

# ● Anion Exchange Chromatography Columns

## Features

- QA-825**
  - Suitable for analyzing relatively high molecular weight compounds: proteins, peptides, DNA, and RNA
- DEAE-825**
  - Usable in a wide pH range from pH 2 to 12
  - QA-825 fulfills USP L23 requirements

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- DEAE3N-4T**
  - Non-porous base material
  - For rapid analysis

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- DEAE-2B**
  - Non-porous base material
  - Can be used with UHPLC (available under hyperbaric conditions up to 30 MPa)

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- ES-502N 7C**
  - Compared to IEC series columns, polyvinyl alcohol is used as base material and this offers different separation pattern
  - Low hydrophobic interaction of proteins allows analysis under mild conditions

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- WA-624**
  - Suitable for anion exchange analysis of low molecular weight compounds such as nucleotides

## ■ Standard columns

### [Strong anion exchange resin] Functional Group: Quaternary ammonium

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6110011	<b>IEC QA-825</b>	0.45	Polyhydroxymethacrylate	12	5,000	<b>8.0 x 75</b>	50mM Na <sub>2</sub> SO <sub>4</sub> aq.

### [Weak anion exchange resin] Functional Group: Diethylaminoethyl

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6118255	<b>IEC DEAE-825</b>	0.6	Polyhydroxymethacrylate	8	5,000	<b>8.0 x 75</b>	50mM Na <sub>2</sub> SO <sub>4</sub> aq.
F6112100	<b>IEC DEAE3N-4T</b>	0.4	Polyhydroxymethacrylate	2.5	–	<b>4.6 x 35</b>	H <sub>2</sub> O
F7640002	<b>Asahipak ES-502N 7C</b>	0.55	Polyvinyl alcohol	9	2,000	<b>7.5 x 100</b>	50mM 1,3-Diaminopropane + 50mM NaCl (pH10.0)
F6356240	<b>AXpak WA-624</b>	1.2	Polyhydroxymethacrylate	10	2,000	<b>6.0 x 150</b>	0.1M Sodium phosphate buffer (pH3.0)/CH <sub>3</sub> CN =80/20
F6700245	<b>AXpak WA-G</b> (guard column)	–	Polyhydroxymethacrylate	10	–	<b>4.6 x 10</b>	0.1M Sodium phosphate buffer (pH3.0)/CH <sub>3</sub> CN =80/20

### [Weak anion exchange resin] Functional Group: Diethylaminoethyl (UHPLC column)

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6112110	<b>PIKESS DEAE-2B</b>	0.4	Polyhydroxymethacrylate	2.5	–	<b>2.0 x 50</b>	H <sub>2</sub> O

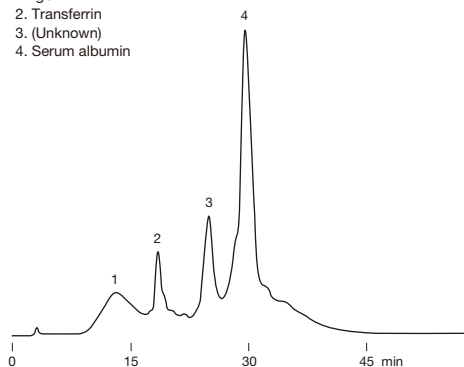
## ■ Preparative columns \*Preparative columns are made to order.

Product Code	Product Name	Particle Size (µm)	Column Size (mm) I.D. x Length	Standard column
F6548000	<b>IEC QA-2025</b>	20	<b>20.0 x 150</b>	QA-825
F6709602	<b>IEC QA-G 8B</b> (IEC QA-LG)	20	<b>8.0 x 50</b>	(guard column)
F6548001	<b>IEC DEAE-2025</b>	20	<b>20.0 x 150</b>	DEAE-825
F6709603	<b>IEC DEAE-G 8B</b> (IEC DEAE-LG)	20	<b>8.0 x 50</b>	(guard column)
F6840004	<b>Asahipak ES-502N 20C</b>	13	<b>20.0 x 100</b>	ES-502N 7C
F6710021	<b>Asahipak GS-20G 7B</b>	20	<b>7.5 x 50</b>	(guard column)

