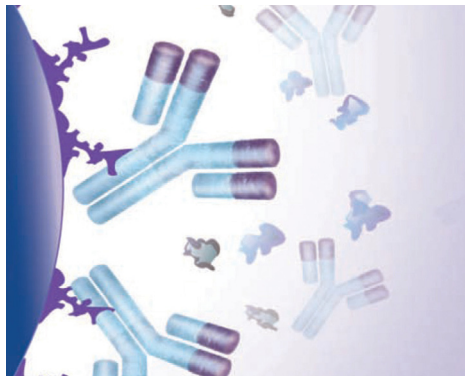
MAbPac Protein A Column

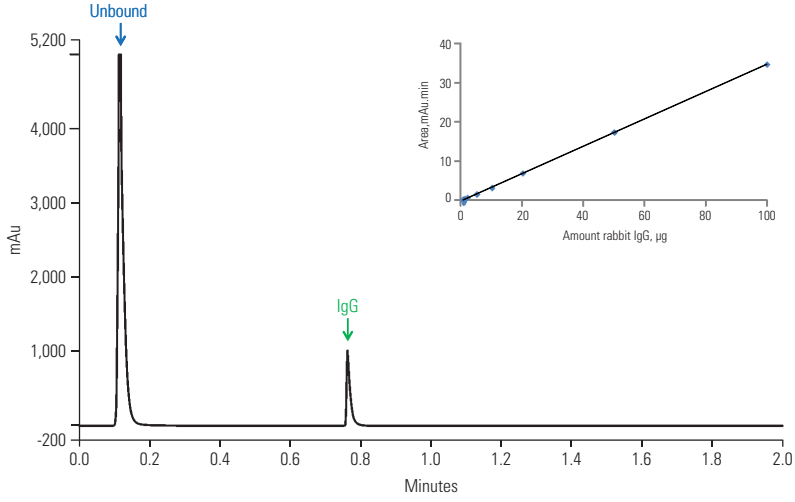
Fast MAb titer analysis



The Thermo Scientific MAbPac Protein A column 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.

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

Harvest cell culture titer analysis



Column: MAbPac Protein A, (4 × 35mm)

Flow Rate:	2 mL/min
Eluent A:	50mM Sodium Phosphate, 150mM NaCl, 5% acetonitrile, pH 7.5
Eluent 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
Detection:	280 nm
Injection volume:	10µL
Sample:	MAb B, 5mg/mL Harvest Cell Culture

MAbPac Protein A Ordering Guide

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

MAbPac SCX-10

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

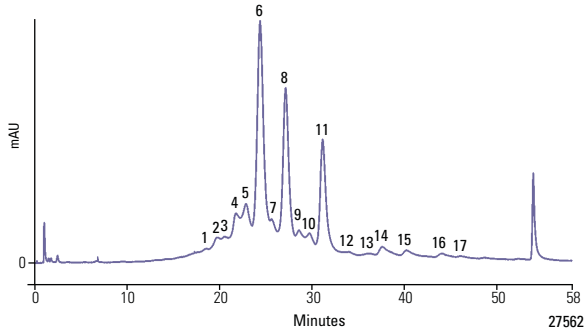
- Exceptionally high resolution for monoclonal antibody variants
- High efficiency
- Ideal for characterization and quality control assessment of monoclonal antibodies
- Unmatched column-to-column and lot-to-lot reproducibility
- Hydrophobic interactions essentially eliminated
- Ideal for stability studies
- Meets the regulatory requirements for biopharmaceutical characterization

The unique nonporous pellicular resin provides exceptionally high resolving power, permitting the separation of monoclonal antibody variants that differ by as little as one charged residue. Hydrophobic interactions with the resin are essentially eliminated for very efficient peaks.

