

Aqueous SEC (GFC) Columns: Polymer-based

Features

SB-800 HQ

- Polymer-based packed columns for aqueous SEC (GFC) analysis
- Supports a wide range of molecular weight sample analysis
- The eluent can be replaced with DMF (except SB-802 HQ and SB-807 HQ), enabling the analysis of polar polymers
- Method using SB-804 HQ or SB-805 HQ for gelatin's mean molecular weight determination is comparable with PAGI method (Ver. 10, Japan)
- Fulfills USP-NF L38 and L39 requirements
- SB-802 HQ fulfills USP-NF L25 requirements
- SB-802.5 HQ fulfills USP-NF L25 and L89 requirements
- SB-803 HQ fulfills USP-NF L37 requirements

SB-807 HQ

- Column for the analysis of water-soluble ultra high molecular weight polymers
- Large particle-size gel prevents shear degradation of polymers
- Fulfills USP-NF L38 and L39 requirements

LB-800

- Polymer-based packed columns for aqueous SEC (GFC) analysis
- Low column bleeding allows its use with light scattering detectors
- The eluent can be replaced with DMF enabling the analysis of polar polymers
- LB-802.5 (exclusion limit: about 10,000) newly added to the series
- Fulfills USP-NF L38 and L39 requirements
- LB-802.5 fulfills USP-NF L25 and L89 requirements
- LB-803 fulfills USP-NF L37 requirements

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
F6429100	OHpak SB-802 HQ	≥ 12,000	8	100	8.0 x 300	0.02 % NaN ₃ aq.
F6429101	OHpak SB-802.5 HQ	≥ 16,000	6	200	8.0 x 300	0.02 % NaN ₃ aq.
F6429102	OHpak SB-803 HQ	≥ 16,000	6	800	8.0 x 300	0.02 % NaN ₃ aq.
F6429103	OHpak SB-804 HQ	≥ 16,000	10	2,000	8.0 x 300	0.02 % NaN ₃ aq.
F6429104	OHpak SB-805 HQ	≥ 12,000	13	7,000	8.0 x 300	0.02 % NaN ₃ aq.
F6429105	OHpak SB-806 HQ	≥ 12,000	13	15,000	8.0 x 300	0.02 % NaN ₃ aq.
F6429106	OHpak SB-806M HQ	≥ 12,000	13	15,000	8.0 x 300	0.02 % NaN ₃ aq.
F6709430	OHpak SB-G 6B	(guard column)	10	—	6.0 x 50	0.02 % NaN ₃ aq.

SB-806M HQ is a mixed-gel column capable of analyzing samples over a wide range of molecular weight distribution.

Base Material: Polyhydroxymethacrylate
Usable pH Range: pH3 - 10

Aqueous high molecular weight analysis column

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
F6429108	OHpak SB-807 HQ	≥ 1,500	35	30,000	8.0 x 300	H ₂ O
F6709431	OHpak SB-807G	(guard column)	35	—	8.0 x 50	H ₂ O

Base Material: Polyhydroxymethacrylate
Usable pH Range: pH3 - 10

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	Shipping Solvent	Standard Column
F6516011	OHpak SB-2002	≥ 9,000	15	20.0 x 300	0.02 % NaN ₃ aq.	SB-802 HQ
F6516012	OHpak SB-2002.5	≥ 12,000	10	20.0 x 300	0.02 % NaN ₃ aq.	SB-802.5 HQ
F6516013	OHpak SB-2003	≥ 12,000	10	20.0 x 300	0.02 % NaN ₃ aq.	SB-803 HQ
F6516014	OHpak SB-2004	≥ 12,000	18	20.0 x 300	0.02 % NaN ₃ aq.	SB-804 HQ
F6516015	OHpak SB-2005	≥ 12,000	20	20.0 x 300	0.02 % NaN ₃ aq.	SB-805 HQ
F6516016	OHpak SB-2006	≥ 12,000	20	20.0 x 300	0.02 % NaN ₃ aq.	SB-806 HQ
F6516017	OHpak SB-2006M	≥ 12,000	20	20.0 x 300	0.02 % NaN ₃ aq.	SB-806M HQ
F6709555	OHpak SB-G 8B	(guard column)	18	8.0 x 50	0.02 % NaN ₃ aq.	(guard column)

