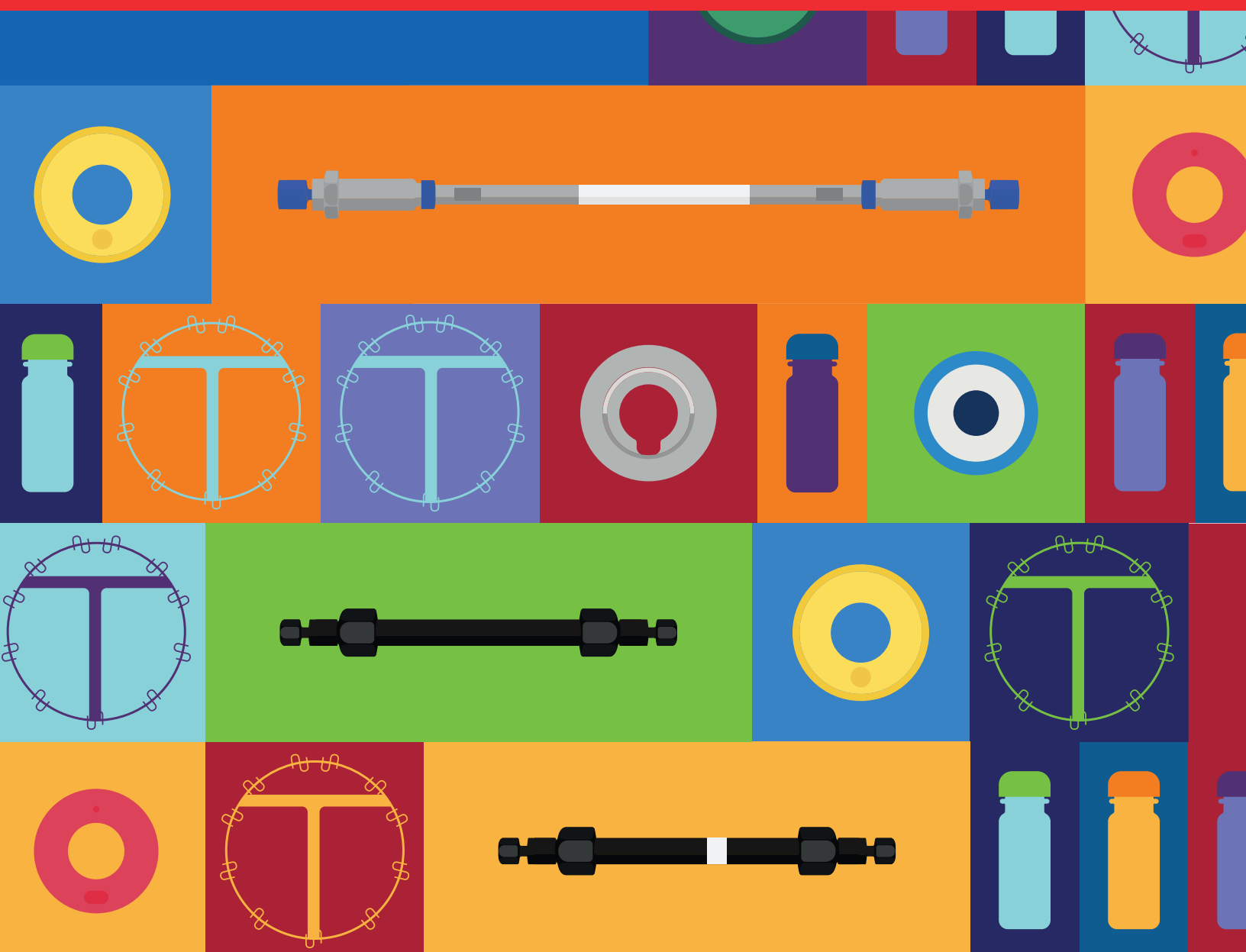


thermo scientific



Connected chromatography solutions

2019/2021 Chromatography Consumables Catalog

ThermoFisher
SCIENTIFIC

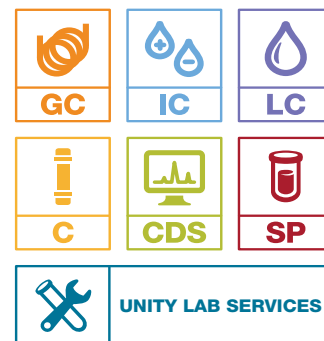


The collective power of chromatography

Expect reproducible results with sample prep, columns and vials

Maximizing your chromatography productivity and achieving reproducible results requires optimizing the whole workflow from sample to knowledge. By choosing the right tools, from your sample preparation (manual or automated) to the highest selectivity column chemistry and cleanest vials, you maintain sample integrity and achieve the highest instrument efficiency and reduce the need for costly reanalysis. With the largest portfolio of sample handling; vials, plates and closures, column chemistries in a broad range of dimensions and sample preparation, we remain a steadfast and committed partner in your endeavor to improve the world around us.

Find out more at thermofisher.com/chromatographyconsumables



ThermoFisher
SCIENTIFIC

2019/2021 Chromatography Consumables Catalog

This PDF catalogue is designed to familiarise you with our comprehensive portfolio of Chromatography consumables, columns and accessories, designed to deliver connected chromatography solutions across Biopharma/Pharma, Food & Beverage, Environmental and Clinical workflows. We have included key workflows in the next few pages to help with your product selection.

How to use this PDF catalog

You can use the 'ctrl F' function to search for products, applications, brands or part numbers, or you can navigate by section using the contents page to guide you.

More information

For more information on Chromatography consumables, to access application notes, educational resources, selection guides and product literature, please visit [thermofisher.com/chromatographyconsumables](https://www.thermofisher.com/chromatographyconsumables)

Or, for more information on our Instrumentation and key applications, please visit [thermofisher.com/chromatography](https://www.thermofisher.com/chromatography)

AppsLab

Gain access to our applications expertise on cloud-based Thermo Scientific™ AppsLab library of analytical applications for a comprehensive fully searchable method repository.

Visit appslab.thermofisher.com

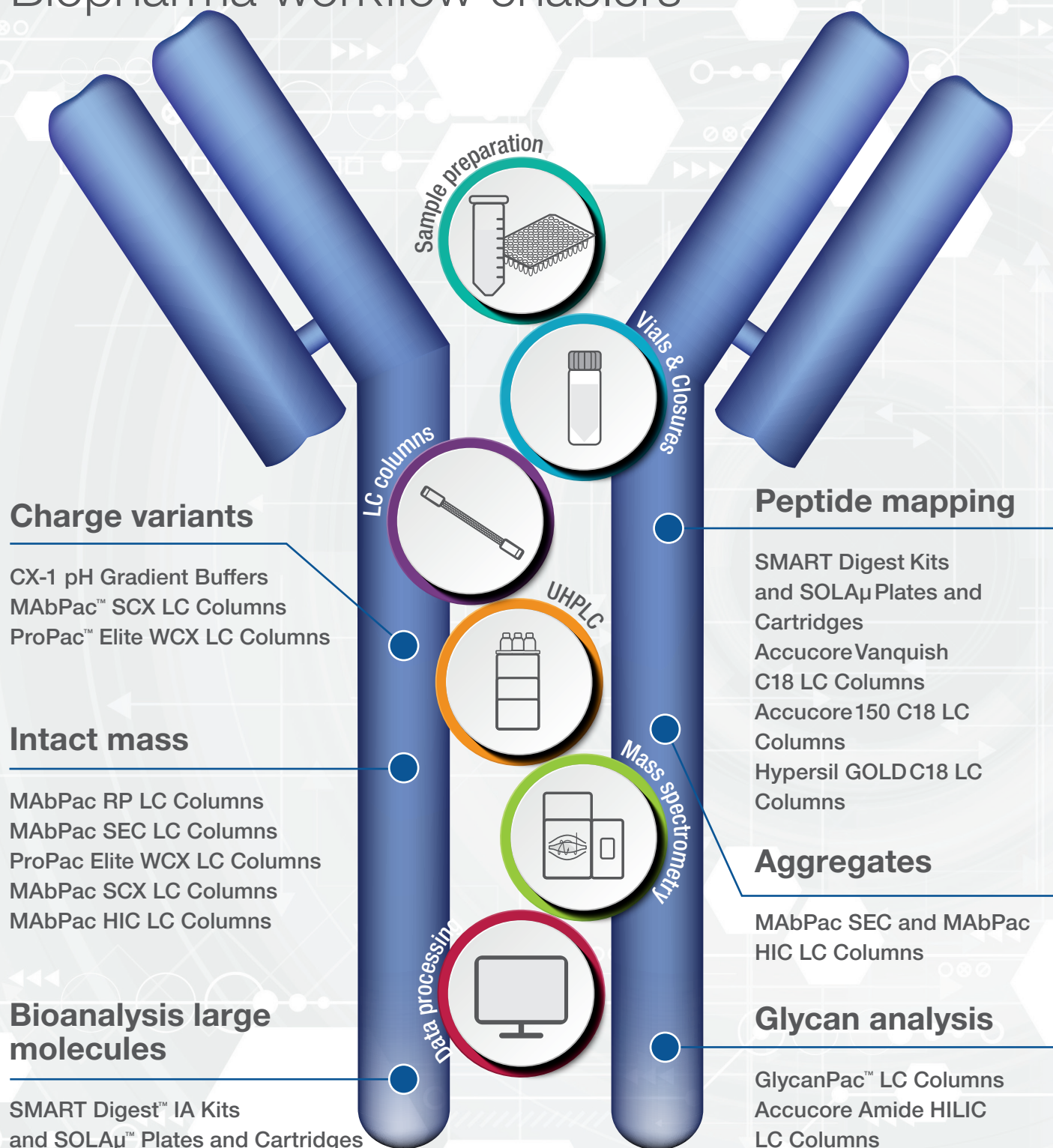
A collaboration built for Biopharma

The National Institute for Bioprocessing Research and Training (NIBRT) and Thermo Fisher Scientific are developing workflows using Thermo Fisher Scientific technology including the latest biomolecule columns.

For more information on collaboration built for BioPharma visit

[thermofisher.com/NIBRT](https://www.thermofisher.com/NIBRT)

Thermo Scientific™ Biopharma workflow enablers



Find out more about consumables for your Biopharma workflow [here](#)

Thermo Scientific™ Pharmaceutical workflow enablers

Small molecules

Discovery DMPK

HyperSep™ SPE Cartridges and Plates
WebSeal™ Well Plates and Mats
Accucore™ RP-MS LC Columns
Accucore Biphenyl LC Columns
Acclaim™ VANQUISH™ C18 UHPLC Columns
Titan3™ Syringe Filters

Development DMPK / Pre Clinical

SOLA™/SOLAμ™ SPE Plates and Cartridges
WebSeal Well Plates and Mats
HyperSep SPE Cartridges and Plates
Accucore C18 LC Columns
Accucore Biphenyl LC Columns
Hypersil GOLD™ VANQUISH™ C18 UHPLC Columns

Clinical

SOLA/SOLAμ SPE Plates and Cartridges
WebSeal Well Plates and Mats
Hypersil GOLD VANQUISH C18 UHPLC Columns
Accucore C18 LC Columns
Accucore Biphenyl LC Columns

QA/QC

Titan3 Syringe Filters
Hypersil GOLD C18 UHPLC Columns
Accucore RP-MS LC Columns
Accucore Biphenyl LC Columns
TraceGOLD™ GC Columns

Large molecules

Discovery DMPK

SMART Digest™ Kits
WebSeal Well Plates and Mats
MAbPac™ LC Columns
ProPac™ Elite WCX LC Column
GlycanPac™ LC Columns
Acclaim 120 C18 Columns
CX-1 pH Gradient Buffers

Development DMPK / Pre Clinical

SMART Digest & SMART Digest ImmunoAffinity Kit
SOLA/SOLAμ SPE Plates and Cartridges
WebSeal Well Plates and Mats
Acclaim 120 C18 Columns

Clinical

SOLA/SOLAμ SPE Plates and Cartridges
WebSeal Well Plates and Mats
Acclaim 120 C18 Columns

QA/QC

Titan3 Syringe Filters
SMART Digest Kits
ProPac LC Columns
MAbPac LC Columns
CX-1 pH Gradient Buffers
Acclaim 120 C18 Columns



Thermo Scientific™ Food and Beverage workflow enablers

Pesticides

HyperSep™ SPE Cartridges
QuEChERS
TraceGOLD™ GC Columns
GC Consumables
and Accessories
Accucore™ aQ LC Columns
Acclaim™ Carbamate
LC Columns
LC Columns
Acclaim Trinity Q1 LC Columns

