

Bioprocessing solutions

Addressing your challenges from drug development
through commercial production

Analytics | Automation | Cell culture | Cell therapy | Purification | Single-use technologies | Supply chain logistics

CaptureSelect and POROS Purification Products

Purifying next-generation biotherapeutics

To meet your downstream processing needs, we offer a broad portfolio of purification products supporting biopharmaceutical development. We offer a variety of commercialized resins for affinity, ion exchange (IEX), and hydrophobic interaction chromatography (HIC) applications accompanied by a robust analytical tool set for characterization and detection of biological compounds.

Thermo Scientific™ POROS™ bulk chromatography resins are used throughout the industry offering high-performance, high-throughput, process-scale bioseparations.

Thermo Scientific™ CaptureSelect™ affinity products are available for process-scale or analytical bioseparations for a wide variety of biotherapeutic compounds including antibodies and antibody fragments, recombinant and plasma proteins, and viral vectors.

Our custom ligand and resin discovery platforms enable the development of innovative purification resins, providing a solution for challenging downstream processes. We can design a custom ligand or develop a resin for your unique separation needs.



Figure 1. This workflow is depicting a typical downstream process for bio-therapeutics development. CaptureSelect and POROS resins can be used for both capture and polishing purification steps.



CaptureSelect technology

Maximize efficiency of your capture chromatography step with CaptureSelect affinity resins

Thermo Scientific™ CaptureSelect™ ligands offer a unique affinity purification solution based on camelid-derived single-domain V_H H antibody fragments. Through their tunable specificity and easy formatting, these small 14 kDa affinity ligands are the solution for complex biomolecule purification challenges. The resins enable increased purity and yield in a single step and are designed to simplify workflows, thereby reducing time and cost in biopharmaceutical drug development.

Unique features of CaptureSelect affinity resins:

- Affinity through antibody selectivity
- Unique screening technology for target specificity, mild elution, and stability
- Animal origin-free production process in yeast

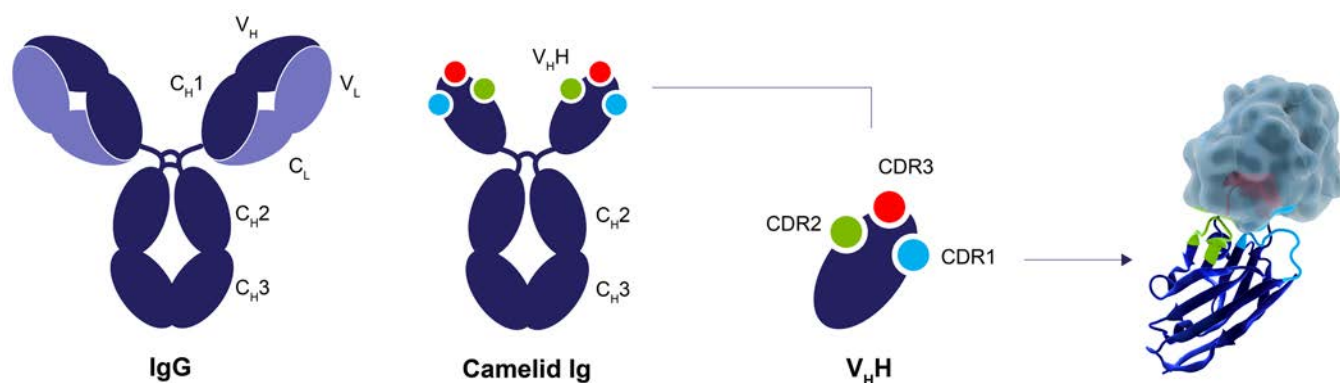


Figure 2. CaptureSelect technology. The small size of the V_H H fragments allows binding to epitopes that are difficult to access.

POROS technology

Simplify your downstream process with POROS chromatography resins

Thermo Scientific™ POROS™ chromatography IEX and HIC resins address the industry bottlenecks caused by increased titers and product demands for antibodies and recombinant proteins. Through their high resolution, high capacity, and flow rate-independent performance, POROS chromatography resins help improve process throughput and flexibility.

These best-in-class chromatography resins are designed for both analytical and process-scale separations of biomolecules such as monoclonal antibodies, recombinant proteins, DNA, viruses, and peptides. The high resolution of POROS resins supports excellent separation of closely related product forms. The high capacity and throughput helps to simplify the development process and to decrease process times of biopharmaceutical manufacturing.

POROS chromatography resins unique features:

- **Poly(styrene-divinylbenzene) backbone**—resulting in linear and scalable performance. The beads are highly robust and chemically stable allowing for stringent cleaning when needed.
- **Large throughpores**—resulting in a reduced mass transfer resistance compared to other available resins. Capacity and resolution are maintained over a wide range of linear velocities, making the purification process more efficient.
- **50 μm bead size**—resulting in superior resolution. The smaller particle size results in tighter peaks and smaller elution volumes, helping to overcome tank size limitations at larger scale.

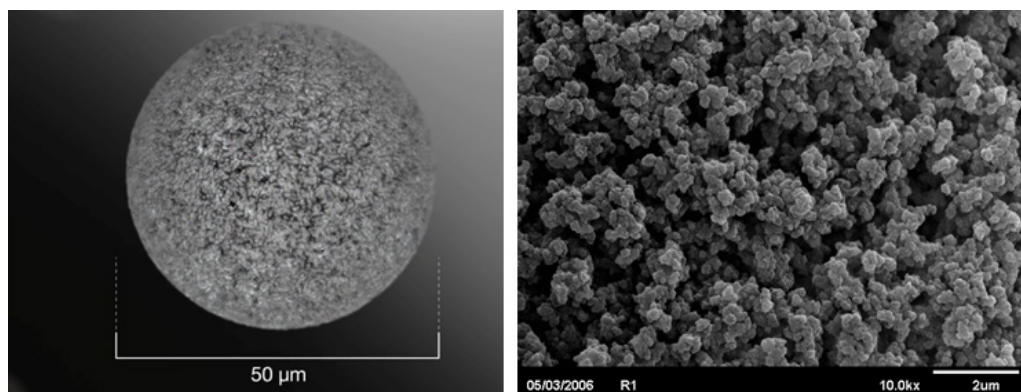


Figure 3. Scanning electron microscope images showing the POROS bead (left) and the large throughpore structure of the bead (right).

