bioproduction

thermo scientific | applied biosystems | gibco

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

Bioprocessing solutions to address your unique challenges

ThermoFisher SCIENTIFIC

POROS and CaptureSelect purification products

Purifying next-generation biotherapeutics

To meet your downstream processing needs, we offer a broad portfolio of purification products supporting biopharmaceutical development. These range from unique chromatography resins and ligands used for primary capture and high-performance polishing, to a robust analytical tool set for characterization and detection of biological compounds.

To meet today's biomolecule purification challenges in large scale manufacturing, we have offer a variety of commercialized resins for affinity, ion exchange (IEX), and hydrophobic interaction chromatography (HIC) applications. 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.

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. Due to recent growth, the capacity was expanded to 60,000 square feet of production space, and the facility is ISO 9001:2008 and ISO 13485:2003 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.

A second production plant in Naarden, The Netherlands, is built to an advanced engineering level, satisfying international standards for hygienic processing and for the handling of genetically modified microorganisms and bioproducts. The facility is ISO 9001:2008 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.

Bedford, Massachusetts, USA facility
Certification status: ISO 9001, ISO 13485

- **Key capabilities:**
  - Large-scale bead manufacturing
  - Manufacturing of bulk chromatography resins
  - QC analysis
  - HPLC column packing

Naarden, The Netherlands facility
Certification status: ISO 9001

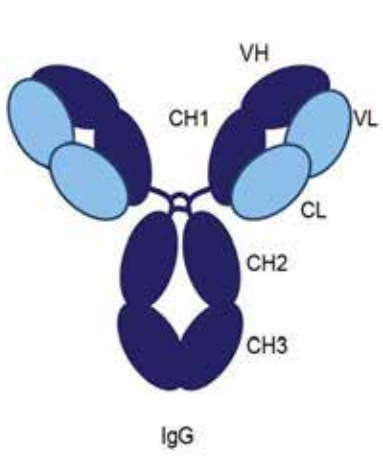
- **Key capabilities:**
  - Production of affinity ligands
  - Manufacturing of conjugated ligands for analytics
  - Small-scale resin manufacturing
  - QC analysis

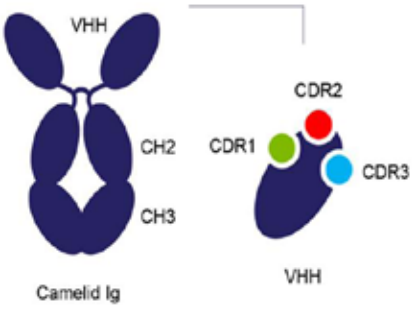
POROS resins

POROS chromatography resins address the industry bottlenecks caused by increased titers and product demands for antibodies and recombinant proteins. Through its high-resolution, high-capacity purification, POROS chromatography resins help maintain performance and add process flexibility.

- A leader in downstream chromatography where capacity, resolution, and yield are critical
- Superior performance with established reputation for process and product-related impurity removal
- Rapid adoption in more than 500 process steps globally
- Strong partner in quality and supply

CaptureSelect products





CaptureSelect affinity ligands and resins have been proven to help reduce biomolecule cost and time of purification, provide a higher-quality product, and increase flexibility in the purification process. These products possess unique selectivity, and improved stability and elution efficiency. They are created specifically for the purification of biopharmaceuticals using proprietary technology based on single-domain V_HH antibody fragments.

- Proven technology for generating product- and process-specific affinity solutions
- Custom design of affinity ligands coupled to high-performance chromatography resins
- Used in commercial biotherapeutic processes
- Animal origin–free products facilitate regulatory approval
- R&D products for use in discovery and preclinical biopharmaceutical development

Ion exchange chromatography

POROS ion exchange resins

POROS ion exchange resins

POROS™ ion exchange (IEX) resins are 50 µm, rigid, polymeric resins, designed for high dynamic binding capacity over a range of pH and conductivity conditions. This allows target molecule binding and impurity removal over a range of process conditions, thereby increasing process development flexibility and manufacturing throughput. In addition, the 50 µm particle size provides superior resolution for unprecedented impurity clearance independent of scale and flow rate. Each of the resins offers unique selectivity that can impact both capacity and separation in a process. The resin backbone consists of crosslinked poly(styrene divinylbenzene) with a polyhydroxyl surface coating that provides low nonspecific binding.

