



Enhance Resolution

FOR POLYMER ANALYSIS, Guaranteed*

- Remarkable Reproducibility
- Exceptional Efficiency
- Long Lifetimes
- Economically Priced



Phenogel™ Non-Aqueous GPC/SEC Columns

Phenomenex Phenogel

5 μm, 300 x 7.8mm



**Guaranteed
Economical
Alternative**

Agilent® PLgel™

5 μm, 300 x 7.5mm



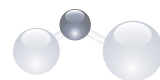
Phenogel Columns are a Recommended Alternative to:

Manufacturer	Columns	
Agilent (Polymer Labs)	PLgel	
Jordi Labs	Jordi Gel™ DVB Jordi Gel DVB Fluorinated	Jordi Gel DVB Glucose
Polymer Standards Service (PSS)	SDV® GRAM PolarSil	PFG POLEFIN®
Shodex®	GPC K-800 Series GPC KF-800 Series	GPC KD-800 Series
Tosoh Bioscience®	TSKgel® SuperMultiporeHZ TSKgel SuperHZ TSKgel Hxl	TSKgel SuperH TSKgel Hhr
Waters®	Styragel® UltraStyragel™	ACQUITY® APC™

*

guarantee

If Phenogel analytical columns do not provide at least equivalent separation as compared to a competing column of the similar particle size, phase, and dimensions, return the column with comparative data within 45 days for a FULL REFUND.



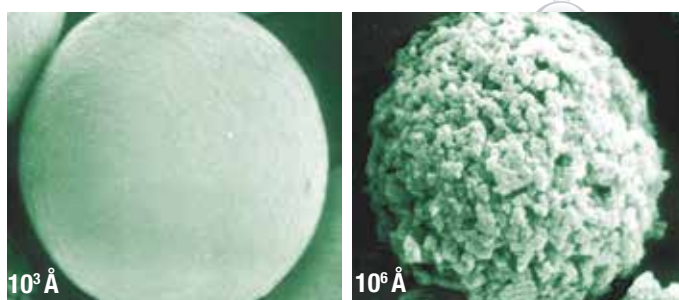
Phenogel™ Non-Aqueous GPC/SEC Columns

- 5 and 10 μm particle sizes
- Narrow bore (4.6 mm ID) solvent-saver columns available
- Highly cross-linked for mechanical and chemical stability
- Temperature stable to 140 °C

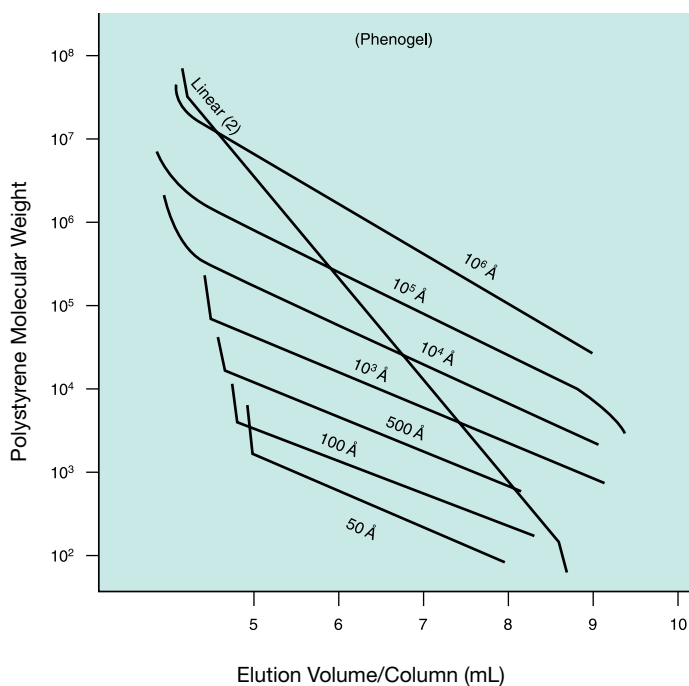
Phenogel packing materials are made from styrene-divinylbenzene by emulsion polymerization under conditions to optimize pore size, total pore volume, particle size, and degree of cross-linking. The results yield Gel Permeation Chromatography (GPC) materials that provide very high resolution, rugged durability, and wide solvent compatibility.

Phenogel is available in seven different pore sizes ranging from 50 Å to 10⁶ Å, and a unique Linear(2) configuration. Pore size distribution and pore volume are closely controlled parameters in the manufacturing process; attention to these details accounts for the high resolution and tight linear calibration curves associated with Phenogel, as well as the excellent column-to-column reproducibility.

SEM Photos of Phenogel Polymer Beads



Column Molecular Weight Calibration Curves



Column Selection by Molecular Weight

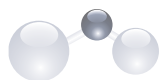
Sample Type	Molecular Weight	Phenogel Column
Small Organics	100 - 3 K 500 - 6 K 1 K - 15 K	50 Å 100 Å 500 Å
Resins	1 K - 75 K 5 K - 500 K 10 K - 1,000 K	10 ³ Å 10 ⁴ Å 10 ⁵ Å
High MW Polymers	60 K - 10,000 K 100 - 10,000 K	10 ⁶ Å Linear(2)

Technical Specifications

Material:	SDVB
Particle Size:	5, 10 μm
Porosities:	50 Å to 10 ⁶ Å, and mixed beds
Maximum Pressure:	1500 psi
Maximum Temperature:	140 °C
Minimum Efficiency*:	5 μm: 45,000 p/m** 10 μm: 35,000 p/m**
Typical Flow Rates:	4.6 mm ID: 0.35 mL/min 7.8 mm ID: 1.0 mL/min 21.2 mm ID: 7.0 mL/min