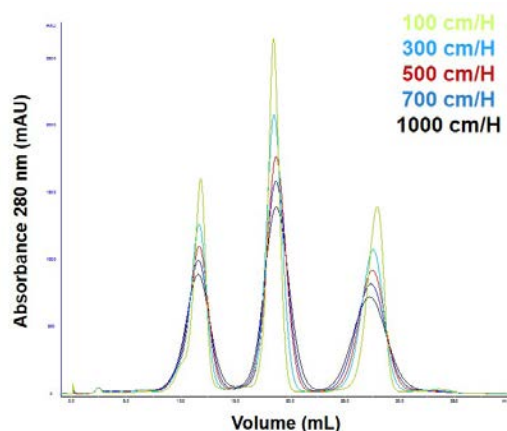


Figure 4. The graph shows the excellent resolution characteristics of the POROS resins and demonstrates resolution is well maintained when flow rates increases.

Quality you can count on

Our products and services are specifically designed to enable proven performance through innovative, efficient, and highly effective downstream applications. From a single supplier you can optimize production, improve process efficiency, add flexibility, and fast-track product development and market introduction by selecting from our portfolio.

POROS chromatography resins are produced in a validated, state-of-the-art manufacturing facility in Bedford, Massachusetts. The facility has 60,000 square feet of production space and is ISO 13485:2016 certified.

Thermo Fisher Scientific owns the production process of the resins from qualified raw materials to released finished goods. We do not utilize chromatography media intermediates from other suppliers. This gives us

complete traceability and control over the entire process. Also, because we control the entire manufacturing process, our customers are protected from supply shortages and disruptions. The base material is polymerized, coated, functionalized, sized, and exchanged into shipping solvent prior to packaging.

The CaptureSelect affinity products are manufactured at our production site in Naarden, the Netherlands. The facility is ISO 9001:2015 certified, and includes two lines of 15,000 L (15 cbm) fermentation reactors, micro- and ultrafiltration systems for biomass removal and product concentration, and a separate purification suite for efficient industrial production of the affinity ligands.

Second site sourcing for the CaptureSelect affinity ligands is assured by manufacturing capabilities at the Thermo Fisher Scientific site in Vilnius, Lithuania, operating under ISO 9001-2015 and ISO 13485 certification.



Bedford, Massachusetts, USA facility

Certification status: ISO 13485:2016

• Key capabilities:

- POROS bulk chromatography resin manufacturing, including QC analysis
- HPLC column packing
- Production of customized process-scale resins



Naarden, The Netherlands facility

Certification status: ISO 9001

• Key capabilities:

- Production of CaptureSelect affinity ligands and process-scale affinity resins, including QC analysis
- Production of customized process-scale affinity resins

Affinity chromatography

Purification of antibody-derived therapeutics

We have developed a unique portfolio of affinity resins, helping you to develop next-generation antibody therapeutics. These affinity resins can be used for clinical and commercial production, and include:

- A platform solution for manufacturing of Fab fragments, irrespective of the type of light chain
- Scalable solutions for poor Protein A binding antibodies and antibody fragments
- Affinity resins offering mild elution conditions for Fc-fusion proteins and pH-sensitive IgGs
- A cost-effective Protein A resin to help reduce cost of clinical manufacturing

In addition to the affinity resins, we also offer product-specific ELISAs to measure any ligand potentially leaching from the column and conjugated ligands for use in analytical assays.

Ordering information

Description	Quantity	Cat. No.
POROS MabCapture A Select Resin	250 mL	4374729
	1 L	4374735
	5 L	4374728
CaptureSelect CH1-XL Affinity Matrix	250 mL	1943462250
	1 L	194346201L
	5 L	194346205L
CaptureSelect KappaXP Affinity Matrix	250 mL	1943212250
	1 L	194321201L
	5 L	194321205L
CaptureSelect KappaXL Affinity Matrix	250 mL	1943210250
	1 L	19432101L
	5 L	19432105L
CaptureSelect FcXL Affinity Matrix	250 mL	1943280250
	1 L	19432801L
	5 L	19432805L

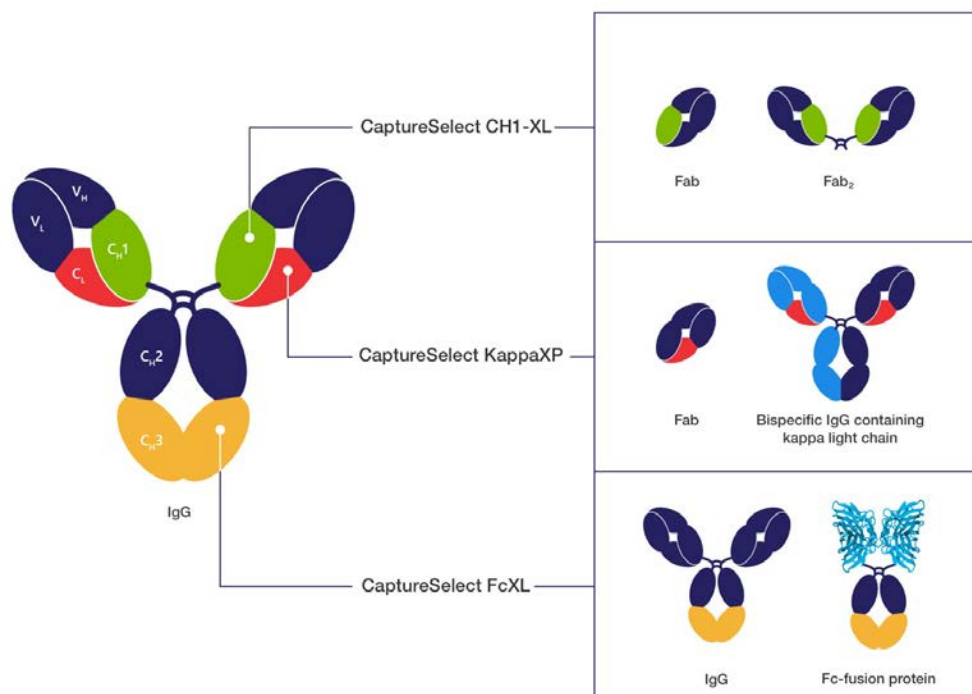


Figure 5. CaptureSelect affinity resins for antibody purification. This image depicts where the various products bind the antibody or antibody fragment.

