

03

Size Exclusion Columns

YMC-SEC MAB	32-33
YMC-Pack Diol	34-35
Ordering Information	36

Size exclusion chromatography column for separation of monoclonal antibody (MAb)

YMC-SEC MAB

- Silica-based SEC column optimized for separation of MAb
- Suitable for separation of aggregates and fragments of MAb
- Excellent resolution and peak shapes

- Particle size : 3 μm
- Pore size : 250 \AA
- Usable pH range : 5-7.5
- USP L20, L59

Size exclusion chromatography column for separation of monoclonal antibody (MAb)

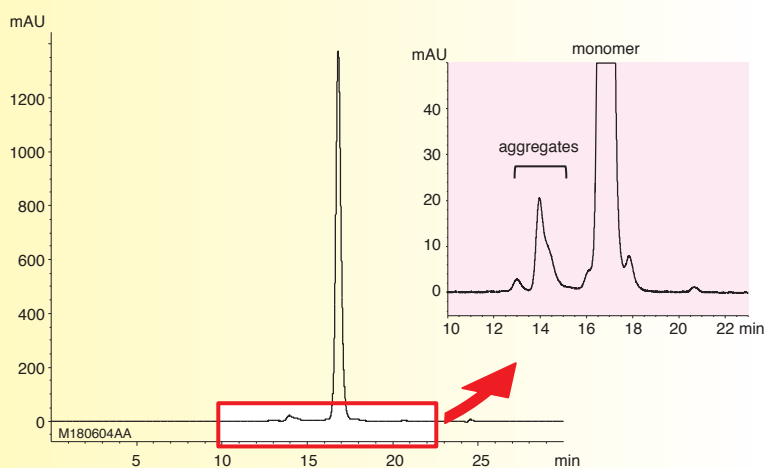
YMC-SEC MAB is a silica-based size exclusion chromatography (SEC)/gel filtration chromatography (GFC) column with excellent durability and batch-to-batch reproducibility. Optimized base material design and surface modification provide superior separation of antibody monomers and their aggregates/fragments with very low nonspecific adsorption. This is ideal for the quality control assessment of antibody drugs.

Specifications

	YMC-SEC MAB
Base	Silica gel
Particle size (μm)	3
Pore size (\AA)	250
Bonded phase	Dihydroxypropyl
Usable pH range	5-7.5
Molecular weight range	10,000-700,000

Suitable for separation of aggregates and fragments of MAb

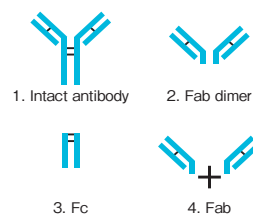
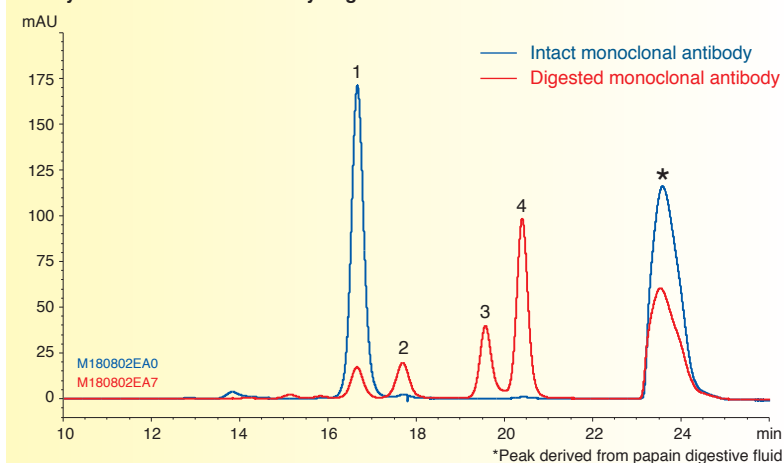
Analysis of monoclonal antibody aggregates



Column	: YMC-SEC MAB (3 μm , 250 \AA) 300 X 4.6 mm I.D.
Eluent	: 0.1 M KH_2PO_4 - K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate	: 0.165 mL/min
Temperature	: 25°C
Detection	: UV at 280 nm
Injection	: 10 μL
Sample	: Humanized monoclonal antibody (5 mg/mL)

Humanized monoclonal antibody was analyzed using YMC-SEC MAB. The chromatogram shows excellent peak shape, and good separation between aggregates and a monomer peak. YMC-SEC MAB is effective for characterization and quality control of antibody therapeutics.

