-1W	C5000-64B	CERT5000-78W	100
	Amber	Yes	Black	Bonded Red PTFE/White Silicone	C4000-2W	C5000-64B	CERT5000-75W	100
Convenience Kit, Certified 9mm Screw Vial, 350µL Fused Insert	Clear	Yes	Black	Bonded Red PTFE/White Silicone	C4000-LV1W	C5000-64B	CERT5000-69LV	100
	Amber	Yes	Black	Bonded Red PTFE/White Silicone	C4000-LV2W	C5000-64B	CERT5000-72LV	100
Convenience Kit, Certified 10-425 Screw Vial, 2mL	Clear	Yes	Black	Bonded Red PTFE/White Silicone	C4015-11W	C4010-68A	CERT4010-91	100
Convenience Kit, Certified 13-425 Screw Vial, 4mL	Clear	No	Black	Bonded Red PTFE/White Silicone	C4015-1	C4015-67A	CERT4015-83	100
Convenience Kit, Certified 9mm Wide Opening High Recovery Screw Vial, 1.7mL	Clear	No	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	C4000-9	C5000-75C	CERT5000-79	100
Convenience Kit, Certified 9mm Wide Opening Screw Vial, 2mL	Clear	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	C4000-1W	C5000-75C	CERT5000-93W	100
	Amber	Yes	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	C4000-2W	C5000-75C	CERT5000-76W	100
Convenience Kit, Certified 9mm Wide Opening Total Recovery Screw Vial, w/10µL Reservoir	Clear	No	Gray	Bonded Clear PTFE/Clear Silicone, Pre-slit	C4000-9TR	C5000-75C	CERT5000-993	100
Convenience Kit, Certified Shell Vial 1mL with SepCap	Clear	No	Natural	Integral Molded Polyethylene	–	–	CERT4015-96	200
Convenience Kit, Certified Crimp Top Vial, 2mL	Clear	Yes	Silver	PTFE/Synthetic Red Rubber	C4011-1W	–	CERT4011-89W	100
	Amber	Yes	Silver	PTFE/Synthetic Red Rubber	C4011-2W	–	CERT4011-89W	100
Assembled Kit, Certified 9mm Wide Opening Screw Vial, 2mL	Amber	Yes	Black	Bonded Red PTFE/White Silicone	C4000-2W	C5000-64B	CERT5000-175W	100
	Clear	Yes	Gray	Bonded Red PTFE/White Silicone, Pre-slit	C4000-1W	C5000-75C	CERT5000-193W	100
	Amber	Yes	Gray	Bonded Red PTFE/White Silicone, Pre-slit	C4000-2W	C5000-75C	CERT5000-176W	100

National 8mm Crimp Top Vials

- Superior quality type 1 borosilicate clear and amber glass
- Low volume sample vials for 6mm, 7mm and 8mm autosampler trays
- 8mm crimp top seal minimizes exposure between sample solvent and septum
- A support sleeve may be required for some autosamplers



Recommended for the following instruments:

- Thermo Scientific
- Agilent
- Beckman
- Carlo Erba
- CTC
- Fisons
- PerkinElmer
- Shimadzu
- VWR (Merck)/Hitachi

For autosampler compatibility visit
www.thermoscientific.com/chromexpert

National 8mm Crimp Top Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (μL)	Usable Volume (μL)	Residual (μL)	Cat. No.	Pack of
8mm Crimp Top Vial	Clear	No	6x32	Round Base	325	250	<6	C4008-632R	100
	Clear	No	6x32	Conical Base	250	200	<2	C4008-632C	100
	Amber	No	7x30	Conical Base	550	400	<3	C4008-730	100
	Amber	No	7x40	Conical Base	575	450	<2	C4008-740	100
	Clear	No	7x40	Flat Base	775	650	<70	C4008-741	100
	Amber	No	7x40	Flat Base	775	650	<70	C4008-742	100
	Clear	No	8x30	Flat Base	800	800	<80	C4008-1	200

National 8mm Crimp Top Closures

- Aluminum crimp seals with prefitted septa
- Provide a secure leak-resistant seal
- Pre-assembled caps and septa are convenient and minimize contamination from handling



National 8mm Crimp Top Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8mm Crimp Cap, 4mm center hole	Silver	Aluminum	Clear PTFE/Red Rubber	45	1.0	C4008-1A	200
	Silver	Aluminum	Red PTFE/White Silicone/Red PTFE	45	1.0	C4008-2A	200
	Silver	Aluminum	Red PTFE/White Silicone	45	1.3	C4008-4A	200

National 8mm Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure
- Easy and convenient handling
- High quality construction for durability and long life
- Painted, plated and coated for maximum corrosion resistance
- Textured handle surface provides an assured grip



Items not shown to scale

National 8mm Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 8mm aluminum crimp seals	C4008-100	1
Decapping Pliers	Removes 8mm aluminum crimp seals, Protective gloves recommended	C4008-101	1
Manual Decrimper	Removes 8mm aluminum crimp seals without vial damage	C4008-102	1

National Standard Opening Screw Thread Vials

2mL, 12x32mm, 8mm standard opening screw thread vials and inserts

- 8-425 screw thread finish
- I-D vials feature a write-on patch with graduation for convenient sample identification
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Available silanized (deactivated) for optimal recovery of critical polar, labile or OH-interacting compounds*
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Precision point insert minimizes residual sample loss
- Pulled point inserts are an economical choice for noncritical applications

Recommended for the following instruments:

- Beckman
- CTC
- Gilson
- Knauer
- Shimadzu
- Spark Holland
- Varian
- VWR (Merck)/Hitachi

For autosampler compatibility visit

www.thermoscientific.com/chromexpert



National Standard Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
8-425 Screw Thread Vial	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-1	100
	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-1500	1000
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-1W	100
	Amber	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-2	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-2W	100
8-425 Screw Thread Vial, silanized*	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4013-S1	100
8-425 Screw Thread 250µL Conical MicroVial	Polypropylene	No	12x32	Conical	475µL	250µL	<4	C4013-11	100
8-425 Screw Thread 600µL Tapered MicroVial	Polypropylene	No	12x32	High Recovery	850µL	675µL	<8	C4013-13	1000
200µL MicroSert Insert	Clear	–	5x31	Flat Bottom	250µL	200µL	<12	C4012-465	500
150µL Polyspring Insert	Clear	–	5x29	Pulled point	200µL	175µL	<1	C4012-530	100
150µL Insert	Clear	–	5x29	Pulled point	200µL	175µL	<1	C4012-529	100
125µL Polyspring Insert	Polypropylene	–	5x29	Precision point	175µL	125µL	<2	C4012-530P	100
150µL Polyspring Insert, silanized*	Clear	–	5x29	Pulled point	200µL	175µL	<1	C4012-S530	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

National Screw Thread Caps and Septa

- Open top caps are designed to be used with any of our 8mm septa
- Phenolic caps are suitable for autoclaving and low temperature applications
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Flanged caps are preferred for Shimadzu, Hitachi and Tosoh autosamplers
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Closures are shipped in sealed polybags to prevent contamination during transport



National 8-425 Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8mm Open Top Cap 5.5mm hole	Black	Polypropylene	–	–	–	C4013-1A	100
8mm Open Top Cap with flange, 5.5mm hole	Black	Polypropylene	–	–	–	C4013-3A	100
	Yellow	Polypropylene	–	–	–	C4013-98Y	1000
	White	Polypropylene	–	–	–	C4013-98W*	100
Septum for 8-425 Screw Caps	–	–	White Virgin PTFE, 0.01" Septum	53	0.25	C4013-10	1000
	–	–	Ivory PTFE/Red Rubber Septum	45	1.00	C4013-30	100
	–	–	Blue PTFE/White Silicone, Pre-slit Septum	55	0.90	C4013-32	100
	–	–	Red PTFE/White Silicone/ Red PTFE Septum	45	1.00	C4013-40	100
	–	–	Red PTFE/White Silicone Septum	45	1.30	C4013-60	100
	–	–	Tan PTFE/White Silicone Septum	45	1.50	C4013-61	1000
	8mm Open Top Cap, 5.5mm hole	Black	Polypropylene	Ivory PTFE/Red Rubber	45	1.00	C4013-30A
Black		Polypropylene	Red PTFE/White Silicone/Red PTFE	45	1.00	C4013-40A	100
Black		Polypropylene	Red PTFE/White Silicone	45	1.30	C4013-60A	100
Pink		Polypropylene	Red PTFE/White Silicone	45	1.30	C4013-60P	100
8mm Open Top Cap with flange, 5.5mm hole	Black	Polypropylene	Red PTFE/White Silicone	45	1.30	C4013-63A	100
	White	Polypropylene	Red PTFE/White Silicone	45	1.30	C4013-63W	100
	Yellow	Polypropylene	Red PTFE/White Silicone	50	1.30	C4013-63Y	100
	Black	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	0.90	C4013-64A	100
	White	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	0.90	C4013-64W	100
8mm Open Top Cap, 5.5mm hole	Black	Phenol	Red PTFE/White Silicone	45	1.30	C4013-74A	100
8mm Open Top Cap with flange, 5.5mm hole	Black	Polypropylene	Red PTFE/White Silicone, Pre-slit	55	1.00	C4013-77A	100
8mm Solid Top Cap, 8-425 thread	White	Urea	PTFE/PE Foam Liner	–	1.30	B7815-8	100
8mm Open Top Cap, 5.5mm hole	Black	Polypropylene	Bonded Red PTFE/White Silicone, Pre-slit	45	1.30	C4013-69A	100
8mm Open Top Cap with flange with Integral PE Membrane	Yellow	Polyethylene	Polyethylene	N/A	N/A	C4013-50Y	1000

* Additional colors on request

National Standard Opening Screw Thread Vial Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closure while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers or in economical polybags



Items not shown to scale

National Standard Opening Screw Thread Vial Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
Convenience Kit	Clear	No	Black, flanged	Red PTFE/White Silicone	C4013-1	C4013-63A	C4013-14	100
	Clear	No	Black	Red PTFE/White Silicone	C4013-1	C4013-60A	C4013-15	100
	Clear	No	Pink	Red PTFE/White Silicone	C4013-1	C4013-60P	C4013-15P	100
	Amber	No	Black	Red PTFE/White Silicone	C4013-2	C4013-60A	C4013-17	100
	Clear	Yes	Black, flanged	Red PTFE/White Silicone, Pre-slit	C4013-1W	C4013-77A	C4013-95W	100
	Clear	No	Black, phenolic	Red PTFE/White Silicone	C4013-1	C4013-74A	C4013-492	100
	Clear	Yes	Yellow, flanged	Red PTFE/White Silicone	C4013-1W	C4013-63Y	C4013-54Y	100
	Clear	Yes	Yellow, flanged	Red PTFE/White Silicone/Red PTFE	C4013-1W	C4013-67Y	C4013-97Y	100
Assembled Kit	Clear	No	Black	White Virgin PTFE, 0.01"	C4013-1	C4013-1A/ C4013-10	C4013-10A	100
	Clear	No	Black	Red PTFE/White Silicone	C4013-1	C4013-60A	C4013-15A	100
	Amber	No	Black	Red PTFE/White Silicone	C4013-2	C4013-60A	C4013-17A	100
	Clear	No	Black, flanged	Blue PTFE/White Silicone, Pre-slit	C4013-1	C4013-3A/ C4013-32	C4013-32A	100
	Clear	Yes	Yellow, flanged	Red PTFE/White Silicone, Pre-slit	C4013-1W	C4013-98Y/ C4013-60TW	C4013-36A	100
	Clear	No	Black, flanged	Red PTFE/White Silicone	C4013-1	C4013-63A	C4013-57	100
	Clear	No	White, flanged	Red PTFE/White Silicone	C4013-1	C4013-63W	C4013-58	100
	Clear	No	Black, phenolic	Red PTFE/White Silicone	C4013-1	C4013-74A	C4013-492A	100
	Amber	No	Black, phenolic	Red PTFE/White Silicone	C4013-2	C4013-74A	C4013-494A	100
Assembled Kit, in Polybag	Clear	No	Black	White Virgin PTFE, 0.01"	C4013-1	C4013-1A/ C4013-10	C4013-010A	100
	Clear	Yes	Yellow, flanged	Red PTFE/White Silicone	C4013-1W	C4013-63Y	C4013-37Y	100

National Target DP 9mm Wide Opening Screw Thread Vials

2mL, 12x32mm, 9mm wide opening short screw thread vials and inserts

Recommended for most brands of autosamplers:

For autosampler compatibility visit
www.thermoscientific.com/chromexpert

- C5000 SureStop 9mm vials as part of the Advanced Vial Closure System (AVCS) offer the sealing and performance characteristics of a crimp top vial and remove any subjectivity achieving optimal seal compression closing a vial by incorporating a definite stop point into the design of the vial finish. They should be used with AVCS C5000 closures in order to get the best possible performance, see pages **2-005** to **2-006**.
- Some vials feature an I-D write-on patch with graduation for convenient sample identification
- Wide neck opening design, allows easy filling, requires Micro-Inserts with a diameter of 6mm
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Available silanized (deactivated) for optimal recovery of critical polar compounds
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Precision point insert minimizes residual sample loss



National 9mm Wide Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
9mm SureStop Vial (AVCS)	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C5000-1	100
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C5000-1W	100
	Amber	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C5000-2	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C5000-2W	100
9mm Target DP Vial	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1	100
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1W	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-2W	100
	Amber PP	Graduated	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-12	100
	Clear PP	Graduated	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-14	100
9mm Target DP ColorBand Vial	Clear	Blue**	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1B	100
	Clear	Green**	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1G	100
	Clear	Red**	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1R	100
	Clear	Yellow**	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-1Y	100



National Target DP 9mm Wide Opening Screw Thread Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
9mm Target DP Vial, High Recovery with 30µL Reservoir	Clear	No	12x32	Tapered Base	1.7mL	1.3mL	<4	C4000-9	100
	Amber	No	12x32	Tapered Base	1.7mL	1.3mL	<4	C4000-9A	100
9mm Target DP Vial, Total Recovery with 10µL Reservoir	Clear	No	12x32	Deep Well Base	1.5mL	1.2mL	<1	C4000-9TR	100
9mm Target DP MacroVial 350µL, Fused Insert	Clear	No	12x32	Insert Vial	475µL	350µL	<2	C4000-LV1	100
	Clear	Yes	12x32	Insert Vial	475µL	350µL	<2	C4000-LV1W	100
	Amber	No	12x32	Insert Vial	475µL	350µL	<2	C4000-LV2	100
	Amber	Yes	12x32	Insert Vial	475µL	350µL	<2	C4000-LV2W	100
9mm Target DP MacroVial 200µL, Fused Insert	Clear	Yes	12x32	Insert Vial	375µL	240µL	<1	C4000-LV3W	100
9mm Target DP Micro-V Tapered MicroVial with 150µL reservoir	Clear	No	12x32	Tapered Base	1.4mL	1.0mL	<4	C4000-V1	100
	Amber	No	12x32	Tapered Base	1.4mL	1.0mL	<4	C4000-V2	100
9mm Target DP Vial, silanized*	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-S1	100
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-S1W	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4000-S2W	100
9mm Target DP Vial, High Recovery, silanized*, with 30µL Reservoir	Clear	No	12x32	Tapered Base	1.7mL	1.3mL	<4	C4000-S9	100
9mm Target DP 300µL Vial	Polypropylene	No	12x32	Conical	400µL	300µL	<2	C4000-11	100
350µL Insert	Clear	–	6x31	Pulled Point	400µL	350µL	<4	C4010-627L	100
300µL Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-629	100
350µL Insert	Clear	–	6x31	Precision Point	400µL	350µL	<2	C4010-629L	100
300µL Insert, Graduation Marks	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-629P	100
300µL Polyspring Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-630	100
	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-630P	100
400µL MicroSert Insert	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631	100
	Polypropylene	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631P	500
300µL Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S629	100
300µL Polyspring Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S630	100
400µL MicroSert Insert, silanized*	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-S631	500
300µL Polyspring Insert, Kimshield*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-K630	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

**Target DP ColorBand vials are designed to provide full sample color coding for autosamplers with optical vial detection. Use the optimum cap for your instrument without sacrificing your color coding scheme.

National 9mm Screw Caps and Septa

C5000 closures featuring AVCS technology (Advanced Vial Closure System)



- Elimination of septum “push-through”
- Increased sealing capability
- Improved autosampler compatibility
- Flexibility to select the best septum for your instrument and applications
- Cost efficient alternative to caps with bonded septa
- Optimized ergonomics, fine texturing and evenly spaced ribbing for superior handling

Further features are:

- Fully compatible with all National Target DP vials
- Easy-on, easy-off convenience with just one turn
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Closures have the profile of a crimp or snap closure for compatibility with robotic autosamplers
- Closures are shipped in sealed polybags to prevent contamination during transport



National 9mm Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
9mm Open Top Screw Cap, 6mm hole	Blue	Polypropylene	–	N/A	N/A	C5000-98B	100
Septum for 9mm Screw Thread Cap	–	–	Ivory PTFE/Red Rubber	35	1.0	C4000-30	100
	–	–	Red PTFE/White Silicone/Red PTFE	45	1.0	C4000-40	100
	–	–	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4000-55	100
	–	–	Red PTFE/White Silicone	50	1.0	C4000-60	100
	–	–	Yellow PTFE/White Silicone	40	1.0	C4000-60Y	100
	–	–	Yellow PTFE/White Silicone	40	1.0	C4000-61	1000
	–	–	Yellow PTFE/White Silicone/Yellow PTFE	40	1.0	C4000-40Y	100
	–	–	Yellow PTFE/White Silicone/Yellow PTFE	40	1.0	C4000-41	1000
9mm Open Top Cap, 6mm hole	Blue	Polypropylene	Soft septum, PTFE/Blue Silicone	30	1.0	C5000-44B	100
	Blue	Polypropylene	Soft septum, PTFE/Blue Silicone, Pre-slit	30	1.0	C5000-45B	100
	Black	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51A	100
	Blue	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51B	100
	Green	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51G	100
	Red	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51R	100
	Yellow	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51Y	100
	Pink	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-51P	100



National 9mm Screw Thread Caps and Septa (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
9mm Open Top Cap, 6mm hole	Black	Polypropylene	Red PTFE/White Silicone/Red PTFE	50	1.0	C5000-53A	100
	Blue	Polypropylene	Red PTFE/White Silicone/Red PTFE	50	1.0	C5000-53B	100
	Green	Polypropylene	Red PTFE/White Silicone/Red PTFE	50	1.0	C5000-53G	100
	Red	Polypropylene	Red PTFE/White Silicone/Red PTFE	50	1.0	C5000-53R	100
	Yellow	Polypropylene	Red PTFE/White Silicone/Red PTFE	50	1.0	C5000-53Y	100
	Yellow	Polypropylene	Yellow PTFE/White Silicone/Yellow PTFE	40	1.0	C5000-53YY	100
	Green	Polypropylene	Yellow PTFE/White Silicone/Yellow PTFE	40	1.0	C5000-53GY	100
	Black	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54A	100
	Blue	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54B	100
	Green	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54G	100
	Red	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54R	100
	Yellow	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54Y	100
	Pink	Polypropylene	Red PTFE/White Silicone	55	1.0	C5000-54P	100
	Yellow	Polypropylene	Yellow PTFE/White Silicone	40	1.0	C5000-54YY	100
	Green	Polypropylene	Yellow PTFE/White Silicone	40	1.0	C5000-54GY	100
	Red	Polypropylene	Yellow PTFE/White Silicone	40	1.0	C5000-54RY	100
	Blue	Polypropylene	Yellow PTFE/White Silicone	40	1.0	C5000-54BY	100
	Black	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55A	100
	Blue	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55B	100
	Green	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55G	100
Red	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55R	100	
Yellow	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55Y	100	
Pink	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C5000-55P	100	
Blue	Polypropylene	Ivory PTFE/Red Rubber, Pre-slit	45	1.0	C5000-57B	100	
Green	Polypropylene	Ivory PTFE/Red Rubber, Pre-slit	45	1.0	C5000-57G	100	
9mm Cap with Integral PP Membrane	Clear	Polypropylene	Polypropylene	N/A	N/A	C5000-50	100
	Blue	Polypropylene	Polypropylene	N/A	N/A	C5000-50B	100
9mm Solid Top Cap	Blue	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C5000-99B	100
9mm Open Top Cap, 6mm hole	Black	Polypropylene	Bonded Red PTFE/White Silicone	45	1.0	C5000-64B	100
	Gray	Polypropylene	Bonded Red PTFE/White Silicone, Pre-slit	45	1.0	C5000-75C	100
	Blue	Polypropylene	Bonded Natural PTFE/Clear Silicone	45	1.3	C5000-62B	100
Magnetic 9mm Open Top Cap, 6mm hole	Blue	Polypropylene	Soft septum, PTFE/Blue Silicone	30	1.0	C5000-46M	100
	Blue	Polypropylene	Soft septum, PTFE/Blue Silicone, Pre-slit	30	1.0	C5000-47M	100
9mm Open Top Cap, 6mm hole	Blue	Polypropylene	Solid Aluminum Disk with Silicone sealing ring		0.06	C5000-56AL	100
	Blue	Polypropylene	Solid PTFE Disk with Silicone sealing ring	53	0.25	C5000-52AE	100

National 9mm Screw Thread Vials Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

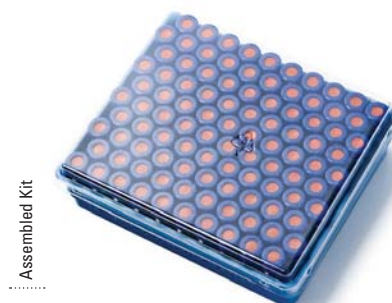
- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closure while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers



Convenience Kit



Assembled Kit

Items not shown to scale

National 9mm Wide Opening Screw Thread Vials Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
SureStop Convenience Kit	Clear	No	Blue	Ivory PTFE/Red Rubber	C5000-1	C5000-51B	C5000-580	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber	C5000-1W	C5000-51B	C5000-580W	100
	Clear	No	Blue	Red PTFE/White Silicone	C5000-1	C5000-54B	C5000-592	100
	Clear	Yes	Blue	Red PTFE/White Silicone	C5000-1W	C5000-54B	C5000-592W	100
	Clear	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C5000-1W	C5000-53B	C5000-586W	100
	Clear	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C5000-1W	C5000-55B	C5000-595W	100
AVCS Convenience Kit	Clear	No	Blue	Ivory PTFE/Red Rubber	C4000-1	C5000-51B	C5000-80	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber	C4000-1W	C5000-51B	C5000-80W	100
	Amber	Yes	Pink	Ivory PTFE/Red Rubber	C4000-2W	C5000-51P	C5000-82P	100
	Amber	Yes	Blue	Ivory PTFE/Red Rubber	C4000-2W	C5000-51B	C5000-82W	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber, Pre-slit	C4000-1W	C5000-57B	C5000-83W	100
	Clear	No	Blue	Red PTFE/White Silicone/Red PTFE	C4000-1	C5000-53B	C5000-86	100
	Clear	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C4000-1W	C5000-53B	C5000-86W	100
	Amber	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C4000-2W	C5000-53B	C5000-88W	100
	Polypropylene	No	Blue	Red PTFE/White Silicone	C4000-11	C5000-54B	C5000-87	100
	Clear	Yes	Black	Red PTFE/White Silicone	C4000-1W	C5000-54A	C5000-91W	100
	Clear	No	Blue	Red PTFE/White Silicone	C4000-1	C5000-54B	C5000-92	100
	Clear	No	Pink	Red PTFE/White Silicone	C4000-1	C5000-54P	C5000-92P	100
	Clear	Yes	Blue	Red PTFE/White Silicone	C4000-1W	C5000-54B	C5000-92W	100
	Amber	Yes	Blue	Red PTFE/White Silicone	C4000-2W	C5000-54B	C5000-94W	100
	Clear	No	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-1	C5000-55B	C5000-95	100
Clear	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-1W	C5000-55B	C5000-95W	100	
Clear	No	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-LV1	C5000-55B	C5000-LV95	100	
Polypropylene	No	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-11	C5000-55B	C5000-97	100	
Convenience Kit	Clear	Yes	Black	Bonded Red PTFE/White Silicone	C4000-1W	C5000-64B	C5000-78W	100
	Clear	Yes	Gray	Bonded Red PTFE/White Silicone, Pre-slit	C4000-1W	C5000-75C	C5000-93W	100

National 9mm Wide Opening Screw Thread Vials Convenience Kits (Continued)

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit	Clear	Yes	Yellow	Ivory PTFE/Red Rubber	C4000-1W	C5000-51Y	C5000-80WY	100
	Clear	Yes	Yellow	Yellow PTFE/White Silicone	C4000-1W	C5000-54YY	C5000-92WY	100
	Clear	Yes	Yellow	Yellow PTFE/White Silicone/ Yellow PTFE	C4000-1W	C5000-53YY	C5000-86WY	100
	Amber	Yes	Yellow	Yellow PTFE/White Silicone	C4000-2W	C5000-54YY	C5000-94WY	100
Assembled AVCS Kit	Clear	No	Blue	Ivory PTFE/Red Rubber	C4000-1	C5000-51B	C5000-180	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber	C4000-1W	C5000-51B	C5000-180W	100
	Amber	Yes	Blue	Ivory PTFE/Red Rubber	C4000-2W	C5000-51B	C5000-182W	100
	Clear	Yes	Blue	Ivory PTFE/Red Rubber, Pre-slit	C4000-1W	C5000-57B	C5000-183W	100
	Amber	Yes	Blue	Ivory PTFE/Red Rubber, Pre-slit	C4000-2W	C5000-57B	C5000-184W	100
	Clear	No	Blue	Red PTFE/White Silicone/Red PTFE	C4000-1	C5000-53B	C5000-186	100
	Clear	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C4000-1W	C5000-53B	C5000-186W	100
	Clear	Yes	Red	Red PTFE/White Silicone/Red PTFE	C4000-1W	C5000-53R	C5000-186WR	100
	Amber	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C4000-2W	C5000-53B	C5000-188W	100
	Clear	Yes	Yellow	Yellow PTFE/White Silicone/ Yellow PTFE	C4000-1W	C5000-53YY	C5000-186WY	100
	Clear	No	Blue	Red PTFE/White Silicone	C4000-1	C5000-54B	C5000-192	100
	Clear	Yes	Blue	Red PTFE/White Silicone	C4000-1W	C5000-54B	C5000-192W	100
	Amber	Yes	Blue	Red PTFE/White Silicone	C4000-2W	C5000-54B	C5000-194W	100
	Clear	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-1W	C5000-55B	C5000-195W	100
	Amber	Yes	Blue	Blue PTFE/White Silicone, Pre-slit	C4000-2W	C5000-55B	C5000-196W	100

National 9mm Wide Opening Screw Thread Vial Storerooms

- Storerooms organize supplies and save valuable bench space
- Some storerooms are shipped fully stocked.
- 6 Drawer Mini-Storeroom holds 500 vials and closures
- 9 Drawer Storeroom holds 2000 vials and closures



C5075-211



C4000-MS



C4075-500

Items not shown to scale

National 9mm Wide Opening Screw Thread Vial Storerooms

Description	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
SureStop 9 Drawer Storeroom , 2000 pieces Caps and Vials	Clear	No	Blue	Red PTFE/White Silicone/Red PTFE	C5000-1	C5000-53B	C5075-211	1
	Clear	Yes	Blue	Red PTFE/White Silicone/Red PTFE	C5000-1W	C5000-53B	C5075-213	1
	Clear	No	Blue	Red PTFE/White Silicone	C5000-1	C5000-54B	C5075-219	1
6 Drawer Mini-Storeroom – Cabinet Only	–	–	–	–	–	–	C4000-MS	1
9 Drawer Storeroom, Full Size – Cabinet Only	–	–	–	–	–	–	C4075-500	1

National 10mm Wide Opening Screw Thread Vials

2mL, 12x32mm 10mm wide opening screw thread vials and inserts

- 10-425 thread finish
- I-D vials feature a write-on patch with graduation for convenient sample identification
- Wide neck opening design, allows easy filling, requires Micro-Inserts with a diameter of 6mm
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Optional silanized (deactivated) glass provides optimal recovery of critical polar, labile or OH-interacting compounds*
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Precision point insert minimizes residual sample loss

Recommended for the following instruments:

- Jasco
- PerkinElmer
- Shimadzu
- Varian
- Waters

For autosampler compatibility visit

www.thermoscientific.com/chromexpert



National 10mm Wide Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
10-425 Screw Thread Vial	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-1	100
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-1W	100
	Amber	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-2	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-2W	100
10-425 Screw Thread MacroVial 350µL, Fused Insert	Clear	No	12x32	Insert Vial	450µL	350µL	<2	C4010-LV1	100
	Amber	No	12x32	Insert Vial	450µL	350µL	<2	C4010-LV2	100
10-425 Screw Thread Micro-V 1.5mL Tapered MicroVial with 150µL reservoir	Clear	No	12x32	Tapered Base	1.5mL	1.1mL	<4	C4010-V1	100
10-425 Screw Thread Vial, silanized*	Clear	No	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-S1	100
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-S1W	100
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	C4010-S2W	100
10-425 Screw Thread Vial	Polypropylene	No	12x32	Conical	600µL	400µL	<6	C4010-11	100
	Polypropylene	No	12x32	Reservoir Base	750µL	550µL	<70	C4010-14	100

* For information about silanized products visit www.thermoscientific.com/chromexpert



National 10mm Wide Opening Screw Thread Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
350µL Insert	Clear	–	6x31	Pulled Point	400µL	350µL	<4	C4010-627L	100
300µL Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-629	100
350µL Insert	Clear	–	6x31	Precision Point	400µL	350µL	<2	C4010-629L	100
300µL Insert, Graduation Marks	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-629P	100
300µL Polyspring Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-630	100
	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-630P	100
400µL MicroSert Insert	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631	500
	Polypropylene	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631P	500
300µL Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S629	100
300µL Polyspring Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S630	100
400µL MicroSert Insert, silanized*	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-S631	500
300µL Polyspring Insert, Kimshield*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-K630	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

Search thousands of applications at our chromatography resource center.

www.thermoscientific.com/crc

National 10-425 Wide Opening Screw Caps and Septa

- Open top caps are designed to be used with any of our 10mm septa
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Closures are shipped in sealed polybags to prevent contamination during transport



National 10-425 Wide Opening Screw Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
10mm Open Top Cap, 8.5mm hole	Light Blue	Polypropylene	–	–	–	C4010-1A	100
	White	Polypropylene	–	–	–	C4010-98W	100
	Black	Polypropylene	–	–	–	C4010-98BLK	100
Septum for 10-425 Screw Caps	–	–	White Virgin PTFE, 0.01" Septum	53	0.25	C4010-10	1000
	–	–	Red PTFE/White Silicone, Soft Septum	50	1.3	C4010-35	100
	–	–	Red PTFE/White Silicone/Red PTFE Septum	45	1.3	C4010-40	100
	–	–	Blue PTFE/White Silicone, Pre-slit Septum	55	1.5	C4010-55	100
	–	–	Red PTFE/White Silicone Septum	45	1.3	C4010-60	100
10mm Open Top Cap, 8.5mm hole	Black	Polypropylene	Tan PTFE/White Silicone	40	1.5	C4010-62BLK	100
	Black	Polypropylene	Tan PTFE/White Silicone, Pre-slit	40	1.5	C4010-63BLK	100
	Light Blue	Polypropylene	Ivory PTFE/Red Rubber	45	1.0	C4010-30A	100
	Black	Polypropylene	Red PTFE/White Silicone, Soft	45	1.3	C4010-35BLK	100
	White	Polypropylene	Red PTFE/White Silicone, Soft	45	1.3	C4010-35W	100
	Light Blue	Polypropylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4010-40A	100
	Light Blue	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.5	C4010-55A	100
	Black	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.5	C4010-55BLK	100
	Light Blue	Polypropylene	Red PTFE/White Silicone	50	1.3	C4010-60A	100
	Red	Polypropylene	Red PTFE/White Silicone	50	1.3	C4010-60AR	1000
	White	Polypropylene	Red PTFE/White Silicone	50	1.3	C4010-60AW	1000
	Black	Polypropylene	Red PTFE/White Silicone	50	1.3	C4010-60BLK	100
	Light Blue	Polypropylene	Red PTFE/White Silicone, Star-slit	50	1.5	C4010-65A	100
10mm Solid Top Cap	White	Polyurethane	PTFE/PE Foam Liner	–	1.3	C4010-99	100
10mm Cap with integral PP Membrane	Clear	Polypropylene	Polypropylene	N/A	N/A	C4010-5A	100

National 10mm Wide Opening Screw Thread Vials Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closure while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers or in economical polybags



Convenience Kit



Assembled Kit



Assembled Kit, in Polybag

Items not shown to scale

National 10mm Wide Opening Screw Thread Vials Convenience Kits

Description	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit	Clear	No	Light Blue	Red PTFE/White Silicone	C4010-1	C4010-60A	C4010-88	100
	Amber	Yes	Light Blue	Red PTFE/White Silicone	C4010-2W	C4010-60A	C4010-88AW	100
	Clear	Yes	Light Blue	Red PTFE/White Silicone	C4010-1W	C4010-60A	C4010-88W	100
	Clear	No	White	Red PTFE/White Silicone, Soft	C4010-1	C4010-35W	C4010-95	100
	Clear	Yes	White	Red PTFE/White Silicone, Soft	C4010-1W	C4010-35W	C4010-95W	100
	Clear	Yes	Black	Blue PTFE/White Silicone, Pre-slit	C4010-1W	C4010-55BLK	C4010-97W	100
Assembled Kit	Clear	No	Light Blue	Red PTFE/White Silicone	C4010-1	C4010-60A	C4010-17	100
	Clear	Yes	Light Blue	Red PTFE/White Silicone	C4010-1W	C4010-60A	C4010-17W	100
	Clear	No	Light Blue	White Virgin PTFE, 0.01"	C4010-1	C4010-1A/C4010-10	C4010-21	100
	Clear	No	White	Red PTFE/White Silicone, Soft	C4010-1	C4010-35W	C4010-57	100
	Amber	No	White	Red PTFE/White Silicone, Soft	C4010-2	C4010-35W	C4010-57A	100
	Amber	Yes	White	Red PTFE/White Silicone, Soft	C4010-2W	C4010-35W	C4010-57AW	100
	Clear	Yes	White	Red PTFE/White Silicone, Soft	C4010-1W	C4010-35W	C4010-57W	100
	Clear	No	Black	Red PTFE/White Silicone, Soft	C4010-1	C4010-35BLK	C4010-67	100
	Amber	No	Black	Red PTFE/White Silicone, Soft	C4010-2	C4010-35BLK	C4010-67A	100
	Amber	Yes	Black	Red PTFE/White Silicone, Soft	C4010-2W	C4010-35BLK	C4010-67AW	100
	Clear	Yes	Black	Red PTFE/White Silicone, Soft	C4010-1W	C4010-35BLK	C4010-67W	100
	Clear	No	Black	Tan PTFE/White Silicone, Pre-slit	C4010-1	C4010-63BKL	C4010-59	100
Assembled Kit, in Polybag	Amber	Yes	Light Blue	Red PTFE/White Silicone	C4010-2W	C4010-60A	C4010-017AW	100
	Clear	Yes	Light Blue	Red PTFE/White Silicone	C4010-1W	C4010-60A	C4010-017W	100
	Clear	No	Light Blue	Red PTFE/White Silicone/Red PTFE	C4010-1	C4010-40A	C4010-019	100

National 11mm Crimp Top Vials

2mL, 12x32, crimp top vials and inserts

**Recommended
for most brands...**

For autosampler compatibility visit
[www.thermoscientific.com/
chromexpert](http://www.thermoscientific.com/chromexpert)

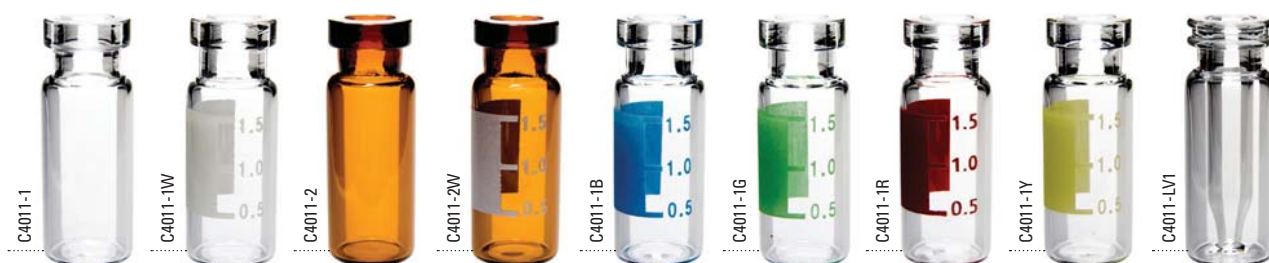
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- I-D vials feature a write-on patch with graduation for convenient sample identification
- Standard opening vials require Micro-Inserts with a diameter of 5mm
- Wide opening vials, allow easy filling, require Micro-Inserts with a diameter of 6mm
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Optional silanized (deactivated) glass provides optimal recovery of critical polar, labile or OH-interacting compounds*
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Precision point insert minimizes residual sample loss
- Pulled point inserts are an economical choice for noncritical applications
- Glastic vial features a glass insert pre-inserted inside of a clear TPX vial



National 11mm Standard Opening Crimp Top Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Standard Opening Crimp Top Vial	Clear	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4012-1	100
	Clear	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4012-1W	100
	Amber	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4012-2	100
	Amber	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4012-2W	100
11mm Standard Opening Crimp /Snap Top Vial 150µL Clear Solid Glass Microvial	Clear	No	12x32	Narrow Conical	425µL	200µL	<2	C4012-10	12
11mm – Crimp/Snap Glastic Glass Insert/TPX Vial	Clear	No	12x32	Insert Vial	475µL	350µL	<4	C4012-15	100
200µL MicroSert Insert	Clear	–	5x31	Flat Bottom	250µL	200µL	<12	C4012-465	500
150µL Polyspring Insert	Clear	–	5x29	Pulled point	200µL	175µL	<1	C4012-530	100
150µL Insert	Clear	–	5x29	Pulled point	200µL	175µL	<3	C4012-529	100
200µL Insert	Clear	–	5x31	Pulled point	200µL	170µL	<2	C4012-529L	100
125µL Polyspring Insert	Polypropylene	–	5x29	Precision point	175µL	125µL	<2	C4012-530P	100
150µL Polyspring Insert, silanized*	Clear	–	5x29	Pulled point	200µL	175µL	<1	C4012-S530	100

* For information about silanized products visit www.thermoscientific.com/chromexpert



National 11mm Wide Opening Crimp Top Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Crimp Top Vial, Wide Opening	Clear	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1	100
	Clear	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1W	100
	Amber	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-2	100
	Amber	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-2W	100
11mm Crimp Top ColorBand Vial, Wide Opening	Clear	Blue*	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1B	100
	Clear	Green*	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1G	100
	Clear	Red*	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1R	100
	Clear	Yellow*	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-1Y	100
11mm Crimp/Snap MacroVial 250µL, Fused Insert	Clear	No	12x32	Fused Conical	500µL	350µL	<2	C4011-LV1	100

* ColorBand vials are designed to provide full sample color coding for autosamplers with optical vial detection. Use the optimum cap for your instrument without sacrificing your color coding scheme.



National 11mm Crimp Top Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Crimp Top MacroVial 250µL, Fused Insert	Clear	Yes	12x32	Fused Conical	500µL	350µL	<2	C4011-LV1W	100
11mm Crimp/Snap MacroVial 250µL, Fused Insert	Amber	No	12x32	Fused Conical	500µL	350µL	<2	C4011-LV2	100
11mm Crimp Top MacroVial 250µL, Fused Insert	Amber	Yes	12x32	Fused Conical	500µL	350µL	<2	C4011-LV2W	100
11mm Crimp Top Solid Glass MicroVials	Clear	No	12x32	Conical Base	650µL	500µL	<5	C4011-10	12
11mm Crimp Top Micro-V Microsampling Vial, 15µL Reservoir	Clear	No	12x32	High Recovery	1.5mL	1.1mL	<4	C4011-V1	100
11mm Crimp Top 1.5mL High Recovery MicroVial	Clear	No	12x32	High Recovery	1.7mL	1.3mL	<4	C4011-9	100
11mm Crimp Top, Wide Opening, silanized*	Clear	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S1	100
	Clear	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S1W	100
	Amber	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S2W	100
11mm Crimp/Snap 250µL MicroVial	Polypropylene	No	12x32	Conical Base	475µL	300µL	<2	C4011-13	100
11mm Crimp/Snap 600µL MicroVial	Polypropylene	No	12x32	Conical Base	600µL	400µL	<4	C4011-16	100
11mm Crimp/Snap 800µL MicroVial	Polypropylene	No	12x32	Conical Base	800µL	600µL	<6	C4011-11	100

* For information about silanized products visit www.thermoscientific.com/chromexpert



National 11mm Crimp Top Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Crimp/Snap 850µL AP-2000 MaxVial	Polypropylene	No	12x32	High Recovery	825µL	650µL	<8	C4011-15	1000
11mm Crimp/Snap 1mL Vial	Polypropylene	No	12x32	Flat Bottom	1000µL	800µL	<80	C4011-14	100
11mm Crimp/Snap 1mL TPX High Recovery Vial	TPX	No	12x32	High Recovery	1000µL	750µL	<8	C4011-24	100
350µL Insert	Clear	–	6x31	Pulled Point	400µL	350µL	<4	C4010-627L	100
300µL Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-629	100
350µL Insert	Clear	–	6x31	Precision Point	400µL	350µL	<2	C4010-629L	100
300µL Insert, Graduation Marks	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-629P	100
300µL Polyspring Insert	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-630	100
	Polypropylene	–	6x30	Conical	325µL	250µL	<2	C4010-630P	100
400µL MicroSert Insert	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631	500
	Polypropylene	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-631P	500
300µL Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S629	100
300µL Polyspring Insert, silanized*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-S630	100
400µL MicroSert Insert, silanized*	Clear	–	6x31	Flat Bottom	500µL	450µL	<25	C4011-S631	500
300µL Polyspring Insert, Kimshield*	Clear	–	6x29	Conical	375µL	300µL	<1	C4010-K630	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

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» Visit **PAGE 4-005**



National 11mm Crimp Top Closures

- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Aluminum crimp closures provide a secure leak-resistant seal
- Aluminum seals must be applied with a crimping tool
- Closures are shipped in sealed polybags to prevent contamination during transport
- Synthetic PTFE/Red Rubber seal is specially formulated for improved background performance
- First crimp cap with assembled aluminum liner for analysis of elastomers, polymers, phthalates, halogenated compounds and silicones
- First crimp cap with tight PTFE sealing disk due to additional silicone ring



National 11mm Crimp Top Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of	
11mm Crimp Cap, 5.5mm hole	Silver	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-1AP	100	
	Silver	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-1A	1000	
	Blue	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-98B	100	
	Green	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-98G	100	
	Red	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-98R	100	
	Yellow	Aluminum	Clear PTFE/Natural Red Rubber	60	1.0	C4011-98Y	100	
	Silver	Aluminum	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-2A	100	
11mm Crimp Cap, 5.5mm hole	Silver	Aluminum	Red PTFE/White Silicone	45	1.3	C4011-4A	100	
	Blue	Aluminum	Red PTFE/White Silicone	45	1.3	C4011-4B	100	
	Green	Aluminum	Red PTFE/White Silicone	45	1.3	C4011-4G	100	
	Red	Aluminum	Red PTFE/White Silicone	45	1.3	C4011-4R	100	
	Silver	Aluminum	Solid PTFE Disk with Silicone sealing ring	53	0.25	C4011-6AE	100	
	Silver	Aluminum	Solid PTFE Disk	53	0.25	C4011-6A	1000	
	Silver	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7A	100	
11mm Crimp Cap, 5.5mm hole, Mixed Color, 200 each	Blue	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7B	1000	
	Green	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7G	1000	
	Red	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7R	1000	
	Yellow	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7Y	1000	
	Silver, Blue, Green, Red, Yellow	Aluminum	PTFE/Synthetic Red Rubber	35	1.0	C4011-7K	1000	
	11mm Crimp Cap, 5.5mm hole	Silver	Aluminum	Solid Aluminum Disk with Silicone sealing ring		0.06	C4011-3AL	100

National 11mm Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure
- Manual decrimping tools allow easy removal of aluminum seals without breakage
- Decapping pliers are an economical choice for small quantities of vials
- Clean room crimpers and decrimpers can be autoclaved



Items not shown to scale

National 11mm Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 11mm aluminum crimp seals	C4012-100	1
Decapping Pliers	Removes 11mm aluminum crimp seals; protective gloves recommended	C4012-101	1
Manual Decrimper	Removes 11mm aluminum crimp seals	C4012-102	1
Manual stainless steel Cleanroom Crimper	Attaches 11mm crimp seals	C4012-100SS	1
Manual stainless steel Cleanroom Decrimper	Removes 11mm crimp seals without vial damage	C4012-102SS	1

For electronic crimpers and decrimpers look on page **2-092**

National 11mm Crimp Top Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closure while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers or in economical polybags



Items not shown to scale

National 11mm Crimp Top Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat.No.	Cap Cat.No.	Cat. No.	Pack of
Convenience Kit, Standard Opening Crimp Top Vial	Clear	No	Silver	Clear PTFE/Red Rubber	C4012-1	C4011-1AHP	C4012-88	500
	Amber	No	Silver	Clear PTFE/Red Rubber	C4012-2	C4011-1AHP	C4012-88A	500
Convenience Kit, Wide Opening Crimp Top Vial	Clear	No	Silver	Clear PTFE/Red Rubber	C4011-1	C4011-1AP	C4011-87	100
	Clear	Yes	Silver	Clear PTFE/Red Rubber	C4011-1W	C4011-1AP	C4011-87W	100
	Amber	Yes	Silver	Clear PTFE/Red Rubber	C4011-2W	C4011-1AP	C4011-87AW	100
	Clear	No	Silver	Clear PTFE/Red Rubber	C4011-1	C4011-1AP	C4011-88	500
Kit includes Polyspring Tapered Insert for small sample volumes	Clear	Yes	Silver	Clear PTFE/Red Rubber	C4011-1W	C4011-1AP	C4011-88W	500
	Clear	No	Silver	PTFE/Synthetic Red Rubber	C4011-1	C4011-7A	C4011-89W	100
	Clear	No	Silver	Clear PTFE/Red Rubber	C4011-1/ C4010-630	C4011-1AP	C4011-95	100
Assembled Kit, Wide Opening Crimp Top Vial, Nitrogen purged	Clear	No	Silver	Clear PTFE/Red Rubber	C4011-1	C4011-1AP	C4011-1CV	100
	Amber	Yes	Silver	Clear PTFE/Red Rubber	C4011-2W	C4011-1AP	C4011-2WCV	100

National 11mm Crimp Top Vial Storerooms

- Storerooms organize supplies and save valuable bench space
- 6 Drawer Mini-Storeroom holds 500 vials and closures
- 9 Drawer Storeroom holds 2000 vials and closures



C4011-688W



C4000-MS



C4075-500

Items not shown to scale

National 11mm Crimp Top Vial Storerooms

Description	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
6 Drawer Mini-Storeroom, 500 pieces Caps and Vials	Clear	Yes	Silver	Clear PTFE/Red Rubber	C4011-1W	C4011-1AP	C4011-688W	1
6 Drawer Mini-Storeroom – Cabinet Only	–	–	–	–	–	–	C4000-MS	1
9 Drawer Storeroom – Cabinet Only	–	–	–	–	–	–	C4075-500	1

National 11mm Crimp Top Vial Racks

- Polypropylene vial racks are resistant to most solvents
- Racks feature alphanumeric indexing for easier vial identification
- Racks can be stacked for efficient storage



C4011-25



C4012-25

Items not shown to scale

National 11mm Crimp Top Vial Racks

Description	Capacity	Cat. No.	Pack of
PVC storage rack for 12x32mm vials with clear lid	100 vials, 10x10	C4011-25	1
Polypropylene storage rack for 12x32mm vials, no lid, reusable	50 vials, 5x10	C4012-25	1

National 11mm Wide Opening Snap-It Vials

2mL, 12x32mm wide opening Snap-It vials and inserts

Recommended for most brands of instruments:

For autosampler compatibility visit
www.thermoscientific.com/chromexpert

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- I-D vials feature a write-on patch with graduation for convenient sample identification
- Wide neck opening design, allows easy filling, requires Micro-Inserts with a diameter of 6mm
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Optional silanized (deactivated) glass provides optimal recovery of critical polar, labile or OH-interacting compounds*
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Precision point insert minimizes residual sample loss
- Pulled point inserts are an economical choice for noncritical applications
- Glastic vial features a glass insert pre-inserted inside of a clear TPX vial
- Snap-It vials can be used with snap caps or aluminum crimp seal closures



National 11mm Wide Opening Snap-It Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Snap-It Vial	Clear	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-5	100
	Clear	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-5W	100
	Amber	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-6	100
	Amber	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-6W	100
11mm Snap-It MacroVial 250µL, Fused Insert	Clear	No	12x32	Fused Conical	500µL	350µL	<2	C4011-LV1	100
	Amber	No	12x32	Fused Conical	500µL	350µL	<2	C4011-LV2	100
11mm Snap-It High Recovery MicroVial, 1.5mL	Clear	No	12x32	High Recovery	1.7mL	1.3mL	<4	C4011-4	100
11mm Snap-It Vial, silanized*	Clear	No	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S5	100
	Clear	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S5W	100
	Amber	Yes	12x32	Flat Bottom	2mL	1.5mL	<170	C4011-S6W	100
	Clear	No	12x32	High Recovery	1.5mL	1.1mL	<4	C4011-S4	100
11mm Snap-It Vial, Total Recovery with 10µL Reservoir	Clear	No	12x32	Deep Well Base	1.5mL	1.2mL	<1	C4011-9TR	100
11mm Snap-It 250µL MicroVial	Polypropylene	No	12x32	Conical Base	475µL	300µL	<2	C4011-13	100

* For information about silanized products visit www.thermoscientific.com/chromexpert



National 11mm Wide Opening Snap-It Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Snap-It 600µL MicroVial	Polypropylene	No	12x32	Conical Base	600µL	400µL	<4	C4011-16	100
11mm Snap-It 800µL MicroVial	Polypropylene	No	12x32	Conical Base	800µL	600µL	<6	C4011-11	100
11mm Snap-It 850µL AP-2000 MaxVial	Polypropylene	No	12x32	High Recovery	825µL	650µL	<8	C4011-15	1000
11mm Snap-It 1mL Vial	Polypropylene	No	12x32	Flat Bottom	1000µL	800µL	<80	C4011-14	100
11mm Snap-It 1mL TPX High Recovery Vial	TPX	No	12x32	High Recovery	1000µL	750µL	<8	C4011-24	100
11mm Snap-It Glastic Glass Insert/TPX Vial	Clear	No	12x32	Insert Vial	475µL	350µL	<4	C4012-15	100



National 11mm Wide Opening Snap-It Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
350µL Insert	Clear	-	6x31	Pulled Point	400µL	350µL	<4	C4010-627L	100
300µL Insert	Clear	-	6x29	Conical	375µL	300µL	<1	C4010-629	100
350µL Insert	Clear	-	6x31	Precision Point	400µL	350µL	<2	C4010-629L	100
300µL Insert, Graduation Marks	Polypropylene	-	6x30	Conical	325µL	250µL	<2	C4010-629P	100
300µL Polyspring Insert	Clear	-	6x29	Conical	375µL	300µL	<1	C4010-630	100
	Polypropylene	-	6x30	Conical	325µL	250µL	<2	C4010-630P	100
400µL MicroSert Insert	Clear	-	6x31	Flat Bottom	500µL	450µL	<25	C4011-631	500
	Polypropylene	-	6x31	Flat Bottom	500µL	450µL	<25	C4011-631P	500
300µL Insert, silanized*	Clear	-	6x29	Conical	375µL	300µL	<1	C4010-S629	100
300µL Polyspring Insert, silanized*	Clear	-	6x29	Conical	375µL	300µL	<1	C4010-S630	100
400µL MicroSert Insert, silanized*	Clear	-	6x31	Flat Bottom	500µL	450µL	<25	C4011-S631	500
300µL Polyspring Insert, Kimshield*	Clear	-	6x29	Conical	375µL	300µL	<1	C4010-K630	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

National 11mm Wide Opening Snap-It Caps and Septa

- Redesign of locking tabs provides easier application and removal of caps
- Enlarged open area allows for needle penetration across the entire vial opening
- Textured outer surface for easier gripping and improved detection by autosamplers with optical vial sensors
- Fully compatible with all Snap-It vials
- Snap-It caps are easy to apply and easy to remove
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Snap-It caps eliminate the need for crimping or de-capping tools
- Polyethylene caps are chemically inert and suitable for most chromatography applications
- Closures are shipped in sealed polybags to prevent contamination during transport
- Integral Molded Polyethylene cap is an economical choice for routine HPLC applications, but with low sealing property and zero resealing capacity



National 11mm Snap-It Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Snap-It Cap, thinned penetration area	Clear	Polyethylene	Integral Molded In Polyethylene	–	–	C4011-50	100
	Blue	Polyethylene	Integral Molded In Polyethylene	–	–	C4011-50B	100
	Green	Polyethylene	Integral Molded In Polyethylene	–	–	C4011-50G	100
	Red	Polyethylene	Integral Molded In Polyethylene	–	–	C4011-50R	100
11mm Snap-It Cap, 6mm hole	Clear	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	C4011-51	100
	Blue	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	C4011-51B	100
	Black	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	C4011-51BLK	100
	Green	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	C4011-51G	100
	Red	Polyethylene	Clear PTFE/Synthetic Red Rubber	60	1.0	C4011-51R	100
	Clear	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52	100
	Blue	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52B	100
	Green	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52G	100
	Red	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52R	100
	Yellow	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52Y	100
	Orange	Polyethylene	White Virgin PTFE, 0.01"	53	0.25	C4011-52OR	1000
	Orange	Polyethylene	Ivory PTFE/Red Rubber	45	1.0	C4011-51OR	100
	Orange	Polyethylene	Ivory PTFE/Red Rubber	45	1.0	C4011-510OR	1000
	Clear	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-53	100
	Blue	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-53B	100
	Red	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-53R	100
	Yellow	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-53Y	100
	Orange	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-53OR	100
	Orange	Polyethylene	Red PTFE/White Silicone/Red PTFE	45	1.0	C4011-530OR	1000
	Clear	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54	100
Blue	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54B	100	
Black	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54BLK	100	
Green	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54G	100	

National 11mm Snap-It Caps and Septa (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Snap-It Cap, 6mm hole	Red	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54R	100
	Yellow	Polyethylene	Red PTFE/White Silicone	50	1.0	C4011-54Y	100
	Orange	Polyethylene	Red PTFE/White Silicone	55	1.0	C4011-54OR	100
	Orange	Polyethylene	Red PTFE/White Silicone	55	1.0	C4011-5400R	1000
	Clear	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55	100
	Blue	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55B	100
	Black	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55BLK	100
	Green	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55G	100
	Red	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55R	100
	Yellow	Polyethylene	Blue PTFE/White Silicone, Pre-slit	55	1.0	C4011-55Y	100
	Clear	Polyethylene	Red PTFE/White Silicone, Star-slit	45	1.3	C4011-59	100
	Pink	Polyethylene	Red PTFE/White Silicone, Y-cut	45	1.3	C4011-67P	100
	Orange	Polyethylene	Red PTFE/White Silicone, Star-slit	55	1.0	C4011-59OR	100
	Orange	Polyethylene	Red PTFE/White Silicone, Star-slit	55	1.0	C4011-5900R	1000

National 11mm Wide Opening Snap-It Cap Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa
- Reusable two compartment trays protect vials and closure while keeping matching supplies together
- Clear trays make it easy to keep track of available supplies without opening containers



Items not shown to scale

National 11mm Wide Opening Snap-It Cap Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Opening Snap Cap Vial	Clear	No	Clear	Clear PTFE/Red Rubber	C4011-5	C4011-51	C4011-72	100
	Amber	Yes	Clear	Clear PTFE/Red Rubber	C4011-6W	C4011-51	C4011-72AW	100
	Clear	No	Clear	Red PTFE/White Silicone	C4011-5	C4011-54	C4011-73	100
	Clear	Yes	Clear	Red PTFE/White Silicone	C4011-5W	C4011-54	C4011-73W	100
	Clear	No	Pink	Red PTFE/White Silicone	C4011-5	C4011-54P	C4011-73P	100
	Clear	Yes	Orange	Red PTFE/White Silicone	C4011-5W	C4011-54OR	C4011-73ORW	100
	Clear	Yes	Orange	Ivory PTFE/Red Rubber	C4011-5W	C4011-51OR	C4011-72ORW	100

National 13mm Crimp/Snap Vials

4mL, 15x45mm crimp/snap cap vials and inserts

- Superior quality 1st hydrolytic class glass (Type 1) in clear feature a 13mm crimp/snap-ring finish – use with 13mm aluminum Seals or Kim-Snap closures
- Polyspring inserts are self-aligning and provide a cushion against needle contact



Recommended for the following instruments:

- Thermo Scientific
- Shimadzu
- Spark Holland
- Varian
- VWR (Merck)/Hitachi
- Waters (Wisp 48 Position Carousel)

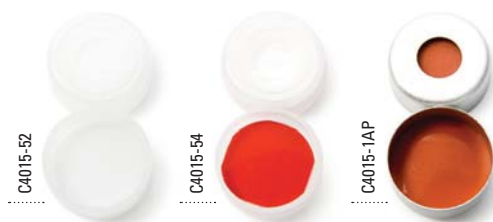
For autosampler compatibility visit
www.thermoscientific.com/chromexpert

National 13mm Crimp/Snap Cap Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
13mm Crimp/Snap Vial	Clear	No	15x45	Flat Bottom	4.8mL	4.25mL	<800µL	C4015-4	100
800µL Polyspring Conical Insert	Clear	–	8x38	Pulled Point	950µL	800µL	<9µL	C4015-638	100
350µL Conical Insert	Clear	–	6x40	Pulled Point	375µL	300µL	<8µL	C4015-643	100
Metal spring for glass inserts in 4mL vials	–	–	–	–	–	–	–	C4015-640	100

National 13mm Crimp/Snap Caps and Septa

- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Aluminum crimp closures provide a secure leak-resistant seal
- Aluminum seals must be applied with a crimping tool
- Synthetic PTFE/red rubber seal is specially formulated for improved background performance
- Kim-Snap closures provide a tight seal without the need of a crimper



National 13mm Crimp/Snap Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
13mm Kim-Snap Closure	Clear	Polypropylene	White Virgin PTFE, 0.01"	53	0.25	C4015-52	100
	Clear	Polypropylene	Red PTFE/White Silicone	45	1.3	C4015-54	100
13mm Crimp Cap, 6mm hole	Silver	Aluminum	Clear PTFE/Synthetic Red Rubber	65	1.3	C4015-1AP	144

National 13mm Crimp/Snap Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure
- Manual decrimping tools allow easy removal of aluminum seals without breakage
- Decapping pliers are an economical choice for small quantities of vials
- Clean room crimpers and decrimpers can be autoclaved



Items not shown to scale

National 13mm Crimp/Snap Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 13mm aluminum crimp seals	C4013-100	1
Decapping Pliers	Removes 13mm aluminum crimp seals, Protective gloves recommended	C4013-101	1
Manual Decrimper	Removes 13mm aluminum crimp seals	C4013-102	1
Manual stainless steel Cleanroom Crimper	Attaches 13mm crimp seals	C4013-100SS	1
Manual stainless steel Cleanroom Decrimper	Removes 13mm crimp seals without vial damage	C4013-102SS	1

For electronic crimpers and decrimpers look on page **2-092**

National 4mL Screw Thread Vials

4mL, 15x45mm screw thread vials and inserts

- 13-425 thread finish
- I-D vials feature a write-on patch with graduation for convenient sample identification
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Optional silanized (deactivated) glass provides optimal recovery of critical polar, labile or OH-interacting compounds*
- Polyspring inserts are self-aligning and provide a cushion against needle contact

Recommended for the following instruments:

- Thermo Scientific
- Shimadzu
- Spark Holland
- Varian
- VWR (Merck)/Hitachi
- Waters (Wisp 48 Position Carousel)

For autosampler compatibility visit
www.thermoscientific.com/chromexpert



National 4mL Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
13-425 Screw Thread Vial	Clear	No	15x45	Flat Bottom	4mL	4mL	<800	C4015-1	100
	Clear	Yes	15x45	Flat Bottom	4mL	4mL	<800	C4015-11W	100
	Amber	No	15x45	Flat Bottom	4mL	4mL	<800	C4015-2	100
	Amber	Yes	15x45	Flat Bottom	4mL	4mL	<800	C4015-2W	100
13-425 Screw Thread AP2000 High Recovery Vial	Clear	No	15.25x45	Tapered Base	3.5mL	3.5mL	<15	C4015-9	100
	Polypropylene	No	15x45	Tapered Base	2.5mL	2mL	<15	C4015-14	100
13-425 Screw Thread Vial, silanized*	Clear	No	15x45	Flat Bottom	4mL	4mL	<800	C4015-S1	100
800µL Polyspring Conical Insert	Clear	–	8x38	Pulled Point	950µL	800µL	<9	C4015-638	100
350µL Conical Insert	Clear	–	6x40	Pulled Point	375µL	300µL	<8	C4015-643	100
Metal spring for glass inserts in 4mL vials	–	–	–	–	–	–	–	C4015-640	100

* For information about silanized products visit www.thermoscientific.com/chromexpert

National 13-425 Screw Thread Caps and Septa

- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Phenolic resin caps perform well at high temperatures and are compatible with exposure to corrosives
- Open top caps are designed to be used with any of our 13mm septa
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Caps with bonded septa resist dislodging during injection when using large diameter blunt needles
- Integral Molded Polypropylene cap is an economical choice when septum resealing is not required



Images shown are 70% to scale

National 13-425 Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
13mm Open Top Screw Cap, 13-425 thread, 8.5mm hole	Black	Polypropylene	–	–	–	C4015-1A	100
	White	Polypropylene	–	–	–	C4015-1W	100
	Black	Phenol	–	–	–	C4015-66	1000
Septum for 13-425 Screw Caps	–	–	White Virgin PTFE, 0.01"	53	0.25	C4015-10	1000
	–	–	Ivory PTFE/Red Rubber	35	1.5	C4015-30	100
	–	–	Red PTFE/White Silicone/Red PTFE	55	1.25	C4015-40	100
	–	–	Red PTFE/White Silicone, Soft	45	1.5	C4015-45	100
	–	–	Red PTFE/White Silicone	50	1.5	C4015-60	100
	–	–	Ivory PTFE/White Silicone	45	1.5	C4015-61	1000
13mm Open Top Screw Cap, 13-425 thread, 8.5mm hole	Black	Polypropylene	Ivory PTFE/Red Rubber	35	1.5	C4015-30A	100
	Black	Polypropylene	Red PTFE/White Silicone/Red PTFE	55	1.25	C4015-40A	100
	White	Polypropylene	Red PTFE/White Silicone, Soft	40	1.5	C4015-45W	100
	Black	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.5	C4015-55BLK	100
	White	Polypropylene	Blue PTFE/White Silicone, Pre-slit	55	1.5	C4015-55W	100
	Black	Polypropylene	Red PTFE/White Silicone	60	1.5	C4015-75A	100
	White	Polypropylene	Red PTFE/White Silicone	60	1.5	C4015-75W	100
13mm Single Piece Screw Cap, 13-425 thread	Natural	Polypropylene	Integral Molded Polypropylene	–	0.25	C4015-5A	100
13mm Open Top Screw Cap, 13-425 thread, 8.5mm hole	Black	Phenol	Red PTFE/White Silicone	60	1.5	C4015-66A	100
13mm Solid Top Storage Cap, 13-425 thread	White	Urea	PTFE/PE Foam Liner	–	1.25	B7815-13	100
13mm Open Top Screw Cap, 13-425 thread, 8.5mm hole	Black	Polypropylene	Bonded Red PTFE/White Silicone	45	1.5	C4015-67A	100

National 4mL Screw Thread Convenience Kits

- Save time during sample preparation
- Reduce the risk of contamination

Unassembled kits

- Includes 100 vials and 100 caps with pre-assembled septa



C4015-88

Assembled kits

- Include 100 vials with pre-attached caps and septa
- Packaged in convenient vial trays with clear covers or in economical polybags



C4015-21



C4015-017

Items not shown to scale

National 4mL Screw Thread Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
Convenience Kit	Clear	No	Black	Red PTFE/White Silicone	C4015-1	C4015-75A	C4015-88	100
	Amber	Yes	Black	Red PTFE/White Silicone	C4015-2W	C4015-75A	C4015-88AW	100
Assembled Kit	Clear	No	Black	White Virgin PTFE, 0.01"	C4015-1	C4015-1A/C4015-10	C4015-21	100
	Clear	No	Black	Red PTFE/White Silicone	C4015-1	C4015-75A	C4015-17	100
	Amber	No	Black	Red PTFE/White Silicone	C4015-2	C4015-75A	C4015-17A	100
	Amber	Yes	Black	Red PTFE/White Silicone	C4015-2W	C4015-75A	C4015-17AW	100
	Clear	Yes	Black	Red PTFE/White Silicone	C4015-11W	C4015-75A	C4015-17W	100
	Clear	No	Black	PTFE/Red Rubber	C4015-1	C4015-66/73816T-13P	C4015-482A	100
Assembled Kit, in Polybag	Clear	No	Black	Red PTFE/White Silicone	C4015-1	C4015-75A	C4015-017	100
	Amber	No	Black	Red PTFE/White Silicone	C4015-2	C4015-75A	C4015-017A	100

National 4mL Screw Thread Vial Racks

- Polypropylene vial racks are resistant to most solvents
- Racks feature alphanumeric indexing for easier vial identification
- Racks can be stacked for efficient storage



C4015-27



C4015-25

Items not shown to scale

National 4mL Screw Thread Vial Racks

Description	Capacity	Cat. No.	Pack of
PVC storage rack for 15x45mm vials with clear lid	100 vials, 10x10	C4015-27	1
Polypropylene storage rack for 15x45mm vials, no lid, reusable	50 vials, 5x10	C4015-25	1

National Shell Vials and Inserts

- Superior quality type 1 borosilicate and amber glass
- Polyethylene SepCap with starburst center design eases syringe needle penetration
- Convenient vial kits include equal quantities of vials and caps
- Polyspring inserts are self-aligning and provide a cushion against needle contact
- Microsampling vials allow maximum sample extraction without need for separate inserts

Recommended for the following instruments:

- Alcott
- Gilson
- Shimadzu
- Waters (Wisp 96 respectively 48 Position Carousel)

For autosampler compatibility visit www.thermoscientific.com/chromexpert



National Shell Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
1mL Shell Vial with SepCap	Clear	No	8x40	Flat Bottom	1.25mL	1mL	<80	C4015-96	200
	Amber	No	8x40	Flat Bottom	1.25mL	1mL	<80	C4015-99	200
	Polypropylene	No	8x40	Flat Bottom	1.25mL	1mL	<80	C4015-95P	250
250µL Polyspring Conical Insert	Clear	–	5x34	Pulled Point	250µL	210µL	<3	C4015-96A	100
300µL Polyspring Conical Insert	Polypropylene	–	5x29	Precision Point	275µL	250µL	<3	C4015-96PA	100
0.7mL Accuform Shell Vial with SepCap	Polypropylene	No	8x40	Tapered Base	0.90mL	0.7mL	<8	C4015-94	1000
2mL Shell Vial with SepCap	Clear	No	12x32	Flat Bottom	2.4mL	1.8mL	<200	C4011-80	200
	Polypropylene	No	12x32	Flat Bottom	2.4mL	1.8mL	<200	C4011-77P	1000
4mL Shell Vial with SepCap	Clear	No	15x45	Flat Bottom	5.5mL	4mL	<800	C4015-48	100
	Polypropylene	No	15x45	Flat Bottom	5.5mL	4mL	<800	C4015-47P	100
800µL Polyspring Conical Insert	Clear	–	6x38	Pulled Point	950µL	800µL	<9	C4015-638	100
3mL Accuform Shell Vial with SepCap	Polypropylene	No	15x45	Tapered Base	3.75mL	2.9mL	<8	C4015-46P	1000
Positive Displacement Vial for Alcott with PE Plug Cap	Clear	No	8x35	Flat Bottom	1mL	900µL	–	C4008-50	1000

National Headspace Vials

- Superior quality 1st hydrolytic class glass (Type 1)
- Headspace vials are available with either a round or flat base
- Round bottom vials are compatible with most autosamplers and more easily handled by robotic arms that lift the vial from the tray
- Flat bottom vials maximize heating efficiency in manual headspace sampling and are required for use in some instrument models
- Vials feature beveled or square edge finish
- The bevel edge on the lip of the vial provides additional sealing power for greater leak resistance under high pressure

Recommended for most brands of instruments.

For autosampler compatibility visit
www.thermoscientific.com/chromexpert



Images shown are 90% to scale

National Headspace Vials

Description	Glass	Dimension (mm)	Finish	Profile	Total Volume (mL)	Usable Volume (mL)	Cat. No.	Pack of
20mm Headspace Crimp Vial	Clear	22x38	Beveled Edge	Flat Bottom	9	6	C4020-60	1000
	Clear	22x38	Square Rim	Flat Bottom	9	6	C4020-6	1000
	Clear	23x46	Beveled Edge	Flat Bottom	12.5	10	C4020-10	100
	Clear	23x46	Beveled Edge	Round Bottom	12.5	10	C4020-210	100
	Clear	23x46	Square Rim	Flat Bottom	12.5	10	C4020-410	1000
	Clear	23x75	Beveled Edge	Flat Bottom	21.5	20	C4020-20	100
	Clear	23x75	Beveled Edge	Round Bottom	21.5	20	C4020-2	100
	Clear	23x75	Square Rim	Flat Bottom	21.5	20	C4020-25	1000
	Clear	30x60	Beveled Edge	Flat Bottom	27	25	C4020-27	1000
18mm Screw Top Headspace Vial	Clear	22.5x46	Screw Thread	Round Bottom	12	10	C4020-180	125
	Clear	22.5x76	Screw Thread	Round Bottom	21	20	C4020-18	125

National Headspace Caps and Septa

- Aluminum seals are available in standard center hole and pressure release versions
- Pressure release seals (Aluminum-PR) are designed to open when internal pressure exceeds 3.0±0.5bar
- Use magnetic tinplate seals with CTC/Leap Technologies, Gerstel and other magnetic transport autosamplers
- Pre-assembled caps and septa are convenient and minimize contamination from handling



Images shown are 50% to scale

National Headspace Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	–	–	–	C4020-3A	1000
20mm Tear-off Crimp Cap	Silver	Aluminum	–	–	–	C4020-5A	1000
20mm Pressure Release Crimp Cap, 7.5mm hole	Silver	Aluminum-PR	–	–	–	C4020-6A	1000
Septum for 20mm Crimp Caps	–	–	20mm Gray Bromobutyl Stopper	37	–	C4020-30	1000
	–	–	20mm Tan PTFE/White Silicone	45	3.2	C4020-32	100
	–	–	20mm Gray PTFE/Red Rubber	50	3.0	C4020-34	100
	–	–	20mm Gray PTFE/Black Butyl Molded	50	3.0	C4020-36	100
	–	–	Unfaced Black Rubber	55	3.0	C4020-40	100
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	Gray PTFE/Red Rubber	50	3.0	C4020-34A	100
20mm Pressure Release Crimp Cap, 8mm hole	Silver	Aluminum-PR	Gray PTFE/Red Rubber	50	3.0	C4020-34AP	100
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	Clear PTFE/Gray Butyl Rubber	50	3.0	C4020-39A	100
20mm Pressure Release Crimp Cap, 8mm hole	Silver	Aluminum-PR	Clear PTFE/Gray Butyl Rubber	50	3.0	C4020-43AP	100
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	Gray PTFE/Gray Butyl Rubber, Pharmafix	50	3.0	C4020-36A	100
20mm Pressure Release Crimp Cap, 8mm hole	Silver	Aluminum-PR	Gray PTFE/Gray Butyl Rubber, Pharmafix	50	3.0	C4020-36AP	100
20mm Crimp Cap, 9.5mm hole	Silver	Aluminum	Tan PTFE/White Silicone	45	3.2	C4020-32A	100
20mm Pressure Release Crimp Cap, 8mm hole	Silver	Aluminum-PR	Tan PTFE/White Silicone	45	3.2	C4020-32AP	100
20mm Magnetic Crimp Cap, 5mm hole	Gold	Tin-plated	Clear PTFE/Translucent Blue Silicone	45	3.0	C4020-38A	100
20mm Magnetic Crimp Cap, 8mm hole	Gold	Tin-plated	Clear PTFE/Translucent Blue Silicone	45	3.0	C4020-42A	100
20mm Pressure Release Crimp Cap, 7.5mm hole	Silver	Aluminum-PR	Clear PTFE/Translucent Blue Silicone	45	3.0	C4020-42AP	100
18mm Magnetic Screw Cap, 8mm hole	Silver	Steel	18mm Blue Silicone/Natural PTFE	45	2.0	C4020-47	125
18mm Magnetic Screw Cap, 8mm hole, SPME	Silver	Steel	18mm Blue Silicone/PTFE, not prefitted	30	1.0	C4020-48	125

Trying to decide what septum is right for you?

Use our selection guide visit www.thermoscientific.com/chromexpert

National 20mm Crimp Top Headspace Unassembled Convenience Kits

- Include matched quantities of vials and silver aluminum seals with pre-assembled septa
- Convenience kits save time during sample preparation



National 20mm Crimp Top Headspace Unassembled Convenience Kits

Item not shown to scale

Kit Type	Glass	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, 20mm Headspace Crimp Vial, Beveled Edge, Round Bottom, Pressure Release Crimp Cap, 7.5mm hole	Clear	Silver	Gray PTFE/Black Butyl Rubber, Pharmafix	C4020-2	C4020-36AP	C4020-139	100
	Clear	Silver	Tan PTFE/White Silicone	C4020-2	C4020-32AP	C4020-320	1000

National 20mm Headspace Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure
- Manual decrimping tools allow easy removal of aluminum seals without breakage
- Decapping pliers are an economical choice for small quantities of vials
- Clean room crimpers and decrimpers can be autoclaved



National 20mm Headspace Crimping and Decrimping Tools

Items not shown to scale

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 20mm crimp seals	C4020-100	1
Decapping Pliers	Removes 20mm crimp seals, Protective gloves recommended	C4020-101	1
Manual Decrimper	Removes 20mm crimp seals	C4020-102	1
Manual stainless steel Cleanroom Crimper	Attaches 20mm crimp seals	C4020-100SS	1
Manual stainless steel Cleanroom Decrimper	Removes 20mm crimp seals without vial damage	C4020-102SS	1

For electronic crimpers and decrimpers look on page **2-092**

National Sample Storage Screw Thread Vials

Sample storage screw thread vials, caps and septa

- Capacity ranges from 2-40mL
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Eliminate leaching of ions
- Provide consistent pH for duration of sample storage life
- PTFE-Lined Solid-top storage caps
- PTFE film/PE foam backing offers broad chemical resistance
- Not autoclavable



Images shown are 70% to scale

National Sample Storage Screw Thread Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Capacity (DRAMS)	Cat. No.	Pack of
8-425 Screw Vial	Clear	No	12x32	Flat Bottom	2	0.5	B7999-1	100
13-425 Screw Vial	Clear	No	15x45	Flat Bottom	4	1	B7999-2	100
15-425 Screw Vial	Clear	No	17x60	Flat Bottom	8	2	B7999-3	200
15-425 Screw Vial	Clear	No	19x65	Flat Bottom	12	3	B7999-12	200
18-400 Screw Vial	Clear	No	21x70	Flat Bottom	16	4	B7999-4	200
20-400 Screw Vial	Clear	No	23x85	Flat Bottom	22	6	B7999-5	200
24-400 Screw Vial	Clear	No	28x95	Flat Bottom	40	8	B7999-6	100
8-425 Screw Vial	Amber	No	12x32	Flat Bottom	2	0.5	B7999-1A	100
13-425 Screw Vial	Amber	No	15x45	Flat Bottom	4	1	B7999-2A	100
15-425 Screw Vial	Amber	No	17x60	Flat Bottom	8	2	B7999-3A	200
15-425 Screw Vial	Amber	No	19x65	Flat Bottom	12	3	B7999-12A	200
18-400 Screw Vial	Amber	No	21x70	Flat Bottom	16	4	B7999-4A	200
24-400 Screw Vial	Amber	No	28x95	Flat Bottom	40	8	B7999-6A	100



Images shown are 70% to scale

National Sample Storage Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8-425 Screw Cap	White	Urethane	PTFE/PE Foam Liner	75	1.3	B7815-8	100
13-425 Screw Cap	White	Urethane	PTFE/PE Foam Liner	75	1.3	B7815-13	100
15-425 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	75	1.3	B7815-15	100
18-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	75	1.3	B7815-18	100
20-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	75	1.3	B7815-20	100
24-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	75	1.3	B7815-24	100
Septum for 8-425 Screw Cap	—	—	0.01" White PTFE/0.05" Clear Silicone	50	1.5	B7995-8	100
Septum for 13-425 Screw Cap	—	—	0.01" White PTFE/0.05" Clear Silicone	50	1.5	B7995-13	100
Septum for 15-425 Screw Cap	—	—	0.01" White PTFE/0.09" Clear Silicone	50	2.6	B7995-15	100
Septum for 18-400 Screw Cap	—	—	0.01" White PTFE/0.05" Clear Silicone	50	1.5	B7995-18	100
Septum for 20-400 Screw Cap	—	—	0.01" White PTFE/0.05" Clear Silicone	50	1.5	B7995-20	100
Septum for 24-400 Screw Cap	—	—	0.01" White PTFE/0.09" Clear Silicone	50	2.6	B7995-24	100
Septum for 24-400 Screw Cap	—	—	0.013" White PTFE/0.120" Clear Silicone	50	3.3	B7995-26	100
Open top 8-425 Screw Cap	Black	Polypropylene	—	—	—	B7807-8	100
Open top 13-425 Screw Cap	Black	Polypropylene	—	—	—	B7807-13	100
Open top 15-425 Screw Cap	Black	Polypropylene	—	—	—	B7807-15	100
Open top 18-400 Screw Cap	Black	Polypropylene	—	—	—	B7807-18	100
Open top 20-400 Screw Cap	Black	Polypropylene	—	—	—	B7807-20	100
Open top 24-400 Screw Cap	White	Polypropylene	—	—	—	B7807-24	100

National Sample Storage Convenience Kits

- Convenience kits save time during sample preparation
- Solid top convenience kits include matched quantities of vials and screw caps with pre-assembled septa
- Open top convenience kits contain shrink-wrapped vials and separately packaged caps and septa in polybags



Items not shown to scale

National Sample Storage Convenience Kits

Kit Type	Glass	Total Volume (mL)	Cap Color	Cap Material	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
Screw Vial Convenience Kit, Solid-top Cap	Clear	2	White	Urethane	PTFE/Polyethylene Foam Liner	B7999-1	B7815-8	B7800-1	100
	Clear	4	White	Urethane		B7999-2	B7815-13	B7800-2	100
	Clear	8	White	Polypropylene		B7999-3	B7815-15	B7800-3	200
	Clear	12	White	Polypropylene		B7999-12	B7815-15	B7800-12	200
	Clear	16	White	Polypropylene		B7999-4	B7815-18	B7800-4	200
	Clear	22	White	Polypropylene		B7999-5	B7815-20	B7800-5	200
	Clear	40	White	Polypropylene		B7999-6	B7815-24	B7800-6	100
	Amber	2	White	Urethane		B7999-1A	B7815-8	B7800-1A	100
	Amber	4	White	Urethane		B7999-2A	B7815-13	B7800-2A	100
	Amber	8	White	Polypropylene		B7999-3A	B7815-15	B7800-3A	200
	Amber	12	White	Polypropylene		B7999-12A	B7815-15	B7800-12A	200
	Amber	16	White	Polypropylene		B7999-4A	B7815-18	B7800-4A	200
	Amber	40	White	Polypropylene		B7999-6A	B7815-24	B7800-6A	100
	Screw Vial Assembled Kit, Solid-top Cap	Clear	20	White		Polypropylene	PTFE/Polyethylene Foam Liner	B7920-V0	B7815-24
Amber		20	White	Polypropylene	B7921-V0	B7815-24		B7800-20A	100
Screw Vial Convenience Kit, Open top Cap	Clear	2	Black	Polypropylene	0.01" White PTFE/ 0.05" Clear Silicone	B7999-1	B7807-8/B7995-8	B7990-1	100
	Clear	4	Black	Polypropylene		B7999-2	B7807-13/B7995-13	B7990-2	100
	Clear	8	Black	Polypropylene		B7999-3	B7807-15/B7995-15	B7990-3	200
	Clear	12	Black	Polypropylene		B7999-12	B7807-15/B7995-15	B7990-12	200
	Clear	16	Black	Polypropylene		B7999-4	B7807-18/B7995-18	B7990-4	200
	Clear	22	Black	Polypropylene		B7999-5	B7807-20/B7995-20	B7990-5	200
	Clear	40	White	Polypropylene		B7999-6	B7807-24/B7995-24	B7990-6	100
	Amber	2	Black	Polypropylene		B7999-1A	B7807-8/B7995-8	B7990-1A	100
	Amber	4	Black	Polypropylene		B7999-2A	B7807-13/B7995-13	B7990-2A	100
	Amber	12	Black	Polypropylene		B7999-12A	B7807-15/B7995-15	B7990-12A	200
	Amber	40	White	Polypropylene		B7999-6A	B7807-24/B7995-24	B7990-6A	100

National EPA Screw Vials

EPA screw vial convenience kits

- Convenience kits save time during sample preparation
- Unassembled convenience kits include shrink-wrapped vials and separately packaged caps and septa in polybags
- Assembled kits include vials with pre-assembled caps and septa
- Recommended for discrete water sampling under EPA 40 CFR 136 "Guidelines for Establishing Test Procedures for the Analysis of Pollutants" and EPA 40 CFR 141 "National Interim Primary Drinking Water Regulations: Control of Trihalomethanes in Drinking Water"



B7920

Items not shown to scale

National EPA Screw Vial Convenience Kits

Kit Type	Glass	Total Volume (mL)	Dimension (mm)	Septum	Cat. No.	Pack of
EPA Screw Vial Convenience Kit	Clear	40	28x95	0.01" White PTFE/0.09" Clear Silicone	B7950-B	100
EPA Screw Vial Assembled Kit	Clear	40	28x95	0.01" White PTFE/0.09" Clear Silicone	B7950	100
	Amber	40	28x95	0.01" White PTFE/0.09" Clear Silicone	B7951	100
	Clear	20	28x57	0.01" White PTFE/0.09" Clear Silicone	B7920	100
	Amber	20	28x57	0.01" White PTFE/0.09" Clear Silicone	B7921	100



B7950-V0



B7951-V0



B7950-1A



B7995-24

National EPA Screw Vials, Caps and Septa

* 60% to scale

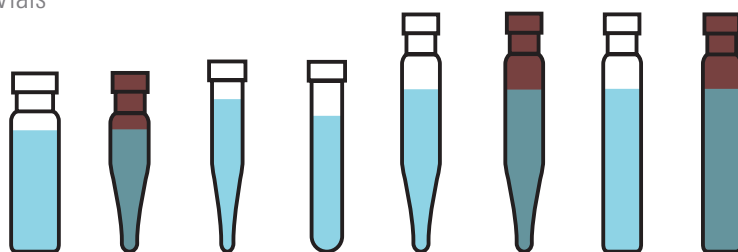
Description	Glass	Cap Color	Dimension (mm)	Total Volume (mL)	Material	Cat. No.	Pack of
24-400 EPA Screw Vial	Clear	—	28x95	40	—	B7950-V0	100
	Amber	—	28x95	40	—	B7951-V0	100
24-400 EPA Screw Cap	—	White	—	—	Polypropylene	B7950-1A	100
Septum for 24-400 Screw Cap	—	—	—	—	0.01" White PTFE/0.09" Clear Silicone	B7995-24	100

National Vial Reference Chart

* Drawing is valid for: C4000-1B, C4000-1G, C4000-1R, C4000-1Y

Images shown are 80% to scale

8mm Crimp Top Vials



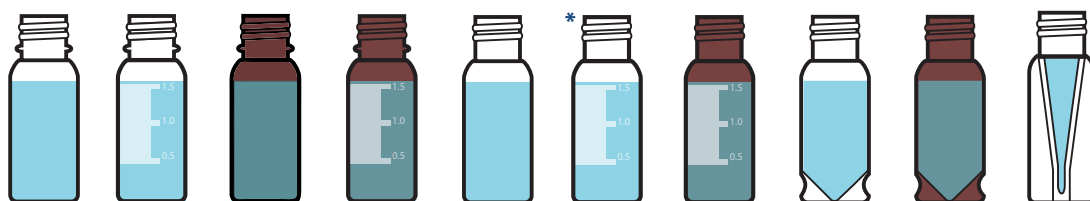
	C4008-1	C4008-730	C4008-632C	C4008-632R	C4008-739	C4008-740	C4008-741	C4008-742
Part No.	C4008-1	C4008-730	C4008-632C	C4008-632R	C4008-739	C4008-740	C4008-741	C4008-742
Dimensions	8x30	7x30	6x32	6x32	7x40	7x40	7x40	7x40
Common Description	0.8mL	0.5mL	0.2mL	0.3mL	0.7mL	0.7mL	0.8mL	0.8mL
Approx. Total Capacity	1mL	550µL	250µL	325µL	575µL	575µL	775µL	775µL
Rec. Usable Volume	0.8mL	400µL	200µL	250µL	450µL	450µL	650µL	650µL
Residual Volume	<80µL	<3µL	<3µL	<6µL	<2µL	<2µL	<70µL	<70µL
Composition	Glass	Amber	Glass	Glass	Glass	Amber	Glass	Amber

Standard-Opening 8-425 Screw Thread Vials – 12x32mm



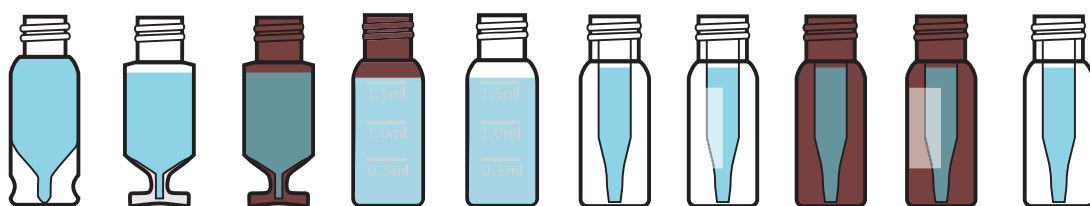
	C4013-1	C4013-1W	C4013-2	C4013-2W	C4013-11	C4013-13
Part No.	C4013-1	C4013-1W	C4013-2	C4013-2W	C4013-11	C4013-13
Common Description	2mL	2mL	2mL	2mL	250µL	600µL
Approx. Total Capacity	1.9mL	1.9mL	1.9mL	1.9mL	475µL	850µL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	250µL	675µL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<3µL	<8µL
Composition	Glass	Glass	Amber	Amber	Polypro	Polypro

Target DP 9mm Screw Vials 12x32mm



	C5000-1	C5000-1W	C5000-2	C5000-2W	C4000-1	C4000-1W	C4000-2W	C4000-9	C4000-9A	C4000-11
Part No.	C5000-1	C5000-1W	C5000-2	C5000-2W	C4000-1	C4000-1W	C4000-2W	C4000-9	C4000-9A	C4000-11
Common Description	2mL	2mL	2mL	2mL	2mL	2mL	2mL	1.5mL	1.5mL	450µL
Approx. Total Capacity	2mL	2mL	2mL	2mL	2mL	2mL	2mL	1.7mL	1.7mL	250µL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	1.5mL	1.5mL	1.5mL	1.3mL	1.3mL	250µL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<170µL	<170µL	<170µL	<4µL	<4µL	<1µL
Composition	Glass	Glass	Amber	Amber	Glass	Glass	Amber	Glass	Amber	PolyPro

Target DP 9mm Screw Vials 12x32mm

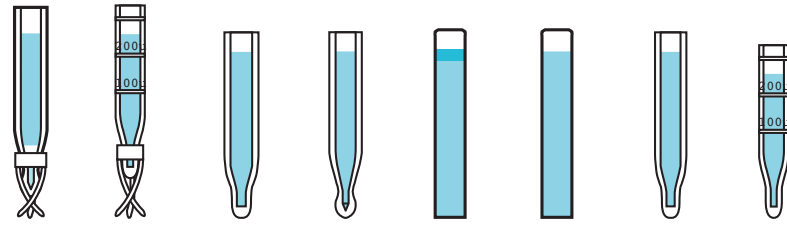


	C4000-9TR	C4000-V1	C4000-V2	C4000-12	C4000-14	C4000-LV1	C4000-LV1W	C4000-LV2	C4000-LV2W	C4000-LV3W
Part No.	C4000-9TR	C4000-V1	C4000-V2	C4000-12	C4000-14	C4000-LV1	C4000-LV1W	C4000-LV2	C4000-LV2W	C4000-LV3W
Common Description	1.5mL	1.5mL	1.5mL	2mL	2mL	350µL	350µL	350µL	350µL	200µL
Approx. Total Capacity	1.5mL	1.4mL	1.4mL	2mL	2mL	475µL	475µL	475µL	475µL	375µL
Rec. Usable Volume	1.2mL	1.0mL	1.0mL	1.5mL	1.5mL	350µL	350µL	350µL	350µL	240µL
Residual Volume	<1µL	<4µL	<4µL	<180µL	<180µL	<2µL	<2µL	<2µL	<2µL	<1µL
Composition	Glass	Glass	Amber	Amber PP	Clear PP	Glass	Glass	Amber	Amber	Glass

Target DP Microvolume Inserts

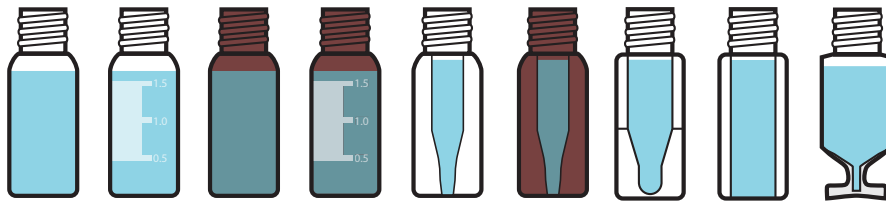
*Drawing is valid for: C4011-1B, C4011-1G, C4011-1R, C4011-1Y

Images shown are 80% to scale



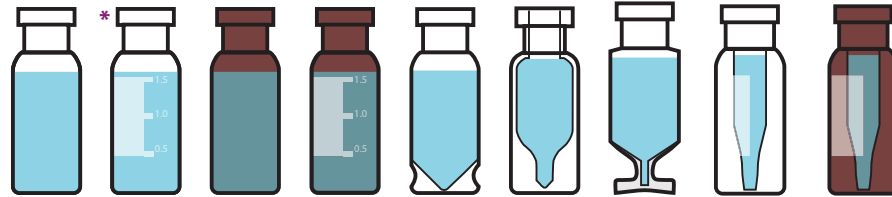
	C4010-630	C4010-630P	C4010-627L	C4010-629L	C4011-631	C4011-631P	C4010-629	C4010-629P
Part No.	C4010-630	C4010-630P	C4010-627L	C4010-629L	C4011-631	C4011-631P	C4010-629	C4010-629P
Dimensions	6x29mm	6x30mm	6x31mm	6x31mm	6x31mm	6x31mm	6x29mm	6x30mm
Common Description	300µL	300µL	350µL	350µL	400µL	300µL	300µL	300µL
Approx. Total Capacity	375µL	325µL	400µL	400µL	500µL	500µL	375µL	325µL
Rec. Usable Volume	300µL	250µL	350µL	350µL	400µL	400µL	300µL	250µL
Residual Volume	<1µL	<2µL	<4µL	<2µL	<25µL	<25µL	<4µL	<2µL
Composition	Glass	Polypro	Glass	Glass	Glass	Polypro	Glass	Polypro

10mm Wide Opening Screw Thread Vials – 12x32mm



	C4010-1	C4010-1W	C4010-2	C4010-2W	C4010-LV1	C4010-LV2	C4010-11	C4010-14	C4010-V1
Part No.	C4010-1	C4010-1W	C4010-2	C4010-2W	C4010-LV1	C4010-LV2	C4010-11	C4010-14	C4010-V1
Common Description	2mL	2mL	2mL	2mL	350µL	350µL	250µL	700µL	1.5mL
Approx. Total Capacity	2mL	2mL	2mL	2mL	450µL	450µL	600µL	750µL	1.5mL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	350µL	350µL	400µL	550µL	1.1mL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<2µL	<2µL	<4µL	<70µL	<4mL
Composition	Glass	Glass	Amber	Amber	Glass	Amber	Polypro	Polypro	Glass

11mm Wide Opening Crimp Top Vials



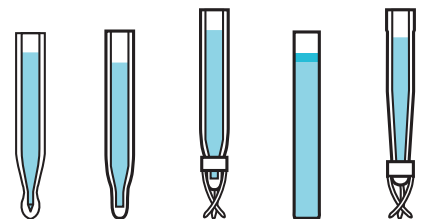
	C4011-1	C4011-1W	C4011-2	C4011-2W	C4011-9	C4011-10	C4011-V1	C4011-LV1W	C4011-LV2W
Part No.	C4011-1	C4011-1W	C4011-2	C4011-2W	C4011-9	C4011-10	C4011-V1	C4011-LV1W	C4011-LV2W
Common Description	2mL	2mL	2mL	2mL	1.5mL	400µL	1.5mL	250µL	250µL
Approx. Total Capacity	2mL	2mL	2mL	2mL	1.7mL	650µL	1.5mL	500µL	500µL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	1.3mL	500µL	1.1mL	350µL	350µL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<4µL	<5µL	<4µL	<2µL	<2µL
Composition	Glass	Glass	Amber	Amber	Glass	Glass	Glass	Glass	Amber

11mm Standard-Opening Crimp Vials 12x32mm



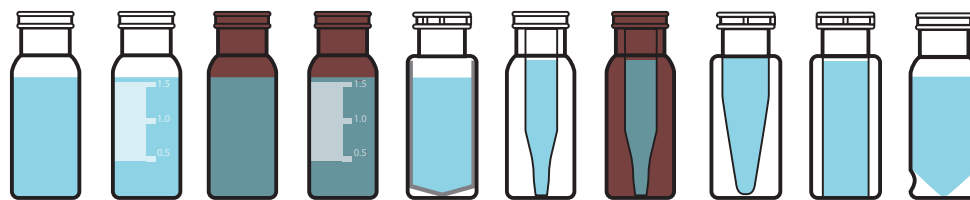
	C4012-1	C4012-1W	C4012-2	C4012-2W	C4012-10
Part No.	C4012-1	C4012-1W	C4012-2	C4012-2W	C4012-10
Common Description	2mL	2mL	2mL	2mL	100µL
Approx. Total Capacity	2mL	2mL	2mL	2mL	425µL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	200µL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<2µL
Composition	Glass	Glass	Amber	Amber	Glass

Standard Microvolume Inserts



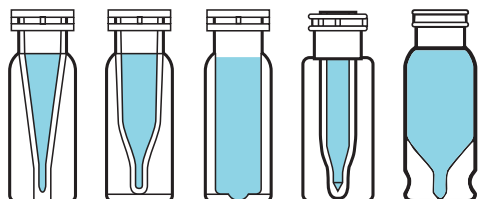
	C4012-529	C4012-529L	C4012-530	C4012-465	C4012-530P
Part No.	C4012-529	C4012-529L	C4012-530	C4012-465	C4012-530P
Dimensions	5x29mm	5x31mm	5x29mm	5x31mm	5x30mm
Common Description	150µL	150µL	150µL	200µL	125µL
Approx. Total Capacity	200µL	200µL	200µL	250µL	175µL
Rec. Usable Volume	175µL	170µL	170µL	200µL	150µL
Residual Volume	<3µL	<2µL	<1µL	<12µL	<2µL
Composition	Glass	Glass	Glass	Glass	Polypro

11mm Snap-It-Vials – 12x32mm



	C4011-5	C4011-5W	C4011-6	C4011-6W	C4011-24	C4011-LV1	C4011-LV2	C4011-11	C4011-14	C4011-4
Part No.	C4011-5	C4011-5W	C4011-6	C4011-6W	C4011-24	C4011-LV1	C4011-LV2	C4011-11	C4011-14	C4011-4
Common Description	2mL	2mL	2mL	2mL	700µL	350µL	350µL	800µL	3700µL	1.5mL
Approx. Total Capacity	2mL	2mL	2mL	2mL	1000µL	500µL	500µL	800µL	1000µL	1.7mL
Rec. Usable Volume	1.5mL	1.5mL	1.5mL	1.5mL	750µL	350µL	350µL	600µL	800µL	1.3mL
Residual Volume	<170µL	<170µL	<170µL	<170µL	<8µL	<2µL	<2µL	<6µL	<80µL	<4µL
Composition	Glass	Glass	Amber	Amber	TPX	Glass	Amber	Polypro	Polypro	Glass

11mm Snap-It-Vials – 12x32mm



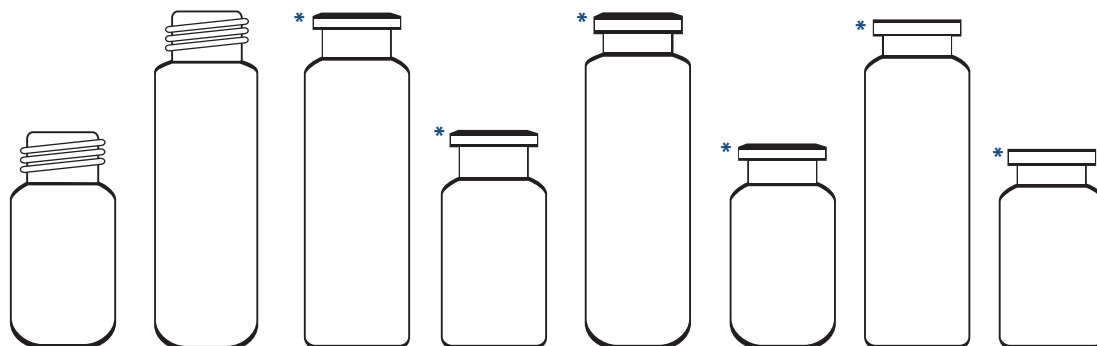
	C4011-13	C4011-16	C4011-15	C4012-15	C4011-9TR
Part No.	C4011-13	C4011-16	C4011-15	C4012-15	C4011-9TR
Common Description	250µL	600µL	850µL	250µL	1.5mL
Approx. Total Capacity	475µL	600µL	825µL	475µL	1.5mL
Rec. Usable Volume	300µL	400µL	650µL	350µL	1.2mL
Residual Volume	<2µL	<4µL	<8µL	<4µL	<1µL
Composition	Polypro	Polypro	Polypro	Glastic	Glass

Headspace Vials



	C4020-6	C4020-60	C4020-27
Part No.	C4020-6	C4020-60	C4020-27
Common Description	6mL	6mL	27mL
Approx. Total Capacity	9mL	9mL	27mL
Composition	Glass	Glass	Glass

Headspace Vials

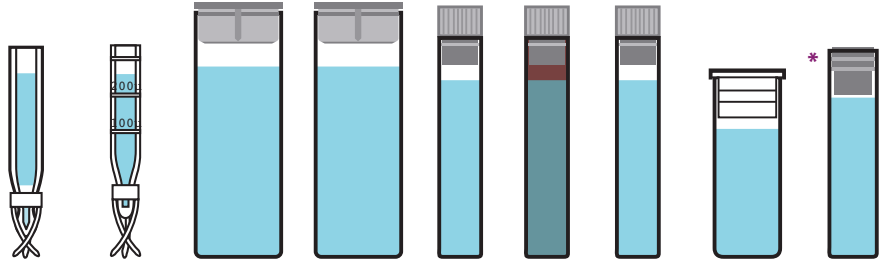


	C4020-180	C4020-18	C4020-20	C4020-10	C4020-2	C4020-210	C4020-25	C4020-410
Part No.	C4020-180	C4020-18	C4020-20	C4020-10	C4020-2	C4020-210	C4020-25	C4020-410
Common Description	10mL	20mL	20mL	10mL	20mL	10mL	20mL	10mL
Approx. Total Capacity	12mL	21mL	21.5mL	12.5mL	21.5mL	12.5mL	21.5mL	12.5mL
Composition	Glass	Glass	Glass	Glass	Glass	Glass	Glass	Glass

Images shown are 80% to scale

* 60% to scale

Shell Vials and Inserts



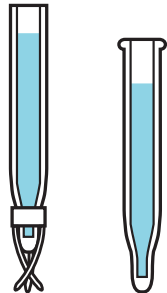
Part No.	C4015-96A	C4015-96PA	C4015-48	C4015-47P	C4015-96	C4015-99	C4015-95P	C4011-80	C4008-50
Dimensions	5x34mm	5x29mm	—	—	—	—	—	—	8x35mm
Common Description	250µL	275µL	4mL	4mL	1mL	1mL	1mL	2mL	1mL
Approx. Total Capacity	375µL	375µL	5.5mL	5.5mL	1.25mL	1.25mL	1.25mL	2.4mL	1mL
Rec. Usable Volume	210µL	250µL	4mL	4mL	1mL	1mL	1mL	1.8mL	850µL
Residual Volume	<3µL	<3µL	<800µL	<800µL	<80µL	<80µL	<80µL	<200µL	—
Composition	Glass	PolyPro	Glass	Polypro	Glass	Amber	PolyPro	Glass	Glass

15x45mm Screw Thread Vials



Part No.	C4015-1	C4015-11W	C4015-2	C4015-2W	C4015-9	C4015-14
Common Description	4mL	4mL	4mL	4mL	3.5mL	2.5mL
Approx. Total Capacity	5.2mL	5.2mL	5.2mL	5.2mL	4.5mL	2.5mL
Rec. Usable Volume	4mL	4mL	4mL	4mL	3.5mL	2mL
Residual Volume	<800µL	<800µL	<800µL	<800µL	<15µL	<15µL
Composition	Glass	Glass	Amber	Amber	Glass	Polypro

Microvolume Inserts for 15x45mm 4mL Vials



Part No.	C4015-638	C4015-643
Dimensions	6x38mm	6x42mm
Common Description	700µL	500µL
Approx. Total Capacity	950µL	375µL
Rec. Usable Volume	800µL	300µL
Residual Volume	<9µL	<8µL
Composition	Glass	Glass

Images shown are 80% to scale

* 50% to scale

* Positive Displacement Vial for Alcott 708

Chromacol Vials and Closures

- Innovative products in micro- and precision sampling
- High quality, stringent manufacturing tolerances, have been extensively tested for comprehensive autosampler compatibility
- Products developed in close technical cooperation with the instrument manufacturers
- Detailed information regarding material specifications and compatibility
- Competent and experienced worldwide distributor network

Approximate Chemical Composition for Borosilicate Glass

Description	SiO ₂	B ₂ O ₃	Al ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	BaO
33 expansion Glass	80%	13%	3%	0.1%	–	4%	0.1%	<0.1%
N-51A Glass	72%	12%	7%	1%	–	6%	2%	<0.1%
Clear Borosilicate-GOLD Grade	80.6%	13%	2.3%	–	–	4%	–	–

For autosampler compatibility visit www.thermoscientific.com/chromexpert



Chromacol 8mm Crimp Top Vials

- The SCI-VI system gives the chromatography user the ability to inject reproducibly from glass vials with residual volumes as low as 1µL to 5µL in a full range of autosampler instruments
- Precision-machined sleeves that allow the vials to be used in the vast majority of commercial autosamplers
- Sleeves are reusable and support the crimped, sealed vials in the correct position within both the autosampler carousel or racks
- Allow movement of the vials as a unit to injection positions in both GC and HPLC autosamplers
- Thermo Scientific™ Chromacol GOLD™ glass quality, a low expansion high purity glass with an extremely low concentration of active sites
- Available in both clear and amber glass these vials can be used with 8mm crimp and snap caps



Chromacol 8mm Crimp Top Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (µL)	Usable Volume (µL)	Residual (µL)	Cat. No.	Pack of
0.3mL Sci-Vi Crimp Top Vial – GOLD Grade Glass	Clear	No	6x32	Round Bottom	325	250	<5	03-CVG	500
0.2mL Sci-Vi Crimp Top Vial – GOLD Grade Glass	Clear	No	6x32	Conical	250	200	<5	02-CTVG	500
0.2mL Sci-Vi Crimp Top Vial	Amber	No	6x32	Conical	250	200	<5	02-CTV(A)	500
0.1mL Sci-Vi Crimp Top Vial – GOLD Grade Glass	Clear	No	6x32	Round Bottom	125	80	<1	01-CVG	500
1.2mL Crimp Top Vial	Clear	No	8x40	Flat Bottom	1300	1200	<75	1.2-CWV	500
1mL Crimp Top Tapered Vial	Clear	No	8x40	Conical	1180	1000	<5	1-CWV	500
0.8mL Crimp Top Vial	Clear	No	8x30	Flat Bottom	1000	800	<80	08-CV	500
	Clear	No	7x40	Flat Bottom	775	650	<70	08-CPV	500
	Amber	No	7x32	Round Bottom	700	600	<30	08-CRV(A)	500
0.7mL Crimp Top Tapered Vial	Clear	No	7x40	Conical	575	450	<5	07-CPV	500
	Amber	No	7x40	Conical	575	450	<5	07-CPV(A)	500



Chromacol 8mm Crimp Top Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (µL)	Usable Volume (µL)	Residual (µL)	Cat. No.	Pack of
0.6mL Crimp Top Tapered Vial	Amber	No	7x32	Conical	600	550	<5	06-CTV(A)	500
0.5mL Crimp Top Tapered Vial	Amber	No	7x30	Conical	500	450	<5	05-CTV(A)	500
PTFE Vial Support Sleeve for 6x32mm vials, fits most autosamplers	PTFE	No	12x31	Flat Bottom	–	–	–	SV-S1	50
PTFE Vial Support Sleeve for 6x32mm vials, fits robotic autosamplers	PTFE	No	12x32	Flat Bottom	–	–	–	SV-S11A	25
Glass Vial Support Sleeve for 6x32mm vials, fits robotic autosamplers	Clear	Yes	12x32	Flat Bottom	–	–	–	SV-S11G	25
PTFE Vial Support Sleeve for 7x32mm vials, fits most autosamplers	PTFE	No	12x32	Flat Bottom	–	–	–	WS-5	40

Sleeves adapt 6x32mm vials for use in autosamplers designed for 12x32mm vials. Use sleeve SV-S1 for autosamplers that do not lift the vial from the tray. Use SV-S11A or SV-S11G for autosamplers that move the vial during sampling. Use WS-5 for 06-CTV(A) and 08-CRV(A).

