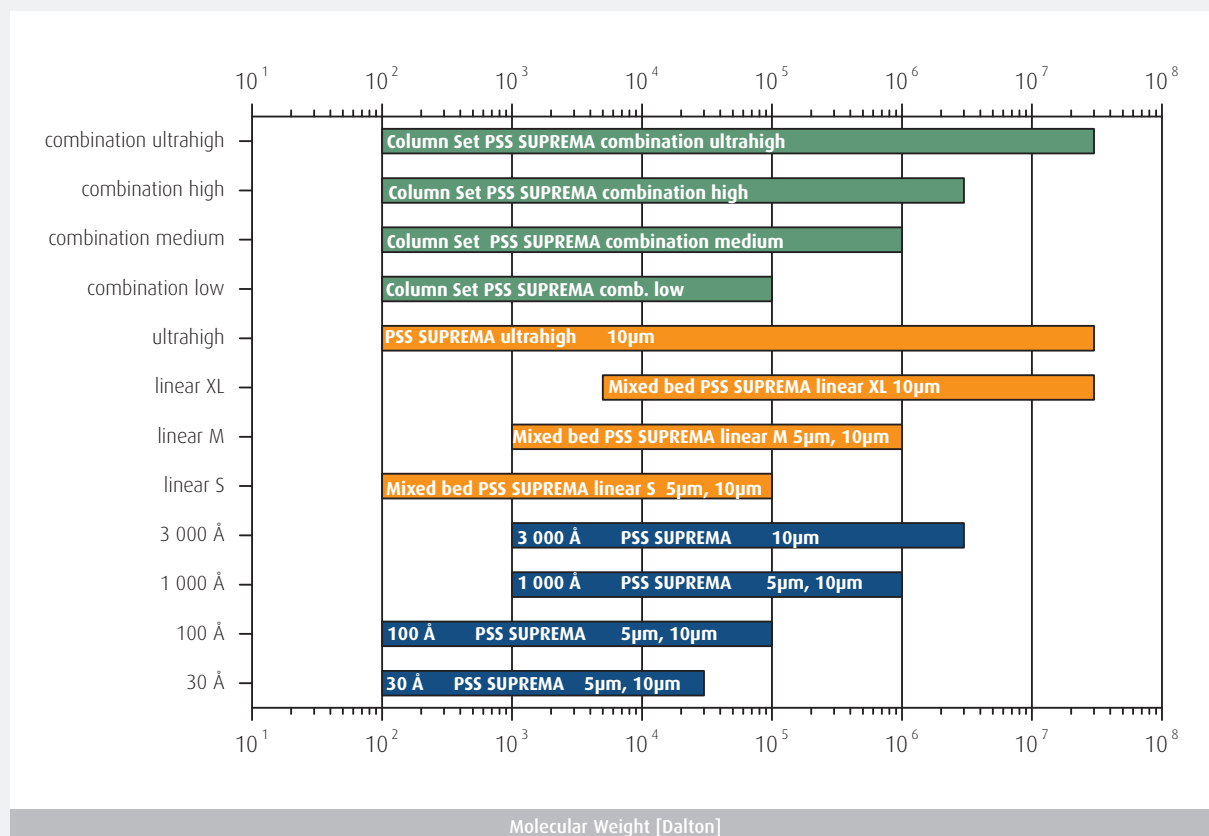


## 2.2| Columns for Aqueous Solvents

### Aqueous GPC/SEC of Neutral and Anionic Polymers - SUPREMA Columns

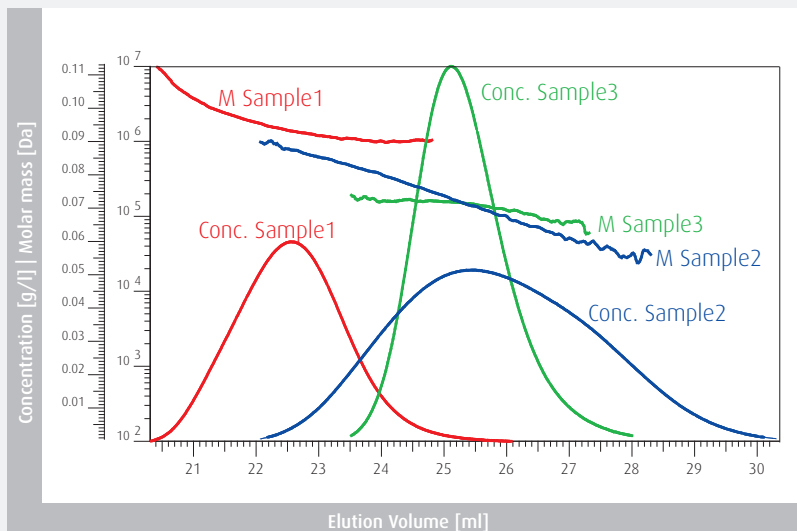
Field of Application	
Applicability	Neutral and anionic polymers (PEO, PEG, Pullulan, Dextran, Poly(acrylamide), Hyaluronic acid, Poly(acrylic acid), Carboxymethyl cellulose, etc.)
Eluents	water (with salts/buffers, MeOH, ACN) pH: 1.5 - 13
Specifications	
Material	Modified acrylate copolymer network
Maximum Pressure	50 - 80 bar (725 - 1160 psi), depending on porosity
Maximum Temperature	80° C
Maximum Flow Rate	2 ml/min (8 mm I.D.)
Particle Size	5 µm, 10 µm
Molecular Weight Range	100 to > 30 000 000 Da