MAbPac SCX-10 Ordering Guide

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID
3	HPLC Column	50	–	**077907**	–
5	HPLC Column	50	–	**078656**	–
		150	–	**085198**	–
		250	–	**078655**	–
10	Guard Column	50	**075749**	**074631**	–
	HPLC Column	50	–	**075603**	–
		150	–	**075602**	–
		250	**075604**	**074625**	**SP6866**

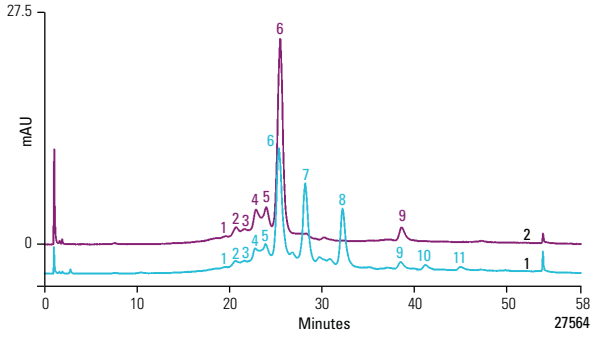
High resolution separations of monoclonal antibody variants



Column: MAbPac SCX-10 (4 × 250mm)

Eluents:	A. 20mM MES (pH 5.6) + 60mM NaCl B. 20mM MES (pH 5.6) + 300mM NaCl
Gradient:	15–36% B in 50 min
Flow Rate:	1mL/min
Temperature:	30°C
Inj. Volume:	10µL
Detection:	UV at 280nm
Sample:	MAb B, 5mg/mL
Peaks 1–5:	Acidic variants
Peaks 6, 8, 11:	C-Terminal Lys variants
Peaks 12–17:	Basic variants

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



Column: MAbPac SCX-10 (4 × 250mm)

Eluents:	A. 20mM MES (pH 5.6) + 60mM NaCl B. 20mM MES (pH 5.6) + 300mM NaCl
Gradient:	15–36% B in 50 min
Flow Rate:	1mL/min
Temperature:	30°C
Inj. 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 afer CBP treatment

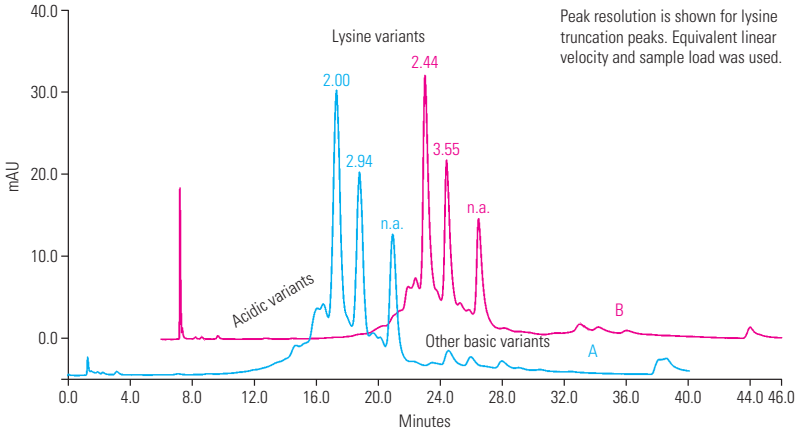
MAbPac SCX-10 RS Columns

BioRS, strong cation exchange column designed for monoclonal antibodies and associated 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 small particle MAbPac strong cation-exchange phase with specially developed bio-inert PEEK lined stainless steel column hardware. These columns take advantage of smaller resin size as well as longer column length to maximize the resolution of MAb variant separation, and are suitable for operation up to 7,000 psi. Higher pressure compatibility of the column hardware allows use of high flow rates for faster separation

Improved MAb resolution



Peak resolution is shown for lysine truncation peaks. Equivalent linear velocity and sample load was used.