Mycotoxins

HyperSep Retain Cartridges
Accucore aQ LC Columns
Hypersil GOLD™ LC Columns

Contaminants by GC-MS

HyperSep SPE Cartridges
TraceGOLD GC Columns
GC Consumables and
Accessories



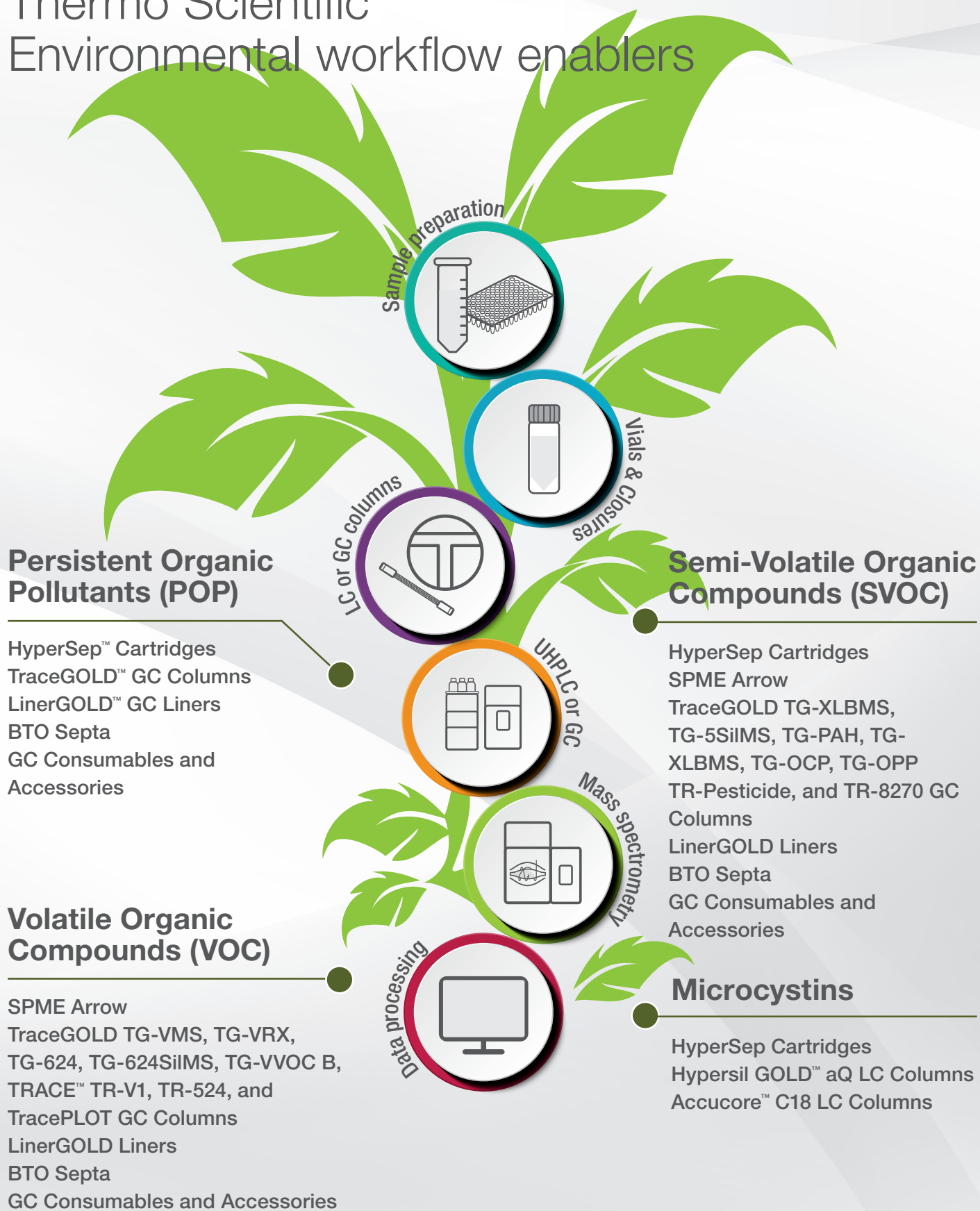
Veterinary drug residues

QuEChERS
Target2™ PTFE Syringe
Filters
Accucore VDX LC Columns

Food quality/ Food labelling / Food fraud

HyperSep Retain Cartridges
HyperSep SPE Cartridges
Acclaim LC Columns
Accucore LC Columns
HyperREX™ LC Columns
GC Columns and
Consumables

Thermo Scientific™ Environmental workflow enablers



Thermo Scientific™ Clinical research workflow enablers

Forensic toxicology

SOLA™/SOLA μ ™ SPE Plates and Cartridges
HyperSep™ SPE Cartridges and Plates
HyperSep™ Retain Cartridges
Accucore™ Biphenyl LC Columns
Accucore RP-MS LC Columns
TraceGOLD™ GC Columns and Guard Columns

Drugs of abuse research

SOLA/SOLA μ SPE Plates and Cartridges
HyperSep Verify CX Cartridges
Accucore Biphenyl LC Columns
Hypersil GOLD™ LC Columns
TraceGOLD GC Columns

Supplement analysis

HyperSep Retain Cartridges and Plates
Hypercarb™ HPLC and UHPLC Columns
Hypersil GOLD PFP LC Columns
Accucore aQ C18 LC Columns

Amino acids, acylcarnitines, and succinylacetone research

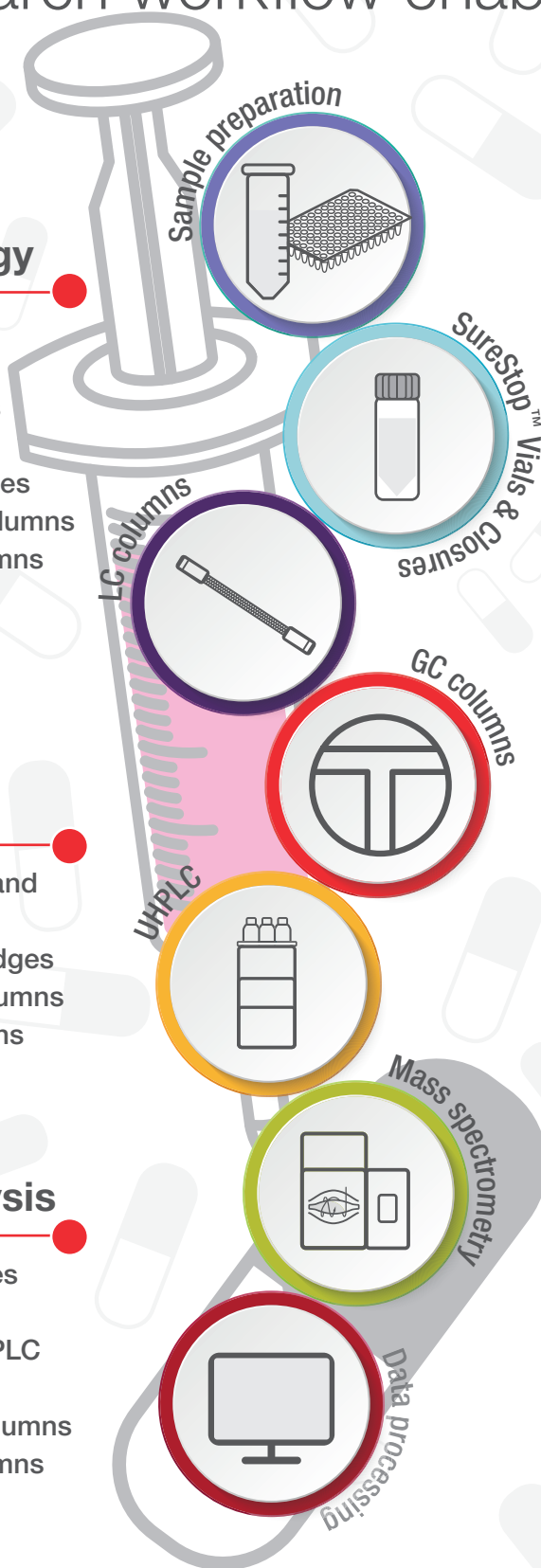
Hypersil GOLD C18 LC Columns
Accucore aQ C18 LC Columns
Acclaim™ HILIC LC Columns
Titan3™ Syringe Filters
HyperSep SLE Plates and Cartridges
TraceGOLD GC Columns

Translational proteomics

SMART Digest™ Kits
SOLA μ SPE Plates and Cartridges
EASY-Spray™ LC Columns
PepMap™ RSLC Columns
WebSeal™ Well Plates and Mats

Drug monitoring research

SOLA/SOLA μ SPE Plates and Cartridges
WebSeal Well Plates and Mats
Acclaim 120 C18 Columns

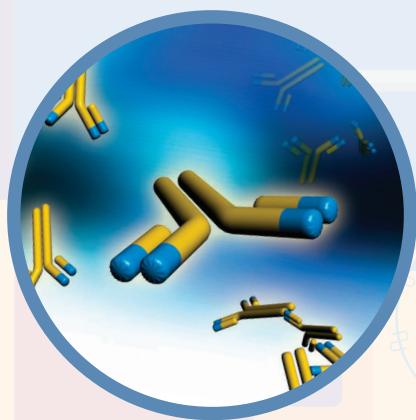


Bio LC columns and accessories

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

For more information on our range of Bio LC columns, visit thermofisher.com/biolc

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.



MABPac SCX

Strong cation exchange (SCX) columns designed specifically for the high-resolution, high efficiency charged variant analysis of mAbs and associated variants.

Section contents

Columns for biomolecules	3-003
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MABPac HPLC and UHPLC columns	3-005
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LC columns for biomolecules	3-008
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Columns for glycan analysis	3-020
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ProPac HPLC columns	3-023
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Silica based protein columns	3-031
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Oligonucleotide columns	3-039
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Nano, capillary and micro LC columns	3-044
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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 3-019



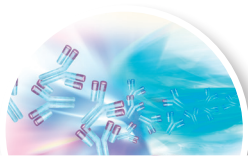
EASY-Spray

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

Page 3-045

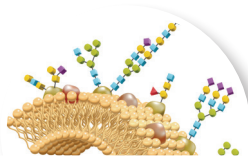
Columns for biomolecules

Proteins, mAbs, ADCs



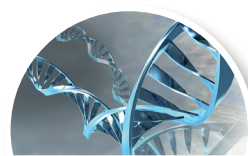
Thermo Scientific™ ProPac™ columns

- ProPac Elite WCX
- ProPac HIC-10
- ProPac WCX-10
- ProPac SAX-10
- ProPac SCX-10
- ProPac WAX-10
- ProPac IMAC-10



Thermo Scientific™ ProSwift™ columns

- ProSwift WAX-1S
- ProSwift SAX-1S
- ProSwift WCX-1S
- ProSwift SCX-1S
- ProSwift RP
- ProSwift Con A



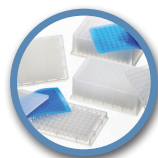
Thermo Scientific™ MAbPac™ columns

- MAbPac SCX-10
- MAbPac SEC
- MAbPac Protein A
- CX-1 pH Buffers
- MAbPac HIC-10
- DNAPac HIC-20
- DNAPac HIC-Butyl
- DNAPac RP

Associated products

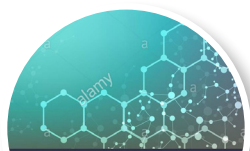


pH Gradient Buffers



WebSeal Well Plates and Mats

Peptides



**Thermo Scientific™
columns**

Acclaim Vanquish
120

Hypersil GOLD
Vanquish

EASY-Spray

Acclaim
PepMap

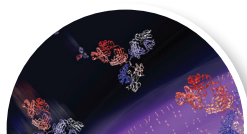
Acclaim
300

BioBasic C18, C8,
C4, AX, CX

Accucore
150-C18

Accucore
Vanquish C18+

Glycans



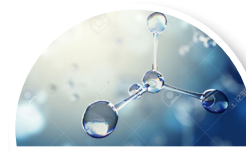
**Thermo Scientific™
Accucore™ and
GlycanPac™ columns**

Acclaim Amide
HILIC

GlycanPac AXH-1

GlycanPac AXR-1

Nucleic Acids



**Thermo Scientific™
DNAPac™ columns**

DNAPac PA100,
PA200

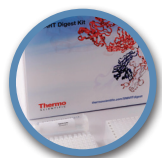
DNASwift

DNAPac PR

Associated products



SOLAμ SPE Plates



SMART Digest Kit



Viper Fingertight Fittings

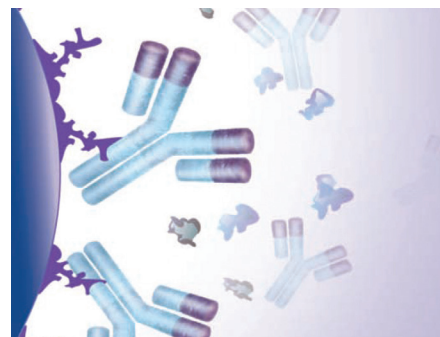
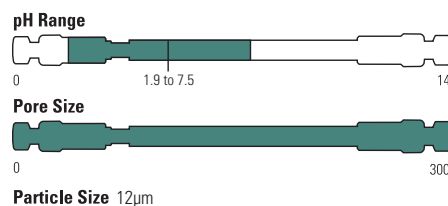
MABPac HPLC and UHPLC columns