Base Material: Polyhydroxymethacrylate

GFC columns to be used with light scattering detector

● 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
F6429206	OHpak LB-802.5 New	≥ 16,000	6	200	8.0 x 300	H ₂ O
F6429201	OHpak LB-803	≥ 16,000	6	800	8.0 x 300	H ₂ O
F6429204	OHpak LB-804	≥ 16,000	10	2,000	8.0 x 300	H ₂ O
F6429203	OHpak LB-805	≥ 12,000	13	7,000	8.0 x 300	H ₂ O
F6429205	OHpak LB-806	≥ 12,000	13	15,000	8.0 x 300	H ₂ O
F6429202	OHpak LB-806M	≥ 12,000	13	15,000	8.0 x 300	H ₂ O
F6709434	OHpak LB-G 6B	(guard column)	13	—	6.0 x 50	H ₂ O

LB-806M is a mixed-gel column capable of analyzing samples over a wide range of molecular weight distribution.

Base Material: Polyhydroxymethacrylate
Usable pH Range: pH3 - 10

Usable solvents

Product Name	Maximum Usable Concentration (%)		
	Methanol	Acetonitrile	N,N-Dimethylformamide (DMF)
SB-802 HQ	0	0	0
SB-802.5 HQ, SB-803 HQ	100	75	100
SB-804 HQ - SB-806M HQ	75	75	100
SB-G 6B	75	75	100
SB-807 HQ, SB-807G	30	30	0
LB-802.5 - LB-806M, LB-G 6B	100	100	100

(Note)

The maximum solvent tolerance of SB-2000 series, preparative columns of SB-800 HQ series, is 50 % methanol, acetonitrile, or DMF. (SB-2002 is not tolerant to organic solvents)

Target molecular weight range and exclusion limit

● Measured with pullulan (eluent: ultrapure water)

Product Name	Target Molecular Weight Range	Exclusion Limit
SB-802 HQ	200 - 1,000	1,000
SB-802.5 HQ	500 - 10,000	10,000
SB-803 HQ	1,000 - 100,000	100,000
SB-804 HQ	5,000 - 400,000	1,000,000
SB-805 HQ	100,000 - 1,000,000	* (4,000,000)
SB-806 HQ	100,000 - * (20,000,000)	* (20,000,000)
SB-806M HQ	500 - * (20,000,000)	* (20,000,000)
SB-807 HQ	500,000 - * (500,000,000)	* (500,000,000)
LB-802.5	500 - 10,000	10,000
LB-803	1,000 - 100,000	100,000
LB-804	5,000 - 400,000	1,000,000
LB-805	100,000 - 1,000,000	* (4,000,000)
LB-806	100,000 - * (20,000,000)	* (20,000,000)
LB-806M	500 - * (20,000,000)	* (20,000,000)

Please use the above table for reference purposes only when selecting columns.

* () Estimated value

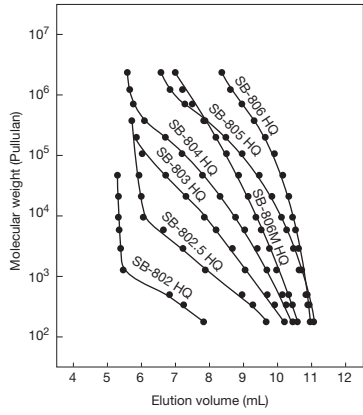
● Measured with *PEG/PEO (eluent: DMF)

Product Name	Target Molecular Weight Range
SB-802.5 HQ	100 - 2,000
SB-803 HQ	200 - 40,000
SB-804 HQ	500 - 300,000
SB-805 HQ	50,000 - 700,000
SB-806 HQ	70,000 - ** (20,000,000)
SB-806M HQ	200 - ** (20,000,000)
LB-802.5	100 - 5,000
LB-803	500 - 50,000
LB-804	500 - 300,000
LB-805	50,000 - 700,000
LB-806	70,000 - ** (20,000,000)
LB-806M	200 - ** (20,000,000)

Please use the above table for reference purposes only when selecting columns.

