# PRODUCT CATALOG

GALAK CHROMATOGRAPHY

GALAK Chromatography Technology Co., Ltd

# GALAK Chromatography

GALAK Chromatography Technology Co, Ltd (GALAK) is a technology-driven enterprise established in 2009 by experienced liquid chromatography experts who worked in the US and Japan. GALAK's headquartered is located in Wuxi Bio-Park with over 1,500 sq.m. of R&D center. It's factory is located in Zhuhai city, Guangdong Province with over 3,000 sq.m. equipped with state-of-art instruments and equipment. During 11 years, GALAK has established over 20 proprietary intellectual property rights on chromatography products and biochemical 0\purification technologies.

GALAK products include packing materials, HPLC systems, industrial purification systems for normal phase, reversed-phase, ion-exchange and affinity chromatography applications. For packing materials, Galaksil® silica-gel materials are silica products with C18, C8, CN, NH2, phenyl. Sepromax® materials are based on the PS/DVB matrix to isolate and purify peptides, proteins, polysaccharides, and antibodies. Bettsep® materials are polymethacrylate-based products. With extended experiences in biochemical purification, GALAK helped over 20 companies and laboratories to design and improve their biochemical purification processes. The projects involved monoclonal antibodies purification, peptides isolation, protein isolation, nature chemicals purification, enantiomers resolution and chromatography analysis.

"Innovation, Cooperation, Mutual benefits" are our philosophy.

GALAK is looking forward to working with you.

# Contents



# Galaksil® Silica-gel Products

Galaksil® silica-gel products are versatile HPLC columns and media based on the silica-gel for reversed-phase/normal phase chromatography. Galaksil® products are made of spherical silica-gel particles which has low metal-ion content (<20 ppm) in total, high specific surface area and high mechanical strength. With unique chemical bonding technique, our products have excellent stability and reproducibility. They can meet the highest requirements for analysis and preparative applications.

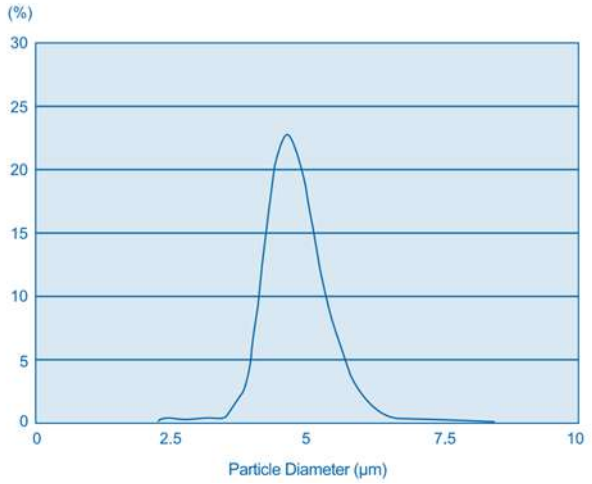
**Advantages:**

- Low silanol activity
- Uniform ligand binding
- Low metal content
- Narrow particle size
- Excellent stability

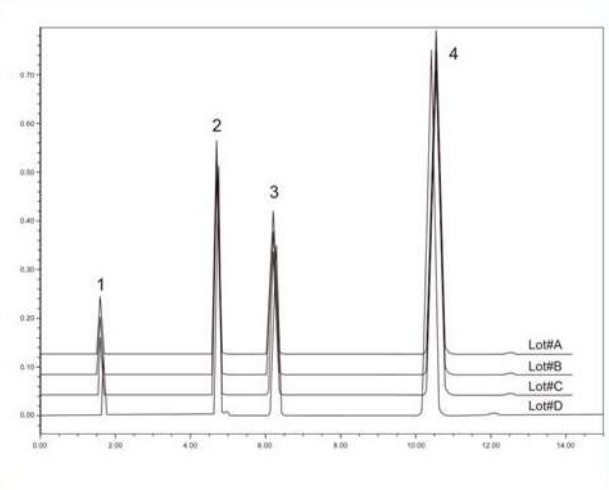
**Galaksil® Silica Products**

| Products | Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|---|
| C18M | 3/5/8/10 um | 120Å | 330$m^2$/g | 16% | 2-8 |
| C18H | 5/8/10 um | 120Å | 330$m^2$/g | 20% | 2-11 |
| C18L | 5 um | 120Å | 330$m^2$/g | 13% | 2-8 |
| C8 | 3/5/10 um | 120Å | 330$m^2$/g | 12% | 2-8 |
| $NH_2$ | 3/5/10 um | 120Å | 330$m^2$/g | 4% | 2-8 |
| CN | 3/5/10 um | 120Å | 330$m^2$/g | 7% | 2-8 |
| Phenyl | 3/5/10 um | 120Å | 330$m^2$/g | 9% | 2-8 |
| Diol | 5/10 um | 120Å | 330$m^2$/g | 8% | 2-8 |
| AA | 5/10 um | 120Å | 330$m^2$/g | 19% | 2-8 |
| C4 Bio | 5/10um | 300Å | 100$m^2$/g | 3% | 2-8 |
| C8 Bio | 5/10um | 300Å | 100$m^2$/g | 5% | 2-8 |
| C18 Bio | 5/10 um | 300Å | 100$m^2$/g | 8% | 2-8 |
| SiO2 | 3/5/10 um | 120Å | 330$m^2$/g | - | 2-8 |
| SiO2 | 5 um | 80/100/200Å | 330$m^2$/g | - | 2-8 |

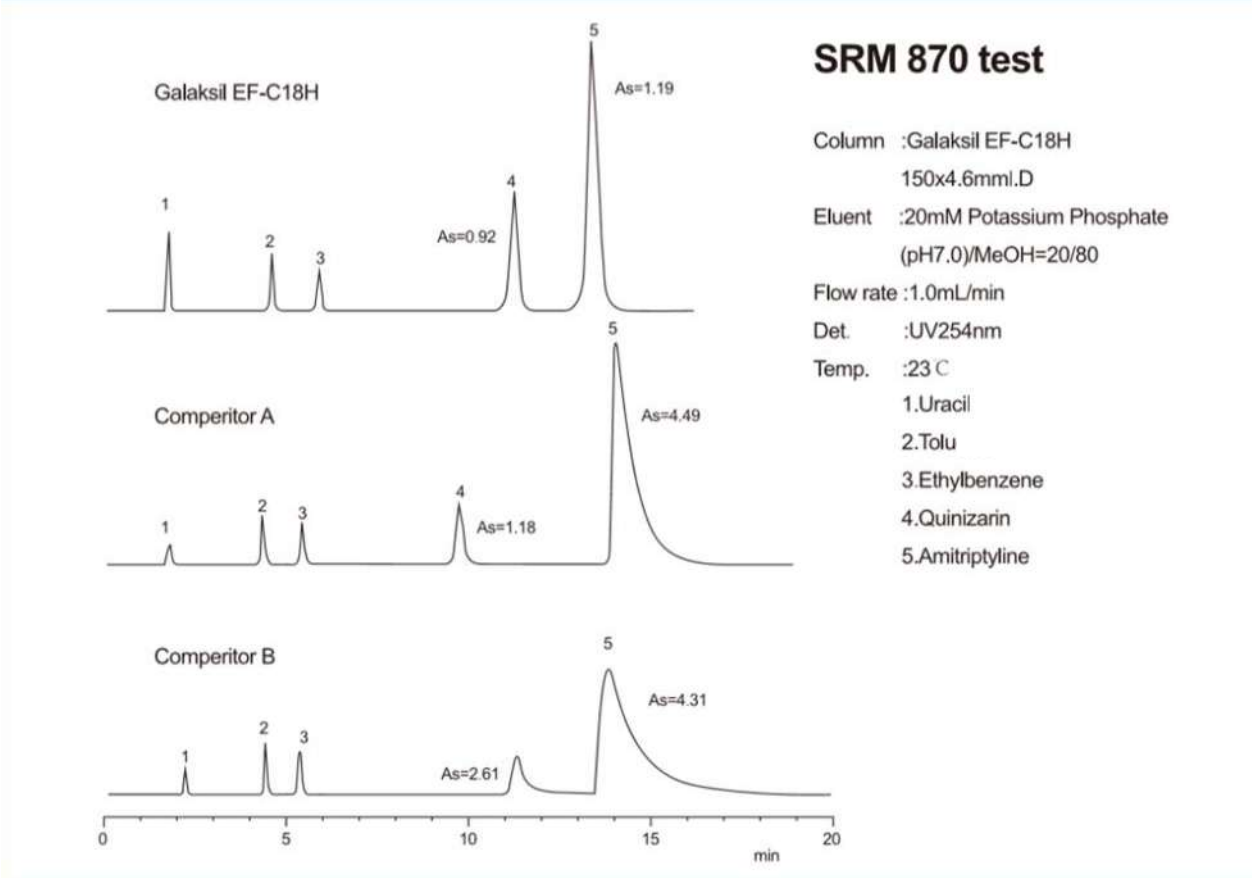
**Distribution of particle size for Galaksil® C18 5 μm**




**Repeated injection tests for Galaksil® C18 5 μm**




## National Institute of Standards and Technology (NIST) ERM 870 Test



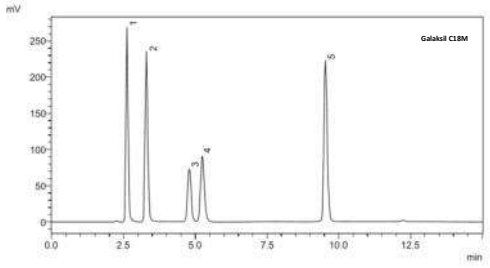

Galaksil® C18H can use in alkali environment with high pH CIP（Clean-in-Place）process. The isolation of toluene and ethylbenzene test shows the uniformities of binding ligands on the silica-gel substrate.

# Galaksil® C18M

## Parameters

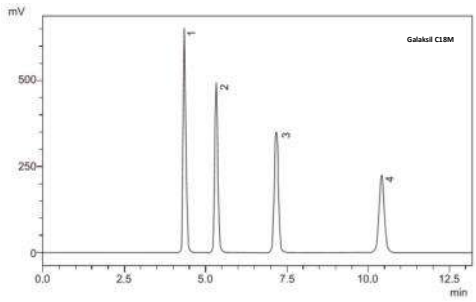
| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/10um | 120Å | 330$m^2$/g | 16% | 2-8 |

## Application



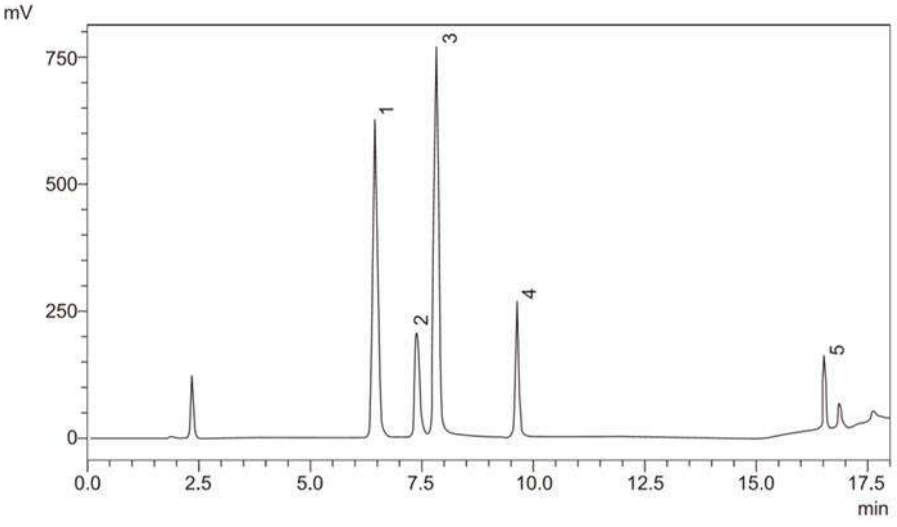

**Nucleotide**
**Column:** C18M 5μm 4.6×150mm
Competitor ODS 5μm 4.6×150mm
**Mobile Phase:**
phosphoric acid buffer / methyl alcohol
**Flow Rate:** 1ml/min
**Wavelength:** 254nm
**Temp.:** 25℃

1 5′-cytidylic acid; 2 5′-uridylic acid;
3 5′-guanylic acid; 4 5′-inosinic acid;
5 5′-adenylic acid




**Paraben**
**Column:** EF-C18M 5μm
4.6×150mm
Competitor ODS 5μm
4.6×150mm
**Mobile Phase:** Water / methyl alcohol
**Flow Rate:** 1ml/min
**Wavelength:** 254nm
**Temp.:** 25℃

1 Methyl ester; 2 Ethyl ester;
3 Propyl ester; 4 Butyl ester




**Water-soluble multivitamin**
**Column:** C18M 5μm
4.6×150mm
**Mobile Phase:**
phosphoric acid buffer / acetonitrile
**Flow Rate:** 1ml/min
**Wavelength:** 210nm
**Temp.:** 25℃

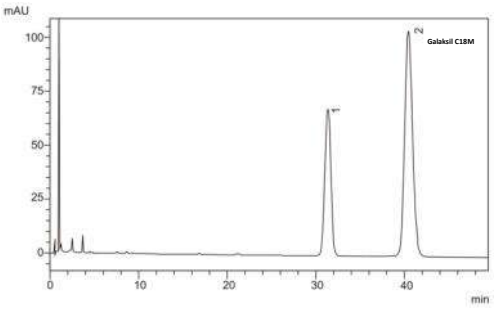
1 Pyridoxine;
2 VB1;
3 Nicotinamide;
4 Folic acid;
5 VB2

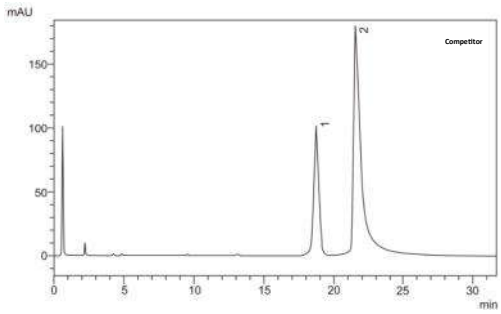
# Galaksil® C18H

## Parameters

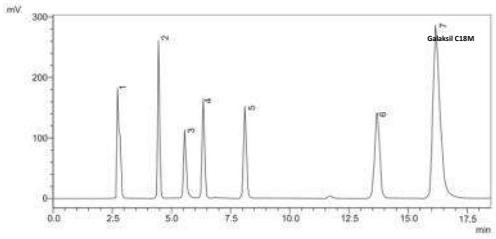
| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/10um | 120Å | 330$m^2$/g | 20% | 2-11 |

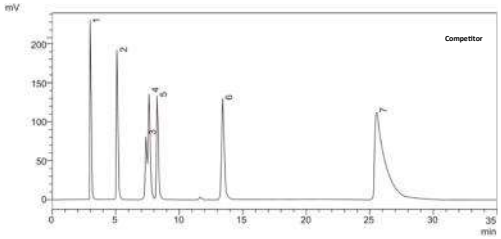
## Application




**Ibuprofen/Benzene ketone**
**Column:** EF-C18H 5μm 4.6×150mm
Competitor 5μm 4.6×150mm
**Mobile Phase:**
phosphoric acid buffer / acetonitrile
**Flow Rate:** 2ml/min
**Wavelength:** 214nm
**Temp.:** 30℃

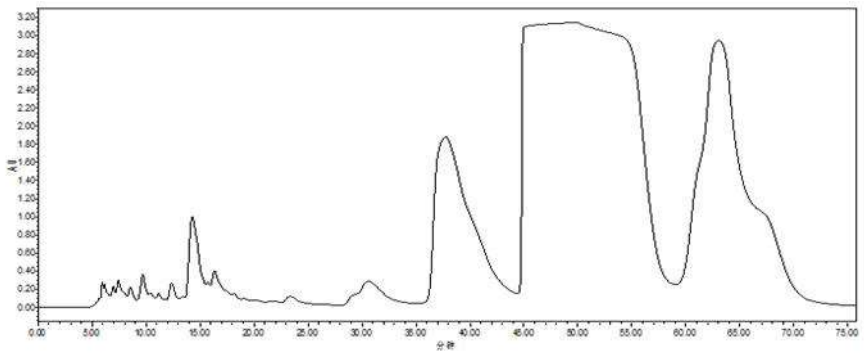



**Polar/Nonpolar/ Neutral/Alkali Compounds**
**Column:** EF-C18H 5μm 4.6×250mm
Competitor 5μm 4.6×250mm
**Mobile Phase:**
phosphoric acid buffer / methyl alcohol
**Flow Rate:** 1ml/min
**Wavelength:** 254nm
**Temp.:** 30℃

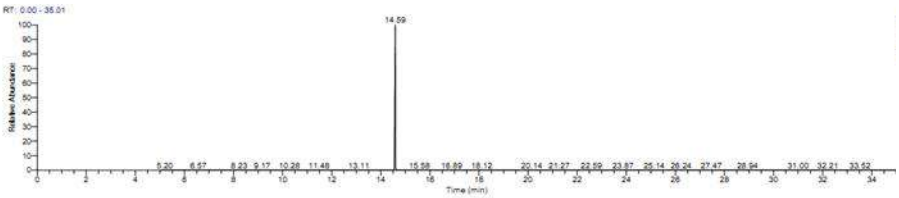
1 Uracil; 2 Butyl p-hydroxybenzoate;
3 Propranolol; 4 Di-propyl ortho-phthalate;
5 Naphthalene; 6 Acenaphthene;
7 Amitriptyline

### The purification of EPA in fish oil



**EPA in fish oil**
**Column:** C18H 8μm
20×250mm
**Sample:** 90% EPA material

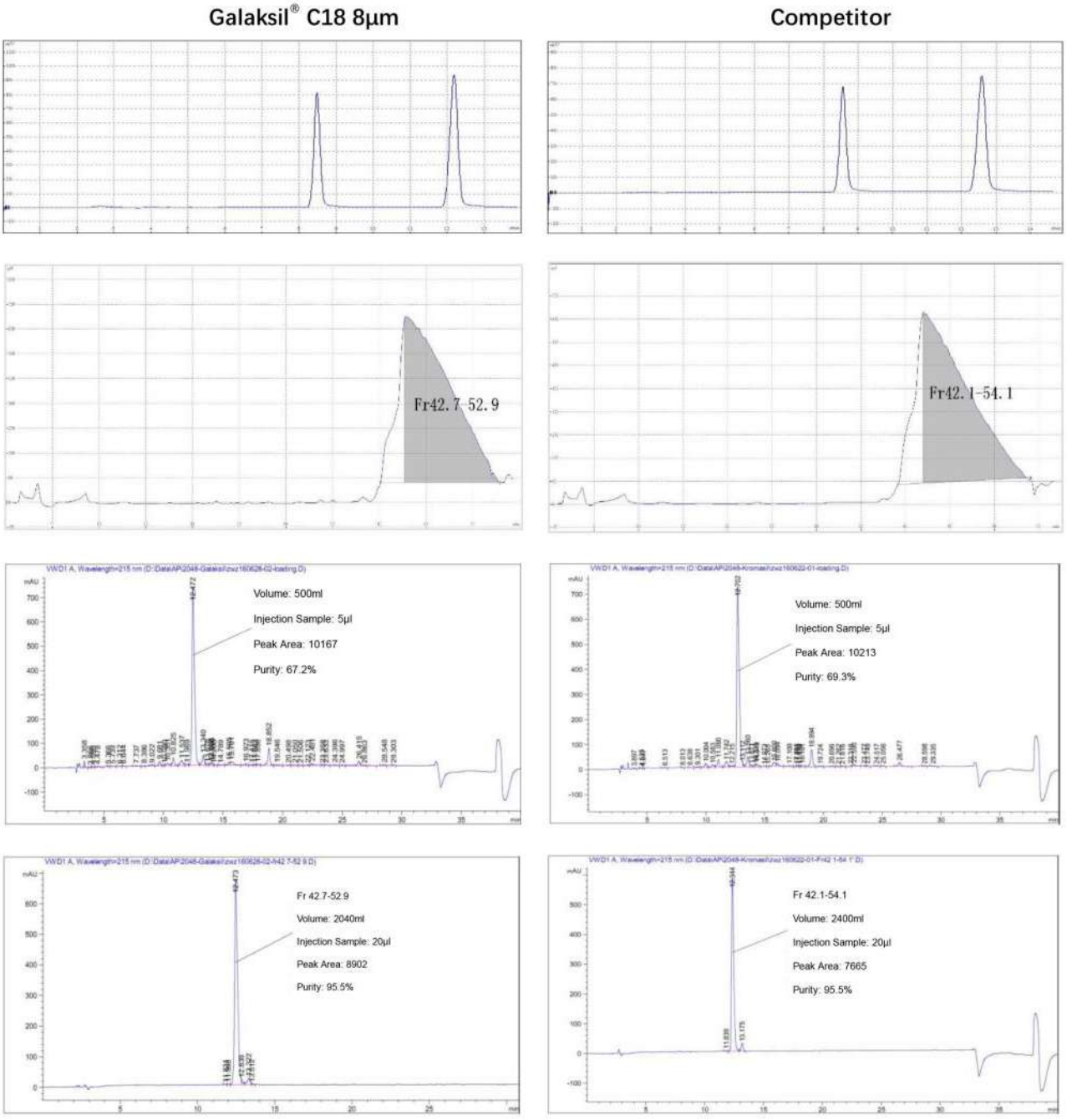
**Finished sample**
**Purification:** 99.7%



## Peptides Purification Test

Galaksil® UP-C18H and word-leading competitive product in a peptides purification study. The results show that the Galaksil® UP-C18H is similar to the competitive product.

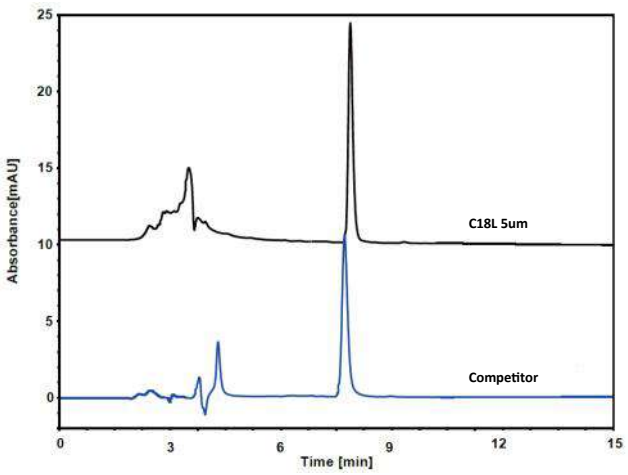
| | | Galaksil® C18 | Competitor |
|---|---|---|---|
| **Performance** | Column Height (cm) | 21.3 | 21.1 |
| | Column Efficiency (TP) | 70457 | 56935 |
| **Peptides** | Injection Sample (g) | 2.5 | 2.5 |
| | Recovery (%) | 89.3 | 90.0 |
| | Purity(%) | 95.5 | 95.5 |
| | Freeze-dried product (g) | 1.1302 | 1.1317 |



# Galaksil® C18L

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 5um | 120Å | 330$m^2$/g | 13% | 2-8 |



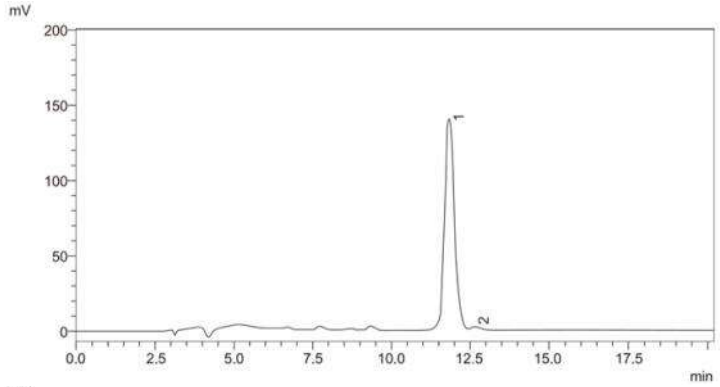

**Tripeptide (5ppm)**
**Column:** C18L 5μm 4.6×250mm
**Mobile Phase:** 70/30 v/v Water/MeCN
**Injection:** 25μL
**Flow Rate:** 1ml/min
**Wavelength:** 220nm
**Temp.:** 25℃

# Galaksil® C8

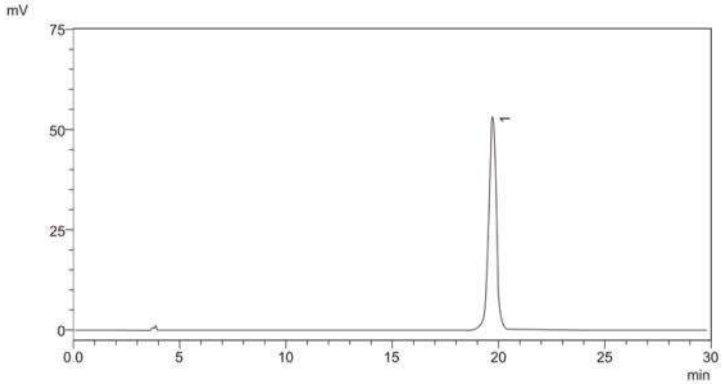
## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/8/10um | 120Å | 330$m^2$/g | 12% | 2-8 |