Chromacol 8mm Crimp Top Closures

- Aluminum crimp seals with prefitted septa
- Provide a secure leak-resistant seal
- Pre-assembled caps and septa are convenient and minimize contamination from handling



Chromacol 8mm Crimp Top Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8mm Crimp Cap, 4mm hole, Type 6 Rubber/PTFE Liner	Silver	Aluminum	Red Natural Rubber/Clear PTFE	38	1.0	8-AC6	1000
	Blue	Aluminum	Red Natural Rubber/Clear PTFE	38	1.0	8-AC6(B)	1000
	Red	Aluminum	Red Natural Rubber/Clear PTFE	38	1.0	8-AC6(R)	1000
8mm Crimp Cap, 4mm hole, Type 7 Rubber/PTFE Liner	Silver	Aluminum	Red Natural Rubber/Clear PTFE	60	1.0	8-AC7	1000
8mm Crimp Cap, 4mm hole	Silver	Aluminum	–	–	–	8-ACB	1000
	Silver	Aluminum	Gray Chlorobutyl Rubber/Clear PTFE	52	1.0	8-AC-CBT1	500
	Blue	Aluminum	Blue Silicone/Red PTFE	20	1.4	8-AC(B)-ST144	500
	Silver	Aluminum	White Silicone/Red PTFE	50	1.3	8-AC-ST15	500
	Silver	Aluminum	Blue Silicone/PTFE	30	1.0	8-AC-ST101	500
	Silver	Aluminum	Blue Silicone/PTFE, Pre-slit	30	1.0	8-AC-ST101X	500
	Silver	Aluminum	White Virgin PTFE, 0.01"	53	0.2	8-ACT	1000
	Silver	Aluminum	Red PTFE/White Silicone/Red PTFE	57	1.0	8-AC-TST1	500
	8mm Snap Cap, Thinned penetration area	Clear	Polyethylene	Integral Molded In Polyethylene	–	–	8-PEC1
Clear		Polyethylene	Integral Molded In Polyethylene, Pre-cut	–	–	8-PEC1X	1000

Chromacol 8mm Crimping and Decrimping Tools

- Crimping tools provide a reproducible secure closure
- High quality construction for durability and long life
- Fine textured surface (powder coated) for a better grip and corrosion resistance



Items not shown to scale

Chromacol 8mm Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 8mm aluminum crimp seals	CR-8C	1
Manual Decrimper	Removes 8mm aluminum crimp seals without vial damage	DCB-8C	1

For electronic crimpers and decrimpers look on page **2-092**

Chromacol 2mL, 12x32mm Standard Opening Screw Thread Vials and Inserts

- 8-425 thread finish vials are best suited for most instruments where the vial remains in the sample tray during injection
- Manufactured from superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- GOLD grade glass quality is a low expansion high purity glass with an extremely low concentration of active sites
- Available with a graduated, write-on patch for convenient sample identification
- Small opening requires Micro-Inserts with a diameter of 5mm
- While maintaining the standard outer dimensions the internal volumes of these vials range from below 300µL to 2mL
- Where levels of inorganic ions have to be kept to an absolute minimum the use of plastics may be preferred to the more conventional glass vials

Recommended for the following instruments:

- Beckman
- CTC
- Gilson
- Knauer
- Shimadzu
- Spark Holland
- Varian
- VWR (Merck)/Hitachi

For autosampler compatibility visit

www.thermoscientific.com/chromexpert



Chromacol 2mL, 12x32 Standard Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
8-425 Screw Thread Vial	Clear	Yes	12x32	Flat Bottom	2.0	1.5	<170	2-SV	500
	Amber	Yes	12x32	Flat Bottom	2.0	1.5	<170	2-SV(A)	500
8-425 Screw Thread Vial – GOLD Grade Glass	Clear	No	12x32	Flat Bottom	2.0	1.5	<170	2-SVG	500
8-425 Screw Thread 1.1mL Vial – GOLD Grade Glass	Clear	No	12x32	Conical	1.2	1.1	<5	1.1-STVG	500
8-425 Screw Thread 0.3mL Vial	Polypropylene	No	12x32	Insert Vial	0.3	250µL	<3	03-PPSV	500
200µL Insert	Clear Glass	No	5x31	Flat Bottom	250µL	200µL	<12	02-NV	1000
	Clear Glass	No	5x30	Conical	200µL	160µL	<4	02-MTV	1000
Self-centering support device for tapered glass inserts	Polyethylene	–	–	–	–	–	–	MTS-1	500
Support Sleeve for 1.1-STVG	PTFE	–	–	–	–	–	–	TTS-312	50

Support sleeve allows conical tip vial to be used in standard 12x32mm autosampler trays

Chromacol 8-425 Screw Thread Caps and Septa

- Open top caps are designed to be used with any of our 8mm septa
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Flanged caps are particularly suitable for Shimadzu and Tosoh autosamplers
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Closures are shipped in sealed polybags to prevent contamination during transport



Chromacol 8-425 Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
8mm Open Top Screw Cap, 8-425 thread, 5mm hole	Black	Polypropylene	–	–	–	8-SC	500
	Red	Polypropylene	–	–	–	8-SC(R)	500
	White	Polypropylene	–	–	–	8-SC(W)	500
8mm Open Top Screw Cap with flange, 8-425 thread, 5mm hole	Black	Polypropylene	–	–	–	8-SCJ	500
	White	Polypropylene	–	–	–	8-SCJ(W)	500
Septum for 8-425 Screw Caps	–	–	Red Natural Rubber/Clear PTFE	38	1.0	8-6RT1	1000
	–	–	White Silicone/Red PTFE	45	1.3	8-ST15	500
	–	–	Blue Silicone/PTFE	50	1.2	8-ST14	500
	–	–	Blue Silicone/PTFE, Pre-slit	50	1.2	8-ST14X	500
	–	–	White Silicone/PTFE	20	1.4	8-ST143	500
	–	–	Blue Silicone/PTFE	30	1.0	8-ST101	500
	–	–	Red PTFE/White Silicone/Red PTFE	57	1.0	8-TST1	500
	–	–	White Virgin PTFE, 0.01"	53	0.3	8-T02	1000
	–	–	Blue Silicone/Red PTFE	20	1.4	8-ST144	500
8mm Open Top Screw Cap, 8-425 thread, 5mm hole, Type 8 Rubber/PTFE Liner	Black	Polypropylene	Red Natural Rubber/Clear PTFE	50	1.3	8-SC-8RT1	500
8mm Open Top Screw Cap, 8-425 thread, 5mm hole	Black	Polypropylene	White Silicone/Red PTFE	45	1.3	8-SC-ST15	500

Chromacol Standard Opening Screw Thread Vial Convenience and Instrument Select (IS) Kits

- Convenience kits save time during sample preparation
- Includes 100 vials and 100 caps with pre-assembled septa for added convenience during sample preparation
- Reusable two compartment trays protect vials and closure while keeping matching supplies together



Convenience Kits

Items not shown to scale

Chromacol Standard Opening Screw Thread Vial Convenience and Instrument Select (IS) Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap/Septum Cat. No.	Cat. No.	Pack of
Convenience Kit, Standard Opening Screw Vial	Clear	Yes	White, flanged	Blue Silicone/PTFE	2-SV	8-SCJ(W) + 8-ST101	2-SVJ(W)101-CP	100
IS Kit, Standard Opening Screw Vial for Shimadzu LC Autosamplers	Clear	Yes	White, flanged	Blue Silicone/PTFE	2-SV	8-SCJ(W) + 8-ST101	SHL	100
IS Kit, Standard Opening Screw Vial for Thermo Scientific LC Autosamplers	Clear	Yes	Black	White Silicone/Red PTFE	2-SV	8-SC-ST15	TSL	100

Trying to decide what septum is right for you?

➤ Use our selection guide at www.thermoscientific.com/chromexpert

Chromacol 9mm Wide Opening Screw Thread Vials and Inserts

- SureStop 9mm vials as part of the Advanced Vial Closure System (AVCS)* offer the sealing and performance characteristics of a crimp top vial and remove any subjectivity in achieving optimal seal compression closing a vial by incorporating a definite stop point into the design of the vial finish. See pages **2-005** to **2-006**
- SureStop 9mm vials should be used with AVCS 9-SCK closures in order to get the best possible performance
- Available with a graduated, write-on patch for convenient sample identification
- Wide neck opening design, allows easy filling, requires Micro-Inserts with a diameter of 6mm
- Manufactured from superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts

Compatible with:

Most HPLC and GC autosamplers
For autosampler compatibility visit
www.thermoscientific.com/chromexpert



Chromacol 9mm Wide Opening Screw Thread Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
9mm SureStop Screw Thread Vial (AVCS) – GOLD Grade Glass	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-SVWVGK	100
9mm SureStop Screw Thread Vial (AVCS)	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-SVWK(A)	100
9mm Screw Thread Vial	Clear	No	15x46	Flat Bottom	4.0mL	3.5mL	<500	4-SVQ	500
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-SVW	500
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-SVW(A)	500
9mm Screw Thread Vial, High Recovery with 30µL Reservoir	Clear	No	12x32	Tapered Base	1.5mL	1.3mL	<4	1.5-HRSV	100
9mm Screw Thread Vial, Ultra High Recovery with 10µL Reservoir	Clear	No	12x32	Mandrel Base	1.2mL	1.0mL	<2	1.2-UHRSV	100
9mm Screw Thread Vial 300µL, Fused Insert	Clear	Yes	12x32	Insert Vial	0.3mL	250µL	<3	03-FISV	500
	Amber	Yes	12x32	Insert Vial	0.3mL	250µL	<3	03-FISV(A)	500
9mm Screw Thread Vial 200µL, Fused Insert-GOLD grade glass	Clear	Yes	12x32	Insert Vial	0.2mL	180µL	<2	02-FISVG	500
300µL Insert	Clear	–	6x31	Flat Bottom	300µL	200µL	<12	03-NV	1000
200µL Insert – GOLD Grade Glass	Clear	–	6x30	Pulled Point	200µL	160µL	<4	02-MTVWG	1000
Self-centering support device for tapered glass inserts	Polyethylene	–	–	–	–	–	–	MTS-1	500
9mm Screw Thread Vial	Polypropylene	No	12x32	Insert Vial, Mandrel	300µL	200µL	<4	03-PPSVW	500

* For information about AVCS see page **2-005**

Chromacol 9mm Screw Thread Closures

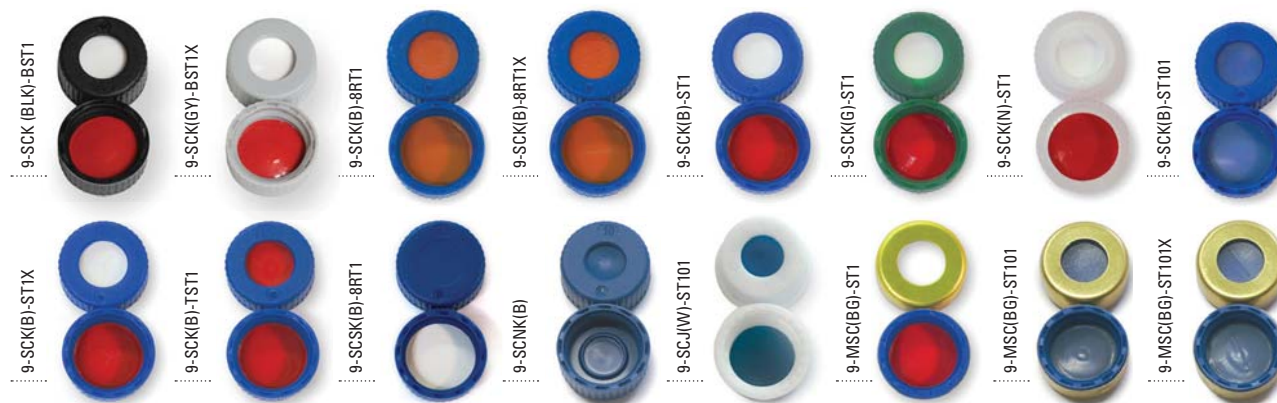


K-Series closures featuring AVCS technology (Advanced Vial Closure System)

- Septa push through virtually eliminated due to improved interior geometry
- Improved sealing capability
- Improved autosampler compatibility
- AVCS provides the freedom to select the best septum for your instrument and applications
- Cost efficient alternative to caps with bonded septa
- Optimized ergonomics, fine texturing and evenly spaced ribbing for superior handling

Further features are:

- Easy-on, easy-off convenience with just one turn
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Closures have the profile of a crimp or snap closure for compatibility with robotic autosamplers
- Closures are shipped in sealed polybags to prevent contamination during transport
- Special caps for magnetic transport autosamplers
- Flanged caps suitable for Shimadzu, Hitachi and Tosoh instruments



Chromacol 9mm Screw Thread Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
9mm Open Top Short Screw Cap, 6mm hole	Black	Polypropylene	Bonded Red PTFE/White Silicone	57	1.0	9-SCK (BLK)-BST1	500
	Gray	Polypropylene	Bonded Red PTFE/White Silicone, Pre-slit	45	1.2	9-SCK (GY)-BST1X	500
9mm Open Top Short Screw AVCS Cap, 6mm hole	Blue	Polypropylene	Red Rubber/Clear PTFE	58	1.0	9-SCK (B)-8RT1	500
	Blue	Polypropylene	Red Rubber/Clear PTFE, Pre-slit	58	1.0	9-SCK (B)-8RT1X	500
	Blue	Polypropylene	White Silicone/Red PTFE	57	1.0	9-SCK (B)-ST1	500
	Green	Polypropylene	White Silicone/Red PTFE	57	1.0	9-SCK (G)-ST1	500
	Clear	Polypropylene	White Silicone/Red PTFE	57	1.0	9-SCK (N)-ST1	500
	Blue	Polypropylene	Blue Silicone/PTFE	30	1.0	9-SCK (B)-ST101	500
	Blue	Polypropylene	White Silicone/Red PTFE, Y-Pre-slit	57	1.0	9-SCK (B)-ST1X	500
	Blue	Polypropylene	Red PTFE/White Silicone/Red PTFE	57	1.0	9-SCK (B)-TST1	500
9mm Solid Top Short Screw AVCS Cap	Blue	Polypropylene	Red Natural Rubber/Beige PTFE	58	1.0	9-SCSK (B)-8RT1	500
9mm Short Screw AVCS Cap with Integral PP-Membrane	Blue	Polypropylene				9-SCNK (B)	500
9mm Open Top Short Screw Cap with flange, 6mm hole	White	HDPE	Blue Silicone/PTFE	30	1.0	9-SCJ (W)-ST101	500
9mm Open Top Short Screw AVCS Cap, 6mm hole, magnetic	Blue/Gold	PP/Steel	White Silicone/Red PTFE	57	1.0	9-MSC (BG)-ST1	100
	Blue/Gold	PP/Steel	Soft septum, Blue Silicone/PTFE	30	1.0	9-MSC (BG)-ST101	100
	Blue/Gold	PP/Steel	Soft septum, Blue Silicone/PTFE, Pre-slit	30	1.0	9-MSC (BG)-ST101X	100

Chromacol 9mm Wide Opening Convenience and Instrument Select (IS) Kits

- Convenience kits save time during sample preparation
- Includes 100 vials and 100 caps with pre-assembled septa for added convenience during sample preparation
- Reusable two compartment trays protect vials and closure while keeping matching supplies together



2-SVWGK8-CPK

Chromacol 9mm Wide Opening Screw Thread Vial Convenience and Instrument Select (IS) Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
SureStop Convenience Kit, GOLD Grade	Clear	Yes	Blue	Red Natural Rubber/Clear PTFE	2-SVWGK	9-SCK(B)-8RT1	2-SVWGK8-CPK	100
	Clear	Yes	Blue	White Silicone/Red PTFE	2-SVWGK	9-SCK(B)-ST1	2-SVWGKST-CPK	100
SureStop Convenience Kit	Amber	Yes	Blue	Red Natural Rubber/Clear PTFE	2-SVWK(A)	9-SCK(B)-8RT1	2-SVWK(A)8-CPK	100
	Amber	Yes	Blue	White Silicone/Red PTFE	2-SVWK(A)	9-SCK(B)-ST1	2-SVWK(A)ST-CPK	100
SureStop IS Kit, GOLD Grade, for Thermo GC Autosampler	Clear	Yes	Blue	Blue Silicone/PTFE	2-SVWGK	9-SCK(B)-ST101	TTRGKK	100
AVCS Convenience Kit	Clear	Yes	Blue	Red Natural Rubber/Clear PTFE	2-SVW	9-SCK(B)-8RT1	2-SVW8-CPK	100
	Clear	Yes	Blue	White Silicone/Red PTFE	2-SVW	9-SCK(B)-ST1	2-SVWST-CPK	100
	Amber	Yes	Blue	Red Natural Rubber/Clear PTFE	2-SVW(A)	9-SCK(B)-8RT1	2-SVW(A)8-CPK	100
	Amber	Yes	Blue	White Silicone/Red PTFE	2-SVW(A)	9-SCK(B)-ST1	2-SVW(A)ST-CPK	100
AVCS IS Kit, for Agilent LC Autosampler	Clear	Yes	Blue	Red Natural Rubber/Clear PTFE	2-SVW	9-SCK(B)-8RT1	HPLSK	100
AVCS IS Kit, for Thermo GC Autosampler	Clear	Yes	Blue	Blue Silicone/PTFE	2-SVW	9-SCK(B)-ST101	TTRK	100
AVCS Convenience Kit, for Varian GC Autosampler	Clear	Yes	Blue	White Silicone/Red PTFE	2-SVW	9-SCK(B)-ST1	VAGK	100
AVCS IS Kit, for Varian LC Autosampler	Clear	Yes	Blue	White Silicone/Red PTFE	2-SVW	9-SCK(B)-ST1	VALK	100
AVCS IS Kit, for Waters Alliance® LC Autosampler	Clear	Yes	Blue	White Silicone/Red PTFE	2-SVW	9-SCK(B)-ST1	WALK	100
AVCS IS Kit, for PerkinElmer LC Autosampler	Clear	Yes	Green	White Silicone/Red PTFE, Pre-slit	2-SVW	9-SCK(G)-ST1X	PELK	100
AVCS IS Kit, for Waters Alliance LC Autosampler	Clear	Yes	Black	Bonded Red PTFE/White Silicone	2-SVW	9-SCK(BLK)-BST1	WALBK	100
Convenience Kit	Clear	Yes	Gray	Bonded Red PTFE/White Silicone, Pre-slit	2-SVW	9-SCK(GY)-BST1X	2-SVWBSTX-CPK	100
	Amber	Yes	Gray	Bonded Red PTFE/White Silicone, Pre-slit	2-SVW(A)	9-SCK(GY)-BST1X	2-SVW(A)BSTX-CPK	100

Chromacol 2mL, 12x32mm, 11mm Crimp Top Vials and Closures

- Thermo Scientific Chromacol GOLD glass quality, a low expansion high purity glass with an extremely low concentration of active sites
- Manufactured from superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Available with a graduated, write-on patch for convenient sample identification
- Wide neck opening design, allows easy filling, requires Micro-Inserts with a diameter of 6mm
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Where levels of inorganic ions have to be kept to an absolute minimum the use of plastics may be preferred to the more conventional glass vials

Compatible with:

Most HPLC and GC autosamplers

For autosampler compatibility visit

www.thermoscientific.com/chromexpert



Chromacol 2mL, 12x32mm, 11mm Crimp Top Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Crimp Top Vial, Wide Opening	Clear	Glass	15x46	Flat Bottom	4.0mL	3.5mL	<500	4-CV	500
	Clear	Glass	12x40	Flat Bottom	2.5mL	2.0mL	<170	2.5-CV	500
	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-CV	500
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-CV(A)	500
11mm Crimp Top Vial, Wide Opening – GOLD Grade Glass	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-CVG	500
11mm Crimp Top Vial, Wide Opening	Clear	Yes	12x32	Round Bottom	2.0mL	1.5mL	<170	2-CRV	500
11mm Crimp Top 1.5mL High Recovery Vial	Clear	No	12x32	High Recovery	1.5mL	1.3mL	<4µL	1.5-HRCV	100



Chromacol 2mL, 12x32mm, 11mm Crimp Top Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Crimp Top 1.1mL Vial, Wide Opening – GOLD Grade Glass	Clear	No	12x32	Conical	1.4mL	1.1mL	<5	1.1-CTVG	500
11mm Crimp Top 1.1mL Vial, Wide Opening	Amber	No	12x32	Conical	1.4mL	1.1mL	<5	1.1-CTV(A)	500
11mm Crimp Top 0.9mL Vial, Wide Opening	Clear	No	10x32	Conical	1.0mL	850µL	<5	09-CTV	500
	Clear	No	12x32	Insert Vial	0.9mL	830µL	<3	09-FIV	500
11mm Crimp Top 0.3mL Vial, Fused Insert	Clear	Yes	12x32	Insert Vial	0.3mL	250µL	<3	03-FIV	500
	Amber	Yes	12x32	Insert Vial	0.3mL	250µL	<3	03-FIV(A)	500
11mm Crimp Top 0.2mL Vial, Fused Insert – GOLD Grade Glass	Clear	Yes	12x32	Insert Vial	0.2mL	180µL	<2	02-FIVG	500



Chromacol 2mL, 12x32mm, 11mm Crimp Top Vials and Inserts (Continued)

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
300µL Insert	Clear	–	6x31	Flat Bottom	300µL	200µL	<12	03-NV	1000
200µL Insert – GOLD Grade Glass	Clear	–	6x30	Pulled Point	200µL	160µL	<4	02-MTVWG	1000
Self-centering vial support device for tapered glass inserts	Polyethylene	–	–	–	–	–	–	MTS-1	500
PTFE Vial Support 1.1-CTVG	PTFE	–	–	–	–	–	–	TTS-312	50
Plastic Vial Support Sleeve for 09-CTV Only	Polyethylene	–	–	–	–	–	–	WS-6	100

Support sleeves allow conical tip vials to be used in standard 12x32mm autosampler trays

Chromacol 11mm Crimp Top Closures

- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Aluminum crimp closures provide a secure leak-resistant seal
- Aluminum seals must be applied with a crimping tool
- Closures are shipped in sealed polybags to prevent contamination during transport
- First crimp cap with assembled aluminum liner for interference free analysis of Elastomers, Polymers, Phthalates, Halogenated compounds and Silicones
- First crimp cap with tight PTFE sealing disk due to additional silicone ring



Chromacol 11mm Crimp Top Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
Septum for 11mm Crimp Caps	–	–	Silicone/PTFE for liquid – liquid extraction	–	0.2	11-LLX	100
11mm Crimp Cap, 6mm hole	Silver	Aluminum	Solid Aluminum Disk with Silicone sealing ring		0.06	11-AC-AL	100
11mm Crimp Cap, 6mm center hole	Silver	Aluminum	–	–	–	11-ACB	500
11mm Crimp Cap, 6mm center hole, Type 6 Rubber/PTFE	Silver	Aluminum	Red Chlorobutyl Rubber/Clear PTFE,	40	1.0	11-AC6	500
	Red	Aluminum	Sulphur free	40	1.0	11-AC6(R)	500
11mm Crimp Cap, 6mm center hole, Type 7 Rubber/PTFE	Silver	Aluminum	Red Natural Rubber/Clear PTFE	60	1.0	11-AC7	500
	Blue	Aluminum		60	1.0	11-AC7(B)	500
	Red	Aluminum		60	1.0	11-AC7(R)	500
	Green	Aluminum		60	1.0	11-AC7(G)	500
	Gold	Aluminum		60	1.0	11-AC7(GO)	500



Chromacol 11mm Crimp Top Closures (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Crimp Cap, 6mm center hole	Blue	Aluminum	Gray Chlorobutyl/PTFE	52	1.0	11-AC-CBT1	500
	Blue	Aluminum	Blue Silicone/Red PTFE	20	1.4	11-AC(B)-ST144	500
	Silver	Aluminum	White Silicone/Red PTFE	50	1.3	11-AC-ST15	500
	Silver	Aluminum	Blue Silicone/PTFE	30	1.0	11-AC-ST101	500
	Silver	Aluminum	Blue Silicone/PTFE, Pre-slit	30	1.0	11-AC-ST101X	500
	Silver	Aluminum	White Virgin PTFE, 0.01" with clear Silicone sealing ring	53	0.25	11-ACTS	1000
	Silver	Aluminum	White Virgin PTFE, 0.01"	–	0.25	11-ACT	1000
	Silver	Aluminum	Red PTFE/White Silicone/Red PTFE	57	1.0	11-AC-TST1	500



Chromacol 11mm Crimp Top Closures (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Crimp Cap, magnetic	Silver	Steel	White Silicone/Red PTFE	57	1.3	11-MC-ST15	500
11mm Crimp Cap, magnetic, Type 8 Rubber/PTFE	Silver	Steel	Red Natural Rubber/Clear PTFE	38	1.0	11-MC-8RT1	500
11mm Crimp Cap, magnetic	Silver	Steel	Blue Silicone/PTFE	30	1.0	11-MC-ST101	500
11mm Snap Cap for Crimp Vials	Clear	Polyethylene	–	–	–	11-PEC1	1000
11mm Snap Cap for Crimp Vials, Pre cut	Clear	Polyethylene	–	–	–	11-PEC1X	1000
11mm Snap Cap for Crimp Vials	Clear	Polyethylene	White Silicone/Red PTFE	57	1.0	11-PEC-ST1	500

Chromacol 11mm Crimp Top Convenience and Instrument Select (IS) Kits

- Convenience kits save time during sample preparation
- Include matched quantities of vials and aluminum seals with pre-assembled septa for added convenience during sample preparation
- Reusable two compartment trays protect vials and closure while keeping matching supplies together



Items not shown to scale

Chromacol 11mm Crimp Top Convenience and Instrument Select (IS) Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Opening Crimp Top Vial	Clear	Yes	Silver	Red Natural Rubber/Clear PTFE, Type 7	2-CV	11-AC7	2-CV7-CP	100
	Clear	Yes	Silver	White Silicone/Red PTFE	2-CV	11-AC-ST15	2-CVST-CP	100
	Amber	Yes	Silver	Red Natural Rubber/Clear PTFE, Type 7	2-CV(A)	11-AC7	2-CV(A)7-CP	100
	Amber	Yes	Silver	White Silicone/Red PTFE	2-CV(A)	11-AC-ST15	2-CV(A)ST-CP	100
IS Kit, Wide Opening Crimp Top Vial for Agilent GC Autosampler	Clear	Yes	Silver	Red Natural Rubber/Clear PTFE, Type 7	2-CV	11-AC7	HPG	100
IS Kit, Wide Opening Crimp Top Vial for Agilent LC Autosampler	Clear	Yes	Silver	Red Natural Rubber/Clear PTFE, Type 7	2-CV	11-AC7	HPL	100
IS Kit, Wide Opening Crimp Top Vial for VWR(Merck)-Hitachi LC Autosampler	Clear	Yes	Silver	Blue Silicone/PTFE-Pre-Cut	2-CV	11-AC-ST101X	MEL	100
IS Kit, Wide Opening Crimp Top Vial for PerkinElmer GC Autosampler	Clear	Yes	Silver	Red Natural Rubber/Clear PTFE, Sulphur free, Type 6	2-CV	11-AC6	PEG	100
IS Kit, Wide Opening Crimp Top Vial for Shimadzu LC Autosampler	Clear	Yes	Silver	Blue Silicone/PTFE	2-CV	11-AC-ST101	SHG	100
IS Kit, Wide Opening Crimp Top Vial for Thermo Scientific GC Autosamplers	Clear	Yes	Silver	Blue Silicone/Red PTFE	2-CV	11-AC(N)-ST144	TQG	100
IS Kit, Wide Opening Crimp Top Vial for Thermo LC Autosampler	Clear	Yes	Silver	White Silicone/Red PTFE	2-CV	11-AC-ST15	TQL	100

Chromacol 11mm Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure for all 11mm vial and seal combinations
- Easy and convenient handling
- High quality construction for durability and long life
- Fine textured surface (powder coated) for a better grip and corrosion resistance



Chromacol 11mm Crimpers and Decrimpers

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 11mm aluminum crimp seals	CR-11C	1
Decapping Pliers	Removes 11mm aluminum crimp seals, Protective gloves recommended	DCR-11	1
Manual Decrimper	Removes 11mm aluminum crimp seals without vial damage	DCB-11C	1

For electronic crimpers and decrimpers look on page **2-092**

Chromacol 2mL, 12x32mm, 11mm Snap Cap Vials

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Available with a graduated, write-on patch for convenient sample identification
- Wide neck opening design, allows easy filling; requires Micro-Inserts with diameter of 6mm
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts
- Available silanized* (deactivated) for optimal recovery of critical polar, labile or chelating compounds.
- Snap-Cap vials can be used with snap caps or aluminum crimp seal closures

Compatible with:

Most HPLC and GC autosamplers
 For autosampler compatibility visit
www.thermoscientific.com/chromexpert



Chromacol 2mL, 12x32mm, 11mm Snap Vials and Inserts

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume	Usable Volume	Residual (µL)	Cat. No.	Pack of
11mm Snap Cap Vial	Clear	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-RV	500
	Amber	Yes	12x32	Flat Bottom	2.0mL	1.5mL	<170	2-RV(A)	500
11mm Snap Cap 1.5mL Vial	Clear	No	12x32	High Recovery	1.5mL	1.3mL	<4	1.5-HRRV	100
11mm Snap Cap 1.5mL Vial, silanized*	Clear	No	12x32	High Recovery	1.5mL	1.3mL	<4	1.5-HRRV(S)	100
11mm Snap Cap Vial, Ultra High Recovery with 10µL Reservoir	Clear	No	12x32	Mandrel Base	1.2mL	1mL	<2	1.2-UHRRV	100
11mm Snap Cap 300µL Vial, Fused Insert	Clear	Yes	12x32	Fused Conical	300µL	250µL	<3	03-FIRV	500
	Amber	Yes	12x32	Fused Conical	300µL	250µL	<3	03-FIRV(A)	500
11mm Snap Cap 200µL Vial, Fused Insert – GOLD grade glass	Clear	Yes	12x32	Fused Conical	200µL	180µL	<2	02-FIRVG	500
300µL Insert	Clear	–	6x31	Flat Bottom	300µL	200µL	<12	03-NV	1000
200µL Insert – GOLD Grade Glass	Clear	–	6x30	Pulled Point	200µL	160µL	<4	02-MTVWG	1000
Self-centering support device for tapered glass inserts	Polyethylene	–	–	–	–	–	–	MTS-1	500

* For information about silanized products visit www.thermoscientific.com/chromexpert

Chromacol 11mm Snap Closures

- New design of locking tabs provides easier application and removal of caps
- Enlarged open area allows for needle penetration across the entire vial opening
- Textured outer surface for easier gripping and improved detection by autosamplers with optical vial sensors
- Easy to apply and easy to remove from Snap vials without tools
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Snap caps eliminate the need for crimping or de-crimping tools
- Polyethylene caps are chemically inert and suitable for most chromatography applications
- Closures are shipped in sealed polybags to prevent contamination during transport
- Integral Molded Polyethylene cap is an economical choice for routine HPLC applications, but with low sealing properties and zero resealing capacity



Chromacol 11mm Snap Closures

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
11mm Snap Cap, thinned penetration area	Blue	Polyethylene	Integral Molded In Polyethylene	–	–	11-PSN(B)	500
11mm Snap Cap, 6mm hole	Blue	Polyethylene	Red Natural Rubber/Clear PTFE	58	1.0	11-PSN(B)-8RT1	500
	Blue	Polyethylene	White Silicone/Red PTFE	57	1.0	11-PSN(B)-ST1	500
	Blue	Polyethylene	Blue Silicone/PTFE	30	1.0	11-PSN(B)-ST101	500
	Blue	Polyethylene	White Silicone/Blue PTFE, Pre-slit	57	1.0	11-PSN(B)-ST1X	500
	Blue	Polyethylene	Red PTFE/White Silicone/Red PTFE	57	1.0	11-PSN(B)-TST1	500
	Red	Polyethylene	White Virgin PTFE, 0.01"	53	0.3	11-PSN(R)-T02	500
	Blue	Polyethylene	White Virgin PTFE, 0.01"	53	0.3	11-PSN(B)-T02	500

Chromacol 11mm Snap Cap Wide Opening Vial Convenience Kits

- Convenience kits save time during sample preparation
- Includes 100 vials and 100 caps with pre-assembled septa for added convenience during sample preparation
- Reusable two compartment trays protect vials and closure while keeping matching supplies together



Chromacol 11mm Snap Cap Wide Opening Vial Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, Wide Opening Snap Vial	Clear	Yes	Blue	White Silicone/Red PTFE	2-RV	11-PSN(B)-ST1	2-RVST-CP	100
	Clear	Yes	Blue	Red Natural Rubber/Clear PTFE	2-RV	11-PSN(B)-8RT1	2-RV8-CP	100

Chromacol 13mm Screw Vials, 13-425 Thread Finish

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Microsampling and High Recovery Vials allow maximum sample extraction without need for separate inserts



Compatible with:

The 4mL vials are preferentially used on instruments of the following manufacturers:

- Thermo Scientific
- Shimadzu
- Spark Holland, Varian
- VWR (Merck)/Hitachi
- Waters (Wisp 48 Position Carousel)

For autosampler compatibility visit www.thermoscientific.com/chromexpert

Images shown are 60% to scale
* 40% to scale

Chromacol 13mm Screw Vials, 13-425 Thread Finish

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
13-425 Screw Thread Vial	Clear	No	13x100	Round Bottom	10.0	8.5	<500	10-SV	125
	Clear	No	13x65	Round Bottom	5.0	4.5	<500	5-SV	125
	Clear	No	15x46	Flat Bottom	4.0	4.0	<800	4-SV	500
	Amber	No	15x46	Flat Bottom	4.0	4.0	<800	4-SV(A)	500
13-425 Screw Thread 3.5mL High Recovery Vial	Clear	No	15.25x46	High Recovery	3.5	3.0	<12	3.5-HRSV	250

Chromacol 13-425 Thread Caps and Septa

- Open top caps are designed to be used with any of our 12mm septa
- Polypropylene caps are chemically inert and suitable for most chromatography applications
- Pre-assembled caps and septa are convenient and minimize contamination from handling



Chromacol 13-425 Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
13mm Open Top Screw Cap, 13-425 thread, 8mm hole	Black	Polypropylene	–	–	–	12-SC	500
	White	Polypropylene	–	–	–	12-SC(W)	500
	Red	Polypropylene	–	–	–	12-SC(R)	500
	Yellow	Polypropylene	–	–	–	12-SC(Y)	500
13mm Solid Top Cap, 13-425 thread	Black	Polypropylene	–	–	–	12-SCS	500
PTFE Lined Solid Top Storage Cap for 13-425 Thread	White	Urea	PTFE/PE Foam Liner	–	–	13-SCST	100
Septum for 13-425 Screw Caps	–	–	Red Natural Rubber/Clear PTFE	38	1.0	12-6RT1	500
	–	–	White Silicone/Red PTFE	57	2.0	12-ST2	500
	–	–	Blue Silicone/PTFE	57	1.8	12-ST18	500
	–	–	Blue Silicone/PTFE	30	1.0	12-ST101	500
	–	–	White Virgin PTFE, 0.01"	53	0.25	12-T02	1000



Chromacol 13-425 Screw Thread Caps and Septa (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
13mm Open Top Screw Cap, 13-425 thread, 8mm hole	Black	Polypropylene	White Silicone/Red PTFE	57	1.3	13-SC-ST15	500
	Black	Polypropylene	Red Natural Rubber/Clear PTFE	58	1.0	12-SC-8RT1	500
	Black	Polypropylene	White Silicone/Red PTFE	57	2.0	12-SC-ST2	500

Chromacol Shell/Neckless Vials

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Polyethylene cap with starburst center design eases syringe needle penetration
- Convenience kits include equal quantities of vials and caps

Recommended for the following instruments:

- Alcott
- Gilson
- Shimadzu
- Waters (Wisp 96 and 48 Position Carousel)

For autosampler compatibility visit www.thermoscientific.com/chromexpert



Chromacol Shell/Neckless Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Usable Volume (mL)	Residual (µL)	Cat. No.	Pack of
1mL Neckless/Shell Vial	Clear	No	8x40	Flat Bottom	1.25	1.0	<80	1-NWV	500
1mL Neckless/Shell Vial with PE-Cap	Clear	No	8x40	Flat Bottom	1.25	1.0	<80	1-NWV-C	200
1mL Neckless/Shell Vial with PE-Cap	Amber	No	8x40	Flat Bottom	1.25	1.0	<81	1-NWV(A)-C	200
2mL Neckless/Shell Vial	Clear	No	12x32	Flat Bottom	2.5	2.0	<175	2.5-NV	500
4mL Neckless/Shell Vial with PE-Cap	Clear	No	15x46	Flat Bottom	5.5	4.0	<350	4-NWV-C	100
8mm PE-Cap/Plug for 1mL Shell-Vial	Polyethylene	–	–	–	–	–	–	8-NPWP	1000
12mm Polyethylene Plug for 2mL Shell-Vial	Polyethylene	–	–	–	–	–	–	12-NPEP4	1000

Trying to decide what glass quality is right for you?

Use our selection guide at www.thermoscientific.com/chromexpert

Chromacol Headspace Vials

Glass vials with 20mm crimp seal or 18mm screw thread finish are designed to fit most headspace autosamplers

- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber, meets all requirements of Pharm. US, EU, JPN
- Round bottom vials are compatible with most autosamplers and more easily handled by robotic arms that lift the vial from the tray
- Vials feature beveled edge 20mm crimp finish
- The bevel edge on the lip of the vial provides additional sealing power for greater leak resistance under high pressure
- Screw thread headspace vials are convenient and do not require tools
- Multiple turn threading maintains a tight seal through extreme heating cycles



Chromacol Headspace Vials

Description	Glass	Patched	Dimension (mm)	Finish	Profile	Total Volume (mL)	Usable Volume (mL)	Cat. No.	Pack of
20mm Headspace Crimp Vial	Clear	No	30x60	Beveled Edge	Flat Bottom	27	27	27-CV	100
	Clear	No	23x75	Beveled Edge	Round Bottom	22	20	22-CV	125
	Clear	No	22.5x75	Beveled Edge	Round Bottom	21	20	20-CV	125
	Amber	No	22.5x75	Beveled Edge	Round Bottom	21	20	20-CV(A)	125
	Clear	No	18x65	Beveled Edge	Round Bottom	12	10	12-CV	100



Chromacol Headspace Vials (Continued)

Description	Glass	Patched	Dimension (mm)	Finish	Profile	Total Volume (mL)	Usable Volume (mL)	Cat. No.	Pack of
20mm Headspace Crimp Vial	Clear	No	22.5x46	Beveled Edge	Round Bottom	12	10	10-CV	125
	Amber	No	22.5x46	Beveled Edge	Round Bottom	12	10	10-CV(A)	125
	Clear	No	18x50	Beveled Edge	Round Bottom	10	9	9-CV	100
	Clear	No	22x38	Beveled Edge	Round Bottom	8	6	6-CV	125
18mm Screw Top Headspace Vial	Clear	No	22.5x76	Screw Thread	Round Bottom	21	20	20-HSV	125
	Clear	No	22.5x46	Screw Thread	Round Bottom	12	10	10-HSV	125

Chromacol 20mm Crimping and Decrimping Tools

- Crimping tools provide a reproducible, secure vial closure for all 20mm vial and seal combinations
- Easy and convenient handling
- High quality construction for durability and long life
- Fine textured surface (powder coated) for a better grip and corrosion resistance



Items not shown to scale

Chromacol 20mm Crimping and Decrimping Tools

Description	Use	Cat. No.	Pack of
Manual Crimper	Attaches 20mm crimp seals	CR-20C	1
Decapping Pliers	Removes 20mm crimp seals, Protective gloves recommended	DCR-20	1
Manual Decrimper	Removes 20mm crimp seals without vial damage	DCB-20C	1

For electronic crimpers and decrimpers look on page **2-092**

Chromacol Headspace Caps and Septa

- Use magnetic seals with PAL/CTC/Leap Technologies, Gerstel and other magnetic transport autosamplers
- 20mm crimp seals must be applied with a crimping tool
- Pre-assembled caps and septa are convenient and minimize contamination from handling
- Extended temperature range products for high-temperature headspace applications



Images shown are 50% to scale

Chromacol Headspace Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
20mm Crimp Cap, 9mm hole	Silver	Aluminum	–	–	–	20-ACB	500
20mm Magnetic Crimp Cap, 6mm hole	Silver	Tinplate	–	–	–	20-MCB	500
20mm Composite Magnetic Crimp Cap, 8mm hole	Blue	Alu/Tinplate	–	–	–	20-MCBC	500
	Red	Alu/Tinplate	–	–	–	20-MCBC(R)	500
18mm Magnetic Screw Cap, 8mm hole	Silver	Steel	–	–	–	18-MSC	125
Septum for 20mm Crimp Caps	–	–	20mm Gray Bromobutyl Stopper	55	3.0	20-B3P	500
	–	–	20mm Gray Butyl Freezer Bung	55	3.0	20-2FB3	2000
	–	–	20mm Molded Gray Chlorobutyl	52	3.0	20-CB3	1000
	–	–	20mm Molded Gray Bromobutyl/Gray PTFE	52	3.0	20-CBT3	1000
	–	–	20mm Molded Black Bromobutyl/Gray PTFE, Bellows Type	52	3.0	20-CBT3B	1000
	–	–	20mm Red Silicone/Aluminum Face Seal 3mm Thick, for >170°C.	45	3.0	20-ASH3	100
	–	–	20mm White Silicone/Aluminum Face Seal 3mm Thick, for <170°C.	45	3.0	20-AS3	100
	–	–	20mm Silicone/PTFE for liquid – liquid extraction	–	0.25	20-LLX	100
	–	–	20mm Blue Silicone/Natural PTFE	45	3.0	20-ST3	500
	–	–	20mm Red Silicone/Natural PTFE, high temperature	45	3.1	20-ST3HT	100
–	–	20mm Blue Silicone/Red PTFE Seal 1.5mm Thick	20	1.5	20-ST15	500	
–	–	20mm Blue Silicone/PTFE	30	1.0	20-ST101	500	



Chromacol Headspace Caps and Septa (Continued)

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
Septum for 18mm Screw Caps	–	–	18mm Blue Silicone/PTFE	30	1.0	18-ST101	125
20mm Composite Magnetic Crimp Cap, 8mm hole	Blue	Alu/Tinplate	20mm Blue Silicone/Natural PTFE	45	3.0	20-MCBC-ST3	500
	Red	Alu/Tinplate	20mm Molded Gray Chlorobutyl	52	3.0	20-MCBC(R)-CBT3	500
	Red	Alu/Tinplate	20mm Blue Silicone/Natural PTFE	45	3.0	20-MCBC(R)-ST3	500
20mm Magnetic Tinplate Crimp Cap	Silver	Tinplate	20mm Blue Silicone/Natural PTFE	45	3.0	20-MCB-ST3	500
20mm Crimp Cap, 9mm hole	Silver	Aluminum	20mm Molded Gray/Bromobutyl/Gray PTFE	52	3.0	20-AC-CBT3	500
	Silver	Aluminum	20mm Blue Silicone/Natural PTFE	45	3.0	20-AC-ST3	500
18mm Magnetic Screw Cap, 8mm hole	Silver	Steel	18mm Molded Blue Chlorobutyl/Gray PTFE	52	3.0	18-MSC-CBT3	125
	Silver	Steel	18mm Blue Silicone/PTFE, not prefitted	30	1.0	18-MSC-ST101	125
	Silver	Steel	18mm Blue Silicone/Natural PTFE	45	2.0	18-MSC-ST201	125
20mm Plug	Natural	Polyethylene	PE Membrane	–	–	20-PEPC5	250
20mm Composite Magnetic Crimp Cap, 8mm hole	Natural	Alu/Tinplate	20mm Red Silicone/Natural PTFE, high temperature (250°C)	45	3.1	20-MCBC(N)-ST3HT	500
20mm Magnetic Tinplate Crimp Cap	Silver	Tinplate	20mm Red Silicone/Natural PTFE, high temperature (300°C)	45	3.1	20-MCB-ST3HT	500
18mm Magnetic Screw Cap, 8mm hole	Silver	Steel	18mm Red Silicone/Natural PTFE, high temperature (250°C)	45	3.1	18-MSC-ST3HT	125

Chromacol Headspace Vial Convenience Kits

- Include matched quantities of vials and seals with pre-assembled septa for added convenience during sample preparation
- Convenience kits save time during sample preparation



Items not shown to scale

Chromacol Headspace Vial Convenience Kits

Kit Type	Glass	Patched	Cap Color	Septum	Vial Cat. No.	Cap Cat. No.	Cat. No.	Pack of
Convenience Kit, 20mL Headspace Screw Vial, Round Bottom, Steel Screw Cap, 8mm hole	Clear	No	Silver	18mm Blue Silicone/ Natural PTFE	20-HSV	18-MSC- ST201	20-HSVST201-CP	125
Convenience Kit, 20mL Headspace Crimp Vial, Beveled Edge, Round Bottom, Al Crimp Cap, 8mm hole	Clear	No	Silver	20mm Molded Blue Chlorobutyl/Gray PTFE	20-CV	20-AC-CBT3	20-CVCBT3-CP	125
Convenience Kit, 20mL Headspace Crimp Vial, Beveled Edge, Round Bottom, Al Crimp Cap, 8mm hole	Clear	No	Silver	20mm Blue Silicone/ Natural PTFE	20-CV	20-AC-ST3	20-CVST3-CP	125



Chromacol Sample Storage Screw Thread Vials

- Capacity range up to 40mL
- Superior quality 1st hydrolytic class glass (Type 1) in clear and amber
- Provide consistent pH for duration of sample storage life
- PTFE-Lined Solid-top storage caps



Caps and Septa images 50% to scale

Chromacol Sample Storage Screw Thread Vials

Description	Glass	Patched	Dimension (mm)	Profile	Total Volume (mL)	Capacity (DRAMS)	Cat. No.	Pack of
24-400 Screw Vial	Clear	No	28x95	Flat Bottom	40	8	40-SV	100
	Amber	No	28x95	Flat Bottom	40	8	40-SV(A)	100
20-400 Screw Vial	Clear	No	23x85	Flat Bottom	22	6	22-SV	200
18-400 Screw Vial	Clear	No	21x70	Flat Bottom	16	4	16-SV	200
	Amber	No	21x70	Flat Bottom	16	4	16-SV(A)	200
15-425 Screw Vial	Clear	No	19x65	Flat Bottom	12	3	12-SV	200
	Amber	No	19x65	Flat Bottom	12	3	12-SV(A)	200
15-425 Screw Vial	Clear	No	17x60	Flat Bottom	8	2	8-SV	200
	Amber	No	17x60	Flat Bottom	8	2	8-SV(A)	200

For smaller vials look at the previous sections



Caps and Septa images 50% to scale

Chromacol Sample Storage Screw Thread Caps and Septa

Description	Cap Color	Cap Material	Septum	Hardness °shore	Thickness (mm)	Cat. No.	Pack of
24-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	–	1.0	24-SCST	100
20-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	–	1.0	20-SCST	100
18-400 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	–	1.0	18-SCST	100
15-425 Screw Cap	White	Polypropylene	PTFE/PE Foam Liner	–	1.0	15-SCST	100
13-425 Screw Cap	White	Urea	PTFE/PE Foam Liner	–	1.0	13-SCST	100

Chromacol Vial Racks and Storage Boxes

- For a safe working position on the lab bench and during transport
- Ideal for space-saving storage in fridges
- Temperature resistant from -90°C to 121°C (except Foam)
- Chemically resistant and fairly robust; autoclavable (except Foam)



Items not shown to scale

Chromacol Vial Racks and Storage Boxes

Description	Color	Material	Dimension (mm)	No of Vials	OD of Vials (mm)	Stackable	Cat. No.	Pack of
Autoclavable freezer and storage box with lid, alphanumeric grid, -90°C to 121°C	5 assorted colors (red, yellow, blue, green, natural)	Polypropylene	155x140x5.5	100	12	Yes	B-100	5
Vial Tray	White	Polypropylene	195x103	10	22	No	T-10/20	1
Sci-Rack	Blue	Anodised Aluminum	85x85	25	12	No	T-25	1
	Silver	Anodised Aluminum	210x134	28	22	No	T-28	5
Vial Tray	Silver	Anodised Aluminum	210x134	55	15	Yes	T-55	5
	Red	Anodised Aluminum	210x134	104	12	Yes	T-104	5
Vial Tray	Black	Foam	210x134	105	12	No	T-105	5
	Black	Foam	210x134	200	8	No	T-200	5
SBS/ANSI standard footprint Vial Rack	Silver	Anodised Aluminum	127,8x85,5	54	12	No	60180-1232	1
	Silver	Anodised Aluminum	127,8x85,5	96	6	No	60180-0632	1

Chromacol EPA , TOC and Scintillation Screw Vials

Level 300 cleaned and certified

- Processed and packaged under a registered ISO Quality Management System
- Laboratory certified to meet U.S. EPA Super Fund Standards in accordance with the latest edition of EPA's "Specifications and Guidance for Contaminant Free Sample Containers"
- Every case of Level 300 product contains a Certificate of Analysis and is custody sealed to ensure reliable chain-of-custody

Level 200 cleaned

- Processed and packaged under a strict registered ISO Quality Management System in the same manner as Level 300 products
- Level 200 products are not certified
- Every case of product is labeled with its production number and is custody sealed to ensure reliable chain-of-custody

Level 100

- Level 100 products are not certified or pre-cleaned
- Every case of product is labeled with its production number and is custody sealed to ensure reliable chain-of-custody

TOC vials

- The only low-level certified vials in the market for Total Organic Carbon testing and sampling
- Major TOC instrument manufacturers recommend these vials when analysis of low levels of TOC requires low background level assurance
- Each lot of vials is tested and certified to contribute less than 10ppb TOC as background or for less stringent applications the 20ppb TOC version

- Certificate of Analysis is included with lot production numbers

Scintillation vials

- Provide the very lowest background count and benefit from very high optical clarity.
- Typical background count of 13CPM or lower, compared to an average 16-65CPM from competitive products
- Noise level of 2.28 and a quenching index factor of 349

Chromacol EPA Screw Vial Kits

Kit Type	Glass	Dimension (mm)	Total Volume (mL)	Level	Septum	Cat. No.	Pack of
EPA Screw Vial Assembled Kit Vials/Septa/Caps	Clear	28x95	40	Level 100	0.01" White PTFE/ 0.09" Clear Silicone	40-EPAVCS	100
	Clear	28x95	40	Level 200 Pre-cleaned		40-EPAVCS-PC	72
	Clear	28x95	40	Level 300 Pre-cleaned	40-EPAVCS-PC3	72	
	Amber	28x95	40	Level 100	40-EPAVCS(A)	100	
	Amber	28x95	40	Level 200 Pre-cleaned	40-EPAVCS(A)-PC	72	
	Clear	28x57	20	Level 100	20-EPAVCS	100	
	Amber	28x57	20	Level 100	20-EPAVCS(A)	100	
	Clear	28x140	60	Level 100	60-EPAVCS	72	

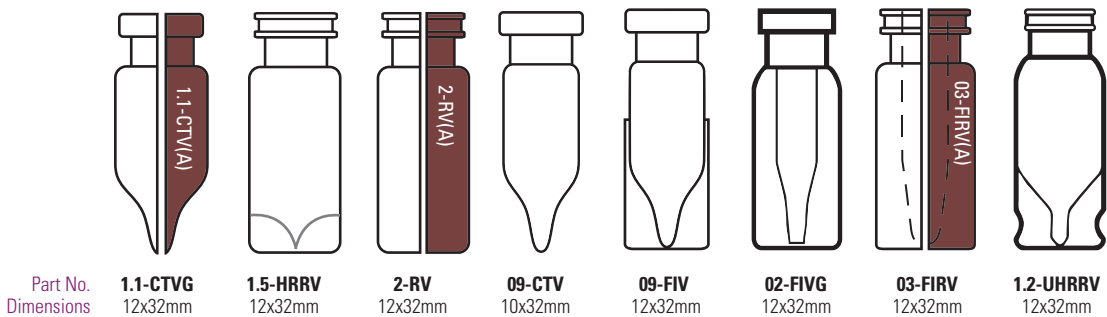
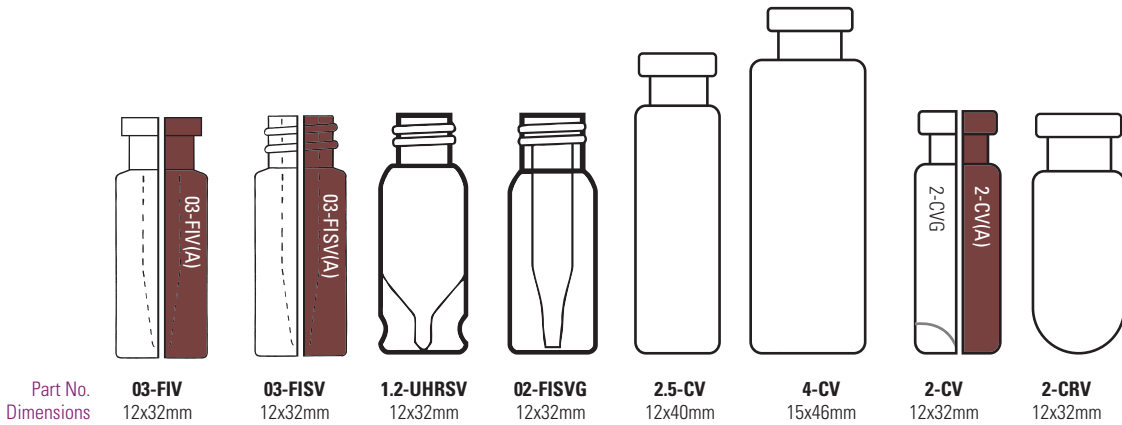
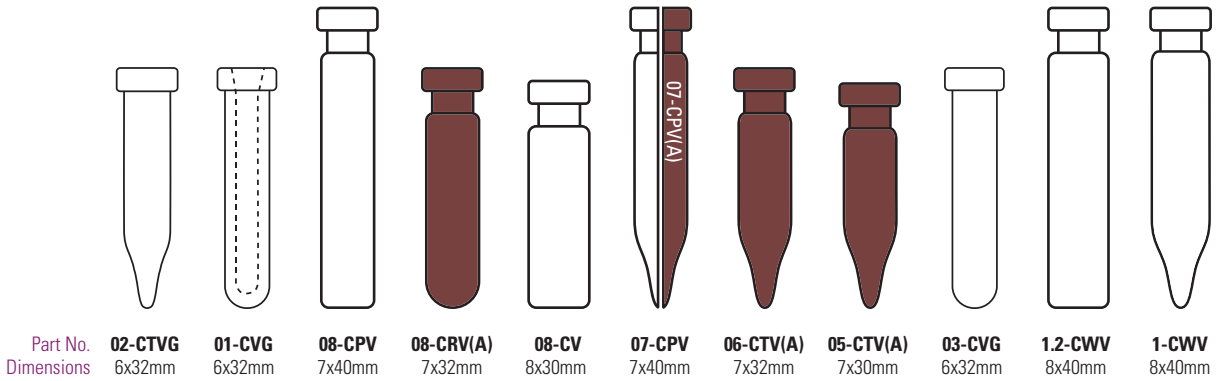
Chromacol TOC Vial Kits (Assembled)

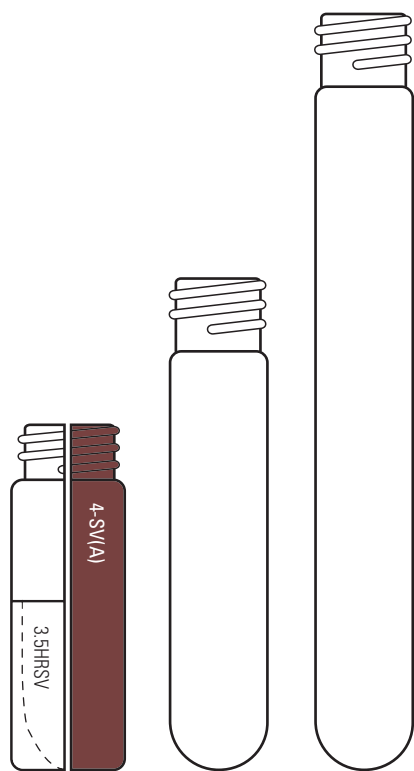
Description	Glass	Dimension (mm)	Total Volume (mL)	Cap Color	Cap Material	Septum	Cat. No.	Pack of
TOC clear vial with bonded cap cover, open top cap TOC 10ppb	Clear	28x96	40	White	Polypropylene	Beige PTFE/ White Silicone	40-TOCSV-10	72
TOC clear vial with cap bonded cover, open top cap TOC 20ppb	Clear	28x96	40	White	Polypropylene	Beige PTFE/ White Silicone	40-TOCSV-20	72

Chromacol Scintillation Vial Kit

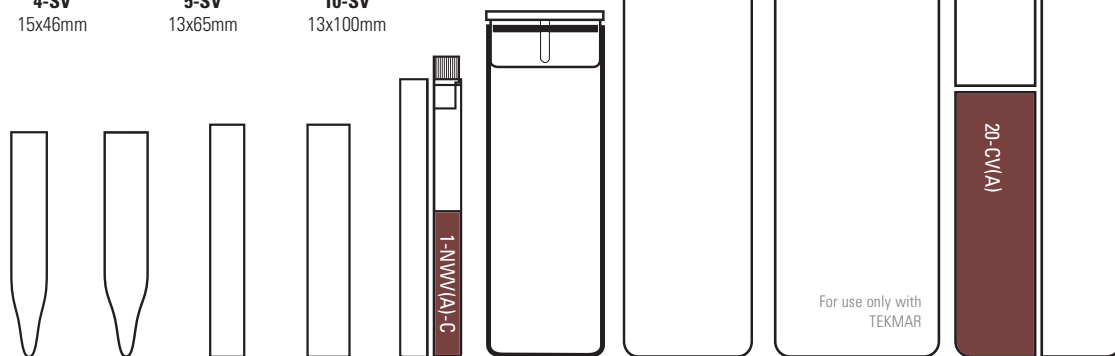
Description	Glass	Dimension (mm)	Total Volume (mL)	Noise	Background Count	Quenching Index Factor	Cat. No.	Pack of
20mL vial with foil lined caps	Clear	27x57	20	2.28	13 CPM	349	20-EPSVCA	500

Chromacol Vial Comparison Chart





Part No. Dimensions
4-SV 15x46mm
5-SV 13x65mm
10-SV 13x100mm



Part No. Dimensions
02-MTV 5x30mm
02-MTVWG 6x30mm
02-NV 5x31mm
03-NV 6x31mm
1-NWV 8x40mm
4-NWV-C 15x46mm
12-CV 18x65mm
22-CV 22x75mm
20-CV/20-HSV 22x75mm



Part No. Dimensions
9-CV 18x50mm
6-CV 22x38mm
20-EPSVCA 27x57mm
27-CV 30x60mm
10-CV/10-HSV 22x45mm

Chromacol Caps and Septa Comparison Chart

Part No. Dimensions	 *8-AC6 8x5mm	 8-AC7 8x5mm	 8-ACB 8x5mm	 8-AC-CBT1 8x5mm	 8-AC-ST15 8x5mm	 8-AC-ST101 8x5mm	 8-AC-ST101X 8x5mm	 8-AC(B)-ST144 8x5mm	
Part No. Dimensions	 8-ACT 8x5mm	 8-AC-TST1 8x5mm	 8-PEC1 8x5mm	 8-PEC1X 8x5mm	 *8-SC 8x9mm	 *8-SCJ 8x9mm	 8-SC-8RT1 8x9mm	 8-SC-ST15 8x9mm	
Part No. Dimensions	 8-ST14 8x1.4mm	 8-ST14X 8x1.4mm	 8-ST143 8x1.5mm	 8-ST144 8x1.4mm	 8-6RT1 8x1mm	 8-ST101 8x1mm	 8-T02 8x0.25mm	 8-TST1 8x1mm	 8-ST15 8x1.5mm
Part No. Dimensions	 9-MS(BG)-ST1 9x6.5mm	 *9-SCK(B)-8RT1 9x6.5mm	 9-SCK(B)-ST101 9x6.5mm	 *9-SCK(B)-ST1 9x6.5mm	 9-SCK(B)-TST1 9x6.5mm	 9-SCSK-8RT1 9x6.5mm	 9-SCJ(W)-ST101 12.9x7.9mm	 *11-AC6 11x6mm	
Part No. Dimensions	 *11-AC7 11x6mm	 11-ACB 11x6mm	 11-AC-CBT1 11x6mm	 11-AC-ST101 11x6mm	 11-AC-ST101X 11x6mm	 11-AC(B)-ST144 11x6mm	 11-AC-ST15 11x6mm	 11-ACT 11x6mm	
Part No. Dimensions	 11-AC-TST1 11x6mm	 11-LLX 11x3mm	 11-PEC1 11x6mm	 11-PEC1X 11x6mm	 11-PEC-ST1 11x7mm	 11-MC-ST15	 11-MC-8RT1	 11-MC-ST101	



* Cap available in alternative colors. See below for more details

Alternative Colors

8-AC6

-  8-AC6(R)
-  8-AC6(B)




8-SC

-  8-SC(R)
-  8-SC(W)






8-SCJ

-  8-SCJ(W)

9-SCK(B)-8RT1

-  9-SCK(G)-8RT1
-  9-SCK(N)-8RT1
-  9-SCK(B)-8RT1X

9-SCK(B)-ST1











































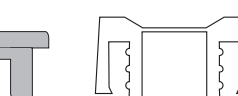
-  9-SCK(G)-ST1
-  9-SCK(N)-ST1
-  9-SCK(B)-ST1X
-  9-SC(BLK)-BST1
-  9-SC(GY)-BST1X

11-AC6

-  11-AC6(R)

11-AC7

-  11-AC7(R)
-  11-AC7(GO)
-  11-AC7(G)
-  11-AC7(B)

Part No. Dimensions	 11-PSN(B) 11x6.5mm	 11-PSN(B)-ST101 11x6.5mm	 *11-PSN(B)-T02 11x6.5mm	 11-PSN(B)-TST1 11x6.5mm	 11-PSN(B)-8RT1 11x6.5mm	 *11-PSN(B)-ST1X 11x6.5mm	 11-PSN(B)-ST1 11x6.5mm
Part No. Dimensions	 *12-SC 12x10mm	 12-SCS 12x10mm	 12-SC-ST2 12x10mm	 12-SC-8RT1 12x10mm	 13-SC-ST15 12x10mm	 13-SCST 12x10mm	
Part No. Dimensions	 12-ST2 12x2mm	 12-ST18 12x1.8mm	 12-6RT1 12x1mm	 12-ST101 12x1mm	 12-T02 12x0.25mm	 8-NPWP 8x9mm	 12-NPEP4 12x7mm
Part No. Dimensions	 18-MSC 18x13mm	 18-MSC-CBT3 18x13mm	 18-MSC-ST201 18x13mm	 20-ACB 20x7mm	 20-MCB 20x7mm	 *20-MCBC 20x7mm	
Part No. Dimensions	 20-MCBC(R)-CBT3	 *20-MCBC-ST3 20x7mm	 20-AC-CBT3 20x7mm	 20-AC-ST3 20x7mm	 20-CB3 20x3mm	 20-CBT3 20x3mm	
Part No. Dimensions	 20-CBT3B 20x3mm	 20-ASH3 20x1.5mm	 20-LLX 20x3mm	 20-ST3 20x3mm	 20-ST3HT 20x3.1mm	 20-ST15 20x1.5mm	
Part No. Dimensions	 20-ST101 20x1mm	 18-ST101 18x1mm	 20-B3P 20x9mm	 20-2FB3 20x13.4mm	 20-PEPC5 20x10mm		

* Cap available in alternative colors. See below for more details

Alternative Colors

11-PSN(B)-T02

■ 11-PSN(R)-T02

11-PSN(B)-ST1X

■ 11-PSN(G)-ST1X

12-SC

■ 12-SC(R)

□ 12-SC(W)

■ 12-SC(Y)

20-MCBC

■ 20-MCBC(R)

20-MCBC-ST3

■ 20-MCBC(R)-ST3

□ 20-MCBC(N)-ST3

Crimping and Decrimping Tools

Electronic crimpers and decrimpers provide an adjustable crimp with reproducible results.

We offer electronic crimpers for crimping or removal of aluminum seals on 8, 11, 13 and 20mm vials. The crimper is a hand held device, which allows aluminum seals to be firmly attached to the vial while it remains in most sample trays with the touch of a button. A separate decrimper allows the removal of the seal just as easily. The instruments have an adjustment for septa of varying thicknesses. Power is supplied by rechargeable Lithium Ion Cells. The 7.5 volt DC power supply comes with a set of plug adaptors to fit power outlets for most countries.

Electronic Crimpers and Decrimpers

- One hand, secure, reproducible crimps of 8, 11, 13 and 20mm vials with the push of a button
- Reduces hand strain compared to manual crimper operation
- Quick and easy removal of aluminum seals with the push of a button
- Ergonomic design eliminates wrist strain
- Vials can be crimped while they remain in most standard removable sample trays
- Adjustable crimp settings for compatibility with most vial/septum/seal combinations
- Fully rechargeable Lithium Ion Battery
- Provided with universal power supply/recharger and international plug adaptors

Electronic Hand-Held Crimpers and Decrimpers

Description	Cat. No.	Pack of
Electronic Hand-held Crimper for 8mm Crimp Caps, Generation 3	ECR-8C	1
Electronic Hand-held Crimper for 11mm Crimp Caps, Generation 3	ECR-11C	1
Electronic Hand-held Crimper for 13mm Crimp Caps, Generation 3	ECR-13C	1
Electronic Hand-held Crimper for 20mm Crimp Caps, Generation 3	ECR-20C	1
Electronic Hand-held Decrimper for 11mm Crimp Caps, Generation 3	EDCB-11C	1
Electronic Hand-held Decrimper for 13mm Crimp Caps, Generation 3	EDCB-13C	1
Electronic Hand-held Decrimper for 20mm Crimp Caps, Generation 3	EDCB-20C	1
Replacement Battery, 6.4V Lithium Ion, For Generation 3 Electronic Crimpers and Decrimper	ECR-CBATT	1
Table/Wall Holder for Electronic Hand-held Crimper	ECR-HOLDER	1



Programmable Electronic High Power Crimp Station

Fully programmable with quick exchange crimp and decrimp heads

We now offer a new fully programmable electronic Thermo Scientific High Power Crimper (HPC) station with adjustable accessory base, external power supply and exchangeable jaw sets for crimping or decrimping of aluminum and stainless steel seals on 8, 11, 13 and 20mm diameter vials. The crimper is a bench top tool, including a versatile height adjustable stand which frees both hands for faster crimping operations. The crimper can be used on the stand or as a hand-held device. For each set of crimping or decrimping jaws up to 10 individual programs can be easily saved, in order to automatically preset the correct head-adjustment for different cap/septum/vial combinations. Special jaws are available for 13mm and 20mm flip-off seals. The crimping force is higher than on battery powered units and is not limited by battery life or charge state. Power is supplied by the included 12 volt power supply (110 – 240V) for unlimited, consistent operation, superior compared to every similar hand held device.



Product features and benefits

- Adjustable crimp settings for compatibility with most vial/septum/seal combinations including aluminum, steel and bi-metal seals
- Crimp-force sensing automatically determines when a proper seal has been formed and opens the jaws to release the vial
- Higher power, perfect for steel caps
- Exchangeable crimp and decrimp heads can be removed or installed in seconds
- For each head, a set of up to 10 adjustment programs are available and can be saved
- Fully electric operation eliminates the need for pressurized air supplies at the operation location

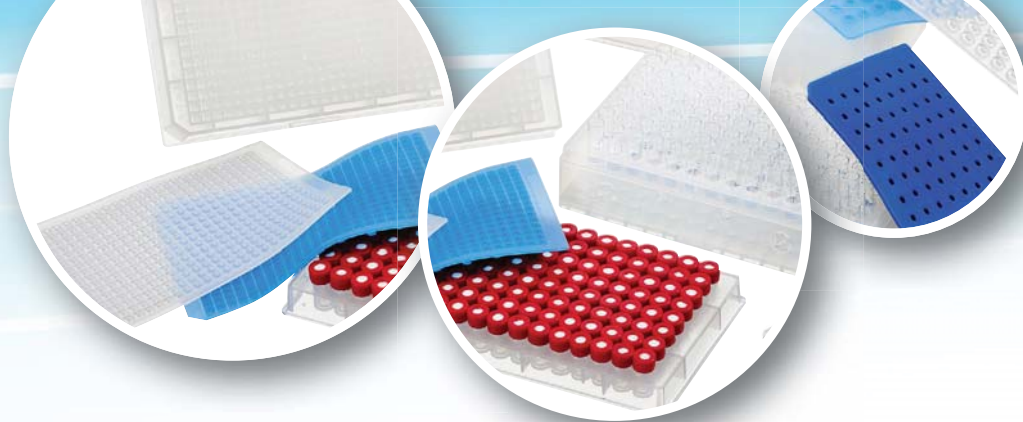
Programmable Electronic High Power Crimp Station

Description	Cat. No.	Pack of
Programmable Electronic High Power Crimper* <i>Includes the basic high power crimper and the 12 volt DC supply with the power cord. (Accessory Base is not included)</i>	ECRH-B	1
Programmable Electronic High Power Crimper 11mm Kit* <i>Includes the basic high power crimper, the 12 volt DC supply with the power cord and a set of crimp heads: 1x11mm crimp head and 1x11mm decrimp head. (Accessory Base is not included)</i>	ECRH-11KIT	1
Programmable Electronic High Power Crimper 20mm Kit* <i>Includes the basic high power crimper, the 12 volt DC supply with the power cord and a set of crimp heads: 1x20mm crimp head and 1x20mm decrimp head. (Accessory Base is not included)</i>	ECRH-20KIT	1

Replacement and Optional Parts

Description	Cat. No.	Pack of
Accessory Base for Electronic Crimpers (base plate and bar) <i>Adjustable in height, base plate is solvent resistant Dimensions: 37.6 × 25.4 × 17.7cm</i>	ECRH-STAND	1
8mm Crimper Jaw Set	ECMJ-8	1
11mm Crimper Jaw Set	ECMJ-11	1
11mm Decrimper Jaw Set	ECDJ-11	1
13mm Crimper Jaw Set	ECMJ-13	1
13mm Decrimper Jaw Set	ECDJ-13	1
13mm Flip-Off Crimper Jaw Set (for circular rim flip caps)	ECMJ-13FO	1
20mm Crimper Jaw Set	ECMJ-20	1
20mm Decrimper Jaw Set	ECDJ-20	1
20mm Flip-Off Crimper Jaw Set (for circular rim flip caps)	ECMJ-20FO	1

* Crimping jaws for other seals available on request.



Well Plates for Chromatography

A comprehensive range of PP well plates

Our plate portfolio contains well plates which meets the requirements of today's chromatographer using autosampler for plates. Compatible with a broad range of instruments, our well plate range offers solutions from simple routine analyses to specific and challenging sample handling problems.

- **Handle More Samples in Less Time**

Low volume and high recovery cavity

- **Solutions for all Applications**

Chromatography tested for solvent compatibility and inertness

- **Autosampler Compatible**

Using ANSI/SBS standards



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Visit www.thermoscientific.com/webseal

WebSeal Well Plates, Plastic, Non-Coated, Non-Sterile, Chromatography Tested

- Thermo Scientific™ WebSeal™ well plates are manufactured from a GC tested polypropylene material
- Microplates are chemically and thermally resistant and will tolerate temperatures from -80°C to $+121^{\circ}\text{C}$
- SBS and ANSI standard footprint design for broad instrument compatibility
- Microplates are ideal for pharmaceutical applications, sample collection and storage, combinatorial chemistry and HTS applications
- U- and V- bottom wells for optimal sample recovery
- Low binding PP for homogenous assays and storage



WebSeal Well Plates, Plastic, Non-Coated, Non-Sterile, Chromatography Tested

Description	Material	Total Height	Well Format	Total Volume (μL)	Working volume range $\mu\text{L}/\text{well}$	Cat. No.	Pack of
96-Well Microplate, round well	PP	14.4	V-Shape, 8mm dia	450	10-400	60180-P100	20
	PP	14.4	V-Shape, 8mm dia	450	10-400	60180-P130	120
	PP	14.5	U-Shape, 8mm dia	500	20-450	60180-P102	10
	PP	14.5	U-Shape, 8mm dia	500	20-450	60180-P132	120
96 Well Plates, round well	PP	31.6	U-Shape, 8mm dia	1300	50-1000	60180-P103	5
	PP	31.6	U-Shape, 8mm dia	1300	50-1000	60180-P133	50
	PP	44.0	U-Shape, 8mm dia	2000	50-1900	60180-P104	5
	PP	44.0	U-Shape, 8mm dia	2000	50-1900	60180-P134	60
96-Well Square Well Microplate (-196°C to +121°C)	PP	44.0	V-Shape, square	2000	50-1900	60180-P105	5
	PP	44.0	V-Shape, square	2000	50-1900	60180-P135	50
384-Shallow Well Standard Height Microplate	PP	14.4	U-Shape, square	58	2-35	60180-P106	25
	PP	14.4	U-Shape, square	58	2-35	60180-P136	100
384-Well Microplate	PP	22.0	U-Shape, square	252	5-240	60180-P107	5
	PP	22.0	U-Shape, square	252	5-240	60180-P137	60
	PP	14.4	U-Shape, square	120	10-100	60180-P108	20
	PP	14.4	U-Shape, square	120	10-100	60180-P138	120
	PP	14.4	V-Shape, square	145	4-120	60180-P109	10
	PP	14.4	V-Shape, square	145	4-120	60180-P139	80

Mats and sealing tapes for these well plates can be found on the next two pages

WebSeal Mats and Sealing Tapes, Non-Sterile

- Mats manufactured of EVA (Ethylene-vinyl acetate) or pure silicone with or without PTFE coating
- The footprint permits plates to be securely stacked without robotic arm interference
- Eliminates cross contamination of samples
- Dry heat autoclavable (only Silicone mats) with excellent chemical compatibility, withstand low temperature to -80°C
- Resists coring and tearing
- Superior resealability after multiple injections
- Available pre-slit for easy penetration and reduced vacuum formation

Sealing tapes minimize evaporation and protect samples from contamination and spilling.

- Adhesive seals effectively seal all microplate formats
- Wide range of adhesive seals for every assay
- Thin, lightweight tapes seal onto the plate with a convenient, handheld applicator (available separately, Cat. No. 60180-M950)



WebSeal Mats and Sealing Tapes, Non-Sterile

Description	Color	Material	Well Design	Pre-slit	Cat. No.	Pack of
WebSeal Mats (Solvent Resistant)	Clear	Silicone	96 Round Well, 8mm Diameter	Yes	60180-M100	10
WebSeal Mats (Alcohol Resistant)	Clear	EVA	96 Round Well, 8mm Diameter	No	60180-M101	5
	Clear	EVA	96 Round Well, 8mm Diameter	No	60180-M171	50
WebSeal CLR Silicone Mat	Clear	Silicone	96 Round Well – Flat Base, 8mm Diameter, Large Penetration Area	No	60180-M134	5
	Clear	Silicone	96 Round Well – Flat Base, 8mm Diameter, Large Penetration Area	Yes	60180-M183	5
WebSeal Mats (Solvent Resistant)	Blue	Silicone/PTFE	96 Round Well – Flat Base, 8mm Diameter, Large Penetration Area	No	60180-M102	5
	Blue	Silicone/PTFE	96 Round Well – Flat Base, 8mm Diameter, Large Penetration Area	Yes	60180-M103	5
WebSeal CLR Silicone Mat	Clear	Silicone	96 Square Well – Flat Base, 8mm Diameter, Large Penetration Area	No	60180-M121	5
	Clear	Silicone	96 Square Well – Flat Base, 8mm Diameter, Large Penetration Area	Yes	60180-M123	5
WebSeal CLR Silicone Mat	Clear	Silicone	384 Square Well	No	60180-M126	5
	Clear	Silicone	384 Square Well	Yes	60180-M150	5
Sealing Tape, -40°C - 90°C	Clear	PE/Silicone	N/A	No	60180-M142	100
Sealing Tape, -70°C - 100°C	Clear	PES/Silicone	N/A	No	60180-M143	100
Sealing Tape, -80°C - 120°C	Silver	Aluminum/Silicone	N/A	No	60180-M144	100
Sealing Tape with SRA (Synthetic Rubber Adhesive)	Clear	Polyolefin/Rubber	N/A	No	60180-M145	100

Well plates for these mats and sealing tapes can be found on the previous page

WebSeal Mats and Sealing Tapes, Non-Sterile (Continued)

Description	Color	Material	Well Design	Pre-slit	Cat. No.	Quantity
Re-sealing Tape with 3 Layer No Adhesive at Cavity Area	Clear	PET/Silicone/PET	N/A	Yes	60180-M146	100 Pack
	Clear	PET/Silicone/PET	N/A	Yes	60180-M176	25 Pack
WebSeal Mats (Alcohol Resistant)	Clear	EVA	96 Square Well - Flat Base	No	60180-M177	5 Pack
	Clear	EVA	96 Square Well - Flat Base	No	60180-M178	50 Pack
Hand held Sealing Tape Applicator	Gold	N/A	N/A	N/A	60180-M950	2 Pack
Hand Held Mat Applicator	Black	N/A	N/A	N/A	60180-M999	1 Each
WebSeal Cutter for Vial Removal	Silver	N/A	N/A	N/A	60180-M975	1 Each

Well plates for these mats and sealing tapes can be found 2 pages prior to this

WebSeal Well Plates, Plastic, Non-Coated, Non-Sterile, Certified

- Polypropylene microplates are manufactured from ultra low bleed high purity basis resin
- Plates are fully LOT tested by GC-MS for organic extractables
- Microplates are chemically and thermally resistant and will tolerate temperatures from -80°C to +121°C
- SBS and ANSI standard footprint design for broad instrument compatibility
- Microplates are ideal for pharmaceutical applications, sample collection and storage, combinatorial chemistry and HTS applications
- U- and V- bottom wells for optimal sample recovery



WebSeal Well Plates, Plastic, Non-Coated, Non-Sterile, Certified

Description	Material	Total Height	Well Format	Total Volume (µL)	Working Volume range µL/well	Cat. No.	Pack of
96-Well Microplate, round well	PP	14.7	Flat bottom, 7mm dia	350	10-300	60180-P215	10
	PP	14.7	Flat bottom, 7mm dia	350	10-300	60180-P205	100
	PP	14.7	U-Shape, 7mm dia	270	10-250	60180-P216	10
	PP	14.7	U-Shape, 7mm dia	270	10-250	60180-P206	100
	PP	14.7	V-Shape, 7mm dia	220	10-190	60180-P217	10
	PP	14.7	V-Shape, 7mm dia	220	10-190	60180-P207	100
96 Well Plates, round well	PP	41.6	U-Shape, 7mm dia	1000	50-900	60180-P211	5
	PP	41.6	U-Shape, 7mm dia	1000	50-900	60180-P201	50
96-Well Square Well Plate	PP	44.4	V-Shape, 8mm dia	2000	50-1900	60180-P212	5
	PP	44.4	V-Shape, 8mm dia	2000	50-1900	60180-P202	50
384-Well Microplate	PP	14.4	U-Shape, square	58	2-35	60180-P213	10
	PP	14.4	U-Shape, square	58	2-35	60180-P203	60
	PP	30.2	V-Shape, square	300	5-240	60180-P214	6
	PP	30.2	V-Shape, square	300	5-240	60180-P204	48

Mats and sealing tapes for these well plates can be found on the next page

WebSeal Mats, Non-Sterile

- Manufactured of pure silicone with or without PTFE coating
- The footprint permits plates to be securely stacked without robotic arm interference
- Eliminates cross contamination of samples
- Dry heat autoclavable with excellent chemical compatibility, withstand low temperature to -80°C
- Resists coring and tearing
- Superior resealability after multiple injections
- Available pre-slit for easy penetration and reduced vacuum formation



WebSeal Mats, Non-Sterile

Description	Color	Material	Well Design	Pre-slit	Cat. No.	Pack of
WebSeal Mats (alcohol resistant)	Clear	EVA	96 Round Well, 7mm Diameter	No	60180-M179	100
WebSeal CLR Silicone Mat	Clear	Silicone	96 Round Well – Flat Base, 7mm Diameter, Large Penetration Area	No	60180-M105	5
	Clear	Silicone	96 Round Well – Flat Base, 7mm Diameter, Large Penetration Area	Yes	60180-M116	5
	Clear	Silicone	96 Round Well – 7mm, Step, Small Penetration Area	No	60180-M149	5
	Clear	Silicone	96 Round Well – 7mm, Step, Small Penetration Area	Yes	60180-M113	5
	Clear	Silicone	96 Square Well – Flat Base - 8mm, Large Penetration Area	No	60180-M121	5
	Clear	Silicone	96 Square well – Flat Base - 8mm, Large Penetration Area	Yes	60180-M123	5
	Clear	Silicone	384 Square Well	No	60180-M126	5
	Clear	Silicone	384 Square Well	Yes	60180-M150	5
WebSeal Mat	Blue	Silicone/PTFE	96 Round Well – Flat Base, Step, 7mm Diameter	No	60180-M111	5
	Blue	Silicone/PTFE	96 Round Well – Flat Base, Step, 7mm Diameter	Yes	60180-M112	5
	Blue	Silicone/PTFE	96 Square Well – Flat Base - 8mm, Large Penetration Area	No	60180-M120	5
	Blue	Silicone/PTFE	96 Square Well – Flat Base - 8mm, Large Penetration Area	Yes	60180-M122	5
	Blue	Silicone/PTFE	384 Square Well	No	60180-M125	5
	Blue	Silicone/PTFE	384 Square Well	Yes	60180-M131	5
WebSeal Mat for Plate+	Blue	Silicone/PTFE	96 Round well – Dome Base, 7.2mm Diameter	No	60180-M108	5
	Blue	Silicone/PTFE	96 Round well – Dome Base, 7.2mm Diameter	Yes	60180-M115	5

Well plates for these mats can be found on the previous page (except for Plate+ which are on the next page)

WebSeal Plate+ Glass Coated Microplates

- High quality polypropylene microplates coated with 200nm thick layer of silicone dioxide
- Plate+ provides microplates with a chemical resistance similar to glass while retaining the advantages of polypropylene
- Eliminates the need to use glass limited volume inserts
- Excellent for applications where plastic microplates are not applicable
- Plate+ is chemically and thermally resistant and will tolerate temperatures from -80°C to +80°C
- Lightweight, precision molded, cost-effective alternative to solid glass plates



WebSeal Plate+ Glass Coated Microplates

Description	Material	Total Height	Well Format	Total Volume	Working Volume	Cat. No.	Pack of
96 Well Microplate, round well	Glass coated PP	14.6	U-Shape, 7mm dia	300µL	250µL	60180-P300	10
	Glass coated PP	14.6	V-Shape, 7mm dia	220µL	190µL	60180-P302	10
	Glass coated PP	14.6	Flat Bottom, 7mm dia	370µL	300µL	60180-P304	10
96 Deep Well Plate, round well	Glass coated PP	41.5	U-Shape, 7mm dia	1.2mL	1.0mL	60180-P306	10
96-Well Square Well Plate	Glass coated PP	44	V-Shape, 8mm dia	2.4mL	2.0mL	60180-P308	10
384 Well Microplate	Glass coated PP	14.4	Square-Rounded, flat	120µL	90µL	60180-P310	10
	Glass coated PP	22	Square-Rounded, U-Shape	240µL	180µL	60180-P312	6

For sealing mats, please refer to the previous page.

WebSeal Glass Inserted Plate Kits with 96-Position Mats

- Convenient wellplate kits with pre-assembled glass or PTFE vials
- Replacement parts for kits available separately
- Unique cutting tool allows removal of individual samples with the seal in place, eliminating cross contamination
- Mats with solid plugs are used for sample storage



WebSeal Glass Inserted Plate Kits with 96-Position Mats

Kit Type	Vial Material	Total Volume (µL)	Vial Dimension (mm)	Profile	Mat material	Total Height (mm)	Vial Cat. No.	Mat Cat. No.	Kit Cat. No.	Pack of
96 Well Small Volume Microplate with Sealing Mat	Clear glass	500	6.5 x 31	taper	Silicone/PTFE	32	60180-V100	60180-M151	60180-K100	5
96 Well Small Volume Microplate with Sealing Mat and Cutting Tool	Clear glass	700	6.5 x 41.4	taper	Silicone/PTFE	44	60180-V101	60180-M151	60180-K101	5
96 Well Small Volume Microplate with Sealing Mat and Cutting Tool	PTFE	700	6.5 x 41.4	round	Silicone/PTFE	44	60180-V103	60180-M151	60180-K103	1
96 Well Microplate with Sealing Mat and Cutting Tool	Clear glass	1100	7.45 x 38.5	round	Silicone/PTFE	41.5	60180-V104	60180-M153	60180-K104	5
96 Well Microplate with Crimp Top Vials, pre-inserted	Clear glass	1100	7.45 x 45	round	N/A	47	60180-V105	N/A	60180-K105	5
96 Deep Well Plate with Sealing Mat	Clear glass	1500	7.25 x 60.5	round	Silicone/PTFE	64.5	60180-V106	60180-M153	60180-K106	5
96 Square Well Plate with Sealing Mat	Clear glass	1000	7.6 x 45	constricted	Silicone/PTFE	47.3	60180-V107	60180-M155	60180-K107	1
96 Square Well Plate with Sealing Mat - Precut	Clear glass	1000	7.6 x 45	constricted	Silicone/PTFE	47.3	60180-V107	60180-M156	60180-K108	1
96 Square Well Plate with Sealing Mat - solid plug	Clear glass	1000	7.6 x 45	constricted	Silicone/PTFE	47.3	60180-V107	60180-M157	60180-K109	1

WebSeal Kit Accessories

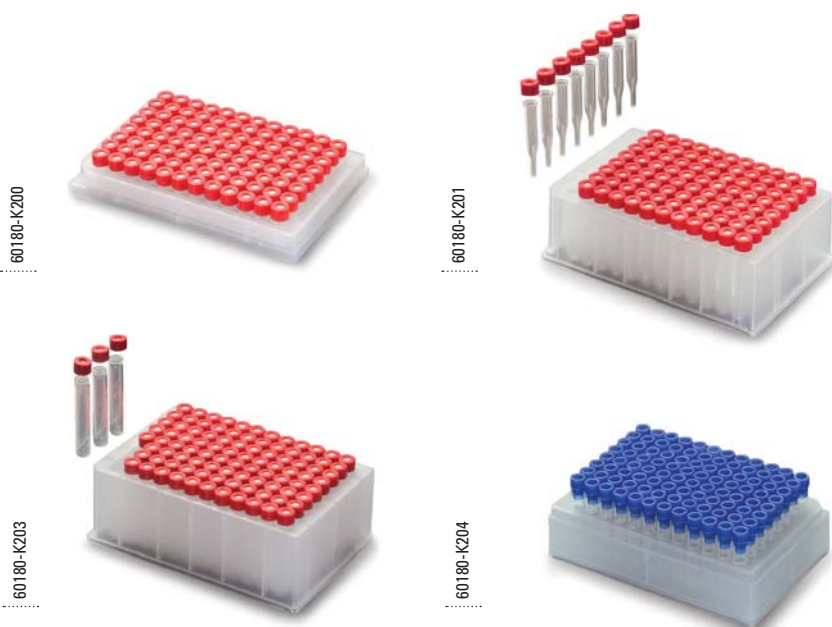


WebSeal Kit Accessories

Kit Type	Vial Material	Total Volume (µL)	Vial Dimension (mm)	Profile	Mat material	Total Height (mm)	Pre-slit	Cat. No.	Pack of
Micro Titer Plate Vial for 96 Wells	Clear glass	500	6.5x31	taper	N/A	N/A	N/A	60180-V100	500
	Clear glass	700	6.5x41.4	taper	N/A	N/A	N/A	60180-V101	500
	PTFE	700	6.5x41.4	round	N/A	N/A	N/A	60180-V103	100
	Clear glass	1100	7.45x38.5	round	N/A	N/A	N/A	60180-V104	500
Square/Deep Well Plate Crimp Top Vial for 96 Wells	Clear glass	1100	7.45x45	round	N/A	N/A	N/A	60180-V105	500
Deep Well Plate Vial for 96 Wells	Clear glass	1500	7.25x60.5	round	N/A	N/A	N/A	60180-V106	500
Square Well Plate Vial for 96 Wells	Clear glass	1000	7.6x45	constricted	N/A	N/A	N/A	60180-V107	960
96 Well WebSeal Mat (60180-K100, 101, 103)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	No	60180-M151	5
96 Well WebSeal Mat (60180-K100, 101, 103)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	Yes	60180-M152	5
96 Well WebSeal Mat (60180-K104, 106)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	No	60180-M153	5
96 Well WebSeal Mat (60180-K104, 106)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	Yes	60180-M154	5
96 Well WebSeal Mat, welled plugs (60180-K107)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	No	60180-M155	1
96 Well WebSeal Mat, welled plugs (60180-K108)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	Yes	60180-M156	1
96 Well WebSeal Mat, solid plugs for sample storage (60180-K109)	N/A	N/A	N/A	N/A	Silicone/PTFE	N/A	No	60180-M157	1
Plastic 96 Round Well Micro Titer Plate (60180-K100)	N/A	800	N/A	V-Shape, 7mm dia	N/A	31.5	N/A	60180-P400	5
PP 96 Round Well Micro Rack (60180-K101, K102)	N/A	N/A	N/A	U-Shape, 7mm dia	N/A	41.6	N/A	60180-P211	5
Plastic 96 Well Micro Titer Rack (60180-K104)	N/A	N/A	N/A	Rack	N/A	31.2	N/A	60180-P401	5
PP 96 Well Micro Titer Plate (60180-K105)	N/A	2200	N/A	U-Shape	N/A	42.5	N/A	60180-P402	5
PP 96 Well Square Well Plate (60180-K107/108/109)	N/A	2000	N/A	U-shape, square	N/A	44.0	N/A	60180-P403	1
PP 96 Well Square Well Plate (60180-K106)	PP	2000	N/A	V-shape, Square	N/A	44	N/A	60180-P212	5
WebSeal Cutter for Vial Removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	60180-M975	1

WebSeal Glass Inserted Plate Kits with Individual Closures

- 96 Position Block Systems with Glass Inserts are used when the pure PP Block is not inert enough
- Inserts manufactured from clear, Type 1 Class A or amber, Type 1 Class B borosilicate glass
- Inserts are sealed individually with a PE Cap Seal and can be easily removed and used externally without risk of losing sample
- The products can be obtained as individual components or as completely assembled, ready-to-use convenience blocks
- Assembled kits include 96 vials with pre-attached caps and septa
- Pre-assembled kits reduce the risk of vial contamination before use
- Snap Caps offer the same functionality as for screw or crimp caps: PTFE layered Silicone septa for excellent solvent stability
- Polyethylene caps are chemically inert and suitable for most chromatography applications



WebSeal Glass Inserted Plate Kits with Individual Closures

Kit Type	Vial Material	Total Volume (µL)	Vial Dimension (mm)	Profile	Septum	Vial Cat. No.	Cap Cat. No.	Kit Cat. No.	Pack of
96 Well Microplate	Clear glass	100	5.7x15.5	flat bottom	Silicone/PTFE, Pre-slit, 45°	60180-V108	60180-C100	60180-K200	1
96 Deep Well Plate	Clear glass	350	6x42.5	taper	Silicone/PTFE, Pre-slit, 45°	60180-V109	60180-C100	60180-K201	1
96 Square Well Plate	Clear glass	1000	7.6x45.9	round	Silicone/PTFE, 45°	60180-V110	60180-C102	60180-K202	1
	Clear glass	1000	7.6x45.9	round	Silicone/PTFE, Pre-slit, 45°	60180-V110	60180-C100	60180-K203	1
96 Micro-Tube-Rack-System	Clear glass	800	7.6x40	round	PE Plug	60180-V111	60180-C101	60180-K204	1

WebSeal Kit Accessories



WebSeal Kit Accessories

Kit Type	Vial Material	Total Volume (µL)	Vial Dimension (mm)	Profile	Septum	Total Height (mm)	Cat. No.	Pack of
Micro Titer Plate Vial for 96 Wells	Clear glass	100	5.7x15.5	flat bottom	N/A	N/A	60180-V108	960
Deep Well Plate Vial for 96 Wells	Clear glass	350	6x42.5	taper	N/A	N/A	60180-V109	960
Square Well Vial for 96 Wells	Clear glass	1000	7.6x45.9	round	N/A	N/A	60180-V110	960
MTRS Vial for 96 Wells	Clear glass	800	7.6x40	round	N/A	N/A	60180-V111	960
PE Cap, red, center hole, for 96 Well Plate Inserts	N/A	N/A	N/A	N/A	Silicone/PTFE, Pre-slit, 45°	N/A	60180-C100	96
8mm PE Plug, blue, for 60180-K204	N/A	N/A	N/A	N/A	PE Plug	N/A	60180-C101	96
MT-Plate, PP, 96 Positions	N/A	350	N/A	Flat Bottom, 7mm dia	N/A	14.3	60180-P404	10
DW-Block, PP, 96 Positions	N/A	1200	N/A	U-Shape	N/A	40.0	60180-P405	10
SQW-Block, PP, 96 Positions	N/A	2000	N/A	U-Shape	N/A	44.3	60180-P406	10
Micro-Tube-Rack-System, PP, 96 Positions	N/A	N/A	N/A	N/A	N/A		60180-P407	10

BioLC Columns and Accessories

The analysis of proteins, peptides, oligonucleotides and other biomolecules demands a range of sample separation modes, column chemistries, column configurations and detection techniques. The range of Thermo Scientific™ polymeric and silica columns in analytical and nano-scale formats are designed to handle these challenging separations.

Featured Products



MAbPac SEC-1

A size exclusion chromatography (SEC) column specifically designed for the high-resolution separation and characterization of monoclonal antibodies (mAbs) and their aggregates.

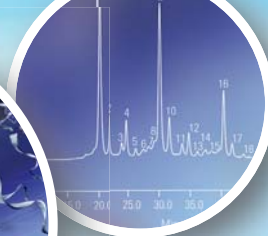
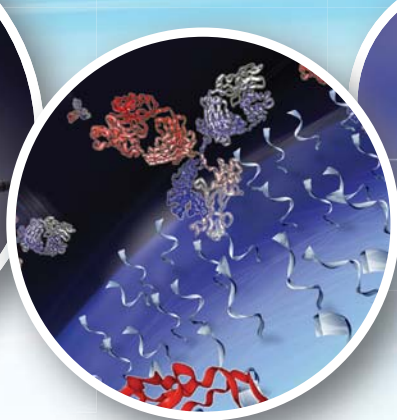
PAGE 3-007



MAbPac SCX

Strong cation exchange columns designed specifically for the high-resolution, high efficiency charged variant analysis of monoclonal antibodies and associated variants.

PAGE 3-008



Section Contents

BioLC Columns Line	3-004	ProPac HPLC Columns	3-018
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pH Gradient Buffers	3-010	Nano, Capillary and Micro LC Columns	3-038
GlycanPac HPLC and UHPLC Columns	3-016		



MABPac RP

Columns designed for high-resolution accurate mass analysis of monoclonal antibodies (mAbs), antibody drug conjugates (ADCs) and other proteins using reversed-phase HPLC and LC-MS for high-resolution separations.

PAGE 3-014



EASY-Spray

EASY-Spray columns offer outstanding peak capacity for comprehensive proteome characterization and temperature control for maximum reliability and performance.

PAGE 3-040

BioLC Columns

Technical Resources



visit www.thermoscientific.com/chromexpert to access the following information:

- BioLC Columns Selection Guide
- HPLC Phases for Biomolecules
- Columns for Protein Separations
- Columns for Monoclonal Antibody Separations
- Columns for Carbohydrate Separations
- Columns for Oligonucleotide Separations



Columns for Biomolecules

BioLC Column Lines



Monoclonal Antibodies

MABPac

MABPac Protein A

MABPac SEC-1

MABPac SCX-10

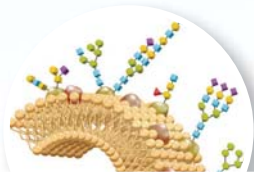
MABPac HIC

MABPac HIC-10

MABPac HIC-20

MABPac HIC-Butyl

MABPac RP



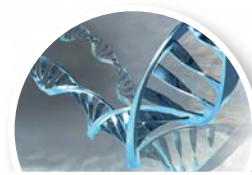
Glycans

GlycanPac

Accucore Amide-HILIC

GlycanPac AXH-1

GlycanPac AXR-1



Nucleic Acids

DNAPac

DNAPac PA100

DNAPac PA200

DNAPac RP

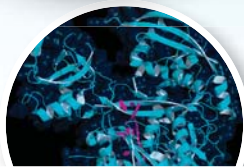
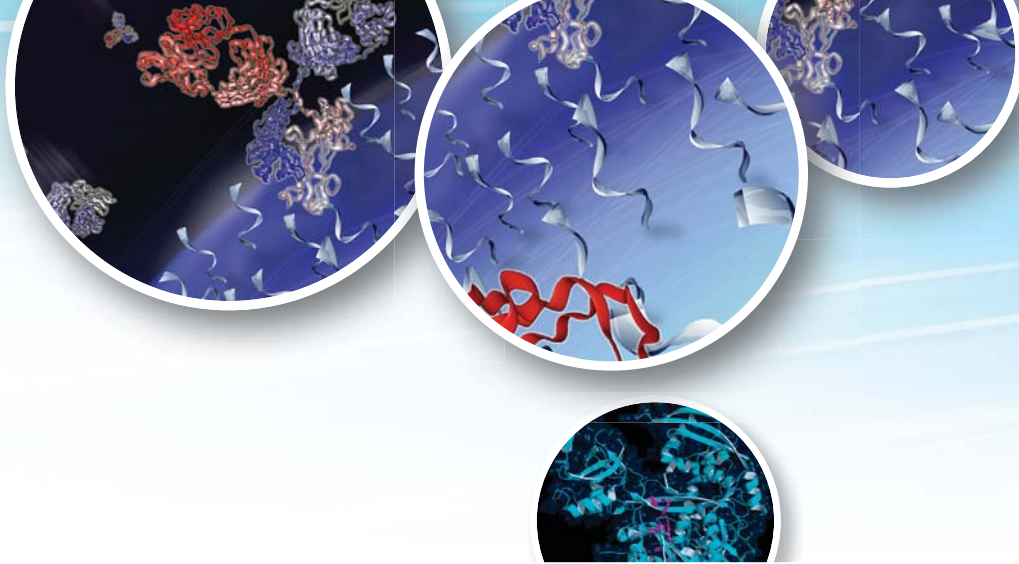
Associated products



pH Gradient Buffers



WebSeal Well Plates and Mats



Proteins / Peptides

ProPac

- ProPac Ion Exchange
- ProPac HIC Hydrophobic Interaction
- ProPac IMAC

**ProSwift/
PepSwift**

- ProSwift Ion Exchange
- ProSwift Rev Phase
- PepSwift Rev Phase
- ProSwift Con A

Others

- Accucore 150
- BioBasic
- Acclaim 300

Associated products



SOLAμ SPE Plates



SMART Digest Kit



Viper Fingertight Fittings

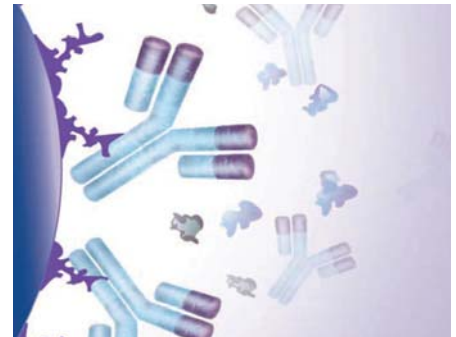
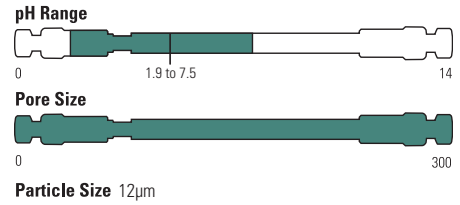
MABPac HPLC and UHPLC Columns

MABPac Protein A

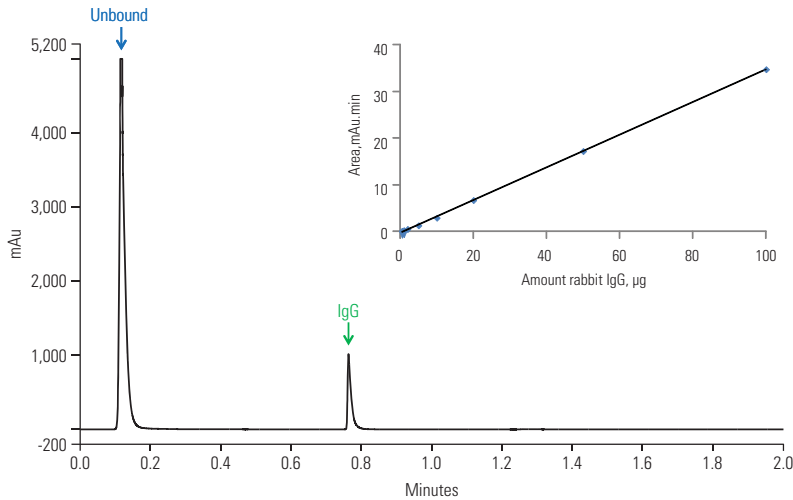
Fast mAb titer analysis

- High efficiency column
- Rugged, long column lifetime
- Excellent sample recovery
- Designed for ease of use and automation

Thermo Scientific™ MABPac™ Protein A is an affinity column designed to provide fast monoclonal antibody (mAb) titer analysis of samples such as harvest cell cultures (HCC). This HPLC column offers high throughput and accurate analysis through a combination of low back pressure and high efficiency. The MABPac Protein A column format allows rapid automation of loading, binding, elution and collection using Thermo Scientific biocompatible systems. The column is based on a novel non-porous polymeric resin consisting of a divinylbenzene core and a hydrophilic surface, optimized for affinity separation.



Harvest cell culture titer analysis



MABPac Protein A, 12µm, 35 x 4.0mm

Flow Rate:	2 mL/min
Mobile Phase A:	50mM Sodium Phosphate, 150mM NaCl, 5% acetonitrile, pH 7.5
Mobile Phase B:	50mM Sodium Phosphate, 150mM NaCl, 5% acetonitrile, pH 2.5
Gradient:	0% B for 0.2 mins, 100% B for 0.60 mins, 0% B for 1.20 mins
Temperature:	30°C
Injection Volume:	10µL
Detection:	280nm
Sample:	MAB B, 5mg/mL Harvest Cell Culture

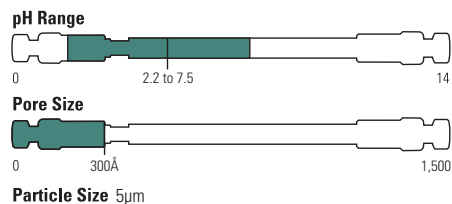
MABPac Protein A

Particle Size (µm)	Format	Length (mm)	4.0mm ID
12	HPLC Column	35	082539



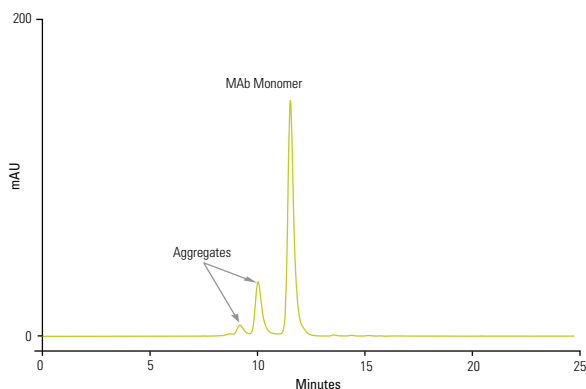
MABPac SEC-1

A size exclusion chromatography (SEC) column specifically designed for the high-resolution separation and characterization of monoclonal antibodies (mAbs) and their aggregates



- Analysis of monoclonal antibodies (mAbs) and their aggregates
- Analysis of mAb Fab and Fc fragments, even using high and low salt concentrations
- Hydrophilic bonded layer for minimal undesired interactions between the biomolecules and the stationary phase
- Stable surface bonding leads to low column bleed and compatibility with MS, ELSD and Corona Charged Aerosol Detection (CAD)
- Separation range for globular proteins 10,000–1,000,000; exclusion limit for globular proteins >1,000,000

Monoclonal antibody aggregate separation



MABPac SEC-1, 5µm, 300 x 4.0mm (PEEK)

Mobile Phase:	0.3 M NaCl in 50mM phosphate buffer pH 6.8
Temperature:	30°C
Flow Rate:	0.20mL/min
Injection Volume:	2µL
Detection:	UV, 280nm
Sample:	MAB (10mg/mL)

MABPac SEC-1

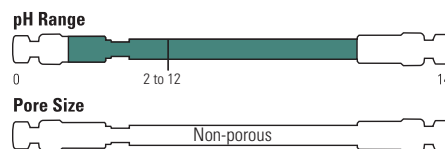
Particle Size (µm)	Format	Length (mm)	2.1mm ID	4.0mm ID	7.8mm ID
5	Guard Column	50	—	074697	—
	HPLC Column	150	088790	075592	—
		300	088789	074696	088460



MAbPac SCX-10

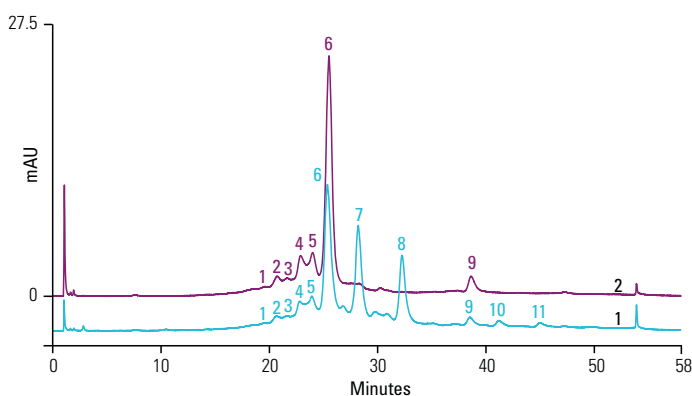
Strong cation exchange column designed specifically for the high-resolution, high efficiency charged variant analysis of monoclonal antibodies and associated variants

- Exceptionally high-resolution for monoclonal antibody charged variants separation
- Ideal for characterization and quality control assessment of monoclonal antibodies
- Unmatched column-to-column and lot-to-lot reproducibility
- Hydrophobic interactions greatly minimized
- Ideal for stability studies
- Meets the regulatory requirements for biopharmaceutical characterization



Particle Size 3µm, 5µm, 10µm

Baseline resolution of C-terminal lysine variants of a monoclonal antibody



MAbPac SCX-10, 5µm, 250 x 4.0mm

Mobile Phase A:	20mM MES (pH 5.6) + 60mM NaCl
Mobile Phase B:	20mM MES (pH 5.6) + 300mM NaCl
Gradient:	15–36% B in 50 min
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	5µL
Detection:	UV at 280nm
Samples:	1. MAb B, 900µg in 100µL (no carboxypeptidase) 2. MAb B, 900µg in 100µL + carboxypeptidase, 50µg, incubation at 37°C for 3 h
Both Chromatograms:	Peaks 1–5: Acidic variants
Sample 1:	Peaks 6-8: C-Terminal lysine truncation variants of main peak Peaks 9–11: C-Terminal lysine truncation variants of minor variant peak
Sample 2:	Peak 6 results from peaks 6, 7, and 8 after CBP treatment. Peak 9 results from peaks 9, 10, and 11 after CBP treatment

MAbPac SCX-10

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID
3	HPLC Column	50	–	077907	–
		150	–	085198	–
		250	–	078655	–
10	Guard Column	50	075749	074631	–
	HPLC Column	50	–	075603	–
		150	–	075602	–
		250	075604	074625	088784

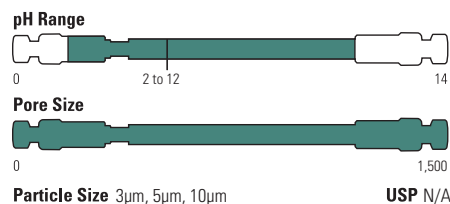


MABPac SCX-10 RS

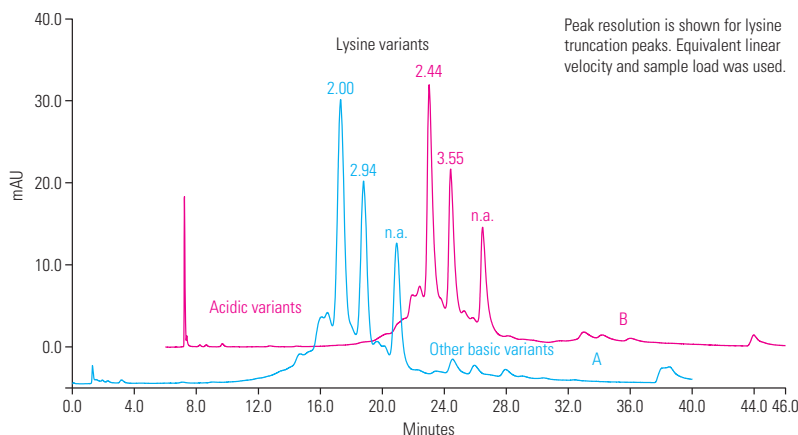
BioRS (Rapid Separation), strong cation exchange column designed for monoclonal antibodies and associated charged variants

- UHPLC, high throughput analysis
- Specially developed bio-inert PEEK lined stainless steel column hardware
- High pressure compatibility
- Suitable for operation up to 7,000 psi

Higher resolution and throughput of mAb charge variant UHPLC separations can be achieved using the MABPac SCX-10 RS strong cation-exchange phase with specially developed bio-inert PEEK lined stainless steel column hardware. These columns are designed to be used at higher UHPLC conditions to maximize the resolution of mAb variant separation. Higher pressure compatibility of the column hardware allows use of high flow rates for faster separation.