### Separation Ranges



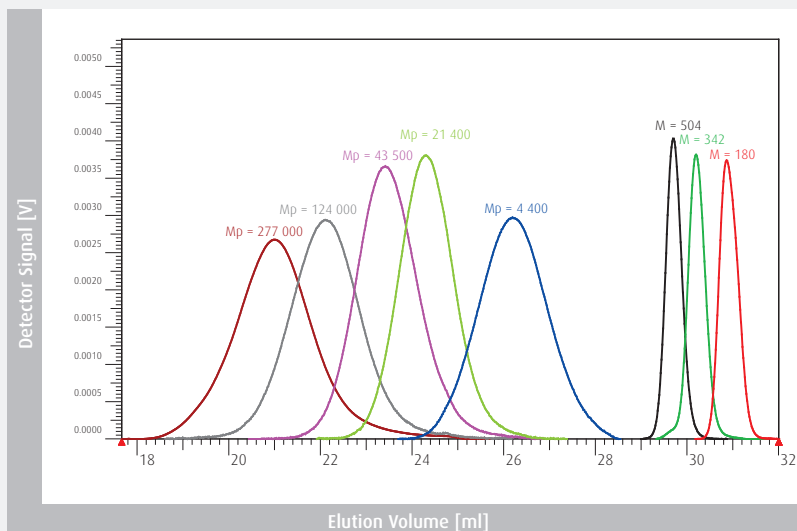
### Hydroxyethyl starch GPC/SEC-MALLS acc. EUP

**Flow rate:** 1 ml/min  
**Loading:** 3 g/l, 100 µl  
**Eluent:** water, NaN<sub>3</sub> 0.1 g/l  
**Temperature:** 25° C  
**Detector:** SECcurity RI, SLD7000 MALLS  
**Columns:** PSS SUPREMA  
 Combination high (Lux)  
 (P/N 206-0003)



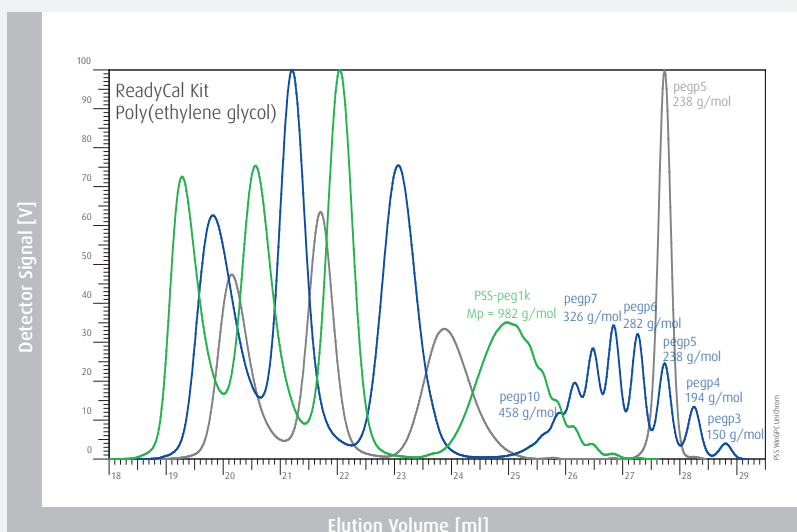
### Dextran

**Flow rate:** 1 ml/min  
**Loading:** 1.0 g/l, 20 µl  
**Eluent:** water, NaN<sub>3</sub> 0.2 g/l  
**Temperature:** 30° C  
**Detector:** SECcurity RI1260  
**Columns:** PSS SUPREMA  
 Combination high  
 (P/N 206-0003)



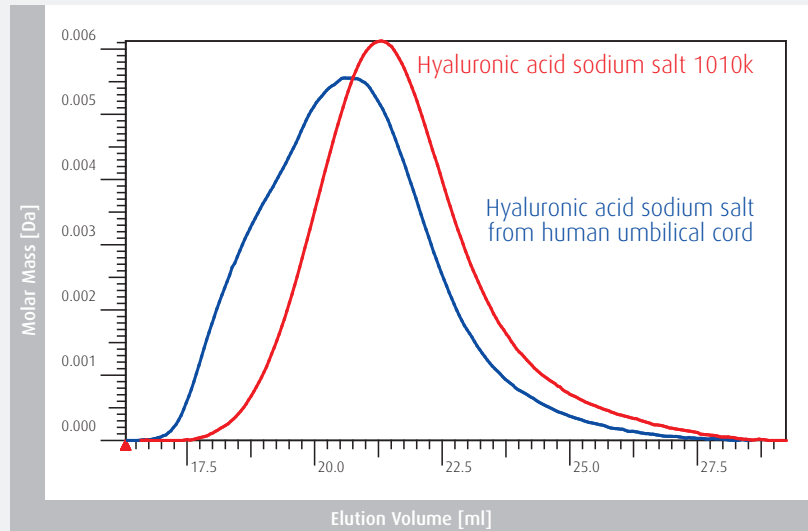
### Poly(ethylene glycol) (PEG)

**Flow rate:** 1 ml/min  
**Loading:** 1.5 g/l, 20 µl  
**Eluent:** water, NaN<sub>3</sub> 0.2 g/l  
**Temperature:** 30° C  
**Detector:** SECcurity RI1260  
**Columns:** PSS SUPREMA  
 Combination low  
 (P/N 206-0001)