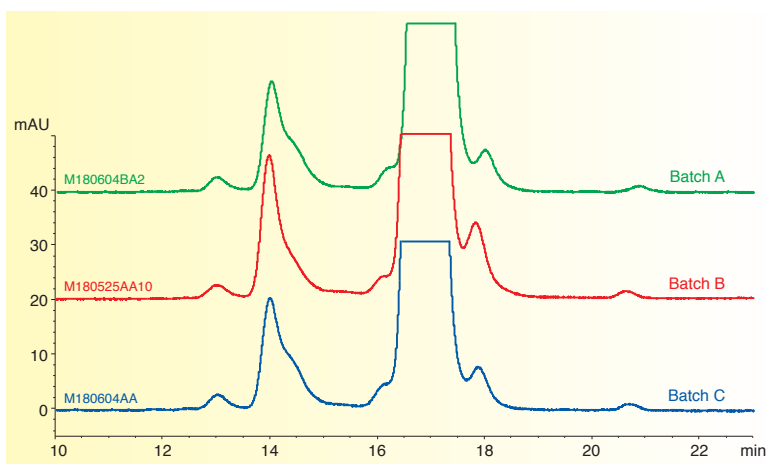
Analysis of monoclonal antibody fragments



Column : YMC-SEC MAB (3 μ m, 250 Å)
 300 X 4.6 mm.I.D.
 Eluent : 0.1 M KH_2PO_4 - K_2HPO_4 (pH 7.0)
 containing 0.2 M NaCl
 Flow rate : 0.165 mL/min
 Temperature : 25°C
 Detection : UV at 280 nm
 Injection : 2 μ L (3 mg/mL)

A monoclonal antibody digested by papain and an intact monoclonal antibody were analyzed using YMC-SEC MAB. Since the column shows excellent separation between Fc and Fab fragments, which have similar amount of MW, it is effective for separation of antibody fragments.

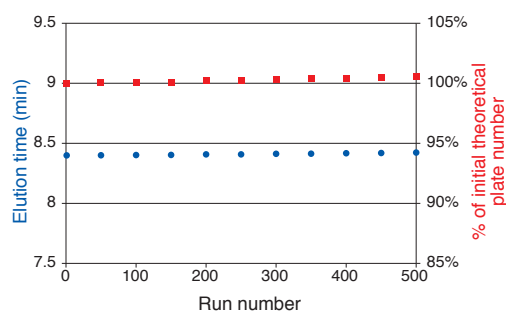
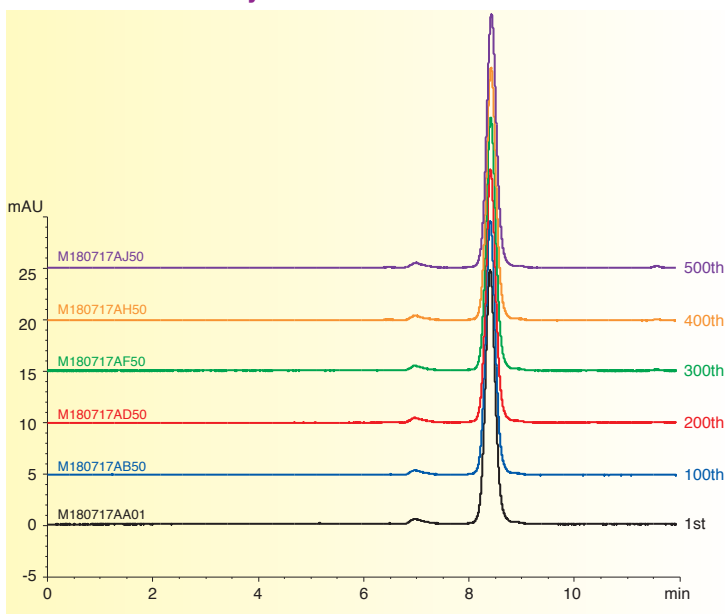
Batch-to-batch reproducibility



