



# PROCESS RESIN - FIND YOUR BEST FIT!

TOYOPEARL<sup>®</sup>, TSKgel<sup>®</sup>, and Ca<sup>++</sup>Pure-HA<sup>™</sup> Chromatography Resins

## Affinity Chromatography

**TOYOPEARL Super A** is a next-generation high-capacity Protein A resin with Fc affinity, engineered for superior process performance and operational flexibility. Its high DBC and high impurity reduction make TOYOPEARL Super A particularly well suited for high titer projects. It maintains high DBC at short residence times and has low backpressure at fast flowrates, making it an excellent resin for intensified process and multi-column chromatography. Additionally, it has improved alkaline stability and fast on/off kinetics for small elution volumes with mild elution conditions.

**TOYOPEARL AF-rProtein L-650F** binds the kappa-light chain of antibodies and antibody derivatives, including scFvs, Fabs, single domain antibodies and more. It maintains high DBC at short residence times and has low backpressure at fast flowrates, making it an excellent resin for intensified process and multi-column chromatography.

TOYOPEARL Affinity Resins	Capacity	Features
	mAb	
Protein A		
Super A	72 g/L	High DBC, Alkaline stable, Mild elution pH
AF-rProtein A HC-650F	68 g/L	High DBC
AF-rProtein A-650F	45 g/L	-

Protein L		
AF-rProtein L-650F	64 g/L	High DBC for kappa-LC containing Ab fragments

### Other Affinity 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-Carboxyl-650M

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

## Ion Exchange Chromatography

**TOYOPEARL 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.

**TOYOPEARL NH2-750F** is a salt-tolerant anion-exchange resin, commonly used in both 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. Its unique selectivity can remove many types of impurities in a single step, including aggregates, endotoxins, HCPs, viruses, and host cell DNA.

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

TOYOPEARL/ TSKgel AEX Resins	Capacity	Features
	mAbBSA	
Salt Tolerant AEX		
NH2-750F	70 g/L-	Unique selectivity

### Strong AEX

GigaCap Q-650 (S,M)	170 g/L	150 g/L	Highest capacity
SuperQ-650 (S,M,C)	155 g/L	145 g/L	Proteins <50 kDa
SuperQ-5PW (20,30)	90 g/L	110 g/L	Oligonucleotide resolution
QAE-550C	-	-	Small protein capture

### Weak AEX

GigaCap DEAE-650M	-	156 g/L	Highest Capacity
DEAE-650 (S,M,C)	30 g/L	25 g/L	
DEAE-5PW (20,30)	-	-	Blood products and nucleic acids

TOYOPEARL/ TSKgel CEX Resins	Capacity	Features
	mAbInsulin	
Salt Tolerant CEX		
Sulfate-650F	115 g/L-	Unique selectivity

### Strong CEX

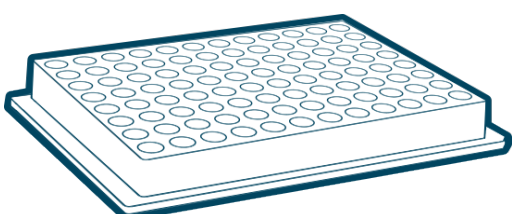
GigaCap S-650 (S,M)	150 g/L	140 g/L	Highest capacity
SP-650 (S,M,C)	10 g/L	50 g/L	Cost efficient
SP-550C	15 g/L	80 g/L	Small protein capture
MegaCap II SP-500EC	-	90 g/L	Insulin capture
SP-3PW (30)	-	65 g/L	Insulin polishing
SP-5PW (20,30)	-	30 g/L	Highest resolution

### Weak CEX

GigaCap CM-650M	100 g/L	-	Highest capacity
CM-650 (S,M,C)	-	-	Cost efficient

Resin screening samples, available as:

- 1 mL and 5 mL SkillPak<sup>™</sup> pre-packed columns
- 10-100 mL loose resin
- Resin Seeker 96-well plate kits
- ToyoScreen<sup>®</sup> RoboColumn<sup>®</sup>



