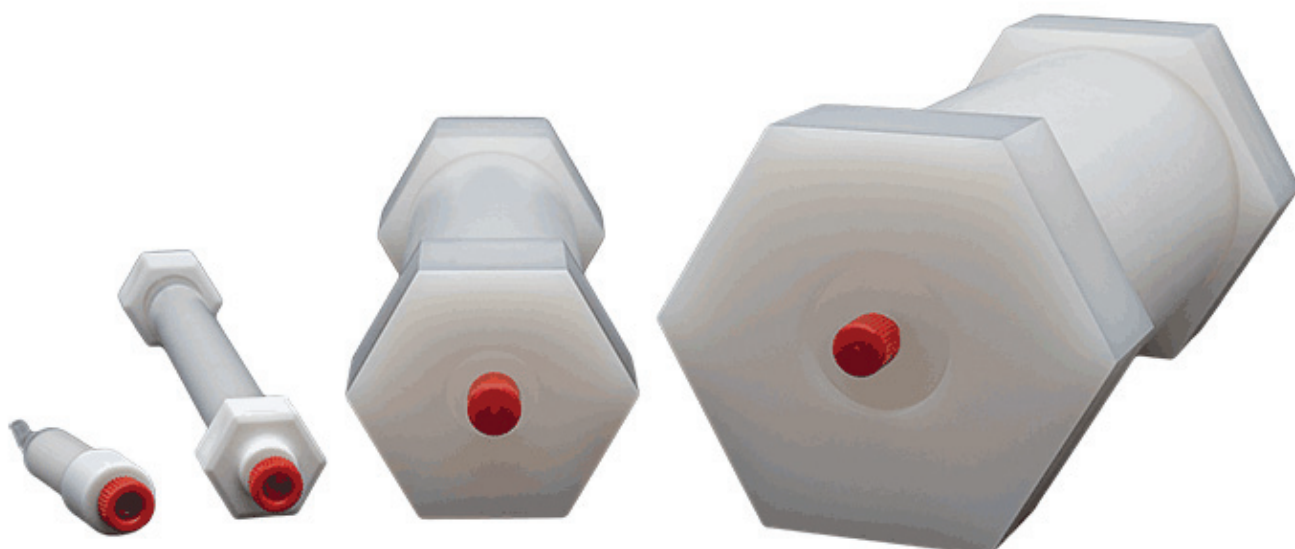# Columnas SkillPak™ preempaquetadas

Kits y Columnas
para la Evaluación Rápida de Biomoléculas
Anticuerpos monoclonales, Proteínas
y Oligonucleótidos

Desarrollo Rápido de Métodos   **Exclusión Molecular**

Selección de Resinas   **Intercambio Iónico**

Concentración de Muestras   **Interacción Hidrofóbica**

Purificación y separación de biomoléculas   **Afinidad**

Desde plataformas de diseño a planta piloto **Hidroxiapatito**

Utilizables con cromatógrafos LPLC o MPLC   **Modo Mixto**

TOSOH BIOSCIENCE

Selección Skillpack 1mL

Part #   Description

Cromatografía de Afinidad

TH-45200   SkillPak TOYOPEARL AF-rProtein L-650F 1 mL column
TH-45221   SkillPak TOYOPEARL AF-rProtein L-650F 1 mL columns (qty. 5)
TH-45201   SkillPak TOYOPEARL AF-rProtein A HC-650F 1 mL column
TH-45222   SkillPak TOYOPEARL AF-rProtein A HC-650F 1 mL columns (qty. 5)
TH-45202   SkillPak TOYOPEARL AF-Chelate-650M 1 mL column