MABPac Protein A

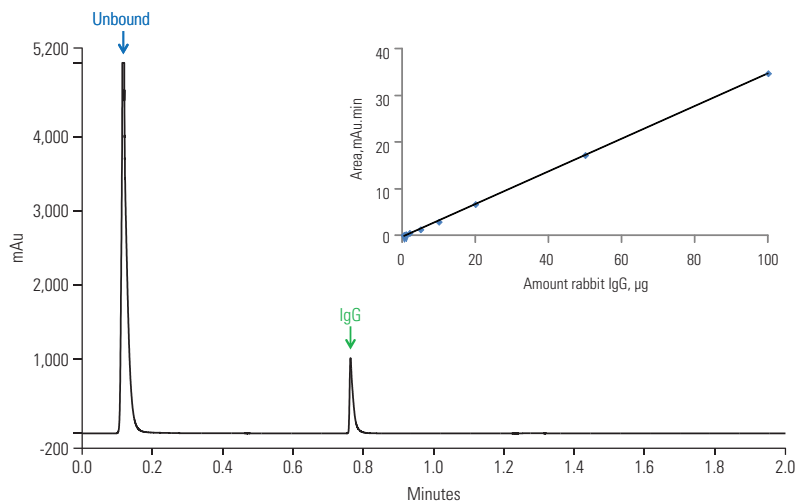
Fast mAb titer analysis

- 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

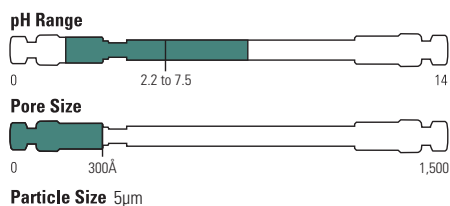
Particle Size (µm)	Format	Length (mm)	4.0mm ID
12	HPLC Column	35	082539



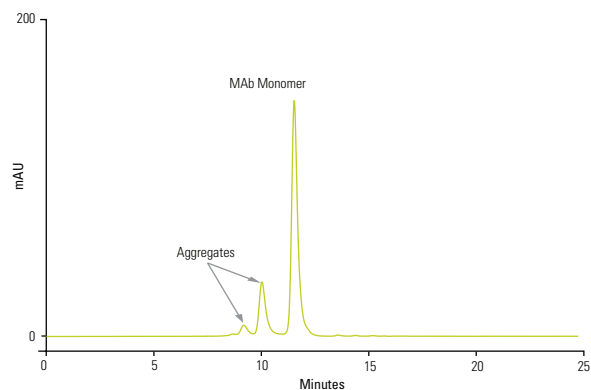
MABPac SEC-1

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

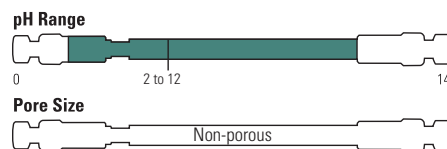
Particle Size (μm)	Format	Length (mm)	2.1mm ID	4.0mm ID	7.8mm ID
5	Guard Column	50	–	074697	–
	HPLC Column	150	088790	075592	–
		300	088789	074696	088460



MABPac SCX-10

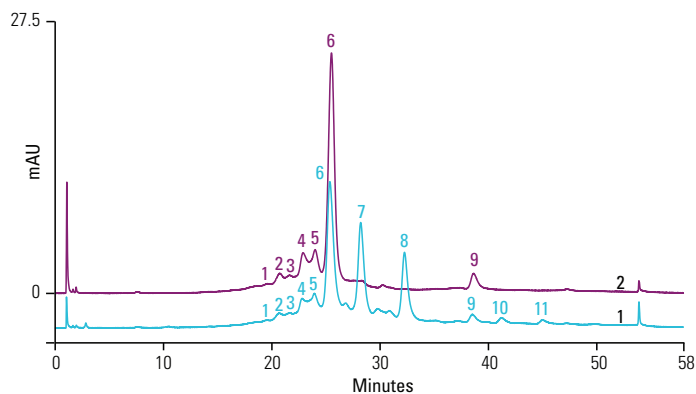
Strong cation exchange column designed specifically for the high-resolution, high efficiency charged variant analysis of monoclonal antibodies and associated variants

- 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	–
5	HPLC Column	50	075749	074631	–
		50	–	075603	–
		150	–	075602	–
		250	075604	074625	088784

Learn more at [thermofisher.com/mabpac](https://www.thermofisher.com/mabpac)



LC columns for biomolecules

The diversity of biological samples in terms of compound structure and properties coupled with matrix complexity demands a range of sample separation modes, column chemistries, column configurations and detection techniques for their effective characterization. We address these needs with a range of silica and polymeric columns specifically designed to handle the unique rigors of the analysis of proteins, peptides, oligonucleotides and other biomolecules.

Columns for proteins

Reversed phase

Thermo Scientific BioBasic reversed-phase columns provide superior chromatography because the extra dense bonding chemistry used for these packings produce a highly stable, reproducible surface for reliable results. BioBasic reversed phase packings are available in C18, C8 and C4, chemistries.

Acclaim 300 C18 features 3 μ m silica particles for rapid analysis of complex protein digests. Compared to 5 μ m column packings, the smaller particles support increased flow rates and shallower gradients on shorter columns, for faster separation analysis.

Thermo Scientific™ ProSwift™ RP monolith columns uniquely provide the advantages of high resolution at exceptionally high flow rates for fast protein separation analysis.

Ion exchange

Thermo Scientific™ ProPac™ and Thermo Scientific™ MAbPac™ ion exchange columns are based on a pellicular nonporous core particles providing exceptionally high resolution and efficiency for separations of protein variants, resolving 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. ProPac WCX and MAbPac SCX columns are specifically developed for monoclonal separation and analytical characterization. Applications include protein variants in a variety of matrices, such as biopharmaceuticals and dairy products. MAbPac columns are specifically designed for the analysis of monoclonal antibody variants.

BioBasic AX and BioBasic SCX ion exchange columns demonstrate superior reproducibility, both column-to-column and batch-to-batch because the 5 μ m, 300Å silica provides high efficiency. Both phases provide superior performance for proteins, peptides and nucleic acids using protein friendly ion exchange conditions.

ProSwift ion exchange monoliths provide an excellent alternative to porous or non porous ion exchange media. They offer increased loading capacity compared to pellicular phases combined with excellent resolution compared to traditional porous ion exchange media.

Size exclusion

BioBasic SEC columns, based on silica with a proprietary polymeric coating, offer the mechanical stability of silica-based size exclusion columns with higher efficiencies than that of polymer-based columns. Four pore sizes (60Å, 120Å, 300Å, 1000Å) are available, making them ideal for molecular weight determination of peptides, proteins and water soluble polymers. They can also be used for sample clean-up prior to other analyses.

MAbPac SEC-1 (300Å 5 μ m silica) is a size exclusion chromatography (SEC) column specifically designed for separation and characterization of monoclonal antibodies (MAb) and their aggregates, as well as the analysis of Fab and Fc fragments resulting from proteolysis.

Hydrophobic interaction

The ProPac HIC-10 column is a high-resolution, high-capacity, 300Å, 5 μ m silica-based HIC column that provides excellent high resolution separations of proteins and variants for analytical and preparative applications. ProPac HIC columns provide exceptional hydrolytic stability under the highly aqueous conditions used in HIC.

Affinity

The MAbPac Protein A column is a unique non-porous polymeric column designed for fast, accurate determination of monoclonal antibody titer analysis from harvest cell culture. The ProPac IMAC-10 is a high-resolution analytical and semipreparative column for separation of proteins and peptides by immobilized metal affinity chromatography. It is packed with 10 μ m, nonporous, polymeric beads coated with a hydrophilic layer, then grafted with poly(IDA) chains.

The ProSwift ConA-1S affinity monolith column is unsurpassed for fast, highly efficient enrichment and purification of Concanavalin A (Con A) binding glycans, glycopeptides, and glycoproteins containing high-mannose regions.

Columns for oligonucleotides

Thermo Scientific DNAPac strong anion exchange columns provide industry-leading resolution for analysis and purification of synthetic oligonucleotides. DNAPac columns can resolve full length oligonucleotides from n-1, n+1, and other failure sequences not possible with other columns.

Thermo Scientific™ DNASwift™ a strong anion exchange monolith column that provides exceptionally high oligonucleotide purity. This semipreparative column incorporates the high resolution and selectivity of the DNAPac column, with increased loading capacity.

Columns for carbohydrates

Thermo Scientific™ GlycanPac™ AXH-1 and AXR-1 columns are HPLC columns designed for the simultaneous separation of glycans by charge, size and polarity. Separating either fluorescently labeled or native glycans.

Columns for proteomics

Nano, capillary and micro columns

Thermo Scientific™ Acclaim™ PepMap™ and PepMap RSLC columns are specially designed for high-resolution analyses of tryptic, natural, and synthetic peptides. The columns are often applied for LC-MS/MS peptide mapping for protein identification, biomarker discovery, and systems biology. Due to their high loading capacity, the columns are exceptionally suitable for the analysis of low abundant peptides in complex proteomics samples. Acclaim PepMap Trap columns are typically applied for the desalting and preconcentration of peptides before LC separation with MS detection.

The columns are designed to provide the highest efficiencies for one dimensional peptide mapping experiments and 2D-LC analyses. Thermo Scientific™ PepSwift™ monolithic columns are specially designed for fast separation and identification of proteins and peptides using nano and capillary LC coupled to MS.

Using highly pure chromatographic media and biocompatible, metal-free fused silica capillaries, Thermo Scientific™ EASY-Spray™ capillary LC columns are produced with a focus on design simplicity and strict quality control. As a result, they deliver outstanding chromatographic performance on any nano LC system.

EASY-Spray columns provide a fully integrated and temperature controlled combined column-emitter design with only a single Thermo Scientific™ nanoViper™ connection between the LC and the MS ion source. This dead volume reduction is a critical component in helping to deliver state of the art performance with ease of use.



Bio columns selection guide

Analyte	Mode of Analysis	Recommended Column
Monoclonal antibodies and Proteins	Size Exclusion	BioBasic SEC
		MABPac SEC-1
	Ion Exchange	BioBasic AX
		ProPac SCX-10, WCX-10, SAX-10, WAX-10, SCX-20
		MABPac SCX-10, MABPac SCX-10 RS
	Reversed Phase	ProSwift IEX
		BioBasic 18, 8, 4
		Acclaim 300 C18
	Hydrophobic Interaction	Accucore 150-C18, 150-C4
		ProSwift RP
Affinity	ProPac HIC-10	
	MABPac Protein A	
	ProPac IMAC-10	
Peptides	Proteomics	ProSwift ConA-1S
		Acclaim PepMap
		PepSwift
	Analytical	EASY-Spray Columns
		EASY-Spray Columns
Preparative	BioBasic 18, 8, 4	
Amino Acids (derivatized)	Ion Exchange	Acclaim 300
	Reversed phase	BioBasic
Amino Acids (underivatized)	Ion Exchange	AminoPac PA10
	Reversed phase	Hypersil GOLD
Nucleotides	Anion Exchange	AminoPac PA10
	Polar retention	Hypercarb
Oligonucleotides	Ion Exchange	BioBasic AX
		DNAPac PA100, PA200, PA200 RS
		DNASwift
Carbohydrates	Ligand Exchange	HyperREZ XP
	Ion Exchange	CarboPac
	Mixed Mode	GlycanPac AXH-1
	HILIC	Acclaim HILIC
		Hypersil GOLD HILIC
		Synchronis HILIC
	Polar retention	Accucore 150-Amide-HILIC
		Hypercarb

HPLC phases for biomolecules

Silica-based reversed phase and ion exchange phases

Phase	Particle Type	Particle Size (µm)	Pore Size (Å)	Nominal Surface Area (m ² /g)	% Carbon	Endcapping	USP Code	Phase Code
Acclaim Phase								
300 C18	Spherical, fully porous silica	3	300	100	8	Yes	L1	–
Acclaim PepMap Phases								
100 C18	Spherical, fully porous silica	2, 3, 5	100	300	15	Yes	L1	–
300 C18	Spherical, fully porous silica	5	300	100	9	Yes	L1	–
100 C8	Spherical, fully porous silica	3, 5	100	300	9	Yes	L7	–
300 C4	Spherical, fully porous silica	5	300	300	3	Yes	L26	–
Accucore Phases								
150-C18	Spherical, solid core silica	2.6	150	80	7	Yes	L1	161
150-C4	Spherical, solid core silica	2.6	150	80	2	Yes	L26	165
150-Amide-HILIC	Spherical, solid core silica	2.6	150	80	–	–	–	167
BioBasic Phases								
18	Spherical, fully porous silica	5	300	100	9	Yes	L1	721
8	Spherical, fully porous silica	5	300	100	5	Yes	L7	722
4	Spherical, fully porous silica	5	300	100	4	Yes	L26	723
AX	Spherical, fully porous silica	5	300	100	3	No	–	731
SCX	Spherical, fully porous silica	5	300	100	3	No	L52	733

Columns for protein separations

Silica-based size exclusion chromatography phases

Phase	SEC Type	Particle Type	Particle Size (µm)	Pore Size (Å)	Exclusion Limit Operating Range (kDa)	USP Code	Phase Code
BioBasic Phases							
SEC 60	Aqueous	Spherical, fully porous silica	5	60	0.1 – 6	–	733
SEC 120	Aqueous	Spherical, fully porous silica	5	120	0.1 – 50	L33	734
SEC 300	Aqueous	Spherical, fully porous silica	5	300	1 – 500	L33, L59	735
SEC 1000	Aqueous	Spherical, fully porous silica	5	1000	20 – 4000	L33	736

Silica-based hydrophobic interaction chromatography phases

Column	Phase	Target Applications	Base Matrix Material	Particle Size (µm)	Pore Size (Å)	Nominal Surface Area (m ² /g)	Breakthrough Capacity	Solvent Compatibility	pH Range
ProPac HIC-10	Hydrophobic Interaction	High resolution separations of proteins and protein variants	Spherical, porous ultrapure silica with amide/ethyl surface chemistry	5	300	100	340mg lysozyme per 7.8 x 75mm column	Ammonium sulfate/phosphate salts, organic solvent for cleanup	2.5-7.5