Improved mAb resolution



MABPac SCX, 5µm, 250 x 4.6mm

Mobile Phase A:	20 mM MES pH 5.6 + 60 mM
Mobile Phase B:	20 mM MES pH 5.6 + 300 mM NaCl
Flow Rate:	1.5 mL/min
Injection Volume:	15µL
Sample:	MAB 5mg/mL
Chromatogram A:	Gradient: 33-53% B in 30 min
Chromatogram B:	Gradient: 33-53% in 20 min

MABPac SCX-10 RS

Particle Size (µm)	Format	Length (mm)	2.1mm ID	4.6mm ID
5	UHPLC Column	50	082675	082674
		150	088242	085209
		250	082515	082673



pH Gradient Buffers

Ready-to-use buffers for simple method development during charge variant characterization

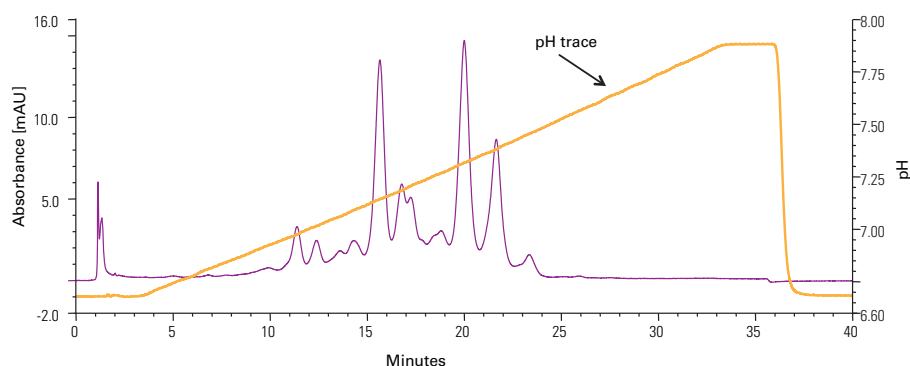


The Thermo Scientific pH gradient platform accelerates method development and facilitates method transfer to QA/QC for a wide range of protein and mAb charge variants through a generic LC-based approach to charge variant characterization.

- Patented buffer formulations enable fast, robust and reproducible pH gradients that are simple to optimize and easily automated
- Ready to use with existing LC columns and systems, without the need for time consuming mobile phase adjustments
- Applicable to the majority of mAbs

Thermo Scientific pH buffer concentrates can be purchased individually or as a pair, in quantities of 125mL or 250mL. For added convenience, the 125mL buffers can also be bundled with columns in a number of specifically preconfigured kits.

Optimization of mAb charge variant separation using a linear pH gradient: 25% B (pH 6.75) to 50% B (pH 7.9)



pH Gradient Buffers

Description	Buffer Bottle size	
	125mL	250mL
Buffer		
CX-1 pH Gradient Buffer A (pH 5.6)	083273	085346
CX-1 pH Gradient Buffer B (pH 10.2)	083275	085348

Kits	MAbPac SCX-10 Column format	Buffer Bottle size	
		125mL	250mL
Buffer			
Gradient Buffer Kit: Includes both Buffer A & Buffer B (available in either 125mL or 250mL size – one bottle each/ kit)	–	083274	085349
Gradient Starter Kit: Includes both Buffer A & Buffer B + MAbPac SCX-10	10µm, 4 × 250mm column	083381	-
Gradient High Throughput Kit: Includes both Buffer A & Buffer B + MAbPac SCX-10	5µm, 4 × 50mm column	083378	-
Gradient High Resolution Kit: Includes both Buffer A & Buffer B + MAbPac SCX-10	5µm, 4 × 250mm column	083272	-

Monoclonal Antibody Characterization and Analysis Kits

MAb Charge Variant Analysis IEX Column Kit

MAb Charge Variant Analysis IEX Column Kit includes two ion-exchange (IEX) specialty columns for mAb charge variants analysis. This kit is a convenient starter kit for researchers at the beginning of a mAb analysis projects, and facilitates the screening of two columns for determination of the best column for their specific monoclonal antibody sample.

Included in the Kit:

- ProPac WCX-10 Analytical column, 4 × 250mm (P/N 054993)
- MAbPac SCX-10 Analytical column, 4 × 250mm (P/N 074625)

MAb Charge Variants Kit

Description	Cat. No.
MAb Charge Variant Analysis IEX Column Kit	076196

MAb Analysis IEX and SEC Column Kit

The MAb Analysis IEX and SEC Column Kit includes two columns: an ion-exchange (IEX) column and a size-exclusion (SEC) column. This kit is a convenient starter and column replacement kit for mAb analysis projects. It is useful for researchers at the beginning of mAb analysis projects, and facilitates the screening of aggregates and variants in two columns.

Included in the kit:

- MAbPac SCX-10 Analytical column, 4 × 250mm (P/N 074625)
- MAbPac SEC-1 Analytical column, 4 × 300mm (P/N 074696)

MAb Analysis Kit

Description	Cat. No.
MAb Analysis IEX and SEC Column Kit	076197



MABPac HIC Family

The MABPac HIC column family is designed for separations of monoclonal antibodies (mAbs) and related biologics by hydrophobic interaction chromatography (HIC). These columns are designed to address the separation challenges as the result of heterogeneity, complexity and diversity of mAbs and related biologics.

- Advanced column chemistry designed for separating mAbs and related biologics
- Broad selectivity coverage for most challenging separations of mAbs
- Excellent bio-compatibility
- High column efficiency
- Rugged column packing

Applications

The MABPac HIC-10 is the column of choice for intact mAbs/proteins and mAb aggregates while the MABPac HIC-20 is suited to resolve mAb fragments, oxidized mAbs and bispecific mAbs. When it comes to ADCs, MABPac HIC-Butyl is ideal for cysteine-conjugated ADC while MABPac HIC-10 and MABPac HIC-20 have proven useful for several cysteine proprietary ADC molecules, as shown below.

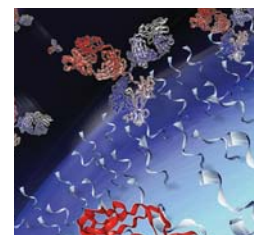
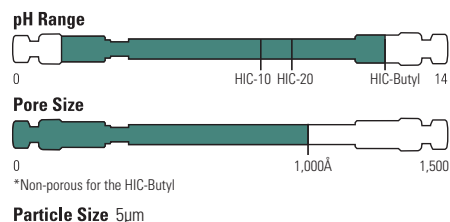
MABPac HIC Selection Guide

Column	MABPac HIC-10	MABPac HIC-20	MABPac HIC-Butyl
Intact mAbs/proteins	++++	+++	++
mAb aggregates	++++	+++	++
mAb fragments (F _{ab} and F _c)	+++	++++	+++
Oxidized mAbs	+++	++++	+++
Antibody Drug Conjugates (ADCs)	+++	+++	++++
Bispecific mAbs	+++	++++	++

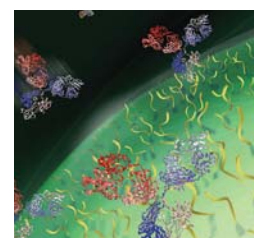
Greater number of ++++ denotes greater suitability

MABPac HIC Family

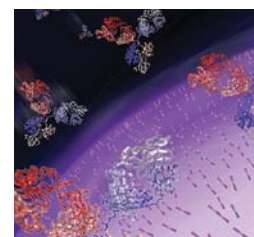
Description	Particle Size (µm)	Format	Length (mm)	4.6mm ID
MABPac HIC-10	5	Guard Cartridges (2/pk)	10	088482
		HPLC Column	100	088480
			250	088481
MABPac HIC-20	5	Guard Cartridges (2/pk)	10	088555
		HPLC Column	100	088553
			250	088554
MABPac HIC-Butyl	5	Guard Cartridges (2/pk)	10	088559
		HPLC Column	100	088558
Guard Cartridge Holder				069580



MABPac HIC-10

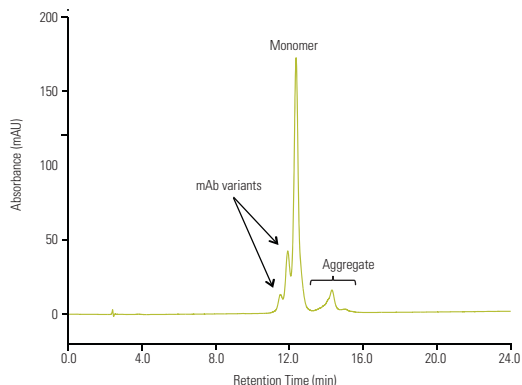


MABPac HIC-20



MABPac HIC-Butyl

Separation of mAb Aggregates



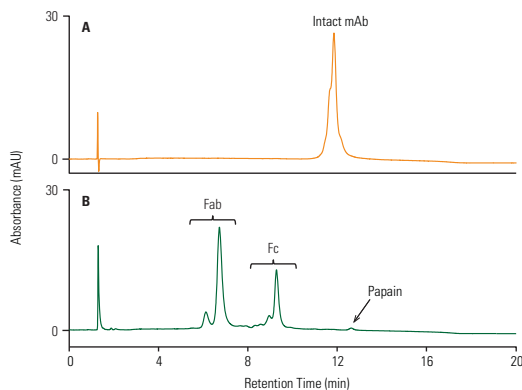
MABPac HIC-10, 5µm, 100 x 4.6mm

Mobile Phase A: 2 M ammonium sulfate, 100mM sodium phosphate, pH 7.0
 Mobile Phase B: 100mM sodium phosphate, pH 7.0

Gradient:	Time (min)	%A	%B
	-5.0	60	40
	0.0	60	40
	1.0	60	40
	29.0	0	100
	34.0	0	100

Temperature: 20°C
 Flow Rate: 0.5mL/min
 Injection Volume: 10µL
 Detection: UV, 280nm
 Sample: Monoclonal antibody (4mg/mL)

Separation of mAb Fragments



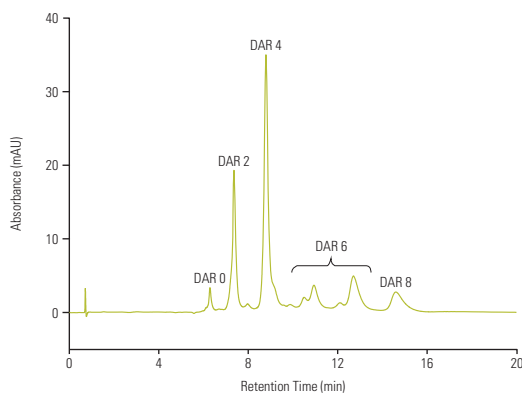
MABPac HIC-20, 5µm, 100 x 4.6mm

Mobile Phase A: 2 M ammonium sulfate, 100mM sodium phosphate, pH 7.0
 Mobile Phase B: 100mM sodium phosphate, pH 7.0

Gradient:	Time (min)	%A	%B
	-5.0	60	40
	0.0	60	40
	1.0	60	40
	15.0	0	100
	20.0	0	100

Temperature: 30°C
 Flow Rate: 1.0mL/min
 Injection Volume: Intact mAb: 5µL
 Papain digest: 12µL
 Detection: UV, 280nm
 Sample: a. Intact mAb (2.5mg/mL)
 b. Papain digest (1mg/mL)

Separation of Antibody Drug Conjugates (ADCs)



MABPac HIC-Butyl, 5µm, 100 x 4.6mm

Mobile Phase A: 1.5 M ammonium sulfate, 50mM sodium phosphate, pH 7.0/ isopropanol (95:5 v/v)
 Mobile Phase B: 50mM sodium phosphate, pH 7.0/ isopropanol (80:20 v/v)

Gradient:	Time (min)	%A	%B
	-5.0	100	0
	0.0	100	0
	1.0	100	0
	15.0	0	100
	20.0	0	100

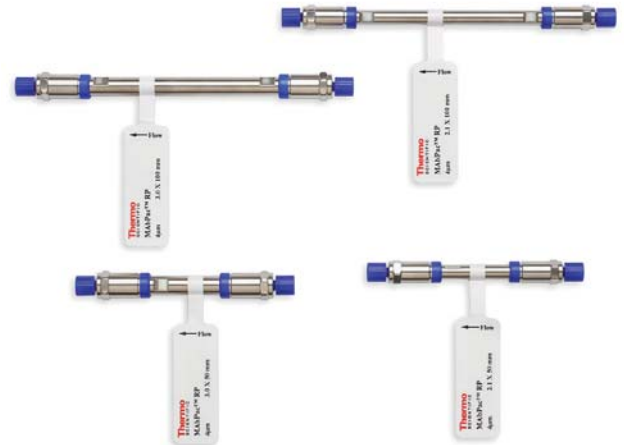
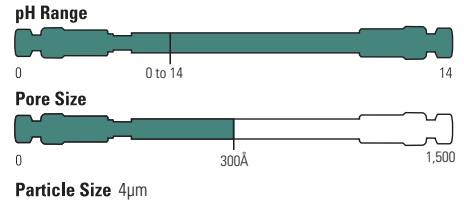
Temperature: 25°C
 Flow Rate: 1.0mL/min
 Injection Volume: 5µL
 Detection: UV, 280nm
 Sample: Cys-conjugated ADC mimic (5mg/mL)

MABPac RP

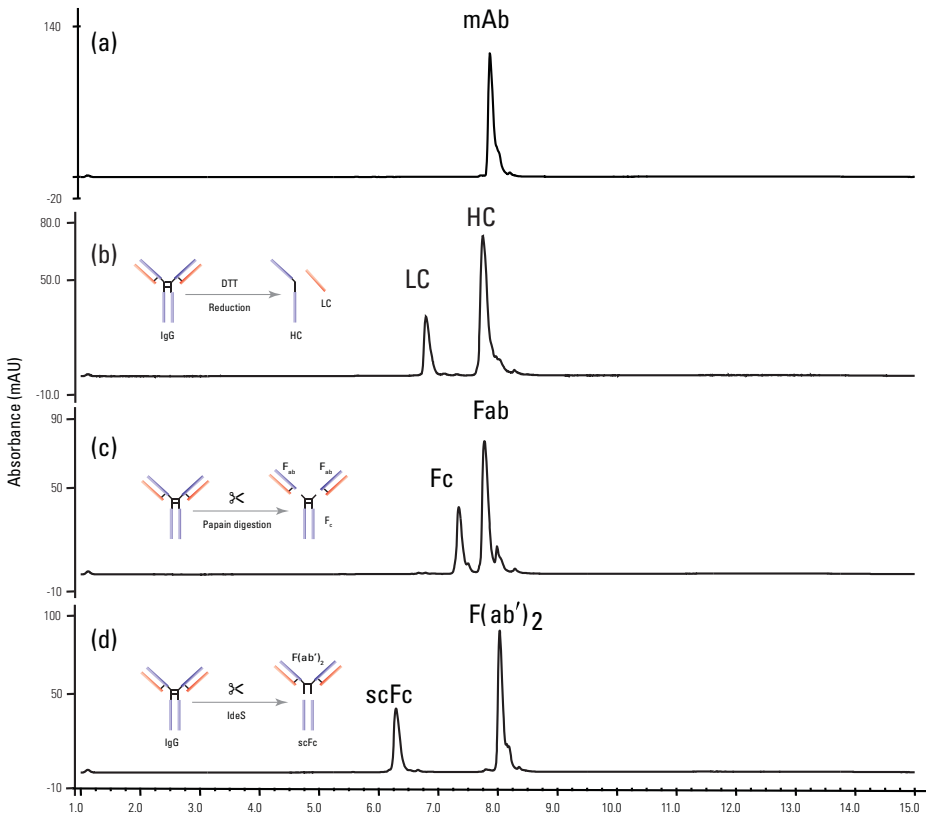
High resolution accurate mass determination of monoclonal antibody variants, antibody drug conjugates (ADC) and proteins

- Superior resolution power for monoclonal antibodies and related substances
- High efficiency with low carry-over
- Excellent MS compatibility
- Wide operating pH range: 0 – 14
- High temperature stability: up to 110°C
- High throughput

The Thermo Scientific™ MABPac™ RP is a reverse phase (RP) liquid chromatography column designed for mAb characterization. Highly efficient separations can be achieved for mAbs and their variants, light chain (LC) and heavy chain (HC), Fc and Fab fragments, scFc and F(ab')₂ fragments. The unique column chemistry provides stability under wide pH range, high temperature, and organic mobile phases and is fully compatible with both UV and MS detection.



mAb and mAb Fragments Analysis



MABPac RP, 4µm, 50 x 3.0mm

Mobile Phase A: H₂O/FA/TFA (99.88 : 0.1:0.02 v/v/v)

Mobile Phase B: MeCN/H₂O/FA/TFA (90: 9.88 :0.1:0.02 v/v/v/v)

Gradient:	Time (min)	%A	%B
	0.0	80	20
	1.0	80	20
	11.0	55	45
	12.0	55	45
	14.0	80	20
	12.0	80	20

Temperature: 80°C

Flow Rate: 0.5mL/min

Injection Volume: 5µL

Detection: UV, 280nm

Sample:

- (a) trastuzumab (5mg/mL)
- (b) trastuzumab + DTT (4mg/mL)
- (c) trastuzumab + Papain (2mg/mL)
- (d) trastuzumab + IdeS (2mg/mL)

MABPac RP

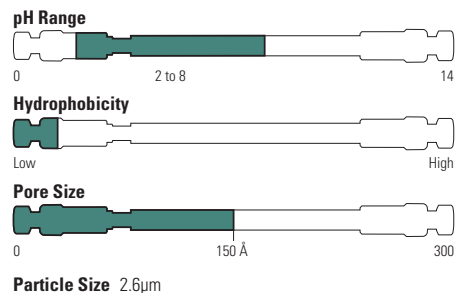
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
4	Guard Cartridges (2/pk)	10	088649	088646
	HPLC Column	50	088648	088645
		100	088647	088644
	Guard Cartridge Holder		069580	069580

Accucore 150-Amide-HILIC

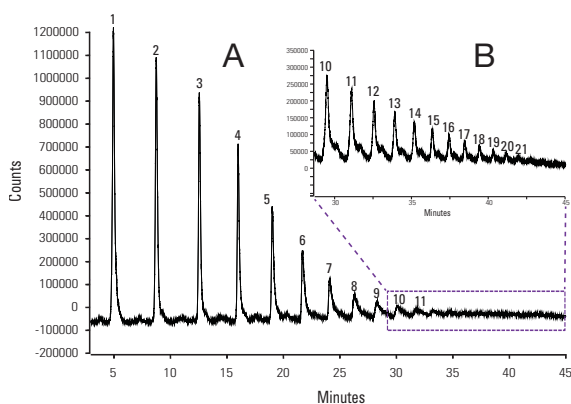
HPLC column for neutral glycan analysis

- Amide phase bonded onto 150 Å pore diameter solid core particles
- High retention of a broad range of hydrophilic analytes in HILIC mode
- Recommended for hydrophilic biomolecules such as glycans

The amide bonded phases provide strong hydrogen bonding interaction between the stationary phase and the analytes, resulting in unique selectivity compared to other HILIC phases. Combined with larger pore size of the solid core particles, Accucore 150-Amide-HILIC is well suited for separating a variety of hydrophilic molecules, including carbohydrates and peptides. As a result, the Accucore 150-Amide-HILIC is an excellent choice for glycan separations.



2-AB labeled dextran ladder



Accucore 150-Amide-HILIC, 2.6µm, 100 x 2.1mm

Mobile Phase A:	Acetonitrile
Mobile Phase B:	50mM Ammonium formate, pH 4.5
Gradient:	20–50 % B in 40.0 minutes 50 % B for 5.0 minutes 50–20 % B in 0.5 minutes 50 % B for 4.5 minutes
Temperature:	60°C
Flow Rate:	500µL/min
Backpressure at Starting Conditions:	110 bar
Injection Volume:	2µL to 5µL of sample.
Injection Wash Solvent:	80:20 (v/v) acetonitrile:water.
Detector:	Fluorescence, 330nm excitation wavelength; 420nm emission wavelength; acquisition start after 3 min from gradient start.
Run Time:	50 minutes

(A) 2µL injection of sample, where 11 glycans were separated.

(B) 5µL injection of sample, zoomed-in to the later part of the gradient rise. A further 10 glycans were detected.

Accucore 150 Amide-HILIC

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	16726-012105	16726-013005	16726-014005
	HPLC Column	50	16726-052130	16726-053030	16726-054630
		100	16726-102130	16726-103030	16726-104630
		150	16726-152130	16726-153030	16726-154630
		250	16726-252130	-	-
Guard Cartridge Holder			852-00	852-00	850-00

For our range of nanoLC columns refer to page **3-043**

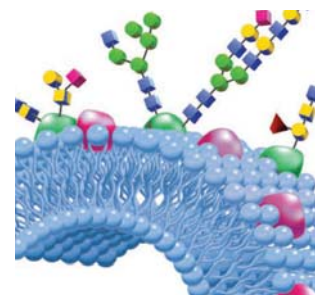
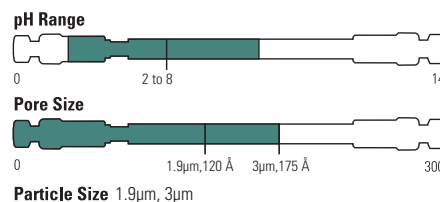
GlycanPac HPLC and UHPLC Columns

GlycanPac AXH-1

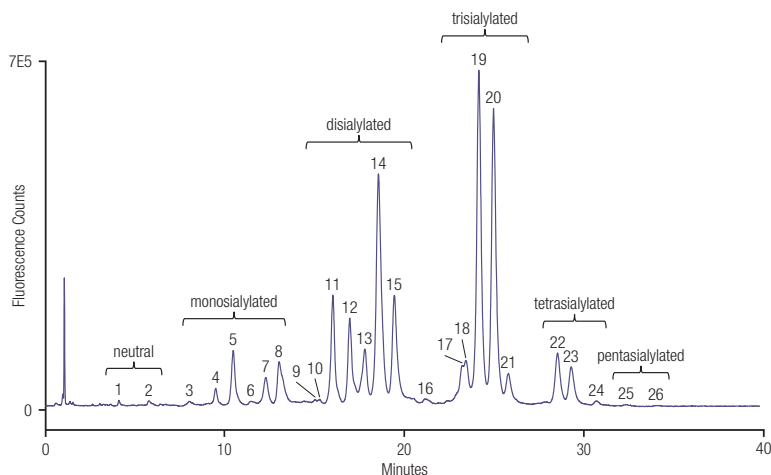
High-resolution columns for neutral and charged glycan analysis

- Unique glycan selectivity based on charge, size and polarity
- Excellent resolution for both native and labeled glycans
- Useful for both high-resolution glycan profile characterization and easy quantification of glycans based on charge, size and polarity
- Compatible with fluorescence and MS detection methods
- High chromatographic efficiency and excellent column stability

Thermo Scientific™ GlycanPac™ AXH-1 is a high-performance, silica-based HPLC column for simultaneous separation of glycans by charge, size and polarity. It is designed for high-resolution and high-throughput analysis of biologically important glycans, either labeled or native, by LC-fluorescence and LC-MS methods.



Separation of 2AB labeled N-glycans from bovine fetuin by charge, size and polarity



GlycanPac AXH-1, 1.9µm, 150 x 2.1mm

Mobile Phase A:	Acetonitrile (100%)
Mobile Phase B:	Water
Mobile Phase C:	Ammonium formate (100mM, pH = 4.4)
Temperature:	30°C
Flow Rate:	0.4mL/min
Injection Volume:	50µmoles
Detection:	Fluorescence, 320/420nm
Sample:	2AB labeled N-glycan from bovine fetuin

Time (min)	% A	% B	% C	Flow (mL/min)	Curve
-10	78	20	2	0.4	5
0	78	20	2	0.4	5
30	70	20	10	0.4	5
35	60	20	20	0.4	5
40	50	20	30	0.4	5

GlycanPac AXH-1

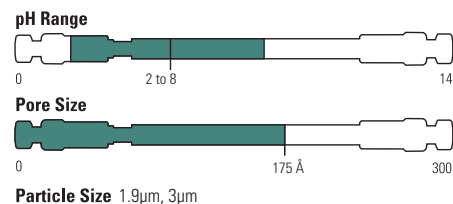
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.9	UHPLC Column	100	082473	—	—
		150	082472	—	—
		250	082521	—	—
3	Guard Cartridges (2/pk)	10	082476	082475	082474
	HPLC Column	150	082470	082469	082468
	Guard Cartridge Holder		069580	069580	069580

GlycanPac AXR-1

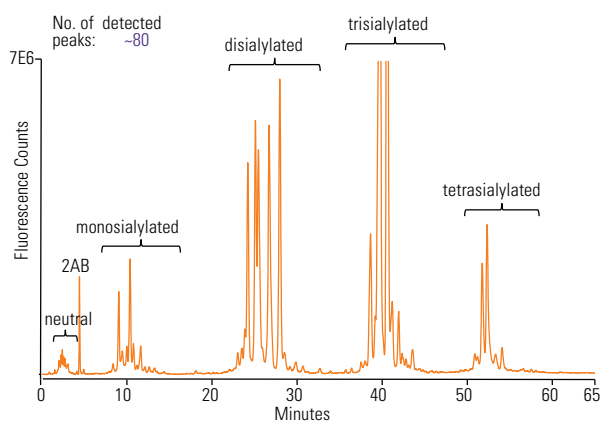
Ultra-high resolution columns for neutral, charged and glycan isomer analysis

- Excellent glycan selectivity based on hydrophobicity, charge, size and isomerization
- High resolution for isomeric glycans
- Compatibility with fluorescence and MS detection methods
- High column efficiency and stability
- Ideal tool for qualitative, quantitative and structural analysis of glycans

The GlycanPac AXR-1 column, based on high-purity and spherical silica substrates, combines both weak anion-exchange (WAX) and reversed-phase (RP) retention mechanisms for optimal selectivity and ultra-high resolution for glycan separation. The WAX functionality separates glycans based on charge, and RP property facilitates high resolution for glycans of the same charge according to their hydrophobicity, branching and isomerization. As the result, the GlycanPac AXR-1 column provides unparalleled resolutions for complex charged glycans.



Separation of 2AB labeled N-glycans from bovine fetuin



GlycanPac AXR-1, 1.9µm, 150 x 2.1mm

Mobile Phase A:	Acetonitrile
Mobile Phase B:	D.I. water
Mobile Phase C:	Ammonium formate (100mM, pH=4.4)
Flow Rate:	0.4mL/min
Temperature:	40°C
Injection Volume:	100pmoles
Detection:	Fluorescence, 320/420nm
Sample:	2AB labeled N-glycan from bovine fetuin

Time (min)	% A	% B	% C	Curve
-10	0	95	5	5
0	0	95	5	5
1	0	95	5	5
30	1	74	25	5
65	20	50	30	5

GlycanPac AXR-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.9	UHPLC Column	150	088136	-	-
		250	088135	-	-
3	Guard Cartridges (2/pk)	10	088258	088259	088260
	HPLC Column	150	088251	088252	088255
	Guard Cartridge Holder		069580	069580	069580

ProPac HPLC Columns

ProPac WCX-10 and SCX-10

Weak and strong cation exchange columns with exceptionally high resolution and efficiency for separations of protein variants

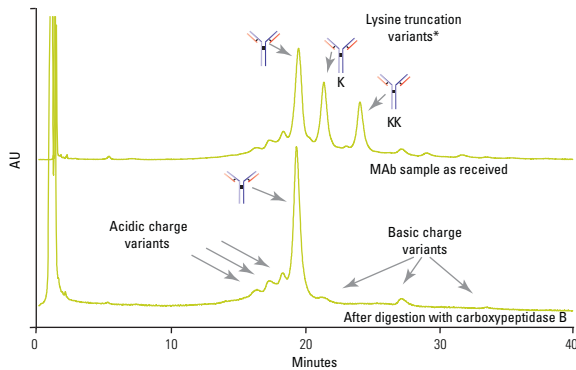
- Characterization and quality control assessment of monoclonal antibodies and other proteins
- Exceptionally high-resolution and high-efficiency separations
- Useful for characterization of related protein variants including deamidation and mAb lysine truncation variants
- ProPac WCX-10 contains carboxylate functional groups and ProPac SCX-10 contains sulfonate functional groups

ProPac WCX-10 and SCX-10 columns are non-porous particles that can resolve isoforms that differ by a single charged residue. A hydrophilic layer prevents unwanted secondary interactions, and a grafted cation exchange surface provides pH-based selectivity control and fast mass transfer for high-efficiency separation and moderate capacity.



Particle Size 10µm

MAb lysine truncation variants



ProPac WCX-10, 10µm, 250 x 4.0mm

Mobile Phase A: 20mM MES+ 115mM NaCl + 1mM EDTA, pH 5.5

Mobile Phase B: 20mM MES+ 145mM NaCl + 1mM EDTA, pH 5.5

Gradient:	t (min)	%E1	%E2
	0	100	0
	2	100	0
	40	0	100
	60	0	100

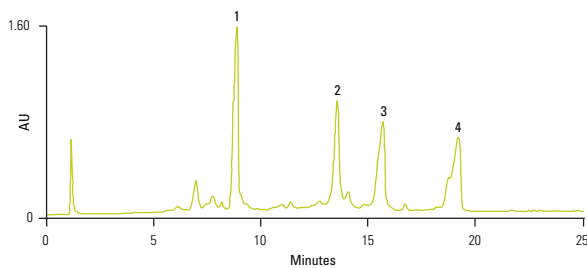
Flow Rate: 1.0mL/min

Detection: UV, 280nm

Sample: MAb

* Peak assignment supported by data from R. J. Harris, et.al, *J.Chromatogr. A* 1995,705, 129-134, and Carboxypeptidase B digest.

Hemoglobin variants



ProPac SCX-10, 10µm, 250 x 4.0mm

Mobile Phase A: 20mM Sodium phosphate, 4mM Potassium cyanide, pH 6

Mobile Phase B: 1 M Sodium chloride in water

Mobile Phase C: Water

Gradient:	Time	%A	%B	%C
	Init	50	0	50
	30 min	50	50	0

Flow Rate: 1mL/min

Injection Volume: 10µL

Detection: UV, 220nm

Sample: 1. Fetal hemoglobin
2. Hemoglobin
3. Sickle cell hemoglobin
4. Hemoglobin C

ProPac WCX-10 and SCX-10 *continued*

ProPac WCX-10

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
10	Guard Column	50	063480	054994	–	–
	HPLC Column	50	–	074600	–	–
		100	–	088778	–	–
		150	–	088779	–	–
		250	063472	054993	063474	088766

ProPac SCX-10

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
10	Guard Column	50	063462	079930	–	–
	HPLC Column	250	063456	054995	063700	088769

ProPac Kits

Part Number	Phase Description	Set Contents	Column Dimensions
088776	ProPac WAX-10 Lot Select Column Set	3 columns from 1 lot of resin	250 x 4.0mm
088777	ProPac WAX-10 Lot Select Column Set	3 lots of resin, 1 column from each lot	250 x 4.0mm
088774	ProPac SAX-10 Lot Select Column Set	3 columns from 1 lot of resin	250 x 4.0mm
088775	ProPac SAX-10 Lot Select Column Set	3 lots of resin, 1 column from each lot	250 x 4.0mm
088767	ProPac WCX-10 Lot Select Column Set	3 columns from 1 lot of resin	250 x 4.0mm
088768	ProPac WCX-10 Lot Select Column Set	3 lots of resin, 1 column from each lot	250 x 4.0mm
088772	ProPac SCX-10 Lot Select Column Set	3 columns from 1 lot of resin	250 x 4.0mm
088773	ProPac SCX-10 Lot Select Column Set	3 lots of resin, 1 column from each lot	250 x 4.0mm

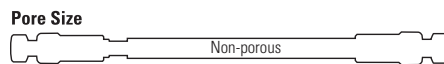


ProPac SCX-20

Strong cation-exchange column for high-resolution protein separations

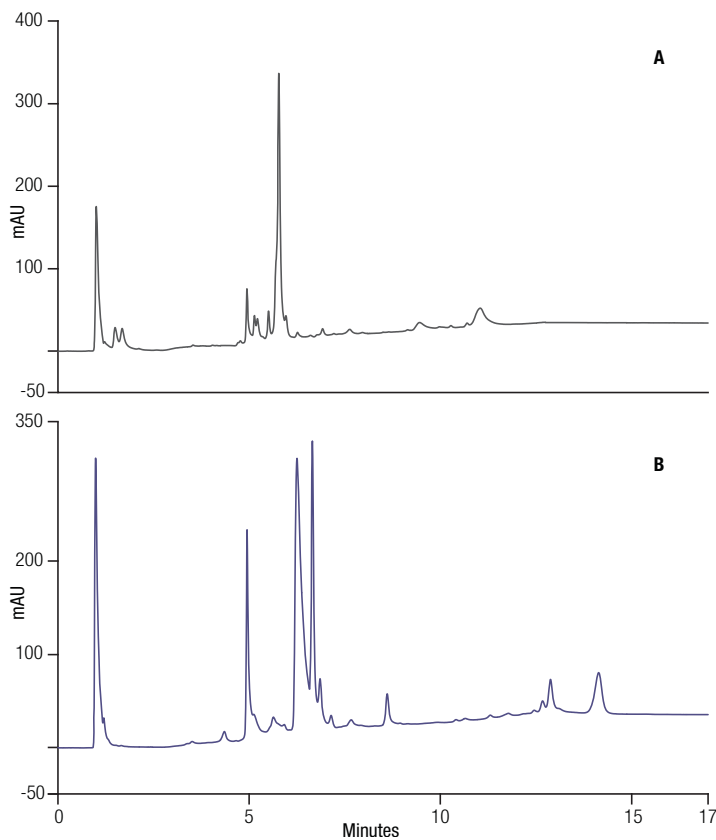
- Grafted cation-exchange surface provides pH-based selectivity control
- Fast mass transfer for high-efficiency separation

The ProPac SCX-20 column is designed specifically to provide high-resolution UHPLC separations of proteins. The stationary phase is composed of 10µm, non-porous, solvent compatible resin beads that are uniformly coated with a highly hydrophilic layer to reduce non-specific interactions between the bead surface and the biopolymer.



Particle Size 10µm

Snake venoms from Naja naja and Russell's viper



ProPac SCX-20, 5µm, 250 x 4.0mm

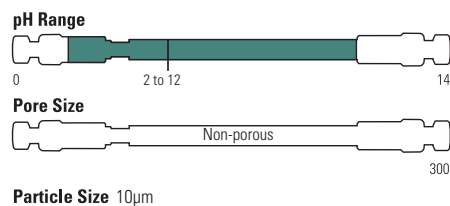
Mobile Phase A:	20mM Tris pH 7.3
Mobile Phase B:	0.5M NaCl in Eluent A
Gradient:	1–100% B in 10 min
Temperature:	30°C
Injection Volume:	10µL
Detection:	UV, 214nm
Samples:	A. Snake Venom (Naja naja) 1mg/mL
	B. Snake Venom (Russell's viper) 1mg/mL

ProPac SCX-20

Particle Size (µm)	Description	Length (mm)	4.0mm ID
10	Guard Column	50	074643
	HPLC Column	250	074628

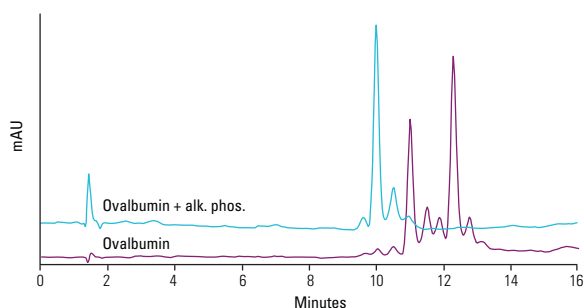
ProPac WAX-10 and SAX-10

Weak and strong anion anion-exchange providing unequalled high resolution and efficiency in the separations of protein variants



- High-efficiency, high-resolution separations
- Useful for characterization and quality control assessment of closely-related protein variants
- Supports separation of proteins that differ by as little as one amino acid residue
- Neutral hydrophilic coat that eliminates protein-resin hydrophobic interactions
- Superior lot-to-lot and column-to-column reproducibility
- ProPac WAX-10 column contains a tertiary amine functional group and ProPac SAX-10 contains a quaternary amine functional group

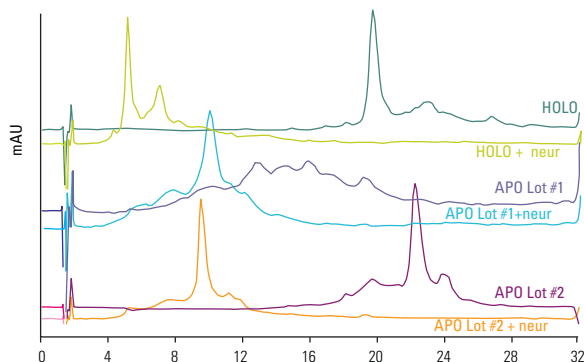
Resolution of phosphorylation variants of ovalbumin



ProPac SAX-10, 10µm, 250 x 4.0mm

Mobile Phase A:	Water		
Mobile Phase B:	2.0 M NaCl		
Mobile Phase C:	0.1 M Tris/HCl (pH 8.5)		
Gradient:	Time	%A	%B %C
	0 min	80	0 20
	15 min	67.5	12.5 20
Flow Rate:	1.0mL/min		
Injection Volume:	30µL		
Detection:	UV, 214nm		
Sample:	Ovalbumin before and after alkaline phosphatase treatment		

Effect of sialylation on transferrin chromatography



ProPac SAX-10, 10µm, 250 x 4.0mm

Mobile Phase A:	Water		
Mobile Phase B:	2.0 M NaCl		
Mobile Phase C:	0.2 M Tris/HCl (pH 9)		
Gradient:	Time	%A	%B %C
	0 min	87	3 10
	30 min	83	7 10
Flow Rate:	1.0mL/min		
Injection Volume:	50µL		
Detection:	UV, 214nm		
Samples:	HOLO (iron rich) and APO (iron poor) human transferrin samples before and after neuraminidase treatment. Digestions were carried out overnight at 37°C in sodium acetate buffer at pH 5.		

ProPac WAX-10

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
10	Guard Column	50	063470	055150	—	—
	HPLC Column	250	063464	054999	063707	088771

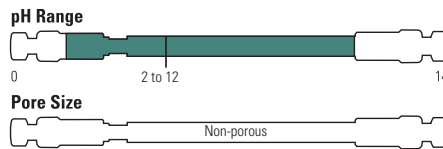
ProPac SAX-10

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID	4 x 50mm
10	Guard Column	50	063454	054998	—	—	—
	HPLC Column	250	063448	054997	063703	088770	078990

ProPac PA1

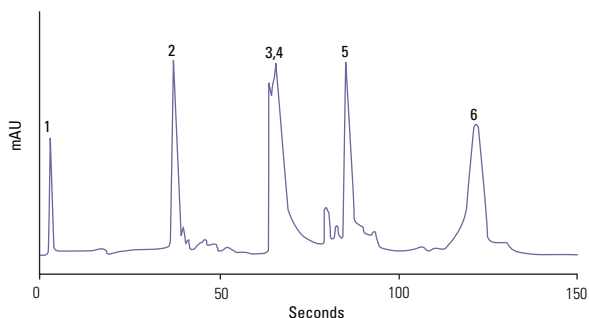
For hydrophilic anionic protein separations

- Good for hydrophilic proteins and peptides
- Ideal for high-resolution separations of proteins with pI values from 3 to 11
- Available in semipreparative format
- Pellicular packing ensures high-efficiency and fast mass transport



Particle Size 10µm

Gradient separation of protein standards



Column: ProPac PA1, 10µm, 50 x 4.0mm
 Mobile Phase: 10 to 350mM NaCl in 1.0mM Tris, pH 8.2
 Flow Rate: 5mL/min
 Detection: UV, 280nm
 Analytes: 1. Horseheart Myoglobin 33µg
 2. Contaminant -
 3,4. Conalbumin 66
 5. Ovalbumin 66
 6. Soybean Trysin Inhibitor 66



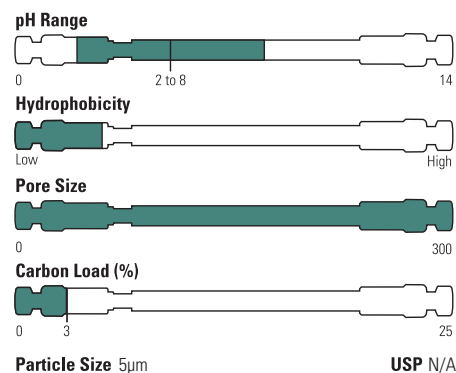
ProPac PA1

Particle Size (µm)	Format	Length (mm)	4.0mm ID	9.0mm ID
10	Guard Column	50	039657	—
	HPLC Column	250	039658	040137

BioBasic AX

Optimized for the separation of proteins, peptides, other anionic species and polar molecules

- Weak anion exchange phase for multiple charged species
- 300Å pore size for enhanced protein and peptide separations
- Suitable for HILIC retention and separation of highly polar molecules
- Superb stability under demanding pH conditions



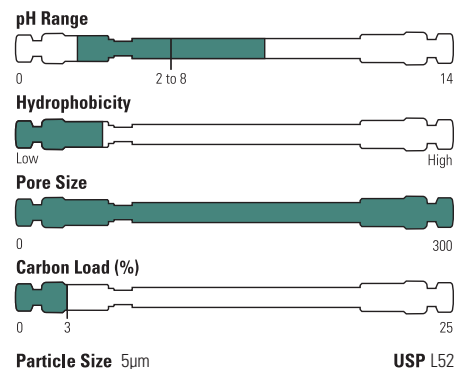
BioBasic AX

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk) HPLC Column	10	73105-011001	73105-012101	73105-013001	73105-014001
		50	73105-051030	73105-052130	73105-053030	73105-054630
		100	73105-101030	73105-102130	73105-103030	73105-104630
		150	73105-151030	73105-152130	73105-153030	73105-154630
		250	73105-251030	73105-252130	-	73105-254630
	UNIGUARD Guard Cartridge Holder		851-00	852-00	852-00	850-00

BioBasic SCX

For the separation of proteins, peptides, and other cationic species

- Strong cation exchange phase based on sulfonic acid chemistry
- Separation and retention of basic and other cationic species
- 300Å pore size for enhanced protein and peptide separations
- Outstanding stability under demanding pH conditions



BioBasic SCX

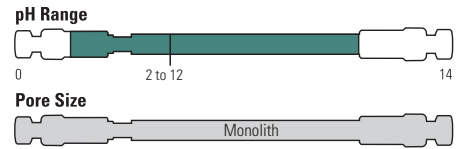
Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk) HPLC Column	10	73205-011001	73205-012101	73205-013001	73205-014001
		50	73205-051030	73205-052130	73205-053030	73205-054630
		100	73205-101030	73205-102130	73205-103030	73205-104630
		150	73205-151030	73205-152130	73205-153030	73205-154630
		250	73205-251030	73205-252130	-	73205-254630
	UNIGUARD Guard Cartridge Holder		851-00	852-00	852-00	850-00

ProSwift IEX

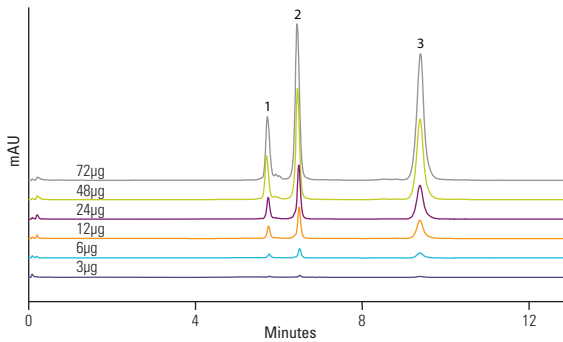
Monolith IEX columns for high-resolution and fast protein analysis

- High resolution
- High loading capacity
- Fast analysis
- Wide range of operational flow rates
- Excellent stability over a wide pH range
- Outstanding reproducibility and ruggedness

ProSwift polymer monolith (poly(Meth)acrylate) media are uniquely suited for separation of proteins. Each monolith is a single cylindrical, sponge-like polymer rod containing an uninterrupted, interconnected network of flow-through channels of a specific pore size. These large channels combined with the monolith's nonporous surfaces result in fast mass-transfer, high-resolution, and fast protein separations. The unique globular morphology of the polymer medium provides its high capacity.



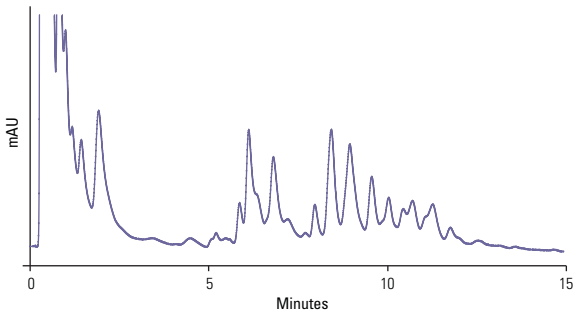
Dynamic protein loading capacity of ProSwift WCX-1S 50 x 1.0mm



ProSwift WCX-1S, 50 x 1.0mm

Mobile Phase A:	10mM Sodium phosphate (pH 7.6)
Mobile Phase B:	1 M NaCl in eluent A
Gradient:	0% B for 2 min, 0–85% B in 7.5 min, 85% B for 3 min
Temperature:	30°C
Flow Rate:	0.2mL/min
Injection Volume:	1–24µL
Detection:	UV, 280nm
Sample:	Protein mix, 1mg/mL each
Analytes:	1. Ribonuclease A 2. Cytochrome C 3. Lysozyme

Protein separation



ProSwift WAX-1S, 50 x 1.0mm

Mobile Phase A:	10mM Tris, pH 7.6
Mobile Phase B:	1 M NaCl in 10mM Tris, pH 7.6
Gradient:	5 to 55% of B in 13 min, hold for 2 min
Temperature:	30°C
Flow Rate:	0.2mL/min
Injection Volume:	1.3µL
Detection:	UV, 280nm
Sample:	1.25mg/mL <i>E. coli</i> protein

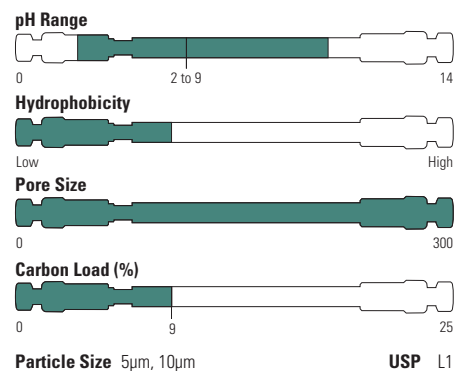
ProSwift IEX

Functional Group	Length (mm)	1.0mm ID	4.6mm ID
WAX-1S	50	066642	064294
WCX-1S	50	066643	064295
SAX-1S	50	068459	064293
SCX-1S	50	071977	066765

BioBasic 18

Outstanding separation of small to medium peptides

- C18 with 300Å pore size for maximum performance with biomolecules
- High peak capacity stationary phase
- Outstanding reproducibility, efficiency and column lifetime
- Excellent for LC-MS separations



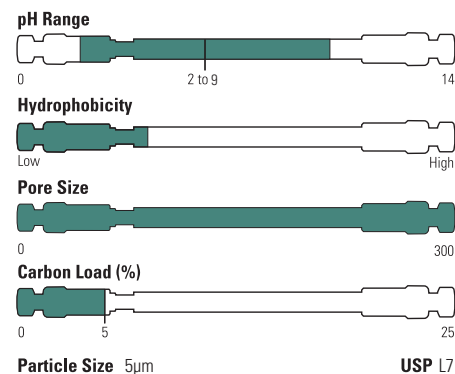
BioBasic 18

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk) HPLC Column	10	72105-011001	72105-012101	72105-013001	72105-014001
		50	72105-051030	72105-052130	-	-
		100	72105-101030	72105-102130	72105-103030	72105-104630
		150	72105-151030	72105-152130	-	72105-154630
		250	72105-251030	72105-252130	-	72105-254630
	UNIGUARD Guard Cartridge Holder		851-00	852-00	852-00	850-00

BioBasic 8

Optimized for the separation of a wide range of peptides

- C8 with 300Å pore size for improved biomolecule analysis
- An excellent starting column for protein and peptide analysis
- Outstanding reproducibility, efficiency and column lifetime
- Excellent for LC-MS separations

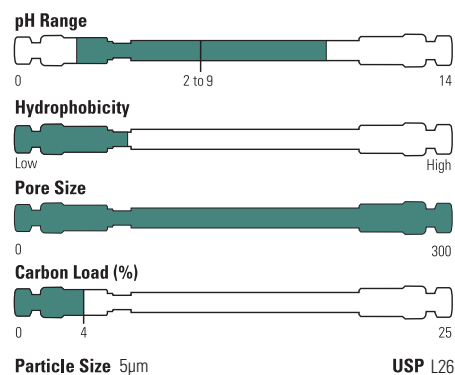


BioBasic 8

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk) HPLC Column	10	72205-011001	72205-012101	72205-013001	72205-014001
		50	72205-051030	72205-052130	-	-
		100	72205-101030	72205-102130	72205-103030	72205-104630
		150	72205-151030	72205-152130	-	72205-154630
		250	72205-251030	72205-252130	-	72205-254630
	UNIGUARD Guard Cartridge Holder		851-00	852-00	852-00	850-00

BioBasic 4

- Based on 300Å silica for outstanding biomolecule performance
- C4 with lower carbon load for optimal retention of larger peptides and proteins
- Outstanding reproducibility, efficiency and column lifetime
- Excellent for LC-MS separations



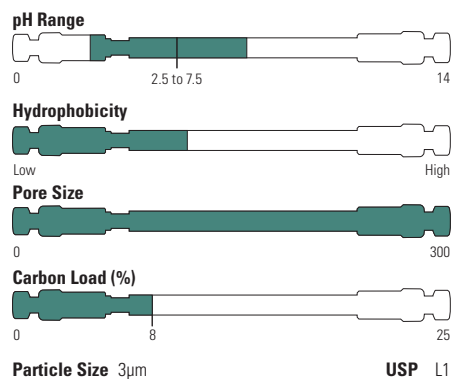
BioBasic 4

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk)	10	72305-011001	72305-012101	72305-013001	72305-014001
	HPLC Column	50	72305-051030	72305-052130	-	-
		100	72305-101030	72305-102130	72305-103030	72305-104630
		150	72305-151030	72305-152130	-	72305-154630
		250	72305-251030	72305-252130	-	72305-254630
	UNIGUARD Guard Cartridge Holder		851-00	852-00	852-00	850-00

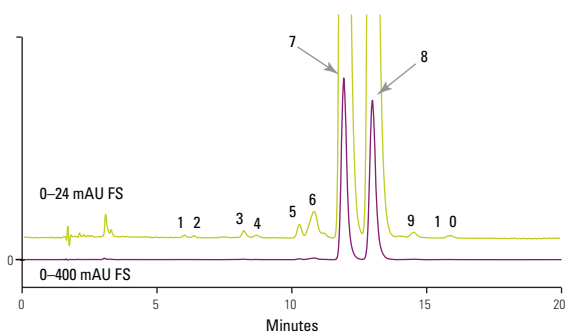
Acclaim 300 C18

High-resolution reversed-phase separation of proteins and peptides

- Designed for high-resolution peptide mapping and protein separations
- Application tested for suitability in peptide mapping
- Reproducible for dependable results
- LC-MS compatible
- Ultrapure silica with low metal content and exhaustive bonding and endcapping



Budesonide and related substances



Acclaim 300 C18, 3µm, 150 x 4.6mm

Mobile Phase A: Acetonitrile:ethanol 15:1
Mobile Phase B: 0.1% phosphoric acid
Isocratic 66% B

Temperature: 30°C

Flow Rate: 1.0mL/min

Injection Volume: 15µL

Detection: UV, 240nm

Sample: Budesonide, 500µg/mL
after three days

Analytes: 7, 8. Budesonide epimers, 99%

Reference: Hou S, Hindle M, Byron PR;
J. Pharm. Biomed. Anal. 2001 24:371-80.

Acclaim 300 C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	060263	—	060265
		150	060264	063684	060266
5	Guard Cartridges (2/pk)	10	069690	075721	069697

Acclaim Guard Holder

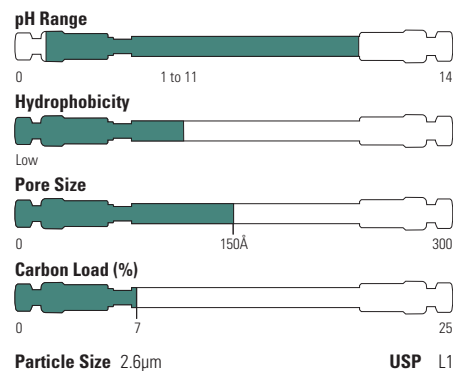
Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Accucore 150-C18

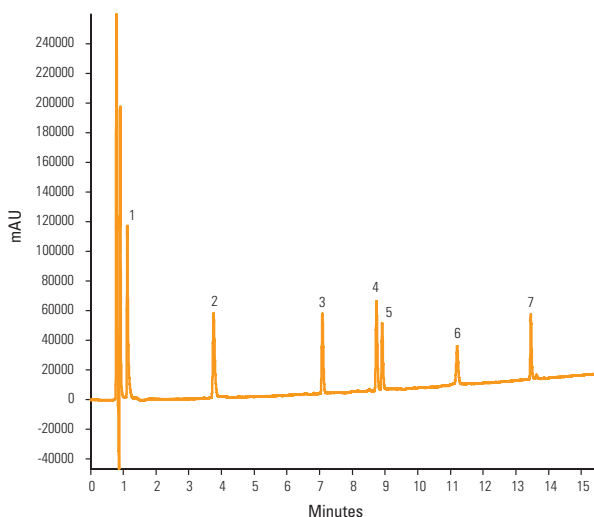
- Designed for the separation of peptides
- Outstanding resolution
- 150Å pore diameter material

Higher peak capacities facilitate increased peptide identifications. Accucore 150-C18 provides much narrower peak widths, therefore significantly higher peak capacity than a column packed with <math><2\mu\text{m}</math> wide pore fully porous C18.

Precision of retention times is critical for reliable analysis. The Accucore 150-C18 column exhibits excellent retention time reproducibility.



Peptide separations



Accucore 150-C18, 2.6µm, 100 x 2.1mm

Mobile Phase A:	0.1% TFA in 10:90 acetonitrile:water
Mobile Phase B:	0.1% TFA in 70:30 acetonitrile:water
Gradient:	0-50% B over 15 min; hold for 2 min; drop to 0% in 0.1 min; hold at 0% B for 5 min
Temperature:	35°C
Flow Rate:	300µL/min
Injection Volume:	5µL
Detection:	UV, 220nm
Analytes:	1. Glycine-Tyrosine 2. Valine-Tyrosine-Valine 3. Met-Enkephalin 4. Angiotensin III 5. Leu-Enkephalin 6. Ribonuclease A 7. Insulin

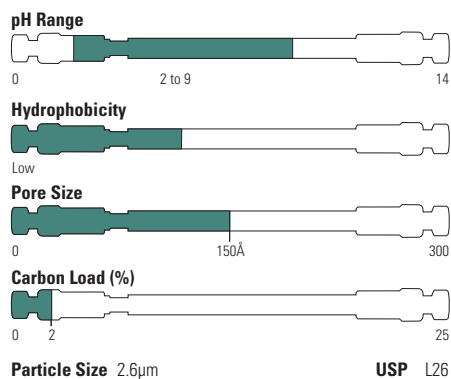
Accucore 150-C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Drop-in Guard (4/pk) HPLC Column	10	16126-012105	16126-013005	16126-014005
		30	16126-032130	16126-033030	16126-034630
		50	16126-052130	16126-053030	16126-054630
		100	16126-102130	16126-103030	16126-104630
		150	16126-152130	16126-153030	16126-154630
	UNIGUARD Guard Cartridge Holder	10	852-00	852-00	850-00

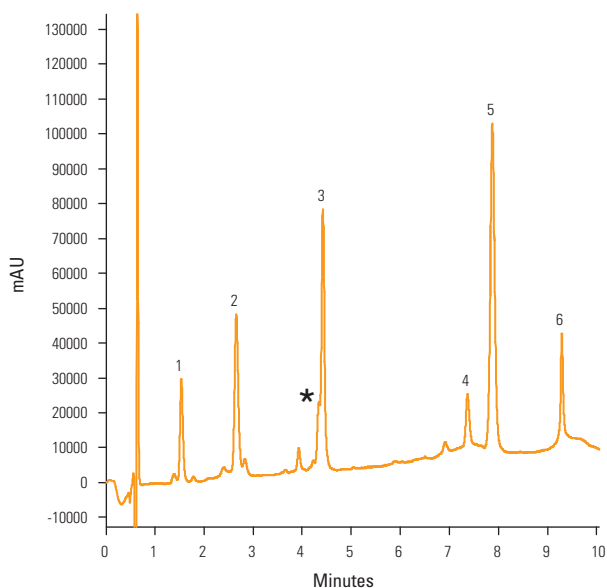
Accucore 150-C4

- Significantly lower hydrophobic retention than C18
- Ideal for retention of proteins and larger peptides

Accucore 150-C4 provides significantly sharper and higher peaks than a column packed with 5µm wide pore fully porous C4, thus offering better resolution and sensitivity. The Accucore 150-C4 also performs better than a column packed with <2µm wide pore fully porous C4 and generates only a fraction of the backpressure.



Intact proteins



Accucore 150-C4, 2.6µm, 100 x 2.1mm

Mobile Phase A: 0.1% TFA in 30:70 acetonitrile:water

Mobile Phase B: 0.1% TFA in 98:2 acetonitrile:water

Gradient: 0-30% B over 8 mins

30-95% B over 2 mins

95% B hold for 1 min

0% B hold for 4 mins

Temperature: 40°C

Flow Rate: 400µL/min

Injection Volume: 2µL 10pmol/µL solution

Detection: UV, 214 and 280nm

Analytes:

1. Insulin

2. Cytochrome C

3. Lysozyme

4. Myoglobin

5. Carbonic anhydrase

6. Ovalbumin

* Carbonic anhydrase impurity

Accucore 150-C4

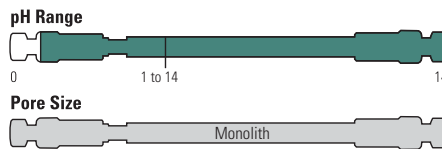
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Drop-in Guard (4/pk) HPLC Column	10	16526-012105	16526-013005	16526-014005
		30	16526-032130	16526-033030	16526-034630
		50	16526-052130	16526-053030	16526-054630
		100	16526-102130	16526-103030	16526-104630
		150	16526-152130	16526-153030	16526-154630
	UNIGUARD Guard Cartridge Holder	10	852-00	852-00	850-00

ProSwift RP

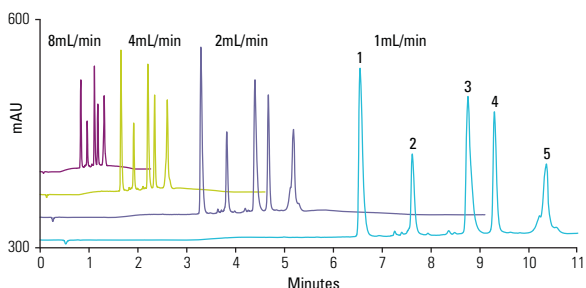
Reversed-phase monolith columns that uniquely provide the advantages of high resolution at exceptionally high flow rates for fast protein separations and analysis

- High resolution at high speed
- Highest operational flow rates available
- High throughput and improved productivity
- Excellent stability over a wide pH range of 1 to 14
- Outstanding reproducibility and ruggedness
- High stringent wash compatible, for example, 1 M NaOH
- High loading capacity

ProSwift polymer reversed-phase monolith media are (polystyrene-co-DVB) uniquely suited for the separation of proteins. Each monolith is a single cylindrical polymer rod containing an uninterrupted, interconnected network of flow-through channels of a specific pore size; ranging from small channel (1S), medium size channels (2H & 4H) to very large channel (3U) sizes. These channels and the monolith's nonporous surfaces result in fast mass transfer for high-resolution and fast protein separations. The channels also produce low backpressure, allowing the use of higher linear velocities with minimal loss of resolution.



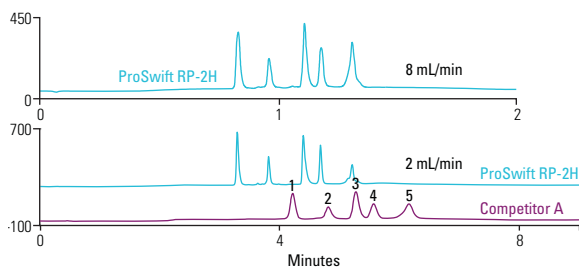
Proteins



ProSwift RP-2H, 50 x 4.6mm

Mobile Phase A:	DI H ₂ O/CH ₃ CN (95:5; V/V) + 0.1% TFA
Mobile Phase B:	DI H ₂ O/CH ₃ CN (5:95; V/V) + 0.1% TFA
Gradient:	1mL/min: 1-75% B in 12 min 2mL/min: 1-75% B in 6 min 4mL/min: 1-75% B in 3 min 8mL/min: 1-75% B in 1.5 min
Flow Rate:	1, 2, 4, or 8mL/min
Injection Volume:	5µL
Detection:	UV, 214nm
Sample:	Mixture of five proteins
Analytes:	1. Ribonuclease A 1.5mg/mL 2. Cytochrome C 0.5mg/mL 3. BSA 1.5mg/mL 4. Carbonic anhydrase 0.9mg/mL 5. Ovalbumin 1.5mg/mL

Competitive comparison



ProSwift RP-2H, 50 x 4.6mm Competitor A, 15µm, 100 x 4.6mm

Mobile Phase A:	DI H ₂ O/CH ₃ CN (95:5; V/V) + 0.1% TFA
Mobile Phase B:	DI H ₂ O/CH ₃ CN (5:95; V/V) + 0.1% TFA
Gradient:	2mL/min: 1-75% B in 6 min 8mL/min: 1-75% B in 1. min
Temperature:	30°C
Flow Rate:	2 or 8mL/min
Injection Volume:	5µL
Detection:	UV, 214nm
Sample:	Mixture of five proteins
Analytes:	1. Ribonuclease A 1.5mg/mL 2. Cytochrome C 0.5mg/mL 3. BSA 1.5mg/mL 4. Carbonic anhydrase 0.9mg/mL 5. Ovalbumin 1.5mg/mL

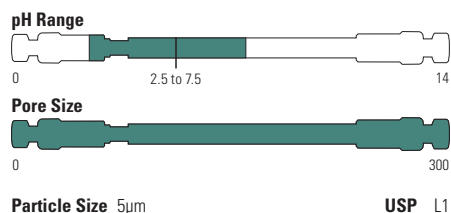
ProSwift RP

Functional Group	Length (mm)	1.0mm ID	4.6mm ID
RP-1S	50	—	064297
RP-2H	50	—	064296
RP-3U	50	—	064298
RP-4H	50	069477	—
RP-10R	50	164586	—
RP-4H	250	066640	—

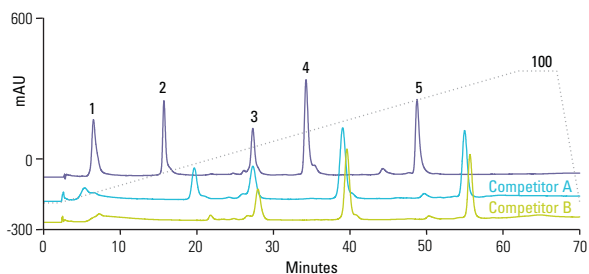
ProPac HIC-10

Hydrophobic Interaction Chromatography columns for the high-resolution separation of proteins and peptides

- High-resolution HPLC separation of proteins, protein variants and peptides
- Proteins are separated under non-denaturing conditions
- High protein loading capacity for protein purification applications
- Wide range of applications
- Based on 5µm ultra high purity spherical silica gel particles with 300Å pores



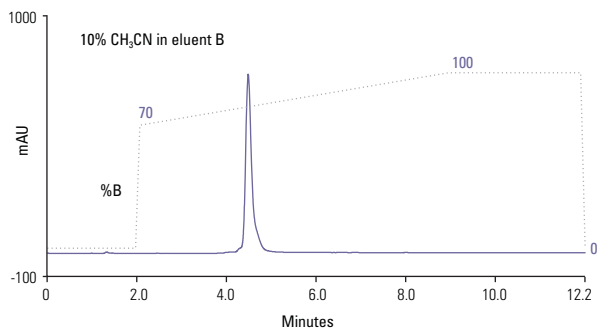
Protein mixture



ProPac HIC-10, 5µm, 75 x 7.8mm Competitors A and B, 75 x 7.5mm

Mobile Phase A:	2 M (NH ₄) ₂ SO ₄ in 0.1 M NaH ₂ PO ₄ (pH 7.0)
Mobile Phase B:	0.1 M NaH ₂ PO ₄ (pH 7.0)
Flow Rate:	1.0mL/min
Injection Volume:	20µL
Detection:	UV, 214nm
Sample:	Mixture of proteins (1mg/mL each final after 1:1 dilution with mobile phase A)
Analytes:	1. Cytochrome c 2. Myoglobin 3. Ribonuclease A 4. Lysozyme 5. Chymotrypsinogen

Monoclonal antibody



ProPac® HIC-10, 5µm 100 x 4.6mm

Mobile Phase A:	0.5 M (NH ₄) ₂ SO ₄ in 0.1 M NaH ₂ PO ₄ (pH 7.0)
Mobile Phase B:	0.1 M NaH ₂ PO ₄ (pH 7.0)
Gradient:	70–100% B in 15 min
Flow Rate:	1mL/min
Injection Volume:	5µL (25µg)
Detection:	UV, 214nm
Sample:	MAB 50µL (50mg/mL) + 450µL Eluent B

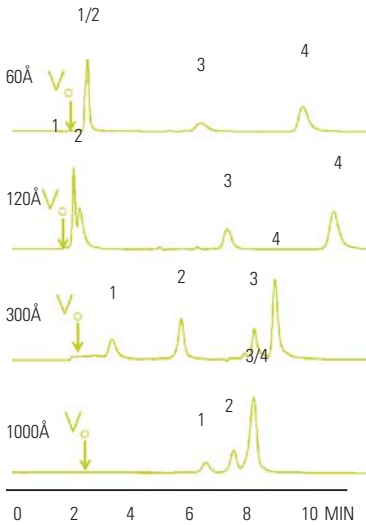
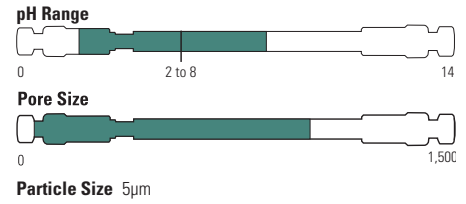
ProPac HIC-10

Particle Size (µm)	Format	Length (mm)	2.1mm ID	4.6mm ID	7.8mm ID
5	HPLC Column	75	–	–	063665
		100	063653	063655	–
		250	–	074197	–

BioBasic SEC

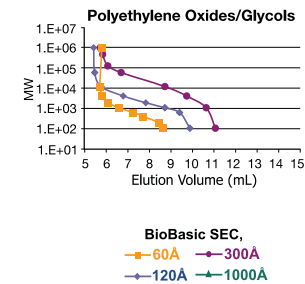
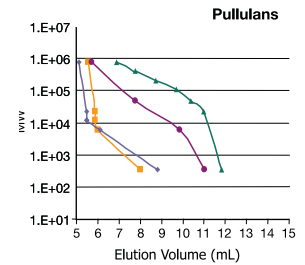
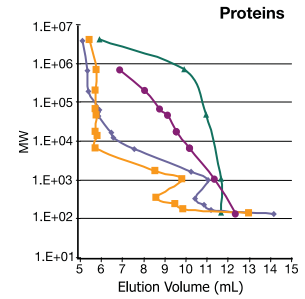
Superior separation of water soluble compounds

- Covers separation of analytes over a wide molecular weight range
- Long column life and high column efficiencies
- Simple mechanism of interaction based on molecular size and shape
- Ideal for sample clean-up
- Straightforward method development, simple mobile phases



BioBasic SEC, 5µm, 300 x 7.8mm
 Mobile Phase: 0.1M KH₂PO₄ pH 7
 Flow Rate: 1.0mL/min
 Injection Volume: 20µL
 Detection: UV, 254nm
 Analytes: 1. Thyroglobulin (MW669,00)
 2. Ovalbumin (MW 45,000)
 3. Angiotensin II (MW 1,046)
 4. PABA (V₀) (MW 137)

Effect of pore size on SEC resolution



Molecular weight calibration curves

BioBasic SEC

Pore Size (Å)	Description	ID (mm)	Length (mm)	Cat. No.
BioBasic SEC 60				
60	Guard Column	7.8	30	73305-037821
	HPLC Column	7.8	150	73305-157846
	HPLC Column	7.8	300	73305-307846
BioBasic SEC 120				
120	Guard Column	7.8	30	73405-037821
	HPLC Column	7.8	150	73405-157846
	HPLC Column	7.8	300	73405-307846
BioBasic SEC 300				
300	Guard Column	7.8	30	73505-037821
	HPLC Column	7.8	150	73505-157846
	HPLC Column	7.8	300	73505-307846
BioBasic SEC 1000				
1000	Guard Column	7.8	30	73605-037821
	HPLC Column	7.8	150	73605-157846
	HPLC Column	7.8	300	73605-307846

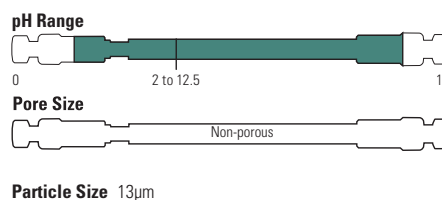
DNAPac HPLC and UHPLC Columns

DNAPac PA100

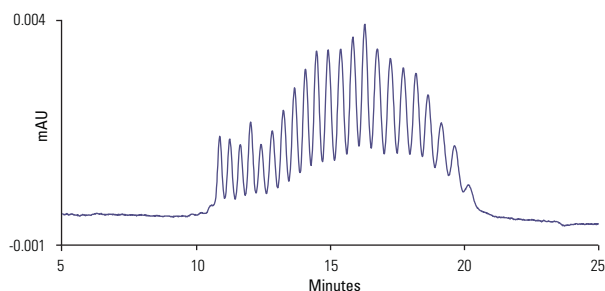
A strong anion exchange column developed to provide high-resolution analysis and purification of synthetic oligonucleotides

- High-resolution oligonucleotide separations
- Achieve n, n-1 resolution for oligonucleotides
- Resolves oligonucleotides with secondary structures
- Suitable for the analysis of phosphorothioate-based clinical samples
- Easy scale-up from 2.0mm to 22mm ID column (>100x)

The DNAPac PA100 is a high-resolution anion-exchange column that provides single-base resolution. It is stable under denaturing conditions, rugged, reliable, and can be readily scaled up. The DNAPac PA100 is a 13µm pellicular, nonporous polymeric resin with bound quaternary amine-functionalized Thermo Scientific™ Dionex™ MicroBeads™. The rapid mass-transport characteristics of this resin result in very high-resolution oligonucleotide separations. DNAPac PA100 can resolve full length from n-1, n+1, and other failure sequences.



Oligonucleotides



DNAPac PA100, 13µm, 250 x 4.0mm

Mobile Phase:	410-510mM NaCl in 25mM Tris-Cl, pH 8.0
Flow Rate:	1.5mL/min
Detection:	UV, 260nm
Sample:	pd(A) ₄₀₋₆₀

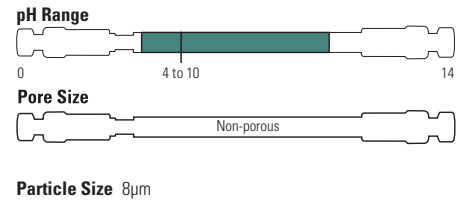
DNAPac PA100

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
13	Guard Column	50	088761	043018	088764	088765
	HPLC Column	250	088760	043010	043011	088759

DNAPac PA200

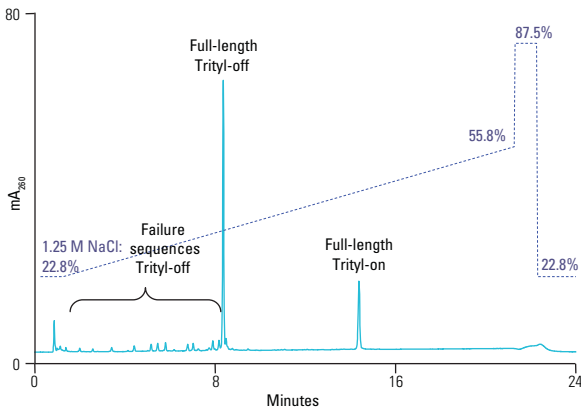
A strong anion exchange column developed to provide the best resolution for analysis and purification of synthetic oligonucleotides

- Achieve n, n-1 resolution for oligonucleotides
- Resolve oligonucleotides with secondary structures
- Assay phosphorothioate purity
- Selectivity control with eluent pH, salt, and solvent
- Resolve RNA with aberrant (2', 5') links from normal ssRNA
- Separate individual phosphorothioate diastereoisomers
- HR/AM AXLC/MS via automated desalting

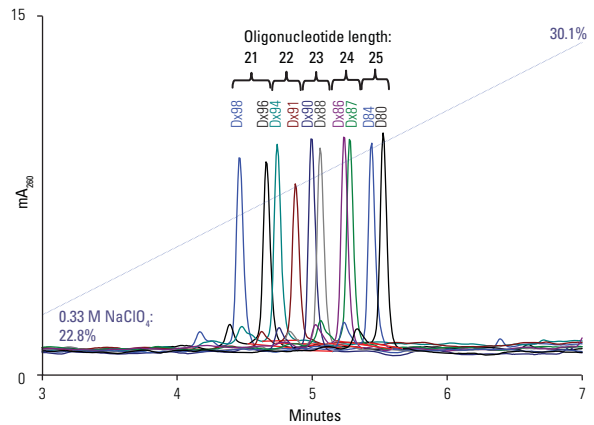


The DNAPac PA200 is packed with a pellicular anion-exchange resin composed of an 8µm diameter nonporous polymeric substrate to which quaternary amine-functionalized Dionex MicroBeads are bound. The rapid mass transport characteristics of this resin result in high-resolution oligonucleotide separations. DNAPac PA200 can resolve full length from n-1, n+1, and other failure sequences not possible with other columns.

Target, failure and trityl-on oligonucleotides



Separation of oligonucleotides by length



DNAPac® PA200, 8µm, 250 x 4.0mm

Mobile Phase: NaClO₄, pH 6.5
with 20% CH₃CN

Flow Rate: 1.2mL/min

Injection Volume: 8µL

Detection: UV, 260nm

DNAPac PA200

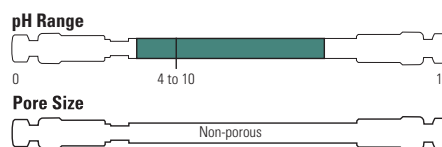
Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
8	Guard Column	50	063423	062998	063419	088780
	HPLC Column	250	063425	063000	063421	088781

DNAPac PA200 RS

UHPLC Solutions for nucleic acid analysis

- Provide single base resolution of oligonucleotides
- Higher efficiency to improve resolution
- Improved throughput
- Ruggedness consistent with the DNAPac PA200 column line
- Stable to 10,000 psi

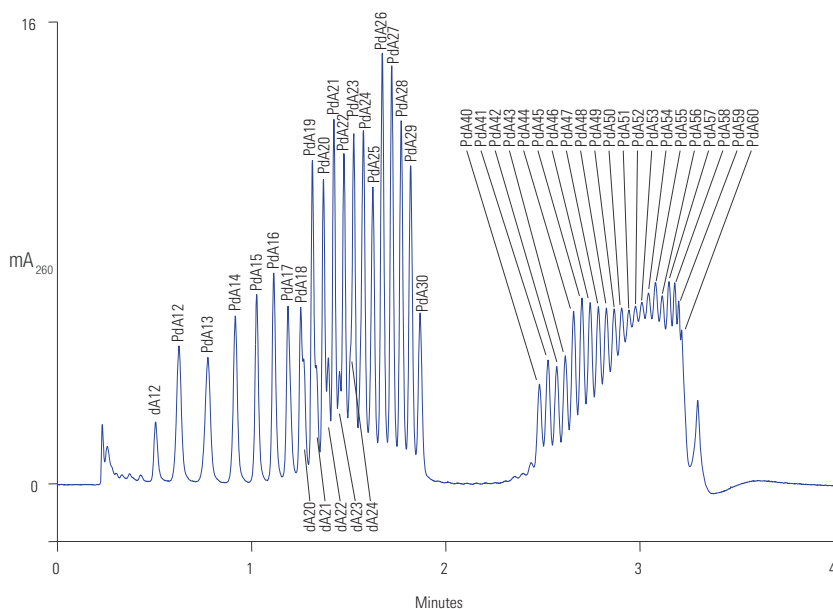
DNAPac PA200 RS columns are packed with smaller, 4µm particles, for improved resolution and better performance. The smaller particles also allow shorter columns to provide significantly higher throughput. These columns are packed in bio-inert PEEK-lined stainless steel (SST) bodies, designed to protect from unwanted interactions of eluents and analytes with metals, while maintaining 10,000 psi stability. These columns offer exceptional resolution of oligonucleotides, including isomer separations; and are able to resolve full length oligonucleotides from n-1 and n+1 oligonucleotides and other failure sequences.



Particle Size 4µm



Partial resolution of 46 oligonucleotides



DNAPac PA200 RS, 4µm, 50 x 4.6mm

Mobile Phase A:	20 mM Tris pH 8
Mobile Phase B:	A + 1.25 M NaCl
Gradient:	28–43% B in 4 CV* (2.56 min) curve 3**
Temperature:	30°C
Flow Rate:	1.30mL/min
Injection Volume:	2.5µL
Sample:	PdA12–30, 40–60

*CV = column volumes
 **Curve 3 indicates continuously changing gradient, asymptotically approaching a maximum salt concentration. Programmed in Chromeleon 6.8.

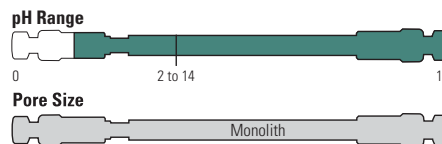
DNAPac PA200 RS

Particle Size (µm)	Format	Length (mm)	4.6mm ID
4	BioRS column	50	082508
		150	082509
		250	082510

DNASwift SAX-1S

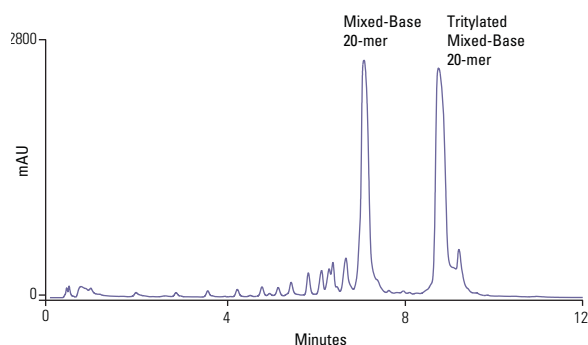
A strong anion exchange monolith column that provides improved capacity and industry-leading oligonucleotide yield-purity performance.

- Micromole purifications in a 5mm ID column body
- Substantial capacity in a small format
- Tunable selectivity control, like the DNAPac columns, for high resolution
- Compatible with high pH mobile phases, solvents, or high temperatures
- Ideal for therapeutic and diagnostic oligonucleotide research
- Purify difficult oligonucleotide products



The DNASwift column is a unique porous polymer monolith coated with functionalized latex nanobeads, optimized for oligonucleotide separations. The monolith, a polymer cylinder with interconnected flow through channels, provides fast mass transfer, low back pressure (for increased flow rates), very high capacity, and refined selectivity control.

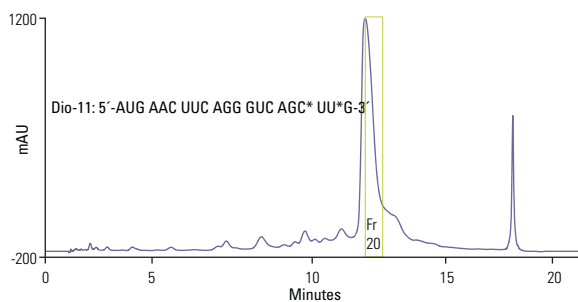
Tritylated oligonucleotide



DNASwift SAX-1S, 150 x 5.0mm

Mobile Phases A:	15mM Tris, pH 8
Mobile Phases B:	15mM Tris, pH 8, 1.25 M NaCl
Gradient:	8–64% B in 10 min
Flow Rate:	1.5mL/min
Injection Volume:	20µL
Detection:	UV, 260nm
Sample:	Derivatized mixed-base 20mer, 20mg/mL

Purification of a 21-base RNA Sample with aberrant 2'-5' linkages at the 1 and 3 positions from the 3' end



DNASwift SAX-1S, 150 x 5.0mm

Mobile Phase A:	40mM Tris, pH 7
Mobile Phase B:	40mM Tris, pH 7 + 1.25 M NaCl
Gradient:	26–42% B in 10 column volumes
Temperature:	30°C
Flow Rate:	1.5mL/min
Injection Volume:	125µg
Detection:	UV, 260nm

DNASwift SAX-1S

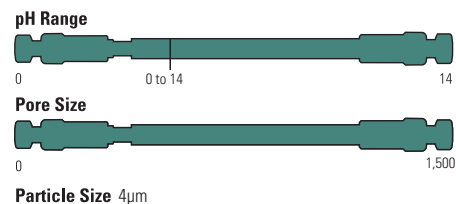
Length (mm)	5.0mm ID
150	066766

DNAPac RP

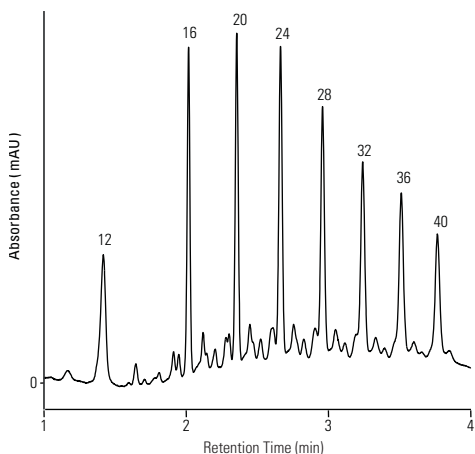
Reverse phase (RP) column specifically for analysis of oligonucleotides and double stranded (ds) DNA and RNA fragments.

- Excellent MS compatibility
- Wide operating pH range: 0–14
- High temperature stability: up to 110°C
- High throughput

The DNAPac RP is based on wide-pore, 4µm polymer particles. The unique column chemistry provides excellent performance under a broad range of pH (0-14), high temperature (up to 110°C) and mobile phase composition. The large pore size of the resin enables efficient separation of small to large oligonucleotides.



Fast analysis of mixed base DNA

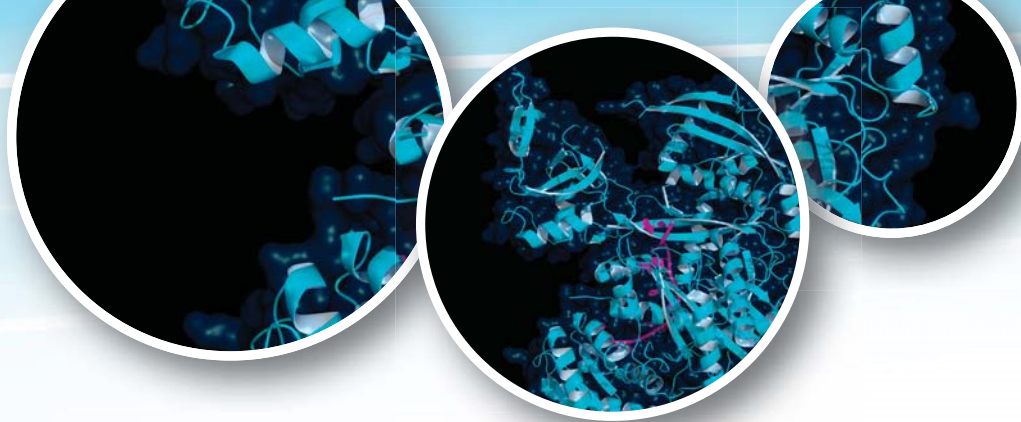


DNAPac RP, 4µm, 50 x 2.1mm

Mobile Phase A:	25 mM HAA, pH 8.5	
Mobile Phase B:	25 mM HAA, pH 8.5 / Acetonitrile (50:50 v/v)	
Gradient:	Time (min)	%A %B
	-0.1	67 33
	0.0	67 33
	3.0	41 59
	3.1	5 95
	4.9	5 95
	5.0	67 33
	8.5	67 33
Gradient Curve:	3	
Temperature:	65°C	
Flow Rate:	0.8mL/min	
Injection Volume:	4µL	
Detection:	UV, 260 nm	
Sample:	8-Combo DNA	
Peak Label:	Length of DNA	

DNAPac RP

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
4	Guard Cartridges (2/pk)	10	088925	088921
	HPLC Column	50	088924	088920
		100	088923	088919
	Guard Cartridge Holder		069580	069580



Nano, Capillary and Micro LC Columns

Delivering high performance separations to -omics research

Our columns have been specifically designed to combine high performance with ease of use. From the “plug and spray” EASY-Spray columns to the innovative nanoViper fitted Acclaim PepMap range and the Monolithic PepSwift and ProSwift columns.

- **LC-MS Compatible Formats**
Offering the highest sensitivity
- **1200 bar Compatible Nano Columns**
With increased length to increase peak capacity
- **Monolithic Polymer Phases**
For high throughput peptide and protein analysis



The Bio LC web page contains the latest news, applications and downloads for the nano, capillary and microbore range. Visit www.thermoscientific.com/columns

NanoLC

Technical Resources



visit www.thermoscientific.com/chromexpert
to access the following information:

- Application Areas by Column Format
- Chemistries



EASY-Spray Columns

“Plug and Spray” nano LC columns for routine and robust performance.

- Simple to use format
- Routine research methodology
- Excellent performance for peptide separations
- Available with wide pore phases and monoliths for the separation of intact proteins

Acclaim PepMap C18 100Å

Particle size (µm)	Length (mm)	50µm ID	75µm ID
2	150	ES801	ES804
	250	–	ES802
	500	–	ES803
	750	–	ES805
3	150	–	ES800

Acclaim PepMap C18 300Å

Particle size (µm)	Length (mm)	50µm ID	75µm ID
5	150	–	ES812

PepSwift

Length (mm)	200µm ID
250	ES810



EASY-Spray Emitters

Integrated sprayer coupled with a transfer line.

- Pre-made connections
- Easy installation in the MS Ion Source
- No chromatography required

EASY-Spray Emitters

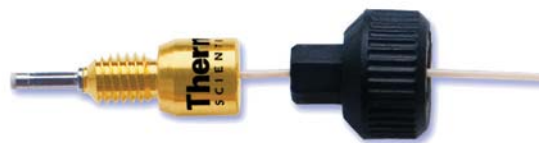
Description	Cat. No.
EASY-Spray Emitter, nanoflow (Emitter ID 7µm, Transfer line ID 20µm, Transfer line length 500mm)	ES791
EASY-Spray Emitter, microflow (Emitter ID 20µm, Transfer line ID 75µm, Transfer line length 500mm)	ES792



nanoViper Fingertight Fittings

Designed to be a virtually dead volume-free fingertight UHPLC fitting system.

- Provides virtually zero-dead-volume connections
- Compatible with backpressures up to 1000 bar (14,500 psi)
- Suitable for temperatures up to 80°C
- Easy to use 1/32" PEEK sheathed fused silica and fingertight design
- Works with virtually any valve and any column from any manufacturer



The nanoViper connections come preassembled and high pressure tested. The fittings do not “grab” the tubing at a single point. It seals at the tip and not with a ferrule. Nor does it “grab” the tubing at a single point. It is this feature that gives nanoViper fittings their UHPLC, virtually dead-volume-free capabilities.

nanoViper Fingertight Fittings

Length (mm)	Green 10µm ID	Orange 20µm ID	Brown 50µm ID	Black 75µm ID	Red 100µm ID	Purple 150µm ID
70	-	6041.5120	6041.5123	6041.5126	6041.5810	6041.5817
150	6041.5118*	6041.5121	6041.5124	6041.5127	6041.5811	6041.5818
250	-	-	-	6041.5730	6041.5812	6041.5819
350	-	6041.5240	6041.5540	6041.5735	6041.5813	6041.5820
450	-	-	-	-	6041.5814	6041.5821
550	-	6041.5260	6041.5560	6041.5760	6041.5815	6041.5822
650	-	6041.5275	6041.5575	6041.5775	6041.5824	-
750	-	6041.5280	6041.5580	6041.5780	6041.5816	6041.5823
850	-	-	-	6041.5785	-	-
950	-	6041.5122	6041.5125	6041.5128	-	-
1100	-	-	-	6041.5711	-	-

*180mm Length

Trap Column Cartridges Holders with nanoViper Fittings

Description	Cartridge Length (mm)	Fitting ID (µm)	Cat. No.
µ-Precolumn holder for trap cartridges with 2 x 100mm length nanoViper fittings	5	30	164649
	15	75	164650

Sample Loops with nanoViper Fittings

Volume (µL)	Cat. No.	Quantity
1	6826.2401	1 Each
5	6826.2405	1 Each
10	6826.2410	1 Each
20	6826.2420	1 Each
50	6826.2450	1 Each
125	6826.2412	1 Each

Find out more about how SMART Digest Kits can benefit your workflow at:
www.thermoscientific.com/SMARTdigest



nanoViper Application Kits

nanoViper fittings are also included in tubing and application kits designed for use with the UltiMate 3000 RSLCnano systems.

nanoViper Fitting Kits for UltiMate 3000 RSLCnano Systems

Description	Tubing	Samples	Trap Column	Separation Column	RSLCnano Systems
Direct Injection nano LC Kit	Y	Y	–	Y	6720.0300
Direct Injection capillary LC Kit	Y	Y	–	Y	6720.0305
Preconcentration nano LC kit	Y	Y	Y	Y	6720.0310
Preconcentration capillary LC kit	Y	Y	Y	Y	6720.0315
Preconcentration monolithic LC kit	Y	Y	Y	Y	6720.0320
2D salt plugs kit	Y	Y	Y	Y	6720.0325
Automated off line SCX-RP peptides kit	Y	Y	Y	Y	6720.0330
Automated off line RP-RP peptides kit	Y	Y	Y	Y	6720.0340
Tandem nano LC kit	Y	Y	Y	Y	6720.0335
FLM nanoViper tubing kit (All tubing for nano LC preconcentration)	Y	–	–	–	6041.5100
MS connection kit	Y	–	–	–	6720.0345
EASY-Spray connection kit (Supports direct injection as well as preconcentration)	Y	Y	Y	–	6720.0395



Acclaim PepMap NanoLC columns

The standard for peptide separations in proteomics

- High-resolution protein identification
- Highest sensitivity in LC-MS
- Fitted with nanoViper fittings as standard



Acclaim PepMap C18 100Å

Particle size (µm)	Length (mm)	nanoViper Column				nanoViper FS
		50µm ID	75µm ID	300µm ID	1000µm ID	75µm ID
2	50	164561	164563	164560	164454	–
	150	164562	164534	164537	164711	164769
	250	164709	164536	–	–	164734
	500	164710	164540	–	–	164738
3	50	164712	164567	164716	164717	–
	150	164713	164568	164571	164572	164738
	250	164714	164569	–	–	–
	500	164715	164570	–	–	164739
	750	–	–	–	–	164939
5	50	–	–	164901	164899	–
	150	–	–	164902	164900	–

Note: nanoViper FS Columns have 45mm of Fused Silica for use with PEEK sleeves and Microtight unions

Acclaim PepMap C8 100Å

Particle size (µm)	Length (mm)	nanoViper Column			
		50µm ID	75µm ID	300µm ID	1000µm ID
3	150	–	164706	164722	164723

Acclaim PepMap C4 300Å

Particle size (µm)	Length (mm)	nanoViper Column			
		50µm ID	75µm ID	300µm ID	1000µm ID
5	150	–	164707	164720	164721

Acclaim PepMap C18 300 Å

Particle size (µm)	Length (mm)	nanoViper Column			
		50µm ID	75µm ID	300µm ID	1000µm ID
5	150	–	164708	164718	164719

Accucore NanoLC Columns

Accucore 150-C18

		nanoViper Column
Particle size (µm)	Length (mm)	75µm ID
2.6	150	16126-157569
	500	16126-507569

Accucore 150-C4

		nanoViper Column
Particle size (µm)	Length (mm)	75µm ID
2.6	150	16526-157569
	500	16526-507569

Accucore 150-Amide-HILIC

		nanoViper Column
Particle size (µm)	Length (mm)	75µm ID
2.6	150	16726-157569



MSPac™ DS-10 MS Desalter Cartridge

Built for LC-MS compatibility

- High confidence with low peak carryover
- Antibody and protein desalting with a high load capacity
- High pH stability: 0 - 14
- IEX, pH-gradient, SEC fraction use
- MS sensitivity improvement



MSPac DS-10 MS Desalter Cartridge

Item	Cat. No.
Desalter Cartridge - 2 Pack	089170
Cartridge Holder	069580

Monolithic Capillary and Micro HPLC Columns

High-speed peptide and protein separations

- High-resolution for protein identification, biomarker discovery, and systems biology
- High column-to-column reproducibility
- nanoViper fittings for easy column installation

The monolithic structure offers a high-quality alternative to traditional microparticulate sorbents, providing important advantages to the chromatographic separation. High-sensitivity proteomics and biotech applications are easily performed using these columns.



PepSwift

Length (mm)	PepSwift		
	100µm ID	200µm ID	500µm ID
5	–	164558	–
50	164584	164557	164585
250	164543	164542	–

ProSwift RP-4H

Length (mm)	ProSwift		
	100µm ID	200µm ID	500µm ID
100	–	–	164925
250	164922	164923	–
500	164921	–	–

ProSwift C4 RP-5H

Length (mm)	ProSwift		
	100µm ID	200µm ID	500µm ID
100	–	–	164931
250	164929	164930	164932
500	164928	–	–



Trap columns – nano trap design

Acclaim PepMap C18 100Å

Type	Part number	Particle Size	ID	Bed Length (mm)	Total Length	Quantity
nanoViper Column	164535	3	75	20	150	2 Pack
	164705	3	75	20	70	2 Pack
	164564	5	100	20	150	2 Pack
Classic Column	164197	5	100	10	150	2 Pack
	164199	5	100	20	150	2 Pack
	164213	5	200	20	150	2 Pack

Note: 164705 is a shorter total length used for vented column set up for example with EASY nLC 1000

Trap Columns – Cartridge (Set of 5)



Acclaim PepMap C18 100Å

Length (mm)	300µm ID	1000µm ID
5	160454	160434
15	–	160438

Acclaim PepMap C8 100Å

Length (mm)	300µm ID
5	161194

Acclaim PepMap C4 300Å

Length (mm)	300µm ID
5	163591

Acclaim PepMap C18 300Å

Length (mm)	300µm ID
5	163589

Accucore 150-C18

Length (mm)	300µm ID
5	16126-900379

Accucore 150-C4

Length (mm)	300µm ID
5	16526-900379

Accucore 150-Amide-HILIC

Length (mm)	300µm ID
5	16726-900379

µ-Precolumn™ holder, 5mm, with 30µm ID connecting tubing, nanoViper fittings

Length (mm)	300µm ID
5	164649



1st dimension columns for 2D separations

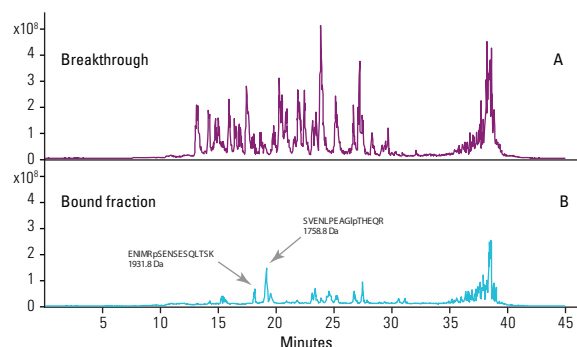
Improving separation efficiency with multidimensional analysis.

There are dedicated application kits which utilize either SCX or RP as the first dimension
 A TiO₂ trapping column can be added to the application for phosphopeptide analysis

1st dimension columns

Chemistry	Part Number	Description	Application
SCX	164565	300µm ID x 10cm, packed with Poros 10 S, nanoViper column	2D Salt plugs
	164566	1.0mm ID x 15cm, packed with Polysulfoethyl ASP, 5µm, 300Å, nanoViper column	Automated off-line 2D LC of Peptides, micro SCX x nano RP
RP	164592	300µm ID x 15cm, packed with Acclaim PA2, nanoViper column	Automated off-line 2D LC, Cap RP (basic) x Nan RP (acidic)
TiO ₂	164205	100µm ID x 1cm packed with TiO ₂	Phosphopeptide analysis
	164215	200µm ID x 1cm packed with TiO ₂	Phosphopeptide analysis

Isolation of two synthetic phosphopeptides from a BSA tryptic digest



Trap Column: 200µm ID x 1cm, packed with TiO₂, 5µm
100µm ID x 1cm, packed with Acclaim PepMap C18, 5µm
Separation Column: Acclaim PepMap C18, 3µm, 75µm x 15cm
Loading Solvent: 0.05% HFBA in DI H ₂ O
Wash Solvent: 0.01% HFBA in DI H ₂ O
Mobile Phase A: 0.05% TFA in DI H ₂ O
Mobile Phase B: 0.04% TFA in acetonitrile/ DI H ₂ O (80:20 v/v)
TiO ₂ Trap
Mobile Phase: 250mM NH ₄ HCO ₃ in DI H ₂ O, pH 9.0
Gradient: 3–40% acetonitrile in 30 min
Flow Rate: 300nL/min
Loading Flow: 8µL/min
Injection Volume: 5µL
Detection: MS

EASY-Columns

Excellence in nanoscale separations

- Compatible with any nanoscale HPLC system
- Simple, flexible design

EASY-Column capillary LC columns are produced with a focus on design simplicity using metal-free fused capillaries and can be used on any nano LC system



EASY-Columns

Description	Cat. No.	Quantity
EASY-Column, 2cm, ID 100µm, 5µm, C18-A1 (Trap column)	SC001	3 Pack
EASY-Column, 10cm, ID 75µm, 3µm, C18-A2 (Analytical column)	SC200	1 Each
EASY-Column, 10cm, ID 75µm, 3µm, C18-A2 (Analytical column)	SC2003	3 Pack
HPLC-to-Column Connector kit Zero-dead-volume union (1/32in OD tubing), 10x SC603	SC600	1 Each
A/B Mixing Tee & Venting Tee for two-column setup Nanoliter-dead-volume tee (1/32in OD tubing), 10 sleeves for 360µm OD fused silica (10xSC603).	SC601	1 Each
Connector Kit for two-column setup Zero-dead-volume union (1/32in OD tubing), Nanoliter-dead-volume tee (1/32 inch OD tubing), 10x SC603	SC602	1 Each
Sleeves (2cm, 1/32in OD) for 360µm OD fused silica	SC603	30 Pack

Nano Instruments

Thermo Scientific nanoLC systems offer market leading performance and integrate seamlessly with all Thermo Scientific nanoESI sources and MS families



EASY-nLC1200

Operational simplicity and excellent performance

- Increased robustness
- Improved performance at 1200 bar
- Improved throughput
- Intelligent maintenance

EASY-nLC1200

Operational simplicity and excellent performance

- Easily configured for routine nano LC
- Wide range of flows available from 20nL/min to 50 μ L/min
- Customized application set up easily established



For more product information visit our website:
www.thermoscientific.com/en/products/nano-capillary-systems.html

LC Columns and Accessories

As a leader in LC column technology including silica, polymer and porous graphitic carbon manufacturing, bonded phase production and column packing for 40 years, you can rely on the quality of Thermo Scientific HPLC products. Here, we showcase our latest and most comprehensive range of innovative columns, accessories and equipment for fast LC, analytical HPLC and UHPLC.

Featured Products



Accucore

Solid core particles enabling high speed, high resolution separations with back pressures significantly lower than those associated with UHPLC.

PAGE 4-005



Hypersil GOLD

Thermo Scientific™ Hypersil GOLD™ columns offers chromatographers outstanding peak shape for reversed phase, ion exchange, HILIC or normal phase chromatography.

PAGE 4-020



Section Contents

Accucore HPLC and UHPLC Columns	4-005	Synchronis HPLC and UHPLC Columns	4-062
Hypersil GOLD HPLC and UHPLC Columns	4-020	Hypersil BDS and Hypersil Classical HPLC Columns	4-070
Acclaim HPLC and UHPLC Columns	4-034	LC Accessories	4-078
Application Specific HPLC Columns	4-048	LC Reagents	4-098
Hypercarb HPLC Columns	4-059	LC and LC-MS Instruments	4-108



Acclaim

Acclaim columns are based on high-purity, porous silica particles with advanced and innovative column bonding technologies. This provides complementary selectivity, high column efficiencies and symmetrical peaks.

PAGE 4-034



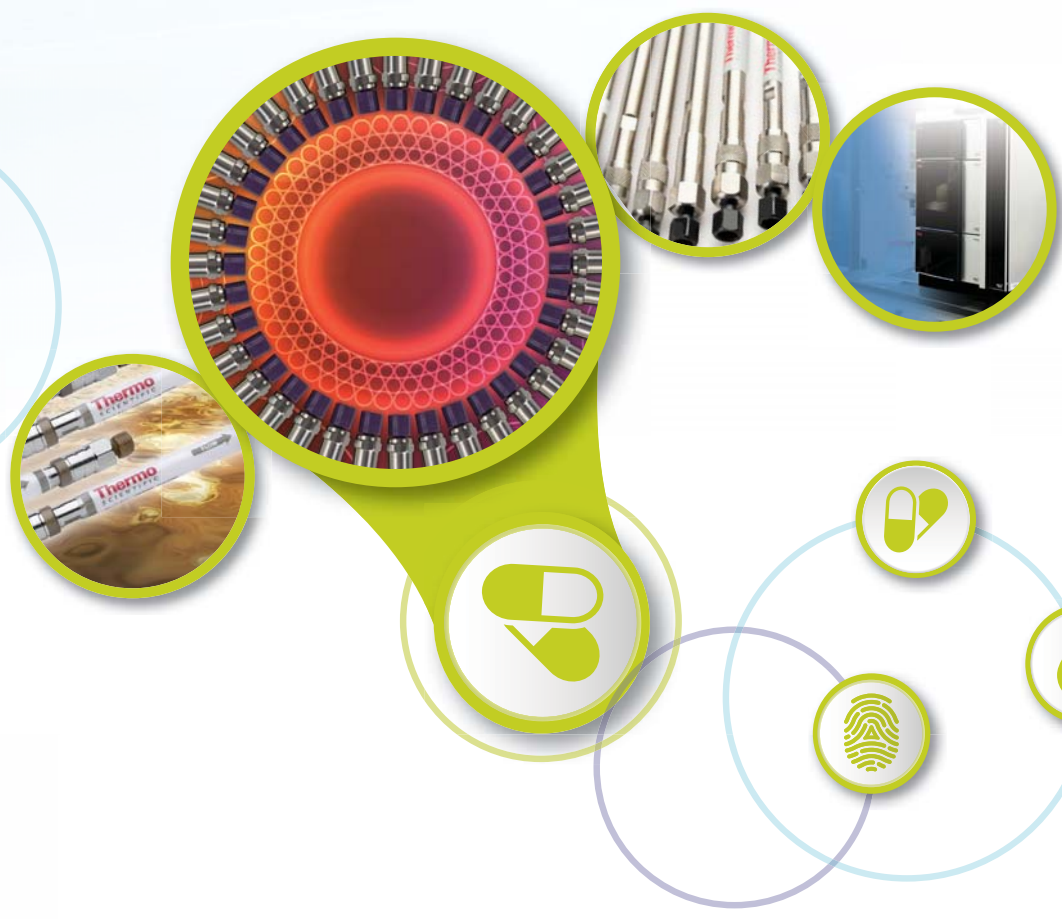
Viper

Maximize liquid chromatography (LC) performance and get zero-dead-volume connections to ensure optimal separations.

PAGE 4-078

LC Columns

Technical Resources



visit www.thermoscientific.com/chromexpert to access the following information:






- HPLC Column Selection
- HPLC Column Selection by US Pharmacopeia Specifications
- Thermo Scientific HPLC Phases
- HPLC Column Selection by Manufacturer
- Method Transfer
- Scaling a Method Up or Down
- HPLC Troubleshooting
- HPLC Definitions and Equations
- Selecting the Correct Buffer
- Preparation of Mobile Phases
- Solvent Properties
- Chromophore Detection Wavelengths
- Column Cleaning and Regeneration



Columns for Fast and Analytical HPLC

The Thermo Scientific LC column portfolio offers a comprehensive range of high quality options for fast and analytical HPLC and UHPLC.

The table below shows our leading column families with details of relative hydrophobicity, key attributes and how the attributes are achieved. Use this table and the information in the subsequent catalogue pages to find the best Thermo Scientific LC columns for your separation needs.

Hydrophobicity		Key Attribute	Achieved through
Low	Accucore Columns Page 4-005 	Ultimate Performance	<ul style="list-style-type: none"> 1.5, 2.6 and 4µm solid core silica particles Core Enhanced Technology
	Hypersil GOLD Columns Page 4-020 	Selectivity & Peak Shape	<ul style="list-style-type: none"> 1.9, 3, 5 and 12µm ultra-high purity silica particles Wide range of conventional phases
Medium/High	Acclaim Columns Page 4-034 	Traditional, Speciality & Application Specific Phases	<ul style="list-style-type: none"> 2.2, 3 and 5µm ultra-pure silica particles Innovative and unique bonded phases
High	Synchronis Columns Page 4-062 	Ruggedness & Reproducibility	<ul style="list-style-type: none"> 1.7, 3 and 5µm high surface area silica particles Dense bonding, double endcapping, rigorous testing
Very High	Hypercarb Columns Page 4-059 	Extended Separation Capabilities	<ul style="list-style-type: none"> 3 and 5µm 100% porous graphitic carbon particles Polar retention effect on graphite (PREG)



Accucore HPLC and UHPLC Columns

Ultimate Core Performance – Speed and Selectivity Combined

Thermo Scientific™ Accucore™ HPLC and UHPLC columns are a family of high speed, high resolution columns based on Core Enhanced Technology™.

- **Next-Generation Accucore Vanquish UHPLC Columns**
Combines the benefits of a solid core material and the increased chromatographic efficiency of a sub-2 μ m particle
- **Solid Core Particles**
With a solid central core and porous outer layer, these particles generate high speed, high resolution separations without excessive backpressure
- **Tight Control of Particle Diameter**
Enhanced selection process keeps particle size distribution to a minimum and produces high efficiency columns



The Accucore web page contains the latest news, applications and downloads for the Accucore HPLC and UHPLC column range. Visit www.thermoscientific.com/accucore

Accucore Vanquish

Powerful separations are our core performance

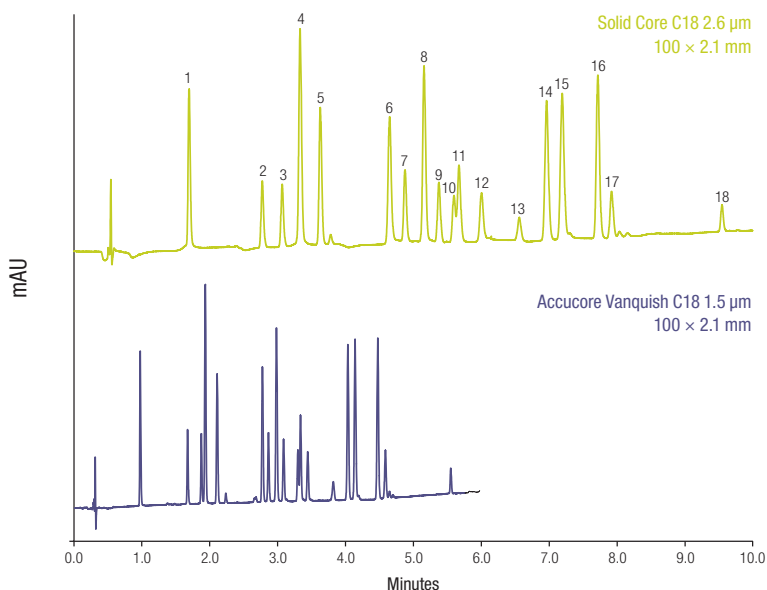
Thermo Scientific™ Accucore™ Vanquish™ UHPLC columns provide a robust chromatography solution to enhance laboratory workflows and productivity. These columns, in combination with Vanquish UHPLC systems, deliver powerful separations to solve your analytical challenges faster and more effectively.