* Tested in THF

** For 300 x 7.8 mm ID columns



Solvent and Temperature Compatibility

- Phenogel™ columns are packed in tetrahydrofuran (THF)
- Columns can also be shipped in solvents such as DMF and chloroform to help minimize equilibration time

Although styrene-divinylbenzene materials are exceptionally inert, interaction between the column packing and sample materials (especially very polar solutes) occasionally occurs and the mobile phase must be modified to eliminate this effect. Phenogel columns can tolerate up to 0.1 % low MW amines, 0.5 % glacial acetic acid, or up to 1 % water in the mobile phase as modifiers.

Phenogel columns are temperature stable to 140 °C which is important for applications involving solutes with limited solubility at

ambient temperatures, or where solubility considerations demand the use of viscous solvents such as DMF or DMSO. At higher temperatures, eluent viscosity is decreased and mass transfer is enhanced, with the effect of increasing sample resolution. This temperature stability is particularly useful when analyzing polymers such as polyethylene and polypropylene which require higher temperatures.

Solvent Selection Table

Recommended GPC Solvent	Sample	Suggested Temp.
THF	Polystyrenes	Ambient
	Polybutadienes	—
	Epoxy Resins	Ambient
	Phenolic Resins	—
	Polymethyl Methacrylates Polyethylene Glycol	—
HFIP**	Polyamides (Nylon) PET/PETP (polyethyleneterephthalate)	30 °C —
Dichloromethane	Naphthalene Diethylhexyl Phthalate	— Ambient
Toluene	Polyisobutylene	Ambient
	Polyisoprene	—
	Silicone Oils	—
DMF	Polyethylene Oxide	50 °C
	Polyvinylpyrrolidone (PVP)	40 °C
	Cellulose Acetate	—
	Hydroxyethylcellulose (HEC)	—
	Chlorinated Rubber	—

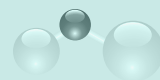
**HFIP (hexafluoroisopropanol) allows polymers such as polyamides and PET that are analyzed at a temperature of 135 °C and higher to be analyzed at temperatures below 100 °C. The narrow particle distribution of Phenogel columns eliminates the problem of overlapping peaks and band broadening that is typically associated with using this solvent with traditional GPC columns.

Solvent Compatibility Table

Mobile Phase Solvent	Phenogel Pore Size:							Linear & Mixed	Suggested Operating Temp.
	50 Å	100 Å	500 Å	10 ³ Å	10 ⁴ Å	10 ⁵ Å	10 ⁶ Å		
Acetone	Y	Y	Y	Y	Y	Y	Y	Y	
Benzene	Y	Y	Y	Y	Y	Y	Y	Y	
Carbon Tetrachloride	Y	Y	Y	Y	Y	Y	Y	Y	
Chloroform	Y	Y	Y	Y	Y	Y	Y	Y	
30% HFIP/Chloroform	Y	Y	Y	Y	Y	Y	Y	Y	
Diethyl Ether	Y	Y	Y	Y	Y	Y	Y	Y	
Dimethylacetamide (DMAC)	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Dimethylformamide (DMF)	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Dioxane	Y	Y	Y	Y	Y	Y	Y	Y	
DMSO	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Ethyl Acetate	Y	Y	Y	Y	Y	Y	Y	Y	
Hexafluoroisopropanol (HFIP)	Y	Y	Y	Y	Y	Y	Y	Y	
Hexane	Y	Y	Y	Y	Y	Y	Y	Y	
M-Cresol	Y*	Y	Y	Y	Y	Y	Y	Y	100 °C
Methyl Ethyl Ketone	Y	Y	Y	Y	Y	Y	Y	Y	
Methylene Chloride	Y	Y	Y	Y	Y	Y	Y	Y	
O-Chlorophenol	Y*	Y	Y	Y	Y	Y	Y	Y	100 °C
O-Dichlorobenzene	Y*	Y	Y	Y	Y	Y	Y	Y	135 °C
Quinolin	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Tetrahydrofuran	Y	Y	Y	Y	Y	Y	Y	Y	
Toluene	Y	Y	Y	Y	Y	Y	Y	Y	
Trichlorobenzene	Y*	Y	Y	Y	Y	Y	Y	Y	135 °C
Water	N	N	N	N	N	N	N	N	
Xylene	Y	Y	Y	Y	Y	Y	Y	Y	

*Not recommended on 5 µm 50 Å columns.

N = Not Compatible
Y = Compatible



Solvent Switching

Solvent Switching Considerations

Although Phenogel™ columns are rugged and can withstand strong solvent changes, care should be exercised when switching from high-swell solvents (A) to low-swell solvents (B, C, and D), see diagram below right. Improper solvent switches can result in a void. Best results are attained when an intermediate-swell solvent

is used, and column lifetime is improved. Contact Phenomenex regarding solvents not listed below.