### Proteins in human serum

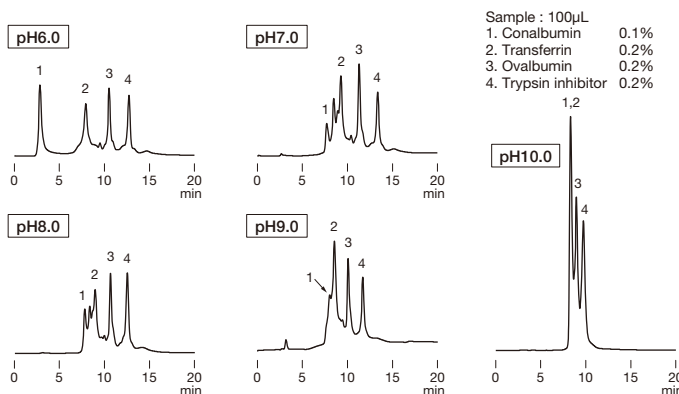
Sample : Human serum 0.5%, 200 $\mu$ L

1. IgG
2. Transferrin
3. (Unknown)
4. Serum albumin



**Column** : Shodex IEC QA-825  
**Eluent** : (A); 20mM Tris-HCl buffer (pH8.6)  
 (B); (A) + 0.5M NaCl  
 Linear gradient; 100% (A) to 50% (B), 60min  
**Flow rate** : 1.0mL/min  
**Detector** : UV (280nm)  
**Column temp.** : Room temp.

### Effects of eluent pH on DEAE-825 analysis

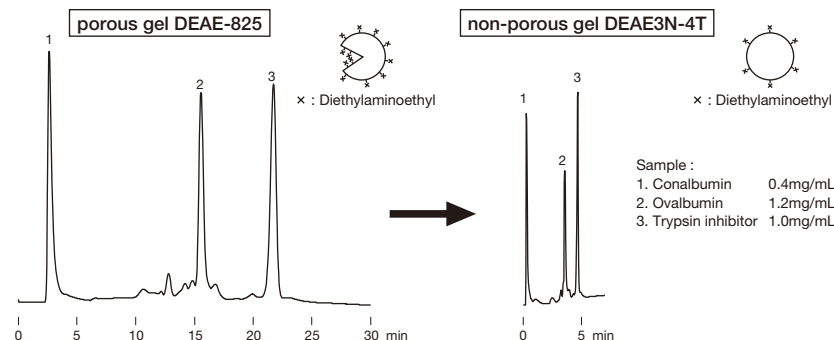


Sample : 100 $\mu$ L  
 1. Conalbumin 0.1%  
 2. Transferrin 0.2%  
 3. Ovalbumin 0.2%  
 4. Trypsin inhibitor 0.2%

**Column** : Shodex IEC DEAE-825  
**Eluent** : (A); 20mM Piperazine-HCl buffer (pH6.0), 20mM Bis-Tris-HCl buffer (pH7.0)  
 20mM Tris-HCl buffer (pH8.0), 20mM Ethanolamine-HCl buffer (pH9.0)  
 20mM 1,3-Diaminopropane-HCl buffer (pH10.0)  
 (B); (A) + 0.5M NaCl  
 Linear gradient; (A) to (B), 20min  
**Flow rate** : 1.0mL/min  
**Detector** : UV (280nm)  
**Column temp.** : 25°C

### Comparison of porous DEAE-825 and non-porous DEAE3N-4T for protein separation

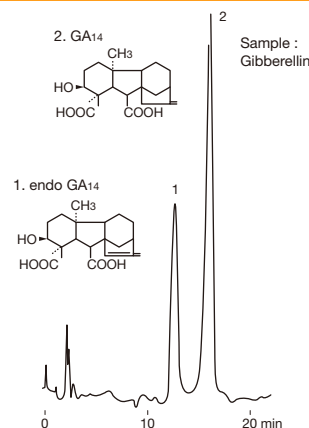
IEC DEAE3N-4T is a weak anion exchange column, having diethylaminoethyl functional group modified on non-porous gel. The non-porous gel enables rapid analysis of proteins and peptides. DEAE3N-4T is also suitable for the analysis of small-volume samples, as it provides sharp peaks even with small injection volume.



