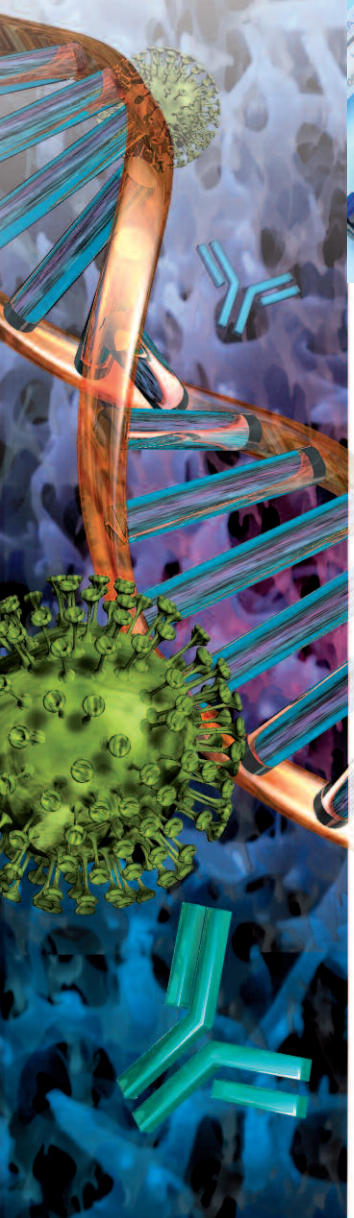
PALL Life Sciences

USD 2492a

PRC Prepacked Columns for Ion Exchange and Mixed-Mode Chromatography



Rapid selectivity screening of MEP, HEA, and PPA HyperCel™ mixed-mode sorbents, and HyperCel and Ceramic HyperD® ion exchangers

- **Convenient** – Ready-to-use 1 mL and 5 mL prepacked columns.
- **Easy to use** – Direct connection to commonly-used laboratory chromatography systems such as ÄKTA◆ systems (see Specifications).
- **Efficient** – High packing efficiency (≥ 2,500 plates/meter).
- **Consistent** – Screen Pall ion exchange and mixed-mode chromatography sorbents under reliable and reproducible conditions, and guarantee performance run after run.

Applications

Rapid screening and condition optimization in the 1 mL PRC column enables rapid selection of the appropriate chemistry. Once the chemistry is selected on a 1 mL PRC column, the conditions of use can be optimized in a 5 mL PRC column in doubling the height.

Two or more columns can be connected in series to increase the column height and more closely model real conditions in pilot scale or for scale down applications. Further scale up can be achieved with minimal re-optimization by packing Pall LRC empty glass columns (refer to Pall USD 2480).

Filtration. Separation. Solution.SM

Sorbent Specifications

Volume
1 mL (5 mm ID x 50 mm)
5 mL (8 mm ID x 100 mm)

Functionalities
Ion exchange: Q and S HyperCel; Q and CM Ceramic HyperD F sorbents
Mixed-mode: MEP, HEA and PPA HyperCel sorbents

Storage Solution
Ceramic HyperD F sorbent: 20% ethanol/150 mM NaCl
HyperCel sorbents: 30% isopropanol/100 mM sodium phosphate, pH 4.3

Working Pressure[1]
Ceramic HyperD F sorbent: < 1.5 barg (22 psig)
HyperCel sorbent: < 0.5 barg (7 psig)

Column Specifications

Outer Dimensions
10 x 100 mm for 1 mL columns
11.5 x 140 mm for 5 mL columns

Materials of Construction
Body and end caps: Molded polypropylene
17 µm frit: PP/PE (Polypropylene/Polyethylene)

Connections[2]
Built-in 10-32 fittings

Maximum Operating Pressure
20 barg (290 psig) for 1 mL columns
30 barg (435 psig) for 5 mL columns

[1] Pressure at 600 cm/h equivalent to 2 mL/min in 0.1 M NaCl.
[2] For HPLC/MPLC/AKTA systems, direct connection with 1/16 in. tubing and 10-32 fittings. For connecting to systems with M6 or 1/4-28 fittings, consult the appropriate system manual for necessary fittings and adapters.