Cromatografía de Intercambio Iónico

TH-45203   SkillPak TOYOPEARL GigaCap Q-650M 1 mL columns (qty. 5)
TH-45204   SkillPak TOYOPEARL GigaCap S-650S 1 mL columns (qty. 5)
TH-45205   SkillPak TOYOPEARL Sulfate-650F 1 mL columns (qty. 5)
TH-45206   SkillPak TOYOPEARL SuperQ-650S 1 mL columns (qty. 5)
TH-45207   SkillPak TSKgel SP-5PW (20) 1 mL columns (qty. 5)
TH-45208   SkillPak TSKgel SuperQ-5PW (20) 1 mL columns (qty. 5)
TH-45209   SkillPak TOYOPEARL NH2-750F 1 mL columns (qty. 5)
TH-45210   SkillPak TOYOPEARL GigaCap DEAE-650M 1 mL columns (qty. 5)
TH-45211   SkillPak TOYOPEARL GigaCap CM-650M 1 mL columns (qty. 5)
TH-45212   SkillPak TOYOPEARL QAE-550C 1 mL columns (qty. 5)
TH-45213   SkillPak TOYOPEARL SP-550C 1 mL columns (qty. 5)

Cromatografía de Interacción Hidrofóbica

TH-45214   SkillPak TOYOPEARL Butyl-600M 1 mL columns (qty. 5)
TH-45215   SkillPak TOYOPEARL Butyl-650M 1 mL columns (qty. 5)
TH-45216   SkillPak TOYOPEARL Phenyl-600M 1 mL columns (qty. 5)
TH-45217   SkillPak TOYOPEARL Phenyl-650M 1 mL columns (qty. 5)
TH-45218   SkillPak TOYOPEARL PPG-600M 1 mL columns (qty. 5)
TH-45219   SkillPak TOYOPEARL Hexyl-650C 1 mL columns (qty. 5)
TH-45220   SkillPak TOYOPEARL Ether-650M 1 mL columns (qty. 5)

Cromatografía de Modo Mixto

TH-45224   SkillPak TOYOPEARL MX-Trp-650M 1 mL columns (qty. 5)

Cromatografía de Exclusión por Tamaño

TH-45223   SkillPak TOYOPEARL HW-40F 1 mL columns (qty. 5)

Cromatografía de Hidroxiapatito

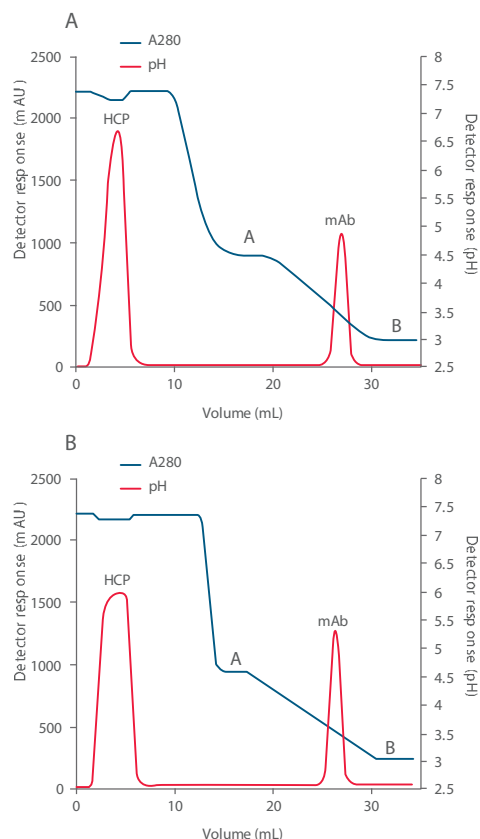TH-45225   SkillPak Ca++Pure-HA 1 mL column

Librerías de Columnas

TH-45226   SkillPak Anion Exchange 1 mL column library, 1 mL × 2 each
(TOYOPEARL   GigaCap Q-650M, GigaCap DEAE-650M, NH2-750F)

TH-45227   SkillPak Cation Exchange 1 mL column library, 1 mL × 2 each
(TOYOPEARL   GigaCap S-650S, GigaCap CM-650M, Sulfate-650F)

TH-45228   SkillPak Antibody 1 mL column library, 1 mL × 1 each
(TOYOPEARL   AF-rProtein A HC-650F, AF-rProtein L-650F, NH2-750F, Sulfate-650F,GigaCapQ-650M, GigaCapS-650S)

TH-45229   SkillPak mAb Platform 1 mL column library, 1 mL × 2 each
(TOYOPEARL AF-rProtein A HC-650F, Sulfate-650F, NH2-750F)