**Column** : Shodex IEC DEAE-825  
**Eluent** : (A); 20mM Piperazine-HCl buffer (pH6.0)  
 (B); (A) + 0.5M NaCl  
 Linear gradient; (A) to (B), 60min  
**Flow rate** : 1.0mL/min  
**Detector** : UV (280nm)  
**Column temp.** : Room temp.  
**Injection vol.** : 100 $\mu$ L

**Column** : Shodex IEC DEAE3N-4T  
**Eluent** : (A); 25mM Piperazine-HCl buffer (pH6.0)  
 (B); (A) + 0.5M NaCl  
 Linear gradient; (A) to (B), 10min  
**Flow rate** : 1.5mL/min  
**Detector** : UV (280nm)  
**Column temp.** : Room temp.  
**Injection vol.** : 20 $\mu$ L

### Gibberellin Isomers

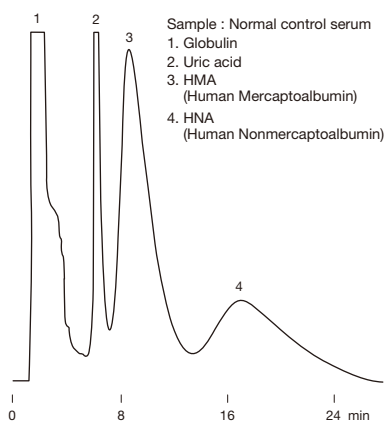


**Column** : Shodex Asahipak ES-502N 7C  
**Eluent** : CH<sub>3</sub>COOH/H<sub>2</sub>O/CH<sub>3</sub>OH  
 =0.1/0.4/99.5  
**Flow rate** : 1.5mL/min  
**Detector** : UV (210nm)  
**Column temp.** : 50°C

Data was provided by Prof. Yamaguchi, Faculty of Agriculture, University of Tokyo.

### Mercaptoalbumin and non-mercaptoalbumin

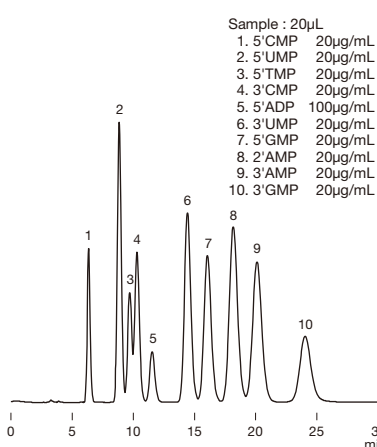
Sample : Normal control serum  
 1. Globulin  
 2. Uric acid  
 3. HMA (Human Mercaptoalbumin)  
 4. HNA (Human Nonmercaptoalbumin)



**Column** : Shodex Asahipak ES-502N 7C  
**Eluent** : 50mM N-methylpiperazine-HCl buffer (pH4.8) + 400mM Na<sub>2</sub>SO<sub>4</sub> + 0.3% C<sub>2</sub>H<sub>5</sub>OH  
**Flow rate** : 1.0mL/min  
**Detector** : UV (280nm)  
**Column temp.** : 35°C

### Nucleotides

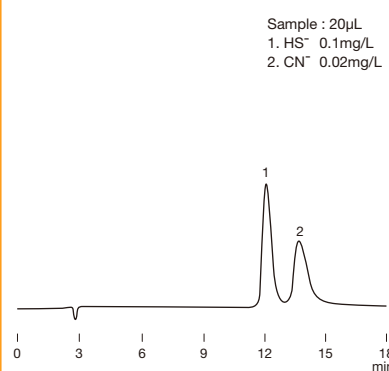
Sample : 20 $\mu$ L  
 1. 5'CMP 20 $\mu$ g/mL  
 2. 5'UMP 20 $\mu$ g/mL  
 3. 5'TMP 20 $\mu$ g/mL  
 4. 3'CMP 20 $\mu$ g/mL  
 5. 5'ADP 100 $\mu$ g/mL  
 6. 3'UMP 20 $\mu$ g/mL  
 7. 5'GMP 20 $\mu$ g/mL  
 8. 2'AMP 20 $\mu$ g/mL  
 9. 3'AMP 20 $\mu$ g/mL  
 10. 3'GMP 20 $\mu$ g/mL



**Column** : Shodex Axpak WA-624  
**Eluent** : 0.35M CH<sub>3</sub>COOH aq. / 0.35M CH<sub>3</sub>COONH<sub>4</sub> aq. =240/100  
**Flow rate** : 1.0mL/min  
**Detector** : UV (260nm)  
**Column temp.** : 60°C

### Sulfide ion and cyanide ion

Sample : 20 $\mu$ L  
 1. HS<sup>-</sup> 0.1mg/L  
 2. CN<sup>-</sup> 0.02mg/L



**Column** : Shodex IEC DEAE-825  
**Eluent** : 10mM Na<sub>2</sub>CO<sub>3</sub> + 1mM Ethylenediamine aq. + 10% CH<sub>3</sub>OH  
**Flow rate** : 1.0mL/min  
**Detector** : Electrochemical (Electrode; Silver, 0mV SCE)  
**Column temp.** : 25°C