These next-generation UHPLC columns feature 1.5µm solid core particles and combine the benefits of a solid core material and the increased chromatographic efficiency of a sub-2µm particle.

Modern analytical laboratories continue to be driven towards higher throughput workflows which require better separations, more results and easier interaction at a reduced cost. Accucore Vanquish UHPLC columns enable you to achieve this by delivering:

Better separations

The high efficiency offered by Accucore Vanquish UHPLC columns enables the resolution of very complex mixtures.

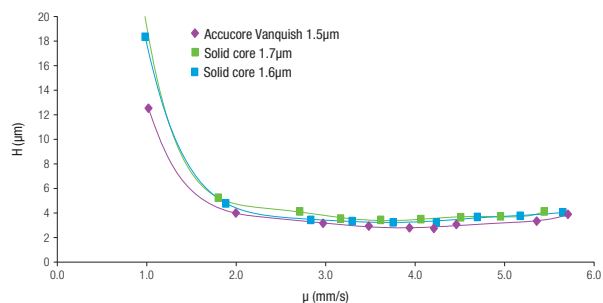


Comparison of separation of 18 pesticides using Accucore Vanquish 1.5µm column to a larger particle size solid core column

Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Gradient:	Solid core C18 2.6µm 100 x 2.1mm
Time (min)	%B
0	20
6.9	40
12.1	80
	Accucore Vanquish C18 1.5µm 100 x 2.1mm
Time (min)	%B
0	20
4	40
7	80
Temperature:	43°C
Flow Rate:	Solid Core C18 2.6µm 100 x 2.1mm = 380µL/min
	Accucore Vanquish C18 1.5µm 100 x 2.1mm = 650µL/min
Injection Volume:	0.5µL
Detection:	UV, 230nm (0.1s rise time, 50Hz)
Analytes:	1. Desethylatrazine 10. Diuron 2. Metoxuron 11. Isoproturon 3. Hexazinone 12. Metobromuron 4. Simazine 13. Metazachlor 5. Cyanazine 14. Sebutylazin 6. Methabenzthiazuron 15. Propazine 7. Chlorotoluron 16. Terbutylazine 8. Atrazine 17. Linuron 9. Monolinuron 18. Metolachlor

More results

High efficiency is maintained even at high flow rates enabling fast reproducible separations.

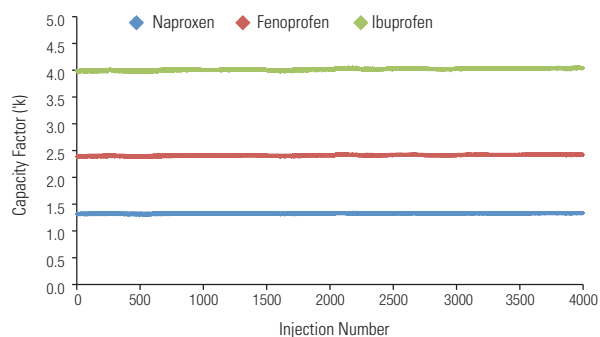


Accucore Vanquish C18, 1.5µm Solid Core C18 1.7µm Solid Core C18 1.6µm

Mobile Phase:	Water:acetonitrile (50:50)
Temperature:	30°C
Flow Rate:	0.1 to 0.6mL/min

Reproducibility

The advanced bonding and automated packing technology used in the manufacture of Accucore Vanquish UHPLC columns results in exceptionally reproducible chromatography.



Accucore Vanquish C18 1.5µm

Mobile Phase:	Acetonitrile:20 mM ammonium formate pH 3.0 (50:50)
Temperature:	30°C
Flow Rate:	0.4mL/min

%RSD for 4000 injections	Naproxen	Fenoprofen	Ibuprofen
Retention time	0.19	0.25	0.29
Capacity factor	0.41	0.42	0.41
Efficiency	2.94	2.74	2.80
Asymmetry	0.92	0.87	1.09
Peak area	0.53	0.50	0.55
Peak height	1.13	1.02	0.91
Pressure	0.53		

- RSD for retention time less than 0.3%
- RSD for peak area less than 0.6%
- RSD for peak height less than 1.2%
- Column pressure stable over 4000 injections (RSD 0.53%)
- Pressure 500 bar

Easier interaction

Accucore Vanquish UHPLC columns, the Vanquish UHPLC System and the Thermo Scientific™ Dionex™ Chromleon™ Chromatography Data System are combined into a seamless workflow solution, which allows for simple and easy to implement separations.

Accucore Vanquish

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18+
1.5	UHPLC Column	50	2.1	27101-052130
		100	2.1	27101-102130
		150	2.1	27101-152130

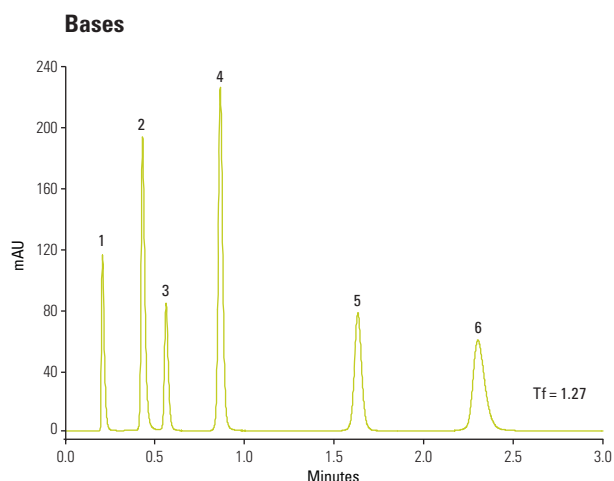
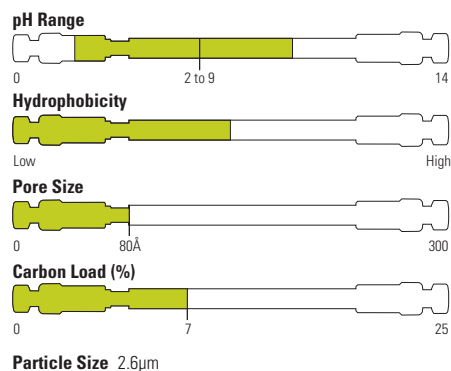
Accucore RP-MS

- Optimized for MS detection
- Excellent peak shapes
- Excellent combination of speed and efficiency

Accucore RP-MS uses an optimized alkyl chain length for more effective coverage of the silica surface. This coverage results in a significant reduction in non-hydrophobic interactions and thus highly efficient peaks with very low tailing.

RP-MS offers slightly lower retention than C18 and this combined with high efficiencies and low peak tailing make this the phase of choice for use with MS detection.

The selectivity offered by Accucore RP-MS matches that of C18 columns.



Accucore RP-MS 2.6μm, 50mm x 2.1mm

Mobile Phase:	65% Methanol / 35% 25mM Potassium Phosphate pH7.0
Temperature:	30°C
Flow Rate:	500μL/min
Injection Volume:	1μL
Backpressure:	232 bar
Detection:	UV, 215nm
Analytes:	1. Uracil 2. Propranolol 3. Butylparaben 4. Naphthalene 5. Acenaphthene 6. Amitriptyline

Accucore RP-MS

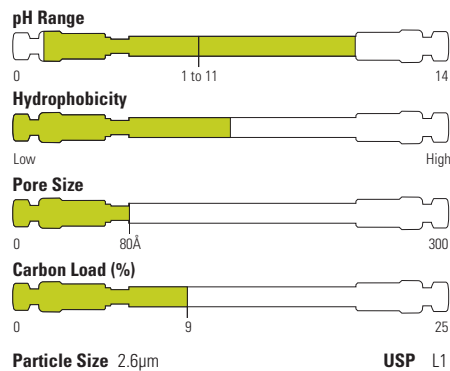
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17626-012105	17626-013005	17626-014005
	HPLC Column	30	17626-032130	-	-
		50	17626-052130	17626-053030	17626-054630
		100	17626-102130	17626-103030	17626-104630
		150	17626-152130	17626-153030	17626-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C18

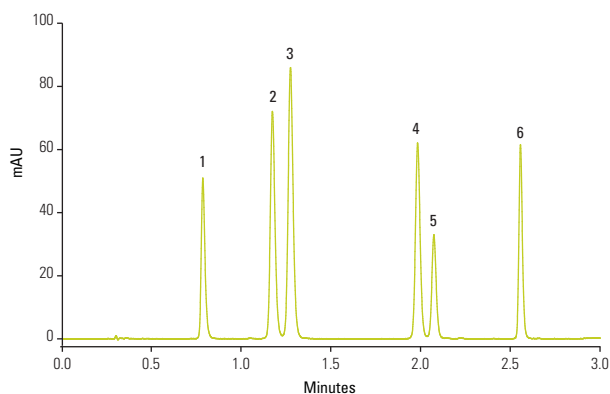
- Optimum retention of non-polar compounds
- Hydrophobic interaction mechanism
- Separates a broad range of analytes

The carbon loading of Accucore C18 phase provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism.

The highly retentive nature of Accucore C18 phase means that it can be used to separate a broad range of analytes.



Triazines



Accucore C18 2.6µm, 50mm x 2.1mm

Mobile Phase A:	Water	
Mobile Phase B:	Acetonitrile	
Gradient:	Time (min)	%B
	1.0	35
	2.5	70
Temperature:	25°C	
Flow Rate:	600µL/min	
Injection Volume:	2µL	
Backpressure:	298 bar	
Detection:	UV, 280nm	
Analytes:	1.	Simazine
	2.	Simetryn
	3.	Atrazine
	4.	Ametryn
	5.	Propazine
	6.	Prometryn

Accucore C18

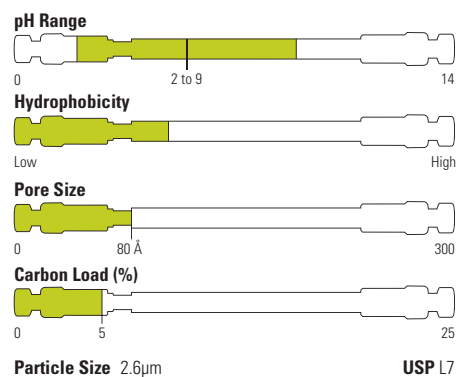
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17126-012105	17126-013005	17126-014005
	HPLC Column	30	17126-032130	-	-
		50	17126-052130	17126-053030	17126-054630
		100	17126-102130	17126-103030	17126-104630
		150	17126-152130	17126-153030	17126-154630
4	Drop-in Guard (4/pk)	10	74104-012101	74104-013001	74104-014001
	HPLC Column	50	74104-052130	74104-053030	74104-054630
		100	74104-102130	74104-103030	74104-104630
		150	74104-152130	74104-153030	74104-154630
		250	74104-252130	74104-253030	74104-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C8

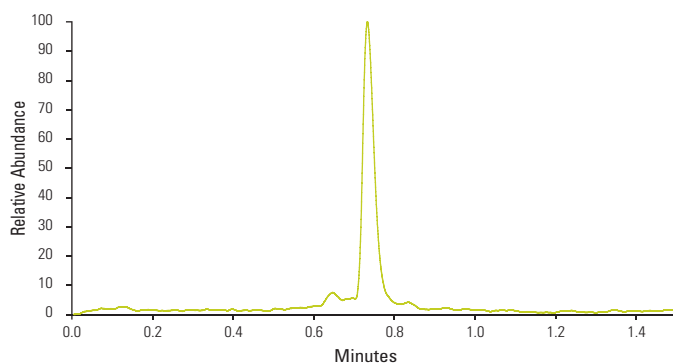
- Lower hydrophobic retention
- Complementary steric selectivity to C18
- Low levels of secondary interactions
- Recommended for moderately polar analytes

Accucore C8 HPLC columns offer lower hydrophobic retention than columns packed with longer alkyl chain length material, such as C18, and are therefore recommended for analytes with medium hydrophobicity or when a less hydrophobic phase provides optimum retention.

The low levels of secondary interactions demonstrated in the phase characterization are the result of excellent bonded phase coverage and allow users of Accucore C8 HPLC columns to benefit from excellent peak shapes.



Testosterone



Accucore C8 2.6µm, 50 x 2.1mm

Mobile Phase A:	Water + 0.1% formic acid
Mobile Phase B:	Acetonitrile + 0.1% formic acid
Gradient:	5–95 % B in 0.8 minutes
Temperature:	60°C
Flow Rate:	1500µL/min
Injection Volume:	5µL
Detection:	ESI-MS/MS

Retention time (tR /min)	0.73
%RSD tR	0.22
%RSD Area	3.01

Data from six injections.

Accucore C8

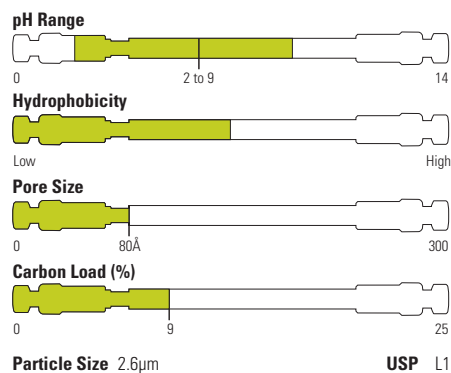
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17226-012105	17226-013005	17226-014005
	HPLC Column	30	17226-032130	-	-
		50	17226-052130	17226-053030	17226-054630
		100	17226-102130	17226-103030	17226-104630
		150	17226-152130	17226-153030	17226-154630
4	Drop-in Guard (4/pk)	10	74204-012101	74204-013001	74204-014001
	HPLC Column	50	74204-052130	74204-053030	74204-054630
		100	74204-102130	74204-103030	74204-104630
		150	74204-152130	74204-153030	74204-154630
		250	74204-252130	74204-253030	74204-254630
		UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00

Accucore aQ

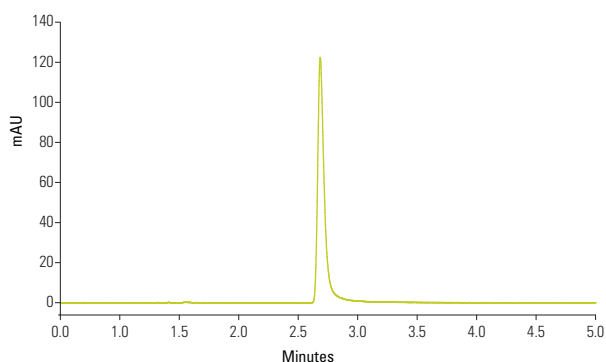
- Retention and resolution of polar analytes
- Polar endcapped C18 stationary phase for alternative selectivity
- Ideal for highly aqueous mobile phases

The polar functional group used to endcap Accucore aQ phase provides an additional controlled interaction mechanism by which polar compounds can be retained and resolved, making the Accucore aQ phase ideal for the quantitative analysis of trace levels of polar analytes.

The wettability of reversed phase media can be increased by the introduction of polar functional groups. The polar endcapping of Accucore aQ media also makes it usable in 100% aqueous mobile phases without the risk of loss of performance or poor stability.



Lamivudine (USP)



Accucore aQ 2.6µm, 50mm x 2.1mm

Mobile Phase: 95:5 (v/v) Ammonium Acetate, pH 3.80 / Methanol

Temperature: 35°C

Flow Rate: 200µL/min

Injection Volume: 1µL

Detection: UV, 277nm

Analytes: Lamivudine

Asymmetry 1.36

%RSD t_r 0.00

%RSD Peak area 1.72

(%RSD calculated from 6 replicate injections)

USP acceptance criteria: % RSD (t_r , Peak Area) <2.0

Accucore aQ

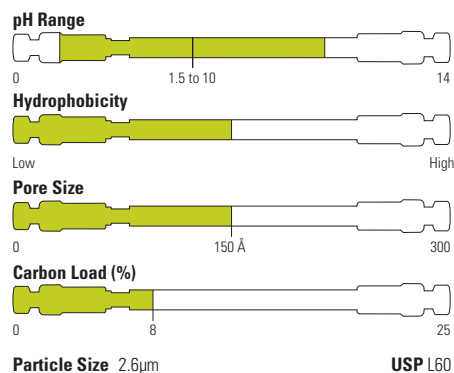
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17326-012105	17326-013005	17326-014005
	HPLC Column	30	17326-032130	-	-
		50	17326-052130	17326-053030	17326-054630
		100	17326-102130	17326-103030	17326-104630
		150	17326-152130	17326-153030	17326-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Polar Premium

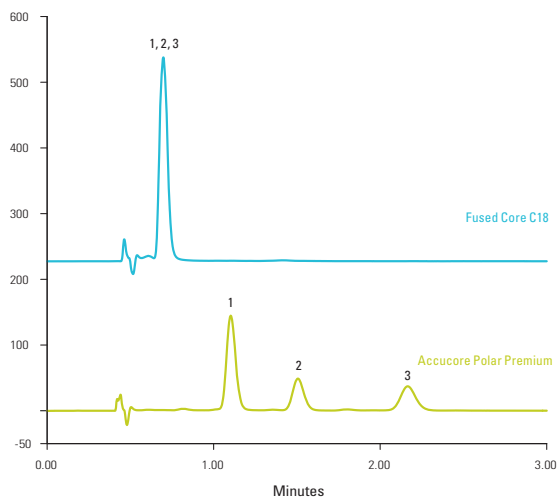
- Rugged amide-embedded C18 phase
- Selectivity complementary to conventional C18 phases
- Stable over a wide pH range and compatible with 100% aqueous mobile phase

Accucore Polar Premium is an exceptionally rugged polar embedded reverse phase material that offers high efficiency, wider operating pH range and unique selectivity complementary to standard C18 phases.

The specially designed bonded phase is stable from pH 1.5 to 10.5 and will not undergo phase collapse in 100% aqueous mobile phase.



Curcuminoids (Turmeric)



Accucore Polar Premium 2.6µm, 100 x 3.0mm Fused Core C18, 100 x 3.0mm

Mobile Phase:	Methanol : 10mM Phosphoric Acid, 80 : 20
Temperature:	40°C
Flow Rate:	800µL/min
Injection Volume:	6µL
Detection:	UV, 428nm
Analytes:	1. Curcumin 2. Desmethoxycurcumin 3. Bis-desmethoxycurcumin

The Accucore Polar Premium HPLC column provides desirable selectivity that resolves the major and minor component under simple isocratic conditions in less than three minutes, while the C18 columns fail to separate these components.

Accucore Polar Premium

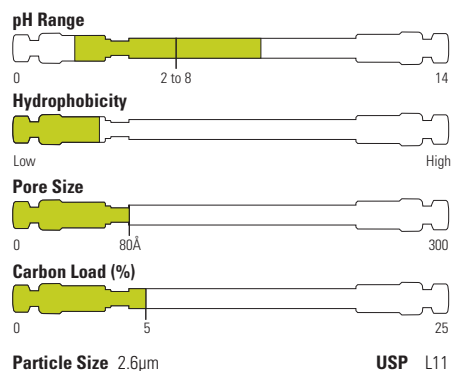
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	28026-012105	-	-
	HPLC Column	50	28026-052130	28026-053030	28026-054630
		100	28026-102130	28026-103030	28026-104630
		150	28026-152130	28026-153030	28026-154630
		250	28026-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Phenyl-Hexyl

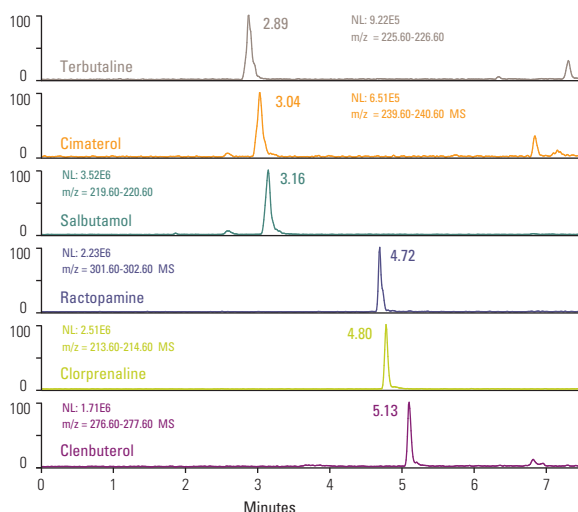
- Mixed-mode selectivity for aromatic and moderately polar analytes
- Enhanced pi-pi interactions with aromatics
- Moderate hydrophobicity

The C6 chain in Accucore Phenyl-Hexyl phase exhibits classical RP retention and selectivity, while the phenyl ring can add special selectivity by interacting with polar groups within the solutes. This results in a mixed-mode separation mechanism. The reduced hydrophobicity of this phase makes it ideal for the separation of very non-polar compounds.

The Phenyl-Hexyl phase should be selected for complex samples where some peaks are well resolved on a conventional alkyl phases, but are not well resolved on a conventional phenyl phase, or when other peaks are well resolved on a phenyl phase, but not well resolved on a conventional alkyl phase.



Beta-agonists



Accucore Phenyl-Hexyl 2.6µm, 100mm x 2.1mm

Mobile Phase A:	Ammonium Acetate 5mM, pH 4
Mobile Phase B:	Acetonitrile
Gradient:	Time (min) %B
	0 5
	1 5
	10 100
Temperature:	40°C
Flow Rate:	0.25mL/min
Injection Volume:	1µL
Backpressure:	120 bar (at t0)
Detection:	+ESI-MS (45°C, 4.5kV, 60V, scan 150 – 350)

Accucore Phenyl-Hexyl

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17926-012105	17926-013005	17926-014005
		HPLC Column	30	17926-032130	-
		50	17926-052130	17926-053030	17926-054630
		100	17926-102130	17926-103030	17926-104630
		150	17926-152130	17926-153030	17926-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

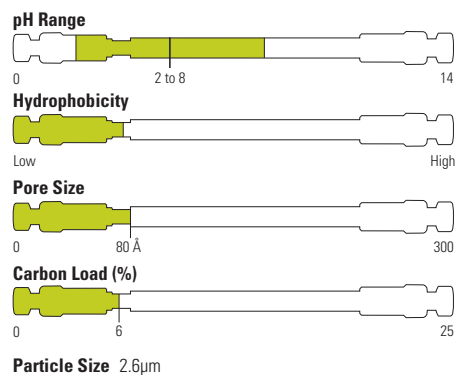
Accucore Phenyl-X

- Unique reversed-phase shape selectivity
- Enhanced selectivity for aromatic compounds
- Compatible with highly aqueous mobile phases
- Robust, high-efficiency, low column bleed

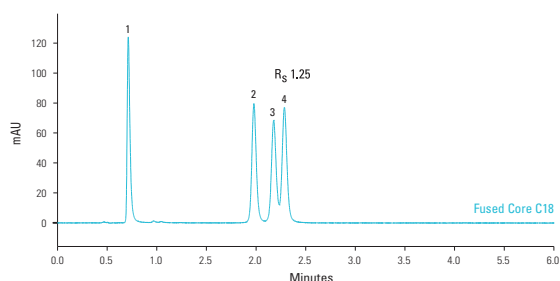
The proprietary Accucore Phenyl-X alkyl aromatic bonded phase provides a unique selectivity when compared to other reversed phase materials such as C18 or Phenyl.

The advanced design of the bonded phase makes it compatible with highly aqueous mobile phases and robust, demonstrating very low bleed.

Phenyl-X exhibits particularly high aromatic selectivity.

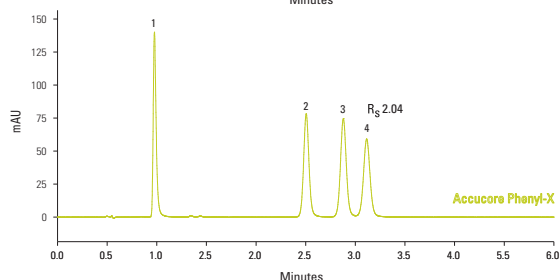


Estrogens

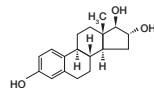


Accucore Phenyl-X 2.6µm, 100 x 2.1mm Fused Core C18, 100 x 2.1mm

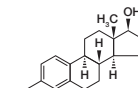
Mobile Phase: 15:40:45 (v/v) Acetonitrile:Methanol:Water
 Temperature: 40°C
 Flow Rate: 400µL/min
 Injection Volume: 1µL
 Detection: UV, 220nm



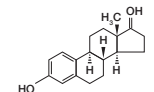
1. Estriol (E3)



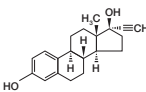
2. Estradiol (E2)



3. Estrone (E1)



4. Ethynylestradiol



Accucore Phenyl-X

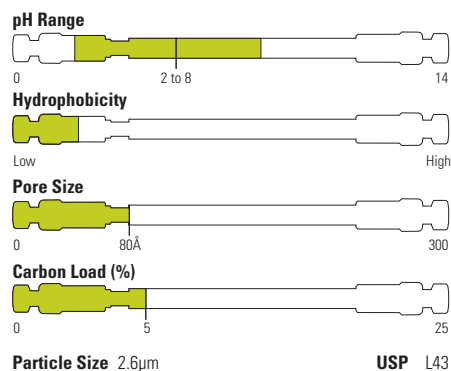
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27926-012105	-	-
	HPLC Column	50	27926-052130	27926-053030	27926-054630
		100	27926-102130	27926-103030	27926-104630
		150	27926-152130	27926-153030	27926-154630
		250	27926-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore PFP

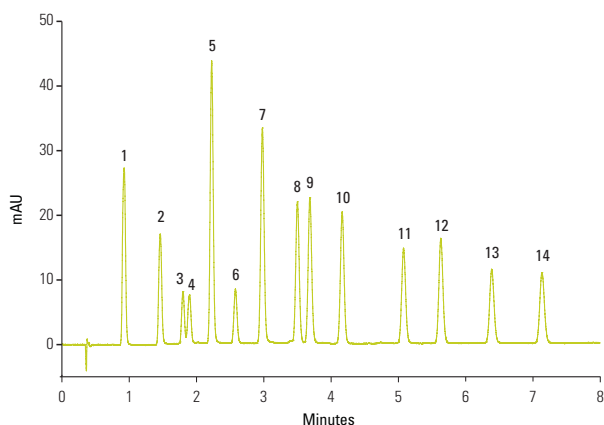
- Alternative selectivity to C18
- Extra retention for halogenated species
- Unique selectivity for non-halogenated polar compounds

The introduction of fluorine groups into the Accucore PFP (pentafluorophenyl) stationary phase causes significant changes in solute-stationary phase interactions. This can lead to extra retention and selectivity for positional isomers of halogenated compounds.

PFP Columns are also well suited to the selective analysis of non-halogenated compounds, in particular polar compounds containing hydroxyl, carboxyl, nitro, or other polar groups. High selectivity is often most apparent when the functional groups are located on an aromatic or other rigid ring system.



Positional isomers



Accucore PFP 2.6µm, 50mm x 2.1mm

Mobile Phase A:	0.1% Formic Acid in Water
Mobile Phase B:	0.1% Formic Acid in Acetonitrile
Gradient:	15-30%B in 7 minutes
Temperature:	50°C
Flow Rate:	600µL/min
Injection Volume:	2µL
Detection:	UV, 270nm
Analytes:	1. 3,4 – Dimethoxyphenol 2. 2,6 – Dimethoxyphenol 3. 2,6 – Difluorophenol 4. 3,5 – Dimethoxyphenol 5. 2,4 – Difluorophenol 6. 2,3 – Difluorophenol 7. 3,4 – Difluorophenol 8. 3,5 – Dimethylphenol 9. 2,6 – Dimethylphenol 10. 2,6 – Dichlorophenol 11. 4 – Chloro-3-Methylphenol 12. 4 – Chloro-2-Methylphenol 13. 3,4 – Dichlorophenol 14. 3,5 – Dichlorophenol

Accucore PFP

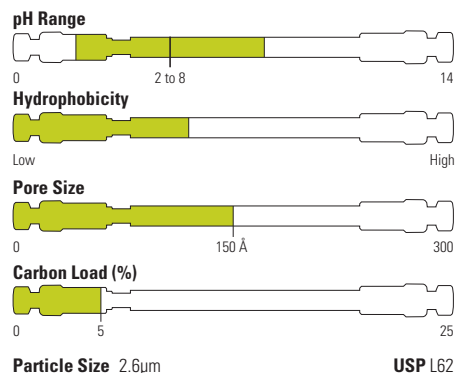
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17426-012105	17426-013005	17426-014005
	HPLC Column	30	17426-032130	-	-
		50	17426-052130	17426-053030	17426-054630
		100	17426-102130	17426-103030	17426-104630
		150	17426-152130	17426-153030	17426-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C30

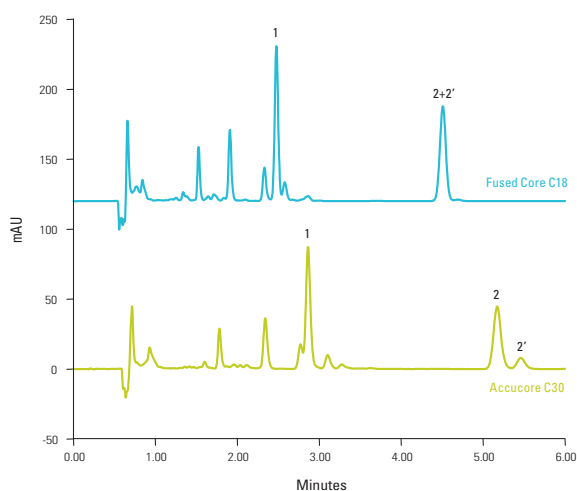
- Ideal for separation of hydrophobic, long alkyl chain compounds
- High shape selectivity for structurally related isomers
- Excellent aqueous-compatibility

Accucore C30 offers high shape selectivity for hydrophobic, long chain, structurally related isomers, for example carotenoids and steroids. This is a different form of shape selectivity from that measured in the steric selectivity phase characterisation test.

It is also an excellent alternative to normal-phase columns for lipid analysis. The optimized bonding density of the long alkyl chains facilitated by a wider pore diameter particle result in a phase that is stable even in highly aqueous mobile phases.



Vitamin K isomers



Accucore C30 2.6µm, 100 x 3.0mm Fused Core C18, 100 x 3.0mm

Mobile Phase: Methanol: 2mM Ammonium Acetate, 98:2
 Temperature: 20°C
 Flow Rate: 650µL/min
 Injection Volume: 5µL
 Detection: UV, 250nm
 Accucore C30 shows better separation for vitamin K1 isomers than the C18 column.

Chromatogram showing the separation of Vitamin K compounds
 Minutes 1-Vitamin K2, 2-Vitamin K1 (trans isomer), 2'-Vitamin K1 (cis isomer)

Accucore C30

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27826-012105	-	-
	HPLC Column	50	27826-052130	27826-053030	27826-054630
		100	27826-102130	27826-103030	27826-104630
		150	27826-152130	27826-153030	27826-154630
		250	27826-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

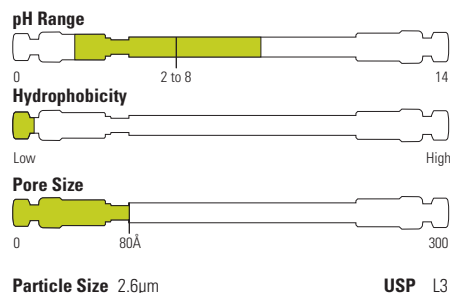
Accucore HILIC

- Enhanced retention of polar and hydrophilic analytes
- Alternative selectivity to C18 without ion-pair or derivatization

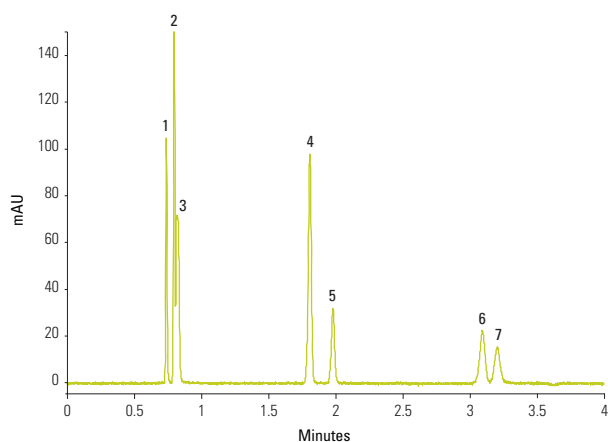
In HILIC mode the separation occurs through two mechanisms. The primary mechanism is a partitioning effect due to the enriched water layer around the polar or charged substrate material. The secondary mechanism involves interaction between the analyte and the active surface moiety.

Analyte properties that govern retention with HILIC phases are acidity/basicity, which determines hydrogen bonding, and polarizability which determines dipole-dipole interactions.

The highly organic mobile phases used with Accucore HILIC phase ensure efficient desolvation in ESI MS detection, which in turn leads to improved sensitivity.



Catecholamines



Accucore HILIC 2.6μm, 50mm x 2.1mm

Mobile Phase: 85:15 Acetonitrile:100mM Ammonium Formate, pH 3.2

Temperature: 40°C

Flow Rate: 2mL/min

Injection Volume: 5μL

Backpressure: 157 bar

Detection: UV, 280nm

Analytes:
1. Catechol
2. 5-HIAA
3. DOPAC
4. Serotonin
5. L-tyrosine
6. Dopamine
7. L-DOPA

Accucore HILIC

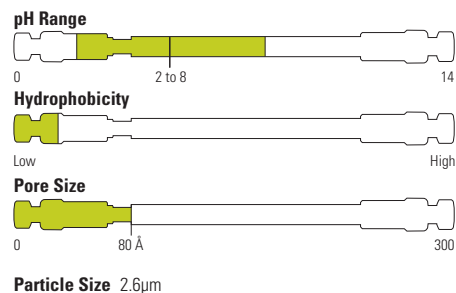
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17526-012105	17526-013005	17526-014005
	HPLC Column	30	17526-032130	-	-
		50	17526-052130	17526-053030	17526-054630
		100	17526-102130	17526-103030	17526-104630
		150	17526-152130	17526-153030	17526-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Urea-HILIC

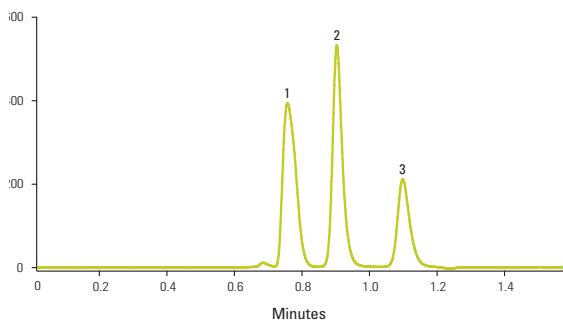
- Bonded hydrophilic stationary phase
- Unique selectivity compared to other HILIC phases
- Low ion exchange activity

Accucore Urea-HILIC has an alternative selectivity and lower ion exchange activity than other HILIC phases.

The bonded hydrophilic stationary phase provides retention of a broad range of polar analytes using up to 20% aqueous mobile phase.



Analgesic compounds



Accucore Urea-HILIC 2.6μm, 100 x 2.1mm

Mobile Phase:	Composition 10:80:10, A : B : C
	A: Water
	B: Acetonitrile
	C: 100 mM Ammonium Acetate adjusted to pH 4.9
Temperature:	35°C
Flow Rate:	300μL/min
Injection Volume:	2μL into 10μL partial loop mode.
Backpressure:	71 bar
Detection:	UV, 230nm

	1. Acetaminophen			2. Salicylic acid			3. Aspirin		
	t_R	A_s	R_s	t_R	A_s	R_s	t_R	A_s	R_s
Mean	0.760	1.474	0.908	1.303	2.359	1.100	1.318	3.264	
CV %	0.00	1.17	0.48	0.92	0.49	0.00	0.63	0.48	

Data from eight replicate analyses of a mixture of acetaminophen, salicylic acid and aspirin

Retention time (t_R), peak asymmetry (A_s), peak resolution (R_s)

Accucore Urea-HILIC

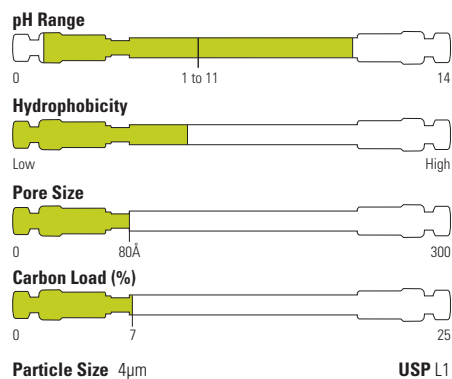
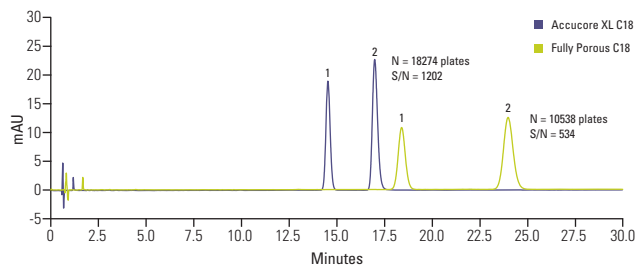
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27726-012105	-	-
	HPLC Column	50	27726-052130	27726-053030	27726-054630
		100	27726-102130	27726-103030	27726-104630
		150	27726-152130	27726-153030	27726-154630
		250	27726-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore XL C18

- Optimum retention of non-polar compounds
- Hydrophobic interaction mechanism
- Separates a broad range of analytes

The carbon loading of Accucore XL C18 provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism.

Ibuprofen and Valerophenone (USP)



Accucore XL C18 4µm, 150 x 4.6mm Fully porous C18 5µm, 150 x 4.6mm

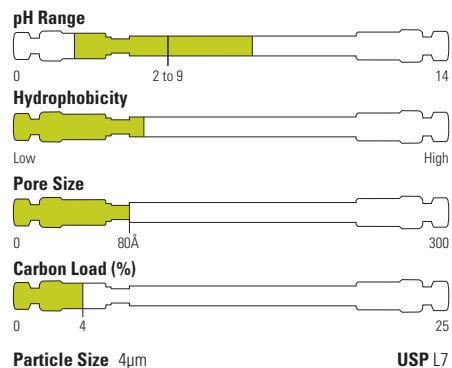
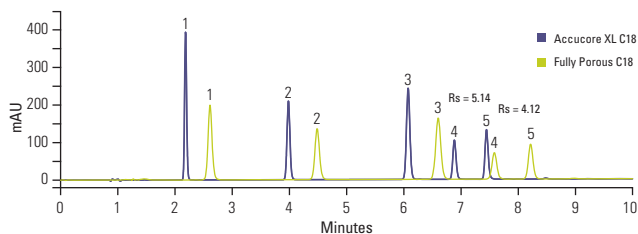
Mobile Phase:	66.3:33.7 (v/v) Water with Phosphoric Acid, pH 2.5:Methanol
Temperature:	30°C
Flow Rate:	2mL/min
Injection Volume:	5µL
Detection:	UV, 214nm
Analytes:	1. Valerophenone 2. Ibuprofen

Accucore XL C8

- Similar selectivity to C18 with lower retention
- Recommended for analytes with moderate hydrophobicity

Accucore XL C8 is recommended for analytes with moderate hydrophobicity, or when a less hydrophobic phase provides optimum retention.

Endocrine Disruptors



Accucore XL C8 4µm, 150 x 4.6mm Fully porous C8 5µm, 150 x 4.6mm

Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Gradient:	Time (min) % B
	0.0 25
	20.0 70
	20.1 75
	25.0 25
Flow rate:	1.5mL/min
Temperature:	25°C
Detection:	UV at 220nm
Injection volume:	5µL
Analytes	1.Desethyl Atrazine 3.Atrazine 2.Simazine 4.Diuron 5.Bisphenol A

Accucore XL

Particle Size (µm)	Format	Chemistry	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
4	Drop-in Guard (4/pk)	C18	10	74104-012101	74104-013001	74104-014001
			50	74104-052130	74104-053030	74104-054630
	100		74104-102130	74104-103030	74104-104630	
	150		74104-152130	74104-153030	74104-154630	
	250		74104-252130	74104-253030	74104-254630	
4	Drop-in Guard (4/pk)	C8	10	74204-012101	74204-013001	74204-014001
			50	74204-052130	74204-053030	74204-054630
	100		74204-102130	74204-103030	74204-104630	
	150		74204-152130	74204-153030	74204-154630	
	250		74204-252130	74204-253030	74204-254630	

Hypersil GOLD HPLC and UHPLC Columns

Outstanding peak shape for your separations

Thermo Scientific™ Hypersil GOLD™ columns are an ideal choice for new method development, delivering outstanding peak shape and increased sensitivity for your separations.

- **Solutions for all Separation Needs**
Particle sizes and column designs optimized for all analyses
- **Improved Sensitivity**
Excellent peak symmetry
- **Enhanced Resolution**
Separation of complex samples
- **pH Stability**
Robust assays at extended pH



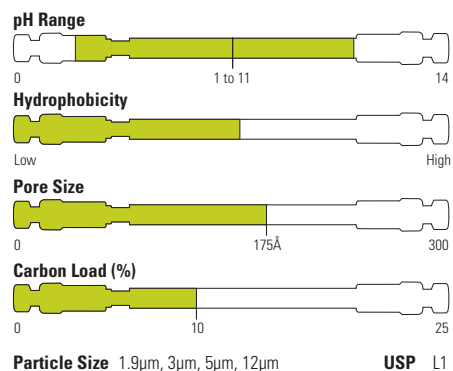
The Hypersil GOLD web page contains the latest news, applications and downloads for the Hypersil GOLD HPLC column range.

Visit www.thermoscientific.com/hypersilgold

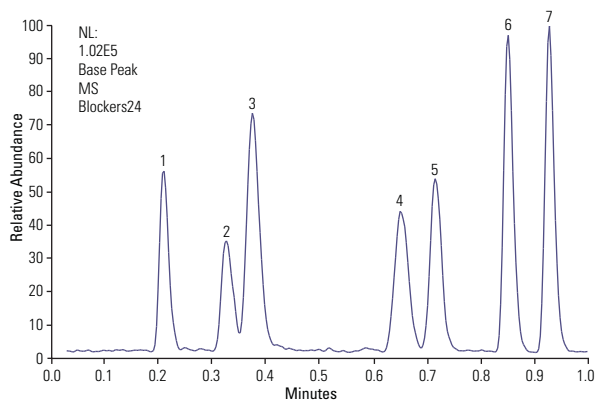
Hypersil GOLD

Endcapped, ultra-pure, silica-based columns with exceptional peak shape and resolution for HPLC and LC-MS

- Significant reduction in peak tailing while retaining C18 selectivity
- Excellent resolution, efficiency and sensitivity
- Confidence in the accuracy and quality of analytical data



Seven β-blockers in 1 minute



Hypersil GOLD, 1.9µm, 20 x 2.1mm

Mobile Phase A:	H ₂ O+0.1%formic acid
Mobile Phase B:	MeCN+0.1%formic acid
Gradient:	15 to 100% B in 1min
Temperature:	30°C
Flow Rate:	0.5mL/min
Detection:	+ESI
Analytes:	1. Atenolol 2. Nadolol 3. Pindolol 4. Timolol 5. Metoprolol 6. Oxprenolol 7. Propranolol

Hypersil GOLD

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25002-022130	-	-	-
		30	25002-031030	25002-032130	-	-	-
		50	25002-051030	25002-052130	25002-053030	-	25002-054630
		100	25002-101030	25002-102130	25002-103030	-	-
		150	-	25002-152130	-	-	-
		200	-	25002-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25003-011001	25003-012101	25003-013001	25003-014001	25003-014001
		30	-	25003-032130	-	-	25003-034630
		50	-	25003-052130	25003-053030	25003-054030	25003-054630
	HPLC Column	100	25003-101030	25003-102130	25003-103030	25003-104030	25003-104630
		150	25003-151030	25003-152130	25003-153030	25003-154030	25003-154630
		200	-	-	-	-	-
5	Drop-in Guard (4/pk)	10	-	25005-012101	25005-013001	25005-014001	25005-014001
		30	-	25005-032130	25005-033030	-	25005-034630
		50	-	25005-052130	25005-053030	-	25005-054630
	HPLC Column	100	-	25005-102130	25005-103030	-	25005-104630
		150	-	25005-152130	25005-153030	25005-154030	25005-154630
		250	-	25005-252130	25005-253030	25005-254030	25005-254630
		UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00

Hypersil GOLD Preparative

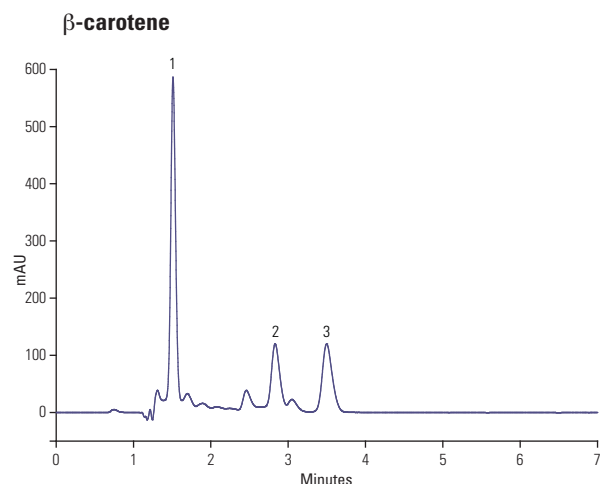
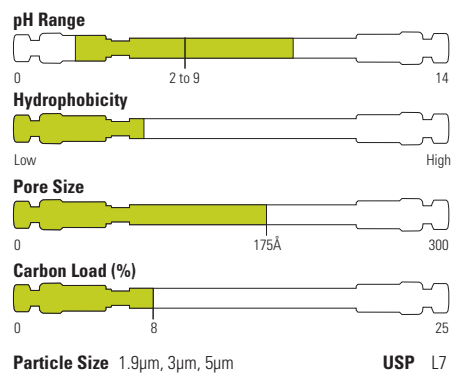
Particle Size (µm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25005-019023	25005-019223	-	-	-
	Preparative HPLC Column	50	25005-059070	-	-	25005-059370	25005-059570
		100	25005-109070	-	25005-109270	25005-109370	25005-109570
		150	25005-159070	-	25005-159270	25005-159370	25005-159570
		250	25005-259070	-	25005-259270	25005-259370	25005-259570
12	Preparative Guard Cartridge (3/pk)	10	25012-019023	25012-019223	-	-	-
	Preparative HPLC Column	50	25012-059070	-	25012-059270	25012-059370	25012-059570
		100	25012-109070	-	25012-109270	25012-109370	25012-109570
		150	-	-	25012-159270	25012-159370	25012-159570
		250	25012-259070	-	25012-259270	25012-259370	25012-259570
	Preparative Guard Cartridge Holder	10	C-1000	854-00	-	-	-



Hypersil GOLD C8

Recommended for analytes with medium hydrophobicity or when a less hydrophobic phase is required to obtain optimum retention

- Similar selectivity to C18 columns but with reduced retention
- Lower hydrophobicity, allowing compounds to elute quicker
- Faster separations
- Excellent peak shape
- High efficiency
- Outstanding sensitivity



Hypersil GOLD C8 5µm, 150 x 4.6mm

Mobile Phase:	MeOH
Temperature:	25°C
Flow Rate:	1.5mL/min
Detection:	UV, 450nm
Analytes:	1. Lutein 2. Lycopene 3. β-Carotene

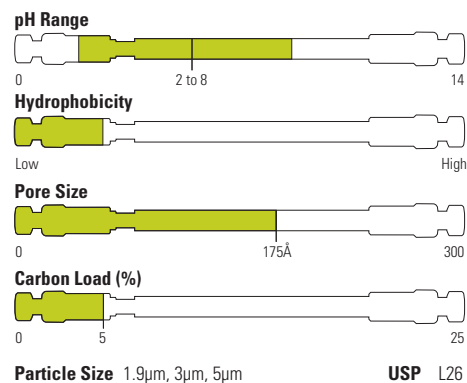
Hypersil GOLD C8

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25202-022130	-	-	-
		30	-	25202-032130	-	-	-
		50	-	25202-052130	25202-053030	-	25202-054630
		100	25202-101030	25202-102130	25202-103030	-	-
		150	-	25202-152130	-	-	-
3	Drop-in Guard (4/pk)	10	25203-011001	25203-012101	25203-013001	25203-014001	25203-014001
	HPLC Column	50	-	25203-052130	25203-053030	25203-054030	25203-054630
		100	25203-101030	25203-102130	25203-103030	25203-104030	25203-104630
		150	-	25203-152130	25203-153030	25203-154030	25203-154630
5	Drop-in Guard (4/pk)	10	-	25205-012101	25205-013001	25205-014001	25205-014001
	HPLC Column	50	-	25205-052130	25205-053030	-	25205-054630
		100	-	25205-102130	25205-103030	-	25205-104630
		150	-	25205-152130	25205-153030	25205-154030	25205-154630
		250	-	25205-252130	25205-253030	25205-254030	25205-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

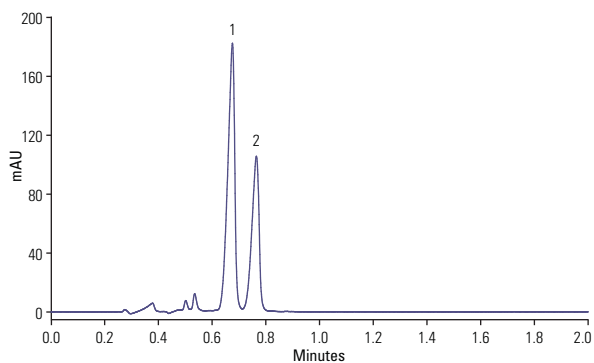
Hypersil GOLD C4

Lower hydrophobicity than C18 or C8 recommended for very hydrophobic analytes

- Lower hydrophobicity
- Faster separations
- Excellent peak shape
- High efficiency
- Outstanding sensitivity



Fatty acids



Hypersil GOLD C4 1.9µm, 100 x 2.1mm

Mobile Phase:	H ₂ O / MeCN (20:80)
Temperature:	30°C
Flow Rate:	0.55mL/min
Injection Volume:	1µL
Detection:	200 nm
Analytes:	1. Linolenic acid 2. Linoleic acid

Hypersil GOLD C4

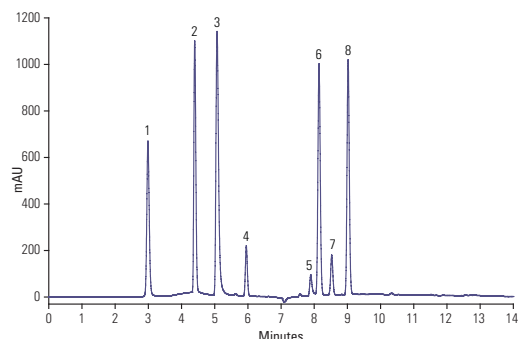
Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25502-052130	-	-
		100	-	25502-102130	-	-
		150	-	25502-152130	-	-
3	Drop-in Guard (4/pk)	10	25503-011001	25503-012101	25503-013001	25503-014001
	HPLC Column	50	-	25503-052130	-	-
		100	-	25503-102130	25503-103030	25503-104630
		150	25503-151030	25503-152130	25503-153030	25503-154630
5	Drop-in Guard (4/pk)	10	-	25505-012101	25505-013001	25505-014001
	HPLC Column	50	-	25505-052130	-	25505-054630
		100	-	25505-102130	25505-103030	25505-104630
		150	-	25505-152130	-	25505-154630
		250	-	25505-252130	25505-253030	25505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00

Hypersil GOLD aQ

Controlled interaction mechanism by which polar analytes can be retained and resolved

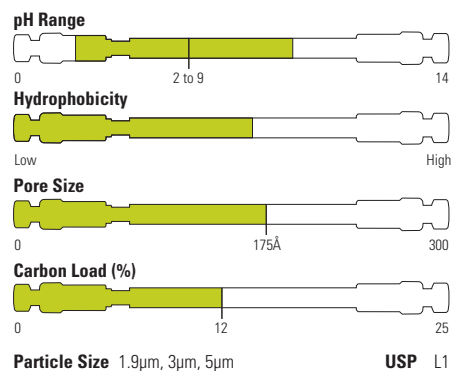
- Polar endcapped C18 phase for alternative selectivity
- Retention and resolution of polar analytes
- Stable in 100% aqueous mobile phases

Water soluble vitamins



Hypersil GOLD aQ 5µm, 150 x 4.6mm

Mobile Phase A:	50 mM KH ₂ PO ₄ , pH 3.5
Mobile Phase B:	MeOH
Gradient:	0 – 100% B in 15 min
Flow Rate:	1mL/min
Detection:	UV, 205nm
Analytes:	<ol style="list-style-type: none"> 1. Vitamin B1 (thiamine) 2. Vitamin B6 (pyridoxine) 3. Vitamin B3 (nicotinamide) 4. Vitamin B5 (pantothenic acid) 5. Folic Acid 6. Vitamin B12 (cyanocobalamin) 7. Vitamin H (biotin) 8. Vitamin B2 (riboflavin)



Hypersil GOLD aQ

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25302-022130	-	-	-
		30	-	25302-032130	-	-	-
		50	25302-051030	25302-052130	25302-053030	-	25302-054630
		100	25302-101030	25302-102130	25302-103030	-	-
		150	-	25302-152130	-	-	-
		200	-	25302-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25303-011001	25303-012101	25303-013001	25303-014001	25303-014001
		30	-	25303-032130	25303-033030	-	-
	HPLC Column	50	-	25303-052130	25303-053030	25303-054030	25303-054630
		100	25303-101030	25303-102130	25303-103030	25303-104030	25303-104630
		150	25303-151030	25303-152130	25303-153030	25303-154030	25303-154630
		250	-	25303-252130	-	25303-254030	25303-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00	

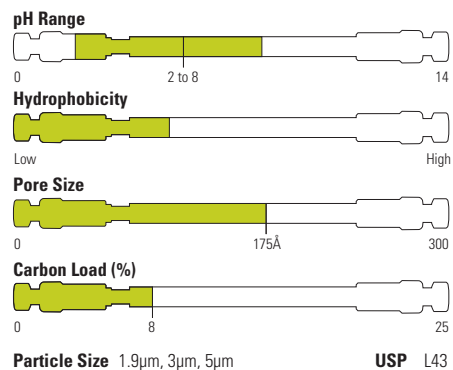
Hypersil GOLD aQ Preparative

Particle Size (µm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25305-019023	25305-019223	-	-	-
		50	25305-059070	-	25305-059270	25305-059370	25305-059570
	Preparative HPLC Column	100	25305-109070	-	25305-109270	25305-109370	25305-109570
		150	25305-159070	-	25305-159270	25305-159370	25305-159570
		250	25305-259070	-	25305-259270	25305-259370	25305-259570

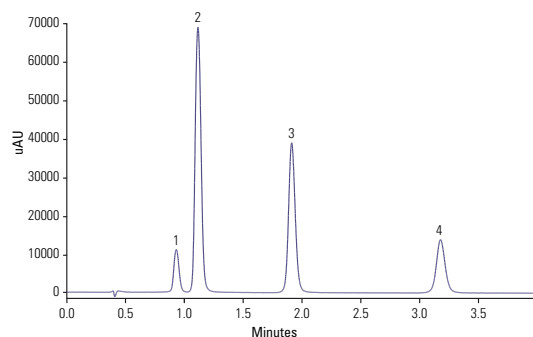
Hypersil GOLD PFP

Introduction of a fluorine group into the stationary phase causes significant changes in solute-stationary phase interaction

- Fluorine atoms around the phenyl ring enhance pi-pi interactions with aromatic molecules
- Extra retention for halogenated species
- Selectivity for non-halogenated polar compounds



Polyphenols



Hypersil GOLD PFP 1.9μm, 50 x 2.1mm

Mobile Phase:	0.1% Acetic Acid
Temperature:	25°C
Flow Rate:	0.5mL/min
Injection Volume:	0.5μL
Detection:	UV, 280nm
Analytes:	1. Pyrogallol 2. Hydroquinone 3. Resorcinol 4. Phenol

Hypersil GOLD PFP

Particle Size (μm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25402-022130	-	-	-
		30	-	25402-032130	-	-	-
		50	25402-051030	25402-052130	25402-053030	-	25402-054630
		100	25402-101030	25402-102130	25402-103030	-	-
		150	-	25402-152130	-	-	-
		200	-	25402-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25403-011001	25403-012101	25403-013001	25403-014001	25403-014001
	HPLC Column	30	-	25403-032130	25403-033030	-	25403-034630
		50	-	25403-052130	25403-053030	25403-054030	25403-054630
		100	25403-101030	25403-102130	25403-103030	25403-104030	25403-104630
		150	25403-151030	25403-152130	25403-153030	-	25403-154630
		200	-	25403-202130	-	-	-
5	Drop-in Guard (4/pk)	10	-	25405-012101	25405-013001	25405-014001	25405-014001
	HPLC Column	50	-	25405-052130	25405-053030	-	-
		100	-	25405-102130	25405-103030	-	25405-104630
		150	-	25405-152130	25405-153030	25405-154030	25405-154630
		250	-	25405-252130	-	25405-254030	25405-254630
		UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00

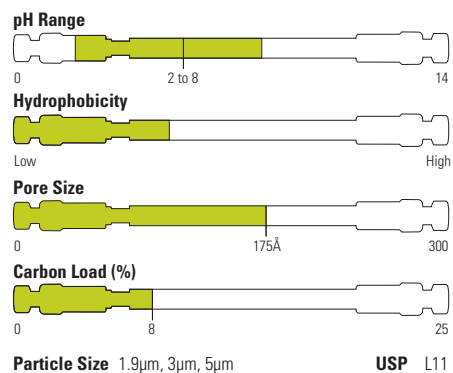
Hypersil GOLD PFP Preparative

Particle Size (μm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25405-019023	25405-019223	-	-	-
	Preparative HPLC Column	50	25405-059070	-	25405-059270	25405-059370	25405-059570
		100	25405-109070	-	25405-109270	25405-109370	25405-109570
		150	25405-159070	-	25405-159270	25405-159370	25405-159570
		250	25405-259070	-	25405-259270	25405-259370	25405-259570

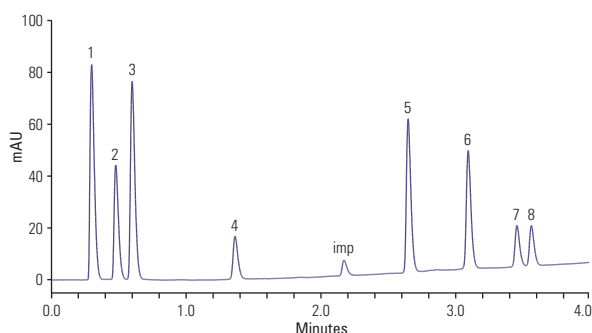
Hypersil GOLD Phenyl

Contains a C4 linker which allows for superior alignment of the phenyl ring with aromatic molecules

- Enhanced pi-pi interactions with aromatics
- Moderate hydrophobicity
- Outstanding peak shape and sensitivity



Antidepressants



Hypersil GOLD Phenyl 1.9µm, 50 x 2.1mm

Mobile Phase A:	0.1% Formic acid
Mobile Phase B:	0.1% Formic acid in MeCN
Gradient:	10 – 60% B in 3.4mins, 60 – 90% B in 0.24 min
Temperature:	60°C
Flow Rate:	0.5mL/min
Injection Volume:	0.7µL
Detection:	UV, 225 and 254nm
Analytes:	1. Uracil 2. Acetaminophen 3. p-Hydroxybenzoic acid 4. o-Hydroxybenzoic acid 5. Oxazepam 6. Diazepam 7. Di-isopropyl phthalate 8. Di-n-propyl phthalate

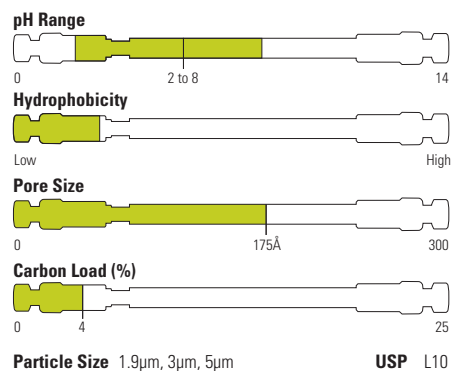
Hypersil GOLD Phenyl

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25902-052130	-	-	-
		100	-	25902-102130	-	-	-
		150	-	25902-152130	-	-	-
		200	-	25902-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25903-011001	25903-012101	25903-013001	25903-014001	25903-014001
	HPLC Column	50	-	25903-052130	-	-	-
		100	-	25903-102130	25903-103030	-	25903-104630
5	HPLC Column	150	25903-151030	-	25903-153030	-	25903-154630
		10	-	25905-012101	25905-013001	25905-014001	25905-014001
		50	-	25905-052130	-	-	25905-054630
	UNIGUARD Drop-in Guard Cartridge Holder	100	-	25905-102130	25905-103030	-	-
		150	-	-	-	-	25905-154630
		250	-	-	25905-253030	25905-254030	25905-254630
10	851-00	852-00	852-00	850-00	850-00		

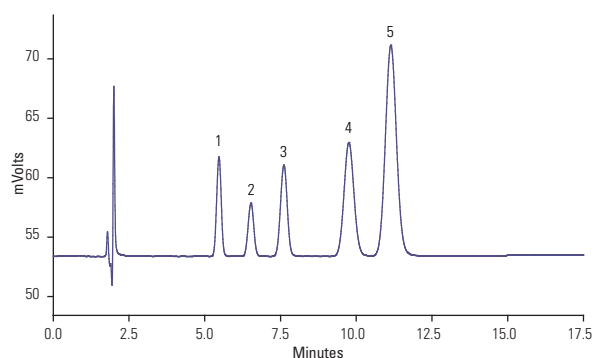
Hypersil GOLD CN

For both normal phase and reversed-phase separations

- Provide alternative selectivity with lower hydrophobicity
- Excellent peak shape
- Outstanding sensitivity
- Less retention for faster analysis



Organic acids



Hypersil GOLD CN 5µm, 150 x 4.6mm

Mobile Phase A:	25 mM KH ₂ PO ₄ , pH2
Mobile Phase B:	MeOH
Temperature:	25°C
Flow Rate:	1.5mL/min
Detection:	UV, 230nm
Analytes:	1. 4-Fluorobenzoic 2. o-Toluic Acid 3. p-Toluic Acid 4. 2,4,6-Trimethylbenzoic Acid 5. 2,5-Dimethylbenzoic Acid

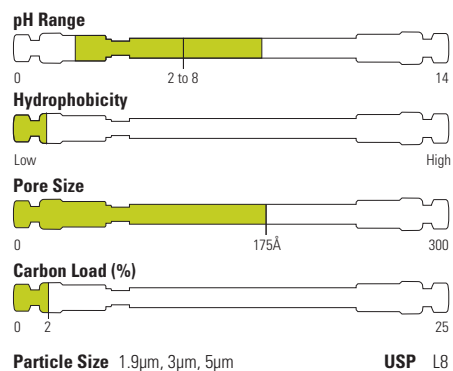
Hypersil GOLD CN

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25802-052130	-	-	-
		100	-	25802-102130	-	-	-
		200	-	25802-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25803-011001	25803-012101	25803-013001	25803-014001	25803-014001
	HPLC Column	30	-	25803-032130	-	-	-
		50	-	25803-052130	-	-	-
		100	-	25803-102130	25803-103030	-	25803-104630
		150	25803-151030	25803-152130	25803-153030	-	25803-154630
5	Drop-in Guard (4/pk)	10	-	25805-012101	25805-013001	25805-014001	25805-014001
	HPLC Column	50	-	25805-052130	-	-	25805-054630
		100	-	25805-102130	25805-103030	-	-
		150	-	25805-152130	-	-	25805-154630
		250	-	25805-252130	25805-253030	25805-254030	25805-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

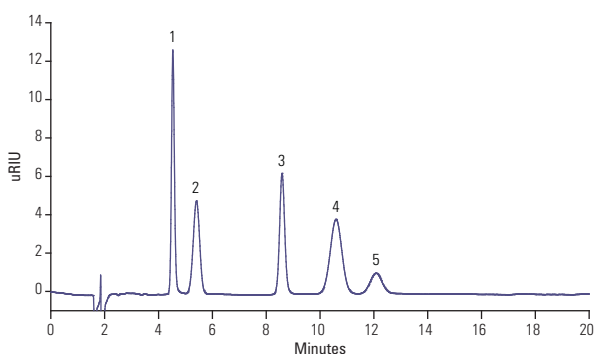
Hypersil GOLD Amino

A high performance aminopropyl phase that gives excellent chromatographic properties in three modes: weak anion exchange, reversed-phase and normal phase

- Retains anions and organic acids in weak anion exchange
- Excellent for carbohydrate analysis in reversed-phase
- Alternative selectivity to silica columns in normal phase chromatography
- Outstanding peak shape and sensitivity



Sugars



Hypersil GOLD Amino 5µm, 150 x 4.6mm

Mobile Phase:	MeCN/Water (80:20)
Temperature:	35°C
Flow Rate:	1.2mL/min
Injection Volume:	20µL
Detection:	RI
Analytes:	1. Fructose 2. Glucose 3. Sucrose 4. Maltose 5. Lactose

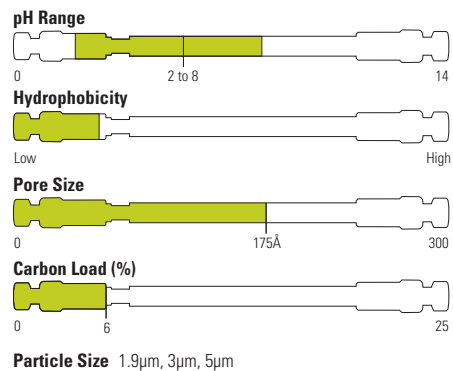
Hypersil GOLD Amino

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25702-052130	-	-	-
		100	-	25702-102130	-	-	-
		150	-	25702-152130	-	-	-
		200	-	25702-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25703-011001	25703-012101	25703-013001	25703-014001	25703-014001
	HPLC Column	30	-	25703-032130	-	-	-
		50	-	25703-052130	-	-	-
		100	-	25703-102130	25703-103030	-	25703-104630
		150	25703-151030	25703-152130	25703-153030	-	25703-154630
5	Drop-in Guard (4/pk)	10	-	25705-012101	25705-013001	25705-014001	25705-014001
	HPLC Column	50	-	25705-052130	-	-	25705-054630
		100	-	25705-102130	25705-103030	-	-
		150	-	-	-	-	25705-154630
		250	-	25705-252130	25705-253030	25705-254030	25705-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

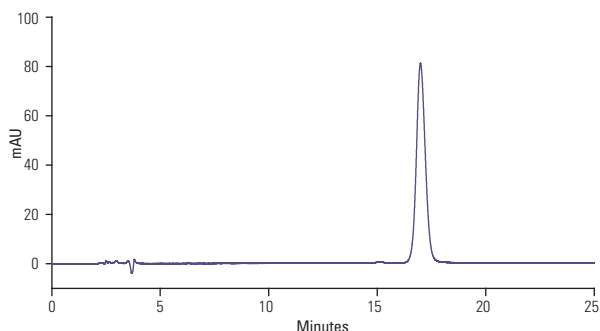
Hypersil GOLD AX

A novel polymeric amine ligand bonded to highly pure base deactivated silica

- Weak anion exchange phase for multiple charged species
- Suitable for HILIC retention and separation of highly polar molecules
- Higher efficiency than polymer based ion exchange columns
- Outstanding peak shape and selectivity



Vitamin C



Hypersil GOLD AX 5µm, 100 x 4.6mm

Mobile Phase:	100 mM Ammonium Acetate pH 6.8/ MeCN (30:70)
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	50µL
Detection:	UV, 240nm

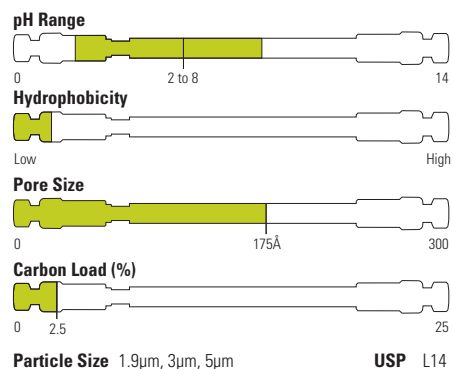
Hypersil GOLD AX

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	26102-052130	-	-	-
		100	-	26102-102130	-	-	-
		150	-	26102-152130	-	-	-
		200	-	26102-202130	-	-	-
3	Drop-in Guard (4/pk)	10	26103-011001	26103-012101	26103-013001	26103-014001	26103-014001
	HPLC Column	30	-	26103-032130	-	-	-
		50	-	26103-052130	-	-	-
		100	-	26103-102130	-	-	26103-104630
		150	26103-151030	26103-152130	26103-153030	-	26103-154630
5	Drop-in Guard (4/pk)	10	-	26105-012101	26105-013001	26105-014001	26105-014001
	HPLC Column	50	-	-	-	-	26105-054630
		100	-	26105-102130	-	-	26105-104630
		150	-	26105-152130	-	-	26105-154630
		250	-	26105-252130	26105-253030	26105-254030	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

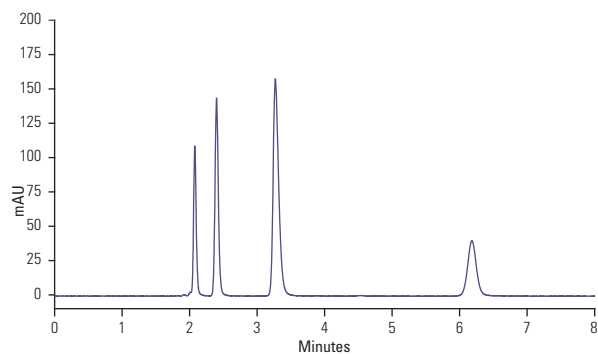
Hypersil GOLD SAX

A highly stable quaternary amine strong anion exchange column for aqueous and low pH mobile phases

- High stability to aqueous and low pH mobile phases
- Ideally suited to the analysis of smaller organic molecules including nucleotides and organic acids
- Outstanding peak shape and sensitivity



Monophosphates



Hypersil GOLD SAX 5µm, 150 x 4.6mm

Mobile Phase: Aqueous KH_2PO_4 (50 mM, pH 3)
 Temperature: 40°C
 Flow Rate: 1.0 mL/min
 Injection Volume: 10 µL
 Detection: UV, 254 nm

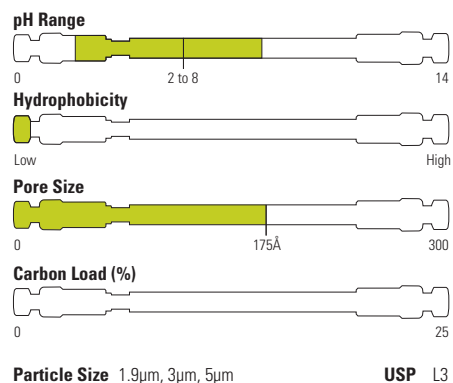
Hypersil GOLD SAX

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	100	26302-102130	-	-	-
		150	26302-152130	-	-	-
3	Drop-in Guard (4/pk)	10	26303-012101	26303-013001	26303-014001	26303-014001
	HPLC Column	50	26303-052130	-	-	-
		100	26303-102130	26303-103030	-	26303-104630
		150	-	26303-153030	-	26303-154630
5	Drop-in Guard (4/pk)	10	26305-012101	26305-013001	26305-014001	26305-014001
	HPLC Column	50	26305-052130	-	-	-
		100	26305-102130	26305-103030	-	26305-104630
		150	26305-152130	-	-	26305-154630
		250	26305-252130	26305-253030	26305-254030	26305-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

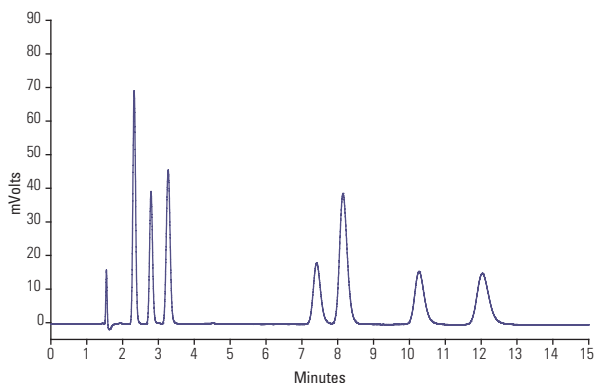
Hypersil GOLD Silica

Unbonded, highly pure base deactivated silica media that is the backbone of the Hypersil GOLD range of columns

- Highly pure base deactivated silica media
- Outstanding peak shape and sensitivity



Steroids



Hypersil GOLD Silica 5µm, 150 x 4.6mm

Mobile Phase:	19:1 (v/v) n-C6H14/EtOH
Temperature:	30°C
Flow Rate:	1.5mL/min
Injection volume:	5µL
Detection:	UV, 254nm
Analytes:	1. Progesterone 2. 21-Hydroxyprogesterone-21-acetate 3. 17- α -Hydroxyprogesterone 4. Cortisone 5. 11- α -Hydroxyprogesterone 6. Corticosterone 7. Hydrocortisone

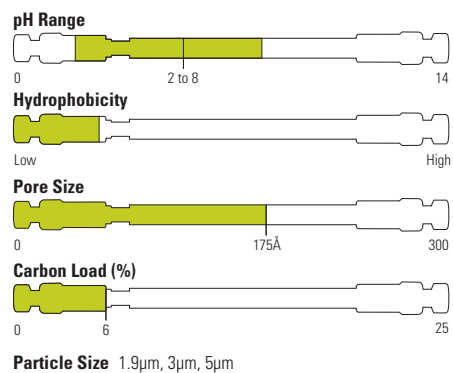
Hypersil GOLD Silica

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25102-052130	-	-	-
		100	-	25102-102130	-	-	-
		150	-	25102-152130	-	-	-
		200	-	25102-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25103-011001	25103-012101	25103-013001	25103-014001	25103-014001
	HPLC Column	30	-	25103-032130	-	-	25103-034630
		50	-	25103-052130	-	-	-
		100	-	25103-102130	25103-103030	-	-
		150	25103-151030	25103-152130	25103-153030	-	25103-154630
5	Drop-in Guard (4/pk)	10	-	25105-012101	25105-013001	25105-014001	25105-014001
	HPLC Column	50	-	25105-052130	-	-	-
		100	-	25105-102130	25105-103030	-	25105-104630
		150	-	25105-152130	-	-	25105-154630
		250	-	25105-252130	-	25105-254030	25105-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

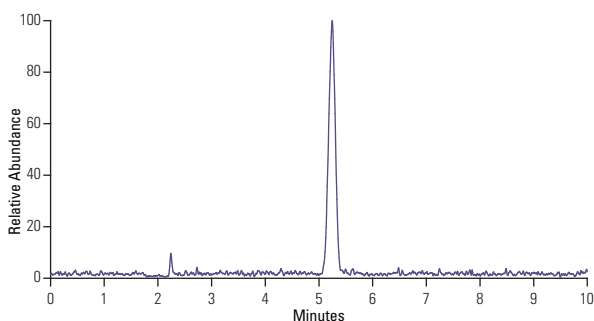
Hypersil GOLD HILIC

Retains and separates polar analytes that are problematic using reversed-phase columns

- Alternative selectivity to C18
- Improved sensitivity for MS detection
- Alternative to ion-pair or derivatization
- Outstanding peak shape and selectivity



Urea

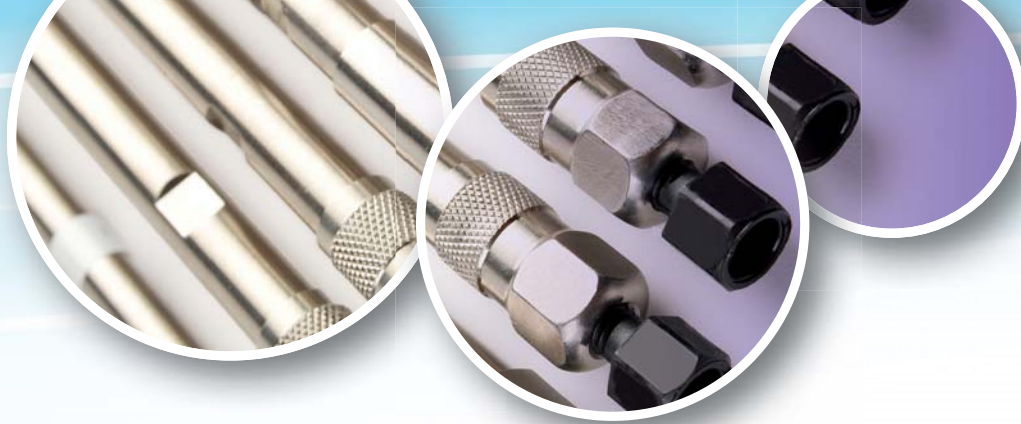


Hypersil GOLD HILIC 5µm, 150 x 4.6mm

Mobile Phase:	H ₂ O/MeCN (10:90) + 0.1% formic acid
Temperature:	30°C
Flow Rate:	0.6mL/min
Injection Volume:	1µL
Detection:	+ESI
Analytes:	1. Urea

Hypersil GOLD HILIC

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	26502-052130	-	-	-
		100	-	26502-102130	-	-	-
		150	-	26502-152130	-	-	-
3	Drop-in Guard (4/pk)	10	26503-011001	26503-012101	26503-013001	26503-014001	26503-014001
	HPLC Column	30	-	26503-032130	-	-	-
		50	-	26503-052130	-	-	-
		100	-	26503-102130	26503-103030	-	26503-104630
		150	26503-151030	26503-152130	26503-153030	-	26503-154630
5	Drop-in Guard (4/pk)	10	-	26505-012101	26505-013001	26505-014001	26505-014001
	HPLC Column	50	-	26505-052130	-	-	26505-054630
		100	-	26505-102130	26505-103030	-	-
		150	-	-	-	-	26505-154630
		250	-	26505-252130	26505-253030	26505-254030	26505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

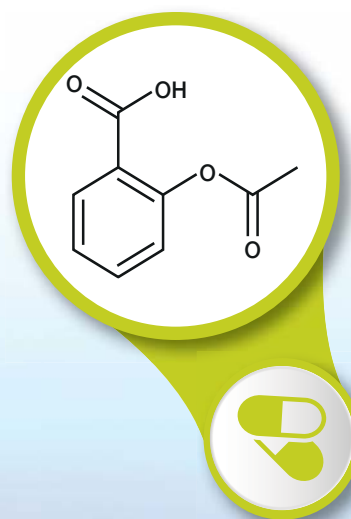


Acclaim HPLC and UHPLC Columns

Optimal selectivity through innovative chemistries

Designed for separating a variety of analytes, from small neutral and polar molecules to complex mixtures. Ideal for pharmaceutical, environmental, food and beverage and chemical applications.

- **Diversified Selectivities**
Novel and proprietary surface chemistries
- **Reproducible and Reliable**
Strict manufacturing and quality processes
- **High Efficiencies**
For optimum resolution of complex mixtures
- **Ultra-pure, Porous, Spherical Silica**
Providing consistent quality and performance



The Acclaim web page contains the latest news, applications and downloads for the Acclaim HPLC column range.

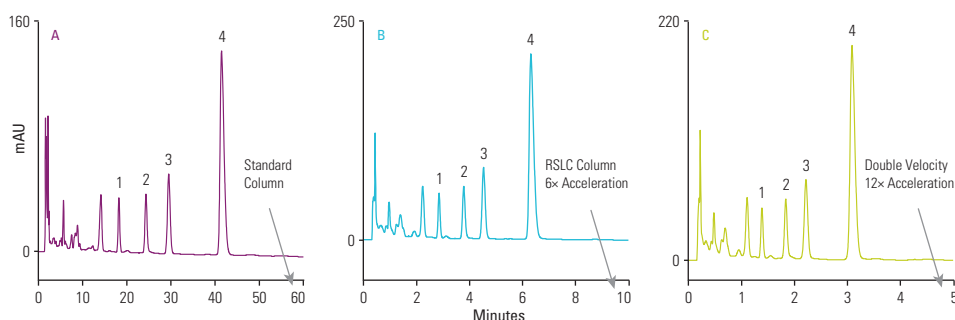
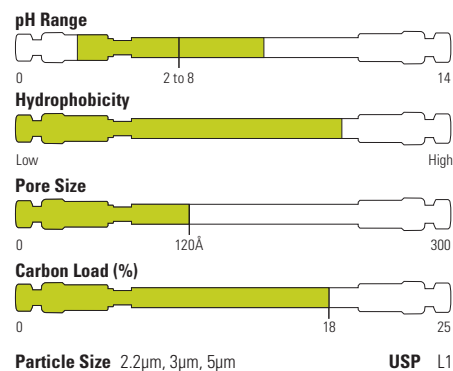
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Acclaim 120 C18

High performance reversed-phase columns for reproducible results

- High hydrophobic retention
- Excellent efficiencies for maximum resolution
- Low silanol activity for excellent peak shapes for basic analytes
- Extremely low bleed, fully compatible with MS

The Acclaim 120 columns are designed for high resolution reversed-phase separations. The very high surface coverage and very low metal content together result in columns with excellent efficiencies. These columns provide exceptional performance for a variety of applications in the pharmaceutical, chemical, environmental and food separations areas.



A: Acclaim 120 C18, 5µm, 150 x 4.6mm
B, C: Acclaim RSLC C18, 2.2µm, 50 x 2.1mm

Mobile Phase:	200mM HOAc in 10% (v/v) MeOH
Temperature:	20°C
Flow Rate:	A: 1.00mL/min B: 0.41mL/min C: 0.82mL/min
Injection Volume:	A: 10µL B: 1.2µL C: 1.2µL
Detection:	UV, 254 nm, A: 1 Hz data rate B: 5 Hz data rate C: 10 Hz data rate
Analytes:	1. p-Hydroxybenzoic acid 2. p-Hydroxybenzaldehyde 3. Vanillic acid 4. Vanillin
Sample:	Commercial vanilla extract in 40% ethanol, filtered
Reference:	AOAC Official Method 990.25

Acclaim 120 C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	071400	071606	-
		50	068981	071605	-
		75	-	075697	-
		100	068982	071604	-
		150	071399	-	-
		250	074812	-	-
3	HPLC Column	33	-	066272	-
		50	059128	068971	059131
		75	-	066273	-
		100	059129	076186	059132
		150	059130	063691	059133
		250	076187	070077	-
5	Guard Cartridge	10	069689	071981	069695
	HPLC Column	150	-	-	059148
		250	-	-	059149

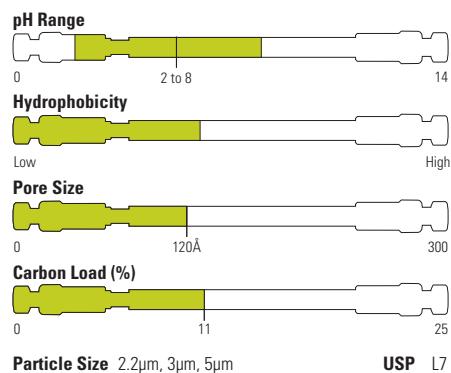
See page 4-037 for Acclaim Guard Holder Ordering Guide

Acclaim 120 C8

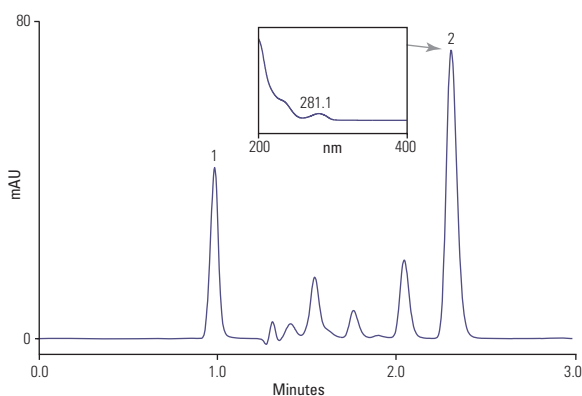
High performance reversed-phase columns with intermediate hydrophobic retention

- Low silanol activity for excellent peak shapes for basic analytes
- Excellent column efficiencies
- LC-MS compatible

Acclaim 120 C8 reversed-phase columns feature densely bonded monolayer C8 ligands on a high-purity, spherical porous silica substrate. The columns are a well-characterized line of LC-MS compatible C8 phases with very high surface coverage and extremely low silanol activity. These columns provide exceptional performance for a variety of applications in the pharmaceutical, environmental, food and many other industrial sectors.



Triclosan in toothpaste



Column: Acclaim RSLC C8, 2.2µm, 50 x 2.1mm

Mobile Phase:	Isocratic, 15% buffer, (2mM Ammonium acetate pH5), 85% methanol (v/v)
Temperature:	50°C
Flow Rate:	0.2mL/min
Injection Volume:	1.0µL
Detection:	Diode array detector, 281nm, 10Hz, 0.1 s resp. time and spectra 200–400 nm
Analytes:	1. Saccharin 2. Triclosan
Sample:	Toothpaste containing 0.3% triclosan

Acclaim 120 C8

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	-	072618	-
		50	072615	072619	-
		100	072616	072620	-
		150	072617	-	-
		250	074811	-	-
3	HPLC Column	50	059122	-	059125
		100	059123	-	059126
		150	059124	068970	059127
		250	076185	-	-
5	Guard Cartridge	10	069688	071979	069696
	HPLC Column	50	059134	-	059138
		100	-	-	059139
		150	059136	-	059140
		250	-	-	059141

See page 4-037 for Acclaim Guard Holder Ordering Guide

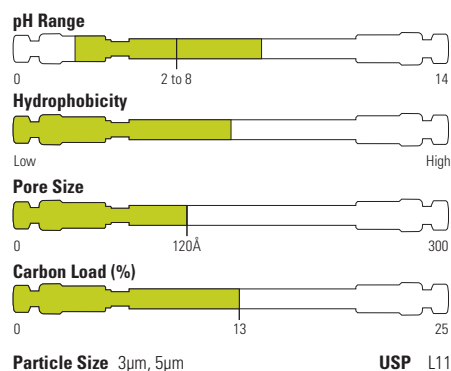
Acclaim Phenyl-1

A unique reversed-phase column with high aromatic selectivity

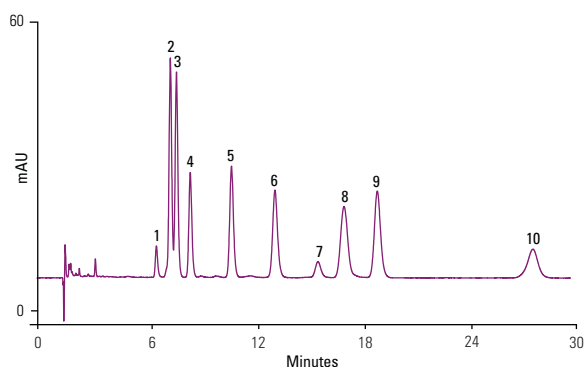
- High aromatic selectivity
- High hydrophobic retention
- Unique and complementary selectivity compared to any other phenyl type column
- Compatibility with highly aqueous mobile phase
- High efficiency and rugged packing

Acclaim Phenyl-1 has a higher pi-pi interaction than other phenyl phases and provides unique selectivity for aromatic compounds while maintaining sufficient hydrophobic interaction and aqueous compatibility for superior chromatographic performance.

The Acclaim Phenyl-1 column can be used in a wide range of applications in pharmaceutical, environmental, food testing and product-quality testing. This column is ideally suited for the analysis of aromatic analytes; some examples include glucocorticosteroids, estrogens, fat-soluble vitamins and phospholipids.



Separation of fat-soluble vitamins



Acclaim Phenyl-1, 3µm, 150 x 3.0mm

Mobile Phase:	Methanol/water v/v 90/10
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	2µL
Detection:	UV, 220nm
Analytes:	(100 ppm each)
	1. Retinol acetate (vitamin A acetate)
	2. Vitamin D2
	3. Vitamin D3
	4. delta-Tocopherol
	5. gamma-Tocopherol
	6. alpha-Tocopherol (vitamin E)
	7. Impurity (unknown)
	8. Vitamin E acetate
	9. Vitamin K2
	10. Vitamin K1

Acclaim Phenyl-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	Guard Cartridge	10	079934	071974	071973
	HPLC Column	150	071971	071970	071969
5	HPLC Column	150	-	-	088016
		250	-	-	079697

Acclaim Guard Holder

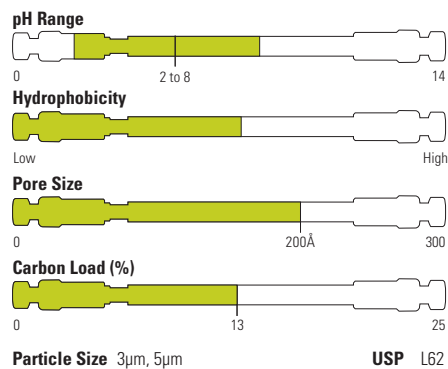
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim C30

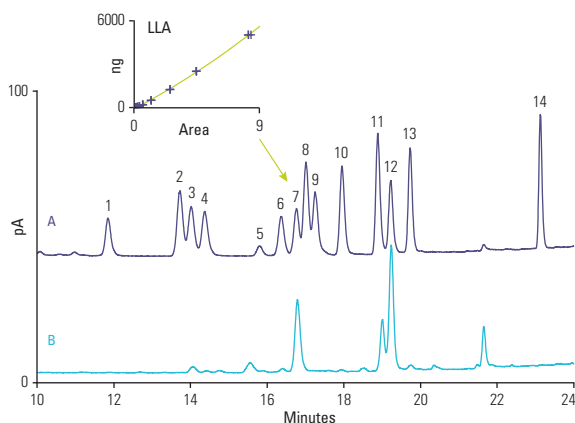
Columns for separating structurally related isomers

- High shape selectivity
- Unique selectivity complementary to other reversed-phase columns
- Compatibility with highly aqueous mobile phase
- High-quality: low column bleed, high efficiency and rugged packing

The Acclaim C30 is designed to provide high shape selectivity for separating hydrophobic structural related isomers and unique selectivity complementary to other reversed-phase columns (e.g. C18).



Omega fatty acids



Acclaim C30, 5µm, 150 x 4.6mm

Mobile Phase A:	Water:formic acid:mobile phase B 900:3.6:100 (v/v)	
Mobile Phase B:	Acetone:acetonitrile:THF:formic acid 675:225:100:4(v/v/v)	
Gradient:	Time (min)	%A %B
	0	100 0
	1	40 60
	13	30 70
	22	5 95
	24	5 95
	29	100 0
	32	100 0
Temperature:	30°C	
Flow Rate:	1.00mL/min	
Injection Volume:	2µL	
Detection:	Corona ultra, nebulizer 15°C, filter high	
Analytes:	1. SDA 2. EPA 3. ALA 4. GLA 5. DHA 6. Arach. 7. LLA	
Samples:	A. Standards in isopropanol B. Saponified chicken fat	

Acclaim C30

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	078666	-	078661
		100	078665	-	-
		150	075725	075724	075723
		250	078664	075726	-
5	Guard Cartridge	10	075722	075721	075720
	HPLC Column	150	-	-	075719
		250	-	-	075718

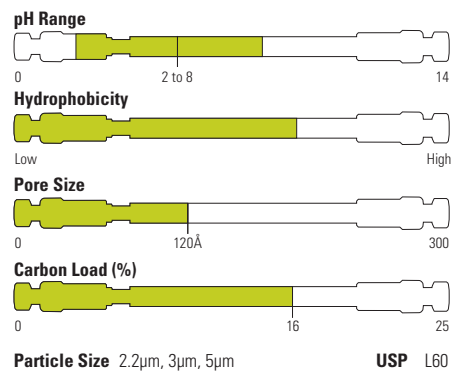
Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim PolarAdvantage

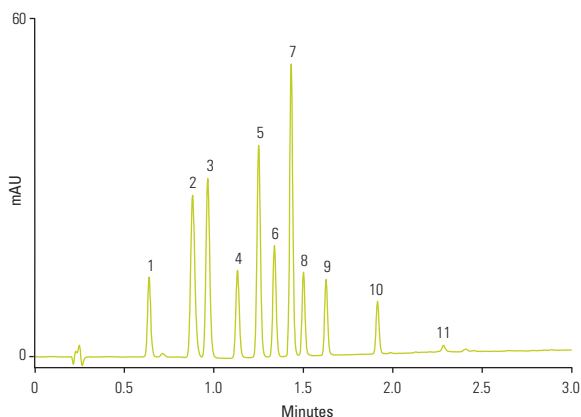
Novel polar-embedded reversed-phase columns with unique selectivity

- Selectivity complementary to the C18 column
- Low silanol activity for excellent peak shape with basic compounds
- Compatible with 100% aqueous mobile phase
- High selectivity for hydrophobic aromatic molecules
- Wide range of applications



Acclaim PolarAdvantage (PA) columns feature a patented bonding column chemistry that incorporates a polar sulfonamide group with an ether linkage near the silica surface. This unique chemistry provides low silanol activity, compatibility with 100% aqueous mobile phase. The Acclaim PA column offers great separation power to resolve a wide variety of polar and non-polar analytes and supports LC-MS analysis.

EPA 604 phenols



Acclaim RSLC PolarAdvantage, 2.2µm, 50 x 3.0mm

Mobile Phase A: 10mM formic acid + 10mM ammonium formate, pH 3.75 ± 0.05

Mobile Phase B: Acetonitrile

Gradient: -1.5 0.0 0.3 2.6 3.0
 %A 70 70 70 10 10
 %B 30 30 30 90 90

Temperature: 30°C

Flow Rate: 1.25mL/min

Injection Volume: 0.5µL

Detection: UV, 280nm, 10Hz, 0.5s resp. time

Analytes: 1. Phenol
 2. 2,4-Dinitrophenol
 3. 4-Nitrophenol
 4. 2-Chlorophenol
 5. 2-Nitrophenol
 6. 2,4-Dimethylphenol
 7. 4,6-Dinitro-2-methylphenol
 8. 4-Chloro-3-methylphenol
 9. 2,4-Dichlorophenol
 10. 2,4,6-Trichlorophenol
 11. Pentachlorophenol

Sample: Calibration mix, 50µg/mL in water

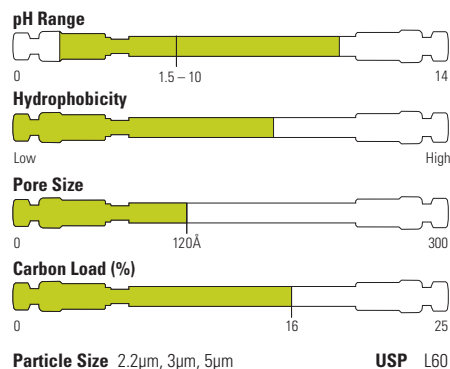
Acclaim PolarAdvantage

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	50	072622	-	-
		75	-	075698	-
		100	072623	072627	-
		150	072624	-	-
		250	074813	-	-
3	HPLC Column	50	063174	068972	-
		100	061316	076214	-
		150	061317	063693	061318
		250	-	070079	-
5	Guard Cartridge	10	069691	071983	069698
	HPLC Column	50	-	-	061319
		150	-	-	061320
		250	-	-	061321

Acclaim PolarAdvantage II

Complementary selectivity and enhanced hydrolytic stability

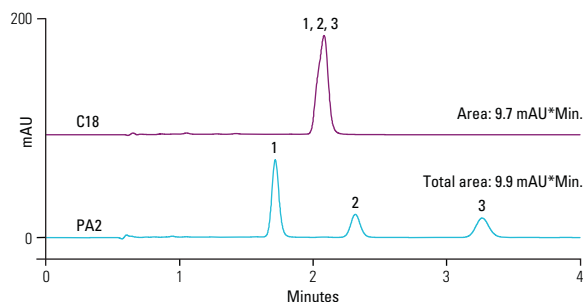
- Unique selectivity complementary to the C18 column
- Novel polar-embedded column chemistry for hydrolytic stability
- Compatible with 100% aqueous mobile phase
- Low bleed for MS compatibility
- Wide range of applications



Acclaim PolarAdvantage II (PA2) columns feature a patented surface chemistry that incorporates an amide-embedded polar group and multi-point attachment between the ligands and the silica surface. This unique chemistry provides enhanced hydrolytic stability from pH 1.5-10 with 100% aqueous mobile phases and exhibits high reversed-phase capacity, with selectivity complementary to conventional C18 columns.

The Acclaim PA2 column is specifically designed to withstand high pH conditions, making it a good choice for the separation of both basic and acidic analytes.

Turmeric



Acclaim RSLC 120 C18 2.2µm, 100 x 2.1mm
Acclaim RSLC PA2, 2.2µm, 100 x 2.1mm

Mobile Phase A:	15mM H ₃ PO ₄
Mobile Phase B:	Methanol
Isocratic:	C18: 70% B (v/v) PA2: 80% B (v/v)
Temperature:	30°C
Flow Rate:	0.41mL/min
Detection:	UV, 428nm
Analytes:	1. Curcumin 2. Demethoxycurcumin 3. Bis-demethoxycurcumin
Sample:	Turmeric extract

Acclaim PolarAdvantage II

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	071402	071609	-
		50	068989	071608	-
		100	068990	071607	-
		150	071401	-	-
		250	074814	-	-
3	HPLC Column	33	-	066276	-
		50	077999	068973	063189
		75	-	066277	-
		100	077998	078000	078001
		150	063187	063705	063191
		250	077997	070080	-
5	Guard Cartridge	10	069692	071985	069699
	HPLC Column	150	-	-	063197
		250	-	-	063199

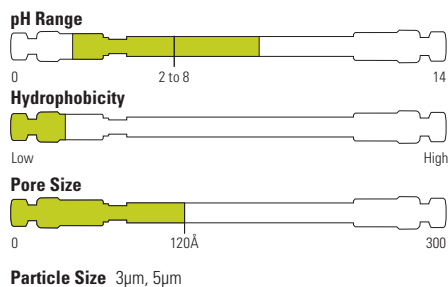
See page 4-037 for Acclaim Guard Holder Ordering Guide

Acclaim HILIC-10

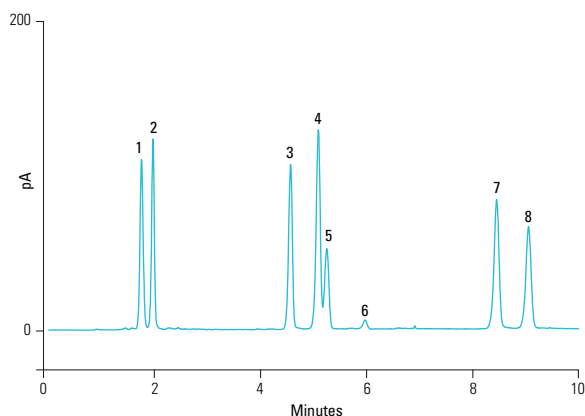
Designed with unique selectivity for hydrophilic molecules

- Retains highly polar molecules that are not retained by reversed-phase chromatography
- Unique selectivity, complementary to reversed-phase columns
- Hydrolytically stable
- Rugged column packing
- Broad application range

The Acclaim HILIC-10 column is designed for separating highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography (HILIC). This column is based on high-purity spherical porous silica covalently modified with a proprietary hydrophilic layer.



Glycerides



Acclaim HILIC-10, 3μm, 150 x 3.0mm

Mobile Phase A:	Heptane
Mobile Phase B:	2-Propanol/acetic acid 99.5:0.5
Temperature:	25°C
Flow Rate:	0.50mL/min
Injection Volume:	4μL
Detection:	Corona ultra, nebulizer 15°C
Analytes:	1. Tristearin 2. Trilaurin 3. Distearin isomer 1 4. Dilaurin isomer 1 5. Distearin isomer 2 6. Dilaurin isomer 2 7. Monostearin 8. Monolaurin

Acclaim HILIC-10

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	150	074259	074258	074257
5	Guard Cartridge	10	074263	074261	074262

Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

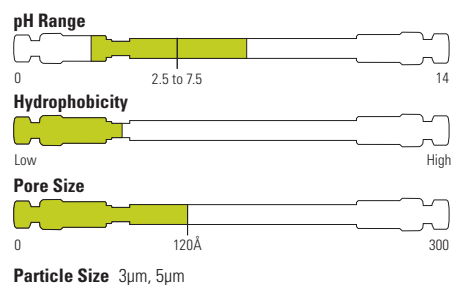
Acclaim Mixed-Mode HILIC-1

Uniquely designed for both reversed-phase and HILIC operations

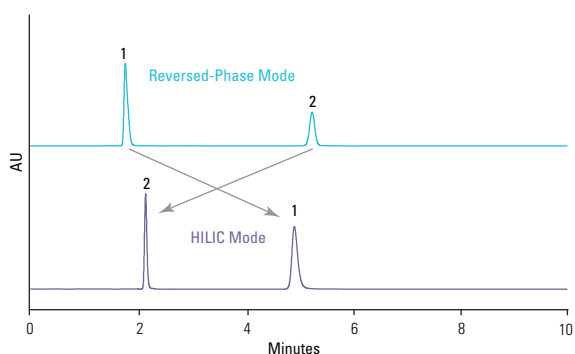
- Can operate in both RP and HILIC modes
- Retains highly polar molecules
- Unique selectivity complementary to RP columns
- Broader application range compared with conventional diol-based columns
- High-efficiency column for high-resolution separations

The Acclaim Mixed-Mode HILIC-1 column features a unique, high-efficiency, silica-based HPLC mixed-mode stationary phase that combines both reversed-phase (RP) and hydrophilic interaction liquid chromatography (HILIC) properties. This combination allows both hydrophobic and hydrophilic interactions to be utilized to optimize separations.

The functional group is of a hydrophobic alkyl chain with a diol group at the terminus. This unique combination results in the adjustable selectivity, making Acclaim Mixed-Mode HILIC-1 separate mixtures that would be impossible for a C18 column. This column is suitable for a broad range of applications, including non-ionic ethoxylated surfactants, drug metabolites, lipids, polyethylene glycols (PEGs), ethoxylated surfactants, and more.



Cytosine and naphthalene



Acclaim Mixed-Mode HILIC-1, 5µm, 150 x 4.6mm

Mobile Phase:	CH ₃ CN/0.1 M NH ₄ OAc, pH 5.2 v/v 52/48 for RP mode v/v 92/8 for HILIC mode
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	10µL
Detection:	UV, 254nm
Analytes:	1. Cytosine (100 ppm) 2. Naphthalene (100 ppm)

Acclaim Mixed-Mode HILIC-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071912	-
		150	070091	070090	-
5	Guard Cartridge	10	069694	071913	069706
	HPLC Column	150	066847	-	066843
		250	-	-	066844

Acclaim Guard Holder

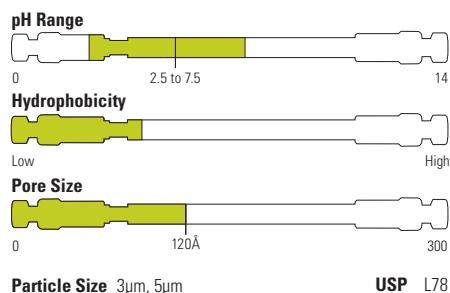
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Mixed-Mode WAX-1

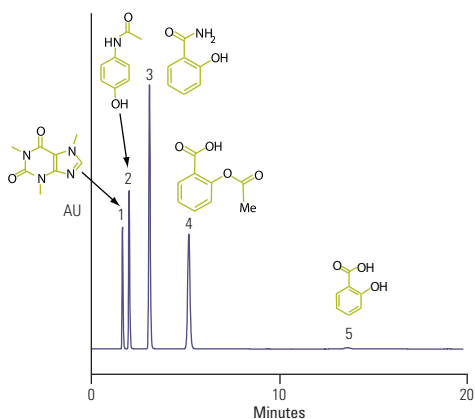
Designed for separating anionic molecules with powerful adjustable selectivity control

- Adjustable selectivity
- Selectivity orthogonal to reversed-phase (RP) columns
- Ideal selectivity for anionic molecules
- Excellent column efficiency and peak asymmetry
- Multimode retention mechanisms: reversed-phase, weak anion exchange, and HILIC modes

The Acclaim Mixed-Mode WAX-1 is a novel, high-efficiency silica HPLC column that combines hydrophobic and weak anion exchange characteristics. Its unique chemistry results in a multimode separation mechanism that includes reversed-phase, anion exchange, and HILIC interactions. Selectivity can be adjusted by changing ionic strength, pH or organic solvent content.



Pain relief medicine



Acclaim Mixed-Mode WAX-1, 5µm, 150 x 4.6mm

Mobile Phase:	40/60 v/v Acetonitrile/buffer (6.8 g potassium monophosphate and 0.5 g pyrophosphate in 1000 g D.I. H ₂ O, pH is adjusted to 6.0 with NaOH)
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	1µL
Detection:	UV, 220nm
Analytes:	1. Caffeine 2. Acetaminophen 3. Salicylamide 4. Acetyl salicylic acid (Aspirin) 5. Salicylic acid

Acclaim Mixed-Mode WAX-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071908	-
		150	070089	070088	-
5	Guard Cartridge	10	069686	071909	069704
	HPLC Column	150	067084	-	064984
		250	-	-	064985

Acclaim Guard Holder

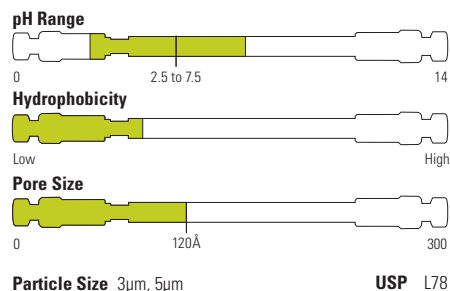
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Mixed-Mode WCX-1

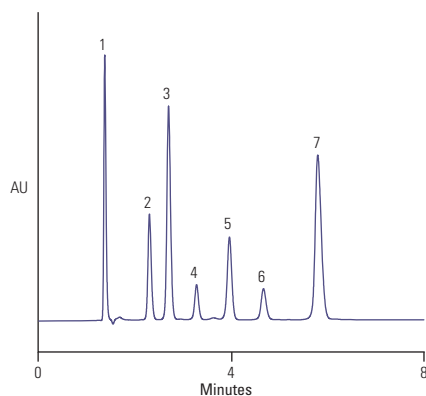
Designed for separating cationic molecules with adjustable selectivity control

- Adjustable selectivity
- Ideal selectivity for separating basic molecules
- Selectivity complementary to C18 RP columns
- Multimode separation mechanism: reversed-phase, weak cation exchange, anion-exclusion and HILIC

The Acclaim Mixed-Mode WCX-1 is a novel, high-efficiency, silica-based column, with a proprietary ligand with both hydrophobic and weak cation exchange properties. Selectivity of ionizable and neutral compounds can be controlled independently or simultaneously by tuning mobile phase ionic strength, pH or organic modifier. This column therefore can separate using multiple separation modes: reversed-phase, cation exchange, and normal-phase/ HILIC and is recommended for a variety of industrial applications, including pharmaceutical, chemical, consumer products, foods and beverages.



Pharmaceutical counterions



Acclaim Mixed-Mode WCX-1, 5µm, 150 x 4.6mm

Mobile Phase:	40/60 v/v CH ₃ CN/NH ₄ OAc, pH 5.2 (20 mM total)
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	5µL
Detection:	UV (225 nm)
Analytes:	1. Maleate 50µg/mL 2. Ketoprofen 30µg/mL 3. Naproxen 30µg/mL 4. Hydrocortisone 60µg/mL 5. Dexamethasone 60µg/mL 6. Oxprenolol 300µg/mL 7. Timolol 250µg/mL

Acclaim Mixed-Mode WCX-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071910	-
		150	070093	070092	-
5	Guard Cartridge	10	085455	071911	069705
	HPLC Column	150	068371	-	068353
		250	-	-	068352

Acclaim Guard Holder

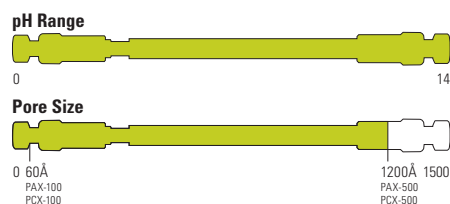
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

OmniPac

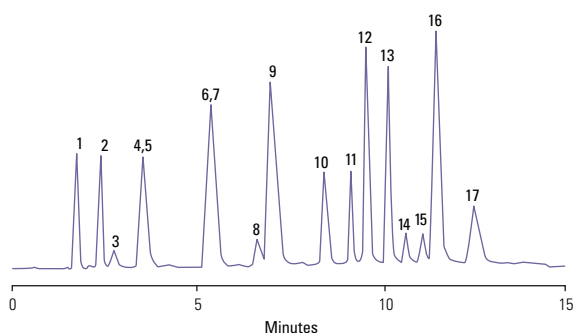
DVB polymer columns for combined ion exchange and reversed-phase separations

- Acid, base and solvent compatible, pH 0 to 14
- Ideal for the separation of high molecular weight organic acids
- Delivers optimal separation of very hydrophobic anions
- Delivers optimal separation of halogenated anions
- Provides simultaneous separation of neutral and ionic species
- Unique selectivity for polar and ionic organic analytes
- Delivers optimal separation of organic, hydrophobic, and halogenated cations

Thermo Scientific™ OmniPac™ is a range of latex-based columns. Both PAX columns have an ion exchange capacity of about 40µeq per column, and the PCX columns have a capacity of approximately 120µeq per column. The PAX-500 and PCX-500 columns separate analytes through both ion exchange and reversed-phase mechanisms, due to their higher reversed-phase capacity relative to the PAX-100 and PCX-100 columns.