TH-45230   SkillPak Salt Tolerant 1 mL column library, 1 mL × 3 each
(TOYOPEARL Sulfate-650F, NH2-750F)

TH-45231   SkillPak Mixed Mode 1 mL column library, 1 mL × 3 each
(Ca++Pure-HA, TOYOPEARL MX-Trp-650M)

TH-45232   SkillPak Best-in-Class 1 mL column library, 1 mL × 1 each
(Ca++Pure-HA, TOYOPEARL AF-rProtein A HC-650F, AF-rProtein L-650F, NH2-750F, Sulfate-650F)

TH-45233   SkillPak HIC 1 mL column library, 1 mL × 1 each
(TOYOPEARL   Butyl-650M, Phenyl-650M, PPG-600M, Hexyl-650C, Ether-650M)

TH-45236   SkillPak HIC 1 mL column library, 1 mL × 2 each
(TOYOPEARL   Butyl-600M, Phenyl-600M, PPG-600M)

ESPECIFICACIONES DE LAS COLUMNAS SkillPak 1 mL

Dimensiones de Columna	7 mm ID × 2.5 cm altura de lecho
Volumen	1 mL
Flujo máximo	4 mL/min (600 cm/hr)
Presión de Trabajo Máxima	0.3 MPa
Conexiones con roscas estándar	(10-32 para 1/16 " Capilar)
Tampón de Envío	20% etanol para TOYOPEARL y TSKgel [con la excepción de of 0.5 mol/L de citrato sódico con 20% etanol para TSKgel SP-5PW (20) y SuperQ-5PW (20)], 20 mmol/L fosfato sódico con 20% etanol para Ca++Pure-HA

ELUCIÓN POR CAMBIO de pH de mAb usando la columna SkillPak 1 mL TOYOPEARL AF-rProtein A HC-650F (PANEL A);
Columna SkillPak 5 mL TOYOPEARL AF-rProtein A HC-650F (PANEL B)

Selección Skillpack 5mL

Part #   **Description**

Cromatografía de Afinidad

TH-45257   SkillPak TOYOPEARL AF-rProtein L-650F 5 mL column
TH-45258   SkillPak TOYOPEARL AF-rProtein A HC-650F 5 mL column
TH-45259   SkillPak TOYOPEARL AF-Chelate-650M 5 mL column

Cromatografía de Intercambio Iónico

TH-45239   SkillPak TOYOPEARL GigaCap Q-650M 5 mL column
TH-45240   SkillPak TOYOPEARL GigaCap S-650S 5 mL column
TH-45241   SkillPak TOYOPEARL Sulfate-650F 5 mL column
TH-45242   SkillPak TOYOPEARL SuperQ-650S 5 mL column
TH-45243   SkillPak TSKgel SP-5PW (20) 5 mL column
TH-45244   SkillPak TSKgel SuperQ-5PW (20) 5 mL column
TH-45245   SkillPak TOYOPEARL NH2-750F 5 mL column
TH-45246   SkillPak TOYOPEARL GigaCap DEAE-650M 5 mL column
TH-45247   SkillPak TOYOPEARL GigaCap CM-650M 5 mL column
TH-45248   SkillPak TOYOPEARL QAE-550C 5 mL column
TH-45249   SkillPak TOYOPEARL SP-550C 5 mL column

Cromatografía de Interacción Hidrofóbica

TH-45250   SkillPak TOYOPEARL Butyl-600M 5 mL column
TH-45251   SkillPak TOYOPEARL Butyl-650M 5 mL column
TH-45252   SkillPak TOYOPEARL Phenyl-600M 5 mL column
TH-45253   SkillPak TOYOPEARL Phenyl-650M 5 mL column
TH-45254   SkillPak TOYOPEARL PPG-600M 5 mL column
TH-45255   SkillPak TOYOPEARL Hexyl-650C 5 mL column
TH-45256   SkillPak TOYOPEARL Ether-650M 5 mL column