Polymeric ion exchange, reversed phase and affinity columns

Column	Phase	Target Applications	Base Matrix Material	Functional Groups	Breakthrough Capacity	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
ProPac WCX-10	Weak Cation Exchange	High resolution separations of proteins and protein variants	Ethylvinylbenzene cross linked with 55% divinylbenzene 10µm nonporous particles	Carboxylate	6mg/mL lysozyme	0.2-2.0 mL/min	80% ACN, acetone. Incompatible with alcohols and MeOH	3000psi (21 MPa)	2.0-12
ProPac SCX-10	Strong Cation Exchange	High resolution separations of proteins and protein variants	Ethylvinylbenzene cross linked with 55% divinylbenzene 10µm nonporous particles	Sulfonate	3mg/mL lysozyme	0.2-2.0 mL/min	80% ACN, acetone, MeOH	3000psi (21 MPa)	2.0-12
ProPac SCX-20	Strong Cation Exchange	High Resolution separations of proteins and protein variants	Divinylbenzene 10µm nonporous particles	Sulfonic	20µg/mL Dynamic capacity	0.2-2.0 mL/min	50% acetonitrile	3000psi (21 MPa)	2.0-12
ProPac WAX-10	Weak Anion Exchange	High resolution separations of proteins and protein variants	Ethylvinylbenzene cross linked with 55% divinylbenzene 10µm nonporous particles	Tertiary amine	5mg/mL BSA	0.2-2.0 mL/min	80% ACN, acetone, MeOH,	3000psi (21 MPa)	2.0-12
ProPac SAX-10	Strong Anion Exchange	High resolution separations of proteins and protein variants	Ethylvinylbenzene cross linked with 55% divinylbenzene 10µm nonporous particles	Quaternary ammonium	15mg/mL BSA	0.2-2.0 mL/min	80% ACN, acetone, MeOH	3000psi (21 MPa)	2.0-12
ProSwift RP-1S	Reversed Phase	Fast protein analysis with high resolution of large peptides to medium proteins	Monolith; polystyrene-divinylbenzene	Phenyl	5.5mg/mL Insulin	2.0-4.0 mL/min	Most common organic solvents	2800psi (19.2 MPa)	1.0-14
ProSwift RP-2H	Reversed Phase	Fast protein analysis with high resolution over a wide size range	Monolith; polystyrene-divinylbenzene	Phenyl	1.0mg/mL Lysozyme	1.0-10 mL/min	Most common organic solvents	2800psi (19.3 MPa)	1.0-14
ProSwift RP-3U	Reversed Phase	Fast protein analysis with high resolution of large proteins	Monolith; polystyrene-divinylbenzene	Phenyl	0.5mg/mL Lysozyme	1.0-16 mL/min	Most common organic solvents	2800psi (19.3 MPa)	1.0-14
ProSwift RP-4H	Reversed Phase	Fast protein analysis with high resolution	Monolith; polystyrene-divinylbenzene	Phenyl	2.3mg/mL Lysozyme	0.1-0.3 mL/min	Most common organic Solvents	1500psi	1.0-14
ProSwift SAX-1S	Strong Anion Exchange	Fast protein analysis with high resolution	Monolith; polymethacrylate	Quaternary amine	18mg/mL BSA	0.5-1.5 (4.6mm)	Most common organic solvents	1000psi (4.6mm) 2000psi (1.0mm)	2.0-12
ProSwift SCX-1S	Strong Cation Exchange	Fast protein analysis with high resolution	Monolith; polymethacrylate	Sulfonic acid	30mg/mL Lysozyme	0.5-1.5 mL/min (4.6mm)	Most common organic solvents	1000psi (4.6mm)	2.0-12
ProSwift WAX-1S	Weak Anion Exchange	Fast protein analysis with high resolution	Monolith; polymethacrylate	Tertiary amine (DEAE)	18mg/mL BSA	0.5-1.5 mL/min (4.6mm)	Most common organic solvents	1000psi (4.6mm) 2000psi (1.0mm)	2.0-12
ProSwift WCX-1S	Weak Cation Exchange	Fast protein analysis with high resolution	Monolith; polymethacrylate	Carboxylic acid	23mg/mL Lysozyme	0.5-1.5mL/min (4.6mm), 0.05-0.20	Most common organic solvents	1000psi (4.6mm) 2000psi (1.0mm)	2.0-12
ProPac IMAC-10	Immobilized Metal Affinity	High resolution separation of certain metal-binding proteins and peptides	Polystyrene divinylbenzene 10µm nonporous particles	Poly (IDA) grafts	>60mg lysozyme/mL gel (4x250mm)	1.0mL/min	EtOH, urea, NaCl, non-ionic detergents, glycerol, acetic acid, guanidine HCl	3000psi (21MPa)	2.0-12
ProSwift ConA-1S	Affinity	Concanavalin A binding (high-mannose) glycans, glycopeptides and proteins	Monolith; polymethacrylate	Concanavalin A ligands	12-16mg of protein	0-1.0mL/min	Up to 10% methanol	2000psi	5.0-8

Learn more at [thermofisher.com/lccolumns](https://www.thermofisher.com/lccolumns)

Columns for monoclonal antibody separations

Polymeric ion exchange columns

Phase	IEX Type	Particle Type	Particle Size (µm)	Pore Size (Å)	Dynamic Capacity	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
MABPac SCX-10	Strong cation exchange (sulfonic)	Polymeric, Highly crosslinked DVB	3, 5, 10	non-porous	MABPac SCX-10 PEEK 3µm: 60µg/mL 5µm: 40µg/mL 10µm: 20µg/mL MABPac SCX-10 RS 5µm: 40 µg/mL	0.2-2.0mL/min (Depending on the particle size and column pressure limits)	50% Acetonitrile	3000psi (21MPa) RS columns 7000psi	2.0-12
ProPac WCX-10	Weak cation exchange (carboxylate)	Polymeric, Non-porous DVB	10	non-porous	6mg/mL	0.2-2.0mL/min	80% ACN, acetone. Incompatible with alcohols including methanol	3000psi (21MPa)	2.0-12

Silica-based size exclusion chromatography columns

Phase	SEC Type	Particle Type	Particle Size (µm)	Pore Size (Å)	Exclusion Limit Operating Range (kDa)	USP Code
MABPac SEC-1	Aqueous	Spherical, fully porous silica	5	300	1-500	L33, L59

Affinity columns

Phase	Affinity ligand	Particle Type	Particle Size (µm)	Pore Size (Å)	Capacity	Recommended Flow Rate	Maximum temperature	Maximum Backpressure	pH Range
MABPac Protein A	Protein A	Polymeric	12	non-porous	100µg IgG/column	< 2.5	30	1000	2.5-7.5

Columns for carbohydrate separations

Polymeric ligand exchange columns

Phase	Particle Type	Particle Size (µm)	Pore Size (Å)	Nominal Surface Area (m ² /g)	% Carbon	Endcapping	USP Code	Phase Code
Thermo Scientific™ HyperREZ™ XP Phases								
Carbohydrate H ⁺	Spherical, polymer	8	–	–	–	–	L17	690
Carbohydrate Pb ²⁺	Spherical, polymer	8	–	–	–	–	L34	691
Carbohydrate Ca ²⁺	Spherical, polymer	8	–	–	–	–	L19	692
Carbohydrate Na ⁺	Spherical, polymer	10	–	–	–	–	–	693
Organic Acid	Spherical, polymer	8	–	–	–	–	L17	696
Sugar Alcohol	Spherical, polymer	8	–	–	–	–	L19	697

Silica-based HILIC and mixed-mode columns

Phase	Particle Type	Particle Size (µm)	Pore Size (Å)	Nominal Surface Area (m ² /g)	% Carbon	Endcapping	USP Code	Phase Code
GlycanPac Phases								
AXH-1	Spherical, fully porous silica	1.9	175	220	–	Yes	–	–
AXH-1	Spherical, fully porous silica	3	120	300	–	Yes	–	–
Accucore Phase								
150-Amide-HILIC	Spherical, solid core silica	2.6	150	80	–	–	–	167

Monolithic affinity columns

Phase	Particle Type	Particle Size (µm)	Pore Size (Å)	Nominal Surface Area (m ² /g)	% Carbon	Endcapping	USP Code	Phase Code
ProSwift Phases								
ConA-1S	Concanavalin A binding (high mannose) glycans, glycopeptides and proteins	"Monolith;	175	220	-	Yes	-	-

Columns for oligonucleotide separations

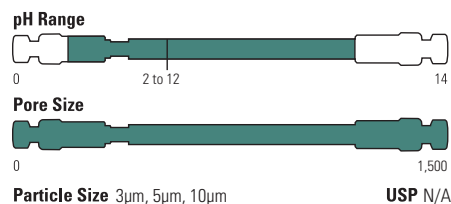
Column	Target Applications	Base Matrix Material	Substrate Crosslinking	Latex Crosslinking	Capacity	Recommended Eluents	Recommended Flow Rate	Solvent Compatibility	Maximum Backpressure	pH Range
DNAPac PA100	High resolution separations of single and double stranded DNA or RNA oligonucleotides	13µm diameter nonporous substrate agglomerated with alkyl quaternary ammonium functionalized latex 100nm MicroBeads	55%	5%	40µeq	Hydroxide or sodium and lithium salts of Chloride or Perchlorate	1.5mL/min	0-100%	4000psi (28MPa)	2-12.5
DNAPac PA200	Improved high resolution separations of single and double stranded DNA or RNA orthogonal to DNAPac PA100	8µm diameter nonporous substrate agglomerated with alkyl quaternary ammonium functionalized latex 130nm MicroBeads	55%	5%	40µeq	Hydroxide, acetate/ or sodium and lithium salts of Chloride or Perchlorate	1.2mL/min	0-100%	4000psi (28MPa)	2-12.5
DNAPac PA200 RS	UHPLC-resolution separations of single and double stranded DNA or RNA Best available resolution	4µm diameter nonporous substrate agglomerated with alkyl quaternary ammonium functionalized latex 130nm MicroBeads	55%	5%	40µeq	Hydroxide, acetate/ hydroxide or sodium and lithium salts of Chloride or Perchlorate	1.3mL/min	0-100%	10,000 psi (69MPa)	2-12.5
DNASwift	High resolution separations for purification of oligonucleotides Highest latex-based capacity	Monolith; polymethacrylate substrate agglomerated with quaternary amine functionalized latex	70%	3%	8mg, of a 20 mer oligonucleotide	NaClO ₄ and NaCl	0.5-2.5mL	Most Common Organic Solvents	1500psi, 10MPa	6.0-12.4

Learn more at thermofisher.com/lccolumns

MABPac SCX-10 RS

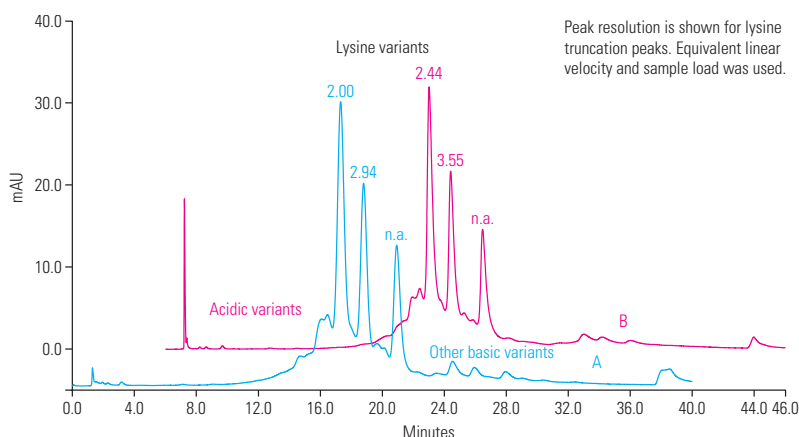
BioRS (Rapid Separation), strong cation exchange column designed for monoclonal antibodies and associated charged variants

- 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 NaCl
 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

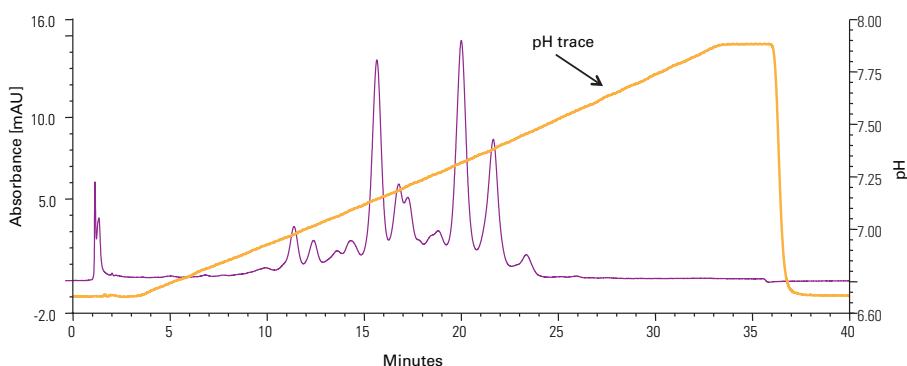
The Thermo Scientific pH gradient platform accelerates method development and facilitates method transfer to QA/QC for a wide range of protein and mAb charge variants through a generic LC-based approach to charge variant characterization.