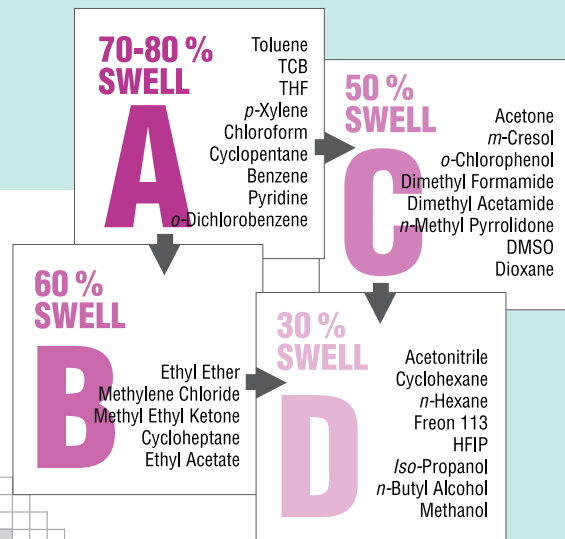
Column life can be maximized by dedicating certain columns to certain solvents. This will also minimize solvent switches. If care is not taken, a void may occur.

- Reduce flow rate to 0.2 mL/min
 - Backpressure must NEVER exceed 1500 psi
 - Always check solvent miscibility in a beaker or follow the solvent miscibility table below before proceeding with ANY solvent switch
 - Compare the swell characteristics of solvent 1 (old solvent) to solvent 2 (new solvent) and follow the guidelines below
- ❑ If solvent 1 and solvent 2 belong to the same swell category (see table below right), check the solvent miscibility and proceed with the switch
 - ❑ If solvent 1 and solvent 2 belong to successive swell categories as indicated by the arrows in the table below right, check the miscibility and proceed with the switch
 - ❑ If solvent 1 and solvent 2 DO NOT belong to the same OR successive swell categories, switch to an intermediate solvent FIRST, as indicated by the arrows in the table below

Solvent Miscibility Table

Solvent	Polarity Index	Refractive Index @ 20 °C	UV (nm) Cutoff @ 1 AU	Boiling Point (°C)	Viscosity (cPoise)	Solubility in water (% w/w)
Acetic Acid	6.2	1.372	230	118	1.26	100
Acetone	5.1	1.359	330	56	0.32	100
Acetonitrile	5.8	1.344	190	82	0.37	100
Benzene	2.7	1.501	280	80	0.65	0.18
n-Butanol	4.0	1.394	254	125	0.73	0.43
Butyl Acetate	3.9	1.399	215	118	2.98	7.81
Carbon Tetrachloride	1.6	1.466	263	77	0.97	0.08
Chloroform	4.1	1.446	245	61	0.57	0.815
Cyclohexane	0.2	1.426	200	81	1.00	0.01
1,2-Dichloroethane ¹	3.5	1.444	225	84	0.79	0.81
Dichloromethane ²	3.1	1.424	235	41	0.44	1.6
Dimethylformamide	6.4	1.431	268	155	0.92	100
Dimethyl Sulfoxide ³	7.2	1.478	268	189	2.00	100
Dioxane	4.8	1.422	215	101	1.54	100
Ethanol	5.2	1.360	210	78	1.20	100
Ethyl Acetate	4.4	1.372	260	77	0.45	8.7
Di-Ethyl Ether	2.8	1.353	220	35	0.32	6.89
Heptane	0.0	1.387	200	98	0.39	0.0003
Hexane	0.0	1.375	200	69	0.33	0.001
Methanol	5.1	1.329	205	65	0.60	100
Methyl-t-Butyl Ether ⁴	2.5	1.369	210	55	0.27	4.8
Methyl Ethyl Ketone ⁵	4.7	1.379	329	80	0.45	24
Pentane	0.0	1.358	200	36	0.23	0.004
n-Propanol	4.0	1.384	210	97	2.27	100
Iso-Propanol ⁶	3.9	1.377	210	82	2.30	100
Di-Iso-Propyl Ether	2.2	1.368	220	68	0.37	
Tetrahydrofuran	4.0	1.407	215	65	0.55	100
Toluene	2.4	1.496	285	111	0.59	0.051
Tichloroethylene	1.0	1.477	273	87	0.57	0.11
Water	9.0	1.333	200	100	1.00	100
Xylene	2.5	1.500	290	139	0.61	0.018

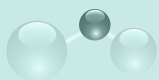
Solvent	Category
Acetic Acid	A
Acetone	A
Acetonitrile	A
Benzene	A
n-Butanol	A
Butyl Acetate	A
Carbon Tetrachloride	A
Chloroform	A
Cyclohexane	A
1,2-Dichloroethane	A
Dichloromethane	A
Dimethylformamide	A
Dimethyl Sulfoxide	A
Dioxane	A
Ethanol	A
Ethyl Acetate	A
Di-Ethyl Ether	A
Heptane	A
Hexane	A
Methanol	A
Methyl-t-Butyl Ether	A
Methyl Ethyl Ketone	A
Pentane	A
n-Propanol	A
Iso-Propanol	A
Di-Iso-Propyl Ether	A
Tetrahydrofuran	A
Toluene	A
Tichloroethylene	A
Water	A
Xylene	A
Ethyl Ether	B
Methylene Chloride	B
Methyl Ethyl Ketone	B
Cycloheptane	B
Ethyl Acetate	B
Acetonitrile	C
Cyclohexane	C
n-Hexane	C
Freon 113	C
HFIP	C
Iso-Propanol	C
n-Butyl Alcohol	C
Methanol	C



Immiscible
 Miscible
 Immiscible means that in some proportions two phases will be produced

Synonym Table
¹ Ethylene Chloride
² Methylene Chloride
³ Methyl Sulfoxide
⁴ tert-Butyl Methyl Ether
⁵ 2-Butanone
⁶ 2-Propanol