## Hyaluronic acid sodium salt (HA)

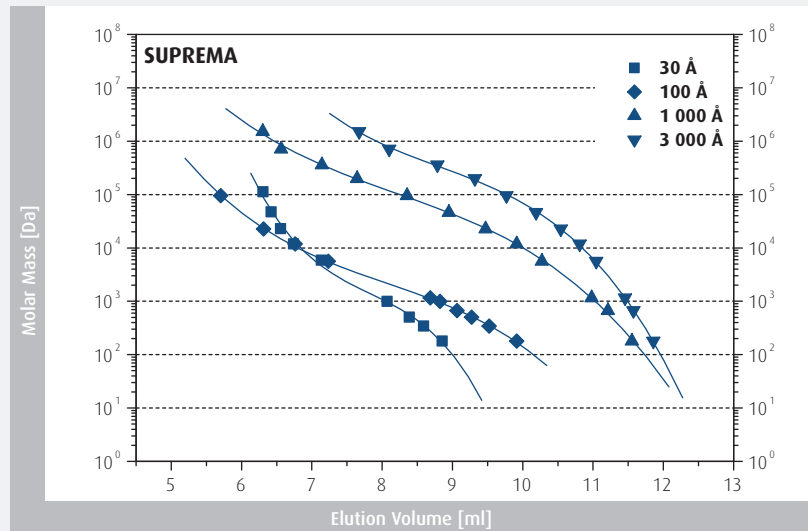
**Flow rate:** 0.25 ml/min  
**Loading:** 0.25 g/l, 100  $\mu$ l  
**Eluent:** water, PBS pH 7.4  
**Temperature:** 30° C  
**Detector:** SECcurity R11260  
**Columns:** PSS SUPREMA combination ultrahigh (P/N 206-0004)



## Calibration Curves

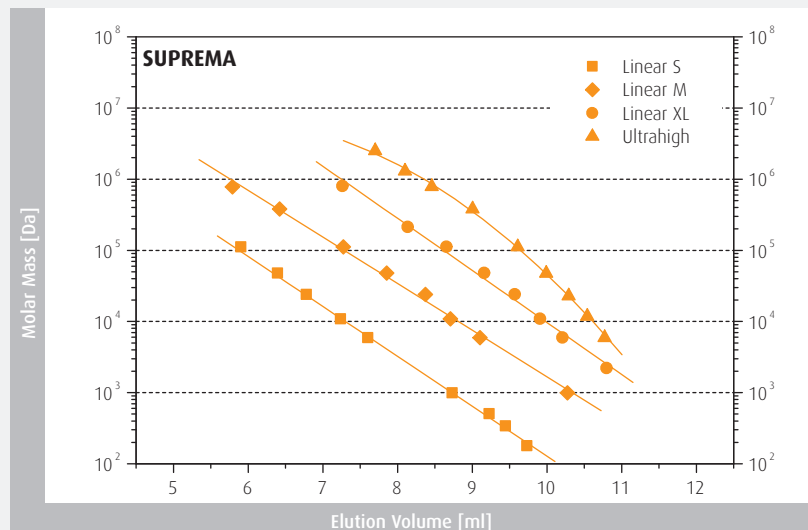
### Single Porosity Columns

**Eluent:** aqueous buffer  
**Calibrants:** Pullulan



### Mixed Bed/Linear Columns

**Eluent:** aqueous buffer  
**Calibrants:** Pullulan



## Part Numbers

### a) Individual Columns

Separation range [Da]	Particle Size [µm]	Porosity [Å]	Analytical Column Dimension: 8*300 mm, pre-column 8*50 mm	Preparative Column Dimension: 20*300 mm, pre-column 20*50 mm	HighSpeed Column Dimension: 20*50 mm	Micro Column Dimension: 4.6*250 mm, pre-column 4.6*30 mm
	5	Precolumn	sua080505			sum050305
100 – 30 000 Da	5	30	sua0830053e1			sum0525053e1
100 – 100 000 Da	5	100	sua0830051e2			sum0525051e2
100 – 1 000 000 Da	5	1 000	sua0830051e3		sus2005051e3	sum0525051e3
100 – 100 000 Da	5	Linear S	sua083005lis		sus200505lis	sum052505lis
1 000 – 1 000 000 Da	5	Linear M	sua083005lim			
	10	Precolumn	sua080510	sup2005		
100 – 30 000 Da	10	30	sua0830103e1	sup20303e1		
100 – 100 000 Da	10	100	sua0830101e2	sup20301e2		
100 – 1 000 000 Da	10	1 000	sua0830101e3	sup20301e3		
1 000 – 3 000 000 Da	10	3 000	sua0830103e3	sup20303e3		
1 000 – 10 000 000 Da	10	10 000	sua0830101e4	sup20301e4		
5 000 – >30 000 000 Da	10	30 000	sua0830103e4			
100 – 100 000 Da	10	Linear S	sua083010lis			
1 000 – 1 000 000 Da	10	Linear M	sua083010lim	sup2030lim	sus200510lim	
5 000 – 3 000 000 Da	10	Linear XL	sua083010lxl	sup2030lxl	sus200510lxl	
100 – 30 000 000 Da	10	Ultrahigh	sua083010luh			