Cromatografía de Modo Mixto

TH-45261   SkillPak TOYOPEARL MX-Trp-650M 5 mL column

Cromatografía de Exclusión por Tamaño

TH-45260   SkillPak TOYOPEARL HW-40F 5 mL column

Cromatografía de Hidroxiapatito

TH-45262   SkillPak Ca++ Pure-HA 5 mL column
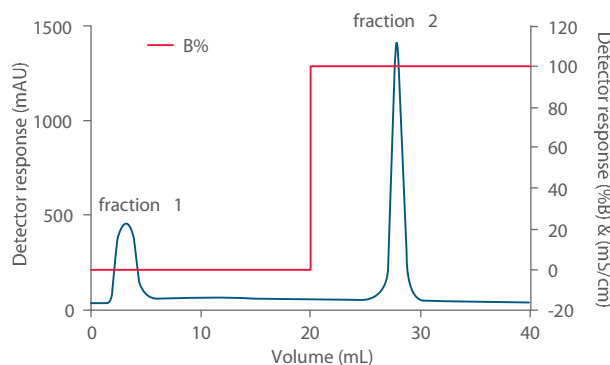
Librerías de Columnas

TH-45263   SkillPak mAb Platform 5 mL column library, 5 mL × 1 each (TOYOPEARL AF-rProtein A HC-650F, Sulfate-650F, NH2-750F)

TH-45264   SkillPak Salt Tolerant 5 mL column library, 5 mL × 1 each (TOYOPEARL Sulfate-650F, NH2-750F)

TH-45265   SkillPak Mixed Mode 5 mL column library, 5 mL × 1 each (Ca $^{++}$Pure-HA, TOYOPEARL MX-Trp-650M)

TH-45266   SkillPak Best-in-Class 5 mL column library, 5 mL x 1 each (Ca $^{++}$Pure-HA, TOYOPEARL AF-rProtein A HC-650F, AF-rProtein L-650F, NH 2-750F, Sulfate-650F)

ESPECIFICACIONES DE LAS COLUMNAS SkillPak 5 mL

Dimensiones de Columna	8 mm ID × 10 cm altura de lecho
Volumen	5 mL
Flujo estándar	1.3 mL/min (150 cm/hr)
Flujo Máximo	5 mL/min (600 cm/hr) para TOYOPEARL M Y resinas de grado C; 2.5 mL/min (300 cm/hr) para TSKgel, Ca++Pure-HA y TOYOPEARL S- y resinas de grado F, incluido TOYOPEARL AF-rProtein A HC-650F y TOYOPEARL AF-rProtein L-650F
Presión de Trabajo Máxima	0.3 MPa para resinas TOYOPEARL, ≤ 0.4 MPa Para resinas TSKgel y Ca++Pure-HA
Conexiones con roscas estándar	(10-32 para 1/16 " Capilar)
Tampón de Envío	20% etanol para TOYOPEARL y TSKgel 20 mmol/L fosfato sódico con 20% etanol para Ca++Pure-HA
Factor de Asimetría (As)	0.8-1.04 para TOYOPEARL y TSKgel, 0.8-2.6 para Ca++Pure-HA

CAPTURA DE Fab USANDO LA COLUMNA SkillPak 1 mL TOYOPEARL AF-rProtein L-650F

Column: SkillPak 1   mL TOYOPEARL AF-rProtein L-650F
Flow rate: 0.5 mL/min
Mobile phase: A: 0.1   mol/L citrate buffer, pH   6.5
                 B: 0.1   mol/L citrate buffer, pH   2.2
Detection: UV @ 280 nm
Sample: papain-digested human IgG1

Selección Skillpack 50 & 200 ml

Part # **Description**

Cromatografía de Afinidad

TH-45338	SkillPak 50 TOYOPEARL AF-rProtein A HC-650F 50 ml
TH-45340	SkillPak 50 TOYOPEARL AF-rProtein L-650F 50 ml
TH-45342	SkillPak 50 TOYOPEARL AF-Chelate-650M 50 ml