Column: MAbPac SCX, 5µm

Dimension:	4.6 × 250mm
Sample:	MAb 5mg/mL
Injection Volume:	15µL
Eluent A:	20 mM MES pH 5.6 + 60 mM
Eluent B:	20 mM MES pH 5.6 + 300 mM NaCl
Flow Rate:	1.5 mL/min
Column backpressure:	~8900Psi
A:	Gradient: 33-53% B in 30 min
B:	Gradient: 33-53% in 20 min

MAbPac SCX-10 RS Ordering Guide

Particle Size (µm)	Format	Length (mm)	4.6 mm ID
5	BioRS Column	50	**082674**
		150	**085209**
		250	**082673**

MAbPac SEC-1

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

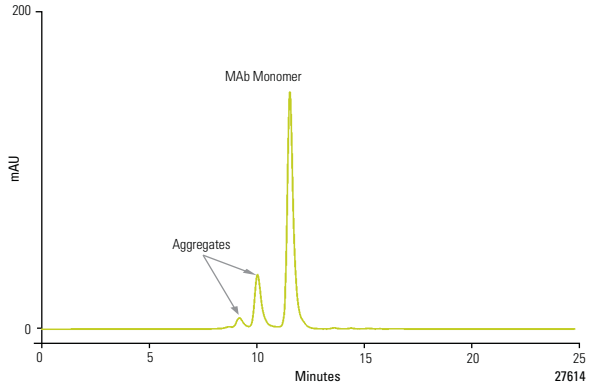
- Anaylsis of monoclonal antibodies (MAb) and their aggregates
- Analysis of MAb Fab and Fc fragments.
- Hydrophilic bonded layer for minimal nondesired interactions between the biomolecules and the stationary phase
- Nonmetallic and Biocompatible PEEK housing eliminates metal contamination from the column hardware
- Stable surface bonding leads to low column bleed and compatibility with MS, ELSD and Corona CAD detection
- Reproducible and rugged
- Superior performance for the analysis of monoclonal antibodies, even using high and low-salt concentrations

The stationary phase is packed in bio-inert PEEK format and is compatible with different eluent conditions containing both low and high concentrations of salt in mobile phases, and mass spectrometry friendly volatile eluents.

MAbPac SEC-1 Ordering Guide

Particle Size (µm)	Format	Length (mm)	4.0mm ID
5	Guard Column	50	**074697**
	HPLC Column	150	**075592**
		300	**074696**

Monoclonal antibody aggregate separation



Column: MAbPac SEC-1, 5µm

Dimension:	4.0 × 300mm (PEEK)
Mobile Phase:	0.3 M NaCl in 50mM phosphate buffer pH 6.8
Temperature:	30°C
Flow Rate:	0.20mL/min
Inj. Volume:	2µL
Detection:	UV, 280nm
Sample:	MAb (10mg/mL)

Monoclonal Antibody Characterization and Analysis Kits

MAb Charge Variant Analysis IEX Column Kit

MAb Charge Variant Analysis IEX Column Kit includes two ion-exchange (IEX) specialty columns for MAb charge variants analysis. This kit is a convenient starter kit for researchers at the beginning of 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), a weak cation-exchange column, the industry standard for high-resolution, high-efficiency analysis of monoclonal antibodies and associated variants
- MAbPac SCX-10 Analytical column, 4 × 250mm (P/N 074625), a strong cation-exchange column designed specifically for high-resolution, high-efficiency analysis of monoclonal antibodies and associated variants

MAb Charge Variants Kit Ordering Guide

Description	Cat. No.
MAb Charge Variants 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.

Included in the kit:

- MAbPac SCX-10 Analytical column, 4 × 250mm (P/N 074625), a strong cation-exchange column designed specifically for high-resolution, high-efficiency analysis of monoclonal antibodies and associated variants.
- MAbPac SEC-1 Analytical column, 4 × 300mm (P/N 074696), a size-exclusion column designed for separating monoclonal antibody (MAb) monomers, aggregates, and fragments.

MAb Analysis Kit Ordering Guide

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

Thermo Scientific pH Gradient Buffers

Simple method development for 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 used in the pH gradient platform 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