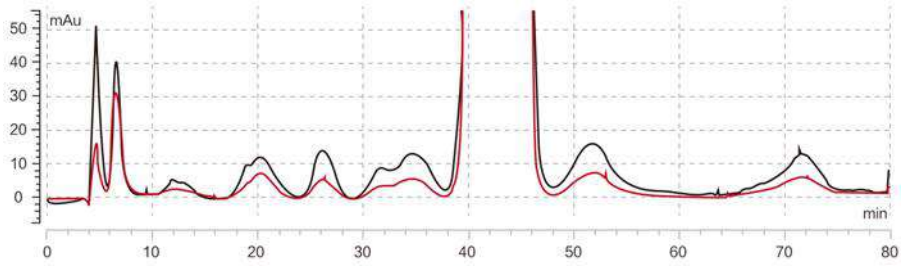
## Application




**Orlistat**
**Column:** C8 5μm 4.6×250mm
**Mobile Phase:** water / EtOH
**Flow Rate:** 1ml/min
**Wavelength:** 203nm
**Temp.:** 25℃

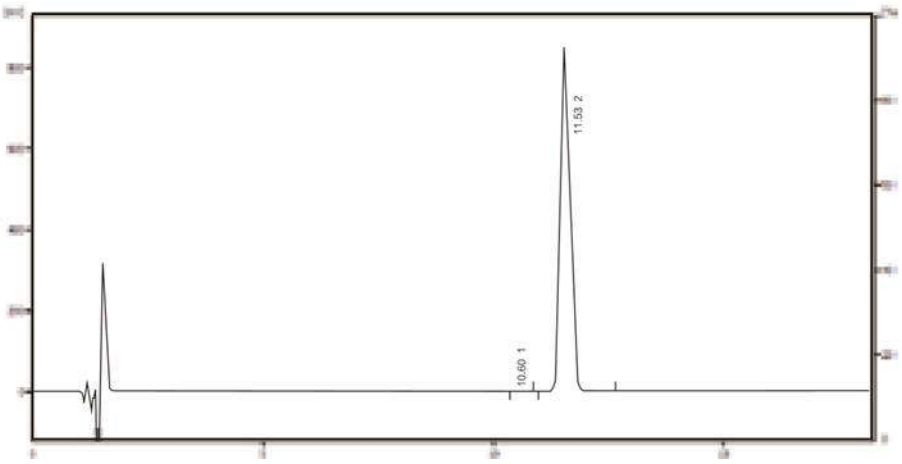



**Omeprazole enteric-coated tablets**
**Column:** C8 5μm 4.6×250mm
**Mobile Phase:** water / EtOH
**Flow Rate:** 1ml/min
**Wavelength:** 203nm
**Temp.:** 25 ℃

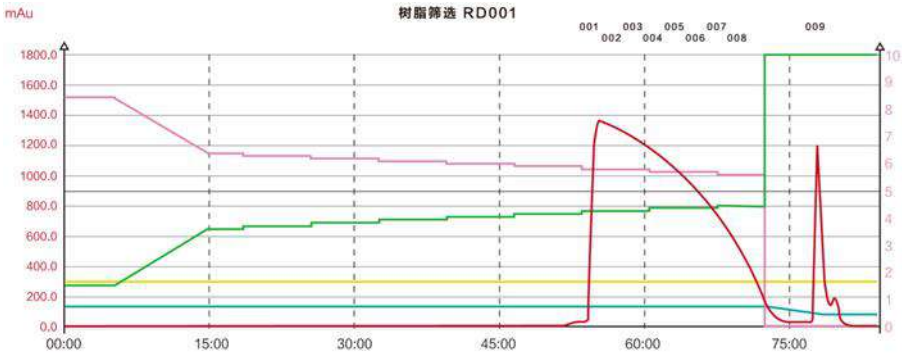



**Orlistat**
**Column:** EP-C8 10μm 10×250mm
**Mobile Phase:** EtOH solution
**Flow Rate:** 4ml/min
**Wavelength:** 195nm

**Sample:**
Dissolved raw material with methyl alcohol
**Concentration:** 50-60mg/ml




**Finished sample**
**Purification:** 99.8%
**Single impurity** < 0.1%
**Recovery:** ≥90%




## Insulin

**Column:** C8 8μm 10×250mm

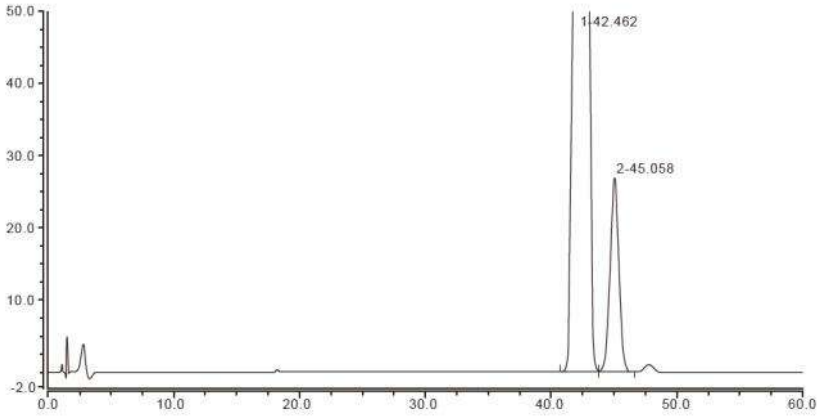
| Time | A | B |
|---|---|---|
| 0 | 85% | 15% |
| 5min | 85% | 15% |
| 15min | 64% | 36% |
| 225min | 34% | 66% |

| | Cycle | Injection | Purification | P1 | P1c | P2 |
|---|---|---|---|---|---|---|
| Galaksil® C8 | 1 | 100ml | 99.76% | 0.21% | 0.02% | 0.01% |
| | | 50ml | 99.74% | 0.22% | 0.02% | 0.02% |
| | 2 | 50ml | 99.75% | 0.22% | 0.02% | 0.01% |
| | 3 | 50ml | 99.74% | 0.22% | 0.02% | 0.01% |
| | 4 | 50ml | 99.74% | 0.22% | 0.02% | 0.01% |
| | 5 | 50ml | 99.76% | 0.21% | 0.02% | 0.01% |
| | 6 | 50ml | 99.75% | 0.22% | 0.02% | 0.02% |
| | 7 | 50ml | 99.76% | 0.21% | 0.02% | 0.02% |
| | 8 | 50ml | 99.74% | 0.22% | 0.02% | 0.01% |
| | 9 | 50ml | 99.74% | 0.22% | 0.02% | 0.02% |

# Galaksil® Phenyl

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 5/10um | 120Å | 330$m^2$/g | 7% | 2-8 |

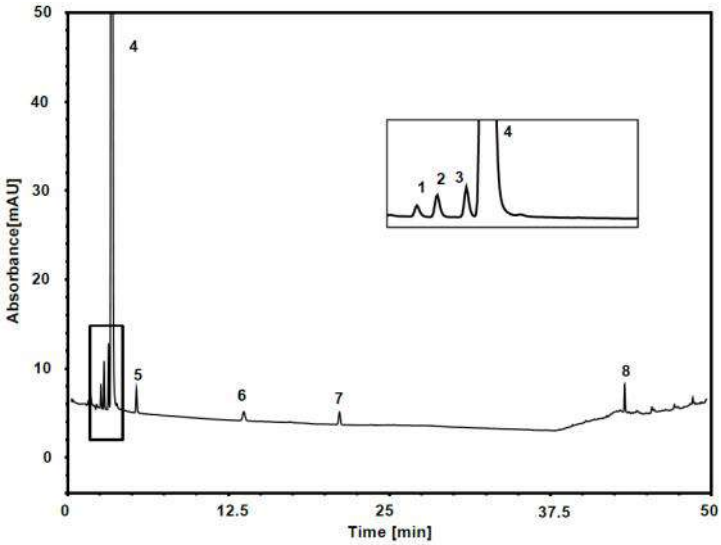



**Roflumilast**
**Column:** Phenyl 5μm 4.6×250mm
**Mobile Phase:** 60/40 v/v Water/MeCN
**Injection:** 10μL
**Flow Rate:** 1ml/min
**Wavelength:** 215nm
**Temp.:** 30℃

# Galaksil® C18Bio

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 5/10um | 300Å | 100$m^2$/g | 7% | 2-8 |




**Riboviron**
**Column:** C18Bio, 5 μm 4.6×150 mm
**Mobile Phase:**
A) $Na_2SO_4$, pH2.5;
B) 40/60 v/v MeCN/$Na_2SO_4$, pH2.5
**Gradient:**

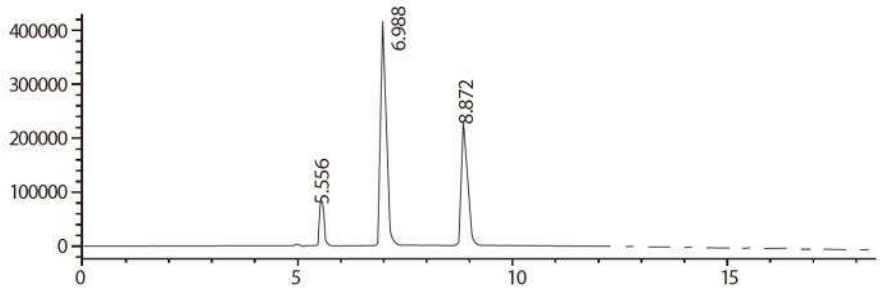
| t (min) | %A | %B |
|---|---|---|
| 0 | 100 | 0 |
| 15 | 100 | 0 |
| 25 | 87 | 13 |
| 35 | 87 | 13 |
| 50 | 0 | 100 |

**Flow Rate:** 1.0 mL/min
**Temperature:** 30℃
**Injection:** 10 μL
**Detection:** UV 220 nm
**Peaks:**
1. triazolinic acid;
2. Triazolamide;
3. Ribavirin acid;
4. Ribavirin;
5. Ribavirin 5 isomers;
6. Ribavirin methyl ester;
7. Ribavirin 5' - acetyl;
8. Ribavirin 5' - benzoyl

# Galaksil® $SiO_2$

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/8/10um | 80/100/120/200Å | 300/330$m^2$/g | — | 2-8 |

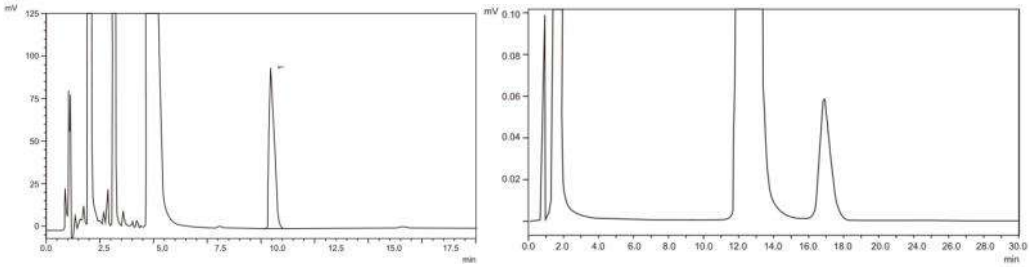



**Maleic Maleic Fumaric Acid**
**Column:** Galaksil SiO2 5μm 4.6×250mm
**Mobile Phase:**
N-hexane/THF/Trifluoroacetic acid =650/350/1.2
**Injection:** 20μl
**Flow Rate:** 0.8ml/min
**Wavelength:** 255nm
**Temp.:** 30℃

# Galaksil® CN

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/10um | 120Å | 330$m^2$/g | 7% | 2-8 |

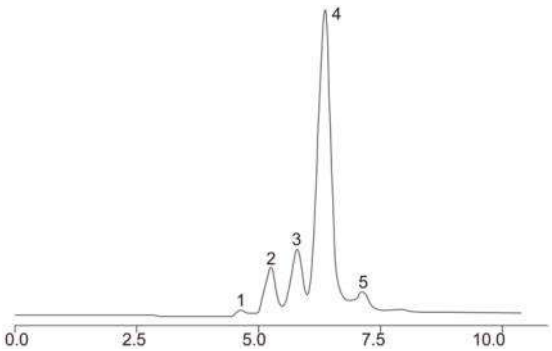


**Benzalkonium Chloride**
**Column:** Galaksil CN 5μm 4.6×150mm
Competitor CN 5μm 4.6×150mm
**Mobile Phase:**
phosphate buffer / acetonitrile
**Flow Rate:** 2.0ml/min
**Wavelength:** 214nm
**Temp.:** 35℃

# Galaksil® $NH_2$

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/10um | 120Å | 330$m^2$/g | 5% | 2-8 |




**Oligomaltose**
**Column:** Galaksil $NH_2$ 5μm 4.6×150mm
**Mobile Phase:** water/ acetonitrile
**Flow Rate:** 1ml/min
**Detector:** RID
**Temp.:** 40℃
**Peak**
1 glucose; 2 maltose; 3 maltodextrin; 4 maltotetraose;
5 maltopentaose

# Protection Columns

4.6mm-10mm Protection Column

4.6mm-30mm Protection Column

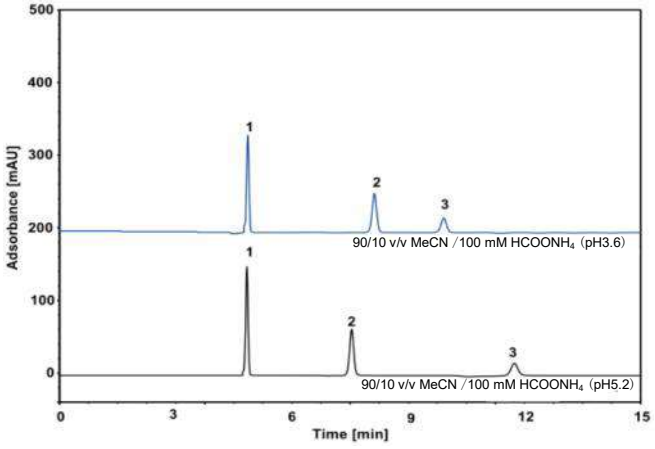
# HILIC Columns

Hydrophilic interaction liquid chromatography (HILIC) is a chromatographic technique used to improve retention of very polar substances under reversed-phase chromatography conditions. HILIC has a wide variety of stationary phases, and in principle, any stationary phase with the polar surface can be used in HILIC mode. Therefore, stationary phases such as silica, amino (NH2), diol, amide (AM) and cyanogen (CN) packing materials can also be used as stationary phases for HILIC.

# Galaksil® HILIC-Diol

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5/10um | 120Å | 330$m^2$/g | 10% | 2-8 |

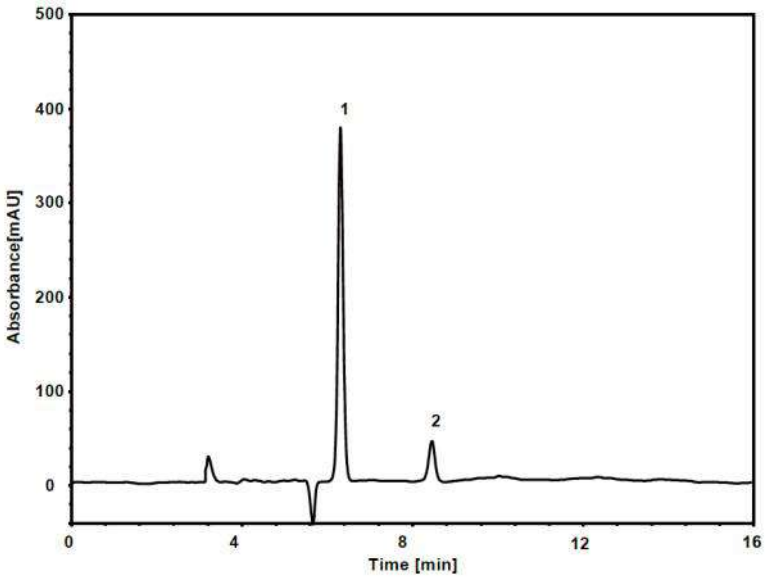



**Column:** HILIC-Diol 5 µm
**Dimension:** 4.6×250mm
**Mobile phase:**
Blue: 90/10 v/v MeCN /100 mM $HCOONH_4$ (pH3.6)
Black: 90/10 v/v MeCN /100 mM $HCOONH_4$ (pH5.2)
**Flow rate:** 1 mL/min
**Temperature:** 30℃
**Injection:** 5 µL
**Detection:** 218 nm
**Peaks:** 1. DICY
2. MET
3. Melamine

# Galaksil® HILIC-Amide

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5um | 120Å | 300$m^2$/g | 7.5% | 2-7 |




**Glycine & Methionine**

**Column:** HILIC-Amide, 5 μm

**Dimension:** 4.6×250 mm

**Mobile Phase:** 75/25 v/v AcCN / 25 mM MSP, pH5.5

**Flow Rate:** 1.0 mL/min

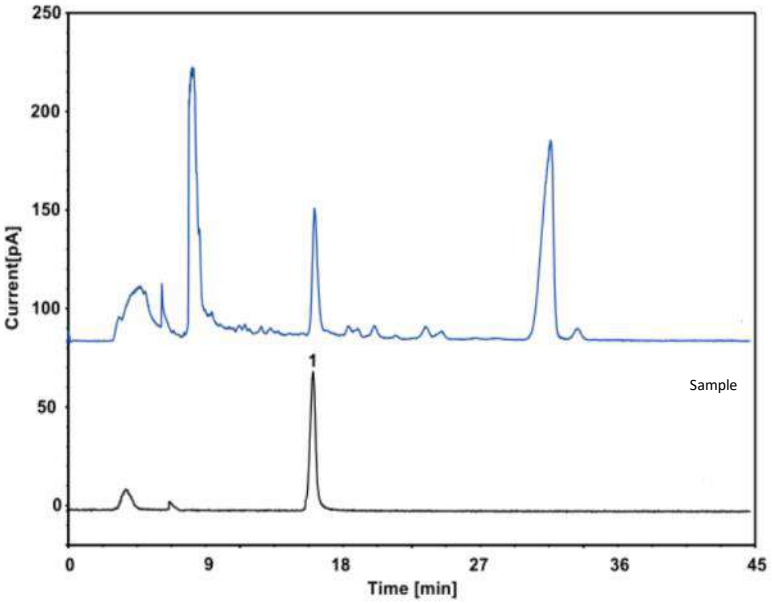
**Temperature:** 35 ℃

**Injection:** 10 μL

**Detection:** UV 210 nm

**Peaks:** 1. Glycine

2. Methionine




**Column:** HILIC-Amide 5 μm

**Dimension:** 4.6×250mm

**Mobile phase:**

80/10 v/v MeCN /100 mM $CH_3COOH$

**Flow rate:** 0.5 mL/min

**Temperature:** 20℃

**Injection:** 10 μL

**Detection:** CDA

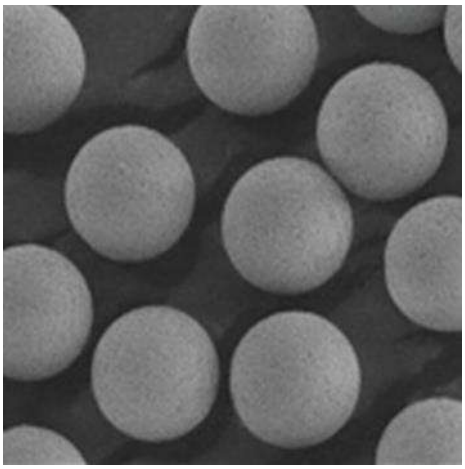
**Peaks:** 1. Stachydrine

# Galaksil® HILIC-Imidazole

## Parameters

| Particle Size | Pore Size | Surface Area | Carbon Content | pH Range |
|---|---|---|---|---|
| 3/5um | 120Å | 300$m^2$/g | 5. 5% | 2-7 |

# Sepromax® A50



Sepromax® A50 is designed for analysis and purification of monoclonal antibodies (mAbs). Compared to traditional agarose media Sepromax® A50 has the advantages of high dynamic binding capacity (DBC), long service life, and less shedding of ligand. NaOH (0.1-0.5M) can be used for clean-in-Place (CIP) .

The ligand of Sepromax® A50 is recombinant protein A (rProtein A) immobilized on the surface of macro-porous PS/DVB microsphere substrate. The rProtein A has better alkali-resisting ability that ensures stability in high pH conditions. With our hydrophilic treatment and binding technology, we eliminated non-specific binding PS-DVB surface. Hence, Sepromax® A50 is extremely useful for purification process of monoclonal antibodies.

**Advantages:**

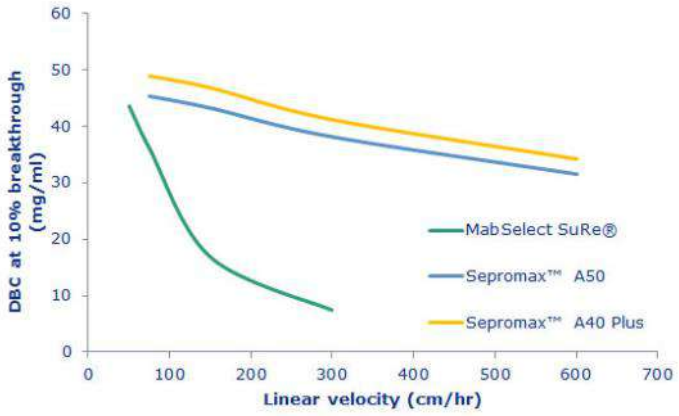
- High rigidity, low backpressure, suitable for small-scale and large-scale mAb purification
- Outstanding high dynamic binding capacity at low residence time
- Excellent alkali resistance, 0.1-0.5 M NaOH for CIP
- Long lifetime, low ligand leakage
- High batch stability

**Parameter**

| | |
|---|---|
| **Support Matrix** | Poly(styrene/divinylbenzene) (PS-DVB) |
| **Ligand** | Recombinant Protein A |
| **Ave. Particle size** | 50μm |
| **Dynamic Binding Capacity (DBC)** | Approx. 40 mg human IgG/ml media (Determined at 10% breakthrough by frontal analysis at a mobile phase velocity of 500 cm/h in a column with a bed height of 5 cm, Residence |
| **Shrinkage/Swelling** | < 1% from 1-100% organic solvent |
| **pH range (Long term)** | pH 2-10 |
| **Maximum Operating Pressure** | 1500 psi (100 bar / 10 MPa) |
| **Cleaning Agents** | 0.1-0.5M NaOH |
| **Temperature Stability** | 4-40 °C |
| **Delivery Conditions** | 20% ethanol (2-8°C) |

## DBC vs. Linear Flow Rate Curve

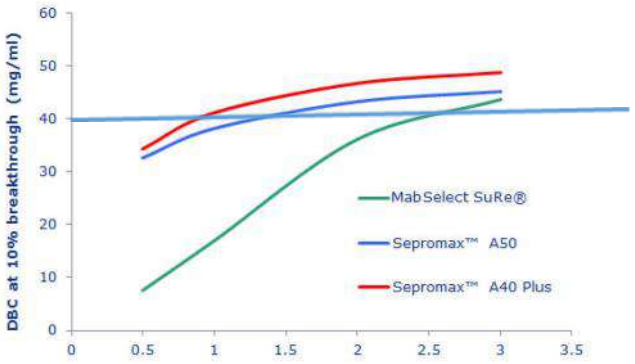
DBC of Sepromax® A50 do not decrease with the increase of flow rate.




| Condition | |
|---|---|
| **System:** | AKTA® Purifier10 |
| **Buffer:** | 20 mM PB, 0.15 M NaCl pH 7.4 |
| **Eluant:** | 0.1 M Gly-HCl, pH 2.5 |
| **CIP Solvent:** | 0.5 M NaOH |
| **Sample:** | 1.0 mg/ml hIgG |

## DBC vs. Residence Time Curve

Column efficiency of Sepromax® A50 is much higher compare with competitive product.




DBC=40 mg/ml, RT=1.3 min (Sepromax® A50), RT=2.4min (competitive product).

Column height=10cm, F =460cm/h (Sepromax® A50), F =250 cm/h (competitive product).

F=300 cm/h, H=6.5cm (Sepromax® A50), H =12 cm (competitive product).

$$RT = \frac{H \times 60}{F}$$

***Note:*** *Because of the difference of columns, residence time (RT) is more suitable for DBC description. F is for flow rate, H is for column height.*

## DBC in High Sample Concentration

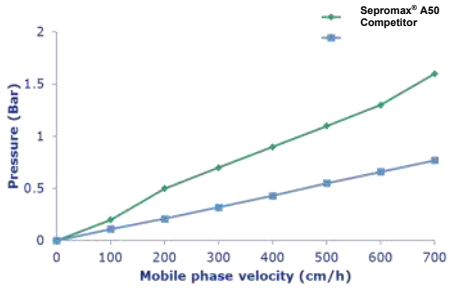
DBC of Sepromax® A50 is about 20-50% higher than competitive product with high IgG concentration injection under 2 minutes residence time (RT).

| Test Condition | |
|---|---|
| **Sample:** | hIgG |
| **Column:** | 7 mm I.D. x 2.5 cm (1mL) |
| **Condition:** | 0.02 mol/L $Na_3PO_4$ buffer (pH 7.4) + 0.15 mol/L NaCl |
| **DBC：** | Base on breakthrough curve (allow 5% leakage) |

| Residence time (min) | Flow rate (ml/min) | DBC @ 5% BT | | | |
|---|---|---|---|---|---|
| | | IgG conc. at 5g/L | | IgG conc. at 10g/L | |
| | | Sepromax® A50 | Competitor | Sepromax® A50 | Competitor |
| 1.92 | 0.5 | 30.3 | 27.4 | 30.3 | 24.5 |
| 0.96 | 1.0 | 26.8 | 15.3 | 26.7 | 14.5 |
| 0.64 | 1.5 | 23.2 | 9.8 | 23.4 | 10.8 |

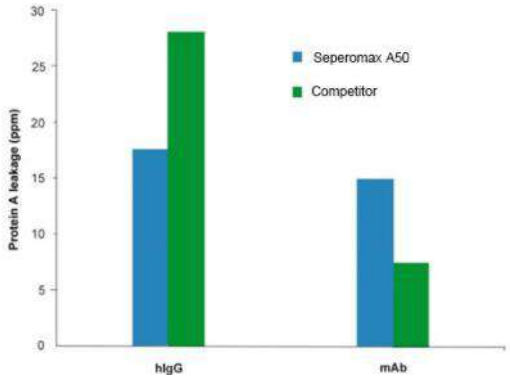
## Pressure vs. Flow Rate Curve

The back pressure of Sepromax® A50 is less than competitive product. Sepromax® A50 is more suitable for industrial purification process.