Cromatografía de Intercambio Iónico

TH-45302	SkillPak 50 TSKgel SuperQ-5PW (20) 50ml
TH-45304	SkillPak 50 TOYOPEARL SuperQ-650S 50 ml
TH-45306	SkillPak 50 TOYOPEARL GigaCap Q-650M 50 ml
TH-45308	SkillPak 50 TOYOPEARL GigaCap DEAE-650M 50 ml
TH-45310	SkillPak 50 TOYOPEARL NH2-750F 50ml
TH-45312	SkillPak 50 TOYOPEARL QAE-550C 50 ml
TH-45314	SkillPak 50 TOYOPEARL GigaCap S-650S 50 ml
TH-45316	SkillPak 50 TSKgel SP-5PW (20) 50 ml
TH-45318	SkillPak 50 TOYOPEARL Sulfate-650F 50 ml
TH-45320	SkillPak 50 TOYOPEARL GigaCap CM-650M 50 ml
TH-45322	SkillPak 50 TOYOPEARL SP-550C 50 ml

Cromatografía de Interacción Hidrofóbica

TH-45324	SkillPak 50 TOYOPEARL PPG-600M 50 ml
TH-45326	SkillPak 50 TOYOPEARL Butyl-600M 50 ml
TH-45328	SkillPak 50 TOYOPEARL Butyl-650M 50 ml
TH-45330	SkillPak 50 TOYOPEARL Hexyl-650C 50 ml
TH-45332	SkillPak 50 TOYOPEARL Phenyl-600M 50 ml
TH-45334	SkillPak 50 TOYOPEARL Phenyl-650M 50 ml
TH-45336	SkillPak 50 TOYOPEARL Ether-650M 50 ml

Cromatografía de Modo Mixto

TH-45344	SkillPak 50 TOYOPEARL MX-Trp-650M 50 ml

Cromatografía de Exclusión por Tamaño

TH-45300	SkillPak 50 TOYOPEARL HW-40F 50 ml

Part # **Description**

Cromatografía de Afinidad

TH-45339	SkillPak 200 TOYOPEARL AF-rProtein A HC-650F 200 ml
TH-45341	SkillPak 200 TOYOPEARL AF-rProtein L-650F 200 ml
TH-45343	SkillPak 200 TOYOPEARL AF-Chelate-650M 200 ml

Cromatografía de Intercambio Iónico

TH-45303	SkillPak 200 TSKgel SuperQ-5PW (20) 200 ml
TH-45305	SkillPak 200 TOYOPEARL SuperQ-650S 200 ml
TH-45307	SkillPak 200 TOYOPEARL GigaCap Q-650M 200 ml
TH-45309	SkillPak 200 TOYOPEARL GigaCap DEAE-650M 200 ml
TH-45311	SkillPak 200 TOYOPEARL NH2-750F 200 ml
TH-45313	SkillPak 200 TOYOPEARL QAE-550C 200 ml
TH-45315	SkillPak 200 TOYOPEARL GigaCap S-650S 200 ml
TH-45317	SkillPak 200 TSKgel SP-5PW (20) 200 ml
TH-45319	SkillPak 200 TOYOPEARL Sulfate-650F 200 ml
TH-45321	SkillPak 200 TOYOPEARL GigaCap CM-650M 200 ml
TH-45323	SkillPak 200 TOYOPEARL SP-550C 200 ml