Acetic Acid
Acetone
Acetonitrile
Benzene
n-Butanol
Butyl Acetate
Carbon Tetrachloride
Chloroform
Cyclohexane
1,2-Dichloroethane
Dichloromethane
Dimethylformamide
Dimethyl Sulfoxide
Dioxane
Ethanol
Ethyl Acetate
Di-Ethyl Ether
Heptane
Hexane
Methanol
Methyl-t-Butyl Ether
Methyl Ethyl Ketone
Pentane
n-Propanol
Iso-Propanol
Di-Iso-Propyl Ether
Tetrahydrofuran
Toluene
Tichloroethylene
Water
Xylene

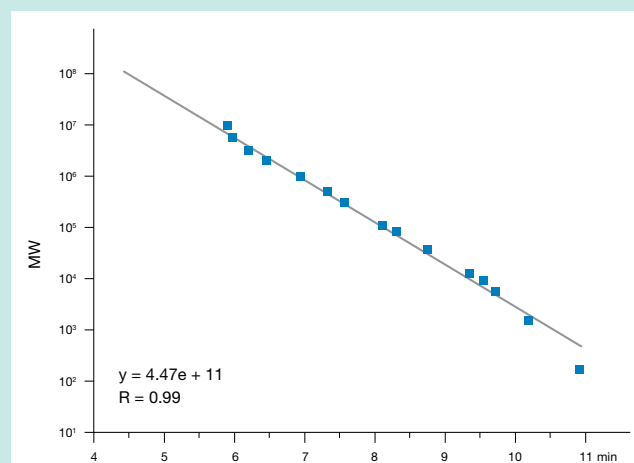


Applications on Phenogel™ Linear Non-Aqueous GPC/SEC Columns

Linear Columns

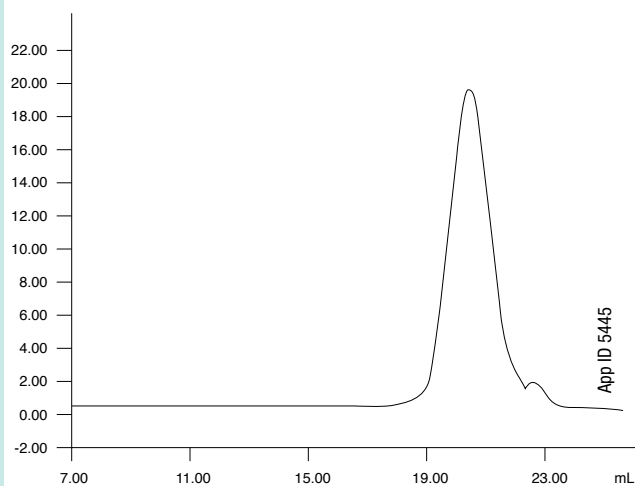
- Linear calibration to 10 million daltons
- Long column lifetime
- Excellent mechanical stability
- Excellent for analyzing a wide range of molecular weights

Calibration Curve: Linear Phenogel 5 µm Linear(2) 300 x 7.8 mm



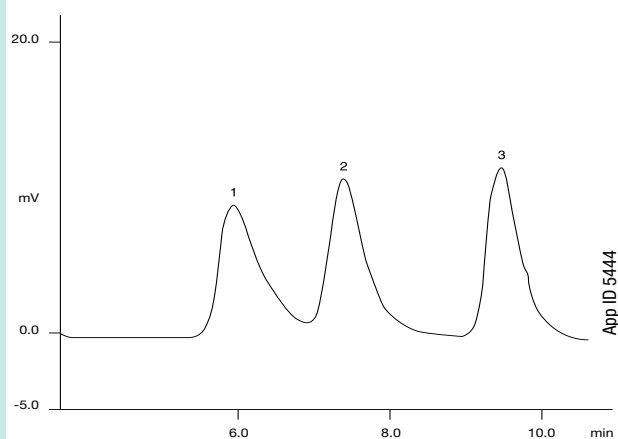
Nylon 6 in HFIP

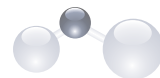
Column: Phenogel 10 µm Linear(2) x 2
Dimensions: 300 x 7.8 mm
Part No.: 00H-3260-K0
Mobile Phase: HFIP (0.01 M NATFAT)
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 µL 0.025% w/v
Temperature: 30 °C
Sample: 14,500 MW



Mixed Polystyrene Standard on Linear(2) Column

Column: Phenogel 5 µm Linear(2)
Dimensions: 300 x 7.8 mm
Part No.: 00H-3259-K0
Mobile Phase: THF
Flow Rate: 1.0 mL/min
Detection: RI
Injection Volume: 50 µL
Temperature: 35 °C
Sample: Polystyrene standards injected
1. 2,860,000 MW
2. 277,000 MW
3. 9,350 MW





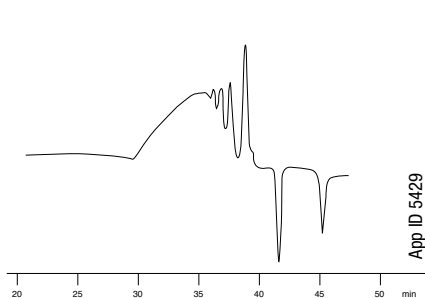
Applications on Phenogel™ Fixed Pore Non-Aqueous GPC/SEC Columns