### b) Preconfigured Analytical Column Sets

Separation range [Da]	Column Set	Description	Part Number
100 - 100 000	PSS SUPREMA combination low	1 x SUPREMA precolumn 5µm 8x50mm (P/N sua080505) 3 x SUPREMA column 5µm 100Å 8x300mm (P/N sua0830051e2)	206-0001
100 - 1 000 000	PSS SUPREMA combination medium	1 x SUPREMA precolumn 5µm 8x50mm (P/N sua080505) 1 x SUPREMA column 5µm 30Å 8x300mm (P/N sua0830053e1) 2 x SUPREMA column 5µm 1000Å 8x300mm (P/N sua0830051e3)	206-0002
100 - 3 000 000	PSS SUPREMA combination high	1 x SUPREMA precolumn 10µm 8x50mm (P/N sua080510) 1 x SUPREMA column 10µm 100Å 8x300mm (P/N sua0830101e2) 2 x SUPREMA column 10µm 3000Å 8x300mm (P/N sua0830103e3)	206-0003
100 - 30 000 000	PSS SUPREMA combination ultrahigh	1 x SUPREMA precolumn 10µm 8x50mm (P/N sua080510) 3 x SUPREMA column 10µm ultrahigh 8x300mm (P/N sua083010luh)	206-0004

**General Information:** delivered in water, inclusive column certificates, column connectors and column manual

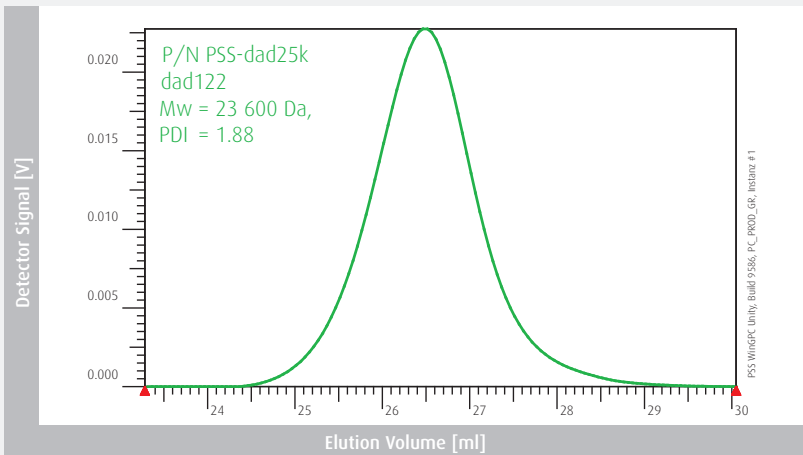
**Option:** Pre-equilibrated for light scattering measurements (P/N 299-2200 (precolum), P/N 299-2201 (8x300mm))

## Aqueous GPC/SEC of Polycations - NOVEMA Max Columns

Field of Application	
Applicability	Cationic polymers, (Polymeric Quarternary Ammonium Compounds, Poly (DADMAC), Poly(vinylpyridine), Chitosan, Poly(ethylene imine), etc.)
Eluents	Water, water with salt/buffer, MeOH, ACN, TFA; pH: 1.5 – 7.0
Specifications	
Material	NH-functionalized acrylate copolymer network
Maximum Pressure	50 - 80 bar (725 - 1160 psi), depending on porosity
Maximum Temperature	80° C
Maximum Flow Rate	2 ml/min (8 mm I.D.)
Particle Size	10 µm
Molecular Weight Range	100 to > 30 000 000 Da

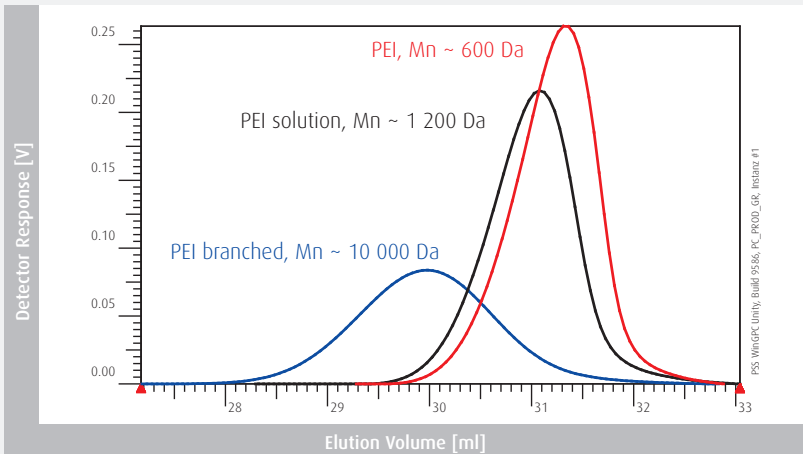
### Poly(DADMAC)

**Flow rate:** 1.00 ml/min  
**Loading:** 2.0 g/l, 50 µl  
**Eluent:** water, NaCl 0.1 M/TFA 0.1%  
**Temperature:** 30° C  
**Detector:** SECcurity RI1260  
**Columns:** PSS NOVEMA Max  
 Combination medium  
 (P/N 212-0002)



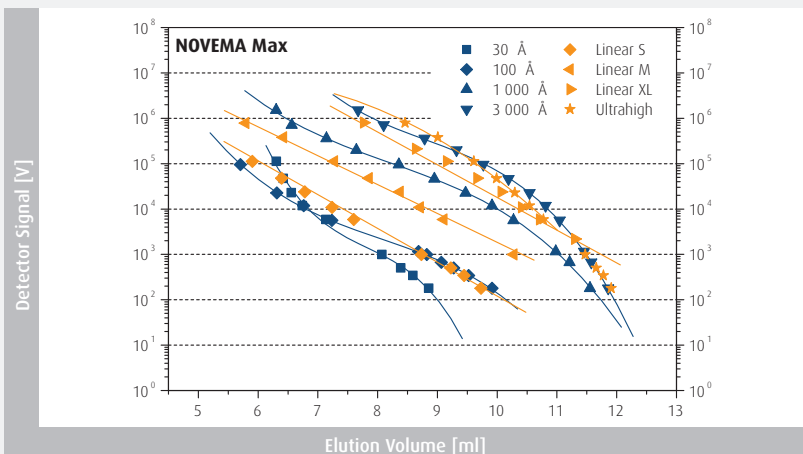
### Poly(ethyleneimine) (PEI)