Column : YMC-SEC MAB (3 μ m, 250 Å)
 300 X 4.6 mm.I.D.
 Eluent : 0.1 M KH_2PO_4 - K_2HPO_4 (pH 7.0)
 containing 0.2 M NaCl
 Flow rate : 0.165 mL/min
 Temperature : 25°C
 Detection : UV at 280 nm
 Injection : 10 μ L
 Sample : Humanized monoclonal antibody (5 mg/mL)

YMC-SEC MAB provides excellent reproducibility of the separation of monomer and aggregates as well as for monomer and fragments. Therefore, it is very effective for quality control of antibody drugs.

Excellent durability



Column : YMC-SEC MAB (3 μ m, 250 Å)
 300 X 4.6 mm.I.D.
 Eluent : 0.1 M NaH_2PO_4 - Na_2HPO_4 (pH 7.0)
 containing 0.2 M NaCl
 Flow rate : 0.33 mL/min
 Temperature : 25°C
 Detection : UV at 280 nm
 Injection : 2 μ L
 Sample : Humanized monoclonal antibody (1 mg/mL)

YMC-SEC MAB has excellent repeatability of separation without any change of theoretical plate number and elution time even after repeated separation of monoclonal antibody for more than 500 times because of its superior durability.

Silica-based size exclusion chromatography columns

YMC-Pack Diol

- Silica-based columns with high mechanical stability
- Useful for molecular weight determination of proteins and sugars
- High-resolution and fast analysis using 2 μm , 3 μm particle
- Particle size : 2, 3, 5 μm
- Pore size : 60, 120, 200, 300 \AA
- Usable pH range : 5-7.5
- USP L20, L33, L59

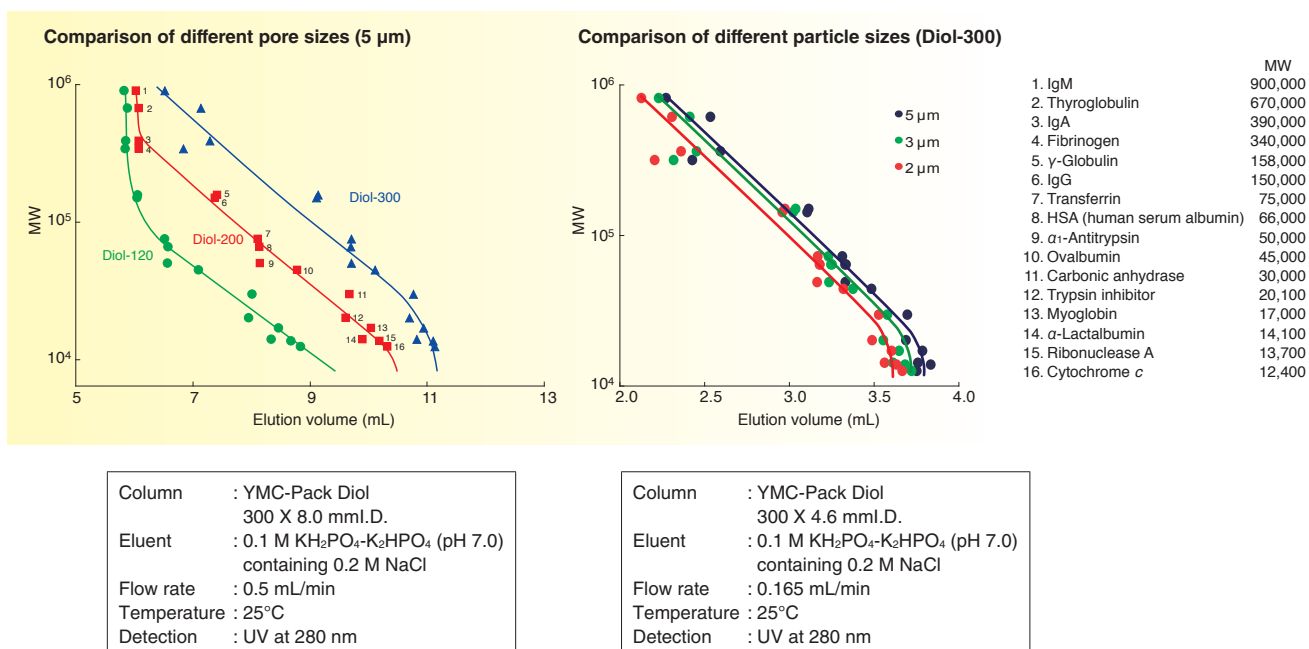
Silica-based size exclusion chromatography (SEC) column