Gradient separation of nitrogen-containing compounds



OmniPac PCX-500, 250 x 4.0mm

Mobile Phase: Acetonitrile/Sodium Chloride/
Hydrochloric Acid Gradient

Flow Rate: 1.0mL/min

Detection: UV, 254nm

Analytes:

1. Orotic Acid
2. 4-Hydroxybenzamide
3. Luminol Impurity
4. Luminol
5. Pyridine
6. PABA
7. 2,2'-Bipyridine
8. p-Phenylenediamine
9. Naphthylamine
10. Nitrobenzoic Acid
11. Tribenzylamine
12. p-Nitroaniline
13. 2,4-Dinitroaniline
14. Dibenzylamine
15. N-Methyl-N-nitrosoaniline
16. 4-Chloro-2-nitroaniline
17. 2,6-Dichloro-4-nitroaniline

OmniPac Anion Exchange

Description	Porosity	Length (mm)	4.0mm ID
PAX-100	Microporous	50	042151
		250	042150
PAX-500	Microporous	50	042153
		250	042152

OmniPac Cation Exchange

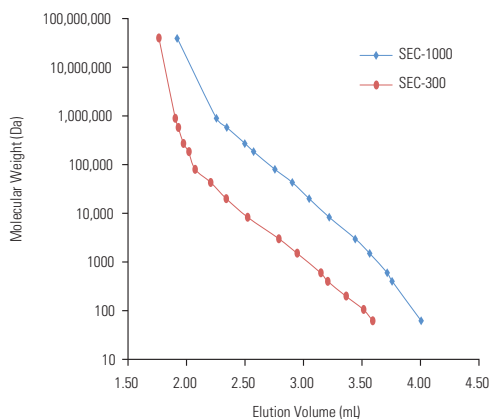
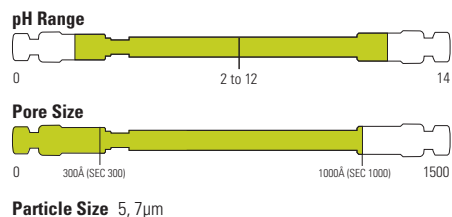
Description	Porosity	Length (mm)	4.0mm ID
PCX-100	Microporous	50	042193
		250	042189
PCX-500	Microporous	50	042195
		250	042191

Acclaim Size Exclusion Chromatography (SEC)

High performance SEC columns for analysis of water soluble polymers

- Proprietary mono-dispersed multi-pore hydrophilic resin: no inflection points in calibration curve
- SEC-300 calibrated from 100 to 50,000 Daltons
- SEC-1000 calibrated from 1,000 to 1,000,000 Daltons
- Availability of small particle sizes packed in 300 x 4.6mm dimension allows for high-resolution analysis at reduced solvent consumption
- Stable surface bonding with low column bleed and compatibility with UV, RI, MS, ELSD and Thermo Scientific™ Dionex™ Corona™ Charged Aerosol Detectors

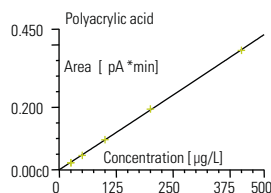
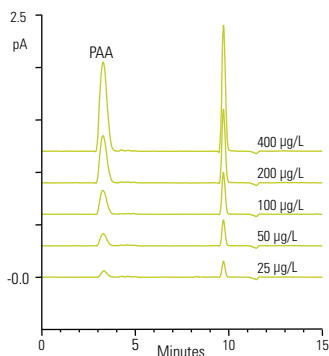
Thermo Scientific™ Acclaim™ SEC-300 and SEC-1000 are a family of resin based, high performance size exclusion chromatography columns specifically designed for the separation of water soluble polymers and oligomers.



Acclaim SEC-300, 5µm, 300 x 4.6mm Acclaim SEC-1000, 7µm, 300 x 4.6mm

Mobile Phase:	10mM sodium perchlorate
Temperature:	25°C
Flow Rate:	0.35mL/min
Injection Volume:	50µL
Detection:	RI
Analytes:	(0.03% - 0.1% in mobile phase) dextran (MW 5,000,000-40,000,000), PEO (MW 895,000, 580,000, 272,000, 185,000, 80,000, 43,000, and 20,000), PEG (MW 8,300, 3,000, 1,500, 600, 400 and 200), diethylene glycol (MW 106 and ethylene glycol (MW 62)

Polyacrylic acid using size-exclusion chromatography with charged-aerosol detection



Acclaim SEC-300, 5µm, 300 x 4.6mm

Mobile Phase A:	Acetonitrile
Mobile Phase B:	Water
Temperature:	30°C
Flow Rate:	0.35mL/min
Injection Volume:	35µL
Detection:	Corona III; evaporator 55°C, Engine 40 °C, 2 Hz, filter 5, power function 1.20
Analytes:	1. PAA standards in water

Acclaim Size Exclusion Chromatography (SEC)

Description	Particle Size (µm)	Format	Length (mm)	4.6mm ID	7.8mm ID
Acclaim SEC-300	5	Guard	33	082740	—
		HPLC Column	150	—	079726
			300	079723	079725
Acclaim SEC-1000	7	Guard	33	082739	—
		HPLC Column	150	—	079722
			300	079724	079721



Application Specific HPLC and UHPLC Columns

Innovative chemistries tailored for challenging and critically important applications

Application specific columns utilize novel and unique chemistries to provide superior resolution with ease of use for key pharmaceutical and environmental applications.

- **Acclaim AmG C18**
Aminoglycoside antibiotics separation
- **Acclaim Trinity P1 and P2**
API & counterion analysis
- **Acclaim Organic Acid**
Fast organic acid analysis
- **Acclaim Surfactant and Surfactant Plus**
Separation of surfactants
- **Acclaim Explosives**
Separation of explosive residues
- **Acclaim Trinity Q1**
Diquat and paraquat analysis
- **Acclaim Carbamate**
The separation of carbamate pesticides
- **Acclaim Carbonyl C18**
Separation of DNPH derivatives of aldehydes and ketones

The Application Specific column web page contains the latest news, applications and downloads for the Application Specific HPLC column range. Visit www.thermoscientific.com/columns



Acclaim AmG C18

Designed to provide rugged and reproducible reversed-phase chromatography of aminoglycoside antibiotics.

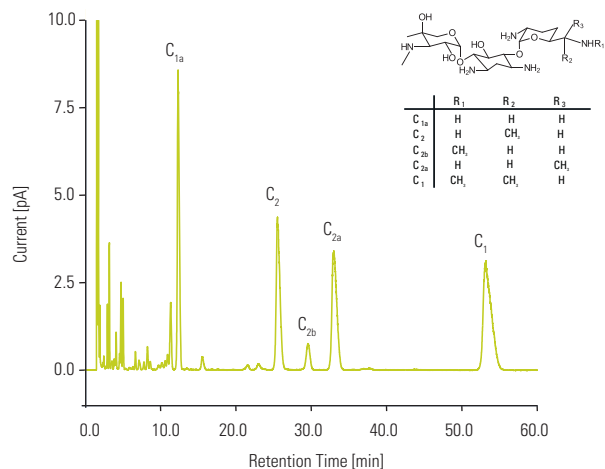
- Rugged and reproducible
- Excellent selectivity for the HPLC of aminoglycosides
- Superior resistance to acidic conditions for long column lifetime
- Easy to use with only aqueous mobile phase; TFA only, or TFA/HFBA or PFPA is needed
- Compatible with simple rugged methods; no solvents are required
- High efficiency and throughput



Aminoglycoside antibiotics are commonly used as clinical and veterinary medicines to treat bacterial infections. HPLC using ion-pairing reversed-phase separations is an effective technique for simultaneous qualitative and quantitative determination of aminoglycosides.

The Acclaim AmG C18 column is designed to provide excellent stability, selectivity and high resolution. It has a unique surface, a polymer encapsulated silica covalently bonded with a C18 ligand. This ensures ultra-stability when exposure to low pH (<1) and high temperature separation conditions.

Isocratic separation of gentamicin sulfate using 100 mM TFA as the mobile phase



Acclaim AmG C18, 3µm, 150 x 3.0mm

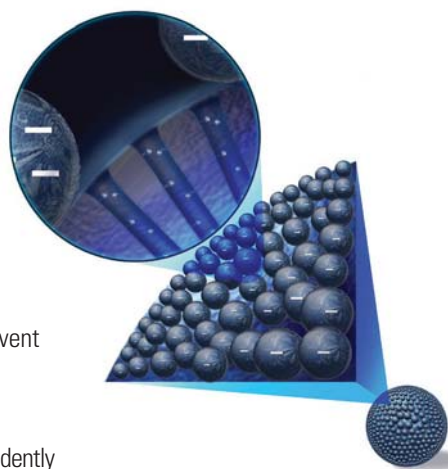
Mobile Phase:	100 mM TFA
Temperature:	30°C
Flow Rate:	0.425 mL/min
Injection Volume:	2µL
Detection:	Corona Veo RS (Filter = 5.0 s; Evaporation Temp = 35°C; Data Rate = 5 Hz; Power Function = 1.00)
Sample:	Gentamicin (1 mg/mL)

Acclaim AmG C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	Guard Cartridges (2/pk)	10	088754	088756	088758
	HPLC Column	150	088753	088755	088757
Guard Cartridge Holder			069580	069580	069580

Acclaim Trinity P1

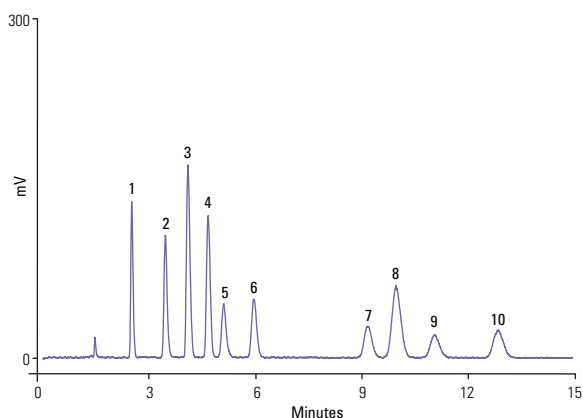
Mixed mode column technology combining reversed-phase, anion exchange and cation exchange functionality on a single support



- Ideal selectivity for simultaneous separation of API and counterion
- Adjustable selectivity by mobile phase ionic strength, electrolyte type, pH, and organic solvent
- Low bleed; compatible with MS, CAD and ELSD
- Retention of hydrophilic ionic and ionizable analytes without ion-pairing reagents
- Greater flexibility in method development: each retention mechanisms can be controlled independently

The Thermo Scientific™ Acclaim™ Trinity™ P1 HPLC column is designed with Nanopolymer Silica Hybrid (NSH) technology, which results in a multimode surface chemistry ideal for the simultaneous separation of drugs and their counterions. The surface chemistry concurrently provides reversed-phase, cation exchange, and anion exchange functionalities. The result is maximum flexibility in method development. Separations can be optimized easily by adjusting the chromatographic parameters (mobile phase pH, ionic strength, and organic strength).

Simultaneous separation of pharmaceutical counterions



Acclaim Trinity P1, 3µm, 100 x 3.0mm

Mobile Phase:	60/40 v/v CH ₃ CN/20mM (total) NH ₄ OAc, pH 5
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	2µL
Detection:	Corona ultra (Gain = 100 pA; Filter = med; Neb Temp = 30°C)
Analytes: (50 to 100ppm)	1. Choline 2. Tromethamine 3. Sodium 4. Potassium 5. Meglumine 6. Mesylate 7. Nitrate 8. Chloride 9. Bromide 10. Iodide

Acclaim Trinity P1

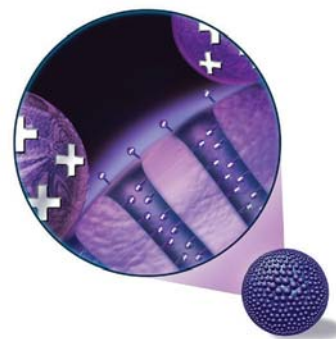
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	071391	071390
		HPLC Column	075565	071388
		100	071389	071387
		150	075564	075563

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Trinity P2

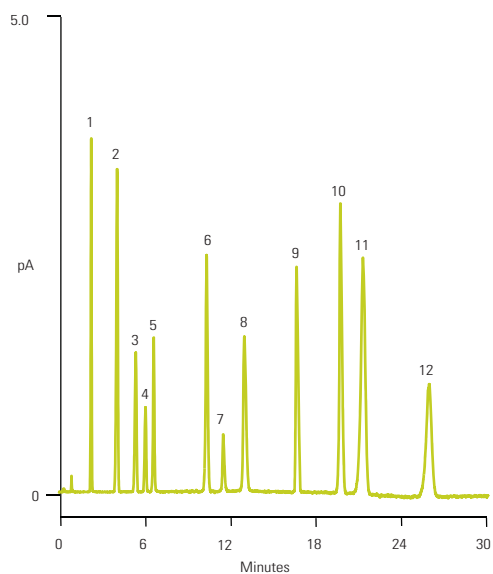
Mixed-mode column technology; hydrophilic interaction combining HILIC, anion exchange and cation exchange functionalities



- Ideal for separating pharmaceutical counterions, including monovalent and divalent cations or anions
- Selectivity complementary to the Trinity P1 column
- Low column bleed, compatible with CAD and MS
- Hydrolytically stable
- High efficiency

The Acclaim Trinity P2 is a unique, high-efficiency, silica-based column specifically designed for separation of pharmaceutical counterions, including monovalent and divalent cations or anions. This column is based on Nanopolymer Silica Hybrid (NSH) technology, which consists of high-purity porous spherical silica particles coated with charged nanopolymer particles. The inner-pore area of the silica bead is modified with a covalently bonded organic layer that provides cation-exchange retention, while the outer surface is modified with anion-exchange nano-polymer beads. Acclaim Trinity P2 column is aimed to complement Acclaim Trinity P1 to provide a total solution for pharmaceutical counter ion analysis by HPLC.

Pharmaceutical-related anions and cations



Acclaim Trinity P2, 3µm, 100 x 3.0mm

Mobile Phase:	D.I. water and 100 mM NH ₄ OFm, pH 3.65 gradient
Temperature:	30°C
Flow Rate:	0.60 mL/min
Injection Volume:	2µL
Detection:	Corona Veo Charged Aerosol Detector
Analytes:	1. Phosphate 2. Sodium 3. Potassium 4. Chloride 5. Malate 6. Bromide 7. Nitrate 8. Citrate 9. Fumarate 10. Sulfate 11. Magnesium 12. Calcium
Samples:	0.02 – 0.10 mg/mL each in D.I. water

Time (min)	H ₂ O	0.1 M Ammonium formate, pH3.65
-10	0.760	1.474
0	80	20
2	80	20
22	0	100
30	0	100

Acclaim Trinity P2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	085435	085436
	HPLC Column	50	085431	085433
		100	085432	085434

Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Organic Acid

Optimized and application-tested for the analysis of hydrophilic organic acids

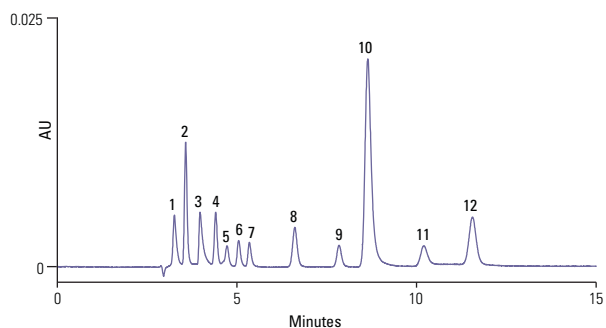
- Tested to guarantee consistent hydrophilic organic acid separations
- Compatible with 100% aqueous mobile phases
- Hydrolytic stability at low-pH conditions
- Ideal selectivity for separating a wide spectrum of organic acids
- Excellent column efficiency and peak shapes for organic acids



The Acclaim Organic Acid (OA) is a silica-based reversed-phase column designed for high-efficiency, high-throughput organic acids analysis. It offers unparalleled performance for separating hydroxyl aliphatic and aromatic organic acids.

The Acclaim OA is the recommended column for determining small hydrophilic organic acids, C1 to C7 aliphatic acids, and hydrophilic aromatic acid and is also valuable for the analysis and quality assurance of food and beverage products, pharmaceutical preparations, plating baths, and manufacturing chemicals, chemical intermediates, and environmental samples.

Hydrophilic organic acids



Acclaim Organic Acid, 5µm, 4 × 250mm

Mobile Phase:	100mM Na ₂ SO ₄ , pH 2.65 (adjusted with methanesulfonic acid)
Temperature:	30°C
Flow Rate:	0.6mL/min
Injection Volume:	5µL
Detection:	UV, 210nm
Analytes:	1. Oxalic acid 15mg/L (ppm) 2. Tartaric acid 120 3. Formic acid 180 4. Malic acid 120 5. iso-Citric acid 120 6. Lactic acid 180 7. Acetic acid 120 8. Citric acid 120 9. Succinic acid 120 10. Fumaric acid 7 11. cis-Aconitic acid * 12. trans-Aconitic acid *

* 7ppm total for cis and trans isomers

Acclaim Organic Acid

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID
3	HPLC Column	150	070087	070086	—
5	Guard Cartridges (2/pkg)	10	—	071987	069700
	HPLC Column	150	—	—	062903
		250	—	—	062902

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Surfactant

Excellent performance for separating a broad range of surfactants

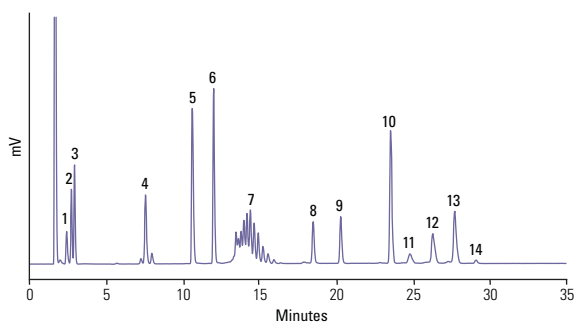
- Ideal selectivity for separation of anionic, nonionic, cationic and amphoteric surfactants
- Excellent peak shapes, especially for cationic surfactants
- Compatible with highly aqueous mobile phases
- Improved resolution for ethoxylated surfactants
- Rugged separations under a variety of conditions



The Acclaim Surfactant columns are the first generation high-efficiency, silica-based columns designed specifically for separating a wide variety of surfactants, including anionic, cationic, nonionic, ethoxylated and amphoteric surfactants using UV, ELSD or RI detection.

Surfactants are widely used in industrial, agricultural, and pharmaceutical markets, in products as diverse as pesticides, detergent powders, petroleum products, cosmetics, and pharmaceuticals. The Acclaim Surfactant column was designed specifically for HPLC separation of these surfactants.

Inorganic anion, hydrotropes, cationic, nonionic, amphoteric, and anionic surfactants



Acclaim Surfactant, 5µm, 150 x 4.6mm

Mobile Phase A:	CH ₃ CN
Mobile Phase B:	0.1 M NH ₄ OAc, pH 5.4
Gradient:	25% to 85% A in 25min, then hold 85% A for 10min
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	25µL
Detection:	ELS detector
Analytes:	1. Chloride 2. Bromide 3. Nitrate 4. Xylene sulfonate 5. Laurylpyridinium chloride 6. Lauryldimethylbenzyl-ammonium chloride 7. Triton X-100 8. Cetyl betaine 9. Decyl sulfate 10. Dodecyl sulfate 11. C ₁₀ -LAS 12. C ₁₁ -LAS 13. C ₁₂ -LAS 14. C ₁₃ -LAS

Acclaim Surfactant

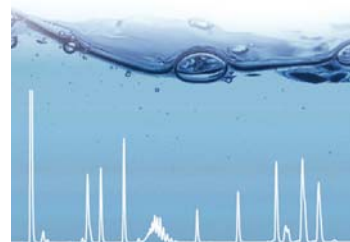
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	150	070085	070084	—
5	Guard Cartridges (2/pk)	10	069693	071991	069701
	HPLC Column	150	068123	—	063201
		250	—	—	063203

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Surfactant Plus

Column of choice for surfactant analysis using higher sensitivity detection: performance, versatility, throughput

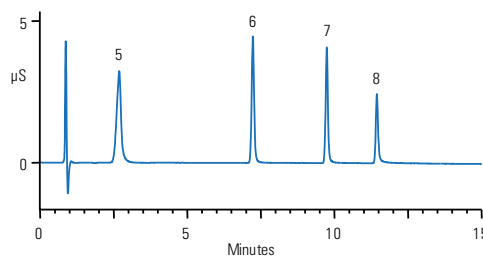
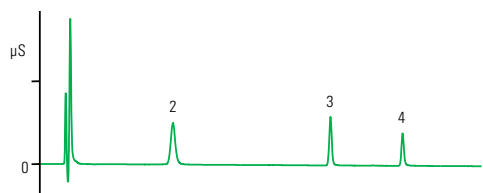


- Ideal selectivity for simultaneous separation of anionic, nonionic, cationic, and amphoteric surfactants
- Compatible with multiple detectors including MS, CAD, ELSD and UV
- Well suited for the determination of cationic surfactants
- High efficiency and fast analysis
- Rugged separations under a variety of conditions

Acclaim Surfactant Plus is a new generation of columns offering improved performance and higher throughput for analyzing surfactants. These columns exhibit exceptionally low bleed and are ideal for use with charged aerosol detectors (CAD) and mass spectrometers (MS). These columns can be used to separate a wide variety of surfactants including anionic, cationic, nonionic and amphoteric surfactants, as well as isomers of xylene sulfonate.

These columns can be used with evaporative light scattering detectors (ELSD), suppressed conductivity detectors (SCD), and UV-Vis detectors (UV). Non-metallic PEEK hardware is available for best compatibility with Dionex ion chromatography systems.

Cationic surfactants



Acclaim Surfactant Plus, 3μm, 150 x 3.0mm

Mobile Phase A: Acetonitrile
 Mobile Phase B: 100mM Formic acid
 Mobile Phase C: Water
 Gradient:

Time (min)	%A	%B	%C
-12	5	5	90
0	5	5	90
12	40	5	55
20	40	5	55

Temperature: 25°C
 Flow Rate: 0.5mL/min
 Injection Volume: 5μL
 Detection: Conductivity with blank subtraction

- Analytes:
1. Tetrabutylammonium
 2. Tetrapentylammonium
 3. Tetrahexylammonium
 4. Tetraheptylammonium
 5. Decyl-trimethylammonium
 6. Dodecyl-trimethylammonium
 7. Tetradecyl-trimethylammonium
 8. Hexadecyl-trimethylammonium

Acclaim Surfactant Plus

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID	4.0mm ID PEEK
3	HPLC Column	100	078955	078952	—	—
		150	078954	078951	078950	—
		250	078953	—	—	—
5	Guard Cartridges (2/pk)	10	078960	078959	082773	—
		HPLC Column	250	—	—	082767
	HPLC Column	250	—	—	082768	078956
		150	—	—	082768	078956

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Explosives E2

The best solution for explosives analysis (EPA Method 8330)

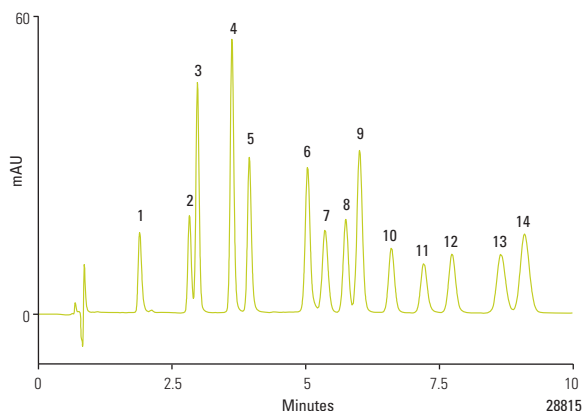
- Acclaim E2 columns provide baseline resolution of all 14 compounds targeted by EPA Method 8330
- Columns available in 2.2, 3 and 5µm particle size
- Simple isocratic elution conditions
- Rugged columns with good lot-to-lot reproducibility



Acclaim Explosives E2 columns are specifically designed to resolve all 14 explosives listed in EPA SW-846 Method 8330: Nitroaromatics and Nitramines by HPLC. The novel and unique chemistries of these columns provide superior resolution with complementary selectivities.

The Acclaim Explosives E2 may be used as either a primary or a confirmatory column. The unique selectivity and versatility of this column provides a wider application range, including the analysis of explosives beyond U.S. EPA Method 8330 (ISO22478).

Rapid determination of EPA 8330A explosives



Acclaim RSLC Explosives E2, 2.2µm, 100 x 2.1mm

Mobile Phase:	Methanol:water 48:52 (v/v)														
Temperature:	31°C														
Flow Rate:	0.34mL/min (293 bar)														
Injection Volume:	1µL														
Detection:	UV, 254nm														
Analytes:	<table border="0"> <tr> <td>1. HMX</td> <td>8. 2,6-DNT</td> </tr> <tr> <td>2. RDX</td> <td>9. 2,4-DNT</td> </tr> <tr> <td>3. 1,3,5-TNB</td> <td>10. 2-NT</td> </tr> <tr> <td>4. 3,5-DNB</td> <td>11. 4-NT</td> </tr> <tr> <td>5. NB</td> <td>12. 3-NT</td> </tr> <tr> <td>6. 2,4,6-TNT</td> <td>13. 4-Am-2,6-DNT</td> </tr> <tr> <td>7. Tetryl</td> <td>14. 2-Am-4,6-DNT</td> </tr> </table>	1. HMX	8. 2,6-DNT	2. RDX	9. 2,4-DNT	3. 1,3,5-TNB	10. 2-NT	4. 3,5-DNB	11. 4-NT	5. NB	12. 3-NT	6. 2,4,6-TNT	13. 4-Am-2,6-DNT	7. Tetryl	14. 2-Am-4,6-DNT
1. HMX	8. 2,6-DNT														
2. RDX	9. 2,4-DNT														
3. 1,3,5-TNB	10. 2-NT														
4. 3,5-DNB	11. 4-NT														
5. NB	12. 3-NT														
6. 2,4,6-TNT	13. 4-Am-2,6-DNT														
7. Tetryl	14. 2-Am-4,6-DNT														
Sample:	Calibration mix, 25µg/mL in 50% acetonitrile														

Acclaim Explosives E2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	076225	076227	–
		150	076226	–	–
3	HPLC Column	150	070083	070082	–
		250	–	070081	–
5	Guard Cartridges (2/pk)	10	–	071989	069703
	HPLC Column	250	–	–	064309

See page 4-054 for Acclaim Guard Holder Ordering Guide

Acclaim Trinity Q1

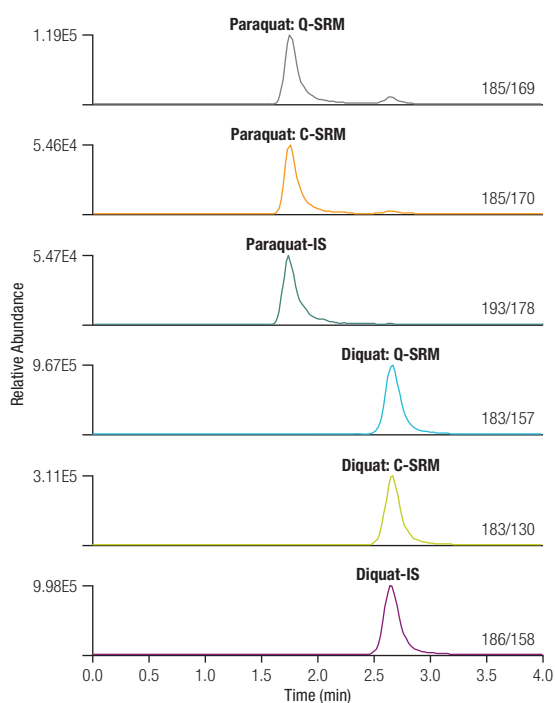
For trace analysis of diquat and paraquat

- Excellent resolution of diquat and paraquat
- Good peak shape
- Fast analysis
- LC-MS compatible
- No ion-pairing reagent needed



Acclaim Trinity Q1 columns are unique, high-efficiency, silica-based columns designed for the separation of the herbicides diquat and paraquat. These herbicides are toxic and residues are monitored in drinking water, wastewater and agricultural products. The Acclaim Trinity Q1 column is a tri-mode (WCX, WAX, RP), column based on Nano-polymer Silica Hybrid technology. It offers unmatched high-resolution and high-throughput trace analysis of the herbicides diquat and paraquat by LC-MS/MS and LC-UV methods.

Diquat and paraquat



Acclaim Trinity Q1, 3µm, 50 x 3.0mm

Mobile Phase:	25% ammonium acetate (100mM, pH 5.0); 75% acetonitrile		
Temperature:	Ambient		
Flow Rate:	0.5mL/min		
Injection Volume:	5µL		
Detection:	Show Mass Spectrometric conditions and the scan events etc. table underneath are the peaks section		
Mass Spectrometric Conditions			
System:	Thermo Scientific TSQ Quantiva Access MAX Quadrupole Mass Spectrometer		
Interface:	Heated Electrospray Ionization with HESI II probe		
Spray Voltage:	1500 V		
Vaporizer Temp:	400 °C		
Sheath Gas Pressure:	70		
Aux Gas Pressure:	10		
Capillary Temp:	350 °C		
Quantitation Mode:	Selected Reaction Monitoring (SRM)		
Scan Events	Precursor	Quantitative SRM (CID)	Confirmative SRM (CID)
Paraquat	185	169 (27)	170 (17)
Paraquat-d ₆	193	178 (17)	
Diquat	183	157 (22)	130 (31)
Diquat-d ₃	186	158 (22)	

Acclaim Trinity Q1

Particle Size		Length (mm)	2.1mm ID	3.0mm ID
3	HPLC Column	50	083242	083241
		100	079717	079715
5	Guard Cartridges (2/pk)	10	083244	079719

Acclaim Carbamate

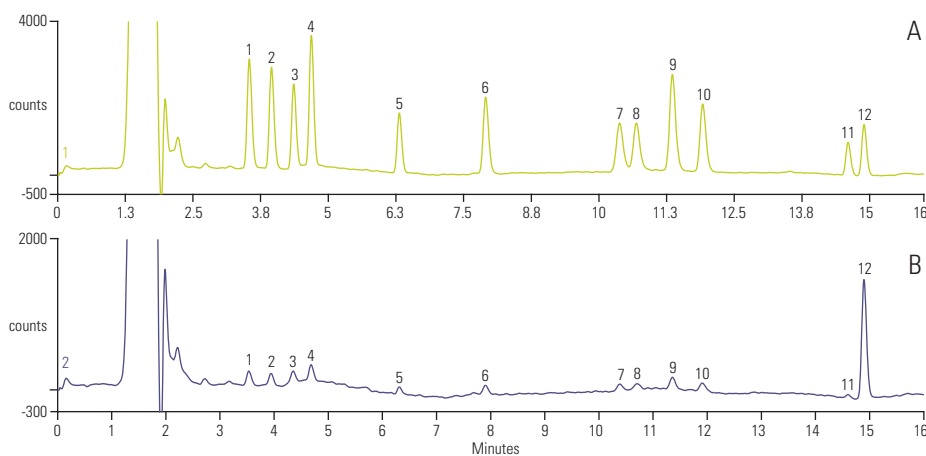
Designed for baseline separation of carbamate pesticides specified in US EPA Method 531.2

- Baseline separation of carbamate pesticides specified in US EPA Method 531.2
- Use with either LC/postcolumn derivatization/fluorescence or LC-MS detection
- Available in 2.2, 3 and 5µm particle size
- Compatible with both binary (methanol/water) and ternary (acetonitrile/methanol/water) mobile phase gradients
- High-efficiency, extremely low column bleed, and rugged column packing



Acclaim Carbamate columns are designed for baseline separation of carbamates (*N*-methylcarbamate and *N*-methylcarbamoyloxime pesticides) specified in US EPA Method 531.2. Carbamate pesticides are widely used throughout the world. Drinking water and raw surface water is monitored for the presence of carbamate pesticides and related compounds using an established EPA Method 531.2 that uses HPLC with postcolumn derivatization. LC-MS is the method of choice for the ultimate sensitivity.

Carbamate standard - spiked rice samples



A: without dispersive SPE
B: with dispersive SPE using PSA

Acclaim Carbamate, 3µm, 150 x 3.0mm

Mobile Phase:	Methanol-H ₂ O
Gradient:	Methanol, -4.0-0.0 min, 14%; 2.0 min, 20%; 8.0 min, 40%; 13.6-16 min, 70%
Temperature:	50 °C
Flow Rate:	0.9mL/min
Injection Volume:	250µL
Detection:	Excitation/330nm and Emission/465nm
Analytes:	1. Aldicarb sulfoxide 2. Aldicarb sulfone 3. Oxamyl 4. Methomyl 5. 3-Hydroxy carbofuran 6. Aldicarb 7. Propoxur 8. Carbofuran 9. Carbaryl 10. 1-Naphthol 11. Methiocarb 12. BDMC (I.S.)

Acclaim Carbamate

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	075597	—	—
		150	075596	—	—
3	Guard Cartridges (2/pk)	10	072930	072929	072928
	HPLC Column	150	072927	072926	072925
5	HPLC Column	250	—	—	072924

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Carbonyl C18

A silica-based, reversed-phase column designed specifically for separating DNPH derivatives of aldehydes and ketones

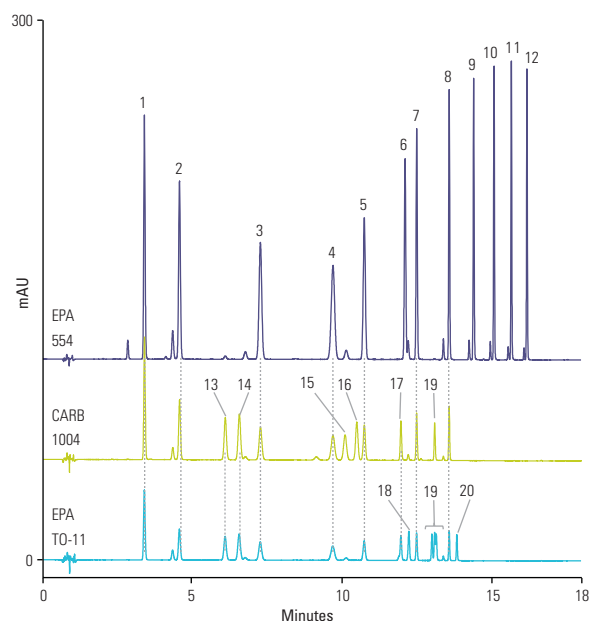
- Ideal selectivity for baseline resolution of DNPH derivatives of aldehydes and ketones regulated by various official methods, including EPA 554, EPA 8315, EPA 1667, EPA TO-11, and CARB 1004
- High efficiency for UHPLC performance
- Rugged columns with good lot-to-lot reproducibility
- Proven robust methods



Acclaim Carbonyl C18 columns are silica-based reversed phase columns designed specifically for separating DNPH derivatives of aldehydes and ketones. They exhibit superior resolution compared with other commercially available columns.

Aldehydes and ketones are common pollutants in air and water. Several standard methods have been developed to apply using dinitrophenylhydrazine (DNPH) to various environmental situations to measure these compounds. Some of the better known ones include CARB 1004 for vehicle exhaust, EPA 554 for drinking water, EPA 1667 for pharmaceutical wastewater, and EPA 8315 for general wastewater.

DNPH aldehydes and ketones

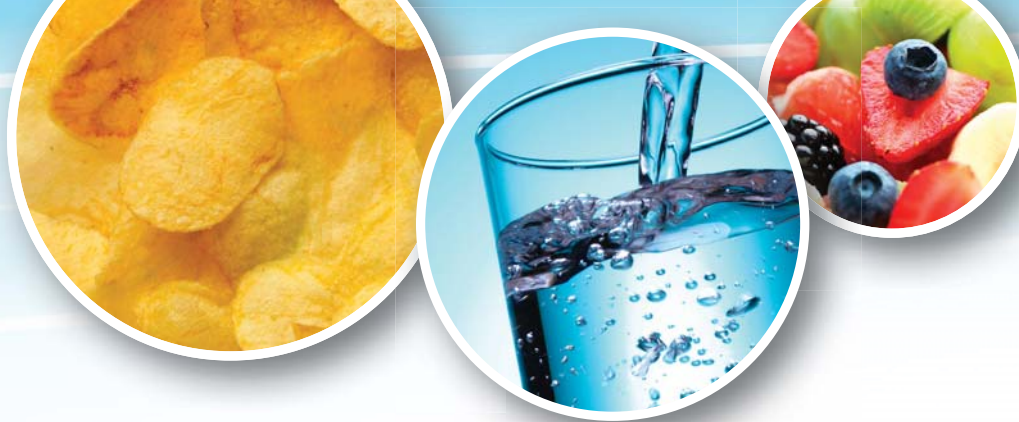


Acclaim Carbonyl RSLC, 2.2µm, 150 x 2.1mm

Mobile Phase A:	D.I. water
Mobile Phase B:	Acetonitrile
Gradient (min):	-4.5 0.0 8.3 15.0 18.0
	%A 48 48 48 0 0
	%B 52 52 52 100 100
Flow Rate:	0.400mL/min
Injection Volume:	1µL
Temperature:	28°C
Detection:	UV, 360nm
Samples:	Calibration mixes diluted in methanol
Analytes:	1. Formaldehyde DNPH 2. Acetaldehyde DNPH 3. Propionaldehyde DNPH 4. Crotonaldehyde DNPH 5. Butyraldehyde DNPH 6. Cyclohexanone DNPH 7. Valeraldehyde DNPH 8. Hexanal DNPH 9. Heptanal DNPH 10. Octanal DNPH 11. Nonanal DNPH 12. Decanal DNPH 13. Acetone DNPH 14. Acrolein DNPH 15. Butanone DNPH 16. Methacrolein DNPH 17. Benzaldehyde DNPH 18. Isovaleraldehyde DNPH 19. Toluvaldehyde DNPH 20. Xylaldehyde DNPH

Acclaim Carbonyl C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	077972	077974	—
		150	077973	—	—
3	HPLC Column	150	079011	079010	—
		250	—	079009	—
5	Guard Cartridge (2/pk)	10	079012	079013	079014
	HPLC Column	150	—	—	079008
		250	—	—	083214



Hypercarb HPLC Columns

100% porous graphitic carbon for extended separation capabilities

Used for the retention and separation of highly polar species. Thermo Scientific™ Hypercarb™ columns are ideally suited to solve in both reversed phase and normal phase HPLC and LC-MS applications.

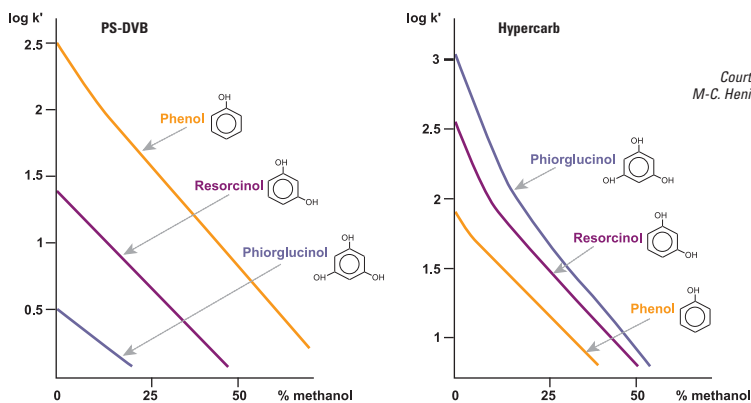
- **Exceptional Retention of Very Polar Analytes**
Ideal for complex separations
- **Separates Structurally Related Substances**
More effective than silica-based columns
- **pH Stable from 0 to 14**
Extended temperature and pressure capabilities



The Hypercarb web page contains the latest news, applications and downloads for the Hypercarb HPLC column range. Visit www.thermoscientific.com/hypercarb

Increased Retention of Polar Analytes

In typical reversed phase chromatography, the retention of an analyte is directly related to its hydrophobicity: the more hydrophobic the analyte, the longer its retention. Conversely, as the polarity of the analyte increases, analyte-solvent interactions begin to dominate and retention is reduced. This observation holds true for the majority of reversed phase systems. An exception to this rule is Hypercarb columns, for which retention may in some cases increase as the polarity of the analyte increases, illustrated to the right. This phenomenon is referred to as the "polar retention effect on graphite" (PREG). This property makes Hypercarb columns particularly useful for the separation of highly polar compounds (with logP as low as -4) that are normally difficult to retain and resolve on silica-based alkyl chain phases. The retention of very polar solutes on Hypercarb columns can be achieved without ion pair reagents or complex mobile phase conditions, as illustrated in the chromatogram below.



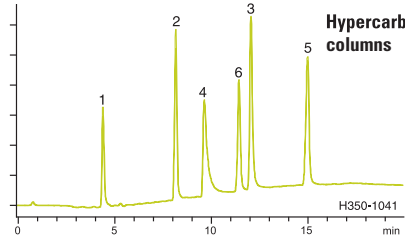
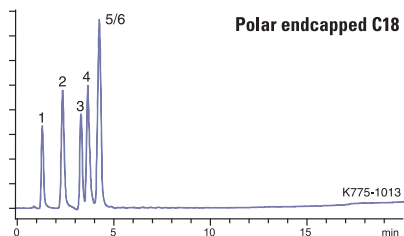
Retention on Hypercarb columns increases as polarity of the analyte increases, which is the opposite of typical reversed phase materials such as PS-DVB

Extended pH Range

One of the other key benefits of Hypercarb columns is the extreme stability of the phase to chemical or physical attack. Due to the unique characteristics of the media, it can withstand chemical attack across the entire pH range of 0 to 14, allowing applications to be run at pH levels that are incompatible

with typical silica-based columns. Hypercarb columns offer more choice in buffer selection while handling both high temperature and high pressure.

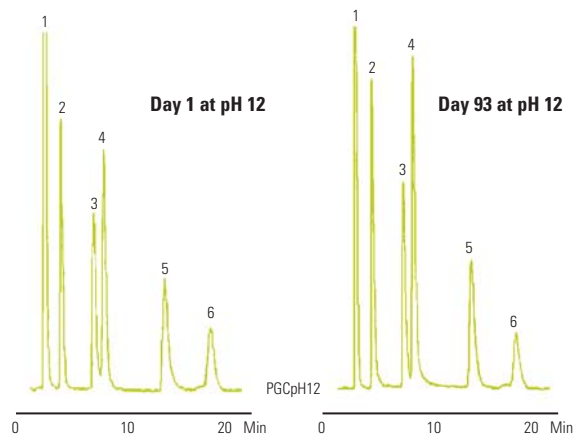
Courtesy V. Coquart and M.-C. Henion, J. Chrom., 1992



Additional retention is achieved for polar compounds using a Hypercarb column compared to a polar endcapped C18. Note also the change in elution order.

Hypercarb, 5µm, 100 x 0.32mm

Mobile Phase A:	H ₂ O + 0.1% formic acid
Mobile Phase B:	ACN + 0.1% formic acid
Gradient:	0 to 25% B in 15 minutes
Temperature:	25°C
Flow Rate:	8µL/min
Detection:	UV, 254nm
Analytes:	1. Cytosine 2. Uracil 3. Guanine 4. Adenine 5. Xanthine 6. Thymine



Hypercarb, 5µm, 100 x 4.6mm

Mobile Phase:	MeOH:H ₂ O
Gradient:	70:30
Flow Rate:	0.7mL/min
Detection:	UV, 254nm
Analytes:	1. Acetone 2. Phenol 3. p-Cresol 4. Anisol 5. Phenetole 6. 3,5-Xylenol

Hypercarb column stability at pH 12: retention and selectivity do not change even after 93 days of storage in 0.1M NaOH/MeOH

Hypercarb

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.		
3	Drop-in Guard (4/pk)	10	2.1	35003-012101		
			3.0	35003-013001		
			4.6	35003-014001		
	HPLC Column	30	30	1.0	35003-032130	
				3.0	35003-033030	
				2.1	35003-052130	
				3.0	35003-053030	
		50	50	2.1	35003-052130	
				3.0	35003-053030	
				4.6	35003-054630	
				2.1	35003-102130	
		100	100	3.0	35003-103030	
				4.6	35003-104630	
				2.1	35003-152130	
				3.0	35003-153030	
	High Temperature HPLC Column	30	30	2.1	35003-032146	
				4.6	35003-054646	
		50	50	2.1	35003-052146	
				4.6	35003-054646	
		100	100	2.1	35003-102146	
				3.0	35003-103046	
5	Drop-in Guard (4/pk)	10	2.1	35005-012101		
			3.0	35005-013001		
			4.6	35005-014001		
	HPLC Column	30	30	2.1	35005-032130	
				3.0	35005-033030	
				4.6	35005-034630	
				2.1	35005-052130	
				3.0	35005-053030	
		50	50	4.6	35005-054630	
				2.1	35005-102130	
				3.0	35005-103030	
				4.6	35005-104630	
				2.1	35005-152130	
		100	100	3.0	35005-153030	
				4.6	35005-154630	
				2.1	35005-032146	
				4.6	35005-034646	
				2.1	35005-052146	
High Temperature HPLC Column	30	30	4.6	35005-054646		
			2.1	35005-102146		
	50	50	4.6	35005-054646		
Javelin HTS Column	20	20	2.1	35005-022135		
			Preparative HPLC Column	100	10	35005-109070
					21.2	35005-109270
Preparative HPLC Column	150	150	30	35005-109370		
			10	35005-159070		
			21.2	35005-159270		

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	1.0	851-00
		2.1	852-00
		3.0	852-00
		4.6	850-00



Synchronis HPLC and UHPLC Columns

Remarkable separations guaranteed time after time

Thermo Scientific™ Synchronis™ HPLC columns are used to achieve consistent, reproducible separations. Chemistries available for a variety of applications.

- **Consistent Separations**

Highly pure, high surface area silica

- **Dense Bonding and Double Endcapping**

Reduction of residual silanols available to interact with basic analytes

- **Strong Quality Control**

Rigorously tested to ensure quality



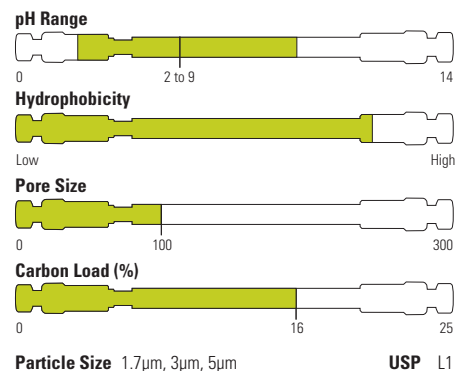
The Synchronis web page contains the latest news, applications and downloads for the Synchronis HPLC column range.

Visit www.thermoscientific.com/synchronis

Synchronis C18

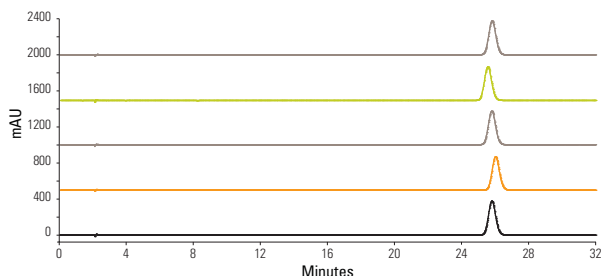
Synchronis C18 columns deliver remarkable separations, time after time

- Highly pure, high surface area silica
- High carbon load for increased retention
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality



Synchronis C18 columns show excellent column to column reproducibility, as illustrated here by the analysis of zidovudine using five separate columns. The reproducibility in terms of retention time and peak area is less than or equal to 0.5%, column to column.

Zidovudine



Synchronis C18, 5µm, 150 x 4.6mm

Mobile Phase:	Water:Methanol (4:1)
Temperature:	25°C
Flow Rate:	1.0mL/min
Injection Volume:	10µL
Detection:	UV, 265nm
Analytes:	1. Zidovudine

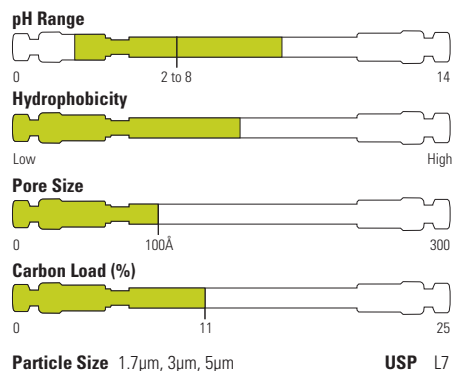
Synchronis C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	30	97102-032130	-	-
		50	97102-052130	-	-
		100	97102-102130	-	-
3	HPLC Column	30	97103-032130	-	-
		50	97103-052130	-	97103-054630
		100	97103-102130	97103-103030	97103-104630
		150	97103-152130	-	97103-154630
5	Drop-in Guard (4/pk)	10	97105-012101	97105-013001	97105-014001
	HPLC Column	30	97105-032130	-	-
		50	97105-052130	97105-053030	97105-054630
		100	97105-102130	97105-103030	97105-104630
		150	97105-152130	97105-153030	97105-154630
		250	97105-252130	97105-253030	97105-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

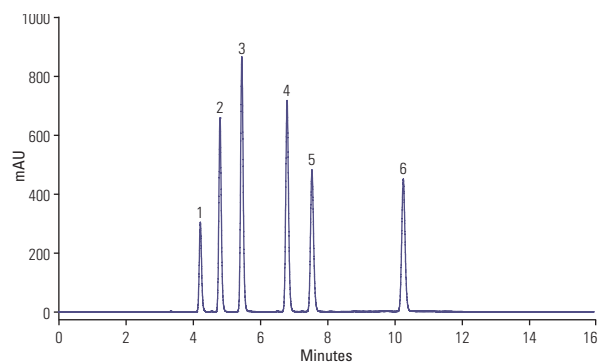
Synchronis C8

Reduces hydrophobic interactions allowing compounds to elute quicker from the column. Recommended for analytes with medium hydrophobicity or when a less hydrophobic phase is required to obtain optimum retention.

- Highly pure, high surface area silica
- Less hydrophobic than Synchronis C18
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Uron herbicides



Synchronis C8, 5µm, 150 x 4.6mm

Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Gradient:	35 to 60% B in 10 minutes
Temperature:	30°C
Flow Rate:	1.0mL/min
Injection Volume:	20µL
Detection:	240nm
Analytes:	1. Tebuthiuron 2. Metoxuron 3. Monuron 4. Chlorotoluron 5. Diuron 6. Linuron

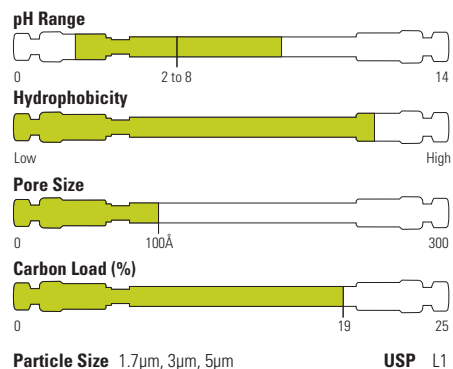
Synchronis C8

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97202-052130	-	-
		100	97202-102130	-	-
3	HPLC Column	50	97203-052130	-	-
		100	-	97203-103030	97203-104630
		150	-	-	97203-154630
5	Drop-in Guard (4/pk)	10	97205-012101	97205-013001	97205-014001
		HPLC Column	30	97205-032130	-
	HPLC Column	50	97205-052130	97205-053030	97205-054630
		100	97205-102130	97205-103030	97205-104630
		150	97205-152130	97205-153030	97205-154630
		250	-	97205-253030	97205-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

Synchronis aQ

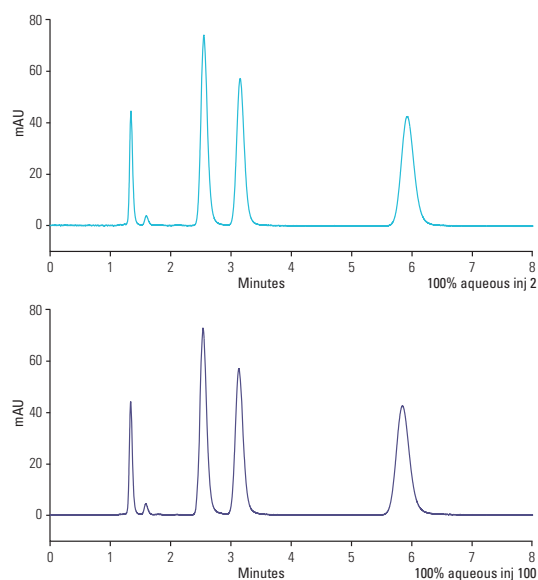
Polar endcapped Synchronis aQ columns provide a controlled interaction mechanism that retains and resolves polar analytes

- Stable in 100% aqueous mobile phase
- Enhanced retention of polar compounds
- Rigorously tested to ensure quality



In comparison to a conventionally endcapped C18, the Synchronis aQ polar end-capped C18 stationary phase exhibits superior stability towards aqueous mobile phase. Synchronis aQ shows no degradation in performance after 100 injections in a buffered 100% aqueous eluent.

Stability of Synchronis aQ in 100% aqueous mobile phase



Synchronis aQ, 5µm, 100 x 4.6mm

Mobile Phase:	50mM Aqueous K ₂ HPO ₄ (pH 6)
Temperature:	30°C
Flow Rate:	0.7mL/min
Injection Volume:	2µL
Detection:	260nm
Analytes:	1. Cytidine-5'-diphosphate 2. Adenosine-5'-triphosphate 3. Adenosine-5'-diphosphate 4. Adenosine-5'-monophosphate

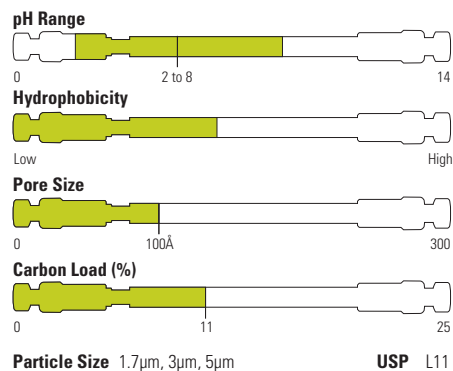
Synchronis aQ

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97302-052130	-	-	97302-054630
		100	97302-102130	97302-103030	-	-
3	HPLC Column	50	97303-052130	-	-	-
		100	-	97303-103030	-	97303-104630
		150	-	-	-	97303-154630
5	Drop-in Guard (4/pk)	10	97305-012101	97305-013001	97305-014001	97305-014001
		50	97305-052130	97305-053030	-	97305-054630
		100	97305-102130	-	-	97305-104630
		150	97305-152130	97305-153030	97305-154030	97305-154630
		250	-	97305-253030	97305-254030	97305-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

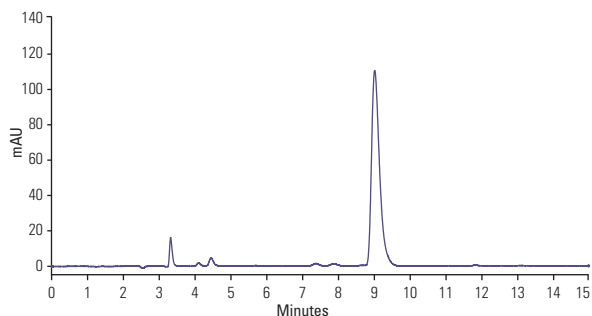
Synchronis Phenyl

Provides an alternative to Synchronis C18 and is particularly useful for retention of aromatic compounds

- Alternative selectivity to Synchronis C18
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality



Oxacillin sodium (USP)



Synchronis Phenyl, 5µm, 300 x 4.0mm

Mobile Phase:	Phosphate Buffer: MeCN:MeOH (70:30:10)
Temperature:	25°C
Flow Rate:	1.0mL/min (2mL/min in USP method)
Injection Volume:	10µL
Detection:	UV, 225nm
Analytes:	1. Oxacillin Sodium (0.11mg/mL)

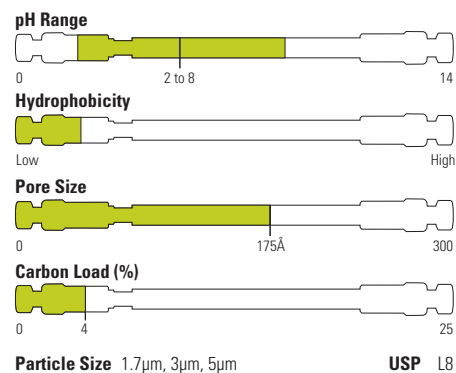
Synchronis Phenyl

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97902-052130	-	-
		100	97902-102130	-	-
3	HPLC Column	50	97903-052130	-	-
		100	-	-	97903-104630
		150	-	-	97903-154630
5	Drop-in Guard (4/pk)	10	97905-012101	97905-013001	97905-014001
	HPLC Column	50	-	97905-053030	97905-054630
		100	-	97905-103030	97905-104630
		150	97905-152130	-	97905-154630
		250	-	-	97905-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

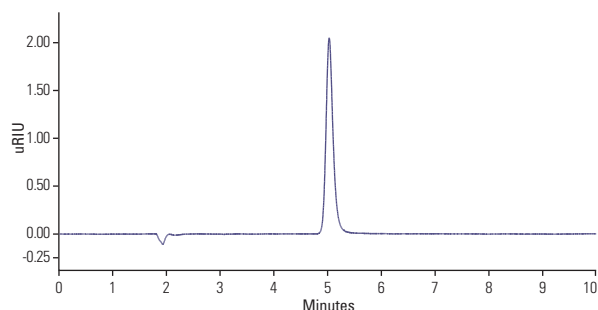
Synchronis Amino

Provides a versatile aminopropyl phase that gives excellent chromatographic properties in four modes: weak anion exchange, reversed-phase, normal phase and HILIC

- Highly pure, high surface area silica
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Lactulose



Synchronis Amino 5µm, 150 x 4.6mm

Mobile Phase:	Water: MeCN (30:70)
Temperature:	35°C
Flow Rate:	1.0mL/min
Detection:	RI
Injection Volume:	5µL
Analytes:	1. Lactulose

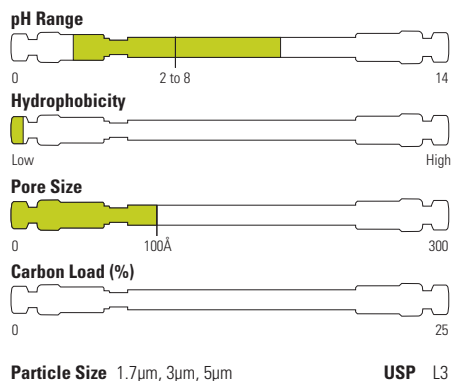
Synchronis Amino

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97702-052130	-	-	-
		100	97702-102130	-	-	-
3	HPLC Column	50	97703-052130	-	-	-
5	Drop-in Guard (4/pk)	10	97705-012101	97705-013001	97705-014001	97705-014001
	HPLC Column	30	97705-032130	-	-	-
		50	97705-052130	-	-	97705-054630
		150	97705-152130	97705-153030	97705-154030	97705-154630
		250	-	97705-253030	97705-254030	97705-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00	

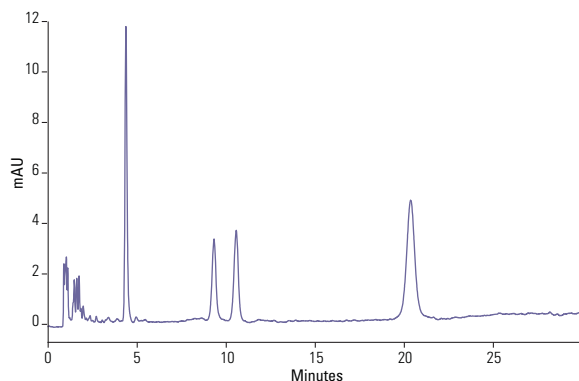
Synchronis Silica

Serves as a powerful and efficient tool for the chromatography of moderately polar organic compounds by normal phase chromatography

- Highly pure, high surface area silica
- Excellent reproducibility for normal phase chromatography
- Rigorously tested to ensure quality



Tocopherols



Synchronis Silica 5 μm, 150 x 4.6mm

Mobile Phase: Hexane +0.2% propan-2-ol (IPA)
 Temperature: 40°C
 Flow Rate: 2.0mL/min
 Injection Volume: 10 μL
 Detection: UV, 254nm
 Analytes: α-tocopherol
 β-tocopherol
 γ-tocopherol
 δ-tocopherol

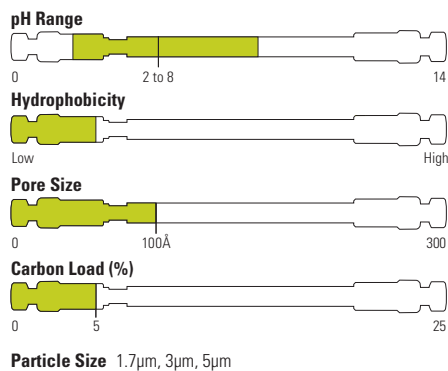
Synchronis Silica

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97002-052130	-	-	-
		100	97002-102130	-	-	-
3	HPLC Column	50	97003-052130	-	-	-
5	Drop-in Guard (4/pk)	10	97005-012101	97005-013001	97005-014001	97005-014001
	HPLC Column	50	97005-052130	-	-	-
		100	97005-102130	-	-	-
		150	97005-152130	97005-153030	97005-154030	97005-154630
		250	-	97005-253030	97005-254030	97005-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

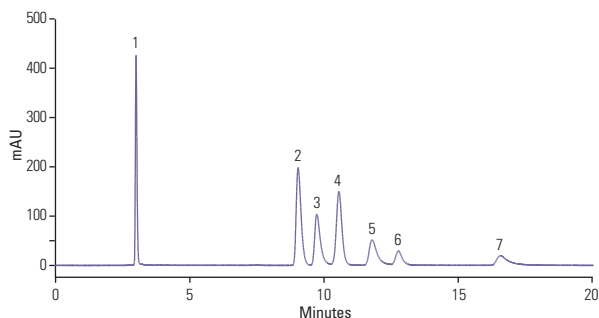
Synchronis HILIC

Provides enhanced retention of polar and hydrophilic analytes

- Alternative selectivity to Synchronis C18
- Improved sensitivity with MS detection
- No need for ion-pair or derivatization
- Outstanding peak shape and sensitivity
- Highly pure, high surface area silica particles
- Neutral (uncharged), highly polar surface



Catecholamines

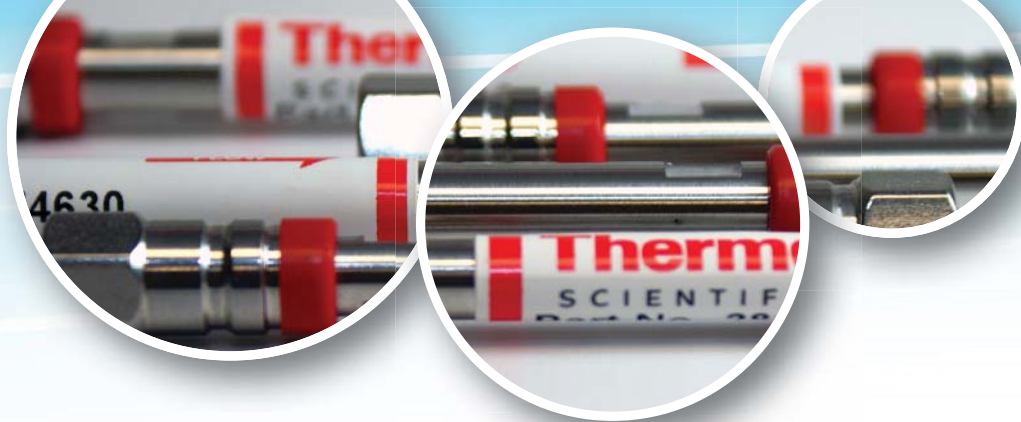


Synchronis HILIC, 5μm, 250 x 4.6mm

Mobile Phase:	Water : acetonitrile : 200mM ammonium formate (10.5 : 84.5 : 5)
Temperature:	40°C
Flow Rate:	1.0mL/min
Injection Volume:	5μL
Detection:	UV, 280nm
Analytes:	1. catechol 2. 5-HIAA 3. DOPAC 4. serotonin 5. tyrosine 6. dopamine 7. L-DOPA

Synchronis HILIC

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97502-052130	-	97502-054630
		100	97502-102130	-	-
3	HPLC Column	50	97503-052130	-	-
		100	-	-	97503-104630
		150	-	-	97503-154630
5	Drop-in Guard (4/pk)	10	97505-012101	97505-013001	97505-014001
	HPLC Column	50	97505-052130	-	97505-054630
		100	97505-102130	-	97505-104630
		150	97505-152130	97505-153030	97505-154630
		250	-	-	97505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00



Hypersil BDS and Hypersil Classical HPLC Columns

Exceptionally reliable and reproducible general purpose columns

Exceptionally reliable robust columns that guarantee you have the same results time after time, even after changing your column. Chemistries available for a variety of applications.

- **Excellent Reproducibility**
Manufactured to the highest standards
- **Very Robust and Rugged**
Rigorous quality control under certified processes
- **Long Column Lifetimes**
Ideal for QA/QC labs



The Hypersil BDS/Classical web page contains the latest news, applications and downloads for the Hypersil BDS/Classical HPLC column range. Visit www.thermoscientific.com/columns

Hypersil BDS

A good choice for robust, general purpose columns

Hypersil BDS

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18	C8	Phenyl	CN	
2.4	Drop-in Guard (4/pk)	10	2.1	28102-012101	28202-012101	-	-	
			4.0/4.6	28102-014001	28202-014001	-	-	
		50	2.1	28102-052130	28202-052130	-	-	
			4.6	28102-054630	-	-	-	
	100	2.1	2.1	28102-102130	28202-102130	-	-	
			4.6	28102-104630	28202-104630	-	-	
		4.6	-	28202-154630	-	-	-	
			-	-	-	-	-	
	3	Drop-in Guard (4/pk)	10	2.1	28103-012101	28203-012101	-	-
				3.0	28103-013001	28203-013001	-	-
4.0/4.6				28103-014001	28203-014001	28903-014001	28803-014001	
HPLC Column			30	2.1	28103-032130	-	-	-
		2.1		28103-052130	28203-052130	-	-	
		3.0		28103-053030	-	-	-	
		100	4.6	28103-054630	28203-054630	-	-	
			2.1	28103-102130	-	-	-	
			3.0	28103-103030	-	-	-	
150		4.0	4.0	28103-104030	-	-	-	
			4.6	28103-104630	28203-104630	-	-	
			2.1	28103-152130	-	-	-	
		3.0	3.0	28103-153030	28203-153030	-	-	
			4.0	28103-154030	-	-	-	
			4.6	28103-154630	28203-154630	28903-154630	28803-154630	
5		Drop-in Guard (4/pk)	10	2.1	28105-012101	28205-012101	-	-
				3.0	28105-013001	28205-013001	-	-
				4.0/4.6	28105-014001	28205-014001	28905-014001	28805-014001
			HPLC Column	50	2.1	28105-052130	28205-052130	-
		3.0			28105-053030	28205-053030	-	-
	4.6	28105-054630			28205-054630	-	-	
	100	2.1		28105-102130	28205-102130	-	-	
		3.0		28105-103030	-	-	-	
		4.0		28105-104030	-	-	-	
	125	4.6	28105-104630	28205-104630	-	-		
		3.0	28105-123030	-	-	-		
		4.0	28105-124030	-	-	-		
	150	4.6	28105-124630	-	-	-		
		2.1	28105-152130	-	-	-		
		3.0	28105-153030	-	-	-		
	250	4.0	4.0	28105-154030	28205-154030	-	-	
			4.6	28105-154630	28205-154630	28905-154630	28805-154630	
		3.0	2.1	28105-252130	-	-	-	
			4.0	28105-254030	28205-254030	28905-254030	-	
	4.6	28105-254630	28205-254630	28905-254630	28805-254630			

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	1.0	851-00
		2.1	852-00
		3.0	852-00
		4.0/4.6	850-00

Hypersil Classical

A global standard for many existing methods

Hypersil ODS

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.		
3	Drop-in Guard (4/pk)	10	2.1	30103-012101		
			3.0	30103-013001		
			4.0/4.6	30103-014001		
	HPLC Column	50	50	3.0	30103-053030	
				4.6	30103-054630	
				100	2.1	30103-102130
		100	100	3.0	30103-103030	
				4.0	30103-104030	
				4.6	30103-104630	
		125	125	4.0	30103-124030	
				4.6	30103-124630	
		150	150	2.1	30103-152130	
				3.0	30103-153030	
			250	250	4.0	30103-154030
					4.6	30103-154630
	5	Drop-in Guard (4/pk)	10	2.1	30105-012101	
				3.0	30105-013001	
				4.0/4.6	30105-014001	
		HPLC Column	50	50	3.0	30105-053030
					4.6	30105-054630
					100	2.1
100			100	3.0	30105-103030	
				4.0	30105-104030	
				4.6	30105-104630	
125	125		3.0	30105-123030		
			4.0	30105-124030		
			4.6	30105-124630		
150	150		2.1	30105-152130		
			3.0	30105-153030		
	200		200	4.0	30105-154030	
				4.6	30105-154630	
250	200		200	2.1	30105-202130	
				4.0	30105-204030	
				4.6	30105-204630	
	250		250	2.1	30105-252130	
				3.0	30105-253030	
		4.0		30105-254030		
			4.6	30105-254630		

Hypersil ODS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
3	Drop-in Guard (4/pk)	10	4.0/4.6	31603-014001
	HPLC Column	50	4.6	31603-054630
		100	4.0	31603-104030
			4.6	31603-104630
		150	4.6	31603-154630
5	Drop-in Guard (4/pk)	10	4.0/4.6	31605-014001
	HPLC Column	50	4.6	31605-054630
		100	4.6	31605-104630
		150	4.6	31605-154630
		250	4.0	31605-254030
	4.6	31605-254630		

Hypersil MOS (C8)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30205-014001
	HPLC Column	50	4.6	30205-054630
		100	4.6	30205-104630
		150	4.6	30205-154630
		250	4.0	30205-254030
	4.6	30205-254630		

Hypersil MOS-2 (C8)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30305-014001
	HPLC Column	150	4.6	30305-154630
		250	4.0	30305-254030
		4.6	30305-254630	

Hypersil SAS (C1)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30505-014001
	HPLC Column	150	4.6	30505-154630
		250	4.6	30505-254630

Hypersil Phenyl

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30905-014001
	HPLC Column	50	4.6	30905-054630
		150	4.6	30905-154630
		250	4.0	30905-254030
		4.6	30905-254630	

Hypersil Phenyl-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	31905-014001
	HPLC Column	150	4.6	31905-154630
		250	4.6	31905-254630

Hypersil CPS

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
3	Drop-in Guard (4/pk)	10	4.0/4.6	30803-014001
	HPLC Column	150	4.6	30803-154630
5	Drop-in Guard (4/pk)	10	4.0/4.6	30805-014001
	HPLC Column	150	4.6	30805-154630
		250	4.0	30805-254030
			4.6	30805-254630

Hypersil CPS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.6	31805-014001
	HPLC Column	150	4.6	31805-254630
		250	4.6	31805-254630

Hypersil APS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.	
3	Drop-in Guard (4/pk)	10	2.1	30703-012101	
			4.6	30703-014001	
	HPLC Column	50	4.6	30703-054630	
			100	2.1	30703-102130
			150	2.1	30703-152130
			4.6	30703-154630	
5	Drop-in Guard (4/pk)	10	3.0	30705-013001	
			4.0/4.6	30705-014001	
	HPLC Column	100	3.0	30705-103030	
			4.6	30705-104630	
			150	4.6	30705-154630
			250	4.0	30705-254030
		4.6	30705-254630		

Hypersil Silica

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.	
3	Drop-in Guard (4/pk)	10	2.1	30003-012101	
			3.0	30003-013001	
			4.0/4.6	30003-014001	
	HPLC Column	50	2.1	30003-052130	
			4.6	30003-054630	
			4.6	30003-154630	
			150	4.6	30003-154630
			250	4.0	30003-254030
5	Drop-in Guard (4/pk)	10	3.0	30005-013001	
			4.0/4.6	30005-014001	
	HPLC Column	50	4.6	30005-054630	
			100	4.6	30005-104630
			150	4.6	30005-154630
			250	4.0	30005-254030
		4.6	30005-254630		

Hypersil Classical *continued*

Hypersil SAX

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	3.0	34105-013001
			4.6	34105-014001
	HPLC Column	250	3.0	34105-253030
			4.6	34105-254630

Hypersil Green PAH

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.	
3	Guard Cartridge	10	2.1	31103-012101	
			3.0	31103-013001	
			4.6	31103-014001	
	HPLC Column	100	2.1	31103-102130	
			3.0	31103-103030	
			4.6	31103-104630	
	HPLC Column	150	2.1	31103-152130	
			4.6	31103-154630	
			5	Guard Cartridge	10
HPLC Column	100	4.6			31105-104630
	150	4.6			31105-154630
	250	4.6	31105-254630		

IonPac NS1 and NS2

Polymeric reversed-phase column ideal for the separation of hydrophobic, ionizable compounds

- Excellent resolution
- Good peak shape
- Ideal for separation of large molecules that carry localized charges, such as surfactants
- Compatible with acids, bases, and solvent from pH 0 to 14
- Can also be used for traditional polymeric reversed-phase applications
- Utilize ion-pair chromatography for difficult separations

Thermo Scientific™ IonPac™ NS1-10 μ m and NS1-5 μ m columns are packed with a neutral, macroporous, high-surface-area, ethylvinylbenzene polymer crosslinked with 55% divinylbenzene. This resin makes the NS1 resistant to solvents, acids, and bases, and permits the use of eluent from pH 0 to 14. The Dionex IonPac NS1 column is the column of choice for routine ion pair chromatography.

IonPac NS2 is a silica-based column for mobile-phase ion chromatography (MPIC) applications using eluents containing trifluoroacetic acid (TFA), heptafluorobutyric acid (HFBA), or tetrabutylammonium borate (TBAB). It provides high performance analysis for hydrophobic amines and hydrophobic acids using suppressed conductivity detection.

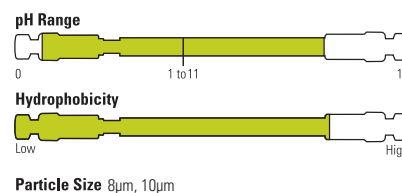
IonPac NS1 and NS2

Description	Particle Size (μ m)	Format	Length (mm)	2.0mm ID	4.0mm ID
IonPac NS1	5	HPLC Column	150	–	039568
	10	Guard Column	35	088763	039567
		HPLC Column	250	088762	035321
IonPac NS2	5	Guard Column	35	–	088788
		HPLC Column	150	–	088787
			250	–	088786

HyperREZ XP

Polymer-based columns for carbohydrate analysis

- Designed for the determination of carbohydrates, saccharides, organic acids, and alcohols
- Efficient and reproducible monodisperse particles
- Stable for long column lifetimes even at low pH and high temperatures



HyperREZ XP

	Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
HyperREZ XP Carbohydrate H+	8	Guard Cartridge (2/pk)	5	3.0	69008-903027
		Guard Column	50	7.7	69008-057726
		HPLC Column	300	7.7	69008-307780
HyperREZ XP Carbohydrate Ca ²⁺	8	Guard Cartridge (2/pk)	5	3.0	69208-903027
		Guard Column	50	7.7	69208-057726
		HPLC Column	300	7.7	69208-307780
HyperREZ XP Carbohydrate Pb ²⁺	8	Guard Cartridge (2/pk)	5	3.0	69108-903027
		Guard Column	50	7.7	69108-057726
		HPLC Column	300	7.7	69108-307780
HyperREZ XP Carbohydrate Na+	10	Guard Cartridge (2/pk)	5	3.0	69310-903027
		Guard Column	50	7.7	69310-057726
		HPLC Column	300	7.7	69310-307780
HyperREZ XP Organic Acids	8	Guard Cartridge (2/pk)	5	3.0	69008-903027
		HPLC Column	100	7.7	69608-107780
HyperREZ XP Sugar Alcohols	8	Guard Cartridge (2/pk)	5	3.0	69208-903027
		HPLC Column	250	4.0	69708-254080

Format	Length (mm)	ID (mm)	Cat. No.
HyperRez Guard Cartridge Holder	5	3	60002-354

Retention Times of Common Saccharides (min)

Saccharide	H ⁺	Ca ²⁺	Pb ²⁺
Adonitol	11.5	14.9	20.4
Arabinose	11.4	13.6	19.4
Erythritol	12.7	15.6	20.3
Fructose	10.6	13.5	19.3
Fucose	12.2	13.7	17.1
Galactose	1.07	12.2	15.6
Glucose	9.9	11.1	13.9
Glycerol	14.1	16.1	19.5
Lactose	8.6	9.7	12.8
Maltose	8.4	9.5	12.5
Maltotriose	7.7	8.7	11.9
Mannitol	11.0	17.3	28.9
Mannose	1.5	12.5	16.7
Raffinose	8.2	8.6	11.4
Sorbitol	11.1	20.7	N/A
Sucrose	9.8	9.4	11.9
Xylose	10.6	12.0	15.0

HyperREZ Carbohydrate H+ 300 x 7.7mm HyperREZ Carbohydrate Ca²⁺ 300 x 7.7mm HyperREZ Carbohydrate Pb²⁺ 300 x 7.7mm

Mobile Phase:	H ₂ O
Flow Rate:	0.6mL/min
Detection:	RI
Temperature:	75°C (H ⁺)
	85°C (Ca ²⁺)
	80°C (Pb ²⁺)

Note: partial hydrolysis may occur with some saccharides using H⁺.



LC Accessories

Excellence in LC accessories providing optimal performance

Thermo Scientific offers a wide range of accessories to suit your LC needs, ensuring confidence in your analysis and delivery of exceptionally reproducible data and reliable chromatography.

- **Viper Fingertight Fitting**
Providing zero dead volume fingertight connections up to 1,250 bar
- **Rheodyne Sample Injectors**
Biocompatible and stainless steel versions for highly accurate and precise injections
- **LC Syringes**
Supporting manual and automated injections

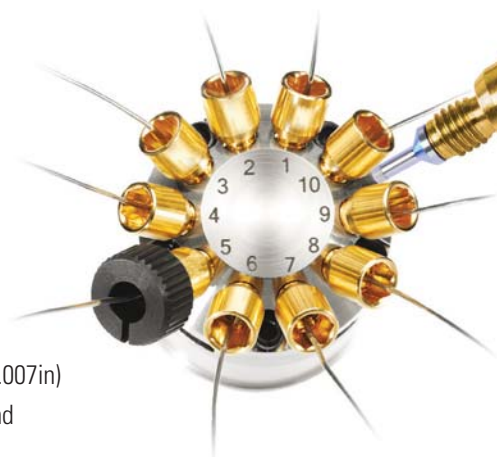


Learn more about LC Accessories.
Visit www.thermoscientific.com/columns

Viper Fingertight Fittings

Provides ease of use and dead-volume free plumbing of every conventional HPLC and UHPLC system

- Provides zero-dead volume fingertight connections
- Supports operating pressures up to 1,500 bar (22,000 psi)
- Available in different lengths: 65mm and from 150 to 950mm in 100mm steps
- Available in different inner diameters: 0.1mm (0.004in), 0.13mm (0.005in) or 0.18mm (0.007in)
- Easy to use due to stainless steel or biocompatible MP35N™ capillaries (1/32in OD) and fingertight design
- Works with virtually any valve and column from any manufacturer
- Fits narrow connections such as 10-port valves and enables mixed use with different designs



The Thermo Scientific™ Viper™ fingertight fitting system provides ease of use and dead-volume free plumbing of every conventional HPLC and modern UHPLC system. Together with flexible stainless steel (SST) or biocompatible MP35N® capillaries, it opens a new dimension in liquid chromatography. The Viper system improves chromatographic results, independent of various different connection geometries and system backpressures. Connecting LC modules,

valves, and columns quickly and easily without tools is simple with the Viper system.

Extra column volumes in HPLC have the most detrimental effects on the separation efficiency of an LC system and must be minimized. Conventional fittings tightened by hand or using tools have considerable drawbacks which can compromise efficiency. The Viper fitting system overcomes these drawbacks by design, working without ferrules

to reduce the dead volume of any fluidic connection to zero. The Viper system unifies robust performance, ease of use, acceptable lifetime, and universal compatibility with virtually all different valves and columns for HPLC system users. All Thermo Scientific™ Dionex™ UltiMate™ 3000 XRS, RS, BioRS and SD systems are equipped with Viper fingertight fitting system as a standard.

Viper Fingertight Fitting Systems - SST

Length (mm)	0.1mm ID	0.13mm ID	0.18mm ID
65	6040.2207	6040.2307	6040.2357
150	6040.2215	6040.2315	6040.2360
250	6040.2225	6040.2325	6040.2385
350	6040.2235	6040.2335	6040.2375
450	6040.2245	6040.2345	6040.2365
550	6040.2255	6040.2305	6040.2355
650	6040.2265	6040.2310	6040.2395
750	-	6040.2320	6040.2370
850	-	6040.2330	6040.2380
950	-	6040.2340	6040.2390

Viper Fingertight Fitting Systems - Biocompatible

Length (mm)	0.065mm ID, PEEK	0.090mm ID, PEEK	0.1mm ID, MP35N	0.13mm ID, MP35N	0.13mm ID, PEEK	0.18mm ID, MP35N
65	-	6041.9075*	6042.2306	-	-	-
150	6041.5615	-	6042.2320	-	6041.5616	6042.2315
250	6041.5625	6041.9025	6042.2330	-	-	6042.2327
350	-	-	6042.2340	-	-	6042.2337
450	-	-	6042.2350	-	-	6042.2365
550	-	-	6042.2360	-	-	6042.2355
650	6041.5665	-	6042.2370	6042.2363	-	6042.2380
750	6041.5675	-	6042.2390	6042.2373	-	6042.2375
850	6041.5685	-	-	-	-	-
950	-	-	6042.2395	-	-	6042.2385

* 75mm length

Viper Accessories

Description	Cat. No.	Quantity
Plug, Biocompatible	6040.2303	1 Each
Union, SST	6040.2304	1 Each
Calibration Tool	6040.2312	1 Each
Inline Filter	6036.1045	1 Each



Viper Fingertight Fitting Kits for UltiMate 3000 Systems

Viper Fingertight Fitting Kits for UltiMate 3000 Systems

Description	SD Systems	RS Systems
Viper Capillary Kit for ISO, LPG or DGP pumps	6040.2302	6040.2301
Viper Capillary Kit for HPG pumps	6040.2309	6040.2308
Viper Capillary Kit for biocompatible RSLC systems	–	6841.2301
Online SPE Solution Kit for x2 Dual Standard or RSLC systems	6040.2802	6040.2801
Tandem Operation Solution Kit for x2 Dual Standard or RSLC systems	6040.2804	6040.2803
Application Switching Solution Kit for x2 Dual Standard or RSLC systems	6040.2806	6040.2805
Parallel Setup Solution Kit for x2 Dual Standard or RSLC systems	6040.2810	6040.2809
Inverse Gradient Kit for x2 Dual Standard or RSLC systems	6040.2819	6040.2820
Automated Method Scouting Solution Kit for Standard or RSLC systems	6040.2808	6040.2807
MS Connection Kit for MS-frontends with WPS autosampler, excluding UV detection	6720.0355	6720.0370
MS Connection Kit for MS-frontends with WPS autosampler, including UV detection	6720.0365	6720.0375
MS Connection Kit for MS-frontends with HPG-RS pump and OAS autosampler excluding UV detection	–	6720.0372
MS Connection Kit for MS-frontends with HPG-RS pump and OAS autosampler including UV detection	–	6720.0377

Description	XRS Systems
Viper Capillary Kit for standalone system with with WPS autosampler	6043.2301
Viper Capillary Kit for standalone system with with OAS autosampler	6845.2301A
MS Connection Kit for MS-frontends with WPS autosampler excluding UV detection	6720.0380
MS Connection Kit for MS-frontends with WPS autosampler including UV detection	6720.0385
MS Connection Kit for MS-frontends with LPG-XRS pump and OAS autosampler excluding UV detection	6720.0372
MS Connection Kit for MS-frontends with LPG-XRS pump and OAS autosampler including UV detection	6720.0377

Javelin Direct-Connection Column Filters

One-piece filter protects HPLC systems

- Direct-connection design for maximum efficiency
- Replace entire disposable filter unit for easy changes
- Recommended for use as dedicated filters for a column rather than the HPLC system
- 1/16in CPI tip attaches directly to HPLC column inlet without tubing or wrenches
- 0.5µm porosity



Javelin Direct-Connection Column Filter

Description	2.1mm ID	3.0mm ID	4.0/4.6mm ID	Quantity
Javelin Column Filter	88200	88700	88400	4 Pack

ColumnSaver Precolumn Filters

Filter mesh size 2µm

ColumnSaver Precolumn Filters

Filter Mesh Size (µm)	Cat. No	Quantity
2	60140-412	10 Pack

UNIFILTER Direct-Connection HPLC Filter Systems

Quickly replaced for minimal down time

- Replaceable 0.5µm drop-in filter enhances column lifetime and improved performance
- Holder attached directly to the inlet of your analytical system for maximum convenience



UNIFILTER Direct-Connection HPLC Filter Systems

Description	2.1/3.0mm ID	4.0/4.6mm ID	Quantity
UNIFILTER Direct Connection Holder	27002	27000	1 Each
Replacement Filter, 0.5µm	22017	22155	5 Pack
Replacement Tip, CPI, Standard	850-RT	850-RT	1 Each
Replacement Tip, Waters End-fitting	850-WT	850-WT	1 Each

UHPLC Filter

Column protection for Hypersil GOLD 1.9µm and Synchronis 1.7µm columns without compromising performance

- Low volume filter cartridge design
- Maintain peak shape
- Minimal efficiency loss through dispersion



UHPLC Filter

Description	Cat. No.	Quantity
UHPLC Direct Connect Filter Holder	27006	1 Each
2.1mm ID Replacement Filter Cartridge, 0.2µm	22180	5 Pack
1.0mm ID Replacement Filter Cartridge, 0.2µm	22185	5 Pack

PTFE One-Piece Column Connector

Excellent for high-throughput screening and quick connection

- Fingertight, leak-free connection of analytical and guard columns with 10-32 threads
- Minimizes dead volume
- Inert and biocompatible material



PEEK One-Piece Column Connector




Description	Cat. No.	Quantity
One Piece Coupler	60170-370	1 Each



Solvent Filters

- Efficient draw
- 100% PTFE polymer, including 2µm filters
- Built-in helium sparge port and frit

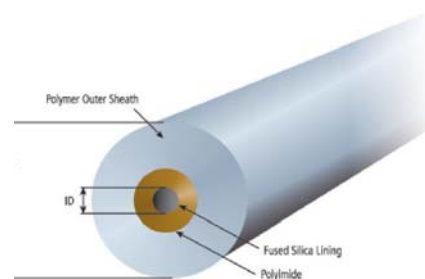
Solvent Filters

	Type	For Use with	Cat. No.	Quantity
	Stainless Steel	Fit 1/16in OD tube to 1/8in OD plastic tubing	A-302	1 Each
	Stainless Steel	Fit to 1/8in OD plastic tubing using 1/8in PP nut	A-302A	1 Each
	Bottom-of-the-Bottle	3/16in OD plastic tubing	A-436	1 Each
	Bottom-of-the-Bottle	1/8in OD tubing	A-437	1 Each

PEEKsil Capillary Tubing

Excellent chemical compatibility and very low carryover

- Precision-bore fused silica tubing coated with 1/16in OD PEEK covering
- Usable in most standard chromatography systems
- Withstands high pressures
- Smooth internal surface for excellent flow characteristics
- Tubing is stiff: not recommended for uses requiring tubing bends
- Precut lengths only: cutting in the lab may damage tubing



PEEKsil Capillary Tubing

ID (in)	Length (cm)	Cat. No.	Quantity
0.002	10	60182-500	5 Pack
	20	60182-501	5 Pack
	50	60182-502	2 Pack
0.004	10	60182-503	5 Pack
	20	60182-504	5 Pack
	50	60182-505	2 Pack
0.007	10	60182-506	5 Pack
	20	60182-507	5 Pack
	50	60182-508	2 Pack

Applications:

- HPLC
- LC-MS

PEEK Sleeves for Fused Silica Capillary Tubing

Withstands high pressures

1/16in OD PEEK Sleeves for Fused Silica Capillary Tubing

ID (in)	Color	Cat. No.	Quantity
0.008	Yellow	F-227	1 Each
0.010	Blue	F-228	1 Each
0.012	Natural	F-229	1 Each
0.015	Orange	F-230	1 Each
0.021	Natural	F-231	1 Each
0.030	Natural	F-232	1 Each



316 Stainless Steel Capillary Tubing

Cleaned, polished, passivated and ready-to-use

- Suitable for ultra high pressure applications
- Wide chemical compatibility
- Prefinished, square, burr-free ends and interiors to minimize dead volume connections
- Not recommended for biological samples
- Rough internal surface may lead to sample carryover



316 Stainless Steel Capillary Tubing

ID (in)	Length (cm)	Color	Cat. No.	Quantity
1/16in OD Precut Tubing				
0.005	5	Red	U-152	1 Each
	10	Red	U-153	1 Each
	20	Red	U-154	1 Each
	30	Red	U-155	1 Each
	50	Red	U-156	1 Each
	100	Red	U-157	1 Each
0.007	5	Black	U-126	1 Each
	10	Black	U-127	1 Each
	20	Black	U-128	1 Each
	30	Black	U-129	1 Each
	50	Black	U-130	1 Each
	100	Black	U-131	1 Each
0.010	5	Blue	U-111	1 Each
	10	Blue	U-112	1 Each
	20	Blue	U-113	1 Each
	30	Blue	U-114	1 Each
	50	Blue	U-132	1 Each
	100	Blue	U-133	1 Each
1/32in OD Precut Tubing with 1/16in Sleeves				
0.005	10.5	Red	30011-FLEX	1 Each
	15	Red	30015-FLEX	1 Each
	28	Red	30028-FLEX	1 Each
	40	Red	30040-FLEX	1 Each
0.007	10.5	Yellow	39011-FLEX	1 Each
	15	Yellow	39015-FLEX	1 Each
	28	Yellow	39028-FLEX	1 Each
	40	Yellow	39040-FLEX	1 Each

1/16in 316 Stainless Steel Tubing, 5-Foot Coil

ID (in)	Cat. No.	Quantity
0.005	U-158	1 Each
0.007	U-108	1 Each
0.010	U-106	1 Each
0.020	U-105	1 Each
0.030	U-107	1 Each
0.040	U-144	1 Each

Terry Tool Tubing Cutters

Description	Cat. No.	Quantity
1/16in stainless steel tubing	60182-509	1 Each
1/8in stainless steel tubing	60182-510	1 Each

PEEK Capillary Tubing

Pre-cut and color-coded for easy identification and use



- Broad chemical compatibility
- Biocompatible
- Easily cut to desired length
- Appropriate for many HPLC applications
- Resistant to most organic solvents, except for nitric acid, sulfuric acid, dichloromethane, THF and DMSO

1/16in OD Precut PEEK Tubing

ID (in)	Length (cm)	Color	Cat. No.	Quantity
0.003	5	Natural	37003-5	1 Each
	10	Natural	37003-10	1 Each
	20	Natural	37003-20	1 Each
	30	Natural	37003-30	1 Each
	50	Natural	37003-50	1 Each
0.005	5	Red	37005-5	1 Each
	10	Red	37005-10	1 Each
	20	Red	37005-20	1 Each
	30	Red	37005-30	1 Each
	50	Red	37005-50	1 Each
0.007	5	Yellow	37007-5	1 Each
	10	Yellow	37007-10	1 Each
	20	Yellow	37007-20	1 Each
	30	Yellow	37007-30	1 Each
	50	Yellow	37007-50	1 Each
0.010	5	Blue	37010-5	1 Each
	10	Blue	37010-10	1 Each
	20	Blue	37010-20	1 Each
	30	Blue	37010-30	1 Each
	50	Blue	37010-50	1 Each
0.020	5	Orange	37020-5	1 Each
	10	Orange	37020-10	1 Each
	20	Orange	37020-20	1 Each
	30	Orange	37020-30	1 Each
	50	Orange	37020-50	1 Each

1/16in OD PEEK Tubing, 5-Foot Coil

ID (in)	Cat. No.	Quantity
0.003	37003	1 Each
0.005	37005	1 Each
0.007	37007	1 Each
0.010	37010	1 Each
0.020	37020	1 Each
0.030	37030	1 Each
0.040	37040	1 Each

Polymer Tubing Cutter





Description	Cat. No.	Quantity
Polymeric Tubing Cutter	A-327	1 Each
Replacement blades	A-328	5 Pack

High Pressure Stainless Steel Nuts and Ferrules

Accommodate a wide range of configurations

- Designed for 10-32 port configurations
- Burr and contaminant free

High Pressure Stainless Steel Nuts and Ferrules

Type	Nut Cat. No.	Quantity	Description	Replacement Ferrule Cat. No.	Quantity
 10-32 thread nut with ferrule	F-190	1 Each	Replacement PEEK Ferrules	F-192x	10 Pack
 Male hex nut	U-400x	10 Pack	Universal Ferrules, 0.625in	U-401x	10 Pack
 Valco male hex nut, 10-32 thread	U-320x	10 Pack	Valco ferrules, 0.625in	U-321x	10 Pack
 Male hex nut, Waters compatible	U-410x	10 Pack	Universal Ferrules, 0.625in	U-401x	10 Pack

Reducing Union for Preparative Columns

Connects 30 to 50mm ID preparative columns to 1/16in tubing

- Stainless steel construction
- 1.0mm bore
- Without frit

Reducing Union for Preparative Column








Description	Cat. No.	Quantity
1/8in to 1/16in Reducing Union for Preparative Column	60182-357	1 Each

PEEK Fingertight Fittings

Machined for reliability and ease of use

- Resist cracking, breaking, thread stripping and leaking in both low and high pressure applications
- Biocompatible for a broad range of applications

PEEK Fingertight Fittings


Type	Cat. No.	Quantity
 One-Piece Fingertight Fitting, 1/16in, 0.37in head	F-120x	10 Pack
 One-Piece Long Fingertight Fitting, 1/16in, 0.37in head	F-130x	10 Pack
 One-Piece PEEK Fingertight Fitting, 1/32in, 0.25in head	M-645	1 Each
 Two-Piece Fingertight Wing Nut with Ferrule, 1/16in	F-300x	10 Pack
 Replacement PEEK Ferrules	F-142x	10 Pack
 Column End Plug, 1/16in, 10-32 coned, Delrin, Red	U-467R	1 Each
 Column End Plug, 1/16in, 10-32 coned, Delrin, Black	U-467BLK	1 Each

Stainless Steel Unions, Tees and Crosses

Well-suited to high-pressure applications

- Absolute zero or low dead volume formats
- Includes two stainless steel nuts and ferrules

Stainless Steel Unions, Tees and Crosses





	Description	Through Hole (in)	Swept Volume (μL)	Cat. No.	Quantity
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.010	0.025	U-435	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.134	U-402	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.050	0.836	U-437	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.062	~0.0	U-438	1 Each
	Union, stainless steel, Waters fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.129	U-412	1 Each
	Union, stainless steel, Valco fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.103	U-322	1 Each
	Tee, stainless steel, 10-32 fittings for use with 1/16in OD tubing	0.020	0.57	U-428	1 Each
	Cross, stainless steel, 10-32 fittings for use with 1/16in OD tubing	0.020	0.72	U-430	1 Each

PEEK Unions, Tees and Crosses

Well-suited to high pressure applications

- Absolute zero or low dead volume formats
- Biocompatible

PEEK Unions, Tees and Crosses

	Description	Through Hole (in)	Swept Volume (μL)	Cat. No.	Quantity
	Union, PEEK polymer, includes two PEEK 2-piece fittings	0.010	0.070	P-742	1 Each
	Union, PEEK polymer, includes two PEEK 2-piece fittings	0.020	0.28	P-704	1 Each
	Tee, PEEK, 10-32 fittings for use with 1/16in OD tubing, includes three 10-32 PEEK double-winged nuts	0.020	0.57	P-727	1 Each
	PEEK, 10-32 fittings for use with 1/16in OD tubing, includes four 10-32 PEEK double-winged nuts	0.020	0.72	P-729	1 Each

Rheodyne 7725 and 7725i Sample Injectors

Allow continuous flow between the load and inject positions to protect against pressure shock



- Stainless steel construction
- Make-Before-Break (MBB) design
- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Inject 1µL to 5mL with high accuracy and precision
- 7725i features a position sensing switch for a reproducible start signal

Rheodyne 7725 and 7725i Sample Injectors

Model	Mode	Features	Cat. No.	Quantity
7725	Dual	Continuous flow	7725	1 Each
7725i	Dual	Continuous flow, position sensing switch	7725i	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 7725 and 7725i injectors	5µL	0.18 / 0.007	7755-020	1 Each
	10µL	0.30 / 0.012	7755-021	1 Each
	20µL	0.30 / 0.012	7755-022	1 Each
	50µL	0.51 / 0.020	7755-023	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
7725/7725i	7725-999	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
7725	7725-010	1 Each

Rheodyne 9725 and 9725i Sample Injectors

Allow continuous flow between the load and inject positions to protect against pressure shock

- Biocompatible PEEK construction
- Make-Before-Break (MBB) design
- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Inject 1µL to 5mL with high accuracy and precision
- 9725i features a position sensing switch for a reproducible start signal

Rheodyne 9725 and 9725i Sample Injectors

Model	Mode	Features	Cat. No.	Quantity
9725	Dual	Continuous flow	9725	1 Each
9725i	Dual	Continuous flow, position sensing switch	9725i	1 Each

PEEK Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 9725 and 9725i injectors	2µL	Internal	7755-015	1 Each
	5µL	0.18 / 0.007	9055-020	1 Each
	10µL	0.25 / 0.010	9055-021	1 Each
	20µL	0.25 / 0.010	9055-022	1 Each
	50µL	0.51 / 0.020	9055-023	1 Each
	100µL	0.51 / 0.020	9055-024	1 Each
	200µL	0.51 / 0.020	9055-025	1 Each
	500µL	0.76 / 0.030	9055-026	1 Each
	1mL	0.76 / 0.030	9055-027	1 Each
	5mL	0.76 / 0.030	9055-029	1 Each

Rheodyne Suction Needle Adapter

For Use with	Cat. No.	Quantity
Rheodyne Injector Models 9725 and 9725i	9125-076	1 Each

Rheodyne 8125 Low-Dispersion Microscale Injector

Designed for use with 1 and 2mm ID HPLC columns

- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Position sensing switch provides reproducible start signal
- Suitable for use with 5 to 50µL sample loops



Rheodyne 8125 Low-Dispersion Microscale Injector

Model	Mode	Features	Cat. No.	Quantity
8125	Dual	Continuous flow	8125	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 8125 injectors	5µL	0.20 / 0.008	8020	1 Each
	10µL	0.20 / 0.008	8021	1 Each
	20µL	0.25 / 0.010	8022	1 Each
	50µL	0.30 / 0.012	8023	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
8125	8125-999	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Vespel Seals		
8125/8126	8125-038	1 Each
Tefzel Seals		
8125	8125-097	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
8125/8126	8125-098	1 Each

Rheodyne Stator Face Assemblies

For Use with Rheodyne Models	Cat. No.	Quantity
8125	8125-074	1 Each

Rheodyne 7010 Sample Injector

Single-mode sample injector designed for the complete filling method



Rheodyne 7010 Sample Injector

Model	Mode	Features	Cat. No.	Quantity
7010	Single	Complete filling method	7010	1 Each

Compatible with:

Sample loop sizes 5µL to 20mL

Rheodyne Ports for Rheodyne Injectors

For Use with Rheodyne Model	Cat. No.	Quantity
7010 Filler Port, Stainless Steel	7012	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 7010 and 7125 injectors	5µL	0.18 / 0.007	7020	1 Each
	10µL	0.30 / 0.012	7021	1 Each
	20µL	0.30 / 0.012	7022	1 Each
	50µL	0.51 / 0.020	7023	1 Each
	100µL	0.51 / 0.020	7024	1 Each
	200µL	0.76 / 0.030	7025	1 Each
	500µL	0.76 / 0.030	7026	1 Each
	1mL	0.76 / 0.030	7027	1 Each
	5mL	1.0 / 0.040	7029	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
7010/7000	7010-999	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Vespel Seals		
7010	7010-039	1 Each
Tefzel Seals		
7010	7010-071	1 Each

Rheodyne 9010 Sample Injector

Single-mode sample injector designed for the complete filling method

- Compatible with sample loop sizes 5µL to 10mL
- PEEK stator
- Position sensing switch provides a reproducible start signal

Rheodyne 9010 Sample Injector

Model	Mode	Features	Cat. No.	Quantity
9010	Single	Continuous flow, position sensing switch	9010	1 Each

Rheodyne Ports for Rheodyne Injectors

For Use with Rheodyne Model	Cat. No.	Quantity
9010 Filler Port, PEEK	9012	1 Each
9010 Needle Port, PEEK	9013	1 Each

PEEK Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 9010 injectors	2µL	Internal	7755-015	1 Each
	5µL	0.18 / 0.007	9055-020	1 Each
	10µL	0.25 / 0.010	9055-021	1 Each
	20µL	0.25 / 0.010	9055-022	1 Each
	50µL	0.51 / 0.020	9055-023	1 Each
	100µL	0.51 / 0.020	9055-024	1 Each
	200µL	0.51 / 0.020	9055-025	1 Each
	500µL	0.76 / 0.030	9055-026	1 Each
	1mL	0.76 / 0.030	9055-027	1 Each
	5mL	0.76 / 0.030	9055-029	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Tefzel Seals		
9010	9010-051	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
9010	9125-043	1 Each





Rheodyne Stator Face Assemblies

For Use with Rheodyne Models	Cat. No.	Quantity
9125	8125-094	1 Each

RheFlex High Pressure Fittings

Precision machined from 316 stainless steel

RheFlex High Pressure Fittings

	Type	Cat. No.	Quantity
	Short Fittings Set	6000-109	5 Pack
	Short Fittings Set	6000-209	10 Pack
	Long Fittings Set	6000-111	5 Pack
	Long Fittings Set	6000-211	10 Pack
	Extra Long Fittings Set	6000-162	5 Pack
	Extra Long Fittings Set	6000-262	10 Pack
	1/16in Ferrule	6000-110	5 Pack
	1/16in Ferrule	6000-210	10 Pack



RheFlex Two-Piece PEEK Fittings

Provide inert, metal-free connections

- Slotted backside of the ferrule is squeezed down onto the tube by the mating conical surface of the nut
- May be used on 1/16in metal or plastic tubing reliably up to 5000psi
- Reusable ferrule and nut

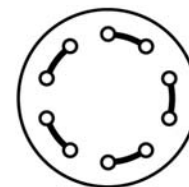


RheFlex Two-Piece PEEK Fittings

Type	Cat. No.	Quantity
Fitting set, standard length	6000-054	5 Pack
Fitting set, short	6000-055	5 Pack
Fitting set, X-long	6000-066	1 Each
Replacement ferrules	6000-051	5 Pack

Cheminert Model C2 Microbore Injector

Can be used as an injector or switching valve



- 1/16in fittings
- 0.010in ports
- Available in 6-port or 10-port configurations
- Available with manual or microelectric actuator

Cheminert Model C2 Microbore Injector

Description	Sample Volume	Cat. No.	Quantity
Model C2 injector, N60 stainless stator, 5µL loop, manual	6 ports	C2-1006	1 Each
	10 ports	C2-1000	1 Each
Model C2 injector, N60 stainless stator, 5µL loop, microelectric actuator	6 ports	C2-1006EH	1 Each
	10 ports	C2-1000EP	1 Each
Sample injector loops, stainless steel	5µL	CSL5	1 Each
	10µL	CSL10	1 Each
	20µL	CSL20	1 Each
	50µL	CSL50	1 Each
	100µL	CSL100	1 Each
Model C4 injector, PAEK stator, 5µL loop, microelectric actuator	6 ports	C2-1346EH	1 Each
Sample injector loops, PAEK	5µL	CZSL5PK	1 Each
	10µL	CZSL10PK	1 Each
	50µL	CZSL50PK	1 Each

Valco Injector Model C6W

Description	Volume	Cat. No.	Quantity
Model C6W injector, six 0.016in ports, manual	20µL loop	C6W	1 Each
Model EPC6W injector, six 0.016in ports, microelectric actuator	20µL loop	EPC6W	1 Each
Replacement rotor	—	SSAC6W	1 Each
Sample injector loop, stainless steel	2µL	SL2CW	1 Each
Sample injector loop, stainless steel	5µL	SL5CW	1 Each
Sample injector loop, stainless steel	10µL	SL10CW	1 Each
Sample injector loop, stainless steel	20µL	SL20CW	1 Each
Sample injector loop, stainless steel	50µL	SL50CW	1 Each
Sample injector loop, stainless steel	100µL	SL100CW	1 Each

Valco Accessories

Description	Volume	Cat. No.	Quantity
Valco syringe ports	22 ga. needles; 1/16in fittings	VISF-1	1 Each
Valco syringe ports	22 ga. 2in needles	VISF-2	1 Each
Valco Nuts and Ferrules	1/16in standard nut	ZN1-10	10 Pack
Valco Nuts and Ferrules	1/16in long nut	LZN1-10	10 Pack
Valco Nuts and Ferrules	1/16in SS ferrule	ZF1-10	10 Pack

LC Syringes for Manual Injection valves

Easy, accurate and reproducible manual injection

- Square tip to prevent damage to the injector
- Wide range of volumes
- Precision made from borosilicate glass and stainless steel
- Robust design and easy-to-read markings

Removable Needle, Gas Tight Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	50	22	90° Blunt End	365DLG21	1 Each	365RNL15	5 Pack
25	50	22	90° Blunt End	365FLG31	1 Each	365RNL25	5 Pack
50	50	22	90° Blunt End	365GLG41	1 Each	365RNL25	5 Pack
100	50	22	90° Blunt End	365HLG51	1 Each	365RNL25	5 Pack
500	50	22	90° Blunt End	365JLG71	1 Each	365RNL25	5 Pack

Fixed Needle, Gas Tight Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	22	90° Blunt End	365DL263	1 Each
25	50	22	90° Blunt End	365F6315	1 Each
50	50	22	90° Blunt End	365G6316	1 Each
100	50	22	90° Blunt End	365H6317	1 Each
500	50	22	90° Blunt End	365J6319	1 Each

Fixed Needle Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
5	50	22	90° Blunt End	365CL221	1 Each
10	50	22	90° Blunt End	365DL231	1 Each
25	50	22	90° Blunt End	365FL241	1 Each
50	50	22	90° Blunt End	365GL251	1 Each
100	50	22	90° Blunt End	365HL261	1 Each
250	50	22	90° Blunt End	365IL271	1 Each
500	50	22	90° Blunt End	365JL281	1 Each



HPLC Syringes

- Instrument specific syringes
- Luer-Lok syringes ideal for priming
- Macro volume sampling syringes suitable for liquid or gas samples

Removable Needle Syringes for Thermo Scientific Instruments

Volume (µL)	Length (mm)	Gauge	Instrument	Cat. No.	Quantity
250	50	22	LCQ	365ILT21	1 Each
500	50	22	LCQ	365JLT41	1 Each
250	–	–	AS1000, AS3000	365ILT91	1 Each
500	–	–	AS1000, AS3000	365JLT61	1 Each
2500	–	–	AS3000, AS3500	365LLT81	1 Each

Mass Spectrometry Replacement ESI Probe Needles

Instrument	Cat. No.	Quantity
LCQ, XP, DECA, Advantage	365RNL1	1 Each
LCQ MS	365RNL2	1 Each
LCQ XSQ	365RNL3	1 Each

Fixed Needle Syringes for CTC Instruments

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	22	–	365DL991	1 Each
25	50	22	–	365FL715	1 Each
50	50	22	–	365GL810	1 Each
100	50	22	–	365HL331	1 Each

PTFE Luer-Lok Syringes

Volume (mL)	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
1	365KL531	1 Each	365RNL22	2 Pack
2.5	365LL541	1 Each	365RNL22	2 Pack
5	365ML551	1 Each	365RNL22	2 Pack
10	365NL561	1 Each	365RNL22	2 Pack
25	365PL571	1 Each	365RNL22	2 Pack

Syringes for Macro Volume Sampling

Volume (mL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
1	50	22s	Bevel	365K3051	1 Each
2.5	50	22s	Bevel	365LL375	1 Each
5	50	22s	Bevel	365M5212	1 Each
10	50	22s	Bevel	365N5214	1 Each

HOT POCKET and COOL POCKET Column Temperature Controllers

Wrap-around column temperature control systems

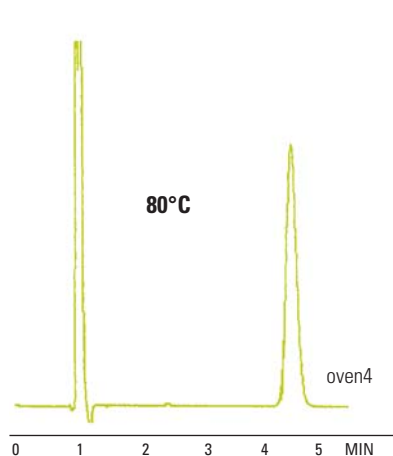
- Easy to install and use with a variety of column lengths
- Dual display of both actual and set point temperature
- HOT POCKET range from just above ambient to 85°C
- COOL POCKET range from 5°C to 55°C
- Explore sample selectivity and stability on both sides of ambient



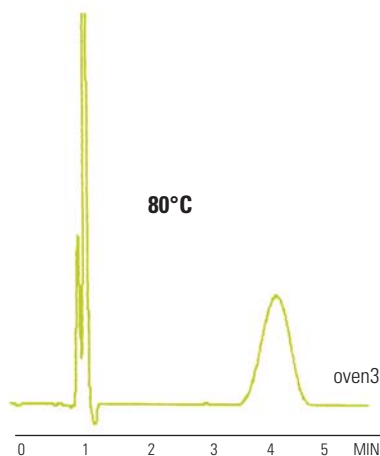
Product Specifications

	HOT POCKET	COOL POCKET
Operating Range	5°C above ambient to 85°C	5°C to 55°C
Display	Dual LED displays of actual and set point temperatures in °C	
Temperature Accuracy	± 2°C over entire range	± 2°C over entire range
Temperature Repeatability	± 1°C	± 1°C
Temperature Stability	± 0.1°C	± 0.1°C
Time to Stabilization (from ambient)	85°C in less than 30 minutes	55°C in 25 minutes, 5°C in 20 minutes

With Eluent Pre-heater



Without Eluent Pre-heater

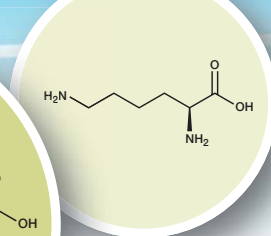
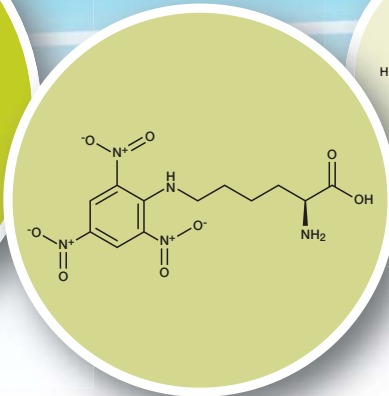
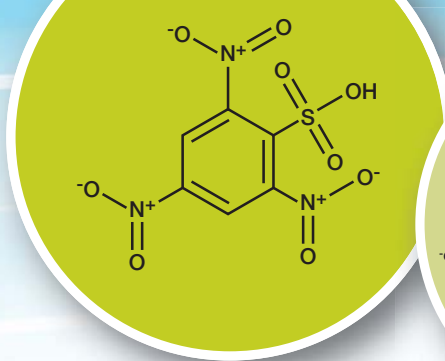


Effect of eluent pre-heater on efficiency

Data courtesy of Dr. Richard F. Myer, Quantitative Technologies, Inc., Whitehouse, NJ

HOT POCKET Column Heaters, Eluent Preheater/Precooler and COOL POCKET Chiller

Description	Cat. No.	Quantity
HOT POCKET Column Heater	92016	1 Each
HOT POCKET Column Heater – short version	92016-150	1 Each
COOL POCKET Column Chiller	92017	1 Each
Eluent Preheater/Precooler	92018	1 Each



LC Reagents

Providing the selectivity needed for high-quality separation of charged compounds

Control selectivity, resolve complex ionic mixtures and improve peak symmetry with the use of our LC reagents.