POROS anion exchange resins

The use of different surface chemistries create four anion exchange (AEX) resins that are unique to the market (Table 1). These AEX resins can be used in bind/elute as well as flow-through mode. POROS™ anion exchange (AEX) resins can be used for the chromatography of biomolecules, including recombinant proteins, monoclonal antibodies, DNA, viruses, and peptides.

Table 1. Anion AEX exchange resins.

POROS™ Resin	XQ	HQ50	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 (mg/mL)	>140	75	80	90
pH range	1–14	1–14	1–9	1–9

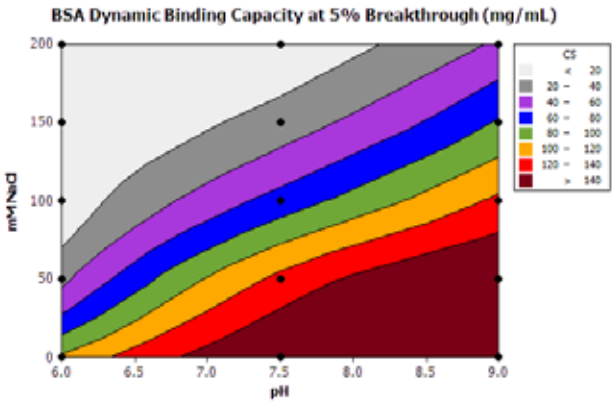


Figure 1. The dynamic binding capacity of POROS XQ resin with BSA at 5% breakthrough as a function of pH and salt concentration.
High capacity is obtained under a wide range of process conditions. The orange, red, and dark red areas indicate the conditions at which greater than 100 mg/mL binding capacity of BSA can be obtained. Column: 0.46 cm (D) x 20 cm (L); base buffer: 20 mM Bis-Tris propane; load conditions: 10 mg/mL BSA; flow rate: 300 cm/hr.

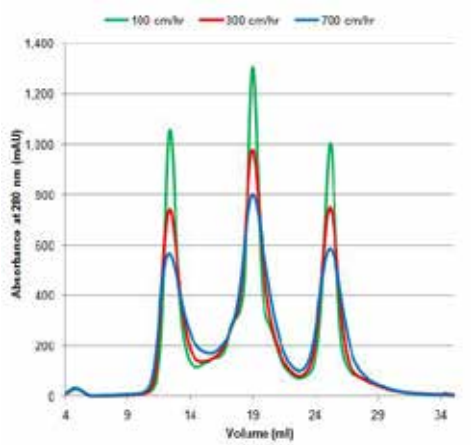


Figure 2. POROS AEX resin is capable of achieving excellent separation over a wide range of flow rates. High efficiency and resolution is maintained in a wide range of flow rates, allowing for higher flow rates to be run. Column format: POROS XQ 0.46 cm (D) x 20 cm (L); buffer A: 20 mM Tris, pH 8.0; buffer B: 20 mM Tris, 1 M NaCl, pH 8.0; gradient: 0-50% B, 10 CV; flow rate: variable; salt gradient elution. Protein mix: holo-transferrin, pI 5.5, ovalbumin, pI 4.6, and soybean trypsin inhibitor, pI 4.5.

Ion exchange chromatography

POROS ion exchange resins

POROS™ cation exchange resins

POROS™ 50 µm HS and XS resins are 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 are designed for the purification of more basic proteins and biomolecules and are especially well-suited for the separation of process impurities and aggregates, making them an excellent choice for both capture and polishing applications.

Both resins have a high dynamic binding capacity (Figure 3) and provide superior resolution for unprecedented impurity clearance independent of scale and flow rate (Figure 4). Each of the resins offers unique selectivity that can impact both capacity and separation in a process.