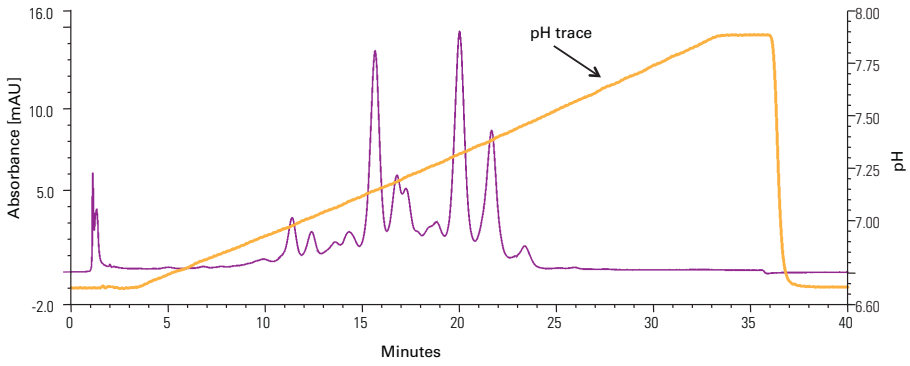
- The CX-1pH gradient starter kit contains 125mL each of buffers A and B, plus a MAbPac SCX-10, 10µm, 4 × 250mm column
- The CX-1 pH gradient high throughput kit contains 125mL each of buffers A and B, plus a MAbPac SCX-10, 5µm, 4 × 50mm column
- The CX-1 pH gradient high resolution kit contains 125mL each of buffers A and B, plus a MAbPac SCX-10, 5µm, 4 × 250mm column

For the ultimate flexibility, the preconfigured kits are also available as platforms, including the pH Designer Software.The options are listed in the table below:

pH Gradient Buffers Ordering Guide

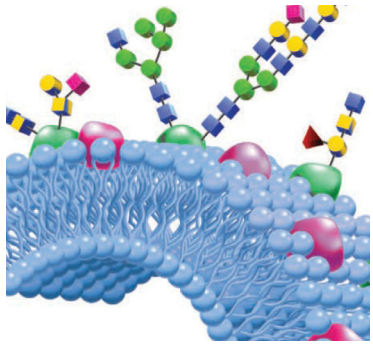
Description	Cat. No.
CX-1 pH Gradient Buffer A (pH 5.6), 125mL	**083273**
CX-1 pH Gradient Buffer B (pH 10.2), 125mL	**083275**
CX-1 pH Gradient Buffer Kit (pH 5.6 to 10.2), 125mL	**083274**
CX-1 pH Gradient Buffer A (pH 5.6), 250mL	**085346**
CX-1 pH Gradient Buffer B (pH 10.2), 250mL	**085348**
CX-1 pH Gradient Buffer Kit (pH 5.6 to 10.2), 250mL	**085349**
CX-1 pH Gradient Starter Kit (pH 5.6 to 10.2), 125mL	**083381**
CX-1 pH Gradient High Throughput Kit (pH 5.6 to 10.2), 125mL	**083378**
CX-1 pH Gradient High Resolution Kit (pH 5.6 to 10.2), 125mL	**083272**
CX-1 pH Gradient Starter Platform (pH 5.6 to 10.2), 125mL	**083380**
CX-1 pH Gradient High Throughput Platform (pH 5.6 to 10.2), 125mL	**083376**
CX-1 pH Gradient High Resolution Platform (pH 5.6 to 10.2), 125mL	**083270**
pH Designer Software	**085022**

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



GlycanPac AXH-1 Column

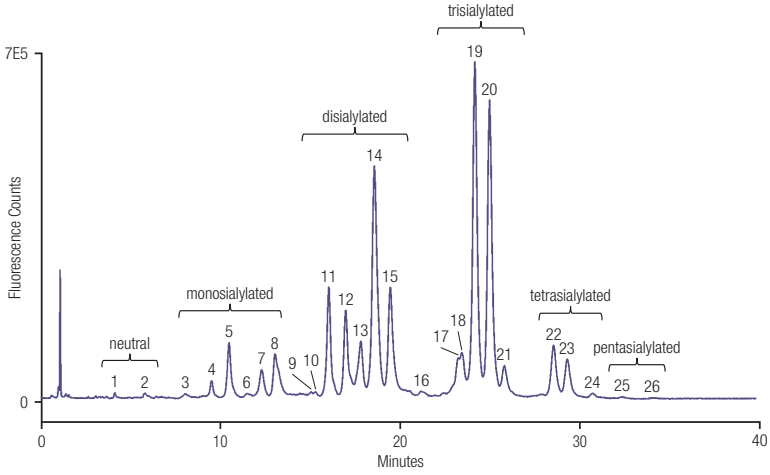
High-Resolution Columns for Glycan Analysis