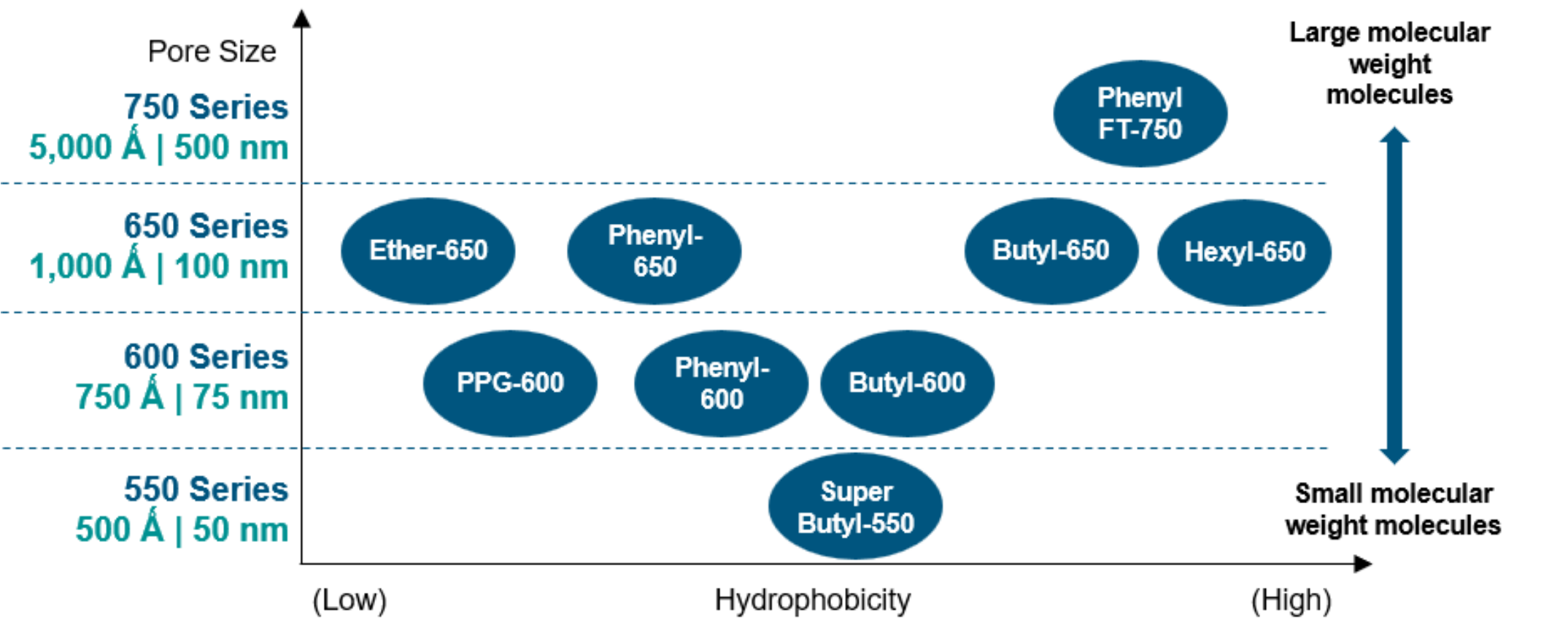
Additional product lines from **Tosoh Bioscience**:

- TSKgel HPLC/ UHPLC Analytical Columns
- LenS<sup>™</sup>3 MALS Detector
- Octave<sup>™</sup> BIO and PRO Multi-Column Chromatography Systems

TOYOPEARL, TOYOPEARL GigaCap, TSKgel, and ToyoScreen are registered trademarks of Tosoh Corporation. Ca<sup>++</sup>Pure-HA, LenS, Octave and SkillPak are trademarks of Tosoh Bioscience LLC. RoboColumn is a registered trademark of Repligen Corporation.

## Hydrophobic Interaction Chromatography

Tosoh offers a wide variety of HIC resins with a choice of pore size, particle size, base matrix. A range of ligands in various hydrophobicities are available, including unique ligands such as PPG.



TOYOPEARL HIC resins	Capacity	Features
	Lysozyme mAb	
Ether-650 (S,M)	20 g/L	Very hydrophobic proteins
PPG-600M	-	30 g/L Antibodies and ADCs
Phenyl-600M	-	50 g/L Aggregate removal
Phenyl-650 (S,M,C)	-	30 g/L Larger pore size, DMT-on/off Oligo purification
Phenyl FT-750F	-	- Low salt conditions, FT
SuperButyl-550C	40 g/L	- Smallest pore size
Butyl-600M	-	50 g/L Aggregate removal
Butyl-650 (S,M,C)	40 g/L	- Larger pore size
Hexyl-650C	40 g/L	- Low salt conditions, FT

TSKgel HIC resins	Capacity	Features
	Lysozyme mAb	
Ether-5PW (20,30)	20 g/L	- Very hydrophobic proteins
Phenyl-3PW (20)	45 g/L	- DMT-on/off Oligo purification
Phenyl-5PW (20,30)	20 g/L	- Highest resolution

## Hydroxyapatite

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

HA resin	Capacity	Features
	Human IgG	
Ca <sup>++</sup> Pure-HA	>30 g/L	High selectivity and resolution

## Mixed Mode Chromatography

**TOYOPEARL MX-Trp-650M** is a mixed mode resin, with a tryptophan ligand, that has cationic and hydrophobic properties. The ability to separate by both charge and hydrophobicity provides unique separation for purifying challenging molecules. It also has high DBC, high recovery, and is excellent at removing mAb aggregates.

TOYOPEARL MXC resin	Capacity	Features
	mAb	
MX-Trp-650M	95 g/L	Unique selectivity

## Size Exclusion Chromatography

All SEC resins use TOYOPEARL hydroxylated polymethacrylate beads with no ligand. A wide variety of pore and bead sizes are available.

TOYOPEARL SEC resins	Pore Size (nm)	Features
HW-40 (S,F,C)	5	Low MW compounds/ buffer exchange
HW-50 (S,F)	12.5	Peptide fragments
HW-55 (S,F)	50	Proteins, antibodies
HW-65 (S,F,C)	100	Proteins, antibodies
HW-75	>100	Large nucleic acids, viruses, plasmid DNA

## What's in a Name?

Tosoh Bioscience offers three base beads: TOYOPEARL, TSKgel, and Ca<sup>++</sup>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.

Particle Size				
Grade	TOYOPEARL	TOYOPEARL GigaCap <sup>®</sup>	TSKgel	Ca <sup>++</sup> 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
Pore Size				
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	500 nm	
TSKgel 3PW resin		PW-3000 base resin	25 nm	
TSKgel 5PW resin		PW-5000 base resin	100 nm	