50 Å - 10⁶ Å Fixed Pore Columns

- High resolution at low cost
- Customize your analysis by coupling different pore-size columns
- Wide range of solvent compatibility

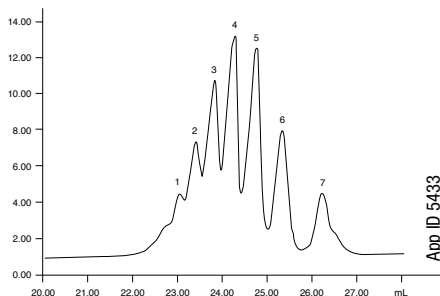
Phenolic Resins

Column: Phenogel 5 μm 500 Å x 2, 10⁵ Å, 10⁴ Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0443-K0 (500 Å)
 00H-0444-K0 (10⁵ Å)
 00H-0445-K0 (10⁴ Å)
Solvent: THF
Flow Rate: 1.0 mL/min
Detection: RI
Injection Volume: 5 μL
Temperature: 25 °C
Sample: Phenolic Aldehyde Resin, MW 500 to 470 K



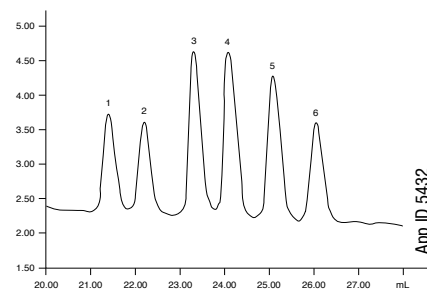
Polyethylene Glycol 330

Column: Phenogel 5 μm 50 Å, 100 Å, 500 Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0441-K0 (50 Å)
 00H-0442-K0 (100 Å)
 00H-0443-K0 (500 Å)
Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25 % w/v
Temperature: Ambient
Sample: 1. dp7 546 MW 5. dp3 194 MW
 2. dp6 458 MW 6. dp2 106 MW
 3. dp5 370 MW 7. dp1 62 MW
 4. dp4 282 MW



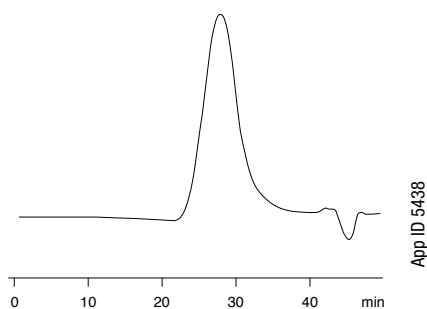
Closely Related Hydrocarbons

Column: Phenogel 5 μm 50 Å, 100 Å, 500 Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0441-K0 (50 Å)
 00H-0442-K0 (100 Å)
 00H-0443-K0 (500 Å)
Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25 % w/v
Temperature: Ambient
Sample: 1. C40 562 MW 4. C20 282 MW
 2. C32 450 MW 5. C16 226 MW
 3. C24 338 MW 6. C13 184 MW



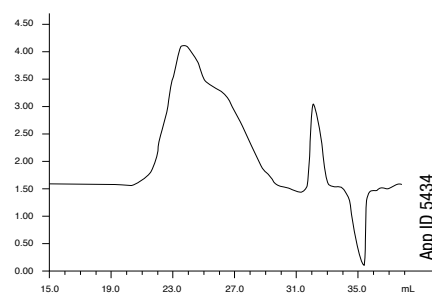
Polyvinyl Butyral

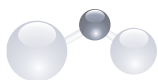
Column: Phenogel 5 μm 500 Å, 10⁵ Å, 10⁴ Å, 10³ Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0443-K0 (500 Å)
 00H-0444-K0 (10⁵ Å)
 00H-0445-K0 (10⁴ Å)
 00H-0446-K0 (10³ Å)
Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25 % w/v
Temperature: 25 °C
Sample: 300,000 MW



Polyethylene Oxide (PEO)

Column: Phenogel 10 μm 10⁵ Å, 10⁴ Å, 10³ Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0446-K0 (10⁵ Å)
 00H-0445-K0 (10⁴ Å)
 00H-0444-K0 (10³ Å)
Mobile Phase: DMF (0.1M LiBr)
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.125 % w/v
Temperature: 50 °C
Sample: 400,000 MW





Applications on Phenogel™ Fixed Pore Non-Aqueous GPC/SEC Columns

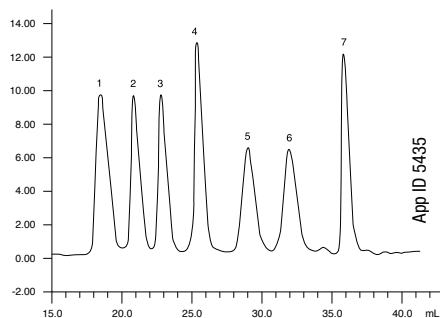
50 Å - 10⁶ Å Fixed Pore Columns (continued)

Polystyrenes (Wide MW Range)

Column: Phenogel 10 μm 10⁵ Å, 10⁴ Å, 10³ Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0446-KO (10⁵ Å)
 00H-0445-KO (10⁴ Å)
 00H-0444-KO (10³ Å)

Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25% w/v
Temperature: Ambient
Sample:

1. 1,560,000 MW	5. 6,100 MW
2. 260,000 MW	6. 854 MW
3. 94,000 MW	7. 146 MW
4. 30,000 MW	

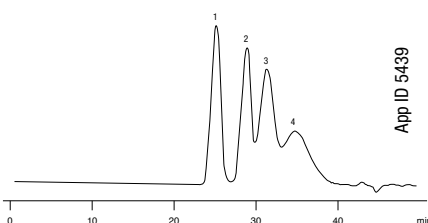


Poly-(α-Methyl Styrene) (Wide MW Range)

Column: Phenogel 5 μm 10⁵ Å, 10⁴ Å, 10³ Å, 500 Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0446-KO (10⁵ Å)
 00H-0445-KO (10⁴ Å)
 00H-0444-KO (10³ Å)
 00H-0443-KO (500 Å)

Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25% w/v
Sample:

1. 680,000 MW
2. 90,000 MW
3. 30,000 MW
4. 6,000 MW

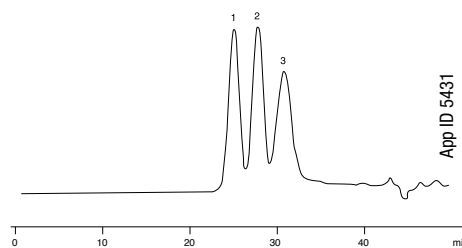


Polymethyl Methacrylates (Wide MW Range)

Column: Phenogel 5 μm 10⁵ Å, 10⁴ Å, 10³ Å, 500 Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0446-KO (10⁵ Å)
 00H-0445-KO (10⁴ Å)
 00H-0444-KO (10³ Å)
 00H-0443-KO (500 Å)

Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25% w/v
Sample:

1. 700,000 MW
2. 107,000 MW
3. 27,000 MW

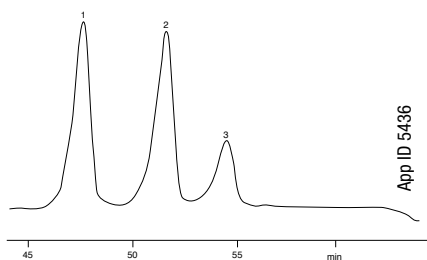


Isoprenes from In Vitro Translation on Products

Column: Phenogel 5 μm 50 Å, 100 Å in series
Dimensions: 300 x 7.8 mm
Part No.: 00H-0441-KO (50 Å)
 00H-0442-KO (100 Å)

Mobile Phase: THF
Flow Rate: 0.25 mL/min
Detection: Differential Refractometer
Sample:

1. Squalene C30
(2, 6, 10, 15, 19, 23-Hexamethyltetracosane)
2. Phytane C20
(2, 6, 10, 14-Tetramethylhexadane)
3. Farnesne C15
(2, 6, 10-Trimethyldodecane)



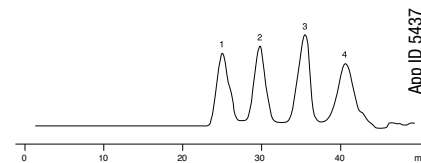
The columns were used in tandem to characterize isoprene chain lengths removed from labeled in vitro translation products or cell proteins. The isoprenoids were removed by treatment with Raney nickel and extracted into pentane. The pentane extractable material was hydrogenated over platinum catalyst and injected onto the column. Fractions were collected at 0.5 minute intervals and radioactivity was monitored by liquid scintillation. These saturated hydrocarbon chains were characterized by comparing radioactive peaks to standard retention times.

Polybutadienes (Wide MW Range)

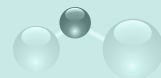
Column: Phenogel 5 μm 10⁵ Å, 10⁴ Å, 10³ Å, 500 Å
Dimensions: 300 x 7.8 mm
Part No.: 00H-0446-KO (10⁵ Å)
 00H-0445-KO (10⁴ Å)
 00H-0444-KO (10³ Å)
 00H-0443-KO (500 Å)

Solvent: THF
Flow Rate: 1.0 mL/min
Detection: Differential Refractometer
Injection Volume: 100 μL 0.25% w/v
Sample:

1. 420,000 MW
2. 24,000 MW
3. 2,500 MW
4. 500 MW



Chromatogram courtesy of W. Maltese and R. Erdman, Weis Center for Research, Geisinger Clinic.



Reduced Solvent Consumption

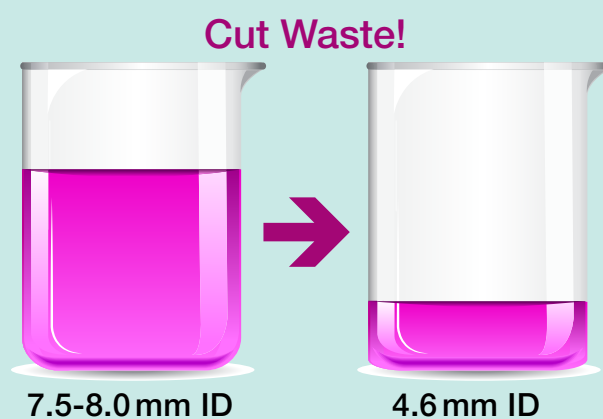
Phenogel Narrow Bore Columns: An Improved Dimension in GPC Analysis

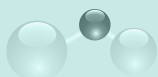
- Decrease solvent consumption
- Reduce solvent disposal costs
- Retain same elution profile

Phenogel-NB (Narrow Bore) columns are optimized to reduce solvent consumption. The Phenogel-NB columns have a 4.6 mm column ID and run at 0.35 mL/minute, **reducing solvent consumption and disposal costs up to 65%!**

Attention

With narrow bore GPC/SEC columns, the volume in which the sample elutes is significantly decreased, thus increasing the effective concentration of the sample. In GPC this leads to overloading effects and proportionally lower sample loadings must be used.