Sorbent		Average Particle Size (µm)	Ionizable Groups (µEq/mL)	Dynamic Capacity (mg/mL)[1]
Ion Exchange	**Chemistry**			
Q HyperCel	Quaternary amine	75	99 – 138	≥ 160[2]
S HyperCel	Sulfonic acid	75	59 – 84	≥ 135[3]
Q Ceramic HyperD F	Quaternary amine	50	≥ 250	≥ 85[4]
CM Ceramic HyperD F	Carboxymethyl	50	≥ 250	≥ 60[5]
Mixed-mode	**Ligand**		**Ligand Density (µmole/mL)**	
MEP HyperCel	4-mercapto-ethyl-pyridine (pKa = 4.8)	90	80 – 125	≥ 20[6]
HEA HyperCel	Hexylamine (aliphatic) (pKa = 8.0)	90	58 – 84	≥ 40[7]
PPA HyperCel	Phenylpropylamine (aromatic) (pKa = 8.0)	90	58 – 80	≥ 40[7]

[1] Determined at 10% breakthrough using:
[2] 5 mg/mL BSA in 50 mM Tris-HCl, pH 8.5 at 2 min residence time
[3] 5 mg/mL human IgG in 50 mM sodium acetate, pH 4.5 at 2 min residence time
[4] 5 mg/mL BSA in 50 mM Tris-HCl buffer, pH 8.6, flow rate 200 cm/h
[5] 5 mg/mL human IgG in 50 mM sodium acetate buffer, 100 mM NaCl, pH 4.7, flow rate 200 cm/h
[6] 5 mg/mL human IgG in PBS, flow rate 60 cm/h
[7] 5 mg/mL BSA in PBS, flow rate 100 cm/h

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Ion Exchange Chromatography Sorbents

Q and S HyperCel sorbents are composed of a rigid cellulose matrix that has excellent flow properties and generates low backpressure. They provide:

- High dynamic binding capacity at short residence time
- Use in either capture or intermediate steps
- Fast re-equilibration, allowing buffer and time savings
- Direct scale up to pilot or production scale columns

Q and CM Ceramic HyperD sorbents have a good capacity hydrogel polymerized within the gigapores of a rigid ceramic bead. Typical features include:

- Good dynamic binding capacity independent of flow rate
- Allowing a direct capture with high binding capacity for IgG at conductivities of 10 to 15 mS/cm on CM Ceramic HyperD sorbent

Ceramic HyperD and HyperCel sorbents have different selectivities. The PRC columns help to determine the best selectivity and resolution in optimal conditions of packing and use.

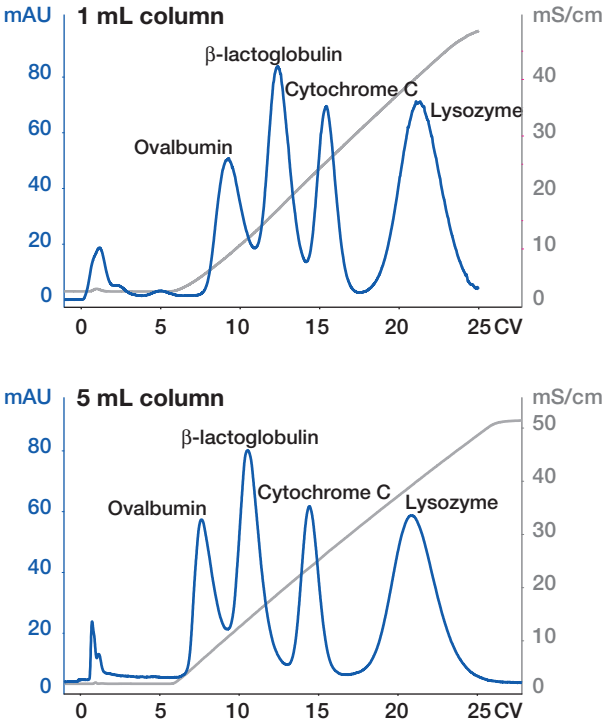
For more information, refer to Pall's literature on Q and S HyperCel sorbents (USD 2591) and Q, S, DEAE and CM Ceramic HyperD sorbents (LPN PN702-001).