By Using the Correct Reagent You Achieve:

- Increased or decreased retention, permitting controlled selectivity
- Resolution of complex ionic mixtures without using ion exchange columns
- Improved peak symmetry

Reagent Types:

- High purity pre-column derivatization reagents
- Hydrolysis reagents
- HPLC ion pair reagents
- Derivatization and visualization reagents
- Amino acid detection reagents
- Peptide standards

The LC Reagents web page contains the latest news, applications and downloads for the LC Reagents HPLC column range. Visit www.thermoscientific.com/columns



LC Reagents

Technical Resources

visit www.thermoscientific.com/chromexpert to access the following information:

- Derivatization and Visualization Reagents for HPLC
- Developments in Amino Acid Analysis
- Hydrolysis
- Methods for Fractionation of Peptide Mixtures



HPLC Ion Pair Reagents

Heptafluorobutyric Acid

Ion-pair reagent for the reversed-phase HPLC separation of proteins and peptides

- Typical purity is 99.7% by GC; <0.1% water
- Sequencing reagent for classical and automated Edman degradation of peptides and proteins
- Density: 1.645
- B.P. 120°C
- Packaged under nitrogen in amber glass ampules or bottles
- Clear, colorless liquid

Heptafluorobutyric Acid

Description	Quantity	Cat. No.	Quantity
Heptafluorobutyric Acid, Sequencing Grade	100mL	X TS-25003	1 Each
Heptafluorobutyric Acid, HPLC Grade	10 x 1mL ampules	TS-53104	1 Pack

X in the ordering table indicates that hazardous shipping charges apply.

Triethylamine (TEA)

Ideal for HPLC separation and analysis of peptides

Triethylamine is an ion-pairing reagent that alters selectivity in reversed-phase HPLC separations. By pairing with peptides, it effectively sharpens peaks, resulting in improved peak resolution.

- 99.5% triethylamine purity, allowing sensitive peptide detection at low UV wavelengths in reverse-phase HPLC peptide separation systems
- Packaged in amber glass bottles with protective PTFE-lined fluorocarbon caps for reagent integrity
- Has a low UV absorbance to provide the most sensitive detection across all wavelengths

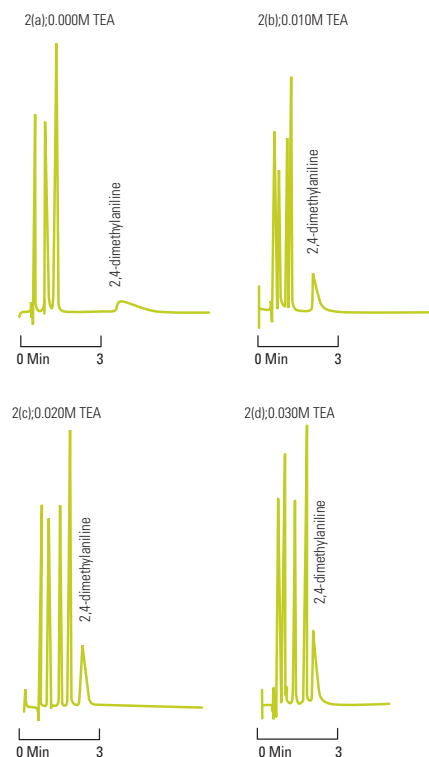
Properties of Triethylamine

- Alternate names TEA, Diethylethanamine
- Molecular formula $C_6H_{15}N$
- Molecular weight 101.19
- Density 0.726g/mL

Triethylamine (TEA)

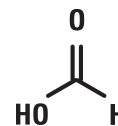
Description	Quantity	Cat. No.	Quantity
Triethylamine, Sequencing Grade	100g	X TS-25108	1 Each

X in the ordering table indicates that hazardous shipping charges apply.



Formic Acid Ampules

Well suited for HPLC and mass spectrometry applications



Formic Acid
MW 46.03

Formic acid is a component found in reverse-phase mobile phases to provide protons for LC-MS analysis. The presence of a low concentration of formic acid in the mobile phase is also known to improve the peak shapes of the resulting separation. Unlike trifluoroacetic acid (TFA), formic acid is not an ion-pairing reagent, and it does not suppress MS ionization of polypeptides when used as a mobile phase component.

- Prescored, nitrogen-flushed, amber glass to protect formic acid from light and moisture
- 99% purity for consistent LC baselines and no interference introduced into LC and mass spectrometry applications
- Convenient format simplifies preparation of gradient and isocratic mobile phases containing 0.1% (v/v) formic acid in water or acetonitrile
- Contents of a single vial in a final volume of 1L solvent yields a mobile phase of the most common formic acid concentration

Formic Acid Ampules

Description	Quantity	Cat. No.	Quantity
Formic Acid 99+%	10 x 1mL ampules	TS-28905	1 Each

For complex peptide separations, the key to success can be to vary selectivity. Varying mobile phase composition on the same column can change selectivity enough to resolve peptides that would otherwise overlap. The TFA concentration is usually specified as 0.1% for reverse-phase HPLC of peptides. For reproducible separations from run-to-run or from lab-to-lab, it is essential to make concentrations the same.



Derivatization and Visualization Reagents for HPLC

Trifluoroacetic Acid (TFA)

Routinely used ion-pairing agent in reversed-phase peptide separations

- Purity: >99.5% TFA and exceptional clarity allows sensitive, non-destructive peptide detection at low UV wavelengths
- High-performance packaging: Packaged under nitrogen in amber glass with protective TFE-lined fluorocarbon caps to ensure TFA integrity
- Choice of formats for convenience: 1mL ampules can prepare 1L of 0.1% v/v TFA solution for the mobile phase in reversed-phase chromatography in moments

Trifluoroacetic Acid (TFA)

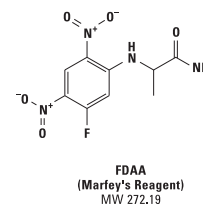
Description	Quantity	Cat. No.	Quantity
Trifluoroacetic Acid, Sequencing Grade	500mL	X TS-28901	1 Each
Trifluoroacetic Acid, Sequencing Grade	100g	X TS-28903	1 Each
Trifluoroacetic Acid, Sequencing Grade	10 × 1mL	X TS-28904	1 Pack
Trifluoroacetic Acid, Sequencing Grade	1g	X TS-28902	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

FDAA, Marfey's Reagent

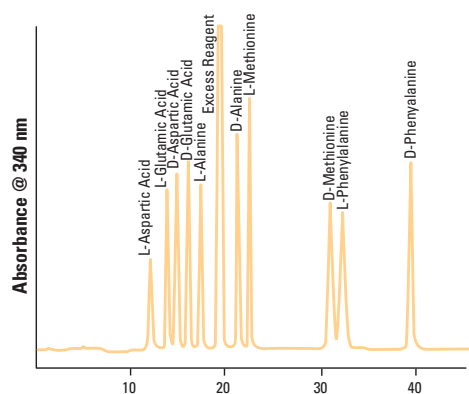
Makes separation and quantitation of optical isomers of amino acids by reversed-phase chromatography quick and easy

- Optical isomers of amino acids derivatization complete in just 90 minutes
- Derivatives have an absorption coefficient of $\sim 3 \times 10^4$
- Derivatives can be detected by UV at 340nm with picomole sensitivity



FDAA, Marfey's Reagent

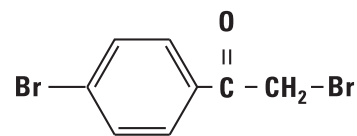
Description	Quantity	Cat. No.	Quantity
FDAA, Marfey's Reagent	50mg	TS-48895	1 Each



p-Bromophenacylate Reagent

Gives quantitative yields with few or no side reactions

- Premixing of phenacylbromide and crown ether is not necessary
- Derivatization is both rapid and quantitative, with yields of >95% in 15 to 20 minutes at 80°C
- Excess reactants do not interfere
- Large excess of alkylating reagent is not necessary
- Small amounts of water or alcohol do not interfere
- If isolation is desired, products are usually crystalline



p-Bromophenacylate
MW 277.94

p-Bromophenacylate Reagent

Description	Quantity	Cat. No.	Quantity
p-Bromophenacylate Reagent	10mL	TS-48891	1 Each

TNBSA (Trinitrobenzene Sulfonic Acid)

An excellent choice for spectrophotometric detection

- Couples with primary amines, sulfhydryls and hydrazides in aqueous solution at pH 8, without undesirable side reactions
- Excellent for solution or solid phase analysis
- Suitable for qualitative and quantitative estimation of biomolecules; including amino acids, peptides or proteins
- Chromogenic, $O_{\max} = 335\text{nm}$
- Colored derivatives are monitored at 345nm and have extinction coefficients in range of $1-1.5 \times 10^4$

TNBSA

Description	Quantity	Cat. No.	Quantity
TNBSA	100mL	X TS-28997	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

Hydrolysis Reagents

Constant Boiling (6N) Hydrochloric Acid

Sequencing-grade reagent for total protein hydrolysis

- Hydrolyzes peptides in 6 hours at 150°C
- Specially purified to give ninhydrin-negative blank on hydrolysis
- Packaged in prescored ampules to eliminate contamination and ensure product integrity

Constant Boiling (6N) Hydrochloric Acid

Description	Quantity	Cat. No.	Quantity
Hydrochloric Acid 6N	10 × 1mL	TS-24308	1 Pack

Amino Acid Standard H

High-purity calibration standard for protein hydrolysates

- Uses L-form configuration to permit standardization of microbial and other assays
- Molar concentration verified by conventional amino acid analysis methods
- With the exception of cystine, each amino acid is supplied at a concentration of 2.5µmoles/mL in 0.1N HCl

The following amino acids are included in Amino Acid Standard H:

L-Alanine, Ammonia [(NH₄)₂SO₄], L-Arginine, L-Aspartic Acid, L-Cystine, L-Glutamic Acid, Glycine, L-Histidine, L-Isoleucine, L-Leucine, L-Lysine•HCl, L-Methionine, L-Phenylalanine, L-Proline, L-Serine, L-Threonine, L-Tyrosine, L-Valine.

Amino Acid Standard H

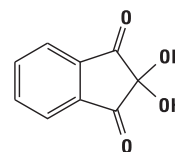
Description	Quantity	Cat. No.	Quantity
Amino Acid Standard H	10 × 1mL	TS-20088	1 Pack

When kept frozen, an unopened vial has an indefinite storage life. Once the seal is broken, the reagent has a maximum storage life of six months. Store frozen between uses.

Amino Acid Detection Reagents

Ninhydrin

The reagent of choice for detection of amino acids



Ninhydrin
MW 178.14

- Used in amino acid chromatography
- Offers superb color response and low blank
- Indefinitely stable and requires no refrigeration

Ninhydrin

Description	Quantity	Cat. No.	Quantity
Ninhydrin	500g	TS-21003	1 Each

Indefinitely stable. No refrigeration required. Keep bottle tightly sealed. Avoid exposure to direct sunlight and ammonia.

HPLC and Spectrophotometric Grade Solvents

Ultrapure solvents are carefully packed for thorough protection

- Distilled in glass, filtered through 0.2µm TFE membranes and packed in solvent-rinsed, amber glass bottles
- TFE-lined screw caps seal bottles

Acetonitrile, HPLC Grade, Physical Properties

- UV Cutoff: 190nm
- Optical Absorbance: <0.02 at 220nm
- Refractive Index at 25°C: 1.342

Water, HPLC Grade, Physical Properties

- UV Cutoff: 190nm
- Optical Absorbance: <0.005 at 220nm
- Refractive Index at 25°C: 1.332

Dimethylformamide (DMF), Sequencing Grade, Physical Properties

- $\text{HCON}(\text{CH}_3)_2$
- Purity (GC): ≥99%
- MW: 73.09
- Density: 0.944
- B.P. 153°C
- Water: 0.1%

Dimethylsulfoxide (DMSO), Sequencing Grade, Physical Properties

- $\text{C}_2\text{H}_6\text{OS}$
- Purity (GC): >99.5%
- MW: 78.13
- Density: 1.101
- Water: ≤0.2%

Pyridine, Physical Properties

- $\text{C}_5\text{H}_5\text{N}$
- Purity (GC): ≥99%
- MW: 79.10
- Density: 0.978
- B.P. 115°C

HPLC and Spectrophotometric Grade Solvents

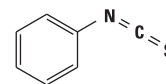
Description	Quantity		Cat. No.	Quantity
Acetonitrile	1L	X	TS-51101	1 Each
Water	1L		TS-51140	1 Each
Dimethylformamide (DMF)	50mL	X	TS-20673	1 Each
Dimethylsulfoxide (DMSO)	950mL	X	TS-20688	1 Each
Pyridine	100g	X	TS-25104	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

High-Purity Pre-Column Derivatization Reagents

PITC (Phenylisothiocyanate)

High-purity reagent for pre-column quantitative derivatization of amino acids by reversed-phase HPLC



PITC
Edman's Reagent
MW 135.19

- Also known as Edman's Reagent
- Reacts readily with amino acids in 5 to 10 minutes at room temperature
- Resulting phenylthiocarbonyl derivatives can be separated and quantified in 30 minutes using reverse-phase HPLC to produce stable products with all amino acids including proline

PITC (Phenylisothiocyanate)

Description	Quantity	Cat. No.	Quantity
PITC (Edman's Reagent)	10 × 1mL	TS-26922	1 Pack

Peptide Standards

Peptide Retention Standard

Allows accurate prediction of elution time for peptides of known amino acid composition up to 20 residues in length

- Save time in peptide purification
- Simplify identification of specific peptides in a complex mixture
- Increase the efficiency of predicting peptide elution profiles
- Determine the relative order of peptide elution of a complex mixture
- Evaluate reverse-phase supports of varying n-alkyl chain lengths and ligand densities

Retention times are predicted by totaling the values that represent the contribution in minutes of each amino acid residue and the peptide terminal groups. Retention time is dependent upon the molecular weight of the peptide. The effect on retention is relatively unimportant with a small peptide, but it increases with the size of the molecule. The accuracy of predicting peptide retention time significantly decreases beyond 20 residues. To ensure accuracy, a peptide standard is used to correct for instrument variation, column aging, n-alkyl chain length variation and ligand density.

Peptide Retention Standard

Description	Quantity	Cat. No.	Quantity
Peptide Retention Standard, S1-S5	1 vial	TS-31700	1 Each

Peptide Retention Time Calibration Mixture

Heavy peptide mixture for column assessment and prediction of peptide retention times

- Assessment of chromatography and MS instrument performance
- Prediction of peptide retention across multiple instrument platforms
- Prediction of peptide retention time from sequence using calculated hydrophobicity factor
- Optimization of scheduled MS acquisition windows for improving quantification and increased multiplexing
- Internal standard to normalize for variation in retention times and peak intensities between runs

Peptide Retention Time Calibration Mixture

Description	Quantity	Cat. No.	Quantity
Peptide Retention Time Calibration Mixture, 0.5pmol/μL	50μL	TS-88320	1 Each
Peptide Retention Time Calibration Mixture, 5pmol/μL	200μL	TS-88321	1 Each

LC and LC-MS Instruments

Our liquid chromatographs and mass spectrometers advance scientific knowledge, enable drug discovery, improve manufacturing processes and protect people and the environment. You can expect the best results and highest productivity, keeping your research or processes moving smoothly.

Vanquish Flex System

The Thermo Scientific™ Vanquish™ Flex system is a biocompatible UHPLC system with state-of-the-art quaternary solvent blending, ideally suited for the biopharma industry.

The Vanquish UHPLC platform is designed to set new benchmarks on accuracy, precision, and sensitivity in liquid chromatography. As a new part of this family, the Vanquish Flex system shares all Vanquish-inherent values, such as a design focus on uptime, robustness and reliability.



Vanquish System

The Vanquish system takes high-end UHPLC to a new level, offering more resolution while meeting the throughput demands of modern laboratories. The system is driven by the gold standard Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) software and delivers better separations, more results and easier interaction. The Vanquish system delivers these values simultaneously, without compromise.

When combined with the Thermo Scientific Charger module, the Vanquish system allows for added sample capacity, performing the highest throughput UHPLC analysis. This setup combines enough sample capacity to run over the weekend, while Chromeleon CDS ensures convenient sample tracking and results processing of even the largest sample sets.

Visit www.thermoscientific.com/vanquish



Basic Automated and Standard (SD) Systems

The Thermo Scientific™ Dionex™ UltiMate™ 3000 Basic Automated System is optimized for reliability and ease-of-use with routine LC applications, and also offers full UHPLC compatibility. The ACC-3000 Autosampler Column Compartment is at the heart of the system. Its unique instrument design combines a rugged sample injection principle with a powerful column oven.

UltiMate 3000 Standard (SD) Systems are designed to meet current and future challenges. System components provide low extra-column and gradient delay volume for high separation efficiency and low gradient response times, as well as superior mixing performance. They offer full support of all HPLC applications and provide UHPLC compatibility – allowing you to move to UHPLC whenever you are ready.

Visit www.thermoscientific.com



Rapid Separation (RS) and BioRS Systems

UltiMate 3000 Rapid Separation (RS) Systems provides unrivaled performance and flexibility in UHPLC. Precision-engineered instrumentation, advanced data processing, and highly optimized chemistries meet all chromatographic performance challenges. With an outstanding product portfolio, UltiMate 3000 RS Systems offers industry-leading versatility covering the maximum range of UHPLC applications, while keeping fully compatible to conventional LC.

UltiMate 3000 Biocompatible Rapid Separation (BioRS) Systems are powered by UltiMate 3000 Rapid Separation technology to support the high pressures required for the separation of bioanalytes on high resolution bio UHPLC columns. This state-of-the-art technology combined with a biocompatible, low-dispersion flow path, provides the highest peak capacity and sensitivity for complex samples, whether proteins, peptides, or biotherapeutics. Bio UHPLC enables faster gradients and shorter run times compared to conventional Bio LC analysis. This results in increased sample throughput in typical modes of biochromatography.

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x2 Dual LC Systems

UltiMate 3000 x2 Dual LC Systems are the ideal choice to maximize sample throughput of conventional HPLC and UHPLC separations by combining the flexibility of ternary solvent selection with the productivity and performance of x2 Dual technology.

Operate conventional or high speed applications, increase sample throughput, achieve higher chromatographic resolution, or automate tedious sample preparation steps such as analyte enrichment or matrix elimination.

Visit www.thermoscientific.com



Thermo Scientific LC-MS Systems

Ion Traps and Orbitrap Series

Thermo Scientific™ Orbitrap™ LC-MS systems are the recognized standards for high-resolution, accurate-mass measurements.

Orbitrap LC-MS technology routinely delivers the superior mass resolution and mass accuracy necessary to reduce analysis times and increase confidence in results. This makes it the platform of choice for the most confident protein and metabolite identification, characterization and quantitation. Combined with superior dynamic range and unsurpassed sensitivity, Orbitrap systems are the only mass spectrometers capable of providing all four benefits at the same time, without compromise.

With market and technology leadership for over 25 years, we offer ion trap LC-MS systems for every application and budget. Ion trap LC-MS systems offer unique capabilities such as MSⁿ and data-dependent analysis along with excellent full-scan sensitivity to provide routine detection and rapid identification of low-level analytes. Ion trap systems support a variety of applications from compound identification and routine HPLC detection through the most demanding analyses of low-level components in complex biological matrices.

Visit www.thermoscientific.com/orbitrap



TSQ Series Triple Quadrupole LC-MS

Robust triple-stage quadrupole LC-MS systems enable ultra-sensitive quantitation of target compounds in complex matrices.

TSQ Series triple-stage quadrupole LC-MS systems offer a wide range of capabilities. From the value-conscious Thermo Scientific™ TSQ Endura™ LC-MS to the precise Thermo Scientific™ TSQ Quantiva™ LC-MS, our mass spectrometers couple perfectly with our HPLC, UHPLC, and nano-LCs to easily accommodate complex matrices encountered in a variety of applications.

Visit www.thermoscientific.com/tsq



MSQ Plus Single Quadrupole LC-MS

Our single quadrupole LC-MS system offers superior ease-of-use and modest price and space requirements.

The system can be used with both HPLC and IC systems in a wide range of applications and methodologies.

Visit www.thermoscientific.com



GC Columns and Accessories

Thermo Scientific GC columns and accessories are designed to give optimum system performance for today's challenging analyses. Thermo Scientific™ TraceGOLD™, Thermo Scientific™ TRACE™ and Thermo Scientific™ TracePLOT™ columns provide excellent quality and performance. Our range of GC accessories include all the tools needed by today's gas chromatographers.

Featured Products



LinerGOLD GC Liners

The GOLD standard in GC liner performance, providing enhanced inertness, leading to increased accuracy and precision in analysis.

PAGE 5-016



TraceGOLD GC Columns

The premium standard in GC column performance, delivering low bleed, excellent reproducibility and high levels of inertness.

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Section Contents

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Injection Port Septa	5-014	TracePLOT GC Columns	5-076
Injection Port Liners	5-016	GC Reagents	5-080
Ferrules	5-021	Reacti-Therm Heating, Stirring and Evaporation System	5-093
Capillary Accessories	5-024	GC and GC-MS Instruments	5-100
GC Tools	5-029		



GC Derivatization Reagents

Making the undetectable detectable. Thermo Scientific GC Derivatization reagents provide high levels of purity and reproducibility in analysis.

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Reacti-Therm Sample Derivatization System

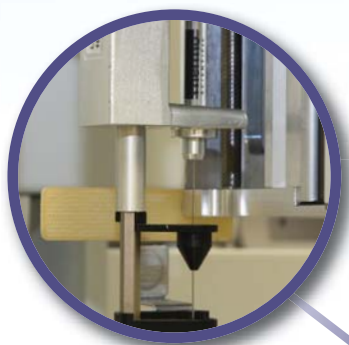
Heating, stirring and evaporation in a single system, offering a complete solution for derivatization and other small-scale reactions.

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GC Columns and Accessories

Product Selection Guide

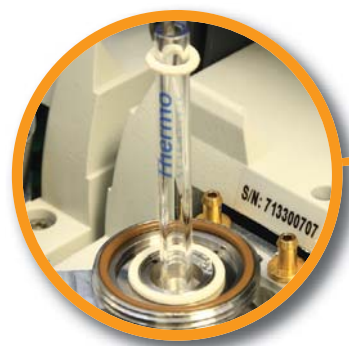
Selection of the correct GC columns and accessories is critical to ensure optimum system performance. The selection guide below is designed to simplify this process



GC Syringes



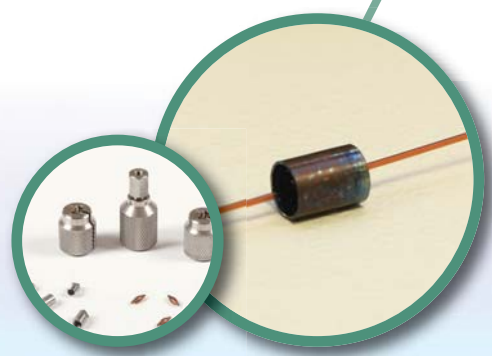
Vials and Closures



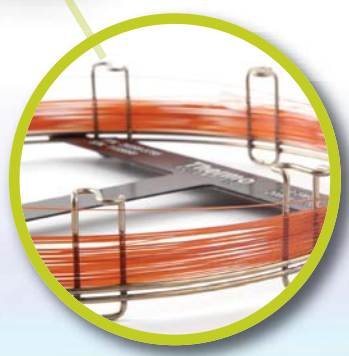
GC Liners



GC Septa



GC Ferrules



GC Columns




Vials and Closures

Nature of Sample	Vial Type Recommended
Routine samples	Clear glass (with or without patch) as SureStop 9mm screw thread or 11mm crimp vial
Light sensitive samples	Amber glass (with or without patch) as SureStop 9mm screw thread or 11mm crimp vial
Low volume samples	Micro-Inserts or Microsampling and High Recovery vials with fixed inserts or reduced internal volume
Trace levels	Silanized glass and/or Certified Kits
Ultra Trace MS analysis	MSCERT kits: The first low particle, low background chromatography vials, pre-cleaned to provide unmatched consistency; tested and certified for up to 15 critical physical characteristics affecting vial performance for mass spectrometry

GC Septa

Material	Max Operating Temperature	Key Features
BTO	400 °C (330 °C for 17 mm size)	Low bleed
TR-Green	350 °C	Long lifetime
Marathon	350 °C	High mechanical durability
TR-Blue	200–250 °C	Easy to penetrate for routine applications

GC Liners






Injection Method	Injection Requirements	Liner Requirements
Split 	Enables rapid vaporization and effective mixing of sample	<ul style="list-style-type: none"> Typically open-ended Large surface area & volume Design to aid mixing Low activity
Splitless 	Sample focused onto column – minimizes sample contact with reactive metal components	<ul style="list-style-type: none"> Typically tapered Small volume to aid transfer Low activity
PTV 	Rapid heating and cooling, fast transfer to column-used for active compounds such as pesticides and large volume injections	<ul style="list-style-type: none"> Small to aid sample transfer Good thermal properties for rapid heating & cooling Siltek coating provides highly inert surface

GC Columns

Column Parameter	Parameters Affecting Resolution			Performance Changes
	Efficiency	Retention	Selectivity	
Column Length (m)	✓			Doubling column length increases resolution by ~ 40%
Internal Diameter (mm)	✓	✓		The smaller the column ID, the greater the efficiency and better the resolution
Film Thickness (µm)		✓		The thicker the film, the greater the retention, e.g. ideal for highly volatile compounds. The thinner the film, the sharper the peaks and lower the bleed
Stationary Phase Chemistry			✓	Altering the stationary phase can affect elution order and help separate closely, or co-eluting peaks

GC Syringes

Syringe Selection by Needle Tip Style

Needle Tip Style	Features / Applications
Cone (Tapered tip) 	Most versatile needle for autosampler use and resist coring of vial and inlet septa
Bevel (Sharp tip) 	Typically used for manual injections. The tip shape helps reduce septa coring
Side Hole (Dome tip with a side hole for sample exit) 	Usually used for headspace and large volume injections
Blunt End or 90° (flat top) 	Used for injectors that do not contain an inlet septa such as Merlin MicroSeal™
Dual Gauge 	Narrow gauge part suitable for megabore on-column injection. Wider part suitable for autosampler use

Syringe Selection by Needle Gauge Size

- Gauge is a measure of the “thickness” of the needle
- The higher the gauge number, the thinner the needle e.g. a 23 gauge is thicker than a 26 gauge
- Suffix “s” e.g. 23s refers to a needle with a narrower internal diameter
- For on-column injection ensure that the column ID is greater than the needle gauge

GC Ferrules

Material	Uses	Advantages	Limitations
100% Graphite	FID, NPD, high temperature	<ul style="list-style-type: none"> Easy-to-use stable seal Higher temperature limit Can be easily removed Can be re-used 	<ul style="list-style-type: none"> Not for MS or oxygen-sensitive detectors Soft, easily deformed or destroyed Possible system contamination
85% Vespel / 15% Graphite	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> Long lifetime High temperature limit MS compatible 	<ul style="list-style-type: none"> Cannot be re-used Must be re-tightened after initial temperature cycles
SilTite™ Metal	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> Long lifetime High temperature limit MS compatible 	<ul style="list-style-type: none"> Cannot be re-used

Gas Management

Click-On Inline Filters

Easy-to-use format eliminates contamination

- Pure gas output 99.9999% or 6.0 grade
- No carrier gas line contamination during filter change
- Easy and fast replacement without the need for tools
- TUEV approved
- Maximum pressure 11 bar (160 psi)
- Maximum flow 25L/min



Filters	For Gas	Indicator Change	Filter Capacity (Click-On Inline)	Filter Capacity (Super Clean)
Moisture	Inert carrier, He, H ₂ , N ₂ , AR, Air		21g H ₂ O	7.2g H ₂ O
Oxygen	Inert carrier, He, H ₂ , N ₂ , AR		3L O ₂	1L O ₂
Hydrocarbon	Inert carrier, He, H ₂ , N ₂ , AR, Air		36g (as n-butane)	24g (as n-butane)
Combi – Moisture, Oxygen	Inert carrier, He, H ₂ , N ₂ , AR		10g H ₂ O, 1.5L O ₂	–
Combi – Moisture, Hydrocarbons	Inert carrier, He, H ₂ , N ₂ , AR, Air		10g H ₂ O, 18g HCs (as n-butane)	3.5g H ₂ O, 12g HCs (as n-butane)
Triple – Moisture, Oxygen, Hydrocarbons	Inert carrier, He, H ₂ , N ₂ , AR		6g H ₂ O, 1L O ₂ , 12g HCs (as n-butane)	1.8g H ₂ O, 500mL O ₂ , 7g HCs (as n-butane)
Triple – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC/MS	He		6g H ₂ O, 1L O ₂ , 12g HCs (as n-butane)	–
Indicating Triple – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC/MS	He	Moisture: Yellow to Clear Oxygen: Green to Gray	0.1g H ₂ O, 100mL O ₂ , 0.07g HCs (as n-butane)	–

Click-On Inline Filters

Type	Cat No.	Quantity
Moisture Filter	60180-801	1 Each
Oxygen Filter	60180-802	1 Each
Hydrocarbon Filter	60180-803	1 Each
Combi – Moisture, Oxygen	60180-804	1 Each
Combi – Moisture, Hydrocarbons	60180-843	1 Each
Triple – Moisture, Oxygen, Hydrocarbons	60180-805	1 Each
Triple – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC/MS	60180-806	1 Each
Indicating Triple – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC/MS	60180-808	1 Each

Connectors and Accessories

Description	Cat No.	Quantity
Brass End Fitting, 0.125in.	60180-809	2 Pack
Steel End Fitting, 0.125in.	60180-810	2 Pack
Brass End Fitting, 0.25in.	60180-811	2 Pack
Steel End Fitting, 0.25in.	60180-812	2 Pack
Double Ended Connector to connect Filter to Indicator	60180-813	1 Each
Replacement O-Rings	60180-833	1 Each
Wall Mounting Clamp	60180-834	4 Pack

Super Clean Cartridge Filters

Replace easily without tools

- 99.9999% pure gas (or 6.0 grade) output
- No carrier gas line contamination during cartridge change
- Cost effective
- TUEV approved
- Max. pressure 11 bar (160 psi)
- Max. flow 7L/min



Super Clean Cartridge Filters

Type	Base Included	Cat. No.	Quantity
Indicating Moisture Cartridge Filter	No	60180-819	1 Each
Indicating Oxygen Cartridge Filter	No	60180-820	1 Each
Hydrocarbon Cartridge Filter	No	60180-821	1 Each
Indicating Combi Filter – Moisture, Hydrocarbons	No	60180-826	1 Each
Indicating Triple Filter – Moisture, Oxygen, Hydrocarbons	No	60180-824	1 Each
Indicating Triple Filter – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC-MS	No	60180-825	1 Each
Triple Filter – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC-MS	Yes	60180-830	1 Each
Indicating Triple Filter – Moisture, Oxygen, Hydrocarbons – He preconditioned for GC-MS	Yes	60180-829	1 Each
3 Cartridge Pack – contains 1 x Triple Filter and 2 x Combi Filter (Moisture, Hydrocarbons)	No	60180-822	1 Each
4 Cartridge Pack – contains 1 x Moisture Filter, 1 x O ₂ Filter and 2 x Hydrocarbon Filter	Yes	60180-827	1 Each
3 Cartridge Pack – contains 1 x Triple Filter and 2 x Combi Filter (Moisture, Hydrocarbons)	Yes	60180-828	1 Each
High Flow Pack of 2 x Hydrocarbon Filters for LC-MS – no Indicator	No	60180-839	1 Each
High Flow Pack of 2 x Moisture Filters for LC-MS – with Indicator	No	60180-841	1 Each

Super Clean Cartridge Filter Baseplates

One-time installation procedure

- Can be configured to the individual user requirements
- Needle valves ensure gas line is not contaminated during cartridge change

Filters are not included



Type	For Use With	For Gas
Single Base	Triple Filter	Carrier Gas Only
Dual Base	2 x Combi Filter	Air and Fuel Gas
Triple Base	Triple and 2 x Combi Filter	Carrier, Make-Up, and Fuel Gas
Four-position Base	Moisture, Oxygen, 2 x Hydrocarbon	High Capacity Carrier, Fuel, Make Up
Two-position, High-flow Base	N ₂ in LC/MS, H ₂ O in H ₂ /air generators	Carrier, Make Up and Fuel

Super Clean Cartridge Filter Baseplates

Type	Cat. No.	Quantity
Single Base	60180-814	1 Each
Dual Base	60180-815	1 Each
Triple Base	60180-817	1 Each
Four-position Base	60180-818	1 Each
O-rings for Base Plates	60180-837	20 Pack
Flush Cap	60180-838	2 Pack

eVol XR Dispensing System

Allows precise and accurate, operator-independent dispensing for better deployment of laboratory staff

- Can be calibrated easily by user to ensure validity of results
- Intuitive interface with touch wheel and full-color screen
- Complies to GLP and GMP protocols
- Improves confidence in reported results
- Unifies two precision devices, a digitally controlled electronic drive and an XCHANGE™ analytical syringe
- Integrated XCHANGE coupling allows syringes to be quickly and easily changed
- XCHANGE syringes offer exceptional versatility and functionality

eVol XR Dispensing System

Description	Cat. No.	Quantity
Sample Dispensing System	66002-020	1 Each
eVol™ XCHANGE Syringe 5µL	66002-021	1 Each
eVol XCHANGE Syringe 50µL	66002-022	1 Each
eVol XCHANGE Syringe 100µL	66002-038	1 Each
eVol XCHANGE Syringe 500µL	66002-023	1 Each
eVol XCHANGE Syringe 1000µL	66002-039	1 Each
Sample Dispensing System Kit*	66002-024	1 Each
eVol Stand	66002-025	1 Each
Charger for eVol System	66002-026	1 Each
Charging Stand for eVol System	66002-027	1 Each
Replacement Battery for eVol System	66002-028	1 Each
Replacement Plunger for 5µL eVol Syringe	66002-029	1 Each
Replacement Plunger for 50µL eVol Syringe	66002-030	1 Each
Replacement Plunger for 100µL eVol Syringe	66002-040	1 Each
Replacement Plunger for 500µL eVol Syringe	66002-031	1 Each
Replacement Plunger for 1000µL eVol Syringe	66002-041	1 Each

* Sample Dispensing Kit contains 1 eVol XR unit, 1x5µL, 1x50µL and 1x500µL syringe.



Applications:

- Routine dispensing of volatile solvents, hazardous, corrosive or viscous chemicals



Syringes for GC Instruments

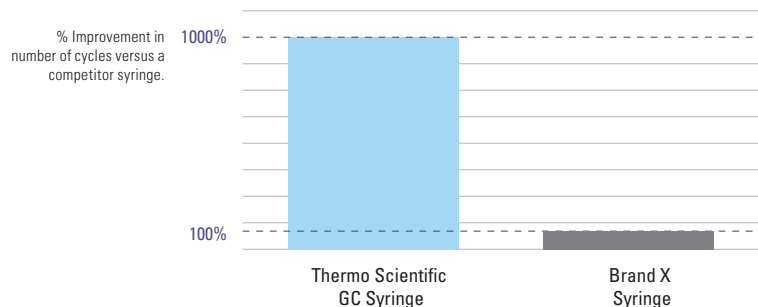
Providing durability, clarity and accuracy for your sample

Thermo Scientific™ syringes for GC instruments are designed to provide enhanced durability, clarity and accuracy in sample introduction. This gives confidence in analytical results, time-after-time.

Durability in your GC Syringe

The enhanced design of the syringes delivers:

- Improved solvent resistance
- Greater temperature range
- Increased operational smoothness
- Longer lifetime and improved cycle life



Clarity in your GC Syringe

Syringes are provided with a clear, easy-to-read black scale, which aids in consistent delivery of samples for manual syringes and easy identification of installed autosampler syringes.

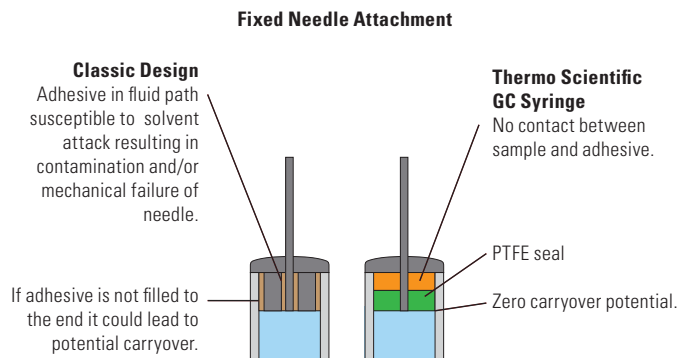


Accuracy in your GC Syringe

The enhanced design of the syringe has eliminated areas where the sample can become trapped and potentially cause carryover:

- Closer fit between the plunger tip and PTFE insert at the zero position
- Tighter fit between PTFE insert and glass barrel
- Improved fixed needle attachment

In addition, the reduction in adhesive from the fluid path enhances durability and reduces the risk of sample interaction with the adhesive.



GC Syringes for Thermo Scientific TriPlus RSH Autosampler

Removable Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat. No.	Quantity	Repair Kit Cat. No.	Quantity
0.5	57	23	Cone	Split	365A0241*	1 Each	365RN617	1 Each
1	57	23	Cone	Split	365B0251*	1 Each	365RN656	1 Each

Fixed Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat. No.	Quantity
5	85	23s	Cone	Merlin Valve SSL Injector: Splitless	365C0221	1 Each
	57	23s	Cone	Merlin Valve Injector: PTV and split	365C0231*	1 Each
	85	26s	Cone	Splitless and OC	365C0241	1 Each
	57	26s	Cone	Split and PTV	365C0251*	1 Each
10	85	23s	Cone	Merlin Valve SSL Injector: Splitless	365D0261	1 Each
	57	23s	Cone	Merlin Valve Injector: PTV and split	365D0271*	1 Each
	85	26s	Cone	Splitless and OC	365D0281	1 Each
	57	26s	Cone	Split and PTV	365D0291*	1 Each

Fixed Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat. No.	Quantity
10	85	23s	Cone	Merlin Valve SSL Injector: Splitless	365D0301	1 Each
	57	23s	Cone	Merlin Valve Injector: PTV and split	365D0311*	1 Each
	85	26s	Cone	Splitless and OC	365D0321	1 Each
	57	26s	Cone	Split and PTV	365D0331*	1 Each
25	85	23s	Cone	Merlin Valve SSL Injector: Splitless	365F2431	1 Each
	57	23s	Cone	Merlin Valve Injector: PTV and split	365F2441*	1 Each
	85	26s	Cone	Splitless and OC	365F2451	1 Each
	57	26s	Cone	Split and PTV	365F2461*	1 Each
50	57	23s	Cone	Merlin Valve SSL Injector: LV Splitless	365G2311*	1 Each
	85	26s	Cone	LV OC	365G2321	1 Each
	57	26s	Cone	LV Splitless	365G2331*	1 Each
100	57	23s	Cone	Merlin Valve SSL Injector: LV Splitless	365H2141*	1 Each
	85	26s	Cone	LV OC	365H2151	1 Each
	57	26s	Cone	LV Splitless	365H2161*	1 Each
	85	23	Side Hole	Variable depth LV PTV (w & w/o Merlin)	365H2171	1 Each
	57	23	Side Hole	LV PTV (with or without Merlin valve)	365H2181*	1 Each
250	85	26	Cone	LV OC	365I2321	1 Each
	57	26	Cone	LV Splitless	365I2331	1 Each
	85	23	Side Hole	Variable depth LV PTV (w & w/o Merlin)	365I2341	1 Each
	57	23	Side Hole	LV PTV (with or without Merlin valve)	365I2351	1 Each
500	85	26	Cone	LV OC	365J2411	1 Each
	57	26	Cone	Sample Dilution	365J2421	1 Each
	85	23	Side Hole	Variable depth LV PTV (w & w/o Merlin)	365J2431	1 Each
	57	23	Side Hole	LV PTV (with or without Merlin valve)	365J2441	1 Each
1000	65	23	Side Hole	Headspace	365Q2121	1 Each
	57	22	LC	Sample Dilution	365K2811	1 Each
2500	65	23	Side Hole	Headspace	365Q2131	1 Each
5000	65	22	Side Hole	Headspace	365Q2141	1 Each
10000	57	19	LC	Sample Dilution	365N2721	1 Each

* Also suitable for use with the Thermo Scientific™ TriPlus™ 100LS Autosampler

GC Syringes for Thermo Scientific Instruments

Removable Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Replacement Needle Cat. No.	Quantity	Instrument Compatibility
10	75	31	Cone	Manual OC	36500520	1 Each	36550046	2 Pack	
100	50	23	Side hole	See Note	36520050	1 Each	36550040	2 Pack	TriPlus, AS200/AS800
100	50	23	Cone	LV Splitless	36500495	1 Each	36566485	5 Pack	TriPlus, AS2000, AS200/AS800
250	80	26	Cone	LVOC	36500490	1 Each	36566480	5 Pack	TriPlus, AS2000
250	50	23	Side hole	See Note	36520051	1 Each	36550040	2 Pack	TriPlus, AS2000, AS200/AS800
1000	50	23	Bevel		365K3041	1 Each	365RN235	5 Pack	AS200/AS800

Removable Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Replacement Needle Cat. No.	Quantity	Instrument Compatibility
5	75	31	Cone	Manual OC	36500510	1 Each	36550045	2 Pack	
10	50	26	Cone		365D1841	1 Each	365RN362	2 Pack	AS3000, AS2000
10	50	23	Cone		365D3731	1 Each	365RN372	2 Pack	AS3000, AS2000, AS200/AS800
50	50	23	Cone	LV Splitless	36503015	1 Each	36566485	5 Pack	AS2000

Syringe 36520051 is to be used when performing PTV/LVI injections with a dedicated liner for thermal labile compounds (liner 45352060). Compatible with Merlin Microseal device installed on BEST PTV and with AS2000 and TriPlus autosamplers for liquids.

Fixed Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Instrument Compatibility
10	50	23	Cone		365D3741	1 Each	AS2000
100	50	25	Bevel		365H2321	1 Each	AS200/AS800
250	50	25	Bevel		365I2561	1 Each	AS200/AS800

Fixed Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Instrument Compatibility
5	50	26	Cone	Split/PTV	36504047	1 Each	TriPlus
5	50	23	Cone		365C3701	1 Each	AS3000, AS2000, AS200/AS800
5	50	26	Cone	Split/PTV	36500505	1 Each	AS3000, AS2000
5	80	26	Cone	Splitless and OC	36502025	1 Each	TriPlus
10	50	26	Cone		365D3711	1 Each	AS3000, AS200, AS200/AS800
10	50	26	Cone		365D1856	6 Pack	AS300, AS2000, AS200/AS800
10	50	25	Cone	Split/PTV	36500525	1 Each	TriPlus, AS3000, AS2000, AS200/AS800

Fixed Needle Syringes (Continued)

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Instrument Compatibility
10	50	23	Cone	PTV/SSL Split	36520060	1 Each	TriPlus, AS300, AS2000, AS200/AS800
10	80	23	Cone	Merlin Valve SSL Splitless	36520061	1 Each	TriPlus, AS2000
10	50	23-26	Cone	OC in PTV Merlin Valve	36500580	1 Each	TriPlus, AS2000
10	80	26	Cone	OC and Splitless	36502019	1 Each	TriPlus, AS2000

Plunger-in-Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Type	Cat No.	Quantity	Instrument Compatibility
0.5	50	23	Cone	Split/PTV	36504045	1 Each	TriPlus, AS3000
0.5	75	31	Cone	Manual OC	36500500	1 Each	
0.5	80	26	Cone	Splitless and OC	36504046	1 Each	TriPlus

GC Syringes for Agilent Instruments**Removable Needle Syringes**

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	42	23	Cone	365D1611	6 Pack	365RN252	2 Pack

Fixed Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	42	23-26	Cone	365D0621	1 Each
		23-26	Cone	365D0626	6 Pack

Fixed Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
5	42	23	Cone	365C0951	1 Each
		23	Cone	365C0956	6 pack
		23-26s	Cone	365C0971	1 Each
		23-26s	Cone	365C0976	6 pack
		23	Cone	365D1571	1 Each
10	42	23	Cone	365D1571	1 Each
		23	Cone	365D1576	6 pack
		23-26s	Cone	365D1621	1 Each
		23-26s	Cone	365D1636	6 pack

Fixed Needle, Super-Elastic Plunger Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	42	23-26s	Cone	365D5416	1 Each

GC Syringes for Shimadzu Instruments

Removable Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
5	42	26s	Cone	365C6610	1 Each	365RN663	2 Pack
		23s	Cone	365C6620	1 Each	365RN661	2 Pack
10	42	26s	Cone	365D6610	1 Each	365RN272	2 Pack
		23s	Cone	365D6620	1 Each	365RN282	2 Pack

GC Syringes for CTC Instruments

Removable Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	50	23	Cone	365D3731	1 Each	365RN372	2 Pack
		26	Cone	365D1841	1 Each	365RN362	2 Pack

Fixed Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	23	Cone	365D2976	6 Pack
		26	Cone	365D2977	1 Each
		23	Cone	365D3741	1 Each
25	50	23	Cone	365F3761	1 Each
100	50	23	Cone	365H3771	1 Each
250	50	26	Cone	365H6700	1 Each
1000	50	26	Side Hole	365K8135	1 Each
2500	50	26	Side Hole	365L8635	1 Each

Fixed Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
5	50	23	Cone	365C3701	1 Each
		26	Cone	36500505	1 Each
10	50	26	Cone	365D3711	1 Each
		23	Cone	36520060	1 Each
		26	Cone	365D1856	6 Pack
		23	Cone	365D2971	6 Pack

Manual GC Syringes

Removable Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	50	26s	Bevel	365D0811	1 Each	365RN215	5 Pack
25	50	25	Bevel	365F1931	1 Each	365RN225	5 Pack
		22s	Blunt End	365FLG31	1 Each	365RNL25	5 Pack
50	50	22s	Blunt End	365GLG41	1 Each	365RNL25	5 Pack
500	50	25	Bevel	365J2881	1 Each	365RN225	5 Pack
		22s	Blunt End	365JLG71	1 Each	365RNL25	5 Pack
1000	50	23	Bevel	365K3041	1 Each	365RN235	5 Pack
		22s	Blunt End	365KLG81	1 Each	365RNL35	5 Pack
5000	50	22	Bevel	365M5212	1 Each	365RN463	2 Pack
		22s	Blunt End	365M6322	1 Each	365RN461	2 Pack
		22s	Side Hole	365M8922	1 Each	365RN465	2 Pack
10000	50	22	Bevel	365N5214	1 Each	365RN463	2 Pack
		22s	Blunt End	365N6323	1 Each	365RN461	2 Pack
		22s	Side Hole	365N8923	1 Each	365RN465	2 Pack

Removable Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	50	26	Bevel	365D1171	1 Each	365RN215	5 Pack
25	50	25	Bevel	365F1901	1 Each	365RN225	5 Pack
50	50	25	Bevel	365G2091	1 Each	365RN225	5 Pack

Fixed Needle, Gas Tight Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	26	Bevel	365D4433	1 Each
		26s	Blunt End	365D6314	1 Each
25	50	22s	Blunt End	365F6315	1 Each
50	50	25	Bevel	365G2111	1 Each
		22s	Blunt End	365G6316	1 Each
100	50	25	Bevel	365H2321	1 Each
		22s	Blunt End	365H6317	1 Each
250	50	25	Bevel	365I2561	1 Each
500	50	25	Bevel	365J2831	1 Each
		22s	Blunt End	365J6319	1 Each
1000	50	22	Bevel	365K3051	1 Each

Fixed Needle Syringes

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
5	50	26	Bevel	365C0741	1 Each
		26	Bevel	365C0746	6 Pack
10	50	26	Bevel	365D1091	1 Each
		26	Bevel	365D1096	6 Pack
25	50	25	Bevel	365F1891	1 Each
100	50	25	Bevel	365H2291	1 Each

PTFE Luer-Lok, Gas Tight Syringes

Volume (µL)	Cat. No.	Quantity	Needle Cat. No.	Quantity
25	365F7655	1 Each	365RNL22	2 Pack
50	365G7656	1 Each	365RNL22	2 Pack
100	365H7657	1 Each	365RNL22	2 Pack
250	365I7658	1 Each	365RNL22	2 Pack
500	365J7659	1 Each	365RNL22	2 Pack
1000	365KL531	1 Each	365RNL22	2 Pack
2500	365LL541	1 Each	365RNL22	2 Pack
5000	365ML551	1 Each	365RNL22	2 Pack
10000	365NL561	1 Each	365RNL22	2 Pack
25000	365PL571	1 Each	365RNL22	2 Pack

Please note that the Luer-Lok syringes do not come with a needle and therefore the needle part number needs to be ordered separately

Luer Tip, Gas Tight Syringes

Volume (µL)	Cat. No.	Quantity
25	365F7812	1 Each
50	365G7813	1 Each
100	365H7814	1 Each
250	365I7815	1 Each
500	365J7816	1 Each
1000	365K7817	1 Each
2500	365L7818	1 Each
5000	365M7819	1 Each
10000	365N7820	1 Each



Injection Port Septa

Quality materials for all applications

BTO Septa

- Low bleed septa - ideal for MS applications
- Excellent mechanical properties
- Maximum temperature 400°C

TR-Green Septa

- Long injection lifetime
- Low injection port adhesion
- Maximum temperature 350°C

Marathon Septa

- Pre-pierced for reliable performance
- Up to 400 injections per septa
- Maximum temperature 350°C

TR-Blue Septa

- General purpose septa
- Easy to penetrate
- Maximum temperature 200-250°C

Septa

Material	ID (mm)	Cat. No. (Blister Pack)	Quantity (Blister Pack)	Cat. No. (Glass Jar)	Quantity (Glass Jar)
BTO	9	31303240-BP	50 Pack	31303240	50 Pack
BTO	11	31303233-BP	50 Pack	31303233	50 Pack
BTO	11.5	31303230-BP	50 Pack	31303230	50 Pack
BTO	12.7	31303250-BP	48 Pack	31303228	50 Pack
BTO	17	31303215-BP	48 Pack	31303211	50 Pack
TR-Green	9	313G3240-BP	50 Pack	313G3240	50 Pack
TR-Green	11	313G3230-BP	50 Pack	313G3230	50 Pack
TR-Green	12.7	313G3250-BP	48 Pack	313G3228	50 Pack
TR-Green	17	313G3215-BP	48 Pack	313G3211	50 Pack
Marathon	9	313P3240-BP	50 Pack	313P3240	50 Pack
Marathon	11	313P3233-BP	50 Pack	313P3233	50 Pack
Marathon	11.5	313P3230-BP	50 Pack	313P3230	50 Pack
Marathon	17	313P3215-BP	48 Pack	313P3211	50 Pack
TR-Blue	9	N/A	N/A	313B3240	50 Pack
TR-Blue	11	N/A	N/A	313B3233	50 Pack
TR-Blue	11.5	N/A	N/A	313B3230	50 Pack
TR-Blue	17	N/A	N/A	313B3211	50 Pack



Gold and Siltek Inlet Base Seals

- Precision machined to provide exceptional sealing properties
- Gold plating and Siltek coatings provide a surface with exceptional inertness for analysis of highly active compounds
- High grade stainless steel providing reproducible seal
- Compatible with Thermo Scientific TRACE 1300 Series GC & Agilent split/splitless injection ports

Gold Inlet Base Seals

For Use With	ID (mm)	Cat. No.	Quantity
Single Column Installation	0.8	290GA081	10 Pack
Single Column Installation	0.8	290GA082	2 Pack
Single Column Installation (Cross Version)	0.8	290GA084	10 Pack
Single Column Installation (Cross Version)	0.8	290GA083	2 Pack
Dual Column Installation	1.2	290GA121	10 Pack
Dual Column Installation	1.2	290GA122	2 Pack

Siltek Inlet Base Seals

For Use With	ID (mm)	Cat. No.	Quantity
Single Column Installation	0.8	290GA091	10 Pack
Single Column Installation	0.8	290GA092	2 Pack
Single Column Installation (Cross Version)	0.8	290GA094	10 Pack
Single Column Installation (Cross Version)	0.8	290GA093	2 Pack



Injection Port Liners

LinerGOLD GC Liners

The GOLD standard in GC liner performance!

- **Increased accuracy and sensitivity in analysis** – LinerGOLD prevents the loss of sensitive compounds in analysis
- **Lower detection limits** – when analyzing active and sensitive compounds
- **Excellent reproducibility** – gives confidence in your results from liner to liner – setting the GOLD standard

The GOLD standard in liner consistency

Consistency in your GC liner is of paramount importance – you expect to see a consistently high level of performance time after time. Thermo Scientific™ LinerGOLD™ GC liners are manufactured and tested to ensure that you have confidence with every liner that it installed onto your GC system.

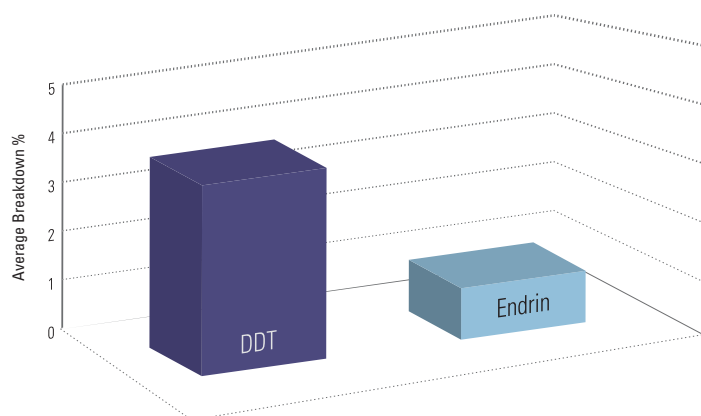


Figure 1: Endrin and DDT breakdown test results showing the lot-to-lot reproducibility and low levels of inertness of LinerGOLD

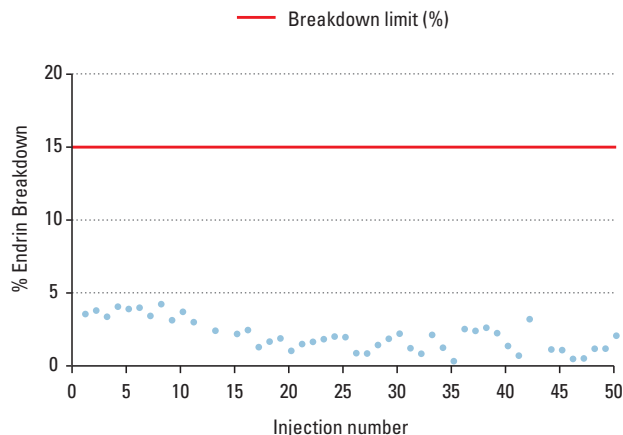
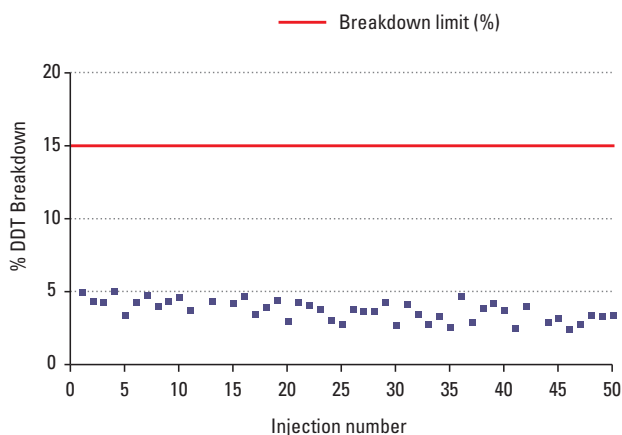











Figure 2: Compound degradation after 50 injections – LinerGOLD exhibits minimal breakdown

LinerGOLD GC Liners for Thermo Scientific TRACE 1300 Series and Agilent Instruments

Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 1 Pack	Cat. No. 5 Pack	Cat. No. 25 Pack
 Split/Splitless Liner	4 x 6.3	78.5	Quartz Wool	453A0164-UI	453A2265-UI	453A1262-UI
 Split/Splitless Straight Liner	4 x 6.3	78.5	No	453A0294-UI	453A1295-UI	453A2292-UI
 Splitless Liner with Single Taper	4 x 6.3	78.5	No	453A0344-UI	453A1345-UI	453A2342-UI
 Splitless Liner with Single Taper	4 x 6.3	78.5	Quartz Wool	453A0924-UI	453A1925-UI	453A2922-UI
 Splitless Liner with Double Taper	4 x 6.3	78.5	No	453A0354-UI	453A1355-UI	453A2352-UI
 Precision Liner	4 x 6.3	78.5	Quartz Wool	453A0254-UI	453A1255-UI	453A1252-UI
 Direct Straight Liner	1 x 6.3	78.5	No	453A0334-UI	453A1335-UI	453A2332-UI

LinerGOLD GC Liners for Thermo Scientific TRACE Ultra and FOCUS Instruments

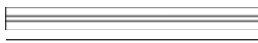



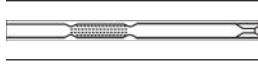
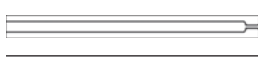



Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 1 Pack	Cat. No. 5 Pack	Cat. No. 25 Pack
 Direct Straight Liner	5 x 8	105	No	45310030-UI	45350030-UI	45354030-UI
 Split Straight Liner	3 x 8	105	No	45310031-UI	45350031-UI	45354031-UI
 Splitless Liner	3 x 8	105	No	45310032-UI	45350032-UI	45354032-UI
 Splitless Liner	5 x 8	105	No	45351033-UI	45350033-UI	45354033-UI
 Precision Liner	5 x 8	105	Quartz Wool	453T0905-UI	453T1905-UI	453T4905-UI
 Splitless Precision Liner	5 x 8	105	Quartz Wool	453T0999-UI	453T2999-UI	453T4999-UI
 Baffled PTV Liner	2 x 2.75	120	No	453T0845-UI	453T2845-UI	453T4845-UI



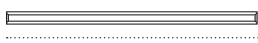
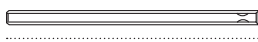


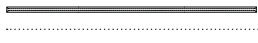
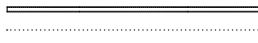
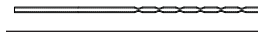

Injection Port Liners for Thermo Scientific Instruments

Highly deactivated and produced to exacting tolerances to ensure a high degree of reproducibility

Liners for Thermo Scientific TRACE 1300 Series SSL Instruments

	Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 5 Pack	Cat No. 25 Pack
	Direct Straight Liner	1.2 x 6.3	78.5	No	453A1335	453A2332
	Split Straight Liner	4 x 6.3	78.5	Quartz Wool	453A2265	453A1262
	Split Straight Liner	4 x 6.3	78.5	No	453A1295	453A2292
	Split/Splitless FocusLiner	4 x 6.3	78.5	Quartz Wool	453A1255	453A1252
	Split/Splitless FocusLiner with Single Taper	4 x 6.3	78.5	Quartz Wool	453A1315	453A1312
	Split/Splitless Liner with Single Taper	4 x 6.3	78.5	No	453A1345	453A2342
	Split/Splitless Liner with Double Taper	4 x 6.3	78.5	No	453A1355	453A2352
	Split/Splitless Liner w/ Recessed Gooseneck	4 x 6.3	78.5	Quartz Wool	453A1305	N/A
	Splitless Liner with Single Taper	4 x 6.3	78.5	Quartz Wool	453A1925	N/A
	Split/Splitless Mini-Lam Liner	4 x 6.3	78.5	No	453A2009	N/A
	Split/Splitless Mixed Liner Sample Pack	Mixed	Mixed	Mixed	453TH002	N/A












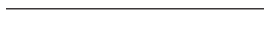
Liners for Thermo Scientific TRACE 1300 Series and TRACE ULTRA PTV Instruments

	Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 2 Pack	Cat. No. 5 Pack	Cat. No. 25 Pack
	PTV Straight Liner	1 x 2.75	120	No	N/A	45352054	N/A
	PTV Straight Liner	2 x 2.75	120	No	N/A	45352057	45354057
	PTV Straight Liner (deactivated)	2 x 2.75	120	No	45322045	N/A	N/A
	PTV Liner with Sintered Lining	1 x 2.75	120	No	N/A	45352060	N/A
	PTV Liner with Three Baffles	1 x 2.75	120	No	N/A	45352062	N/A
	PTV Siltek Metal Liner	1 x 2.75	120	No	45322046	N/A	N/A
	PTV Siltek Metal Liner	2 x 2.75	120	No	45322044	N/A	N/A
	PTV Siltek Metal Liner	2 x 2.75	120	Wool	45322056	N/A	N/A
	PTV Baffle Liner (Siltek)	2 x 2.75	120	No	N/A	453T2120	N/A
	PTV Split Liner with Recessed Gooseneck	2 x 2.75	120	Quartz Wool	N/A	45352070	N/A
	PTV Silcosteel Liner for OC	1 x 2.75	120	No	45322052	N/A	N/A
	PTV Mixed Liner Sample Pack	Mixed	Mixed	Mixed	N/A	453TH003	N/A

Liner Sealing Rings for Thermo Scientific Instruments

Description	Cat. No.	Quantity
Liner Sealing Ring for TRACE 1300 Series GC SSL Injector	29001312	1 Each
Liner Sealing Ring for TRACE 1300 Series GC PTV Injector	29001318	1 Each
Viton Liner Sealing Ring for TRACE 1300 Series GC	2900A241	10 Pack
Liner sealing Ring for TRACE and FOCUS GC SSL Injector	29033406	10 Pack
Liner sealing Ring for TRACE PTV Injector	29013417	2 Pack















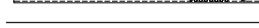



Liners for Thermo Scientific TRACE ULTRA and FOCUS SSL Instruments

	Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 5 Pack	Cat. No. 25 Pack
	Split Straight Liner	5 x 8	105	No	45350030	45354030
	Split Straight Liner	3 x 8	105	No	45350031	45354031
	Split Straight Liner	5 x 8	105	CarboFrit	453T2131	N/A
	Splitless Straight Liner	3 x 8	105	No	45350032	45354032
	Splitless Straight Liner	5 x 8	105	No	45350033	45354033
	Splitless Straight Liner	5 x 8	105	CarboFrit	453T2130	N/A
	Splitless Straight Liner (Siltek)	3 x 8	105	No	453T2121	N/A
	Split FocusLiner for 50mm Needle	5 x 8	105	Quartz Wool	453T1905	453T4905
	Splitless FocusLiner for 50mm Needle	5 x 8	105	Quartz Wool	453T2999	453T4999
	Splitless FocusLiner for 70mm Needle	5 x 8	105	Quartz Wool	453T2895	453T4895
	Baffle Liner	2 x 8	105	No	453T1001	N/A
	Split/Splitless Straight Liner	0.75 x 2.75	105	No	45352083	N/A



Injection Port Liners for Agilent Instruments

Liners for Agilent Instruments

	Injection Type	ID x OD (mm)	Length (mm)	Packing	Cat. No. 5 Pack	Cat No. 25 Pack
	Direct Straight Liner	1.2 x 6.3	78.5	No	453A1335	453A2332
	Split Straight Liner	4 x 6.3	78.5	Quartz Wool	453A2265	453A1262
	Split Straight Liner	4 x 6.3	78.5	No	453A1295	453A2292
	Split/Splitless FocusLiner	4 x 6.3	78.5	Quartz Wool	453A1255	453A1252
	Split/Splitless FocusLiner with Single Taper	4 x 6.3	78.5	Quartz Wool	453A1315	453A1312
	Split/Splitless Liner with Single Taper	4 x 6.3	78.5	No	453A1345	453A2342
	Split/Splitless Liner with Double Taper	4 x 6.3	78.5	No	453A1355	453A2352
	Split/Splitless Liner w/ Recessed Gooseneck	4 x 6.3	78.5	Quartz Wool	453A1305	N/A
	Split/Splitless FAST FocusLiner	2.3 x 6.3	78.5	Quartz Wool	453A1285	453A2282
	Split/Splitless FAST FocusLiner with Single Taper	2.3 x 6.3	78.5	Quartz Wool	453A2375	453A1372
	Splitless Liner with Single Taper	4 x 6.3	78.5	Quartz Wool	453A1925	N/A
	Splitless Straight Liner	2.0 x 6.3	78.5	No	453A2275	N/A
	Splitless Liner with Recessed Gooseneck	2.0 x 6.3	78.5	No	453A2325	N/A
	Cyclo/Single Gooseneck (Deactivated Metal)	5.2 x 6.3	78.5	No	453A2000	N/A
	Single Gooseneck (Deactivated Metal)	5.2 x 6.3	78.5	No	453A2001	N/A
	Cyclosplitter Liner (Deactivated Metal)	5.2 x 6.3	78.5	No	453A2002	N/A
	Split/Splitless Liner with Wool (Deactivated Metal)	5.2 x 6.3	78.5	No	453A2003	N/A
	Split/Splitless Mixed Liner Sample Pack	Mixed	Mixed	No	453AG001	N/A

Liner Sealing Rings for Agilent Instrument

Description	Cat. No.	Quantity
Graphite Liner Sealing Ring for Agilent Direct Straight Liners	290GA242	10 Pack
Graphite Liner Sealing Ring for Agilent SSL Liners	290GA243	10 Pack
Graphite Liner Sealing Ring for Agilent 2.0mm Liners	290GA244	10 Pack
Viton Liner Sealing Ring for Agilent SSL Injector	290OA241	10 Pack

Thermo Scientific GC consumables are suitable for use with Agilent GC systems



Ferrules

Wide range of choices for a wide range of instruments and applications

Thermo Scientific ferrules are available in three different materials and various dimensions to match the instrument and capillary column ID. The choice of material is dependent upon the use; guidelines are given in the table.

Material Type	Suitable for GC-MS	Temp Limit (°C)	Re-usable
Graphite	No	450	Yes
Graphite/Vespel	Yes	350	No
Stainless Steel (SiITite)	Yes	500	No

100% Graphite Ferrules



Thermo Scientific 100% graphite ferrules are a soft material that is porous to oxygen, making them suitable

for most applications except GC-MS interface connections. These easy-to-use ferrules form a soft grip with the column and provide a stable seal.

15% Graphite / 85% Vespel Ferrules



The mechanically robust 15% Graphite/85% Vespel ferrules have a long lifetime and are compatible with GC-MS. These

ferrules form a strong grip with the column and cannot be reused as they form a permanent seal with the column. They have a temperature limit of 350°C, but must be re-tightened after initial temperature cycles.

SiITite Metal Ferrules



The SiITite ferrule forms a strong, permanent, airtight seal around the capillary column, eliminating leaks.

The base of the ferrule is flat and forms a perfect seal with the MS interface. The ferrule's temperature tolerance is well above the limit of the injector, MS interface or GC oven. Unlike other ferrules, SiITite Ferrules do not need re-tightening after installation.

Please also see syringes on page 5-007.

All varieties of ferrules are supplied in contaminant-free, individual blister packs, allowing removal of an individual item without risk of contamination to the other supplied items.

To select the most appropriate ferrule for your GC system, refer to the table below:

	100% Graphite	15% Graphite/ 85% Vespel	SiITite
Suitable for Thermo Scientific TRACE ULTRA SSL Injector	•	•	
Suitable for Thermo Scientific TRACE 1300/1310 & Agilent SSL Injectors	•	•	•
Suitable for Thermo Scientific TRACE ULTRA non-MS detectors	•	•	
Suitable for Thermo Scientific TRACE 1300/1310 & Agilent non-MS detectors	•	•	
Suitable for all Thermo Scientific & Agilent MS Detectors		•	•
Suitable for Thermo Scientific PTV Injector	•	•	

Ferrules for Thermo Scientific Instruments

For Use with	Material Type	Ferrule Size (Column ID) (mm)	Cat. No.	Quantity
Thermo Scientific TRACE 1300/1310 SSL injectors and non-MS detectors	100 % Graphite	0.1-0.32	290GA139	10 Pack
		0.45-0.53	290GA140	10 Pack
	15% Graphite/85% Vespel	0.1-0.25	290VA191	10 Pack
		0.32	290VA192	10 Pack
		0.53	290VA193	10 Pack
Capillary Column Nut for injectors and non-MS Detectors	Stainless Steel		35050458	5 Pack
Thermo Scientific TRACE Ultra SSL injectors and non-MS detectors	100 % Graphite	0.1-0.25	29053488	10 Pack
		0.32	29053487	10 Pack
		0.53	29053486	10 Pack
	15% Graphite/85% Vespel	0.1-0.25	29033461	10 Pack
		0.32	29033460	10 Pack
		0.53	29033471	10 Pack
		Packed Column 1/8" OD	290VT168	10 Pack
	Packed Column 1/4" OD	290VT165	10 Pack	
	15% Graphite/85% Vespel (3.4mm length)	0.1-0.25	290VT186	10 Pack*
		0.32	290VT187	10 Pack*
		0.53	290VT188	10 Pack*
Capillary Column Nut for Graphite/Vespel Ferrules	Brass		290BT239	2 Pack
All Thermo Scientific PTV injectors	100 % Graphite	0.1-0.25	29053488	10 Pack
		0.32	29053487	10 Pack
		0.53	29053486	10 Pack
Thermo Scientific MS detectors	15% Graphite/85% Vespel	0.1-0.25	29033496	10 Pack
		0.32	29033497	10 Pack
Capillary Column Nut for MS Detectors	Brass		290BT240	5 Pack
	Stainless Steel		290BT241	5 Pack
SilTite Kit for Thermo Scientific TRACE 1300/1310 GC SSL injectors	SilTite Metal	0.1-0.25	290MA215	1 Each**
		0.32	290MA216	1 Each**
		0.53	290MA217	1 Each**
SilTite Kit for Thermo Scientific ISQ GC-MS interface	SilTite Metal	0.1-0.25	290MA194	1 Each**
		0.32	290MA195	1 Each**
		0.53	290MA196	1 Each**
Replacement SilTite Ferrules for Thermo Scientific TRACE 1300/1310 SSL and ISQ GC-MS interface kits	SilTite Metal	0.1-0.25	290MA201	10 Pack
		0.32	290MA202	10 Pack
		0.53	290MA203	10 Pack
SilTite Nuts for MS interface			290MA205	5 Pack
SilTite Nuts for SSL injectors			290MA207	5 Pack
SilTite Kits for Thermo Scientific DSQ GC-MS interface	SilTite Metal	0.1-0.25	290MT229	1 Each**
		0.32	290MT230	1 Each**
		0.53	290MT231	1 Each**
		Replacement SilTite Nuts	290MT211	5 Pack
Replacement SilTite Ferrules for Thermo Scientific DSQ GC-MS interface kits	SilTite Metal	0.1-0.25	290MT221	10 Pack
		0.32	290MT222	10 Pack
		0.53	290MT223	10 Pack

* Vespel Ferrules must be used in conjunction with brass nut part number 290BT239

** SilTite Kits contain 2 SilTite nuts and 10 ferrules

Ferrules for Agilent Instruments

For Use with	Material Type	Ferrule Size (Column ID) (mm)	Cat. No.	Quantity
Agilent injectors and non-MS detectors	100 % Graphite	0.1-0.32	290GA139	10 Pack
		0.45-0.53	290GA140	10 Pack
		Packed Column 1/8" OD	290GA108	10 Pack
		Packed Column 1/4" OD	290GA107	10 Pack
	15% Graphite/85% Vespel	0.1-0.25	290VA191	10 Pack
		0.32	290VA192	10 Pack
		0.53	290VA193	10 Pack
		Packed Column 1/8" OD	290VT168	10 Pack
Packed Column 1/4" OD	290VT165	10 Pack		
Capillary Column Nut for injectors and non-MS Detectors	Stainless Steel		35050458	5 Pack
Agilent MS detectors	15% Graphite/85% Vespel	0.1-0.25	29033496	10 Pack
		0.32	29033497	10 Pack
		0.53	290VP144	10 Pack
SilTite Kits for Agilent SSL injectors	SilTite Metal	0.1-0.25	290MA215	1 Each*
		0.32	290MA216	1 Each*
		0.53	290MA217	1 Each*
SilTite Nuts for MS interface			290MA205	5 Pack
SilTite Kit for Agilent MS detectors	SilTite Metal	0.1-0.25	290MA194	1 Each**
		0.32	290MA195	1 Each**
		0.53	290MA196	1 Each**
Replacement SilTite Ferrules for all SilTite Kits	SilTite Metal	0.1-0.25	290MA201	10 Pack
		0.32	290MA202	10 Pack
		0.53	290MA203	10 Pack
SilTite Nuts for SSL injectors			290MA207	5 Pack
Replacement Baseplate Seals			290MA227	2 Pack
			290MA228	10 Pack

Thermo Scientific GC consumables are suitable for use with Agilent GC systems

* Kit contains 2 nuts, 10 ferrules and 2 base seals

** Kit contains 2 nuts and 10 ferrules



Capillary Accessories

SilTite μ -Union

The tiny connection for GC Columns

The SilTite μ -Union is a connector for GC capillary columns, giving zero dead volume. The product has low thermal mass – it is only 9mm in length and has a mass <0.5g. It is available in kits to connect columns from 0.1mm ID to 0.53mm ID.

- Zero dead volume – giving optimized peak shapes
- FingerTite technology – easy to install and leak-free
- Highly inert and robust

Each SilTite μ -Union kit contains the following:

- 5 x ferrules
- 2 x union fittings
- Installation jigs
- Installation instructions



SilTite μ -Union Kits, Ferrules and Replacement Unions

Column ID (mm)	2nd Column ID (mm)	SilTite μ -Union Kit Cat. No. (1 Each)	SilTite μ -Union Ferrules Cat. No. (10 Pack)	SilTite μ -Union Replacement Union Cat. No. (1 Each)
0.1 – 0.25	0.1-0.25	290SM301	290SM401	290SM321
	0.32	290SM302	290SM402	290SM321
	0.53	290SM303	290SM403	290SM322
0.32	0.32	290SM304	290SM404	290SM321
	0.53	290SM305	290SM405	290SM322
0.53	0.53	290SM306	290SM406	290SM323

SilTite Capillary Column Connectors

For use with capillary GC columns

- For fused silica capillary columns
- Glass lined for inertness
- Low thermal mass
- Each pack contains 1 Connector, 2 Nuts and 5 Ferrules

SilTite Capillary Column Connectors and Ferrules

Column ID (mm)	2nd Column ID (mm)	SilTite Column Connector Kit Cat. No. (1 Each)	SilTite Ferrules Cat. No. (10 Pack)	Replacement SilTite Connector Nuts* Cat. No. (5 Pack)
0.1-0.25	0.1-0.25	290MU498	290MF229	290MN211
0.32	0.32-0.53	290MU499	290MF230	290MN211
0.53	0.45-0.53	290MU500	290MF231	290MN211

* SilTite nuts must be used with SilTite ferrules

GC Capillary Connectors

Description	Cat. No.	Quantity
Universal Capillary Connector	64000-001	1 Each
Y Capillary Connector	64000-002	1 Each

Finger Tite Connectors

Easier fit, reliability and leak-free connections

- No need to re-tighten ferrules as they expand and contract with the fitting
- Easy to handle with the nut touchable even with a hot injector/detector
- No tools required



Finger Tite Connectors for TRACE 1300 Series GC and Agilent GCs

Description	Cat. No.	Quantity
Male Nut	290SA130	5 Pack
Split/Splitless and MS Starter Kit	290SA131	1 Each
Split/Splitless and FID Starter Kit	290SA132	1 Each
Split/Splitless Injector Base Seal	290SA133	2 Pack
Ferrules for 0.1-0.25mm ID Columns	290S1132	10 Pack
Ferrules for 0.32mm ID Columns	290S1131	10 Pack

Finger Tite Connectors for TRACE GC Ultra and FOCUS GCs

Description	Cat. No.	Quantity
Female Nut	290ST130	5 Pack
Split/Splitless and MS Starter Kit	290ST131	1 Each
Split/Splitless and FID Starter Kit	290ST132	1 Each
Split/Splitless and MS Starter Kit for ISQ	290ST136	1 Each
Ferrules for 0.1-0.25mm ID Columns	290S1132	10 Pack
Ferrules for 0.32mm ID Columns	290S1131	10 Pack

Retention Gap Kits

Support Thermo Scientific gas chromatography consumables

- Kit contains one union and five ferrules
- Length of deactivated fused silica tubing



Retention Gap Kits

Description	Cat. No.	Quantity	Replacement Union Cat. No.	Quantity
Retention Gap Kit, 0.22 – 0.32mm ID, 2m	260RG497	1 Each	290GU498	1 Each
Retention Gap Kit, 0.53mm ID, 2m	260RG499	1 Each	290GU499	1 Each
Retention Gap Kit, 0.53mm ID, 5m	260RG500	1 Each	290GU499	1 Each

Deactivated Silica Tubing

Description	Cat. No.	Quantity
Deactivated silica tubing, 0.32mm ID; 2m Length	260G498P	1 Each
Deactivated silica tubing, 0.53mm ID; 2m Length	260G499P	1 Each
Deactivated silica tubing, 0.25mm ID; 5m Length	260G495P	1 Each
Deactivated silica tubing, 0.32mm ID; 5m Length	260G496P	1 Each
Deactivated silica tubing, 0.53mm ID; 5m Length	260G500P	1 Each
Deactivated silica tubing, 0.53mm ID; 1m Length (Siltek)	260G401P	1 Each

Capillary GuardGOLD and HydroGOLD Columns

Providing protection to the analytical column

- Protects against column contamination caused by non-volatile materials, extending the column lifetime
- Focuses target analytes at the head of the analytical column, leading to better chromatographic peak shape
- Highly deactivated to provide superior inertness, essential for analysis of active compounds
- HydroGOLD extends column lifetime by preventing degradation from harsh “steam-cleaning” water injections

Capillary GuardGOLD and HydroGOLD Columns

ID (mm)	Length (m)	GuardGOLD Cat. No.	Quantity	HydroGOLD Cat. No.	Quantity
0.18	2	26050-0218	1 Each	26H50-0218	1 Each
0.25	2	26050-0225	1 Each	26H50-0225	1 Each
0.32	2	26050-0232	1 Each	26H50-0232	1 Each
0.53	2	26050-0253	1 Each	26H50-0253	1 Each
0.18	5	26050-0518	1 Each	26H50-0518	1 Each
0.25	5	26050-0525	1 Each	26H50-0525	1 Each
0.32	5	26050-0532	1 Each	26H50-0532	1 Each
0.53	5	26050-0553	1 Each	26H50-0553	1 Each
0.18	10	26050-1018	1 Each	26H50-1018	1 Each
0.25	10	26050-1025	1 Each	26H50-1025	1 Each
0.32	10	26050-1032	1 Each	26H50-1032	1 Each
0.53	10	26050-1053	1 Each	26H50-1053	1 Each

Capillary Column End Caps

Feature a universal fit to all GC capillary columns

- Eliminate column contamination caused by leaving a column unsealed or sealed with a septum
- Color-coordinated fittings ensure that the column is reinstalled the same way it came out
- Reusable



Capillary Column End Caps

Description	Cat No.	Quantity
Capillary Column End Caps, Paired	260EC111	10 Pack

SWAP-IT GC-MS Interface System

Easy to install for quick column changeovers

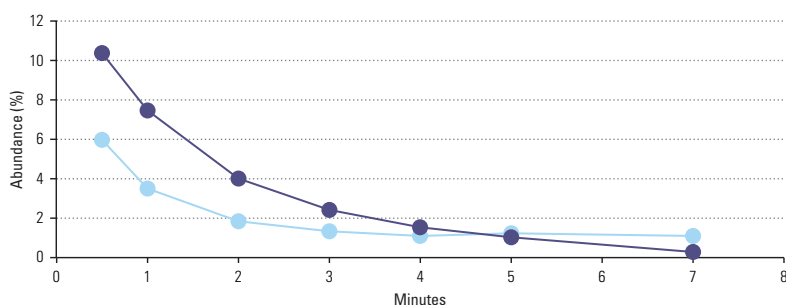
The SWAP-IT GC-MS Interface provides a powerful tool for switching capillary columns without the need to vent the MS

- Specially deactivated, robust stainless steel transfer capillary provides an interface between the analytical column and the MS detector
- Small ID of transfer capillary ensures exposure to air and water is reduced to a minimum during disconnection of the analytical column
- The system works without the requirement for additional He-purge
- Finger-tight connections make exchanging the analytical column quick and easy without the need for tools



SWAP-IT GC-MS Interface System

Description	Cat. No.	Quantity
For Thermo Scientific Instruments (ISQ GC-MS, TSQ 8000 GC-MS/MS)		
SWAP-IT GC-MS Interface Kit: SWAP-IT GC-MS Interface, Nuts, Ferrules, Accessories	60180-791	1 Each
For Thermo Scientific Instruments (DSQ GC-MS, DSQ II GC-MS, Polaris Q GC-MS, ITQ GC-MS only)		
SWAP-IT GC-MS Interface Kit: SWAP-IT GC-MS Interface, Nuts, Ferrules, Accessories	60180-790	1 Each
SWAP-IT GC-MS Interface, SWAP-IT only	60180-792	1 Each
Transfer Line Nut	290SG001	1 Each
Graphite/Vespel Ferrule for Transfer Line	290SG020	10 Pack
For Agilent Instruments		
SWAP-IT GC-MS Interface Kit: SWAP-IT GC-MS Interface, Nuts, Ferrules, Accessories	60180-794	1 Each
SWAP-IT GC-MS Interface, SWAP-IT Only	60180-796	1 Each
Transfer Line Nut	290SG004	1 Each
Graphite/Vespel Ferrule for Transfer Line	290SG021	10 Pack
SWAP-Tight Nut and Adaptor for S/SL Injector	290SG003	1 Each
Accessories		
SWAP-Tight Nut	290SG002	1 Each
SWAP-Tight Ferrules, Blank	290SG000	10 Pack
SWAP-Tight Ferrules, 0.1 – 0.25mm	290SG025	10 Pack
SWAP-Tight Ferrules, 0.32mm	290SG032	10 Pack



● Mass 28, nitrogen
● Mass 18, water

Removal of water and nitrogen to levels less than 2% is obtained within 3-4 minutes after column replacement

3-Port SilFlow Device

Switch your GC column without the need to vent

- Allows column switching in GC-MS without the need to vent
- Utilizes a make up gas module and a microfluidic device
- SilTite FingerTite fittings for easy set up and a reliable seal



3-Port SilFlow Device

Description	Cat. No.	Quantity
3 Port SilFlow MCD (0.25/0.32)	60201-398	1 Each

3-Port SilFlow Replacement Parts

Description	Cat. No.	Quantity
SilFlow Fingertight Ferrules for 0.25mm ID Columns	29063466	10 Pack
SilFlow Fingertight Ferrules for 0.32mm ID Columns	29063467	10 Pack
SilFlow Fingertight Tool	60201-401	1 Each
SilFlow Nuts	290SF302	10 Pack
Blanking Ferrule	290ST414	5 Pack
170µm Deactivated Tubing 0.363mm OD 60cm Length	60201-390	1 Each
75µm Untreated Fused Silica Tubing 0.363mm OD 30cm Length	60201-391	1 Each
170µm Deactivated Tubing 0.363mm OD 120cm Length	60201-394	1 Each
75µm Untreated Fused Silica Tubing 0.363mm OD 80cm Length	60201-395	1 Each

GC Tubing

GC tubing for plumbing GC systems

GC Tubing

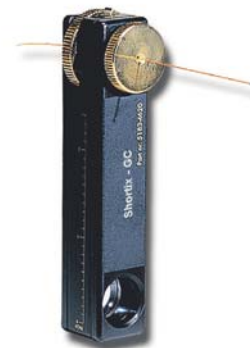
Material	OD (in)	ID (in)	Length (ft)	Cat. No.	Quantity
Copper	1/8	0.065	50	60181-632	1 Each
	1/4	0.19	50	60181-633	1 Each
Stainless Steel	1/16	0.01	25	60181-634	1 Each
		0.02	25	60181-635	1 Each
		0.03	25	60181-636	1 Each
		0.04	25	60181-637	1 Each
	1/8	0.085	25	60181-638	1 Each
	1/4	0.21	25	60181-639	1 Each

GC Tools

Support GC applications

GC Tools

Description	Cat. No.	Quantity
Straight-Tipped Forceps	60180-770	1 Each
Angle-Tipped Forceps	60180-771	1 Each
Pin Vice	60180-772	1 Each
Pick-Up Tool	60180-777	1 Each
0.35mm Drill Bit	60180-779	1 Each
0.45mm Drill Bit	60180-780	1 Each
0.70mm Drill Bit	60180-781	1 Each
Adjustable Spanner	60180-782	1 Each
Tri-Scale Ruler	60180-783	1 Each
Shortix Capillary Column Cutter	60180-835	1 Each
Shortix Capillary Column Cutter Repair Kit	60180-836	1 Each
Ceramic Column Cutter	60201-318	1 Each



GC Tool Kits

Includes: Wrench sets, flashlight, brushes, mini-drill set and other tools for maintaining your GC system performance

GC Tool Kits

Description	Cat. No.	Quantity
Capillary Tool Kit for Thermo Scientific GCs	60180-784	1 Each
Capillary Tool Kit for Agilent GCs	60180-786	1 Each

GC Installation Kit

Includes:

- Tubing cutter
- 1/8 x 1/4in. reamer
- 7/16in. wrench
- 1/2in. wrench
- 1/8in. brass tees, 4
- 1/8in. brass nuts, 10
- Brass front and back ferrules, 10
- 15.2m instrument-grade, cleaned 1/8in. copper tubing



GC Installation Kit

Description	Cat. No.	Quantity
GC Installation Kit	60180-888	1 Each

GLD Pro Gas Leak Detector

Aids in quickly locating and identifying gas leaks

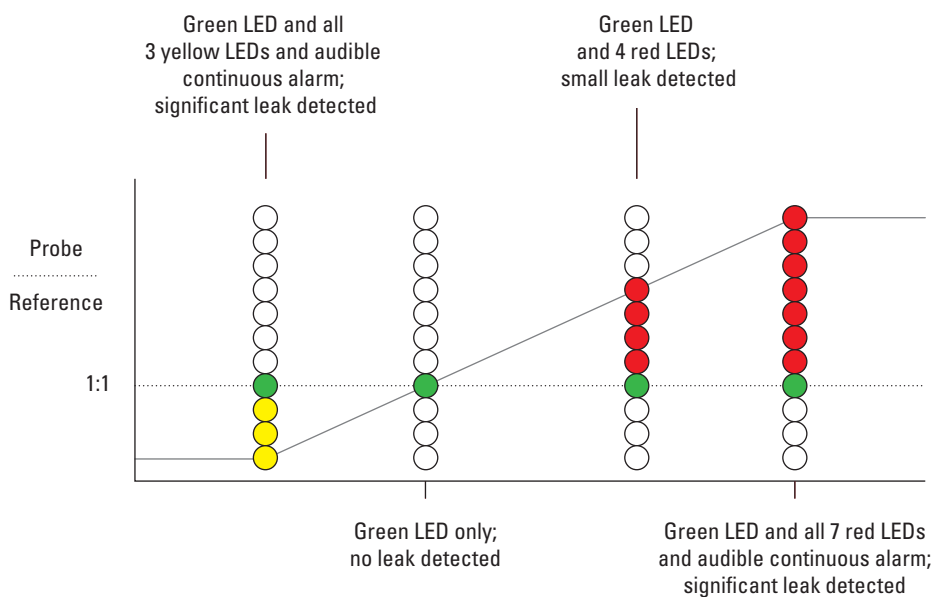
The Thermo Scientific™ GLD Pro™ Gas Leak Detector is specifically designed for use with gas chromatography instruments. Detection of leaks allows the user to reduce detector noise, provide a stable baseline, reduce carrier gas by minimizing waste, and maximize the lifetime of the analytical column by minimizing the presence of oxygen and other impurities in the carrier gas.

- Suitable for detection of a wide range of laboratory gases
- Push button on/off switch
- Push button zero function
- Automatic shutoff (5 minutes)
- LED light indicator for intensity of leak
- Rechargeable battery (up to 6 hrs. operation)
- Durable storage case
- Probe holder
- One year warranty



GLD Pro Gas Leak Detector

Description	Cat. No.	Quantity
GLD Pro Leak Detector	66002-001	1 Each
Small Probe Adaptor	66002-003	1 Each
Soft-Sided Carry Case (Leak Detector not included)	66002-002	1 Each



GFM Pro Electronic Flowmeter

Measure and monitor flow quickly and efficiently

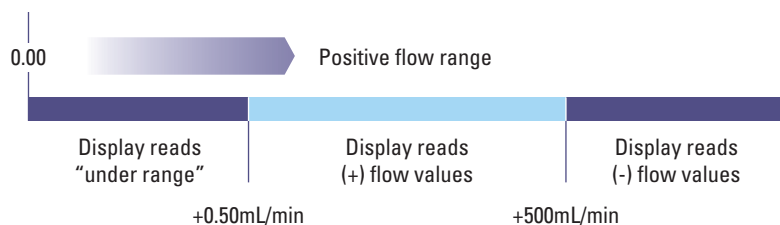
The Thermo Scientific™ GFM Pro™ Flowmeter is specifically designed for use with gas chromatography instruments. This versatile product is an electronic device capable of measuring volumetric flow for all types of gases. Real-time measurements can be made for various types of flow paths including continually changing gas types. The unit is portable so it can be hand-held or it also has an optional stand for bench-top convenience.

- Compact ergonomic design features side grips for added durability
- Easy-to-use interface features over-range warning indicator and auto-shutoff
- Measurement range of 0.5-500mL/min
- Accuracy of +/- 2% of flow or +/- 0.2mL/min, whichever is greater
- Data output via USB port
- Calibration: traceable to NIST primary standards
- Explosion-proof rating for flammable and explosive gases
- CE certified
- Uses 2-AA batteries
- Re-calibration service available



GFM Pro Electronic Flowmeter

Description	Cat. No.	Quantity
GFM Pro Flowmeter	66002-010	1 Each
Soft-Sided Carry Case (Flowmeter not included)	66002-002	1 Each
GFM Pro Flowmeter Re-Calibration	66002-GFMCAL	1 Each





GC Columns

A comprehensive column range providing excellent quality and performance, with guaranteed reproducibility

Get reliable, reproducible results for GC and GC-MS with our comprehensive portfolio of GC columns that meet all of your analytical needs.

- **TraceGOLD**
Offering a leap forward in column performance delivering low bleed and superior inertness
- **TRACE**
For excellent quality and reproducibility for a wide range of applications
- **UltraFast**
Short, narrow-bore columns for use with the Thermo Scientific UltraFast instrument
- **TracePLOT**
Providing reproducible analyses of permanent gases, hydrocarbons and solvents



The GC columns web page contains the latest news, applications and downloads for the range.

Visit www.thermoscientific.com/columnsforgc

GC Columns

Technical Resources



visit www.thermoscientific.com/chromexpert to access the following information:

- GC Column Selection
- GC Column Selection by Manufacturer
- GC Column Selection by US Pharmacopeia Specifications
- GC Column Selection by ASTM Method
- GC Column Selection by US EPA Drinking Water Test Method
- GC Column Selection by US EPA Waste Water Test Method
- GC Column Selection by US EPA Solid Water Test Method
- GC Column Selection by NIOSH Method
- GC Method Selection and Optimization
- GC Troubleshooting
- GC Equations
- Carrier Gas Choice
- Selection of Injection Method
- Column Conditioning



TraceGOLD GC Columns

TraceGOLD GC columns offer you a leap forward in column performance delivering low bleed and superior inertness ideally suited to MS applications.

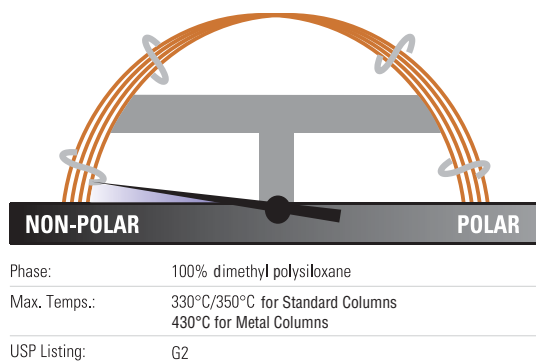
TG-1MS	5-037	TG-225MS	5-051
TG-5MS	5-038	TG-200MS	5-052
TG-5SiIMS	5-038	TG-WaxMS.....	5-053
TG-5MS AMINE	5-040	TG-WaxMS A.....	5-054
TG-5HT	5-041	TG-WaxMS B.....	5-055
TG-SQC.....	5-045	TG-POLAR.....	5-056
TG-35MS	5-043	TG-XLBMS	5-057
TG-35MS AMINE	5-044	TG-VRX.....	5-058
TG-1301MS	5-045	TG-VMS	5-059
TG-624	5-046	TG-OCP I / TG OCP II	5-060
TG-624SiIMS	5-047	TG-OPP I / TG-OPP II.....	5-061
TG-1701MS	5-048	TG-ALC Plus I / TG-ALC Plus II.....	5-062
TG-17MS	5-049	TG-Dioxin	5-063
TG-17SiIMS	5-050		



TraceGOLD TG-1MS GC Columns

Exceptionally low bleed for optimal signal-to-noise ratio, sensitivity and MS integrity

- Non-polar
- Equivalent to USP G2



TraceGOLD TG-1MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.1	26099-0200	1 Each
0.20	12	0.33	26099-5820	1 Each
0.15	10	0.15	26099-2750	1 Each
	20	0.15	26099-2760	1 Each
	40	0.15	26099-2940	1 Each
0.18	20	0.18	26099-5780	1 Each
0.25	15	0.25	26099-1300	1 Each
		0.5	26099-2110	1 Each
		1.0	26099-2840	1 Each
	30	0.25	26099-1420	1 Each
		0.5	26099-2230	1 Each
		1.0	26099-2960	1 Each
	30 with 5m SafeGuard	0.25	26099-1425	1 Each
	60	0.25	26099-1540	1 Each
		0.5	26099-2350	1 Each
		1.0	26099-3080	1 Each
0.32	15	0.25	26099-1310	1 Each
		1.0	26099-2850	1 Each
		3.0	26099-4840	1 Each
	30	0.25	26099-1430	1 Each
		0.5	26099-2240	1 Each
		1.0	26099-2970	1 Each
		3.0	26099-4840	1 Each
		0.25	26099-1550	1 Each
		0.5	26099-2360	1 Each
	60	1.0	26099-3090	1 Each
		0.5	26099-2130	1 Each
		1.0	26099-2860	1 Each
0.53	15	1.5	26099-3340	1 Each
		0.5	26099-2250	1 Each
		1.0	26099-2980	1 Each
	30	1.5	26099-3360	1 Each
		1.0	26099-2985	1 Each
		1.0	26099-2985	1 Each
	30 with 5m SafeGuard	1.0	26099-2985	1 Each

TraceGOLD TG-1MT Metal GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26M99-1300	1 Each
	30	0.25	26M99-1420	1 Each
0.53	5	0.1	26M99-4130	1 Each
		0.88	26M99-4120	1 Each
	6	0.15	26M99-4100	1 Each

Applications:

- Hydrocarbons
- Solvent impurities
- PCB congeners
- Aroclor mixes
- Simulated distillation
- Drugs of abuse
- Natural gas odorants
- Essential oils
- Pesticides

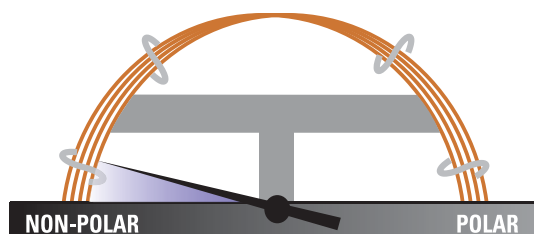
Similar to:

- Rxi-1ms
- DB-1
- DB-1ms
- HP-1
- HP-1ms
- Ultra-1
- SPB-1
- Equity-1
- VF-1ms
- CP-Sil 5 CB Low Bleed/MS

TraceGOLD TG-5MS GC Columns

The most widely used MS phase in gas chromatography

- Low polarity phase
- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Exceptional inertness ideal for analysis of active compounds
- Equivalent to USP G27 phase



Phase:	5% diphenyl / 95% dimethyl polysiloxane
Max. Temps.:	330°C/350°C for Standard Columns 430°C for Metal Columns
USP Listing:	G27, G36

TraceGOLD TG-5MS GC Columns

ID (mm)	Length (m)	Film Thickness (μm)	Cat. No.	Quantity	
0.10	10	0.1	26098-0200	1 Each	
0.15	10	0.15	26098-2750	1 Each	
	20	0.15	26098-2760	1 Each	
	40	0.15	26098-2940	1 Each	
0.18	20	0.18	26098-5780	1 Each	
	20 with 5m SafeGuard	0.18	26098-5785	1 Each	
0.25	10	0.25	26098-1180	1 Each	
	15	0.25	26098-1300	1 Each	
		1.0	26098-2840	1 Each	
	15 with 5m SafeGuard	0.25	26098-1305	1 Each	
	30	0.25	26098-1420	1 Each	
		0.5	26098-2230	1 Each	
		1.0	26098-2960	1 Each	
	30 with 5m SafeGuard	0.1	26098-0475	1 Each	
		0.25	26098-1425	1 Each	
	60	0.25	26098-1540	1 Each	
		0.5	26098-2350	1 Each	
	1.0	26098-3080	1 Each		
0.32	15	1.0	26098-2850	1 Each	
	30	0.25	26098-1430	1 Each	
		0.5	26098-2240	1 Each	
		1.0	26098-2970	1 Each	
	30 with 5m SafeGuard	0.25	26098-1435	1 Each	
	60	0.25	26098-1550	1 Each	
		0.5	26098-2360	1 Each	
	1.0	26098-3090	1 Each		
0.53	15	0.25	26098-1320	1 Each	
		0.5	26098-2130	1 Each	
		1.0	26098-2860	1 Each	
		1.5	26098-3340	1 Each	
	30	0.25	26098-1440	1 Each	
		0.5	26098-2250	1 Each	
		1.0	26098-2980	1 Each	
		1.5	26098-3360	1 Each	
		60	5.0	26098-4100	1 Each

TraceGOLD TG-5MT Metal GC Columns

ID (mm)	Length (m)	Film Thickness (μm)	Cat. No.	Quantity
0.25	15	0.1	26M98-0350	1 Each
		0.25	26M98-1300	1 Each
	30	0.25	26M98-1420	1 Each
	60	0.25	26M98-1540	1 Each

Applications:

- Semi-volatiles
- Phenols
- Amines
- Residual solvents and solvent impurities
- Drugs of abuse
- Pesticides
- PCB congeners
- Aroclor mixes

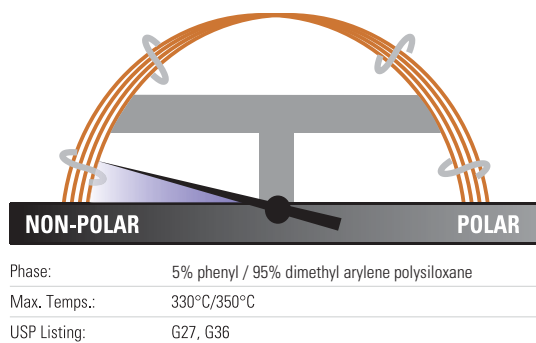
Similar to:

- Rxi-5ms
- DB-5
- HP-5
- HP-5ms
- Ultra-2
- SPB-5
- Equity-5
- CP-Sil 8

TraceGOLD TG-5SiIMS GC Columns

Incorporate phenyl groups in the polymer backbone for improved thermal stability, reduced bleed and reduced susceptibility to oxidation

- Low polarity, silarylene phase
- Designed for low bleed and outstanding inertness



TraceGOLD TG-5SiIMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.15	10	0.15	26096-2750	1 Each
	20	0.15	26096-2760	1 Each
	40	0.15	26096-2940	1 Each
0.18	20	0.18	26096-5780	1 Each
0.25	15	0.25	26096-1300	1 Each
		0.5	26096-2110	1 Each
	15 with 10m SafeGuard	0.25	26096-1301	1 Each
	30	0.25	26096-1420	1 Each
		0.5	26096-2230	1 Each
		1.0	26096-2960	1 Each
	30 with 5m SafeGuard	0.25	26096-1425	1 Each
		0.5	26096-2235	1 Each
	30 with 10m SafeGuard	0.25	26096-1421	1 Each
	60	0.25	26096-1540	1 Each
			26096-3080	1 Each
1.0		26096-3080	1 Each	
0.32	15	0.25	26096-1310	1 Each
		0.25	26096-1430	1 Each
	30	0.5	26096-2240	1 Each
		1.0	26096-2970	1 Each
0.53	30	1.5	26096-3360	1 Each

Applications:

- GC-MS applications using ion-trap systems
- Polycyclic aromatics
- Hydrocarbons including chlorinated hydrocarbons
- Phthalates
- Phenols
- Amines
- Organophosphate

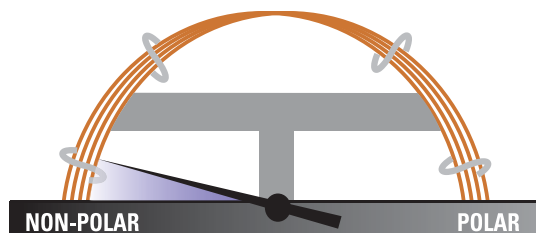
Similar to:

- DB-5ms Ultra Inert
- VF-5ms
- CP-Sil 8 Low-Bleed/MS
- Rxi-5SiIMS
- BPX5
- ZB-5ms
- Optima-5MS
- SLB-5

TraceGOLD TG-5MS AMINE GC Columns

Analysis of ppm levels of amines without column priming

- Low polarity phase, base optimized
- Tubing surface is chemically altered to reduce tailing of active basic compounds
- Also allows analysis of neutral or weakly acidic compounds (e.g. phenols) and compounds susceptible to hydrogen bonding
- Low bleed at maximum operating temperature



Phase:	Modified 5% diphenyl / 95% dimethyl polysiloxane for basic compounds
Max. Temps.:	300°C / 315°C
USP Listing:	N/A

TraceGOLD TG-5MS AMINE GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26097-1300	1 Each
		1.0	26097-2840	1 Each
	30	0.25	26097-1420	1 Each
		0.5	26097-2230	1 Each
0.32	30	1.0	26097-2960	1 Each
		1.0	26097-2970	1 Each
0.53	15	1.0	26097-2860	1 Each
	30	1.0	26097-2980	1 Each
		3.0	26097-3960	1 Each

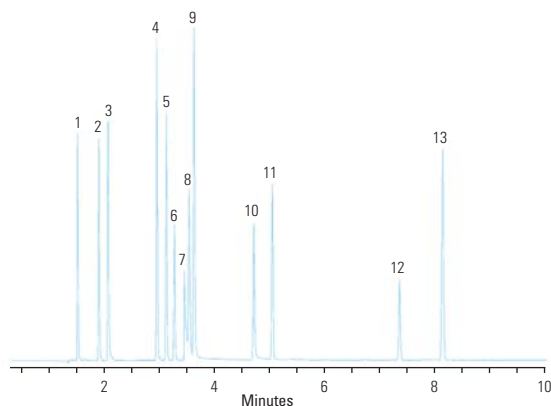
Applications:

- Amines and other basic compounds, including alkylamines, diamines, triamines, ethanolamines
- Nitrogen-containing heterocyclics

Similar to:

- Rtx-5 Amine

Amines and phenols



TG-5MS Amine 30m x 0.32mm x 1.0µm

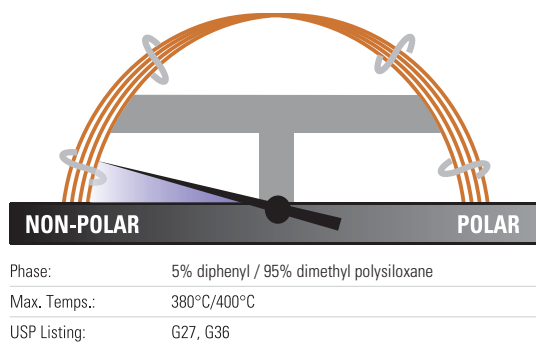
Temperature:	120°C to 220°C at 10°C/minute
Detector Type:	FID
Carrier Gas:	Hydrogen
Flow Rate:	40cm/min
Injection Volume:	1.0µL
Injection Mode:	Split 25:1, 300°C

- | | |
|-----------------------|---------------------------|
| 1. diethylamine | 8. octylamine |
| 2. pyridine | 9. 1-methyl-2-pyrrolidone |
| 3. morpholine | 10. 2-nitrophenol |
| 4. phenol | 11. 2,6-dimethylaniline |
| 5. aniline | 12. nicotine |
| 6. 2-chlorophenol | 13. 2-nitroaniline |
| 7. diethylenetriamine | |

TraceGOLD TG-5HT GC Columns

Offers extended operation up to 400°C, ideal for high temperature extended GC applications

- Low polarity
- Lower bleed and better inertness than comparable high-temperature columns
- Special design of fused silica tubing extends column lifetime by up to 40%



TraceGOLD TG-5HT GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.1	26095-0350	1 Each
		0.25	26095-1300	1 Each
	30	0.1	26095-0470	1 Each
		0.25	26095-1420	1 Each
0.32	15	0.1	26095-0360	1 Each
	30	0.1	26095-0480	1 Each
		0.25	26095-1430	1 Each
0.53	10	0.15	26095-1640	1 Each
	30	0.15	26095-0620	1 Each

Applications:

- Phenols
- Residual solvents
- Solvents
- Semivolatiles
- Pesticides
- PCBs
- Solvent impurities

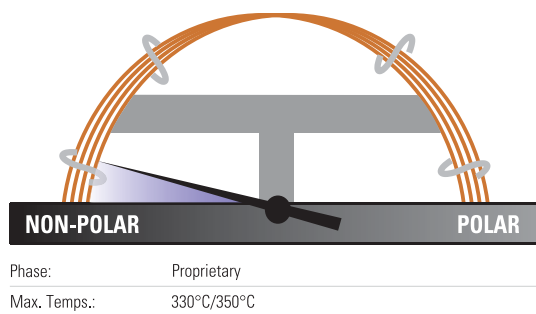
Similar to:

- Rxi-5HT
- BP-5HT
- VF-5HT
- ZB-5HT

TraceGOLD TG-SQC GC Columns

Ensure the quality of a Thermo Scientific instrument when installed on site

- Optimized for system qualification tests for new GC-MS installations or during service/maintenance of an existing instrument
- We recommend reserving this column for benchmark testing only



TraceGOLD TG-SQC GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26070-1300	1 Each
	30	0.25	26070-1420	1 Each

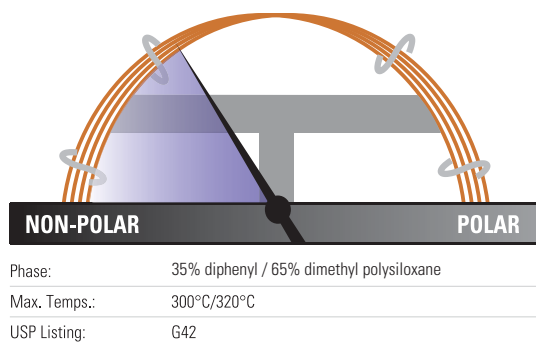
Applications:

- System Qualification Tests (Thermo Scientific GC-MS)

TraceGOLD TG-35MS GC Columns

Higher phenyl content for useful elution order and retention time changes

- Mid-polarity phase
- Equivalent to USP G42 phase



TraceGOLD TG-35MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26094-1300	1 Each
		0.25	26094-1420	1 Each
		0.5	26094-2230	1 Each
0.32	15	0.25	26094-1310	1 Each
		0.5	26094-2120	1 Each
		0.25	26094-1430	1 Each
	30	0.5	26094-2240	1 Each
		0.5	26094-2130	1 Each
		1.0	26094-2860	1 Each
0.53	15	1.5	26094-3340	1 Each
		0.5	26094-2250	1 Each
		1.0	26094-2980	1 Each
	30	1.5	26094-3360	1 Each
		0.5		
		1.0		

Applications:

- Organochlorine pesticides and herbicides
- Pharmaceuticals
- PCB congeners
- Aroclor mixes
- Sterols
- Rosin acids
- Phthalate esters

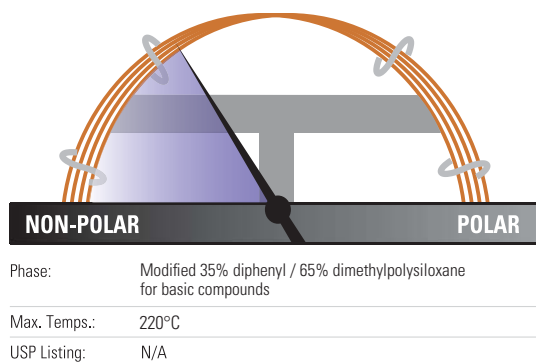
Similar to:

- Rtx-35
- BP-35
- HP-35
- SPB-35
- SPB-608

TraceGOLD TG-35MS AMINE GC Columns

Chemically altered tubing surface reduces tailing and eliminates the need for column priming

- Mid-polarity phase, base optimized
- Developed for analysis of active basic compounds without derivatization
- Also allows analysis of neutral compounds and adsorptive compounds with oxygen groups susceptible to hydrogen bonding
- Low bleed at maximum operating temperature



TraceGOLD TG-35MS AMINE GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	1.0	26092-2840	1 Each
	30	0.5	26092-2230	1 Each
		1.0	26092-2960	1 Each
0.32	15	1.0	26092-2850	1 Each
	30	1.0	26092-2970	1 Each
		1.5	26092-3350	1 Each
0.53	15	1.0	26092-2860	1 Each
	30	1.0	26092-2980	1 Each
		3.0	26092-3960	1 Each

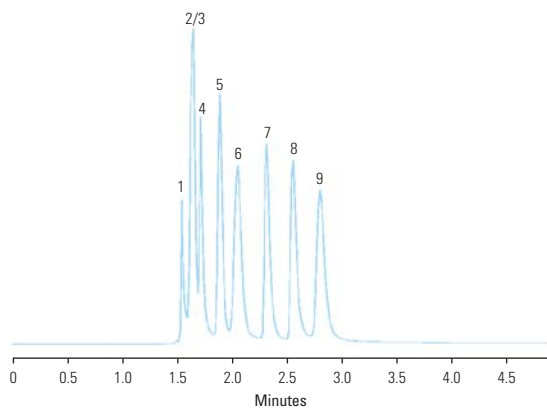
Applications:

- Amines including alkylamines, diamines, triamines and ethanolamines
- Nitrogen-containing heterocyclics

Similar to:

- Rtx-35 Amine

Primary amines



TG-35MS AMINE 30m x 0.53mm x 1.0µm

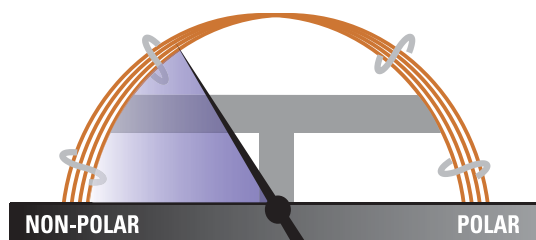
Temperature:	35°C (5 minute hold) Isothermal
Detector Type:	FID
Carrier Gas:	He
Flow Rate:	35cm/sec
Injection Volume:	1.0µL
Injection Mode:	Split (10:1), 250°C

1. methylamine	6. tert-butylamine
2. dimethylamine	7. n-propylamine
3. trimethylamine	8. diethylamine
4. ethylamine	9. sec-butylamine
5. isopropylamine	

TraceGOLD TG-1301MS GC Columns

Low bleed, excellent reproducibility and column-to-column consistency even with sensitive detectors like ECD and MS

- Mid-polarity phase
- Long lifetime
- Excellent inertness
- Equivalent to USP G43 phase



The diagram shows a cross-section of a GC column with a gradient from non-polar to polar phase. The left side is labeled 'NON-POLAR' and the right side is labeled 'POLAR'. The phase is 6% cyanopropyl phenyl / 94% dimethyl polysiloxane. The maximum temperature is 260°C/280°C. The USP Listing is G43.