Cromatografía de Interacción Hidrofóbica

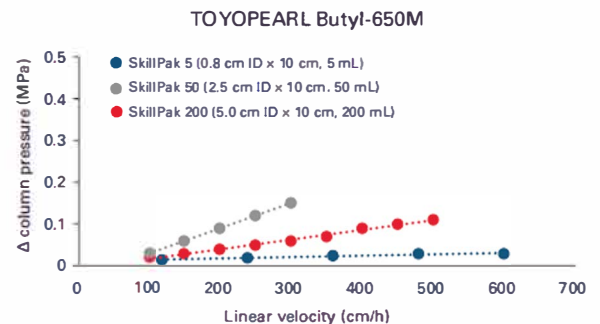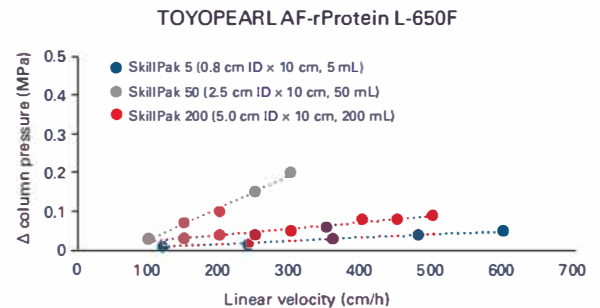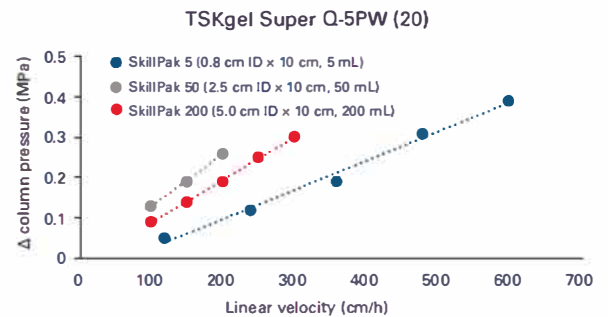|	
TH-45325	SkillPak 200 TOYOPEARL PPG-600M 200 ml
TH-45327	SkillPak 200 TOYOPEARL Butyl-600M 200 ml
TH-45329	SkillPak 200 TOYOPEARL Butyl-650M 200 ml
TH-45331	SkillPak 200 TOYOPEARL Hexyl-650C 200 ml
TH-45333	SkillPak 200 TOYOPEARL Phenyl-600M 200 ml
TH-45335	SkillPak 200 TOYOPEARL Phenyl-650M 200 ml
TH-45337	SkillPak 200 TOYOPEARL Ether-650M 200 ml

Cromatografía de Modo Mixto

TH-45345	SkillPak 200 TOYOPEARL MX-Trp-650M 200 ml

Cromatografía de Exclusión por Tamaño

TH-45301	SkillPak 200 TOYOPEARL HW-40F 200 ml

Packing performance data for SkillPak columns

TSKgel Super Q-5PW (20)

- SkillPak 5 (0.8 cm ID × 10 cm, 5 mL)
- SkillPak 50 (2.5 cm ID × 10 cm, 50 mL)
- SkillPak 200 (5.0 cm ID × 10 cm, 200 mL)

Δ column pressure (MPa) vs Linear velocity (cm/h)

TOYOPEARL AF-rProtein L-650F

- SkillPak 5 (0.8 cm ID × 10 cm, 5 mL)
- SkillPak 50 (2.5 cm ID × 10 cm, 50 mL)
- SkillPak 200 (5.0 cm ID × 10 cm, 200 mL)

Δ column pressure (MPa) vs Linear velocity (cm/h)

TOYOPEARL Butyl-650M

- SkillPak 5 (0.8 cm ID × 10 cm, 5 mL)
- SkillPak 50 (2.5 cm ID × 10 cm, 50 mL)
- SkillPak 200 (5.0 cm ID × 10 cm, 200 mL)

Δ column pressure (MPa) vs Linear velocity (cm/h)

PROCESS MEDIA - FIND YOUR BEST FIT!

TOYOPEARL®, TSKgel®, and CA⁺⁺PURE-HA® Chromatography Resins

Biomolecules are purified by a succession of chromatography steps. Each step uses a different mode of separation, based on specific interactions between the biomolecules and the packing material.

The various modes are based on specific physical, chemical, or biological features of the target or sample, like size, charge, hydrophobicity, function or specific content of the molecule.

TOSOH BIOSCIENCE offers a comprehensive line of media and pre-packed columns for all modes of liquid chromatography - affinity, ion-exchange, mixed-mode, hydrophobic, hydroxyapatite, and size exclusion.

AFC
Affinity Chromatography

AF-rProtein A HC-650F binds to the Fc part of antibodies. It allows for increased productivity and reduced production costs. IgG DBCs over 100 g/L can even be observed at higher titers. This prevents DSP bottlenecks even at short residence times.