YMC-Pack Diol is a size exclusion chromatography column packed with dihydroxypropyl-bonded silica, and available in four different pore sizes. Diol-120, 200, and 300 are suitable for separation or molecular weight determination of proteins with molecular weights of 1,000 to 1,000,000. Diol-60 is the most suitable for separation of peptides or oligosaccharides whose molecular weights are 10,000 or less.

Specifications

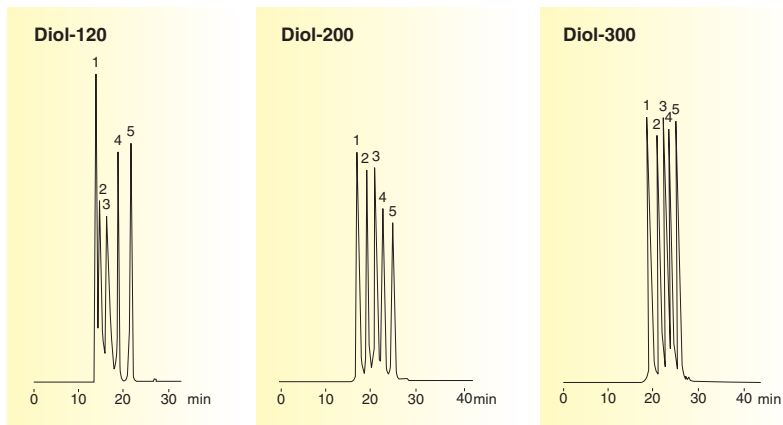
Column	Base	Bonded phase	Pore size (\AA)	Particle size (μm)	Usable pH range	Characteristics
Diol-60	Silica gel	Dihydroxypropyl	60	3, 5	5-7.5	For molecular weights less than 10,000
Diol-120			120			For molecular weights 1,000 to 100,000
Diol-200			200	For molecular weights 5,000 to 300,000		
Diol-300			300	For molecular weights 20,000 to 1,000,000		

Calibration curves of various proteins



Diol-120, Diol-200, and Diol-300 are suitable for the separation or molecular weight determination of proteins with molecular weights from 1,000 to 1,000,000. Calibration curves of proteins with different particle sizes using YMC-Pack Diol are almost the same and this enables easy method transfer between UHPLC and HPLC.

Separation for standard protein markers

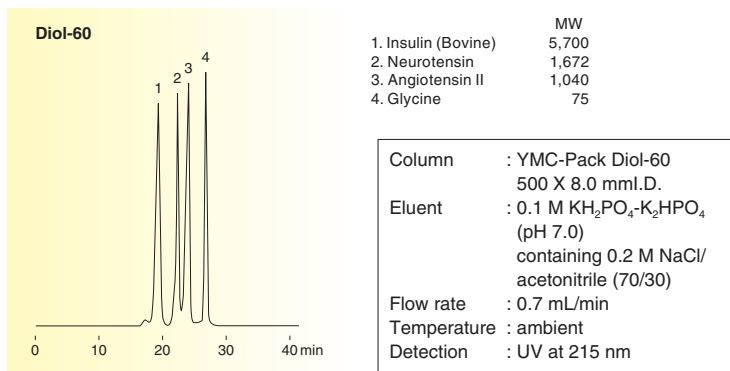


	MW
1. Glutamate dehydrogenase	290,000
2. Lactate dehydrogenase	142,000
3. Enolase	67,000
4. Adenylate kinase	32,000
5. Cytochrome c	12,400