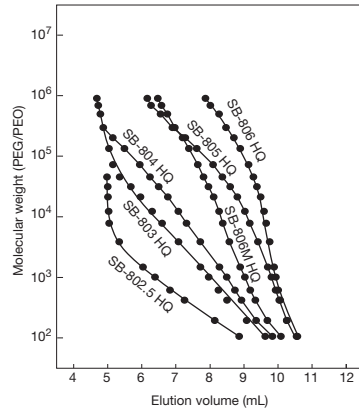
*PEG : polyethylene glycol
*PEO : polyethylene oxide
** () Estimated value

Calibration curves for SB-800 HQ series using pullulan (eluent: H₂O)



Column : Shodex OHpak SB-800 HQ series
Eluent : H₂O
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 30 °C

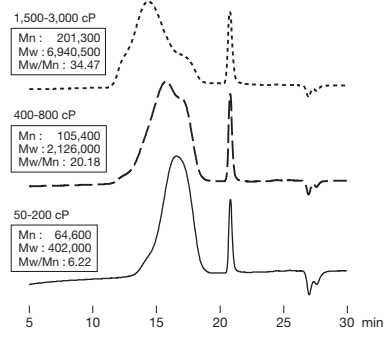
Calibration curves for SB-800 HQ series using PEG/PEO (eluent: DMF)



Column : Shodex OHpak SB-800 HQ series
Eluent : DMF
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Carboxymethylcellulose

Sample : Carboxymethylcellulose 0.1 % each, 50 µL



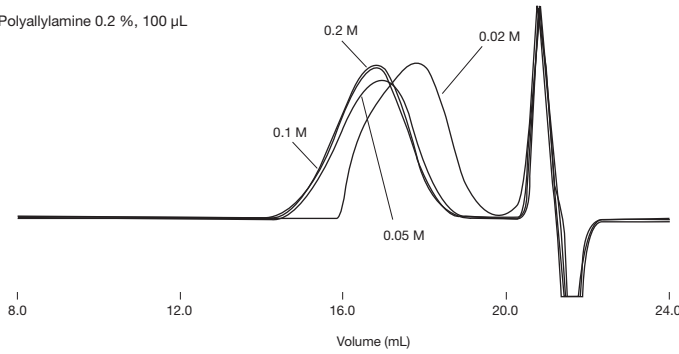
Molecular weight was determined from the calibration curve of pullulan.

Column : Shodex OHpak SB-806M HQ x 2
Eluent : 0.1 M NaCl aq.
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Effects of sodium nitrate in eluent on the analysis of polyallylamine

For the analysis of cationic polymers, such as polyallylamine, the polymer is observed to adsorb on the column or delayed in elution when low sodium nitrate eluent was used. These phenomena can be suppressed by increasing the concentration of sodium nitrate in the eluent. In the case of polyallylamine, a good shape chromatogram is obtained when sodium nitrate concentration is 0.1 M or higher.

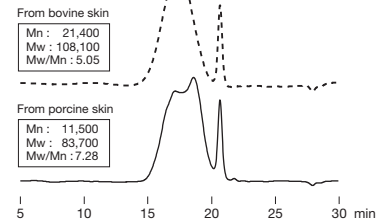
Sample : Polyallylamine 0.2 %, 100 µL



Column : Shodex OHpak SB-806M HQ x 2
Eluent : 0.5 M CH₃COOH + NaNO₃ aq.
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Gelatin

Sample : 0.1 % each, 100 µL
 Gelatin from bovine skin (Acid treatment, Gel strength : 225 g)
 Gelatin from porcine skin (Alkali treatment, Gel strength : 90-100 g)