Check out our other resins and additional sizes at

thermofisher.com/captureselect

Affinity chromatography

Purification of recombinant proteins, biosimilars, and vaccines

Biosimilars and recombinant proteins

CaptureSelect affinity resins help you to develop biosimilars, biobetters, and other types of recombinant proteins. These affinity resins can be used for clinical and commercial production. CaptureSelect protein purification products exhibit affinity and specificity for their target proteins, for efficient single-step purification of non-antibody biomolecules.

Key features

- **Selectivity**—high purity in single step; feedstock-independent
- **Mild elution conditions**—retention of biological activity of target
- **Reduction of process steps**—helps reduce costs, allows higher yields
- **Efficient clearance of HCP, DNA, virus**—high selectivity in one capture step

In addition to the affinity resins, we also offer product-specific ELISAs to measure any ligand potentially leaching from the column and conjugated ligands for use in analytical assays.

Protein vaccine development with C-tag and C-tagXL affinity resin

One of the major bottlenecks in protein vaccine development is obtaining sufficient quantities of high-quality and pure protein. The C-tag affinity tag allows for recombinant protein production through the addition of a small tag (4 amino acids) to the protein of interest. The Thermo Scientific™ CaptureSelect™ C-tagXL Affinity Resin combines the unique selectivity to the C-tag with the benefits of a robust and high-quality affinity matrix allowing for high yield and purity in a single purification step.

Benefits of C-tag:

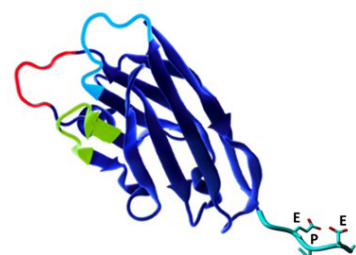
- Small inert tag, limiting effect on protein functionality
- Highly selective when fused at the C-terminus of a protein
- Limits drawbacks of conventional tags such as lack of selectivity, heavy metal waste, or limited reusability
- Enables high target yield and purity from complex mixtures (compared to His6 tag)

Benefits of the CaptureSelect C-tagXL affinity matrix:

- Enables high target purity and yield from complex mixtures
- Mild elution, protecting the protein of interest
- Scalable

Ordering information

Description	Qty	Cat. No.
CaptureSelect FSH Affinity Matrix	250 mL	1943180250
	500 mL	1943180500
	1 L	19431801L
	5 L	19431805L
CaptureSelect Human Albumin Affinity Matrix	250 mL	1912970250
	500 mL	1912970500
	1 L	19129701L
	5 L	19129705L
CaptureSelect hCG Affinity Matrix	250 mL	1943410250
	500 mL	1943410500
	1 L	19434101L
	5 L	19434105L
CaptureSelect tPA Affinity Matrix	250 mL	1943430250
	1 L	19434301L
	5 L	19434305L
CaptureSelect TSH Affinity Matrix	250 mL	1943562250
	1 L	194356201L
	5 L	194356205L
CaptureSelect hGH Affinity Matrix	250 mL	1943160250
	1 L	194316001L
	5 L	194316005L
CaptureSelect C-tagXL Affinity Matrix	250 mL	1943072250
	1 L	1943072500
	5 L	194307201L
	10 L	194307205L



Check out additional sizes at

thermofisher.com/captureselect

Affinity chromatography

Purification of viral vectors

AAV-based gene therapy vectors

The non-pathogenic adeno-associated virus (AAV) has emerged as the vector of choice in many gene therapies currently in development. Purification of biologically active viral vectors at large-scale commercial use is a challenge. The Thermo Scientific™ POROS™ CaptureSelect™ AAV affinity resins help to overcome this challenge and enable scale-up of viral vector production.

POROS CaptureSelect AAV affinity resins

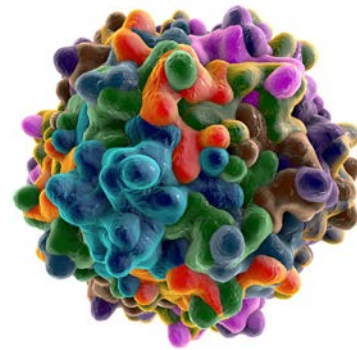
The utilization of POROS CaptureSelect AAV affinity resins represents a significant improvement to the downstream processing of AAV vectors. The unique CaptureSelect ligand technology is combined with the large pore structure of POROS resins to enable the development of large biomolecules such as viral vectors and vaccines.

The use of AAV affinity resins helps to:

- Limit the number of steps and maximize productivity in the AAV purification process
- Increase purity and yield in a single capture step
- Increase process flexibility and throughput
- Scale up the AAV manufacturing process
- Establish a single purification platform for multiple AAV serotypes

Ordering information

Description	Quantity	Cat. No.
POROS CaptureSelect AAV8 Resin	250 mL	A30792
	1 L	A30793
	5 L	A30794
	10 L	A30795
POROS CaptureSelect AAV9 Resin	250 mL	A27355
	1 L	A27359
	5 L	A27358
	10 L	A27357
POROS CaptureSelect AAVX Affinity Resin	250 mL	A36742
	1 L	A36743
	5 L	A36744
	10 L	A36745



Resin	Binding capacity (vg/mL)*	Serotype affinity
POROS CaptureSelect AAV8	>10 ¹³	AAV8
POROS CaptureSelect AAV9	>10 ¹⁴	AAV9
POROS CaptureSelect AAVX	>10 ¹⁴	AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9, recombinant and chimeric vectors

* Viral genomes per milliliter; binding capacity will vary based on serotype, feed stream, additives, and mutations to parent serotypes.