- 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
- 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 with unique selectivity for 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



Column: GlycanPac AXH-1 (1.9µm)

Dimension:	2.1 × 150mm
Mobile Phase	A: Acetonitrile (100%) B: Water C: Ammonium formate (100mM, pH = 4.4)
Flow Rate:	0.4mL/min
Injection Vol.:	50 Pmoles
Temperature:	30 °C
Detection:	Fluorescence at 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 Ordering Guide

Particle Size (µm)	Format	Length (mm)	2.1 mm ID	3.0 mm ID	4.6 mm 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**

Acclaim Guard Holder Ordering Guide

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

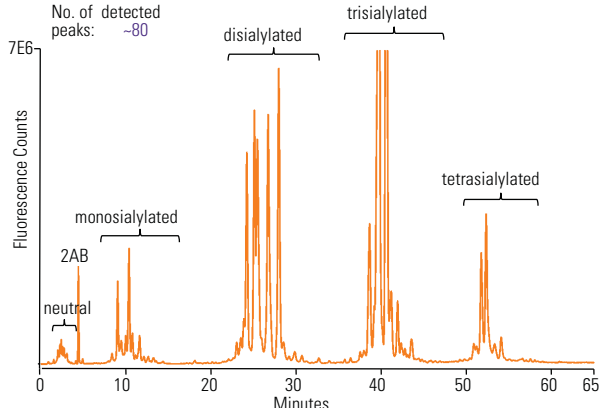
GlycanPac AXR-1

Ultra-high resolution UHPLC columns for glycan 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 1.9µm, 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 using GlycanPac AXR-1



Column: GlycanPac AXR-1, 1.9µm

Dimension:	2.1 × 150mm
Mobile phase:	A: acetonitrile B: D.I. water C: ammonium formate (100 mM, pH =4.4)
Flow Rate:	0.4 mL/min
Temperature:	40 °C
Injection Vol.:	100 pmoles
Detection:	fluorescence at 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 Ordering Guide

Particle Size (µm)	Format	Length (mm)	2.1 mm ID
1.9	UHPLC Column	150	**088136**
		250	**088135**

DNAPac PA100

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

- High-resolution oligonucleotide separations
- Capable of n, n-1 resolution for oligonucleotides
- Resolves oligonucleotides with secondary structures
- Compatible with solvent, high pH or high temperatures
- Analyzes phosphorothioate-based clinical samples
- Provides easy scale-up from 2.0mm to 22mm ID column (>100x)

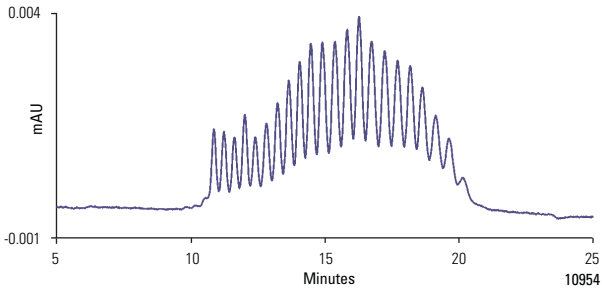
The DNAPac PA100 is a high-resolution anion-exchange column that provides single-base resolution. It is stable under denaturing conditions, rugged, reliable, and can be readily scaled up. The DNAPac PA100 is a 13 µm pellicular, nonporous polymeric resin with bound quaternary amine-functionalized Thermo 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.