Applications

- Native and recombinant proteins
- Plasmids
- Vaccines
- Monoclonal and polyclonal antibodies
- Plasma derivatives
- Biopharmaceuticals

Figure 1

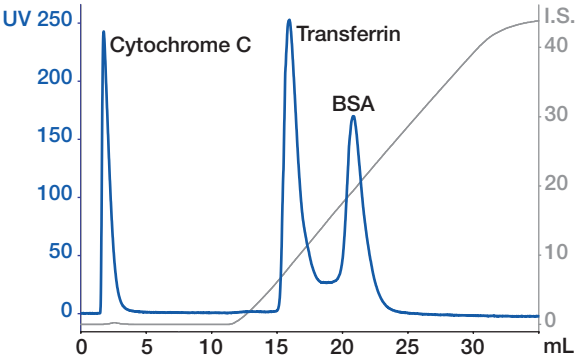
Separation of Model Proteins (Ovalbumin, ß-lactoglobulin, Cytochrome C and Lysozyme) on 1 mL PRC S HyperCel Prepacked Columns and Scale Up on 5 mL Column, Constant Residence Time of 2 Minutes



Columns: *Pall S HyperCel PRC prepacked columns of 1 mL (5 mm I.D. x 50 mm) and 5 mL (8 mm I.D. x 100 mm).* ***Load:*** *for 1 mL column: 100 µL ovalbumin (10 mg/mL), ß-lactoglobulin (10 mg/mL), cytochrome C (2.5 mg/mL) and lysozyme (5 mg/mL). For 5 mL column: 500 µL of same proteins.* ***Equilibration:*** *50 mM Na acetate, pH 4.5.* ***Elution:*** *50 mM Na acetate, pH 4.5 + 0.5 M NaCl by linear gradient from 0 to 100%.*

Figure 2

Separation of Cytochrome C, BSA and Human Transferrin on a Pall PRC Q Ceramic HyperD F Prepacked Column



Column: *Pall PRC Column 5x50 Q Ceramic HyperD F, 5 mm I.D. x 50 mm, volume: 1 mL, linear flow rate: 150 cm/h.* ***Equilibration and wash:*** *50 mM Tris-HCl, pH 8.6.* ***Load:*** *100 µL (5 mg/mL cytochrome C, 20 mg/mL BSA and 20 mg/mL human transferrin in equilibration buffer).* ***Elution:*** *50 mM Tris-HCl, pH 8.6 + 0.5 M NaCl by linear gradient from 0 to 100% in 60 minutes.*

Mixed-mode Chromatography Sorbents for Antibody Capture and "No Salt" Hydrophobic Interaction

MEP, HEA and PPA HyperCel sorbents exploit unique selectivities of robust synthetic ligands to capture proteins or separate them from contaminants. They provide a unique separation mechanism different from conventional methods. All ligands operate predominantly by hydrophobic interaction. This "HIC-like" interaction typically takes place without the addition of lyotropic salt.

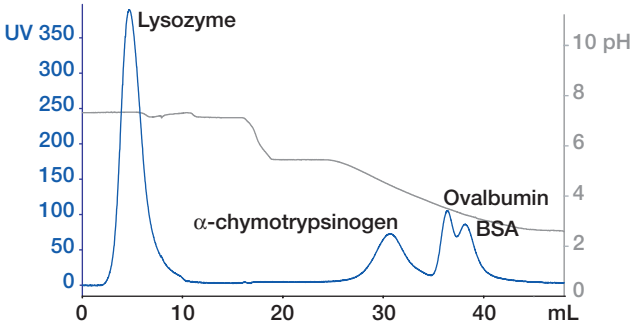
For more information, refer to Pall's literature on MEP HyperCel sorbent (USD 2629) and HEA and PPA HyperCel sorbents (USD 2443).

