Aqueous SEC (GFC) Columns : Silica-based

Features

KW-800
- Silica-based packed columns for aqueous SEC (GFC) analysis
- Suitable for the analysis of proteins and enzymes
- Corresponds to USP L20, L33, and L59

KW400
- Reducing particle size of the packing material enhances column performance
- Three- or four-fold higher sensitivity than KW-800 series
- KW405-4F is applicable to samples with a molecular weight above 1,000,000
- Corresponds to USP L20, L33, and L59

Standard columns

Product Code	Product Name	Plate Number (TP/column)	Particle Size (μm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6989000	**PROTEIN KW-802.5**	≥ 21,000	5	400	**8.0 × 300**	H_2O
F6989103	**PROTEIN KW-803**	≥ 21,000	5	1,000	**8.0 × 300**	H_2O
F6989104	**PROTEIN KW-804**	≥ 16,000	7	1,500	**8.0 × 300**	H_2O
F6700131	**PROTEIN KW-G 6B (PROTEIN KW-G)**	(guard column)	7	–	**6.0 × 50**	H_2O

Base Material : Silica Usable pH range : pH3.0-7.5

High performance semi-micro columns

◎ Use of the KW400 series with semi-micro type devices is recommended.

Product Code	Product Name	Plate Number (TP/column)	Particle Size (μm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6989201	**KW402.5-4F**	≥ 35,000	3	400	**4.6 × 300**	H_2O
F6989202	**KW403-4F**	≥ 35,000	3	800	**4.6 × 300**	H_2O
F6989203	**KW404-4F**	≥ 25,000	5	1,500	**4.6 × 300**	H_2O
F6989204	**KW405-4F**	≥ 25,000	5	2,000	**4.6 × 300**	H_2O
F6700132	**KW400G-4A**	(guard column)	5	–	**4.6 × 10**	H_2O

Base Material : Silica Usable pH range : pH3.0-7.5

Semi-micro columns

*** The following semi-micro columns are made to order.** ◎ Use of the KW400 series with semi-micro type devices is recommended.

Product Code	Product Name	Particle Size (μm)	Pore Size (Å)	Column Size (mm) I.D. x Length
F7781213	**KW402.5-4B**	3	400	**4.6 × 50**
F7781212	**KW402.5-4D**	3	400	**4.6 × 150**
F7781313	**KW403-4B**	3	800	**4.6 × 50**
F7781312	**KW403-4D**	3	800	**4.6 × 150**

Preparative columns * Preparative columns are made to order.

Product Code	Product Name	Plate Number (TP/column)	Particle Size (μm)	Column Size (mm) I.D. x Length	Standard Columns
F6505020	**PROTEIN KW-2002.5**	≥ 17,000	5	**20.0 × 300**	KW-802.5
F6505021	**PROTEIN KW-2003**	≥ 17,000	5	**20.0 × 300**	KW-803
F6505022	**PROTEIN KW-2004**	≥ 14,000	7	**20.0 × 300**	KW-804
F6709556	**PROTEIN KW-G 8B (PROTEIN KW-LG)**	(guard column)	7	**8.0 × 50**	(guard column)

Target molecular weight range and Exclusion limit

● With Protein (eluent : phosphate buffer)

Product Name	Target Molecular Weight Range	Exclusion Limit
KW-802.5	5,000 – 100,000	150,000
KW-803	10,000 – 700,000	*(1,000,000)
KW-804	30,000 – *(4,000,000)	*(4,000,000)
KW402.5	5,000 – 70,000	150,000
KW403	10,000 – 500,000	600,000
KW404	30,000 – *(4,000,000)	*(4,000,000)
KW405	200,000 – *(20,000,000)	*(20,000,000)