DNAPac PA100 Ordering Guide

Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID	9.0mm ID	22.0mm ID
13	Guard Column	50	**SP4016**	**043018**	**SP4511**	**SP4513**
	HPLC Column	250	**SP3686**	**043010**	**043011**	**SP2091**

Oligonucleotides



Column: DNAPac PA100

Eluent:	410-510mM NaCl in 25mM Tris-Cl, pH 8.0
Flow Rate:	1.5mL/min
Detection:	UV, 260nm
Sample:	$pd(A)_{40-60}$

DNAPac PA200

The DNAPac PA200 is a strong anion exchange column developed to provide best-resolution for analysis and purification of synthetic oligonucleotides

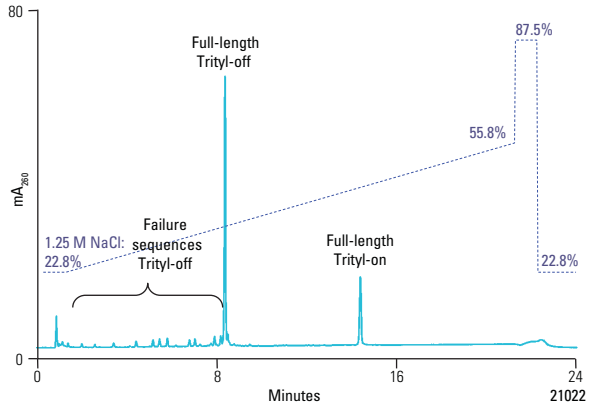
- Industry leading resolution for oligonucleotide separations
- Achieve n, n-1 resolution for oligonucleotides
- Resolve oligonucleotides with secondary structures
- Assay phosphorothioate purity
- Selectivity control with eluent pH, salt, and solvent
- Resolve RNA with aberrant (2', 5') links from normal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

The DNAPac PA200 is packed with a pellicular anion-exchange resin composed of an 8 µm 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.

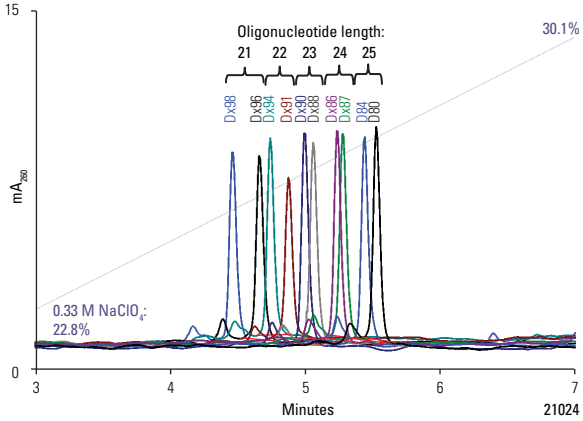
DNAPac PA200 Ordering Guide

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**	**SP6731**
	HPLC Column	250	**063425**	**063000**	**063421**	**SP6734**

Target, failure and trityl-on oligonucleotides



Separation of oligonucleotides by length



Column: DNAPac® PA200

Eluent:	$NaClO_4$, pH 6.5 with 20% CH_3CN
Flow Rate:	1.2mL/min
Inj. Volume:	8µL
Detection:	UV, 260nm

