

Aqueous-Organic SEC Columns

Features

GF-HQ

- Polymer-based SEC columns with high solvent durability
- Works well with both aqueous and organic solvents

• 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
F7600000	Asahipak GF-210 HQ	≥ 19,000	5	180	7.5 x 300	H ₂ O
F7600001	Asahipak GF-310 HQ	≥ 19,000	5	400	7.5 x 300	H ₂ O/CH ₃ OH = 70/30
F7600002	Asahipak GF-510 HQ	≥ 19,000	5	2,000	7.5 x 300	H ₂ O/CH ₃ OH = 70/30
F7600004	Asahipak GF-7M HQ	≥ 13,000	9	10,000	7.5 x 300	H ₂ O/CH ₃ OH = 70/30
F6710018	Asahipak GF-1G 7B	(guard column)	9	—	7.5 x 50	H ₂ O/CH ₃ OH = 70/30
F7600110	MSPak GF-310 4D	≥ 10,000	5	400	4.6 x 150	H ₂ O

GF-7M HQ is a mixed-gel column capable of analyzing samples over a wide range of molecular weight.

Base Material: Polyvinyl alcohol
Usable pH Range: pH2 - 9

• 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
F6810038	Asahipak GS-310 20G	≥ 14,000	13	20.0 x 500	H ₂ O/CH ₃ OH = 70/30	GF-310 HQ
F6810039	Asahipak GS-510 20G	≥ 14,000	13	20.0 x 500	H ₂ O/CH ₃ OH = 70/30	GF-510 HQ
F6710020	Asahipak GS-10G 7B	(guard column)	20	7.5 x 50	H ₂ O/CH ₃ OH = 70/30	(guard column)

Base Material: Polyvinyl alcohol

Usable solvents

Solvent	Product Name	
	GF-210 HQ	GF-310 HQ GF-510 HQ GF-7M HQ
Water (0 - 0.5 M salt concentration)	✓	✓
Methanol	✓	✓
Ethanol	✓	✓
Acetonitrile	✓	✓
Tetrahydrofuran (THF)	✓	✓

✓ : Solvent replacement possible Δ : Solvent replacement possible up to 50 %

Solvent	Product Name	
	GF-210 HQ	GF-310 HQ GF-510 HQ GF-7M HQ
N,N-Dimethylformamide (DMF)	✓	✓
Acetone	✓	✓
Chloroform	✓	✓
Ethylacetate	✓	✓
Dimethyl sulfoxide (DMSO)	✓	Δ

Target molecular weight range and exclusion limit

• Measured with pullulan (eluent: ultrapure water)

Product Name	Target Molecular Weight Range	Exclusion Limit
GF-210 HQ	300 - 4,000	9,000
GF-310 HQ	300 - 30,000	40,000
GF-510 HQ	5,000 - 200,000	300,000
GF-7M HQ	300 - * (10,000,000)	* (10,000,000)

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

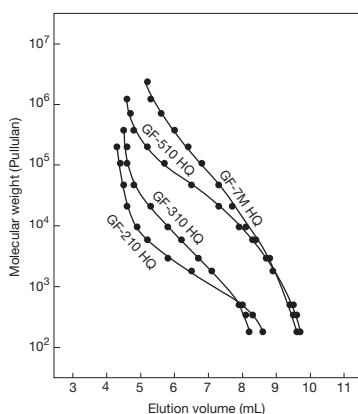
* () Estimated value

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

Product Name	Target Molecular Weight Range
GF-210 HQ	100 - 2,000
GF-310 HQ	200 - 4,000
GF-510 HQ	2,000 - 200,000
GF-7M HQ	200 - ** (10,000,000)

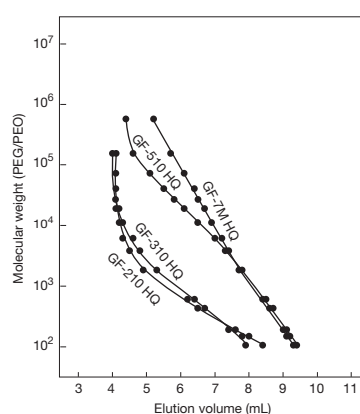
Please use the above table for reference purposes only when selecting columns.