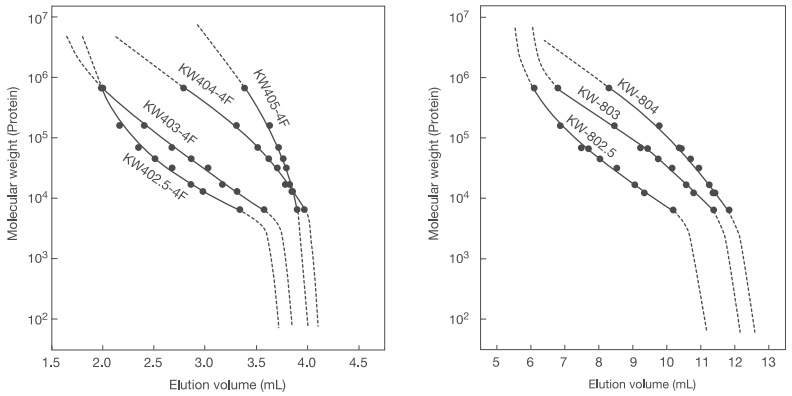
* Please use the above table as a rough indication for the column selection. *( ) Estimated value

● With Pullulan (eluent : ultrapure water)

Product Name	Target Molecular Weight Range	Exclusion Limit
KW-802.5	2,000 – 50,000	60,000
KW-803	5,000 – 100,000	170,000
KW-804	20,000 – 300,000	500,000
KW402.5	2,000 – 40,000	60,000
KW403	3,000 – 50,000	80,000
KW404	20,000 – 300,000	400,000
KW405	100,000 – 700,000	1,300,000

* Please use the above table as a rough indication for the column selection.

Calibration curves for KW400 series and KW-800 series using protein



Column : **Shodex KW400-4F series, Shodex PROTEIN KW-800 series**
Eluent : 50mM Sodium phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : 0.33mL/min (KW400)
1.0mL/min (KW-800)
Detector : UV (280nm) (small cell volume) (KW400)
UV (280nm) (conventional type) (KW-800)
Column temp. : 30°C

Recovery rate of proteins

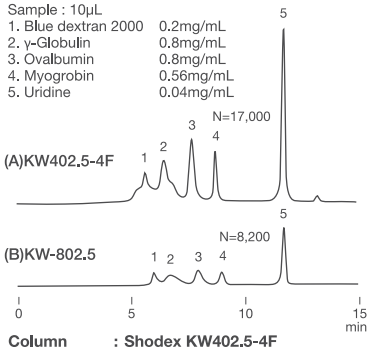
Protein	Recovery (%)	
	KW402.5-4F	KW403-4F
γ- Globulin	98	96
Bovine serum albumin	89	96
Ovalbumin	89	97
Myoglobin	90	89
Cytochrome c	92	92
Lysozyme	87	98
α-Chymotrypsinogen A	95	94

Column : **Shodex KW402.5-4F**
Shodex KW403-4F
Eluent : 50mM Sodium phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : 0.33mL/min
Detector : UV (280nm) (small cell volume)
Column temp. : 25°C

Comparison of KW402.5-4F and KW-802.5

KW400 series is a high performance type of semi-micro columns, offering approximately 1.5 times larger theoretical plate number and 3 to 4 times higher detection sensitivity (peak height) than KW-800 series columns does.

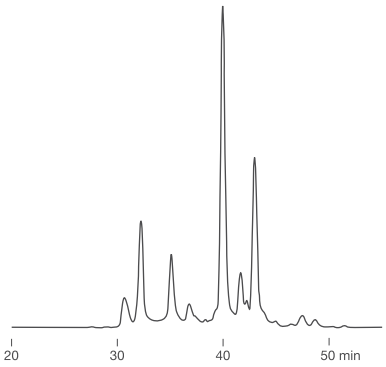
Sample : 10μL
1. Blue dextran 2000 0.2mg/mL
2. γ-Globulin 0.8mg/mL
3. Ovalbumin 0.8mg/mL
4. Myogrobin 0.56mg/mL
5. Uridine 0.04mg/mL



Column : **Shodex KW402.5-4F**
Shodex PROTEIN KW-802.5
Eluent : 50mM Sodium phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : (A) 0.33mL/min, (B) 1.0mL/min
Detector : UV (280nm) (small cell volume)
Column temp. : 25°C