**Flow rate:** 1.00 ml/min  
**Loading:** 4.0 g/l, 50 µl  
**Eluent:** water, Formic Acid 0.3 M  
**Temperature:** 30° C  
**Detector:** SECcurity RI1260  
**Columns:** PSS NOVEMA Max  
 Combination medium  
 (P/N 212-0002)

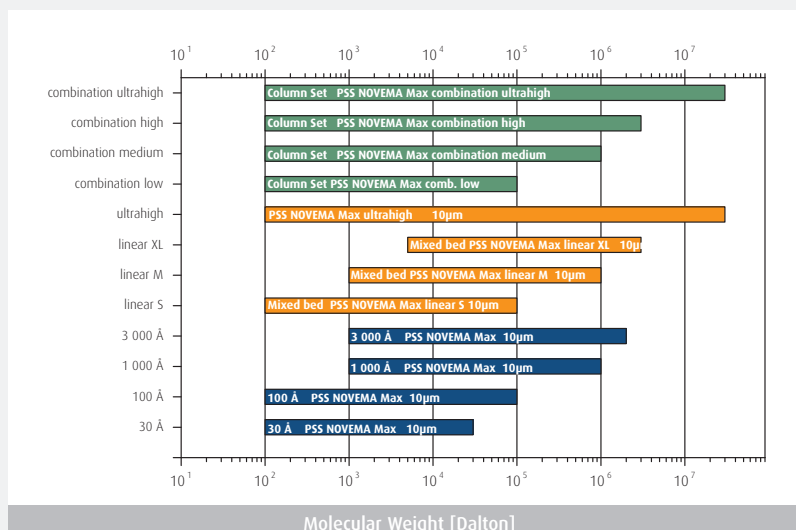


### Calibration Curves

**Eluent:** aqueous buffer  
**Calibrants:** Pullulan



## Separation Ranges



## Part Numbers

### a) Individual Columns

Separation range [Da]	Particle Size [µm]	Porosity [Å]	Analytical Column Dimension: 8*300 mm, precolumn 8*50 mm	Preparative Column Dimension: 20*300 mm, precolumn 20*50 mm	HighSpeed Column Dimension: 20*50 mm
	10	Precolumn	nma080510	nmp2005	
100 - 30 000 Da	10	30	nma0830103e1	nmp20303e1	
100 - 100 000 Da	10	100	nma0830101e2	nmp20301e2	
1 000 - 1 000 000 Da	10	1 000	nma0830101e3	nmp20301e3	nms2005101e3
1 000 - 3 000 000 Da	10	3 000	nma0830103e3	nmp20303e3	
100 - 100 000 Da	10	Linear S	nma083010lis	nmp2030lis	nms200510lis
1 000 - 1 000 000 Da	10	Linear M	nma083010lim	nmp2030lim	nms200510lim
5 000 - 3 000 000 Da	10	Linear XL	nma083010lxl	nmp2030lxl	nms200510lxl
100 - 30 000 000 Da	10	Ultrahigh	nma083010luh		

### b) Preconfigured Analytical Column Sets

Separation range [Da]	Column Set	Description	Part Number
100 - 100 000	PSS NOVEMA Max combination low	1 x NOVEMA Max precolumn 10µm 8x50mm (P/N nma080510) 3 x NOVEMA Max column 10µm 100Å 8x300mm (P/N nma0830101e2)	212-0001
100 - 1 000 000	PSS NOVEMA Max combination medium	1 x NOVEMA Max precolumn 10µm 8x50mm (P/N nma080510) 1 x NOVEMA Max column 10µm 30Å 8x300mm (P/N nma0830103e1) 2 x NOVEMA Max column 10µm 1000Å 8x300mm (P/N nma0830101e3)	212-0002
100 - 3 000 000	PSS NOVEMA Max combination high	1 x NOVEMA Max precolumn 10µm 8x50mm (P/N nma080510) 1 x NOVEMA Max column 10µm 100Å 8x300mm (P/N nma0830101e2) 2 x NOVEMA Max column 10µm 3000Å 8x300mm (P/N nma0830103e3)	212-0003
100 - 30 000 000	PSS NOVEMA Max combination ultrahigh	1 x NOVEMA Max precolumn 10µm 8x50mm (P/N nma080510) 3 x NOVEMA Max column 10µm ultrahigh 8x300mm (P/N nma083010luh)	212-0004

**General Information:** delivered in water, inclusive column certificates, column connectors and column manual

**Option:** Pre-equilibrated for light scattering measurements (P/N 299-2200 (precolumn), P/N 299-2201 (8x300mm))

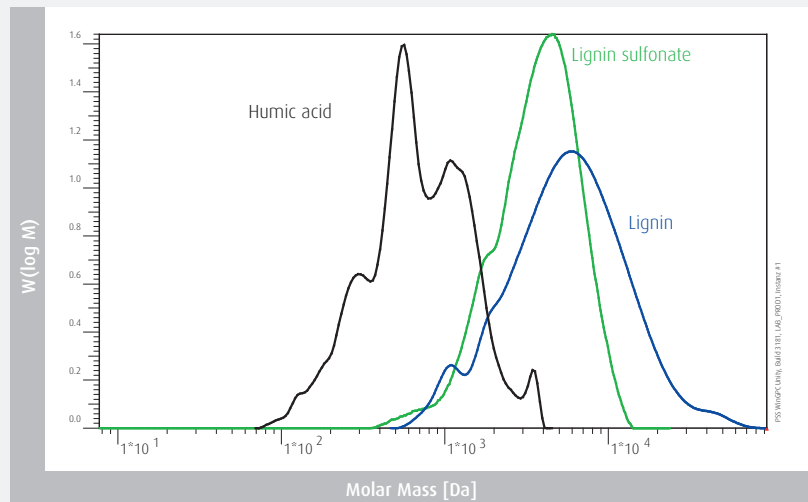
All applications which run on NOVEMA columns will run on NOVEMA Max columns, too. NOVEMA columns are available for existing applications. If in doubt, please contact us directly.