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

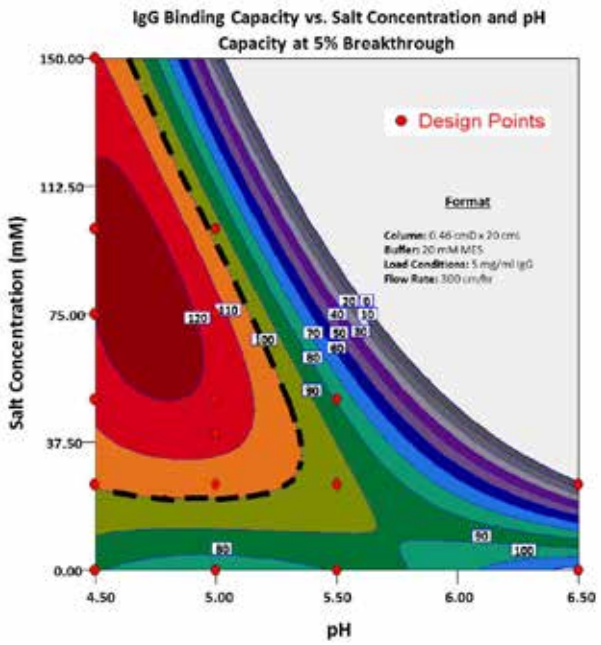


Figure 3. Binding capacity of POROS XS resin with IgG at 5% breakthrough. High binding capacity is obtained under a wide range of process conditions. The area inside the dotted line indicates the conditions at which greater than 100 mg/mL binding capacity of IgG can be obtained. Column: 0.46 cm (D) x 20 cm (L); buffer: 20 mM MES; load conditions: 5 mg/mL IgG; flow rate: 300 cm/hr.

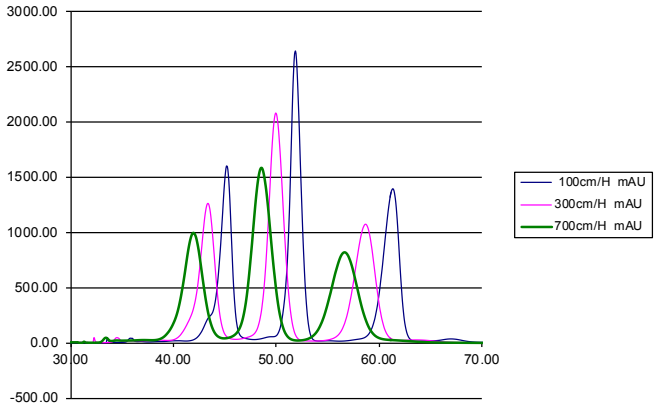


Figure 4. POROS XS and HS resins present with similar, high-resolution properties. Column: 1 cm (D) x 20 cm (L); buffer A: 20 mM MES, 25 mM NaCl pH 6.2, buffer B: 20 mM MES, 1 M NaCl pH 6.2; gradient: 10%–50% buffer B, 7.5 CV; flow rate: 300 cm/hr; protein mix: chymotrypsinogen A, cytochrome C, and lysozyme.

Hydrophobic interaction chromatography

POROS hydrophobic interaction resins

POROS hydrophobic interaction chromatography resins

POROS™ hydrophobic interaction chromatography (HIC) resins are rigid, 50 µm polymeric resins with a range of hydrophobic functionalities. POROS HIC resins are suitable for bind/elute and flow-through applications utilized at lower salt concentrations (Figure 5) for the purification of therapeutic proteins, antibody fragments, antibody drug conjugates, and other biomolecules. These resins have superior resolution capability, high capacity, and differentiating selectivity for a range of biomolecules. This performance is independent of flow rate, making POROS HIC a reliable resin for impurity removal.

Key features

- High resolution, even with lower conductivity buffers
- High dynamic binding capacity
- Flow rate–independent performance
- Bind/elute or flow-through mode
- Good recovery and robust stability

The resin backbone consists of crosslinked poly(styrene divinylbenzene) with a unique pore structure that provides rapid mass transport and enables enhanced productivity. The particle surface is coated with a novel polymer coating, which is then further derivatized with a range of hydrophobic ligands to provide three new resins (Table 2) that span a wide range of hydrophobicity (Figure 6).

Table 2. POROS HIC resins offering a different range of hydrophobicity.

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

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

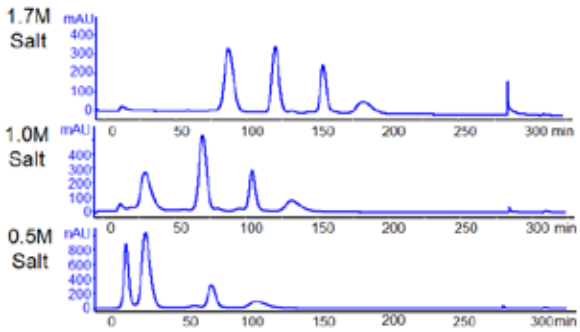


Figure 5. High performance and resolution of POROS Benzyl Ultra resin with lower-conductivity buffers. POROS Benzyl and Benzyl Ultra resins are designed for use in low-salt applications without compromising performance. Protein mixture: ribonuclease A, lysozyme, chymotrypsin, and chymotrypsinogen A.