- 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	500mL
Buffer			
CX-1 pH Gradient Buffer A (pH 5.6)	083273	085346	302779
CX-1 pH Gradient Buffer B (pH 10.2)	083275	085348	302780

Kits	Buffer	MABPac SCX-10 Column format	Buffer Bottle size	
			125mL	250mL
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	–

Learn more at thermofisher.com/mabpac

Monoclonal antibody characterization and analysis kits

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

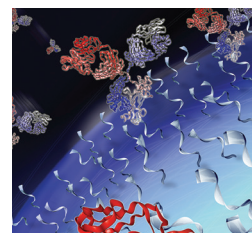
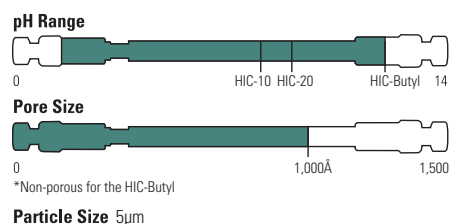
Applications

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 cystein-conjugated ADC while MABPac HIC-10 and MABPac HIC-20 have proven useful for several cysteine proprietary ADC molecules, as shown below.

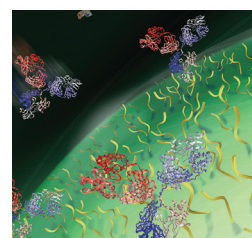
MABPac HIC Selection Guide

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

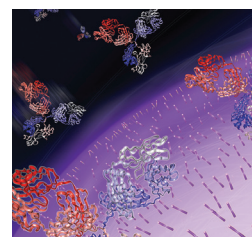
Greater number of ++++ denotes greater suitability



MABPac HIC-10



MABPac HIC-20



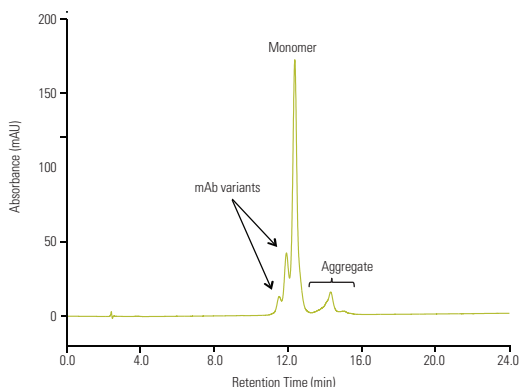
MABPac HIC-Butyl

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

Learn more at [thermofisher.com/mabpac](https://www.thermofisher.com/mabpac)

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

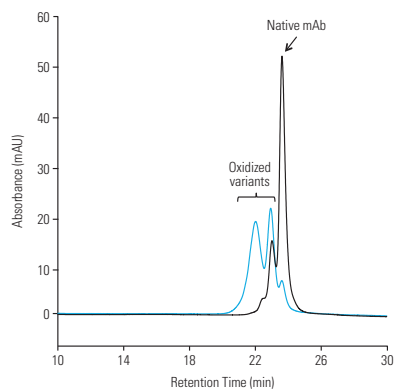
Flow Rate: 0.5mL/min

Injection Volume: 10µL

Detection: UV, 280nm

Sample: Monoclonal antibody (4mg/mL)

Separation of mAb Fragments



Column: MABPac HIC-20, 5 µm

Format: 4.6 x 250 mm

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

Mobile phase B: 100 mM sodium phosphate, pH 7.0

Gradient:	Time (min)	%A	%B
	-6.0	50	50
	0.0	50	50
	2.0	50	50
	30.0	0	100
	35.0	0	100

Flow Rate: 0.5 mL/min

Inj. Volume: Untreated mAb: 20 µL (1.25 mg/mL)

Oxidized mAb: 20 µL (1.25 mg/mL)

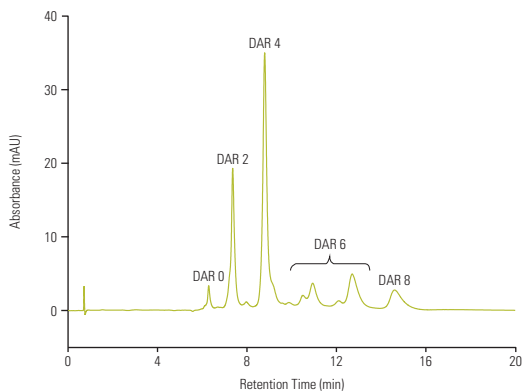
Temp.: 30 °C

Detection: UV (280 nm)

Sample: Untreated mAb

H₂O₂ oxidized mAb

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

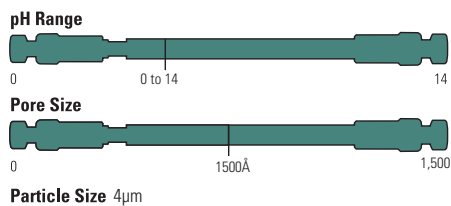
Detection: UV, 280nm

Sample: Cys-conjugated ADC mimic (5mg/mL)

MABPac RP

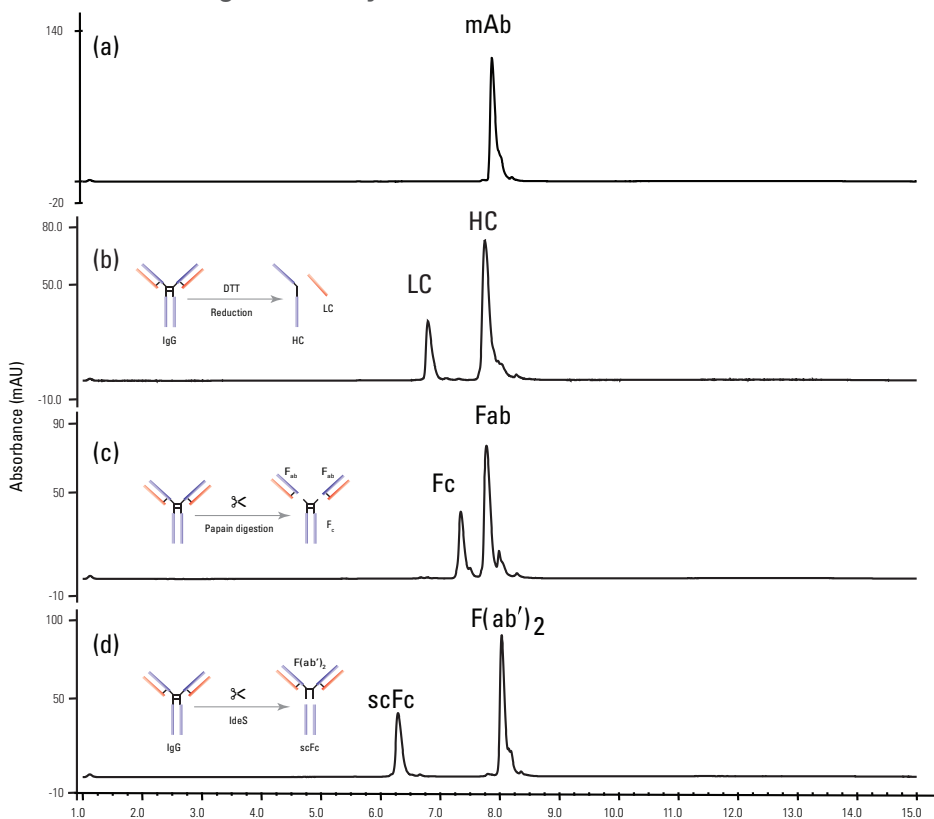
High resolution accurate mass determination of monoclonal antibody variants, antibody drug conjugates (ADC) and proteins

- 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, 4 μm, 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: 5 μL

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 1mm

Particle Size (μm)	Length (mm)	1mm ID
4 μm	50	303182
	100	303183
	150	303184

MABPac RP

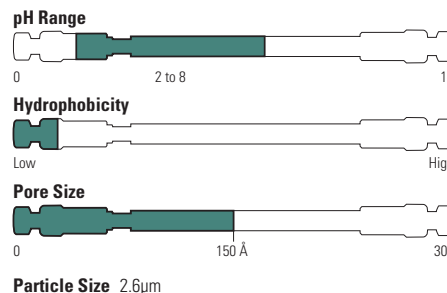
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID
4	Guard Cartridges (2/pk)	10	088649	088646
		HPLC Column	50	088648
		100	088647	088644
		150	303270	303269
	Guard Cartridge Holder		069580	069580

Columns for glycan analysis

Accucore 150-amide-HILIC

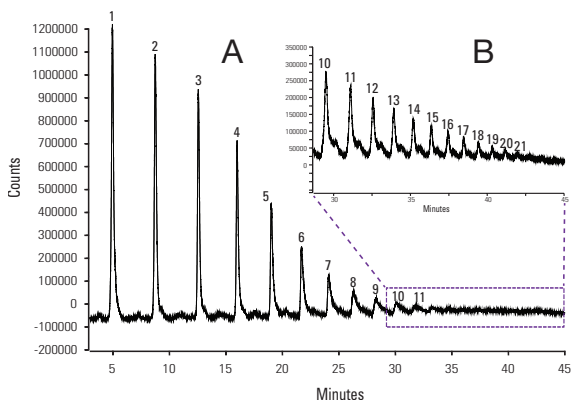
HPLC column for neutral glycan analysis

- 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

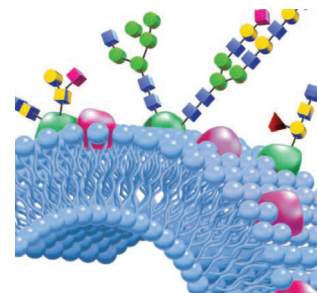
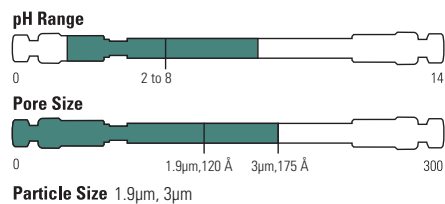
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	16726-012105	16726-013005	16726-014005
		HPLC Column	50	16726-052130	16726-053030
		100	16726-102130	16726-103030	16726-104630
		150	16726-152130	16726-153030	16726-154630
		250	16726-252130	-	-
	Guard Cartridge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

GlycanPac AXH-1

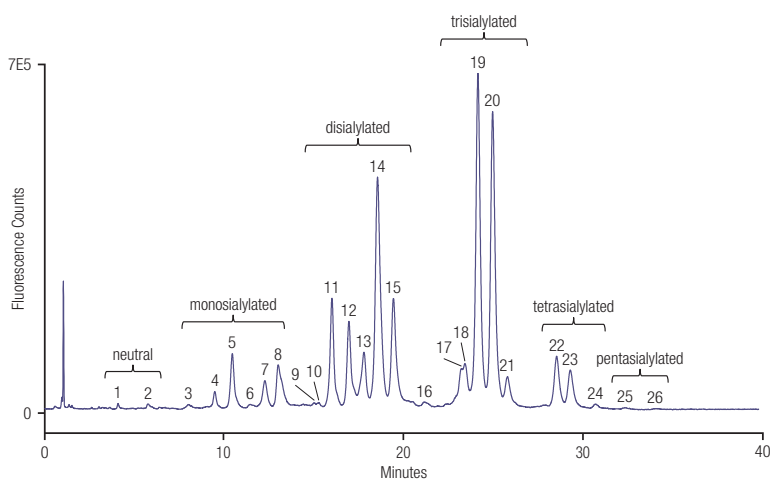
High-resolution columns for neutral and charged glycan analysis

- 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: 50pmoles
 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

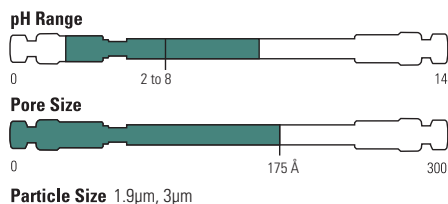
GlycanPac AXH-1

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

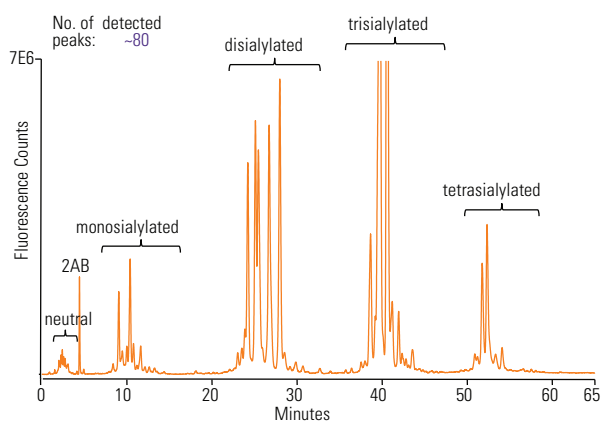
Ultra-high resolution columns for neutral, charged and glycan isomer analysis

- 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)	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 Elite WCX

High performance chromatography column for charge variant analysis

The ProPac Elite WCX is a weak cation exchange (WCX) liquid chromatography column designed for therapeutic protein charge variant characterization, including the separation of mAbs, ADCs and biosimilars, using LC/UV or MS. The unique column chemistry provides excellent resolution under salt gradient or pH gradient separations. The 5µm particle size and updated column chemistry provide high resolution separations.