Ion exchange chromatography

POROS ion exchange resins

Thermo Scientific™ POROS™ ion exchange (IEX) resins are the industry standard for large-scale polish chromatography applications. POROS IEX resins allows target molecule binding and impurity removal over a broad range of process conditions, thereby increasing process flexibility and manufacturing throughput.

POROS anion exchange resins

The Thermo Scientific™ POROS™ anion exchange (AEX) resin portfolio offers four unique chemistries (Table 1). These strong and weak AEX resins possess distinctive selectivity in bind/elute as well as flow-through operation to produce the highest purity elution.

POROS anion exchange applications

- Monoclonal antibodies, bispecific antibodies, and antibody–drug conjugates (ADCs)
- Enzymes, hormones, and blood products
- Vaccines, viral vector plasmids, and oligonucleotides
- Viral vector polishing
- Excellent clearance of DNA in flow-through mode

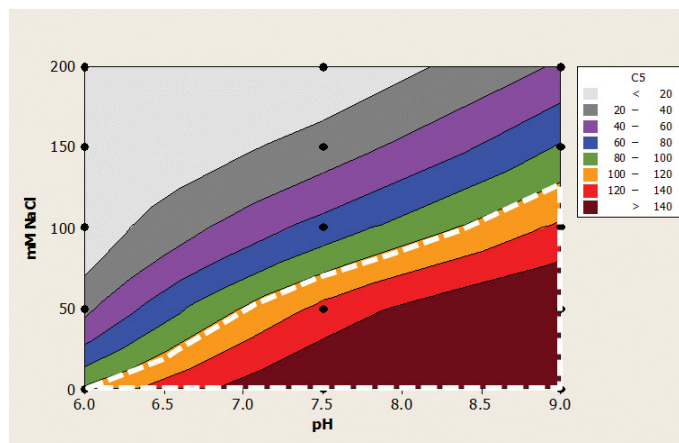


Figure 6. The dynamic binding capacity of POROS XQ resin with BSA at 5% breakthrough as a function of pH and salt concentration. High capacity is obtained under a wide range of process conditions. The orange, red, and dark red areas indicate the conditions in which greater than 100 mg/mL binding capacity of BSA can be obtained. Column: 0.46 cm (D) x 20 cm (L); load: 10 mg/mL BSA; base buffer: 20 mM Bis-Tris propane; flow rate: 300 cm/hr.

Anion exchange resins.

Resin	XQ	HQ	PI50	D50
Type of AEX resin	Strong	Strong	Weak	Weak
Surface chemistry	Fully quaternized amine	Quaternized polyethyleneimine (mixed amine)	Polyethyleneimine (mixed amine)	Dimethylaminopropyl
BSA binding capacity	>140 mg/mL	75 mg/mL	80 mg/mL	90 mg/mL
pH range	1–14	1–14	1–9	1–9

Viral clearance results for two common model viruses XmuLV and MMV.

POROS XQ and HQ resins provide excellent viral clearance capabilities over an increasing range of conductivities.

Conductivity	Loading	POROS HQ		POROS XQ	
		XmuLV log ₁₀ reduction	MMV log ₁₀ reduction	XmuLV log ₁₀ reduction	MMV log ₁₀ reduction
5 mS/cm	500 g/L	>4.31 ± 0.12	>5.10 ± 0.09	>4.31 ± 0.12	>5.10 ± 0.09
10 mS/cm	500 g/L	>4.39 ± 0.14	2.49 ± 0.20	>4.39 ± 0.14	1.61 ± 0.23
15 mS/cm	500 g/L	4.13 ± 0.33	1.03 ± 0.13	3.46 ± 0.29	0.19 ± 0.28

Ion exchange chromatography

POROS ion exchange resins

POROS cation exchange resins

Thermo Scientific™ POROS™ HS and XS resins are 50 µm strong cation exchange (CEX) resins based on a sulfopropyl functionalization and can be used over a wide range of pH (1–14) and conductivity conditions. These CEX resins have a high dynamic-binding capacity for more basic biomolecules and provide superior resolution for unprecedented impurity clearance independent of scale and flow rate.

POROS cation exchange applications

- Monoclonal antibodies, bispecific antibodies, and antibody–drug conjugates (ADCs)
- Vaccines and virus-like particles
- Viral vectors, exosomes, and lipid nanoparticles

POROS resin	HS	XS
Type of CEX resin	Strong	Strong
Surface chemistry	Sulfopropyl	Sulfopropyl
IgG binding capacity (mg/mL)	70	115
pH range	1–14	1–14

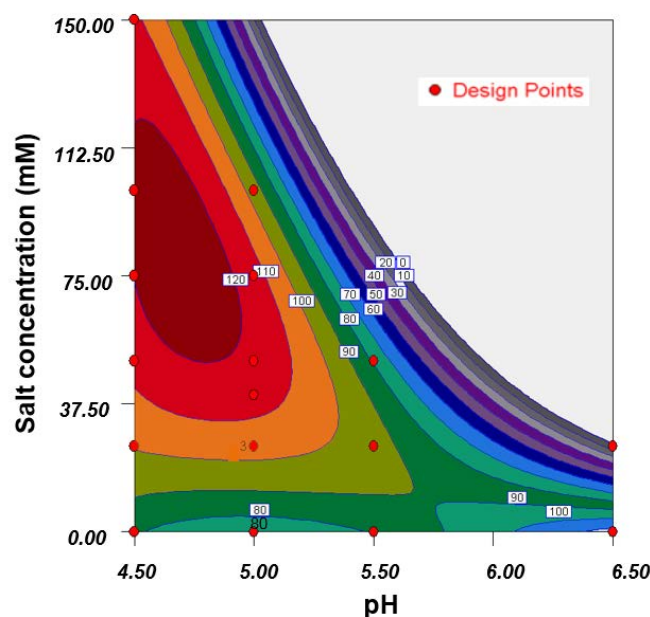


Figure 7. Binding capacity of POROS XS resin with IgG at 5% breakthrough. High binding capacity is obtained under a wide range of process conditions. Column: 0.46 cm (D) x 20 cm (L); buffer: 20 mM MES; load: 5 mg/mL IgG; flow rate: 300 cm/hr.