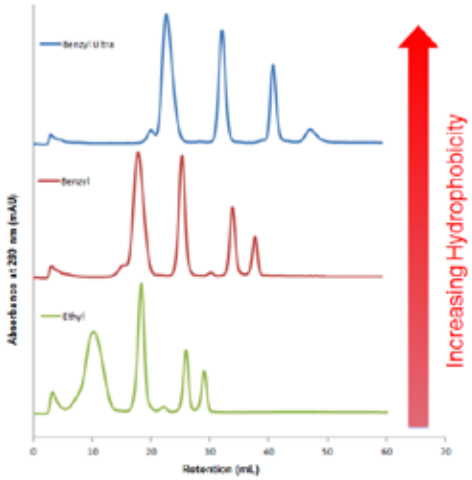


Figure 6. POROS HIC resins span a wide range of hydrophobicity. The POROS HIC resin product range accommodates a wide variety of molecules and purification challenges. Protein mixture: ribonuclease A, lysozyme, chymotrypsin, and chymotrypsinogen A

Affinity chromatography

Purification of antibody-derived therapeutics

Purification products for 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
- Affinity resins offering mild elution conditions for Fc-fusion proteins and pH-sensitive IgGs
- A cost-effective, high performance protein A resin developed from in-house sourced protein A

Thermo Fisher Scientific offers protein A affinity resins for monoclonal antibody purification that demonstrates consistent binding performance at increased flow rates, maintaining superior binding capacity at high linear velocities where other chromatography media products cannot operate.

Ordering information

Description	Quantity	Cat. No.
POROS MabCapture A Select Resin	250 mL	4374729
	1 L	4374735
	5 L	4374728
CaptureSelect CH1-XL	250 mL	1943200250
	1 L	19432001L
	5 L	19432005L
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

Check out our other bioprocess resins and additional sizes at
thermofisher.com/poros
thermofisher.com/captureselect

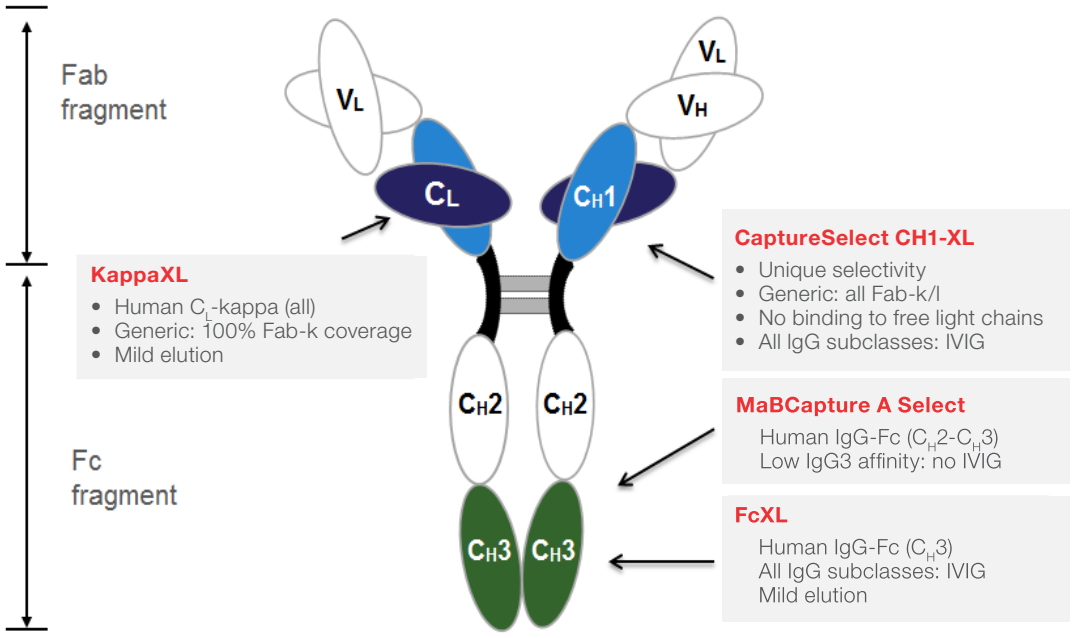


Figure 7. CaptureSelect affinity resins for antibody purification. This image depicts where the various products bind the antibody or antibody fragment.