Polymer Calibration Standards Kits

- Low, medium and high molecular weights available
- Narrow molecular weight distribution

Organic SEC (GPC) Calibration Kits

All calibration kits contain standards that are uniformly separated logarithmically to give equally distributed data points on a calibration curve over the Mp (peak molecular weight) range stated.

Ordering Information

Part No.	MW	Kit Description	Mp Range	Unit
AL0-2761	Low MW Narrow MWD Kit	8 Standards	100-10,000	250 mg/standard
AL0-2762	Medium MW Narrow MWD Kit	6 Standards	10,000-100,000	250 mg/standard
AL0-2763	High MW Narrow MWD Kit	6 Standards	120,000-1,850,000	250 mg/standard

Phenex™ Syringe Filters

- Consistent, reproducible results
- Increased column lifetime



Phenex Syringe Filter Membrane Type/Size	4 mm Diameter for ≤ 2 mL sample volumes		15 mm Diameter for 2 – 10 mL sample volumes		25 - 28 mm Diameter for 10 – 100 mL sample volumes	
	Part No.	Unit	Part No.	Unit	Part No.	Unit
0.20 μm						
Phenex-RC (Regenerated Cellulose)	AF0-3203-12	100/pk	AF0-2203-12	100/pk	AF0-8203-12 ⁴	100/pk
	AF0-3203-52	500/pk	AF0-2203-52	500/pk	AF0-8203-52 ⁴	500/pk
Phenex-PTFE ³ (Polytetrafluoroethylene)	AF0-3202-12	100/pk	AF0-2202-12	100/pk	AF0-1202-12	100/pk
	AF0-3202-52	500/pk	AF0-2202-52	500/pk	AF0-1202-52	500/pk
0.45 μm						
Phenex-RC (Regenerated Cellulose)	AF0-3103-12	100/pk	AF0-2103-12	100/pk	AF0-8103-12 ⁴	100/pk
	AF0-3103-52	500/pk	AF0-2103-52	500/pk	AF0-8103-52 ⁴	500/pk
Phenex-PTFE ³ (Polytetrafluoroethylene)	AF0-3102-12	100/pk	AF0-2102-12	100/pk	AF0-1102-12	100/pk
	AF0-3102-52	500/pk	AF0-2102-52	500/pk	AF0-1102-52	500/pk
1.20 μm						
Phenex-GF ^{1,2} (Glass Fiber)	Prefiltration of heavily contaminated or highly viscous samples. When used in-series preceding a membrane filter, clogging of the membrane filter is prevented and sample clean up is optimized. Outlet connection is luer lock.				AF0-8515-12 ¹	100/pk
					AF0-8515-52 ¹	500/pk

Above syringe filters are non-sterile.

Housing is made of medical-grade polypropylene (PP) and offer luer lock inlet/slip outlet connections, unless otherwise indicated.

1. Glass fiber filters are 28 mm diameter and made of borosilicate. They will remove 90% of all particles >1.2 μm.

2. Housing material is methacrylate butadiene styrene (MBS) polymerisate. Also known as Cryolite®.

3. Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.

4. 26 mm diameter.

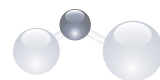
5. Larger quantity purchases at significant savings are available. Additional dimensions and membrane types are available. Please contact your local Phenomenex technical consultant or distributor for availability or assistance.

Tip: Try a Sample Pack!

Request yours today by phone or visit www.phenomenex.com/sample



If Phenex Syringe Filters do not perform as well or better than your current syringe filter product of similar membrane, diameter and pore size, send in your comparative data within 45 days and return product for a FULL REFUND.



Ordering Information

5 µm Columns (mm)			SecurityGuard™ Cartridges* (mm)	Guards
			300 x 7.8	4 x 3.0
			/3pk	
Pore Size	MW Range			
50 Å	100-3 K	00H-0441-K0	AJO-9292	03B-2088-K0
100 Å	500-6 K	00H-0442-K0	AJO-9292	03B-2088-K0
500 Å	1 K-15 K	00H-0443-K0	AJO-9292	03B-2088-K0
10 ³ Å	1 K-75 K	00H-0444-K0	AJO-9292	03B-2088-K0
10 ⁴ Å	5 K-500 K	00H-0445-K0	AJO-9292	03B-2088-K0
10 ⁵ Å	10 K-1,000 K	00H-0446-K0	AJO-9292	03B-2088-K0
10 ⁶ Å	60 K-10,000 K	00H-0447-K0	AJO-9292	03B-2088-K0
			300 x 7.8	4 x 3.0
			/3pk	
Mixed Beds				
Linear(2)	100-10,000 K	00H-3259-K0	AJO-9292	03B-2088-K0

for 3.2-8.0 mm ID

5 µm Narrow Bore (NB) Columns (mm)			SecurityGuard Cartridges* (mm)	Guards
			300 x 4.6	4 x 3.0
			/3pk	
Pore Size	MW Range			
50 Å	100-3 K	00H-0441-E0	AJO-9292	03A-2088-E0
100 Å	500-6 K	00H-0442-E0	AJO-9292	03A-2088-E0
500 Å	1 K-15 K	00H-0443-E0	AJO-9292	03A-2088-E0
10 ³ Å	1 K-75 K	00H-0444-E0	AJO-9292	03A-2088-E0
10 ⁴ Å	5 K-500 K	00H-0445-E0	AJO-9292	03A-2088-E0
10 ⁵ Å	10 K-1,000 K	00H-0446-E0	AJO-9292	03A-2088-E0
10 ⁶ Å	60 K-10,000 K	00H-0447-E0	AJO-9292	03A-2088-E0
			300 x 4.6	4 x 3.0
			/3pk	
Mixed Beds				
Linear(2)	100-10,000 K	00H-3259-E0	AJO-9292	03A-2088-E0