Ordering information

Description	Quantity	Cat. No.
POROS XQ 50 µm Strong Anion Exchange Resin	250 mL	4467820
	1 L	4467818
	5 L	4467817
	10 L	4467816
POROS HQ 50 µm Strong Anion Exchange Resin	250 mL	1255911
	1 L	1255907
	5 L	1255909
	10 L	1255908
POROS PI 50 µm Weak Anion Exchange Resin	250 mL	1245911
	1 L	1245907
	5 L	1245909
	10 L	1245908
POROS D 50 µm Weak Anion Exchange Resin	250 mL	1365911
	1 L	1365907
	5 L	1365909
	10 L	1365908
POROS XS 50 µm Strong Cation Exchange Resin	250 mL	4404337
	1 L	4404336
	5 L	4404335
	10 L	4404334
POROS HS 50 µm Strong Cation Exchange Resin	250 mL	1335911
	1 L	1335907
	5 L	1335909
	10 L	1335908

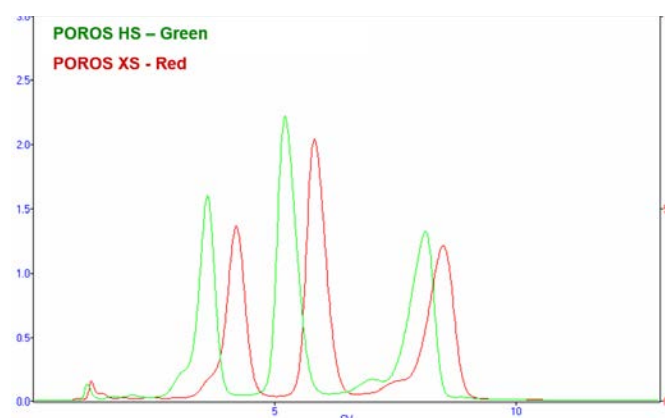


Figure 8. POROS XS and HS resins present with similar, high-resolution properties. Column: 1 cm (D) x 20 cm (L); buffer A: 20 mM MES, 25 mM NaCl pH 6.2; buffer B: 20 mM MES, 1 M NaCl pH 6.2; Elution: gradient 10%–50% buffer B, 7.5 CV; flow rate: 300 cm/hr; protein mix: chymotrypsinogen A, cytochrome C, and lysozyme.

Hydrophobic interaction chromatography

POROS hydrophobic interaction resins

POROS hydrophobic interaction chromatography (HIC) resins are based on the 50 µm POROS base bead, utilizing a novel coating procedure to enable functionalization with unique hydrophobic ligands. These resins are suitable for bind-elute and flow-through applications at lower salt concentrations and have higher binding capacity and resolution than classical HIC resins, thereby providing more flexibility around process operating conditions.

Key features

- 3 unique resins covering a wide range of hydrophobicity
- High resolution, even with lower conductivity conditions
- High dynamic binding capacity and superior pressure-flow characteristics

Key applications

- Monoclonal antibodies, bispecific antibodies, and antibody–drug conjugates (ADCs)
- Product-related impurities and aggregate removal
- Plasmids, RNAi, and oligonucleotides

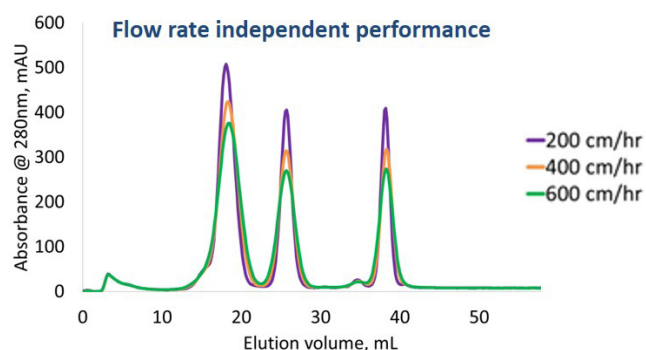


Figure 9. Separation comparison of POROS benzyl resin at different flow rates showing good resolution and flow rate independent performance. Experimental details: a Load buffer: 1.7 M ammonium sulfate in 50 mM sodium phosphate, pH 7; buffer gradient: load buffer to 50 mM sodium phosphate, pH 7, in 10 CVs; format: 0.46 cm D x 20 cm L; flow rate: 200, 400, 600 cm/hr. Protein mixture: ribonuclease A, lysozyme, and chymotrypsinogen A.

Ordering information

Description	Quantity	Cat. No.
POROS Ethyl HIC Resin	250 mL	A32555
	1 L	A32554
	5 L	A32553
	10 L	A32552
POROS Benzyl HIC Resin	250 mL	A32561
	1 L	A32560
	5 L	A32559
	10 L	A32558
POROS Benzyl Ultra HIC Resin	250 mL	A32567
	1 L	A32566
	5 L	A32565
	10 L	A32564

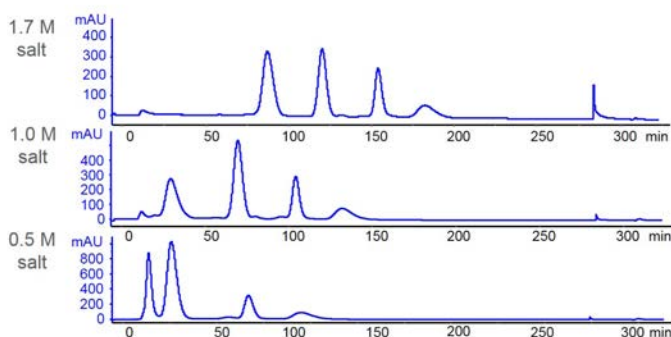


Figure 10. High performance and resolution of POROS Benzyl Ultra resin with lower-conductivity buffers. POROS Benzyl and Benzyl Ultra resins are designed for use in low-salt applications without compromising performance. Protein mixture: ribonuclease A, lysozyme, chymotrypsin, and chymotrypsinogen A.