Column : YMC-Pack Diol
500 X 8.0 mmI.D.
Eluent : 0.1 M KH₂PO₄-K₂HPO₄ (pH 7.0)
containing 0.2 M NaCl
Flow rate : 0.7 mL/min
Temperature : ambient
Detection : UV at 280 nm

For molecular weight 5,000 to 300,000 substances, Diol-200 is suitable for the separation.

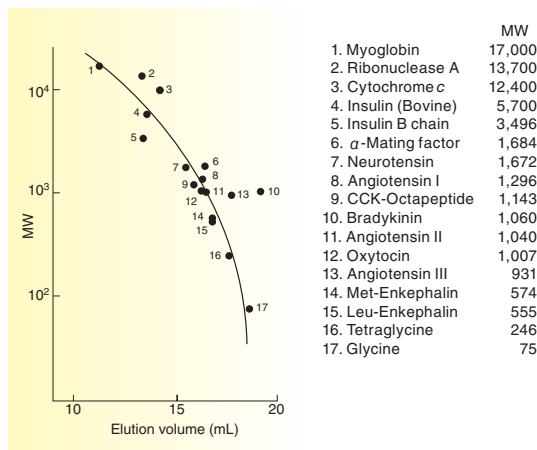
Separation of peptides with molecular weights less than 10,000



	MW
1. Insulin (Bovine)	5,700
2. Neurotensin	1,672
3. Angiotensin II	1,040
4. Glycine	75

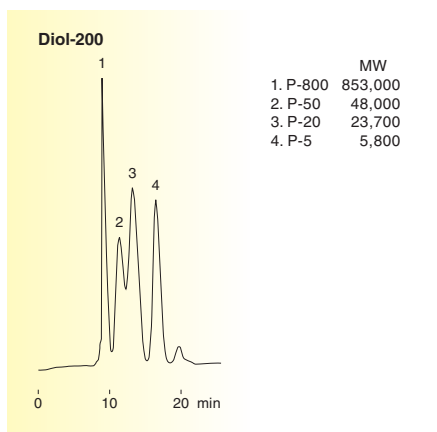
Column : YMC-Pack Diol-60
500 X 8.0 mmI.D.
Eluent : 0.1 M KH₂PO₄-K₂HPO₄
(pH 7.0)
containing 0.2 M NaCl/
acetonitrile (70/30)
Flow rate : 0.7 mL/min
Temperature : ambient
Detection : UV at 215 nm

For molecular weight less than 10,000 peptides, Diol-60 is suitable for the separation.

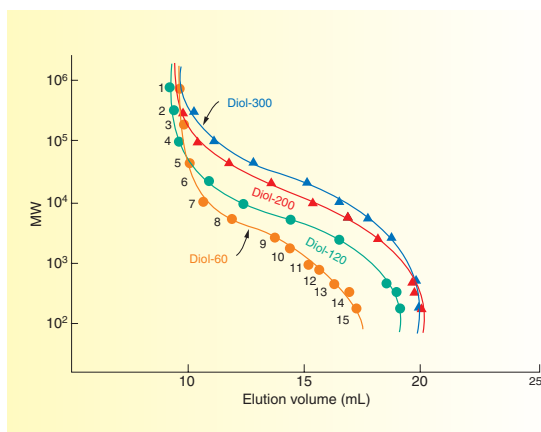


	MW
1. Myoglobin	17,000
2. Ribonuclease A	13,700
3. Cytochrome c	12,400
4. Insulin (Bovine)	5,700
5. Insulin B chain	3,496
6. α-Mating factor	1,684
7. Neurotensin	1,672
8. Angiotensin I	1,296
9. CCK-Octapeptide	1,143
10. Bradykinin	1,060
11. Angiotensin II	1,040
12. Oxytocin	1,007
13. Angiotensin III	931
14. Met-Enkephalin	574
15. Leu-Enkephalin	555
16. Tetraglycine	246
17. Glycine	75