## Aqueous GPC/SEC of Sulfonated Polymers - MCX Columns

Field of Application	
Applicability	Sulfonated Polyanions, Poly(styrene sulfonate), Lignin sulfonate, Modified Starches, Acids, Alcohols, pectins, etc.)
Eluents	Water, water with salt/buffer, MeOH, ACN; pH: 7 - 13
Specifications	
Material	Sulfonated styrene-divinylbenzene copolymer-network
Maximum Pressure	100 - 150 bar (1450 - 2180 psi), depending on porosity
Maximum Temperature	80° C
Maximum Flow Rate	2 ml/min (8 mm I.D.)
Particle Size	5 µm, 10 µm
Molecular Weight Range	100 to > 5 000 000 Da

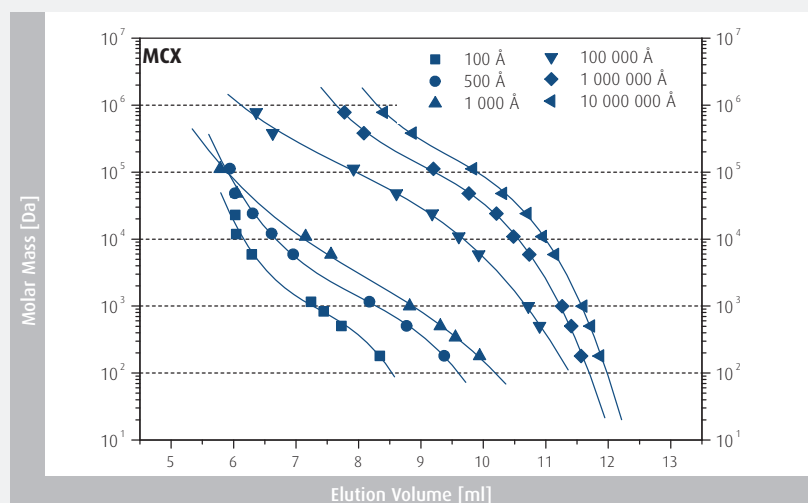
### Lignin, Lignin Sulfonate, Humic Acid

**Flow rate:** 1.00 ml/min  
**Loading:** 4 g/l, 20 µl  
**Eluent:** water, NaOH 0.1 M  
**Temperature:** 25° C  
**Detector:** SECcurity RI  
**Columns:** PSS MCX Combination medium (P/N 211-0002)

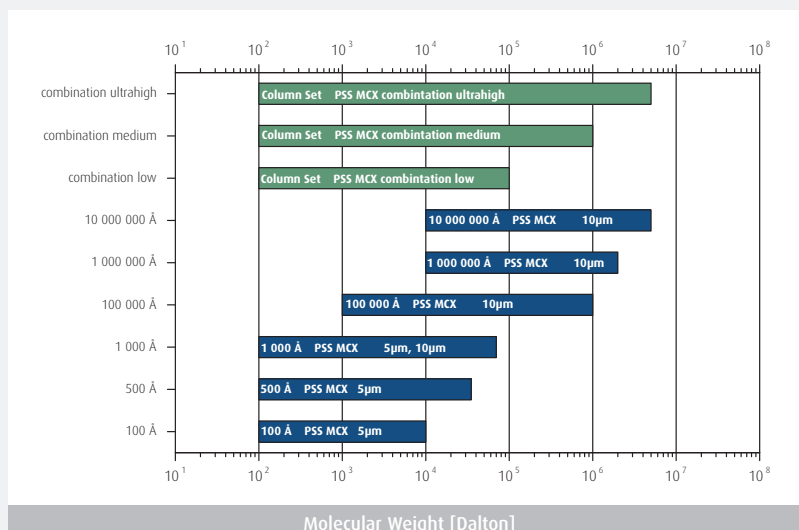


### Calibration Curves

**Eluent:** aqueous buffer  
**Calibrants:** Poly(styrene sulfonate) sodium salt



## Separation Ranges



## Part Numbers

### a) Individual Columns

Separation range [Da]	Particle Size [µm]	Porosity [Å]	Analytical Column Dimension: 8*300 mm, precolumn 8*50 mm	Preparative Column Dimension: 20*300 mm, precolumn 20*50 mm	HighSpeed Column Dimension: 20*50 mm
	5	Precolumn	mca080505		
100 - 10 000 Da	5	100	mca0830051e2		
100 - 35 000 Da	5	500	mca0830055e2		
100 - 70 000 Da	5	1 000	mca0830051e3		mcs2005051e3
	10	Precolumn	mca080510	mcp2005	
100 - 70 000 Da	10	1 000	mca0830101e3	mcp20301e3	
1 000 - 1 000 000 Da	10	100 000	mca0830101e5	mcp20301e5	
10 000 - 2 000 000 Da	10	1 000 000	mca0830101e6		
10 000 - 5 000 000 Da	10	10 000 000	mca0830101e7	mcp20301e7	