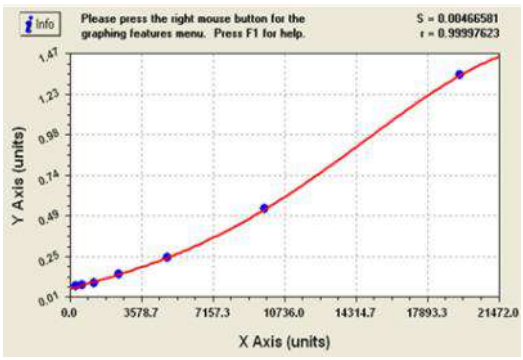



## Protein A Ligand Leakage Test (ELISA)

Samples: 20mg hIgG/ml-resin, 9mg mAb/ml-resin； ELISA test: Cygnus F400 kit

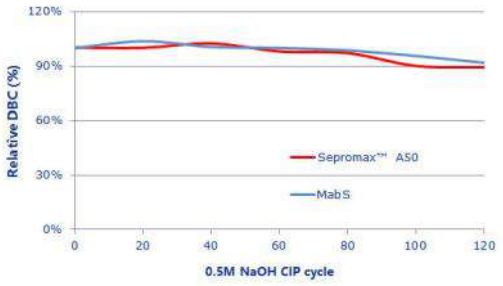



Protein A concentration standard curve




## NaOH Clean-in-Place Test

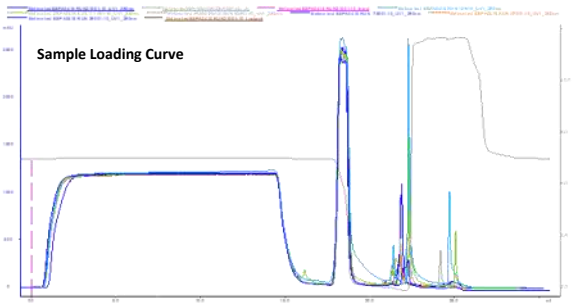
After 120 cycles of 0.5M NaOH CIP, the relative DBC is still stay in high level.

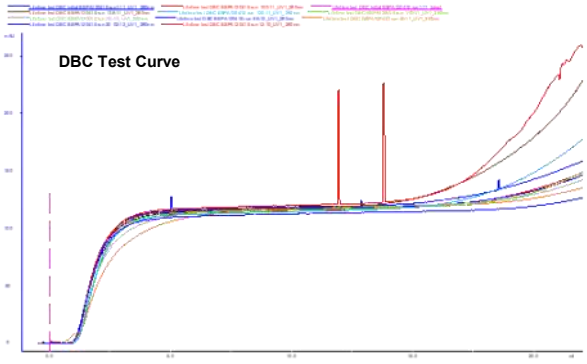


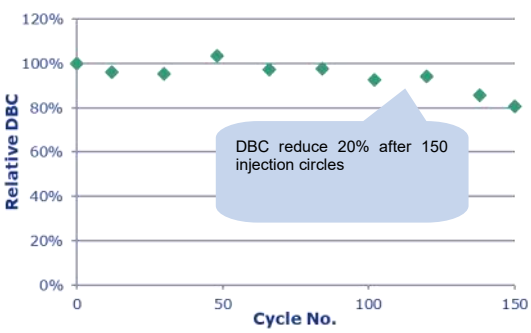

## Alkali Resistance Test (150 Cycle Lifetime)

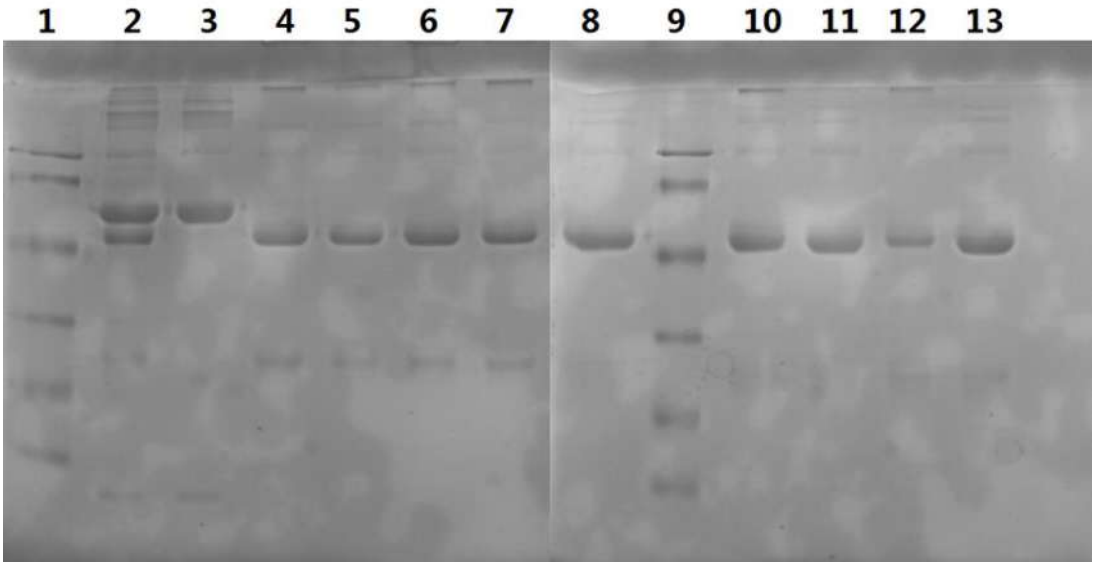
Do CIP after purification process, measure DBC each 18 injection cycles.

| Step | solution | CV |
|---|---|---|
| Equilibration | 20 mM PB，0.15M NaCl，pH7.4 | 5CV |
| Loading | 1mg/ml hIgG+ BSA/Lysozyme | RT=0.6min，50%DBC |
| Washing | 20 mM PB，0.15M NaCl，pH7.4 | 5CV |
| Elution | 0.1M Gly-HCl，pH3.0 | 5CV |
| CIP | 0.1M NaOH | 4CV, 15min |





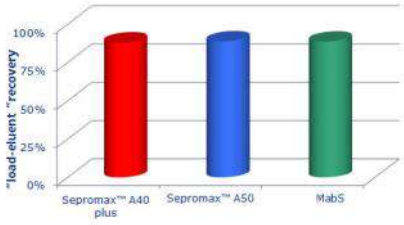

Lane
1：Marker
2：Sample
3：Flow through
4：Run 4
5：Run 21
6：Run 39
7： Run 57
8： Run 75
9：Marker
10： Run 95
11： Run 111
12： Run 129
13： Run 148

## Load-Eluent Recovery

With the rProtein A ligand fully functional, Sepromax® A50 delivers high recovery of purified antibodies.

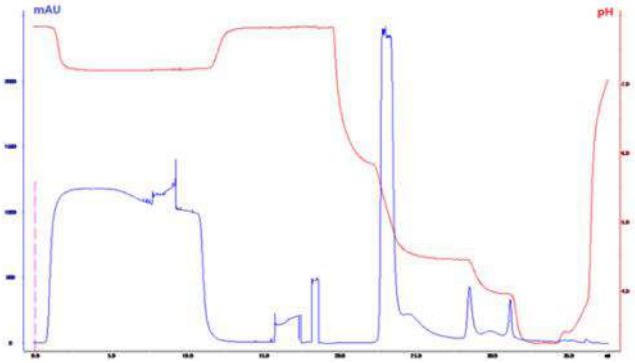
Sample: 1.0mg/ml γ-globulin

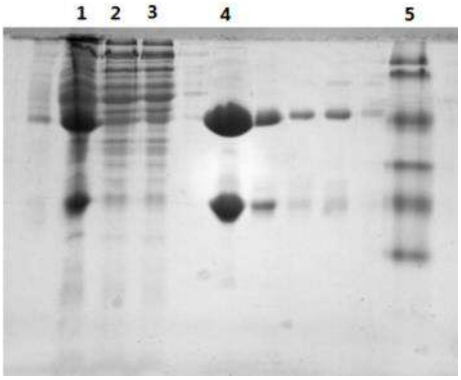
| | Load (μg) | Eluent (μg) | Recovery (%) |
|---|---|---|---|
| Sepromax® A50 | 37.65 | 33.16 | 88.07 |
| Sepromax® A40 Plus | 36.01 | 31.97 | 88.61 |
| Competitor | 33.96 | 30.09 | 88.81 |




## mAb Purification Test

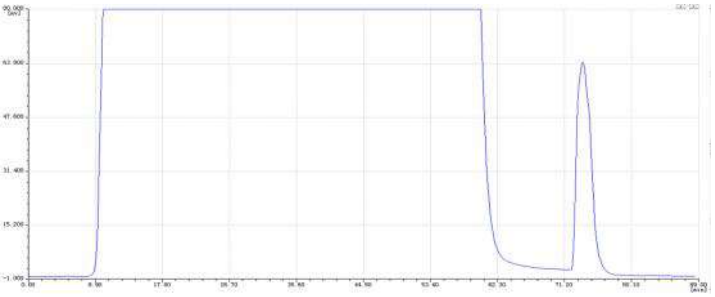
Sample: monoclonal antibody from murine




**Lane**
1 Ascites treatment fluid (reduction) 2 break through (reduction)
3 break through (reduction) 4 eluent (reduction) 5 marker

## Fc protein Purification Test



| | |
|---|---|
| Media | Sepromax A 50 affinity media |
| Column | 1.0 × 2.5cm，column volume 2mL |
| Sample | Fc protein Xsupernatant(2.0g/L) |
| Loading buffer | 10mM PB+0.2M NaCl, pH 7.5 |
| Elution buffer | 20mM Sodium Citrate+0.2M NaCl, pH3.7 |
| Flow rate | 115 cm/h |

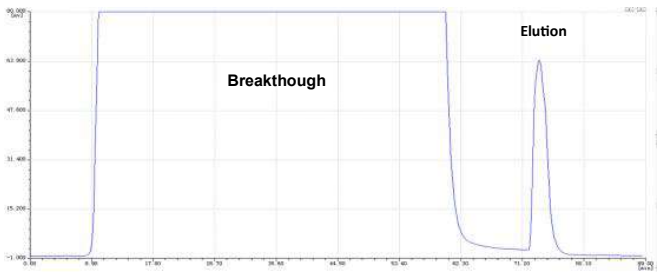
## Impurity Removal Test (HCP&DNA)

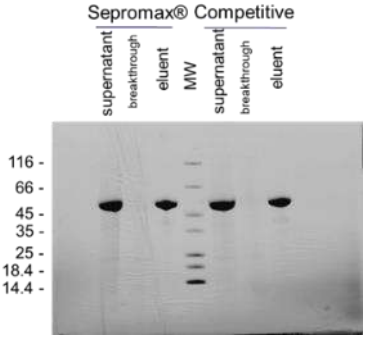
In the production of mAb's for pharmaceutical applications, residue of host protein (HCP) and DNA are an important indicators of quality. Protein A affinity chromatography is an efficient method to remove these residual impurities.

| | |
|---|---|
| **Media** | 1.0 × 2.5cm，column volume 2mL<br>Sepromax A50 |
| **Sample** | Fc protein Xsupernatant(2.0g/L) |
| **Loading buffer** | 10mM PB+0.2M NaCl, pH 7.5 |
| **Elution buffer** | 20mM Sodium Citrate+0.2M NaCl, pH3.7 |
| **Flow rate** | 115 cm/h |

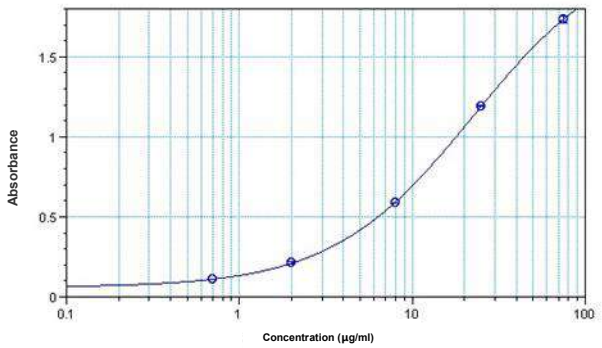
**Result:**

| HCP (ng/mg) | Sepromax® A50 | Competitor |
|---|---|---|
| supernatant | 1754.3 | 1716.5 |
| rPA Eluate | 1.9 | 4.5 |
| Reduction | $9.2\times10^2$ | $3.8\times10^2$ |




**Standard Curve of HCP**




**Standard HCP μg**

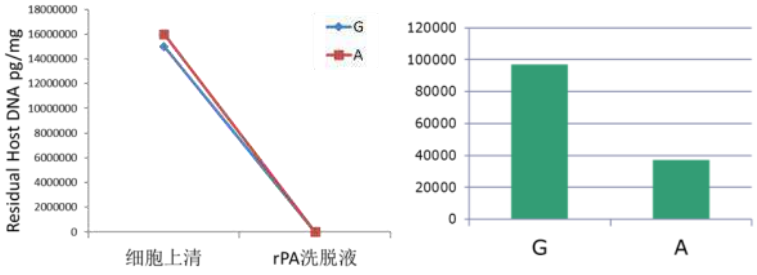
| Sample | Concentration | Wells | Values | MeanValue | Std.Dev. | CV% |
|---|---|---|---|---|---|---|
| HC01 | 0.000 | A4 | 0.052 | 0.056 | 0.004 | 8.0 |
| | | A5 | 0.059 | | | |
| HC02 | 0.700 | B4 | 0.112 | 0.112 | 0.000 | 0.3 |
| | | B5 | 0.113 | | | |
| HC03 | 2.000 | C4 | 0.206 | 0.212 | 0.008 | 4.0 |
| | | C5 | 0.218 | | | |
| HC04 | 8.000 | D4 | 0.588 | 0.589 | 0.001 | 0.3 |
| | | D5 | 0.590 | | | |
| HC05 | 25.000 | E4 | 1.190 | 1.192 | 0.003 | 0.2 |
| | | E5 | 1.194 | | | |
| HC06 | 75.000 | F4 | 1.751 | 1.734 | 0.023 | 1.3 |
| | | F5 | 1.718 | | | |

Smallest standard value: 0.056
Largest standard value: 1.734

## DNA Removal Test

DNA test kit: AB (4413713)

QPCR — using magnetic beads extracted DNA from sample. Prepare PCR reaction mixture with DNA extraction solution and standard solution. Using Bio-rad real-time PCR for reaction and fluorescence assay.




| rDNA (pg/mg) | Sepromax ® A40 plus G | Competitor A |
|---|---|---|
| Cell supernatant | $1.5\times10^7$ | $1.6\times10^7$ |
| rProtein A eluate | 154.4 | 431.3 |
| Reduction | $9.7\times10^4$ | $3.7\times10^4$ |

## Regulatory Support Files, RSF

All regulatory support documents based on FDA reporting requirements that can assist customers in process development, validation and preparation of SOPs.

# Absolut® A Column

Absolut® A column is designed for fast analysis of monoclonal antibody (mAb) concentration (titer) in affinity chromatography. Alkali resistant recombinant Protein A (rProtein A) ligand used in this product has specific binding ability to the Fc region of immunoglobulins. The matrix of Absolut® A is PS-DVB (Polystyrene Divinylbenzene) particles, which are highly cross-linked for enhanced mechanical stability and particle strength. Compared to agarose base, hydrophilic PS-DVB has a higher dynamic binding capacity (DBC) and longer lifetime. Hence, Absolut A is an excellent choice for mAbs titer analysis.


**Advantages**

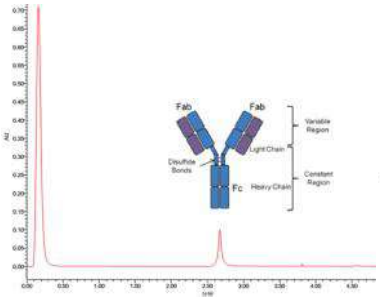
- Direct use on HPLC instruments
- High dynamic binding capacity, quick mass transfer
- Minimum nonspecific absorption, accurate determination
- Fast analysis cycle time: 2–5 minutes
- Satisfactory linearity in wide concentration range: 0.02-10 mg/ml
- Long lifetime
- Alkali resistance: 0.1-0.5 M NaOH cleaning conditions

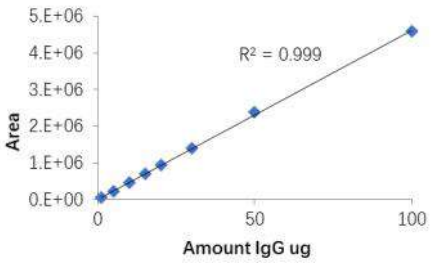
**Parameter**

| | Absolut® A | Absolut® A Plus |
|---|---|---|
| Column Size | 2.0mm ID × 30mm L; 4.6mm ID × 50mm L | |
| Column Tube Material | 316L Stainless steel, PEEK | |
| Support Matrix | Polystyrene Divinylbenzene (PS-DVB) | |
| Ligand | Recombinant Protein A | |
| Particle Size | 30μm | 20μm |
| Shipping Solution | 0.02 M sodium phosphate, pH 7.0, 0.02% sodium azide | |
| pH range | pH 2-10 | |
| Maximum Pressure | 1000 psi | |
| Cleaning Agents | 0.1-0.5M NaOH | |
| Cycle Time | 2-5 minutes | |
| Temperature Stability | 4-40 °C | |

## Excellent Linearity

Quantitative analysis for antibody fermentation broth by Absolut® A.

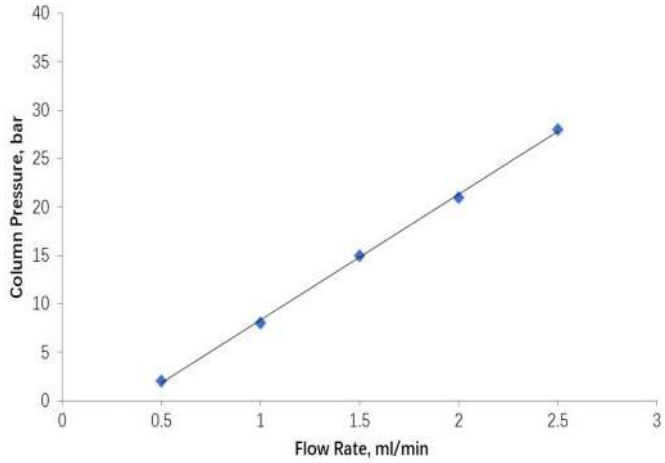



**Column:** Absolut A 2×30mm
**Eluent A:** 20mM PB, 150mM NaCl, pH7.4
**Eluent B:** 0.1%HCl, 150mM NaCl
**Gradient:** 0% B for 1.0 min, 100% B for 2.0 min, 0% B for 2.0 min
**Flow rate:** 1ml/min
**Sample:** mAb

## Flow Rate and Pressure

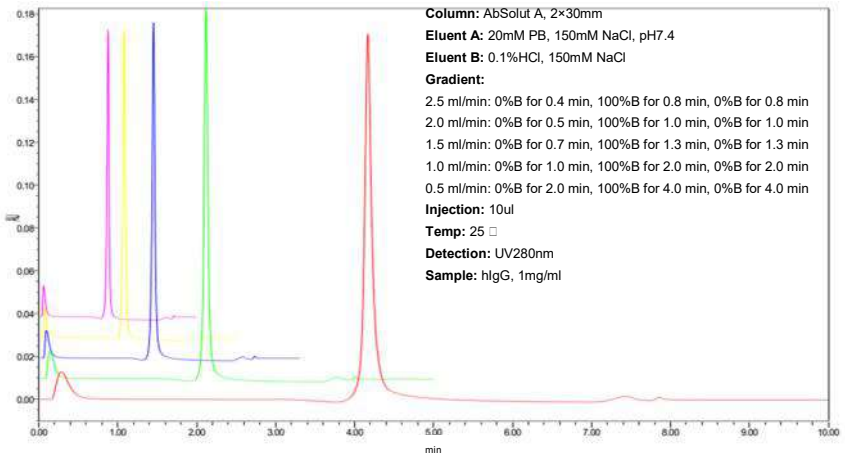
The operating flow rate is 0.5-3 ml/min as recommended for HPLC system.




**Column:** AbSolut A, 2.0×30mm
**Eluent A:** 20mM PB, 150mM NaCl, pH7.4
**Eluent B:** 0.1%HCl, 150mM NaCl
**Temp:** 25 □
**System:** Waters 1525 pump

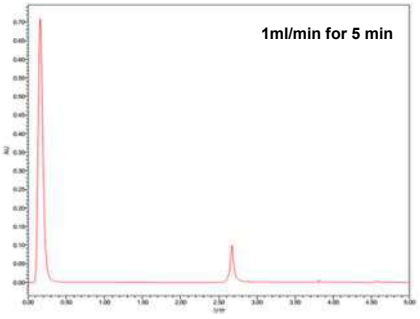
## Flexible Choice of Flow Rate

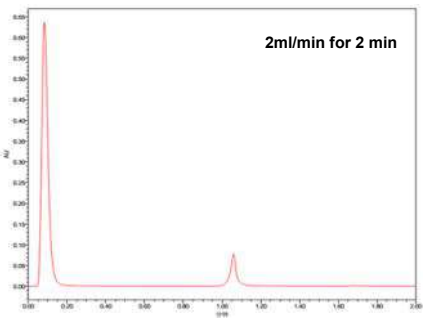
The ratio of bounded and unbounded IgG has almost no effect on the flow rate.




**Column:** AbSolut A, 2×30mm
**Eluent A:** 20mM PB, 150mM NaCl, pH7.4
**Eluent B:** 0.1%HCl, 150mM NaCl
**Gradient:**
2.5 ml/min: 0%B for 0.4 min, 100%B for 0.8 min, 0%B for 0.8 min
2.0 ml/min: 0%B for 0.5 min, 100%B for 1.0 min, 0%B for 1.0 min
1.5 ml/min: 0%B for 0.7 min, 100%B for 1.3 min, 0%B for 1.3 min
1.0 ml/min: 0%B for 1.0 min, 100%B for 2.0 min, 0%B for 2.0 min
0.5 ml/min: 0%B for 2.0 min, 100%B for 4.0 min, 0%B for 4.0 min
**Injection:** 10ul
**Temp:** 25 □
**Detection:** UV280nm
**Sample:** hIgG, 1mg/ml

Normally, the flow rate is 1ml/min for 5 min analysis. Large samples, 2ml/min for 2 min analysis.

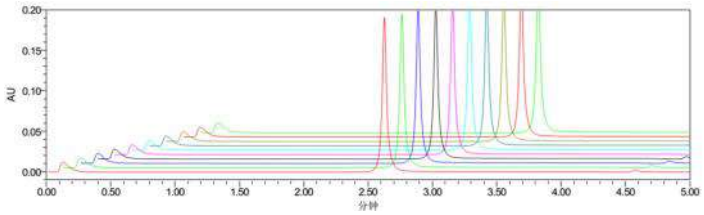



| Flow rate ml/min | Total Area | Unbound Area | Unbound Relative Area % | IgG Area | IgG Relative Area % |
|---|---|---|---|---|---|
| 0.5 | 1459568 | 145807 | 9.99 | 1313761 | 90.01 |
| 1.0 | 743661 | 75069 | 10.09 | 668592 | 89.91 |
| 1.5 | 492377 | 49715 | 10.01 | 442662 | 89.90 |
| 2.0 | 376354 | 39877 | 10.06 | 336477 | 89.40 |
| 2.5 | 322735 | 32984 | 10.22 | 289751 | 89.78 |

## Stability Test

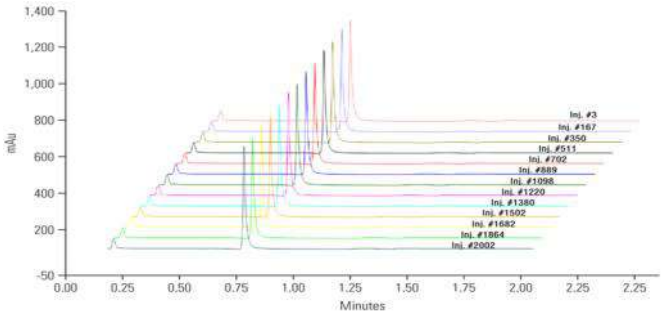
Performance test for 10 different Absolut®m A columns.




| No. | RT (min) | Peak Area | Peak Height | TP | As |
|---|---|---|---|---|---|
| 1 | 2.652 | 537586 | 190057 | 29507 | 1.10 |
| 2 | 2.641 | 536434 | 187236 | 26529 | 1.21 |
| 3 | 2.602 | 533688 | 186841 | 27349 | 1.12 |
| 4 | 2.599 | 531408 | 188244 | 29147 | 1.05 |
| 5 | 2.622 | 534911 | 187224 | 26901 | 0.98 |
| 6 | 2.647 | 540382 | 188746 | 26862 | 1.19 |
| 7 | 2.626 | 531906 | 188743 | 27855 | 1.08 |
| 8 | 2.628 | 540015 | 189618 | 28034 | 1.11 |
| 9 | 2.610 | 541372 | 188711 | 26567 | 1.16 |
| 10 | 2.623 | 527072 | 185477 | 26420 | 1.20 |

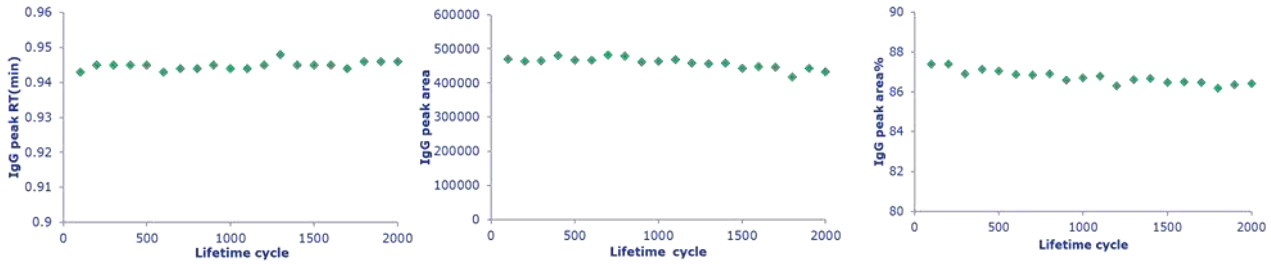
## Long Lifetime

Stacking chart after 2000 analysis cycles.