for 3.2-8.0 mm ID

10 µm Columns (mm)			SecurityGuard Cartridges* (mm)	Guards
			300 x 7.8	4 x 3.0
			/3pk	
Pore Size	MW Range			
50 Å	100-3 K	00H-0641-K0	AJO-9292	03B-2090-K0
100 Å	500-6 K	00H-0642-K0	AJO-9292	03B-2090-K0
500 Å	1 K-15 K	00H-0643-K0	AJO-9292	03B-2090-K0
10 ³ Å	1 K-75 K	00H-0644-K0	AJO-9292	03B-2090-K0
10 ⁴ Å	5 K-500 K	00H-0645-K0	AJO-9292	03B-2090-K0
10 ⁵ Å	10 K-1,000 K	00H-0646-K0	AJO-9292	03B-2090-K0
10 ⁶ Å	60 K-10,000 K	00H-0647-K0	AJO-9292	03B-2090-K0
			300 x 7.8	4 x 3.0
			/3pk	
Mixed Beds				
Linear(2)	100-10,000 K	00H-3260-K0	AJO-9292	03B-2090-K0

for 3.2-8.0 mm ID

Guard Cartridge Holder		
Part No.	Description	Price
KJO-4282	Reusable holder (SecurityGuard kit)	/kit

*SecurityGuard Analytical Cartridges require holder, Part No.: KJO-4282



If Phenogel analytical columns do not provide at least equivalent separation as compared to a competing column of the similar particle size, phase, and dimensions, return the column with comparative data within 45 days for a FULL REFUND.

5 µm Preparative Columns (mm)		Guards	
		300 x 21.2	50 x 21.2
Pore Size	MW Range		
100 Å	500-6 K	00H-0442-P0	03B-0642-P0

10 µm Preparative Columns (mm)		Guards	
		300 x 21.2	50 x 21.2
Pore Size	MW Range		
100 Å	500-6 K	00H-0642-P0	03B-0642-P0

Contact your Phenomenex representative or authorized distributor for other shipping solvents.

Phenogel Columns are a Recommended Alternative to:

Manufacturer	Columns	
Agilent® (Polymer Labs)	PLgel™	
Jordi Labs	Jordi Gel™ DVB Jordi Gel DVB Fluorinated	Jordi Gel DVB Glucose
Polymer Standards Service (PSS)	SDV® GRAM PolarSil	PFG POLEFIN®
Shodex®	GPC K-800 Series GPC KF-800 Series	GPC KD-800 Series
Tosoh Bioscience®	TSKgel® SuperMultiporeHZ TSKgel SuperHZ TSKgel Hxl	TSKgel SuperH TSKgel Hhr
Waters®	Styragel® UltraStyragel™	ACQUITY® APC™



Australia

t: 02-9428-6444
f: 02-9428-6445
auinfo@phenomenex.com

Austria

t: 01-319-1301
f: 01-319-1300
anfrage@phenomenex.com

Belgium

t: 02 503 4015 (French)
t: 02 511 8666 (Dutch)
f: +31 (0)30-2383749
beinfo@phenomenex.com

Canada

t: (800) 543-3681
f: (310) 328-7768
info@phenomenex.com

Denmark

t: 4824 8048
f: +45 4810 6265
nordicinfo@phenomenex.com

Finland

t: 09 4789 0063
f: +45 4810 6265
nordicinfo@phenomenex.com

France

t: 01 30 09 21 10
f: 01 30 09 21 11
franceinfo@phenomenex.com

Germany

t: 06021-58830-0
f: 06021-58830-11
anfrage@phenomenex.com

India

t: 040-3012 2400
f: 040-3012 2411
indiainfo@phenomenex.com

Ireland

t: 01 247 5405
f: +44 1625-501796
eireinfo@phenomenex.com

Italy

t: 051 6327511
f: 051 6327555
italiainfo@phenomenex.com

Luxembourg

t: +31 (0)30-2418700
f: +31 (0)30-2383749
nlinfo@phenomenex.com

Mexico

t: 001-800-844-5226
f: 001-310-328-7768
tecnicomx@phenomenex.com

The Netherlands

t: 030-2418700
f: 030-2383749
nlinfo@phenomenex.com

New Zealand

t: 09-4780951
f: 09-4780952
nzinfo@phenomenex.com

Norway

t: 810 02 005
f: +45 4810 6265
nordicinfo@phenomenex.com

Puerto Rico

t: (800) 541-HPLC
f: (310) 328-7768
info@phenomenex.com

Sweden

t: 08 611 6950
f: +45 4810 6265
nordicinfo@phenomenex.com

United Kingdom

t: 01625-501367
f: 01625-501796
ukinfo@phenomenex.com

United States

t: (310) 212-0555
f: (310) 328-7768
info@phenomenex.com

All other countries: Corporate Office USA

t: (310) 212-0555
f: (310) 328-7768
info@phenomenex.com



www.phenomenex.com

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