### b) Preconfigured Analytical Column Sets

Separation range [Da]	Column Set	Description	Part Number
100 - 100 000	PSS MCX combination low	1 x MCX precolumn 5µm 8x50mm (P/N mca080505) 3 x MCX column 5µm 1000Å 8x300mm (P/N mca0830051e3)	211-0001
100 - 1 000 000	PSS MCX combination medium	1 x MCX precolumn 10µm 8x50mm (P/N mca080510) 1 x MCX column 10µm 1000Å 8x300mm (P/N mca0830101e3) 1 x MCX column 10µm 10e <sup>5</sup> Å 8x300mm (P/N mca0830101e5)	211-0002
100 - 5 000 000	PSS MCX combination ultrahigh	1 x MCX precolumn 10µm 8x50mm (P/N mca080510) 1 x MCX column 10µm 1000Å 8x300mm (P/N mca0830101e3) 1 x MCX column 10µm 10e <sup>5</sup> Å 8x300mm (P/N mca0830101e5) 1 x MCX column 10µm 10e <sup>7</sup> Å 8x300mm (P/N mca0830101e7)	211-0004

**General Information:** delivered in water, inclusive column certificates, column connectors and column manual

**Option:** Pre-equilibrated for light scattering measurements (P/N 299-2200 (precolumn), P/N 299-2201 (8x300mm))

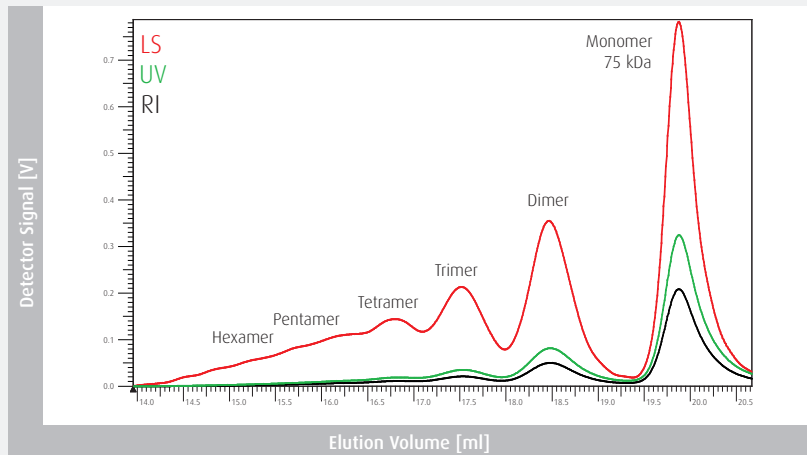


## Aqueous GPC/SEC of Proteins - PROTEEMA Columns

Field of Application	
Applicability	Natural and synthetic Proteins, Peptides, Enzymes, Gelatins/Collagens
Eluents	Water, water with salt/buffer, MeOH, ACN; pH: <7
Specifications	
Material	Special modified silica
Maximum Pressure	150 - 200 bar (2180 - 2900 psi), depending on porosity
Maximum Temperature	70° C
Maximum Flow Rate	3 ml/min (8 mm I.D.)
Particle Size	3 µm, 5 µm
Molecular Weight Range	100 to > 7 500 000 Da*

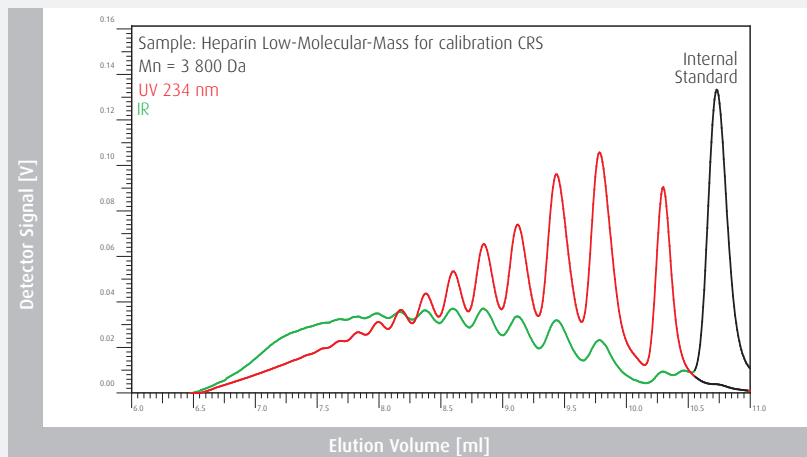
### BSA GPC/SEC-MALLS

**Flow rate:** 0.5 ml/min  
**Loading:** 1.0 g/l, 20 µl  
**Eluent:** Phosphate buffer pH = 6.6,  
 NaCl 0.3 M  
**Temperature:** 25° C  
**Detectors:** SECcurity RI + UV, SLD7000 MALLS  
**Columns:** PSS PROTEEMA 5 µm 300 Å,  
 300 Å (8 x 300 mm) + precolumn  
 (P/N pra080505 and  
 pra0830053e2)