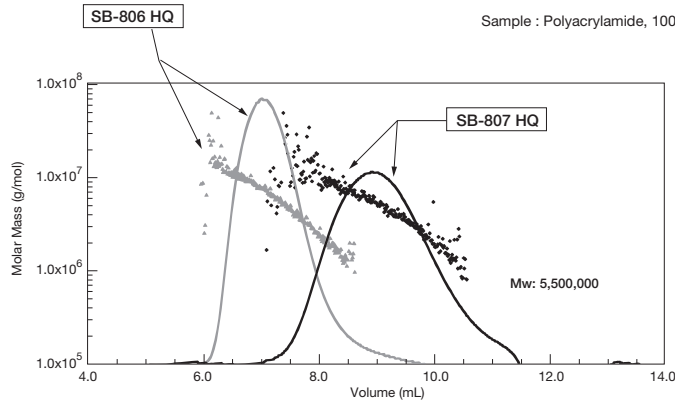


*Molecular weight was determined from the calibration curve of pullulan.

Column : Shodex OHpak SB-806M HQ x 2
Eluent : 0.1 M KH₂PO₄ aq./ 0.1 M Na₂HPO₄ aq. = 50/50
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Polyacrylamide

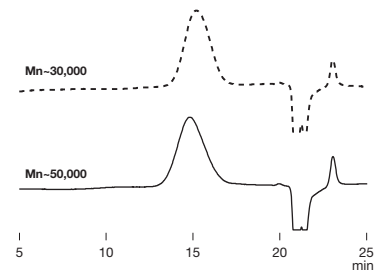
Sample : Polyacrylamide, 100 µL



Column : Shodex OHpak SB-807 HQ, SB-806 HQ
Eluent : 0.2 M NaCl aq.
Flow rate : 0.5 mL/min
Detector : RI
 MALS (Multi angle light scattering)
Column temp. : 30 °C

Cellulose acetate

Sample : Cellulose acetate 0.1 % each, 100 µL



Column : Shodex OHpak SB-806M HQ x 2
Eluent : 20 mM LiBr in DMF
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 °C

Copovidones

Sample : 100 μ L
Poly(1-vinylpyrrolidone-co-vinyl acetate) 0.1 % each

Copolymer 7:3
Mn : 2,000
Mw : 14,400
Mw/Mn : 7.40

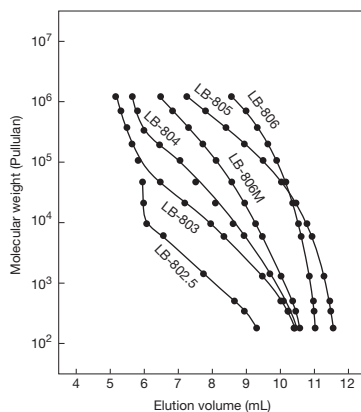
Copolymer 3:7
Mn : 6,400
Mw : 28,900
Mw/Mn : 4.53



Molecular weight was determined from the calibration curve of PEG/P EO.

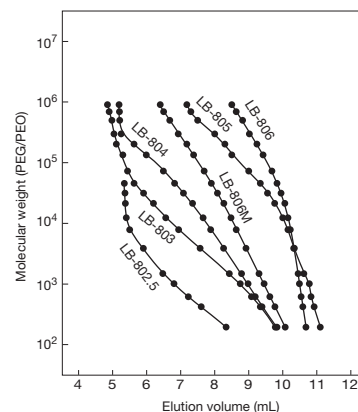
Column : Shodex OHpak SB-806M HQ x 2
Eluent : 20 mM LiBr in DMF
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 $^{\circ}$ C

Calibration curves for LB-800 series using pullulan (eluent: H₂O)



Column : Shodex OHpak LB-800 series
Eluent : H₂O
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 30 $^{\circ}$ C