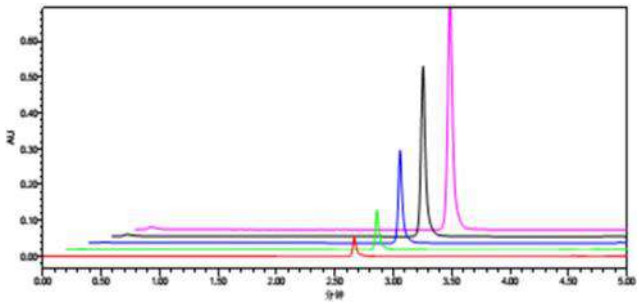

| Test Condition | |
|---|---|
| **Column** | AbSolut A, 2×30 mm |
| **Eluent A** | 50 mM Sodium Phosphate, 150 mM NaCl, pH 7.0 |
| **Eluent B** | 0.1% HCl, 150 mM NaCl, pH 1.9 |
| **Flow rate** | 2.0 ml/min |
| **Gradient** | 0% B for 0.2 min, 100% B for 0.60 min, 0% B for 1.20 min |
| **Temperature** | 25□ |
| **Detection** | 280 nm |
| **Injection volume** | 10 uL |
| **Sample** | hIgG, 1 mg/mL |

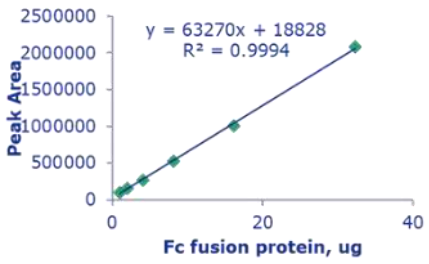
Statistical analysis of data demonstrates.



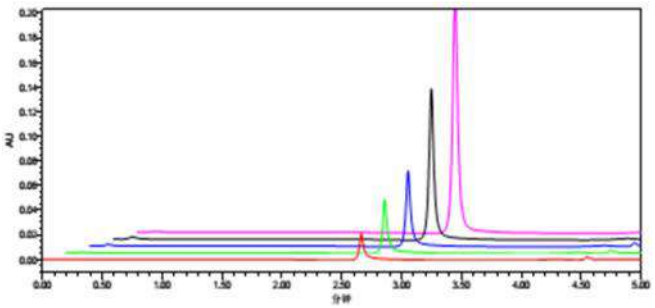

## Application Cases

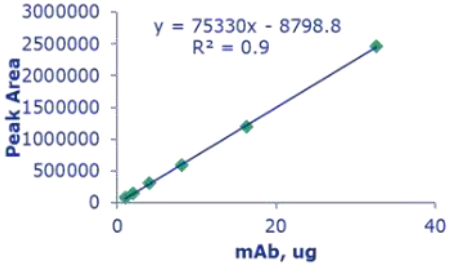
Fc Fusion Protein sample




Monoclonal antibody sample



# GLK-gel Agarose Media

GLK-gel Agarose media offer the high specificity and selectivity for biomolecular separations and purifications. Affinity separation can often remove contaminants difficult to eliminate using other chromatographic procedures. Purifications up to several orders of magnitude can be achieved in a single step.

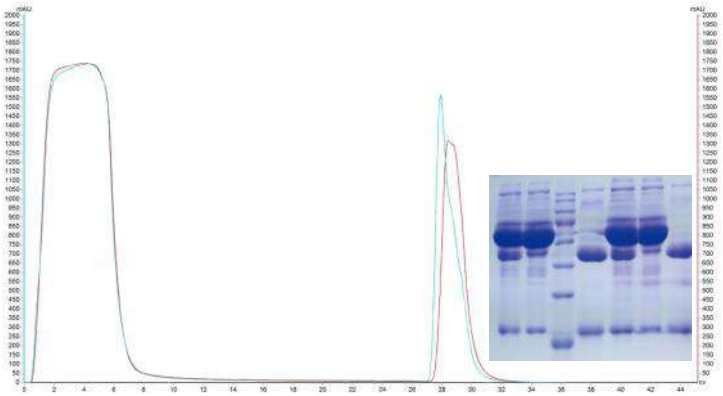
**Advantages**

- Stable bonding
- Low ligand leaching
- NaOH CIP

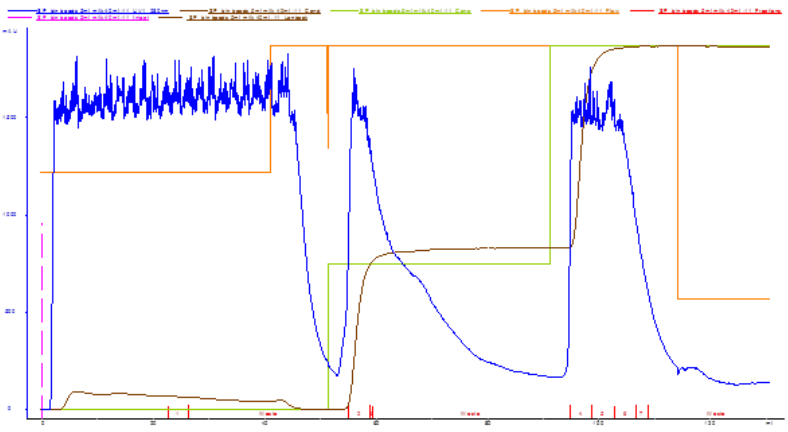
| | Pr A 4FF | Pr G 4FF | IgM 6HP | IgY 6HP |
|---|---|---|---|---|
| **Substrate** | 4% cross-linked agarose | | 6% cross-linked agarose | |
| **Ligand** | rProtein A | rProtein G | IgM | IgY |
| **Particle Size** | 90μm (45-165μm) | | 37μm (25-45μm) | |
| **Capacity (DBC)** | 20mg hIgG/ml | 25mg hIgG/ml | 5mg hIgG/ml | 20mg hIgG/ml |
| **pH Stability** | 2-10 (Short) 3-9 (Long) | | 2-13 (Short) 3-11 (Long) | |
| **Max. Pressure** | 0.3MPa | | | |
| **Flow Rate** | 300cm/h | 300cm/h | 150cm/h | 150cm/h |
| **Storage** | 4-8 °C, 20% EtOH | | | |

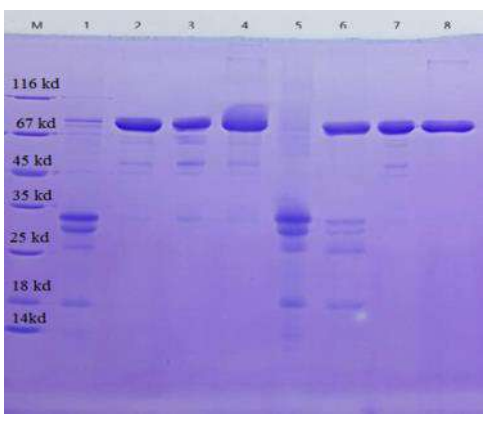
### Purification of IgG in human serum

**Sample:** 5ml human serum with five times dilution (different buffers)
**Column:** HT01 1.0ml Protein G 4FF
**Balance:** A 0.02 M PB pH7.0;
B 0.02M PB, 0. 3M NaCl pH 7.0
**Elution:** 0.1 M Glycine-HCl pH2.7
**Flow Rate:** 0.25m/min (sampling), 1ml/min



### Protein Purification





# GLK-gel Ni Affinity Media

GLK-gel Ni affinity media are a nickel metal chelating chromatography media with IDA/NTA/TED ion high cross-linked agarose. GLK gel Ni Affinity Media have advantages of excellent stability, biocompatibility, solvent compatibility, large capacity, good selectivity, high resolution natural generation and low cost.

## GLK-gel Ni NTA/NTA+

GLK gel Ni IMAC/IMAC+ media use $Ni^{2+}$ to interact with amino acids (histidine, cysteine, tryptophan) on the side chain of protein. It is suitable for the separation and purification of His tag proteins and biomolecules interacting with $Ni^{2+}$.

| | |
|---|---|
| **Substrate** | 6% high cross-linked agarose |
| **Particle Size** | 90μm (45-165μm) GLK Ni IMAC/NTA; 37μm(25-45μm) GLK Ni IMAC/NTA+ |
| **Binding Capacity** | Approx. 40 mg His (tag protein)/ml media |
| **pH Stability** | 3-12 (Working); 2-14 (Cleaning) |
| **Max. Pressure** | 0.3MPa |
| **Chemical Stability** | 0.01M HCl; 0.01M NaOH (one week);1M NaOH;<br>70%EtOH(12 hours); 2% SDS(1 hour); 30% isopropanol (0.5 hour) |
| **Storage** | 4-15 °C, 20°C EtOH |

### His tag Protein Purification

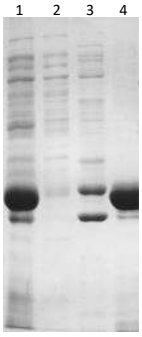
Column: 1ml

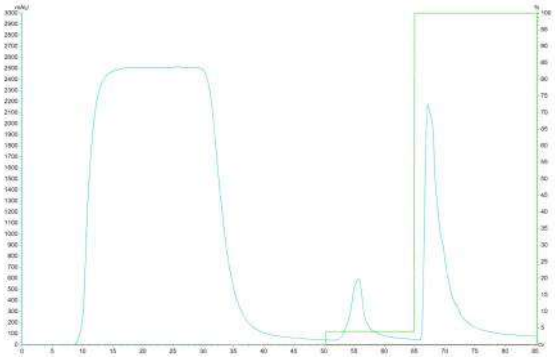
Sample: E. coli cracking supernatant (His tag protein)

Equilibrium liquid: 0.02MPB、0.5MNaC1，pH 7.4

Elution: 0.02MPB、0. M NaCl、 Imidazole, pH 7.4，
Flow Rate: 1ml/min

1. Original; 2. Breakthough; 3. Elution(4%B); 4. Elution(100%B)



## GLK-gel Ni IDA

| | |
|---|---|
| **Substrate** | 6% high cross-linked agarose |
| **Particle Size** | 90μm (45-165μm) |
| **Binding Capacity** | Approx. 45 mg His (tag protein)/ml media |
| **pH Stability** | 3-12 (Working); 2-14 (Cleaning) |
| **Max. Pressure** | 0.3MPa |
| **Chemical Stability** | Common aqueous solutions and buffers.<br>Avoid chelating agents (EDTA, EGTA) and reducing agents (DTT, DTE) |
| **Storage** | 4-15 °C, 20°C EtOH |

## Application Case

Column: 1ml

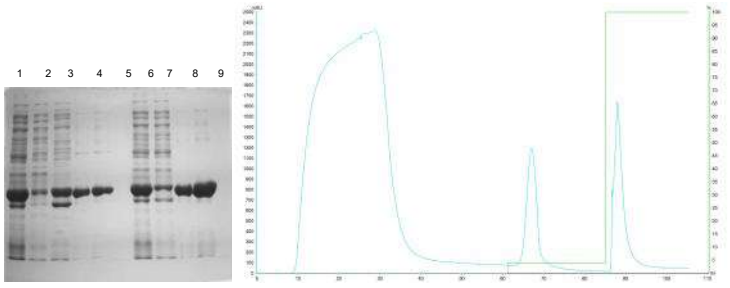
Sample: E. coli cracking supernatant (His tag protein)

Equilibrium liquid: 0.02MPB、0.5MNaC1，pH 7.4

Elution: 0.02MPB、0. M NaCl、 Imidazole, pH 7.4

Flow Rate: 1ml/min

1. Original; 2. Breakthough; 3. Elution(4%B); 4. Elution(100%B); 5. Elution (100%B); 7. Original; 8. Breakthough; 9. Elution(4%B); 10. Elution(100%B)
No imidazole in 1-5. 0.02M imidazole in 7-10.




## GLK-gel Ni TED

Tolerance of higher reducing agents and chelating agents, eukaryotic secreted expression of His tag protein can loading without prior treatment, maximum protect the activity of protein.
Direct use NaOH for cleaning without nickel removal, reduce cleaning time.
Lower nickel shedding, no need for repeated regeneration.

| | |
|---|---|
| **Substrate** | 6% high cross-linked agarose |
| **Particle Size** | 90μm (45-165μm) |
| **Binding Capacity** | Approx. 20 mg His (tag protein)/ml media |
| **pH Stability** | 3-12 (Working); 2-14 (Cleaning) |
| **Max. Pressure** | 0.3MPa |
| **Chemical Stability** | 0.01M hydrochloric acid; 0.01M sodium hydroxide (one week); 20mM EDTA; 10mM DTT; 1M sodium hydroxide; 8M urea; 100mM EDTA; 0.5m imidazole (2 hours); 6M guanidine hydrochloride (24 hours); 30% isopropanol (20 min) |
| **Storage** | 4-15 °C, 20°C EtOH |

# GLKgel Benzamidine Affinity Media

GLK-gel Benzamidine Affinity Media is used for serine protease purification, agarose microspheres combine with broad spectrum inhibitor of serine protease (p - aminophenyl methyl ether).

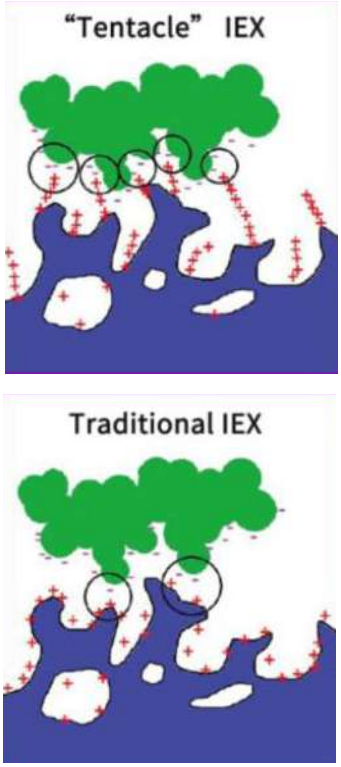
| | Benzamidine 4FF-HS | Benzamidine 6FF |
|---|---|---|
| **Substrate** | 4% cross-linked agarose | 6% agarose |
| **Ligand** | Para amphenamidine | Para amphenamidine |
| **Particle Size** | 90μm (45-165μm) | |
| **Capacity** | 35mg trypsin /ml | 13mg trypsin/ml |
| **pH Stability** | 1-9 (Short) 2-8 (Long) | |
| **Max. Pressure** | 0.3MPa | 0.02MPa |
| **Flow Rate** | 300cm/h | 300cm/h |
| **Storage** | 4-8 °C, 0.05M acetate buffer, 20% EtOH , pH4.0 | |

# PS-DVB Ion-exchange Media

**Alkali-resistance Type**

Sepromax® ion-exchange media are based on large pore PS-DVB particles. It has excellent mechanical property and can withstand pressures up to 10 MPA. Their 1000Å pore size allows low mass transform of biomacromolecules. These particles have been modified with GALAK unique coating technology and become hydrophilic completely.

Sepromax® IEX media carry “tentacle” surface structures. Functional groups are covalently bonded on the surface in the form of linear polymer chains. This structure enables macromoleculesn such as antibodies, viruses and plasmids to interact more effectively to the functional groups of the media, increasing the binding capacity significantly. “Tentacle” structure also effectively reduces the non-specific interaction between biomolecules and media, thus improving the recovery of target molecules.




**Advantages:**

- Rigid particles, low backpressure, suitable for large-scale purification processes.
- High flow rate, high loading capacity, high purification efficiency.
- Excellent chemical stability, alkali stable under CIP and long lifetime.

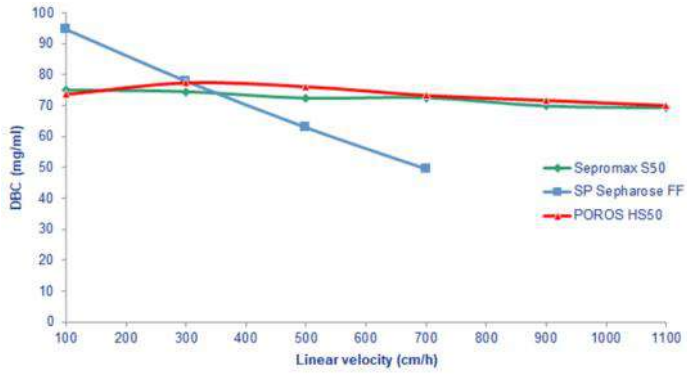
**Parameter**

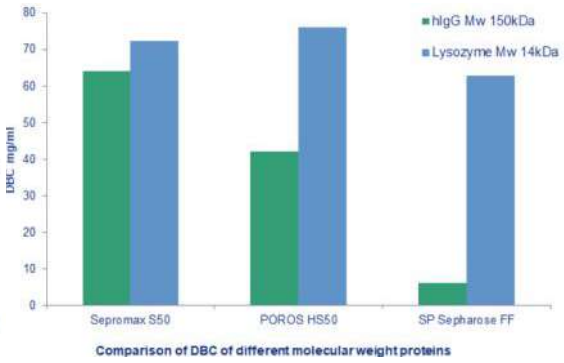
| | Sepromax® S50 | Sepromax® CM50 | Sepromax® Q50 | Sepromax® D50 |
|---|---|---|---|---|
| **Substrate** | Rigid, PS-DVB microspheres | | | |
| **Particle Size** | 50um (35-85μm) | | | |
| **Ligand** | $-SO^{3-}$ | -COO- | $-N^{+}(CH_3)_3$ | $-N^{+}H(CH_3)_2$ |
| **Ph Range** | 2-12 | 6-12 | 2-12 | 2-9 |
| **pKa** | 1 | 4.5 | 13 | 8-9 |
| **Dynamic Capacity** | 60mg hIgG/ml | 80mg Lysozyme/ml | 100mg Lysozyme/ml | 100mg BSA/ml |
| **Max Pressure** | 1500 psi (100 bar or 10 MPa) | | | |
| **pH Stability** | 1-14 | | | |
| **Storage** | 20% EtOH,4-30°C | | | |

* DBC (Dynamic Binding Capacity): frontal analysis @ 10%, 300cm/h, 5cm column height

## High Loading Capacity

In high linear velocity, Sepromax® S50 has excellent binding capacity. This leads to use of a smaller column and faster cycle time.

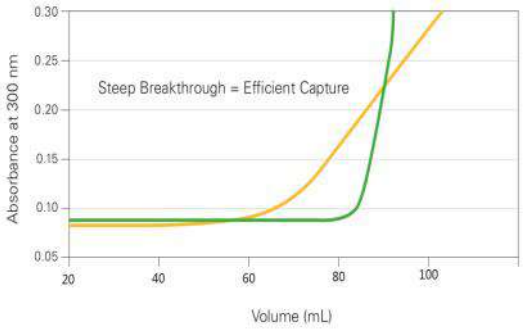



## Break-though Curve

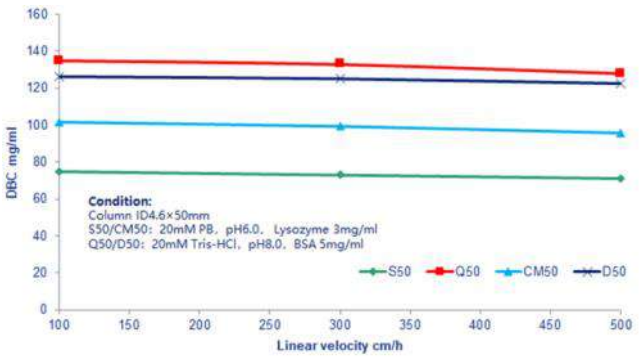
The capture efficiency of Sepromax® S50 was measured by the fronted break-though curves at 5% and 10%.

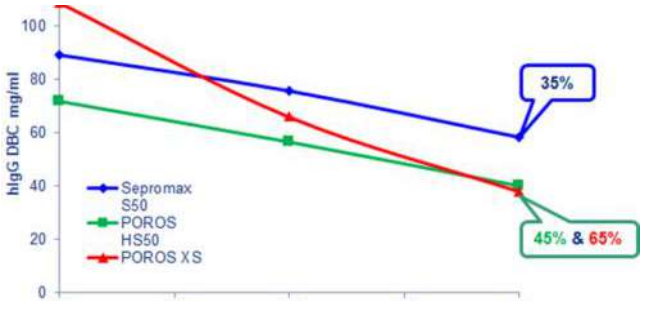
The break-though point of protein penetration curve of polysaccharide type media is relatively earlier.




## Excellent Stability

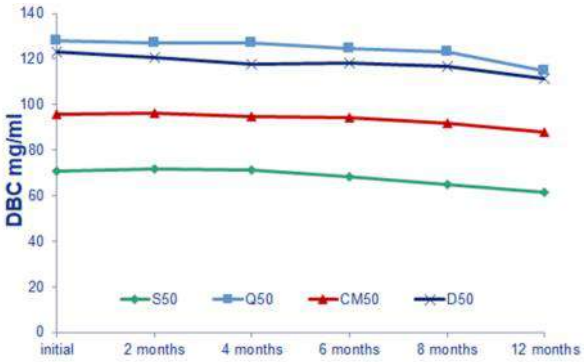
The dynamic binding capacity (DBC) of Sepromax® IEX will not decrease significantly with high linear flow rate. When flow rate increased from 100cm/h to 500cm/h, Sepromax® S50 can maintain 65% of its DBC at 100cm/h.

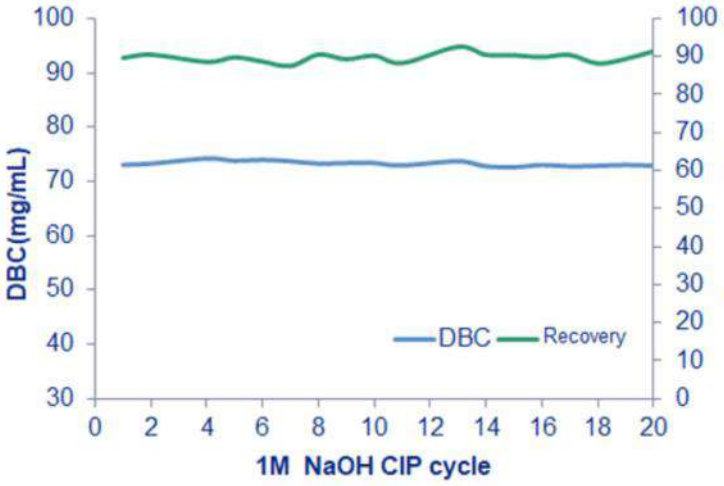


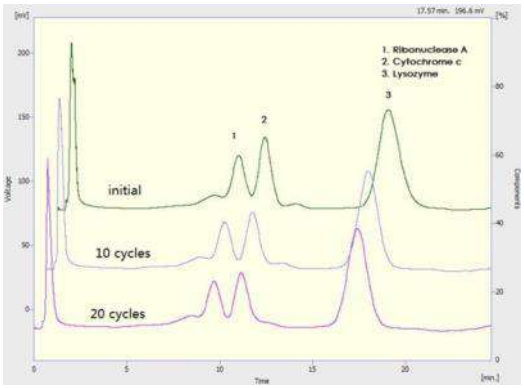



## Stability under CIP Condition

Clean-in-place (CIP) is a very important process in protein purification in biopharmaceutical industry. Sepromax® IEX media shows excellent chemical stability under harsh CIP conditions. In the experiment, 1M NaOH solution was selected to soak the four ion exchange media, and the loading was evaluated at regular intervals. After soaking for one year, the loading capacity of the four media did not decrease significantly.