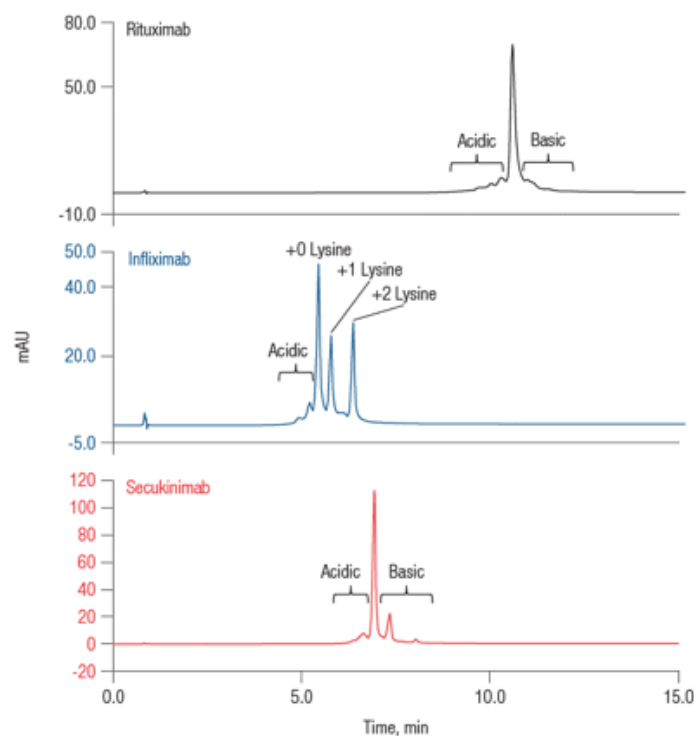
- Next Generation of the ProPac WCX-10
- High efficiency with low carry-over
- Excellent lot-to-lot reproducibility
- Wide operating pH range: 2-12
- High temperature stability: up to 60 °C
- High throughput
- Compatible with CX-1 pH gradient buffers

Ordering guide

Description		Particle Size	Length (mm)	2.0 mm ID	4.0 mm ID
ProPac Elite WCX	Analytical	5 µm	50	303028	302973
			100	303027	302972
	HPLC Column		250	303026	303025

Validation kits

Part Number	Phase Description	Set Contents	Column Dimensions
302976	ProPac Elite WCX	3 Columns from 1 Lot	4 × 150 mm
302977	ProPac Elite WCX, Analytical	3 Columns from 3 Lots	4 × 150 mm
303061		3 Columns from 1 Lot	4 × 250 mm
303062		3 Columns from 3 Lots	4 × 250 mm



Column: ProPac Elite WCX 5µm
 Format: 4x150mm
 Eluents: A: 1X CX-1 pH Gradient Buffer A
 B: 1X CX-1 pH Gradient Buffer B

Gradient:	Time (min)	%A	%B
	0.0	80	20
	15.0	20	80
	15.1	0	100
	17.0	0	100
	17.1	80	20
	25.0	80	20

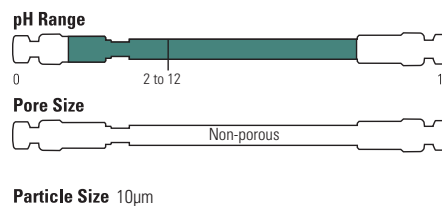
Flow Rate: 1.0 mL/min
 Inj. Vol: 2 µL
 Temp: 30 oC
 Detection: UV, 280 nm
 Sample: Top: Rituximab, 5 mg/mL
 Middle: Infliximab, 5 mg/mL
 Bottom: Secukinimab, 5 mg/mL

ProPac WCX-10 and SCX-10

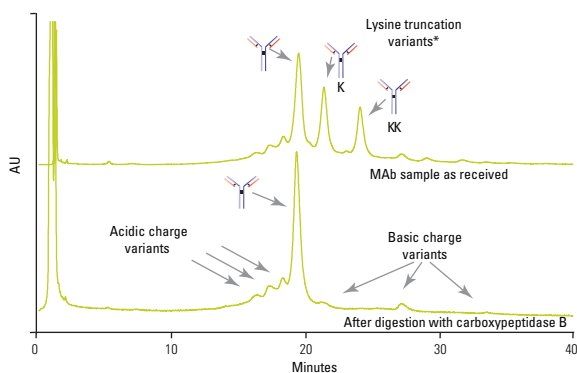
Weak and strong cation exchange columns with exceptionally high resolution and efficiency for separations of protein variants

- 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.



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

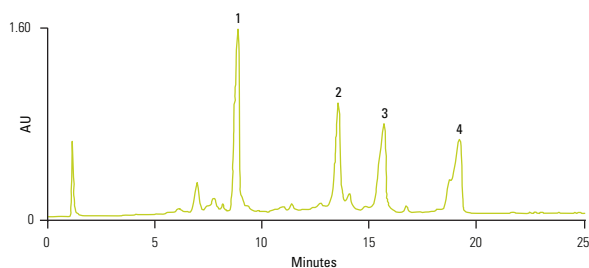
Flow Rate: 1.0mL/min

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	–	088778	–	–
		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

Learn more at thermofisher.com/propac

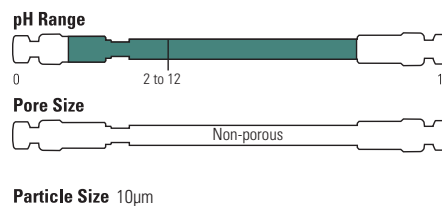


ProPac SCX-20

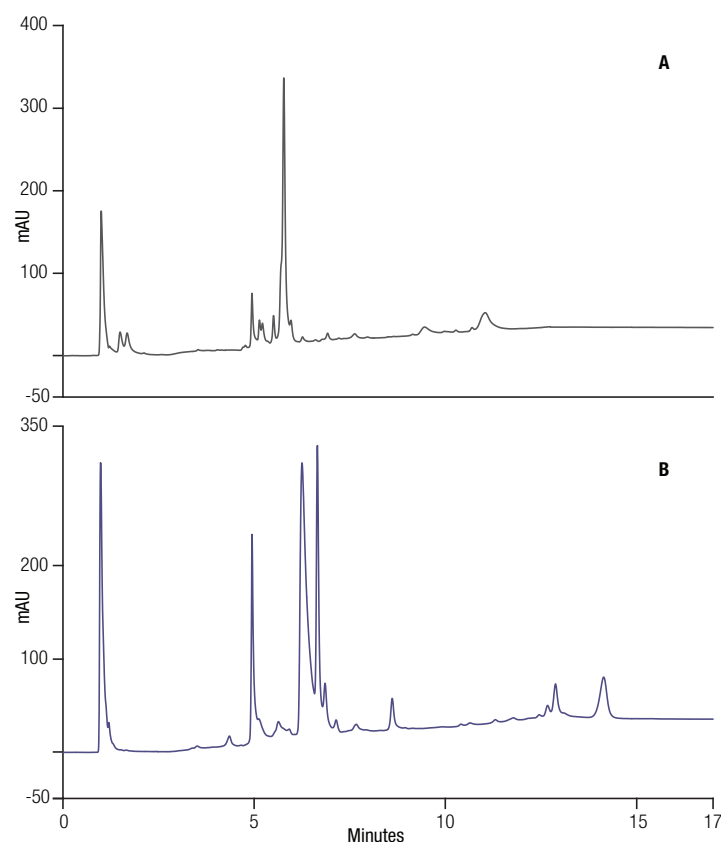
Strong cation-exchange column for high-resolution protein separations

- 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.



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 (<i>Naja naja</i>) 1mg/mL
	B. Snake Venom (Russell's viper) 1mg/mL

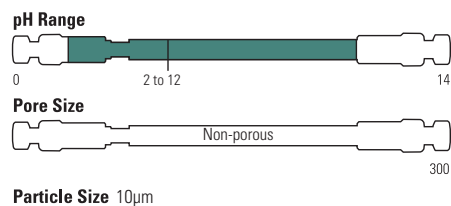
ProPac SCX-20

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

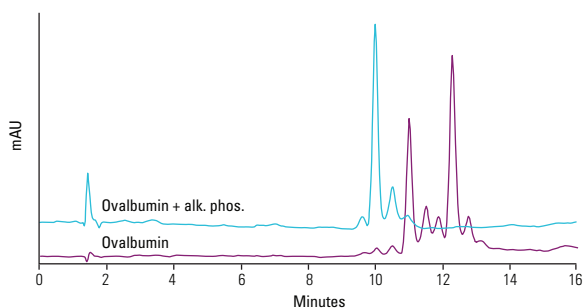
ProPac WAX-10 and SAX-10

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



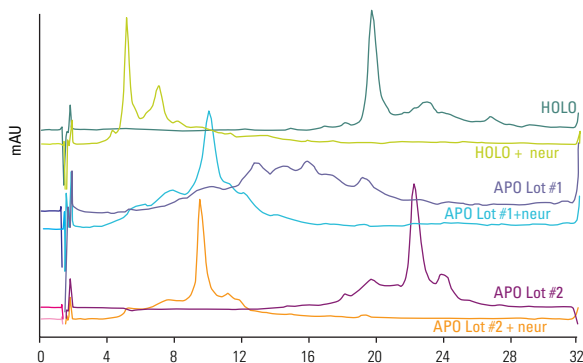
Resolution of phosphorylation variants of ovalbumin



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:	HOL0 (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

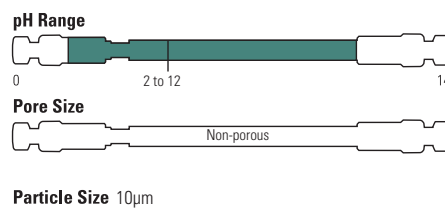
ProPac SAX-10

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

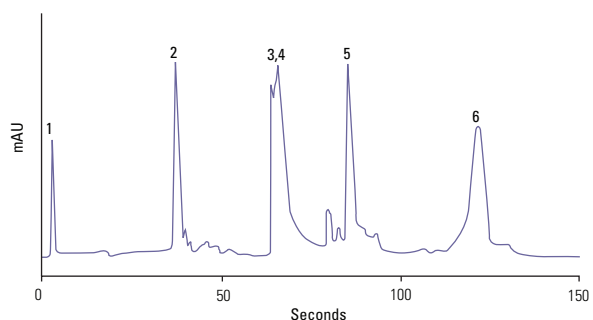
ProPac PA1

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



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

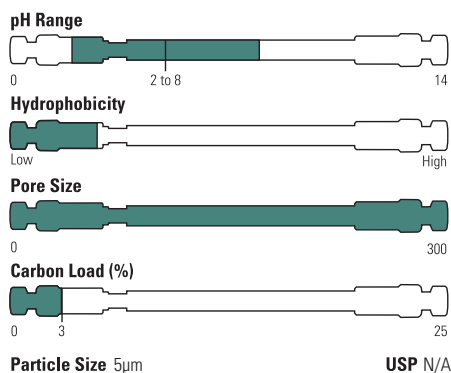
Particle Size (µm)	Format	Length (mm)	4.0mm ID	9.0mm ID
10	Guard Column	50	039657	-
	HPLC Column	250	039658	040137



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



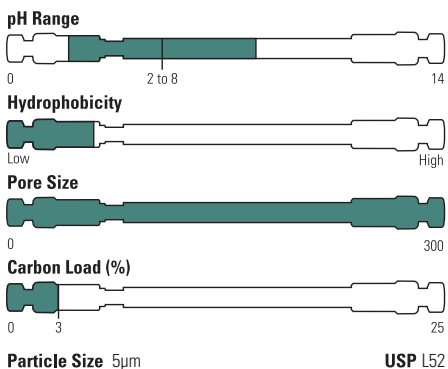
BioBasic AX

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
5	Drop-in Guard (4/pk)	10	73105-011001	73105-012101	73105-013001	73105-014001
	HPLC Column	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)	10	73205-011001	73205-012101	73205-013001	73205-014001
	HPLC Column	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	-	-	73205-254630
	UniGuard Guard Cartridge Holder		851-00	852-00	852-00	850-00

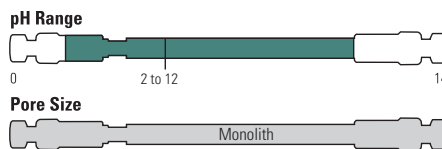
Learn more at [thermofisher.com/LCcolumns](https://www.thermofisher.com/LCcolumns)

ProSwift IEX

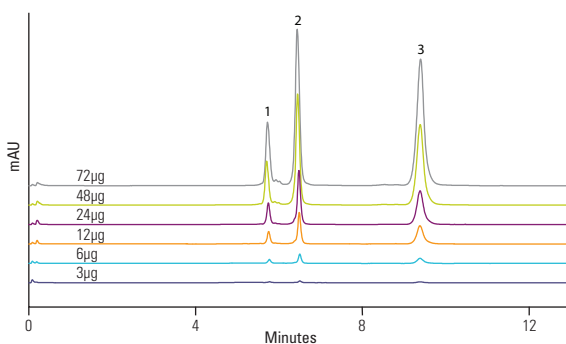
Monolith IEX columns for high-resolution and fast protein analysis