Affinity chromatography

Purification of recombinant proteins and biosimilars

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 superior affinity and specificity for their target proteins, for efficient single-step purification of non-antibody biomolecules. In addition, sensitive proteins can be efficiently eluted using mild conditions. These protein purification resins were designed for reliable, efficient purification of target proteins, with essential stability and elution properties.

Key features

- **Selectivity:** high purity in single step; feed-stock 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.

Ordering information

Description	Quantity	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	5 mL	2943562005
	10 mL	2943562010
	50 mL	2943562050
	250 mL	1943562250
	1 L	194356201L
	5 L	194356205L
CaptureSelect hGH Affinity Matrix	5 mL	1943160005
	10 mL	1943160010
	50 mL	1943160050
	250 mL	1943160250
	1 L	194316001L
	5 L	194316005L

Affinity chromatography

Purification of viral vectors and vaccines

AAV-based gene therapy vectors

Gene therapy has undergone significant advances over the last few years, and the adeno-associated virus (AAV) subclasses have emerged as the vector of choice for many therapies. The field currently faces a challenge to develop efficient commercial manufacturing capabilities for these unique therapies and to increase productivity to meet market needs. Affinity chromatography for purification of these biomolecules offers clear advantages of obtaining high purity and high yield in a single step and is an essential part of platform technologies.

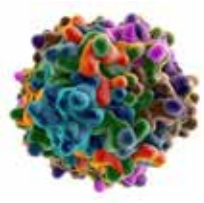
POROS CaptureSelect AAV affinity resins

The utilization of POROS™ CaptureSelect™ AAV8 and AAV9 resins may represent a significant improvement to the downstream processing. The high-capacity, high-specificity features of these affinity resins can help reduce purification steps, maximize productivity, and offer a more scalable, consistent, and flexible process.

The large pore structure of POROS CaptureSelect AAV8 and AAV9 affinity resins makes them suited for purifying large, complex AAV vectors, supporting chromatographic separations at considerably faster flow rates than conventional liquid chromatography separations, while maintaining high dynamic binding capacity.

Table 4. Properties of viral vector affinity resins.

	POROS CaptureSelect AAV8	POROS CaptureSelect AAV9
Ligand selectivity	AAV8	AAV9
Binding Capacity	$>10^{14}$	$>10^{13}$
pH stability	pH 1–10	pH 1–10



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
CaptureSelect C-tagXL Affinity Matrix	250 mL	1943072250
	1 L	1943072500
	5 L	194307201L
	10 L	194307205L

Protein-based vaccines

Vaccine development is rapidly evolving as vaccination is an important tool to prevent and control infectious diseases. Currently, many of the vaccines under development are recombinant protein or subunit vaccines, as these type of vaccines reduce the risk for pathogenicity and production is cost-efficient. One of the major bottlenecks of this technology is obtaining sufficient quantities of high-quality and pure protein [1].

CaptureSelect Novel Affinity Tag System

Epitope tagging is a technique that employs genetic engineering to fuse a known epitope, called an affinity tag, to either the C or N terminus of a recombinant protein to facilitate affinity purification and detection. This approach enables high selective capture, leading to high yield and purity of the final product. The C-tag is a small and inert 4 amino acid peptide tag: E-P-E-A (glutamic acid - proline - glutamic acid - alanine) which needs to be engineered to the protein of interest at the C-terminal of proteins. This limits any potential interaction with the recombinant protein or proteins that might be present in culture media. CaptureSelect C-tagXL is a novel affinity resin system offering unique selectivity for C-tag, which enables simple purification of C-tagged proteins.

1. Jin J, Hjerrild KA, Silk SE et al. (2017) Int J Parasitol 47(7):435-446.

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

Description	Quantity	Cat. No.
RoboColumn Affinity Columns		
POROS MabCapture A RoboColumn	200 µL	A30725
	600 µL	A30726
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
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

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.

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 derivatives thereof to plasma proteins and non-mAb biosimilars. The affinity ligand is chemically conjugated to biotin via an appropriate spacer that retains binding reactivity of the ligand when immobilized onto streptavidin-functionalized surfaces.

Applications for CaptureSelect™ biotinylated ligands include capture ELISA, western blot, and label-free detection platforms.