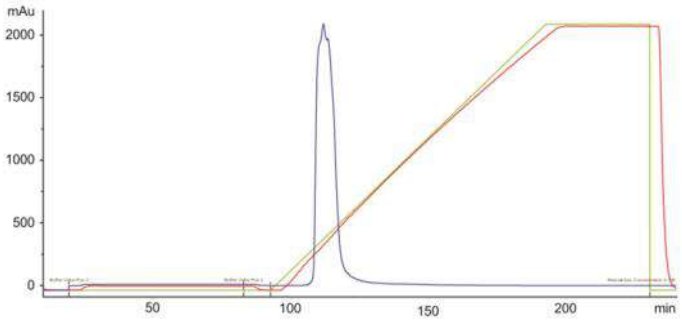


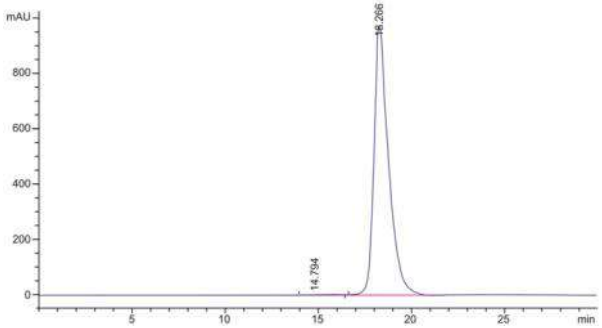






## Monoclonal Antibody Purification




Purify of finished product: 99.5%

Column: 2.5cm Height, 5ml CV

Medium: Sepromax® S50

Sample: Mab, Protein A elution pool 150 ml

Buffer A: 20 mM NaAc-HAC, pH 6.0

Buffer B: 20 mM NaAc-HAC, pH 6.0+ 1 M NaCl

Flow rate: 2 ml/min

Gradient: 0%-100% B (20 CV)

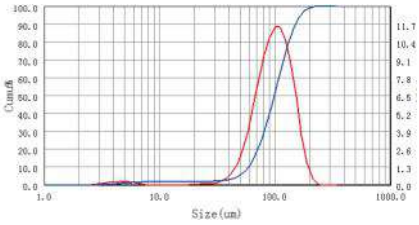
System: AKTA explorer100

## Order Information

Sepromax® Resin: 10ml to 50L

# Ion-exchange Agarose Media

GALAK provide agarose based ion-exchange media such as SP, Q, ANX, MMA, MMC, CM, DEAE to meet different purification needs.



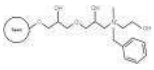
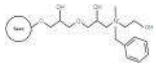

## GLKgel Strong Cation IEX SP Media

| | SP 6BB | SP 6FF | SP 6HF | SP 6HP | SP 6XL | SP HPR |
|---|---|---|---|---|---|---|
| **Substrate** | 6% cross-linked Agarose | | High-rigid Agarose | 6% cross-linked Agarose | 6% cross-linked Agarose with glucan | High-rigid Agarose |
| **Particle Size** | 200μm (165-300μm) | 90μm (45-165μm) | 90μm (45-165μm) | 37μm (25-45μm) | 90μm (45-165μm) | 37μm (25-45μm) |
| **Ligand** | $-CH_2CH_2CH_2SO_3^-$ | | | | | |
| **Loading Capacity** | 180-250μmol $H^+$/ml resin | | 140-200μmol $H^+$/ml resin | 150-200μmol $H^+$/ml resin | 180-250μmol $H^+$/ml resin | 130-160μmol $H^+$/ml resin |
| **pH Stability** | 4-13 (Long) 3-14 (Short) | | 4-12 (Long) 3-14 (Short) | 4-13 (Long) 3-14 (Short) | | 4-12 (Long) 3-14 (Short) |
| **Pressure** | ⩽0.3MPa | | | | | ⩽0.5MPa |
| **Flow Rate** | 1800cm/h | 700 cm/h | 100 cm/h | 150 cm/h | 700 cm/h | 400 cm/h |
| **Chemical Stability** | All common buffer, 1.0m sodium hydroxide, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer | | | | | |
| **Storage** | 0.2M NaAc, 20% EtOH, 4-30°C | | | | | |

## GLKgel Strong Anion IEX Q Media

| | Q 6BB | Q 6FF | Q 6HF | Q 6HP | Q 6XL | Q HPR |
|---|---|---|---|---|---|---|
| **Substrate** | 6% cross-linked Agarose | | High-rigid Agarose | 6% cross-linked Agarose | 6% cross-linked Agarose with glucan | High-rigid Agarose |
| **Particle Size** | 200μm (165-300μm) | 90μm (45-165μm) | 90μm (45-165μm) | 37μm (25-45μm) | 90μm (45-165μm) | 37μm (25-45μm) |
| **Ligand** | $-N^+(CH_3)_3$ | | | | | |
| **Loading Capacity** | 180-250μmol $Cl^-$/ml resin | | 160-200μmol $Cl^-$/ml resin | 140-200μmol $Cl^-$/ml resin | 180-250μmol $Cl^-$/ml resin | 150-180μmol $Cl^-$/ml resin |
| **pH Stability** | 2-12 (Long Period) 2-14 (Short Period) | | 2-12 (Long) 2-14 (Short ) | 2-12 (Long) 2-14 (Short) | | 2-12 (Long ) 2-14 (Short) |
| **Pressure** | ⩽0.3MPa | | | | | ⩽0.5MPa |
| **Flow Rate** | 1800cm/h | 700 cm/h | 1000 cm/h | 150 cm/h | 700 cm/h | 400 cm/h |
| **Chemical Stability** | All common buffer, 1.0m sodium hydroxide, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer | | | | | |
| **Storage** | 20% EtOH, 4-30°C | | | | | |

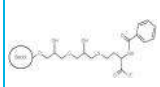
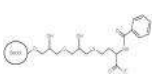
## GLKgel Strong Anion IEX MMA Media

| | Substrate | Particle Size | Ligand | Capacity | pH Stability | pH Stability | Flow Rate |
|---|---|---|---|---|---|---|---|
| **MMA 6HF** | High Rigid Agarose | 90μm (45-165μm) |  | 90-120μmol $Cl^-$/ml resin | 2-14 (Long) 4-12 (Short) | ⩽0.5 MPa | 1000 cm/h |
| **MMA HPR** | High Rigid Agarose | 37μm (25-45μm) |  | 80-110μmol $Cl^-$/ml resin | 2-14 (Long) 4-12 (Short) | ⩽0.5 MPa | 400 cm/h |
| **Chemical Stability** | All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer | | | | | | |
| **Storage** | 20% EtOH, 4-30°C | | | | | | |

## GLKgel Weak Cation IEX CM Media

| | CM 6FF | CM 6HF | CM 6HP | CM 6XL |
|---|---|---|---|---|
| **Substrate** | 6% cross-linked Agarose | High-rigid Agarose | 6% cross-linked Agarose | 6% cross-linked Agarose with glucan |
| **Particle Size** | 90μm (45-165μm) | 90μm (45-165μm) | 37μm (25-45μm) | 90μm (45-165μm) |
| **Ligand** | $-O-CH_2COO^-$ | | | |
| **Capacity** | 90-130μmol $H^+$/ml resin | 90-120μmol $H^+$/ml resin | 80-110μmol $H^+$/ml resin | 180-250μmol $H^+$/ml resin |
| **pH Stability** | 4-13 (Long) 2-14 (Short) | 4-12 (Long) 3-14 (Short) | 4-13 (Long) 2-14 (Short) | |
| **Pressure** | ⩽0.3 MPa | ⩽0.5MPa | ⩽0.3 MPa | |
| **Flow Rate** | 700 cm/h | 1000 cm/h | 150 cm/h | 700 cm/h |
| **Chemical Stability** | All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer | | | |
| **Storage** | 20% EtOH, 4-30°C | | | |

## GLKgel Weak Cation IEX MMC Media

| | Substrate | Particle Size | Ligand | Capacity | pH Stability | pH Stability | Flow Rate |
|---|---|---|---|---|---|---|---|
| **MMC 6HF** | High Rigid Agarose | 90μm (45-165μm) |  | 70-90μmol $H^+$/ml resin | 2-14 (Long) 3-12 (Short) | ⩽0.5 MPa | 1000 cm/h |
| **MMC HPR** | High Rigid Agarose | 37μm (25-45μm) |  | 60-80μmol $H^+$/ml resin | 2-14 (Long) 3-12 (Short) | ⩽0.5 MPa | 400 cm/h |
| **Chemical Stability** | All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer | | | | | | |
| **Storage** | 20% EtOH, 4-30d | | | | | | |

## GLKgel Weak Anion IEX DEAE Media

| | DEAE 6FF | DEAE 6HF | DEAE 6HP | DEAE 6XL |
|---|---|---|---|---|
| **Substrate** | 6% cross-linked Agarose | High-rigid Agarose | 6% cross-linked Agarose | 6% cross-linked Agarose |
| **Particle Size** | 90μm (45-165μm) | 90μm (45-165μm) | 37μm (25-45μm) | 90μm (45-165μm) |
| **Ligand** | $-N^+(CH_3)_3$ | | | |
| **Capacity** | 110-160μmol $Cl^-$/ml resin | 290-350μmol $Cl^-$/ml resin | 90-130μmol $Cl^-$/ml resin | 110-160μmol $Cl^-$/ml resin |
| **pH Stability** | 2-13 (Long)<br>1-14 (Short) | 2-12 (Long)<br>2-14 (Short) | 2-13 (Long)<br>1-14 (Short) | |
| **Pressure** | ⩽0.3 MPa | ⩽0.5MPa | ⩽0.3 MPa | |
| **Flow Rate** | 700 cm/h | 1000 cm/h | 150 cm/h | 700 cm/h |
| **Chemical Stability** | All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol<br>Avoid using oxidant, cationic detergent, cationic buffer | | | |
| **Storage** | 20% EtOH, 4-30°C | | | |

## GLKgel Weak Anion IEX ANX Media

| | Substrate | Particle Size | Ligand | Capacity | pH Stability | pH Stability | Flow Rate |
|---|---|---|---|---|---|---|---|
| **ANX 4FF** | 4% cross-linked Agarose | 90μm (45-165μm) | $-N^+(C_2H_5)_2H$ | 130-170μmol $Cl^-$/ml resin | 3-10 (Long)<br>2-14 (Short) | ⩽0.3 MPa | 250 cm/h |
| **Chemical Stability** | All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol<br>Avoid using oxidant, cationic detergent, cationic buffer | | | | | | |
| **Storage** | 20% EtOH, 4-30°C | | | | | | |

## Moderately Purified Fusion Protein

Sample: 20ml e. coli lysate

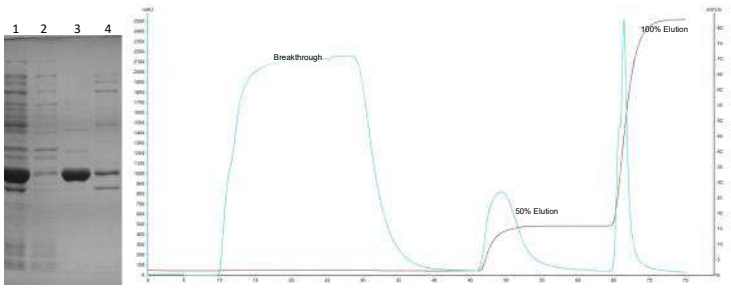
Column: GLKgel DEAE 6FF 1ml

Equilibrium solution: 0.02m Triethanolamine, pI7.5

Eluent: 0.02M Triethanolamine, 1.0M NaCl, pI7.5

Flow Rate: 1 ml / min

1. Original; 2. Breakthrough; 3. 50% Elution; 4. 100% Elution



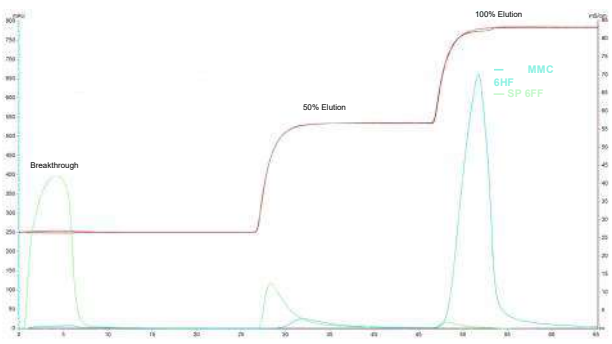

## MMC 6HF VS. SP 6FF

Column: 1ml

Sample: 25 mg BSA (pI 5.4-5.6) solve in 5ml equilibrium liquid

Equilibrium liquid: 0.05 M NaAc, 0.25 M NaCl pH4.75

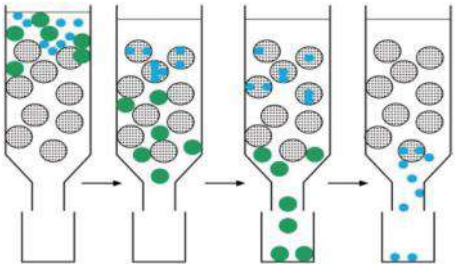
Eluant: 0.02MPB, 1.0M NaCl pH7.4



# Gel Filtration Chromatography Media

Gel filtration chromatography achieves the purpose of separation according to the size of solute molecules. Gel filtration chromatography is also known as volume exclusion chromatography, molecular sieve chromatography. Gel filtration chromatography media are inert spherical granular materials with porous network structure.

GALAK provide two types gel filtration media: crosslinked agarose microspheres and crosslinked glucan microspheres.



## GLKgel GFC Agarose Media

GALAK offers two types of agarose gel filtration media: 4% and 6% agarose gel. Crosslinked agarose gel (CL) exhibits better physical and chemical stability. High velocity agarose gel (FF) with its higher degree of crosslinking shows higher level of physical and chemical stability. They can be sterilized by heat and humidity, and withstand various working conditions in protein production.

| Products | Molecular Weight Range (globulin) | Particle Size | Pressure | Flow Rate | pH Range |
|---|---|---|---|---|---|
| **GFC 4B** | $6\times10^4$-$2\times10^7$ | 90μm (45-165μm) Customized Size: 25-46μm & 165-300μm | ⩽0.02MPa | 12 cm/h | 4-9 (Long) 4-9 (Short) |
| **GFC 4FF** | $7\times10^4$-$2\times10^7$ | | ⩽0.3MPa | 250 cm/h | 2-12 (Long) 2-14 (Short) |
| **GFC 6B** | $1\times10^4$-$4\times10^6$ | | ⩽0.02MPa | 14 cm/h | 4-9 (Long) 4-9 (Short) |
| **GFC CL-6B** | $1\times10^4$-$4\times10^6$ | | ⩽0.05MPa | 30 cm/h | 3-12 (Long) 2-14 (Short) |
| **GFC 6FF** | $1\times10^4$-$4\times10^6$ | | ⩽0.3MPa | 300 cm/h | 2-12 (Long) 2-14 (Short) |

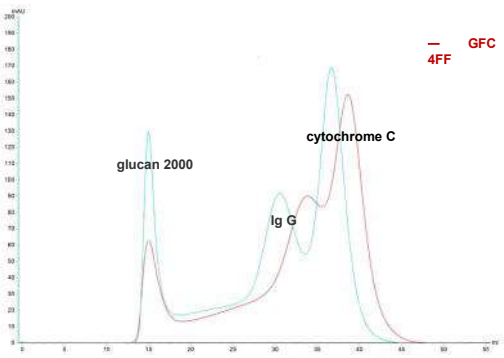
### Separation effect of GFC 4FF vs. GFC 6FF

Column volume: 42ml (XK12/40, loading height: 37cm)

Loading Capacity: 0.5% CV (5mg/ml glucan 2000, 10mg/ ml IgG, 10mg/ml cytochrome C)

Flow Rate: 10 cm/h

Buffer: 20 mM $Na_2HPO_4$, 0.15M NaCl, pH7.0

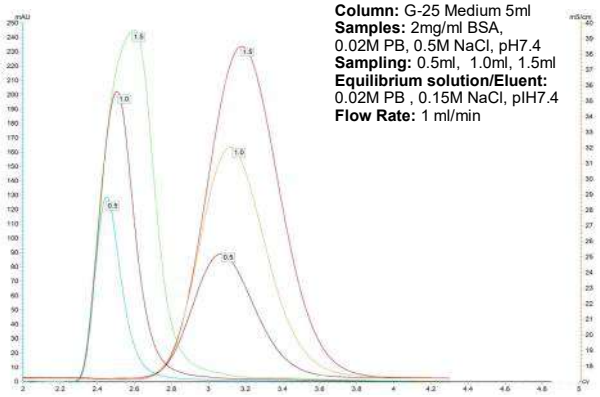


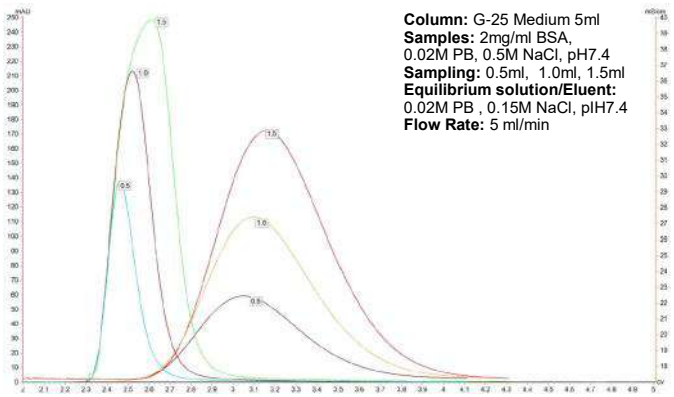
## GLKgel GFC Glucan Media

Cross-linked glucan is a globular gel that contains a large number of hydroxyl groups and is prone to swelling in water and electrolyte solutions. G-type cross-linked glucans have different crosslinking degrees, their swelling degree and separation range are different. The swelling degree of crosslinked glucan is not affected by the presence of salt and detergent.

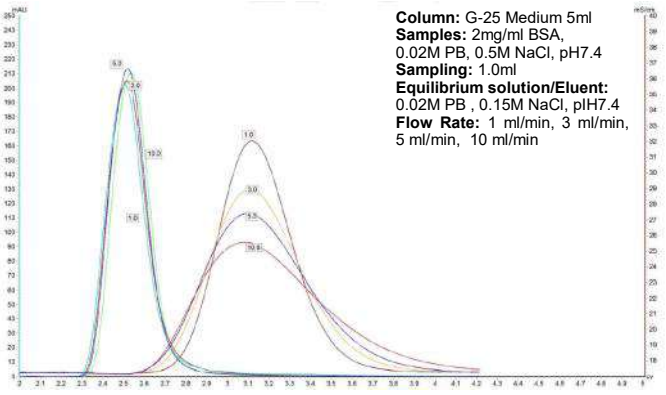
| Products | Molecular Weight Range (globulin) | Particle Size (Powder) | Swelling Degree (ml/g) | Flow Rate | pH Range |
|---|---|---|---|---|---|
| **GFC G-25 Coarse** | $1\times10^3$-$5\times10^3$ | 165-300μm | 4-6 | 300 cm/h | 2-13 |
| **GFC G-25 Medium** | | 45-165μm | 4-6 | 150 cm/h | |
| **GFC G-75 Medium** | $3\times10^3$-$8\times10^4$ | 45-165μm | 12-15 | 80 cm/h | |
| **GFC G-75 Fine** | | 25-45μm | 12-15 | 20 cm/h | |

## Desalting Effect Comparison



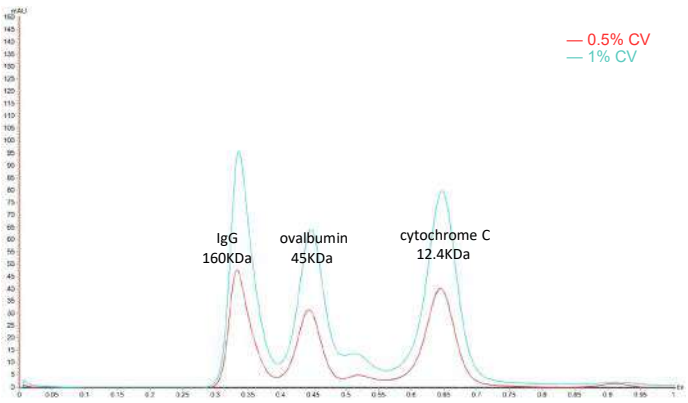




Desalting of G-25 Medium has not effect by different sampling and flow rate.



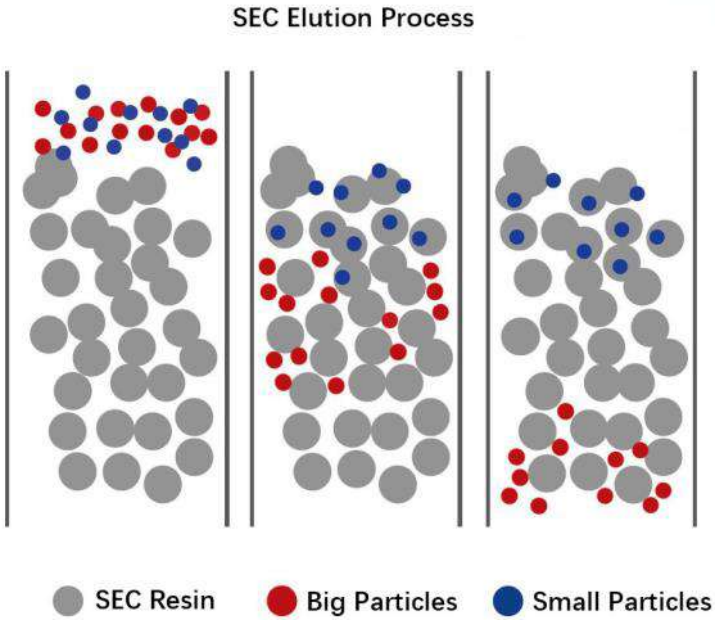

### Small Molecular Protein Purification

Column: G-25 Fine HK16/40, bed height 34.5cm
Samples: 2mg/ml IgG, 4mg/ml ovalbumin, 2mg/ml cytochrome C (8mg mixed protein/ml)
Buffer: 20M PB , 150M NaCl, pIH7.4
Flow Rate: 11 ml/min
Sampling: 0.5% CV, 1.0% CV



# SEC Column

GALAK SEC columns are a family of high performance, size exclusion chromatography (SEC) columns for separating a broad range of biomolecules based on the size of analytes. The column technology involves creation of a neutral hydrophilic layer on the surface of specially designed high-strength monodispered silica particles followed by well established production process. Therefore, GALAK SEC columns can be used in pharmaceutical, biopharmaceutical and academic research applications.

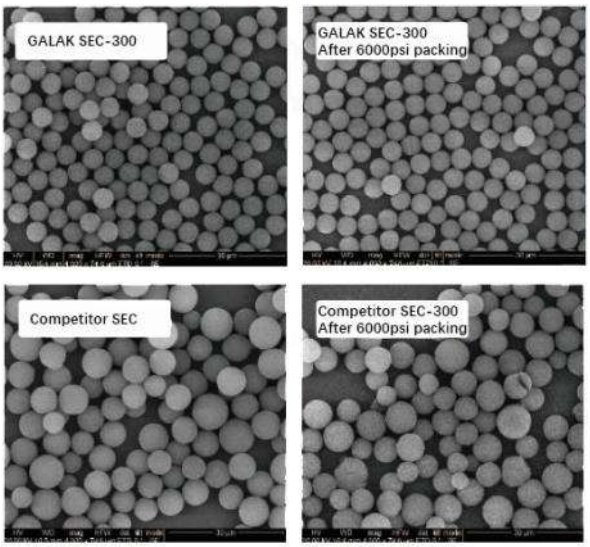


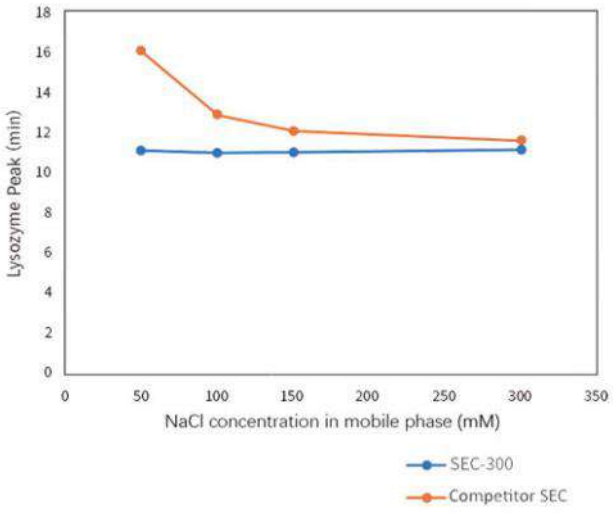

**Features**

High column efficiency, high resolution;
Minimal undesired interactions between stationary phase and analytes, resulting in good peak shape and recovery;
High physical strength for better column lifetime;
Broad range of applications, including small molecule drugs, peptides, proteins, oligos, glycans, etc.