Applications

- MEP HyperCel sorbent: Antibody capture; alternative to conventional hydrophobic interaction
- MEP, HEA, PPA HyperCel sorbents: No salt/low salt alternative to hydrophobic interaction

Figure 3

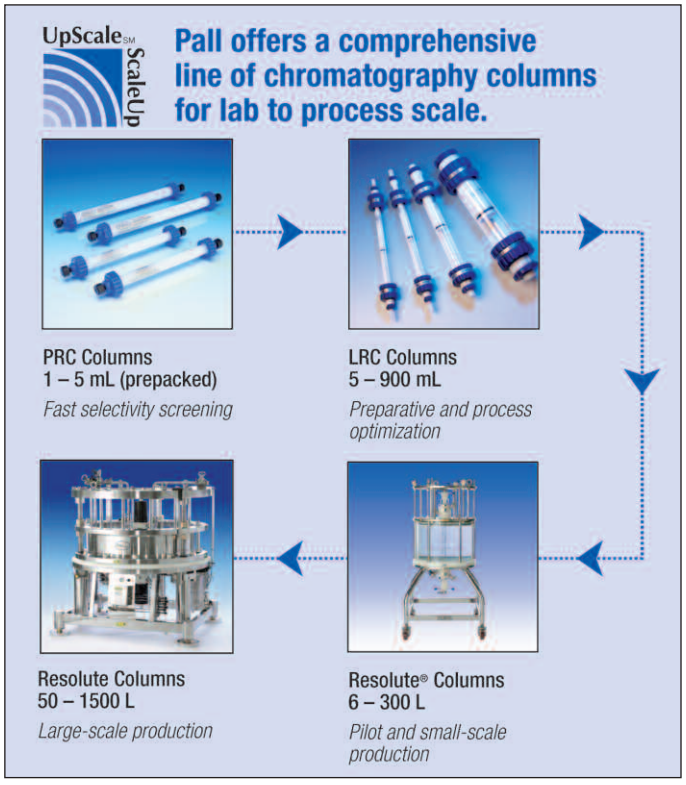
Separation of Lysozyme, α-Chymotrypsinogen, Ovalbumin and BSA on a Pall PRC PPA HyperCel Prepacked Column



Column: *Pall PRC prepacked column PPA HyperCel, 5 mm I.D. x 50 mm, volume: 1 mL, linear flow rate: 75 cm/h.* ***Equilibration and wash:*** *PBS, pH 7.4.* ***Load:*** *500 µL (lysozyme, α-chymotrypsinogen, ovalbumin and BSA, all at 2 mg/mL in equilibration buffer).* ***Elution:*** *by pH step gradient in phosphate/ citrate buffer, pH 7.0 - 5.4 and 2.6.*

Ordering Information

Part Number	Description	Volume
PRC05X050QHCEL01	PRC Column 5x50 Q HyperCel	1 mL
PRC05X050SHCEL01	PRC Column 5x50 S HyperCel	1 mL
PRC05X050MEPHCEL01	PRC Column 5x50 MEP HyperCel	1 mL
PRC05X050HEAHCEL01	PRC Column 5x50 HEA HyperCel	1 mL
PRC05X050PPAHCEL01	PRC Column 5x50 PPA HyperCel	1 mL
PRC05X050QCHDF01	PRC Column 5x50 Q Ceramic HyperD F	1 mL
PRC05X050CMCHDF01	PRC Column 5x50 CM Ceramic HyperD F	1 mL
PRC08X100QHCEL01	PRC Column 8x100 Q HyperCel	5 mL
PRC08X100SHCEL01	PRC Column 8x100 S HyperCel	5 mL
PRC08X100MEPHCEL01	PRC Column 8x100 MEP HyperCel	5 mL
PRC08X100HEAHCEL01	PRC Column 8x100 HEA HyperCel	5 mL
PRC08X100PPAHCEL01	PRC Column 8x100 PPA HyperCel	5 mL



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