Affinity columns include:

- Protein A and G columns
- Aldehyde-, epoxide-, or hydroxyl-activated affinity columns
- Antibody isotype and fragment affinity columns: IgG Fc, IgA, IgM, LC kappa, LC lambda
- 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

Analytical tools

Ordering information

Description	Column size (D x L), volume	Cat. No.
POROS protein A/G and POROS CaptureSelect affinity columns		
POROS A 20 µm	2.1 x 30 mm, 0.1 mL (PEEK)	2100100
	10 x 100 mm, 7.9 mL (PEEK)	1502246
POROS G 20 µm	2.1 x 30 mm, 0.1 mL (PEEK)	2100200
	10 x 100 mm, 7.9 mL (PEEK)	1512246
HSA Affinity Column	2.1 x 30 mm, 0.1 mL	4469151
	10 x 100 mm, 7.9 mL	4469175
LC Kappa Affinity Column	2.1 x 30 mm, 0.1 mL	4469149
	10 x 100 mm, 7.9 mL	4469172
IgG Fc Affinity Column	2.1 x 30 mm, 0.1 mL	4469148
	10 x 100 mm, 7.9 mL	4469171
FG, POROS LC-lambda	2.1 x 30 mm (PEEK)	4469150
	4.6 x 50 mm (PEEK)	4469163
	4.6 x 100 mm (PEEK)	4469168
	10 x 100 mm (PEEK)	4469173
FG, POROS HSA	2.1 x 30 mm (PEEK Each)	4469151
	4.6 x 50 mm (PEEK Each)	4469165
	4.6 x 100 mm (PEEK Each)	4469170
	10 x 100 mm (PEEK Each)	4469175
FG, POROS IgM	2.1 x 30 mm (PEEK Each)	4469152
	4.6 x 50 mm (PEEK Each)	4469164
	4.6 x 100 mm (PEEK Each)	4469169
	10 x 100 mm (PEEK Each)	4469174
FG, POROS FSH	2.1 x 30 mm (PEEK Each)	4481822
	4.6 x 50 mm (PEEK Each)	4481824
	4.6 x 100 mm (PEEK Each)	4481826
POROS GCSF	2.1 x 30 mm (PEEK Each)	4485157
	4.6 x 50 mm (PEEK Each)	4485164
	4.6 x 100 mm (PEEK Each)	4485168
	10 x 100 mm (PEEK Each)	4485172
POROS hGH	2.1 x 30 mm (PEEK Each)	4485161
	4.6 x 50 mm (PEEK Each)	4485165
	4.6 x 100 mm (PEEK Each)	4485169
	10 x 100 mm (PEEK Each)	4485173
POROS IgA	2.1 x 30 mm (PEEK Each)	4485162
	4.6 x 50 mm (PEEK Each)	4485166
	4.6 x 100 mm (PEEK Each)	4485170
	10 x 100 mm (PEEK Each)	4485174

Description	Column size (D x L), volume	Cat. No.
POROS protein A/G and POROS CaptureSelect affinity columns continued		
POROS CH1-XL	4.6 x 50 mm (PEEK Each)	A37053
	4.6 x 100 mm (PEEK Each)	A37054
POROS HCG	2.1 x 30 mm (PEEK Each)	A37055
	4.6 x 50 mm (PEEK Each)	A37056
	4.6 x 100 mm (PEEK Each)	A37057
POROS FC XL	2.1 x 30 mm (PEEK Each)	A37058
	4.6 x 50 mm (PEEK Each)	A37059
	4.6 x 100 mm (PEEK Each)	A37060

Description	Column size (D x L), volume	Cat. No.
CaptureSelect Ligand Conjugates		
Biotin anti-IgG-Fc (ms)	100 µg	7102852100
	500 µg	7102852500
Biotin anti-IgA	100 µg	7102882100
	500 µg	7102882500
Biotin anti-IgM	100 µg	7102892100
	500 µg	7102892500
Biotin anti-LC-lambda (Hu)	100 µg	7103082100
	500 µg	7103082500
Biotin anti-LC-kappa (Murine)	100 µg	7103152100
	500 µg	7103152500
Biotin anti-IgG-CH1	100 µg	7103202100
	500 µg	7103202500
Biotin anti-C-tag	100 µg	7103252100
	500 µg	7103252500
Biotin anti-IgG-Fc (Hu)	100 µg	7103262100
	500 µg	7103262500
Biotin anti-LC-kappa (Hu)	100 µg	7103272100
	500 µg	7103272500

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 product- or process-specific CaptureSelect affinity solutions
- **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 product- or process-specific affinity solutions tailored to a target protein and its specific requirements. The custom ligand can be 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 screening includes pore size, ligand density, and 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**

Notes

Find out more at **thermofisher.com/bioprocessing**

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