Whey in yogurt

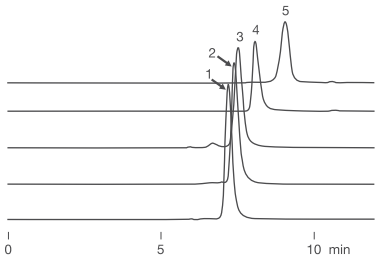
Sample : Whey, 5μL



Column : **Shodex KW402.5-4F + KW403-4F**
Eluent : 50mM Sodium phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : 0.20mL/min
Detector : UV (280nm) (small cell volume)
Column temp. : 30°C

Lectins

Sample : 5μL
1. Lectin from Soybean 0.6mg/mL
2. Lectin from Arachis hypogaea 1.1mg/mL
3. Lectin from Canavalia ensiformis (Con A) 0.9mg/mL
4. Lectin from Lens culinaris (LCA) 0.7mg/mL
5. Lectin from Triticum vulgaris (WGA) 0.8mg/mL

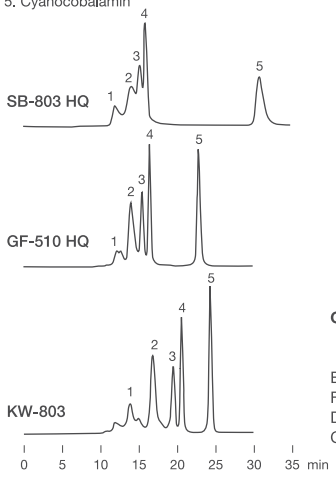


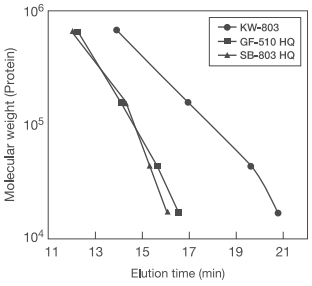
Column : **Shodex KW402.5-4F**
Eluent : 50mM Sodium phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : 0.33mL/min
Detector : UV (220nm) (small cell volume)
Column temp. : 30°C

Comparison of various GFC columns for separation of standard proteins

Sample :
1. Thyroglobulin (bovine)
2. γ-Globulin (bovine)
3. Ovalbumin (chicken)
4. Myoglobin (horse)
5. Cyanocobalamin

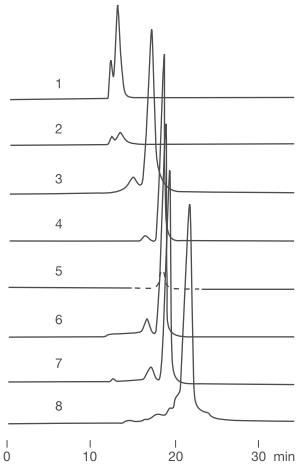
Three aqueous SEC columns (SB-803 HQ, GF-510 HQ, and KW-803) were compared for their separation performances. KW-803, silica-based column, showed the best separation performance for the analysis of protein standards.





Column : **Shodex OHpak SB-803 HQ**
Shodex Asahipak GF-510 HQ
Shodex PROTEIN KW-803
Eluent : 0.2M Phosphate buffer (pH6.9)
Flow rate : 0.5mL/min
Detector : UV (280nm)
Column temp. : 30°C

Proteins in human blood serum



Sample : 0.1% each
1. Fibrinogen 50μL
2. α_2 -Macroglobulin 50μL
3. IgG 50μL
4. Transferrin 50μL
5. Plasminogen 50μL
6. Albumin 100μL
7. Antitrypsin 100μL
8. Hemoglobin 100μL

Column : **Shodex PROTEIN KW-803**
Eluent : 50mM Phosphate buffer + 0.3M NaCl (pH7.0)
Flow rate : 1.0mL/min
Detector : UV (280nm)
Column temp. : Room temp.