Separation of oligo- and polysaccharides



	MW
1. P-800	853,000
2. P-50	48,000
3. P-20	23,700
4. P-5	5,800



	MW
1. Pullulan (P-800)	853,000
2. Pullulan (P-400)	380,000
3. Pullulan (P-200)	186,000
4. Pullulan (P-100)	100,000
5. Pullulan (P-50)	48,000
6. Pullulan (P-20)	23,700
7. Pullulan (P-10)	12,200
8. Pullulan (P-5)	5,800
9. Maltopentadecaose (G15)	2,448
10. Maltoundecaose (G11)	1,800
11. Maltoheptaose (G7)	1,152
12. Maltopentaose (G5)	824
13. Maltotriose (G3)	504
14. Maltose (G2)	342
15. Glucose (G1)	180

Column : YMC-Pack Diol, 500 X 8.0 mmI.D.
Eluent : water
Flow rate : 1.0 mL/min
Temperature : ambient
Detection : RI

For separation or molecular weight determination of water-soluble oligo- and polysaccharides, Diol-60, Diol-120, Diol-200, and Diol-300 are useful individually or in combination.

Ordering Information -Columns-

YMC-SEC MAB

Particle size (µm)	Column size inner diameter X length (mm)	YMC-SEC MAB (250 Å)
3	4.6 X 150	DLM25S03-1546WT
	4.6 X 300	DLM25S03-3046WT
	8.0 X 300	DLM25S03-3008WT

YMC-Pack Diol (Stainless steel columns)

Particle size (µm)	Column size inner diameter X length (mm)	Diol-60 (60 Å)	Diol-120 (120 Å)	Diol-200 (200 Å)	Diol-300 (300 Å)
2	4.6 X 150	—	—	DL20S02-1546PTH	DL30S02-1546PTH
	4.6 X 300	—	—	DL20S02-3046PTH	DL30S02-3046PTH
3	4.6 X 300	DL06S03-3046WT	DL12S03-3046WT	DL20S03-3046WT	DL30S03-3046WT
	4.6 X 300	DL06S05-3046WT	DL12S05-3046WT	DL20S05-3046WT	DL30S05-3046WT
5	8.0 X 300	DL06S05-3008WT	DL12S05-3008WT	DL20S05-3008WT	DL30S05-3008WT
	8.0 X 500	DL06S05-5008WT	DL12S05-5008WT	DL20S05-5008WT	DL30S05-5008WT
	20 X 300	DL06S05-3020WT	DL12S05-3020WT	DL20S05-3020WT	DL30S05-3020WT
	20 X 500	DL06S05-5020WT	DL12S05-5020WT	DL20S05-5020WT	DL30S05-5020WT
	20 X 500	DL06S05-5020WT	DL12S05-5020WT	DL20S05-5020WT	DL30S05-5020WT

YMC-Pack Diol Guard columns (Stainless steel columns)

Particle size (µm)	Column size inner diameter X length (mm)	Diol-60 (60 Å)	Diol-120 (120 Å)	Diol-200 (200 Å)	Diol-300 (300 Å)
5	8.0 X 30	DL06S05-0308WTG	DL12S05-0308WTG	DL20S05-0308WTG	DL30S05-0308WTG
	20 X 50	DL06S05-0520WTG	DL12S05-0520WTG	DL20S05-0520WTG	DL30S05-0520WTG

YMC-Pack Diol (Glass columns)

Particle size (µm)	Column size inner diameter X length (mm)	Diol-60 (60 Å)	Diol-120 (120 Å)	Diol-200 (200 Å)	Diol-300 (300 Å)
5	8.0 X 300	DL06S05-3008FG	DL12S05-3008FG	DL20S05-3008FG	DL30S05-3008FG
	8.0 X 500	DL06S05-5008FG	DL12S05-5008FG	DL20S05-5008FG	DL30S05-5008FG