AF-rProtein L-650F binds to the Kappa-light chain of antibodies and antibody derivates. It excels all other commercially available protein L media with regards to binding capacity and robustness. It is especially suited for the purification of new antibody formats such as antibody fragments, single chain variable fragments, domain antibodies and immunoglobulin types that cannot be purified with Protein A media.

Antibody AFC resins	Min. static capacity (mAb)	Special feature
PROTEIN A		
AF-rProtein A HC-650F	68 g/L	Highest binding capacity
AF-rProtein A-650F	45 g/L	Fast flow rates
PROTEIN L		
AF-rProtein L-650F	64 g/L	Highest binding for non-standard mAb formats

Other AFC resins		
GROUP SPECIFIC	**ACTIVATED RESINS***	**REACTIVE RESINS***
AF-Chelate-650M	AF-Tresyl-650M	AF-Formyl-650M
AF-Red-650M	AF-Epoxy-650M	AF-Amino-650M
AF-Heparin HC-650M		AF-Carboxy-650M

* Activated and reactive resins are used to couple your ligand of choice.

HIC
Hydrophobic Interaction Chromatography

The large choice of pore and particle sizes for TOYOPEARL and TSKgel HIC resins gives the possibility to screen for the resin offering at the same time the highest binding capacity, the highest recovery, and the highest selectivity.

PPG-600M is specially well suited for the purification of antibodies and antibody-drug conjugates.

HIC ligand candidates

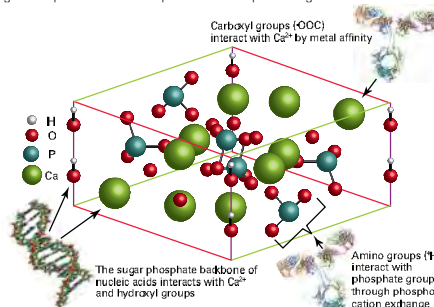| HIC resins	Typical capacity (g/L) Lysozyme (L) or mAb (A)	Special feature Target molecules
Ether-650 (S, M)	20 (L)	Very hydrophobic proteins
PPG-600M	30 (A)	Antibodies and ADCs
Phenyl-600M	50 (A)	Antibodies
Phenyl-650 (S, M, C)	30 (A)	Recombinant proteins
SuperButyl-550C	40 (L)	Recombinant proteins
Butyl-600M	50 (A)	Antibodies
Butyl-650 (S, M, C)	40 (L)	Recombinant proteins
Hexyl-650C	40 (L)	Hydrophilic proteins
Ether-5PW (20, 30)	20 (L)	Very hydrophobic proteins
Phenyl-5PW (20, 30)	20 (L)	Highest resolution

MXC
Mixed Mode Chromatography

MX-Trp-650M is a multimodal resin with unique selectivity and high recovery. Its ligands have both ionic and hydrophobic groups. This unique ligand allows the separation of acidic, basic, and neutral proteins by one resin. It provides high binding capacity and outstanding selectivity for mAbs and mAb aggregates.

MXC resins	Typical capacity (mAB)	Recovery (mAb)
MX-Trp-650M	95 g/L	97 %

HA
Hydroxyapatite

Ca⁺⁺Pure-HA provides exceptional separation properties and unequalled selectivity and resolution for multiple classes of biomolecules. The robust nature of Ca⁺⁺Pure-HA offers the flexibility to use this resin at any stage in a process from capture to final polishing.

Carboxyl groups (-OOC) interact with Ca²⁺ by metal affinity

The sugar phosphate backbone of nucleic acids interacts with Ca²⁺ and hydroxyl groups

Amino groups (H₃N) interact with phosphate groups through phosphoryl cation exchange

HA resin	Typical capacity (human IgG)
Ca⁺⁺Pure-HA	> 30 g/L (2 min residence time)

IEC
Ion Exchange Chromatography

Sulfate-650F is a highly selective, salt tolerant and high capacity cation exchange resin for the capture and intermediate polishing of biomolecules. It offers the ability to use mobile phases at physiological conditions without any loss of capacity or selectivity.