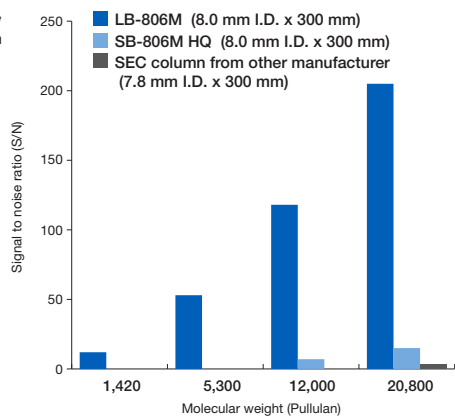
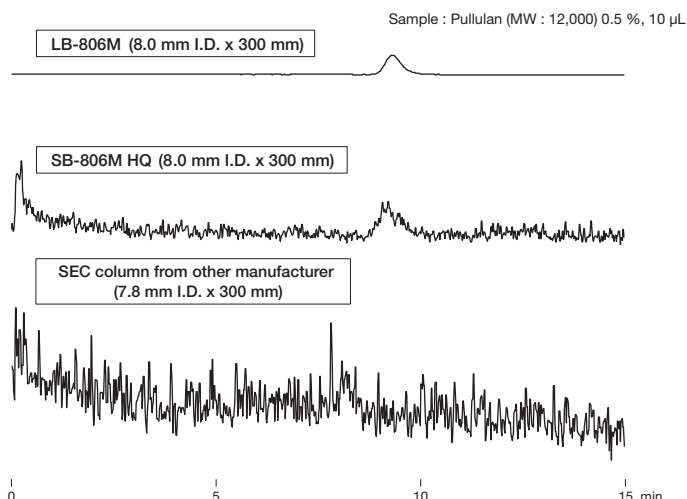
Calibration curves for LB-800 series using PEG/P EO (eluent: DMF)



Column : Shodex OHpak LB-800 series
Eluent : DMF
Flow rate : 1.0 mL/min
Detector : RI
Column temp. : 40 $^{\circ}$ C

Comparison of pullulan detection using multi angle light scattering detector

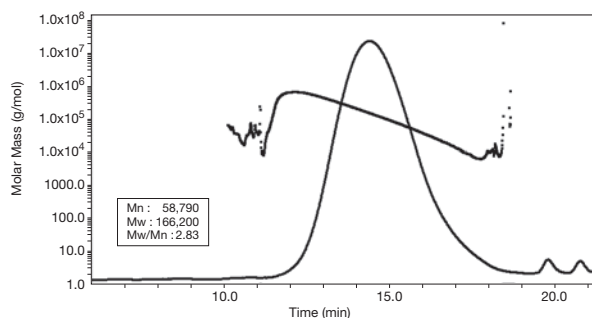
The OHpak LB-800 series is able to detect low molecular weight substances owing to its improved low baseline noise level while using it with a multiangle light scattering detector. This cannot be achieved with other manufacturer's SEC column.



Column : Shodex OHpak LB-806M
Shodex OHpak SB-806M HQ
SEC column from other manufacturer
Eluent : 0.1 M NaNO₃ aq.
Flow rate : 1.0 mL/min
Detector : MALS (Multi angle light scattering) (90 $^{\circ}$)
Column temp. : 30 $^{\circ}$ C

Sodium alginate

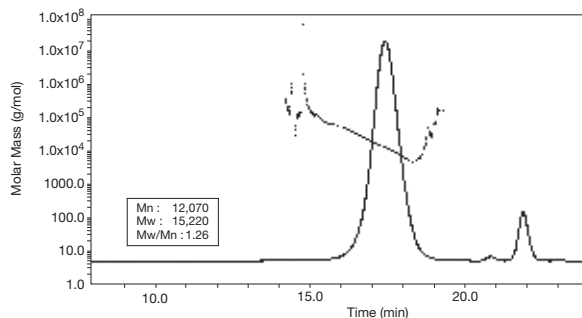
Sample : Sodium alginate 0.1 % , 100 μ L



Column : Shodex OHpak LB-806M x 2
Eluent : 0.1 M NaNO₃ aq.
Flow rate : 1.0 mL/min
Detector : RI
MALS (Multi angle light scattering)
Column temp. : 30 $^{\circ}$ C

Sodium heparin

Sample : Sodium heparin 0.1 % , 100 μ L



Column : Shodex OHpak LB-806M x 2
Eluent : 0.1 M NaNO₃ aq.
Flow rate : 1.0 mL/min
Detector : RI
MALS (Multi angle light scattering)
Column temp. : 30 $^{\circ}$ C