**Types**

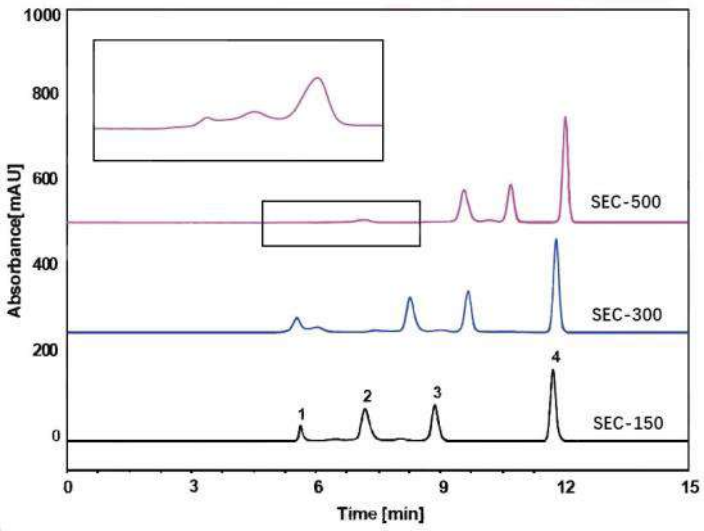
SEC-150 - designed for separating peptides, glycans, small oligos, small proteins.
SEC-300 - designed for mAb aggregate determination.
SEC-500 - designed for separating larger proteins and oligos.



## Parameter

| | SEC-150 | SEC-300 | SEC-500 |
|---|---|---|---|
| **Ligand** | Diol | | |
| **Substrate** | Monodisperse High-pure Silica Particle | | |
| **Particle Size** | 5um | | |
| **Pore Size** | 150A | 300A | 500A |
| **pH Range** | 2-8 | | |
| **Temperature** | ＜40℃ | | |
| **Pressure** | 6000psi | | |
| **Ligand Range (PEG)** | 200-15,000 | 1.000-100,000 | 5,000-200,000 |
| **Ligand Range (Glucan)** | 1,000-50,000 | 5,000-150,000 | 20,000-500,000 |
| **Ligand Range (Globular Protein)** | 5,000-150,000 | 10,000-1,000,000 | 20,000-2,000,000 |




**Column Black:** SEC-150, 5μm

**Column Blue:** SEC-300, 5μm

**Column Red:** SEC-500, 5μm

**Dimension:** 4.6×300mm

**Mobile phase:** 150 mM Phosphate Buffered Saline (pH 6.8)

**Flow rate:** 0.35 mL/min

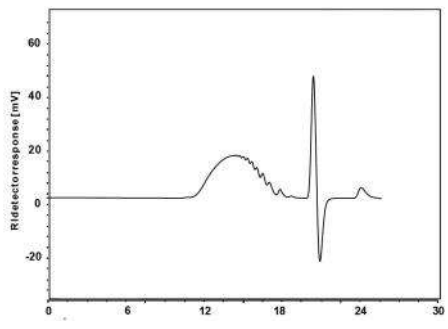
**Temperature:** 30 ℃

**Injection:** 5μL

**Detection:** UV 280 nm

**Peaks:**

1. Thyroglobulin (0.5mg/mL) -669,000Da
2. Conalbumin (1mg/mL) -75,000Da
3. Ribonuclease A (1mg/mL) -13,700Da
4. Uracil (0.1mg/mL) –112Da




**Column:** SEC-150, 5μm
**Dimension:** 7.8×300mm

**Mobile phase:** 100 mM Ammonium Acetate

**Flow rate:** 0.5 mL/min

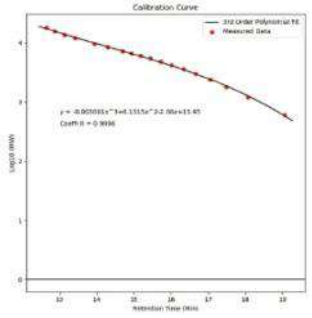
**Temperature:** 35 ℃

**Injection:** 25 μL

**Detection:** RID (35℃)

**Sample:** Low molecular weight heparin to adjust CRS (10 mg /mL)

GPC simulation software: Correlation coefficient= 0.9996



| | 5um 7.8×300mm | 5um 4.6×300mm | 5um 4.6×50mm | 5um 4.6×10mm |
|---|---|---|---|---|
| **SEC-150** | 213-05015-07830 | 213-05015-04630 | 213-05015-04605 | 213-05015-04601 |
| **SEC-300** | 213-05030-07830 | 213-05030-04630 | 213-05030-04605 | 213-05030-04601 |
| **SEC-500** | 213-05050-07830 | 213-05050-04630 | 213-05050-04605 | 213-05050-04601 |

# VirCap® Perfusion Media

Perfusion chromatography media with their large pore structure, are widely used in biomolecule purification due to low mass transfer barriers. During last 25 years, this type of media have been proven as a powerful tool in biopharma separation.

## Characteristic

- **Large Pore Size**

1000-3000Å pore size, enable the diffusion and mass transfer for large biomolecules.

- **Particle Size**

35-85 micron particles, satisfy your purification processing requests.

- **Rigid Microspheres**

Maximum pressure is over 870psi(60 bar), excellent mechanical property.

- **Flexible Tentacles**

Higher recovery rate and target purity, with excellent combination and capture capability .

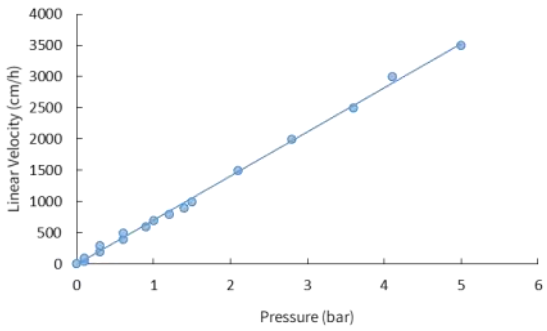
- **Harsh Clean-in-Place Condition (CIP)**

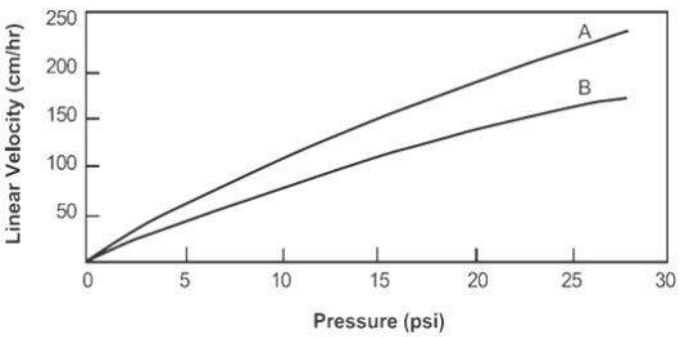
0.5-1M NaOH, organic solvent, high salt solvent.

- **Robust Chemical Stability**

VirCap® particles are rigid polymeric particles that are coated with a proprietary hydrophilic polymer onto which the various functional groups (ion exchange, affinity, etc.) are covalently attached.

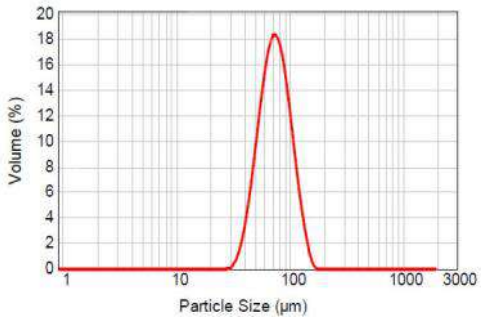
| | |
|---|---|
| **Substrate** | Hydrophilic PS/DVB Microspheres |
| **Particle Size** | 50um, 70um |
| **Function Group** | Heparinoid, IEX Ligand |
| **Dynamic Binding Capability** | 80mg lysozyme/ml |
| **Flow Rate** | 1000cm/h (20°C, buffer solution viscosity same as water，pressure < 3 bar / 43.5psi, column bed height 20cm) |
| **Column Bed Height** | 20-40cm |
| **pH Stability** | 1-14 |
| **Working Temperature** | 4-30°C |
| **CIP Condition** | 0.5-1M NaOH |
| **Storage** | 2-8°C 20% EtOH |

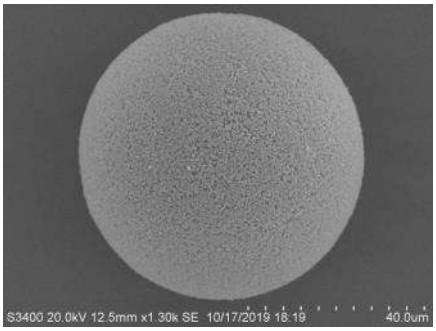


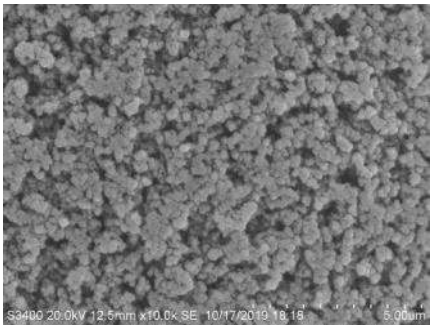



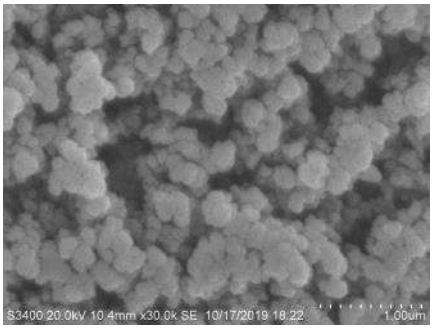
## Rigid Microsphere With Large Pore Size

VirCap® particles large “through-pores”. These large through -pores allow part of mobile phase flow through, quickly carrying biomolecules to smaller diffusive pores. The large through-pores reduce diffusion rate of biomolecules and enhance interaction between biomolecules and functional groups on the surface. Consequently, mass transfer barriers are lowered, and flow rate can be increased - without compromising capacity or resolution.



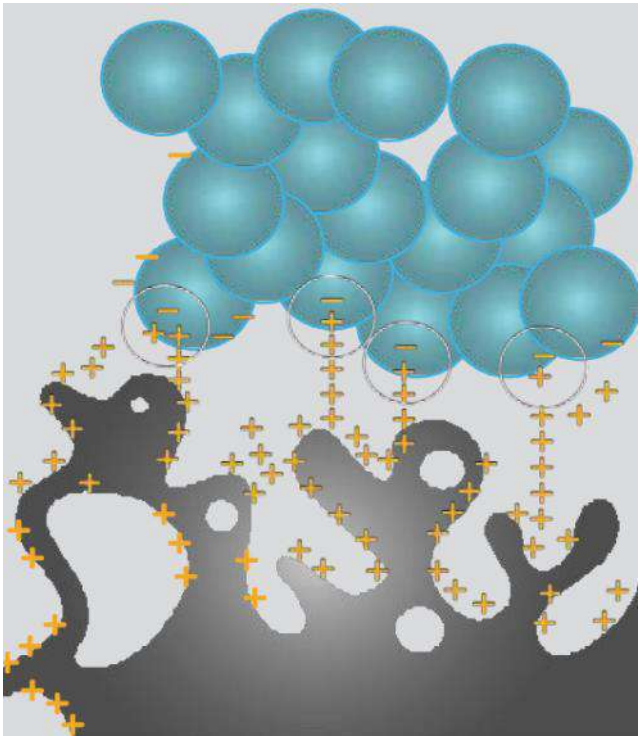





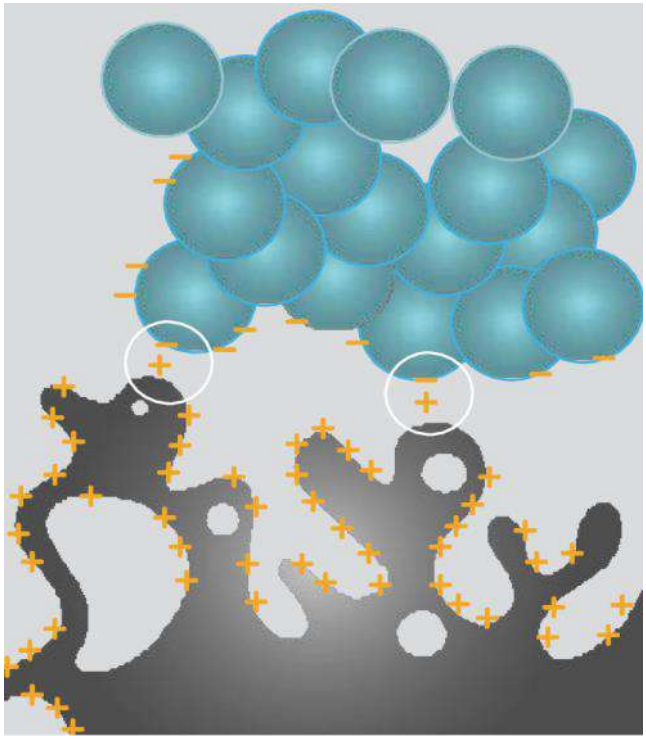

## Flexible Tentacles

Flexible tentacle structure minimizes the steric hindrance between functional groups and target molecules. It also improves the binding capability of the target material.
Compared to traditional media, VirCap® media show more effective capture and higher recovery.

**Tentacle ion chromatography media**



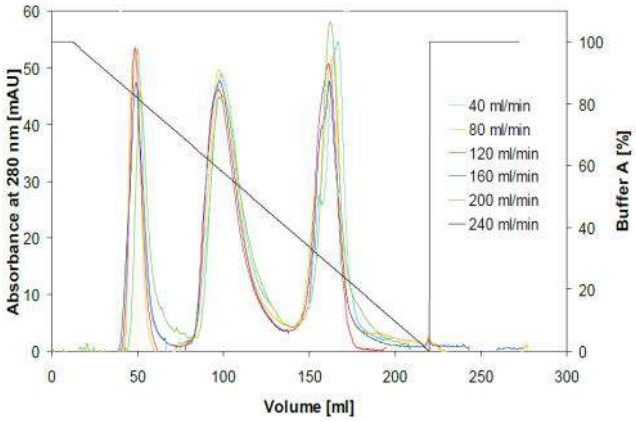
**Traditional ion chromatography media**



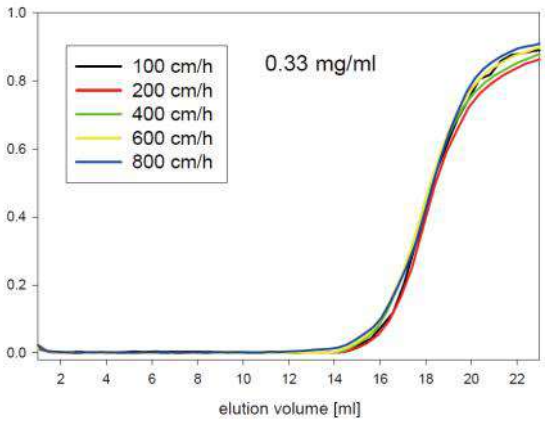
## High Flow Rate, Low Backpressure

VirCap® media offer an excellent balance of resolution and operating backpressure.

Under recommended condition of mobile phase, VirCap® media exhibit almost no shrinkage or expansion. The combination of through-pores and flexible tentacles ensures rapid diffusion of solute. It also reduces the barrier of mass transfer, and realizes high dynamic binding capacity (DBC) under the operation of high flow rate.




**Peak width at different flow rates (VirCap® media 3000Å)**

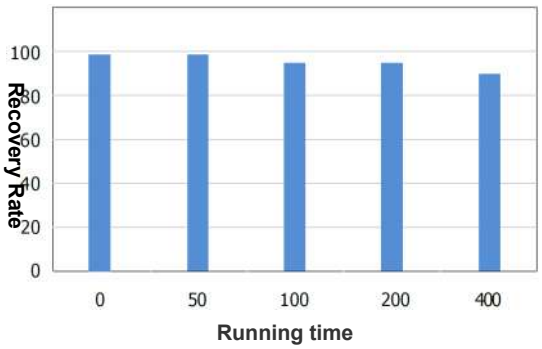



**Dynamic capability at different flow rates (VirCap® media 3000Å)**

## Robust Chemical Stability

VirCap® media are highly cross-linked polymeric particles coated with a proprietary hydrophilic layer on which various functional groups (ion exchange, affinity, etc.) are covalently attached. The result is chemically stable product that is ideally suitable for large-scale biopharmaceutical separation.

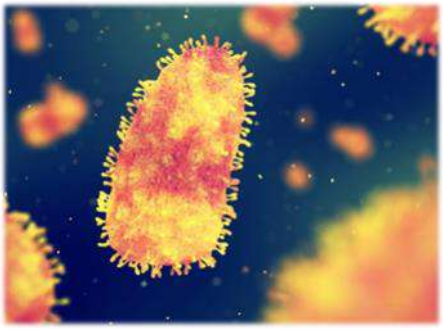
| Lot | RT | Area | Height | TP | As |
|---|---|---|---|---|---|
| 1 | 2.652 | 537586 | 190057 | 29507 | 1.10 |
| 2 | 2.641 | 536434 | 187236 | 26529 | 1.21 |
| 3 | 2.602 | 533688 | 186841 | 27349 | 1.12 |
| 4 | 2.599 | 531408 | 188244 | 29147 | 1.05 |
| 5 | 2.622 | 534911 | 187224 | 26901 | 0.98 |
| 6 | 2.647 | 540382 | 188746 | 26862 | 1.19 |
| 7 | 2.626 | 531906 | 188743 | 27855 | 1.08 |
| 8 | 2.628 | 540015 | 189618 | 28034 | 1.11 |
| 9 | 2.610 | 541372 | 188711 | 26567 | 1.16 |
| 10 | 2.623 | 527072 | 185477 | 26420 | 1.20 |




## VirCap® AF media Application

| Viruses | | Viral/Microbial Antigens |
|---|---|---|
| Rabies | Feline Calicivirus | Herpes Simplex gA and gB Glycoprotein Subunits |
| Influenza | Respiratory Syncytial Virus | Hepatitis B Surface Antigen |
| Japanese Enchephalitis | Human Herpes Simplex | Filamentous Hemagglutinin from B. pertussis |
| Feline Leukemia | Human Measles | Leucocytosis Promoting Factor Hemagglutinin |
| Feline Herpes | Human Parainfluenza | |

## One-step Rabies Virus Purification



Rabies infection is known to be fatal. Efficacious and safe rabies vaccines for pre and post exposure treatment are available. However the cost of the vaccine and the huge need worldwide are the main hurdles for an equitable and global use of human rabies vaccine. A better option is purified rabies vaccine for dogs. GALAK offers VirCap® AF materials that allow a single step purification of rabies vaccine after inactivation.

**Test Condition:**

Column: VirCap® AF 1ml prepacked column

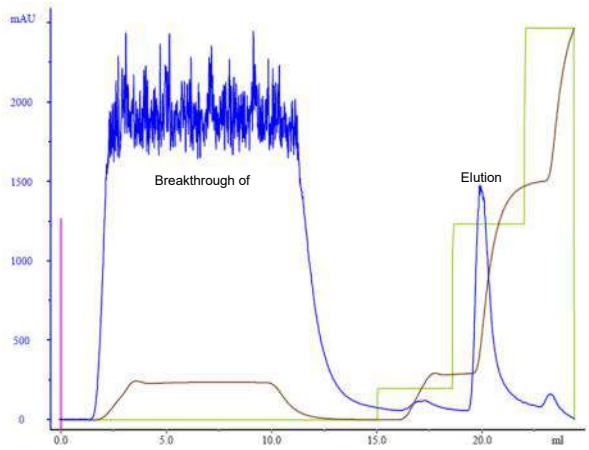
Mobile phase A: 10mM PB pH7.4

Mobile phase B: 10mM PB pH7.4 2M NaCl

Flow Rate: 0.5ml/min

Testing: UV 280nm

Sample: Clarified virus medium

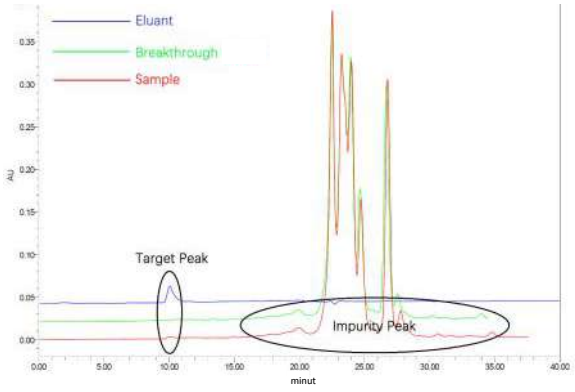



**Purification Chromatogram For Rabies Virus**

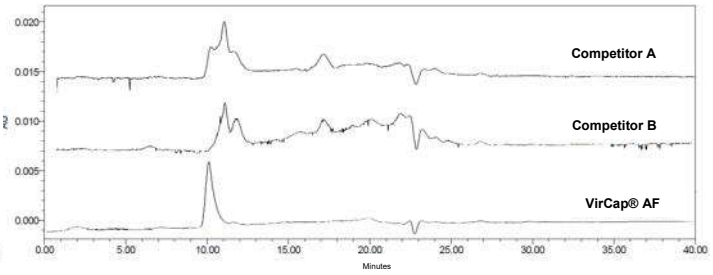


Using HPSEC analysis for the tests of sample solution, percolation fluid and collection fluid, and no peak of target in break-though at RT=10min. VirCap® AF media elutes virus particles by changing the ion strength in mobile phase. Both the purity and concentration of the virus improves significantly.

Parallel tests of HPSEC analysis for target peak collection is also done among competitors.




**HPSEC Analysis For Rabies Virus Purification**




**Parallel tests of HPSEC analysis for target peak collection**

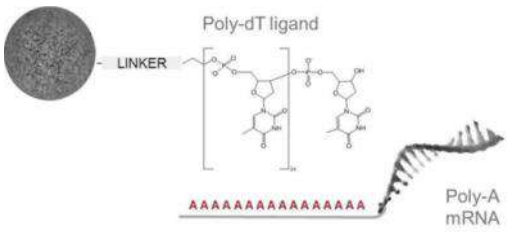
### CIP and Clearance

Frequency of Clean-in-Place (CIP) depends on properties and conditions of solvent.

For the capture step, we suppose at least 30 minutes of 1 M NaOH countercurrent CIP process after each running.

To reduce microbial contamination in the prepacked column, clean with 0.5 to 1.0 M NaOH, 1 h contact time is recommended.

# VirCap® Oligo dT(25) Affinity Resin




VirCap® Oligo dT(25) Affinity Resin is based on rigid, 50µm polymeric resin designed to isolate messenger RNA (mRNA). The resin backbone consists of crosslinked PS-DVB (polystyrene divinylbenzene).

The polyhydroxy surface coating provides low non-specific binding. The surface is functionalized with a linker and poly dT(25) functional group allowing capture of mRNA through H-bonding pairing with the mRNA polyA tail.

VirCap® Oligo dT(25) Affinity Resin provides efficient capture and easy release under standard mRNA purification conditions. It thereby decreases process development time and enhances productivity. In addition, the selective nature of this resin allows a reduction in plasmid DNA and other transcription mix components. The resin is also stable at elevated temperatures for the breakdown of undesired higher-order structures if required.

## Features:

- Easy mRNA purification to separate non-poly A tail contaminents
- Simplified workflow helps to maximize efficiency, thereby reducing complexity of subsequent polish steps
- Excellent scalability
- Non-animal derived

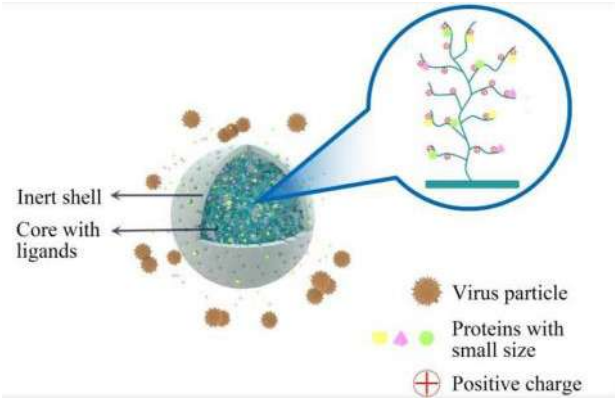
*VirCap® Oligo ligands are manufactured using a synthetic manufacturing process that are free of animal components.*

## Specification

| | |
|---|---|
| **Support matrix** | Cross-linked PS-DVB |
| **Surface functionality** | dT-25mer |
| **Ligand density** | ⩾ 0.2 umol dT/mL resin |
| **Shipping solvent** | 20% ethanol |
| **Average particle size** | 50 µm |
| **Average pore diameter** | 200 nm |
| **Mechanical resistance** | 1000 psi (6.9 MPa) |
| **Suggested compression factor** | 1.06 |
| **Operating temperature** | 2 to 65℃ Do not freeze |

# VirCap® InertShell Core-Shell Resin

VirCap® InertShell is designed with the core-shell technology. It is for purification of viruses and other large biomolecules. The core-shell technology allows for combining size exclusion separation with IEX chromatography. Viruses and other large biomolecules that are too large to penetrate the inert shell of the chromatography resins are collected in flow through fraction (FT mode). Contaminants (< Mr 700 000) on the other hand pass through the inert outer shell and bind to the ligands in the inner core.