- 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

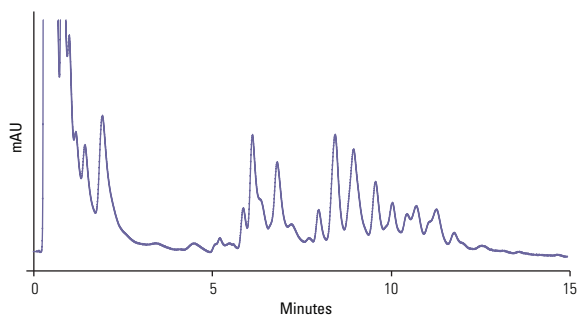


ProSwift WCX-1S, 50 x 1.0mm

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 *E. coli* protein



ProSwift IEX

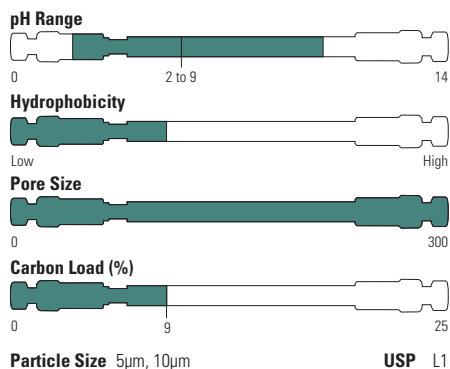
Functional Group	Length (mm)	1.0mm ID	4.6mm ID
WAX-1S	50	-	064294
WCX-1S	50	-	064295
SAX-1S	50	068459	064293
SCX-1S	50	-	066765

Silica based protein columns

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



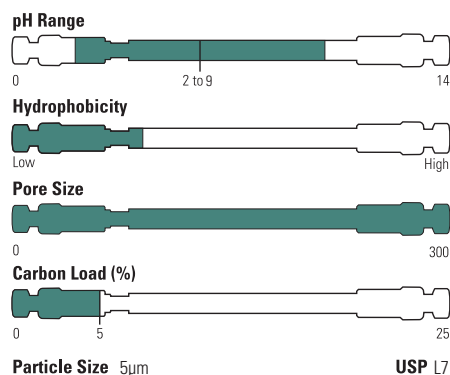
BioBasic 18

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



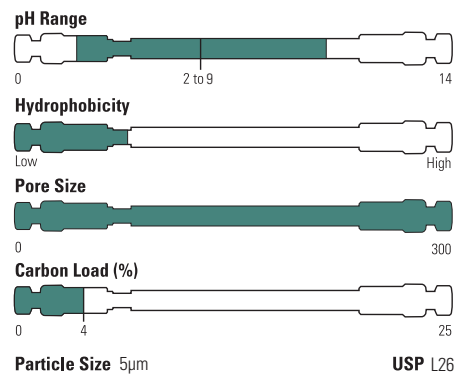
BioBasic 8

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

Learn more at [thermofisher.com/LCcolumns](https://www.thermofisher.com/LCcolumns)

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



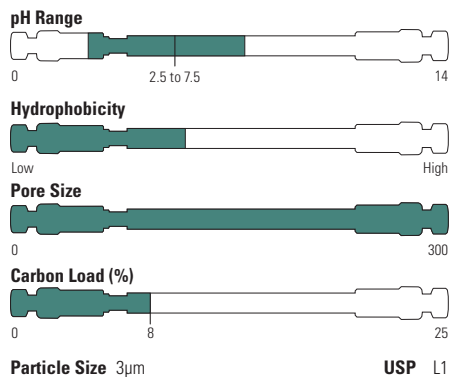
BioBasic 4

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

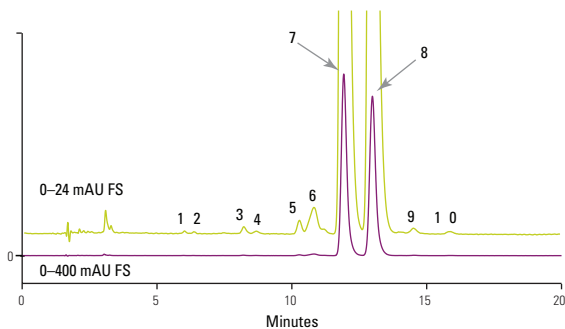
Acclaim 300 C18

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

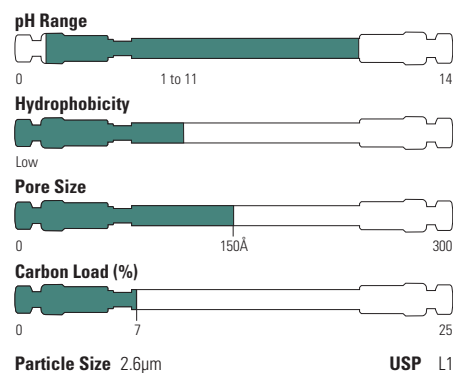
Learn more at thermofisher.com/LCcolumns

Accucore 150-C18

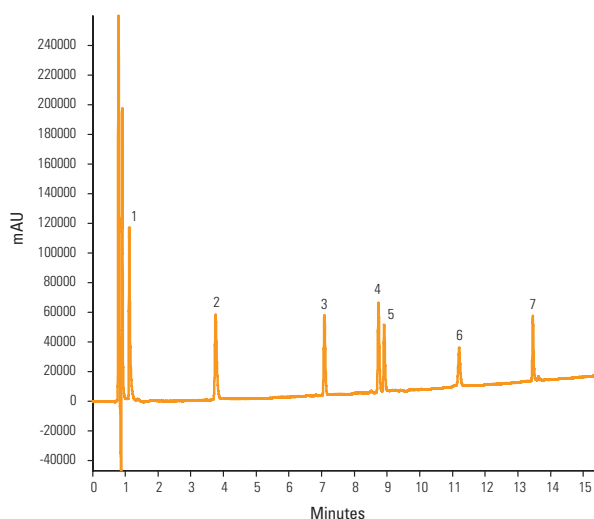
- Designed for the separation of peptides
- Outstanding resolution
- 150Å pore diameter material

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

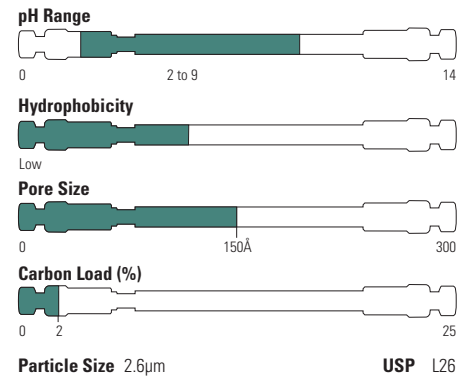
Accucore 150-C18

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

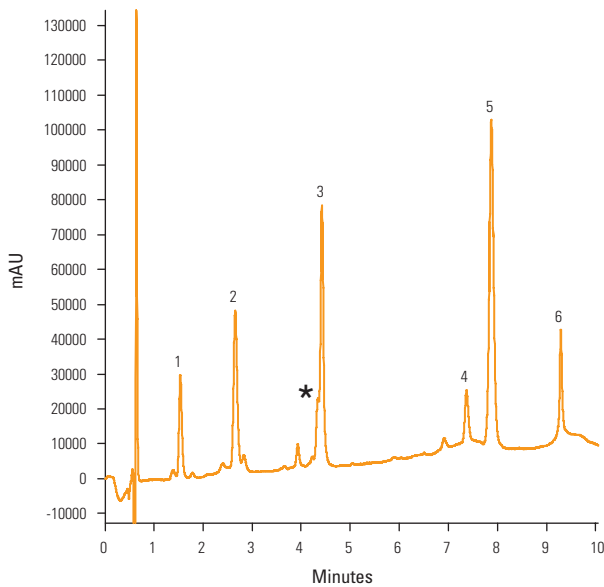
Accucore 150-C4

- 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)	10	16526-012105	16526-013005	16526-014005
	HPLC Column	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

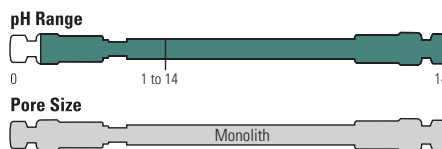
Learn more at thermofisher.com/LCcolumns

ProSwift RP

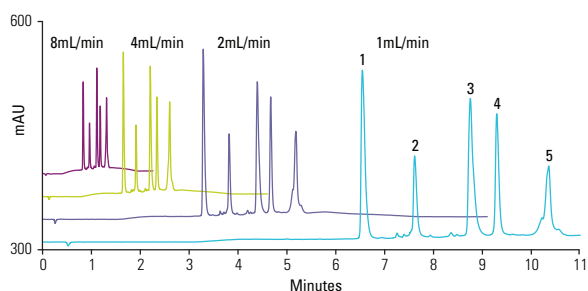
Reversed-phase monolith columns that uniquely provide the advantages of high resolution at exceptionally high flow rates for fast protein separations and analysis

- 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

Swift 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.



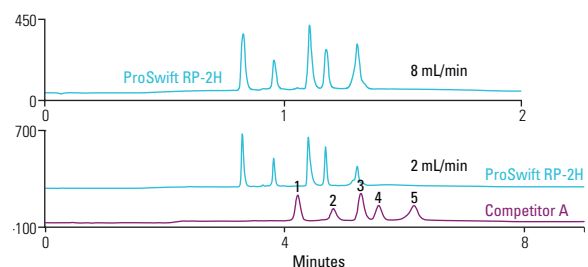
Proteins



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



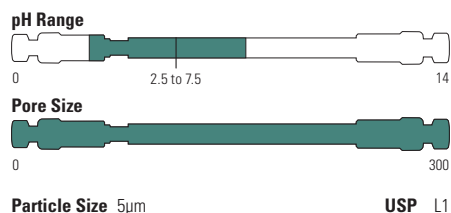
ProSwift RP

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	–

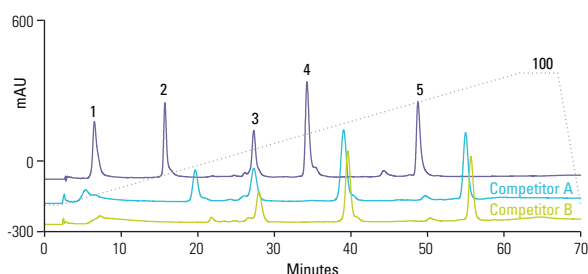
ProPac HIC-10

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



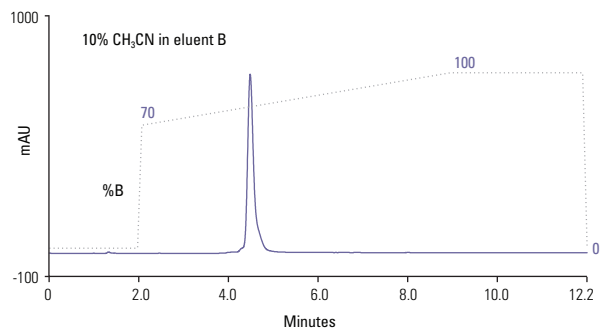
Protein mixture



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

Mobile Phase A:	2 M ammonium sulfate, 0.1 M sodium phosphate, pH 7.0
Mobile Phase B:	0.1 M sodium phosphate, 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 ammonium sulfate, 0.1 M sodium phosphate, pH 7.0
Mobile Phase B:	0.1 M sodium phosphate, pH 7.0 / acetonitrile (90:10 v/v) 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

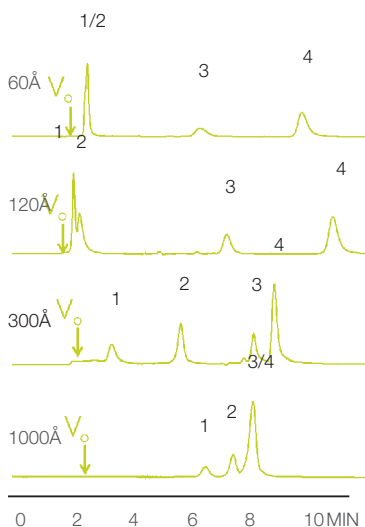
Particle Size (µm)	Format	Length (mm)	2.1mm ID	4.6mm ID	7.8mm ID
5	HPLC Column	75	–	–	063665
		100	063653	063655	–
		250	–	074197	–

Learn more at thermofisher.com/LCcolumns

BioBasic SEC

Superior separation of water soluble compounds

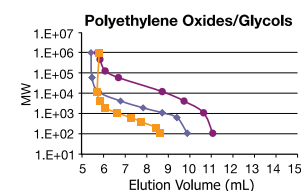
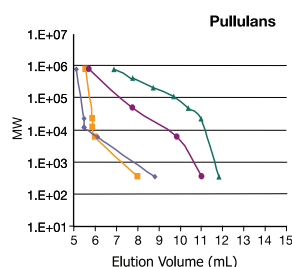
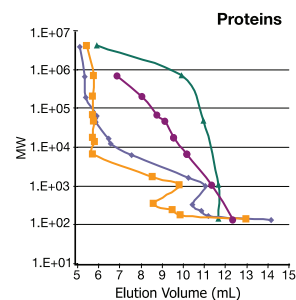
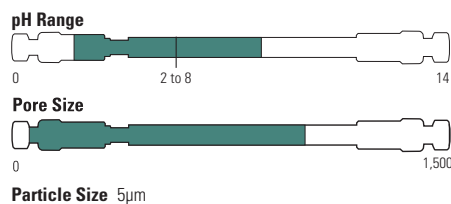
- Covers separation of analytes over a wide molecular weight range
- Long column life and high column efficiencies
- Simple mechanism of interaction based on molecular size and shape
- Ideal for sample clean-up
- Straightforward method development, simple mobile phases



Effect of pore size on SEC resolution

BioBasic SEC, 5 μ m, 300 x 7.8mm

Mobile Phase: 0.1M KH_2PO_4 , pH 7
 Flow Rate: 1.0mL/min
 Injection Volume: 20 μ L
 Detection: UV, 254nm
 Analytes:
 1. Thyroglobulin (MW669,00)
 2. Ovalbumin (MW 45,000)
 3. Angiotensin II (MW 1,046)
 4. PABA (V_m) (MW 137)