Phase:	6% cyanopropyl phenyl / 94% dimethyl polysiloxane
Max. Temps.:	260°C/280°C
USP Listing:	G43

TraceGOLD TG-1301MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26091-1300	1 Each
		0.5	26091-2110	1 Each
	30	0.25	26091-1420	1 Each
		0.5	26091-2230	1 Each
		1.0	26091-2960	1 Each
	60	0.25	26091-1540	1 Each
1.0		26091-3080	1 Each	
0.32	15	0.25	26091-1310	1 Each
		0.25	26091-1430	1 Each
	30	0.5	26091-2240	1 Each
		1.0	26091-2970	1 Each
		1.5	26091-3350	1 Each
		1.8	26091-3390	1 Each
		0.5	26091-2360	1 Each
	60	1.0	26091-3090	1 Each
		1.8	26091-3410	1 Each
0.53	30	0.25	26091-1440	1 Each
		1.0	26091-2980	1 Each
		1.5	26091-3360	1 Each
	60	3.0	26091-3960	1 Each
		0.25	26091-1560	1 Each
		0.5	26091-2370	1 Each
		3.0	26091-4080	1 Each

Applications:

- Alcohols
- Volatile organics
- Oxygenates
- Residual solvents

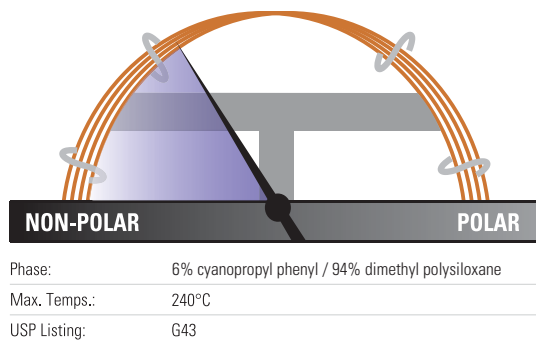
Similar to:

- Rtx-1301
- DB-1301
- BP-624
- HP-1301
- HP-624
- SPB-1301
- SPB-624
- VP-1301
- BF-624ms
- CP-1301
- CP-Select 624 CB

TraceGOLD TG-624 GC Columns

Offers 90+% resolution of the first six gases in EPA Method 8260 and EPA Method 524.2 for volatile organics analysis

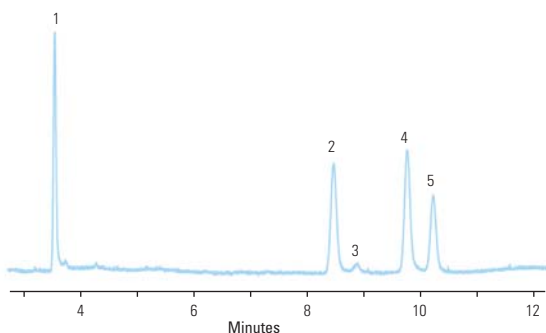
- Mid-polarity phase
- Ideal for EPA methods 624 and 608
- Allows resolution of 2-nitropropane from 1,1-dichloropropanone under EPA Method 524.2 revision IV



TraceGOLD TG-624 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	1.0	26085-4950	1 Each
	40	1.0	26085-4960	1 Each
0.25	30	1.4	26085-3320	1 Each
	60	1.4	26085-3330	1 Each
0.32	30	1.8	26085-3390	1 Each
	60	1.8	26085-3410	1 Each
0.53	30	3.0	26085-3960	1 Each
	60	3.0	26085-4080	1 Each
	75	3.0	26085-4900	1 Each
	105	3.0	26085-4090	1 Each

Residual solvents class 1



TG-624 30m x 0.32mm x 1.80µm

Temperature: 40°C (20 minute hold) to 240°C at 10°C/min (20 minute hold)

Detector Type: FID

Carrier Gas: He

Flow Rate: 2.15mL/min

Injection Volume: 1mL

Injection Mode: Headspace, Split (1:5), 140°C

1. 1,1-dichloroethane
2. 1,1,1-trichloroethane
3. carbon tetrachloride
4. benzene
5. 1,2-dichloroethane

Applications:

- Residual Solvents
- Volatile Organic Compounds
- Alcohols
- Oxygenates

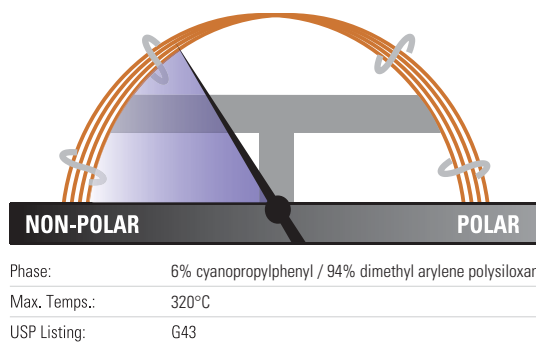
Similar to:

- DB-1301
- DB-624
- HP-1301
- HP-624
- SPB-1301
- SPB-624
- VF-1301
- VF-624ms
- CP-1301
- CP-Select 624 CB
- Rtx-624
- BP-624
- ZB-624
- Optima-1301
- Optima-624
- AT-624
- 007-1301

TraceGOLD TG-624SiIMS GC Columns

High thermal stability column ideal for volatile organics analysis

- Mid-polarity phase
- High thermal stability – maximum temperatures up to 320°C
- Highly inert – excellent peak shape for a wide range of compounds



TraceGOLD TG-624SiIMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	1.0	26059-4950	1 Each
0.25	30	1.4	26059-3320	1 Each
	60	1.4	26059-3330	1 Each
0.32	30	1.8	26059-3390	1 Each
	60	1.8	26059-3410	1 Each
0.53	30	3.0	26059-3960	1 Each
	60	3.0	26059-4080	1 Each
	75	3.0	26059-4900	1 Each
	105	3.0	26059-4090	1 Each

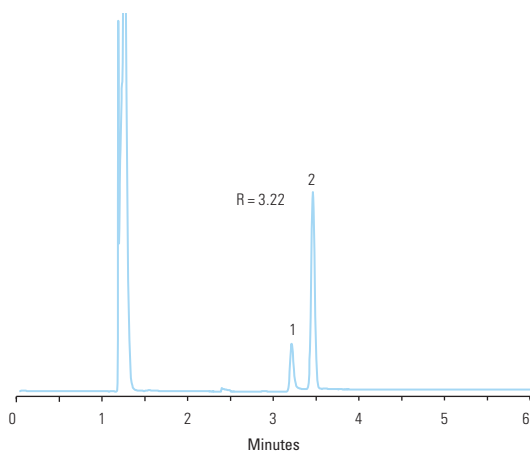
Applications:

- Residual Solvents
- Volatile Organic Compounds
- Alcohols
- Oxygenates

Similar to:

- DB-624 Ultra Inert
- VF-624ms
- CP-Select 624 CB
- ZB-624

Acetonitrile and Dichloromethane



TG-624SiIMS 30m x 0.32mm x 1.8µm

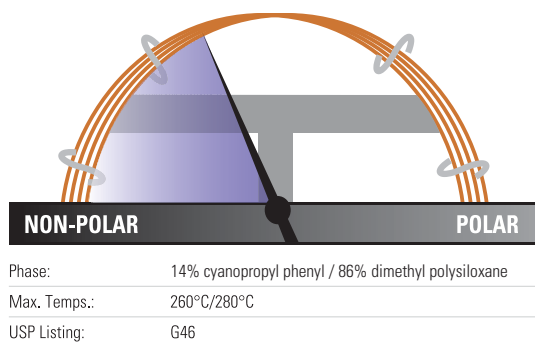
Temperature: 40°C for 6 minutes
 Detector Type: MS (ISQ); m/z 40,41 for Acetonitrile (1), m/z 49, 84 for Dichloromethane (2)
 Carrier Gas: Helium
 Flow Rate: 1.5 mL/min
 Injection Volume: 500µL
 Injection Mode: Headspace, Split (20:1) 220°C

1. Acetonitrile
2. Dichloromethane

TraceGOLD TG-1701MS GC Columns

Feature a mix of cyano and phenyl groups for increased polarity and a different elution order relative to less polar columns

- Mid-polarity phase, 14% cyanopropylphenyl methylpolysiloxane
- Fully characterized for long-term reproducibility, column-to-column consistency and low bleed
- Optimal for confirmation analysis
- Equivalent to USP G46 phase



TraceGOLD TG-1701MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.1	26090-0200	1 Each
	0.25	15	0.25	26090-1300
0.25			26090-1420	1 Each
0.5		26090-2230	1 Each	
1.0		26090-2960	1 Each	
60		0.25	26090-1540	1 Each
		1.0	26090-3080	1 Each
0.32	15	0.25	26090-1310	1 Each
		0.25	26090-1430	1 Each
	0.5	26090-2240	1 Each	
	1.0	26090-2970	1 Each	
	60	0.25	26090-1550	1 Each
		1.0	26090-3090	1 Each
0.53	15	0.25	26090-1320	1 Each
		0.25	26090-1440	1 Each
	0.5	26090-2250	1 Each	
	1.0	26090-2980	1 Each	
	30	3.0	26090-3960	1 Each

Applications:

- Alcohols
- Pesticides
- Oxygenates
- PCB congeners
- Aroclor mixes

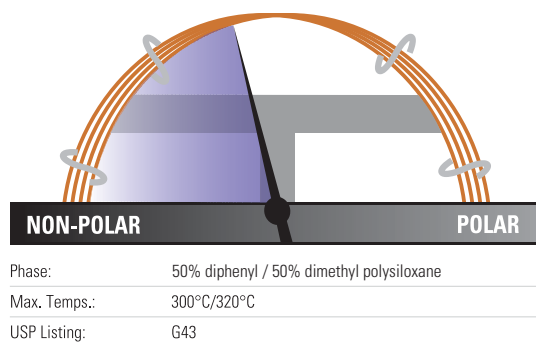
Similar to:

- Rtx-1701
- DB-1701
- HP-1701
- SPB-1701
- VF-1701
- CP-Sil 19 CB

TraceGOLD TG-17MS GC Columns

Particularly suited to GC-MS applications that require more polarity than a 5% phenyl phase

- Mid-polarity phase
- Ideal for confirmational analysis
- Excellent inertness for active compounds such as pesticides
- Very low bleed ideal for analysis by GC-MS



TraceGOLD TG-17MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.1	26089-0200	1 Each
0.25	15	0.25	26089-1300	1 Each
		0.25	26089-1420	1 Each
		0.5	26089-2230	1 Each
		1.0	26089-2960	1 Each
		0.25	26089-1540	1 Each
0.32	15	0.25	26089-1310	1 Each
		0.25	26089-1430	1 Each
		0.5	26089-2240	1 Each
		1.0	26089-2970	1 Each
0.53	30	0.25	26089-1440	1 Each
		0.5	26089-2250	1 Each
		1.0	26089-2980	1 Each
		1.5	26089-3360	1 Each

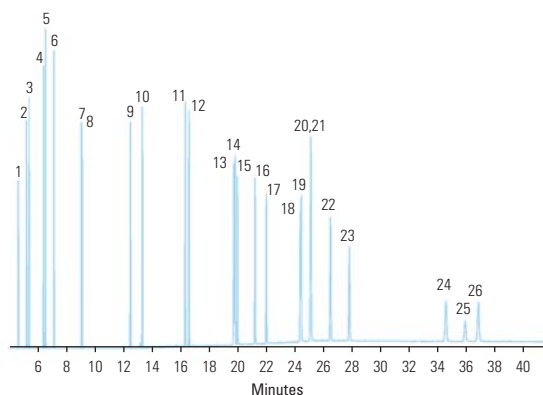
Applications:

- Pesticides and herbicides
- Rosin acids
- Phthalate esters
- Triglycerides
- Sterols

Similar to:

- Rxi-17
- DB-17
- DB-608
- VF-17ms
- CP-Sil 24 CB

Polycyclic aromatic hydrocarbons



TG-17MS 30m x 0.25mm x 0.25µm

Temperature: 90°C (1.0 minute hold) to 215°C (0.5 minute hold) at 25°C/minute to 235°C at 4°C/minute to 280°C/minute at 15°C/minute to 320°C (20 minute hold) at 4°C/minute

Detector Type: MS

Carrier Gas: He

Flow Rate: 1.2mL/min

Injection Volume: 1.0µL

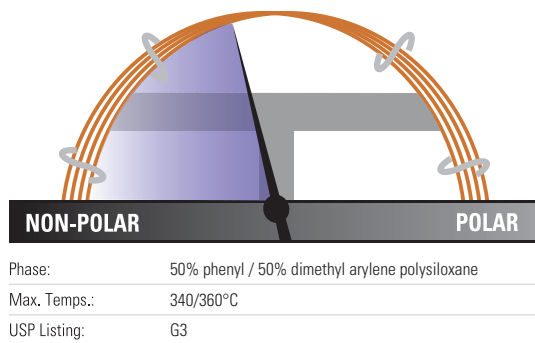
Injection Mode: Splitless, 300°C

- | | |
|--------------------------|------------------------------|
| 1. naphthalene | 15. benzo(j)fluoranthene |
| 2. 1-methylnaphthalene | 16. benzo(a)pyrene |
| 3. 2-methylnaphthalene | 17. 3-methylcholanthrene |
| 4. acenaphthylene | 18. dibenzo(a,h)acridine |
| 5. acenaphthene | 19. dibenzo(a,j)acridine |
| 6. fluorene | 20. indeno(1,2,3-cd)pyrene |
| 7. phenanthrene | 21. dibenzo(a,h)anthracene |
| 8. anthracene | 22. benzo(ghi)perylene |
| 9. fluoranthene | 23. 7H-dibenzo(c,g)carbazole |
| 10. pyrene | 24. dibenzo(a,e)pyrene |
| 11. benzo(a)anthracene | 25. dibenzo(a,i)pyrene |
| 12. chrysene | 26. dibenzo(a,h)pyrene |
| 13. benzo(b)fluoranthene | |
| 14. benzo(k)fluoranthene | |

TraceGOLD TG-17SiIMS GC Columns

Excellent separation of active environmental compounds

- Mid-polarity phase
- High thermal stability – maximum temperatures up to 340/360°C
- Excellent inertness for active environmental compounds such as PAHs



TraceGOLD TG-17SiIMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.15	10	0.15	26072-2750	1 Each
	20	0.15	26072-2760	1 Each
0.18	20	0.18	26072-5780	1 Each
		0.36	26072-1380	1 Each
0.25	15	0.25	26072-1300	1 Each
	30	0.25	26072-1420	1 Each
0.32	15	0.25	26072-1310	1 Each
	30	0.25	26072-1430	1 Each

Applications:

- PAHs
- Pesticides and herbicides
- Phthalate esters
- Triglycerides

Similar to:

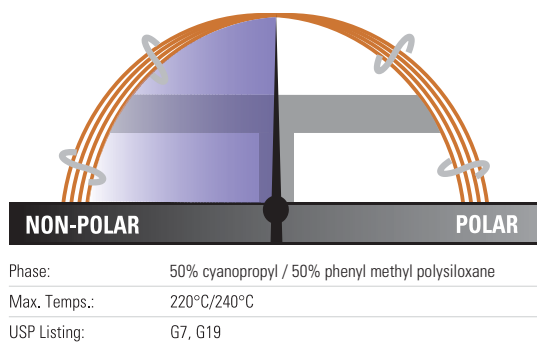
- DB-17ms
- VF-17ms
- CP-Sil 24 CB
- ZB-50
- BPX-50



TraceGOLD TG-225MS GC Columns

Offers better thermal stability than comparable columns

- Polar phase
- Innovative deactivation process for siloxane reduces tailing and improves efficiency over comparable columns
- Equivalent to USP G7, G19 phases



TraceGOLD TG-225MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26083-1300	1 Each
	30	0.25	26083-1420	1 Each
	60	0.25	26083-1540	1 Each
0.32	30	0.25	26083-1430	1 Each
		0.5	26083-2240	1 Each

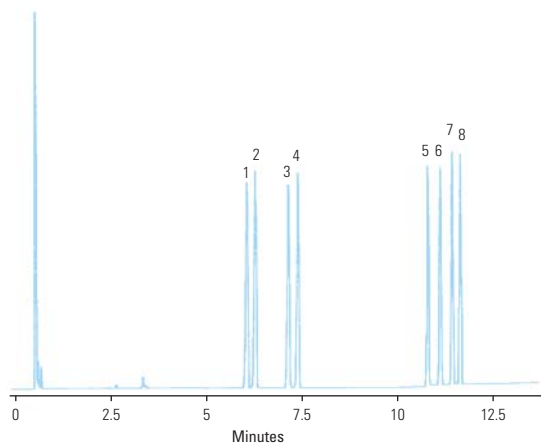
Applications:

- FAMES
- Carbohydrates
- Sterols
- Flavor compounds

Similar to:

- Rtx-225
- DB-225
- HP-225
- SPB-225

Sugars



TG-225MS 15m x 0.25mm x 0.25µm

Temperature: 190°C (5 minute hold) to 250°C at 8°C/min (5 minute hold)

Detector Type: FID

Carrier Gas: Hydrogen

Flow Rate: 45cm/sec

Injection Volume: 0.5µL

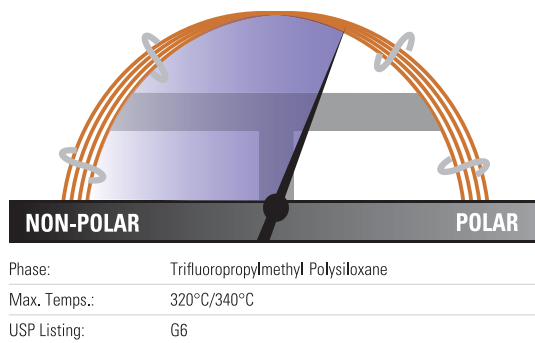
Injection Mode: Split (35:1), 260°C

- | | |
|---------------|---------------|
| 1. rhamnitol | 5. mannitol |
| 2. fucitol | 6. galactitol |
| 3. ribitol | 7. glucitol |
| 4. arabinitol | 8. inositol |

TraceGOLD TG-200MS GC Columns

Exceptionally inert mid-polarity columns with selectivity and elution order optimized for difficult separations

- Polar phase, trifluoropropyl methyl polysiloxane solid phase resolves compounds that phenyl and cyano phases cannot
- Outstanding thermal stability and low bleed
- Suitable for use with sensitive detectors including ECD, NPD and MS
- Confirmation column in combination with another GC column



TraceGOLD TG-200MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.15	10	0.15	26084-2750	1 Each
	20	0.15	26084-2760	1 Each
0.25	30	0.25	26084-1420	1 Each
		0.5	26084-2230	1 Each
		1.0	26084-2960	1 Each
0.32	30	0.25	26084-1430	1 Each
		0.5	26084-2240	1 Each
		1.0	26084-2970	1 Each

Applications:

- Solvents
- Fluorocarbons
- Alcohols and ketones
- Silanes
- Glycols

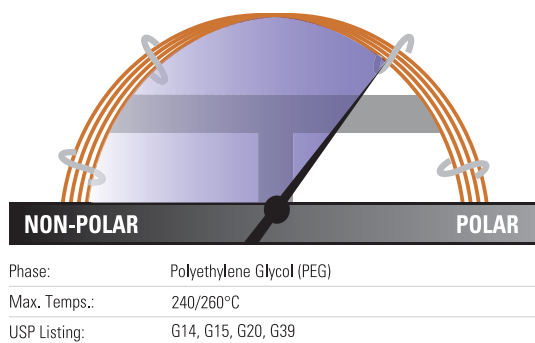
Similar to:

- Rtx-200MS
- DB-200
- DB-210

TraceGOLD TG-WaxMS GC Columns

Manufactured for better column-to-column reproducibility

- Polar phase, polyethylene glycol
- Polar-deactivated surface tightly binds polymer for excellent thermal stability
- Resists oxidative damage, damage from strongly acidic or basic volatiles better than silicone solid phases



TraceGOLD TG-WaxMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity	
0.0	10	0.1	26088-0200	1 Each	
0.15	10	0.15	26088-2750	1 Each	
	20	0.15	26088-2760	1 Each	
	40	0.15	26088-2940	1 Each	
0.18	20	0.18	26088-5780	1 Each	
0.25	15	0.25	26088-1300	1 Each	
		0.25	26088-1420	1 Each	
	30	0.5	26088-2230	1 Each	
		0.25	26088-1421	1 Each	
		0.25	26088-1540	1 Each	
		0.5	26088-2350	1 Each	
0.32	15	0.25	26088-1310	1 Each	
		0.5	26088-2120	1 Each	
		1.0	26088-2850	1 Each	
	30	0.25	26088-1430	1 Each	
		0.5	26088-2240	1 Each	
		1.0	26088-2970	1 Each	
		30m with 5m SafeGuard	0.25	26088-1435	1 Each
		60	0.25	26088-1550	1 Each
			0.5	26088-2360	1 Each
	1.0		26088-3090	1 Each	
	0.53	15	0.5	26088-2130	1 Each
			1.0	26088-2860	1 Each
30			0.25	26088-1440	1 Each
60		0.5	26088-2250	1 Each	
		1.0	26088-2980	1 Each	
		1.5	26088-3360	1 Each	
		0.25	26088-1560	1 Each	
		0.5	26088-2370	1 Each	
		1.0	26088-3100	1 Each	

Applications:

- FAMES
- Flavor compounds and essential oils
- Solvents
- Xylene isomers
- EPA Method 603 for Acrolein/ Acrylonitrile

Similar to:

- DB-WAX
- DB-WAXetr
- HP-Wax
- HP-Innowax
- Supelcowax 10
- CP-Wax 52 CB
- Stabilwax
- Rtx-Wax
- BP20
- ZB-Wax
- Optima Wax
- AT-Wax

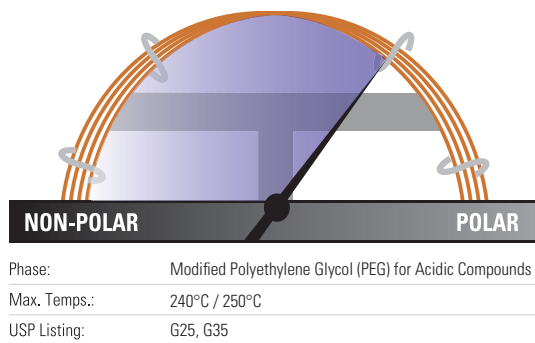
TraceGOLD TG-WaxMT Metal GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	26M88-1420	1 Each
		0.5	26M88-2230	1 Each
	60	0.25	26M88-1540	1 Each
0.53	30	0.25	26M88-1440	1 Each
		0.5	26M88-2250	1 Each
		1.0	26M88-2880	1 Each
		1.5	26M88-3360	1 Each

TraceGOLD TG-WaxMS A GC Columns

Acidic functionality in the polymer structure allows analysis of acidic compounds without derivatization

- Polar phase, acid-deactivated polyethylene glycol
- Resists oxidative damage and adsorption of acids
- Excellent peak shapes for high MW acids
- Equivalent to USP G25, G35 phases



TraceGOLD TG-WaxMS A GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	26087-1300	1 Each
		0.25	26087-1420	1 Each
	60	0.5	26087-2230	1 Each
		0.25	26087-1540	1 Each
		0.5	26087-2350	1 Each
0.32	15	0.25	26087-1310	1 Each
		0.5	26087-2120	1 Each
	30	0.25	26087-1430	1 Each
		0.5	26087-2240	1 Each
		1.0	26087-2970	1 Each
	60	0.25	26087-1550	1 Each
		0.5	26087-2360	1 Each
15		0.5	26087-2130	1 Each
		1.0	26087-2860	1 Each
30	0.25	26087-1440	1 Each	
	0.5	26087-2250	1 Each	
	1.0	26087-2980	1 Each	

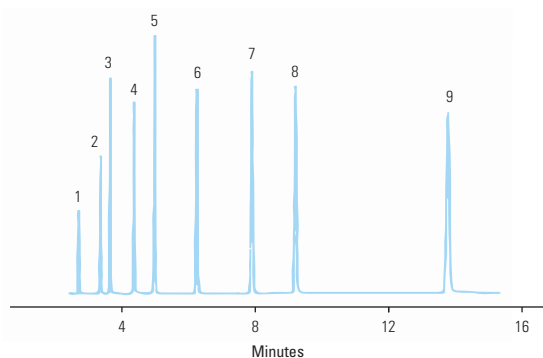
Applications:

- Organic acids
- Free fatty acids
- Alcohols

Similar to:

- DB-FFAP
- HP-FFAP
- NUKOL
- OV-351
- CP-Wax 58 CB
- FFAP
- Stabilwax-DA
- BP-21
- Optima FFAP

Free fatty acids



TG-WaxMS A 30m x 0.25mm x 0.25µm

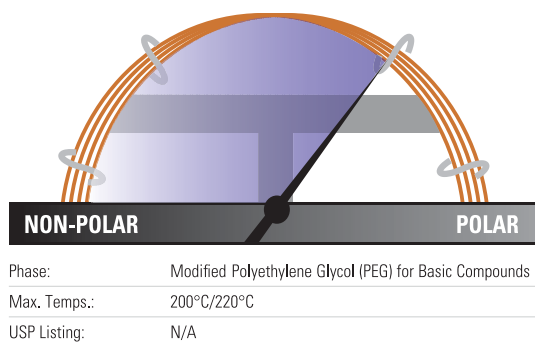
Temperature:	145°C Isothermal
Detector Type:	FID
Carrier Gas:	Hydrogen
Flow Rate:	40cm/sec
Injection Volume:	1.0µL
Injection Mode:	Split (50:1), 250°C

- | | |
|--------------------|--------------------|
| 1. acetic acid | 7. isocaproic acid |
| 2. propionic acid | 8. caproic acid |
| 3. isobutyric acid | 9. heptanoic acid |
| 4. n-butyric acid | |
| 5. isovaleric acid | |
| 6. n-valeric acid | |

TraceGOLD TG-WaxMS B GC Columns

Base deactivation allows analysis of basic analytes without derivatization or column priming

- Polar phase, base deactivated polyethylene glycol
- Reduced absorption and improved responsiveness for basic compounds
- Not suitable for use with water or alcohols



TraceGOLD TG-WaxMS B GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	26086-1420	1 Each
		0.5	26086-2230	1 Each
0.32	30	0.25	26086-1430	1 Each
		0.5	26086-2240	1 Each
		1.0	26086-2970	1 Each
		1.0	26086-3090	1 Each
0.53	30	0.5	26086-2250	1 Each
		1.0	26086-2980	1 Each

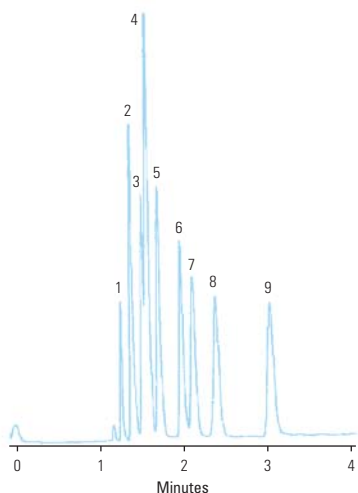
Applications:

- Amines
- Alkylamines
- Diamines
- Other basic compounds

Similar to:

- CAM
- Carbowax Amine
- CP Wax51
- Stabilwax-DB

Amines



TG-WaxMS B 30m x 0.53mm x 1.0µm

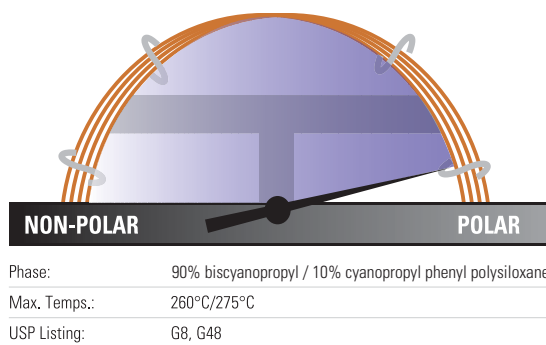
Temperature:	45°C Isothermal
Detector Type:	FID
Carrier Gas:	Hydrogen
Flow Rate:	40cm/sec
Injection Volume:	1µL
Injection Mode:	Direct Injection, 250°C

- | | |
|-------------------|--------------------|
| 1. trimethylamine | 7. tert-butylamine |
| 2. dimethylamine | 8. diethylamine |
| 3. ethylamine | 9. sec-butylamine |
| 4. methylamine | |
| 5. isopropylamine | |
| 6. n-propylamine | |

TraceGOLD TG-POLAR GC Columns

Specifically designed polymer and surface treatment overcome traditional problems with high-polarity columns

- Highly polar phase
- Strong dipole moment and high selectivity for cis/trans compounds or compounds with conjugated double bonds
- Equivalent to USP G8 and G48



TraceGOLD TG-POLAR GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.1	26082-0470	1 Each
		0.2	26082-5010	1 Each
	60	0.1	26082-0590	1 Each
		0.2	26082-5020	1 Each
	105	0.1	26082-5000	1 Each
		0.2	26082-5030	1 Each
0.32	30	0.2	26082-5040	1 Each
	60	0.2	26082-5050	1 Each
0.53	30	0.1	26082-0490	1 Each
		0.2	26082-5070	1 Each
	60	0.1	26082-0610	1 Each
		0.2	26082-5080	1 Each

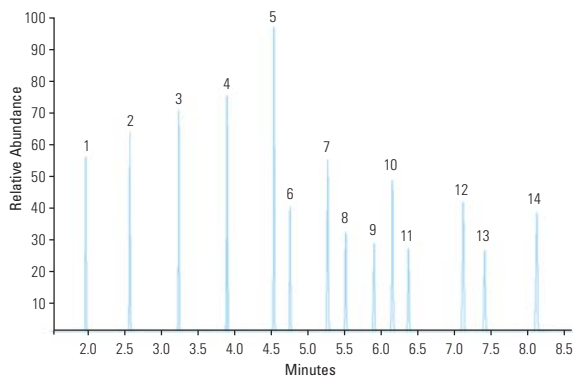
Applications:

- Cis/Trans FAMES
- Dioxins

Similar to:

- DB-23
- HP-23
- Rtx-2330
- SP-2330
- SP-2380
- SPB-2560
- HP-88
- Silar 10c
- CP-Sil 88 FAME
- CP-Sil 88
- BPX 70
- BPX 90

FAMES C8-C24



TG-POLAR 30m x 0.25mm x 0.2µm

Temperature: 100°C (0.5 minute hold) to 195°C at 25°C/minute (1 minute hold) to 250°C at 10°C/minute (3 minute hold)

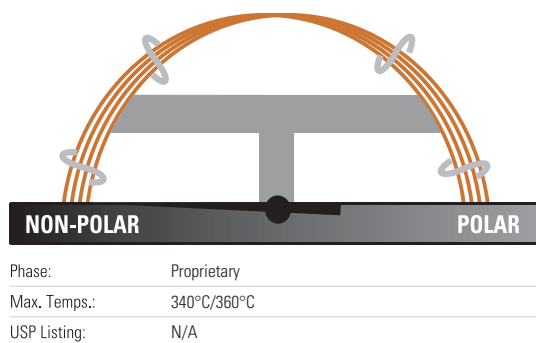
Detector Type: MS
Carrier Gas: He
Flow Rate: 1.2mL/min
Injection Volume: 0.1µL
Injection Mode: Split (100:1), 250°C

- | | |
|------------------------|-------------------------------|
| 1. Methyl octanoate | 10. Methyl linolenate |
| 2. Methyl decanoate | 11. Methyl arachidate |
| 3. Methyl decanoate | 12. Methyl behenate |
| 4. Methyl myristate | 13. Methyl cis-13-docosenoate |
| 5. Methyl palmitate | 14. Methyl tetracosanoate |
| 6. Methyl palmitoleate | |
| 7. Methyl stearate | |
| 8. Methyl oleate | |
| 9. Methyl linoleate | |

TraceGOLD TG-XLBMS GC Columns

General purpose columns exhibiting extremely low bleed

- Low polarity phase, proprietary
- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Ideal for analysis of active, high molecular weight compounds with sensitive GC-MS systems



TraceGOLD TG-XLBMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	0.18	26079-5780	1 Each
0.25	15	0.1	26079-0350	1 Each
		0.25	26079-1300	1 Each
		0.1	26079-0470	1 Each
		0.25	26079-1420	1 Each
		0.5	26079-2230	1 Each
		0.25	26079-1540	1 Each
0.32	30	0.1	26079-0480	1 Each
		0.25	26079-1430	1 Each
		0.5	26079-2240	1 Each
		1.0	26079-2970	1 Each

Applications

- Pesticides
- PCB congeners
- PAHs
- Aroclor mixes

Similar to:

- Rxi-XLB
- DB-XLB
- VF-Xms

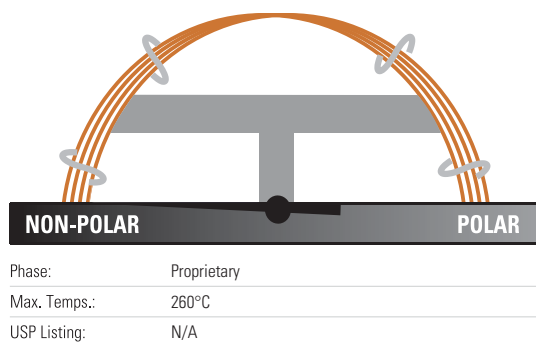
Semi-Volatile Drinking Water Application Kit

Description	Cat. No.	Quantity
Semi-Volatile Drinking Water Application Kit	60181-736	1 Each
Containing the following:		
TraceGOLD TG-XLBMS GC Column 30m x 0.25mm x 0.25µm	26079-1420	1 Each
BTO Septa 17mm Diameter	31303211	50 Pack
S/SL Injector – Split/Splitless Liner, 5mm ID x 8mm OD x 105mm Length	45350033	5 Pack
S/SL Injector – Silver Seals	29033629	10 Pack
S/SL Injector – Graphite Liner Seals	29033406	10 Pack
S/SL Injector – Graphite Ferrules for 0.25mm ID Column	29053488	10 Pack
MS Interface – Graphite/Vespel Ferrules for 0.25mm ID Column	29033496	10 Pack
2mL Screw Top Vials, Amber Glass	60180-567	100 Pack
Blue Caps With PTFE/Red Rubber Seals	60180-569	100 Pack
5µL Fixed Needle Syringe, 50mm Length, 26 Gauge, Cone Needle	36500505	1 Each

TraceGOLD TG-VRX GC Columns

Application specific column for volatile organic pollutants

- Highly stable polymer phase
- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Excellent resolution for analysis of volatile compounds
- Fast analysis times for volatile compounds



TraceGOLD TG-VRX GC Columns

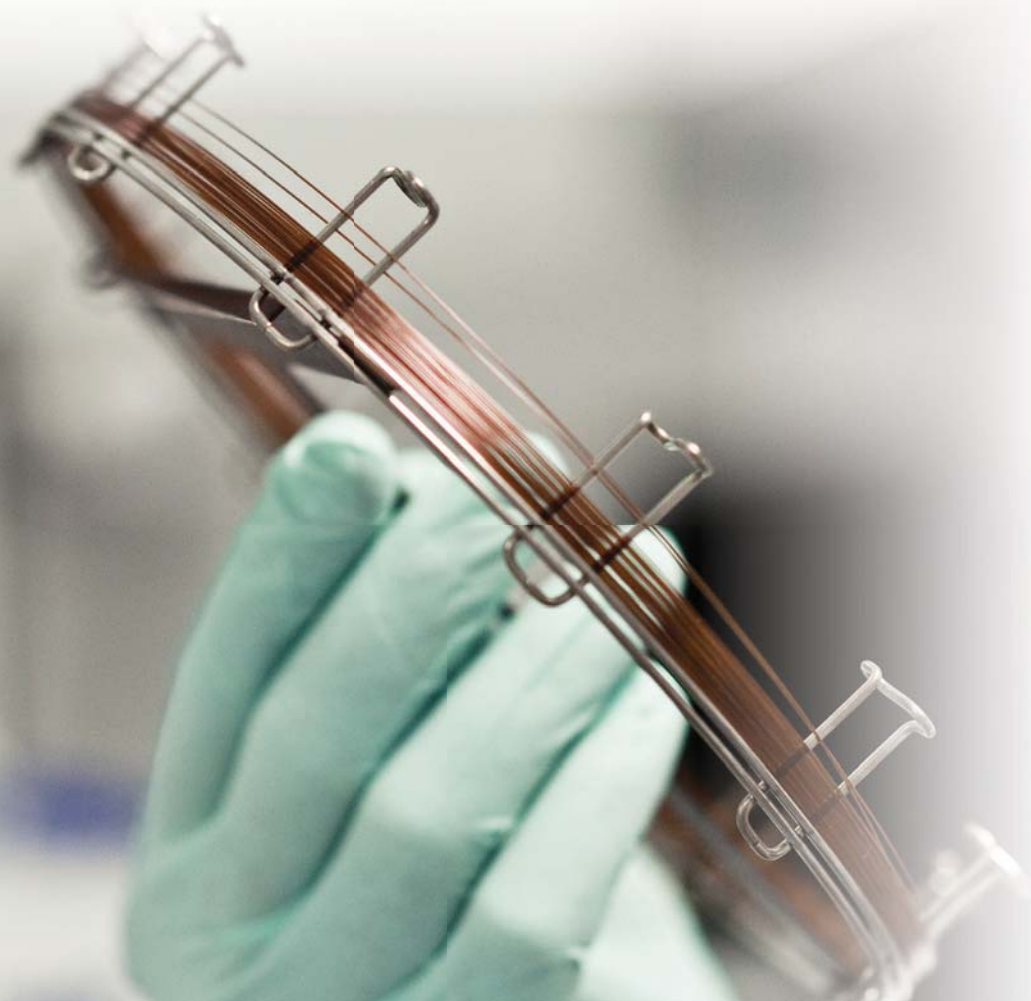
ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	1.0	26081-4950	1 Each
	40	1.0	26081-4960	1 Each
0.25	30	1.4	26081-3320	1 Each
	60	1.4	26081-3330	1 Each
0.32	30	1.8	26081-3390	1 Each
	60	1.8	26081-3410	1 Each

Applications:

- Volatile organic pollutants
- US EPA Method 8021 compounds

Similar to:

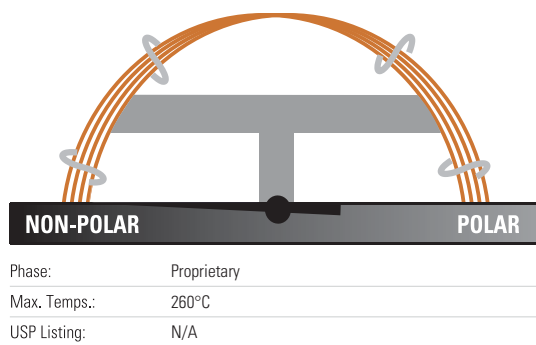
- Rtx-VRX
- DB-VRX



TraceGOLD TG-VMS GC Columns

Application specific column for volatile organic pollutants

- Highly stable polymer phase
- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Excellent resolution for analysis of volatile compounds
- Fast analysis times for volatile compounds



TraceGOLD TG-VMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	1.0	26080-4950	1 Each
	40	1.0	26080-4960	1 Each
0.25	30	1.4	26080-3320	1 Each
	60	1.4	26080-3330	1 Each
0.32	30	1.8	26080-3390	1 Each
	60	1.8	26080-3410	1 Each

Applications:

- Volatile organic pollutants
- US EPA Method 8260B compounds

Similar to:

- Rtx-VMS

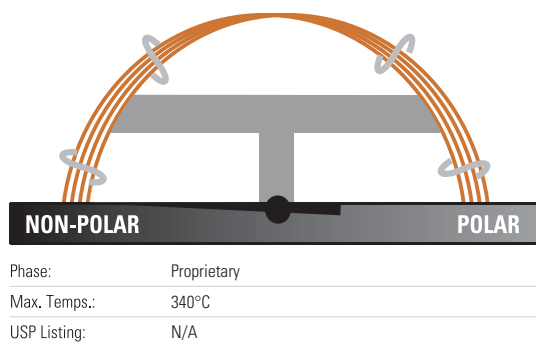
Volatile Organic Compound (VOC) Application Kit

Description	Cat. No.	Quantity
Volatile Organic Compound (VOC) Application Kit	60181-734	1 Each
Containing the following:		
TraceGOLD TG-VMS GC Column 20m x 0.18mm x 1.00µm	26080-4950	1 Each
S/SL Injector – BTO Septa 9mm Diameter	31303240	50 Pack
S/SL Injector – Silver Seals	29033629	10 Pack
S/SL Injector – Graphite Liner Seals	29033406	10 Pack
S/SL Injector – Graphite Ferrules for 0.25mm ID Column	29053488	10 Pack
MS Interface – Graphite/Vespel Ferrules for 0.25mm ID Column	29033496	10 Pack
2mL Screw Top Vials, Amber Glass	60180-567	100 Pack
Blue Caps with PTFE/Red Rubber Seals	60180-569	100 Pack
40mL VOA Sample Vials with Caps and Seals	60180-573	72 Pack

TraceGOLD TG-OCP I / TG-OCP II GC Columns

Application-specific columns for organochlorine pesticides and herbicides

- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Fast analysis time giving full separation of chlorinated pesticides
- Ideal for US EPA methods 8081, 608 and CLP



TraceGOLD TG-OCP I GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity	
0.10	10	0.1	26078-0200	1 Each	
	15	0.25	26078-1300	1 Each	
		30	0.25	26078-1420	1 Each
0.25	60	0.25	26078-1540	1 Each	
	0.53	30	0.32	26078-5760	1 Each
			0.5	26078-2240	1 Each

Applications:

- Organochlorine pesticides
- Herbicides

Similar to:

- Rtx-CLPesticides/
Rtx-CLPesticides2

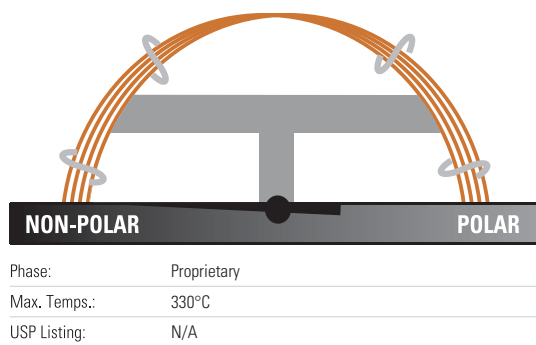
TraceGOLD TG-OCP II GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.1	26077-0200	1 Each
	20	0.1	26077-1450	1 Each
0.18	10	0.14	26077-5700	1 Each
	20	0.14	26077-5690	1 Each
0.25	15	0.2	26077-5730	1 Each
	30	0.2	26077-5720	1 Each
	60	0.2	26077-5710	1 Each
0.32	15	0.25	26077-1310	1 Each
	30	0.25	26077-1430	1 Each
		0.5	26077-2240	1 Each
0.53	15	0.42	26077-5750	1 Each
	30	0.42	26077-5740	1 Each

TraceGOLD TG-OPP I / TG-OPP II GC Columns

Application-specific columns for organophosphorus pesticides

- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Fast analysis time giving full separation of organophosphorus pesticides
- Ideal for US EPA methods 8141A



TraceGOLD TG-OPP I GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	26076-1420	1 Each
0.32	30	0.5	26076-2240	1 Each
0.53	30	0.83	26076-0690	1 Each

TraceGOLD TG-OPP II GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	26075-1420	1 Each
0.32	30	0.32	26075-5760	1 Each
0.53	30	0.5	26075-2250	1 Each

Applications:

- Organophosphorus pesticides

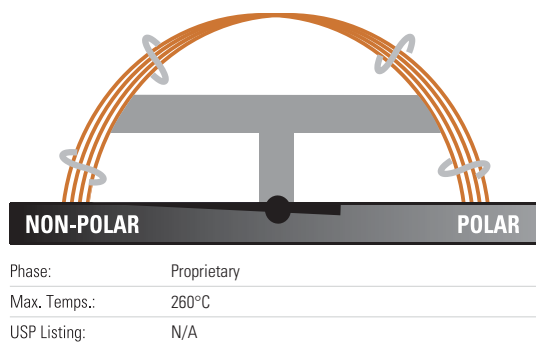
Similar to:

- Rtx-OPPesticides/
Rtx-OPPesticides2

TraceGOLD TG-ALC Plus I / TG-ALC Plus II GC Columns

Application-specific columns for blood alcohol analysis

- Low bleed for excellent signal-to-noise ratio, sensitivity and mass spectral integrity
- Fast analysis time giving full separation of blood alcohols



TraceGOLD TG-ALC Plus I GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	30	1.8	26063-3390	1 Each
0.53	30	3.0	26063-3960	1 Each

TraceGOLD TG-ALC Plus II GC Columns

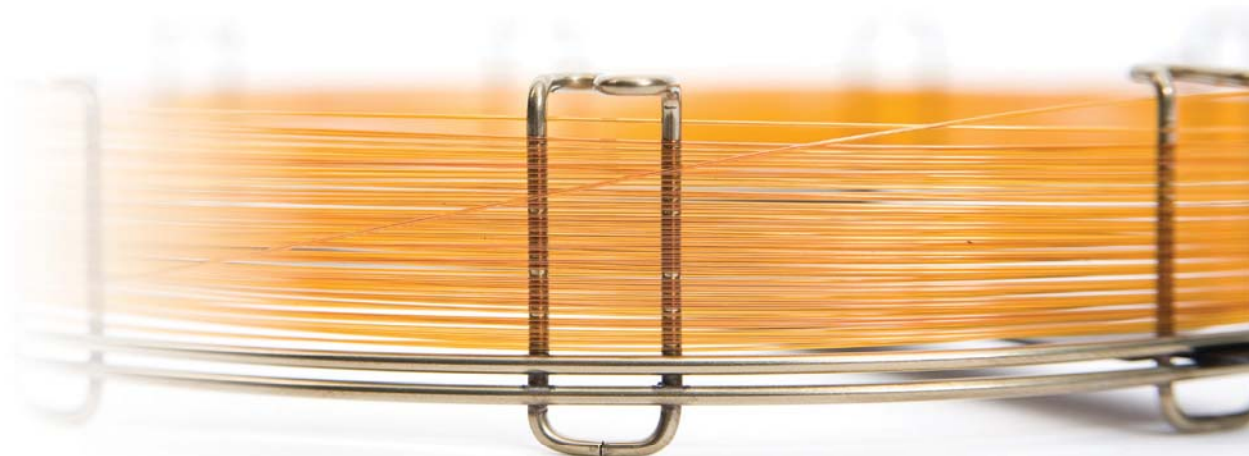
ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	30	0.5	26063-2240	1 Each
0.53	30	1.0	26063-2980	1 Each

Applications:

- Blood alcohol analysis
- Abused inhalent anesthetics
- γ -hydroxybutyrate (GHB)
- γ -butyrolactone (GBL)
- Glycols
- Common industrial solvents

Similar to:

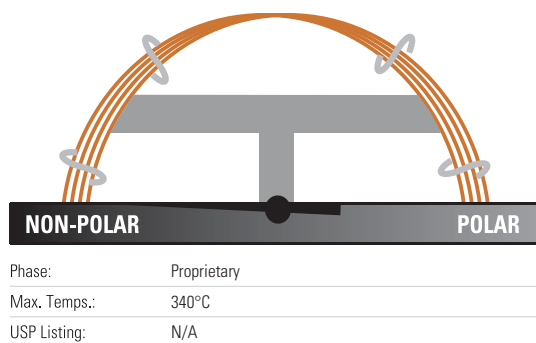
- Rtx BAC Plus 1 / Rtx BAC Plus 2



TraceGOLD TG-Dioxin GC Columns

Excellent separation of toxic dioxin and furan congeners

- Isomer specificity for 2,3,7,8-TCDD and 2,3,7,8-TCDF achieved with a single GC column
- High thermal stability – maximum temperatures up to 340°C
- Unique selectivity for toxic dioxin and furan congeners allows use as a confirmation GC column



TraceGOLD TG-Dioxin GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	40	0.18	26066-4800	1 Each
0.25	60	0.25	26066-1540	1 Each

Persistent Organic Pollutants (POPs) Confirmation Kit

Description	Cat. No.	Quantity
Persistent Organic Pollutants (POPs) Confirmation Kit	TS-MKITG503	1 Each
Containing the following:		
TraceGOLD TG-Dioxin GC Column 60m x 0.25mm x 0.25µm	26066-1540	1 Each
S/SL Injector – BTO Septa 11mm diameter	31303233	50 Pack
S/SL Injector – Split Straight Liner 4 x 6.3 x 78.5mm, Quartz Wool	453A2265	5 Pack
S/SL Injector – Splitless Liner with Single Taper 4 x 6.3 x 78.5mm, Quartz Wool	453A1925	5 Pack
Gold Inlet Base Seals, Single Column Installation	290GA081	10 Pack
Graphite Liner Sealing Rings	290GA243	10 Pack
Graphite Ferrules for 0.1-0.32mm Column	290GA139	10 Pack
Graphite/Vespel Ferrules for 0.1-0.25mm Column	290VA191	10 Pack
1.1mL Screw Top Tapered Vial, Clear Gold Grade Glass	1.1-STVG	500 Pack
8mm Screw Caps with Pre-Fitted Silicone/PTFE Septa	8-SC-ST15	500 Pack
10µL Fixed Needle Syringe for TriPlus RSH, 57mm Length, 26s Gauge	365D0291	1 Each

Applications:

- Dioxins
- Furans

Similar to:

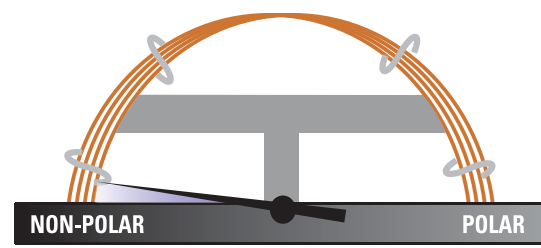
- Rtx-Dioxin2
- DB-Dioxin

TRACE GC Columns

TRACE TR-1 GC Columns

Designed for method development

- Non-polar phase, 100% dimethyl polysiloxane
- High operating temperature



Phase:	100% Dimethyl Polysiloxane
Max. Temps.:	340°C/360°C
USP Listing:	G1, G2, G38

TRACE TR-1 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	260A130P	1 Each
	30	0.1	260A047P	1 Each
		0.25	260A142P	1 Each
	60	0.25	260A154P	1 Each
0.32	15	0.25	260A131P	1 Each
	30	0.25	260A143P	1 Each

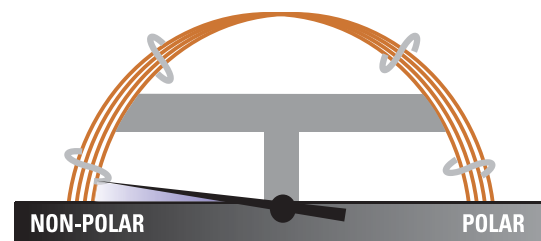
Applications:

- Chlorinated and nitroaromatic compounds
- Environmental analyses

TRACE TR-1MS GC Columns

Extremely low-bleed non-polar columns suitable for GC-MS applications

- Non-polar phase, 100% dimethyl polysiloxane
- High operating temperature
- Inert phase suited for environmental analyses



Phase:	100% Dimethyl Polysiloxane
Max. Temps.:	340°C/360°C
USP Listing:	G1, G2, G38

TRACE TR-1MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.1	260B047P	1 Each
		0.25	260B142P	1 Each
		0.25	260B154P	1 Each
0.32	30	0.25	260B143P	1 Each
		0.25	260B155P	1 Each
		1.0	260B309P	1 Each

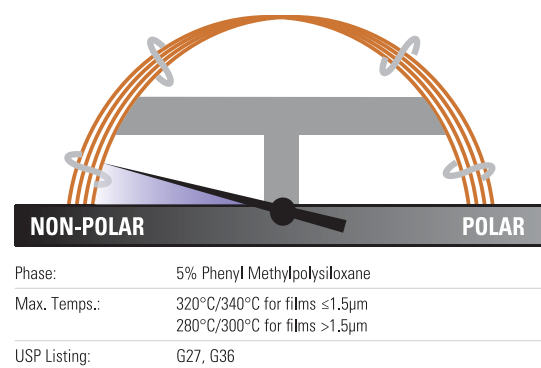
Applications:

- Chlorinated and nitroaromatic compounds
- GC-MS environmental analyses

TRACE TR-5 GC Columns

Excellent starting columns for method development, capable of performing most required separations

- Non-polar phase, 5% phenyl methyl polysiloxane
- High operating temperature and extremely low bleed
- Widely used in a variety of applications



TRACE TR-5 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	260E130P	1 Each
	30	0.25	260E142P	1 Each
		0.5	260E223P	1 Each
	60	0.25	260E154P	1 Each
0.32	7	0.25	260E113P	1 Each
	15	0.25	260E131P	1 Each
	30	0.25	260E143P	1 Each
		0.5	260E224P	1 Each
		1.0	260E297P	1 Each
	60	0.25	260E155P	1 Each
	100	0.5	260E242P	1 Each
0.53	30	0.5	260E225P	1 Each
		1.0	260E298P	1 Each
		1.5	260E336P	1 Each
		5.0	260E470P	1 Each

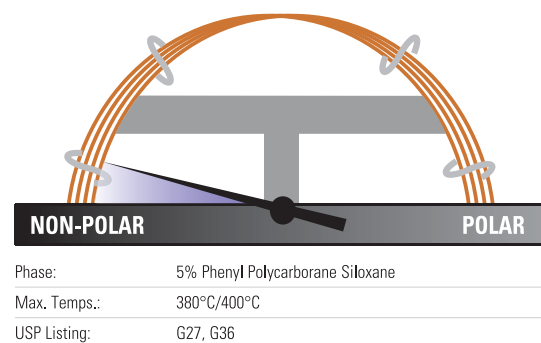
Applications:

- Alcohols
- Free fatty acids
- Aromatics
- Flavors
- Low polarity pesticides

TRACE TR-5HT GC Columns

Feature upper temperature limits as high as 400°C

- Non-polar phase, 5% phenyl polycarborane siloxane
- Allow the elution of higher-boiling hydrocarbons up to C100
- Low bleed even at elevated temperatures



TRACE TR-5HT GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.1	260H035P	1 Each
	30	0.1	260H047P	1 Each
		0.25	260H142P	1 Each
0.32	12	0.1	260H030P	1 Each

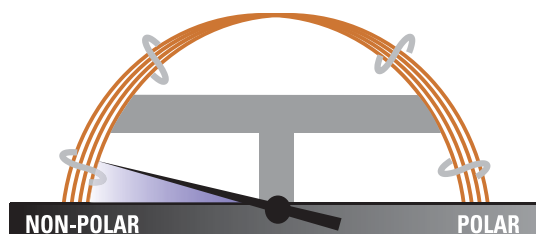
Applications:

- Hydrocarbons
- Solvents
- Pesticides
- Herbicides
- Phenols
- Amines

TRACE TR-5MS GC Columns

Features a popular GC-MS phase for many applications

- Non-polar phase, 5% phenyl polysilphenylene-siloxane
- Low bleed and high stability
- High signal-to-noise ratio for increased sensitivity
- High robustness to oxygen and water contamination



Phase:	5% Phenyl Polysilphenylene-siloxane
Max. Temps.:	360°C/370°C for films ≤1.5µm 350°C/360°C for films >1.5µm
USP Listing:	G27, G36

TRACE TR-5MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.1	260F020P	1 Each
0.15	25	0.25	260F134P	1 Each
0.18	20	0.18	260F578P	1 Each
0.25	15	0.1	260F035P	1 Each
		0.25	260F130P	1 Each
		0.1	260F047P	1 Each
		0.25	260F142P	1 Each
		0.25	260F142J	1 Each
		0.5	260F223P	1 Each
		1.0	260F296P	1 Each
0.32	60	0.25	260F154P	1 Each
		1.0	260F308P	1 Each
		1.0	260F285P	1 Each
0.32	15	0.25	260F143P	1 Each
		0.5	260F224P	1 Each
		1.0	260F297P	1 Each
		1.0	260F225P	1 Each
0.53	30	0.5	260F225P	1 Each
		1.0	260F298P	1 Each
		1.5	260F336P	1 Each
		3.0	260F396P	1 Each

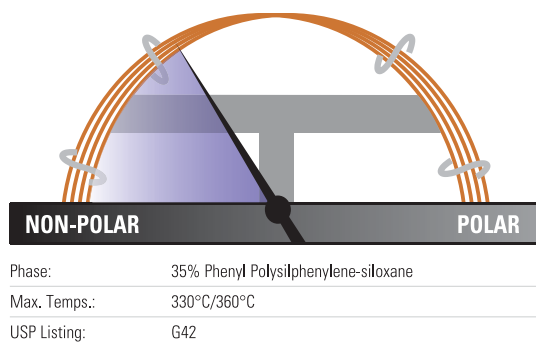
Applications:

- Hydrocarbons
- Solvents
- Pesticides
- Herbicides
- Phenols
- Amines

TRACE TR-35MS GC Columns

Mid-polarity columns excellent for many applications

- Mid-polarity phase, 35% phenyl polysilphenylene-siloxane
- Exceptionally low surface activity
- Low bleed even at elevated temperatures



TRACE TR-35MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	260C130P	1 Each
	30	0.25	260C142P	1 Each
	60	0.25	260C154P	1 Each
0.32	30	0.25	260C143P	1 Each
0.53	15	1.0	260C286P	1 Each
	30	1.0	260C298P	1 Each

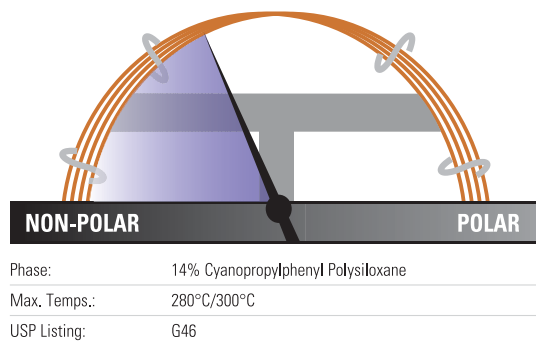
Applications:

- Pesticides
- Herbicides
- Drugs of abuse
- PAHs
- Pharmaceuticals

TRACE TR-1701 GC Columns

Mid-polarity column with alternative selectivity

- Mid-polarity phase, 14% cyanopropylphenyl polysiloxane
- Low bleed even at a high operating temperature
- Excellent starting point for method development
- Suitable for a wide variety of applications



TRACE TR-1701 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	260Q142P	1 Each
	60	0.25	260Q154P	1 Each
0.32	15	0.25	260Q131P	1 Each
	30	0.25	260Q143P	1 Each
	60	1.0	260Q309P	1 Each
0.53	30	0.25	260Q155P	1 Each
		1.0	260Q298P	1 Each

Applications:

- Pesticides
- PCBs
- PAHs
- Organic acids
- Drugs
- Steroids
- EPA 608, 8081

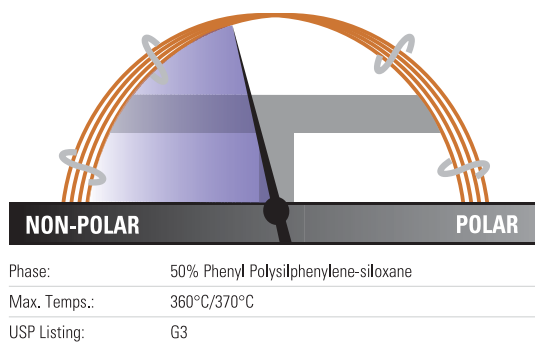
TRACE TR-50MS GC Columns

Mid-polarity columns well-suited to GC-MS applications

- Mid-polarity phase, 50% phenyl polysilphenylene-siloxane
- Low bleed decreases MS contamination
- Particularly useful for applications requiring a higher temperature and more polarity than a 5% phenyl column
- Column inertness results in minimal peak tailing and decreased breakdown of sensitive samples

TRACE TR-50MS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	260R130P	1 Each
	30	0.15	260R050P	1 Each
		0.25	260R142P	1 Each
0.32	30	0.25	260R143P	1 Each



Applications:

- Herbicides
- Drugs of abuse
- EPA 604, 608, 8060, 8081
- Pharmaceuticals

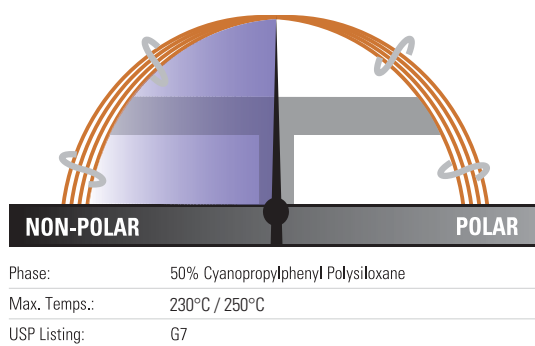
TRACE TR-225 GC Columns

Reliable and reproducible performance

- Mid-polarity phase, 50% cyanopropylphenyl polysiloxane
- Low bleed even at elevated temperatures
- Outstanding robustness for difficult separations
- Manufactured to minimize risk of damage from contaminated carrier gas

TRACE TR-225 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	260Y142P	1 Each
	60	0.25	260Y154P	1 Each
0.32	25	0.25	260Y137P	1 Each



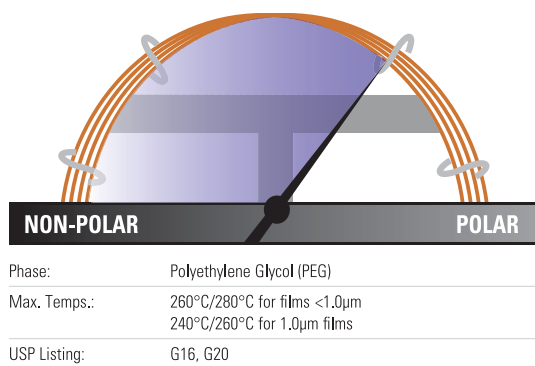
Applications:

- Fatty Acid Methyl Esters (FAMES)
- Carbohydrates
- Neutral sterols

TRACE TR-Wax GC Columns

General purpose, high-polarity columns

- Polar phase, polyethylene glycol
- Highly crosslinked and fully deactivated
- Solvent washable



TRACE TR-Wax GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	260W142P	1 Each
		0.5	260W223P	1 Each
		1.0	260W296P	1 Each
0.32	60	0.25	260W154P	1 Each
		0.25	260W131P	1 Each
	30	0.25	260W143P	1 Each
		0.5	260W224P	1 Each
		1.0	260W297P	1 Each
		0.25	260W155P	1 Each
0.53	60	1.0	260W309P	1 Each
		1.0	260W286P	1 Each
	15	0.5	260W225P	1 Each
		1.0	260W298P	1 Each
		1.0	260W310P	1 Each
		1.0	260W310P	1 Each

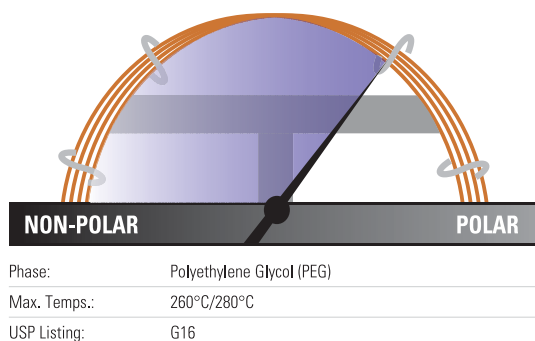
Applications:

- Esters
- Alcohols
- Ketones
- Glycols
- Aromatic isomers

TRACE TR-WaxMS GC Columns

Feature a high-polarity phase designed for mass spectrometry detectors

- Polar phase, polyethylene glycol
- Proprietary bonding method expands operating temperatures
- Extremely low bleed improves sensitivity and library matches
- High stability with oxygen and water



TRACE TR-WaxMS GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	30	0.25	260X142P	1 Each
		0.5	260X223P	1 Each
		1.0	260X296P	1 Each
0.32	60	0.25	260X154P	1 Each
		0.25	260X143P	1 Each
	30	0.5	260X224P	1 Each
0.25		260X155P	1 Each	

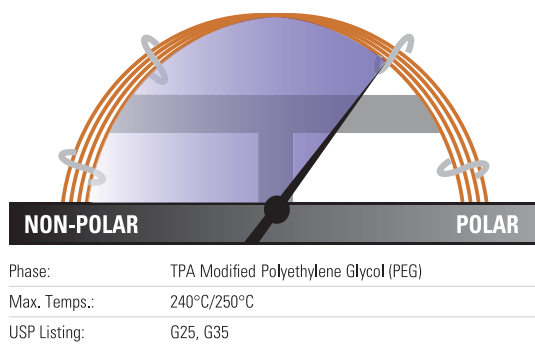
Applications:

- Aromatic hydrocarbons
- Food additives
- Essential oils
- Alcohols
- Esters
- Aldehydes
- Ketones

TRACE TR-FFAP GC Columns

High-polarity phase optimized for FFAP analysis

- Polar phase, TPA modified polyethylene glycol
- Bonded FFAP phase
- Quality tested for acidic compound analysis



TRACE TR-FFAP GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.25	15	0.25	260N130P	1 Each
	30	0.25	260N142P	1 Each
	60	0.25	260N154P	1 Each
0.32	30	0.25	260N143P	1 Each
	50	0.5	260N230P	1 Each
0.53	15	0.5	260N213P	1 Each
	30	0.5	260N225P	1 Each
		1.0	260N298P	1 Each

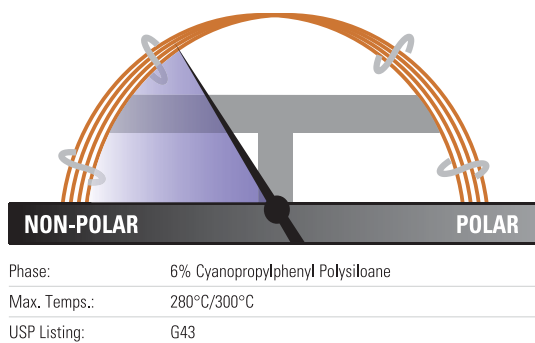
Applications:

- FFAP analysis
- Acidic compound analysis

TRACE TR-V1 GC Columns

Mid-polarity, thick-film columns

- Mid-polarity phase, 6% cyanopropylphenyl polysiloxane
- Thick films for the analysis of volatile analytes
- Low bleed suitable for MS detection



TRACE TR-V1 GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.18	20	1.0	260V495P	1 Each
0.25	30	1.4	260V332P	1 Each
	60	1.4	260V333P	1 Each
0.32	30	1.8	260V339P	1 Each
	60	1.8	260V341P	1 Each
0.53	30	3.0	260V396P	1 Each

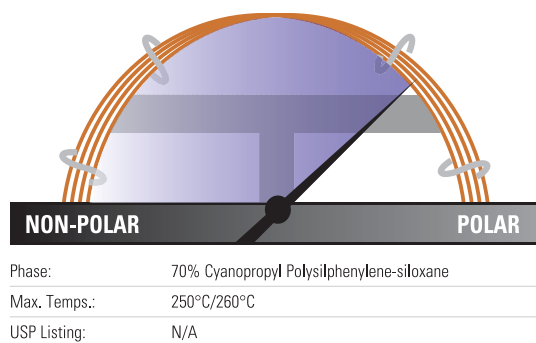
Applications:

- Volatile organics
- Alcohols
- EPA 502.2, 608 and 624

TRACE TR-FAME GC Columns

High-polarity phase optimized for FAME analysis

- Polar phase, 70% cyanopropyl polysilphenylene-siloxane
- High operating temperature compared to competitor columns
- Low bleed for mass spectrometry use



TRACE TR-FAME GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.10	10	0.2	260M096P	1 Each
0.22	25	0.25	260M135P	1 Each
	30	0.25	260M141P	1 Each
	50	0.25	260M147P	1 Each
	60	0.25	260M153P	1 Each
0.25	30	0.25	260M142P	1 Each
	60	0.25	260M154P	1 Each
	120	0.25	260M166L	1 Each
0.32	25	0.25	260M137P	1 Each
	30	0.25	260M143P	1 Each
	60	0.25	260M155P	1 Each

Applications:

- Fatty Acid Methyl Esters (FAMEs)
- FAMEs Cis/Trans Isomers

TRACE GC Columns for EPA Methods

Low bleed and temperature-stable performance tailored to specific EPA methodologies

- TRACE TR-524 and TRACE TR-525 Columns: US EPA Drinking Water Test Methods 524 or 525
- TRACE TR-527 Columns: US EPA Drinking Water Test Method 527, features the robust, low-bleed performance required for analysis of pesticides and flame retardants
- TRACE TR-8270 Columns: US EPA Solid Waste Test Method 8270
- TRACE TR-8095 Columns: US EPA Method 8095 for Explosives Testing featuring high max temperature and low surface activity

TRACE GC Columns for EPA Methods

Phase	ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
TR-524	0.18	20	1.0	26RV495P	1 Each
TR-525	0.25	30	0.25	26RX142P	1 Each
TR-527	0.25	30	0.25	26RF142P	1 Each
TR-8095	0.32	12	0.25	260P123P	1 Each
TR-8270	0.25	30	0.5	26RF223P	1 Each
TR-8270	0.25	30	1.0	26RF296P	1 Each

Applications:

- Volatile Organic Compounds (VOCs)
- Pesticides
- Flame retardants
- Explosives

TRACE GC Columns for Pesticides

Specifically designed and tested for analysis of pesticides

- Low bleed decreases MS contamination
- Particularly useful for applications requiring a higher temperature
- Column inertness results in minimal peak tailing and decreased breakdown of sensitive samples

Applications:

- Organophosphate pesticides
- Organochlorine pesticides
- Pyrethroid pesticides
- Herbicides

TRACE GC Columns for Pesticides

Phase	ID (mm)	Length (m)	Film Thickness (µm)	Guard	Cat. No.	Quantity
TR-Pesticide	0.25	30	0.25	5m guard column attached	26RF142F	1 Each
TR-Pesticide II	0.25	30	0.25	5m guard column attached	26RD142F	1 Each
TR-Pesticide III	0.25	30	0.25	5m guard column attached	26RC142F	1 Each
TR-Pesticide IV	0.25	30	0.25	–	26RC142P	1 Each

TRACE GC Columns for Dioxin and PCB Analysis

Designed to meet the requirements of high resolution GC-MS methods

- TRACE TR-Dioxin 5MS Columns; Specifically designed for Dioxin and Furan testing
- Wide coverage of the 17 congeners with the highest toxicological significance
- TRACE TR-PCB 8MS Columns; meets the requirements for HR GC-MS analysis of PCBs
- Low bleed

TRACE GC Columns for Dioxin and PCB Analysis

Phase	ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
TR-PCB 8MS	0.25	50	0.25	26AJ148P	1 Each
TR-Dioxin 5MS	0.25	60	0.25	26AF154P	1 Each
TR-Dioxin 5MS	0.25	30	0.1	26AF047P	1 Each
TR-Dioxin 5MS	0.25	60	0.1	26AF059P	1 Each

Applications:

- Dioxins (PCDDs)
- Furans (PCDFs)
- PCB congeners

TRACE GC Columns for Biodiesel Analysis

Designed for use in carbon neutral fuels development applications

- GC columns designed for specific EN methods and ASTM methods
- Specific columns for the determination of methanol, FAMES or glycerides

Applications:

- Biodiesel
- ASTM D-6584
- EN14214

TRACE GC Columns for Biodiesel Analysis

Phase	Method	ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
TR-BioDiesel (M)	EN 14110	0.32	30	3.0	26AA395P	1 Each
TR-BioDiesel (G)	EN 14105	0.32	10	0.1	26AF024P	1 Each
TR-BioDiesel (F)	EN 14103	0.25	30	0.25	26AX142P	1 Each
TR-BioDiesel (G) ASTM	ASTM D-6584	0.32	10	0.1	26RF024P	1 Each

TRACE GC Columns for Drugs of Abuse

Specifically designed for the analysis of common drugs of abuse

- TRACE TR-DoA 5MS Columns; widely used for the analysis and determination of a range of toxicological target compounds including amphetamines, codeine and morphine
- TRACE TR-DoA 35MS Columns; the recommended column for use in drug testing labs for the confirmation of THC

TRACE GC Columns for Drugs of Abuse

Phase	ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
TR-DoA35	0.20	15	0.33	26AC497P	1 Each
TR-DoA5	0.25	15	0.25	26AF130P	1 Each

Applications:

- Amphetamines, codeine and morphine

UltraFast GC Columns

The huge demand of samples to be analyzed every day by labs in industries such as environmental and petrochemical requires an increased speed of analysis

A significant gain in analysis speed compared to conventional GC procedures is obtained through UltraFast Gas Chromatography. UltraFast GC utilizes short (2-10m) narrow bore capillaries and temperature programming conditions usually faster than 2°C/s. This leads to peak widths in the 50-200ms range. The analysis times are in the range of 1 minute or even less.

Benefits of UltraFast GC Columns

- Dramatically shorter analysis times – typically a minute or less
- Ideal for applications in petrochemical and environmental markets
- Long column lifetimes

Application – UltraFast Analysis of Pure Petroleum Products through Nanovolumes Injection

The analyses were performed in the UltraFast GC mode using a TRACE GC Ultra System equipped with a Split/Splitless injector (SSL) and a Digital Pressure and Flow Controller, as well as a FAST FID detector. The GC System was also equipped with an UltraFast Module (UFM).

Split injections were performed with a AS3000 Autosampler using a 0.5µL plunger-in-needle syringe p/n 36504045. A minimum penetration depth in the injector (cold needle mode) was set, and 0.3µL of air was automatically withdrawn after the sample to ensure that the part of the needle inserted into the injector was empty. A 3mm ID upper-tapered empty liner with an 8mm long and 1mm wide restriction at the top was installed. The SSL injector was set to 225°C and the FID to 320°C.

UFC-1 10m x 0.32mm x 3µm

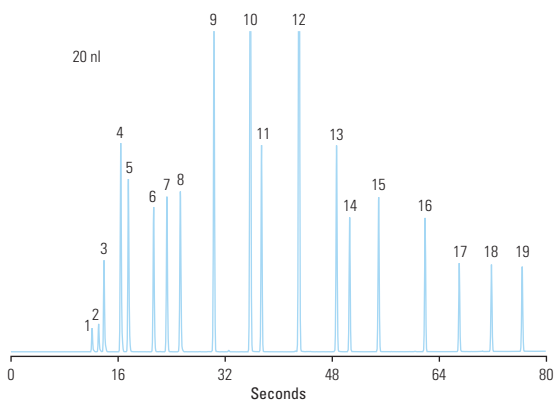
Temperature: 40°C (6 sec hold) to 300°C
(6 sec hold) at 180°C/min

Detector Type: FID

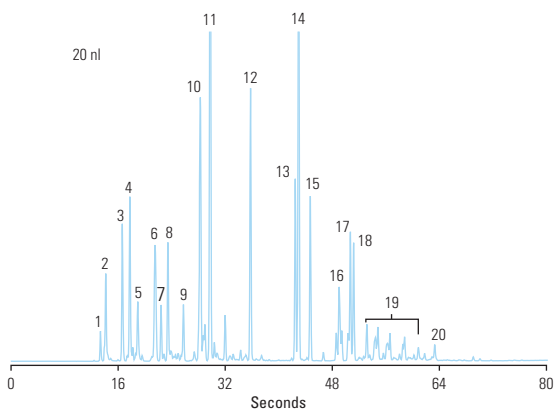
Carrier Gas: Helium

Flow Rate: 0.5mL/min

Injection Mode: Split/Splitless



- | | |
|---------------------|--------------------|
| 1. propane | 11. octane |
| 2. methyl-propane | 12. p-xylene |
| 3. butane | 13. propyl-benzene |
| 4. methyl-butane | 14. n-decane |
| 5. pentane | 15. butyl-benzene |
| 6. methyl-pentane | 16. n-dodecane |
| 7. hexane | 17. n-tridecane |
| 8. dimethyl-pentane | 18. n-tetradecane |
| 9. heptane | 19. n-pentadecane |
| 10. toluene | |



- | | |
|----------------------|-------------------------------------|
| 1. methyl-propane | 12. toluene |
| 2. butane | 13. ethyl-benzene |
| 3. 2-methyl-butane | 14. p-xylene |
| 4. pentane | 15. m-xylene |
| 5. ter-butyl alcohol | 16. propyl-benzene |
| 6. methyl-pentane | 17. tetramethyl-octane |
| 7. 3-methyl-pentane | 18. 1,2,4-trimethyl-benzene |
| 8. hexane | 19. tri/tetramethyl-benzene isomers |
| 9. dimethyl-pentane | 20. naphthalene |
| 10. cyclohexane | |
| 11. dimethyl-hexane | |

UltraFast GC Columns

Short, narrow-bore columns for use with the Thermo Scientific TRACE GC UltraFast instrument

- Dramatically shorter analysis times
- Increase sample throughput by a factor of 20
- Lengthen column lifetimes

Applications:

- Chemical
- Petrochemical
- Environmental
- Flavors and fragrances

UltraFast GC Columns

Phase	ID (mm)	Length (m)	Film Thickness (µm)	Uses	Cat. No.	Quantity
UFC-1	0.10	5	0.1	General	UFMC00001010401	1 Each
		5	0.1	ASTM D-2887	UFMC00001070401	1 Each
	0.32	5	0.25	ISO 9377-2	UFMC00001070404	1 Each
		10	3.0	ASTM D-3710	UFMC00002070414	1 Each
UFC-5	0.10	2.5	0.4	General	UFMC00100000000	1 Each
		5	0.4	General	UFMC00200000000	1 Each
		5	0.1	General	UFMC00300000000	1 Each
		10	0.1	General	UFMC00002010601	1 Each
		10	0.4	General	UFMC00502010006	1 Each
UFC-1701	0.10	5	0.1	General	UFMC00400000000	1 Each
UFC-WAX	0.10	5	0.1	FAMES, Essential Oils	UFMC00001010501	1 Each
		5	0.2	General	UFMC00001010503	1 Each
UFC-264	0.10	10	0.5	Volatiles	UFMC00002010207	1 Each
UFC-BioDiesel	0.32	5	0.5	Biodiesel	UFMC00001070600	1 Each
UFC-M1	0.32	5	0.25	General	UFMC00001070904	1 Each
UFC-POR Q					UFMC00002060614	1 Each



TracePLOT GC Columns

TracePLOT TG-BOND Alumina GC Columns: Na₂SO₄ and KCl Deactivation

Optimized for linear and quantitative analysis of polar unsaturated hydrocarbons

- Strong bonding to prevent particle generation suits these columns in valve-switching operations without damage to injection and detection systems from particle release
- Columns to which water has adsorbed may be regenerated to restore full efficiency and selectivity
- Each column has been tested to ensure proper film thickness (1,3-butadiene), selectivity (propadiene and methyl acetylene), resolution (trans-2-butene and 1-butene) and coating efficiency (1,3-butadiene)

TracePLOT TG-BOND Alumina GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
Na₂SO₄ Deactivation				
0.32	30	5	26001-6020	1 Each
	50	5	26001-6050	1 Each
0.53	30	10	26001-6080	1 Each
	50	10	26001-6110	1 Each
KCl Deactivation				
0.32	30	5	26002-6020	1 Each
	50	5	26002-6050	1 Each
0.53	30	10	26002-6080	1 Each
	50	10	26002-6110	1 Each

Applications:

- C1-C5 hydrocarbons
- Unsaturated hydrocarbon isomers

TracePLOT TG-BOND Msieve 5A GC Columns

Designed for separation of Ar/O₂ and other permanent gases

- Specially designed coating and deactivation procedures for chromatographic efficiency and the integrity of the coating porous layer
- Deactivation process yields a sharp peak for CO elution rather than the tailing commonly seen in other columns
- High retention of molecular sieve permits separation of permanent gases at temperatures above ambient
- Uniform particles remain adherent to the tubing even following continuous valve-cycling

TracePLOT TG-BOND Msieve 5A GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	15	30	26003-6010	1 Each
	30	30	26003-6040	1 Each
0.53	15	50	26003-6070	1 Each
	30	50	26003-6100	1 Each
	50	50	26003-1630	1 Each

Applications:

- Permanent gases
- Refinery or natural gases

TracePLOT TG-BOND Q GC Columns

Non-polar columns for oxygenated compounds and solvents

- Non-polar 100% divinyl benzene phase
- Particles incorporated into the walls of the tubing for essentially no particle release

TracePLOT TG-BOND Q GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	15	10	26004-6000	1 Each
	30	10	26004-6030	1 Each
0.53	15	20	26004-6060	1 Each
	30	20	26004-6090	1 Each

Applications:

- C1 to C3 isomers and alkanes up to C12
- Separation of CO₂, methane and O₂/N₂/CO
- Analysis of oxygenated compounds and solvents

TracePLOT TG-BOND Q+ GC Columns

Intermediate polarity columns for baseline separation of ethane, ethylene and acetylene

- Intermediate polarity, porous divinyl benzene homopolymer
- Particles incorporated into the walls of the tubing for essentially no particle release

TracePLOT TG-BOND Q+ GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	15	10	26005-6000	1 Each
	30	10	26005-6030	1 Each
0.53	15	20	26005-6060	1 Each
	30	20	26005-6090	1 Each

Applications:

- Separation of ethane, ethylene and acetylene to baseline

TracePLOT TG-BOND S GC Columns

Columns for analysis of non-polar and mid-polar compounds

- Mid-polarity, divinylbenzene 4-vinylpyridine solid phase
- Particles incorporated into the walls of the tubing for essentially no particle release

TracePLOT TG-BOND S GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	15	10	26006-6000	1 Each
	30	10	26006-6030	1 Each
0.53	15	20	26006-6060	1 Each
	30	20	26006-6090	1 Each

Applications:

- Non-polar and mid-polar compounds

TracePLOT TG-BOND U GC Columns

Columns for analysis of polar compounds

- Polar, divinylbenzene ethylene glycol/dimethylacrylate phase
- Particles incorporated into the walls of the tubing for essentially no particle release

TracePLOT TG-BOND U GC Columns

ID (mm)	Length (m)	Film Thickness (µm)	Cat. No.	Quantity
0.32	15	10	26007-6000	1 Each
	30	10	26007-6030	1 Each
0.53	15	20	26007-6060	1 Each
	30	20	26007-6090	1 Each

Applications:

- Analysis of polar compounds

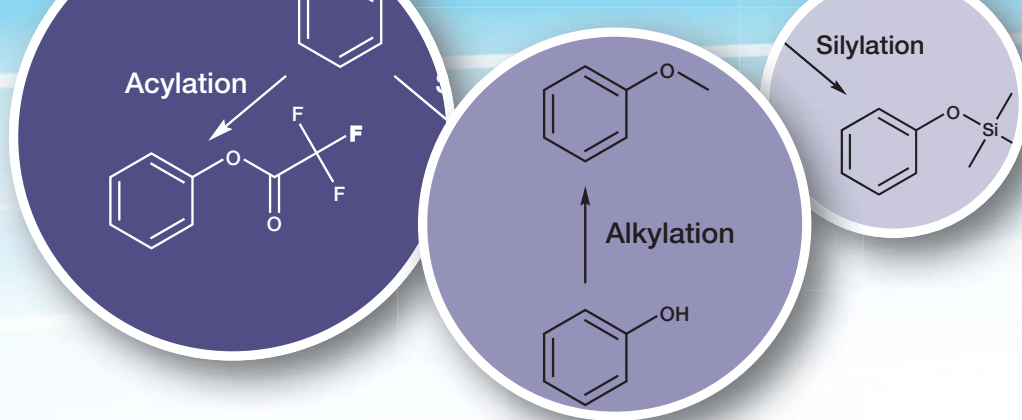
TracePLOT Particle Traps for GC Instruments

Provides a safeguard from dislodged particles entering the detector

- Provides a safeguard from dislodged particles entering the detector

TracePLOT Particle Traps for GC Instruments

Description	ID (mm)	Cat. No.	Quantity
PLOT Particle Trap 2.5m x 0.25mm	0.25	60180-862	1 Each
PLOT Particle Trap 2.5m x 0.32mm	0.32	60180-860	1 Each
PLOT Particle Trap 2.5m x 0.53mm	0.53	60180-861	1 Each



GC Reagents

Making the undetectable, detectable

Improve separation and detection for GC and GC-MS applications with our selection of derivatization reagents.

The Ideal Derivatization Procedure Will:

- Accomplish the desired modification.
- Proceed quantitatively, or at least reproducibly.
- Produce products that are readily distinguishable and separable from the starting materials.
- Proceed rapidly with simple and straightforward laboratory techniques that will be both selective and applicable to a number of similar compounds.
- Involve reagents and reactions that present no unusual hazards.

Why Derivatize:

- To make a compound that otherwise could not be analyzed by a particular method suitable for analysis.
- To improve the analytical efficiency of the compound.
- To improve the detectability of the compound.

The GC Reagents web page contains the latest news, applications and downloads for the GC Reagents range. Visit www.thermoscientific.com/gcreagents



GC Reagents

Technical Resources



visit www.thermoscientific.com/chromexpert
to access the following information:

- Thermo Scientific Silylation Reagents Overview
- Thermo Scientific Acylation Reagents Overview
- Thermo Scientific Alkylation Reagents Overview
- Derivatization Reagents for Specific Functional Groups
- Derivatization Reagents for Drugs of Abuse
- Troubleshooting Reagents

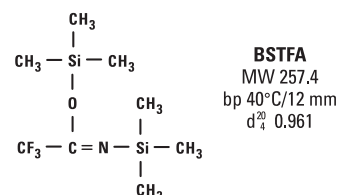


Silylation Reagents

BSTFA and BSTFA + TMCS

For excellent chromatographic separations and difficult-to-silylate compounds

- Increased volatility makes it possible to derivatize smaller molecules with which the TMS derivatives elute with the byproducts from BSA
- Excellent for derivatizing fatty acid amides, slightly hindered hydroxyls and other compounds
- Catalyzed formulation is stronger than BSTFA alone



BSTFA and BSTFA + TMCS

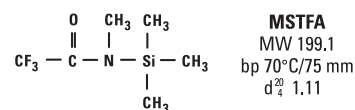
Description	Quantity	Cat. No.	Quantity
BSTFA	10 × 1mL ampules	TS-38830	1 Pack
	25g	TS-38828	1 Each
	100g	X TS-38829	1 Each
BSTFA + 1% TMCS	10 × 1mL ampules	TS-38831	1 Pack
	10g	TS-38832	1 Each
	25g	TS-38833	1 Each
	100g	X TS-38834	1 Each
BSTFA + 10% TMCS	10 × 1mL ampules	TS-38840	1 Pack

X in the ordering table indicates that hazardous shipping charges apply.

MSTFA and MSTFA + 1% TMCS

Offers maximum volatility

- Trimethylsilyl donor strength comparable to BSA and BSTFA
- Reacts to replace labile hydrogens on a wide range of polar compounds with a Si(CH₃)₃ group
- Used to prepare volatile and thermally stable derivatives for GC and GC-MS
- Addition of Thermo Scientific TMCS aids derivatization of amides, secondary amines and hindered hydroxyls not derivatized by MSTFA alone



MSTFA and MSTFA + 1% TMCS

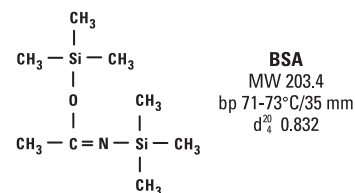
Description	Quantity	Cat. No.	Quantity
MSTFA	10 × 1mL ampules	TS-48910	1 Pack
	10g	TS-48911	1 Each
	25mL	TS-48913	1 Each
	100mL	X TS-48914	1 Each
MSTFA + 1% TMCS	10 × 1mL ampules	TS-48915	1 Pack

X in the ordering table indicates that hazardous shipping charges apply.

BSA

The perfect reagent for rapid silylation reactions

- Highly reactive trimethylsilyl donor that reacts quantitatively to form volatile, stable TMS derivatives
- Reacts quickly and quantitatively under mild conditions with a variety of compounds
- Derivatizes alcohols, amines, amides, carboxylic acids, phenols, steroids, biogenic amines and alkaloids



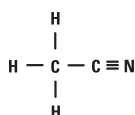
BSA

Description	Quantity	Cat. No.	Quantity
BSA	10 x 1mL	TS-38836	1 Pack

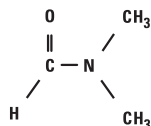
Silylation Grade Solvents

Manufactured to meet your exacting silylation needs

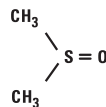
- Purified, dried and packaged under nitrogen in convenient 50mL Hypo-Vial Sample Storage Vials
- Supplied with elastomer septa, allowing immediate access to the sample without exposure to moisture and oxygen
- Use polar solvents (acetonitrile, dimethylformamide, dimethylsulfoxide, pyridine, tetrahydrofuran) to facilitate reactions; nonpolar organic solvents may be used, but they will not accelerate the rate of reaction



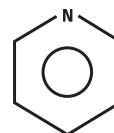
Acetonitrile
 MW 41.05
 bp 81.6°C



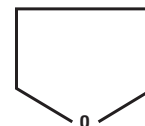
Dimethylformamide
 MW 73.09
 bp 153°C



Dimethylsulfoxide
 MW 78.13
 bp 189°C



Pyridine
 MW 79.10
 bp 115.2°C



Tetrahydrofuran
 MW 72.10
 bp 66°C

Silylation Grade Solvents

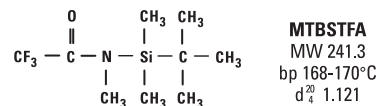
Description	Quantity	Cat. No.	Quantity
Acetonitrile	50mL	X TS-20062	1 Each
Dimethylformamide (DMF)	50mL	X TS-20672	1 Each
Dimethylsulfoxide (DMSO)	50mL	X TS-20684	1 Each
Pyridine	50mL	X TS-27530	1 Each
Tetrahydrofuran (THF)	50mL	X TS-27860	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

MTBSTFA and MTBSTFA + 1% TBDMCS

Offers stable TBDMS (tert-butyldimethylsilyl) derivatization

- Derivatizes hydroxyl, carboxyl, thiol and primary and secondary amines
- Typical yields are >96%
- Reaction byproducts are neutral and volatile
- Silylating potential increased by adding 1% TBDMCS



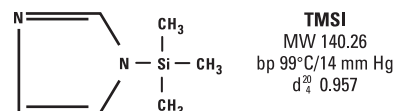
MTBSTFA and MTBSTFA + 1% TBDMCS

Description	Quantity	Cat. No.	Quantity
MTBSTFA	5mL ampules	TS-48920	1 Each
MTBSTFA + 1% TBDMCS	10 × 1mL	TS-48927	1 Pack

TMSI (*N*-Trimethylsilylimidazole)

The strongest silylator available for carbohydrates and steroids

- Reacts quickly and smoothly with hydroxyls and carboxylic acids, but not with amines
- Used in the derivatization of alcohols, phenols, organic acids, steroids, hormones, glycols, nucleotides and narcotics
- Excellent for C1 through C5 fatty acids in serum and urine



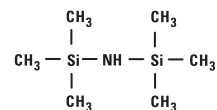
TMSI

Description	Quantity	Cat. No.	Quantity
TMSI (<i>N</i> -Trimethylsilylimidazole)	10 × 1mL ampules	TS-88623	1 Pack
	25g	TS-88625	1 Each
	100g	TS-88626	1 Each

HMDS (Hexamethyldisilazane)

The popular choice for silylation of sugars and related substances

- Greatly extends the practical range of GC, improving chromatographic results
- Suitable for deactivating and coating chromatographic supports
- Monofunctional, making polymerization not possible and eliminating surface moisture



HMDS
 MW 161.4
 bp 125°C
 n_D²⁰ 1.4071

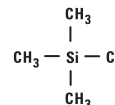
HMDS

Description	Quantity	Cat. No.	Quantity
HMDS (Hexamethyldisilazane)	25g	TS-84770	1 Each

TMCS (Trimethylchlorosilane)

An excellent catalyst for difficult-to-silylate compounds

- Excellent adjunct for forming trimethylsilyl ethers for GC determinations
- Used to prepare TMS derivatives of organic acids



TMCS
 MW 108.7
 bp 57.6°C
 d₄²⁰ 0.858

TMCS

Description	Quantity	Cat. No.	Quantity
TMCS	25g	TS-88530	1 Each

MOX (Methoxamine) Reagent

Useful for preparing oximes of steroids and ketoacids prior to silylation

- 2% methoxyamine HCl (M.W. 83.51) in pyridine
- Prevents formation of multiple derivatives when enols are present during silylation

MOX Reagent

Description	Quantity	Cat. No.	Quantity
MOX (Methoxamine) Reagent (2% methoxyamine•HCl in pyridine)	10mL	TS-45950	1 Each

Tri-Sil HTP (HMDS:TMCS:Pyridine) Reagent

Reagent-catalyst mixture for one-step derivatization

- Derivatizes carbohydrates, phenols, steroids, sterols, organic acids, alcohols and some amines
- Useful for rapid production of TMS derivatives of polar compounds for gas chromatographic determination and biochemical synthesis
- The versatility, speed and ease of use of Tri-Sil HTP Reagent has made it the most widely used silylation formulation available

Tri-Sil HTP Reagent

Description	Quantity	Cat. No.	Quantity
Tri-Sil HTP Reagent HMDS:TMCS:Pyridine (2:1:10)	10 × 1mL ampules	TS-48999	1 Pack
Tri-Sil HTP Reagent HMDS:TMCS:Pyridine (2:1:10)	50mL	X TS-49001	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

Tri-Sil BP (BSA:Pyridine) Reagent

Derivatizes alcohols, phenols, organic acids, aromatic amides and amines

Tri-Sil BP Reagent reacts with:

- Alcohols, phenols, some enols and other hydroxyl and polyhydroxyl compounds to form trimethylsilyl esters
- Organic acids to form trimethylsilyl esters
- Aromatic amides to form N-trimethylsilyl derivatives
- Amino acids to form both N- and O-trimethylsilyl derivatives
- Amines to form N-trimethylsilyl derivatives

Tri-Sil BP Reagent

Description	Quantity	Cat. No.	Quantity
Tri-Sil BP Reagent (2.5mEq/mL BSA in pyridine)	25mL	TS-49012	1 Each

Tri-Sil TBT (TMSI:BSA:TMCS) Reagent

A catalyzed silylation reagent formulation containing three parts TMSI, three parts BSA and two parts TMCS

- Converts all classes of hydroxyl groups to TMS ethers
- Under usual conditions, the reaction is complete in a short period of time at 60 to 80°C, although very hindered hydroxyls may require several hours

Tri-Sil TBT Reagent

Description	Quantity	Cat. No.	Quantity
Tri-Sil TBT Reagent TMSI:BSA:TMCS (3:3:2)	10 × 1mL ampules	TS-49016	1 Pack

Tri-Sil TP (TMSI:Pyridine) Reagent

Derivatizes hydroxyl compounds, particularly carbohydrates

- Silylates alcohols and phenols, organic acids, hydroxylamines, amino acids, carbohydrates, flavonoids, glycols and polyglycols, nucleotides, steroids, hydroxyl acids, barbiturates, narcotics, indoles and vitamins
- Does not react with amines
- May be used with water as long as there is enough reagent present to react with both the water and the sample

Tri-Sil TP Reagent

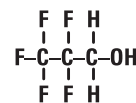
Description	Quantity	Cat. No.	Quantity
Tri-Sil TP Reagent TMSI: Pyridine (1:4)	10 × 1mL ampules	TS-49230	1 Pack
Tri-Sil TP Reagent TMSI: Pyridine (1:4)	25mL	TS-49231	1 Each

Acylation Reagents

Pentafluoropropanol

Purified for GC-MS applications

- Addition of fluorine atoms into compounds greatly enhances the sensitivity of certain detectors for all those materials
- Carboxylic acids can be derivatized using a two-step reaction involving reaction with anhydride, followed by a fluorinated alcohol



Pentafluoropropanol

MW 150.05
bp 80.6°C
d₄²⁰ 1.2880

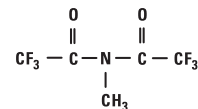
Pentafluoropropanol

Description	Quantity	Cat. No.	Quantity
Pentafluoropropanol	10 x 1mL ampules	TS-65195	1 Pack

MBTFA

For trifluoroacetylating primary and secondary amines, hydroxyl and thiol groups and carbohydrates

- Reacts under non-acidic conditions
- Principle byproduct from the derivatization reaction is N-methyltrifluoroacetamide, which is stable, volatile and does not present problems in subsequent GC
- Produces very volatile derivatives of carbohydrates
- Can be used to selectively acylate amines in the presence of hydroxyl and carboxyl groups that have been protected by silylation



MBTFA
MW 223.08
bp 123-124°C
d₄²⁰ 1.55

MBTFA

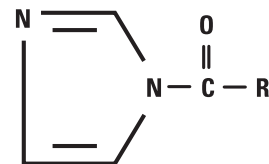
Description	Quantity	Cat. No.	Quantity
MBTFA [N-Methyl-bis(trifluoroacetamide)]	10 x 1mL ampules	TS-49700	1 Pack
	25mL	TS-49703	1 Each
	100mL	X TS-49704	1 Each
	5g	TS-49701	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

Perfluoroacylimidazoles (HFBI and TFAI)

Offer effective acylation of hydroxyl groups and primary and secondary amines

- Reactions are smooth, quantitative and produce no acid byproducts
- Excellent for FID and ECD techniques
- Derivatives are volatile, despite size of group
- Closely bound fluorines contribute to stability



R	Name	M.W.	Boiling Point
C ₃ F ₇	HFBI	264.10	57 to 58°C/10mm
CF ₃	TFAI	164.08	38 to 40°C/14mm

Perfluoroacylimidazoles (HFBI and TFAI)

Description	Quantity	Cat. No.	Quantity
HFBI	5g	* TS-44211	1 Each
TFAI	10 x 1mL ampules	TS-48882	1 Pack

* indicates that additional dry ice and/or freight charges apply.

Perfluoro Acid Anhydrides (TFAA, PFAA and HFAA)

Highly purified for optimal preparation of fluoracyl derivatives

- Used to prepare fluoracyl derivatives for GC-MS
- Produce stable volatile derivatives for FID and ECD techniques



Perfluoro Acid Anhydrides

Description	Quantity	Cat. No.	Quantity
TFAA (Trifluoroacetic Acid Anhydride)	100g	X TS-67363	1 Each
PFAA (Pentafluoropropionic Acid Anhydride)	10 x 1mL ampules	TS-65193	1 Pack
PFAA	25g	X TS-65192	1 Each
PFAA	100g	X TS-65191	1 Each
HFAA (Heptafluorobutyric Acid Anhydride)	10 x 1mL ampules	TS-63164	1 Pack
HFAA	25g	X TS-63163	1 Each
HFAA	100g	X TS-63162	1 Each

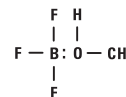
X in the ordering table indicates that hazardous shipping charges apply.