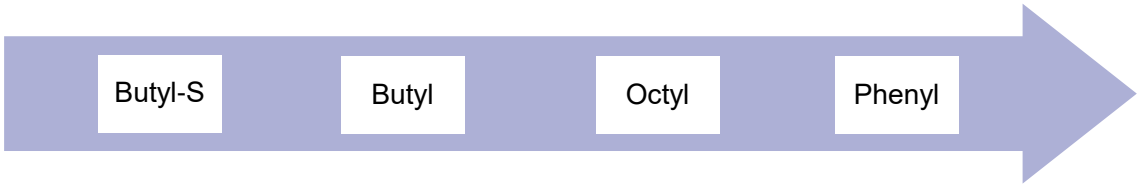

VirCap® InertShell is made polymethacrylate microspheres with octylamine ligand, inside the pore as shown in Pic 1. The shell of the microspheres is neutral and hydrophilic, which has no biomolecule adsorption. The pore size of the shell (50-100 nm) is smaller than that of the core (200-500 nm). And the thickness of the shell is about 0.5-1.0μm. The shell prevents proteins (molecular weights greater than 700 kDa) from entering the core. In the chromatography process, large-size viruses or other large biomolecules cannot enter the microsphere core that they are breakthrough and be collected quickly. The octylamine ligand in the core realize its dual functions of anion exchange and hydrophobicity, capturing protein molecules with molecular weight less than 700 kDa. VirCap® InertShell can effectively remove host cell proteins(HCP's), DNA fragment, endotoxin, albumin and other.

## Specification

| | VirCap® Inert Shell | Capto Core 700 |
|---|---|---|
| Matrix | Polyacrylate | Highly cross□linked agarose |
| Ligand | Octylamine | Octylamine |
| Average particle size | 50-150 μm | 50-150 μm |
| Density of ligand | 0.10-0.20 mmol/mL | 0.04-0.085 mmol/mL |
| Binding capacity[1] | 6-12 mg BSA/mL resin | 12 mg BSA/mL resin |
| Operational pressure | ≤1.0 MPa | ≤0.3 MPa |
| Operational flow rate | 100-600 cm/h | 100-600 cm/h |
| pH stability | 3-13 | 3-13 |
| Temperature | 4-30℃ | 4-30℃ |
| Chemical stability | All commonly used aqueous buffers, 1 M sodium hydroxide (NaOH), 6 M guanidine hydrochloride, 30% isopropanol, and 70% ethanol. | |
| Storage | 20% ethanol at 4°C to 25 ℃ | |

# Hydrophobic Interaction Chromatography

Hydrophobic interaction chromatography (HIC) is used for separating based on the difference of hydrophobicity of proteins. The separation is basically reversible interaction between protein and hydrophobic groups on the surface of the hydrophobic media.




## GLKgel HIC Butyl-S Media

| | Substrate | Particle Size | Ligand Content | pH Stable | Flow Rate |
|---|---|---|---|---|---|
| Butyl-S | 6% cross-linked Agarose | 90μm 45-165μm | 10 μmol/ml media | 2-14 (Short) 3-13 (Long) | 400 cm/h |

## GLKgel HIC Butyl Media

| | Substrate | Particle Size | Ligand Content | pH Stable | Flow Rate |
|---|---|---|---|---|---|
| Butyl 4FF | 4% cross-linked Agarose | 90μm 45-165μm | 40μmol/ml media | 2-14 (Short) 3-13 (Long) | 400cm/h |
| Butyl 6HP | 6% cross-linked Agarose | 37μm 25-45μm | 50μmol/ml media | 2-14 (Short) 3-13 (Long) | 150cm/h |



## GLKgel HIC Butyl Media

| | Substrate | Particle Size | Ligand Content | pH Stable | Flow Rate |
|---|---|---|---|---|---|
| Butyl-S | 4% cross-linked Agarose | 90μm 45-165μm | 40 μmol/ml media | 2-14 (Short) 3-13 (Long) | 400 cm/h |

## GLKgel HIC Phenyl Media

| | Substrate | Particle Size | Ligand Content | pH Stable | Flow Rate |
|---|---|---|---|---|---|
| Phenyl 6FF-LS | 6% cross-linked Agarose | 90μm 45-165μm | 20μmol/ml media | 2-14 (Short) 3-13 (Long) | 400cm/h |
| Phenyl 6FF-HS | 6% cross-linked Agarose | 90μm 45-165μm | 40μmol/ml media | 2-14 (Short) 3-13 (Long) | 400cm/h |
| Phenyl 6HP | 6% cross-linked Agarose | 37μm 25-45μm | 25μmol/ml media | 2-14 (Short) 3-13 (Long) | 150cm/h |

### HIC Column

HIC Column separation materials are prepared by bonding hydrophobic groups on hydrophilic surface based on monodisperse polymer microspheres. Based on the hydrophobic mechanism under non-densification conditions, it is used for the separation and analysis of various biological molecules such as proteins.

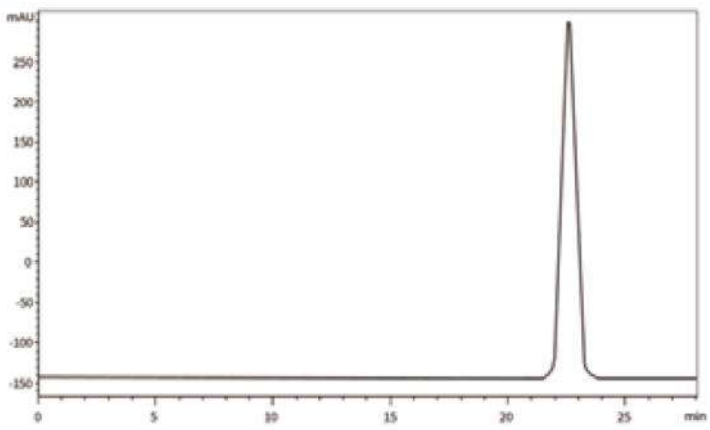
The HIC series includes Hic-Butyl and Hic-phenyl, which offer different selectivity for different types of protein isolation.

| Product | Ligand | Particle Size | Pore Size | Pressure |
|---|---|---|---|---|
| HIC-Butyl | Butyl | 15um | 1000A | 4.0MPa |
| HIC-Phenyl | Phenyl | 15um | 1000A | 4.0MPa |

# Sugar Analysis Column

Galaksil suger analysis column can meet the analysis requirements of different types of polysaccharides, sugar alcohols and organic acids. These columns are produced with two kinds of PS-DVB monodisperse microsphere with different degree of cross-linking. Hydrogen-type, sodium-type and calci--type were formed through a unique sulfonation bonding process based on coordination exchange principle., they shows different selectivity in the analysis.

| | Suger-10H | Suger-10Ca | Suger-10Na |
|---|---|---|---|
| **Ligand** | $-SO_3H$ | $-SO_3Ca$ | $-SO_3Na$ |
| **Substrate** | Monodisperse PS-DVB substrate | | |
| **Particle Size** | 6um/8um | | |
| **Degree of crosslinking** | 0.1 | | |
| **pH Range** | 1-3 | 5-9 | 5-9 |
| **Temperature** | <95°C | | |
| **Pressure** | 1200psi | | |
| **Application** | Organic acids and alcohols mixer | honey and oligosaccharides | sugars and mannitols |




### Riboviron, RBV

Column: Sugar-10H, 8um

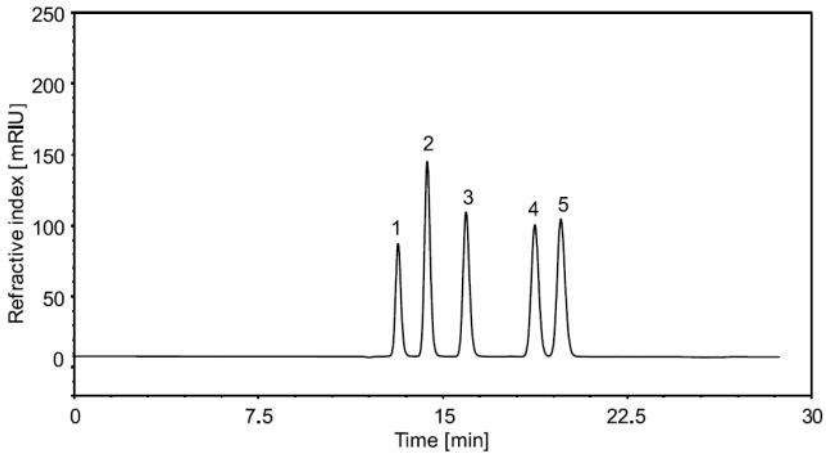
Dimension: 7.8×300mm

Mobile phase: H2SO4 H2O, pH2.5

Flow rate: 0.5mL/min

Temperature: 30°C

Detection: UV207nm




**Column:** Sugar-10H, 6um

**Dimension:** 7.8x300mm

**Mobile phase:** 9mM H2SO4

**Flow rate:** 0.5mL/min

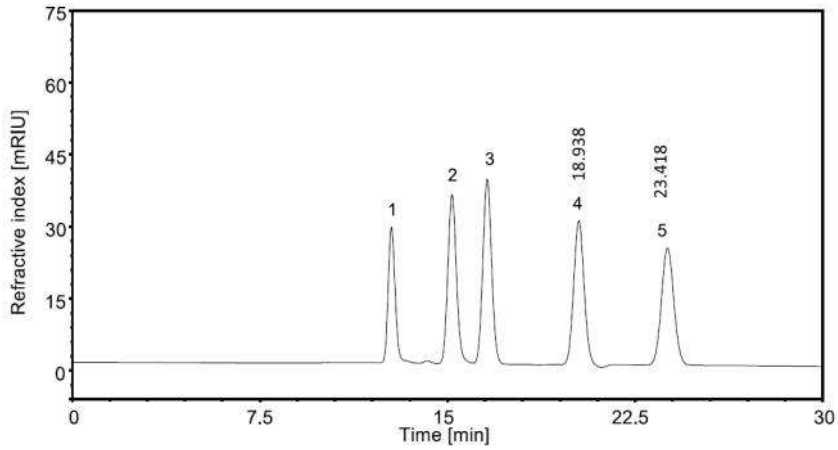
**Temperature:** 65℃

**Injection:** 5μL

**Detector:** RID

**Samples:**

1. Citric acid; 2. Malic acid; 3. Succinic acid;
4. Formic acid; 5. Acetic acid.




**Mannitol**

**Column:** Sugar-10Ca, 6um

**Dimension:** 7.8x300mm

**Mobile phase:** H2O

**Flow rate:** 0.5mL/min

**Temperature:** 80°C

**Injection:** 5uL

**Detection:** RID

**Sample:**

1. Sucrose; 2. Galactose;
3. Fructose; 4. Mannito; 5. Sorbitol

| Particle Size | Column Size | Sugar-10H | Sugar-10Na | Sugar-10Ca |
|---|---|---|---|---|
| 6um | 4.6*250mm | 017-06010-04625 | 058-06010-04625 | 019-06010-04625 |
| | 7.8*250mm | 017-06010-07825 | 058-06010-07825 | 019-06010-07825 |
| 8um | 4.6*250mm | 017-08010-04625 | 058-08010-04625 | 019-08010-04625 |
| | 7.8*250mm | 017-08010-07825 | 058-08010-07825 | 019-08010-07825 |



# DNA Analysis Columns

- DNA RP columns are based on macroporous PS/DB microspheres with high crosslinking degree and they are suitable for the separation of large DNA and RNA molecules.
- DNA 120-C18, based on 120A pore diameter monodispersed C18 bonded silica gel, is used for the separation of smaller oligonucleotides.
- DNA 1000-C18 is based on 1000A pore diameter monodispersed C18 bonded silica gel for the separation of large oligonucleotides, DNAs and RNAs.

| Product | Substrate | Particle Size | Pore Size | Column Size |
|---|---|---|---|---|
| **DNA RP** | PS-DVB | 5um | 1000A | 4.6×150mm<br>4.6×100mm<br>4.6×50mm<br>2.1×150mm<br>2.1×100mm<br>2.1×50mm |
| **DNA 120-C18** | Silica | 3um/5um | 120A | |
| **DNA 1000-C18** | Silica | 3um/5um | 1000A | |

# Magnetic Beads

## For histidine-tagged proteins

rProtein A/G & Ni NTA magnetic beads design for simple small-scale purification of histidine-tagged proteins. Magarose beads are suitable for purification of a single sample or multiple samples in parallel for example in screening experiments.

GALAK Magarose Beads can be used together with Eppendorf microcentrifuge tubes and a magnetic rack, for example, MagRack 6. GALAK Magarose Beads can be easily separated from the liquid phase during the different steps of the purification protocol.

### rProtein A/G Magnetic Beads

| | |
|---|---|
| **Substrate** | Magnetic agarose microspheres |
| **Ligands** | Recombinant protein A/G |
| **Combined ability** | >10mg hIgGml / magnetic beads |
| **Particle size** | 30-100 μm |
| **Storage buffer** | 1XPBS containing 20% ethanol |
| **Volume** | Suspend in protection solution, 20% content |
| **Storage temperature** | 2°C-8°C |

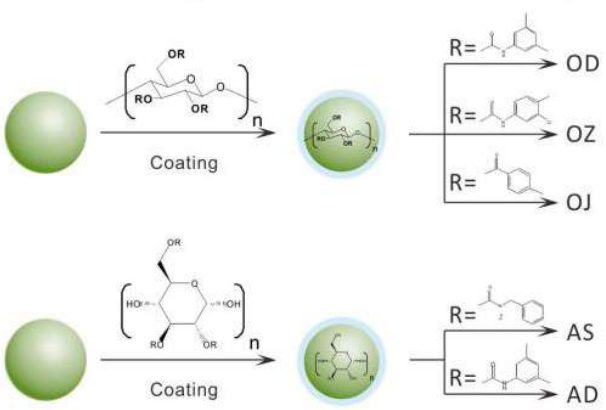
### Ni NTA Magnetic Beads

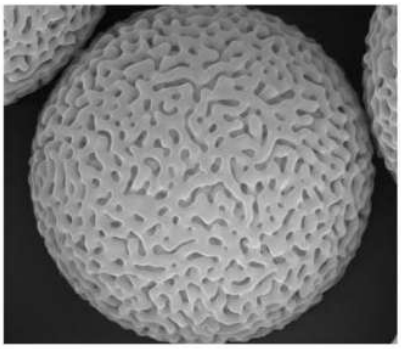
| | |
|---|---|
| **Substrate** | Magnetic agarose microspheres |
| **Combined ability** | >10mg 6XHis-tagged protein / magnetic beads |
| **Particle size** | 30-100 μm |
| **Storage buffer** | 1XPBS containing 20% ethanol |
| **Magnetic bead volumes** | Suspend in protection solution, 20% content |
| **Protective buffer** | 20% EtOH 1XPBS |
| **Storage temperature** | 2°C-8°C |

# Chiral Column

GALAK Chiral Columns are designed for chiral separation. Unichiral® is polysaccharide derivative bond with microporous silica-gel substrate which has the advantages of high capacity of cellulose/ amylose derivative, good stability and high chiral separation ability.

GALAK Chiral Columns include OD, OJ, OZ, AS and AD series. 5um columns are for analysis, 10um columns are for preparation. OD and AD columns are the most widely used for HPLC analysis, semipreparative, SFC of chiral compound.

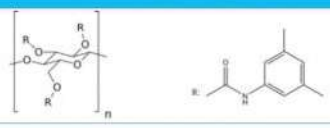
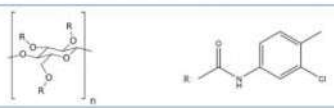


SEM Photo for UniChiral® 5μm 1000Å Chiral (50,000 times)

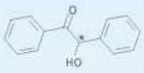
## Specification



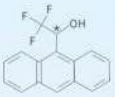
| Product | Functional Group | Particle Size |
|---|---|---|
| OD |  | 5μm<br>10μm |
| | Cellulose tris (3,5-dimethylphenylcarbamate) | |
| OJ |  | |
| | Cellulose tris (4-methylbenzoate) | |
| OZ |  | |
| | Cellulose tris(3-chloro-4-methylphenylcarbamate) | |
| AS |  | |
| | Amylose tris [(S)-α-methylbenzylcarbamate] | |
| AD |  | |
| | Amylose tris (3,5-dimethylphenylcarbamate) | |

## Compare with famous Chiral Column

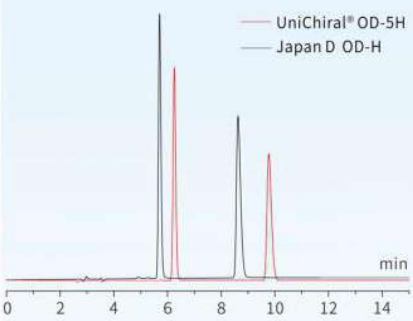
Sample: Trans-Stilbene oxide
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

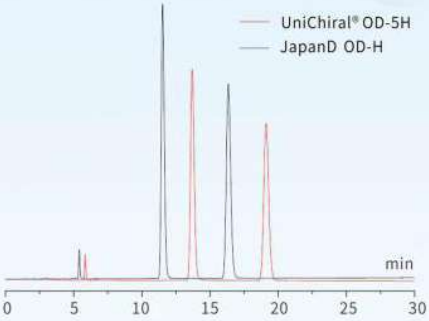


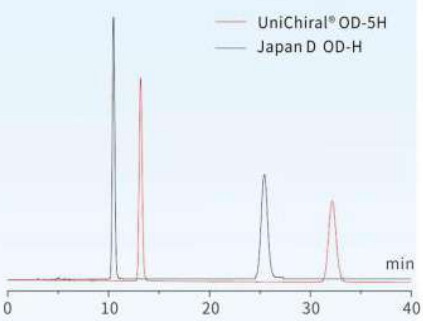
Sample: Benzoin
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



Sample: 2,2,2-Trifliuoro-1
(9-anthryl)ethanol
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



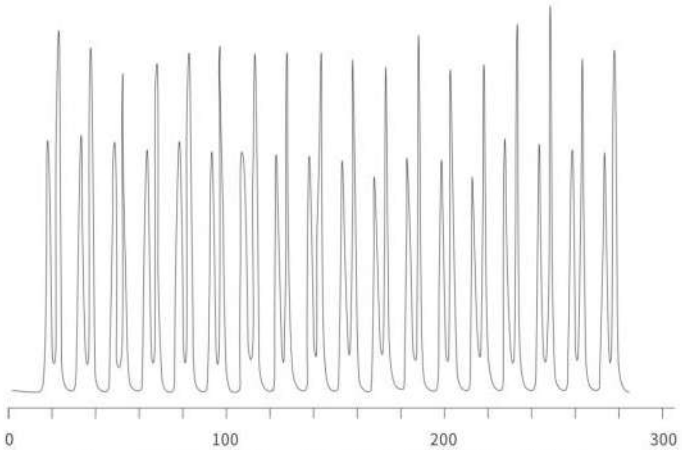

| Theoretical Plates | | Tailing Factor | | α | |
|---|---|---|---|---|---|
| UniChiral | Japan D | UniChiral | Japan D | UniChiral | Japan D |
| 16222 | 15267 | 1.149 | 1.214 | 2.07 | 2.07 |
| 14779 | 13740 | 1.345 | 1.437 | | |

| Theoretical Plates | | Tailing Factor | | α | |
|---|---|---|---|---|---|
| UniChiral | Japan D | UniChiral | Japan D | UniChiral | Japan D |
| 11899 | 12219 | 1.167 | 1.197 | 1.50 | 1.56 |
| 12707 | 12150 | 1.114 | 1.154 | | |

| Theoretical Plates | | Tailing Factor | | α | |
|---|---|---|---|---|---|
| UniChiral | Japan D | UniChiral | Japan D | UniChiral | Japan D |
| 9138 | 8300 | 1.101 | 1.090 | 2.85 | 2.99 |
| 8287 | 7205 | 1.066 | 1.058 | | |

Compare with Japan products, UniChiral® chiral column media has similar selective, higher column efficiency, and better peak type symmetry.

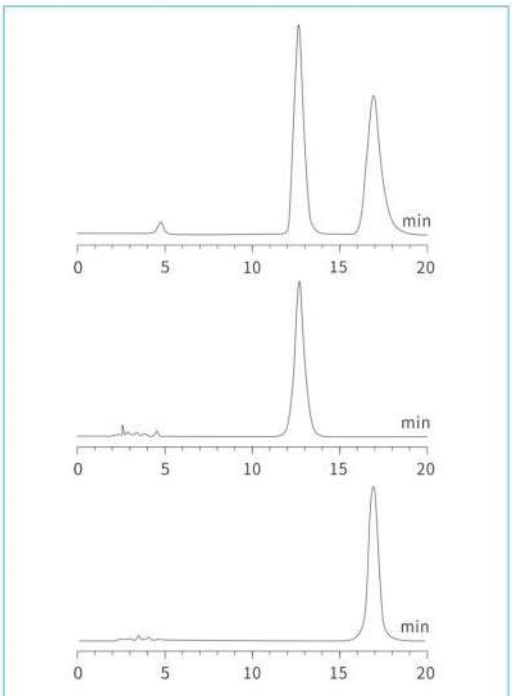





Chromatogram of continuous injection for 20 times

## Chiral Column Application

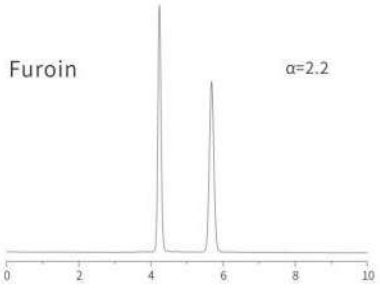
Column: UniChiral® OD-5H
50×250mm
Injection: 100mg every time
ee Value: >99
Yield: ~90%
Flow Rate: 80mL/min
Column Pressure: 2MPa



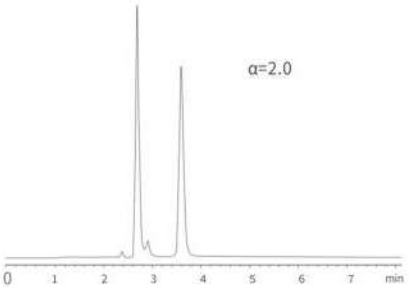

Analysis of compounds before and after resolution

UniChiral® chiral column has lower pressure and satisfied separation ability.

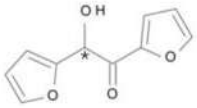
Furoin




UniChiral AD-5H 4.6×250mm



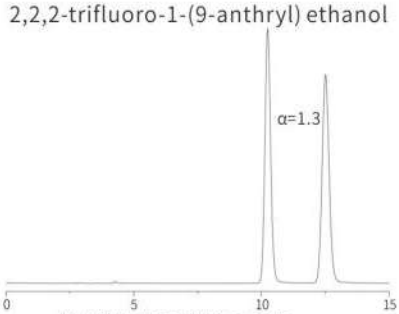

Japan D AD-H 4.6×250mm



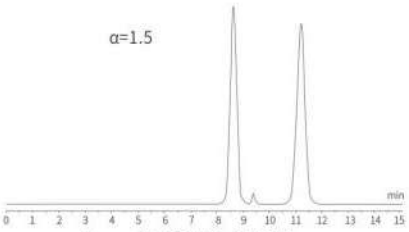

Mobile Phase: EtOH
Flow Rate: 1mL/min
Wavelength: UV 270nm
Temp.: 25°C

---

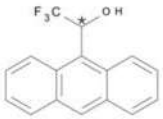
2,2,2-trifluoro-1-(9-anthryl) ethanol




UniChiral AD-5H 4.6×250mm




Japan D AD-H 4.6×250mm




Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

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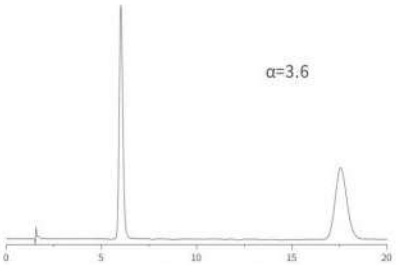
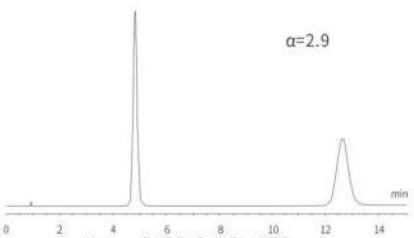
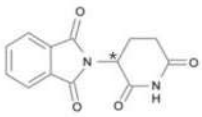
Thalidomide




UniChiral AD-5H 4.6×250mm




Japan D AD-3 4.6×150mm




Mobile Phase: MeOH
Flow Rate: 2mL/min
Wavelength: UV 220nm
Temp.: 25°C

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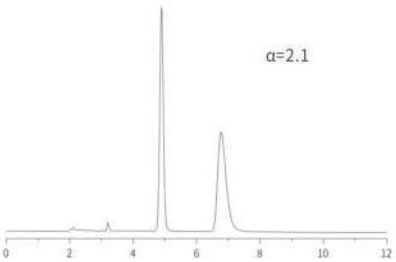
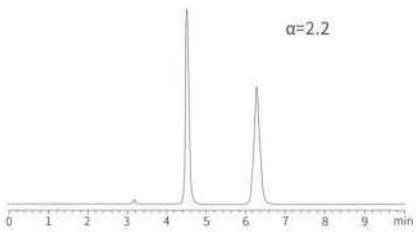
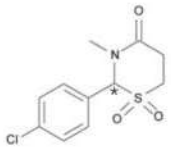
Chlormezanoneh