NH2-750F is a salt-tolerant anion-exchange resin, working both in flow-through and bind/elute mode. It is ideal for removing impurities from target proteins without dilution, or for intermediate or final purification of monoclonal antibodies. One of its major benefits is the possibility to remove aggregates as well as endotoxins, HCPs, viruses and DNA in a single step.

SuperQ-5PW (20) is the industry standard for the purification of oligonucleotides.

IEC resins	Typical capacity (g/L resin)				Special feature
	BSA	Lyso-zyme	mAb	Insulin	Target molecules
STRONG ANION EXCHANGERS					
NH2-750F			70		Salt-tolerant
GigaCap Q-650 (S, M)	150		110		Highest capacity
SuperQ-650 (S, M, C)	145	15			Proteins <50 kDa
Q-600C AR	110	90			Alkaline stability
QAE-550C	50	30			Capturing of small proteins
SuperQ-5PW (20, 30)					Oligonucleotides
WEAK ANION EXCHANGERS					
GigaCap DEAE-650M					Blood products and nucleic acids. GigaCap - highest capacity
DEAE-650 (S, M, C)	25		30		
DEAE-5PW (20, 30)					
STRONG CATION EXCHANGERS					
Sulfate-650F		115			Salt-tolerant
GigaCap S-650 (S, M)	200	150	140		Highest capacity
SP-650 (S, M, C)	40	10	50		Cost efficient
SP-550C	100	15	80		Capturing of small proteins
MegaCap II SP-550EC	70		90		Insulin capturing
SP-3PW (20)			65		Insulin polishing
SP-5PW (20, 30)			30		Highest resolution
WEAK CATION EXCHANGERS					
GigaCap CM-650M	35	100			Highest capacity
CM-650 (S, M, C)	35				Cost efficient

SEC
Size Exclusion Chromatography

All TOYOPEARL resins are based on the polymeric HW-type beads. Their rigid polymeric backbone has better pressure-flow properties than most other commercially made materials. The base resins are stable over the pH 2-12 range for operating conditions and pH 1-13 for cleaning conditions.

SEC resins	Pore size	Target molecules
HW-40 (S, F, C)	5 nm	Separation of low MW compounds / buffer echange
HW-50 (S, F)	12.5 nm	Peptide fragments
HW-55 (S, F)	50 nm	Proteins and antibodies
HW-65 (S, F, C)	100 nm	
HW-75 (F)	> 100 nm	Large nucleic acids, viruses and plasmid DNA

WHAT'S IN A NAME?

1. Resin types

Tosoh Bioscience offers three base beads: TOYOPEARL, TSKgel, and Ca⁺⁺Pure-HA.

TOYOPEARL and TSKgel products are hydroxylated methacrylic polymer resins and are offered in many different pore sizes and particle diameters. The key differences between the two types are particle size availability, degree of crosslinking, dynamic binding capacity, and operating pressures.

Since similarly functionalized TOYOPEARL and TSKgel resins have the same backbone polymer chemistry, the selectivity remains the same when scaling up or down.

Unlike all other TOYOPEARL and TSKgel products, Ca⁺⁺Pure-HA is a hydroxyapatite resin. Ca⁺⁺Pure-HA is a spherical, macroporous form of the hexagonal crystalline structure of $Ca_{10}(PO_4)_6(OH)_2$.

2. Particle sizes				
Grade	TOYOPEARL	GigaCap	TSKgel	Ca⁻Pure-HA
EC	200 µm			
C	100 µm (SEC are 75 µm)			
M	65 µm (MX-Trp is 75 µm)	75 µm		
F	45 µm			
S	35 µm (SEC are 30 µm)	35 µm		
(30)			30 µm	
(20)			20 µm	
HA				39 µm

3. Pore sizes of base media for AFC, MXC, IEC, and HIC		
TOYOPEARL 550 resins	HW-55 base resin	50 nm
TOYOPEARL 600 resins	HW-60 base resin	75 nm
TOYOPEARL 650 resins	HW-65 base resin	100 nm
TOYOPEARL 750 resins	HW-75 base resin	> 100 nm
TSKgel 3PW resin	PW-3000 base resin	25 nm
TSKgel 5PW resin	PW-5000 base resin	100 nm