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

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

Column : Shodex Asahipak GF-HQ series
 Eluent : H₂O
 Flow rate : 0.6 mL/min
 Detector : RI
 Column temp. : 30 °C

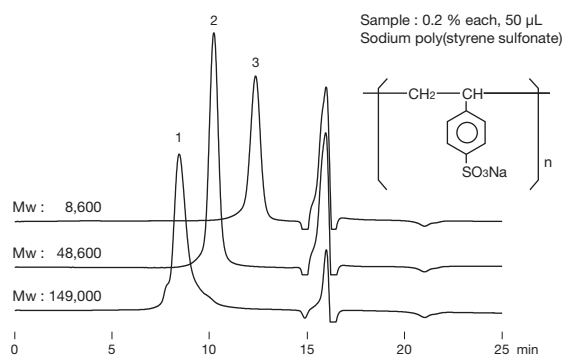
Calibration curves for GF-HQ series using PEG/PEO (eluent: DMF)



Column : Shodex Asahipak GF-HQ series
 Eluent : DMF
 Flow rate : 0.6 mL/min
 Detector : RI
 Column temp. : 40 °C

Sodium polystyrene sulfonates

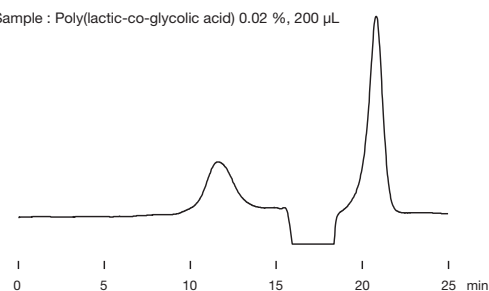
Polymers having both hydrophobic and hydrophilic functional groups may exhibit hydrophobic interactions with packing materials. When analyzing such polymers, addition of organic solvents to the eluent can suppress the hydrophobic interaction.



Column : Shodex Asahipak GF-510 HQ
 Eluent : 50 mM LiCl aq./CH₃CN = 60/40
 Flow rate : 0.6 mL/min
 Detector : UV (254 nm)
 Column temp. : 30 °C

Biodegradable Polymer

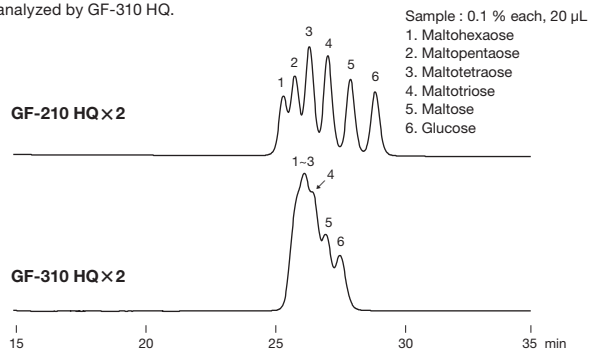
Sample : Poly(lactic-co-glycolic acid) 0.02 %, 200 µL



Column : Shodex Asahipak GF-7M HQ
 Eluent : CH₃CN
 Flow rate : 0.6 mL/min
 Detector : RI
 Column temp. : 40 °C

Comparison of two GF column performances for the separation of maltoligosaccharides

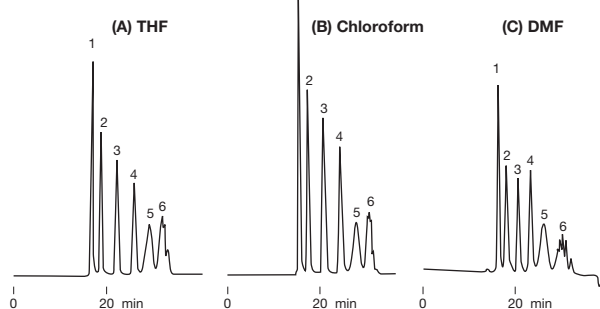
GF-210 HQ demonstrates an improved separation of low molecular substances. The chromatograms below show that the peaks obtained by GF-210 HQ are separated with deeper notches compared to peaks obtained by GF-310 HQ. GF-210 HQ is capable of separating oligosaccharides (trisaccharide to hexasaccharide) while those oligosaccharides were eluted all together when analyzed by GF-310 HQ.



Column : Shodex Asahipak GF-210 HQ x 2
 Shodex Asahipak GF-310 HQ x 2
 Eluent : H₂O
 Flow rate : 0.6 mL/min
 Detector : RI
 Column temp. : 50 °C

Comparison of polystyrene separation under three different solvent conditions

Sample : Polystyrene 1 mg/mL each, 50 µL
 1. Mw : 1,090,000
 2. Mw : 190,000
 3. Mw : 37,900
 4. Mw : 9,100
 5. Mw : 2,980
 6. Mw : 500



Column : Shodex Asahipak GF-510 HQ + GF-310 HQ
 Eluent : (A); THF, (B); Chloroform, (C); DMF
 Flow rate : 0.5 mL/min
 Detector : (A),(B) UV (254 nm), (C) UV (270 nm)
 Column temp. : 30 °C