Resin	Surface chemistry	Key application
POROS ethyl	Novel ethyl	Bind-elute mode of moderately to considerably hydrophobic molecules
POROS benzyl	Low-density benzyl/aromatic	Bind-elute or flow-through mode depending on molecule
POROS benzyl ultra	High-density benzyl/aromatic	Flow-through mode in lower salt to bind impurities such as aggregates

Increasing hydrophobicity ↓

Large-scale pre-packed columns

EvolveD pre-packed bioprocess chromatography columns

Large-volume pre-packed chromatography columns are a cost-effective alternative for the purification of biologics. The use of these columns eliminates the need for column packing, column qualification, and cleaning, thereby saving precious time, resources, and costs.

Key features

- Prepared and packed in a classified ISO 7 environment
- Ready-to-use formats, suitable to be used in cGMP processes
- Suitable for direct connection to standard chromatography systems
- Non-metallic flow path eliminates corrosion risk and contamination of the process, allowing for use of high salt concentrations (when needed)
- Regulatory support documents available for column hardware and packed resin



Thermo Scientific™ EvolveD™ columns are pre-packed with all of the CaptureSelect bioprocess affinity resins, making your affinity capture step extra efficient. The columns are available in a variety of diameters, bed heights, and volumes.

Column	10 cm bed height			20 cm bed height		
Diameter (cm)	7	10	20	7	10	20
Length (cm)	10	10	10	20	20	20
Cross-sectional area (cm ²)	38.5	78.5	314.2	38.5	78.5	314.2
Volume (mL)	385	785	3,140	770	1,570	6,280
Inlet/outlet internal diameter (mm)	3	3	6	3	3	6

Operating and technical specifications	
Pressure rating	4 bar /58 psi
Operation temperature	2–30°C (depending on the packed resin)
Bed support size	8 µm
Inlet/outlet port connections	25 mm TC sanitary fitting

Large-scale pre-packed columns

EvolveD pre-packed bioprocess chromatography columns

Ordering information

EvolveD column	385 mL	770 mL	785 mL	1.6 L	3.1 L	6.3 L
CaptureSelect IgG-CH1	6943200071	6943200072	6943200101	6943200102	6943200201	6943200202
CaptureSelect KappaXL	6943210071	6943210072	6943210101	6943210102	6943210201	6943210202
CaptureSelect KappaXP	6943212071	6943212072	6943212101	6943212102	6943212201	6943212202
CaptureSelect FcXL	6943280071	6943280072	6943280101	6943280102	6943280201	6943280202
CaptureSelect CH1-XL	6943462071	6943462072	6943462101	6943462102	6943462201	6943462202
CaptureSelect HSA	6942970071	6942970072	6942970101	6942970102	6942970201	6942970202
CaptureSelect HGH	6943160071	6943160072	6943160101	6943160102	6943160201	6943160202
CaptureSelect TSH	6943562071	6943562072	6943562101	6943562102	6943562201	6943562202
CaptureSelect FSH	6943180071	6943180072	6943180101	6943180102	6943180201	6943180202
CaptureSelect hCG	6943410071	6943410072	6943410101	6943410102	6943410201	6943410202
CaptureSelect tPA	6943430071	6943430072	6943430101	6943430102	6943430201	6943430202
CaptureSelect C-tagXL	6943072071	6943072072	6943072101	6943072102	6943072201	6943072202

All columns are made to order and require a minimum order quantity of 2 pre-packed columns.



Process screening and optimization

Tools for high-throughput resin screening and optimization

Tools for high-throughput resin screening and optimization

POROS™ and CaptureSelect™ RoboColumn™ products are small chromatography columns supporting high-throughput process development for resin screening and optimizing chromatographic conditions. The ready-to-use, 96-well formatted chromatography columns are useful for fully automated and parallel chromatographic separations on robotic liquid handling stations.

Key applications

- High-throughput screening
 - Parallel screening and optimization of chromatographic conditions
 - Chromatographic resin screening for dynamic binding capacity and separation efficiency
- Scale-down experiments
 - POROS and CaptureSelect RoboColumns prepacked columns are available with a large selection of commercially available chromatographic resins of different functionalities, including ion exchange, hydrophobic interaction, and affinity chromatography



Ordering information

Description	Quantity	Cat. No.
RoboColumn Cation Exchange Columns		
POROS HS50 RoboColumn Cation Exchange Columns	200 µL	A30713
	600 µL	A30714
POROS XS RoboColumn Cation Exchange Columns	200 µL	A30715
	600 µL	A30716
RoboColumn Anion Exchange Columns		
POROS HQ50 RoboColumn Anion Exchange Columns	200 µL	A30717
	600 µL	A30718
POROS XQ50 RoboColumn Anion Exchange Columns	200 µL	A30719
	600 µL	A30720
POROS PI50 RoboColumn Anion Exchange Columns	200 µL	A30721
	600 µL	A30722
POROS D50 RoboColumn Anion Exchange Columns	200 µL	A30723
	600 µL	A30724
RoboColumn Hydrophobic Interaction Columns		
POROS Ethyl RoboColumn	200 µL	A34810
	600 µL	A34812
POROS Benzyl RoboColumn	200 µL	A34813
	600 µL	A34814
POROS Benzyl Ultra RoboColumn	200 µL	A34815
	600 µL	A34816

Description	Quantity	Cat. No.
RoboColumn Affinity Columns		
POROS MabCapture A Select RoboColumn	200 µL	A30727
	600 µL	A30728
CaptureSelect Kappa XL RoboColumn	50 µL	5943210050
	200 µL	5943210200
CaptureSelect FcXL RoboColumn	50 µL	5943280050
	200 µL	5943280200
CaptureSelect Human Albumin RoboColumn	50 µL	5912970050
	200 µL	5912970200
CaptureSelect CH1-XL RoboColumn	200 µL	5943462200
CaptureSelect KappaXP RoboColumn	200 µL	5943212200

Analytical tools

POROS and CaptureSelect analytical columns and conjugated ligands

We offer a range of products to support your analytical needs, including affinity columns, non-affinity columns, and conjugated ligands for the development of analytical assays.