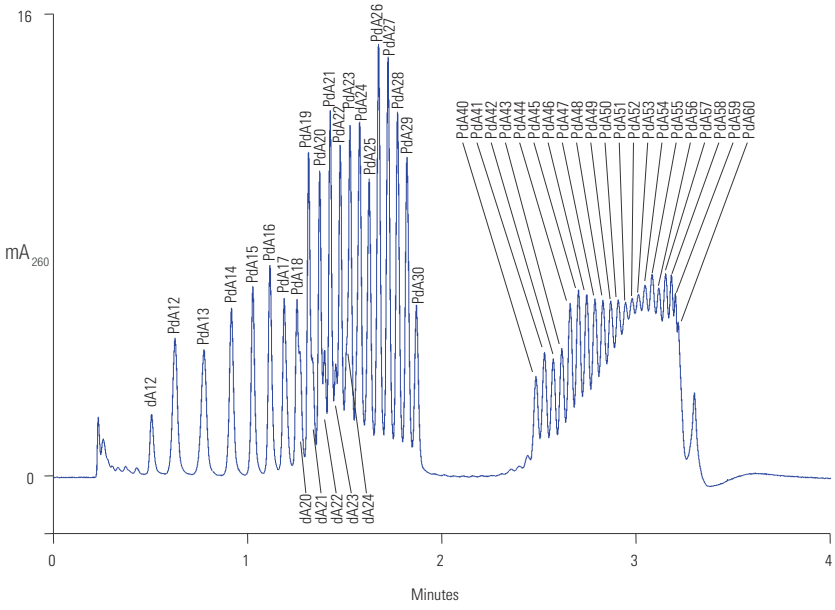
DNAPac PA200 RS

UHPLC Solutions for Nucleic Acid Analysis

DNAPac PA200 RS columns are packed with smaller, 4 µm particles, for improved resolution and better performance. The smaller particles also allow shorter columns to provide significantly higher throughput. These columns are packed in bioinert PEEK-lined stainless steel (SST) bodies, designed to protect from unwanted interactions of eluents and analytes with metals, while maintaining 10,000 psi stability. They 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.

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

Partial resolution of 46 oligonucleotides



Column: DNAPac PA200 RS, 4.6 x 50mm

Eluent: A	20 mM Tris pH 8
Eluent B:	A + 1.25 M NaCl
Temp:	30 °C
Flow Rate:	1.30 mL/min
Inj. (µL):	2.5 µL
Detection:	28–43% B in 4 CV* (2.56 min) curve 3**
Sample:	PdA12–30, 40–60

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

DNAPac PA200 RS Ordering Guide

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

DNASwift SAX-1S

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

This semipreparative column incorporates selectivity control of the DNAPac column, providing unsurpassed purity and yields.

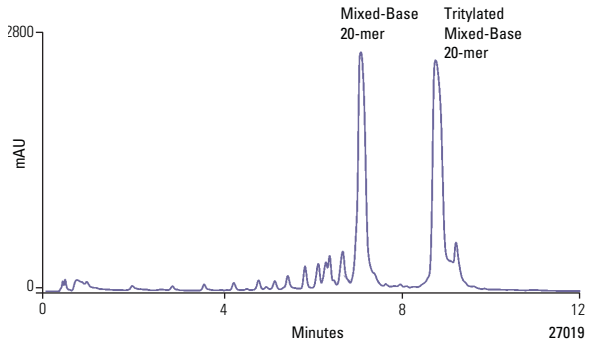
- Micromole purifications in a 5cm column body
- Substantial capacity in a small format
- Tunable selectivity control, the DNAPac columns, for high resolution
- Compatible with high pH mobile phases, solvents, or high temperatures
- Ideal for therapeutic and diagnostic oligonucleotide research
- Purify difficult oligonucleotide products
- Use in combination with the DNAPac for industry leading purification and characterisation of 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.

DNASwift SAX-1S Ordering Guide

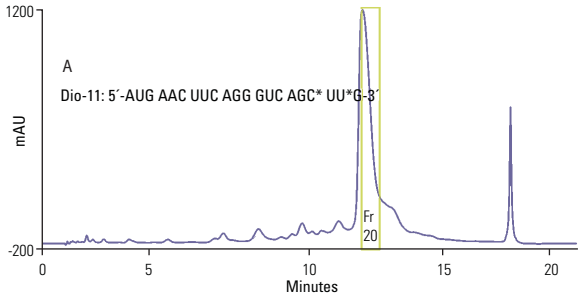
Functional Group	Length (mm)	5.0mm ID
SAX-1S	150	**066766**

Tritylated oligonucleotide



Column:	**DNASwift SAX-1S, 5 × 150mm**
Mobile Phases:	A: 15mM Tris, pH 8
	B: 15mM Tris, pH 8, 1.25 M NaCl
Gradient:	8–64% B in 10 min
Flow Rate:	1.5mL/min
Inj. Volume:	20µL
Detection:	UV at 260nm
	Prep Cell (2mm path length)
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



Column:	DNASwift SAX-1S, 5 × 150mm
Eluents:	A. 40mM Tris, pH 7
	B. 40mM Tris, pH 7 + 1.25 M NaCl
Gradient:	26–42% B in 10 column volumes
Flow Rate:	1.5mL/min
Inj. Amount:	125µg
Temperature:	30°C
Detection:	UV at 260nm