Alkylation Reagents

BF₃-Methanol

Provides convenient, fast and quantitative esterification of fatty acids

- Supplied in septum-sealed Hypo-Vial Sample Storage Vial for convenient syringe removal
- Consists of 14% BF₃, MW 67.82, and 86% CH₃OH, MW 32.04



BF₃-Methanol
14% BF₃ MW 67.82
86% CH₃OH MW 32.04

BF₃-Methanol

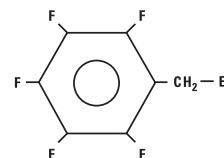
Description	Quantity	Cat. No.	Quantity
BF ₃ -Methanol	100mL	X TS-49370	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

Pentafluorobenzyl Bromide (PFBBr)

For electron capture GC analysis of carboxyl acids, phenols and sulfonamides

- Fast reaction times for extraction alkylation technique: ~20 minutes
- Derivatives are highly EC-sensitive
- Analysis of trace organics in asphalt



PFBBr
MW 260.9
bp 174-175°C
d₄²⁰ 1.86

Pentafluorobenzyl Bromide

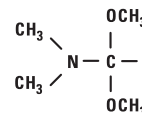
Description	Quantity	Cat. No.	Quantity
PFBBr (Pentafluorobenzyl Bromide)	5g	TS-58220	1 Each

Methylate Reagent (DMFDMA)

For easy, effective preparation of methyl esters from fatty acids and amino acids

Advantages for preparation of methyl esters for gas chromatography:

- Speed: the reaction is complete upon dissolution (except long chain solid acids)
- No water washing, extraction or concentration of derivatives required
- No water formed
- Convenient: ready-to-use reagent contains 2mEq/mL pyridine



Methylate Reagent
MW 119.17
bp 102-104°C
d₄²⁰ 0.897

Methylate Reagent

Description	Quantity	Cat. No.	Quantity
Methylate Reagent (N, N-Dimethylformamide dimethyl acetal)	25mL	TS-49350	1 Each

MethElute Reagent (TMPAH)

Provides accurate sensitive on-column methylation

- 0.2M trimethylanilinium hydroxide (TMPAH) in methanol solution
- For quantitative methylation and detection of barbiturates, sedatives, xanthine bases, phenolic alkaloids and phenytoin by gas chromatography
- Single quantitative peak for each substance
- Comparable to or better than UV/TLC method (when phenobarbital and phenytoin are present, GC is superior to UV/TLC)
- Coefficient of variation is 5% or less
- Detects barbiturates to 0.2mg/dL

MethElute Reagent

Description	Quantity	Cat. No.	Quantity
MethElute Reagent (TMPAH)	10mL	TS-49300	1 Each
MethElute Reagent (TMPAH)	12 × 1mL ampules	TS-49301	1 Pack



Siliconizing Fluids

Water-Soluble Siliconizing Fluid

Attaches the silane polymer, octadecyltrialkylsilane, to make the surface inert or polymerizes to create an inert film

- Easy-to-use silane monomer solution that is supplied as a 20% solid solution in a mixture of diacetone alcohol and tertiary butyl alcohol
- Greater resistance to base hydrolysis than other surface treatments
- Can be used on plastic surfaces

Water-Soluble Siliconizing Fluid

Description	Quantity		Cat. No.	Quantity
Siliconizing Fluid-Water Soluble	120mL	X	TS-42799	1 Each

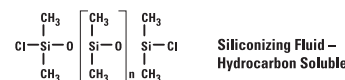
X in the ordering table indicates that hazardous shipping charges apply.

Hydrocarbon-Soluble Siliconizing Fluid

Attaches a short-chain silane polymer to make the surface inert or polymerizes to create an inert film

When applied to glass, quartz or similar materials, the unhydrolyzed chlorines present on the chain react with surface silanols to form a neutral, hydrophobic and tightly bonded film over the entire surface.

- Soluble in organic solvents
- Excellent for modifying metals, glass, ceramics and fiber optics
- Can be used for certain plastic surfaces
- Well-suited for treatment of GC injection port liners



Hydrocarbon-Soluble Siliconizing Fluid

Description	Quantity		Cat. No.	Quantity
Siliconizing Fluid-Hydrocarbon Soluble	120mL	X	TS-42800	1 Each
Siliconizing Fluid-Hydrocarbon Soluble	480mL	X	TS-42801	1 Each

X in the ordering table indicates that hazardous shipping charges apply.



Reacti-Therm Heating, Stirring and Evaporation System

Reliable and easy-to-use for constant temperatures and easy sample evaporation

Thermo Scientific Reacti-Therm and Reacti-Vap Evaporators provide the complete solution for derivatization and small-scale reactions.

- **Heating and Stirring Systems**

Unmatched convenience and versatility

- **Reacti-Vap**

Providing uniform dry heat to samples

- **Complete Solution**

For derivatization and small scale reactions

- **Complimentary Accessories**

Reacti-Vials and caps



Learn more about the Reacti-Therm and Reacti-Vap Systems.
Visit www.thermoscientific.com/columns

Reacti-Therm Heating and Stirring Modules

Reliable and easy-to-use for constant temperatures

- Uniform, stable heating: steady temperature incubation between ambient plus 10°C to 200°C
- LED display: match digital display to in-block thermometer to calibrate temperature set-point
- Modular design: switch aluminum blocks and vials; attach compatible evaporator manifold
- In-block temperature control option by Remote Temperature Probe, an optional accessory to allow temperature regulation from block wells or actual sample vials
- Magnetic stirrers for heating / stirring module for simultaneous stirring of samples in multiple vials

Reacti-Therm Heating Modules

Type	Size of Unit	Cat. No.	Quantity
Heating Function	Single-block	TS-18822	1 Each
	Triple-block	TS-18824	1 Each
Remote Temperature Probe		TS-18820	1 Each

Reacti-Therm Heating and Stirring Modules

Type	Size of Unit	Cat. No.	Quantity
Heating and Stirring Function	Single block	TS-18821	1 Each
	Triple-block	TS-18823	1 Each
Magnetic Stirrers for 3.0, 5.0 & 10.0mL Reacti-Vials		TS-16000	6 Pack
Magnetic Stirrers for 0.3 and 1mL Small Reaction Vials		TS-16010	6 Pack

Applications:

- General sample incubation and evaporation in a variety of tube and vial sizes
- Silylation, alkylation and acylation derivatization reactions for GC sample preparation
- Protein hydrolysis and vacuum hydrolysis reactions for amino acid analysis by HPLC

Reacti-Vap Evaporators

Manifolds for easy sample evaporation

- Integrated pressure-relief valve protects against excessive gas-flow and dangerous pressure build up
- Easy set-up: attach to corresponding Reacti-Therm Module, attach tubing from gas supply, and lower into position over samples and start gas flow
- Choose 9-port or 27-port model for compatibility with single-block and triple-block Reacti-Therm Modules, respectively

Reacti-Vap Evaporators

No. of Ports	For Use With	Cat. No.	Quantity
9	Single-block Reacti-Therm Module	TS-18825	1 Each
27	Triple-block Reacti-Therm Module	TS-18826	1 Each

Gas Regulators

Description	Cat. No.	Quantity
1/8" tube fitting	60181-625	1 Each
1/4" tube fitting	60181-626	1 Each



Applications:

- General sample incubation and evaporation in a variety of tube and vial sizes
- Silylation, alkylation and acylation derivatization reactions for GC sample preparation

Reacti-Block Aluminum Blocks

Optimal thermal conductivity

- Constructed of an aluminum alloy for optimal thermal conductivity
- Each Reacti-Block aluminium block contains a thermometer well
- Block dimensions are 9.4 L x 7.5 W x 5.1cm H for all blocks except for F, G, J and M which have a depth (height) of 7.6cm



Reacti-Block Aluminum Blocks

Description		Cat. No
Reacti-Block A-1 Holds 13 x 0.3mL or 1mL Reacti-Vials; 13 holes/14mm dia. x 23mm deep		TS-18801
Reacti-Block B-1 Holds 9 x 3mL or 5mL Reacti-Vials; 9 holes/21mm dia. x 32mm deep		TS-18802
Reacti-Block C-1 Holds 13 x 3.5mL Screw Cap Septum Vials; 13 holes/15mm dia. x 34mm deep		TS-18803
Reacti-Block Z-1 Holds 9 x 0.1mL Reacti-Vials; 9 holes/12mm dia. x 21mm deep		TS-18804
Reacti-Block M-1 Holds 6 x 27.5mL Reacti-Vials; 6 holes/28.5mm dia. x 70mm deep		TS-18811
Reacti-Block S-1 Holds 13 x 13mm dia. Test Tubes; 13 holes/14mm dia. x 45mm deep		TS-18816
Reacti-Block T-1 Holds 9 x 16mm dia. Test Tubes; 9 holes/17mm dia. x 45mm deep		TS-18817
Reacti-Block U-1 Holds 8 x 20mm dia. Test Tubes; 8 holes/21mm dia. x 45mm deep		TS-18818
Reacti-Block V-1 Holds 17 Microcentrifuge Test Tubes; 17 holes/11mm dia. x 45mm deep		TS-18819

The Reacti-Block aluminium blocks below are designed to be used exclusively with the Reacti-Therm modules. The hole patterns do not match the needle configuration of Reacti-Vap Evaporators.

Description		Cat. No
Reacti-Block F Holds 8 x 6mL Vacuum Hydrolysis Tubes; 8 holes/10mm dia. x 64mm deep		TS-18806
Reacti-Block G Holds 4 x 18mL Vacuum Hydrolysis Tubes; 4 holes/19mm dia. x 64mm deep		TS-18807
Reacti-Block J Blank/no holes (for custom drilling) 7.6cm tall		TS-18809
Reacti-Block K Blank/no holes (for custom drilling) 5.1cm tall		TS-18810
Reacti-Block L Holds 16 x 0.1mL Reacti-Vials; 16 holes/12mm dia. x 21mm deep		TS-18812

Reacti-Therm Thermometers

Thermometers specially designed for use in dry block heaters

- Mercury-free: alcohol-filled for greater safety
- PTFE coating ensures that glass is impervious to corrosive materials
- Shock-resistant glass and coatings
- Standard laboratory size: 225mm length x 8mm diameter
- Compatible for use in Reacti-Therm Heating Modules and other laboratory equipment



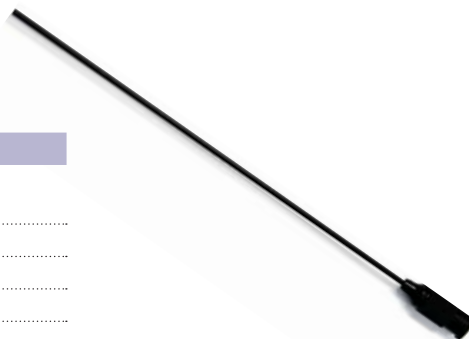
Reacti-Therm Thermometers

Min. Temperature (°C)	Max. Temperature (°C)	Cat. No.	Quantity
0	100	TS-18914	1 Each
0	200	TS-18915	1 Each

Reacti-Vap Replacement Parts

Reacti-Vap Replacement Parts

Description	Cat. No.	Quantity
Reacti-Vap Replacement Tube Kit 2.5 inch (64mm) (Tubes and Plugs)	TS-18782	9 Pack
Reacti-Vap PTFE-Coated Needles 102mm (4in) Length	TS-18784	9 Pack
Reacti-Vap PTFE-Coated Needles 152mm (6in) Length	TS-18786	9 Pack
Replacement Luer-Lok Fitting	TS-18827	1 Each
Replacement Screws for Mounting Bracket	TS-18828	4 Pack
Replacement Height Adjustment Knob	TS-18829	1 Each
Replacement Mounting Bracket	TS-18830	1 Each
Replacement Metal Rod	TS-18831	1 Each
Replacement Dial for Flow Control	TS-18832	1 Each
Replacement Long Screws for Mounting Bracket	TS-18833	4 Pack



Vacuum Hydrolysis Tubes

For fast, effective protein and peptide hydrolysis

- The upper temperature limit of the Vacuum Hydrolysis Tubes is 260°C; however, do not heat the tubes greater than 100°C in an oven
- Vacuum hydrolysis tubes fit conveniently into Reacti-Block aluminium heating blocks



Vacuum Hydrolysis Tubes

Volume (mL)	OD (mm)	Length (mm)	Cat. No.	Quantity
1	8	60	TS-29570	1 Each
6	10	150	TS-29571	1 Each
18	19	100	TS-29572	1 Each

Reacti-Vial Small Reaction Vials

An internal cone makes small sample handling easy and convenient

- Extra thick glass wall magnifies the sample, making these vials ideal for observing chemical reactions
- Amber vials available for light-sensitive compounds
- Supplied complete with Open-Top Screw Caps and PTFE/Rubber Discs



Reacti-Vial Small Reaction Vials

Capacity	Cat. No.	Quantity
Amber		
1mL	TS-13097	12 Pack
5mL	TS-13099	12 Pack
Clear		
100µL	TS-13100	12 Pack
300µL	TS-13220	12 Pack
1mL	TS-13221	12 Pack
3mL	TS-13222	12 Pack
5mL	TS-13223	12 Pack
10mL	TS-13225	12 Pack

Applications:

- Residue isolation, derivative preparation, maximum sample retrieval, moisture protection, sample storage, precipitations, centrifugations, solvent evaporation

Thermo Scientific Tuf-Bond PTFE/Silicone Discs

Discs that combine the inertness of PTFE with the resealability of silicone

- Structurally bonded PTFE to silicone; no cement to leak out of your sample after needle penetration
- Reseals instantly, puncture after puncture
- Autoclavable
- Compresses to maintain a tight seal forcing the PTFE to conform to the sealing surface
- Standard syringe and GC needles penetrate the entire disc with ease



Thermo Scientific Tuf-Bond PTFE/Silicone Discs

Diameter (mm)	Fits	Cat. No.	Quantity
8	100µL Reacti-Vial Small Reaction Vials, 1.5mL Screw Cap Septum Vials	TS-12708	72 Pack
12	0.3 and 1mL Reacti-Vial Small Reaction Vials, 3.5mL Screw Cap Septum Vials	TS-12712	72 Pack
13	7mL Screw Cap Septum Vials	TS-12713	72 Pack
16	14mL Screw Cap Septum Vials; 15mL (0.5 oz.) Screw Cap Bottles	TS-12716	72 Pack
18	3 and 5mL Reacti-Vial Small Reaction Vials	TS-12718	72 Pack
22	25 and 40mL Screw Cap Septum Vials, 240mL (8 oz.) Screw Cap Bottles, 10mL Reacti-Vial	TS-12722	72 Pack

PTFE/Rubber Laminated Discs

Provides a highly inert and unreactive seal

- Constructed of white pharmaceutical rubber with PTFE bonded to one side
- Discs are autoclavable with no loss of integrity after heating above 100°C for 5 hours



PTFE/Rubber Laminated Discs

Diameter (mm)	Fits	Cat. No.	Quantity
12	0.3 and 1mL Reacti-Vial Small Reaction Vials, 2 and 3.5mL Screw Cap Septum Vial	TS-12412	72 Pack
18	3 and 5mL Reacti-Vial Small Reaction Vials; 10 and 25mL Reacti-Flask	TS-12418	72 Pack

Open-Top Screw Caps

Provide inert, air-tight seal and direct puncture-access to sample with a syringe needle

- Fits into Reacti-Vial Small reaction vials
- Used with PTFE/Rubber laminated discs



Open-Top Screw Caps

Fits	Cat. No.	Quantity
3 and 5mL Reacti-Vials	TS-13218	72 Pack
0.3 and 1.0mL Reacti-Vials, 3.5mL Screw Cap Septum Vial	TS-13215	72 Pack
10mL Reacti-Vials, 40mL Screw Cap Septum Vials	TS-13219	72 Pack

Screw Cap Septum Vials

Economy, convenience and versatility in a vial and closure system

- Flat bottom vials
- Heavy-duty flip-top divider box provides easy access to vials, caps and septa and offers a convenient sample storage center
- Storage of reagents and standards under complete seal with instant syringe access



Screw Cap Septum Vials

Capacity (mL)	Cat. No.	Quantity
Clear		
3.5	TS-13019	72 Pack
7	TS-13028	72 Pack

Ordering Alerts: Septa not included with vials; must be ordered separately.

Mininert Valves

Excellent closures for chemicals that deteriorate or evaporate through conventional vial caps and seals



Thermo Scientific™ Mininert™ Valves are screw caps that have integrated resealable valves to allow repeated and unlimited syringe-needle access to samples. Slide the valve one way to open the needle-port. Slide the valve back to close and completely seal the close.

- Available in two sizes – 20mm (thread size 20/400) and 27mm (thread size 24/400) to fit 3 and 5mL Reacti-Vial Small Reaction Vials and 40mL Screw Cap Septum Vials, respectively
- Precision crafted from PTFE plastic for repeated use and chemical resistance
- Valve design eliminates the septum-boring that occurs with repeated puncture of traditional septa

Mininert Valves

Size (mm)	Fits	Cat. No.	Quantity
20	Fits 3 and 5mL Reacti-Vial Small Reaction Vials	TS-10135	12 Pack
27	Fits 40mL Screw Cap Septum Vials	TS-10130	12 Pack

GC and GC-MS Instruments

Our gas chromatography and mass spectrometry instruments offer solutions to food, environmental, pharmaceutical laboratories and industrial customers. Our instruments stimulate to advance scientific knowledge, enable drug discovery and to improve manufacturing processes. Using our GC and GC-MS you can expect the best results and highest level of productivity to keep your research or processes moving smoothly.

TRACE 1300 Series GC

- User-installable injectors and detectors
- Easy adoption of standard GC methods
- Unmatched detector sensitivity in trace analysis
- Increased robustness of injector technology
- Shorter sample cycle time



For routine GC and GC-MS laboratories that need flexibility for a wide range of applications, the Thermo Scientific™ TRACE™ 1300 Series GC Gas Chromatograph is the latest technology to simplify workflow and increase analytical performance.

The TRACE 1300 Series offers the most versatile GC platform in the market, with unique instant connect modularity for ground-breaking ease of use and performance, setting a new era in GC technology. GC users now have the unique ability to easily configure the system themselves, to increase throughput or for a rapid exchange of configurations, with the added benefit of continuous operation since modules can be swapped and routine maintenance performed offline to fit laboratory's schedule.

Visit www.thermoscientific.com/trace1300

TriPlus RSH Autosampler

- Reliable GC and GC-MS automation
- Liquid injection/headspace/SPME, all-in-one unattended sequence
- Enhanced productivity and powerful versatility in sample preparation

The Thermo Scientific™ TriPlus™ RSH Autosampler offers scalable flexibility from simple liquid injection to extended sample preparation. An innovative Automated Tool Change (ATC) station addresses sampling demand and selects the most suitable syringe during a sequence. Up to 6 different syringes can be programmed in a sequence for extended sample preparation capabilities and different sampling modes (liquid, HS, SPME). Unsurpassed sample handling flexibility combined with high sample capacity, places no limits even to more stringent productivity requirements. Multiple sample trays increase unattended operation up to 972 x 2mL vials. The unique Bottom Vial Sensing feature secured syringe depth positioning in your vial for the last μL sample. Even nanovolume injections through the use of plunger-in-needle syringes can be programmed in a flexible sequence. All these, combined with large volume injections deliver unsurpassed sample handling flexibility.

Visit www.thermoscientific.com/triplusrsh



AI/AS 1310 Autosampler

- Automated liquid injection systems for all Thermo Scientific GC and GC-MS systems
- Performance and simplicity in liquid sampling
- “Tool-Free” upgradability from 8 to 155 vial positions

Engineered to meet the highest level requirements of ruggedness and ease-of-use, the AI/AS 1310 automatic sampling system is ideal for high throughput and QA/QC control on the Thermo Scientific GC and GC/MS product portfolio. Utmost precision and ease-of-use of the plug and inject concept are combined in the available configurations: 8-position single module system for small batches of samples; 155 position tray system for high sample throughput. Boost productivity further with the Gemini configuration, which allows two autosamplers to be mounted on the same GC, serving two injection ports simultaneously.

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AI 1310 mounted onto a TRACE 1310 GC



AS 1310 155-vial Autosampler mounted on a TRACE 1300 GC with ISQ Mass Spectrometer

TriPlus 300 Headspace Autosampler

- Unprecedented productivity and accelerated analytical results
- High throughput operations with expanded sample capacity
- Ideal for organic volatiles analysis

The Thermo Scientific™ TriPlus™ 300 Headspace valve-and-loop autosampler offers a quick start-up and enables reliable, unattended and high throughput operations with expanded sample capacity. Its ability to fully comply with existing methods in pharmaceutical, forensic and environmental laboratories makes TriPlus 300 HS the product of choice for automated and dependable organic volatiles determinations.

Combined with the user-configurable TRACE 1300 Series GC and supported by a range of chromatography data systems that offer comprehensive system control, TriPlus 300 HS delivers unprecedented productivity and accelerated analytical results within the laboratory workflow.

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ISQ Series Single Quadrupole GC-MS

- Unique Full Source Removal™ capability delivers maximum uptime and unstoppable productivity
- ExtractaBrite™ solid, inert ion source provides robust operations and low detection limits
- Versatile and flexible for a broad range of applications

The Thermo Scientific™ ISQ™ Series single quadrupole GC-MS system features time-proven technology developed with the accumulation of almost 50 years of mass spectrometry innovation, offering an affordable and robust solution. This GC-MS series offers operational simplicity, proven dependability, and unstoppable productivity.

The ISQ QD GC-MS offers quality design, MS operational simplicity, and proven dependability for QA/QC and low-to medium-throughput production environments, as well as in teaching and academic facilities.

For analytically-demanding, high-throughput laboratories, requiring utmost sensitivity and unstoppable productivity, the ISQ LT GC-MS does not need to be vented to exchange the source, and it boasts the lowest detection limits and unlimited flexibility.

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TSQ 8000 Evo GC-Triple Quadrupole MS

- Unique full source removal capability delivers maximum uptime and unstoppable productivity
- ExtractaBrite™ solid, inert ion source provides robust operations and low detection limits
- Unprecedented ease of use with innovative AutoSRM software

The Thermo Scientific™ TSQ™ 8000 Evo Gas Chromatograph/Triple Quadrupole Mass Spectrometer offers the easiest way to achieve the lower detection limits and reduced sample preparation allowed by selected reaction monitoring (SRM). The TSQ 8000 Evo GC-MS/MS is the first triple quadrupole GC-MS/MS system to offer an extractable ion source under vacuum and software that fully automates SRM development.

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TSQ™ Duo Triple Quadrupole GC-MS/MS

- AutoSRM: provides automated method development and method maintenance software
- SIM Bridge: assists transitioning from SIM to SRM methods
- Portable methods: use existing methods or develop master methods on the TSQ 8000 Evo in the core lab and run them on the TSQ Duo system in field labs
- Chromeleon CDS software: MS control and data processing
- Timed Acquisition upgrade: when your methods grow in analyte number
- Excellent performance in Full Scan mode, with NIST MS Library searchable spectra
- User-installable modules: can be changed in less than two minutes

This GC-MS/MS is like no other. The Thermo Scientific™ TSQ™ Duo GC-MS/MS system is tailored to chromatographers and single quadrupole GC-MS users who need easy access to powerful new MS/MS workflows and who need to satisfy current method requirements. The system provides excellent performance in both single and triple quadrupole modes that is easily achievable, even for less experienced users. The TSQ Duo is the only cost-sensitive instrument featuring efficient, simply intelligent software workflows made possible by Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) software.

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Q Exactive GC Orbitrap GC-MS/MS

Bring the power of the first-ever combination of high-resolution gas chromatography (GC) and high-resolution/accurate-mass (HR/AM) Orbitrap mass spectrometry to your laboratory. The Thermo Scientific™ Q Exactive™ GC Orbitrap™ GC-MS/MS system provides comprehensive characterization of samples in a single analysis for the highest confidence in compound discovery, identification, and quantitation. Q Exactive GC offers the quantitative power of a GC triple quadrupole MS combined with the high performance, full scan HR/AM capabilities that are only possible with Orbitrap MS technology.

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02-CTV(A)	2-062	043018	3-033	063423	3-034	068989	4-035	069707	4-053
02-CTVG	2-062	054993	3-019	063425	3-034	068989	4-040	069707	5-057
02-CTVG	2-088	054994	3-019	063448	3-021	068990	4-035	069707	3-027
02-FIRVG	2-075	054995	3-019	063454	3-021	068990	4-040	06-CTV(A)	2-062
02-FISVG	2-067	054997	3-021	063456	3-019	069477	3-030	06-CTV(A)	2-088
02-FISVG	2-088	054998	3-021	063462	3-019	069580	4-037	070079	4-039
02-FIVG	2-071	054999	3-021	063464	3-021	069580	4-038	070080	4-035
02-FIVG	2-088	055150	3-021	063470	3-021	069580	4-041	070081	5-055
02-MTV	2-064	059122	4-036	063472	3-019	069580	4-042	070082	5-055
02-MTV	2-089	059123	4-036	063474	3-019	069580	4-043	070083	5-055
02-MTVWVG	2-067	059124	4-036	063480	3-019	069580	4-044	070084	4-053
02-MTVWVG	2-071	059125	4-036	063653	3-031	069580	4-049	070085	4-053
02-MTVWVG	2-075	059126	4-036	063655	3-031	069580	4-050	070086	4-052
02-MTVWVG	2-089	059127	4-036	063665	3-031	069580	4-051	070087	4-052
02-NV	2-064	059134	4-036	063684	3-027	069580	4-052	070088	4-043
02-NV	2-089	059136	4-036	063693	4-039	069580	4-053	070089	4-043
035321	4-076	059138	4-036	063700	3-019	069580	3-012	070090	4-042
039567	4-076	059139	4-036	063703	3-021	069580	3-014	070091	4-042
039568	4-076	059140	4-036	063705	4-035	069580	3-016	070092	4-044
039657	3-022	059141	4-036	063707	3-021	069580	3-017	070093	4-044
039658	3-022	05-CTV(A)	2-062	064293	3-024	069580	3-027	071387	4-050
03-CVG	2-088	05-CTV(A)	2-088	064294	3-024	069580	3-037	071388	4-050
03-FIRV	2-075	060263	3-027	064295	3-024	069580	3-044	071389	4-050
03-FIRV	2-088	060264	3-027	064296	3-030	069686	4-043	071390	4-050
03-FIRV(A)	2-075	060265	3-027	064297	3-030	069688	4-036	071391	4-050
03-FIRV(A)	2-088	060266	3-027	064298	3-030	069690	3-027	071401	4-035
03-FISV	2-067	061316	4-039	064309	5-055	069691	4-039	071401	4-040
03-FISV	2-088	061317	4-039	064984	4-043	069692	4-035	071402	4-035
03-FISV(A)	2-067	061318	4-039	064985	4-043	069692	4-040	071402	4-040
03-FISV(A)	2-088	061319	4-039	066276	4-035	069693	4-053	071607	4-035
03-FIV	2-071	061320	4-039	066276	4-040	069694	4-042	071607	4-040
03-FIV	2-088	061321	4-039	066277	4-035	069696	4-036	071608	4-035
03-FIV(A)	2-071	062902	4-052	066277	4-040	069697	3-027	071608	4-040
03-FIV(A)	2-088	062903	4-052	066640	3-030	069698	4-039	071609	4-035
03-NV	2-067	062998	3-034	066642	3-024	069699	4-035	071609	4-040
03-NV	2-071	063000	3-034	066643	3-024	069699	4-040	071908	4-043
03-NV	2-075	063174	4-039	066765	3-024	069700	4-052	071909	4-043
03-PPSV	2-064	063187	4-035	066766	3-036	069701	4-053	071910	4-044
03-PPSV	2-088	063187	4-040	066843	4-042	069703	5-055	071911	4-044
03-PPSVW	2-067	063189	4-035	066844	4-042	069704	4-043	071912	4-042
040137	3-022	063189	4-040	066847	4-042	069705	4-044	071913	4-042
042150	4-045	063191	4-035	067084	4-043	069706	4-042	071969	4-037
042151	4-045	063191	4-040	068123	4-053	069707	4-037	071970	4-037
042152	4-045	063197	4-035	068352	4-044	069707	4-038	071971	4-037
042153	4-045	063197	4-040	068353	4-044	069707	4-041	071973	4-037
042189	4-045	063199	4-035	068371	4-044	069707	4-042	071974	4-037
042191	4-045	063199	4-040	068459	3-024	069707	4-043	071977	3-024
042193	4-045	063201	4-053	068970	4-036	069707	4-044	071979	4-036
042195	4-045	063203	4-053	068972	4-039	069707	4-050	071983	4-039

071985	4-035	074813	4-039	078664	4-038	082539	3-006	088558	3-012
071985	4-040	074814	4-035	078665	4-038	082673	3-009	088559	3-012
071987	4-052	074814	4-040	078666	4-038	082674	3-009	088644	3-014
071989	5-055	075563	4-050	078950	5-054	082675	3-009	088645	3-014
071991	4-053	075564	4-050	078951	5-054	082739	4-046	088646	3-014
072615	4-036	075565	4-050	078952	5-054	082740	4-046	088647	3-014
072616	4-036	075592	3-007	078953	5-054	082767	5-054	088648	3-014
072617	4-036	075596	5-057	078954	5-054	082768	5-054	088649	3-014
072618	4-036	075597	5-057	078955	5-054	082773	5-054	088700	4-082
072619	4-036	075602	3-008	078956	5-054	083214	5-058	088753	4-049
072620	4-036	075603	3-008	078959	5-054	083241	5-056	088754	4-049
072622	4-039	075604	3-008	078960	5-054	083242	5-056	088755	4-049
072623	4-039	075698	4-039	078990	3-021	083244	5-056	088756	4-049
072624	4-039	075699	4-035	079008	5-058	083272	3-010	088757	4-049
072627	4-039	075718	4-038	079009	5-058	083273	3-010	088758	4-049
072924	5-057	075719	4-038	079010	5-058	083274	3-010	088759	3-033
072925	5-057	075720	4-038	079011	5-058	083275	3-010	088760	3-033
072926	5-057	075721	4-038	079012	5-058	083378	3-010	088761	3-033
072927	5-057	075721	3-027	079013	5-058	083381	3-010	088762	4-076
072928	5-057	075722	4-038	079014	5-058	085198	3-008	088763	4-076
072929	5-057	075723	4-038	079697	4-037	085209	3-009	088764	3-033
072930	5-057	075724	4-038	079715	5-056	085346	3-010	088765	3-033
074188	4-037	075725	4-038	079717	5-056	085348	3-010	088766	3-019
074188	4-038	075726	4-038	079719	5-056	085349	3-010	088767	3-019
074188	4-041	075749	3-008	079721	4-046	085431	4-051	088768	3-019
074188	4-042	076185	4-036	079722	4-046	085432	4-051	088769	3-019
074188	4-043	076196	3-011	079723	4-046	085433	4-051	088770	3-021
074188	4-044	076197	3-011	079724	4-046	085434	4-051	088771	3-021
074188	4-050	076214	4-039	079725	4-046	085435	4-051	088772	3-019
074188	4-051	076225	5-055	079726	4-046	085436	4-051	088773	3-019
074188	4-052	076226	5-055	079930	3-019	085455	4-044	088774	3-019
074188	4-053	076227	5-055	079934	4-037	088016	4-037	088775	3-019
074188	5-057	077907	3-008	07-CPV	2-062	088135	3-017	088776	3-019
074188	3-027	077972	5-058	07-CPV	2-088	088136	3-017	088777	3-019
074197	3-031	077973	5-058	07-CPV(A)	2-062	088242	3-009	088778	3-019
074257	4-041	077974	5-058	07-CPV(A)	2-088	088251	3-017	088778	3-019
074258	4-041	077997	4-035	082468	3-016	088252	3-017	088780	3-034
074259	4-041	077997	4-040	082469	3-016	088255	3-017	088781	3-034
074261	4-041	077998	4-035	082470	3-016	088258	3-017	088784	3-008
074262	4-041	077998	4-040	082472	3-016	088259	3-017	088786	4-076
074263	4-041	077999	4-035	082473	3-016	088260	3-017	088787	4-076
074600	3-019	077999	4-040	082474	3-016	088400	4-082	088788	4-076
074625	3-008	078000	4-035	082475	3-016	088460	3-007	088789	3-007
074628	3-020	078000	4-040	082476	3-016	088480	3-012	088790	3-007
074631	3-008	078001	4-035	082508	3-035	088481	3-012	088919	3-037
074643	3-020	078001	4-040	082509	3-035	088482	3-012	088920	3-037
074696	3-007	078655	3-008	082510	3-035	088553	3-012	088921	3-037
074697	3-007	078656	3-008	082515	3-009	088554	3-012	088923	3-037
074811	4-036	078661	4-038	082521	3-016	088555	3-012	088924	3-037

088925	3-037	11-AC7(G)	2-090	12-SC(W)	2-091	16126-103030	3-028	164709	3-043
089170	3-044	11-AC7(GO)	2-072	12-SC(Y)	2-091	16126-104630	3-028	164710	3-043
08-CPV	2-062	11-AC7(GO)	2-090	12-6RT1	2-078	16126-152130	3-028	164711	3-043
08-CPV	2-088	11-AC7(R)	2-072	12-6RT1	2-091	16126-153030	3-028	164712	3-043
08-CRV(A)	2-062	11-AC7(R)	2-090	12-CV	2-080	16126-154630	3-028	164713	3-043
08-CRV(A)	2-088	11-AC-AL	2-072	12-CV	2-089	16126-157569	3-044	164714	3-043
08-CV	2-062	11-ACB	2-072	12-NPEP4	2-079	16126-507569	3-044	164715	3-043
08-CV	2-088	11-ACB	2-090	12-NPEP4	2-091	16126-900379	3-046	164716	3-043
09-CTV	2-071	11-AC-CBT1	2-073	12-SC	2-078	163589	3-046	164717	3-043
09-CTV	2-088	11-AC-ST101	2-073	12-SC	2-091	163591	3-046	164718	3-043
09-FIV	2-071	11-AC-ST101	2-090	12-SC(R)	2-078	164197	3-047	164719	3-043
09-FIV	2-088	11-AC-ST101X	2-073	12-SC(W)	2-078	164199	3-046	164720	3-043
1.1-CTV(A)	2-071	11-AC-ST101X	2-090	12-SC(Y)	2-078	164205	3-047	164721	3-043
1.1-CTV(A)	2-088	11-AC-ST15	2-073	12-SC-8RT1	2-078	164213	3-046	164722	3-043
1.1-CTVG	2-071	11-ACT	2-073	12-SC-8RT1	2-091	164215	3-047	164723	3-043
1.1-CTVG	2-088	11-ACT	2-090	12-SCS	2-078	164454	3-043	164734	3-043
1.1-STVG	2-064	11-ACTS	2-073	12-SCS	2-091	164534	3-043	164738	3-043
1.1-STVG	2-088	11-AC-TST1	2-073	12-SC-ST2	2-078	164535	3-046	164739	3-043
1.2-CVW	2-062	11-AC-TST1	2-090	12-SC-ST2	2-091	164536	3-043	164769	3-043
1.2-CVW	2-088	11-LLX	2-072	12-ST101	2-078	164537	3-043	164899	3-043
1.2-UHRRV	2-075	11-MC-8RT1	2-073	12-ST101	2-091	164540	3-043	164900	3-043
1.2-UHRRV	2-088	11-MC-8RT1	2-090	12-ST18	2-078	164542	3-045	164901	3-043
1.2-UHRSV	2-067	11-MC-ST101	2-073	12-ST18	2-091	164543	3-045	164902	3-043
1.2-UHRSV	2-088	11-MC-ST101	2-090	12-ST2	2-078	164557	3-045	164921	3-045
1.5-HRCV	2-070	11-MC-ST15	2-073	12-ST2	2-091	164558	3-045	164922	3-045
1.5-HRRV	2-075	11-MC-ST15	2-090	12-SV	2-085	164560	3-043	164923	3-045
1.5-HRRV	2-088	11-PEC1	2-073	12-SV(A)	2-085	164561	3-043	164925	3-045
1.5-HRRV(S)	2-075	11-PEC1	2-090	12-T02	2-078	164562	3-043	164928	3-045
1.5-HRSV	2-067	11-PEC1X	2-073	12T02	2-091	164563	3-043	164929	3-045
1.5-HRSV	2-088	11-PEC1X	2-090	13-SCST	2-078	164564	3-046	164930	3-045
10-CV	2-081	11-PEC-ST1	2-073	13-SCST	2-085	164565	3-047	164931	3-045
10-CV	2-089	11-PEC-ST1	2-090	13-SCST	2-091	164566	3-047	164932	3-045
10-CV(A)	2-081	11-PSN(B)	2-076	13-SC-ST15	2-078	164567	3-043	164939	3-043
10-CV(A)	2-089	11-PSN(B)	2-091	13-SC-ST15	2-091	164568	3-043	16526-012105	3-029
10-HSV	2-081	11-PSN(B)-8RT1	2-076	15-SCST	2-085	164569	3-043	16526-013005	3-029
10-HSV	2-089	11-PSN(B)-8RT1	2-091	160434	3-046	164570	3-043	16526-014005	3-029
10-SV	2-077	11-PSN(B)-ST1	2-076	160438	3-046	164571	3-043	16526-032130	3-029
10-SV	2-089	11-PSN(B)-ST1	2-091	160454	3-046	164572	3-043	16526-033030	3-029
11-AC(B)-ST144	2-073	11-PSN(B)-ST101	2-076	161194	3-046	164584	3-045	16526-034630	3-029
11-AC-ST15	2-090	11-PSN(B)-ST101	2-091	16126-012015	3-028	164585	3-045	16526-052130	3-029
11-AC6	2-072	11-PSN(B)-ST1X	2-076	16126-013005	3-028	164586	3-030	16526-053030	3-029
11-AC6	2-090	11-PSN(B)-ST1X	2-091	16126-014005	3-028	164592	3-047	16526-054630	3-029
11-AC6(R)	2-072	11-PSN(B)-T02	2-076	16126-032130	3-028	164649	3-041	16526-102130	3-029
11-AC6(R)	2-090	11-PSN(B)-T02	2-091	16126-033030	3-028	164649	3-046	16526-103030	3-029
11-AC7	2-072	11-PSN(B)-TST1	2-076	16126-034630	3-028	164650	3-041	16526-104630	3-029
11-AC7	2-090	11-PSN(B)-TST1	2-091	16126-052130	3-028	164705	3-046	16526-152130	3-029
11-AC7(B)	2-072	11-PSN(G)-ST1X	2-091	16126-053030	3-028	164706	3-043	16526-153030	3-029
11-AC7(B)	2-090	11-PSN(R)-T02	2-076	16126-054630	3-028	164707	3-043	16526-154630	3-029
11-AC7(G)	2-072	11-PSN(R)-T02	2-091	16126-102130	3-028	164708	3-043	16526-157569	3-044

16526-507569	3-044	17326-052130	4-011	17926-013005	4-013	20-CBT3	2-091	22-CV	2-080
16526-900379	3-046	17326-053030	4-011	17926-014005	4-013	20-CBT3B	2-082	22-CV	2-089
16726-012105	3-015	17326-054630	4-011	17926-032130	4-013	20-CBT3B	2-091	22-SV	2-085
16726-013005	3-015	17326-102130	4-011	17926-052130	4-013	20-CV	2-080	23004-6090	5-077
16726-014005	3-015	17326-103030	4-011	17926-053030	4-013	20-CV(A)	2-080	24-SCST	2-085
16726-052130	3-015	17326-104630	4-011	17926-054630	4-013	20-CV(A)	2-089	25002-022130	4-021
16726-053030	3-015	17326-152130	4-011	17926-102130	4-013	20-CV/20-HSV	2-089	25002-031030	4-021
16726-054630	3-015	17326-153030	4-011	17926-103030	4-013	20-CVCBT3-CP	2-084	25002-032130	4-021
16726-102130	3-015	17326-154630	4-011	17926-104630	4-013	20-CVST3-CP	2-084	25002-051030	4-021
16726-103030	3-015	17426-012105	4-015	17926-152130	4-013	20-EPAVCS	2-087	25002-052130	4-021
16726-104630	3-015	17426-013005	4-015	17926-153030	4-013	20-EPAVCS(A)	2-087	25002-053030	4-021
16726-152130	3-015	17426-014005	4-015	17926-154630	4-013	20-EPSVCA	2-087	25002-054630	4-021
16726-153030	3-015	17426-032130	4-015	18-MSA	2-082	20-EPSVCA	2-089	25002-101030	4-021
16726-154630	3-015	17426-052130	4-015	18-MSA	2-091	20-HSV	2-081	25002-102130	4-021
16726-157569	3-044	17426-053030	4-015	18-MSA-CBT3	2-083	20-HSV	2-089	25002-103030	4-021
16726-252130	3-015	17426-054630	4-015	18-MSA-CBT3	2-091	20-HSVST201-CP	2-084	25002-152130	4-021
16726-900379	3-046	17426-102130	4-015	18-MSA-ST101	2-083	20-LLX	2-082	25003-011001	4-021
16-SV	2-085	17426-103030	4-015	18-MSA-ST201	2-083	20-LLX	2-091	25003-012101	4-021
16-SV(A)	2-085	17426-104630	4-015	18-MSA-ST201	2-091	20-MCB	2-082	25003-013001	4-021
17126-012105	4-009	17426-152130	4-015	18-MSA-ST3HT	2-083	20-MCB	2-091	25003-014001	4-021
17126-013005	4-009	17426-153030	4-015	18-SCST	2-085	20-MCBC	2-082	25003-032130	4-021
17126-014005	4-009	17426-154630	4-015	18-ST101	2-083	20-MCBC	2-091	25003-034630	4-021
17126-032130	4-009	17526-012150	4-017	18-ST101	2-091	20-MCBC(N)-ST3	2-091	25003-052130	4-021
17126-052130	4-009	17526-013005	4-017	1-CWV	2-062	20-MCBC(N)-ST3HT	2-083	25003-053030	4-021
17126-053030	4-009	17526-014005	4-017	1-CWV	2-088	20-MCBC(R)	2-082	25003-054030	4-021
17126-054630	4-009	17526-032130	4-017	1-NWV	2-079	20-MCBC(R)	2-091	25003-054630	4-021
17126-102130	4-009	17526-052130	4-017	1-NWV-C	2-079	20-MCBC(R)-CBT3	2-083	25003-101030	4-021
17126-103030	4-009	17526-053030	4-017	1-NWV	2-089	20-MCBC(R)-CBT3	2-091	25003-102130	4-021
17126-104630	4-009	17526-054630	4-017	1-NWV(A)-C	2-079	20-MCBC(R)-ST3	2-083	25003-103030	4-021
17126-152130	4-009	17526-102130	4-017	1-NWV(A)-C	2-089	20-MCBC(R)-ST3	2-091	25003-104030	4-021
17126-153030	4-009	17526-103030	4-017	2.5-CV	2-070	20-MCBC-ST3	2-083	25003-104630	4-021
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26087-2250	5-054	26089-3360	5-049	26092-3350	5-044	26097-2970	5-040	26099-2240	5-037
26087-2350	5-054	26090-0200	5-048	26092-3960	5-044	26097-2980	5-040	26099-2250	5-037
26087-2360	5-054	26090-1300	5-048	26094-1300	5-043	26097-3960	5-040	26099-2350	5-037
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26087-2980	5-054	26090-1420	5-048	26094-1430	5-043	26098-1180	5-038	26099-2760	5-037
26088-0200	5-053	26090-1430	5-048	26094-2120	5-043	26098-1300	5-038	26099-2840	5-037
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26099-2860	5-037	260F047P	5-066	260Q131P	5-067	26103-013001	4-030	26503-011001	4-033
26099-2940	5-037	260F130P	5-066	260Q142P	5-067	26103-014001	4-030	26503-012101	4-033
26099-2960	5-037	260F134P	5-066	260Q143P	5-067	26103-032130	4-030	26503-013001	4-033
26099-2970	5-037	260F142J	5-066	260Q154P	5-067	26103-052130	4-030	26503-014001	4-033
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26099-2985	5-037	260F143P	5-066	260Q309P	5-067	26103-104630	4-030	26503-052130	4-033
26099-3080	5-037	260F154P	5-066	260R050P	5-068	26103-151030	4-030	26503-102130	4-033
26099-3090	5-037	260F223P	5-066	260R130P	5-068	26103-152130	4-030	26503-103030	4-033
26099-3340	5-037	260F224P	5-066	260R142P	5-068	26103-153030	4-030	26503-104630	4-033
26099-3360	5-037	260F225P	5-066	260R143P	5-068	26103-154630	4-030	26503-151030	4-033
26099-4840	5-037	260F285P	5-066	260RG497	5-025	26105-012101	4-030	26503-152130	4-033
26099-5780	5-037	260F296P	5-066	260RG499	5-025	26105-013001	4-030	26503-153030	4-033
26099-5820	5-037	260F297P	5-066	260RG500	5-025	26105-014001	4-030	26503-154630	4-033
260A047P	5-064	260F298P	5-066	260V332P	5-070	26105-054630	4-030	26505-012101	4-033
260A130P	5-064	260F308P	5-066	260V333P	5-070	26105-102130	4-030	26505-013001	4-033
260A131P	5-064	260F336P	5-066	260V339P	5-070	26105-104630	4-030	26505-014001	4-033
260A142P	5-064	260F396P	5-066	260V341P	5-070	26105-152130	4-030	26505-052130	4-033
260A143P	5-064	260F578P	5-066	260V396P	5-070	26105-154630	4-030	26505-054630	4-033
260A154P	5-064	260G401P	5-025	260V495P	5-070	26105-252130	4-030	26505-102130	4-033
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260B142P	5-064	260G496P	5-025	260W142P	5-069	26105-254030	4-030	26505-154630	4-033
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260B155P	5-064	260G500P	5-025	260W155P	5-069	26303-012101	4-031	26505-254030	4-033
260B309P	5-064	260H030P	5-065	260W223P	5-069	26303-013001	4-031	26505-254630	4-033
260C130P	5-067	260H035P	5-065	260W224P	5-069	26303-014001	4-031	26AA395P	5-073
260C142P	5-067	260H047P	5-065	260W225P	5-069	26303-014001	4-031	26AX142P	5-073
260C143P	5-067	260H142P	5-065	260W286P	5-069	26303-052130	4-031	26AC497P	5-073
260C154P	5-067	260M096P	5-071	260W296P	5-069	26303-102130	4-031	26AF024P	5-073
260C286P	5-067	260M135P	5-071	260W297P	5-069	26303-103030	4-031	26AF047P	5-073
260C298P	5-067	260M137P	5-071	260W298P	5-069	26303-104630	4-031	26AF059P	5-073
260E113P	5-065	260M141P	5-071	260W309P	5-069	26303-153030	4-031	26AF130P	5-073
260E130P	5-065	260M142P	5-071	260W310P	5-069	26303-154630	4-031	26AF154P	5-073
260E131P	5-065	260M143P	5-071	260X142P	5-069	26305-012101	4-031	26AJ148P	5-073
260E142P	5-065	260M147P	5-071	260X143P	5-069	26305-013001	4-031	26H50-0218	5-026
260E143P	5-065	260M153P	5-071	260X154P	5-069	26305-014001	4-031	26H50-0225	5-026
260E154P	5-065	260M154P	5-071	260X155P	5-069	26305-052130	4-031	26H50-0232	5-026
260E155P	5-065	260M155P	5-071	260X223P	5-069	26305-102130	4-031	26H50-0253	5-026
260E223P	5-065	260M166L	5-071	260X224P	5-069	26305-103030	4-031	26H50-0518	5-026
260E224P	5-065	260N130P	5-070	260X296P	5-069	26305-104630	4-031	26H50-0525	5-026
260E225P	5-065	260N142P	5-070	260Y137P	5-068	26305-152130	4-031	26H50-0532	5-026
260E242P	5-065	260N143P	5-070	260Y142P	5-068	26305-154630	4-031	26H50-0553	5-026
260E297P	5-065	260N154P	5-070	260Y154P	5-068	26305-252130	4-031	26H50-1018	5-026
260E298P	5-065	260N213P	5-070	26102-052130	4-030	26305-253030	4-031	26H50-1025	5-026
260E336P	5-065	260N225P	5-070	26102-102130	4-030	26305-254030	4-031	26H50-1032	5-026
260E470P	5-065	260N230P	5-070	26102-152130	4-030	26305-254630	4-031	26H50-1053	5-026
260EC111	5-026	260N298P	5-070	26102-202130	4-030	26502-052130	4-033	26M88-1420	5-053
260F020P	5-066	260P123P	5-072	26103-011001	4-030	26502-102130	4-033	26M88-1440	5-053
260F035P	5-066	260Q 298P	5-067	26103-012101	4-030	26502-152130	4-033	26M88-1540	5-053

26M88-2230	5-053	27826-154630	4-016	28105-014001	4-071	28805-254630	4-071	290MA195	5-022
26M88-2250	5-053	27826-252130	4-016	28105-052130	4-071	28903-154630	4-071	290MA195	5-023
26M88-2880	5-053	27926-012105	4-014	28105-053030	4-071	28905-014001	4-071	290MA196	5-022
26M88-3360	5-053	27926-052130	4-014	28105-054630	4-071	28905-154630	4-071	290MA196	5-023
26M98-0350	5-038	27926-053030	4-014	28105-102130	4-071	28905-254030	4-071	290MA201	5-022
26M98-1300	5-038	27926-054630	4-014	28105-103030	4-071	28905-254630	4-071	290MA201	5-023
26M98-1420	5-038	27926-102130	4-014	28105-104030	4-071	29001312	5-019	290MA202	5-022
26M98-1540	5-038	27926-103030	4-014	28105-104630	4-071	29001318	5-019	290MA202	5-023
26M99-1300	5-037	27926-104130	4-014	28105-123030	4-071	29013417	5-019	290MA203	5-022
26M99-1420	5-037	27926-152130	4-014	28105-124030	4-071	29033406	5-019	290MA203	5-023
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26M99-4120	5-037	27926-154630	4-014	28105-152130	4-071	29033461	5-022	290MA205	5-023
26M99-4130	5-037	27926-252130	4-014	28105-153030	4-071	29033471	5-022	290MA207	5-022
26M99-4130	5-037	27926-252130	4-014	28105-153030	4-071	29033496	5-022	290MA207	5-023
26RC142F	5-072	27-CV	2-080	28105-154030	4-071	29033496	5-023	290MA215	5-022
26RC142P	5-072	27-CV	2-089	28105-154630	4-071	29033497	5-022	290MA215	5-023
26RD142F	5-072	28026-012150	4-012	28105-252130	4-071	29033497	5-023	290MA216	5-022
26RF024P	5-073	28026-052130	4-012	28105-253030	4-071	29053486	5-022	290MA216	5-023
26RF142F	5-072	28026-053030	4-012	28105-254030	4-071	29053487	5-022	290MA217	5-022
26RF142P	5-072	28026-054630	4-012	28105-254630	4-071	29053488	5-022	290MA217	5-023
26RF223P	5-072	28026-102130	4-012	28202-012101	4-071	29063466	5-028	290MA227	5-023
26RF296P	5-072	28026-103030	4-012	28202-014001	4-071	29063467	5-028	290MA228	5-023
26RV495P	5-072	28026-104630	4-012	28202-052130	4-071	290BT239	5-022	290MF229	5-024
26RX142P	5-072	28026-152130	4-012	28202-102130	4-071	290BT240	5-022	290MF230	5-024
27000	4-082	28026-153030	4-012	28202-104630	4-071	290BT241	5-022	290MF231	5-024
27002	4-082	28026-154630	4-012	28202-154630	4-071	290GA081	5-015	290MN211	5-024
27006	4-082	28026-252130	4-012	28203-012101	4-071	290GA082	5-015	290MT211	5-022
27101-052130	4-007	28102-012101	4-071	28203-013001	4-071	290GA083	5-015	290MT221	5-022
27101-102130	4-007	28102-014001	4-071	28203-014001	4-071	290GA084	5-015	290MT222	5-022
27101-152130	4-007	28102-052130	4-071	28203-052130	4-071	290GA091	5-015	290MT223	5-022
27726-012105	4-018	28102-054630	4-071	28203-054630	4-071	290GA092	5-015	290MT229	5-022
27726-052130	4-018	28102-102130	4-071	28203-104630	4-071	290GA093	5-015	290MT230	5-022
27726-053030	4-018	28102-104630	4-071	28203-153030	4-071	290GA094	5-015	290MT231	5-022
27726-054630	4-018	28103-012101	4-071	28203-154630	4-071	290GA107	5-023	290MU498	5-024
27726-102130	4-018	28103-013001	4-071	28205-012101	4-071	290GA108	5-023	290MU499	5-024
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27726-104630	4-018	28103-032130	4-071	28205-014001	4-071	290GA122	5-015	290OA241	5-019
27726-152130	4-018	28103-052130	4-071	28205-052130	4-071	290GA139	5-022	290OA241	5-020
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27726-252130	4-018	28103-102130	4-071	28205-102130	4-071	290GA139	5-022	290SA130	5-025
27826-012150	4-016	28103-103030	4-071	28205-104630	4-071	290GA140	5-023	290SA131	5-025
27826-052130	4-016	28103-104030	4-071	28205-154030	4-071	290GA140	5-023	290SA132	5-025
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27826-102130	4-016	28103-153030	4-071	28205-254630	4-071	290GA244	5-020	290SG000	5-027
27826-103030	4-016	28103-154030	4-071	28803-014001	4-071	290GU498	5-025	290SG001	5-027
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27826-153030	4-016	28105-012101	4-071	28805-014001	4-071	290MA194	5-022	290SG003	5-027
27826-153130	4-016	28105-013001	4-071	28805-154630	4-071	290MA194	5-023		

290SG004	5-027	2-CVG	2-088	30028-FLEX	4-085	30205-254630	4-073	31303233	5-014
290SG020	5-027	2-CVST-CP	2-074	30040-FLEX	4-085	30305-014001	4-073	31303233-BP	5-014
290SG021	5-027	2-RV	2-088	30103-012101	4-072	30305-154630	4-073	31303240	5-014
290SG025	5-027	2-RV	2-075	30103-013001	4-072	30305-254030	4-073	31303240-BP	5-014
290SG032	5-027	2-RV(A)	2-088	30103-014001	4-072	30305-254630	4-073	31303250-BP	5-014
290SM301	5-024	2-RV(A)	2-075	30103-053030	4-072	30505-014001	4-073	313B3211	5-014
290SM302	5-024	2-RV8-CP	2-077	30103-054630	4-072	30505-154630	4-073	313B3230	5-014
290SM303	5-024	2-RVST-CP	2-077	30103-102130	4-072	30505-254630	4-073	313B3233	5-014
290SM304	5-024	2-SV	2-064	30103-103030	4-072	30703-012101	4-074	313B3240	5-014
290SM305	5-024	2-SV	2-088	30103-104030	4-072	30703-014001	4-074	313G3211	5-014
290SM306	5-024	2-SV W GK8-CPK	2-069	30103-104630	4-072	30703-054630	4-074	313G3215-BP	5-014
290SM321	5-024	2-SV(A)	2-064	30103-124030	4-072	30703-102130	4-074	313G3228	5-014
290SM322	5-024	2-SV(A)	2-088	30103-124630	4-072	30703-152130	4-074	313G3230	5-014
290SM323	5-024	2-SVG	2-064	30103-152130	4-072	30703-154630	4-074	313G3230-BP	5-014
290SM401	5-024	2-SVJ(W)101-CP	2-066	30103-153030	4-072	30705-013001	4-074	313G3240	5-014
290SM402	5-024	2-SVW	2-067	30103-154030	4-072	30705-014001	4-074	313G3240-BP	5-014
290SM403	5-024	2-SVW	2-088	30103-154630	4-072	30705-103030	4-074	313G3250-BP	5-014
290SM404	5-024	2-SVW(A)	2-067	30103-252130	4-072	30705-104630	4-074	313P3211	5-014
290SM405	5-024	2-SVW(A)	2-088	30103-253030	4-072	30705-154630	4-074	313P3215-BP	5-014
290SM406	5-024	2-SVW(A)8-CPK	2-069	30103-254030	4-072	30705-254030	4-074	313P3230	5-014
290ST130	5-025	2-SVW(A)ST-CPK	2-069	30103-254630	4-072	30705-254630	4-074	313P3230-BP	5-014
290ST131	5-025	2-SVWBSTX-CPK	2-069	30105-012101	4-072	30803-014001	4-074	313P3233	5-014
290ST132	5-025	2-SVW(A)BSTX-CPK	2-069	30105-013001	4-072	30803-154630	4-074	313P3233-BP	5-014
290ST136	5-025	2-SVW8-CPK	2-069	30105-014001	4-072	30805-014001	4-074	313P3240	5-014
290ST414	5-028	2-SVW GK	2-067	30105-053030	4-072	30805-154630	4-074	313P3240-BP	5-014
290VT165	5-022	2-SVW GK	2-088	30105-054630	4-072	30805-254030	4-074	31603-014001	4-073
290VT165	5-023	2-SVW GKST-CPK	2-069	30105-102130	4-072	30805-254630	4-074	31603-054630	4-073
290VT168	5-022	2-SVW K(A)	2-067	30105-103030	4-072	30905-014001	4-073	31603-104030	4-073
290VT168	5-023	2-SVW K(A)	2-069	30105-104030	4-072	30905-054630	4-073	31603-104630	4-073
290VT186	5-022	2-SVW K(A)	2-088	30105-104630	4-072	30905-154630	4-073	31603-154630	4-073
290VT187	5-022	2-SVW K(A)8-CPK	2-069	30105-123030	4-072	30905-254030	4-073	31605-014001	4-073
290VT188	5-022	2-SVWST-CPK	2-069	30105-124030	4-072	30905-254630	4-073	31605-054630	4-073
290VA191	5-022	3.5HRSV	2-089	30105-124630	4-072	31103-012101	4-075	31605-104630	4-073
290VA191	5-023	3.5-HRSV	2-077	30105-152130	4-072	31103-013001	4-075	31605-154630	4-073
290VA192	5-022	30003-012101	4-074	30105-153030	4-072	31103-014001	4-075	31605-254030	4-073
290VA192	5-023	30003-013001	4-074	30105-154030	4-072	31103-102130	4-075	31605-254630	4-073
290VA193	5-022	30003-014001	4-074	30105-154630	4-072	31103-103030	4-075	31805-014001	4-074
290VA193	5-023	30003-052130	4-074	30105-202130	4-072	31103-104630	4-075	31805-254630	4-074
290VP144	5-023	30003-054630	4-074	30105-204030	4-072	31103-152130	4-075	31805-254630	4-074
2-CRV	2-070	30003-154630	4-074	30105-204630	4-072	31103-154630	4-075	31905-014001	4-073
2-CRV	2-088	30005-013001	4-074	30105-252130	4-072	31105-014001	4-075	31905-154630	4-073
2-CV	2-070	30005-014001	4-074	30105-253030	4-072	31105-104630	4-075	31905-254630	4-073
2-CV	2-088	30005-054630	4-074	30105-254030	4-072	31105-154630	4-075	34105-013001	4-075
2-CV(A)	2-070	30005-104630	4-074	30105-254630	4-072	31105-254630	4-075	34105-014001	4-075
2-CV(A)	2-088	30005-154630	4-074	30205-014001	4-073	31303211	5-014	34105-253030	4-075
2-CV(A)7-CP	2-074	30005-254030	4-074	30205-054630	4-073	31303215-BP	5-014	34105-254630	4-075
2-CV(A)ST-CP	2-074	30005-254630	4-074	30205-104630	4-073	31303228	5-014	35003-012101	4-061
2-CV7-CP	2-074	30011-FLEX	4-085	30205-154630	4-073	31303230	5-014	35003-013001	4-061
2-CVG	2-070	30015-FLEX	4-085	30205-254030	4-073	31303230-BP	5-014	35003-014001	4-061

35003-032130	4-061	36500505	5-009	365D1096	5-012	365G2331	5-008	365JLG71	5-012
35003-032146	4-061	36500505	5-011	365D1171	5-012	365G6316	4-096	365JLT41	4-097
35003-033030	4-061	36500510	5-009	365D1571	5-010	365G6316	5-012	365JLT61	4-097
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60108-722	1-021	60108-904	1-019	60109-400-2-7W	1-012	60110-309	1-014	60180-569	5-057
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60108-728	1-021	60108-908	1-019	60109-403	1-015	60110-404	1-014	60180-597	2-012
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60108-731	1-021	60108-911	1-019	60109-406	1-015	60110-407	1-014	60180-600	2-010
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60180-679	2-013	60180-824	5-005	60180-M121	2-098	60180-P137	2-095	60180-VT404A	2-008
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60180-712	2-013	60180-830	5-005	60180-M126	2-098	60180-P204	2-097	60180-VT504	2-008
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60180-724	2-010	60180-834	5-004	60180-M134	2-096	60180-P206	2-097	60180-VTMSC72LV	2-008
60180-728	2-011	60180-835	5-029	60180-M142	2-096	60180-P207	2-097	60180-V100	2-101
60180-729	2-011	60180-836	5-029	60180-M143	2-096	60180-P211	2-097	60180-V101	2-101
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60180-744	2-014	60180-838	5-005	60180-M145	2-096	60180-P212	2-097	60180-V104	2-101
60180-770	5-029	60180-839	5-005	60180-M146	2-097	60180-P212	2-101	60180-V105	2-101
60180-771	5-029	60180-841	5-005	60180-M149	2-098	60180-P213	2-097	60180-V106	2-101
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60180-777	5-029	60180-860	5-078	60180-M150	2-098	60180-P215	2-097	60180-V108	2-103
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60180-805	5-004	60180-K107	2-100	60180-M999	2-097	60180-P407	2-103	60182-500	4-084
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60180-809	5-004	60180-M100	2-096	60180-P103	2-095	60180-VT301	2-008	60182-503	4-084
60180-810	5-004	60180-M101	2-096	60180-P104	2-095	60180-VT302	2-008	60182-504	4-084
60180-811	5-004	60180-M102	2-096	60180-P105	2-095	60180-VT302A	2-008	60182-505	4-084
60180-812	5-004	60180-M103	2-096	60180-P106	2-095	60180-VT303	2-008	60182-506	4-084
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60180-814	5-005	60180-M108	2-098	60180-P108	2-095	60180-VT309	2-008	60182-508	4-084
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60180-817	5-005	60180-M112	2-098	60180-P130	2-095	60180-VT310	2-008	60182-510	4-085
60180-818	5-005	60180-M113	2-098	60180-P132	2-095	60180-VT310A	2-008	60201-318	5-029
60180-819	5-005	60180-M115	2-098	60180-P133	2-095	60180-VT400	2-008	60201-390	5-028
60180-820	5-005	60180-M116	2-098	60180-P134	2-095	60180-VT401	2-008	60201-391	5-028

60201-394	5-028	60300-821	1-024	60307-243	1-022	60310-501	1-029	6040.2375	4-079
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60201-398	5-028	60300-823	1-024	60307-251	1-022	60311-201	1-029	6040.2385	4-079
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60209-005	1-011	60300-841	1-023	60307-263	1-021	60311-501	1-029	6040.2804	4-081
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60300-726	1-024	60307-214	1-018	60309-001	1-011	6040.2320	4-079	6041.5625	4-080
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66002-020	5-006	69008-903027	4-077	72205-052130	3-025	73205-014001	3-023	74104-153030	4-019
66002-021	5-006	69108-057726	4-077	72205-101030	3-025	73205-051030	3-023	74104-154630	4-009
66002-022	5-006	69108-307780	4-077	72205-101030	3-025	73205-052130	3-023	74104-154630	4-019
66002-023	5-006	69108-903027	4-077	72205-102130	3-025	73205-053030	3-023	74104-252130	4-009
66002-024	5-006	69208-057726	4-077	72205-103030	3-025	73205-054630	3-023	74104-252130	4-019

74104-253030	4-009	8023	4-091	851-00	4-024	8-AC6(R)	2-063	8-SV(A)	2-085
74104-253030	4-019	8125	4-091	851-00	4-025	8-AC6(R)	2-090	8-T02	2-065
74104-254630	4-009	8125-038	4-091	851-00	4-026	8-AC7	2-063	8-T02	2-090
74104-254630	4-019	8125-074	4-091	851-00	4-027	8-AC7	2-090	8-TST1	2-065
74204-012101	4-010	8125-094	4-093	851-00	4-028	8-ACB	2-063	8-TST1	2-090
74204-012101	4-019	8125-097	4-091	851-00	4-029	8-ACB	2-090	9- SC(BLK)-BST1	2-090
74204-013001	4-010	8125-098	4-091	851-00	4-030	8-AC-CBT1	2-063	9- SC(GY)-BST1X	2-090
74204-013001	4-019	8125-999	4-091	851-00	4-032	8-AC-CBT1	2-090	9- SCK(B)-8RT1X	2-090
74204-014001	4-010	850-00	4-008	851-00	4-033	8-AC-ST101	2-063	9- SCK(B)-ST1X	2-090
74204-014001	4-019	850-00	4-009	851-00	4-061	8-AC-ST101	2-090	9- SCK(G)-8RT1	2-090
74204-052130	4-010	850-00	4-010	851-00	4-071	8-AC-ST101X	2-063	9- SCK(G)-ST1	2-090
74204-052130	4-019	850-00	4-011	851-00	3-023	8-AC-ST101X	2-090	9- SCK(N)-8RT1	2-090
74204-053030	4-010	850-00	4-012	851-00	3-025	8-AC-ST15	2-063	9- SCK(N)-ST1	2-090
74204-053030	4-019	850-00	4-013	851-00	3-026	8-AC-ST15	2-090	9010	4-093
74204-054630	4-010	850-00	4-014	852-00	3-029	8-ACT	2-063	9010-051	4-093
74204-054630	4-019	850-00	4-015	852-00	4-023	8-ACT	2-090	9012	4-093
74204-102130	4-019	850-00	4-016	852-00	4-024	8-AC-TST1	2-063	9013	4-093
74204-103030	4-010	850-00	4-017	852-00	4-025	8-AC-TST1	2-090	9055-020	4-090
74204-103030	4-019	850-00	4-018	852-00	4-026	8-NPWP	2-079	9055-020	4-093
74204-104630	4-010	850-00	4-021	852-00	4-027	8-NPWP	2-091	9055-021	4-090
74204-104630	4-019	850-00	4-023	852-00	4-028	8-PEC1	2-090	9055-021	4-093
74204-152130	4-010	850-00	4-024	852-00	4-029	8-PEC1	2-063	9055-022	4-090
74204-152130	4-019	850-00	4-025	852-00	4-030	8-PEC1X	2-090	9055-022	4-093
74204-153030	4-010	850-00	4-026	852-00	4-031	8-PEC1X	2-063	9055-023	4-090
74204-153030	4-019	850-00	4-027	852-00	4-032	8-SC	2-065	9055-023	4-093
74204-154630	4-010	850-00	4-028	852-00	4-033	8-SC	2-090	9055-024	4-090
74204-154630	4-019	850-00	4-029	852-00	4-061	8-SC(R)	2-065	9055-024	4-093
74204-252130	4-010	850-00	4-030	852-00	4-063	8-SC(W)	2-065	9055-025	4-090
74204-252130	4-019	850-00	4-031	852-00	4-064	8-SC-8RT1	2-065	9055-025	4-093
74204-252130	4-019	850-00	4-032	852-00	4-065	8-SC-8RT1	2-090	9055-026	4-090
74204-253030	4-010	850-00	4-033	852-00	4-066	8-SCJ	2-065	9055-026	4-093
74204-253030	4-019	850-00	4-061	852-00	4-067	8-SCJ	2-090	9055-027	4-090
74204-254630	4-010	850-00	4-063	852-00	4-068	8-SCJ(W)	2-065	9055-027	4-093
74204-254630	4-019	850-00	4-064	852-00	4-069	8-SCJ(W)	2-090	9055-028	4-090
7725	4-089	850-00	4-065	852-00	4-071	8-SC-ST15	2-065	9055-029	4-090
7725i	4-089	850-00	4-066	852-00	3-015	8-SC-ST15	2-090	9055-029	4-093
7755-010	4-089	850-00	4-067	852-00	3-028	8-ST101	2-065	9125-043	4-093
7755-015	4-090	850-00	4-068	854-00	4-022	8-ST101	2-090	9125-076	4-090
7755-015	4-093	850-00	4-069	8-6RT1	2-065	8-ST14	2-065	92016	4-098
7755-020	4-089	850-00	4-071	8-6RT1	2-090	8-ST14	2-090	92016-150	4-098
7755-021	4-089	850-00	3-015	88200	4-082	8-ST143	2-065	92017	4-098
7755-022	4-089	850-00	3-023	88400	4-082	8-ST143	2-090	92018	4-098
7755-023	4-089	850-00	3-025	88700	4-082	8-ST144	2-065	97002-052130	4-068
7755-999	4-089	850-00	3-026	8-AC(B)-ST144	2-063	8-ST144	2-090	97002-102130	4-068
8- SC(R)	2-089	850-00	3-028	8-AC(B)-ST144	2-090	8-ST14X	2-065	97003-052130	4-068
8- SC(W)	2-089	850-00	3-029	8-AC6	2-063	8-ST14X	2-090	97005-012101	4-068
8020	4-091	850-RT	4-082	8-AC6	2-090	8-ST15	2-065	97005-013001	4-068
8021	4-091	850-WT	4-082	8-AC6(B)	2-063	8-ST15	2-090	97005-014001	4-068
8022	4-091	851-00	4-023	8-AC6(B)	2-090	8-SV	2-085	97005-014001	4-068

97005-052130	4-068	97205-102130	4-064	97505-154630	4-069	9-SCK(B)-ST101	2-068	B7950-1A	2-056
97005-102130	4-068	97205-103030	4-064	97505-254630	4-069	9-SCK(B)-ST1X	2-068	B7950-B	2-056
97005-152130	4-068	97205-104630	4-064	97702-052130	4-067	9-SCK(B)-TST1	2-068	B7950-VO	2-056
97005-153030	4-068	97205-152130	4-064	97702-102130	4-067	9-SCK(B)-TST1	2-090	B7951	2-056
97005-154030	4-068	97205-153030	4-064	97703-052130	4-067	9-SCK(G)-ST1	2-068	B7951-VO	2-056
97005-154630	4-068	97205-154630	4-064	97705-012101	4-067	9-SCK(GY)-BST1X	2-068	B7990-1	2-055
97005-253030	4-068	97205-253030	4-064	97705-013001	4-067	9-SCK(N)-ST1	2-068	B7990-12	2-055
97005-254030	4-068	97205-254630	4-064	97705-014001	4-067	9-SCNK(B)	2-068	B7990-12A	2-055
97005-254630	4-068	9725	4-090	97705-014001	4-067	9-SCSK(B)-8RT1	2-068	B7990-1A	2-055
97102-032130	4-063	9725i	4-090	97705-032130	4-067	9-SCSK-8RT1	2-090	B7990-2	2-055
97102-052130	4-063	97302-052130	4-065	97705-052130	4-067	A-302	4-084	B7990-2A	2-055
97102-102130	4-063	97302-054630	4-065	97705-054630	4-067	A-302A	4-084	B7990-3	2-055
97103-032130	4-063	97302-102130	4-065	97705-152130	4-067	A-327	4-087	B7990-4	2-055
97103-052130	4-063	97302-103030	4-065	97705-153030	4-067	A-328	4-087	B7990-5	2-055
97103-054630	4-063	97303-052130	4-065	97705-154030	4-067	A-436	4-083	B7990-6	2-055
97103-102130	4-063	97303-103030	4-065	97705-154630	4-067	A-437	4-083	B7990-6A	2-055
97103-103030	4-063	97303-104630	4-065	97705-253030	4-067	B-100	2-086	B7995-13	2-054
97103-104630	4-063	97303-154630	4-065	97705-254030	4-067	B7800-1	2-055	B7995-15	2-054
97103-152130	4-063	97305-012101	4-065	97705-254630	4-067	B7800-12	2-055	B7995-18	2-054
97103-154630	4-063	97305-013001	4-065	97902-052130	4-066	B7800-12A	2-055	B7995-20	2-054
97105-012101	4-063	97305-014001	4-065	97902-102130	4-066	B7800-1A	2-055	B7995-24	2-054
97105-013001	4-063	97305-014001	4-065	97903-052130	4-066	B7800-2	2-055	B7995-24	2-056
97105-014001	4-063	97305-052130	4-065	97903-104630	4-066	B7800-20	2-055	B7995-26	2-054
97105-032130	4-063	97305-053030	4-065	97903-154630	4-066	B7800-20A	2-055	B7995-8	2-054
97105-052130	4-063	97305-054630	4-065	97905-012101	4-066	B7800-2A	2-054	B7999-1	2-053
97105-053030	4-063	97305-102130	4-065	97905-013001	4-066	B7800-3	2-055	B7999-12	2-053
97105-054630	4-063	97305-104630	4-065	97905-014001	4-066	B7800-3A	2-055	B7999-12A	2-053
97105-102130	4-063	97305-152130	4-065	97905-053030	4-066	B7800-4	2-055	B7999-1A	2-053
97105-103030	4-063	97305-153030	4-065	97905-054630	4-066	B7800-4A	2-055	B7999-2	2-053
97105-104630	4-063	97305-154030	4-065	97905-103030	4-066	B7800-5	2-055	B7999-2A	2-053
97105-152130	4-063	97305-154630	4-065	97905-104630	4-066	B7800-6	2-055	B7999-3	2-053
97105-153030	4-063	97305-253030	4-065	97905-152130	4-066	B7800-6A	2-055	B7999-3A	2-053
97105-154630	4-063	97305-254030	4-065	97905-154630	4-066	B7807-13	2-054	B7999-4	2-053
97105-252130	4-063	97305-254630	4-065	97905-254630	4-066	B7807-15	2-054	B7999-4A	2-053
97105-253030	4-063	97502-052130	4-069	9-CV	2-081	B7807-18	2-054	B7999-5	2-053
97105-254630	4-063	97502-054630	4-069	9-CV	2-089	B7807-20	2-054	B7999-6	2-053
97202-052130	4-064	97502-102130	4-069	9-MSC(BG)-ST1	2-068	B7807-24	2-054	B7999-6A	2-053
97202-102130	4-064	97503-052130	4-069	9-MSC(BG)-ST1	2-090	B7807-8	2-054	C-1000	4-022
97203-052130	4-064	97503-104630	4-069	9-MSC(BG)-ST101	2-068	B7815-13	2-047	C2-1000	4-095
97203-103030	4-064	97503-154630	4-069	9-MSC(BG)-ST101X	2-068	B7815-13	2-054	C2-1000EP	4-095
97203-104630	4-064	97505-012101	4-069	9-SCJ(W)-ST101	2-068	B7815-15	2-054	C2-1006	4-095
97203-154630	4-064	97505-013001	4-069	9-SCJ(W)-ST101	2-090	B7815-18	2-054	C2-1006EH	4-095
97205-012101	4-064	97505-014001	4-069	9-SCK(BLK)-BST1	2-068	B7815-20	2-054	C2-1346EH	4-095
97205-013001	4-064	97505-052130	4-069	9-SCK(B)-8RT1	2-068	B7815-24	2-054	C4000-1	2-024
97205-014001	4-064	97505-054630	4-069	9-SCK(B)-8RT1	2-090	B7815-8	2-022	C4000-1	2-057
97205-032130	4-064	97505-102130	4-069	9-SCK(B)-8RT1X	2-068	B7815-8	2-054	C4000-11	2-025
97205-052130	4-064	97505-104630	4-069	9-SCK(B)-ST1	2-068	B7920	2-056	C4000-11	2-057
97205-053030	4-064	97505-152130	4-069	9-SCK(B)-ST1	2-090	B7921	2-056	C4000-12	2-024
97205-054630	4-064	97505-153030	4-069	9-SCK(B)ST101	2-090	B7950	2-056	C4000-12	2-057

C4000-14	2-024	C4008-1A	2-020	C4010-57W	2-033	C4010-95W	2-033	C4011-1G	2-035
C4000-14	2-057	C4008-2A	2-020	C4010-59	2-033	C4010-97W	2-033	C4011-1R	2-035
C4000-1B	2-024	C4008-4A	2-020	C4010-5A	2-032	C4010-98BLK	2-032	C4011-1W	2-035
C4000-1G	2-024	C4008-50	2-060	C4010-60	2-032	C4010-98W	2-032	C4011-1W	2-058
C4000-1R	2-024	C4008-632C	2-019	C4010-60A	2-032	C4010-99	2-032	C4011-1Y	2-035
C4000-1W	2-024	C4008-632C	2-057	C4010-60AR	2-032	C4010-K630	2-025	C4011-2	2-035
C4000-1W	2-057	C4008-632R	2-057	C4010-60AW	2-032	C4010-K630	2-031	C4011-2	2-058
C4000-1Y	2-024	C4008-632R	2-019	C4010-60BLK	2-032	C4010-K630	2-036	C4011-24	2-036
C4000-2W	2-024	C4008-730	2-019	C4010-627L	2-025	C4010-K630	2-041	C4011-24	2-041
C4000-2W	2-057	C4008-730	2-057	C4010-627L	2-031	C4010-LV1	2-030	C4011-24	2-059
C4000-30	2-026	C4008-739	2-057	C4010-627L	2-036	C4010-LV1	2-058	C4011-25	2-039
C4000-40	2-026	C4008-740	2-019	C4010-627L	2-041	C4010-LV2	2-030	C4011-2A	2-037
C4000-40Y	2-026	C4008-740	2-057	C4010-627L	2-058	C4010-LV2	2-058	C4011-2W	2-035
C4000-41	2-026	C4008-741	2-019	C4010-629	2-025	C4010-S1	2-030	C4011-2W	2-058
C4000-55	2-026	C4008-741	2-057	C4010-629	2-031	C4010-S1W	2-030	C4011-2WCV	2-038
C4000-60	2-026	C4008-742	2-019	C4010-629	2-036	C4010-S2W	2-030	C4011-3AL	2-037
C4000-60Y	2-026	C4008-742	2-057	C4010-629	2-041	C4010-S629	2-025	C4011-4	2-038
C4000-61	2-026	C4010-017AW	2-033	C4010-629	2-058	C4010-S629	2-031	C4011-4	2-059
C4000-9	2-025	C4010-017W	2-033	C4010-629L	2-025	C4010-S629	2-036	C4011-4A	2-037
C4000-9	2-057	C4010-019	2-033	C4010-629L	2-031	C4010-S629	2-041	C4011-4B	2-037
C4000-9A	2-025	C4010-1	2-030	C4010-629L	2-036	C4010-S630	2-025	C4011-4G	2-037
C4000-9A	2-057	C4010-1	2-058	C4010-629L	2-041	C4010-S630	2-031	C4011-4R	2-037
C4000-9TR	2-025	C4010-10	2-032	C4010-629L	2-058	C4010-S630	2-036	C4011-5	2-040
C4000-9TR	2-057	C4010-11	2-030	C4010-629P	2-025	C4010-S630	2-041	C4011-5	2-059
C4000-LV1	2-025	C4010-11	2-058	C4010-629P	2-031	C4010-V1	2-030	C4011-50	2-042
C4000-LV1	2-057	C4010-14	2-030	C4010-629P	2-036	C4010-V1	2-058	C4011-50B	2-042
C4000-LV1W	2-025	C4010-14	2-058	C4010-629P	2-041	C4011-1	2-035	C4011-50G	2-042
C4000-LV1W	2-057	C4010-17	2-033	C4010-629P	2-058	C4011-1	2-058	C4011-50R	2-042
C4000-LV2	2-025	C4010-17W	2-033	C4010-62BLK	2-032	C4011-10	2-035	C4011-51	2-042
C4000-LV2	2-057	C4010-1A	2-032	C4010-630	2-025	C4011-10	2-058	C4011-510OR	2-042
C4000-LV2W	2-025	C4010-1W	2-030	C4010-630	2-031	C4011-11	2-035	C4011-51B	2-042
C4000-LV2W	2-057	C4010-1W	2-058	C4010-630	2-036	C4011-11	2-041	C4011-51BLK	2-042
C4000-LV3W	2-025	C4010-2	2-030	C4010-630	2-041	C4011-11	2-059	C4011-51G	2-042
C4000-LV3W	2-057	C4010-2	2-058	C4010-630	2-058	C4011-13	2-035	C4011-51OR	2-042
C4000-MS	2-029	C4010-21	2-033	C4010-630P	2-025	C4011-13	2-040	C4011-51R	2-042
C4000-MS	2-039	C4010-2W	2-030	C4010-630P	2-031	C4011-13	2-059	C4011-52	2-042
C4000-S1	2-025	C4010-2W	2-058	C4010-630P	2-036	C4011-14	2-036	C4011-52B	2-042
C4000-S1W	2-025	C4010-30A	2-032	C4010-630P	2-041	C4011-14	2-041	C4011-52G	2-042
C4000-S2W	2-025	C4010-35	2-032	C4010-630P	2-058	C4011-14	2-059	C4011-52OR	2-042
C4000-S9	2-025	C4010-35BLK	2-032	C4010-63BLK	2-032	C4011-15	2-036	C4011-52R	2-042
C4000-V1	2-025	C4010-35W	2-032	C4010-65A	2-032	C4011-15	2-041	C4011-52Y	2-042
C4000-V1	2-057	C4010-40	2-032	C4010-67	2-033	C4011-15	2-059	C4011-53	2-042
C4000-V2	2-025	C4010-40A	2-032	C4010-67A	2-033	C4011-16	2-035	C4011-530OR	2-042
C4000-V2	2-057	C4010-55	2-032	C4010-67AW	2-033	C4011-16	2-041	C4011-53B	2-042
C4008-1	2-019	C4010-55A	2-032	C4010-67W	2-033	C4011-16	2-059	C4011-53OR	2-042
C4008-1	2-057	C4010-55BLK	2-032	C4010-88	2-033	C4011-1A	2-037	C4011-53R	2-042
C4008-100	2-020	C4010-57	2-033	C4010-88AW	2-033	C4011-1AP	2-037	C4011-53Y	2-042
C4008-101	2-020	C4010-57A	2-033	C4010-88W	2-033	C4011-1B	2-035	C4011-54	2-042
C4008-102	2-020	C4010-57AW	2-033	C4010-95	2-033	C4011-1CV	2-038	C4011-540OR	2-043

C4011-54B	2-042	C4011-87	2-038	C4012-15	2-059	C4013-1W	2-057	C4015-17AW	2-048
C4011-54BLK	2-042	C4011-87AW	2-038	C4012-1W	2-034	C4013-2	2-021	C4015-17W	2-048
C4011-54G	2-042	C4011-87W	2-038	C4012-1W	2-058	C4013-2	2-057	C4015-1A	2-047
C4011-54OR	2-043	C4011-88	2-038	C4012-2	2-034	C4013-2W	2-021	C4015-1AP	2-045
C4011-54R	2-043	C4011-88W	2-038	C4012-2	2-058	C4013-2W	2-057	C4015-1W	2-047
C4011-54Y	2-043	C4011-89W	2-038	C4012-25	2-039	C4013-30	2-022	C4015-2	2-046
C4011-55	2-043	C4011-9	2-035	C4012-2W	2-034	C4013-30A	2-022	C4015-2	2-060
C4011-55B	2-043	C4011-9	2-058	C4012-2W	2-058	C4013-32	2-022	C4015-21	2-048
C4011-55BLK	2-043	C4011-95	2-038	C4012-465	2-021	C4013-32A	2-023	C4015-25	2-048
C4011-55G	2-043	C4011-98B	2-037	C4012-465	2-034	C4013-36A	2-023	C4015-27	2-048
C4011-55R	2-043	C4011-98G	2-037	C4012-465	2-058	C4013-37Y	2-023	C4015-2W	2-046
C4011-55Y	2-043	C4011-98R	2-037	C4012-529	2-021	C4013-3A	2-022	C4015-2W	2-060
C4011-59	2-043	C4011-98Y	2-037	C4012-529	2-034	C4013-40	2-022	C4015-30	2-047
C4011-590OR	2-043	C4011-9TR	2-040	C4012-529	2-058	C4013-40A	2-022	C4015-30A	2-047
C4011-59OR	2-043	C4011-9TR	2-059	C4012-529L	2-034	C4013-492	2-023	C4015-4	2-044
C4011-5W	2-040	C4011-LV1	2-035	C4012-529L	2-058	C4013-492A	2-023	C4015-40	2-047
C4011-5W	2-059	C4011-LV1	2-040	C4012-530	2-021	C4013-494A	2-023	C4015-40A	2-047
C4011-6	2-040	C4011-LV1	2-059	C4012-530	2-034	C4013-50Y	2-022	C4015-45	2-047
C4011-6	2-059	C4011-LV1W	2-035	C4012-530	2-058	C4013-54Y	2-023	C4015-45W	2-047
C4011-631	2-025	C4011-LV1W	2-058	C4012-530P	2-021	C4013-57	2-023	C4015-46P	4-049
C4011-631	2-031	C4011-LV2	2-035	C4012-530P	2-034	C4013-58	2-023	C4015-47P	4-049
C4011-631	2-036	C4011-LV2	2-040	C4012-530P	2-058	C4013-60	2-022	C4015-47P	2-060
C4011-631	2-041	C4011-LV2	2-059	C4012-88	2-038	C4013-60A	2-022	C4015-48	2-060
C4011-631	2-058	C4011-LV2W	2-035	C4012-88A	2-038	C4013-60P	2-022	C4015-482A	2-048
C4011-631P	2-025	C4011-LV2W	2-058	C4012-S530	2-021	C4013-61	2-022	C4015-52	2-045
C4011-631P	2-031	C4011-S1	2-035	C4012-S530	2-034	C4013-61A	2-022	C4015-52	2-045
C4011-631P	2-036	C4011-S1W	2-035	C4013-010A	2-023	C4013-63A	2-022	C4015-54	2-045
C4011-631P	2-041	C4011-S2W	2-035	C4013-1	2-021	C4013-63W	2-022	C4015-55BLK	2-047
C4011-631P	2-058	C4011-S4	2-040	C4013-1	2-057	C4013-63Y	2-022	C4015-55W	2-047
C4011-67P	2-043	C4011-S5	2-040	C4013-10	2-022	C4013-64A	2-022	C4015-5A	2-047
C4011-688W	2-039	C4011-S5W	2-040	C4013-100	2-045	C4013-64W	2-022	C4015-60	2-047
C4011-6A	2-037	C4011-S631	2-025	C4013-100SS	2-045	C4013-69A	2-022	C4015-61	2-047
C4011-6AE	2-037	C4011-S631	2-031	C4013-101	2-045	C4013-74A	2-022	C4015-638	2-044
C4011-6W	2-040	C4011-S631	2-036	C4013-102	2-045	C4013-77A	2-022	C4015-638	2-046
C4011-6W	2-059	C4011-S631	2-041	C4013-102SS	2-045	C4013-95W	2-023	C4015-638	2-060
C4011-72	2-043	C4011-S6W	2-040	C4013-10A	2-023	C4013-97Y	2-023	C4015-640	2-044
C4011-72AW	2-043	C4011-V1	2-035	C4013-11	2-021	C4013-98W	2-022	C4015-640	2-046
C4011-72ORW	2-043	C4011-V1	2-058	C4013-11	2-057	C4013-98Y	2-022	C4015-643	2-044
C4011-73	2-043	C4012-1	2-034	C4013-13	2-021	C4013-S1	2-021	C4015-643	2-046
C4011-73ORW	2-043	C4012-1	2-058	C4013-13	2-057	C4015-017	2-048	C4015-643	2-060
C4011-73P	2-043	C4012-10	2-034	C4013-14	2-023	C4015-017A	2-048	C4015-66	2-047
C4011-73W	2-043	C4012-10	2-058	C4013-15	2-023	C4015-1	2-060	C4015-66A	2-047
C4011-7A	2-037	C4012-100	2-038	C4013-1500	2-021	C4015-10	2-047	C4015-67A	2-047
C4011-7B	2-037	C4012-100SS	2-038	C4013-15A	2-023	C4015-10	2-047	C4015-75A	2-047
C4011-7G	2-037	C4012-101	2-038	C4013-15P	2-023	C4015-11W	2-046	C4015-75W	2-047
C4011-7K	2-037	C4012-102	2-038	C4013-17	2-023	C4015-11W	2-060	C4015-88	2-048
C4011-7R	2-037	C4012-102SS	2-038	C4013-17A	2-023	C4015-14	2-046	C4015-88AW	2-048
C4011-7Y	2-037	C4012-15	2-034	C4013-17A	2-022	C4015-14	2-060	C4015-9	2-046
C4011-80	2-060	C4012-15	2-041	C4013-1W	2-021	C4015-17	2-048	C4015-9	2-060
						C4015-17A	2-048	C4015-95P	2-060

C4015-96	2-060	C5000-180	2-029	C5000-54Y Y	2-027	CERT4010-91	2-018	ECMJ-20FO	2-093
C4015-96A	2-060	C5000-180W	2-029	C5000-55A	2-027	CERT4011-89W	2-018	ECMJ-8	2-093
C4015-96PA	2-060	C5000-182W	2-029	C5000-55B	2-027	CERT4015-83	2-018	ECR-11C	2-092
C4015-99	2-060	C5000-183W	2-029	C5000-55G	2-027	CERT4015-96	2-018	ECR-13C	2-092
C4015-S1	2-046	C5000-184W	2-029	C5000-55P	2-027	CERT5000-175W	2-018	ECR-20C	2-092
C4020-10	2-059	C5000-186	2-029	C5000-55R	2-027	CERT5000-176W	2-018	ECR-8C	2-092
C4020-100	2-052	C5000-186W	2-029	C5000-55Y	2-027	CERT5000-193W	2-018	ECR-CBATT	2-092
C4020-100SS	2-052	C5000-186WR	2-029	C5000-56AL	2-027	CERT5000-575W	2-018	ECRH-11KIT	2-093
C4020-101	2-052	C5000-186WY	2-029	C5000-57B	2-027	CERT5000-576W	2-018	ECRH-20KIT	2-093
C4020-102	2-052	C5000-188W	2-029	C5000-57G	2-027	CERT5000-578W	2-018	ECRH-B	2-093
C4020-102SS	2-052	C5000-192	2-029	C5000-580	2-028	CERT5000-580W	2-018	ECR-HOLDER	2-092
C4020-139	2-052	C5000-192W	2-029	C5000-580W	2-028	CERT5000-582W	2-018	ECRH-STAND	2-093
C4020-18	4-050	C5000-194W	2-029	C5000-586W	2-028	CERT5000-593W	2-018	EDCB-11C	2-092
C4020-18	2-059	C5000-195W	2-029	C5000-592	2-028	CERT5000-69LV	2-018	EDCB-13C	2-092
C4020-180	2-059	C5000-196W	2-029	C5000-592W	2-028	CERT5000-72LV	2-018	EDCB-20C	2-092
C4020-2	2-059	C5000-1W	2-024	C5000-595W	2-028	CERT5000-75W	2-018	EPC6W	4-095
C4020-20	2-059	C5000-1W	2-057	C5000-62B	2-027	CERT5000-76W	2-018	ES791	3-040
C4020-210	2-059	C5000-2	2-024	C5000-64B	2-027	CERT5000-78W	2-018	ES792	3-040
C4020-25	2-059	C5000-2	2-057	C5000-75C	2-027	CERT5000-79	2-018	ES800	3-040
C4020-27	2-059	C5000-2W	2-024	C5000-78W	2-028	CERT5000-80	2-018	ES801	3-040
C4020-30	2-051	C5000-2W	2-057	C5000-80	2-028	CERT5000-80W	2-018	ES802	3-040
C4020-32	2-051	C5000-44B	2-026	C5000-80W	2-028	CERT5000-82W	2-018	ES803	3-040
C4020-320	2-052	C5000-45B	2-026	C5000-80WY	2-029	CERT5000-92W	2-018	ES804	3-040
C4020-32A	2-051	C5000-46M	2-027	C5000-82P	2-028	CERT5000-93W	2-018	ES805	3-040
C4020-32AP	2-051	C5000-47M	2-027	C5000-82W	2-028	CERT5000-992	2-018	ES810	3-040
C4020-34	2-051	C5000-50	2-027	C5000-83W	2-028	CERT5000-993	2-018	ES812	3-040
C4020-34A	2-051	C5000-50B	2-027	C5000-86	2-028	CR-11C	2-075	F-120x	4-087
C4020-34AP	2-051	C5000-51A	2-026	C5000-86W	2-028	CR-20C	2-081	F-130x	4-087
C4020-36	2-051	C5000-51B	2-026	C5000-86WY	2-029	CR-8C	2-063	F-142x	4-087
C4020-36A	2-051	C5000-51G	2-026	C5000-87	2-028	CSL 20	4-095	F-190	4-087
C4020-36AP	2-051	C5000-51P	2-026	C5000-88W	2-028	CSL10	4-095	F-192x	4-087
C4020-38A	2-051	C5000-51R	2-026	C5000-91W	2-028	CSL100	4-095	F-227	4-084
C4020-39A	2-051	C5000-51Y	2-026	C5000-92	2-028	CSL5	4-095	F-228	4-084
C4020-3A	2-051	C5000-52AE	2-027	C5000-92P	2-028	CSL50	4-095	F-229	4-084
C4020-40	2-051	C5000-53A	2-027	C5000-92W	2-028	CZSL10PK	4-095	F-230	4-084
C4020-410	2-059	C5000-53B	2-027	C5000-92WY	2-029	CZSL50PK	4-095	F-231	4-084
C4020-42A	2-051	C5000-53G	2-027	C5000-93W	2-028	CZSL5PK	4-095	F-232	4-084
C4020-42AP	2-051	C5000-53GY	2-027	C5000-94W	2-028	DCB-11C	2-075	F2500-1	1-038
C4020-43AP	2-051	C5000-53R	2-027	C5000-94WY	2-029	DCB-20C	2-081	F2500-10	1-039
C4020-47	2-051	C5000-53Y	2-027	C5000-95	2-028	DCB-8C	2-063	F2500-12	1-038
C4020-48	2-051	C5000-54A	2-027	C5000-95W	2-028	DCR-11	2-075	F2500-13	1-038
C4020-5A	2-051	C5000-54B	2-027	C5000-97	2-028	DCR-20	2-081	F2500-14	1-039
C4020-6	2-059	C5000-54BY	2-027	C5000-98B	2-026	ECDJ-11	2-093	F2500-15	1-039
C4020-60	2-059	C5000-54G	2-027	C5000-99B	2-027	ECDJ-13	2-093	F2500-16	1-039
C4020-6A	2-051	C5000-54GY	2-027	C5000-LV95	2-028	ECDJ-20	2-093	F2500-17	1-039
C4075-500	2-029	C5000-54P	2-027	C5075-211	2-029	ECMJ-11	2-093	F2500-18	1-039
C4075-500	2-039	C5000-54R	2-027	C5075-213	2-029	ECMJ-13	2-093	F2500-19	1-039
C5000-1	2-024	C5000-54RY	2-027	C5075-219	2-029	ECMJ-13FO	2-093	F2500-2	1-038
C5000-1	2-057	C5000-54Y	2-027	C6W	4-095	ECMJ-20	2-093	F2500-20	1-039

F2500-3	1-038	F2519-2	1-041	P-704	4-088	TS-12412	5-098	TS-18824	5-094
F2500-4	1-038	F2519-3	1-041	P-727	4-088	TS-12418	5-098	TS-18825	5-094
F2500-5	1-038	F2519-4	1-041	P-729	4-088	TS-12422	5-098	TS-18826	5-094
F2500-50	1-038	F2519-5	1-041	P-742	4-088	TS-12708	5-097	TS-18827	5-096
F2500-6	1-038	F2519-6	1-041	PEG	2-074	TS-12712	5-097	TS-18828	5-096
F2500-7	1-039	F2520-1	1-041	PELK	2-069	TS-12713	5-097	TS-18829	5-096
F2500-8	1-039	F2520-2	1-041	S7510-1	1-040	TS-12716	5-097	TS-18830	5-096
F2500-9	1-039	F2520-3	1-041	S7510-10	1-040	TS-12718	5-097	TS-18831	5-096
F2502-1	1-038	F2520-4	1-041	S7510-20	1-040	TS-12722	5-097	TS-18832	5-096
F2502-2	1-038	F2520-5	1-041	S7510-3	1-040	TS-13019	5-098	TS-18833	5-096
F2502-3	1-038	F2520-6	1-041	S7510-30	1-040	TS-13028	5-098	TS-18914	5-096
F2502-9	1-039	F2520-7	1-041	S7510-5	1-040	TS-13043	5-098	TS-18915	5-096
F2504-5	1-038	F2520-8	1-041	S7510-50	1-040	TS-13097	5-097	TS-20062	5-083
F2504-6	1-038	F-300x	4-087	S7515-10	1-040	TS-13099	5-097	TS-20088	4-105
F2504-1	1-038	HPG	2-074	S7515-20	1-040	TS-13100	5-097	TS-20672	5-083
F2504-10	1-039	HPL	2-074	S7515-3	1-040	TS-13208	5-098	TS-20673	4-106
F2504-15	1-039	HPLSK	2-069	S7515-5	1-040	TS-13215	5-098	TS-20684	5-083
F2504-16	1-039	LZN1-10	4-095	SC001	3-047	TS-13216	5-098	TS-20688	4-106
F2504-2	1-038	M-645	4-087	SC200	3-047	TS-13217	5-098	TS-21003	4-106
F2504-3	1-038	MEL	2-074	SC2003	3-047	TS-13218	5-098	TS-24308	4-105
F2504-4	1-038	MSCERT4011-74W	2-017	SC600	3-047	TS-13219	5-098	TS-25003	4-101
F2504-7	1-039	MSCERT4015-135W	2-017	SC601	3-047	TS-13220	5-097	TS-25104	4-106
F2504-8	1-039	MSCERT4015-136W	2-017	SC602	3-047	TS-13221	5-097	TS-26922	4-107
F2504-9	1-039	MSCERT5000-134W	2-017	SC603	3-047	TS-13222	5-097	TS-27530	5-083
F2513-1	1-038	MSCERT5000-135W	2-017	SHG	2-074	TS-13223	5-097	TS-27860	5-083
F2513-10	1-039	MSCERT5000-30LV W	2-017	SHL	2-066	TS-13225	5-097	TS-28901	4-103
F2513-14	1-039	MSCERT5000-31LV W	2-017	SL 20CW	4-095	TS-16000	5-094	TS-28902	4-103
F2513-15	1-039	MSCERT5000-32	2-017	SL 2CW	4-095	TS-16010	5-094	TS-28903	4-103
F2513-16	1-039	MSCERT5000-33TR	2-017	SL100CW	4-095	TS-18782	5-096	TS-28904	4-103
F2513-17	1-039	MSCERT5000-341W	2-017	SL10CW	4-095	TS-18784	5-096	TS-28905	4-102
F2513-2	1-038	MSCERT5000-34W	2-017	SL50CW	4-095	TS-18786	5-096	TS-28997	4-104
F2513-3	1-038	MSCERT5000-351W	2-017	SL5CW	4-095	TS-18801	5-095	TS-29570	5-096
F2513-4	1-038	MSCERT5000-35W	2-017	SSAC6W	4-095	TS-18802	5-095	TS-29571	5-096
F2513-5	1-038	MSCERT5000-36LV W	2-017	ST-CPK	2-069	TS-18803	5-095	TS-29572	5-096
F2513-6	1-038	MSCERT5000-37LV W	2-017	SV-S1	2-062	TS-18804	5-095	TS-31700	4-108
F2513-7	1-039	MSCERT5000-38	2-017	SV-S11A	2-062	TS-18806	5-095	TS-38828	5-082
F2513-8	1-039	MSCERT5000-39TR	2-017	SV-S11G	2-062	TS-18807	5-095	TS-38829	5-082
F2513-9	1-039	MSCERT5000-401W	2-017	T TS-312	2-064	TS-18809	5-095	TS-38830	5-082
F2517-1	1-040	MSCERT5000-40W	2-017	T-10/20	2-086	TS-18810	5-095	TS-38831	5-082
F2517-10	1-040	MSCERT5000-411W	2-017	T-104	2-086	TS-18811	5-095	TS-38832	5-082
F2517-2	1-040	MSCERT5000-41W	2-017	T-105	2-086	TS-18812	5-095	TS-38833	5-082
F2517-3	1-040	MSCERT5000-S34W	2-017	T-200	2-086	TS-18816	5-095	TS-38834	5-082
F2517-4	1-040	MSCERT5000-S35W	2-017	T-25	2-086	TS-18817	5-095	TS-38836	5-083
F2517-5	1-040	MSCERT5000-S40W	2-017	T-28	2-086	TS-18818	5-095	TS-38840	5-082
F2517-6	1-040	MSCERT5000-S41W	2-017	T-55	2-086	TS-18819	5-095	TS-42799	5-092
F2517-7	1-040	MTS-1	2-064	TQG	2-074	TS-18820	5-094	TS-42800	5-092
F2517-8	1-040	MTS-1	2-067	TQL	2-074	TS-18821	5-094	TS-42801	5-092
F2517-9	1-040	MTS-1	2-071	TS-10130	5-099	TS-18822	5-094	TS-44211	5-089
F2519-1	1-041	MTS-1	2-075	TS-10135	5-099	TS-18823	5-094	TS-45950	5-085

TS-48882	5-089	TS-51101	4-106	U-105	4-085	U-320x	4-087	UFMC00002060614	5-075
TS-48891	4-104	TS-51140	4-106	U-106	4-085	U-321x	4-087	UFMC00002070414	5-075
TS-48895	4-103	TS-53104	4-101	U-107	4-085	U-322	4-088	UFMC00100000000	5-075
TS-48910	5-082	TS-58220	5-090	U-108	4-085	U-400x	4-087	UFMC00200000000	5-075
TS-48911	5-082	TS-63162	5-089	U-111	4-085	U-401x	4-087	UFMC00300000000	5-075
TS-48913	5-082	TS-63163	5-089	U-112	4-085	U-402	4-088	UFMC00400000000	5-075
TS-48914	5-082	TS-63164	5-089	U-113	4-085	U-410x	4-087	UFMC00502010006	5-075
TS-48915	5-082	TS-65191	5-089	U-114	4-085	U-412	4-088	VAGK	2-069
TS-48920	5-084	TS-65192	5-089	U-126	4-085	U-428	4-088	VALK	2-068
TS-48927	5-084	TS-65193	5-089	U-127	4-085	U-430	4-088	VISF-1	4-095
TS-48999	5-086	TS-65195	5-088	U-128	4-085	U-435	4-088	VISF-2	4-095
TS-49001	5-086	TS-67363	5-089	U-129	4-085	U-437	4-088	WALBK	2-069
TS-49012	5-086	TS-84770	5-085	U-130	4-085	U-438	4-088	WALK	2-069
TS-49016	5-087	TS-88320	4-108	U-131	4-085	U-467BLK	4-087	WS-5	2-062
TS-49230	5-087	TS-88321	4-108	U-132	4-085	U-467R	4-087	WS-6	2-071
TS-49231	5-087	TS-88530	5-085	U-133	4-085	UFMC00001010401	5-075	ZF1-10	4-095
TS-49300	5-091	TS-88623	5-084	U-144	4-085	UFMC00001010501	5-075	ZN1-10	4-095
TS-49301	5-091	TS-88625	5-084	U-152	4-085	UFMC00001010503	5-075		
TS-49350	5-090	TS-88626	5-084	U-153	4-085	UFMC00001070401	5-075		
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UNLESS OTHERWISE EXPRESSLY AGREED IN WRITING, ALL SALES ARE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

1. **GENERAL.** Thermo Fisher Scientific ("Seller") hereby offers for sale to the buyer named on the face hereof ("Buyer") the products listed on the face hereof (the "Products") on the express condition that Buyer agrees to accept and be bound by the terms and conditions set forth herein. Any provisions contained in any document issued by Buyer are expressly rejected and if the terms and conditions in this Agreement differ from the terms of Buyer's offer, this document shall be construed as a counter offer and shall not be effective as an acceptance of Buyer's document. Buyer's receipt of Products or Seller's commencement of the services provided hereunder will constitute Buyer's acceptance of this Agreement. This is the complete and exclusive statement of the contract between Seller and Buyer with respect to Buyer's purchase of the Products. No waiver, consent, modification, amendment or change of the terms contained herein shall be binding unless in writing and signed by Seller and Buyer. Seller's failure to object to terms contained in any subsequent communication from Buyer will not be a waiver or modification of the terms set forth herein. All orders are subject to acceptance in writing by an authorized representative of Seller.

2. **PRICE.** All prices published by Seller or quoted by Seller's representatives may be changed at any time without notice. All prices quoted by Seller or Seller's representatives are valid for thirty (30) days, unless otherwise stated in writing. All prices for the Products will be as specified by Seller or, if no price has been specified or quoted, will be Seller's price in effect at the time of shipment. All prices are subject to adjustment on account of specifications, quantities, raw materials, cost of production, shipment arrangements or other terms or conditions which are not part of Seller's original price quotation.

3. **TAXES AND OTHER CHARGES.** Prices for the Products exclude all sales, value added and other taxes and duties imposed with respect to the sale, delivery, or use of any Products covered hereby, all of which taxes and duties must be paid by Buyer. If Buyer claims any exemption, Buyer must provide a valid, signed certificate or letter of exemption for each respective jurisdiction.

4. **TERMS OF PAYMENT.** Seller may invoice Buyer upon shipment for the price and all other charges payable by Buyer in accordance with the terms on the face hereof. If no payment terms are stated on the face hereof, payment shall be net thirty (30) days from the date of invoice. If Buyer fails to pay any amounts when due, Buyer shall pay Seller interest thereon at a periodic rate of one and one-half percent (1.5%) per month (or, if lower, the highest rate permitted by law), together with all costs and expenses (including without limitation reasonable attorneys' fees and disbursements and court costs) incurred by Seller in collecting such overdue amounts or otherwise enforcing Seller's rights hereunder. Seller reserves the right to require from Buyer full or partial payment in advance, or other security that is satisfactory to Seller, at any time that Seller believes in good faith that Buyer's financial condition does not justify the terms of payment specified. All payments shall be made in U.S. Dollars.

5. **DELIVERY; CANCELLATION OR CHANGES BY BUYER.** The Products will be shipped to the destination specified by Buyer, F.O.B. Seller's shipping point. Seller will have the right, at its election, to make partial shipments of the Products and to invoice each shipment separately. Seller reserves the right to stop delivery of Products in transit and to withhold shipments in whole or in part if Buyer fails to make any payment to Seller when due or otherwise fails to perform its obligations hereunder. All shipping dates are approximate only, and Seller will not be liable for any loss or damage resulting from any delay in delivery or failure to deliver which is due to any cause beyond Seller's reasonable control. In the event of a delay due to any cause beyond Seller's reasonable control, Seller reserves the right to terminate the order or to reschedule the shipment within a reasonable period of time, and Buyer will not be entitled to refuse delivery or otherwise be relieved of any obligations as the result of such delay. Products as to which delivery is delayed due to any cause within Buyer's control may be placed in storage by Seller at Buyer's risk and expense and for Buyer's account. Orders in process may be canceled only with Seller's written consent and upon payment of Seller's cancellation charges. Orders in process may not be changed except with Seller's written consent and upon agreement by the parties as to an appropriate adjustment in the purchase price therefor. Credit will not be allowed for Products returned without the prior written consent of Seller.

6. **TITLE AND RISK OF LOSS.** Notwithstanding the trade terms indicated above and subject to Seller's right to stop delivery of Products in transit, title to and risk of loss of the Products will pass to Buyer upon delivery of possession of the Products by Seller to the carrier; provided, however, that title to any software incorporated within or forming a part of the Products shall at all times remain with Seller or the licensor(s) thereof, as the case may be.

7. **WARRANTY.** Seller warrants that the Products will operate or perform substantially in conformance with Seller's published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage by properly trained personnel, for the period of time set forth in the product documentation, published specifications or package inserts. If a period of time is not specified in Seller's product documentation, published specifications or package inserts, the warranty period shall be one (1) year from the date of shipment to Buyer for equipment and ninety (90) days for all other products (the "Warranty Period"). Seller agrees during the Warranty Period, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said published specifications; provided that Buyer shall (a) promptly notify Seller in writing upon the discovery of any defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; and (b) after Seller's review, Seller will provide Buyer with service data and/or a Return Material Authorization ("RMA"), which may include biohazard decontamination procedures and other product-specific handling instructions, then, if applicable, Buyer may return the defective Products to Seller with all costs prepaid by Buyer. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products shall be made in accordance with the Delivery provisions of the Seller's Terms and Conditions of Sale. Consumables are expressly excluded from this warranty.

Notwithstanding the foregoing, Products supplied by Seller that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller, but Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the original manufacturer or third party supplier, to the extent such assignment is allowed by such original manufacturer or third party supplier.

In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage and handling of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

THE OBLIGATIONS CREATED BY THIS WARRANTY STATEMENT TO REPAIR OR REPLACE A DEFECTIVE PRODUCT SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A DEFECTIVE PRODUCT. EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY STATEMENT, SELLER DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE PRODUCTS, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE PRODUCTS ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT.

8. **INDEMNIFICATION.**

8.1 By Seller. Seller agrees to indemnify, defend and save Buyer, its officer, directors, and employees from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorney's fees) ("Indemnified Items") for (i) injury to or death of persons or damage to property to the extent caused by the negligence or willful misconduct of Seller, its employees, agents or representatives or contractors in connection with the performance of services at Buyer's

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Notwithstanding the above, Seller's infringement related indemnification obligations shall be extinguished and relieved if Seller, at its discretion and at its own expense (a) procures for Buyer the right, at no additional expense to Buyer, to continue using the Product; (b) replaces or modifies the Product so that it becomes non-infringing, provided the modification or replacement does not adversely affect the specifications of the Product; or (c) in the event (a) and (b) are not practical, refund to Buyer the amortized amounts paid by Buyer with respect thereto, based on a five (5) year amortization schedule. THE FOREGOING INDEMNIFICATION PROVISION STATES SELLER'S ENTIRE LIABILITY TO BUYER FOR THE CLAIMS DESCRIBED HEREIN.

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