UniChiral AS-5H 4.6×250mm



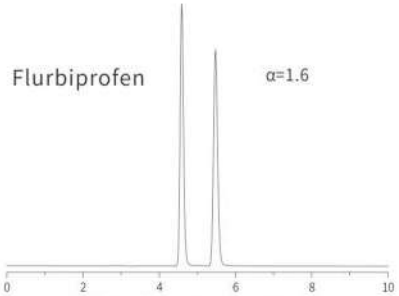

Japan D AS-H 4.6×250mm



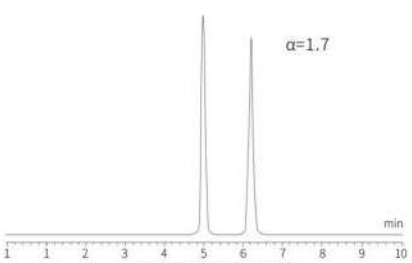

Mobile Phase: MeOH
Flow Rate: 1mL/min
Wavelength: UV 210nm
Temp.: 30°C

---

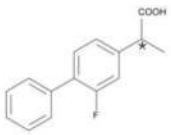
Flurbiprofen



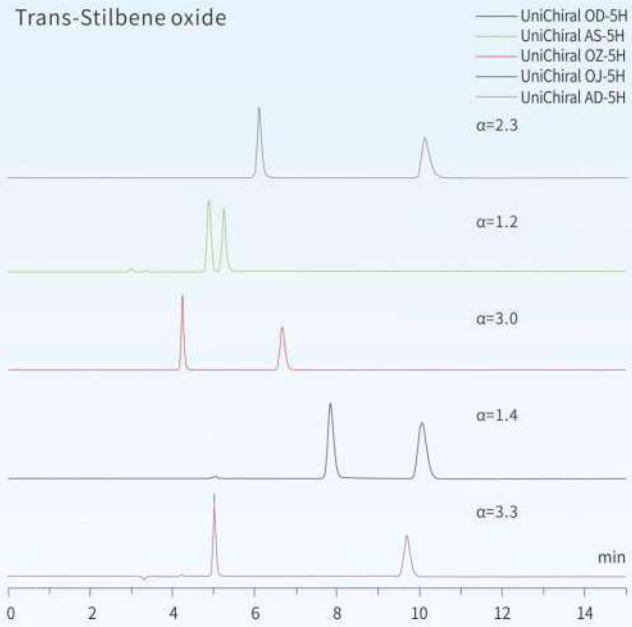

UniChiral AD-5H 4.6×250mm

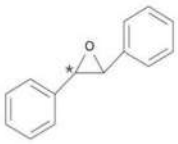



Japan D AD-H 4.6×250mm

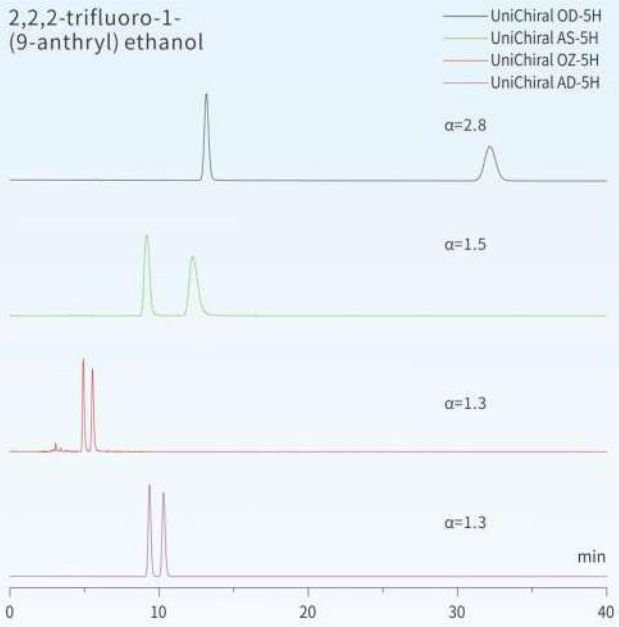


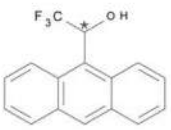

Mobile Phase:
Hexane/IPA/TFA=80:20:0.1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



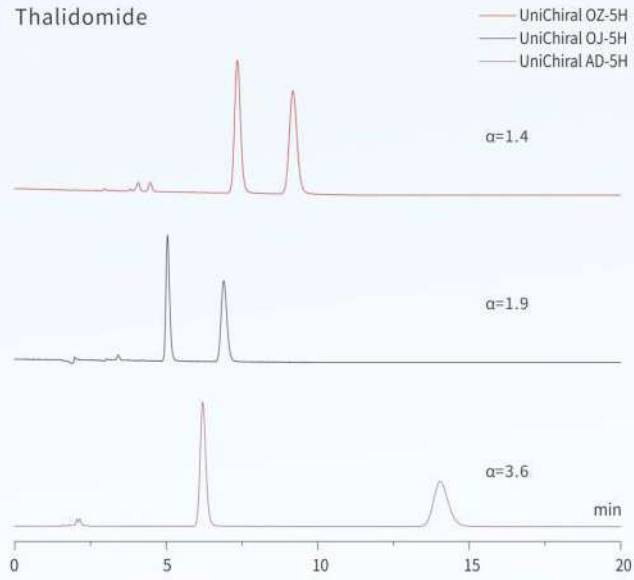



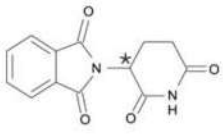
Column: 4.6×250mm, 5μm
Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



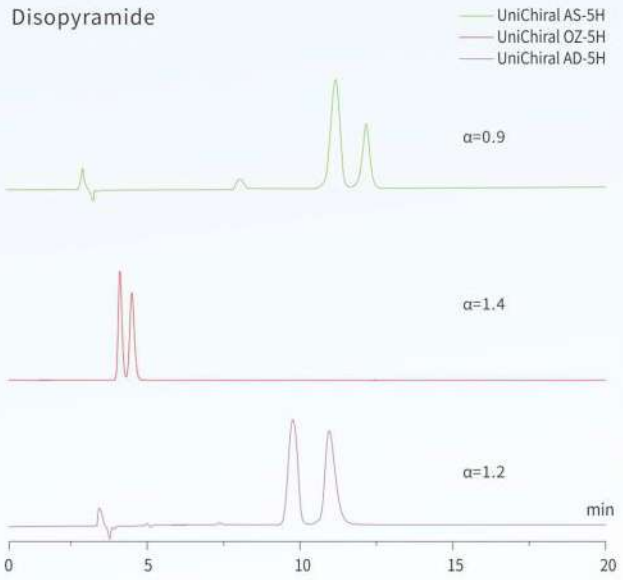



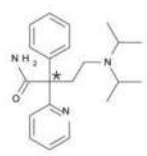
Column: 4.6×250mm, 5μm
Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



Column: 4.6×250mm, 5μm
Mobile Phase: MeOH
Flow Rate: 2mL/min
Wavelength: UV 220nm
Temp.: 25°C



Column: 4.6×250mm, 5μm
Mobile Phase: EtOH/DEA=99.9:0.01
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

# HPLC Column Packing System

## GLK1000 / GLK 2000

GLK1000/ 2000 HPLC Column Packing Systems (ZI:201320503871.6) are designed for packing analysis, semi-preparative and preparative columns.

GLK 1000, designed for packing analytical columns only, is suitable for the packing of conventional silica-gel and polymer HPLC columns.
GLK 2000, with higher pressure and power, are designed for both analytical and preparative columns with inner diameter 10mm~50mm.

Homogenate Tanks (ZL: 201320517976.7) is suitable for homogenate during the packing process.

**Service:**

1. One year warranty and free replacement parts
2. Free online training for operation and maintenance
3. Recovery of old equipment

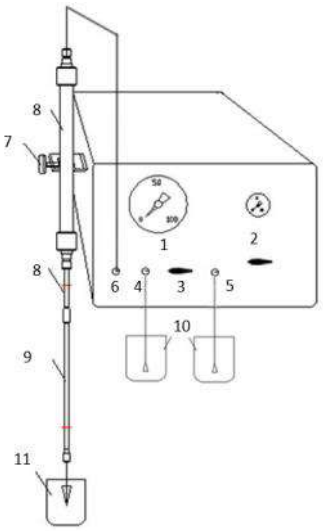
**Parameters:**

| | GLK1000 | GLK2000 |
|---|---|---|
| **Column ID** | 2.0/2.1/4.6mm | 4.6/10/20/30/50 mm |
| **Output Pressure** | 9800 psi | 15000 psi |
| **Flow Rate** | 3.3L/min | 3.3L/min |
| **Output Power** | 1.5hp | 2hp |
| **Air Cylinder** | Single | Double |

**Details:**


**Control Panel Introduction**

1 Pressure gauge
2 Pressure regulator
3 Liquid inlet:
4 Inlet A:
5 Inlet B:
6 Liquid outlets:
7 Column support
8 Homogenate tank
9 SS HPLC column
10 Solvent tank
11 Waste liquid recovery




GLK1000/2000 HPLC Column Packing System is widely used in many famous universities and research institutions like Tsinghua University, Sichuan University, Zhengzhou University, Dalian Institute of Chemical Physics Dalian Ocean University.

| Standard Parts | Optional Parts |
|---|---|
| Operation instruction | Air compressor |
| Pneumatic booster pump | Air purification system |
| Control panel | Homogenate tanks |
| Homogenate tank support | Column connection (ID 10-50mm) |
| Stainless steel connections | Empty HPLC column (ID 4.6-50mm) |
| Stainless steel column | Packing materials |

GALAK provide customized service according to customer's requests.

**Empty HPLC columns are available.**

# High-pressure Injection Pumps

## Eldex Optos Injection Pump

Eldex's Optos Series is designing and manufacturing reciprocating piston pumps for a wide variety of applications, while integrating the latest technology and electronics.

With upgrade to Plus Version

- Pressure monitoring with high and low pressure limits
- Integrated low volume pulse damper

### Model 1

| | Flow Rate (mL/min) | Max. Pressure (psi) | Piston Diameter (in.) | Piston Stroke (in.) | Model |
|---|---|---|---|---|---|
| **316 stainless steel** | 0.002 - 2.5 | 6000 | 3/32 | .125 | 1LM |
| | 0.003 - 5 | 6000 | 1/8 | .125 | 1SM |
| | 0.01 - 20 | 3000 | 1/4 | .125 | 1HM |
| **PEEK** | **Flow Rate (mL/min)** | **Max. Pressure (psi)** | **Piston Diameter (in.)** | **Piston Stroke (in.)** | **Model** |
| | 0.002 - 2.5 | 4000 | 3/32 | .125 | 1LI |
| | 0.003 - 5 | 4000 | 1/8 | .125 | 1SI |
| | 0.01 - 20 | 3000 | 1/4 | .125 | 1HI |

### Model 2

| | Flow Rate (mL/min) | Max. Pressure (psi) | Piston Diameter (in.) | Piston Stroke (in.) | Model |
|---|---|---|---|---|---|
| **316 stainless steel** | 0.003 - 5 | 6000 | 3/32 | .250 | 2LM |
| | 0.01 - 10 | 6000 | 1/8 | .250 | 2SM |
| | 0.02 - 40 | 1500 | 1/4 | .250 | 2HM |
| | **Flow Rate (mL/min)** | **Max. Pressure (psi)** | **Piston Diameter (in.)** | **Piston Stroke (in.)** | **Model** |
| **PEEK** | 0.003 - 5 | 4000 | 3/32 | .250 | 2LI |
| | 0.01 - 10 | 4000 | 1/8 | .250 | 2SI |
| | 0.02 - 40 | 1500 | 1/4 | .250 | 2HI |

### Model 3

| | Flow Rate (mL/min) | Max. Pressure (psi) | Piston Diameter (in.) | Piston Stroke (in.) | Model |
|---|---|---|---|---|---|
| **316 stainless steel** | 0.01 - 10 | 3000 | 3/32 | .500 | 3LM |
| | 0.01 - 20 | 1500 | 1/8 | .500 | 3SM |
| | 0.04 - 80 | 750 | 1/4 | .500 | 3HM |
| **PEEK** | **Flow Rate (mL/min)** | **Max. Pressure (psi)** | **Piston Diameter (in.)** | **Piston Stroke (in.)** | **Model** |
| | 0.01 - 10 | 3000 | 3/32 | .500 | 3LI |
| | 0.01 - 20 | 1500 | 1/8 | .500 | 3SI |
| | 0.04 - 80 | 750 | 1/4 | .500 | 3HI |

### Optos Plus Model: Minimize Pulsation, Monitor Pressure

Add Plus to your Optos Series pump to integrate a pulse damper to further reduce pulsation and have the ability to monitor pressure and set high and low pressure limits. Plus is available on L and S piston pumps.

| | Flow Rate* (mL/min) | Max. Pressure (psi) | Piston Diame-ter (in.) | Piston Stroke (in.) | Model |
|---|---|---|---|---|---|
| **316 stainless steel** | 0.002 - 2.5 | 6000 | 3/32 | .125 | 1LMP |
| | 0.003 - 5 | 6000 | 1/8 | .125 | 1SMP |
| | **Flow Rate* (mL/min)** | **Max. Pressure (psi)** | **Piston Diame-ter (in.)** | **Piston Stroke (in.)** | **Model** |
| **PEEK** | 0.002 - 2.5 | 4000 | 3/32 | .125 | 1LIP |
| | 0.003 - 5 | 4000 | 1/8 | .125 | 1SIP |



# Single-layer Glass Column

- Pressure-resistant borosilicate glass, visualization and stability
- Supporting foot, adjustable level, convenient for users to use
- Reasonable price, high cost performance
- Reproducibility, excellent column efficiency and reliable results
- Zero dead volume structural connections


| | |
|---|---|
| **Working Temperature** | 4-40℃ |
| **pH Range** | 1-14 |
| **Chemical Stability** | Tolerant to salt, acid, alkali, and a small number of organic solvents alcohols, ketones, phenols. |
| **Column Material** | Borosilicate glass |
| **Column Head Material** | PTFE |
| **Thread-end Material** | PEEK |
| **Seal Ring Material** | PTFE/EPDM |
| **Tubing Material** | 1/16&1/8 |
| **Connector Material** | PEEK 1/16&1/8 |

| No. | Internal Diameter (mm) | Length (mm) | One-side Adjustable Type | | Double-side Adjustable Type | | Pressure (bar) |
|---|---|---|---|---|---|---|---|
| | | | Volume (mL) | Bed Height (cm) | Volume (mL) | Bed Height (cm) | |
| **YS16/200** | 16 | 200 | 4-30 | 2-14.5 | 0-30 | 0-14.5 | 7 |
| **YS16/400** | 16 | 400 | 46-72 | 22-34.5 | 17-72 | 8.5-34.5 | 7 |
| **YS16/700** | 16 | 700 | 109-136 | 52-64.5 | 81-136 | 38.5-64.5 | 7 |
| **YS16/1000** | 16 | 1000 | 173-199 | 82-94.5 | 144-199 | 68.5-94.5 | 7 |
| **YS26/200** | 26 | 200 | 10-73 | 2-14.5 | 0-73 | 0-14.5 | 7 |
| **YS26/400** | 26 | 400 | 111-174 | 22-34.5 | 43-174 | 8.5-34.5 | 7 |
| **YS26/700** | 26 | 700 | 263-326 | 52-64.5 | 195-326 | 38.5-64.5 | 7 |
| **YS26/1000** | 26 | 1000 | 415-479 | 82-94.5 | 347-479 | 68.5-94.5 | 7 |
| **YS50/200** | 50 | 200 | 19-275 | 1-14 | 0-275 | 0-14 | 5 |
| **YS50/400** | 50 | 400 | 215-471 | 11-24 | 0-471 | 0-24 | 5 |
| **YS50/600** | 50 | 600 | 804-1060 | 41-54 | 549-1060 | 28-54 | 5 |
| **YS50/1000** | 50 | 1000 | 1589-1845 | 81-94 | 1334-1845 | 68-94 | 5 |

# BSXK Double-layer Glass Column

BSXK glass columns are made of borosilicate glass. They allow visual inspection of media bed and exhibit excellent chemical resistance. Column packing can be performed using either a packing reservoir or extra column tube attached with a packing connector. QuickLock of the adapter shaft facilitates rapid and easy movement of the adapter, simplifying adjustments of the bed height and cleaning. Adapter plunger gives a uniform flow which maintains the integrity of the packed bed during operations.

| | |
|---|---|
| **Working Temperature** | 4-40℃ |
| **pH Range** | 1-14 |
| **Chemical Stability** | Tolerant to salt, acid, alkali, and a small number of organic solvents alcohols, ketones, phenols. |
| **Column Material** | Borosilicate glass |
| **Column Head Material** | PTFE |
| **Thread-end Material** | PEEK |
| **Seal Ring Material** | PTFE/EPDM |
| **Tubing Material** | 1/16&1/8 |
| **Connector Material** | PEEK 1/16&1/8 |
| **Max. Pressure** | 5 bar |

| No. | Internal Diameter (mm) | Length (mm) | One-side Adjustable Type | | Double-side Adjustable Type | |
|---|---|---|---|---|---|---|
| | | | Volume (mL) | Bed Height (cm) | Volume (mL) | Bed Height (cm) |
| **BSXK10/100** | 10 | 100 | 4-7.5 | 0-9 | 0-7 | 0-8 |
| **BSXK10/150** | 10 | 150 | 7.5-12 | 9-12 | 4.7-12 | 5-13 |
| **BSXK16/200** | 16 | 200 | 4-30 | 2-14.5 | 0-30 | 0-14.5 |
| **BSXK16/400** | 16 | 400 | 46-72 | 22-34.5 | 17-72 | 8.5-34.5 |
| **BSXK16/700** | 16 | 700 | 109-136 | 52-64.5 | 81-136 | 38.5-64.5 |
| **BSXK16/1000** | 16 | 1000 | 173-199 | 82-94.5 | 144-199 | 68.5-94.5 |
| **BSXK26/200** | 26 | 200 | 10-73 | 2-14.5 | 0-73 | 0-14.5 |
| **BSXK26/400** | 26 | 400 | 111-174 | 22-34.5 | 43-174 | 8.5-34.5 |
| **BSXK26/700** | 26 | 700 | 263-326 | 54-64.5 | 195-326 | 38.5-64.5 |
| **BSXK26/1000** | 26 | 1000 | 415-479 | 82-94.5 | 347-479 | 68.5-94.5 |
| **BSXK50/200** | 50 | 200 | 19-275 | 1-14 | 0-275 | 0-14 |
| **BSXK50/300** | 50 | 300 | 215-471 | 11-24 | 0-471 | 0-24 |
| **BSXK50/600** | 50 | 600 | 804-1060 | 41-54 | 549-1060 | 28-54 |
| **BSXK50/1000** | 50 | 1000 | 1589-1849 | 81-94 | 1334-845 | 68-94 |

# Single-layer Fixed Glass Column

HT series chromatographic columns have unique flared cylinder design for more even fluid distribution. The columns are equipped with a unique nozzle instead of the sieve plate, which is especially suitable for solid sample loading and dry sample mixing. It effectively prevents the destruction of the column bed caused by high mobile phase line velocity. HT chromatographic column has a large volume of sample loading. It can be pumped to eliminate the blocking of the inlet valve interface caused by high concentration of samples.

HT series chromatography columns are suitable for reverse-phase, ion-exchange, gel-permeation and affinity chromatography. Compared with ordinary open glass columns purification time is shortened 2-10 times with higher purification efficiency and less solvent usage. The column tube is convenient to disassemble and wash, which saves time for the researchers.

| No. | Inner diameter (mm) | Length (mm) | Max. Pressure (bar) | Silica Resin (40-60um) (g) | Sampling (g) | Flow Rate (mL/min) |
|---|---|---|---|---|---|---|
| HT10/110 | 10 | 110 | 40 | Protective column, on-column injector. | | |
| HT-15/310 | 15 | 310 | 40 | 45 | 0.45-4.5 | 5-20 |
| HT-15/460 | 15 | 460 | 40 | 70 | 0.7-7.00 | 5-20 |
| HT-15/920 | 15 | 920 | 40 | 140 | 1.4-14.00 | 5-20 |
| HT26/100 | 26 | 100 | 40 | Protective column, on-column injector. | | |
| HT-26/310 | 26 | 310 | 40 | 130 | 1.30-13.00 | 20-70 |
| HT-26/460 | 26 | 460 | 40 | 200 | 2.00-20.00 | 20-70 |
| HT-26/920 | 26 | 920 | 40 | 400 | 4.00-40.00 | 20-70 |
| HT-36/310 | 36 | 310 | 30 | 240 | 2.40-24.00 | 45-135 |
| HT-36/460 | 36 | 460 | 30 | 350 | 3.50-35.00 | 45-135 |
| HT-36/920 | 36 | 920 | 30 | 700 | 7.00-70.00 | 45-135 |
| HT-49/100 | 49 | 100 | 20 | Protective column, on-column injector. | | |
| HT-49/310 | 49 | 310 | 20 | 450 | 4.50-45.00 | 80-200 |
| HT-49/460 | 49 | 460 | 20 | 650 | 6.50-65.00 | 80-200 |
| HT-49/920 | 49 | 920 | 20 | 1300 | 13.00-130.00 | 80-200 |
| HT-70/310 | 70 | 310 | 10 | 880 | 8.80-88.00 | 170-250 |
| HT-70/460 | 70 | 460 | 10 | 1300 | 13.00-130.00 | 170-250 |
| HT-70/920 | 70 | 920 | 10 | 2600 | 26.00-260.00 | 170-250 |
| HT-100/310 | 100 | 310 | 10 | 1900 | 19.00-190.00 | 200-250 |
| HT-100/460 | 100 | 460 | 10 | 2750 | 27.50-275.00 | 170-250 |
| HT-100/920 | 100 | 920 | 10 | 5500 | 55.00-550.00 | 200-250 |
| HT-150/300 | 150 | 300 | 5 | 3180 | 36.50-365.00 | 500-800 |
| HT-150/600 | 150 | 600 | 5 | 6360 | 55.00-550.00 | 500-800 |
| HT-150/900 | 150 | 900 | 5 | 9540 | 110.00-1100.00 | 500-800 |

# Economic HPLC column

- Inner diameter: 4.0mm, 4.6mm, 7.8mm, 10mm, 20mm, 21.2mm, 30mm, 50mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm, 250mm, 300mm, 500mm
- Material: 316 L stainless steel
- OEM is available
- Original country: China



# High-performance HPLC column

Inner diameter: 2.0mm, 3.0mm, 4.0mm, 4.6mm

- Length: 20mm, 30mm, 50mm, 100mm, 150mm, 250mm, 300mm
- Material: 316 L stainless steel
- OEM is available
- Original country: USA

# PEEK Columns

- Inner diameter: 2.1mm, 3.0mm, 4.0mm, 4.6mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm
- Material: PEEK
- OEM is available
- Original country: USA

- Inner diameter: 2.1mm, 4.0mm, 4.6mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm
- Material: PEEK
- OEM is available
- Original country: China

# Guard Columns

**For Analysis Column**

4.6-10mm

**For Preparative Column**

10-30mm

20-30mm

50-30mm

# In-filter for HPLC column

**Type:**

10mm

20mm

30mm

**Mini, Micro & Nano Filters (Made-in-USA)**

**In-line Holder Configuration (Made-in-USA)**

**Mini Guard Columns (Made-in-USA)**

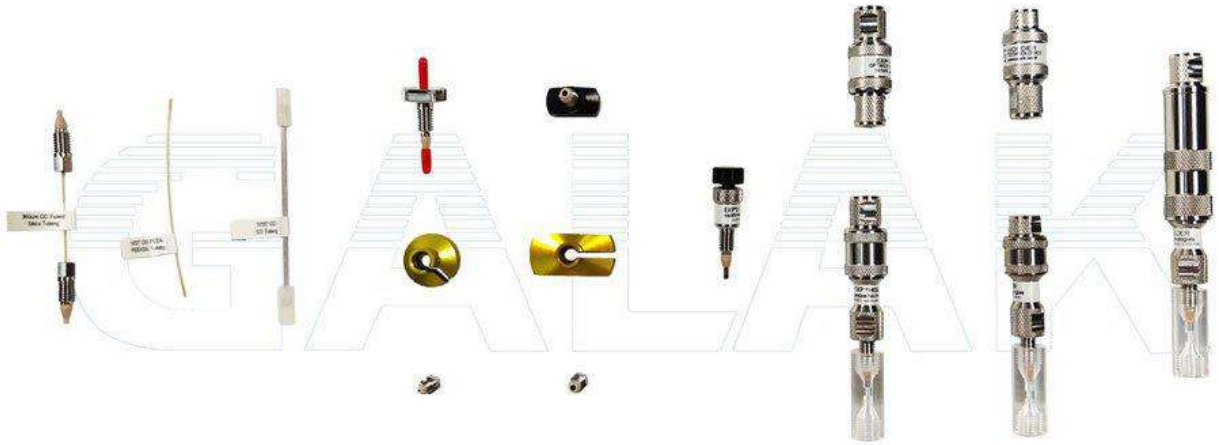
**Back Pressure Regulator (Made-in-USA)**

# UPLC Column Accessories (Made-in-USA)





| | | | |
|---|---|---|---|
| 1 | 1/16" Stainless steel tubing | 8 | EXP® 10-32 Nuts & Titanium Hybrid Ferrule |
| 2 | 1/32" PEEK PEEKsil® tubing | 9 | EXP®2 Stem Filter / Trap |
| 3 | EXP®2 TI-LOK™ Adapters with Interal PEEK Sleeves | 10 | EXP®2 Pre-column Filter |
| 4 | EXP®2 TI-LOK™ 10-32 Fitting | 11 | EXP®2 In-line Filter / Nano Trap |
| 5 | EXP®2 TI-LOK™ 6-64 Fitting | 12 | EXP® Direct-connect Trap / Guard |
| 6 | EXP®2 Driver | 13 | EXP® In-line Trap |
| 7 | EXP®2 TI-LOK™ AIO 10-32 Fitting | 14 | EXP® Analysis Column |



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