Analytical chromatography columns

POROS™ and CaptureSelect™ analytical columns are used throughout the industry to monitor monoclonal antibody titer and product yield from cell culture supernatant. The columns can be operated on any standard high-performance liquid chromatography (HPLC) or medium-pressure chromatography system. POROS analytical chromatography columns, available in 10 and 20 µm particle sizes, enable rapid separation of biomolecules for both analytical and lab-scale preparative applications. POROS Protein A analytical columns are widely used in the industry for monitoring monoclonal antibody titer and yield from cell culture supernatant. The addition of POROS CaptureSelect analytical columns expand the advantages of high-speed, high-performance quantitation to antibody fragments and isotypes, biosimilars, and fusions proteins.

Affinity columns include:

- Protein A and G columns
- Aldehyde-, epoxide-, or hydroxyl-activated affinity columns
- Antibody isotype and fragment affinity columns: IgG-Fc, IgM, IgA, CH1XL, FcXL, KappaXL
- Biosimilars and recombinant protein columns: HSA, FSH, GCSF, hGH lambda

Non-affinity columns include:

- Anion and cation exchange columns
- Reversed-phase columns
- Hydrophobic interaction columns

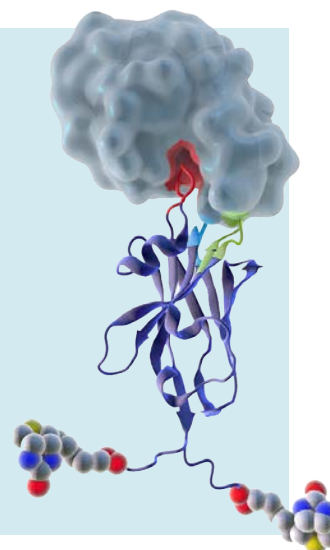
Columns are available in 4 different formats (D x L, volume):

- 2.1 x 30 mm, 0.1 mL
- 4.6 x 50 mm, 0.8 mL
- 4.6 x 100 mm, 1.7 mL
- 10 x 100 mm, 7.9 mL

CaptureSelect ligand conjugates

CaptureSelect™ biotinylated ligands are available for use in a range of analytical assays, and include everything from ligands binding to antibodies and antibody fragments to plasma proteins and non-mAb biosimilars. The affinity ligand is chemically conjugated to biotin via an appropriate spacer that retains binding activity of the ligand when immobilized onto streptavidin-functionalized surfaces.

Applications for CaptureSelect™ biotinylated ligands include capture ELISA, western blot, and label-free detection platforms such as Surface Plasmon Resonance and Bio-Layer interferometry



Find out more at
thermofisher.com/captureselect-conjugates

Analytical tools

Affinity columns ordering information

Description	Column size (D x L), volume	Cat. No.	Description	Column size (D x L), volume	Cat. No.
POROS A 20 µm	2.1 x 30 mm, 0.1 mL	2100100	POROS GCSF	2.1 x 30 mm	4485157
	10 x 100 mm, 7.9 mL	1502246		4.6 x 50 mm	4485164
	4.6 x 50 mm, 0.8 mL	1502224		4.6 x 100 mm	4485168
POROS G 20 µm	2.1 x 30 mm, 0.1 mL	2100200	POROS hGH	2.1 x 30 mm	4485161
	4.6 x 100 mm, 1.7 mL	1512226		4.6 x 50 mm	4485165
	4.6 x 50 mm, 0.8 mL	1512224		4.6 x 100 mm	4485169
POROS HE 50 µm	2.1 x 30 mm, 0.1 mL	4333411		10 x 100 mm	4485173
	4.6 x 50 mm, 0.8 mL	4333412	POROS HCG	2.1 x 30 mm	A37055
	4.6 x 100 mm, 1.7 mL	4333413		4.6 x 50 mm	A37056
POROS MC µm	2.1 x 30 mm, 0.1 mL	1542212		4.6 x 100 mm	A37057
	4.6 x 50 mm, 0.8 mL	1542224	POROS HSA	2.1 x 30 mm	4469151
	4.6 x 100 mm, 1.7 mL	1542226		4.6 x 50 mm	4469165
POROS AL 20 µm	2.1 x 30 mm, 0.1 mL	1602212		4.6 x 100 mm	4469170
	4.6 x 100 mm, 1.7 mL	1602226	POROS FSH	2.1 x 30 mm	4481822
	4.6 x 50 mm, 0.8 mL	1602224		4.6 x 50 mm	4481824
POROS EP 20 µm	4.6 x 100 mm, 1.7 mL	1612226		4.6 x 100 mm	4481826
	4.6 x 50 mm, 0.8 mL	1612224			
POROS HP2	4.6 x 50 mm, 0.8 mL	1452224			
LC Kappa Affinity Column	2.1 x 30 mm, 0.1 mL	4469149			
	10 x 100 mm, 7.9 mL	4469172			
FG, POROS LC-lambda Affinity Column	2.1 x 30 mm	4469150			
	4.6 x 50 mm	4469163			
	4.6 x 100 mm	4469168			
POROS IgM	2.1 x 30 mm	4469152			
	4.6 x 50 mm	4469164			
	4.6 x 100 mm	4469169			
POROS IgA	2.1 x 30 mm	4485162			
	4.6 x 50 mm	4485166			
	4.6 x 100 mm	4485170			
POROS CH1-XL	4.6 x 50 mm	A37053			
	4.6 x 100 mm	A37054			
POROS FcXL	2.1 x 30 mm	A37058			
	4.6 x 50 mm	A37059			
	4.6 x 100 mm	A37060			

Custom chromatography services

Ligand and resin development programs

The manufacture of complex biotherapeutics requires novel purification strategies, which may not always exist. Our custom ligand and resin development platforms enable the development of innovative purification resins, providing a solution for challenging downstream processes.