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

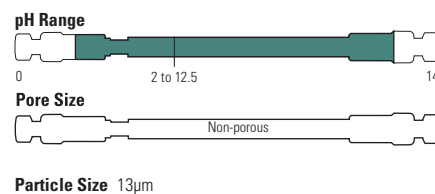
Oligonucleotide columns

DNAPac PA100

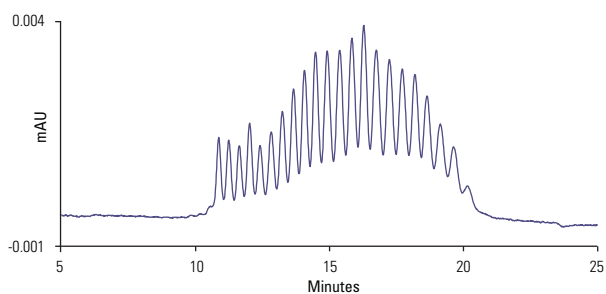
A strong anion exchange column developed to provide high-resolution analysis and purification of synthetic oligonucleotides

- 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)₄₀₋₅₀

DNAPac PA100

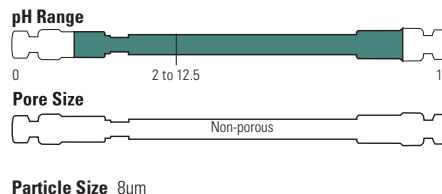
Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
13	Guard Column	50	088761	043018	088764	088765
	HPLC Column	250	088760	043010	043011	088759

Learn more at thermofisher.com/LCcolumns

DNAPac PA200

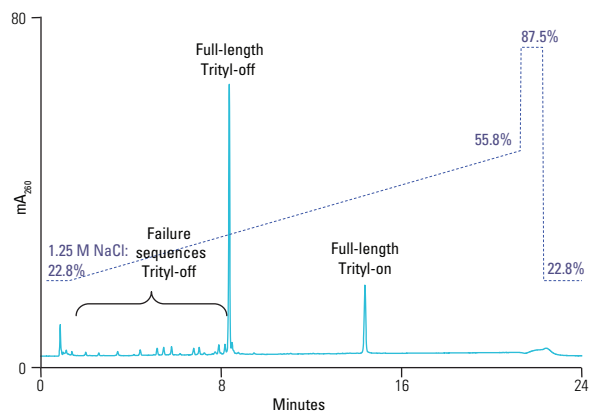
A strong anion exchange column developed to provide the best resolution for analysis and purification of synthetic oligonucleotides

- 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
- 9-fold more stable to high pH than DNAPac PA100

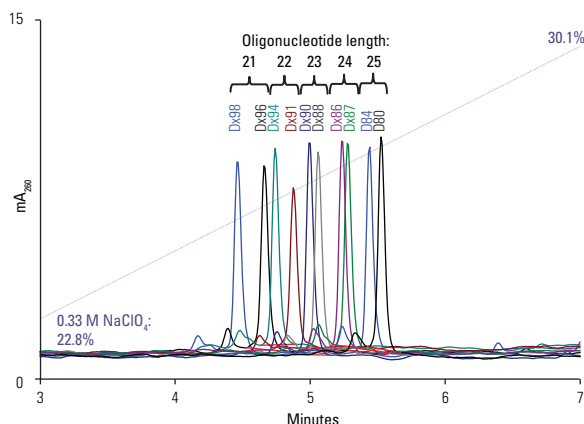


The DNAPac PA200 is packed with a pellicular anion-exchange resin composed of an 8µm diameter nonporous polymeric substrate to which quaternary amine-functionalized Dionex MicroBeads are bound. The rapid mass transport characteristics of this resin result in high-resolution oligonucleotide separations. 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:	NaClO ₄ , pH 6.5 with 20% CH ₃ CN
Flow Rate:	1.2mL/min
Injection Volume:	8µL
Detection:	UV, 260nm

DNAPac PA200

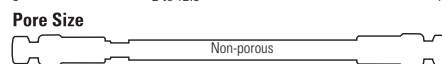
Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
8	Guard Column	50	063423	062998	063419	088780
	HPLC Column	250	063425	063000	063421	088781

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

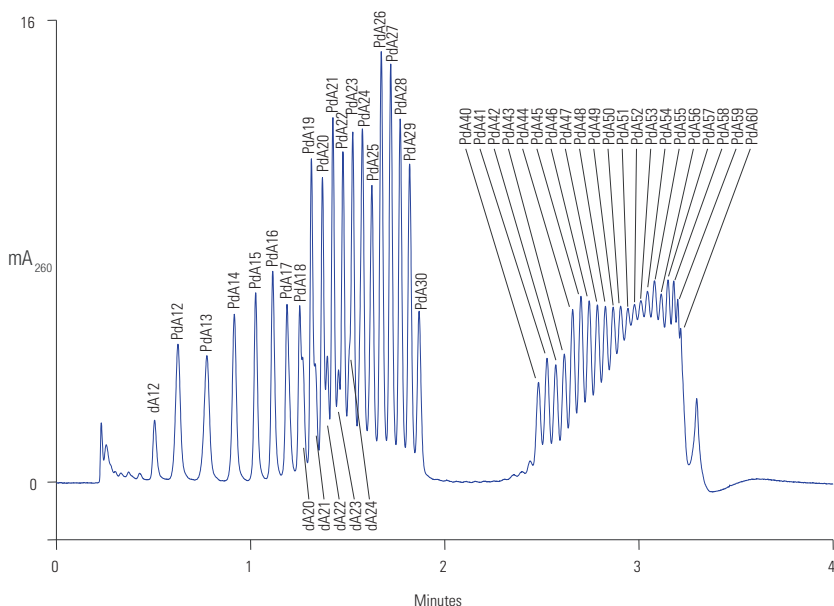
DNAPac PA200 RS columns are packed with smaller, 4µm particles, for improved resolution and better performance. The smaller particles also allow shorter columns to provide significantly higher throughput. These columns are packed in Bio-Inert PEEK-lined stainless steel (SST) bodies, designed to protect 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 Thermo Scientific™ Chromeleon™ 6.8.	

DNAPac PA200 RS

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

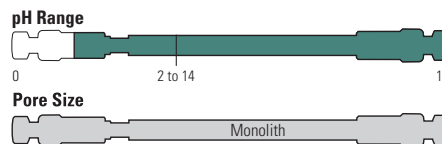
Learn more at thermofisher.com/LCcolumns

DNASwift SAX-1S

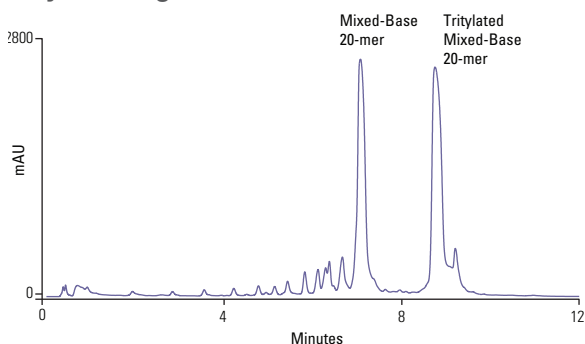
A strong anion exchange monolith column that provides improved capacity and industry-leading oligonucleotide yield-purity performance.

- Micromole purifications in a 5mm ID column body
- Substantial capacity in a small format
- Tunable selectivity control, like the DNAPac PA200 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.



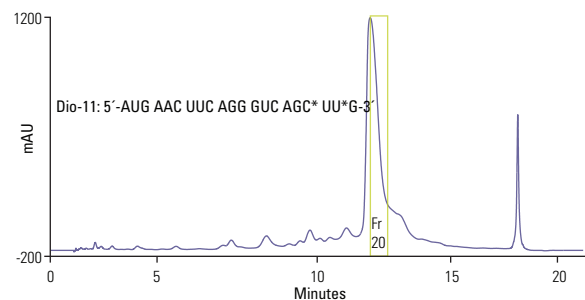
Tritylated oligonucleotide



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

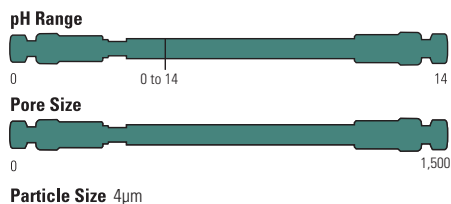
Length (mm)	5.0mm ID
150	066766

DNAPac RP

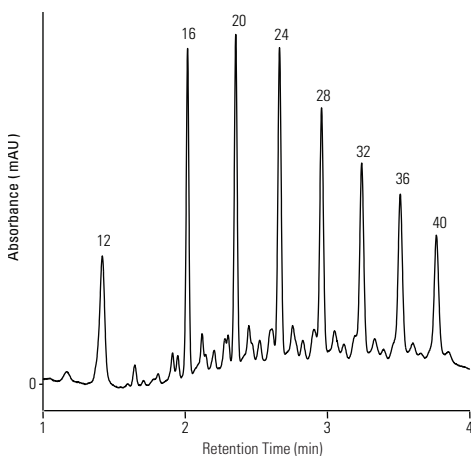
Reverse phase (RP) column specifically for analysis of oligonucleotides and double stranded (ds) DNA and RNA fragments.

- Excellent MS compatibility
- Wide operating pH range: 0–14
- High temperature stability: up to 100°C
- High throughput

The DNAPac RP is a column designed for analysis of oligonucleotides and ds DNA and RNA fragments using LC/UV or LC/MS. The unique column chemistry provides excellent performance under a broad range of pH, temperature, and mobile phase compositions. In addition, the large pore size of the resin provides excellent 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
		50	088924	088920
		100	088923	088919
	Guard Cartridge Holder		069580	069580

Learn more at [thermofisher.com/LCcolumns](https://www.thermofisher.com/LCcolumns)

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

1200s bar compatible nano columns

- With increased length to increase peak capacity

Monolithic polymer phases

- For high throughput peptide and protein analysis

For more information visit [thermofisher.com/biolc](https://www.thermofisher.com/biolc)

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 C-18 100Å

Particle size (µm)	Length (mm)	50µm ID	75µm ID	150µm ID
2	150	ES801A	ES804A	ES806A
	250	–	ES802A	
	500	–	ES803A	
	750	–	ES805A	
3	150	–	ES800A	

Accucore 150-C4

Particle size (µm)	Length (mm)	50µm ID	75µm ID
2.6	150	–	ES811A

PepSwift

Length (mm)	200µm ID
250	ES810A

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)	ES791A
EASY-Spray Emitter, microflow (Emitter ID 20µm, Transfer line ID 75µm, Transfer line length 500mm)	ES792A

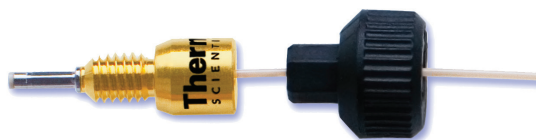
Learn more at thermofisher.com/easyspray



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

nanoViper application kits

nanoViper fittings are also included in tubing and application kits designed for use with the Thermo Scientific™ 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

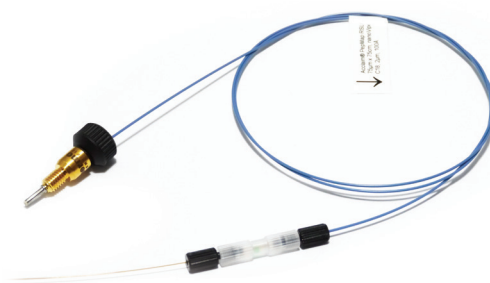
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Acclaim PepMap NanoLC columns

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

		nanoViper Column			
Particle size (µm)	Length (mm)	50µm ID	75µm ID	300µm ID	1000µm ID
2	50	164561	164563	164560	164454
	150	164943*	164940	164537	164711
	250	164944*	164941*	–	–
	500	164945*	164942	–	–
	750	–	164939*	–	–
3	50	164712	164567	164716	164717
	150	164713	164738	164571	164572
	250	164714	164569	–	–
	500	164715	164739	–	–
	750	–	–	–	–
5	50	–	–	164901	164899
	150	–	–	164902	164900

Note: * denotes capable of operating to 1200 bar

Acclaim PepMap C8 100Å

		nanoViper Column			
Particle size (µm)	Length (mm)	50µm ID	75µm ID	300µm ID	1000µm ID
3	150	–	164706	164722	164723

Acclaim PepMap C4 300Å

		nanoViper Column			
Particle size (µm)	Length (mm)	50µm ID	75µm ID	300µm ID	1000µm ID
5	150	–	164707	164720	164721

Acclaim PepMap C18 300 Å

		nanoViper Column			
Particle size (µm)	Length (mm)	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



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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

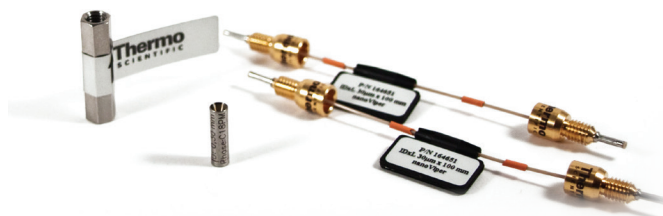
Length (mm)	300µm ID
5	163589

Accucore 150-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

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