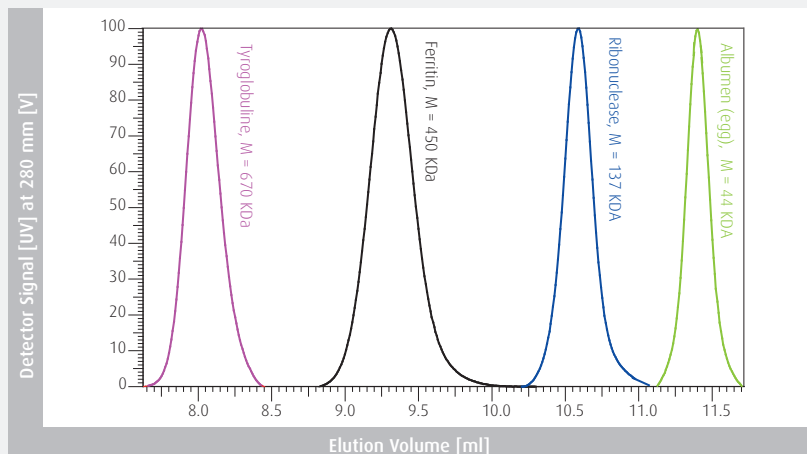
### Heparin Low-Molecular-Mass

**Flow rate:** 0.50 ml/min  
**Loading:** 10.0 g/l, 25 µl  
**Eluent:** Water Disodium phosphate  
 28.4 g/l pH 5  
**Temperature:** 30° C  
**Detectors:** SECcurity RI, SECcurity VWD  
**Columns:** PSS PROTEEMA 5µm 100 Å  
 (P/N pra080505 and  
 pra0830051e2)  
 Used in monograph 0828



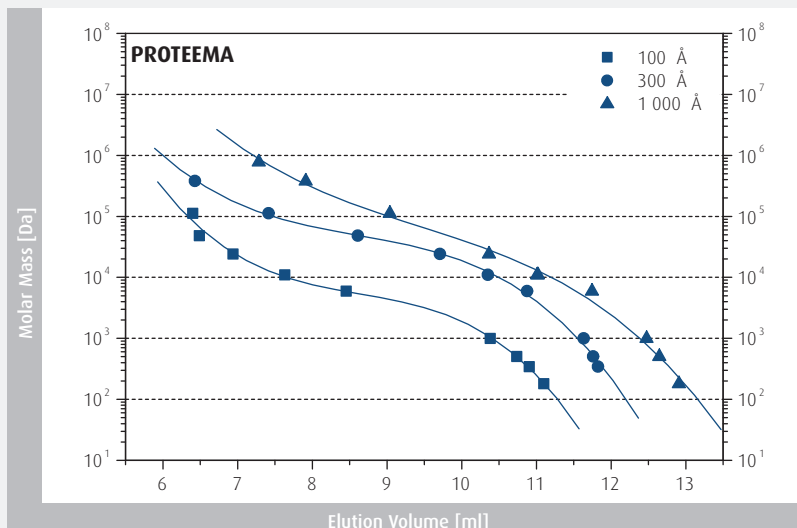
### Protein Mixture

**Flow rate:** 0.5 ml/min  
**Loading:** 1.0 g/l, 20 µl  
**Eluent:** water, NaCl 0.3 M  
**Temperature:** 25° C  
**Detector:** SECcurity UV  
**Columns:** PSS PROTEEMA 5 µm 300 Å  
 (8 x 300 mm) + precolumn  
 (P/N PRA080505 and  
 pra0830053e2)

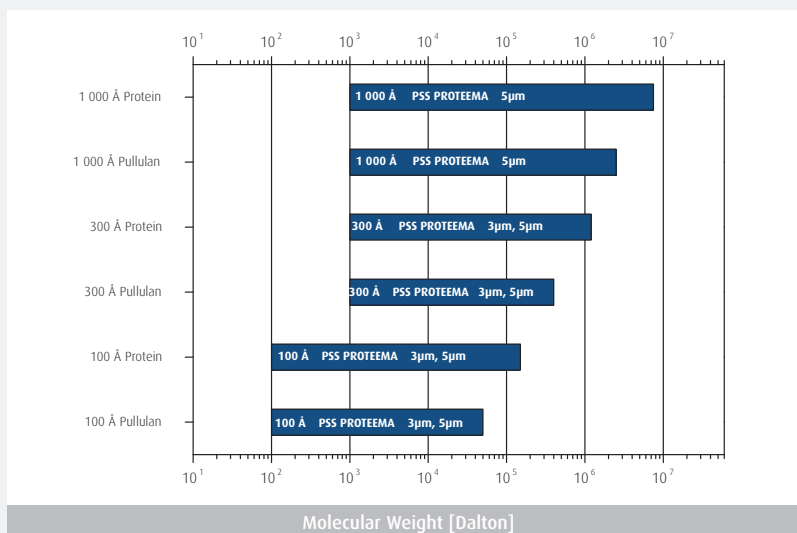


## Calibration Curves

Eluent: aqueous buffer  
Calibrants: Pullulan



## Separation Ranges



## Part Numbers

### a) Individual Columns

Separation range [Da]*	Particle Size [μm]	Porosity [Å]	Analytical Column Dimension: 8*300 mm, precolumn 8*50 mm	Micro Column Dimension: 4.6*250 mm, precolumn 4.6*30 mm
	3	Precolumn		prm050303
100 - 150 000 Da	3	100		prm0525031e2
1 000 - 1 200 000 Da	3	300		prm0525033e2
	5	Precolumn	pra080505	
100 - 150 000 Da	5	100	pra0830051e2	
1 000 - 1 200 000 Da	5	300	pra0830053e2	
1 000 - 7 500 000 Da	5	1 000	pra0830051e3	

\* Based on protein molecular weights

General Information: delivered in water; inclusive column certificates, column connectors and column manual

Option: Pre-equilibrated for light scattering measurements (P/N 299-2201)

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