Custom development services

We have been successfully developing and manufacturing chromatography resins for more than two decades. Our ligand- and resin-manufacturing facilities support the production of prototype affinity resins and scale up to commercial lot sizes of 250 L.

Custom services include

- **Custom affinity ligand/resin:** Development of CaptureSelect affinity solutions developed for your specific product or process
- **Custom resins:** POROS resins tailored to your process requirements based on existing ligands

Custom CaptureSelect ligand development

We offer a unique, milestone-based service for the development of specific affinity solutions tailored to a target protein and its specific requirements. The custom ligand can be immobilized on a variety of backbones, including POROS resins, and further developed into an affinity resin, which can be used in large-scale processing of biopharmaceuticals.

Custom POROS resins

POROS chromatography resins provide attributes that are well-suited to downstream processing. Our resin development program helps deliver a high-speed, high-performance affinity chromatography solution tailored to your process requirements.



Resin development includes the use of Design of Experiments (DoE) to define the resin-manufacturing process required for your purification needs. DoE coupling chemistry to optimize performance for your biotherapeutic.

Start the process with your ligand or another commercially available ligand, select from our library of existing CaptureSelect ligands, or generate a custom CaptureSelect™ ligand for your application.

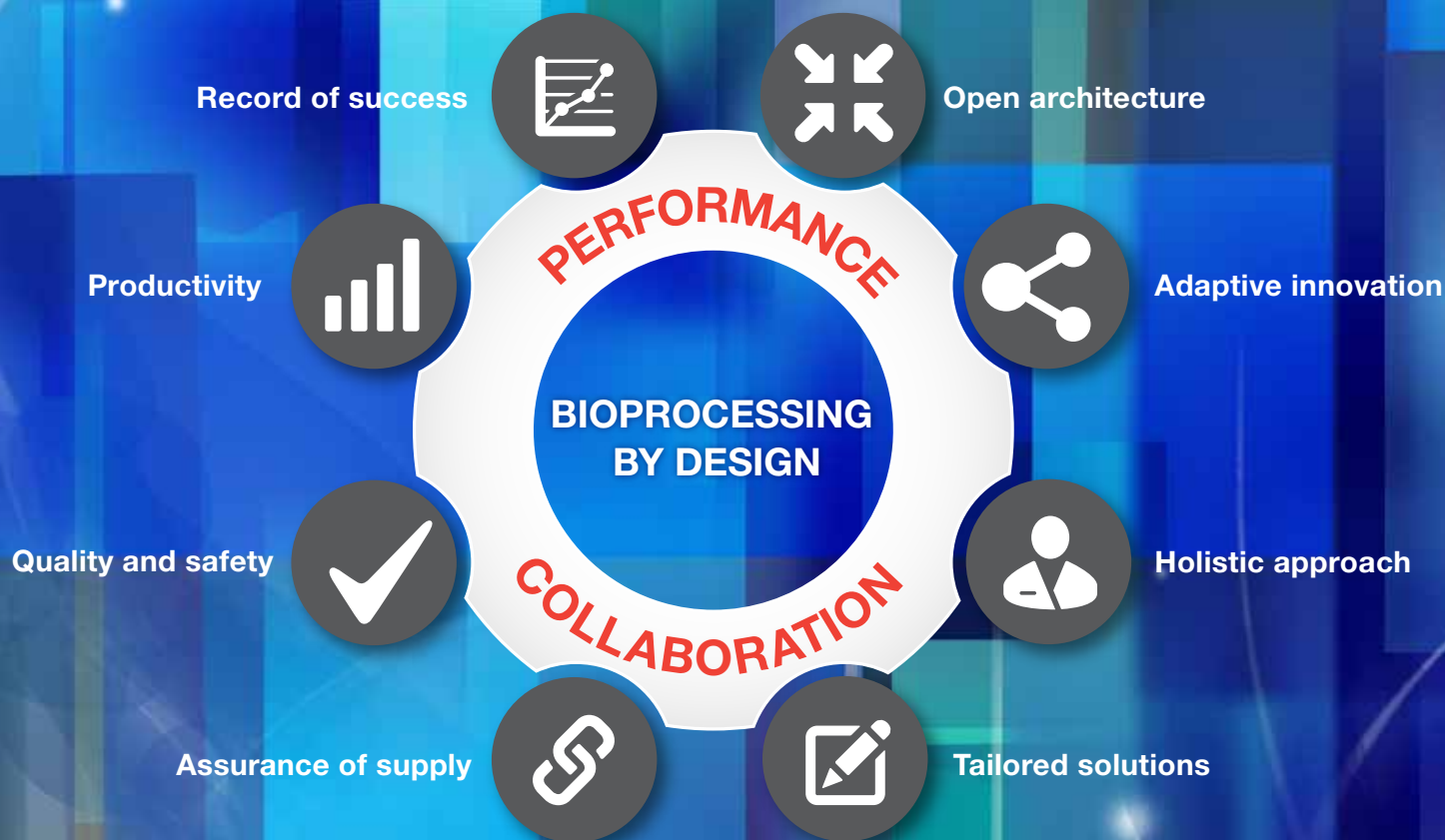
Service and support

We offer expert field applications, service, and training support to complement your development process every step of the way. These include column packing on-site, training, process optimization, cleaning recommendations, stability studies, lifetime approaches, and many more.

For questions and concerns, please contact us at bp@thermofisher.com

Find out more at

[thermofisher.com/custom-chromatography-solutions](https://www.thermofisher.com/custom-chromatography-solutions)



Find out more at thermofisher.com/bioprocessing

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